REPORT OF SUBSURFACE EXPLORATION

Pharr Mill Road Site

Harrisburg, North Carolina
ESP Project Number: JO35.300

Prepared For:
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July 23, 2021

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Ladies and Gentlemen:

ESP Associates, Inc. (ESP) has completed a preliminary subsurface exploration for the proposed single-family residential community in Harrisburg, North Carolina. This exploration was performed in general accordance with our Proposal No.P1-21165-REVISED, dated March 12, 2021, as authorized by you.

ESP appreciates the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, Inc.

Robert V. Barnette, EI
Project Manager

NORTH CAROLINA PROFESSIONAL SEAL 028947 ENGINEER RICHARD CHAD SHERMAN

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NORTH CAROLINA LICENSE NO.: F-1407 ESP ASSOCIATES, INC.

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1.0 INTRODUCTION

1.1 Purpose of Services

The purpose of the exploration was to evaluate the general subsurface conditions within the proposed building and pavement areas. This report contains a brief description of the field and laboratory testing procedures performed for this study and a discussion of the soil conditions encountered at the site. Our findings, conclusions and recommendations for foundation and pavement design, as well as construction considerations for the proposed foundations and paved areas are presented within this report.

1.2 Site Description

The proposed site is located south of Mulberry Road, approximately 1,800 feet east of the intersection of Mulberry Road and Speedrail Court in Harrisburg, North Carolina (reference "Site Vicinity Map" Figure 1). The proposed site consists of approximately 205 acres identified by Tax Parcel Identification Numbers 55179854430000 and 55179699450000. The majority of the site is currently undeveloped; however, existing residential structures are located on the northern and western portions of the site and several out buildings are located in the central portion of the site. The undeveloped portion of the site consists of several, sporadic cultivated fields and wooded areas. The site is bordered to the north by Mulberry Road, to the west by Pharr Mill Road, to the south and east by existing residential subdivisions. Rocky River also borders the southern portion of the site. Based on topographic information provided by Cabarrus County GIS, the site generally slopes downward from the north towards the south corner of the site, with approximately 90 feet of relief.

1.3 Project Description

We understand plans are to develop the approximate 205 acre site with a single-family residential community. The development will consist of single-family homes with associated roadways and infrastructure. We anticipate the structures will be lightly loaded with shallow foundations and slab-on-grade floor systems. No other details were available at this time.

2.0 EXPLORATION PROCEDURES

2.1 Field

The following methods were used to evaluate the subsurface conditions of the site. Additional descriptions of the field exploration procedures are also presented in the Appendix. The test locations were located in the field by a representative from our office using a hand held GPS. While in the field and where applicable, a representative of the geotechnical engineer visually examined the samples obtained or subsurface material encountered to evaluate the type of soil, soil plasticity, moisture condition, organic content, presence of lenses and seams, colors and apparent geological origin using general guidance from "ASTM D 2488 Standard Practice for Description and Identification of Soils (Visual Manual Procedures)." Clearing by a skid-steer with attached hydro-mulcher was required to gain access to a portion of the test locations. Test locations are shown on the attached "Test Boring Location Plan," Figure 1.

2.1.1 Soil Test Borings

Twenty soil test borings (Borings B-01 through B-20) were extended to depths ranging between 18.6 and 20 feet below the existing ground surface using a CME 550X drill rig. Hollow-stem, continuous flight augers were used to advance the borings into the ground. Standard Penetration Tests were performed within the soil test borings using an automatic hammer. The Standard Penetration Test provides the Standard Penetration Resistances (N-values) reported in blows per foot (bpf) as outlined in the Field Exploration Procedures section located in the Appendix. Water level measurements were attempted at termination of drilling. The soil test borings were backfilled upon completion due to safety concerns.

The results of the visual soil classifications for the borings, as well as field test results and N-values, are presented on the individual "Test Boring Record," included in Appendix I. Similar soils were grouped into strata on the records. The strata lines represent approximate boundaries between the soil types; however, the actual transition between soil types in the field may be gradual in both the horizontal and vertical directions.

2.2 Laboratory

Select samples of the on-site soils obtained during the field testing program were tested in the laboratory. Tests performed included:

- Atterberg limits
- Grain size distribution
- Standard Proctor Moisture-Density Relationship

The results of the laboratory tests performed for this study are attached in Appendix I. A brief description of the procedures used are also presented in Appendix I.

2.3 Seasonal High Water Table Evaluation

ESP subcontracted Willcox and Mabe Soil Solutions, PLLC (WMSS) to perform Storm Control Measures Soil Testing and evaluate the Seasonal High Water Table within the proposed water quality area. The Seasonal High Water Table Evaluation performed by WMSS, dated July 6, 2021 is included in Appendix II of this report.

3.0 SUBSURFACE CONDITION

3.1 Site Geology

The referenced property is located in Harrisburg, North Carolina which is in the Piedmont Physiographic Province. The Piedmont Province generally consists of hills and ridges which are intertwined with an established system of draws and streams. The Piedmont Province is predominately underlain by igneous rock (formed from molten material) and metamorphic rock (formed by heat, pressure and/or chemical action), which were initially formed during the Precambrian and Paleozoic eras.

The residual soils encountered in this area are the product of in-place chemical weathering of rock which was similar to the rock presently underlying the site. In areas not altered by erosion or disturbed by the activities of man, the typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. The boundary between soil and rock is not sharply defined. This transitional zone termed “partially weathered rock” is normally found overlying the parent bedrock. Partially weathered rock is defined, for engineering purposes, as residual material with Standard Penetration Resistances in excess of 100 blows per foot (bpf). Weathering is facilitated by fractures, joints and by the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is common to find lenses and boulders of hard rock and zones of partially weathered rock within the soil mantle, well above the general bedrock level.

3.2 Subsurface Findings

Subsurface conditions as indicated by the borings generally consist of topsoil underlain by residual soils and partially weathered rock. The generalized subsurface conditions at the site are described below and are graphically depicted in Appendix I. For more detailed soil descriptions and stratifications at a particular soil test boring location, the attached “Test Boring Record” should be reviewed.

3.2.1 Surface

A topsoil/grass/rootmat layer approximately 3 to 9 inches thick was encountered at the soil test boring locations.

3.2.2 Residuum

Residual soils are mineral material accumulated by the in-place chemical weathering of the underlying parent rock. Underlying the surface materials in each of the borings, residual soils were encountered. The residuum generally consists of firm to very hard sandy silt, sandy clay, and sandy high plasticity clay and medium dense to very dense silty sands. N-values in the residuum varied between 5 and 95 bpf. The residuum extends to depths ranging between 6.5 and 20 feet below the existing ground surface. Soil Test Borings B-01, B-07, B-12 and B-15 through B-20 were terminated in the residual soils at depths of 20 feet below the existing ground surface.

3.2.3 Partially Weathered Rock (PWR)

Partially weathered rock is defined, for engineering purposes, as residual material with Standard Penetration Resistances in excess of 100 blows per foot. Underlying the residuum in Borings B-02 through B-06, B-08 through B-11, B-13 and B-14 and within the residuum in Borings B-10, B-11 and B-13, partially weathered rock (PWR) was encountered. When sampled, the PWR generally breaks down into sandy silts and silty sands with rock fragments. Borings B-02 through B-06, B-08 through B-11, B-13 and B-14 were terminated in the PWR at depths ranging between 18.6 and 19.9 feet below the existing ground surface.

3.3 Subsurface Water

The generalized subsurface water conditions encountered during our exploration are described below. For more detailed information, the attached "Test Boring Record" sheets should be reviewed. The test locations were backfilled upon completion of the field test boring due to safety concerns.

Test Location	Water Depth at Time of Testing	Cave-In Depth at Time of Testing
B-01	Dry	16.5
B-02	Dry	16.4
B-03	Dry	17.3
B-04	Dry	16.7
B-05	Dry	16.1
B-06	Dry	17.2
B-07	8.7	14.7
B-08	Dry	16.7
B-09	Dry	17.2
B-10	Dry	17.5
B-11	Dry	16.6
B-12	Dry	17.2
B-13	Dry	18.8
B-14	14.3	17.3
B-15	17.0	17.5
B-16	Dry	17.5
B-17	Dry	16.8

Test Location	Water Depth at Time of Testing	Cave-In Depth at Time of Testing
B-18	**Dry**	**17.2**
B-19	**Dry**	**15.7**
B-20	**Dry**	**16.4**

Note: Hole cave-in depths may provide an indication of water presence.

Subsurface water levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations. Therefore, water may be encountered during construction at depths not indicated during this study.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Geotechnical Considerations

Based on the project information previously discussed, the data obtained from the field and laboratory testing program and our analysis, the following conditions should be considered and addressed in the proposed development and are further discussed in the following sections of this report.

- High Plasticity Clay
- Low-Consistency Soils
- Difficult Excavation
- Dewatering
- Previous Site Development

Our conclusions and recommendations are based on the project information previously discussed and on the data obtained from the field and laboratory testing program. If the structural loading, geometry or proposed building locations are changed or significantly differ from those discussed, or if conditions are encountered during construction that differ from those encountered by the borings, ESP requests the opportunity to review our recommendations based on the new information and make any necessary changes.

4.2 Site Development

4.2.1 High Plasticity Clay

Laboratory tests were performed on select samples obtained from the split spoon samples. Laboratory testing consisted of Atterberg Limits and grain size testing. Typically, soils with a Plasticity Index (PI) less than 30 are considered to be low to moderate plasticity material. A summary of the laboratory test results are presented in the table below:

Sample Location	Depth (feet)	USCS Classification	Percent Fines (%)	Liquid Limit (%)	Plasticity Index
B-04	3.5 – 5	CH	63.0	61	31
B-06	0.5 – 10	CL	57.4	43	22
B-14	1 – 2.5	SC	39.8	41	21
B-17	6 – 7.5	CH	78.6	67	37
B-18	0.5 - 10	CH	79.8	70	37

In addition to the laboratory testing, manual manipulation of recovered samples in the field indicates that high plasticity clays were encountered in Borings B-04, B-08, B-10, B-17, B-18 and B-19 to depths ranging from approximately 0.3 to 8.5 feet below the existing ground surface. Our experience indicates that these soils can undergo significant change in volume (shrink/swell) with changes in their moisture content. If high

plasticity clay soils such as those encountered on the site become wet during or after construction, there may be an increase in their volume (swelling) and/or a reduction in their strength. In addition, if these materials are in-place during construction and subsequently dry out, there may be a decrease in their volume (shrinking) resulting in settlement. While swell testing was beyond the scope of our services, the presence of soils with plasticity indices greater than 30 within the near surface (upper 2 to 3 feet) soil profile may present an increased risk of distress to the proposed foundations, slabs-on-grade or pavements due to swell or shrinkage of these materials with variations in moisture content.

Foundations, slabs and/or pavements may not be sufficiently weighted to reduce the potential for swell and/or heave, if bearing directly on high plasticity clays. In addition, our past experience indicates that high plasticity clays may exhibit reduced long-term stability for support of flexible pavements. Several options may be considered for reducing the risk, imposed by these materials, to the proposed foundations, slabs and pavements, including:

1) Undercut and replace with select fill or raise grade with select fill to achieve three (3) feet of separation between stable high plasticity soils and bottom of bearing, slab and pavement section elevations,
2) Lime stabilize to minimize swell potential, and
3) Extend footings below the expansive soil and design a structural slab to withstand uplift.

A more detailed exploration and laboratory testing should be performed, once site layout and grading plans are developed, to evaluate the potential for swell of the high plasticity clay soils and to provide detailed recommendations for remediation. Swell testing may be performed on the high plasticity soils in order to determine if less than three (3) feet of separation would limit the swell potential of the high plasticity soils.

A thorough field evaluation should be performed by a representative of the geotechnical engineer at the time of construction to further determine the presence of high plasticity clay soils that may adversely affect the performance of the proposed structures and pavements.

In addition, it should be noted that, based on our previous experience, high plasticity clays are typically very sensitive to moisture variations and tend to break down under construction traffic when left exposed at proposed subgrades. Therefore, we recommend providing and maintaining proper site drainage during and after construction and limiting construction traffic in areas where these materials are present at or near the proposed subgrade elevations. Excessive construction traffic on these soils prior to construction of the proposed structures or pavements may result in damage to the subgrade and the need for undercutting and/or repairs. We also recommend that grading operations take place during the typically drier, warmer periods of the year, if practical.

4.2.2 Low-Consistency Soils

Results from the soil test borings performed at the site indicate that lower consistency (N-values less than 7 bpf) residual soils are present in Borings B-07. The lower consistency soils extend 2 feet below the existing ground surface. The N-value obtained in the lower consistency soil was 5 bpf. Depending on the final design grades, if the lower consistency residual soils are present in the near-surface, some

undercutting, re-working, or stabilization may be required. Remediation recommendations can typically be developed at the time of construction through routine engineering evaluations.

The presence of lower consistency soils may lead to excessive settlement and long term structure, slab-on-grade, and/or pavement distress. The presence and depth of the lower consistency soils were considered in the development of recommendations provided in subsequent sections of this report.

4.2.3 Difficult Excavation

Based on the results of the soil test borings, it appears that the majority of the general excavation will be in firm to hard and medium dense to dense residual soil. We anticipate that the residual soils can be excavated using pans, scrapers, backhoes and front end loaders. Borings B-02 through B-06, B-08 through B-11, B-13 and B-14 indicated that PWR was encountered at depths ranging from approximately 2 to 19.9 feet below the existing ground surface. Therefore, we anticipate that partially weathered rock, intermittent rock lenses, bedrock and/or boulders may be encountered during general site grading and excavation for the installation of footings and utilities.

The depth to, and thickness of, PWR and rock lenses or seams, can vary dramatically in short distances and between boring locations; therefore, PWR or bedrock may be encountered during construction at locations or depths between boring locations, not encountered during this exploration. Additional information regarding excavation conditions and definitions are included in Section 5.2 of this report.

4.2.4 Dewatering

Considering the relatively shallow water level in several of the borings performed at the site, and the presence of water in the drainage feature that dissects the central portion of the property, it is our opinion that groundwater could be encountered. We recommend that stabilized groundwater levels be considered when establishing final site grades. If final grades are set near (within 5 feet of) existing elevations where water encountered, a permanent underdrain system will be required. Once more detailed site grading information is available, we request the opportunity to review the plans and provide detailed recommendations for the permanent dewatering system.

