REPORT OF SUBSURFACE EXPLORATION

Lesslie Volunteer Fire Department - New Truck Garage and Driveway

York County, South Carolina
ESP Project Number: E4: 25-02334-GEO

Prepared For:
York County Government
6 South Congress Street
York, South Carolina 29745

Prepared By:
ESP Associates, Inc
3475 Lakemont Boulevard
Fort Mill, SC 29708

January 5, 2026

January 5, 2026

Ms. Lisa Hagood
County Engineer
York County Government
6 South Congress Street
York, South Carolina 29745

Reference: **REPORT OF SUBSURFACE EXPLORATION**
Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, South Carolina
ESP Project No. E4: 25-02334-GEO

Dear Ms. Hagood:

ESP Associates, Inc. (ESP) has completed a subsurface exploration for the proposed new garage building and parking lot/driveway expansion in York County, South Carolina. This exploration was performed in general accordance with our Proposal No. 25-02334, dated October 10, 2025, as authorized by Ms. Lisa Hagood with York County.

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.

Nathan D. McLaren, PG
Project Manager

Christopher J. Brown, PE
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APPENDIX

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 roadway section design, as well as construction considerations for the proposed foundations and paved areas are presented within this report.

1.2 Site Description

ESP understands that plans are to develop the approximately 1.37-acre parcel identified as a portion of York County Tax Parcel Number 7480000087 in Rock Hill, South Carolina. The northern portion of the site is bordered by Neely Store Road. The eastern portion of the site is bordered by Reservation Road. The western and southern portions of the site are bordered by single family residences and undeveloped, heavily wooded property. At the time of our subsurface investigation the site had been previously developed with the existing Lesslie Volunteer Fire Department – Station No. 2, which consists of a parking lot, access drive, and vehicle storage building with an adjoining office space and associated subsurface infrastructure.

1.3 Project Description

ESP understands the development will consist of the construction of a new vehicle storage building and gravel expansion of the existing parking lot to facilitate vehicle access to the new vehicle storage building. This information was obtained based on our review of the preliminary site layout titled “Lesslie Fire Department – Bid Plan Layout 2”, provided by Lisa Hagood with York County on October 6, 2025.

ESP was subsequently provided with structural plans for the proposed new truck storage building via December 30, 2025, email correspondence between Ms. Lisa Hagood with York County, Ms. Abby Branch with CPL, and Mr. Nathan McLaren with ESP. The structural plans, titled “Lesslie Fire Department Station 2”, produced by D&T Home Designs on September 8, 2020, contain information regarding construction type, assumed soil bearing capacity or 2,000 pounds per square foot (psf), and an allowable lateral passive pressure of 250 psf/ft.

Based on a review of the plans provided, the proposed structure will be a wood framed structure utilizing laminated veneer lumber beams, structural steel tubes, pipes, and galvanized metal decking supported by an 8-inch thick, reinforced turn-down slab-on-grade foundation system with isolated 30-inch diameter column footings specified to bear 5 feet below proposed finished grade upon either undisturbed residual materials or newly placed structural fill achieving a minimum of 95 percent compaction based upon either a Standard or Modified Proctor Moisture-Density Relationship Test, depending upon the fill material utilized. For the purposes of this report, we have assumed the following loading information: up to 150 kips for column footings and 3 kips/lf for continuous footings.

The selection of test boring locations and depths was based on our experience with similar projects in the area, as well as the previously referenced site layout plan. For more detailed information, reference the attached “Test Location Plan with Site Vicinity Map,” Figure 1 located in the Appendix.

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).” Test locations are shown on the attached “Test Location Plan and Site Vicinity Map,” Figure 1.

2.1.1 Soil Test Borings

Seven soil test borings (Borings B-01 through B-05, P-01, and P-02) were extended to depths ranging between 9.3 and 41.4 feet below the existing ground surface (bgs) using a Mobile B-51 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 the termination of drilling.

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 the Appendix. 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 (with mechanical sieve)
- Standard Proctor Moisture-Density Relationship

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

Sample Location	Depth (feet)	USCS Classification	Percent Fines (%)	Liquid Limit (%)	Plasticity Index	Maximum Dry Unit Weight (lbs/ft^3)	Optimum Water Content (%)
B-01	3.5-5.0	CH	88.4	56	42		
B-04	0.0-10.0	CL	82.5	33	12	106.2	17.4

3.0 SUBSURFACE CONDITION

3.1 Site Geology

The referenced property is located in York County, South 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 physical and 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. The generalized subsurface conditions at the site are described below and are graphically depicted in the Appendix. For more detailed soil descriptions and stratifications at a particular test location, the attached “Test Boring Record” should be reviewed.

3.2.1 Surface

A topsoil/rootmat layer approximately ranging from six to seven inches in thickness was encountered at each test boring location.

3.2.2 Residuum

Residual soils are mineral material accumulated by the in-place physical and chemical weathering of the underlying parent rock. Underlying the surface materials in each test boring location, residual soils were encountered. The residuum generally consists of soft to very hard sandy silts, sandy clays, and silty clays and dense to very dense silty sands. N-values in the residuum varied between 2 and 63 bpf with the majority in excess of 7 bpf. The residuum extends to depths ranging between approximately 4.0 and 28.5 feet bgs. Soil Test Borings B-01, B-02, and P-02 were terminated in the residual soils at depths ranging between approximately 10.0 and 20.0 feet bgs.

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-03, B-04, B-05, and P-01, partially weathered rock (PWR) was encountered. When sampled, the PWR generally breaks down into sandy silts and silty sands with rock fragments. Borings B-03, B-05, and P-01, were terminated in the PWR at depths ranging between approximately 9.3 and 18.9 feet bgs.

3.2.4 Auger Refusal

Auger refusal is defined as material that could not be penetrated with the drill rig equipment used on the project. Auger refusal material may consist of large boulders, rock ledges, lenses, seams or the top of parent bedrock. Core drilling techniques would be required to evaluate the character and continuity of the refusal material. Boring B-04 was terminated in the PWR upon auger refusal at a depth of approximately 41.4 feet bgs.

3.3 Subsurface Water

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

Test Location	Water Depth at Time of Testing (feet)	Cave-In Depth at Time of Testing (feet)
B-01	Dry	18.0
B-02	Dry	17.0
B-03	Dry	16.0
B-04	26.0	38.0
B-05	Dry	15.0
P-01	Dry	8.0
P-02	Dry	8.0

Note: Hole cave-in depths noted are approximate depths bgs and 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/Elastic Silts
- Low-Consistency Soils
- 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 Previous Site Development

We anticipate that underground utility lines may be present within the proposed site based on its present use. We recommend all existing lines be located prior to construction and either removed or relocated outside of the proposed building area. 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 small diameter 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.

