Randolph County Purchasing Office

725 McDowell Road, Asheboro, NC 27205

P: 336.318.6304 F: 336.636.7568 Email: lisa.garner@randolphcountync.gov

Request for Qualifications

Construction Materials Testing and Special Inspections for Randolph County Jail Addition and Renovation

Description of Project

Randolph County is seeking a professional firm to provide material testing and special inspections for the Randolph County Jail. This is an approximate 34,000 square foot addition along with various renovations to the existing jail.

The geotechnical report for the project has been completed and is attached.

Definitions

As used in this RFQ, the following terms shall have the meanings set forth below:

County:	Randolph County Government
Contract or Agreement:	The contract(s) executed by the County and the Service Provider for the services covered by this RFQ
RFQ:	This Request for Qualifications for the services of Construction Material Testing and Special Inspections and any addenda issued by the County
Services:	The services described in this RFQ
Service Provider:	Each firm that submits a Qualifications Package for consideration by Randolph County in compliance with the requirements stated in this RFQ
SOQ:	The Service Provider's official response to this RFQ

Required Qualifications

In order to be considered for this project, a Service Provider must demonstrate that their team has experience in materials testing. The approximate beginning date for services is July 2018.

Statement of Qualifications Preparations

If you would like to be considered for providing the required Services to Randolph County, please submit an electronic version of your qualifications to Lisa Garner, lisa.garner@randolphcountync.gov. The SOQs are due by 10:00 AM EST, Thursday, June 21, 2018.

Your SOQ should consist of the following information:

a. A cover letter (no more than 1 page) signed by a person empowered to commit the firm to a contractual arrangement with Randolph County. The cover letter should also include all contact information (phone number, email address, and mailing address). The letter should identify the persons who will be responsible for regular communications with Randolph County.
b. A brief history of the firm and key subs, including the following:
   - Size of the firm and office locations
   - Locations of the office(s) where the work associated with each element of the project will be performed
c. A range of services provided, relevant work experience, capabilities and expertise that qualify the firm to undertake this project. Relevant work experience should include projects of similar size undertaken within the last five (5) years, involving the field personnel who will be assigned to this project.
d. A list of the individuals who will be providing services to the County, including their individual work experience and certifications
e. A description of the firm's approach and methodology to execute the services required for this project
f. A current certificate of insurance

Contact with County Staff

Maintaining the integrity of this RFQ is of paramount importance for the County. To this end, unless you have questions regarding the RFQ process itself, do not contact any members of the Randolph County staff until the contract is awarded. Questions regarding the process may be directed to Lisa Garner at lisa.garner@randolphcountync.gov. Answers to questions will be posted on the Randolph County website (http://www.randolphcountync.gov/Departments/Purchasing-Office/Bids). Failure to adhere to these restrictions may significantly reduce you prospects for selection.

Due Date

10:00 AM EST on Thursday, June 21, 2018
Email to: lisa.garner@randolphcountync.gov

We look forward to receiving your qualifications package.

Lisa T. Garner
Purchasing Officer

Geotechnical Engineering Report
Randolph County Jail Addition
790 New Century Drive
Asheboro, North Carolina
S&ME Project No. 1335-17-047

PREPARED FOR:

Randolph County Public Works
725 McDowell Road
Asheboro, North Carolina 27205

PREPARED BY:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

October 6, 2017

October 6, 2017

Randolph County Public Works
725 McDowell Road
Asheboro, North Carolina 27205

Attention: Mr. Paxton Arthurs, P.E.
Director of Randolph County Public Works

Reference: **Geotechnical Engineering Report**
Randolph County Jail Addition
790 New Century Drive
Asheboro, North Carolina
S&ME Project No. 1335-17-047
NC PE Firm License No. F-0176

Dear Mr. Arthurs:

S&ME, Inc. (S&ME) is pleased to submit this Geotechnical Engineering Report for the above-referenced project. Geotechnical services were provided in general accordance with our proposal No. 13-1700366 dated August 11, 2017.

The purpose of the geotechnical study was to determine the general subsurface conditions at the site and to evaluate those conditions with regard to the design and construction of the project. This report presents our findings together with our conclusions and recommendations for site construction.

S&ME appreciates the opportunity to assist you during this phase of the project. If you have questions, please contact us.

Sincerely,

S&ME, Inc.

NORTH CAROLINA PROFESSIONAL SEAL 42168 10/6/2017 ENGINEER JOSEPH WILLIAMSON

Joseph R. Williamson, P.E.
Project Engineer
NC Registration No. 42168

Luis A. Campos, P.E.
Project Engineer/Geotechnical Group Leader

Senior Reviewed by: Matt Moler, P.E.

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1.0 Introduction

1.1 Project and Site Descriptions

Project information is based on telephone and email correspondence between Paxton Arthurs of Randolph County Public Works and Luis Campos of S&ME on August 4, 2017. The project description, as well as a site aerial image and a marked-up Architectural Site Plan (prepared by Moseley Architects, dated August 1, 2017), which showed five requested boring locations and other scope items, were provided in the email correspondence. Additional project information was relayed through email correspondence between Mr. Arthurs, Jason Hopkins of Moseley Architects, and Joseph Williamson of S&ME on September 25 and 26, 2017. The additional correspondence included a Topographic Survey Map prepared by Charlie Morgan Surveying, PLLC dated September 21, 2017.

We understand that Randolph County Public Works is planning an addition to the Randolph County Jail located at 790 New Century Drive in Asheboro, North Carolina. The approximate site location is identified in the Site Vicinity Plan (Figure 1) included in the Appendix. Based on the information and plans provided, the proposed building addition will have a footprint of 30,000 square feet and will be located on the eastern side of the existing jail. The finish floor elevation of the addition will be 30 inches lower than the finished floor of the existing jail which is 825.97 feet (proposed addition finish floor elevation of 824.47 feet). The addition will connect to the existing structure via a new ramped hallway. However, the remainder of the building addition appears to be structurally isolated. Also, no new pavement areas are planned. Structural loading and other proposed grading information have not been provided at this time.

The proposed addition area consists of a grassed field in the northwestern and western portion of the footprint and slopes down gently to the south and east to a low lying wooded area. Ground surface elevations across the proposed addition footprint range from approximately 822 feet to 813 feet. Based on the planned addition finished floor elevation and existing site grades, up to approximately 12 feet of new fill will be required for the addition construction.

In developing the conclusions and recommendations in this report, we have made the following assumptions:

- The building addition will consist of masonry construction with a slab-on-grade floor system.
- Structural loads for the building will be relatively light (column loads less than 150 kips, wall loads less than 5 kips per foot, and floor loads less than 200 pounds per square foot).

1.2 Purpose and Scope

The purpose of this geotechnical study was to explore the subsurface conditions at the site and develop geotechnical recommendations for the design and construction of the proposed project. S&ME has completed the following scope of geotechnical services for this project:

- Coordinated field activities with Randolph County Public Works and Randolph County Jail personnel.
- Visited the site to observe site surface conditions and mark test locations.

- Contacted North Carolina 811 and subcontracted a private utility locator to have them mark the locations of existing underground utilities in the exploration areas.
- Subcontracted a land clearing company to clear small trees and brush with a Hydro-Axe.
- Mobilized a power drilling rig mounted on an all-terrain vehicle and crew to the site.
- Drilled five soil test borings at the approximate requested locations.
- Hand excavated to expose the building foundation at one requested area.
- Attempted water level measurements.
- Backfilled the boreholes with soil cuttings.
- Performed shear wave velocity testing at the site.
- Performed laboratory testing.
- Performed geotechnical analysis and prepared this geotechnical report.

2.0 Exploration Procedures

2.1 Field Testing

2.1.1 Soil Test Borings

In order to explore the general subsurface conditions at the project site, five soil test borings (labeled B-1 through B-5) were drilled to depths of 20 feet below the existing ground surface on September 13, 2017. The borings were advanced at the approximate locations shown on the Test Location Plan (Figure 2) in the Appendix. The boring locations were selected by others and were marked in the field by an S&ME geotechnical engineer using a handheld GPS system. The northings and eastings presented on the logs should be considered approximate.

A CME 550X drill rig mounted on an all-terrain vehicle carrier was used to advance the borings with hollow-stem, continuous flight augers. Standard Penetration Test (SPT) split-spoon sampling was performed at designated intervals in the soil test borings in general accordance with ASTM D1586 to provide an index for estimating soil strength and relative density or consistency. The CME 550X drill rig used to drill the borings was equipped with a hydraulic automatic hammer for Standard Penetration Tests. In conjunction with the SPT testing, samples were obtained for soil classification purposes. Representative portions of each soil sample were placed in plastic bags and taken to our laboratory.

Water level measurements were attempted in each boring at the termination of drilling activities and after a two day waiting period. Upon completion of the water level measurements, the boreholes were backfilled with soil cuttings to the ground surface.