Based on existing ground surface elevations, stabilized groundwater levels and presence of drainage features, we anticipate that temporary dewatering may be required at the site. We expect that dewatering could be adequately handled with pumping from sumps excavated at least 3 feet below the bottom of the excavations. Pumping from the sumps should be maintained until fill placement in the excavation is a minimum of 3 feet above the water level. At no time should pumping be performed directly beneath the exposed subgrade elevation since this could result in disturbance of the bearing materials and a loss of soil strength and increased settlement.

4.2.5 Previous Site Development

Since the site contains several existing residential structures, existing underground utilities, potential septic systems, and other unforeseen conditions should be expected during general site grading within the northern, western and central portion of the site. We recommend that these portions of the site be thoroughly evaluated by a representative of the geotechnical at the time of construction to reduce the risk

associated with such conditions. The evaluations may include test pit excavations, hand auger borings with DCP testing, and/or proofrolling.

We anticipate that several underground utility lines may be present within the previously mentioned portions of the proposed site based on its present use. We recommend that any existing lines be removed and relocated outside of the proposed building areas. Additionally, all trench backfill material should be removed and the subgrade in all trench excavations be evaluated by a representative of the geotechnical engineer prior to backfilling. The subgrade evaluation should consist of visual observations, probing with a steel rod and performing hand auger borings with DCP tests to evaluate their suitability for receiving structural fill. Once all trenches are evaluated and approved, they should be backfilled with adequately compacted structural fill.

4.2.6 Site Preparation

The entire building and pavement areas should be stripped of all topsoil, high plasticity near surface soils, trash, debris and other organic materials to a minimum of 10 feet and 5 feet beyond the structural and pavement limits, respectively. It has been our experience that stripping depths of topsoil may vary from the depths recorded on the Test Boring Record sheets due to variability between boring locations. Deeper stripping may be required to adequately remove rootmat and stumps from wooded sites and may be dependent on surface conditions at the time of grading, such as wetter conditions during winter months. It is often desired by project owners to place topsoil/strippings in non-structural areas of the site, such as in over-built slopes or buried in on-site borrow pits. If on-site topsoil disposal is considered, the geotechnical engineer should be consulted to provide additional analysis and recommendations, as needed in this regard.

Upon completion of the stripping operations, the exposed subgrade in areas to receive fill should be proofrolled with a loaded dump truck or similar pneumatic tired vehicle (minimum loaded weight of 20 tons) under the observation of a representative of the geotechnical engineer. The proofrolling procedures should consist of complete passes of the exposed areas, with half of the passes being in a direction perpendicular to the preceding ones. After excavation of the site has been completed, the exposed subgrade in cut areas should also be proofrolled as previously described. Any areas which deflect, rut or pump excessively during proofrolling or fail to improve sufficiently after successive passes should be undercut to suitable soils and replaced with structural fill.

Near-surface low consistency soils were encountered in Boring B-07 and extended downward from the existing ground surface to a depth of 2 feet. It is anticipated that undercutting, re-working and/or stabilization will be required within the area. Unsuitable soils may be encountered between the borings during site grading or excavation for foundations. Some undercutting of the soft near surface soils in various portions of the site, as well as the areas where high plasticity clay soils are present within the upper 3 feet of subgrade or the bearing surface should be anticipated. The extent of the undercut required should be evaluated in the field by an experienced representative of the geotechnical engineer while monitoring construction activity. The evaluation should consist of a comprehensive proofrolling program and thorough field evaluation during construction. After the proofrolling operation has been completed and approved, final site grading should proceed immediately. If construction progresses during wet weather, the proofrolling

operation should be repeated with at least one pass in each direction immediately prior to proceeding with site grading. If unstable conditions are exposed during this operation, then undercutting should be performed.

4.2.7 Fill Material and Placement

All fill used for site grading operations should consist of a clean (free of organics and debris), low plasticity soil (Plasticity Index less than 30). The proposed fill should have a maximum dry density of at least 90 pounds per cubic foot as determined by a Standard Proctor Moisture-Density Relationship test, ASTM D 698. All fill should be placed in loose lifts not exceeding 8 inches in thickness and compacted to a minimum of 95 percent of its Standard Proctor maximum dry density, with at least 100 percent achieved in the upper 12 inches. We recommend that field density tests, including one-point Proctor verification tests, be performed on the fill as it is being placed at a frequency determined by an experienced geotechnical engineer to verify the compaction criteria. Any fills that may be constructed greater than 10 feet in height should be evaluated with regard to long term settlement, consolidation and slope stability. This analysis should be requested of the geotechnical engineer once grading plans are complete and available.

Based on the results of the soil test borings and our past experience with similar type materials, the residual soils encountered, except for the high plasticity clay soils, appear suitable for re-use as structural fill. High plasticity clay soils may be used in deep fill areas (more than 5 feet of fill) or in landscaped areas provided they can be manipulated and properly compacted. As with any grading operation, moisture conditioning of the fill soils may be required.

4.2.8 Cut and Fill Slopes

For landscaping and mowing concerns, final project slopes should be designed to be 3 horizontal to 1 vertical or flatter. Slopes can be designed as steep as 2 horizontal to 1 vertical; however, soil erosion, slope sloughing and slope maintenance should be expected. If designing slopes steeper than 3 horizontal to 1 vertical, a slope stability analysis should be performed to verify stability of the slope. The tops and bases of all slopes should be located a minimum of 10 feet from structural and 5 feet from pavement limits. The fill slopes should be adequately compacted as outlined within this report, and all slopes should be seeded and maintained after construction.

4.2.9 Temporary Excavations

Excavations greater than four feet in depth should be sloped or shored in accordance with local, state, and federal regulations, including OSHA “Construction Standard for Excavations” (29 CFR Part 1926.650-652). The contractor is usually solely responsible for site safety. This information is provided only as a service and under no circumstances should ESP be assumed to be responsible for construction site safety.

4.2.10 Structural Fill Greater Than 10 Feet In Thickness

Any structural fills that may be constructed greater than 10 feet in height should be monitored prior to constructing the foundations and slab-on-grade. Settlement monitoring points should be embedded at the proposed subgrade level and monitored regularly by a licensed surveyor. Once the magnitude and rate of settlement are within acceptable levels, then foundation and slab-on-grade construction may begin. Based on our previous experience and soil types at the site, we anticipate the time required to reduce settlements

to an acceptable level may be on the order of 30 to 60 days. Should the constructed pad be left in place for an extended period of time prior to construction of a building, the need and/or timeframe for settlement monitoring may lessen.

We recommend that the settlement monitoring data be reviewed by the geotechnical engineer to determine when foundation and slab-on-grade construction may proceed. Failure to allow adequate time for the settlement to occur may result in excessive settlement of the buildings and subsequent damage to the structures. Therefore, the owner is taking a risk if construction is allowed to proceed prematurely.

4.3 Foundation Support

For satisfactory performance, the foundation for any structure must satisfy two independent design criteria. First, it must have an acceptable factor of safety against bearing failure of the foundation soils under the maximum design loads. Second, the settlement of the foundations due to consolidation or swell of the underlying soils should be within tolerable limits for the structures.

4.3.1 Shallow Foundation Support

The results of the soil test borings indicate that the proposed structures can be adequately supported on shallow foundations bearing on the low-plasticity residual soils, or newly placed structural fill, provided the site preparation and fill placement procedures outlined in this report are implemented. A net allowable bearing pressure of up to 2,500 pounds per square foot (psf) can be used for design of the foundations bearing on residual soils exhibiting N-values of 7 bpf or greater, or on suitable structural fill compacted to at least 95 percent of the Standard Proctor maximum dry density. In addition, three (3) feet of separation should be provided between stable, high plasticity soils and bottom of footing elevations.

Based on the general stratigraphy in the building areas, past experience with similar projects and the anticipated magnitude of the building loads, it is our opinion that the total and differential settlement potentials for the building should be on the order of 1 inch and ½ inch, respectively. This conclusion is contingent upon compliance with the site preparation and fill placement recommendations outlined in this report.

Minimum wall and column footing dimensions of 18 and 24 inches, respectively, should be maintained to reduce the possibility of a localized, punching-type shear failure. Exterior foundations and foundations in unheated areas should be designed to bear at least 18 inches below finished grade for frost protection.

We recommend that the subgrade soils be observed by a representative of the geotechnical engineer prior to foundation installation. This is to assess their suitability for foundation support and confirm their consistency with the conditions upon which our recommendations are based.

The subgrade materials can be sensitive to moisture variations; therefore, foundation excavations should be opened for a minimum amount of time, particularly during inclement weather. Soils exposed to moisture variations may become highly disturbed and require undercutting prior to placing foundations.

4.4 Slab-On-Grade

The slab-on-grade should be completely isolated from the structural components to allow independent movements between the slab and the foundations of the structure. The slab-on-grade floor system can be adequately supported on the low-plasticity residual/native soils or newly compacted fill, provided the site preparation and fill placement procedures outlined in this report are implemented.

The need for a base material between the soil subgrade and the slab-on-grade is dependent on subgrade soil strength characteristics, variability of subgrade soil constituents and the free draining characteristics of the subgrade soils. The inclusion of a water vapor retarder beneath the floor slab is a design element based on the subgrade constituents and design use of the structure and floor covering systems. For design guidance, refer to ACI 360R Design of Slabs on Grade, ACI 302.1R-15 Guide for Concrete Floor and Slab Construction and ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

Immediately prior to constructing the floor slabs, we recommend that the areas be proofrolled or otherwise evaluated to detect unstable, low consistency/relative density areas or areas that may have been exposed to wet weather or construction traffic. Areas that are found to be unstable or indicate low consistency/relative density during the evaluation should be undercut and replaced with adequately compacted structural fill. The evaluation should be performed by a representative of the geotechnical engineer.

4.5 Pavements

We recommend that special care be given to providing adequate drainage away from pavement areas to reduce infiltration of surface water to the base course and subgrade materials in these areas. This is very important on this site due to the presence of high plasticity clay soils that have a high shrink/swell potential. If these materials are allowed to become saturated during the life of the pavement section, then there will be a strength reduction of the materials that could result in a reduced life of the pavement section. All water should be routed away from the pavement areas and adequate slopes provided to maintain drainage off site. Pavement areas should be proofrolled prior to placing structural fill and/or base course. Proofrolling procedures are outlined in subsequent sections of this report.

4.6 Site Retaining Walls

At the time of this report, the information provided to us did not include site retaining walls. Therefore, the scope of services and the information contained within this report are not intended, nor sufficient, for the design of retaining walls. If retaining walls are included in the proposed construction at this site, additional subsurface exploration is required. In addition, design of the retaining walls, including global stability analyses and analyses of other design criteria must be performed by the wall designer.

5.0 OTHER CONSIDERATIONS

5.1 Drainage

Soil strength and settlement potential is highly dependent upon the moisture condition of the supportive soil. Soil characteristics can change dramatically when moisture conditions change. As such, building pads, roadways, structures and surrounding grades should be properly designed and constructed to properly control water (surface and subsurface). Building pads should be designed to shed surface water prior to building construction. Grades surrounding structures should be adequately sloped away from the structure to promote positive drainage and prevent water from ponding near or against the structure. Swales and/or storm drainage structures should be constructed to collect and remove all surface water run-off. All roof drain downspouts should be connected to drain leaders that are properly daylighted or connected to storm drainage structures such that water is removed from structural areas. Foundation drains should be designed and constructed to properly protect foundations from changing moisture conditions. Foundation drains constructed should be properly daylighted or connected to storm drain structures to remove all water from foundation areas. Roof drain lines and foundation drain lines should always remain independent of each other. Any subsurface water that may rise near structural grades should be controlled by adequately constructed subsurface drainage mechanisms.

5.2 Excavation Conditions and Definitions

It has been our past experience in this geologic area that materials having Standard Penetration Resistances of less than 50 blows per 0.4 foot can generally be excavated using pans and scrapers by first loosening with a ripper attached to a suitable sized dozer such as a Caterpillar D-8. On earthwork projects requiring ripping, questions sometimes develop as to whether the materials can be removed by ripping or whether blasting is required. It should be noted that ripping is dependent upon finding the right combination of equipment and techniques used, as well as the operator's skill and experience. The success of the ripping operation is dependent on finding the proper combinations for the conditions encountered. Excavation of the weathered rock is typically much more difficult in confined excavations. Jackhammering or blasting is anticipated to be required for materials having Standard Penetration Resistances in excess of 50 blows per 0.2 foot.

We recommend that materials requiring blasting or hammering to remove be well defined in the project specifications and/or construction contract documents. Below are recommended definitions for "rock." Please note the definition below for boulders regarding difficult excavation is different to the USCS definition of boulders regarding soil classification.

> Mass Rock: Material that cannot be dislodged by a Caterpillar D-8 Bulldozer, or equivalent, equipped with a single tooth ripper.
>
> Trench Rock: Material that cannot be dislodged by a Caterpillar 320 hydraulic backhoe, or equivalent, equipped with a rock bucket.

Boulders: Masses of rock exceeding 1 cubic yard in volume for mass excavations and ½ cubic yard in volume for trench excavations shall also be considered mass or trench rock, respectively, during excavation.

These classifications are for information purposes only and are not considered contractual definitions unless referenced as such by the project plans and/or contract documents. The classifications do not include materials such as loose rock, concrete, or other materials that can be removed by means other than impact hammering, but which for any reason, such as economic reasons, the contractor chooses to remove by impact hammering.

We also recommend that quantification guidelines for payment purposes be established prior to removal of materials defined above. These guidelines should include the following measurements to be used during quantity calculations:

- The depth below proposed subgrade for mass rock.
- The depth below proposed utility design depth for trench rock.
- The width on each side of the utility for trench rock.

These guidelines should establish a base line for payment and should be completely independent of the means and methods of the contractor.

6.0 LIMITATIONS of REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice with regard to the specific conditions and requirements of this site. The conclusions and recommendations contained in this report were based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

The analysis and recommendations submitted herein are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of variations between the borings will not be known until construction is underway. If variations appear evident, then we request the opportunity to re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structures are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing by ESP.

In order to verify that earthwork and foundation recommendations are properly interpreted and implemented, we recommend that ESP be provided the opportunity to review the final plans and specifications. Any concerns observed will be brought to our client's attention in writing.