4.2.2 High Plasticity Clay/Elastic Silt

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 and/or a Liquid Limit less than 50 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-01	3.5-5.0	CH	88.4	56	42

In addition to the laboratory testing, manual manipulation of recovered samples in the field indicates that high plasticity clays were encountered in Borings B-01, B-02, P-01, and P-02 to depths ranging from approximately 3.5 to 6.0 feet bgs and elastic silts were encountered in Borings B-02 and B-03 to a depth of approximately 3.5 feet bgs. Our experience indicates that these soils can undergo significant change in volume (shrink/swell) with changes in their moisture content. If high plasticity clay and/or elastic silt 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 or elastic silts. In addition, our past experience indicates that high plasticity clays and elastic silts may exhibit reduced long-term stability for support of flexible pavements. ESP recommends undercutting and removing the high plasticity clays and/or elastic silt soils in the upper 3 feet of the proposed subgrade or bearing elevations, whichever is deeper, and replacing them with properly compacted, low plasticity/elasticity fill soils to reduce the risk imposed by these materials to the proposed foundations, slabs and pavements.

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 and elastic silt soils and to provide detailed recommendations for remediation.

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 or elastic silt 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 and elastic silts 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.

4.2.3 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-01 and B-02. The lower consistency soils were encountered at various depths below the existing ground surface. N-values obtained in the lower consistency soils ranged from 2 to 6 bpf. ESP understands that approximately one to two feet of fill will be required to achieve the proposed site grades, however, it should be anticipated that portions of the proposed building will require undercutting the existing materials up to 6 feet bgs due to the presence of low consistency elastic silts and highly plastic clays. The undercut materials should be replaced with low plasticity structural fill as specified in Section 4.2.5.

Recommendations regarding the depth and extent of undercut can typically be provided during the course of construction via the performance of test pits, hand auger borings supplemented with Dynamic Cone Penetrometer testing, and proofroll observations.

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.

4.2.4 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 Records due to variability between boring locations. Deeper stripping may be required to adequately remove topsoil and stripping depths may be influenced by 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.

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 or elastic silt 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.

4.2.5 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 and elastic silt soils, appear suitable for re-use as structural fill. High plasticity clay and elastic silt 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.

4.2.6 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.

4.2.7 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.

4.3 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 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 3,000 pounds per square foot (psf) can be used for design of the foundations bearing on low plasticity residual soils with an N-Value of 7 bpf or greater. It should be anticipated that implementation of the remediation recommendations provided within Sections 4.2.2 and 4.2.3, which specify the undercutting and removal of highly plastic clays, elastic silts, and/or low consistency materials to a depth of approximately 6.0 feet bgs, and adherence to the fill placement recommendations provided in Section 4.2.5, will be necessary to achieve the referenced allowable bearing pressure.

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 Seismic Considerations

Based on the soil test borings performed at the site and our review of the current International Building Code with SC Modifications, with reference to Chapter 20 of the American Society of Civil Engineers (ASCE) Standard 7, “Minimum Design Loads for Buildings and Other Structures," the site is identified as Seismic Site Class D.

If a higher (less restrictive) site class is desired, additional evaluation, including shear wave velocity testing, can be performed to evaluate the potential for an improved site class.

The American Society of Civil Engineers (ASCE) Standard 7, “Minimum Design Loads for Buildings and Other Structures," Section 11.8 states that an evaluation of the following potential geologic and seismic hazards be addressed; slope instability, liquefaction, total and differential settlement, and surface displacement due to faulting or seismically induced lateral spreading or lateral flow.

Based on the soils encountered at this site, our analyses and our past experience with the site soils, liquefaction and lateral spreading is not expected to occur at this site as a result of a seismic event.

The following parameters present ground motion for this site based on Site Class D.

The following parameters can be utilized by the design team to aid in determining the seismic design category for the proposed structure.

$F_A = 1.6$

$F_V = 2.4$

$S_S = 0.234$

$S_1 = 0.089$

$S_{MS} = 0.375$

$S_{M1} = 0.214$

$S_{DS} = 0.250$

$S_{D1} = 0.143$

4.5 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. Based on our experience on the subject site and on our observation of the potential cut soils to be used as fill for the site grading, we recommend a preliminary modulus of subgrade reaction (k_s) of 100 pounds per square inch per inch (pci) for point load conditions. This assumes the slab subgrade soils are determined to be suitable or any disturbed slab subgrade soils are reworked or stabilized prior to slab construction. We recommend the structural engineer provide the implied slab stresses to ESP after initial design and the modulus of subgrade reaction can be modified in an iterative process with the structural engineer to optimize the slab-on-grade design. If a stone base material is used, an adjusted (composite) modulus of subgrade reaction may be appropriate for slab design.

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.

4.6 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 Effects of Construction Methods

Several aspects of construction at this site could adversely affect the adjacent streets, utilities and nearby facilities. Therefore, proper design and special care during construction will be needed to protect the adjoining properties. These items are discussed below.

Jackhammering, blasting, pile driving and other construction activities can generate vibrations that travel off-site. These vibrations can cause damage to adjacent structures if not properly controlled. Care must be taken to prevent damage of newly placed structures, especially fresh concrete. Any blasting charges that are used must be properly sized and timed to prevent structural damage. We recommend that vibration monitoring be performed for structures located nearby during the construction activities that generate a large amount of vibration. This will reduce the potential for large magnitude vibrations and subsequent damage claims.

General site dewatering can sometimes cause settlement of adjacent structures due to an increase in effective stresses which can consolidate soils. Based on the available data, we anticipate that this will generally not be a problem at this site. However, pumping of fine soil particles due to improper dewatering techniques can result in unwanted subsidence. Therefore, proper dewatering systems, if required, should be implemented to reduce these effects.

5.3 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

FIELD EXPLORATION

Soil Test Boring: Seven (7) soil test borings were drilled at the approximate locations shown on the attached 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 individual "Test Boring Record" 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 Records 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 D 421 and 422. The results are presented on the attached Grain Size Distribution Sheets included in the Appendix.

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 the Appendix.

Standard Proctor Compaction Test: Select samples of the on-site and borrow soils were obtained from auger cuttings piles to determine their suitability as fill material. Standard Proctor Compaction Tests was 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 the Appendix.

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC,

SITE VICINITY MAP
(Not to Scale)

THIS SHEET IS FOR PROPOSED BORING INFORMATION PURPOSES ONLY.

NOTE: PRELIMINARY SITE SKETCH TITLED "LESSLIE FD - BID PLAN LAYOUT" PROVIDED VIA EMAIL CORRESPONDENCE BY LISA HAGOOD, PE, WITH YORK COUNTY GOVERNMENT ON OCTOBER 6, 2025.

This drawing is intended to show approximate boring locations only. No other information is expressed or implied.

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

⊕ Approximate Test Location

Boring Labels

- ■ Test Location Name Designation
- 🟥 Depth of High Plasticity or Elastic Material
- 🟩 Depth of Low Consistency Material
- 🟦 Depth to Subsurface Water
- ■ Depth of Partially Weathered Rock
- 🟪 Depth to Auger Refusal

SHEET TITLE:

Test Location Plan with Site Vicinity Map
Figure 1

Lesslie Volunteer Fire Department - New Truck Garage and Driveway
Rock Hill, South Carolina

The reproduction, alteration, copying, or other use of this drawing without written consent is prohibited and any infringement will be subject to legal action.

