Report of Preliminary Geotechnical Exploration
Project Connect – Arum Tract
Blythewood, South Carolina
S&ME Project No. 22610625A

PREPARED FOR:

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April 19, 2023

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Thomas & Hutton
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Columbia, South Carolina 29201

Attention: Mr. John Culbreath

Reference: **Report of Preliminary Geotechnical Exploration**
Project Connect – Arum Tract
Blythewood, South Carolina
S&ME Project No. 22610625A

Dear Mr. Culbreath:

As requested, S&ME, Inc. has completed our desk audit of previous explorations for the Arum Tract site, located in Blythewood, Richland County, South Carolina. Our work was performed in general accordance with our proposal number 22610625A, dated January 31, 2023. This report only addresses the Preliminary Geotechnical Exploration scope of services of the afore-mentioned proposal. Results and reports of other scopes of services in the proposal are provided under separate cover.

This report provides our previous boring and sounding records, our previous 1-D shear wave velocity profiles, and our preliminary analysis regarding IBC 2021 site class and design category, as well as seasonal high-water table, shrink/swell potential, permeability and corrosivity from published literature. Furthermore, this report provides our preliminary recommendations regarding site preparation, dewatering considerations (if necessary), excavation considerations, slope considerations, suitability of on-site soils for use as structural fill, and fill placement and compaction, shallow foundation, grade slab and pavement support, and deep ground improvement considerations.

S&ME appreciates this opportunity to work with you as your geotechnical engineering consultant on this project. Please contact us at (803) 561-9024 if you have questions or need additional information regarding this report.

Sincerely,

S&ME, Inc.

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 26144 ROBERT C. BRUORTON 4-19-23

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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION S&ME, INC. No. C00473

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1.0 Project Information

Project Connect consists of a major South Carolina Department of Commerce (SCDOC) and Richland County economic development project related to a manufacturing facility for a confidential company (the applicant). According to the recent site plans by Thomas & Hutton, the proposed project will consist of multiple buildings, parking areas, internal roads, detention ponds, and utility extensions primarily on the Blythewood Industrial Park, across Interstate 77 (I-77) to the west of the Arum Tract. A new interchange on I-77 extending into the Blythewood Industrial Park and Arum Tract, a railroad spur line extending west across the Arum Tract from the mainline paralleling U.S. Highway 21 to the east, and roadway infrastructure improvements along Community Road are proposed. It is our understanding that development on the Arum Tract will include roadway and rail infrastructure and potential supplier facilities needed to service the manufacturing facility planned at the Blythewood Industrial Park. The Arum Tract is understood to consist of Richland County TMS Number R15000-02-27, which is roughly 466 acres and is located between I-77 to the west and U.S. Highway 21 to the east, in Blythewood, South Carolina, as shown on the *Site Location Plan*, attached as Figure 1 in Appendix I.

Site layout, grading, or loading information for the Arum Tract has not been provided at this time.

2.0 Previous Data and Reports

S&ME is familiar with the Arum Tract, having performed the following previous geotechnical explorations at this tract:

- *Report of Preliminary Geotechnical Information – Firetower/Palmer Tract*, S&ME Project No. 1611-00-938, dated September 27, 2000.
- *Report of Supplemental Geotechnical Borings – Palmer Tract*, S&ME Project No. 1611-00-992, dated November 1, 2000.
- *Report of Geotechnical Exploration – Project Spider,* S&ME Project No. 1611-00-025, dated January 24, 2001.
- *Report of Geotechnical Exploration – Project Y*, S&ME Project No. 1611-06-293, dated September 6, 2006.

From our review of the existing site boundaries for the Arum Tract and these previous explorations, a total of ninety (90) soil test borings, four (4) cone penetration test soundings, three (3) flat-blade dilatometer soundings, and three (3) surface shear wave velocity test arrays are located within this tract. The results of these previous explorations are incorporated into this report, with locations of the previous testing shown on the *Testing Location Plan*, attached as Figure 2 in Appendix II.

3.0 Site Conditions

S&ME's assessment of the geotechnical conditions began with a reconnaissance of the topography and physical features of the site. We also consulted various available topographic and geologic maps for relevant information.

3.1 Surface Conditions

As previously mentioned, the Arum Tract is understood to consist of Richland County TMS Number R15000-02-27, which is roughly 466 acres and is located between I-77 to the west and U.S. Highway 21 to the east, in Blythewood, South Carolina. From our review of existing aerial imagery, this parcel is undeveloped woodlands and field areas with unnamed tributaries of Beasley Creek traversing the tract. From our review of the USGS historic topographic quadrangles, it appears that the tract generally slopes from the north and northeast down to southwest. Existing grades generally range from roughly elevation 470 feet above MSL to elevation 400 feet above MSL.

3.2 Subsurface Conditions

Historic boring and sounding records from our previous explorations at the site, as detailed above, were reviewed. These records are assembled in Appendix II.

3.2.1 Site Geology

From our review of the *Geologic Map of the Blythewood Quadrangle, Richland and Fairfield Counties, South Carolina 1962,* prepared by the South Carolina Geological Survey, the site maps as being location along the fall-line separating the Coastal Plain and Piedmont physiographic providences of South Carolina.

The site maps as lying within the White Sand Hills Physiographic Region of the Upper Coastal Plain of South Carolina. The White Sand Hills form the most inland portion of the Coastal Plain and are underlain by mostly sandy Upper Cretaceous age sediments of the Cape Fear and Eutaw formations. These soils were eroded from a range of mountains in the northwest portion of the state approximately 65,000,000 years ago and laid down in their present positions as fan deposits, where they have weathered in place. In the Columbia metropolitan area these sediments rest unconformably on top of the underlying late-Proterozoic age Piedmont rocks of the Persimmon Fork formation at depths of between 20 and 120 feet. Massive, buff or tan kaolin beds are prevalent throughout the sequence, alternating with coarse-grained water-bearing sands and gravels which become increasingly prevalent near the base of the formation. Soil layers exhibit considerable lateral and vertical discontinuity. In many areas groundwater is relatively shallow and supports heavy forest cover. Fresh soil exposures are typically white, but become pink, purple or rusty orange with weathering. Iron-oxide cemented sandstone beds are common. In the local area, Coastal Plain sediments have been deeply eroded, exposing underlying Piedmont residuum and weathered rock in some of the deeper swales and depressions.

