

Addition to The Samaritan House

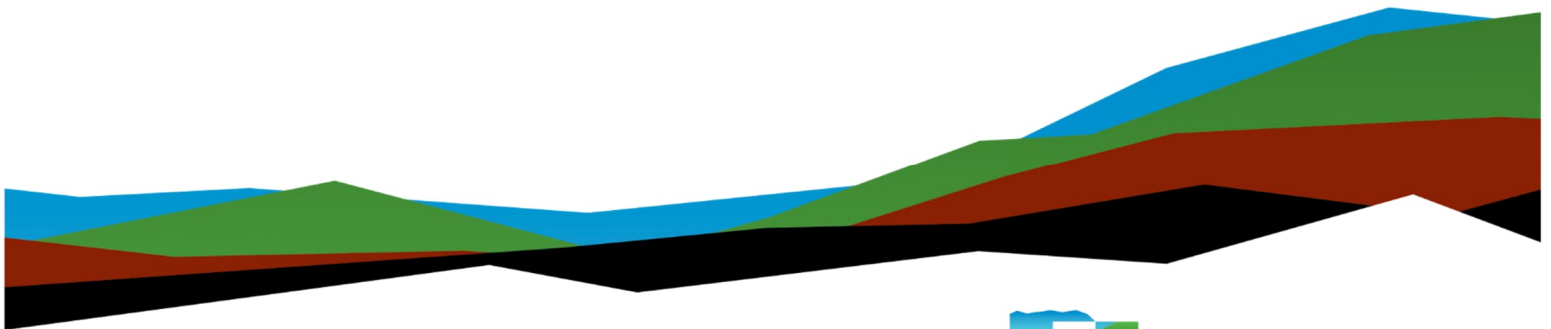
Orangeburg, SC

Geotechnical Engineering Report

July 23, 2026 | Terracon Project No. 73265011

Prepared for:

Becker Morgan Group, Inc.
1942 East 7th Street, Suite 240
Charlotte, NC 28202



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- Facilities
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July 23, 2026

Becker Morgan Group, Inc.
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Attn: Mr. Chris Coleman
P: (803) 518-6850
E: ccoleman@beckermorgan.com

Re: Geotechnical Engineering Report
Addition to The Samaritan House
1580 Middleton Street
Orangeburg, SC
Terracon Project No. 73265011

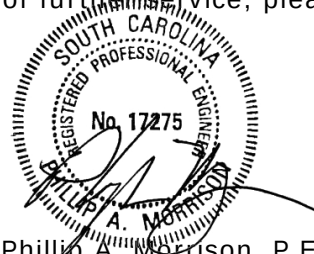
Dear Mr. Coleman:

We have completed the scope of Geotechnical Engineering services for the above referenced project in general accordance with Terracon Proposal No. P73255011 (Rev. 1), dated March 10, 2026 and authorized on March 25, 2026 and Change Order No. 1, dated May 21, 2026 and authorized on June 2, 2026. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon


Zach Zelaya, P.G.
Staff Geologist

A circular professional seal for Phillip A. Morrison, a Registered Professional Engineer in South Carolina. The seal includes the text "SOUTH CAROLINA", "REGISTERED PROFESSIONAL ENGINEER", and "No. 17275". A signature is written over the seal.

Phillip A. Morrison, P.E.
Principal
SC Registration No. 17275



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[Exploration and Testing Procedures](#)
[Site Location and Exploration Plans](#)
[Exploration and Laboratory Results](#)
[Supporting Information](#)

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  Terracon logo will bring you



back to this page. For more interactive features, please view your project online at client.terracon.com.

Refer to each individual Attachment for a listing of contents.



Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed free-standing addition to The Samaritan House, located at 1580 Middleton Street in Orangeburg, SC. The purpose of these services was to provide information and geotechnical engineering recommendations related to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report. [Site Location](#) and [Exploration Plan](#) present the site and boring locations, respectively. The boring logs and the results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included in [Exploration and Laboratory Results](#).

Project Description

Our initial understanding of the project was presented in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

In the course of the project the addition location was changed from the area northeast of the existing's northeast wing to the area to its southeast.

Item	Description
Information Provided	The following were provided for our use in preparing this report: ■ Aerial photograph of the general area of the addition, undated ■ Narrative of the planned addition shared by text ■ Life Safety Plan and Code Study (Sheet G101, original addition location) dated September 2026 by BMG ■ Life Safety Plan and Code Study (Sheet G101, updated addition location) dated September 2026 by BMG

Item	Description
Project Description	The planned addition will be a 1,870 s.f., one-story, free-standing building located to the southeast of the existing building's northeast wing. For the actual layout, see Exploration Plan .
Building Construction	We understand that the addition will be constructed using wood- or light-gauge steel framing and concrete slab-on-grade. We further understand the addition will be structurally separate from the existing building.
Finished Floor Elevation	The finished floor elevation has not been provided. We have assumed the FFE will match that of the existing building, generally about 1 foot or less above the existing ground surface.
Maximum Loads	The structural loads were not provided. In the absence of information provided by the design team, we have considered the following loads to be maximum. ■ Columns: 50 kips ■ Walls: 3 kips per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf)
Grading/Slopes	Grading information was not provided. As noted earlier, the site is relatively flat. We expect that less than 1 foot of new fill will be required to develop final grade.
Below-Grade Structures	None indicated.
Free-Standing Retaining Walls	None indicated.
Pavements	None indicated.
Building Code	IBC 2021