2.1.2 Foundation Excavation

On September 15, 2017, S&ME used hand tools to perform a test pit excavation (labeled TP-1) at the corner of the existing jailhouse building to expose the foundation and measure dimensions of the footing. The intent of the test pit excavation was to ascertain the existing foundation bearing depth, thickness, and projection from the wall for use by others in the design of the tie-in structure. The test pit was performed at the approximate requested location which is identified on the Test Location Plan (Figure 2) in the Appendix.

2.1.3 *Shear Wave Velocity Testing*

S&ME measured the shear wave velocities of the subsurface materials at the site using surface wave methods. Specifically, we used a combination of Multi-Channel Analysis of Surface Waves (MASW) and Microtremor Array Measurements (MAM) at the site.

On September 15, 2017, S&ME performed MASW and MAM measurements within the proposed addition footprint. The approximate test location (labeled SW-1) is shown on the Test Location Plan (Figure 2) in the Appendix. The MASW survey consisted of recording different frequency surface waves generated from an active energy source (sledgehammer striking a metal plate) traveling across a linear array and was conducted using a Geometrics ES3000 seismograph equipped with twenty-four 4.5 Hz vertical geophones. Measurements for the MASW survey were collected with geophones at a set spacing of 5 feet. The MAM survey consisted of recording different frequency surface waves generated from a passive energy source (e.g. background noise, vehicles, etc.) traveling across a non-linear array and was conducted using the same seismograph equipped with eleven 4.5 Hz vertical geophones. Measurements for the MAM survey were conducted along an “L-shaped” array using geophones at a set spacing of 30 feet. Data analysis from the shear wave velocity testing was conducted using the OYO Corporation’s SeisImager/SW™ software (Pickwin™ and WaveEq™).

2.2 Laboratory Testing

Once the samples were received in our laboratory, a geotechnical engineer visually examined each sample to estimate the distribution of grain sizes, plasticity, organic content, moisture condition, color, presence of lenses and seams, and apparent geological origin. The results of the classifications, designated in general accordance with the Unified Soil Classification System (USCS) and ASTM D2488, as well as the field test results are presented on the attached boring logs. Similar soils were grouped into strata on the boring logs. The strata contact lines represent approximate boundaries between the soil types; the actual transition between the soil types in the field may be gradual in both the horizontal and vertical directions.

Laboratory classification tests were also performed on a select soil sample to confirm visual soil classifications and estimate the engineering properties of the soils tested. Laboratory testing included:

Moisture Content: The moisture content is the ratio, expressed as a percentage, of the weight of water in a given mass of soil to the weight of the solid particles. This test was conducted in accordance with ASTM D2216.

Grain Size Test: Grain size testing was performed to determine the particle size and distribution of the tested sample. To perform the test, the sample was dried, weighed, and washed over a No. 200 mesh sieve. The dried sample was then passed through a standard set of nested sieves to determine the grain size distribution of the soil particles coarser than the No. 200 sieve. This test was conducted in accordance with the Sieve Analysis portion of ASTM D422.

Atterberg Limits Test: Atterberg Limits testing determines the plasticity characteristics of soil. The Plasticity Index (PI) is representative of this characteristic and is bracketed by the Liquid Limit (LL) and the Plastic Limit (PL). These tests were conducted in accordance with ASTM D4318.

Results of the laboratory testing are summarized in Section 3.3 and are also included in the Appendix.

3.0 Area Geology and Subsurface Conditions

3.1 Physiography and Area Geology

The site is located within the Carolina Slate Belt of the Piedmont Physiographic Province of North Carolina as shown in Figure 3-1. The Carolina Slate Belt is a rock formation which extends from Georgia to North Carolina and parts of Virginia. Over geologic time, the volcanic and sedimentary rocks which originally covered the Belt area were subjected to metamorphism, heat and pressure. The metamorphic process gave rise to the primary rock types seen today in this region which are referred to as metavolcanics. These metavolcanics include dacitic, rhyolitic, and andesitic flows along with tuffs and breccias. The metasediments found in the region include argillite and slate, the latter for which the belt is named. According to the 1985 *Geologic Map of North Carolina*, the bedrock under the site consists of metamudstone and meta-argillite.

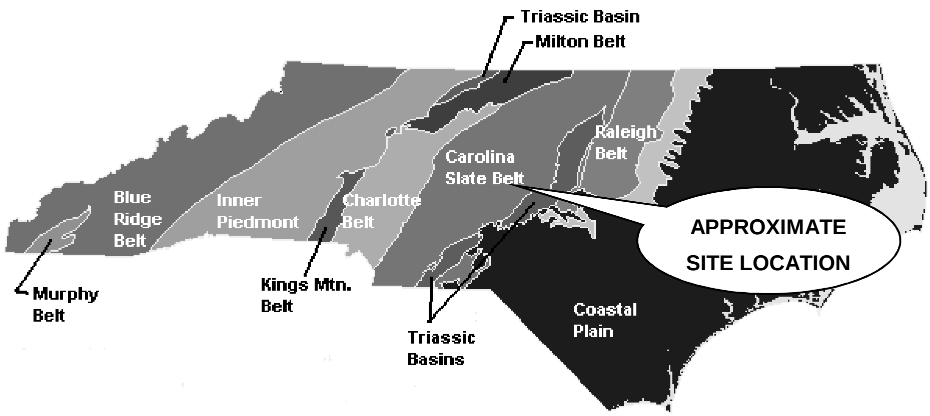


Figure 3-1: General Geologic Provinces of North Carolina

The topography and relief of the Piedmont Province have developed from differential weathering of the igneous and metamorphic rock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarser grained with increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation, and foliations of the parent rock.

The boundary between soil and rock in the Piedmont is not sharply defined. A transitional zone termed "Partially Weathered Rock" is normally found overlying the parent bedrock. Partially Weathered Rock (PWR) is defined for engineering purposes as residual material with Standard Penetration Resistances (N-values) exceeding 100 blows per foot. The transition between hard/dense residual soils and PWR occurs at irregular depths due to variations in degree of weathering. A depiction of typical weathering profiles in the Piedmont Province is presented in Figure 3-2:

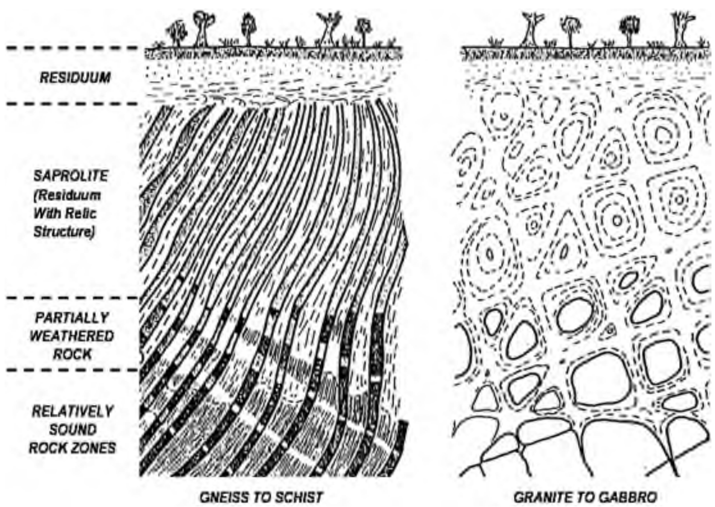


Figure 3-2: Typical Piedmont Weathering Profiles

Groundwater is typically present in the residual soils and within fractures in the PWR or underlying bedrock in the Piedmont. On upland ridges in the Piedmont, groundwater may or may not be present in the residual soils above the PWR and bedrock. Alluvial soils, which have been transported and deposited by water, are typically found in floodplains and are generally saturated to within a few feet of the ground surface. Fluctuations in groundwater levels are typical in residual soils and PWR in the Piedmont, depending on variations in precipitation, evaporation, and surface water runoff. Seasonal high groundwater levels are expected to occur during or just after the typically wetter months of the year (November through April).

3.2 Subsurface Conditions

Subsurface conditions as indicated by the soil test borings generally consist of topsoil underlain by fill soils and residual soils. The generalized subsurface conditions at the site are described below. Additionally, a Generalized Subsurface Conditions drawing (Figure 3) is presented in the Appendix. The surface elevations presented on the boring logs were measured by differential measurement techniques using a hydrostatic level and a nearby storm sewer manhole cover for reference. For more detailed soil descriptions and stratifications at a particular boring location, the respective boring log should be reviewed.

Surface Materials: All borings encountered a surficial layer of topsoil measuring between approximately 2 and 7 inches thick. Also, boulders were observed at the ground surface at the wood line near Boring B-3 and southeast of Boring B-2. (See Photo No. 1 of the Photographic Record included in the Appendix.)

Fill Soils: Fill soils were encountered below the surficial materials in Borings B-1 and B-2 and extended to depths of approximately 3 feet and 5.5 feet, respectively. The fill soils generally consisted of firm to very stiff silty clay (USCS classification CH) and stiff clayey silt (classification MH). The SPT N-values of the fill soils ranged from 7 to 20 blows per foot (bpf).