The underlying Piedmont residuum consist of soils weathered in place from the parent crystalline bedrock material. Residual soils of the Carolina Piedmont consist of stiff or very stiff micaceous silts and clays, grading to firm sands with depth. These soils have been completely weathered in place from the parent bedrock material, mostly fine grained schists and phyllites of the Carolina Slate Belt. There are a number of volcanic intrusive sills or dikes comprised of diabase, where hard rock lies within a few feet of the surface. Elsewhere the soil residuum retains nearly all of the relict rock foliation or bedding structure below a depth of a few feet. Soil strength derives largely from relict intermolecular bonding and remolded materials generally exhibit lower shear strength than do undisturbed samples. Piedmont soils are normally consolidated to slightly over-consolidated.

The term *partially weathered rock (PWR)* is applied to very dense micaceous sands or silty sands of the Carolina Piedmont, which register SPT N-values in excess of 100 blows per foot. PWR generally varies widely within even small areas owing to minute differences in the chemical properties of the parent bedrock, which results in widely varying rates of weathering. Isolated lenses or seams of PWR often are present within Piedmont Residuum well above the overall PWR level within a given area. PWR is considered excellent bearing material for foundations and is relatively incompressible except in highly stressed deep foundations.

3.2.2 *USDA Soil Survey Information*

From a qualitative standpoint, the USDA Natural Resources Conservation Service's Soil Surveys can often provide helpful information. The surveys map the near surface soils (i.e., depths ≤ 6 ft.) and provide general descriptions. The data is not intended to replace geotechnical evaluations and testing but it can help identify trends. Soil maps are often a useful indication of the geologic environment governing soil behavior as well as the seasonal depth to ground water and depth to rock.

The USDA-NCSS web-based SoilWeb and USDA Natural Resource Conservation Service soils map of Richland County, South Carolina, issued in 1978 were reviewed. Ten (10) series were indicated across the site:

- Blanton sand, 0 to 6 percent slopes (BaB) – deep, moderately well drained, nearly level to gently sloping soil on convex side slopes on the Coastal Plain uplands.
- Chewacla soils (CH) – somewhat poorly drained, nearly level soil on flood plains and low terraces along small streams and creeks.
- Dothan loamy sand, 0 to 2 percent slopes (DoA) – deep, nearly level, well drained soil on smooth board ridges throughout the Coastal Plain.
- Fuquay sand, 0 to 6 percent slopes (FuA/FuB) – deep, well drained, nearly level to gently sloping soil on narrow to broad ridgetops and on narrow side slopes parallel to streams and drainageways of the Sand Hills and Coastal plain uplands.
- Herndon silt loam, 6 to 10 percent slopes (HeC) – deep, well drained, sloping soil on ridgetops and side slopes in the Piedmont.
- Johnston loam (Jo) – deep, very poorly drained, nearly level soil on the floodplains of streams in the Coastal Plain.
- Lakeland sand, 2 to 6 percent slopes (LaB) – deep, excessively drained, gently sloping sandy soil on smooth, convex ridgetops in the Sand Hills.
- Nanford silt loam, 10 to 30 percent slopes (NaE) – deep to shallow, well drained, strongly sloping soil on side slopes, toe slopes and narrow ridges in the Slate Belt of the Piedmont.
- Pelion loamy sand, 6 to 15 percent slopes (PeD) – deep, moderately well drained, sloping to strongly sloping soil on irregular side slopes and knolls, mainly in the Sand Hills.
- Troup sand, 0 to 6 percent slopes (TrB) – deep, nearly level or gently sloping, well drained soil on smooth convex ridgetops in the Coastal Plain uplands.

The soil series information is provided in the table below:

Table 3-1 – USDA Soil Series Survey

Soil Series	Soil Type	Depth to Seasonal High GW Table	Depth to Bedrock	Permeability	Shrink / Swell Potential	Corrosive Potential
BaB	SP-SM, SC, SM, SP-SC	> 6 ft.	> 60 in.	Moderate to Rapid	Low	Very Strongly to Medium acid
CH	ML, CL, MH	0.5-1.5 ft apparent (Nov-Apr)	> 60 in.	Moderate	Low	Strongly to Medium acid
DoA	SM, SC-SM, SC	4.3-4.0 Perched (Jan-Apr)	> 60 in.	Moderately Rapid to Moderately Slow	Low	Very Strongly to Strongly acid
FuA/FuB	SP-SM, SM, SC-SM, SC, CL-ML, CL	2.5-4.0 ft perched (Jan-Mar)	> 60 in.	Slow to Rapid	Low	Very Strongly to Strongly acid
HeC	ML, CL-ML, MH	> 6 ft.	> 60 in.	Moderate to Moderately Rapid	Low	Extremely to Slightly acid
Jo	SM, SC-SM, SC, ML, CL	(1)-1.5 ft. apparent (Nov-Jun)	> 60 in.	Moderately Rapid to Rapid	Low	Very Strongly to Strongly acid
LaB	SP, SP-SM	> 6 ft.	> 72 in.	Very Rapid	Low	Very Strongly to Medium acid
NaE	ML, CL-ML, CL, MH, CH	> 6 ft.	40-60 in.	Moderate	Low to Moderate	Very Strongly to Strongly acid
PeD	SM, SC-SM, SC, CL-ML, CL	1-2.5 ft apparent (Nov-Apr)	> 60 in.	Slow to Moderate	Low	Extremely to Slightly acid
TrB	SM, SC-SM, SC, CL-ML, CL	> 6 ft.	> 60 in.	Moderate to Rapid	Low	Very Strongly to Strongly acid

The USDA information provided for this site points to a few items that could influence geotechnical recommendations for specific structures within the site.

- Soil series CH, DoA, FuA/FuB, Jo and PeD mapped at the site indicate the potential for shallow seasonal high ground water and perched ground water conditions.
- Soil series NaE mapped at the site indicates the potential for shallow bedrock.
- Soil series CH, HeC and NaE mapped at the site are noted as possibly having high plasticity soil types (MH and CH).
- Soil series across the site are indicated to have extremely to slightly acidic soil conditions.

The USDA Soil Survey is shown on the *USDA Soil Survey Map*, Figure 3 in Appendix I.