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The Samaritan's House is located at 1580 Middleton Street in Orangeburg, SC. It is bordered on the northwest side by Cemetery Street. The addition will be on the southeast side of the existing building's northeast wing. The approximate center of the building area is located at 33.4943° N, 80.8679° W. For additional information, see Site Location.
Existing Improvements	The site is currently developed with the primary building, a centrally located, L-shaped structure. A separate, metal-sided structure is present, forming somewhat of a courtyard on the southeast side of the L-shaped building's northeast wing. A site drive follows between the building cluster and the northeast and southeast property boundaries. Each side of the road on the northeast side area is supported by a retaining wall. The actual location of the planned building addition is a lawn area with several raised gardening beds.
Current Ground Cover	Outside the two existing structures, the ground cover is asphalt in the perimeter road and grass between the road and the building.
Existing Topography	Topographic information was not provided. Based on our field observations, the site grades generally slope downward from the site drive's intersection with Cemetery Street toward its intersection with Middleton Street. Elevations range from 200 feet to 184 feet at the noted intersections based on the Orangeburg County GIS System. The portion of the site being considered for the addition appears generally flat with an elevation of close to 185 feet.

Geotechnical Characterization

Area Geology

The site is located in the upper Coastal Plain physiographic province of South Carolina. The Coastal Plain is a wedge-shaped cross-section of water and wind deposited soil. Its thickness ranges from a featheredge at the surface contact of the Piedmont (Fall Line) to several thousand feet at the present day coastline. The sediments range in age from the Cretaceous and Tertiary periods at the contact with the bedrock to the recent period at the present coastline. The sediments include clays, silts, sands, and gravels, as well as organics.

Fill soils are those soils that have been placed or reworked in conjunction with past construction grading or farming. Fill can be composed of different soil types from various sources and can contain debris from building demolition, organics, topsoil, trash, etc. The engineering properties of the fill depend primarily on its composition, density, and moisture content.

Soil Conditions

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in [Exploration and Laboratory Results](#) and the GeoModel can be found in [Figures](#).

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Fill	Loose to medium dense Silty Sand (SM)
2	Sands	Very loose to medium dense Silty Sand (SM), Silty Clayey Sand (SC-SM) and Clayey Sand (SC)
3	Clays	Medium stiff to stiff Fat Clay with Sand (CH), Sandy Fat Clay (CH) and Stiff Lean Clay with Sand (CL) and Sandy Lean Clay (CL)
4	Santee Limestone	Santee Limestone, very stiff to stiff Sandy Elastic Silt (MH) with concreted hard layers sampled as Sandy Elastic Silt (MH)

Existing fill was encountered in Borings B-2 in the original addition to 3 feet and to depths of 1 to 2 feet in Borings B-3, B-4 and B-5, located in the updated addition location. The existing fill consists of loose to medium dense sand.

Very loose sandy soil was encountered in Boring B-3 at a depth of 3½ feet bgs. To estimate the extents of this condition, Borings B-4 and B-5 were drilled. Firmer conditions were encountered at this depth in both the supplemental borings.

Groundwater Conditions

Borings B-2 and B-3 were advanced in the dry using hollow stem auger drilling techniques that allow short term groundwater observations to be made while and shortly after drilling. Groundwater seepage was encountered in Boring B-2 at 14 feet bgs at the completion of drilling. Groundwater conditions may be different at the time of construction. Due to the planned boring depth, Boring B-1 was advanced with the rotary wash drilling techniques which introduces water into the borehole to aid in the removal of the drill cuttings. Therefore, a groundwater level is not available at this location.

Mapping by the Natural Resources Conservation Service (NRCS) indicates a seasonal high groundwater level below 72 inches of ground surface. Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of drilling. Long-term groundwater monitoring was outside the scope of services for this project.

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC).

To determine the seismic site class, Terracon initially screened the site soil profile to determine whether any of the following conditions were satisfied which would require the site to be classified as Site Class F. These include:

- Soils vulnerable to potential failure or collapse under seismic loading, such as liquefiable soils, quick and highly sensitive clays, and collapsible weakly cemented soils.
- More than 10 feet thick, peats and/or highly organic clays.
- More than 25 feet thick, very high plasticity clays of Plasticity Index (PI) > 75.
- More than 120 feet thick, soft/medium clays with undrained shear strength less than 1,000 psf.

Based on the data from the soil test borings and liquefaction screening performed, we do not anticipate the conditions listed above are present. Based on the data from soil test borings and liquefaction screening performed, our professional opinion is for that a Seismic Site Classification of D be considered for the project. Subsurface explorations at this site were extended to a maximum depth of 29 feet where refusal of the drilling equipment was encountered. The site properties below the boring depth to 100 feet were

estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Geotechnical Overview

The site appears to be generally suited for the proposed construction based upon the geotechnical conditions encountered in the test borings. Presuming the foundations bear on firm native soils or on structural fill extending to these materials, the structure can be supported by conventional spread/strip footings with tolerable settlement estimates. [Shallow Foundations](#) provides recommendations for their use. [Floor Slabs](#) provides recommendations regarding support for the slabs-on-grade on prepared subgrades.

While most of the borings indicated generally firm soils within the explored soil profile, Boring B-3 encountered very loose soils at a depth of 3½ feet. At this depth, these conditions will influence the foundation bearing conditions and require undercutting and replacement to prepare it to support the recommended allowable bearing pressure. As the soil consistency noted in Boring B-3 appears somewhat anomalous compared to the other borings, it is recommended that test pits be excavated to better observe the soil conditions as it may be an indicator of prior construction, possibly associated with utility installation, previous foundations, or previous general fill that may be detrimental to the proposed development if not addressed.

As noted previously, the borings indicated the presence of undocumented existing fill within the upper 1 to 2 feet of the soil profile in the planned building footprint. Based on the anticipated grading scheme, the existing fill will not likely be removed by the grading activities. While the N-values from the boring data indicate that some of the existing fill may have received at least some compactive effort in its placement, its consistency is variable.