Our conclusions and recommendations are based on the project information previously discussed and on the data obtained from the field and laboratory testing program. If the structural loading, geometry or proposed building locations are changed or significantly differ from those discussed, or if conditions are encountered during construction that differ from those encountered by the borings, ESP requests the opportunity to review our recommendations based on the new information and make any necessary changes.

APPENDIX I

FIELD EXPLORATION PROCEDURES

Soil Test Boring: Twenty (20) soil test borings were drilled at the approximate locations shown on the attached Test Boring Location Plan, Figure 1. Soil sampling and penetration testing were performed using general guidance from ASTM D 1586.

The borings were advanced with hollow-stem augers and, at standard intervals, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-tube sampler. The sampler was first seated six (6) inches to penetrate any loose cuttings, then driven an additional foot with blows of a 140-pound hammer falling 30 inches with the exception of penetration restrictions. The sum of the last foot of hammer blows is designated the “Standard Penetration Resistance.” Standard Penetration Tests were performed within the soil test borings utilizing an automatic hammer attached to the referenced drill rig(s) utilized in this exploration. The Standard Penetration Test values shown on the “Test Boring Record” sheets have not been corrected for theoretical energy or depths adjustments. When properly evaluated, the Standard Penetration Resistances provide an index to soil strength, relative density, and ability to support foundations.

Select portions of each soil sample were placed in sealed containers and taken to our office. The samples were examined by a representative of the geotechnical engineer for classification. Test Boring Record sheets are attached showing the soil descriptions and Standard Penetration Resistances.

LABORATORY PROCEDURES

Grain Size Test: Grain size tests were performed to determine the particle size and distribution of the samples tested. The grain size distribution of soils coarser than a No. 200 sieve was determined by passing the samples through a set of nested sieves. This test was conducted using general guidance from ASTM D6913. The results are presented on the attached Grain Size Distribution Sheets included in Appendix I.

Soil Plasticity Tests (Atterberg Limits Test): Select samples were identified for Atterberg Limits testing to determine the soil's plasticity characteristics. This test was conducted using general guidance from ASTM D 4318. The Plasticity Index (PI) is representative of this characteristic and is determined utilizing the Liquid Limit (LL) and the Plastic Limit (PL). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous. The Plastic Limit is the moisture content at which the soil transitions between the plastic and semi-solid states. The data obtained is presented on the attached Atterberg Limits Results sheet included in Appendix I.

Standard Proctor Compaction Test: Select samples of the on-site soils were obtained from auger cuttings to determine their suitability as fill material. Standard Proctor Compaction Tests were conducted using general guidance from ASTM D 698 and were performed on these soils to determine their compaction characteristics including maximum dry density and optimum moisture content. The test results are presented on the attached Moisture-Density Relationship Sheets included in Appendix I.

Legend

- Approximate Boring Location
- Approximate Seasonal High Water Table Boring Location

Legend

Boring ID
Depth of High Plasticity Soils (ft)
Depth of Lower Consistency Soils (ft)
Depth of Partially Weathered Rock (ft)
Depth to Water (ft)

SHEET TITLE:

Test Boring Location Plan
Figure 1

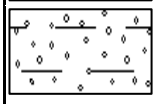
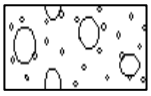
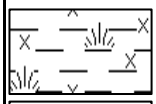
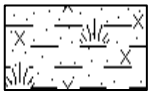
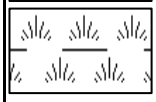
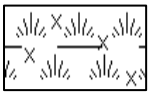
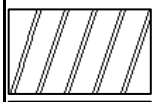
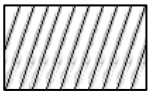
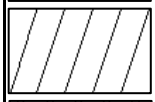
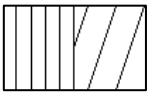
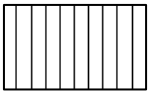
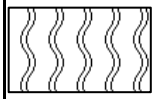
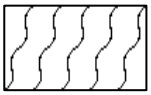
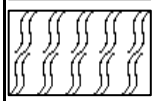
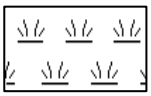
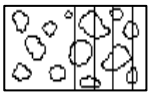
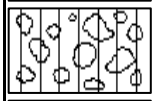
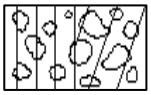
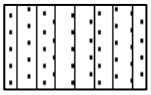
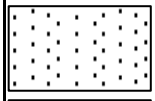
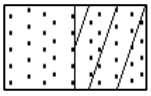
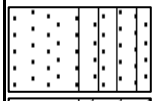
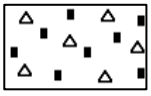
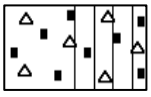
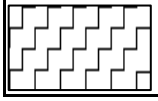
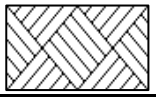
Pharr Mill Road Site
Harrisburg, North Carolina

N

PROJECT NO.:	JO35.300
SCALE:	NTS
DRAWN BY:	RB
DATE:	July 21, 2021
CHECKED BY:	CS

ESP
7144 Weddington Road NW
Suite 110
Concord, NC 28027
www.espassociates.com
Phone: 704-793-9855

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

	ABC Stone		Asphalt/Concrete
	Concrete/Brick Debris		Coquina Shell Base Course
	Topsoil/Rootmat		Topsoil/Grassmat
	Topsoil		Wood and Roots
	High Plasticity Clay		Moderate Plasticity Clay
	Clay		Clayey Silt
	Elastic Silt		Silt
	Organic Clay		Organic Silt
	Organic Silt and Clay		Peat
	Poorly Graded Gravel		Poorly Graded Gravel with Silt
	Poorly Graded Gravel with Clay		Clayey Gravel
	Silty Gravel		Poorly Graded Gravel with Silt and Clay
	Well Graded Gravel		Well Graded Gravel with Silt
	Well Graded Gravel with Clay		Silty Sand
	Poorly Graded Sand		Poorly Graded Sand with Clay
	Poorly Graded Sand with Silt		Well Graded Sand
	Well Graded Sand with Clay		Well Graded Sand with Silt
	Partially Weathered Rock		Cored Rock

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SAMPLER TYPES
(Shown in Samples Column)


Shelby Tube


Split Spoon


Rock Core


No Recovery

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STANDARD PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	31 to 50
Very Hard	Over 50

WATER LEVELS


= Water Level at Boring Termination


= Water Level at 1 Day


= Loss of Drilling Fluid

HC = Hole Cave

CONSISTENCY OF COHESIONLESS SOILS

CONSISTENCY	STANDARD PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	Over 50

TERMS

Standard Penetration Resistance - The number of blows it takes a 140 lb. hammer falling 30 in. to drive a 1.4 in I.D. split spoon sampler 1 foot (N-Value) as specified in ASTM D-1586.

Dynamic Cone Penetrometer Test Data - The cone point is driven up to three 1 ¾ inch intervals using a 15-pound weight falling 20 inches. The penetrometer test result is the average number of blows per interval. The penetrometer test result is similar to the Standard Penetration Resistance (N-value), as defined by ASTM D 1586. When properly evaluated, the penetrometer test results provide an index for estimating soil strength and relative density.

Kessler Dynamic Cone Penetrometer Test Data – The cone point is driven using a 17.6-pound weight falling 22.6 inches. The total penetration for a given number of blows is measured and recorded in mm/blow as specified in ASTM D 6951. When properly evaluated, the penetrometer test result can be used to describe soil stiffness and estimate an in-situ CBR strength from an appropriate correlation chart.

REC - Total length of rock recovered in the core barrel divided by the total length of the core run times 100 (expressed as a percentage).

RQD - Total length of sound rock segments recovered that are longer than or equal to 4" (mechanical breaks included) divided by the total length of the core run times 100 (expressed as a percentage).

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-01	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/28/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0	Topsoil/Grassmat					
	RESIDUUM: Very Stiff Orange Brown and Tannish White Sandy SILT, slightly micaceous, with manganese stains					28
	RESIDUUM: Very Dense Orange Brown to Orange Tan Silty SAND with gravel, fine to coarse, moderately micaceous, with manganese stains			-5.0		75
5						54
10				-10.0		64
	RESIDUUM: Dense Orange Tan and Bluish Gray Silty SAND, fine, with manganese stains					45
15		HC		-15.0		
						43
20	Boring was terminated at 20.0 feet. Cave-in depth at 16.5 feet. Backfilled with soil.			-20.0		
25				-25.0		
30				-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-02

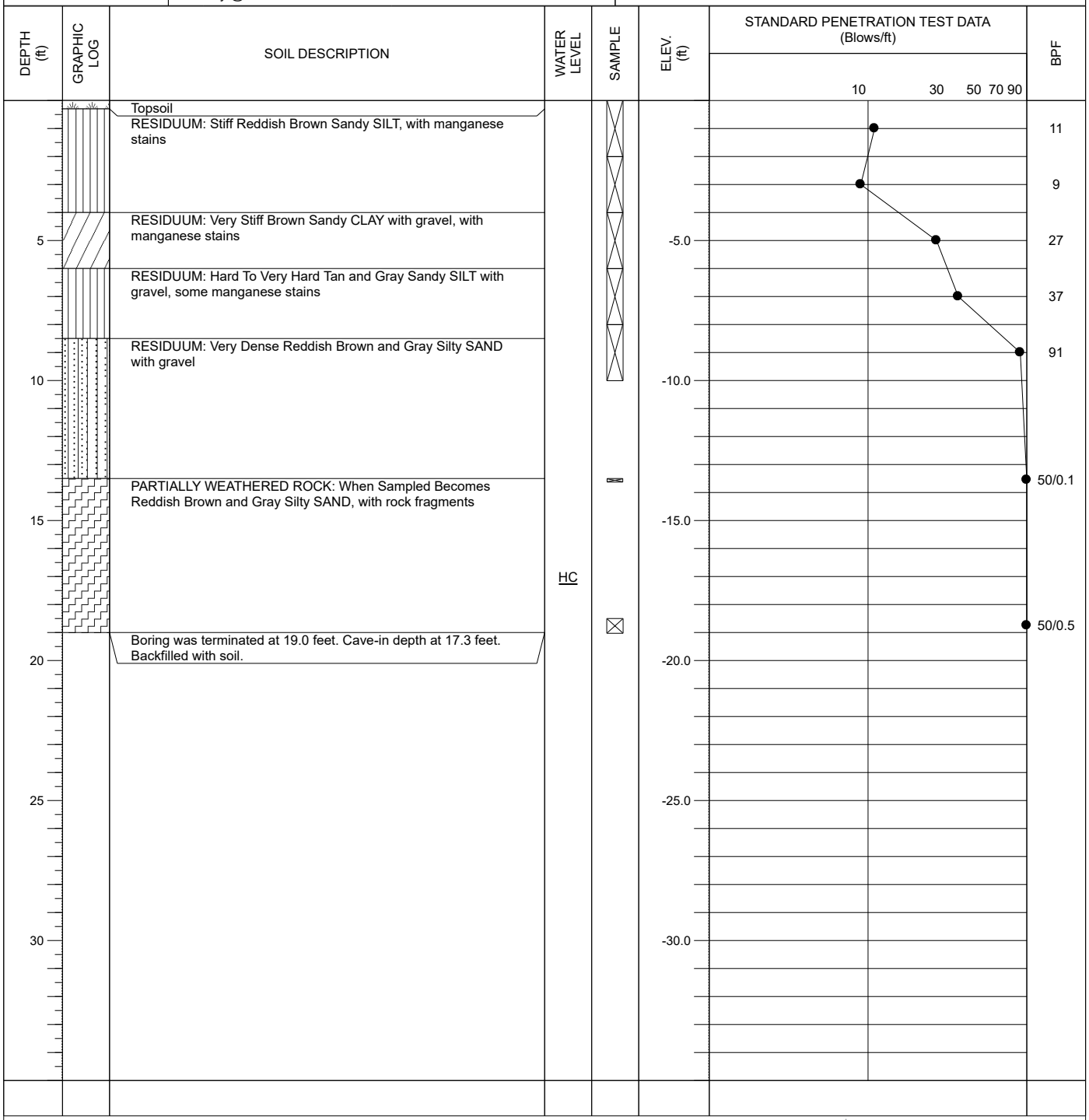
PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Robert Barnette	18.6 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/28/21	▽ Dry @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil/Rootmat					
		RESIDUUM: Very Dense To Dense Grayish Tan Silty SAND, fine to medium					
5					-5.0		74
							78
							59
10					-10.0		79
15			HC		-15.0		35
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Grayish Tan Silty SAND, fine to medium					50/0.1
20		Boring was terminated at 18.6 feet. Cave-in depth at 16.4 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-03	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	19.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/30/21	▽ Dry @ TOB	▼ N/A		



DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-04

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	18.6 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/30/21	▽ Dry @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil					
		RESIDUUM: Stiff Reddish Brown Sandy High Plasticity CLAY					
5					-5.0		15
							15
		RESIDUUM: Stiff Orange Tan and Tan Sandy SILT, with manganese stains					14
10					-10.0		12
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Tan Silty SAND, fine to coarse, with rock fragments					50/0.3
15			HC		-15.0		
		Boring was terminated at 18.6 feet. Cave-in depth at 16.7 feet. Backfilled with soil.					50/0.1
20					-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-05

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	19.8 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/30/21	▽ Dry @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil					
		RESIDUUM: Very Stiff Orange Tan and Reddish Brown Sandy SILT, with manganese stains					16
5					-5.0		23
		RESIDUUM: Very Stiff Orange Tan Sandy SILT, with manganese stains					30
		RESIDUUM: Very Stiff To Hard Tan with Gray Sandy SILT, with manganese stains					27
10					-10.0		
							38
15			HC		-15.0		
		RESIDUUM: Very Stiff To Hard Reddish Brown and Gray Sandy SILT, with manganese stains, rock fragments					50/0.3
20		PARTIALLY WEATHERED ROCK: When Sampled Becomes Reddish Brown and Gray Sandy SILT, with manganese stains, rock fragments			-20.0		
		Boring was terminated at 19.8 feet. Cave-in depth at 16.1 feet. Backfilled with soil.					
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-06	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2 Exploration
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	19.9 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/30/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0	Topsoil					
	RESIDUUM: Very Stiff To Stiff Reddish Brown and Orange Tan Sandy CLAY, with manganese stains					17
5				-5.0		15
	RESIDUUM: Stiff To Very Stiff Orange Tan and Tan Sandy SILT, slightly micaceous, with manganese stains					14
10				-10.0		22
	RESIDUUM: Very Stiff Reddish Brown and Tan Sandy SILT, with rock fragments, With clay seams					30
15		HC		-15.0		
	RESIDUUM: Very Dense Tan and Gray Silty SAND, fine, with manganese stains					50/0.4
20	PARTIALLY WEATHERED ROCK: When Sampled Becomes Tan and Gray Silty SAND, fine, with manganese stains			-20.0		
	Boring was terminated at 19.9 feet. Cave-in depth at 17.2 feet. Backfilled with soil.					
25				-25.0		
30				-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-07