3.2.3 *Interpreted Subsurface Profile*

The generalized subsurface conditions at the site are described below. The discussed subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring/sounding records included in Appendix II should be reviewed for specific information at each boring/sounding location. The depth and thickness of the subsurface strata indicated on the boring records was estimated based on the drill cuttings and the samples recovered. The transition between materials may be more gradual than indicated on the boring records. Information on actual subsurface conditions exists only at the specific boring/sounding locations and is relevant to the time the exploration was performed. Variations may occur and should be expected at locations remote from the boring/sounding. The stratification lines were used for our analytical purposes and, unless specifically stated otherwise, should not be used as the basis for design or construction cost estimates.

Surface Materials

Topsoil thicknesses in borings previously conducted at the site indicate organic laden topsoil in the agricultural fields to depths of 3 to 12 inches, 2 to 4 inches of sandy organic topsoil along the western side of the site, and 12 to 18 inches of dense root mats within the wooded areas. We caution that varying depths of surface materials may be encountered in areas that were not explored by our borings.

Topsoil is typically associated with the pedologic "O" horizon in USDA soil maps, which represents material containing less than about 50 percent mineral matter. The underlying "A" horizon soils are often also dark stained and to some degree visually similar to the "O" horizon, though containing substantially less organic matter. For the purpose of describing subsurface conditions, we have included in the designation "topsoil" for samples containing apparent organic content that do not appear to have been previously disturbed.

Due to past agricultural activity, organic staining of soils may occur to depths of 12 to 18 inches. However, in most areas, soils below a depth of about 6 inches were organic-stained but appeared to contain little organics.

Coastal Plain Deposits

Beneath the surface materials, native Coastal Plain deposits consisting of sands with varying amounts of fines (SW-SM, SP, SP-SM, SP-SC SC-SM, SM and SC) and low to high plasticity silts/clays with varying amounts of sand (ML, CL-ML, CL, MH and CH) were encountered to depths ranging to up to 37 feet below the existing ground surface, with several borings not encountering this Coastal Plain mantle. Some soils were kaolinitic in nature. Soil behavior type based on CPT point resistance and friction ratio was typical of sands, silts and clays. We note that soil behavior type is not always indicative of the classification per ASTM D2487.

Recovered samples were generally brown, red, white, gray, orange, tan and yellow in color and were typically dry to wet to the touch. SPT N-values ranged from 3 to 100+ blows per foot (bpf), indicating very loose to very dense relative densities in the sandy soils and firm to very hard consistencies in the silty/clayey soils. The tip resistance q_t, was measured to vary from approximately 5 to over 300 tons per square foot (tsf).

Piedmont Residuum

Beneath the Coastal Plain deposits, where encountered, the borings encountered Piedmont residual soils consisting of sands with varying amounts of fines (SP-SM and SM) and low to high plasticity silts and clays with varying amounts of sand (ML, CL and MH). Recovered samples were generally yellow, white, gray and tan in color and were typically dry to moist to the touch. Many samples retained the relict rock structure and some samples contained rock fragments. SPT N-values ranged from 13 to 69 bpf, indicating dense to dense relative densities in the sandy soils and stiff to very hard consistencies in the silty/clayey soils.

Partially Weathered Rock (PWR)

As previously mentioned, PWR is defined as a very dense or very hard residual material exhibiting SPT N-values in excess of 100 bpf. Layered within and beneath the Piedmont residual soils, PWR was encountered as summarized in the table below:

Table 3-2 – Summary of PWR Encountered Depth/Elevation

Boring No.	Top of PWR Depth (ft.)	Approximate Top of PWR Elevation (ft.)
B-06	24½	430.5
B-16	33½	420.5
B-22	31	424
B-34	24½	429.5
B-35	37	417
B-36	37	418
B-37	32	424
B-38	13	442
B-40	23½	428.5
B-41	42	412
B-106	24	434
B-111	29	430
B-115	23½	430.5
B-116	18½	431.5
B-119	8½	441.5
B-120	13½	427.5
B-124	23½	426.5
B-125	18½	416.5
B-127	13½	430.5
B-131	14	417
B-132	18½	401.5
B-139	19	394

Boring No.	Top of PWR Depth (ft.)	Approximate Top of PWR Elevation (ft.)
B-141	3½	420.5
B-143	18½	414.5
B-146	23½	408.5
B-150	23½	406.5

Recovered samples of the PWR were similar to the overlying residual soils.

Refusal Materials

Auger refusal is defined as material that could not be penetrated with the drill rig equipment used on the project. Auger refusal was encountered as summarized below:

Table 3-3 – Summary of Auger Refusal Depth/Elevation

Boring No.	Refusal Depth (ft.)	Approximate Refusal Elevation (ft.)
B-16	41	413
B-22	47	408
B-102	22½	427.5
B-103	16	444
B-104	22	450
B-105	17	447
B-108	21½	432.5
B-114	23	428
B-120	22½	418.5
B-122	16	433
B-141	6½	417.5
B-142	18	410

Auger refusal at this site may have occurred on noncontinuous large boulders, rock ledges, lenses, seams or the top of parent bedrock. Core drilling would be required to evaluate the character and continuity of the refusal material.

Push refusal occurred in each of the four (4) CPT and three (3) DMT soundings advanced at the site. Push refusal occurs when the reaction weight of the rig was exceeded by the thrust required to push the tip further into the ground. At that point the rig tended to lift off the ground. Refusal may have resulted from encountering hard cemented or indurated soils, very stiff residual soils, soft weathered rock, coarse gravel, cobbles or boulders, thin rock seams, or the upper surface of sound continuous rock.

Ground Water

Ground water measurements were obtained at the time of boring and up to roughly 24-hours after termination of drilling activities, in order to obtain a delayed reading. Ground water was encountered at depths ranging from roughly 3 to 23 feet below the existing ground surface at time of boring in 2000 and 2006. Delayed ground water measurements ranged from roughly 1 and 23 feet below the existing ground surface at that time.

Ground water levels established during the previous explorations are subject to substantial variations due to seasonal changes in the rate of infiltrating surface water, surface evaporation and other factors. Seasonal variations in ground water levels could result in ground water levels substantially varying from those depicted on the boring records. Ground water levels at the site are also likely influenced by fluctuations in the level of the traversing tributaries of Beasley Creek. Ground water level information is obtained by observing depth to which water accumulates in open boreholes during the exploration. These observations are often unreliable, particularly in the Coastal Plain portion of the state, for a variety of factors, including 1) insufficient time for equilibrium in borings in fine grained soils, 2) artesian pressures in confined aquifers, and 3) perched water tables in granular soils overlying fine grained soils or very dense PWR similar to the conditions encountered at the site.