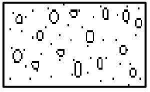
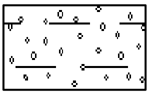
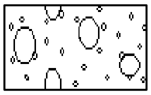
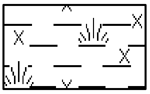
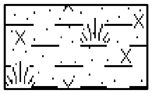
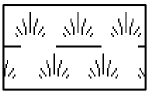
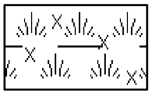
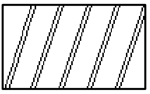
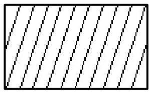
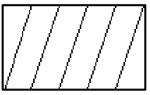
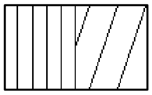
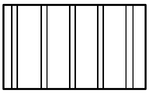
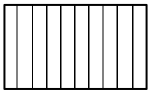
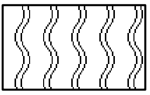
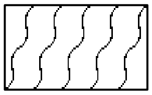
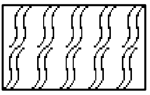
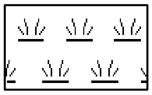
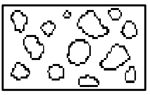
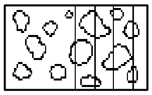
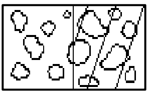
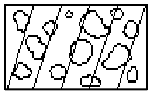
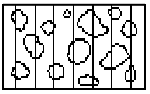
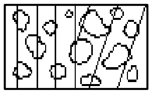
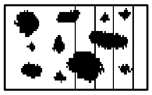
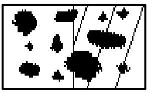
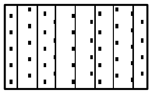
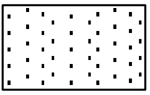
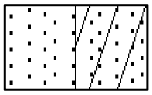
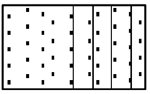
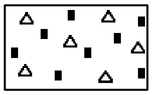
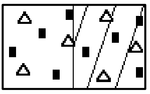
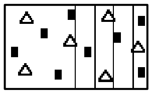
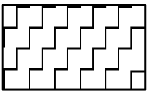
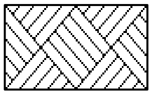
N

DATE: *December 29, 2025*

PROJECT NO.: *25-02334-GEO*
SCALE: *NTS*
DRAWN BY: *NDM*
CHECKED BY: *CJB*

ESP
3475 Lakemont Blvd.
Fort Mill, SC 29708
www.espassociates.com
Phone: 803-802-2440

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).

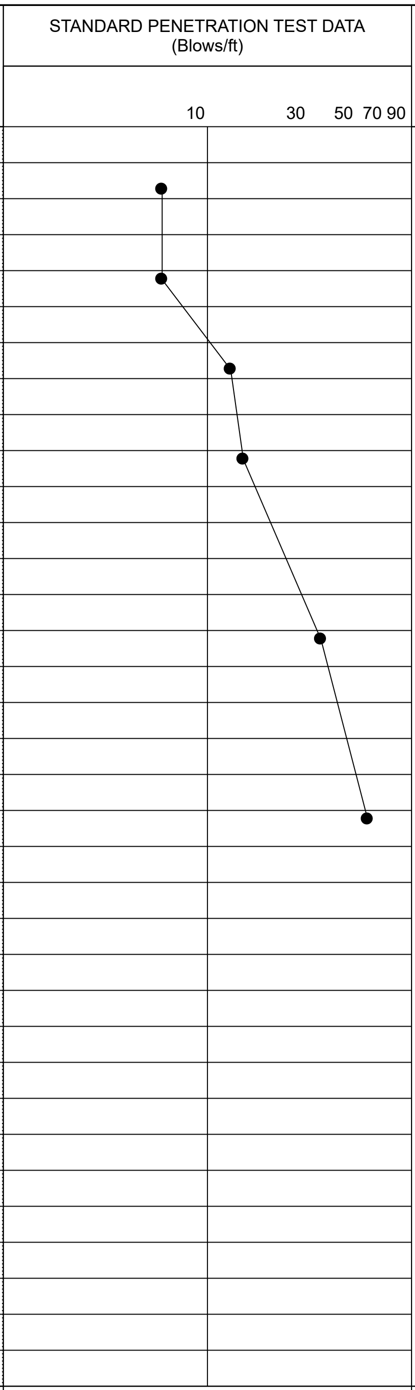
RQD - Total length of sound rock segments recovered that are longer than or equal to 4” (mechanical breaks included) divided by the total length of the core run times 100 (expressed as a percentage).

PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
B-01

PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 20.0 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/19/25	**WATER LEVEL:** ▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	BPF
	Topsoil/Grassmat, Approximately 6 inches of topsoil/grassmat				
	RESIDUUM: Firm Tan and Gray Sandy High Plasticity CLAY, (moist)		☒		6
			☒		6
5				-5.0	
	RESIDUUM: Stiff To Hard Gray and Tan Sandy SILT, (moist)		☒		13
			☒		15
10				-10.0	
			☒		36
15				-15.0	
		HC			
	RESIDUUM: Very Dense Tan and Brown Silty SAND, fine to coarse, (moist), Trace rock fragments		☒		61
20				-20.0	
	Boring was terminated at 20.0 feet. Cave-in depth at 18.0 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 TEST LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
B-02

PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 20.0 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/19/25	**WATER LEVEL:** ▽ Dry @ TOB	▼ N/A		