There is an inherent risk for the owner that compressible fill or unsuitable material within or buried by the fill is present. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill but can be reduced by performing additional testing and evaluation. If the owner's risk tolerance is low, the fill should be completely removed and replaced with new structural fill. Presuming that the owner can tolerate some risk, the building's floor slab can be supported on the existing fill, provided it is evaluated and repaired as necessary. This method of preparing the slab-on-grade and pavement subgrades is discussed in this report.

To help manage the Owner's risk of allowing the fill to remain in-place for floor slab support, Terracon recommends the existing fill be further evaluated. Considering the shallow depth of the fill, this would primarily include proofrolling of the existing subgrade to observe its stability. Depending on the findings, test pit excavation may also

be necessary. It should be expected that undercutting and replacement of unsuitable fill soils may be required in some areas of the site to improve the subgrade support characteristics.

Below the footings, we recommend that the existing fill be removed. Depending on the depth of the fill below the footing bottoms, the footings can be lowered or the excavated soil can be replaced with flowable fill, compacted structural fill or crushed aggregate.

Sandy clays and silty/clayey sand with moderately high fines contents comprise the existing subgrade conditions. Based on our understanding of the likely grading scheme, we expect these materials will remain at the subgrade level. Such soils can become unstable with typical earthwork and construction traffic, especially after precipitation events. During construction, the subgrade's moisture content should be maintained to help limit the potential of subgrade instability. This would include establishing effective drainage early in the construction sequence and maintaining it through and after construction. Performing the grading during the warmer and drier times of the year would also be beneficial to this effort. If grading is performed during the winter months, an increased risk for possible undercutting and replacement to address unstable subgrades will persist.

Based on our understanding of the grading scheme, it is not likely that a significant amount of overburden material will be generated by the grading activities. Nevertheless, the surficial sandy clays and clayey sands (less any organics and debris) can generally be considered for use as structural fill. However, the moisture contents of the collected samples appeared generally above the optimum level for this material. If conditions during construction are as now, it may be necessary to lower their moisture levels closer to the optimum value to facilitate compaction. This would likely include manipulation to help the materials dry prior to use. Such activities are more efficiently performed in the warm summer months.

Groundwater was encountered at a depth of 14 feet bgs in Boring B-2. Based on our understanding for the planned construction, we do not expect the groundwater to adversely influence the proposed construction.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in [Exploration and Laboratory Results](#)), engineering analyses, and our current understanding of the proposed project. [General Comments](#) provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications

for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and floor slabs.

Site Preparation

The proposed building will be constructed within the footprint of raised wooden beds which will need to be demolished, as well as exterior sidewalks, pavements, and utilities. We recommend any existing foundations, slabs, and utilities be removed from within the proposed building footprint and at least 5 feet beyond the outer edge of foundations.

For areas outside the proposed building footprints and foundation bearing zones, existing foundations, floor slabs, and utilities should be removed where they conflict with proposed utilities, retaining walls, and pavements. In such cases, existing foundations, floor slabs, and utilities should be removed to a depth of at least 2 feet below the affected utility or design pavement subgrade elevation.

Existing utilities that are to be abandoned should be removed or filled with grout. The excavations resulting from foundation and utility removal should be properly backfilled with compacted structural fill as described in “Fill Material Types” and “Fill Compaction Requirements”, below. Utilities that are to remain in service or abandoned in place should be accurately located horizontally and vertically to minimize conflict with new foundation construction and their backfill evaluated and repaired, as necessary.

Subgrade Preparation

After stripping and in preparation for floor slab support, we recommend that all exposed at-grade areas and those which will receive fill should be scarified to a minimum depth of 10 inches, moisture conditioned as necessary, and compacted per the compaction requirements in “Fill Placement and Compaction Requirements”, below. Similar preparation of the subgrade should be performed in the cut areas, once the overburden soils are removed.

After compaction, the subgrades in the at-grade areas and areas receiving fill should be proofrolled with an adequately loaded vehicle such as a fully loaded, tandem-axle dump truck. Cut areas should be proofrolled after they have been excavated to their proposed subgrade levels. Proofrolling should be performed after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade. The proofrolling should be performed under the observation of the Geotechnical Engineer or representative. Proofrolling should be performed after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade.

Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed or modified as discussed in “Soil Stabilization”. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted. The actual method and extent of the subgrade repair/undercutting should be determined in the field and observed by Terracon’s geotechnical engineer at the time of construction.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable; however, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Fill Material Types

Based on the size of the planned construction area, we recommend that all fill required to achieve the design grade should be classified as structural fill. Recommendations for the reuse of the on-site soil and for imported fill are discussed below.

Reuse of On-Site Soil: Based on our understanding of the likely grading scheme, limited, if any, overburden material available for reuse as structural fill is expected to be generated at the site. Nevertheless, the surface on-site soil may be selectively reused as structural fill. Portions of the on-site soil have an elevated fines content and will be sensitive to moisture conditions (particularly during seasonally wet periods) and may not be suitable for reuse when above optimum moisture content. Such conditions would require drying of the soil to facilitate its use.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Soil Type ¹	USCS Classification	Acceptable Parameters (for Structural Fill)
Coarse-Grained Soil	SM, SC, SW	Liquid Limit less than 30 Plasticity index less than 10 Less than 30% passing No. 200 sieve

1. Structural fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

Fill Placement and Compaction Requirements

Structural fill should meet the following compaction requirements.