Residual Soils: Residual soils were encountered beneath the fill soils in Borings B-1 and B-2 and beneath the topsoil in Borings B-3, B-4, and B-5. The residual soils generally consisted of firm to very stiff silty clay (CH), firm to very stiff clayey silt (MH), and very soft to very hard sandy silt (ML). SPT N-values in the residual soils ranged from 2 to 19 bpf typically but were as high as 54 bpf in one boring. All borings were terminated in the residual soils at the planned termination depth of 20 feet.

Water Levels: Groundwater level measurements were attempted in the borings at the completion of drilling operations and after a two day waiting period. Groundwater was encountered at a depth of approximately 19 feet at the time of drilling termination in Boring B-5. After the waiting period, all borings were dry above the hole cave depths which ranged from 3.4 to 8.6 feet below the existing ground surface. Water levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations. Therefore, groundwater may be encountered during construction at depths not indicated by the borings.

3.3 Laboratory Summary

Laboratory classification tests (moisture content, grain-size distribution, and Atterberg limits) were performed on a select soil sample. The results are summarized in the Table 3-1 and in the Appendix.

Table 3-1: Results of Laboratory Classification Tests

Test Location	Sample Depth (ft)	USCS Classification	Moisture Content (%)	Fines (%)	Liquid Limit	Plasticity Index
B-1	1 – 2.5	MH	22.1	89.4	61	29

3.4 Shear Wave Velocity Testing

Shear wave velocity measurements were obtained to a depth of approximately 130 feet below the existing ground surface at test location SW-1. The shear wave velocity profile measured at test location SW-1 is presented as Figure 4 of the Appendix. The calculated weighted average V_{s100}-value for SW-1 is 1,133 feet per second.

4.0 Existing Footing Dimensions

The hand excavation of Test Pit TP-1 exposed the foundation of the existing jailhouse at the requested location. The following dimensions of the existing footing were measured.

- **Depth to Top of Footing:** 13 inches
- **Depth to Bottom of Footing:** 24 inches
- **Footing Thickness:** 11 inches
- **Projection of Footing Beyond Edge of CMU Block Wall:** 6 inches

5.0 Conclusions and Recommendations

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

Generally, the addition can be constructed as planned, and we recommend that shallow spread foundations be considered for foundation support. We do not anticipate that groundwater will be encountered or that PWR or rock excavation will be required at this site. However, highly plastic clays were encountered in the near-surface of each boring, some of which will require undercutting. Fill induced-settlement monitoring is recommended after fill placement is complete and prior to addition construction. These and other design considerations and their impact to site construction are discussed in detail in the following sections and should be considered by the structural and project civil engineer.

5.1 Earthwork

5.1.1 Site Preparation

The entire building pad area should be stripped of vegetation, topsoil, trash, debris, and organic materials to a minimum of 10 feet outside the structural limits. Debris (including topsoil) from stripping operations should be properly disposed of off-site.

The borings indicate that topsoil thicknesses range from 2 to 7 inches, with the thicker topsoil measurements observed in the wooded areas. However, our experience indicates stripping depths of 6 to 12 inches may be required, particularly in areas with large trees. As such, deeper stripping depths may be required in order to adequately remove large root bulbs in the wooded portions of the site. In addition, the depth of topsoil stripping will also be dependent upon prevailing weather conditions at the time of construction. During wet conditions, rubber-tired equipment will mix topsoil with underlying “clean” soils, causing stripping depths to be greater than topsoil depths indicated on the borings. We recommend that topsoil stripping be performed with light, tracked equipment to reduce disturbance of the underlying soils, or be performed during dry periods.

Any existing underground utilities that will be affected by construction should be properly excavated, removed, abandoned, or re-routed to facilitate the proposed construction. The resulting excavations should be properly backfilled as described later in this report. For any utilities that are not removed, care should be taken as to not damage the utility lines during construction.

5.1.2 Expansive Soils

Based on the results of the soil test borings performed and our visual observations of the split-spoon samples recovered, silty clay (CH) and clayey silt (MH) soils were encountered at the ground surface of each test location and extend to depths ranging from 5.5 to 12 feet below the existing ground surface. These plastic soils have a moderate shrink/swell potential, are very moisture sensitive, and can be difficult to work. Due to their shrink/swell potential, support of foundations and slabs directly above these materials poses a risk of structural distress. To reduce this risk, we recommend adequate separation be provided between these plastic soils and structural subgrades (i.e., slab and column foundations). By providing adequate separation, seasonal variations in moisture conditions are less severe and overburden pressures can counteract swell pressures thereby reducing the shrink/swell risks associated with these materials.

We recommend 3 feet of separation material consisting of clean, low-plasticity soils be provided between the high-plasticity clays and silts (CH and MH) and column and wall foundation subgrades, while 2 feet of separation material is sufficient beneath slab subgrades. Identification of these materials and confirmation that the required separation has been achieved should be performed by the geotechnical engineer's representative during construction. We anticipate that this separation will be achieved through the proposed fill placement in the southern and eastern portions of the addition footprint, while undercutting a portion of the highly plastic clays and replacing with properly compacted structural fill soils will be required in the western portion of the addition footprint.

It should be noted that expansive soils are fairly low-strength, sensitive to moisture, and can degrade quickly when subjected to changes in moisture. Additional preparation of these materials (undercutting, moisture-conditioning, etc.) should be anticipated particularly if construction occurs during the wetter, cooler months of the year (November through April). Moderately plastic silts (MH) can be re-used provided they are well-mixed with low plasticity soils or placed deeper than 2 feet from structural subgrades. Highly plastic clays (CH) are not considered suitable for re-use as structural fill and should only be re-used in landscaped areas.

5.1.3 Existing Fill Soils

Existing fill soils were observed in Borings B-1 and B-2 to depths of 3 and 5.5 feet, respectively, below the existing ground surface. As previously discussed, these fill soils consisted of silty clay (CH) and clayey silt (MH) with SPT N-values that ranged from 7 to 20 bpf. Based on our experience, properly compacted fill typically exhibits N-values in excess of 8 bpf, suggesting the material was generally placed in a controlled manner with moderate to good compactive effort.

While the fill soils encountered were relatively clean and free of deleterious inclusions, due to the limited testing performed and the wide spacing of the borings, the possibility of deleterious inclusions in or under the existing fill between our sample intervals and test locations cannot be completely ruled out. If the fill contains wood fragments, trash, organics, voids, or soft lenses, excessive settlement could result.

Support of building foundations and slabs on/above poorly compacted or variable fill also poses a risk of excessive settlement that can lead to structural distress. We anticipate that any near surface variable fill soils will be identifiable during subgrade evaluation procedures (outlined in Section 5.1.4). In order to eliminate the risk of structural distress associated with any variable fill soils that might be encountered, complete undercutting and replacement of these materials will be required.

5.1.4 *Proofrolling/Subgrade Evaluation*

Upon completion of the recommended stripping and undercutting operations, areas to provide support for the foundations, floor slab and structural 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 staff professional or a senior soil technician. The proofrolling procedures should consist of four complete passes of the exposed areas, with two of the passes being in a direction perpendicular to the preceding ones. Areas which deflect, rut, or pump excessively during proofrolling or fail to "tighten up" after successive passes should be undercut to suitable soils and replaced with compacted structural fill.

After the subgrade/proofrolling operation has been completed and approved, final site grading and undercutting as discussed in this report 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 placing aggregate base course in the building footprint areas. If unstable conditions are exposed during this operation, then undercutting or scarifying may be required.

5.1.5 *Subgrade Repair after Exposure*

The near-surface soils in the project area consist of low-strength, moisture sensitive soils which can degrade quickly if exposed to water. Because of this, the exposed subgrade soil may deteriorate when exposed to construction activity and environmental changes such as freezing, erosion, softening from ponded rainwater, and rutting from construction traffic.

We recommend that exposed subgrade surfaces in the building addition area that have deteriorated be properly repaired by scarifying and re-compacting immediately prior to additional construction. It should be noted that the level of difficulty and cost of developing a stable subgrade will depend upon the weather conditions before and during construction as well as the time available to stabilize the subgrade. Specifically, deteriorated subgrades may be due to excessive moisture exposure combined with construction traffic, and may require drying through the use of disk harrows or lime treatment. If subgrade preparation operations must be performed during wet weather conditions, undercutting the deteriorated soil and replacing it with compacted crushed stone may be preferable. The impact that rutting subgrade materials has on the construction schedule should be considered. The contractor may wish to consider chemical stabilization (i.e., lime or cement stabilization) to protect their subgrade/work area.