DEPTH (ft) | GRAPHIC LOG | SOIL DESCRIPTION | WATER LEVEL | SAMPLE

Topsoil/Grassmat, Approximately 6 inches of topsoil/grassmat

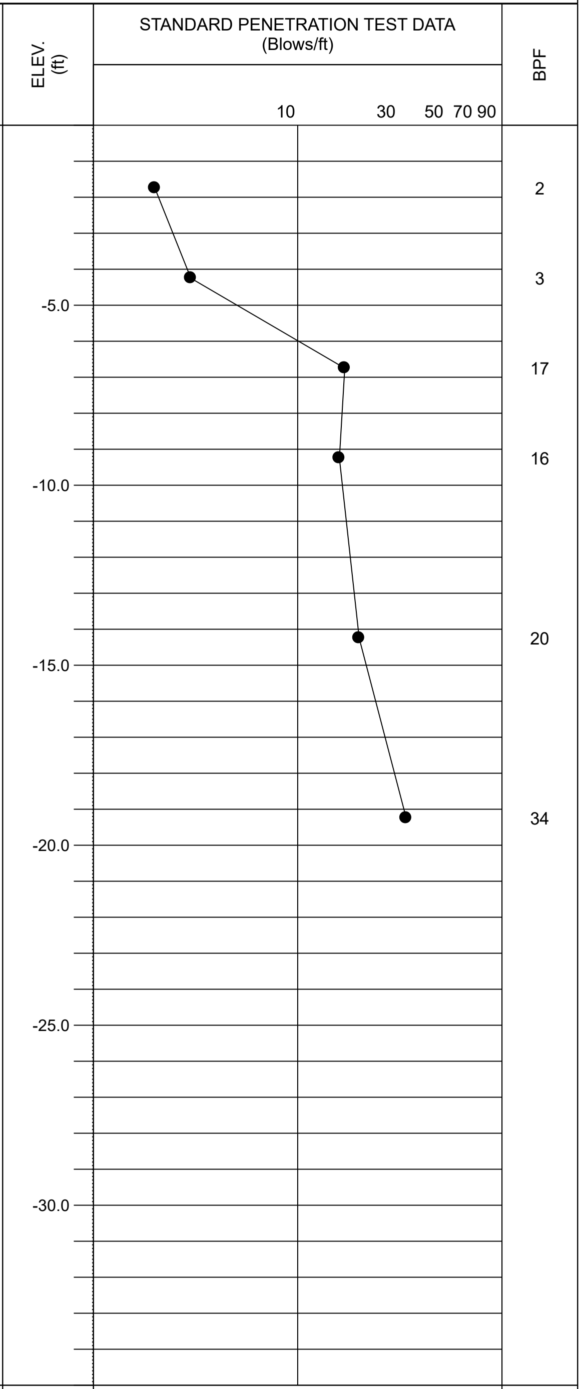
RESIDUUM: Very Soft Gray Sandy Elastic SILT, (moist)

RESIDUUM: Soft Gray and Brown Sandy High Plasticity CLAY, (moist)

RESIDUUM: Very Stiff To Hard White and Tan Sandy SILT, (moist)

Boring was terminated at 20.0 feet. Cave-in depth at 17.0 feet. Backfilled with soil.

HC



5
10
15
20
25
30

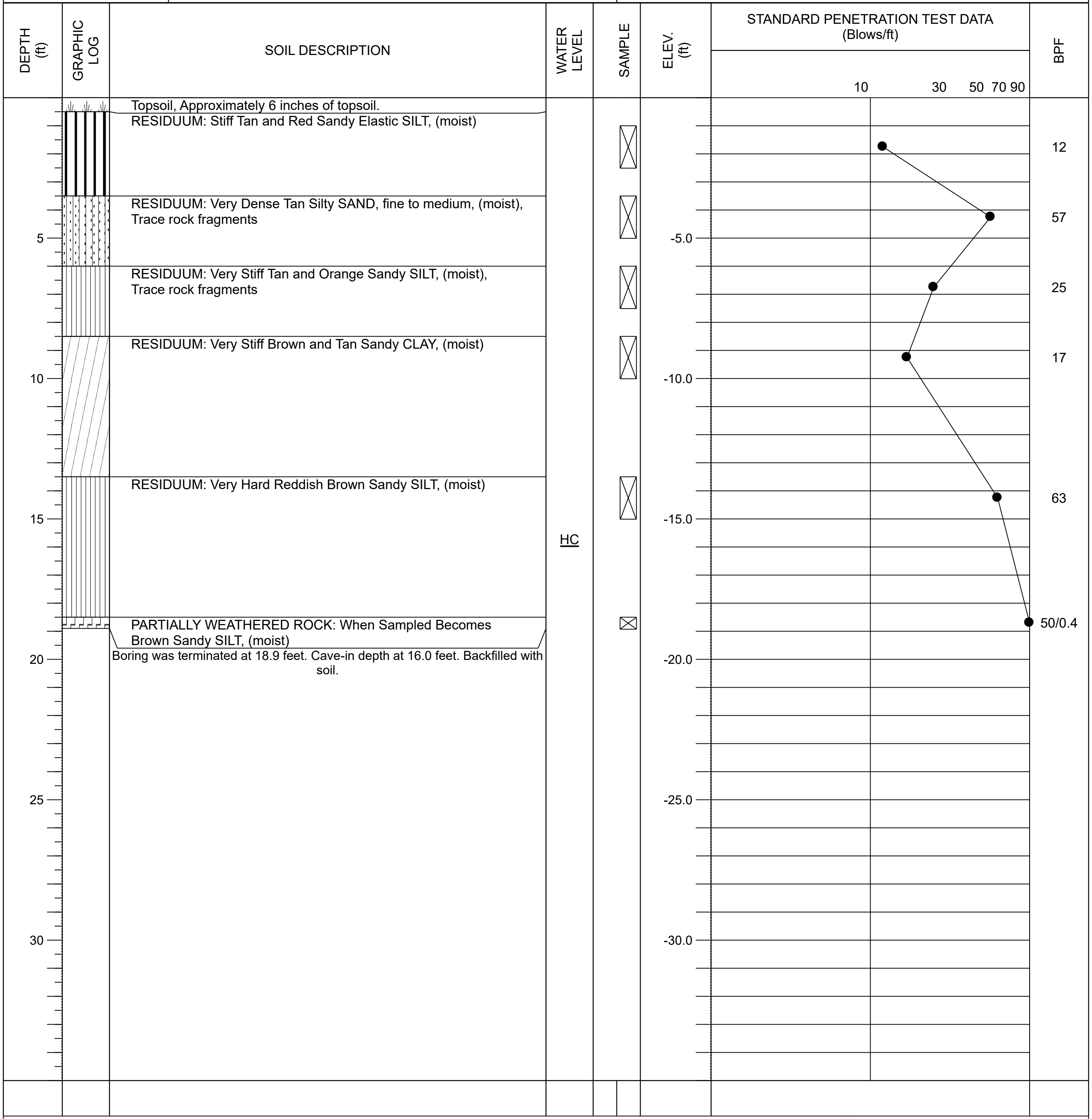
DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE TEST LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
B-03

PROJECT No.:	ELEVATION:	DRILLING METHOD:	AUGER I.D.:	DRILLING COMPANY:
25-02334-GEO	Existing Ground Surface	Hollow Stem Auger	2.25 in	Wells Geotech
LOGGED BY:	**BORING DEPTH:**	**DRILL RIG:**	**NOTES:**	
Pablo Barrera	18.9 Feet	Mobile B51		
DATE DRILLED:	**WATER LEVEL:**			
11/19/25	▽ Dry @ TOB	▼ N/A		



Topsoil, Approximately 6 inches of topsoil.

RESIDUUM: Stiff Tan and Red Sandy Elastic SILT, (moist)

RESIDUUM: Very Dense Tan Silty SAND, fine to medium, (moist), Trace rock fragments

RESIDUUM: Very Stiff Tan and Orange Sandy SILT, (moist), Trace rock fragments

RESIDUUM: Very Stiff Brown and Tan Sandy CLAY, (moist)

RESIDUUM: Very Hard Reddish Brown Sandy SILT, (moist)

PARTIALLY WEATHERED ROCK: When Sampled Becomes Brown Sandy SILT, (moist)

Boring was terminated at 18.9 feet. Cave-in depth at 16.0 feet. Backfilled with soil.