Item	Parameter
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e., jumping jack or plate compactor) is used
Minimum Compaction Requirements	95% of maximum dry density (ASTM D698)
Water Content Range	-2% to +2% of optimum moisture content (ASTM D698)

Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with structural fill or bedding material in accordance with public works specifications for the utility to be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent raising of the grade could cause settlement in the subgrade supporting the utility. Trench excavation should not be conducted below a downward 1:1 projection from existing foundations without engineering review of shoring requirements and geotechnical observation during construction.

On-site materials are considered suitable for backfill of utility and pipe trenches from 1 foot above the top of the pipe to the final ground surface. This is provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the various structures and slabs can result in weakening of the shallow

soils, potentially resulting in subgrade failure. The roof should have gutters/drains with downspouts that discharge directly into the storm drain system.

Earthwork Construction Considerations

The site soil generally consists of moderate consistency sandy clay and loose to medium dense clayey/silty sand. We anticipate that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as the floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompact prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations. Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining structures. Our scope of services does not include reviewing available final grading information or considering potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby buildings and infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent or near existing buildings and property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of

existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas. Where not specified by local ordinance, one density and water content test should be performed for every 100 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options. In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

If the site has been prepared in accordance with the requirements noted in [Earthwork](#), the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure ^{1, 2}	2,000 psf
Required Bearing Stratum ³	Undisturbed native soils or structural fill extending to undisturbed native soils
Minimum Foundation Dimensions	Columns: 24 inches Continuous: 18 inches
Ultimate Passive Resistance ⁴ (equivalent fluid pressures)	300 pcf
Sliding Resistance ⁵	0.30 ultimate coefficient of friction
Minimum Embedment below Finished Grade ⁶	12 inches
Estimated Total Settlement from Structural Loads ²	Less than about 1 inch
Estimated Differential Settlement ^{2, 7}	About 1/2 of total settlement

Item	Description
1.	The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2.	Values provided are for maximum loads noted in Project Description . Additional geotechnical consultation will be necessary if higher loads are anticipated.
3.	Unsuitable or soft soils should be overexcavated and replaced per the recommendations presented in Earthwork .
4.	Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
5.	Can be used to compute sliding resistance where foundations are placed on suitable soil/materials.
6.	Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7.	Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Anomalous conditions were encountered in Boring B-3 which would influence the support conditions of the foundation subgrades. These conditions should be further evaluated by test pits as discussed in [Geotechnical Overview](#).

Design Parameters – Overturning and Uplift Loads

Shallow foundations subjected to overturning loads should be proportioned such that the resultant eccentricity is maintained in the center-third of the foundation (e.g., $e < b/6$, where b is the foundation width). This requirement is intended to keep the entire foundation area in compression during the extreme lateral/overturning load event. Foundation oversizing may be required to satisfy this condition.

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils with consideration to the IBC basic load combinations.

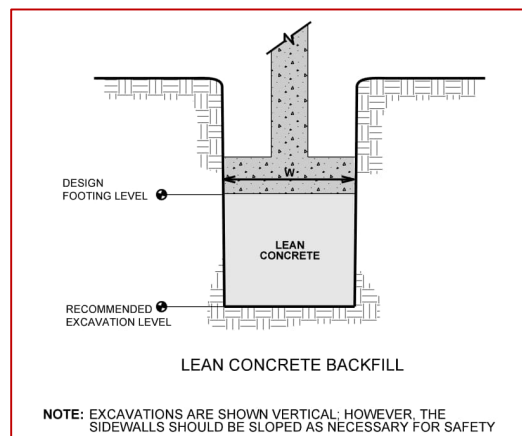
Item	Description
Soil Moist Unit Weight	115 pcf

Item	Description
Soil weight included in uplift resistance	Soil included within the prism extending up from the top perimeter of the footing at an angle of 15 degrees from vertical to ground surface

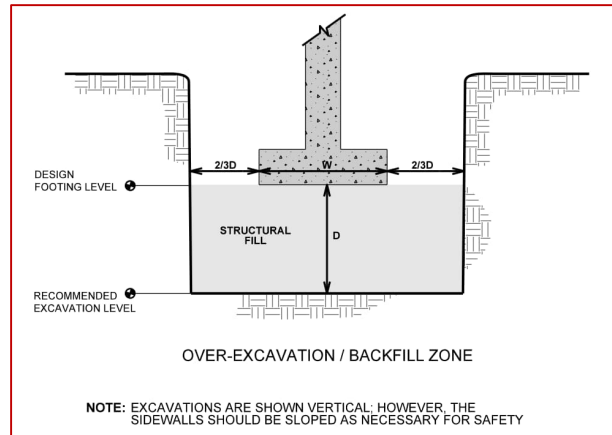
Foundation Construction Considerations

As noted in [Earthwork](#), the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The lean concrete replacement zone is illustrated in the sketch below.



Overexcavation for structural fill placement below footings should be conducted as shown below. The overexcavation should be backfilled up to the footing base elevation, with structural fill or graded aggregate base placed, as recommended in [Earthwork](#).



Floor Slabs

Design parameters for floor slabs assume the requirements for [Earthwork](#) have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support ¹	For slabs above exterior grades, use a minimum of 4 inches of base course consisting of well graded crushed aggregate compacted to at least 95% of ASTM D1557. The subgrade should be compacted to recommendations in Earthwork .
Estimated Modulus of Subgrade Reaction ²	90 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in [Earthwork](#), and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder,

the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through the use of sufficient control joints, appropriate reinforcing or other means.

Settlement of floor slabs supported on existing fill materials cannot be accurately predicted but could be larger than normal and result in some cracking. Mitigation measures, as noted in Existing Fill within [Earthwork](#), are critical to the performance of floor slabs. In addition to the mitigation measures, the floor slab can be stiffened by adding steel reinforcement.