We note that ground-water levels are influenced by precipitation, long term climatic variations, and nearby construction. Measurements of ground water made at different times than our 2000 and 2006 explorations may indicate ground-water levels substantially different than indicated on the boring records in Appendix II.

4.0 Building Code Seismic Provisions

Seismic induced ground shaking at the foundation is the effect taken into account by building code seismic-resistant design provisions. Other effects, such as soil liquefaction, are not addressed in building codes but must also be considered.

4.1 IBC Site Class

The 2021 edition of the International Building Code (IBC) is currently adopted for use in South Carolina. We classified the site as one of the Site Classes listed in IBC Section 1613.2.2, using the procedures described in Chapter 20 of ASCE 7-16.

The initial step in site class definition is a check for the four conditions described for Site Class F, which would require a site-specific evaluation to determine site coefficients F_A and F_V. Soils vulnerable to potential failure under item 1) including quick and highly sensitive clays or collapsible weakly cemented soils were not observed in the borings. Three other conditions, 2) peats and highly organic clays; 3) very high plasticity clays (H>25 feet); and 4) very thick, soft/medium stiff clays were also not evident in the borings performed. The remaining vulnerability, liquefaction, appears unlikely at this site due to the age, density and fines content of the soils encountered.

As previously mentioned, three (3) MASW-MAM arrays were previously conducted by S&ME at the site in 2006. Based on Sections 20 and Equation 20.4.1 of ASCE 7-16, the calculated weighted average V_{s100} values were 1,359 to 1,832 feet per second (ft/s). Based on this result, potential structures built within cut and minimal fill portions of the site can be designed using a Seismic Site Class C. However, potential structures within deep fill portions of the site may need to be designed using a Seismic Site Class D.

4.2 Design Spectral Values

S&ME determined the spectral response parameters for the site using the general procedures outlined under the 2021 International Building Code Section 1613.2.3. This approach utilizes a mapped acceleration response spectrum reflecting a targeted risk of structural collapse equal to 1 percent in 50 years to determine the spectral response acceleration at the top of seismic bedrock for any period. The 2021 IBC seismic provisions of Section 1613 use Chapter 20 of ASCE 7-16 to define the base rock motion spectra.

The Site Class is used in conjunction with mapped spectral accelerations S_S and S_1 to determine Site Amplification Coefficients F_A and F_V in IBC Section 1613.2.3, tables 1613.2.3(1) and 1613.2.3(2). For purposes of computation, the Code includes probabilistic mapped acceleration parameters at periods of 0.2 seconds (S_S) and 1.0 seconds (S_1), which are then used to derive the remainder of the response spectra at all other periods. The mapped S_S and S_1 values represent motion at the top of seismic bedrock, defined as the Site Class B-C boundary. The surface ground motion response spectrum, accounting for inertial effects within the soil column overlying rock, is then determined for the design earthquake using spectral coefficients F_A and F_V for the appropriate Site Class.

The design ground motion at any period is taken as 2/3 of the smoothed spectral acceleration as allowed in section 1613.2.4. The design spectral response acceleration values at short periods, S_{DS}, and at one second periods, S_{D1}, are tabulated below for the unimproved soil profile using the IBC 2021 criteria.

ASCE 7-16 was referenced for determination of peak ground acceleration values for computation of seismic hazard. Peak ground acceleration is separately mapped in ASCE 7-16 and corresponds to the geometric mean maximum credible earthquake (MCEG). The mapped PGA value is adjusted for site class effects to arrive at a design peak ground acceleration value, designated as PGA_M.

Table 4-1 - Spectral Design Values

Code	Site Class	S_s	S_1	F_a	F_v	PGA_M	S_{DS}	S_{D1}	Design Cat.
IBC 2021	C	0.339g	0.110g	1.300	1.500	0.231g	0.293g	0.110g	B
	D			1.529	2.379	0.271g	0.345g	0.175g	C

The above Seismic Design category is based on a structure having a Risk Category classification of I, II or III, and spectral response acceleration factors given above defined in section 1613.2.5 and Tables 1613.2.5(1) and 1613.2.5(2) of the 2021 IBC.

5.0 Conclusions and Recommendations

The following paragraphs include our preliminary conclusions and recommendations for site preparation, dewatering considerations, excavation considerations, slope considerations, suitability of on-site soils for use as structural fill and fill placement and compaction, shallow foundation, grade slab and pavement support, and deep ground improvement considerations. Additional geotechnical exploration and analysis will be required to provide recommendations for final site preparation/earthwork/foundation/slab/pavement design and will depend on final site grades and building/pavement locations.

The soil profile encountered at this site appears suitable to adaptable for the proposed development. Conditions at this site do not appear to pose issues for general site grading that differ substantially from the surrounding region.

Sandy soils (SP, SP-SM, SP-SC, SM and SC) in cut portions of the site appear suitable for re-use as structural fill. Low to medium plasticity silty/clayey soils (ML, CL-ML and CL) in planned cut areas of the site appear marginally suitable for re-use as structural fill. The term marginally refers to the fact that these soils are moisture sensitive and can be difficult to work if allowed to become wet. These difficulties can include softening of exposed subgrade soils, excessive rutting or deflection under construction traffic, and the difficulty associated with adequately drying and compacting wet soil. Moisture-related earthwork difficulties can be reduced by performing the earthwork during the typically drier months of the year (May through October). High plasticity silty/clayey soils (MH and CH) in planned cut areas of the site appear unsuitable for re-use.

Although planned grades across the site are unknown, it appears that groundwater, as well as perched groundwater, will impact construction at this site.

Mass excavation using conventional grading equipment, including pan scrapers, appears feasible, within the upper Coastal Plain soils across the site. Some difficulty may be realized in deeper Coastal Plain soils and the Piedmont residual soils. If PWR or rock is encountered during excavation processes, special procedures including ripping and/or blasting will be necessary during site grading.

5.1 Site Preparation

Site preparation will need to include removal of unsuitable surface materials within proposed building and pavement footprints. This should include surface vegetation, organic laden topsoil, stumps, root bulbs, surface debris and unstable surface or subsurface soils.