We recommend that the grading subcontractor smooth-roll exposed subgrades at the end of each work day, limit construction traffic to defined areas, and protect exposed subgrade soils during construction. This is essential for construction during the typically wetter, cooler months of November through April. If subgrades are rough-graded and not immediately covered by floor slab bearing materials, or stabilized with lime or cement, then the grading subcontractor should cover the exposed subgrades with a sacrificial layer of crushed stone, leave the subgrades approximately 6 to 8 inches high, or be prepared to repair/stabilize the subgrades at a later date.

5.1.6 Excavations

Based on the results of the soil test borings, we anticipate excavations for footings and utilities at the site will be performed through newly placed fill, existing fill, and/or residual soils. These soils can typically be excavated using backhoes, trackhoes, front-end loaders, bull dozers, and other types of typical earthmoving equipment.

While partially weathered rock and auger refusal material were not encountered at the site, it should be noted that the depth to and thickness of PWR and rock lenses or seams in the Piedmont Geologic Province can vary dramatically in short distances. Therefore, PWR, boulders, or bedrock may be encountered during general excavation or excavation of footings and utilities at locations or depths between boring locations not encountered during this exploration. Given the relatively shallow excavations planned at the site, encountering PWR or bedrock is not anticipated. However, boulders were observed at the ground surface at the wood line near Boring B-3 and southeast of Boring B-2. These boulders were likely encountered during the mass grading of the existing facility and placed at the wood line during the initial construction. As such, boulders may be encountered during site excavation.

For temporary excavations, shoring and bracing or flattening (laying back) of the slopes should be performed to obtain a safe working environment. Excavations should be sloped or shored in accordance with local, state and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. The contractor is solely responsible for site safety; this information is provided only as a service and under no circumstances should we be assumed responsible for construction site safety.

5.1.7 Groundwater/Dewatering

As previously discussed, groundwater was only encountered in Boring B-5 at a depth of approximately 19 feet at drilling termination. While the other boreholes were dry, the soils in Borings B-3 and B-5 (in the low-lying wooded areas) were noted as being wet below a depth of 12 feet. As such, excavations extending to these depths may encounter groundwater. However, given the relatively shallow excavations planned at the site, the need for dewatering is not anticipated at this site.

5.1.8 Fill Material and Placement

Based on the planned addition finished floor elevation and existing site grades, up to approximately 12 feet of new fill will be required for the addition construction. All fill used for site grading operations should consist of a clean (free of organics and debris), low plasticity soil (Liquid Limit less than 50, Plasticity Index less than 25). The proposed fill should have a maximum dry density of at least 90 pcf as determined by a standard Proctor compaction test, (ASTM D698). Structural fill soils should generally classify as CL, ML, SC, SM, SW, or GW in accordance with the USCS. Additionally, the maximum grain size should not exceed 3 inches. Due to limited cuts for the planned addition, we anticipate the use of off-site borrow soils to raise site grades.

The existing near surface fill and residual silty clay (CH) soils are not suitable for reuse as structural fill given their high plasticity. As previously discussed, moderately plastic silts (MH) can be re-used provided they are well-mixed with low-plasticity soils or placed more than 2 feet below subgrades.

All fill should be placed in loose lifts not exceeding 8 inches in thickness and at moisture contents within 3 percent of the optimum moisture content of the material as determined by ASTM D698 (standard Proctor). Each lift of fill should be uniformly compacted to a dry density of at least 95 percent of the maximum dry density of the material determined according to ASTM D698 (standard Proctor), with the upper 18 inches of fill compacted to at least 98 percent. The geotechnical engineer's representative should perform in-place field density tests to evaluate the compaction of the structural fill and backfill placed at the site. We recommend that at least one density test be performed every 5,000 square feet per lift in the addition area and one test per lift per 100 linear feet in utility trenches.

5.1.9 Fill Induced-Settlement Monitoring

Placement of up to 12 feet of new structural fill within the addition footprint will induce settlement of the underlying residual soils. We anticipate most of the settlement will occur as the fill is being placed, and will substantially be complete within approximately 20 to 30 days after completion of fill placement. Actual time required for settlement to stabilize can only be determined by a monitoring process. Construction of the building addition foundations should be deferred until settlement due to the weight of the new fill is substantially complete.

We recommend that following fill placement completion, a minimum of 4 settlement pins be installed to monitor settlement. Two of the pins should be installed in the southeast addition corner, and the remaining two within other portions of the fill area. Settlement pins may consist of 24-inch long pieces of reinforcing steel driven 20-inches into the compacted subgrade. The elevation of the settlement pins should be surveyed weekly by a Registered Land Surveyor relative to an independent benchmark beyond the fill area. The settlement points should be estimated to the nearest 0.001 feet. While the accuracy of the third decimal place may be questionable, as surveying is commonly performed to the nearest 0.01 feet, it is useful to assist in determining if movement is completed. Measurements should be performed until interpretation of the survey data by the geotechnical engineer determines that settlement is substantially complete and construction may proceed. Settlement pins should be protected from disturbance.

5.1.10 Cut and Fill Slopes

We recommend that construction of any cut and fill slopes should be no steeper than 3H: 1V (horizontal to vertical). The tops and bases of all slopes should be located a minimum of 10 feet from structural limits. To prevent shallow surface failures on the exposed slope faces we also recommend that the soils exposed on all slope faces be compacted with track-mounted equipment prior to final seeding and mulching. Surface water runoff should be directed away from the slopes.

5.2 Seismic Design Parameters

The proposed structures should be designed to resist possible earthquake effects as determined in accordance with the current (2012) edition of the North Carolina Building Code (NCBC). As previously discussed, the shear wave velocity testing performed at the site indicates the weighted average V_{s100}-value for SW-1 is 1,133 feet per second. Based on Section 1613 of the NCBC, the data indicate a **Seismic Site Class D** should be used for design.

Considering Seismic Site Class D, the five percent damped design spectral response acceleration at short periods, S_{DS}, and at 1 second period, S_{D1}, were determined to be 0.265 g and 0.147 g, respectively. For an Occupancy Category IV structure, this would correspond to a **Seismic Design Category D**.

5.3 Foundation Support

Following completion of settlement monitoring, the proposed building can be adequately supported by shallow foundations bearing on newly-placed structural fill or the low-plasticity residual soils provided the earthwork procedures and recommendations outlined in this report are implemented. An allowable bearing pressure of up to 3,000 pounds per square foot (psf) can be used for design of the foundations in the footprint of the main addition area. However, to control differential settlement at the tie-in to the existing structure, an allowable bearing pressure of 2,000 psf should be used for foundations within the hallway connecting the addition to the existing structure.

Shallow foundations should be designed to bear at least 12 inches below finished grades for frost protection and protective embedment. Column footings should be at least 24 inches square and wall footings should be at least 18 inches wide to prevent a punching shear failure of the foundation bearing soils.

Based on the general stratigraphy in the building areas, our experience with similar projects, the anticipated magnitude of the building loads and bearing elevations, and following completion of fill-induced settlement monitoring, total settlement due to structural loads (for foundations sized for an allowable bearing pressure of 3,000 psf) is estimated to be on the order of 1 inch, with differential settlement on the order of ½ inch. Lesser settlements on the order of ½ inch total and ¼ inch differential are anticipated along the hallway where a 2,000 psf allowable bearing pressure is recommended. The majority of the settlement should occur shortly after construction.

All footing excavations should be observed by the geotechnical engineer's representative to confirm that suitable soils are present at/below the proposed bearing elevation. Plastic soils, if encountered at foundation bearing elevation, should be undercut per the direction of the geotechnical engineer. If evaluation with DCP testing encounters soft or other unsuitable materials in the footing excavations, undercutting may be required. Soft soils should be undercut until suitable soils are encountered. Undercut foundations should be backfilled with compacted structural fill or lean concrete.

Prepared bearing surfaces for foundations should not be disturbed or left exposed during inclement weather. Saturation of the footing subgrade can cause a loss of strength and increased compressibility. If foundation excavations must remain open overnight or if rainfall becomes imminent while the bearing soils are exposed, we recommend that a 2 to 4-inch thick "mud-mat" of lean (2000 psi) concrete be placed on the bearing soils before placement of reinforcing steel to help protect the bearing soils from further disturbance. Also, concrete should not be placed on frozen subgrades.

5.4 Floor Slabs

Ground-level floor slabs may be supported on newly placed structural fill soils. A 4-inch thick layer of washed stone (NCDOT No. 57 or No. 67) or a 6-inch thick layer of compacted ABC stone, as well as a plastic moisture vapor barrier, should be provided beneath all building floor slabs to provide a capillary break in areas where floor coverings/spaces prohibit a damp slab condition. The floor slabs should be designed to resist the anticipated dead and live loads. We recommend floor slabs be designed using a Standard Modulus of Subgrade Reaction (k) of 100 pounds per cubic inch. The Standard Modulus of Subgrade Reaction represents the value correlated for a 30-inch diameter Plate Bearing Test.