Floor Slab Construction Considerations

The finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become

evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the information provided by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

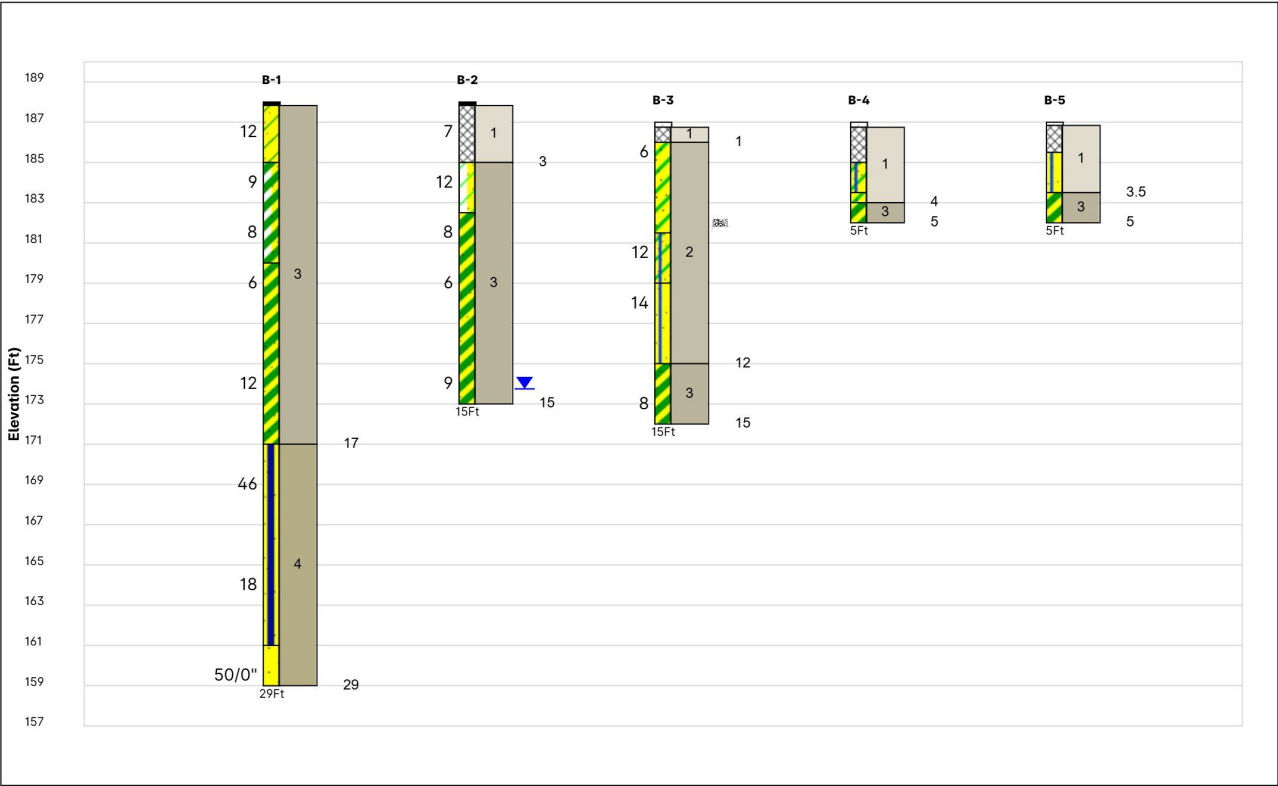
Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Figures

Contents:

GeoModel

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions

#	Layer Name	General Description
1	Fill	Loose to medium dense Silty Sand (SM)
2	Sands	Very loose to medium dense Silty Sand (SM), Silty Clayey Sand (SC-SM) and Clayey Sand (SC)
3	Clays	Medium stiff to stiff Fat Clay with Sand (CH), Sandy Fat Clay (CH), Stiff Lean Clay with Sand (CL) and Sandy Lean Clay (CL)
4	Santee Limestone	Santee Limestone, very stiff to stiff Sandy Elastic Silt (MH) with concreted hard layers sampled as Sandy Elastic Silt (MH)

Legend					
Asphalt	Sandy Lean Clay	Fat Clay with Sand	Sandy Fat Clay	Sandy Elastic Silt	Elastic Silt with Sand
Fill	Lean Clay with Sand	Topsoil	Clayey Sand	Silty Clayey Sand	Silty Sand

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

Notes:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

- First Water Observation
- Second Water Observation
- Third Water Observation

Attachments

Exploration and Testing Procedures

Field Exploration

Two test borings, (Borings B-1 and B-2) were drilled on April 6, 2026. The borings were drilled to depths of 15 to 29 feet bgs (the deepest encountered power auger refusal). Due to a shift in the building location, a third boring (Boring B-3) was drilled to 15 feet bgs on June 29, 2026. Finally, two hand auger borings (Borings B-4 and B-5) were performed on July 21, 2026 due to the conditions encountered in Boring B-3. The approximate locations of each boring are shown on [Exploration Plan](#).

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ± 10 feet) and referencing existing site features. Approximate ground surface elevations were obtained by interpolation from and were estimated using Orangeburg County GIS. If elevations and a more precise boring layout are desired, we recommend that the borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted drill rig using continuous flight hollow stem augers. Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths.

Two borings were performed using a hand auger with penetrometer testing at offset locations from Boring B-3. The consistency of the soil was estimated using dynamic cone penetration testing at regular intervals of 1 to 2 feet.