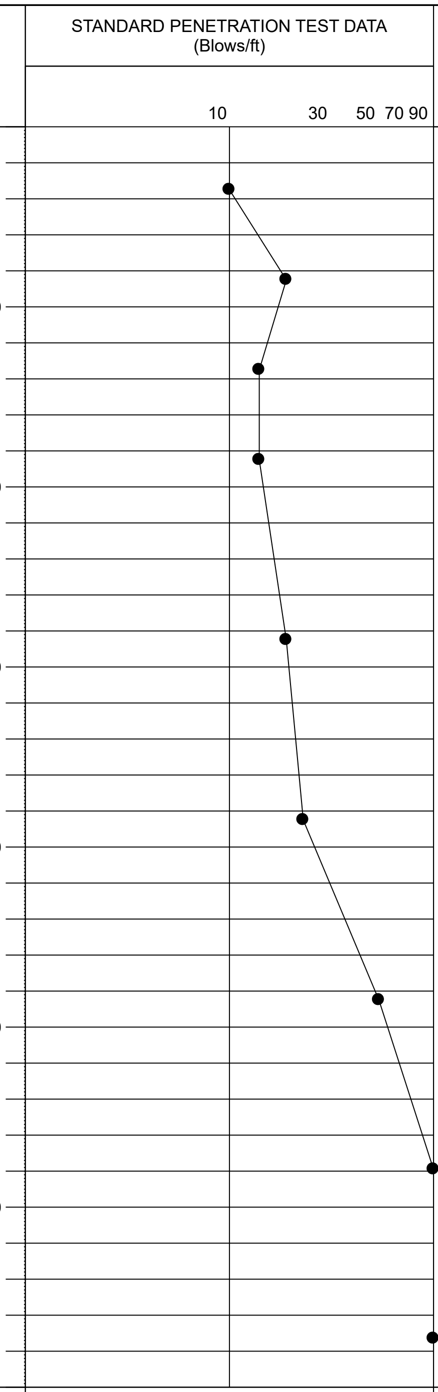
DEPTH MEASUREMENTS ARE SHOWN TO ILLUSTRATE THE GENERAL ARRANGEMENTS OF THE SOIL TYPES ENCOUNTERED AT THE TEST LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
B-04

PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 41.4 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/20/25	**WATER LEVEL:** ▽ 26.0 feet @ TOB ▼ N/A			

DEPTH (ft)	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	BPF
	Topsoil/Grassmat, Approximately 7 inches of topsoil/rootmat.				
	RESIDUUM: Stiff To Very Stiff Brown and Orange Sandy CLAY, (moist)		☒		10
			☒		19
5				-5.0	
			☒		14
			☒		14
10	RESIDUUM: Stiff To Very Stiff Orangeish Brown Sandy SILT, (moist)			-10.0	
			☒		19
15				-15.0	
	RESIDUUM: Very Stiff Brown Sandy CLAY, (moist), Trace rock fragments at 18.5 ft bgs.		☒		23
20				-20.0	
	RESIDUUM: Very Dense Brown and Orange Silty SAND, (moist to wet), Trace rock fragments at 23.5 ft bgs		☒		54
25				-25.0	
		▽			
	PARTIALLY WEATHERED ROCK: When Sampled Becomes Brown Sandy SILT, (moist)		☒		50/0.4
30				-30.0	
	PARTIALLY WEATHERED ROCK: When Sampled Becomes Brown Silty SAND, fine to medium, (moist)		☒		50/0.3



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

ESP

PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
B-04

PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 41.4 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/20/25	**WATER LEVEL:** ▽ 26.0 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
	▨	PARTIALLY WEATHERED ROCK: When Sampled Becomes Brown Silty SAND, fine to medium, (moist)	HC	⊠		●	50/0.2
40					-40.0		
		Auger refusal encountered at 41.4 feet. Boring was terminated at 41.4 feet. Cave-in depth at 38.0 feet. Backfilled with soil.		—		●	50/0.04
45					-45.0		
50					-50.0		
55					-55.0		
60					-60.0		
65					-65.0		

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

ESP

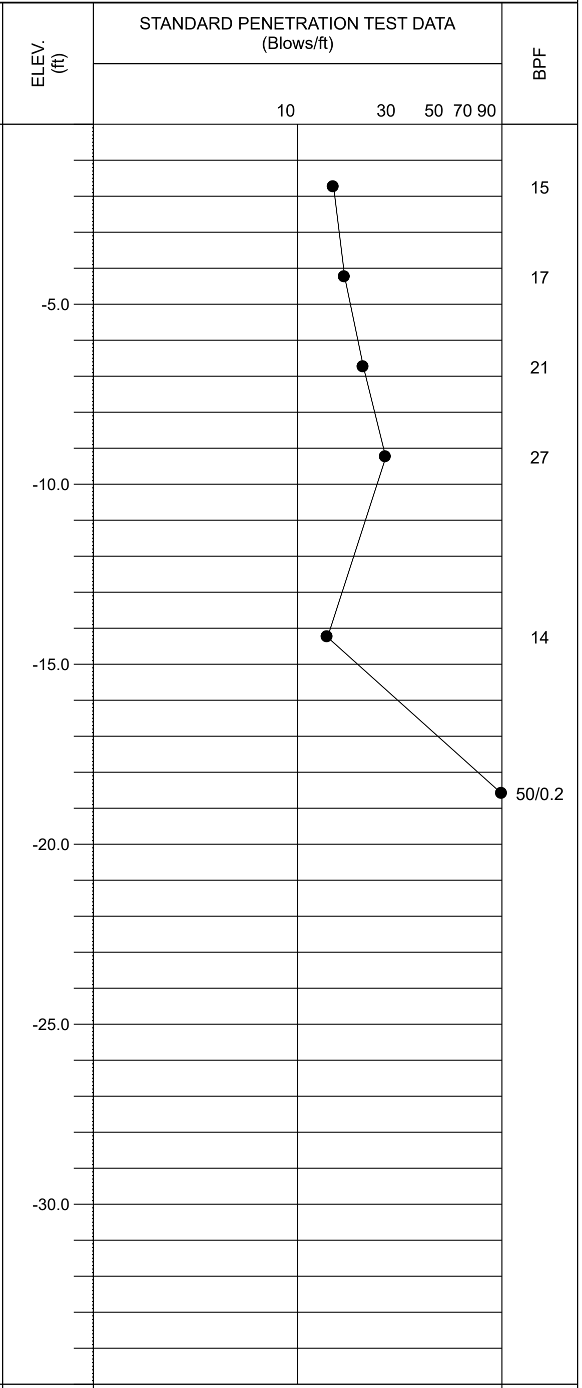
PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
B-05

PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 18.7 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/20/25	**WATER LEVEL:** ▽ Dry @ TOB	▼ N/A		

SOIL DESCRIPTION	WATER LEVEL	BPF
Topsoil/Grassmat, Approximately 6 inches of topsoil/grassmat.		
RESIDUUM: Stiff To Very Stiff Brown and White Sandy SILT, (moist)		15 17 21 27
RESIDUUM: Stiff Orange and Brown Sandy SILT, (moist), Trace rock fragments at 13.5 ft bgs	HC	14
PARTIALLY WEATHERED ROCK: When Sampled Becomes Brown Sandy SILT, (moist), Rock fragments stuck on shoe of sampler. Very little soil recovery.		50/0.2

Boring was terminated at 18.7 feet. Cave-in depth at 15.0 feet. Backfilled with soil.