Immediately prior to constructing the floor slabs, we recommend that the areas be evaluated to detect softened, loosened, or disturbed areas that may have been exposed to wet weather or construction traffic. Areas that are found to be disturbed or unsuitable should be undercut and replaced with adequately compacted structural fill. This evaluation should be performed by a staff professional or a senior soil technician under his/her direction.

5.5 Below-Grade Walls

Below-grade walls (stem walls or other retaining walls) planned should be designed with regard to the lateral pressure exerted by the retained soils in accordance with the 2012 North Carolina Building Code. In addition to the lateral loads exerted by the retained materials, allowances should be included for lateral stresses imposed by any temporary or long-term surcharge loads, such as cars or trucks, adjacent to the tops of the walls, including foundation loads from the adjacent building. External stability of the proposed retaining walls should be checked during design, including resistance to sliding, overturning, and global slope failure.

The pressures exerted on walls will depend on the materials used as backfill and on the boundary condition (i.e., allowable movement) at the top of the wall. Basement/ foundation walls are typically restrained from rotation/movement and should be designed using “at-rest” lateral earth pressures. Walls that are not restrained from movement (e.g., cantilever retaining walls) can be designed using “active” lateral earth pressures; however, the lateral movement can result in settlement behind the walls which could cause distress in slabs, structures, and utilities. Design of the retaining walls should consider the boundary conditions and the amount of acceptable deflection. Based on the locally available, suitable fill soils (i.e., low plasticity or granular soil materials), we recommend the following lateral earth pressure parameters be used:

Table 5-1: Below-Grade Wall Design Parameters

Lateral Earth Pressure Condition	Coefficient	Equivalent Fluid Pressure (γ_{EQ})
At-Rest	(K_O)= 0.53	60 psf/ft*
Active	(K_A)= 0.36	40 psf/ft*
Passive	(K_P)= 2.77	320 psf/ft*
Unit Weight of Soil (moist)	115 pcf**	

*psf/ft – pounds per square foot per foot **pcf – pounds per cubic foot

A minimum of 12 inches of free-draining granular material and/or approved manufactured product should be placed directly behind the walls to provide drainage and prevent buildup of hydrostatic forces.

Plastic clays and clayey silt soils (CH and MH) should not be used as wall backfill. Care should be taken to prevent retaining wall backfill from being over-compacted, as this could result in excessive lateral stresses against the walls. Hand-held equipment should be used to avoid placing high stresses on the walls during compaction. Heavy compactors and grading equipment should not be allowed to operate within 5 to 10 feet of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

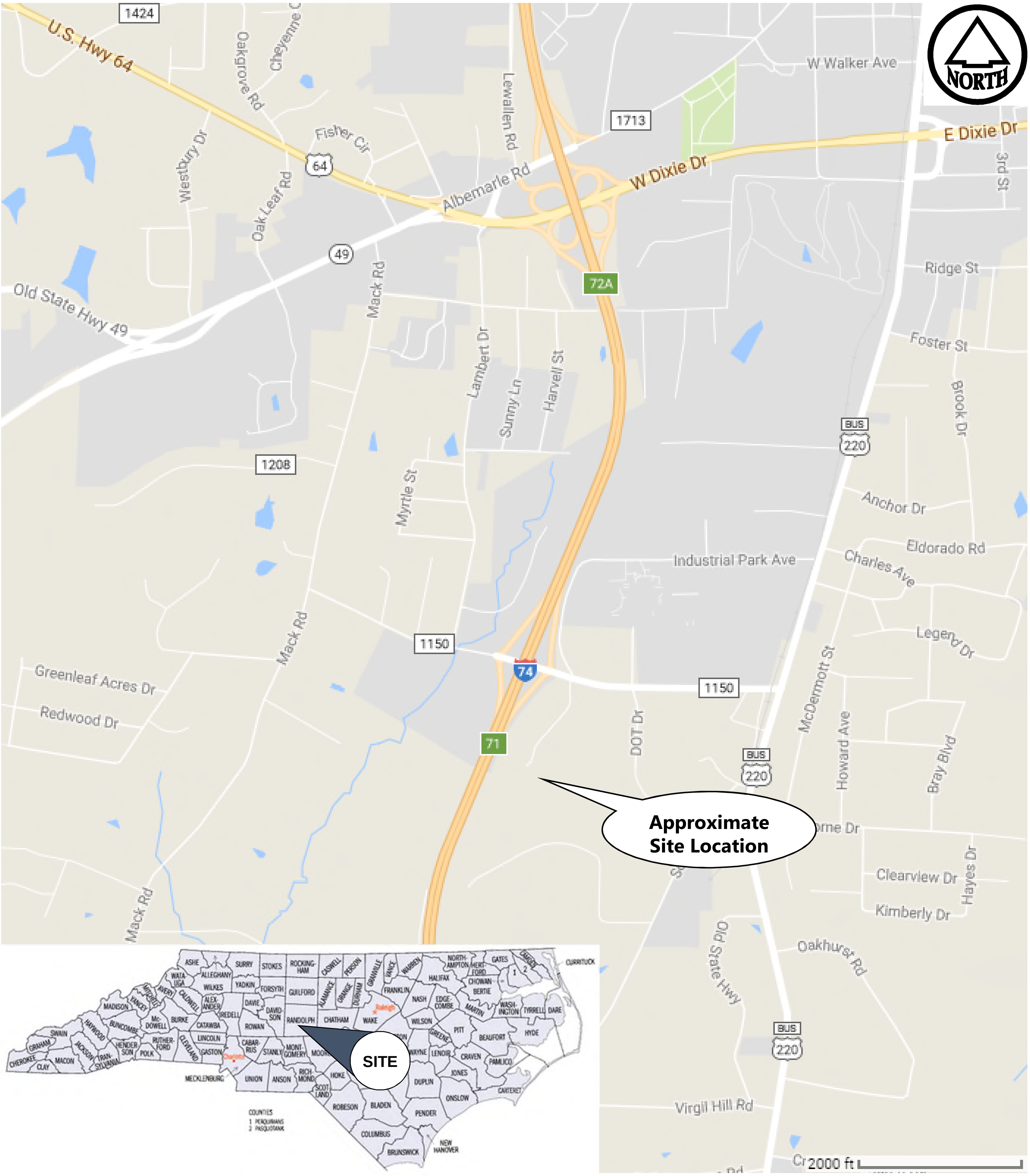
6.0 Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon 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 analyses 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 become evident until construction. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structure 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.

We recommend that S&ME be provided the opportunity to review the final design plans and specifications in order that earthwork and foundation recommendations are properly interpreted and implemented.