We observed and recorded groundwater levels during drilling and sampling and at the completion of the exploration activities. The collected information is shown on the attached boring logs. After which, all borings were backfilled with auger cuttings. Pavements were patched with cold-mix asphalt and/or pre-mixed concrete, as appropriate.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field logs of the borings as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling

and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Atterberg Limits
- Fines Content

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

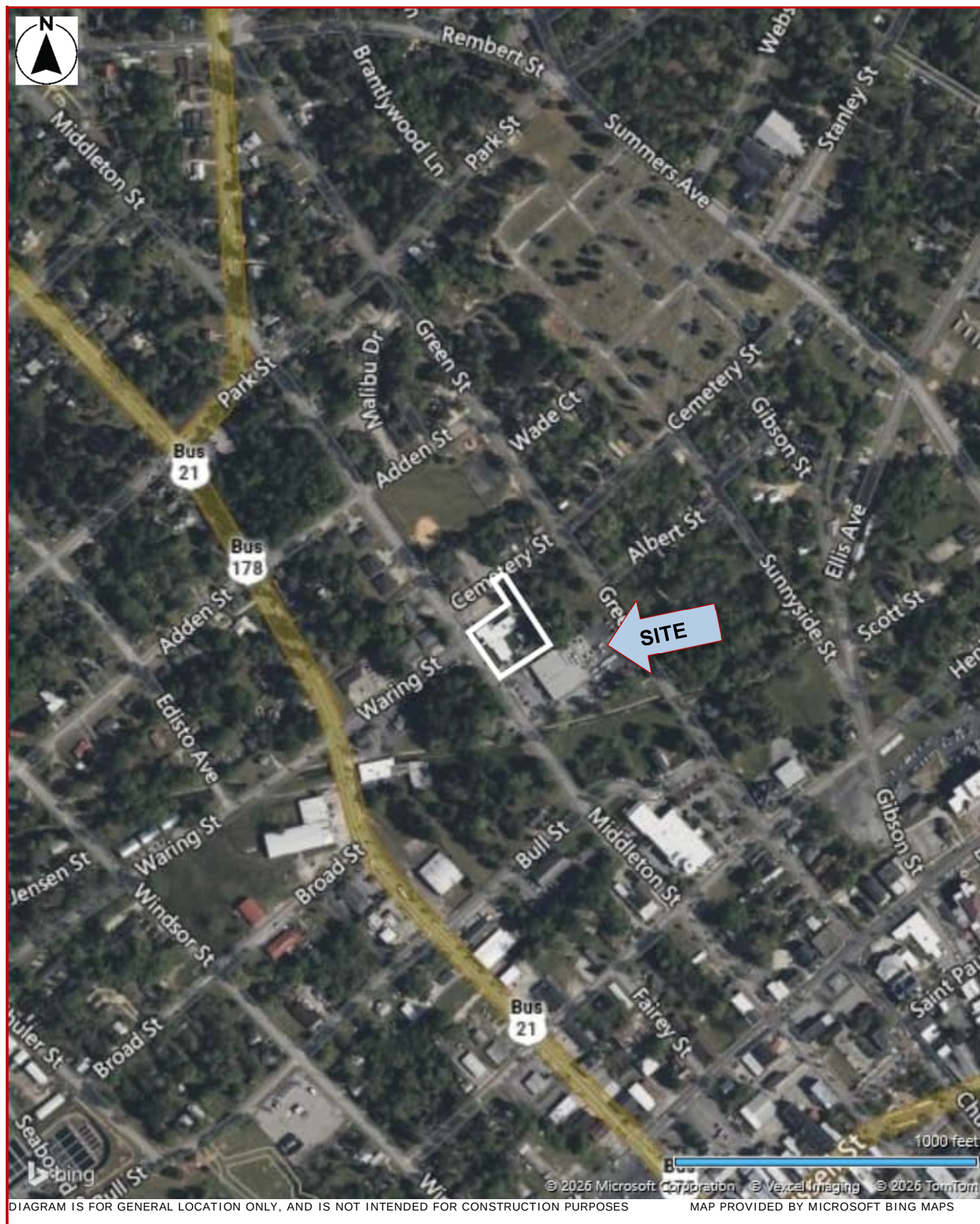
Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location



Exploration Plan



Exploration and Laboratory Results

Contents:

Boring Logs (B-1 through B-5)
Summary of Laboratory Testing
Atterberg Limits Results

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

Surface Elevation:
188(Ft) +/-

Model Layer	Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Percent Fines	Atterberg Limits		
											LL	PL	PI
3		0.2	ASPHALT , 2 inches		188.0								
			SANDY LEAN CLAY (CL) , gray with red and orange mottling, stiff, trace fine to coarse quartz gravel		187.8								
						X	14	12-6-6 N = 12					
		3.0	FAT CLAY WITH SAND (CH) , gray with red and orange mottling, medium stiff to stiff		185.0								
						X	14	3-4-5 N = 9	26	66.8	76	19	57
4				5		X	16	4-3-5 N = 8					
		8.0	SANDY FAT CLAY (CH) , gray, medium stiff to stiff		180.0								
						X	16	3-3-3 N = 6	44	59.1			
				10									
				15		X	16	4-4-8 N = 12					
4		17.0	SANDY ELASTIC SILT (MH) , gray, very stiff to hard, trace fine to coarse gravel limestone concretions		171.0								
						X	16	19-20-26 N = 46					
				20									
						X	16	8-7-11 N = 18					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were obtained through Orangeburg County GIS.

Water Level Observations

Water level not measured while drilling

Advancement Method

0-29 Ft. Mud/Wash Rotary

Abandonment Method

Boring backfilled with cement grout and capped with asphalt upon completion.