Removal of stumps and roots will result in disturbance of the upper soils. In filled areas, the upper soils will need to be stabilized prior to placing fill. Stabilization, if required, may consist of removing and replacing unstable material or, where unstable soils are thin, drying and compacting in-place.

Stripping and grubbing may be limited within non-structural areas to be filled, including pavement areas, however, we caution that utilities in these areas may be at greater depths. Where new fills are at least five feet thick in non-structural areas, soft zones will be at relatively great depth below applied loads. In these areas topsoil may be left in place, vegetation cut off flush and the surface bridged with clean sandy fill material dumped and pushed in a 2-foot lift without compactive effort. Try to minimize disturbance of the surface crust and root mat to limit reworking of the upper soils.

5.1.1 Clearing, Grubbing and Stripping

Topsoil thickness encountered in our borings measured up to 12 to 18 inches in thickness. The organic soil stripping process may expose deeper organic soils in portions of the site than suggested by the boring data. These soils often have a similar color to topsoil but contain only minor amounts of organics. The organic content of the topsoil materials encountered at the existing ground surface was not tested, therefore, the depth of initial stripping is not known at this time, and could vary, depending on the actual organic content of the soils and the project specifications. If these soils are to remain in-place or are to be re-used as structural fill, the organic content should be tested, in general accordance with ASTM D2974.

Our experience also suggests that the movement of clearing and construction equipment during wet weather and/or on areas of standing water or saturated soils will result in degradation of the soils to depths of 1 to 2 feet. Repeated passes of equipment will cause rutting and the mixture of surface materials (organics) into what might otherwise be acceptable soils. Movement of construction equipment on saturated soils should be avoided where possible. Where organics and near surface soils become mixed, it will be necessary to remove and replace the mixed material.

5.1.2 Existing Water Features

As previously discussed, tributaries of Beasley Creek and associated wetlands traverse the site.

5.1.2.1 Existing Tributaries

Existing tributaries will need to be diverted or re-routed to dewater the area. Diversion techniques may include, but are not limited to, diversion embankments and/or temporary ditches. It has been our experience that organic muck and/or saturated/water-softened soils will likely be encountered within the base and along the side slopes of the tributaries.

The organic muck encountered in tributaries within the cut portions of the site will not be suitable for reuse as structural fill and the saturated/water-softened materials will likely require extensive drying and reworking to be able to be reused as structural fill. Therefore, these materials should be spread and dried, stockpiled for future use in non-structural areas, wasted in deep fill areas, or hauled off-site.

For tributaries within close proximity to the planned cut/fill line, these organic muck and saturated/water-softened soils should be over-excavated and replaced prior to fill placement or to achieve planned grade.

For tributaries in deep fill areas, these materials may be left in-place, assuming they are not within the depth of influence of the building foundations and do not pose concerns with future long-term consolidation of the fill to be placed.

5.1.2.2 Existing Wetlands

The existing wetlands adjacent to and associated with the existing tributaries across the site will also require dewatering and will likely encounter organic muck and/or saturated/water-softened soils. Dewatering techniques will likely consist of, but are not necessarily limited to, temporary ditches and use of sumps/pumps.

After dewatering, these areas should be handled in similar fashion to that detailed above for tributaries when existing wetlands lie within cut, near the cut/fill line and within fill areas of the site.

5.1.3 Dewatering Considerations

Although proposed grades were not available at the time of this report, the data suggests that ground water in unconfined or confined aquifers will likely be encountered during grading activities. While dewatering should be the sole responsibility of the contractor, we offer the following recommendations regarding practices that have been successful in the past.

5.1.3.1 Temporary Construction Dewatering

A temporary system that has performed adequately on previous projects with similar conditions consists of temporary excavations (ditches) and sump pumps. We recommend that temporary collection/diversion ditches be excavated as soon as practical. Temporary ditches should be excavated to a depth that will promote collection of the ground water and positioned/sloped to allow for positive drainage flow of this water to be diverted from the graded area.

Due to the size of this site, intermediate temporary ditches may require sump pumps where difficulties arise in promoting positive drainage. Pumping from the sumps should be maintained until fill placement is a minimum of three feet above the water level. Other means of improving drainage at the site may be accomplished with ditches located in select areas. Ground water emerging from cut slopes, if necessary, may require remedial measures such as drainage or slope flattening.

Continue dewatering during fill placement to maintain groundwater at its lowered elevation. If discontinued prematurely, the ground water level will rise, saturating the fill soils and preventing effective compaction. When the area has been filled more than three feet above the natural groundwater level, dewatering may be discontinued.

If ground water or infiltrating surface water is not properly controlled during construction, the subgrade soils which will support foundations, as well as pavements or floor slabs, may be damaged. Furthermore, construction equipment mobility may be impaired.

5.1.3.2 Tributaries/Wetlands

Depending on the effectiveness of temporary dewatering and re-routing of existing tributaries and wetlands, a wrapped rock drain may be required in these areas. The wrapped rock drain should consist of needle-punched, non-woven, geotextile filter fabric placed along the stream/creek beds or within an excavated trench, with sufficient length to cover the entire bottom, sides and top with a minimum of 12 inches of overlap. Once the filter fabric has been placed, clean-washed crushed stone, such as No. 57 stone or approved equivalent should be placed. Once the drain component has been completed, the filter fabric should be overlapped over the washed stone. Due to the extent of the existing tributaries/wetlands, the wrapped rock drain may consist of trunk lines with feeder lines as necessary to reach necessary areas of dewatering while generally following the existing meandering path of the features. Drains should be extended to allow for “daylighting” of the drain beyond the structural limits of the fill areas.

5.1.3.3 Long-term Groundwater Control

Although planned grades for the site were not available at the time of this report, it is possible that the ground water encountered may be close to or even above planned grades. Temporary dewatering described above may suffice for mass grading activities, however, long-term control of this water may be required.

A system that has performed adequately on previous projects with similar conditions consists of converting the temporary ditches into permanent French drains. Connection of the permanent drains into the planned storm water system should be provided, or they should be extended to allow for "daylighting" of the drain beyond the structural limits of the development.