Appendices



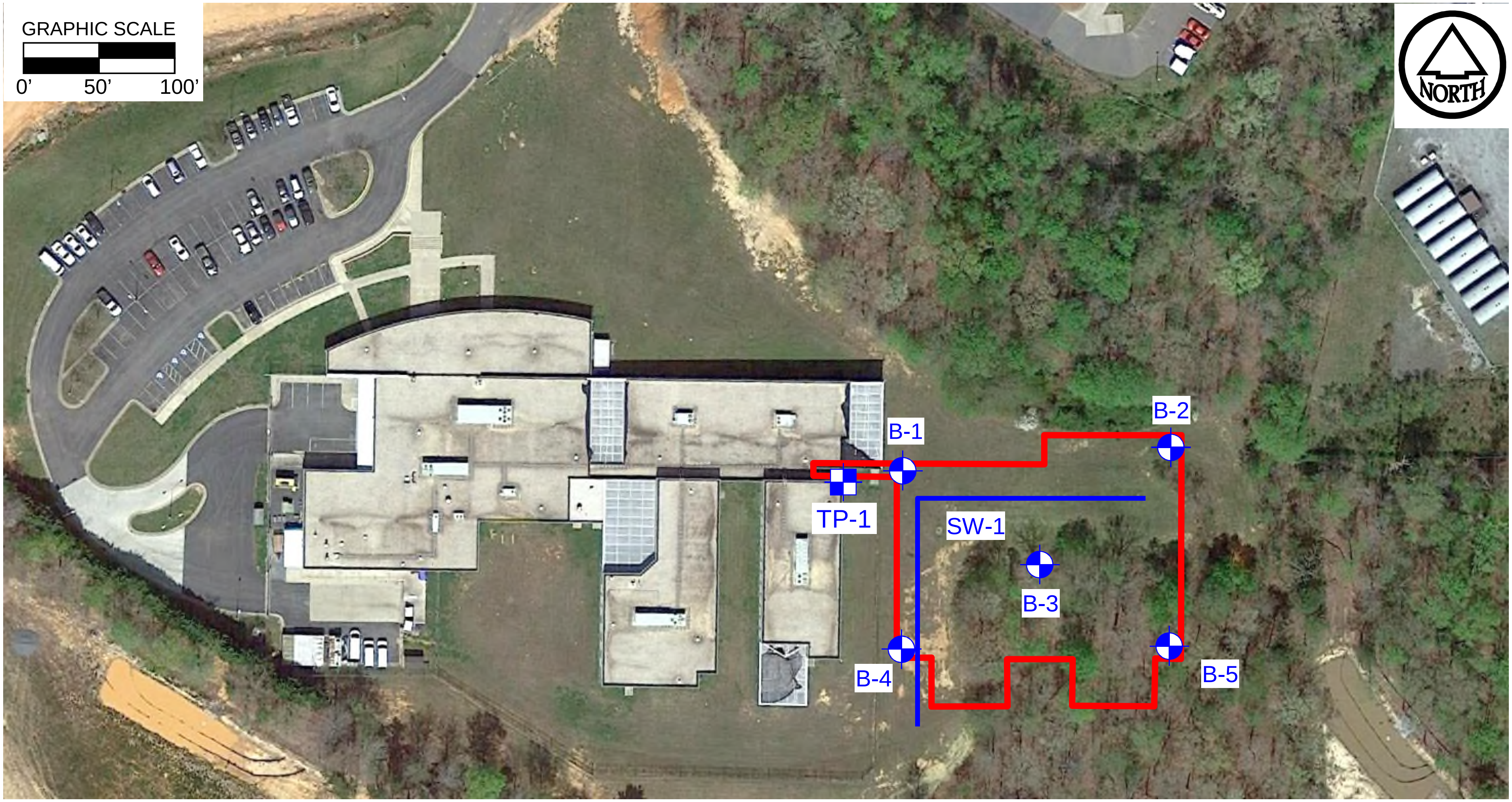
SITE VICINTY PLAN

RANDOLPH COUNTY JAIL ADDITION

790 NEW CENTURY DRIVE

ASHEBORO, NORTH CAROLINA

SCALE:	AS SHOWN
DRAWN BY:	LAC
CHECKED BY:	JRW
DATE:	10/6/2017
PROJECT NO.:	1335-17-047
FIGURE NO.	1



NOTE: AERIAL IMAGE OBTAINED FROM GOOGLE EARTH PRO™ AND MODIFIED BY S&ME TO SHOW APPROXIMATE TEST LOCATIONS. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

LEGEND

- APPROXIMATE SOIL TEST BORING LOCATION
- APPROXIMATE TEST PIT LOCATION
- APPROXIMATE MASW/MAM ALIGNMENT
- PROPOSED ADDITION FOOTPRINT

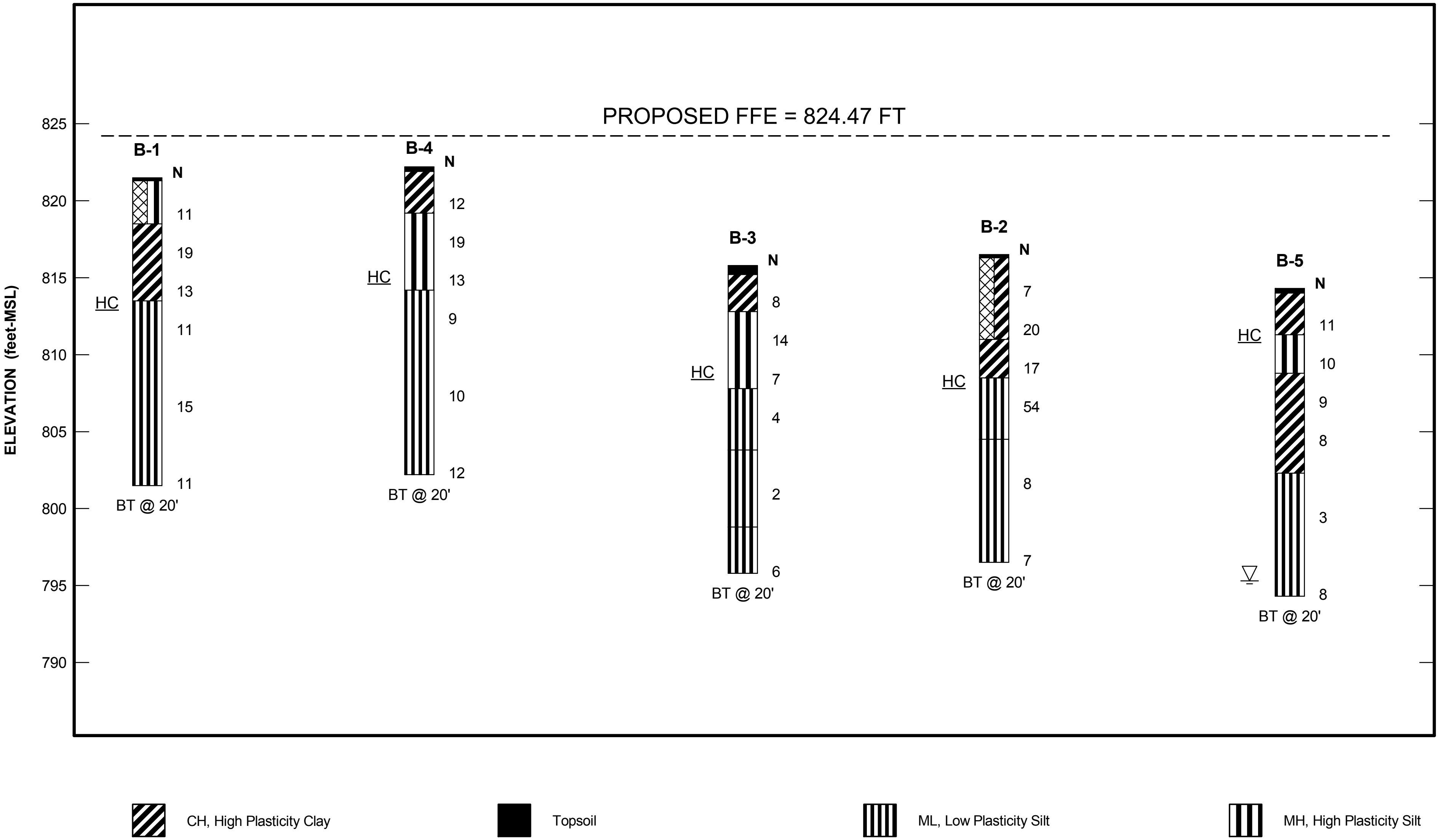
TEST LOCATION PLAN

RANDOLPH COUNTY JAIL ADDITION

790 NEW CENTURY DRIVE

ASHEBORO, NORTH CAROLINA

SCALE: 1" = 100'	DRAWN BY: LAC	FIGURE NO. 2
DATE: 10/6/2017	CHECKED BY: JRW	
PROJECT NO: 1335-17-047		



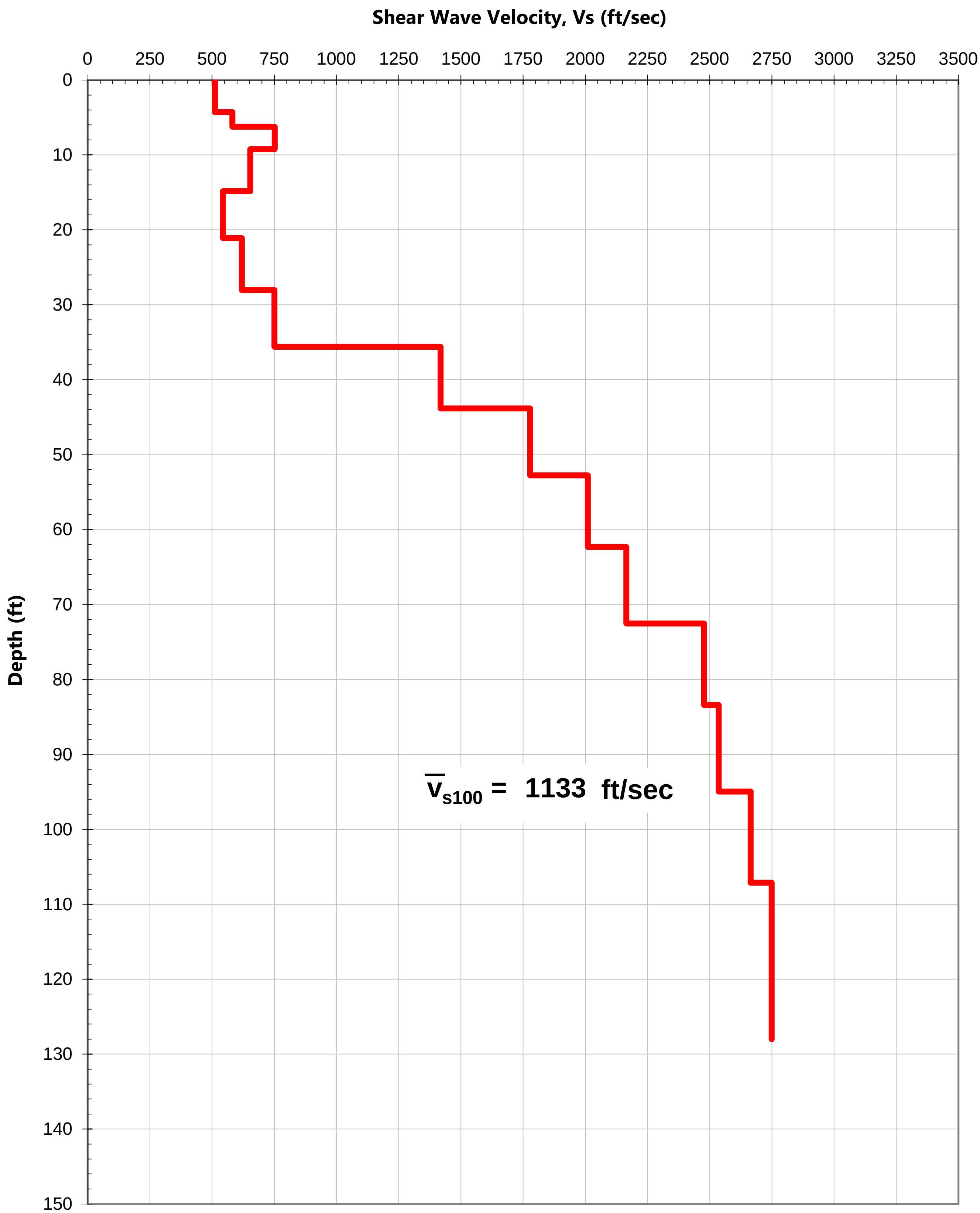
N = Standard Penetration Test resistance value (blows per foot). The depicted stratigraphy is shown for illustrative purposes only. The actual subsurface conditions will vary between boring locations.