Equipment

543/CME-45C

Hammer Type

Automatic

Driller

P. Buzhardt

Logged By

A. Abdalla

Start Date

04/06/2026

Completion Date

04/06/2026

Addition to The Samaritan House
1580 Middleton St, Orangeburg, SC,USA
Terracon Project No. 73265011



521 Clemson Rd
Columbia, SC 29229-4307

Latitude: 33.4944° Longitude: -80.8677°

BORING LOG NO. B-1

Surface Elevation:
188(Ft) +/-

Model Layer	Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Percent Fines	Atterberg Limits		
											LL	PL	PI
4		27.0	SANDY ELASTIC SILT (MH) , gray, very stiff to hard, trace fine to coarse gravel limestone concretions	163.0									
			ELASTIC SILT WITH SAND (MH) , gray, hard, trace fine to coarse gravel limestone concretions	161.0									
						X	4	24-50/0" N = 50/0"					
			Boring Refusal at 29 Ft										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were obtained through Orangeburg County GIS.

Water Level Observations

Water level not measured while drilling

Advancement Method

0-29 Ft. Mud/Wash Rotary

Abandonment Method

Boring backfilled with cement grout and capped with asphalt upon completion.

Equipment

543/CME-45C

Hammer Type

Automatic

Driller

P. Buzhardt

Logged By

A. Abdalla

Start Date

04/06/2026

Completion Date

04/06/2026

BORING LOG NO. B-2

Surface Elevation:
188(Ft) +/-

Model Layer	Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Water Level Observations	Field Test Results	Water Content (%)	Percent Fines
1		0.2 3.0	ASPHALT , 2 inches FILL- SILTY SAND , fine to medium grained sand, gray with brown, loose		188.0 187.8		12		3-3-4 N = 7	12	
3		3.0 5.5	LEAN CLAY WITH SAND (CL) , gray with orange mottling, stiff		185.0		14		3-5-7 N = 12		
			SANDY FAT CLAY (CH) , gray with orange mottling, medium stiff to stiff	5	182.5		16		3-4-4 N = 8	29	54.1
							16		3-3-3 N = 6		
				10			16		3-4-5 N = 9		
Boring Terminated at 15 Ft											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were obtained through Orangeburg County GIS.

Water Level Observations

14 Ft. At completion of drilling

Advancement Method

0-15 Ft. Hollow Stem Auger

Abandonment Method

Boring backfilled with cement grout and capped with asphalt upon completion.

Equipment
543/CME-45C

Hammer Type
Automatic

Driller
P. Buzhardt

Logged By
A. Abdalla

Start Date
04/06/2026

Completion Date
04/06/2026

BORING LOG NO. B-3

Surface Elevation:
187(Ft) +/-

Model Layer	Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Water Level Observations	Field Test Results
1		0.3	TOPSOIL		187.0				
		1.0	FILL- SILTY SAND , fine to medium grained sand, brown, loose		186.8				
			CLAYEY SAND (SC) , fine to medium grained sand, brown to brownish purple, very loose to loose, trace roots, micaceous		186.0	X	17		3-3-3 N = 6
2						X	12		1-WoH-2
		5.5	SILTY CLAYEY SAND (SC-SM) , fine to medium grained sand, dark gray to gray, medium dense	5	181.5				
		8.0	SILTY SAND (SM) , fine grained sand, gray, medium dense		179.0	X	18		3-7-5 N = 12
				10		X	18		3-4-10 N = 14
		12.0			175.0				
3			SANDY FAT CLAY (CH) , green with brown and gray mottles, stiff			X	18		1-3-5 N = 8
			Boring Terminated at 15 Ft						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were obtained through Orangeburg County GIS.

Water Level Observations

■ 5 Ft. Dry cave in

Abandonment Method

Boring backfilled with soil cuttings upon completion.

Equipment

Subcontractor-7822DT
Geoprobe

Hammer Type

Automatic

Driller

William Walker Environmental

Logged By

Zach Zelaya

Start Date

06/29/2026

Completion Date

06/29/2026

Addition to The Samaritan House
1580 Middleton St, Orangeburg, SC,USA
Terracon Project No. 73265011



521 Clemson Rd
Columbia, SC 29229-4307

Latitude: 33.494269° Longitude: -80.867894°

BORING LOG NO. B-4

Surface Elevation:
187(Ft) +/-

Model Layer	Graphic Log	Lithology Depth (ft.)	Material Description	Depth (ft.)	Elevation (Ft.)	Sample Type	Field Test Results
1		0.3	TOPSOIL , 3 inches		187.0	↓	6-5-6
			FILL- SILTY SAND , fine to medium grained sand, brown, moist, medium dense, trace roots @ 1.5 feet - trace glass fragments		186.8	↓	4-9-8
		2.0	SILTY CLAYEY SAND (SC-SM) , fine to medium grained sand, dark brown and brown, moist, medium dense		185.0		
		3.5			183.5		
3		4.0	CLAYEY SAND (SC) , fine to medium grained sand, gray with orange mottles, moist, medium dense		183.0	↓	4-6-7
			SANDY FAT CLAY (CH) , gray with orange mottles, very stiff				
			Boring Terminated at 5 Ft				6-13-14

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were obtained through Orangeburg County GIS.

Water Level Observations

Groundwater not encountered upon completion

Abandonment Method

Boring backfilled with auger cuttings upon completion.

Equipment

Hand Auger

Driller

Z. Zelaya

Logged By

Zach Zelaya

Start Date

07/21/2026

Completion Date

07/21/2026

BORING LOG NO. B-5

Surface Elevation:
187(Ft) +/-

Model Layer	Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Field Test Results
1		0.2	TOPSOIL , 2 inches		187.0	↓	6-6-6
			FILL- SILTY SAND , fine to medium grained sand, brown, moist, medium dense		186.8		
		1.5	SILTY SAND (SM) , fine to medium grained sand, gray and brown, medium dense		185.5	↓	7-7-6
3		3.5	SANDY FAT CLAY (CH) , gray with orange mottles, medium stiff to stiff		183.5	↓	2-4-8
			Boring Terminated at 5 Ft				7-14-10

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were obtained through Orangeburg County GIS.