5.1.4 Surface Preparation/Proofrolling

In most areas, surface preparation can likely be limited to proofrolling of the surface. Areas that rut, pump, or move excessively under movement of the equipment need to be stabilized prior to placement of fill soil, concrete, or base course stone. If the low to high plasticity silts and clays (ML, CL-ML, CL, MH and CH) are proofrolled during wet conditions, additional and widespread areas of stabilization may be required, as these materials are sensitive to changes in moisture.

After removal of topsoil and unsuitable soils/materials and cutting to grade, but prior to fill placement, the exposed ground surface should be observed by the geotechnical engineer or a representative of the geotechnical engineer to confirm that poor soils have been removed and that the exposed subgrade is suitable for support of the structures and pavements.

To aid in evaluation of the exposed soils, the area should be proofrolled using a loaded dump truck or similarly heavy piece of equipment. Areas that rut, pump, or move excessively under movement of the equipment should be stabilized prior to placement of fill soil. If left in place, soft or wet soils will exhibit substantially lower bearing for foundations, slabs and pavements. Stabilization, if required, may consist of removing and replacing unstable material with properly compacted structural fill, or where unstable soils are thin, wet/drying and compacting in-place. If large unstable areas are encountered that are cost prohibitive to undercut and replace, drying and stabilizing by chemical means (such as lime stabilization) is an option.

Care should be taken during construction so that the subgrade soils are not disturbed more than necessary. If heavily reworked or disturbed, stabilization may be required for what could otherwise be considered an acceptable subgrade.

5.1.5 Potential Subgrade Deterioration and Repair

Depending on planned grades, the near-surface subgrade soils may consist of clayey sands with higher plasticity fines, silts and clays (SC, ML, CL-ML, CL, MH and CH) which are highly susceptible to weather related deterioration. The exposed subgrade soils can deteriorate when exposed to construction activities and environmental changes. Subgrade soil deterioration can occur from exposure to rainwater, rutting from construction traffic, freezing, and erosion. Exposed subgrades in structural areas that have deteriorated should be properly repaired by scarifying, moisture conditioning, and recompacting, or by undercutting and replacement immediately prior to construction. Drying may be accomplished by spreading and disking to maximize exposure to sun and wind during favorable drying weather or by chemical means.

5.1.6 Wet Weather Grading

Based on our experience, clayey sands with higher plasticity fines, silts and clays (SC, ML, CL-ML, CL, MH and CH) similar to those encountered at the site, can be difficult to work if allowed to become wet and may also require extended drying times. Reasonable measures by the grading contractor to grade the surface to drain and seal the surface with a smooth drum roller prior to rainfall will likely be effective to limit risk of periodic rain significantly affecting grading.

Our experience indicates that allowing heavy equipment to run on the existing ground surface will result in heavy rutting. Running heavy equipment on previously placed fill during rain events or where water is ponded will result in degradation of the fill. If these conditions are evident or persist and routinely cause issues, then during construction, gravity-drained surface ditches should be installed around the site to promote surface runoff. Ditches should have at least 6 inches of relief per 100 feet of length to facilitate flow.

5.1.7 Chemical Stabilization Techniques

Chemical stabilization techniques could be utilized, if necessary, in order to lower the moisture content (short-term) and plasticity (long-term) of the clayey sands with higher plasticity fines (SC) and the low to high plasticity silty and clayey (ML, CL-ML, CL, MH and CH) soils encountered across the site. These techniques should extend to a depth of at least 3 feet below structural subgrades in slab and pavement areas. It should be noted that the success of chemical stabilization techniques is highly dependent upon the means and methods utilized by the contractor.

Laboratory mix design testing on representative samples should be performed prior to use of these stabilization methods. Lime stabilization would likely be more effective in the more plastic silty and clayey soils, while cement stabilization more effective in the sandy and less plastic silty soils. A preliminary range of 3 to 7 percent by weight for lime should be considered depending on planned results. A preliminary range of 2 to 6 percent by weight for cement should be considered depending on planned results. The lower end of this preliminary range would be more effective for short-term drying, while the higher end more effective for long-term stabilization.

5.2 Excavation Considerations

Cut areas encountering very loose to dense sandy and soft to hard silty/clayey soils can be typically excavated using pans, scrapers, backhoes and front end loaders in mass grading. The degree of difficulty that mobile equipment will encounter rises dramatically in materials exceeding about 70 to 80 blows per foot. These conditions were sporadically encountered in our soil borings. Although planned grades across the site were not available at the time of this report, these conditions were encountered as shallow as roughly elevation 462 feet MSL and as deep as roughly elevation 394 feet MSL. Subsurface conditions encountering or exceeding 70 to 80 bpf typically consisted of kaolinitic clays/silts and PWR.

5.2.1 Difficult Excavation – PWR

Based on the subsurface conditions encountered, as detailed in Table 3-2 above, PWR may be encountered within the planned cut depth, depending on planned grades. It is important to note that PWR elevations shown in the borings reflect the widely spaced boring locations. No generalization of the trend between boring locations is made. Such generalization would entail substantial risk since the composition and density of the soil and rock may vary between testing locations. We emphasize that there may be substantial areas on the site where PWR or rock may occur above the level indicated by the testing.

PWR can normally be excavated by hard to very hard ripping. We recommend ripping be performed with a single-tooth hydraulically articulated ripper mounted to the frame of a D-9 or larger dozer. Our experience indicates that as the consistency of partially weathered rock increases ("N" values greater than 50/4" to 50/2" as represented on the Boring Records in Appendix II) the probability that blasting will be required increases for both mass and local excavation. Based on the subsurface conditions encountered by the borings, it is our professional opinion that the majority of soils can be excavated by appropriately sized heavy construction equipment. Occasional blasting or hoe ram use to excavate local areas of more resistant material may be expected in both mass and confined excavations. The speed and ease of excavation will depend on the type of grading equipment, operator skill and the geologic structure of the material itself, such as the direction of bedding, planes of weakness, and spacing of discontinuities.

It has been our experience in this geological area that materials having SPT N-values of less than 50 blows/3 inches (i.e. 50/3" as represented on the Boring Records in Appendix II) can generally be excavated using pans and scrapers by first loosening with a single-tooth ripper attached to a suitable sized dozer, such as a Caterpillar D-8 or D-9.