JOB NO: 1335-17-047 DATE: 10/6/2017	S&ME, INC. 9751 SOUTHERN PINE BOULEVARD CHARLOTTE, NORTH CAROLINA 28273 P: (704) 523-4726 F: (704) 525-3953	Diagram: Generalized Subsurface Conditions Project: Randolph County Jail Expansion Location: Asheboro, North Carolina	Figure: 3

Shear Wave Velocity Profile SW-1

Randolph County Jail Addition
Asheboro, North Carolina
Project No.: 1335-17-047

FIGURE NO.
4



LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)

	Fill
	Asphalt
	Concrete
	Topsoil
	Partially Weathered Rock
	Cored Rock
GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SM	SILTY SANDS, SAND - SILT MIXTURES
SC	CLAYEY SANDS, SAND - CLAY MIXTURES
ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS, ELASTIC SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
OH	ORGANIC SILTS AND ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY

WATER LEVELS

(Shown in Water Level Column)

- ▽ = Water Level At Termination of Boring
- ▼ = Water Level Taken After 24 Hours
- ◄ = Loss of Drilling Water
- HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. 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

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. 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

SAMPLER TYPES

(Shown in Samples Column)

- Shelby Tube
- Split Spoon
- Rock Core
- No Recovery

TERMS

Standard Penetration Resistance – The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D 1586.

REC – Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

RQD – Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.

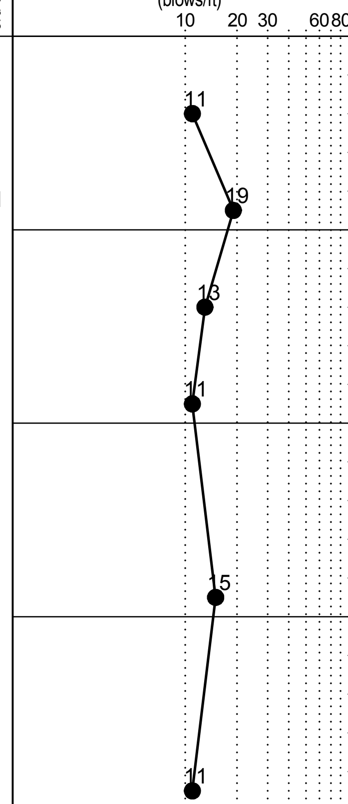
PROJECT: Randolph County Jail Addition Asheboro, North Carolina S&ME Project No. 1335-17-047	BORING LOG **B-1**

DATE DRILLED: **9/13/17**	ELEVATION: **821.5 ft**	NOTES:
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **E. Rummage**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **L. Campos**	
SAMPLING METHOD: **Split spoon**		NORTHING: **698529** / EASTING: **1753146**
DRILLING METHOD: **2¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0	Topsoil (2 inches)							
	FILL: CLAYEY SILT (MH) - stiff, orange brown, moist			SS-1	4	5	6	11
3	**RESIDUUM: SILTY CLAY (CH)** - very stiff to stiff, light brown, moist			SS-2	5	8	11	19
5			816.5					
				SS-3	5	5	8	13
8	**SANDY SILT (ML)** - stiff, red tan, moist	HC		SS-4	4	4	7	11
10			811.5					
				SS-5	4	6	9	15
15			806.5					
				SS-6	3	4	7	11
20	Boring terminated at 20 feet		801.5					

REMARKS

STANDARD PENETRATION TEST DATA (blows/ft)



NOTES:

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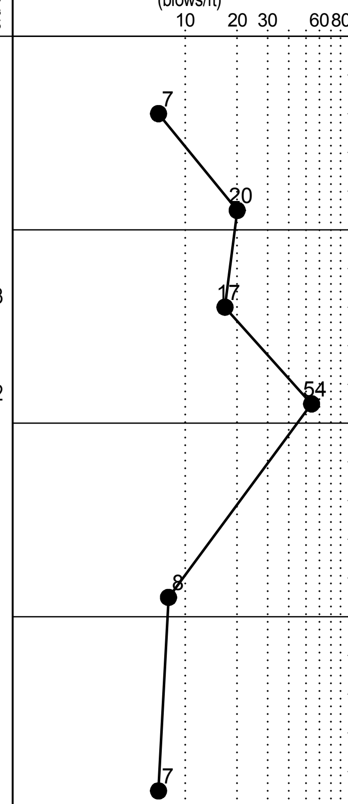
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: Randolph County Jail Addition Asheboro, North Carolina S&ME Project No. 1335-17-047	BORING LOG B-2

DATE DRILLED: **9/13/17**	ELEVATION: **816.5 ft**	NOTES:
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **E. Rummage**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **L. Campos**	
SAMPLING METHOD: **Split spoon**		NORTHING: **698541** / EASTING: **1753322**
DRILLING METHOD: **2¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	Topsoil (2 inches)							
	FILL: SILTY CLAY (CH) - firm to very stiff, brown gray, moist			SS-1	3	3	4	7
5			811.5	SS-2	12	12	8	20
	RESIDUUM: SILTY CLAY (CH) - very stiff, gray, moist			SS-3	3	4	13	17
	SANDY SILT (ML) - very hard, gray, moist	HC		SS-4	30	32	22	54
10			806.5					
	SANDY SILT (ML) - firm, gray, moist			SS-5	3	4	4	8
15			801.5					
20			796.5	SS-6	4	3	4	7
	Boring terminated at 20 feet							

REMARKS — STANDARD PENETRATION TEST DATA (blows/ft)



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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: Randolph County Jail Addition Asheboro, North Carolina S&ME Project No. 1335-17-047	**BORING LOG B-3**

DATE DRILLED: **9/13/17**	ELEVATION: **815.8 ft**	NOTES:
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **E. Rummage**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **L. Campos**	
SAMPLING METHOD: **Split spoon**		NORTHING: **698465** — EASTING: **1753235**
DRILLING METHOD: **2¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0	Topsoil (7 inches)							
	RESIDUUM: SILTY CLAY (CH) - firm, light brown, moist			SS-1	3	3	5	8
	CLAYEY SILT (MH) - stiff to firm, red brown, moist			SS-2	4	7	7	14
5			810.8					
		HC		SS-3	4	4	3	7
	SANDY SILT (ML) - soft, brown, moist			SS-4	2	2	2	4
10			805.8					
	SANDY SILT (ML) - very soft, red brown, wet			SS-5	woh	woh	2	2
15			800.8					
	SANDY SILT (ML) - firm, red brown, wet			SS-6	2	2	4	6
20	Boring terminated at 20 feet		795.8					

REMARKS — STANDARD PENETRATION TEST DATA (blows/ft): 10, 20, 30, 60, 80

S&ME BORING LOG RANDOLPH JAIL BORING LOGS.GPJ S&ME.GDT 9/28/17

NOTES:

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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