DEPTH (ft): 5, 10, 15, 20, 25, 30

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

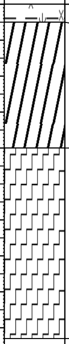
ESP

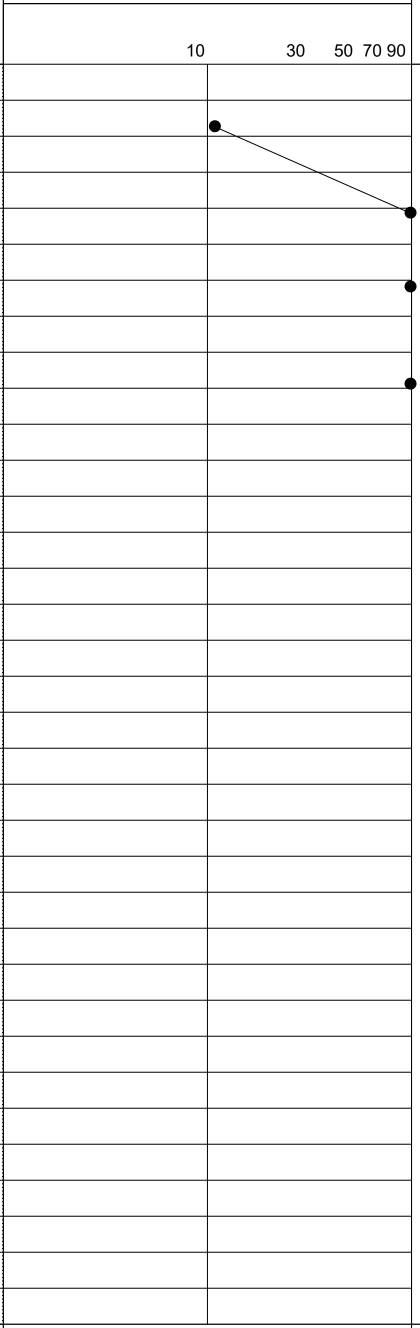
PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
P-01

PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 9.3 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/19/25	**WATER LEVEL:** ▽ Dry @ TOB	▼ N/A		

DEPTH (ft)	GRAPHIC LOG	SOIL DESCRIPTION	WATER LEVEL	SAMPLE	ELEV. (ft)	STANDARD PENETRATION TEST DATA (Blows/ft)	BPF
		Topsoil/Grassmat, Approximately 6 inches of topsoil/grassmat.					
		RESIDUUM: Stiff Gray and Tannish Orange Sandy High Plasticity CLAY, (moist)		☒			11
		PARTIALLY WEATHERED ROCK: When Sampled Becomes Gray and Brown Silty SAND, fine to medium, (moist), Trace rock fragments at 6.0 ft bgs		☒			50/0.3
5					-5.0		
				☒			50/0.4
			HC				
				☒			50/0.3
		Boring was terminated at 9.3 feet. Cave-in depth at 8.0 feet. Backfilled with soil.					
10					-10.0		
15					-15.0		
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 TEST LOCATIONS. DO NOT USE DEPTH MEASUREMENTS FOR DETERMINATION OF DISTANCES OR QUANTITIES.

ESP

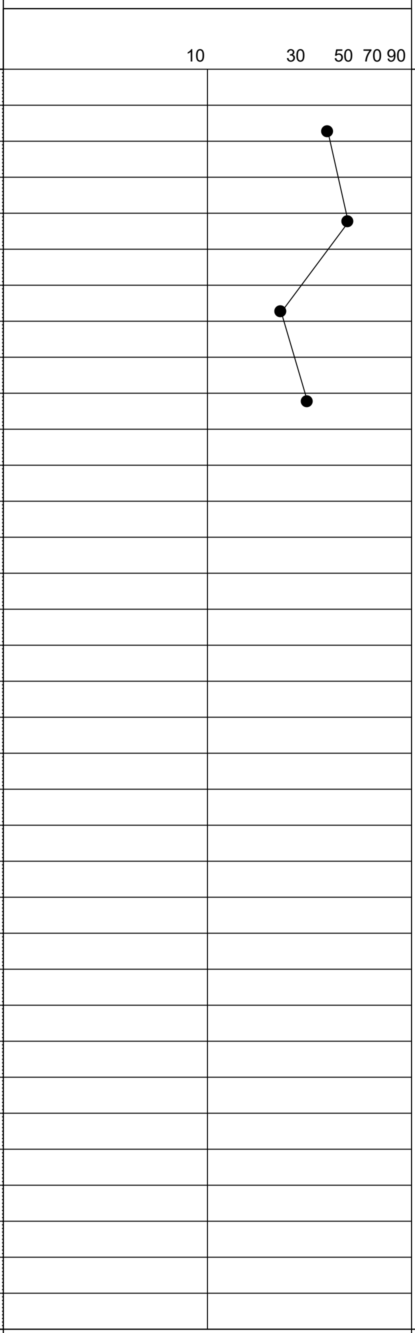
PROJECT: Lesslie Volunteer Fire Department - New Truck Garage and Driveway
York County, SC