Abandonment Method

Boring backfilled with auger cuttings upon completion.

Equipment

Hand Auger

Driller

Z. Zelaya

Logged By

Zach Zelaya

Start Date

07/21/2026

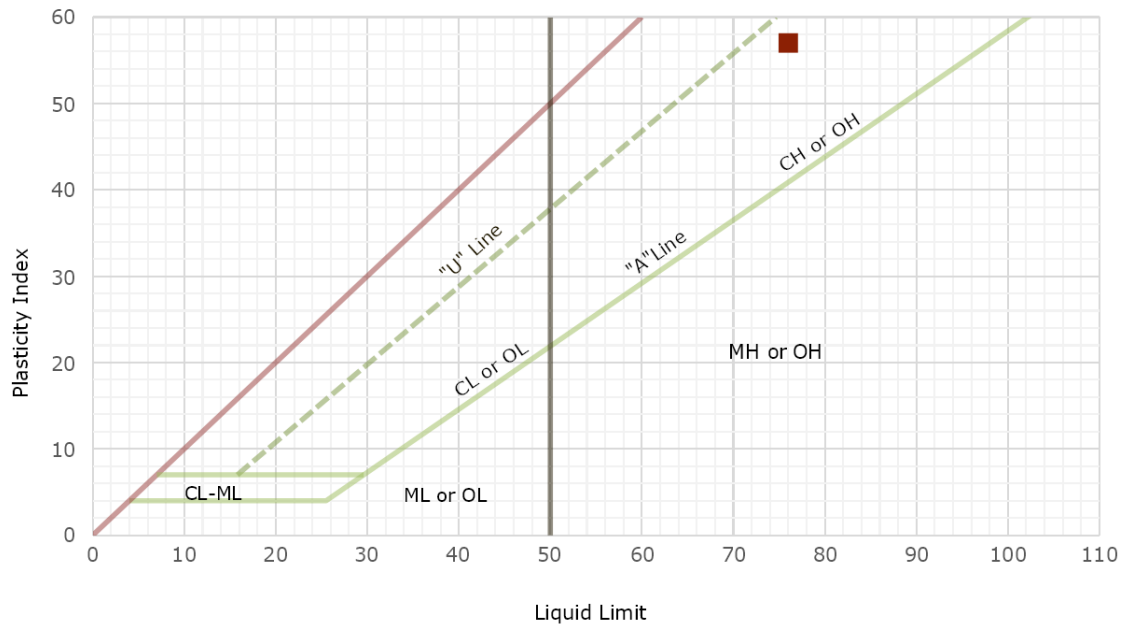
Completion Date

07/21/2026

Summary of Laboratory Results

Boring ID	Depth (Ft.)	Water Content (%)	Fines %
B-1	3.5'-5'	26	66.8
B-1	8.5'-10'	44	59.1
B-2	1'-2.5'	12	
B-2	6'-7.5'	29	54.9

Atterberg Limit Results ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines (%)	Description	USCS
■	B-1	3.5-5	76	19	57	66.8	Sandy Fat Clay	CH

Supporting Information

Contents:

General Notes

Unified Soil Classification System

Note: All attachments are one page unless noted above.

General Notes

Sampling			Water Level	Field Tests
 Auger Cuttings	 Modified California Ring Sampler	 Rock Core	 Water Initially Encountered	N Standard Penetration Test Resistance (Blows/Ft.)
 Dynamic Cone Penetrometer	 Modified Dames & Moore Ring Sampler	 Dual Sampler SPT	 Water Level After a Specified Period of Time	(HP) Hand Penetrometer
 Grab Sample	 GeoProbe Macro Core or Large Bore	 No Recovery	 Water Level After a Specified Period of Time	(T) Torvane
 Ring Sampler	 Shelby Tube	 Standard Penetration Test	 Cave In Encountered	(DCP) Dynamic Cone Penetrometer
 Split Spoon	 Texas Cone Penetrometer	 Vane Shear	Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	
				UC Unconfined Compressive Strength
				(PID) Photo-Ionization Detector
				(OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	Standard Penetration or N-Value (Blows/Ft.)	Consistency	Unconfined Compressive Strength Qu (tsf)	Standard Penetration or N-Value (Blows/Ft.)
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	5 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	9 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	16 - 30
		Hard	> 4.00	> 30

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A					Soil Classification	
					Group Symbol	Group Name ^B
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E		GW	Well-graded gravel ^F
			$Cu < 4$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E		GP	Poorly graded gravel ^F
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH		GM	Silty gravel ^{F, G, H}
			Fines classify as CL or CH		GC	Clayey gravel ^{F, G, H}
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E		SW	Well-graded sand ^I
			$Cu < 6$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E		SP	Poorly graded sand ^I
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH		SM	Silty sand ^{G, H, I}
			Fines classify as CL or CH		SC	Clayey sand ^{G, H, I}
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots above "A" line ^J		CL	Lean clay ^{K, L, M}
			$PI < 4$ or plots below "A" line ^J		ML	Silt ^{K, L, M}
		Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$		OL	Organic clay ^{K, L, M, N}
						Organic silt ^{K, L, M, O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line		CH	Fat clay ^{K, L, M}
			PI plots below "A" line		MH	Elastic silt ^{K, L, M}
		Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$		OH	Organic clay ^{K, L, M, P}
						Organic silt ^{K, L, M, Q}
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

$$E \quad Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.