5.2.2 *Ripping versus Blasting*

On earthwork projects requiring ripping, a controversy sometimes develops as to whether the materials can be removed by ripping or whether blasting is required. It should be noted that ripping is dependent on the equipment and techniques used as well as the operator's skill and experience. The success of the ripping operation is dependent on finding the proper combinations for the conditions encountered. Excavation of the weathered rock is typically much more difficult in confined excavations. Jackhammering or blasting is anticipated to be required for materials having SPT N-values in excess of 50 blows/2 inches (i.e. 50/2"), or at or near the level that auger refusal/rock is encountered.

5.2.3 *Confined Areas*

Excavation of dense to very dense or hard to very hard soils in confined areas will likely require pneumatic hammers or spades. Light blasting may be necessary to efficiently remove more resistant partially weathered rock, bedrock or dense boulders that could be present in confined excavations. We emphasize that the character of the soil and rock strata may vary widely between testing locations, and no trend between testing locations is implied.

5.2.4 *Classified Excavations*

For classified excavations, we suggest that massive rock excavation be defined as any material that cannot be excavated with a single tooth, hydraulically articulated ripper drawn by a crawler tractor (Caterpillar D-9 or equivalent), occupying an original volume of at least one cubic yard.

For confined excavations, we suggest that any material occupying an original volume of at least one-half of a cubic yard or more which cannot be excavated with a Caterpillar 325 or equivalent using a 24-inch wide bucket equipped with rock teeth.

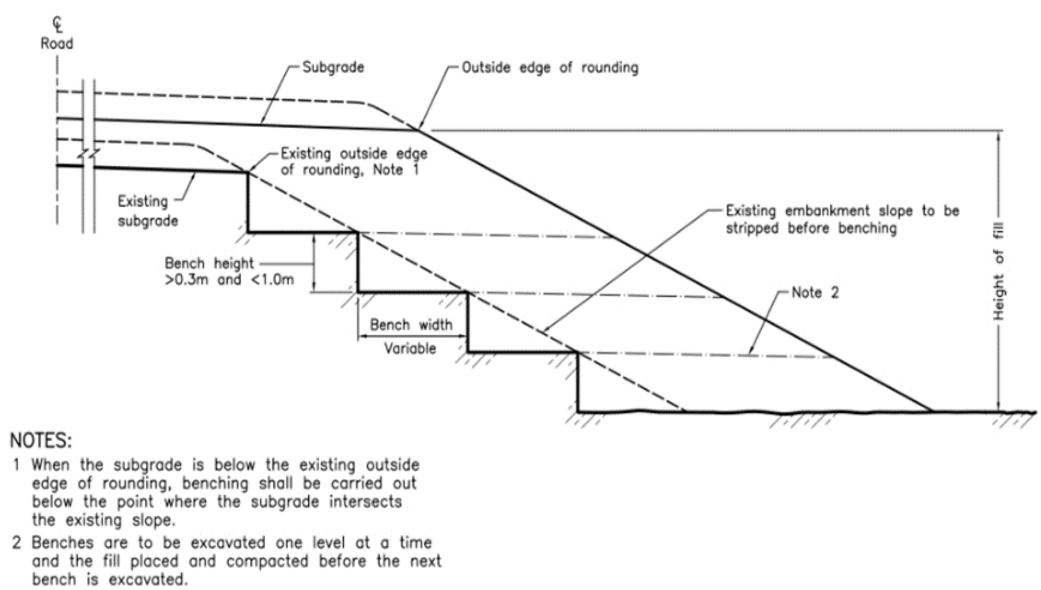
5.3 General Comments on Slope Stability and Construction

It is assumed that due to the existing grades at the site, ranging from roughly elevation 400 to 470 feet MSL, fill slopes may be required.

5.3.1 Fill Slopes

Slope stability analysis is outside of our current scope of work; however, based upon our experience, permanent compacted fill slopes with inclinations of 2H:1V (horizontal:vertical) are generally considered stable if properly constructed.

To ensure stability, loose material should be removed (undercut) from the toe of the proposed fill slope or compacted as indicated in this report prior to placing fill. The fill slopes should be benched into existing sloping terrain and adequately compacted. The tops and bases of slopes should be located a minimum of 3 times the height of the slope from structural limits. Furthermore, we recommend that fill slopes constructed along existing slopes or embankments steeper than 4H:1V have a keyway constructed along the slope base to help counteract sliding failure. The keyway width should be at least ½ of the planned slope height, and the keyway should be embedded a minimum of 2 feet into stiff to medium dense soils.



__Benching for Fill Slopes constructed along Existing Slopes__

We recommend that compacted fill slopes be benched and slightly over-built, (in order to minimize the presence of a loose zone of poorly compacted soils near the slope face), and then cut back to firm, well compacted soils prior to the placement of structure or vegetative cover. Upon construction of a competent slope face, the slope face should be protected from erosion.

5.3.2 General Slope Recommendations

Surface water is assumed to be captured by appropriate drainage measures above the slope crest and not allowed to drain down the slope. If perched groundwater is observed emerging from the face of the slope or if surface water is adversely affecting the slope, S&ME should be contacted immediately. Finally, the recommended slope inclination assumes that slopes are monitored for indications of instability and that slopes are flattened or other measures taken if appropriate. Monitoring of the slopes during construction is presently not part of our contracted scope of services for this project.

Stability can be reduced by a number of additional factors including excessive erosion, non-uniform sloping resulting in areas of steeper grades, loose seams in the slope face, and/or ground water emerging from the slopes. As a result, proper channeling of surface water is critical. Surface runoff shall be directed away from the slopes via the use of berms, swales, or slope drains. For erosion protection, a protective cover of grass should be established on permanent soil slopes as soon as possible after slope construction.

We caution against the installation of drop inlets or storm sewer lines within an improper embedment zone of the slope face, where possible over stressing and leakage may create maintenance problems or possible isolated slope failure. In general, these structures need to be installed a minimum distance of 1½ times the height of the embankment, as measured from the crest and/or toe of the slope. Furthermore, proper embedment of buried utilities beneath slope faces should be established prior to construction, with a minimum embedment for foundation recommended to be 5 feet below the down gradient portion of the slope, while a minimum embedment for buried utilities is recommended to be 3 feet below the down gradient portion of the slope.

5.4 Use of On-site Soils as Structural Fill

The on-site soils that may be proposed for use as fill at the site range in USCS soil classification but are generally sands with varying amounts of low to medium plasticity fines (SP, SP-SM, SP-SC, SM and SC) and low to medium plasticity silts and clays with varying amounts of fines (ML and CL).