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ 8.7 feet @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil/Grassmat RESIDUUM: Firm Brown Sandy SILT					5
		RESIDUUM: Firm To Very Stiff Tan and Gray Sandy SILT, with manganese stains					7
5					-5.0		16
							12
		RESIDUUM: Firm Tan and Orange Tan Sandy SILT, slightly micaceous	▽				7
10					-10.0		
		RESIDUUM: Very Stiff Orange Tan and Gray Sandy SILT, slightly micaceous, with manganese stains	HC				16
15					-15.0		
							17
20		Boring was terminated at 20.0 feet. Cave-in depth at 14.7 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-08

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	19.8 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/28/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
		Topsoil					
		RESIDUUM: Stiff Reddish Brown Sandy High Plasticity CLAY, with manganese stains					13
5		RESIDUUM: Hard To Very Hard Tan with Orange Tan Sandy SILT, some manganese stains			-5.0		44 56
10		RESIDUUM: Very Dense Orange Tan and Gray Silty SAND, fine, slightly micaceous, with manganese stains			-10.0		58
15			HC		-15.0		95
20		PARTIALLY WEATHERED ROCK: When Sampled Becomes Orange Tan and Gray Silty SAND, fine, slightly micaceous, with manganese stains Boring was terminated at 19.8 feet. Cave-in depth at 16.7 feet. Backfilled with soil.			-20.0		50/0.3
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-09	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Robert Barnette	19.9 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	SOIL DESCRIPTION	WATER LEVEL	ELEV. (ft)	BPF
	Topsoil			
	RESIDUUM: Very Stiff Brown to Tan Sandy SILT, with manganese stains			18
	RESIDUUM: Very Stiff Tan and Gray Sandy CLAY, with manganese stains			17
5			-5.0	
	RESIDUUM: Very Stiff Tan and Gray Sandy SILT, slightly micaceous, with manganese stains			14
				25
10			-10.0	
	RESIDUUM: Medium Dense Tan and Orange Tan Silty SAND, fine, with manganese stains			29
15			-15.0	
		HC		
	RESIDUUM: Medium Dense Gray with Tan Silty SAND, fine, with manganese stains			50/0.4
20	PARTIALLY WEATHERED ROCK: When Sampled Becomes Gray with Tan Silty SAND, fine, with manganese stains		-20.0	
	Boring was terminated at 19.9 feet. Cave-in depth at 17.2 feet. Backfilled with soil.			
25			-25.0	
30			-30.0	

STANDARD PENETRATION TEST DATA (Blows/ft)

10 30 50 70 90

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-10

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	19.7 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	SOIL DESCRIPTION	ELEV. (ft)	BPF
	Topsoil		
	RESIDUUM: Stiff Reddish Brown Sandy High Plasticity CLAY, with manganese stains		9
	Orange Tan with Gray Sandy SILT, with manganese stains		21
5	RESIDUUM: Hard To Very Hard Tan and Orange Tan Sandy SILT, moderately micaceous	-5.0	49
	PARTIALLY WEATHERED ROCK: When Sampled Becomes Orange Tan and Gray Silty SAND, fine, moderately micaceous, with manganese stains		50/0.4
	RESIDUUM: Dense Orange Tan and Gray Silty SAND, fine, moderately micaceous, with manganese stains		30
10		-10.0	
			50/0.4
15	PARTIALLY WEATHERED ROCK: When Sampled Becomes Orange Tan and Gray Silty SAND, fine, moderately micaceous, with manganese stains	-15.0	
			50/0.2
20	Boring was terminated at 19.7 feet. Cave-in depth at 17.5 feet. Backfilled with soil.	-20.0	
25		-25.0	
30		-30.0	

WATER LEVEL: HC

STANDARD PENETRATION TEST DATA (Blows/ft)

10 30 50 70 90

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-11

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	18.9 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/28/21	▽ Dry @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
		Topsoil/Grassmat					
		RESIDUUM: Very Dense Gray Silty SAND, fine					50/0.3
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Gray Silty SAND, fine					50/0.3
5		PARTIALLY WEATHERED ROCK: When Sampled Becomes Orange Tan and Gray Sandy SILT, fine, slightly micaceous, With rock fragments from 7 to 7.3			-5.0		50/0.3
		RESIDUUM: Hard Orange Tan Sandy SILT, moderately micaceous					43
10					-10.0		
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Orange Tan and Gray Silty SAND, fine, moderately micaceous, with manganese stains					50/0.4
15			HC		-15.0		
		Boring was terminated at 18.9 feet. Cave-in depth at 16.6 feet. Backfilled with soil.					50/0.4
20					-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-12	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/28/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
		Topsoil/Grassmat					
		RESIDUUM: Medium Dense To Very Dense Gray and Orange Tan Silty SAND, moderately micaceous, with manganese stains					22
5					-5.0		74
							74
10					-10.0		52
		RESIDUUM: Hard Tan and Orange Tan Sandy SILT, slightly micaceous, some manganese stains					31
15			HC		-15.0		
							31
20		Boring was terminated at 20.0 feet. Cave-in depth at 17.2 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-13

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	18.8 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil/Grassmat					
		RESIDUUM: Stiff Orange Tan with Gray Sandy CLAY					9
		RESIDUUM: Gray with Orange Tan Silty SAND, fine					50/0.4
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Gray with Orange Tan Silty SAND, fine					
5		RESIDUUM: Very Dense Gray with Orange Tan Silty SAND, fine			-5.0		75
							50/0.5
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Tan with Silty SAND, fine, with rock fragments					
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Tan and Gray Silty SAND, fine, with manganese stains					50/0.4
10					-10.0		
							50/0.2
15			HC		-15.0		
							50/0.3
20		Boring was terminated at 18.8 feet. Cave-in depth at 16.7 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-14	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	18.9 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ 14.3 feet @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
		Topsoil/Grassmat					
		RESIDUUM: Loose Orange Tan and Gray Clayey SAND, slightly micaceous					8
5		RESIDUUM: Very Hard Brown Sandy SILT, with rock fragments			-5.0		56 63
10		RESIDUUM: Dense Reddish Brown and Gray Silty SAND, fine, slightly micaceous, with manganese stains			-10.0		40
15		RESIDUUM: Very Dense Tan and Gray Silty SAND, fine to medium, slightly micaceous, with manganese stains	▽ HC		-15.0		72
20		PARTIALLY WEATHERED ROCK: When Sampled Becomes Gray with Tan Silty SAND, fine to medium, slightly micaceous, with manganese stains Boring was terminated at 18.9 feet. Cave-in depth at 17.3 feet. Backfilled with soil.			-20.0		50/0.4
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-15

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger		CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ 17.0 feet @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil					
		RESIDUUM: Very Stiff Reddish Brown Sandy SILT, slightly micaceous, with manganese stains					18
		RESIDUUM: Very Stiff To Stiff Orange Tan and Tan Sandy SILT, slightly micaceous, with manganese stains					22
5					-5.0		15
							19
10					-10.0		
		RESIDUUM: Stiff Tan and Tannish White Sandy SILT, slightly micaceous, with manganese stains					13
15			HC		-15.0		
		RESIDUUM: Dense Tannish White and Gray Silty SAND, fine, slightly micaceous					37
20		Boring was terminated at 20.0 feet. Cave-in depth at 17.5 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-16

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil					
		RESIDUUM: Stiff To Firm Reddish Brown and Orange Tan Sandy SILT, slightly micaceous, with manganese stains					15
							12
5					-5.0		9
							8
10					-10.0		
		RESIDUUM: Firm Reddish Brown and Tan Sandy SILT, with manganese stains					8
15			HC		-15.0		
		RESIDUUM: Firm Reddish Brown and Orange Tan SILT with sand, slightly micaceous, with manganese stains					8
20		Boring was terminated at 20.0 feet. Cave-in depth at 17.5 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-17	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	BPF
	Topsoil				
	RESIDUUM: Very Stiff Reddish Brown Sandy High Plasticity CLAY, with manganese stains				
5				-5.0	18, 27, 21
	RESIDUUM: Very Stiff Reddish Brown with Orange Tan Sandy SILT, slightly micaceous, with manganese stains				
10				-10.0	17
	RESIDUUM: Stiff To Firm Orange Tan and Tan Sandy SILT, slightly micaceous	HC			
15				-15.0	9
20	Boring was terminated at 20.0 feet. Cave-in depth at 16.8 feet. Backfilled with soil.			-20.0	7
25				-25.0	
30				-30.0	

STANDARD PENETRATION TEST DATA (Blows/ft)

10 30 50 70 90

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC	TEST BORING RECORD B-18

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/30/21	▽ Dry @ TOB ▼ N/A			

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
0		Topsoil/Grassmat					
		RESIDUUM: Stiff Reddish Brown with Tan Sandy High Plasticity CLAY, slightly micaceous, with manganese stains					13
5					-5.0		10
							11
10		RESIDUUM: Stiff Orange Brown with Tan Sandy SILT, slightly micaceous, with manganese stains			-10.0		10
15		RESIDUUM: Stiff Orange Tan and Gray Sandy SILT, moderately micaceous, with manganese stains	HC		-15.0		10
20		RESIDUUM: Stiff Tan and Tannish White Sandy SILT, slightly micaceous, with manganese stains			-20.0		10
		Boring was terminated at 20.0 feet. Cave-in depth at 17.2 feet. Backfilled with soil.					
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-19	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
		Topsoil					
		RESIDUUM: Stiff To Very Stiff Reddish Brown Sandy High Plasticity CLAY, with manganese stains					11
5					-5.0		23
							23
		RESIDUUM: Stiff To Very Stiff Reddish Brown with Tan Sandy SILT, slightly micaceous, with manganese stains					18
							14
10					-10.0		22
							12
15			HC		-15.0		15
		RESIDUUM: Medium Dense Gray with Tan Silty SAND, fine, slightly micaceous, with manganese stains					20
							17
20		Boring was terminated at 20.0 feet. Cave-in depth at 15.7 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

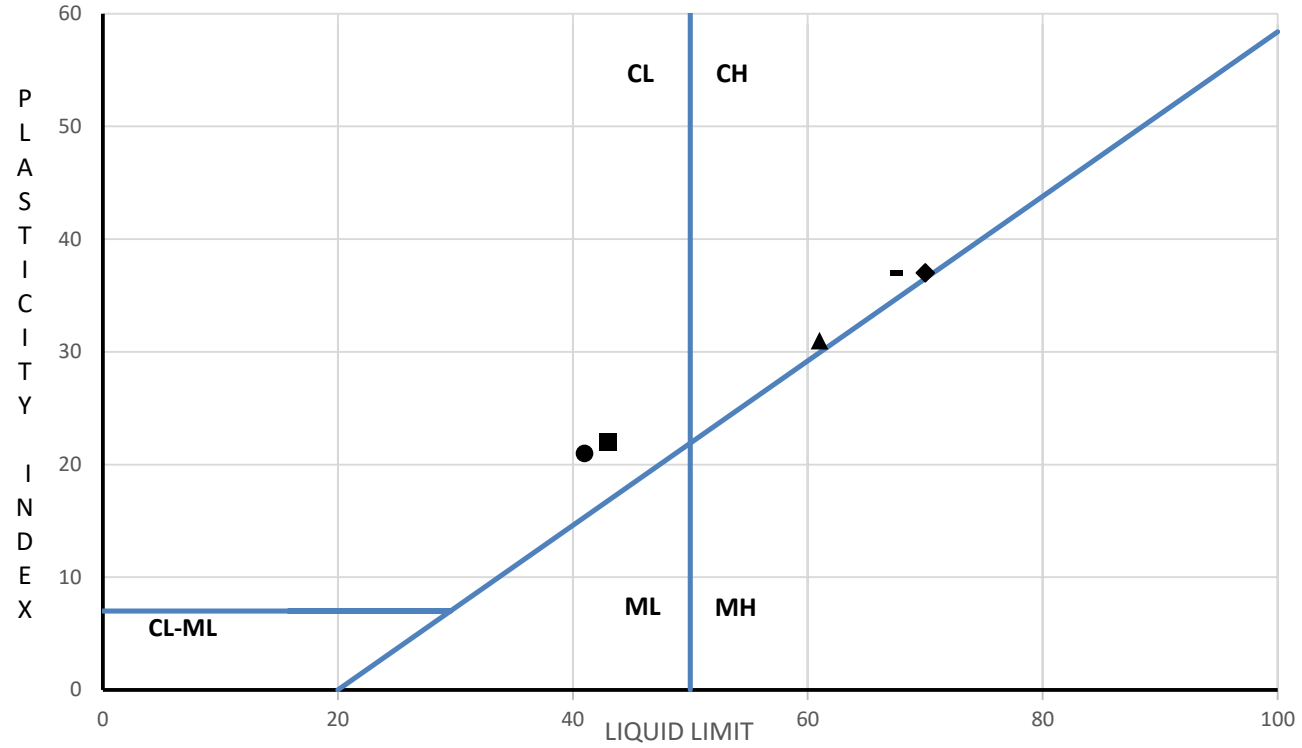
ESP

PROJECT:	Pharr Mill Road Site Harrisburg, NC		TEST BORING RECORD B-20	
PROJECT No.:	**ELEVATION:**	**DRILLING METHOD:**	**AUGER I.D.:**	**DRILLING COMPANY:**
JO35.300	Existing Ground Surface	Hollow Stem Auger	2.25 in	CG2
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Dan Harborth	20.0 Feet	CME550X (ATV)		
DATE DRILLED:	**WATER LEVEL:**		Boring backfilled upon completion due to safety concerns.	
06/29/21	▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft) 10 30 50 70 90	BPF
		Topsoil					
		RESIDUUM: Very Stiff Reddish Brown with Orange Tan Sandy SILT, slightly micaceous					23
5					-5.0		18
		RESIDUUM: Firm Orange Tan and Tan Sandy SILT, with manganese stains					8
10					-10.0		8
		RESIDUUM: Stiff To Firm Tan and Sandy SILT, moderately micaceous, with manganese stains					15
15			HC		-15.0		
							7
20		Boring was terminated at 20.0 feet. Cave-in depth at 16.4 feet. Backfilled with soil.			-20.0		
25					-25.0		
30					-30.0		

DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE BOREHOLE LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP



Specimen Identification	LL	PL	PI	Fines	Classification
■ S-1 B-06 (0.5' - 10')	43	21	22	57.4	Sandy lean clay CL
◆ S-2 B-18 (0.5' - 10')	70	33	37	79.8	Fat clay with sand CH
▲ S-3 B-04 (3.5' - 5')	61	30	31	63.0	Sandy fat clay CH
● S-4 B-14 (1' - 2.5')	41	20	21	39.8	Clayey sand SC
– S-5 B-17 (6' - 7.5')	67	30	37	78.6	Fat clay with sand CH

Remarks:

ATTERBERG LIMITS' RESULTS

TEST METHOD: ASTM D4318

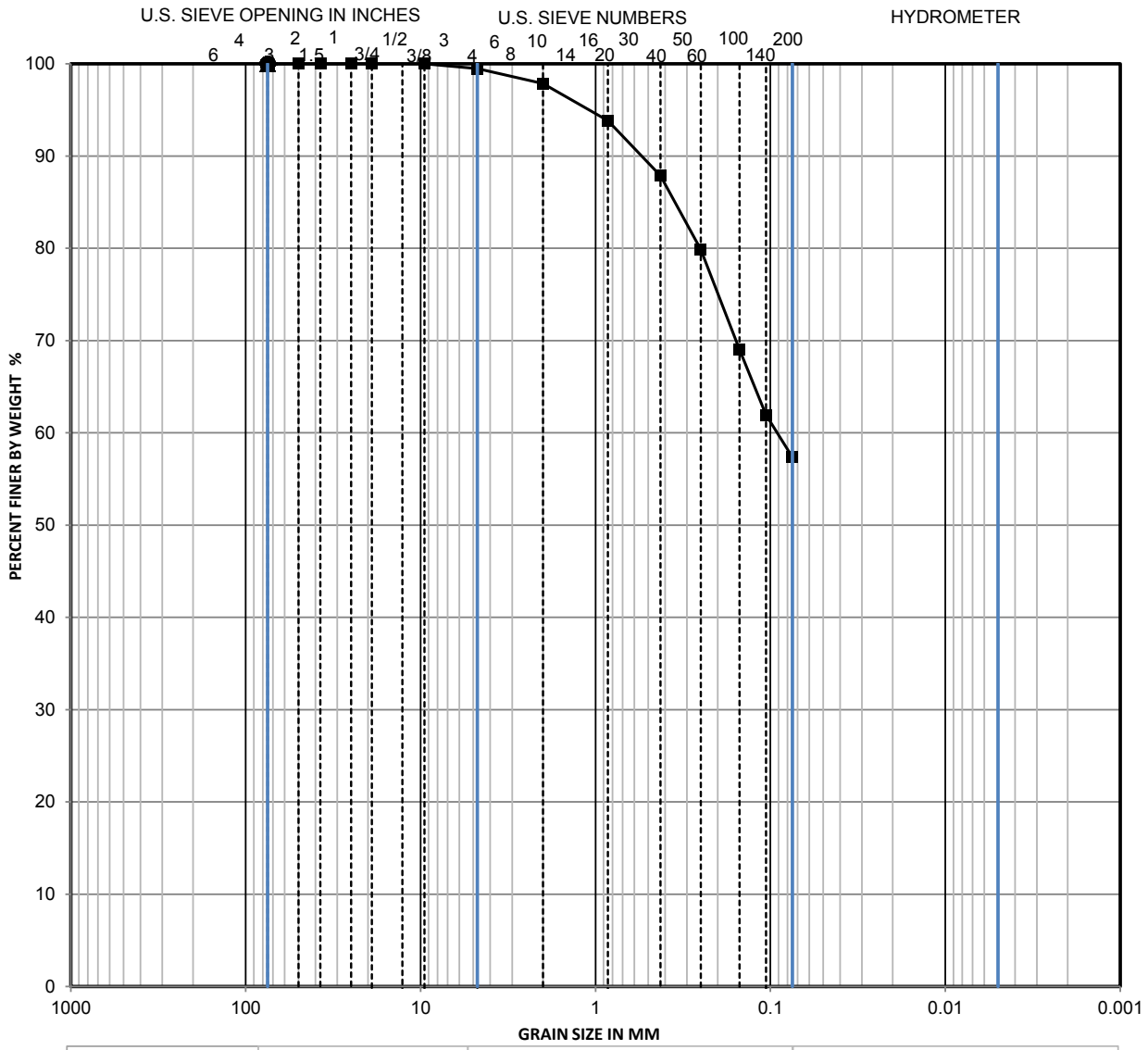
ESP
Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



COBBLE	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
■	**S-1 B-06 (0.5' - 10')**	**Sandy lean clay CL**	**43**	**21**	**22**		

	Specimen Identification	D100	D60	D30	D10	% Gravel	% Sand	% Silt	% Clay
■	**S-1 B-06 (0.5' - 10')**	**9.5**				**0.5**	**42.1**	**57.4**	

Grainsize Requirement Limits: NA

Remarks:

GRAIN SIZE DISTRIBUTION

TEST METHOD: ASTM D6913

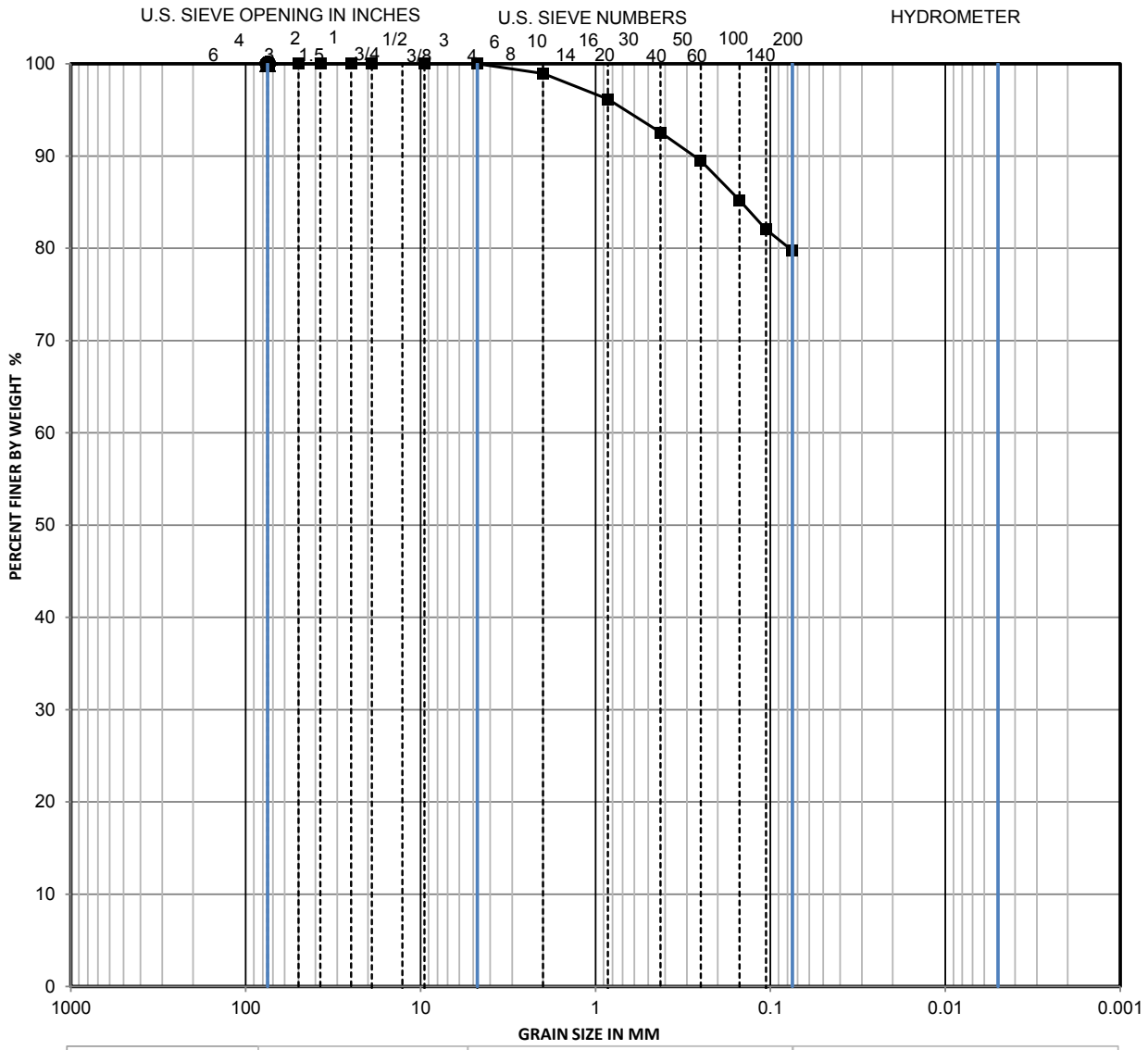
ESP
Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



COBBLE	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
■	**S-2 B-18 (0.5' - 10')**	**Fat clay with sand CH**	**70**	**33**	**37**		

	Specimen Identification	D100	D60	D30	D10	% Gravel	% Sand	% Silt	% Clay
■	**S-2 B-18 (0.5' - 10')**	**4.7**					**20.2**	**79.8**	

Grainsize Requirement Limits: NA

Remarks:

GRAIN SIZE DISTRIBUTION

TEST METHOD: ASTM D6913

ESP

Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024

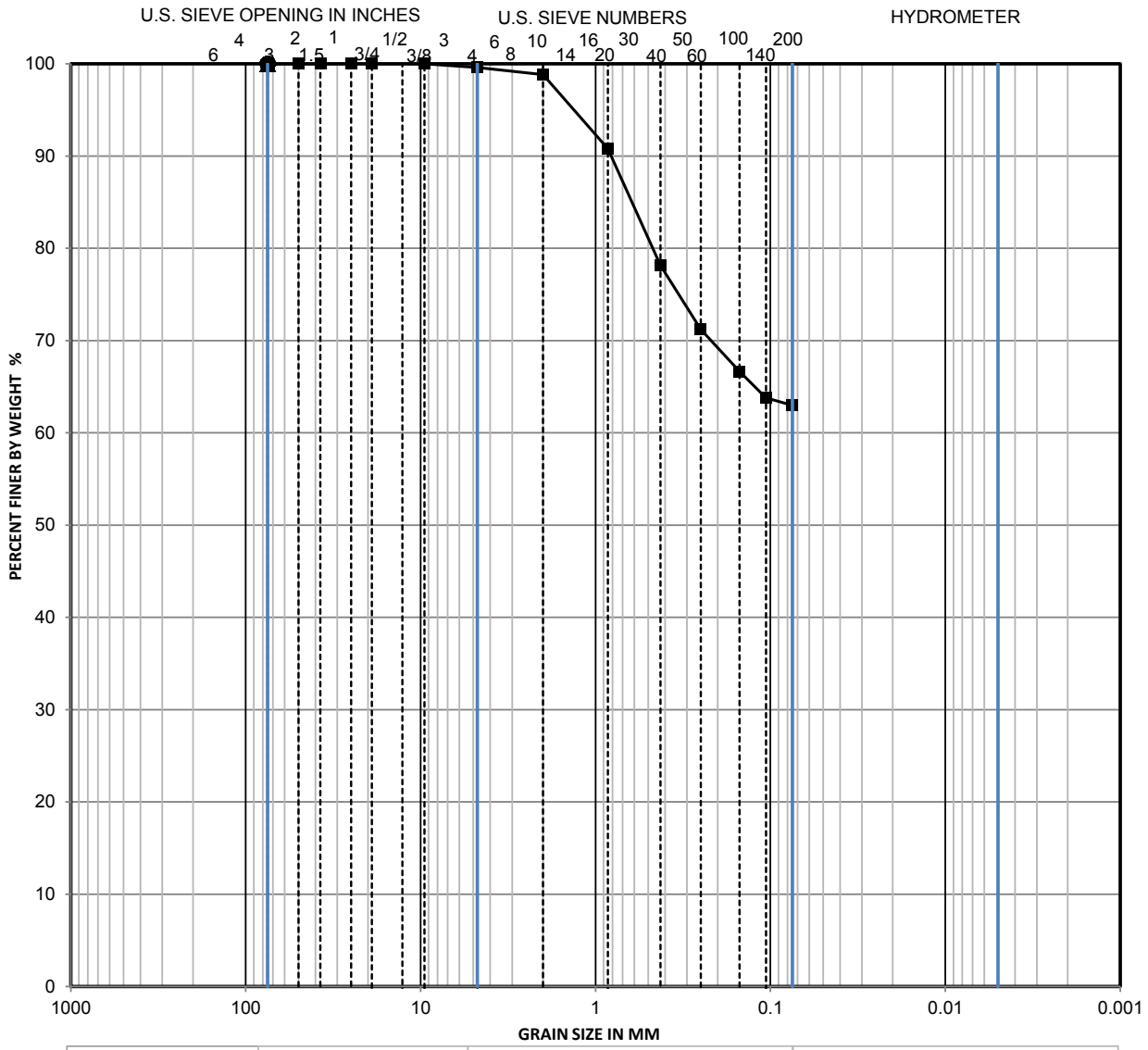
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



COBBLE	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
■	**S-3 B-04 (3.5' - 5')**	**Sandy fat clay CH**	**61**	**30**	**31**		

	Specimen Identification	D100	D60	D30	D10	% Gravel	% Sand	% Silt	% Clay
■	**S-3 B-04 (3.5' - 5')**	**9.5**				**0.4**	**36.6**	**63.0**	

Grainsize Requirement Limits: NA

Remarks:

GRAIN SIZE DISTRIBUTION

TEST METHOD: ASTM D6913

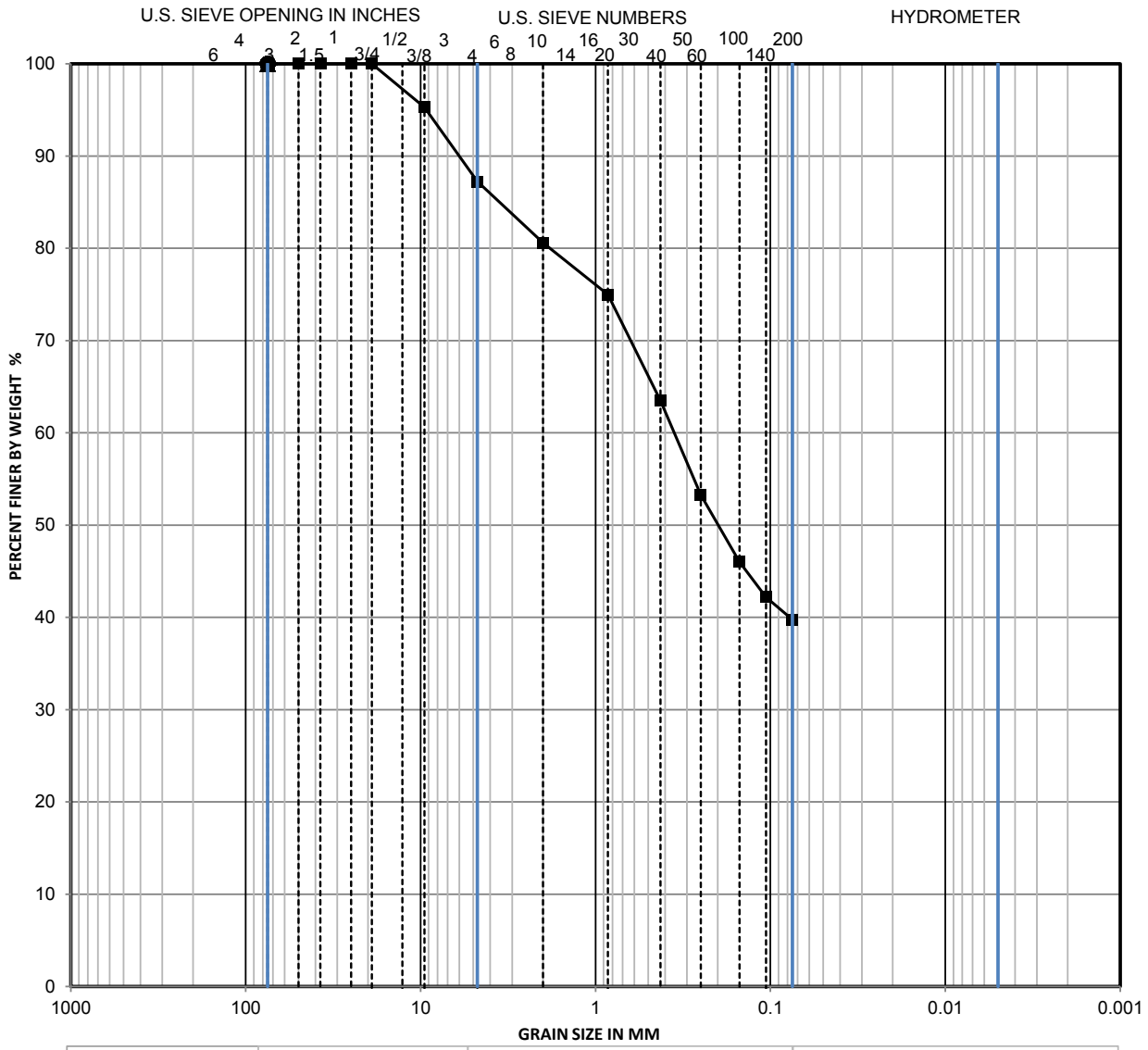
ESP
Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



COBBLE	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
■	**S-4 B-14 (1' - 2.5')**	**Clayey sand SC**	**41**	**20**	**21**		

	Specimen Identification	D100	D60	D30	D10	% Gravel	% Sand	% Silt	% Clay
■	**S-4 B-14 (1' - 2.5')**	**19.0**	**0.4**			**12.8**	**47.5**	**39.8**	

Grainsize Requirement Limits: NA

Remarks:

GRAIN SIZE DISTRIBUTION

TEST METHOD: ASTM D6913

ESP

Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024

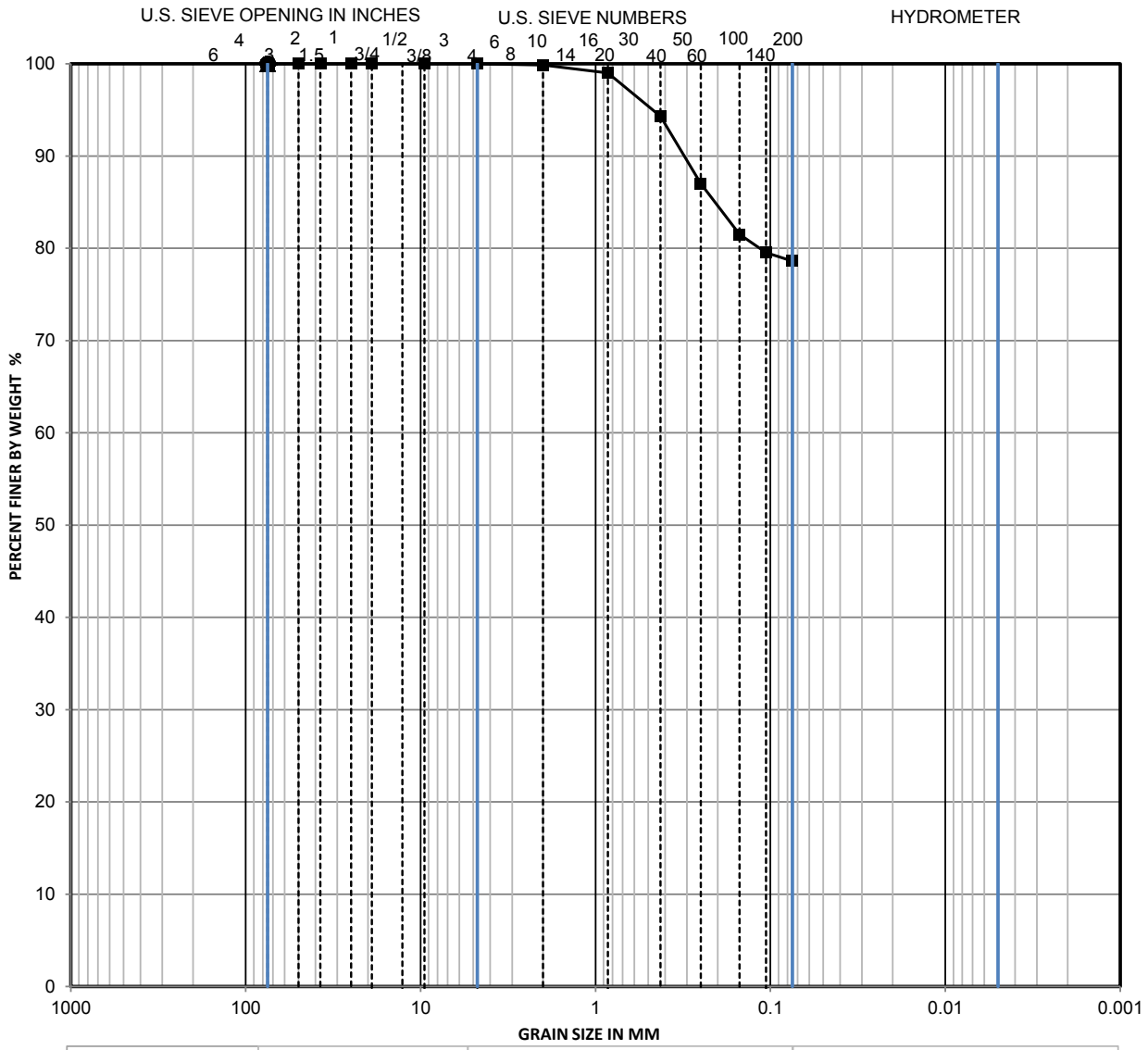
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



COBBLE	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
■	**S-5 B-17 (6' - 7.5')**	**Fat clay with sand CH**	**67**	**30**	**37**		

Specimen Identification		D100	D60	D30	D10	% Gravel	% Sand	% Silt	% Clay
■	**S-5 B-17 (6' - 7.5')**	**4.7**					**21.4**	**78.6**	

Grainsize Requirement Limits: NA

Remarks:

GRAIN SIZE DISTRIBUTION

TEST METHOD: ASTM D6913

ESP

Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024

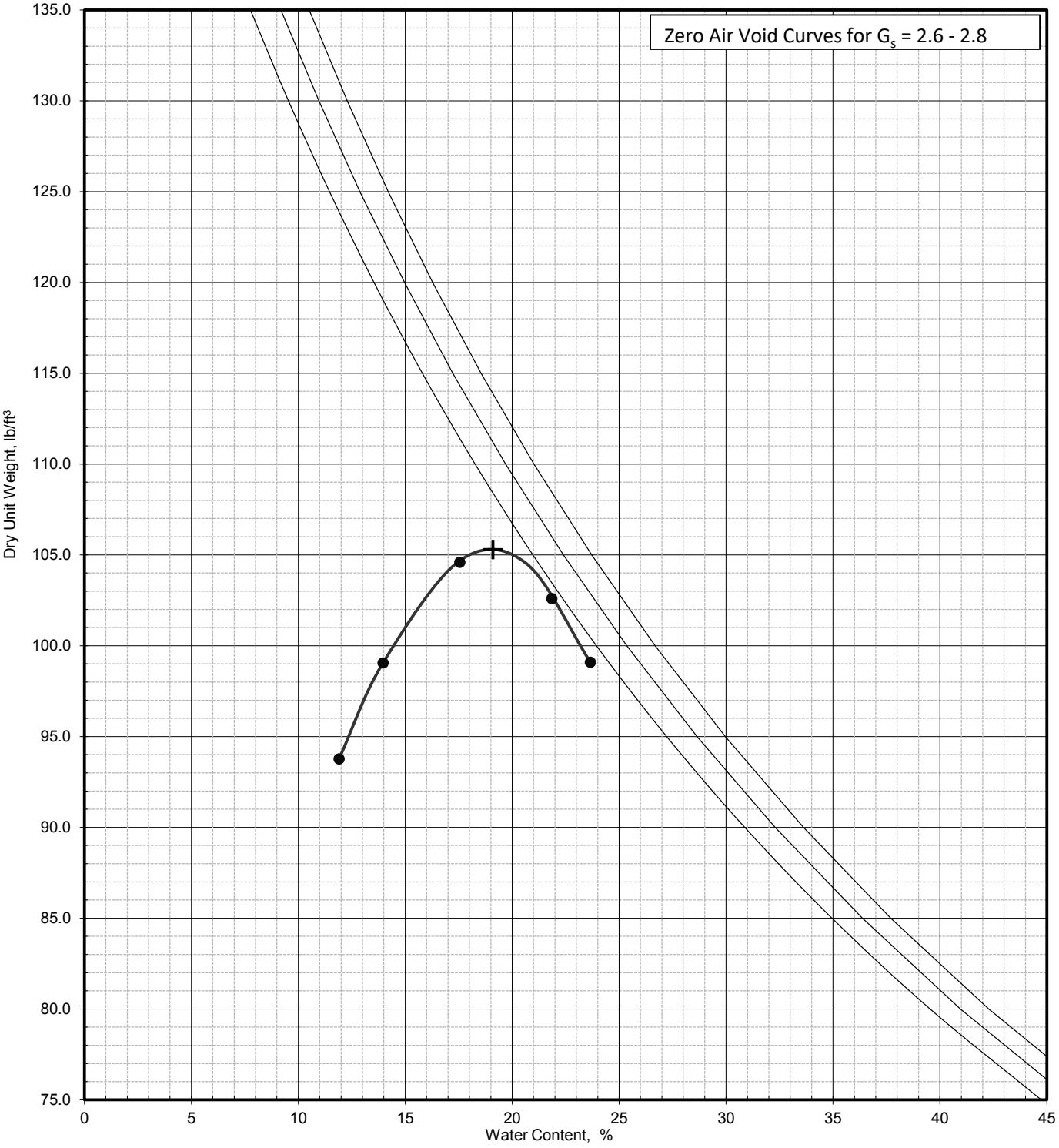
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



Soil Description:	**Reddish Brown Sandy Lean Clay CL**					Sample No.	**S-1**		
Sample Type:	**BLK**	Preparation:	**Moist**	Rammer:	**Manual - 5.5lbf (24.5N)**	Location:	**B-06**		
Depth :	0.5 - 10 ft	Maximum Dry Unit Weight:	**105.3** lb/ft³			PL:	**21**	PI:	**22**
Received water content:	%	Optimum Water Content:	**19.1** %			Fines:	**57.4** %	LL:	**43**

Remarks:

STANDARD MOISTURE-DENSITY RELATIONSHIP

TEST METHOD: ASTM D698 method A

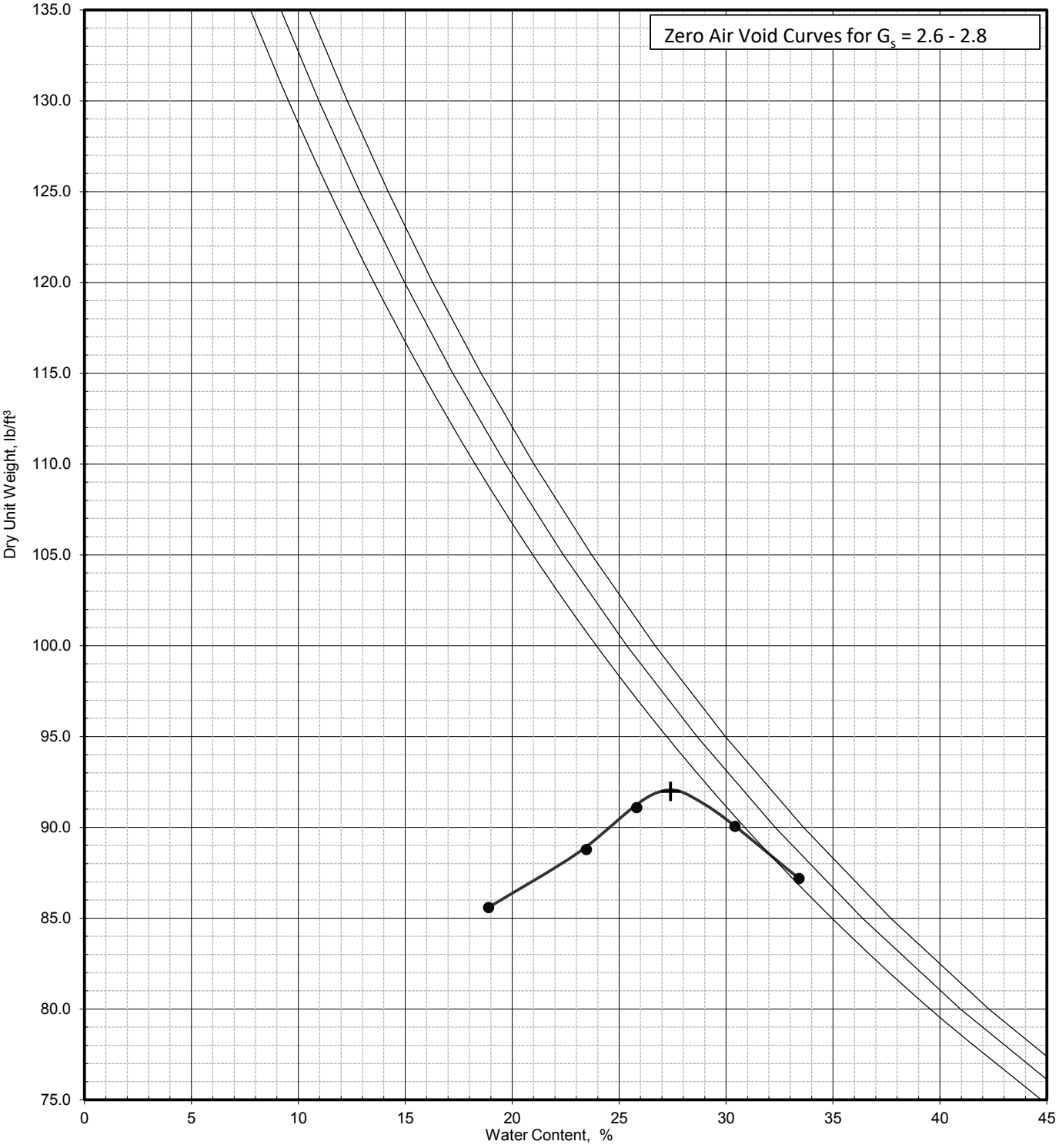
ESP
Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette



Soil Description:	**Reddish Brown Fat Clay with Sand CH**					Sample No.	**S-2**		
Sample Type:	**BLK**	Preparation:	**Moist**	Rammer:	**Manual - 5.5lbf (24.5N)**	Location:	**B-18**		
Depth :	0.5 - 10 ft	Maximum Dry Unit Weight:	**92.0** lb/ft³			PL:	**33**	PI:	**37**
Received water content:	%	Optimum Water Content:	**27.4** %			Fines:	**79.8** %	LL:	**70**

Remarks:

STANDARD MOISTURE-DENSITY RELATIONSHIP

TEST METHOD: ASTM D698 method A

ESP
Address: 7144 Weddington Rd NW, Suite 110, Concord, NC 28024
Telephone: 704-793-9855

Project: **Pharr Mill Road Site**

Number: **JO35.300**

Lab Technician: bpierce

Project Manager: rbarnette

APPENDIX II

July 6, 2021

ESP Associates, Inc.
7144 Weddington Road NW – Suite 110
Concord, North Carolina 28027

Attention: Mr. Robert Barnette

Reference: **Stormwater Control Measures (SCM) Soil Testing**
Seasonal High Water Table (SHWT) Evaluation
Proposed SCM
Pharr Mill Road Site – Cabarrus County, N.C.
Willcox & Mabe Soil Solutions, PLLC Project No. 16-06; Phase: 69

Dear Mr. Barnette:

Willcox & Mabe Soil Solutions, PLLC (WMSS) has conducted Stormwater Control Measures (SCM) Soil Testing in accordance with ESP Associates, Inc. (ESP) Subcontract Agreement dated January 8, 2021, and WMSS Subcontract Work Authorization No. 15-21 dated June 24, 2021. The SCM Soil Testing was performed to provide information for technical assistance with the design of a proposed SCM. A soil scientist investigation was conducted to evaluate the soil properties at one location being considered for a possible SCM, to determine suitability for stormwater management systems. The soil scientist investigation was conducted to evaluate: seasonal high water table (SHWT) elevations below existing ground surface. A "Site Plan" was provided to WMSS by ESP that identified relative site features and potential location for the proposed SCM's.

PROJECT BACKGROUND

The areas evaluated were located within the areas associated with planned SCM's. The SCM's are planned in conjunction with proposed site improvements associated with the Pharr Mill Road site in Cabarrus County, North Carolina. The site is located south of Mulberry Road and east of Pharr Mill Road **(Figure 1)**. Proposed SCM boring locations B-03, B-07, B-10, B-13, and B-19 are located within the edge of open fields and wooded areas within the proposed development area **(Figure 2)**.

Use of on-site stormwater management systems, is being considered to comply with stormwater management requirements. The use of stormwater SCMs is subject to the suitability of site soils and regulatory approval. Regulatory guidance on requirements for permitting of stormwater SCMs is provided in the North Carolina Department of Environmental Quality (NCDEQ), Division of Energy, Mineral and Land Resources (DEMLR) – Stormwater Design Manual (NCDEQ-DEMLR-SDM), (Revised, 2017).

The NCDEQ-DEMLR-SDM requires that the SHWT shall be taken into consideration for the design of most SCMs.

WMSS conducted an evaluation of the soils through the review of drill rig borings, within the area identified on a base map provided by ESP, and located in the field by ESP. Maps were prepared using Arcview 10.8 a Geographic Information System (GIS). Base maps were generated using information from the ESRI Web site and maps provided by ESP **(Figures 1 and 2)**.

FINDINGS

Seasonal High Water Table Evaluation

The SHWT evaluation was performed on June 29, 2021 and June 30, 2021 by evaluating five drill rig borings (Location B-03, B-07, B-10, B-13, and B-19), to depths of approximately 20 feet below the existing ground surface (bgs) (**Figure 2**). The soils were evaluated under the guidance of a NC Licensed Soil Scientist for evidence of seasonal high water table influence. This evaluation involved observing the actual moisture content in the soil and observing the matrix and mottle colors. Depending on the soil texture, the soil color will indicate processes that are driven by SHWT fluctuations such as iron reduction and oxidation and organic matter staining.

Location B-03 was observed to consist of loam texture in the upper soil horizon, to clay texture in the subsurface horizons. B-03 transitioned into massive structure (saprolite) at approximately 60 inches bgs that consisted of sandy loam texture to 226 inches bgs where the boring was terminated. No evidence of a SHWT or an apparent water table (AWT) was observed to a depth of 226 inches bgs.

Location B-07 was observed to consist of sandy loam texture in the upper soil horizon, to sandy clay loam and clay textures in the subsurface horizons. B-07 transitioned into massive structure (saprolite) at approximately 68 inches bgs that consisted of sandy loam texture to 179 inches bgs where the boring was terminated. Evidence of a SHWT was identified at approximately 44 inches bgs and an AWT was observed at a depth of 107 inches bgs.

Location B-10 was observed to consist of sandy loam texture in the upper soil horizon, to clay texture in the subsurface horizons. B-10 transitioned into massive structure (saprolite) at approximately 46 inches bgs that consisted of sandy loam texture to 236 inches bgs where the boring was terminated. No evidence of a SHWT or AWT was observed to a depth of 236 inches bgs.

Location B-13 was observed to consist of sandy loam texture in the upper soil horizon, to silty clay texture in the subsurface horizons. B-13 transitioned into massive structure (saprolite) at approximately 20 inches bgs that consisted of sandy loam texture to 36 inches bgs where the boring transitioned to partially weathered rock (PWR). The boring was terminated at 222 inches bgs. Evidence of a SHWT was identified at 16 inches bgs, and no AWT was observed to a depth of 226 inches bgs.

Location B-19 was observed to consist of sandy loam texture in the upper soil horizon, to clay texture in the subsurface horizons. B-19 transitioned into massive structure (saprolite) at approximately 95 inches bgs that consisted of sandy loam texture to 240 inches bgs where the boring was terminated. No evidence of a SHWT or AWT was observed to a depth of 240 inches bgs. Reference attached **Figure 2** for the approximate SHWT test location, and **Table 1** and the attached soil profile description for the approximated SHWT depth.

Please note that SHWT evaluations are based on secondary evidence and not on direct groundwater level measurements. Groundwater levels fluctuate for numerous reasons and these findings do not indicate that groundwater levels have not or will not rise above the noted depths.

Table 1: Approximated SHWT and AWT Depths

Boring Location	Seasonal High Water Table (SHWT) (inches bgs)	Apparent Water Table (AWT) (inches bgs)	Depth Boring Terminated (inches bgs)
B-03	>226	>226	226
B-07	44	107	179
B-10	46	>236	236
B-13	16	>222	222
B-19	>240	>240	240

CONCLUSIONS

Based upon our findings associated with the locations evaluated, the SHWT was identified at approximately 44 inches bgs at boring location B-07, 46 inches bgs at boring location B-10, and 16 inches bgs at boring location B-13. These findings should be taken into careful consideration when designing an appropriate SCM for the proposed location.

CLOSING

Willcox & Mabe Soil Solutions appreciates the opportunity to provide these services to you. If you have any questions, please contact us.

Sincerely,

Willcox & Mabe Soil Solutions, PLLC

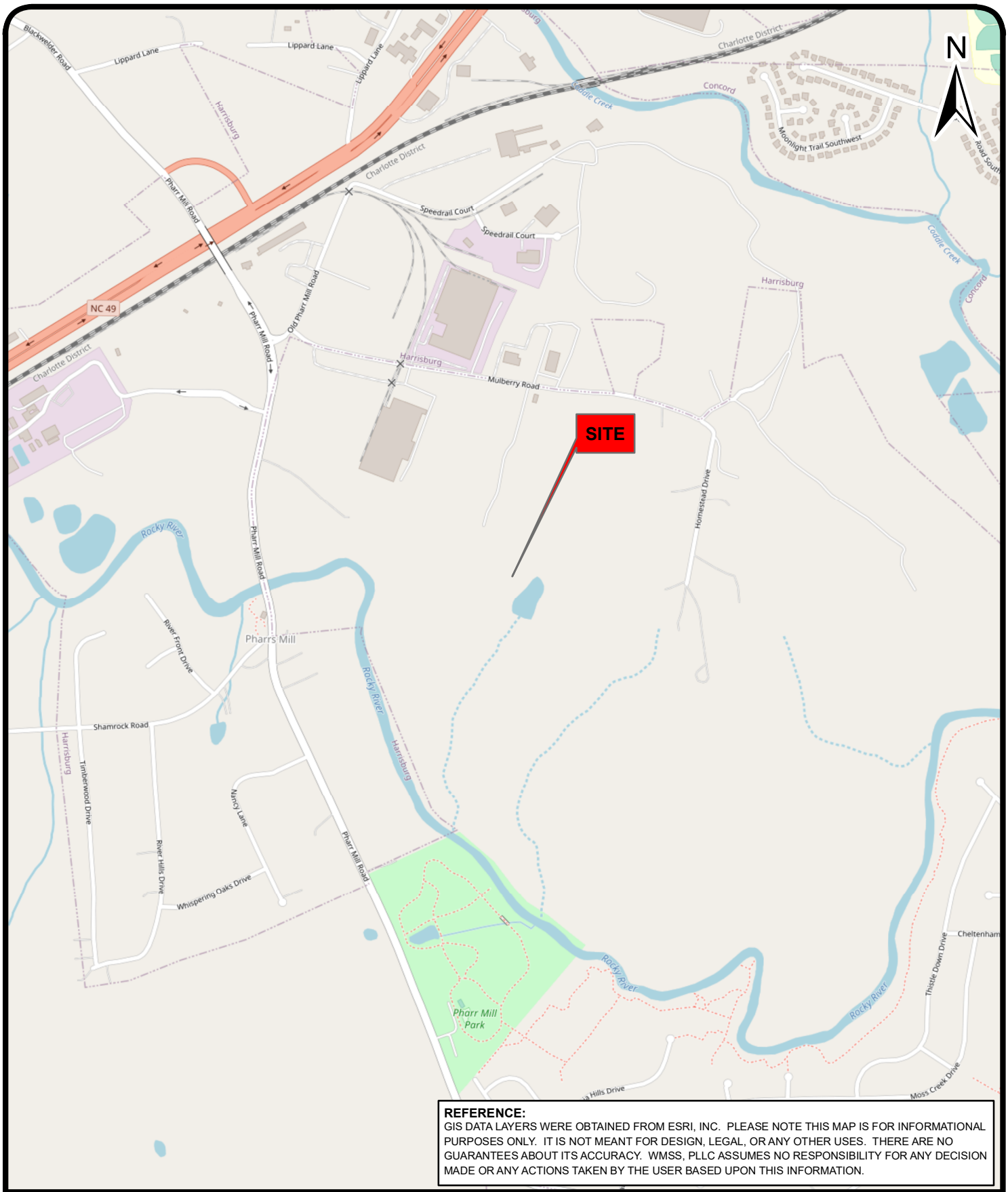
Martin Mabe
Partner / Agronomist

Rob Willcox, L.S.S.
Partner / Soil Scientist

Tables: Approximated SHWT and AWT Depth

Attachments: Figure 1 – Vicinity Map
Figure 2 – Boring Location Map
Boring Profile Sheet

Shared\WMSS Projects\2016\16-06 ESP Associates\Phase 69 - Pharr Mill Road Site SHWT\16-06, Phase 69 Pharr Mill Road Site SCM Soil Report.doc



REFERENCE:
GIS DATA LAYERS WERE OBTAINED FROM ESRI, INC. PLEASE NOTE THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. WMSS, PLLC ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON THIS INFORMATION.