TEST BORING RECORD
P-02

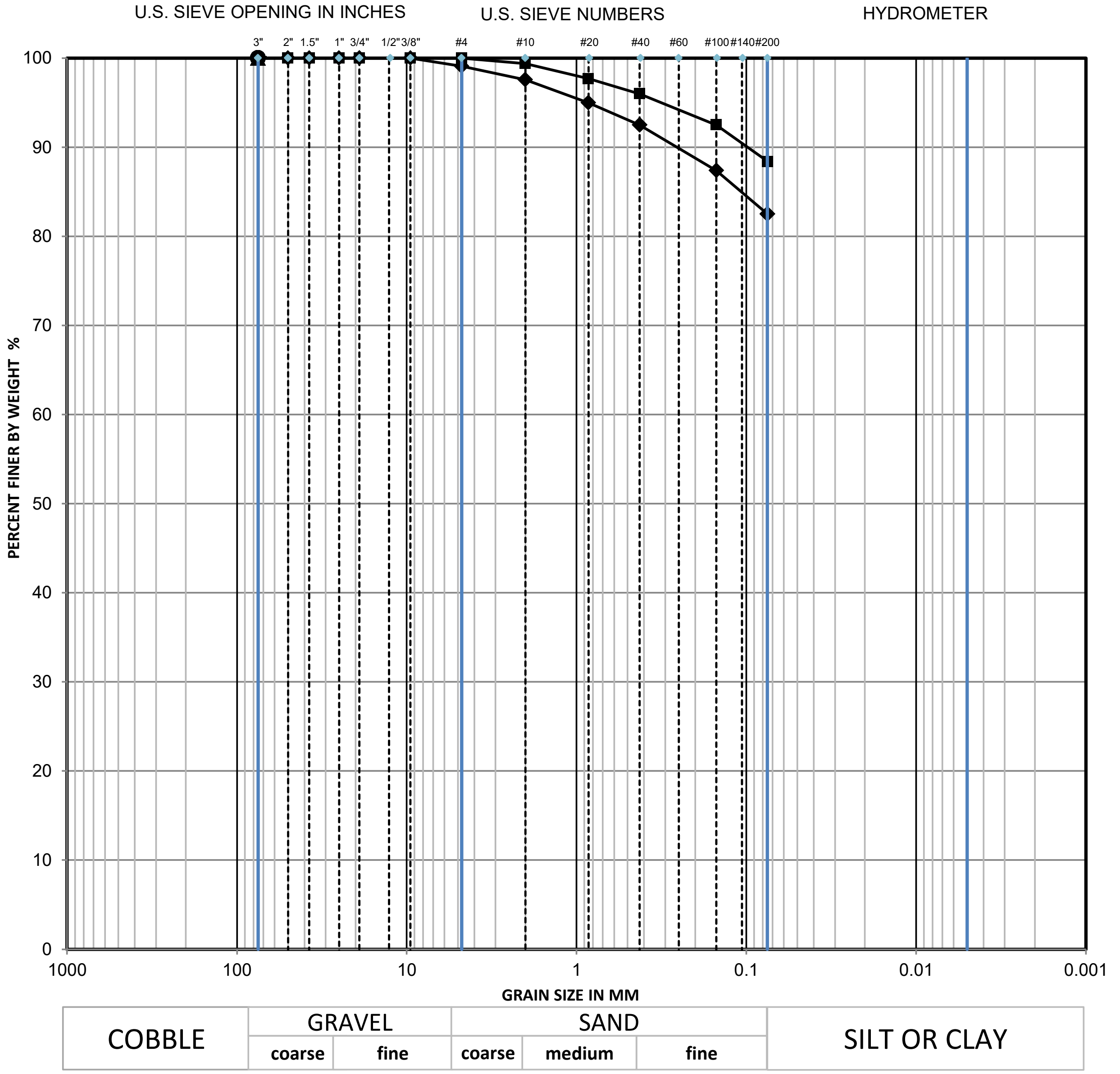
PROJECT No.: 25-02334-GEO	**ELEVATION:** Existing Ground Surface	**DRILLING METHOD:** Hollow Stem Auger	**AUGER I.D.:** 2.25 in	**DRILLING COMPANY:** Wells Geotech
LOGGED BY: Pablo Barrera	**BORING DEPTH:** 10.0 Feet	**DRILL RIG:** Mobile B51	**NOTES:**	
DATE DRILLED: 11/19/25	**WATER LEVEL:** ▽ Dry @ TOB ▼ N/A			

SOIL DESCRIPTION	WATER LEVEL	SAMPLE	BPF
Topsoil/Grassmat, Approximately 6 inches of topsoil/grassmat			
RESIDUUM: Hard Brown and Orange Sandy High Plasticity CLAY, (moist)		☒	39
RESIDUUM: Dense Brown and Orange Silty SAND, fine to coarse, Trace rock fragments at 3.5 ft bgs		☒	49
RESIDUUM: Very Stiff Brown Sandy CLAY, (moist), Trace rock fragments at 6.0 ft bgs	HC	☒	23
RESIDUUM: Hard Brown and Orange Sandy SILT, (moist), Trace rock (quartz) fragments at 8.5 ft bgs.		☒	31
Boring was terminated at 10.0 feet. Cave-in depth at 8.0 feet. Backfilled with soil.			

STANDARD PENETRATION TEST DATA
(Blows/ft)



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



	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
■	**B-01 (3.5' - 5')**	**Fat clay CH**	**56**	**14**	**42**		
◆	**B-04 (0' - 10')**	**Lean clay with sand CL**	**33**	**21**	**12**		

	Specimen Identification	D100	D60	D30	D10	% Gravel	% Sand	% Fines
■	**B-01 (3.5' - 5')**	**4.8**					**11.6**	**88.4**
◆	**B-04 (0' - 10')**	**9.5**				**0.9**	**16.6**	**82.5**

Grainsize Requirement Limits:

Remarks:

GRAIN SIZE DISTRIBUTION

TEST METHOD: ASTM D422

Address: 3475 Lakemont Boulevard
Fort Mill, SC 29708

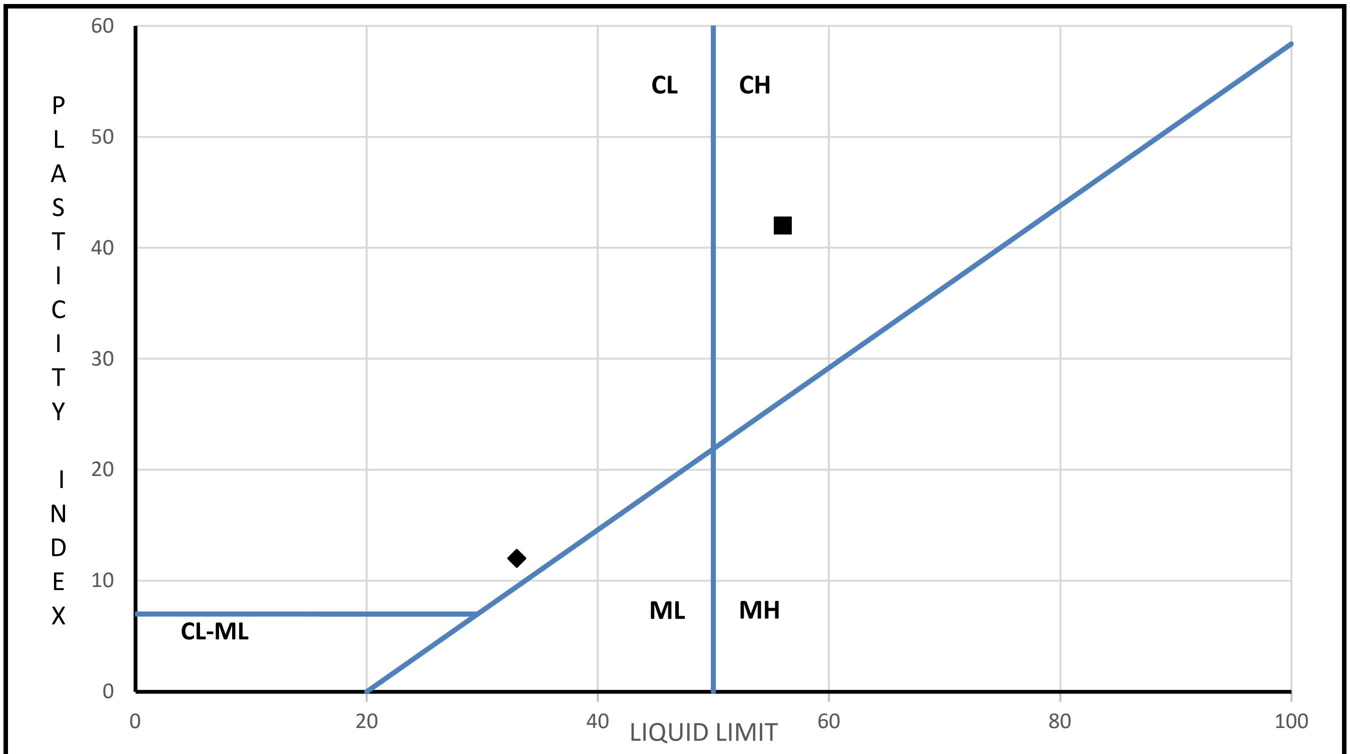
Telephone: 803-802-2440

Project: **Lesslie Volunteer Fire Department**

Number: **25-02334-GEO**

Lab Technician: tbarrett

Project Manager: cbrown



	Specimen Identification	LL	PL	PI	Fines	Classification
■	**B-01 (3.5' - 5')**	**56**	**14**	**42**	**88.4**	**Fat clay CH**
◆	**B-04 (0' - 10')**	**33**	**21**	**12**	**82.5**	**Lean clay with sand CL**

Remarks:

ATTERBERG LIMITS' RESULTS

TEST METHOD: ASTM D4318

ESP

Address: 3475 Lakemont Boulevard
Fort Mill, SC 29708

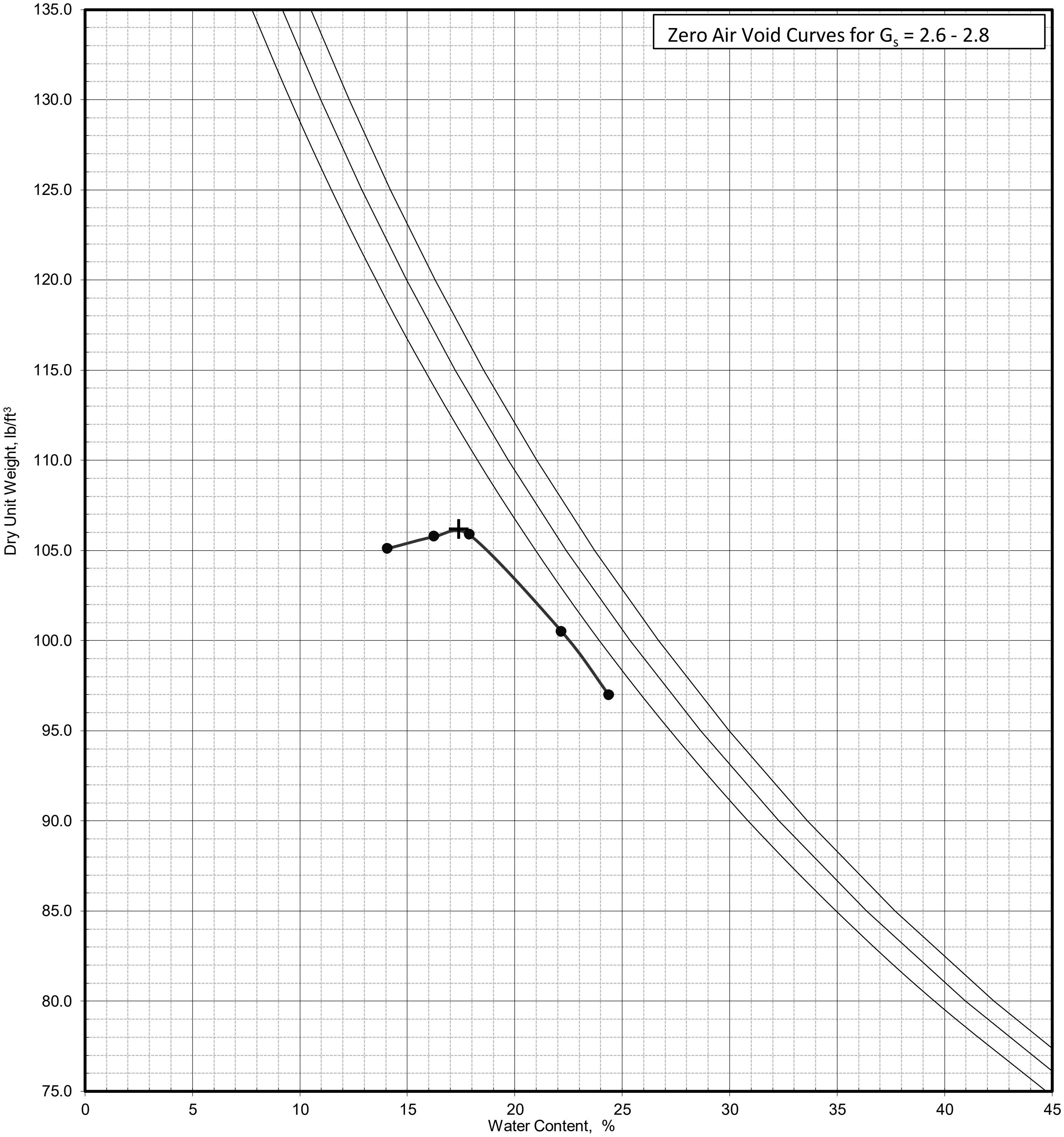
Telephone: 803-802-2440

Project: **Lesslie Volunteer Fire Department**

Number: **25-02334-GEO.400**

Lab Technician: tbarrett

Project Manager: cbrown



Soil Description: **Orange Brown Lean CLAY with Sand CL**
Sample No.
Sample Type: **BLK**
Preparation:
Rammer: **Manual - 5.5lbf (24.5N)**
Location: **B-04**
Depth : 0 - 10 ft
Maximum Dry Unit Weight: **106.2** lb/ft³
PL: **21**
PI: **12**
Received water content: %
Optimum Water Content: **17.4** %
Fines: **82.5** %
LL: **33**

Remarks:

STANDARD MOISTURE-DENSITY RELATIONSHIP

TEST METHOD: ASTM D698 method A

ESP

Address: 3475 Lakemont Boulevard
Fort Mill, SC 29708

Telephone: 803-802-2440

Project: **Lesslie Volunteer Fire Department**

Number: **25-02334-GEO**

Lab Technician: tbarrett

Project Manager: cbrown

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