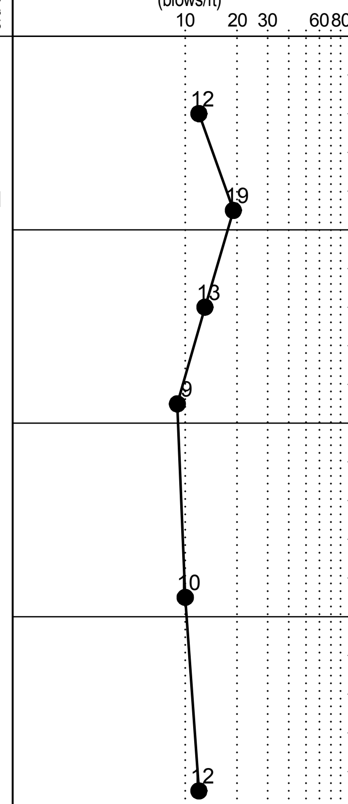
PROJECT: **Randolph County Jail Addition**
Asheboro, North Carolina
S&ME Project No. 1335-17-047

BORING LOG B-4

DATE DRILLED: **9/13/17**	ELEVATION: **822.2 ft**	NOTES:
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **E. Rummage**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **L. Campos**	
SAMPLING METHOD: **Split spoon**		NORTHING: **698411** / EASTING: **1753144**
DRILLING METHOD: **2¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	BLOW COUNT 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0	Topsoil (3 inches)							
	RESIDUUM: SILTY CLAY (CH) - stiff, tan red, moist			SS-1	4	5	7	12
	CLAYEY SILT (MH) - very stiff to stiff, tan red, moist			SS-2	8	8	11	19
5			817.2					
		HC		SS-3	4	6	7	13
	SANDY SILT (ML) - stiff, red tan, moist			SS-4	3	4	5	9
10			812.2					
				SS-5	3	4	6	10
15			807.2					
				SS-6	3	5	7	12
20	Boring terminated at 20 feet		802.2					

REMARKS / STANDARD PENETRATION TEST DATA (blows/ft)



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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

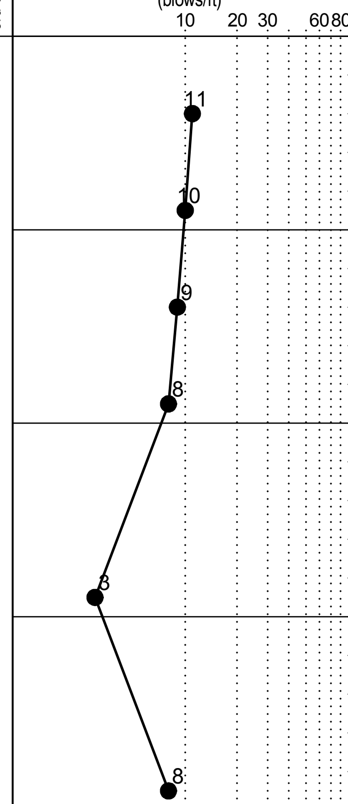
PROJECT: Randolph County Jail Addition Asheboro, North Carolina S&ME Project No. 1335-17-047	**BORING LOG B-5**

DATE DRILLED: **9/13/17**	ELEVATION: **814.3 ft**	NOTES:
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **E. Rummage**	WATER LEVEL: **19 feet on 9/13/17**	
HAMMER TYPE: **Automatic**	LOGGED BY: **L. Campos**	
SAMPLING METHOD: **Split spoon**		NORTHING: **698411** / EASTING: **1753319**
DRILLING METHOD: **2¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	BLOW COUNT 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0	Topsoil (4 inches)							
	RESIDUUM: SILTY CLAY (CH) - stiff, light brown, moist			SS-1	2	4	7	11
	CLAYEY SILT (MH) - stiff, brown gray, moist	HC		SS-2	4	6	4	10
5			809.3					
	SILTY CLAY (CH) - stiff to firm, brown gray, moist			SS-3	3	4	5	9
				SS-4	2	4	4	8
10			804.3					
	SANDY SILT (ML) - soft to firm, brown, wet			SS-5	woh	1	2	3
15			799.3					
		∇		SS-6	7	4	4	8
20	Boring terminated at 20 feet		794.3					

REMARKS

STANDARD PENETRATION TEST DATA (blows/ft)



S&ME BORING LOG RANDOLPH JAIL BORING LOGS.GPJ S&ME.GDT 9/28/17

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Photographic Record

Date: 8/28/2017

Photographer: JRW

1	**Location / Orientation**	Woodline at southeast corner of site
	Remarks	Boulders likely placed during initial mass grading

Date: 8/28/2017

Photographer: JRW

2	**Location / Orientation**	Test Pit TP-1
	Remarks	Footing projects 6 inches from edge of wall; 13 inches to top of footing; 24 inches to base of footing

Form No: TR-D422-WH-1Ga
Revision No. 1
Revision Date: 8/10/17

SIEVE ANALYSIS OF SOILS

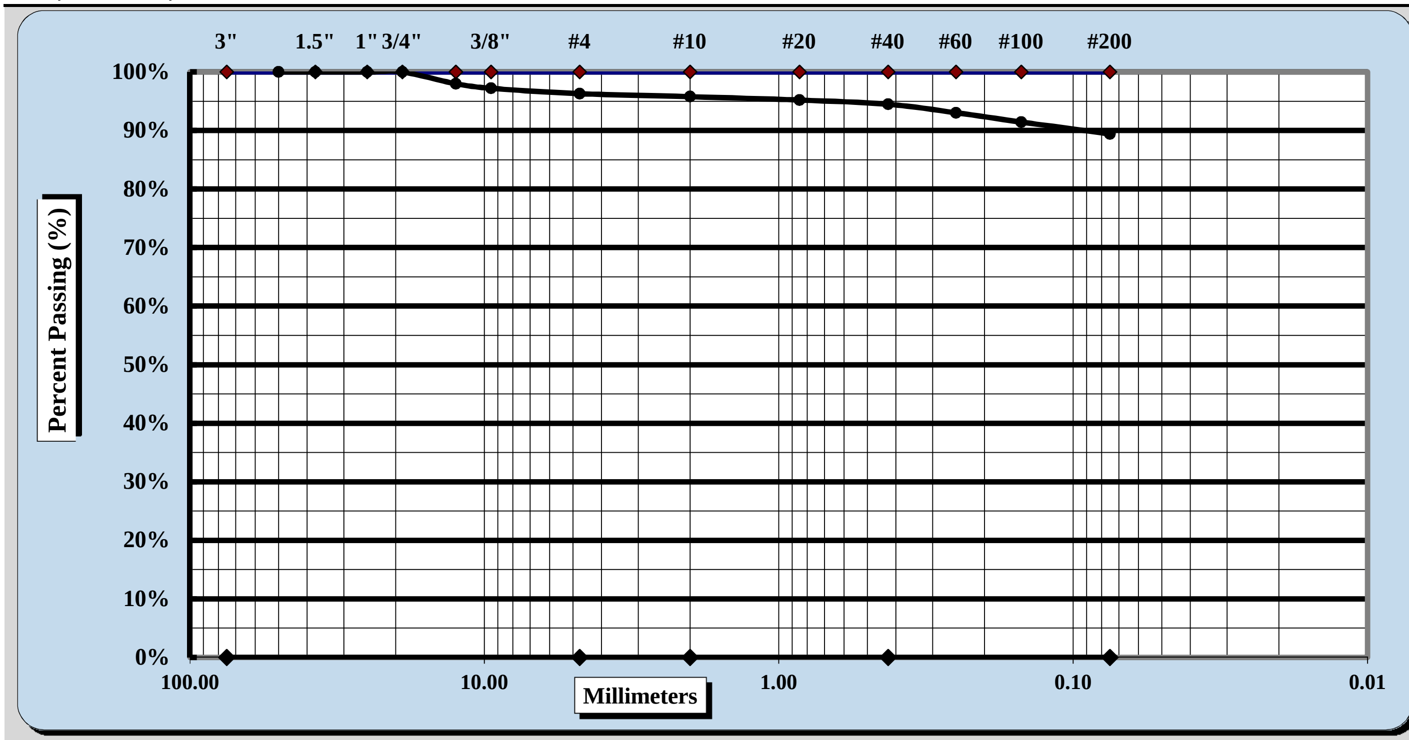
ASTM D 422

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273

Project #:	1335-17-047 Phase 01	Report Date:	9/27/17
Project Name:	Randolph County Jail Expansion	Test Date(s):	9/21-27/17
Client Name:	Randolph County Public Works		
Client Address:	725 McDowell Road		

Sample Id.	B-1	Type:	Split Spoon	Sample Date:	9/13/17
Location:	Borehole	Sample:	SS-1	Elevation:	1-2.5'

Sample Description: Orange Brown Clayey Silt (MH)



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	1/2"	Coarse Sand	0.5%	Fine Sand	5.1%
Gravel	3.7%	Medium Sand	1.3%	Silt & Clay	89.4%
Liquid Limit	61	Plastic Limit	32	Plastic Index	29
Specific Gravity	ND			Moisture Content	22.1%
Coarse Sand	0.5%	Medium Sand	1.3%	Fine Sand	5.1%

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☒

Notes / Deviations / References:

Joseph Williamson	[signature]	Project Engineer	9/29/2017
Technical Responsibility	*Signature*	*Position*	*Date*

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