SCALE:	1 " = 1,000 '
DATE:	07-01-21
DRAWN BY:	MEM
PROJECT NO:	16-06 Ph:69

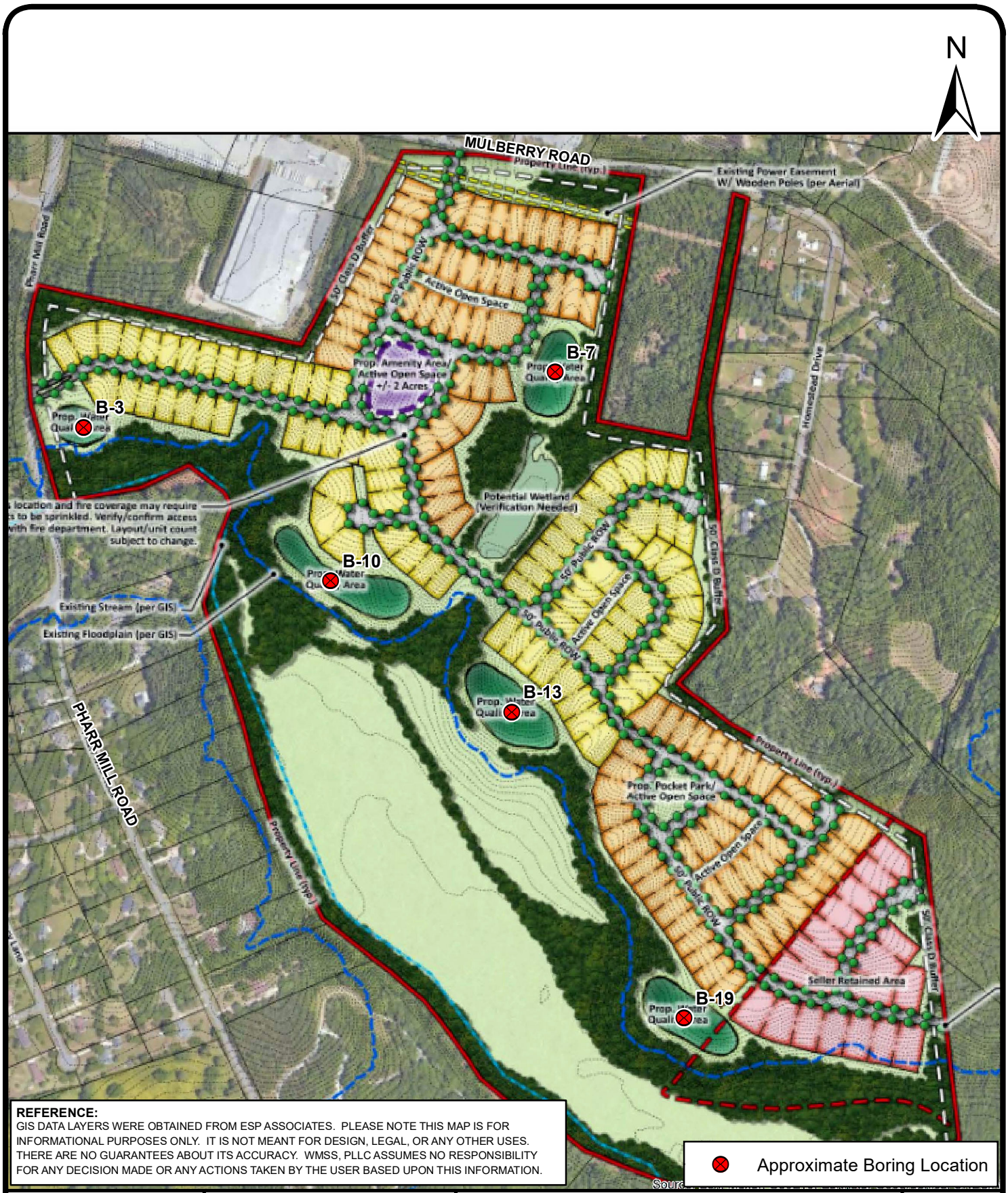
willcox&mabe
SOIL SOLUTIONS

VICINITY MAP

PHARR MILL ROAD SITE
CABARRUS COUNTY, NORTH CAROLINA

FIGURE NO.
1

C:\arcgis\2016\ESP Associates\Ph69 Pharr Mill Road\Maps\Fig1.mxd



REFERENCE:
GIS DATA LAYERS WERE OBTAINED FROM ESP ASSOCIATES. PLEASE NOTE THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. WMSS, PLLC ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON THIS INFORMATION.

SCALE:	Not to scale
DATE:	07-02-21
DRAWN BY:	MEM
PROJECT NO:	16-06 Ph:69

willcox&mabe
SOIL SOLUTIONS

BORING LOCATION MAP

PHARR MILL ROAD SITE
CABARRUS COUNTY, NORTH CAROLINA

FIGURE NO.
2

C:\arcgis\2016\ESP Associates\Ph69 Pharr Mill Road\Maps\Fig2.mxd

WILLCOX & MABE SOIL SOLUTIONS, PLLC
SITE/SOIL EVALUATION

Project No. 16-06 PhilA **Phone No.** _____ **Date:** 6-30-21
Location Burr Mill Rd. **Pin** _____ **County:** Cabarrus **Property Size** _____

Proposed Facility: SFHWT Eval. **Water Supply:** On-Site Well ☐ Community ☐ Public ☐ **Evaluation:** Drill Rig ☒ Auger Boring ☐ Pit ☐ Cut ☐

Described By: M Mabe
Weather: Sunny, 90's **Antecedent Moisture** _____ **Surface Water:** _____

FACTORS	PROFILE B-3	PROFILE B-3 cont.	PROFILE	PROFILE
Landscape Position %	L 2-3%			
Horizon Depth I	0-7	85-162		
Color Munsell	5YR4/4	Multi		
Texture	l	sl sap		
Structure	mmgr	Massive		
Consistence	FR NS NP	FI NS NP		
		c/m gravels		
Boundary				
Horizon Depth II				
Color – Munsell	5YR4/6	162-226		
Texture	c	Multi		
Mottles	7-19	sl sap		
Structure	mmsbk	Massive		
Consistence	FI S P	VFI NS NP		
		PWR crushes to		
		sl sap		
Boundary				
Horizon Depth III	19-60			
Color – Munsell	5YR4/8			
Texture	c			
Mottles	F: 10YR6/6			
Structure	mmsbk			
Consistence	FI S P			
	F sap in hz			
Boundary				
Horizon Depth IV	60-85			
Color – Munsell	Multi			
Texture	sl sap			
Mottles				
Structure	Mass.			
Consistence	FI SS SP			
	F: c small			
	gravels			
Boundary				
Soil Wetness		>226"		
Restrictive Horizon		>226"		
Saprolite		60"		
LTAR				
Classification				

748

LEGEND

LANDSCAPE POSITION

R	Ridge Interfluve
S	Shoulder
L	Linear Slope
FS	Foot Slope
N	Nose Slope
H	Head Slope
Cc	Concave Slope
Cv	Convex Slope
T	Terrace
P	Flood Plain

TEXTURE

s	sand
ls	loamy sand
sl	sandy loam
l	loam
si	silt
sil	silt loam
sicl	silty clay loam
cl	clay loam
scl	sandy clay loam
sc	sandy clay
sic	silty clay
c	clay

CONSISTENCE WET

Ns	non-sticky
Ss	slightly sticky
S	sticky
Vs	very sticky
Np	non-plastic
Sp	slightly plastic
P	plastic
Vp	very plastic

MOIST

vfr	Very friable
fr	friable
fi	firm
vfi	Very firm

STRUCTURE

sg	single grain
m	massive
cr	crumb
gr	granular
sbk	subangular blocky
abk	angular blocky
pl	platy
pr	prismatic

WILLCOX & MABE SOIL SOLUTIONS, PLLC
SITE/SOIL EVALUATION

Project No. 16-06 Ph:69 **Phone No.** _____ **Date:** 6-29-21
Location Pharr Mill Rd. **Pin** _____ **County:** Cabarrus **Property Size** _____

Proposed Facility: SHWT Eval. **Water Supply:** On-Site Well ☐ Community ☐ Public ☐ **Evaluation:** Drill Rig ☒ Auger Boring ☐ Pit ☐ Cut ☐

Described By: M. Mabe
Weather: Partly Cloudy 80's **Antecedent Moisture** _____ **Surface Water:** _____

FACTORS	PROFILE B-7	PROFILE B-7 cont.	PROFILE B-10	PROFILE B-10 cont.
Landscape Position %	L 4-6%			
Horizon Depth I	0-7	62-68	0-4	216-282
Color Munsell	10YR 4/4	10YR 6/2	10 YR 4/4	Mult.
Texture	sl	C	sl	sl sap
Structure	wgr	Massive	wgr	Mass
Consistence	FR NS NP	FR/FI S P	FR NS NP	FI/VFI NS NP
		Ci 10YR 4/4		
Boundary				
Horizon Depth II	7-32	68-179	4-26	282-96
Color – Munsell	10YR 5/4	Mult.	7.5YR 5/6	Mult.
Texture	sl	sl sap	scl Vc	sl sap
Mottles	—		—	Many
Structure	mgr	Mass	wsbk	FI/VFI NS
Consistence	FR NS NP	FR NS NP	FI SS SP	
				Layer of PWR
Boundary				
Horizon Depth III	32-44		26-37	96-236
Color – Munsell	10YR 5/4		7.5YR 5/6	Mult
Texture	scl		c	sl sap
Mottles	Fi 10YR 6/3		Fi sap inclu.	—
Structure	wsbk		wsbk	Mass
Consistence	FR SS SP		FI SS SP	FI/VFI NS
		10.2-1.5=8.9		Ci PWR inclu
		16.2-1.5 = 14.9		
Boundary		107"-H2O		
Horizon Depth IV	44-62		37-46	
Color – Munsell	10YR 5/1		7.5YR 5/6	
Texture	scl		c/cl	
Mottles	Cim 10YR 6/2		Ci sap inclu.	
Structure	wsbk		wsbk	
Consistence	FR SS SP		VFI SS SP	
	Ci 10YR 6/3			
Boundary				
Soil Wetness		SHWT @ 44"		>236"
Restrictive Horizon		AWT @ 107"		>236"
Saprolite		168"		46"
LTAR				
Classification				

LEGEND

LANDSCAPE POSITION

R	Ridge Interfluve
S	Shoulder
L	Linear Slope
FS	Foot Slope
N	Nose Slope
H	Head Slope
Cc	Concave Slope
Cv	Convex Slope
T	Terrace
P	Flood Plain

TEXTURE

s	sand
ls	loamy sand
sl	sandy loam
l	loam
si	silt
sil	silt loam
sicl	silty clay loam
cl	clay loam
scl	sandy clay loam
sc	sandy clay
sic	silty clay
c	clay

CONSISTENCE WET

Ns	non-sticky
Ss	slightly sticky
S	sticky
Vs	very sticky
Np	non-plastic
Sp	slightly plastic
P	plastic
Vp	very plastic

MOIST

vfr	Very friable
fr	friable
fi	firm
vfi	Very firm

STRUCTURE

sg	single grain
m	massive
cr	crumb
gr	granular
sbk	subangular blocky
abk	angular blocky
pl	platy
pr	prismatic

WILLCOX & MABE SOIL SOLUTIONS, PLLC
SITE/SOIL EVALUATION

Project No. 16-06 Ph 169 **Phone No.** _____ **Date:** 6-29-21
Location Pharr Mill Rd. **Pin** _____ **County:** Cabarrus **Property Size** _____

Proposed Facility: SFWT **Water Supply:** **On-Site Well** ☐ **Community** ☐ **Public** ☐ **Evaluation:** Drill Rig ☒ **Auger Boring** ☐ **Pit** ☐ **Cut** ☐

Described By: M. Mabe
Weather: Partly Cloudy 80's **Antecedent Moisture** _____ **Surface Water:** _____

FACTORS	PROFILE B-13	PROFILE B-13 Cont.	PROFILE B-19	PROFILE B-19 Cont
Landscape Position %	L 8-10%		L 4-6%	
Horizon Depth I	0-4	36-222	0-4	62-95
Color Munsell	10YR 4/4	mult	10YR 4/4	2.5YR 5/6
Texture	sl	sl sap	sl	c
Structure	wgr	massive	wgr	wsbk
Consistence	FR NS NP	FI/VFI NS NP.	FR NS NP	FR/FI SS SP
		PWR started		fic sap inclus.
Boundary				
Horizon Depth II	4-16		4-8	95-240
Color – Munsell	7.5YR 5/6		2.5YR 6/6	2.5YR 5/6
Texture	sic		scl	sl sap
Mottles	Fi 10YR 6/4/6/2		—	—
Structure	wsbk		wsbk	massive
Consistence	FI SS SP		FR SS SP	FI/FR NS NP
Boundary				
Horizon Depth III	16-20		8-24	
Color – Munsell	7.5YR 5/6		2.5YR 5/6	
Texture	sic		c	
Mottles	fic 10YR 6/2		Fi YB mottles Inconsc	
Structure	wsbk		wsbk	
Consistence			FI SS SP	
Boundary				
Horizon Depth IV	20-36		24-62	
Color – Munsell	mult		2.5YR 5/6	
Texture	sl sap		c	
Mottles	—		Fi sap inclus.	
Structure	massive		wsbk	
Consistence	FI/VFI NS NP		FR/FI SS SP	
Boundary				
Soil Wetness		>222"		>240'
Restrictive Horizon		SHWT 16"		>240'
Saprolite				
LTAR				
Classification				
		PWR started @		
		36" bgs		

LEGEND

LANDSCAPE POSITION

R	Ridge Interfluve
S	Shoulder
L	Linear Slope
FS	Foot Slope
N	Nose Slope
H	Head Slope
Cc	Concave Slope
Cv	Convex Slope
T	Terrace
P	Flood Plain

TEXTURE

s	sand
ls	loamy sand
sl	sandy loam
l	loam
si	silt
sil	silt loam
sicl	silty clay loam
cl	clay loam
scl	sandy clay loam
sc	sandy clay
sic	silty clay
c	clay

CONSISTENCE WET

Ns	non-sticky
Ss	slightly sticky
S	sticky
Vs	very sticky
Np	non-plastic
Sp	slightly plastic
P	plastic
Vp	very plastic

MOIST

vfr	Very friable
fr	friable
fi	firm
vfi	Very firm

STRUCTURE

sg	single grain
m	massive
cr	crumb
gr	granular
sbk	subangular blocky
abk	angular blocky
pl	platy
pr	prismatic

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