5.4.1 Sandy Proposed Fill Soils

Coarse grained sandy soils with varying amounts of fines (SP, SP-SM, SP-SC, SM and SC), similar to those encountered across the site, are typically suitable for use as structural fill and for use as the immediate subgrade for pavements and floor slabs.

5.4.2 Fine Grained Low Plasticity Proposed Fill Soils

Fine grained low plasticity silts and clays (ML and CL) containing varying amounts of sands, similar to those encountered across the site, are typically suitable to marginally suitable for use as structural fill. Suitability of these soils for use depends a great deal on the moisture content of the material at time of placement.

Marginal suitability refers to the fact that fine grained soils are moisture sensitive to some degree and can be difficult to work if allowed to become wet. These difficulties can include softening of exposed subgrade soils, excessive rutting or deflection under construction traffic, and the difficulty associated with adequately drying and compacting wet soil. Moisture-related earthwork difficulties can be reduced by performing the earthwork during the typically drier months of the year (May through October).

Drainage from the site should be provided and maintained to reduce the potential for ponding of water on exposed subgrades. Before beginning to place fill, sample and test each proposed fill material to determine its maximum dry density, optimum moisture content, natural moisture content, and suitability as a structural fill material.

5.4.3 Use of Rock Fill

Shot rock or partially weathered rock (PWR) excavated in large chunks can be used in deep fill areas, provided you place them well apart to allow compaction of soil between them. However, it is important to note that placement of these materials may adversely affect potential ground improvement techniques. Avoid placing heaped large boulders in the fill, particularly in the building pads. Also, avoid placing large boulders within 2 feet of subgrades in paved areas.

Shot rock used as mass fill often contains so many fines that considerable settling will occur if the fill is not compacted. Rock fill is usually spread in 18-inch to 48-inch lifts, depending on maximum fragment size. Lift thickness must typically be greater than the maximum size. Typically, each lift should be topped by a layer of fine gravel or soil to choke off the voids in the rock fill and limit risk of dropouts forming on the surface.

Heavy compaction forces are needed to relocate large stones to increase the density and stability of the rock mass. Densification of the rock mass typically requires use of very large, high capacity smooth drum vibratory compactors. Since compactors are subject to great stresses, the vibratory drum should be constructed of thick, high-grade steel.

Procedures used to lay and spread each lift prior to compaction are very important in achieving a satisfactory fill. Dozer spreading of the layers is recommended in advance of compaction, because the dozer blade can do some reorienting of the rocks and the tracks perform some compaction. This provides a more or less even surface for the compactor.

Compaction of each lift must be monitored to judge whether the rock fragments tend to break down under the compactive effort. If there is a crushing effect on the surface material, the number of passes may have to be reduced. Or, if the machine is equipped with more than one amplitude, lower amplitude can be used to reduce surface material distortion.

5.5 Fill Placement and Compaction

Before beginning to place fill, sample and test each proposed fill material to determine maximum dry density, optimum moisture content, natural moisture content, gradation and plasticity of the soil. Structural soil fill material should have less than 5 percent organic matter, a standard Proctor maximum dry density of 90 pcf or greater and a plasticity index (PI) of 30 percent or less.

We recommend that off-site borrow, if necessary, meet the organic content, PI and density requirements of this section. Testing will be required before fill placement begins to determine the optimum moisture-density condition for the fill materials. Material to be used as soil fill should be tested and approved by the geotechnical engineer before being placed.

5.5.1 Density and Moisture Requirements

Place fill in maximum 8-inch loose lifts and compact to at least 98 percent of maximum dry density (ASTM D698 standard Proctor) within structural areas (i.e. building, pavement, utility and rail areas). This level of compaction can be practically achieved with area soils and has been found to provide adequate support for foundations, pavements and rail lines. Fill moisture content should be maintained within +/- 3 percent of the optimum moisture content. Contractor should be prepared to wet or dry soils as necessary to achieve compaction. In addition to meeting the compaction requirement, fill material should be stable under movement of the construction equipment and should not exhibit rutting or pumping.

5.5.2 Fill Placement Near Ground Water Elevation

Due to the measured ground water levels across the site and the areas of existing tributaries and wetlands, special care should be taken during fill placement activities. Where fill will be placed at or near ground water elevations, the static setting of the roller should be used. The use of the static setting will minimize the capillary action created from an increased pore-water pressure of the underlying saturated soils, which is most commonly created with the use of a vibratory setting of the roller. This will ultimately minimize the saturation of the fill soils and the degradation of previously placed fills.

5.5.3 Compaction of Granular Soils

A vibratory smooth-drum roller will likely be effective for compaction of the sandy soils with nil to few low plasticity fines content (SP, SP-SM and SP-SC) encountered at the site.

A vibratory sheeps-foot roller will likely be more effective for compaction of the silty and clayey sandy (SM and SC) soils encountered at the site. Sheeps-foot compactors will likely be preferable because the pads better penetrate the soil and they tend to break down the natural cohesive bonds between the particles.

Sandy soils excavated above the water table are usually close enough to optimum moisture content to place and compact efficiently. However, as previously mentioned, recovered samples of near-surface sandy soils appeared to be fairly dry and therefore, may require moisture conditioning during fill placement. Soils that are initially too wet or are allowed to become wet due to rainfall are more difficult to use.

5.5.4 Compaction of Cohesive Soils

The compaction characteristics of silty and clayey soils (ML and CL) with plastic properties encountered at this site will be highly dependent on the soil moisture content at the time of construction. Sheeps-foot compactors will likely be preferable because the pads better penetrate the soil, and they tend to break down the natural cohesive bonds between the particles.

The water content of these soils is usually very difficult to modify in the field. Above or below the optimum moisture content, the soils become progressively more difficult to manipulate and compact. Soils excavated above the water table are usually close enough to optimum moisture content to place and compact efficiently with little moisture conditioning required. Soils that are initially too wet or are allowed to become wet due to rainfall are more difficult to use. Drying wet silty/clayey soils usually requires favorable weather conditions and often requires repeated disking and rolling with sheeps-foot rollers to lower the moisture content.

Slope the fill surface to drain and prevent ponding water. If rain is expected while filling is temporarily halted, roll the surface with rubber tire or steel drum equipment to improve surface run-off.

5.5.5 *Deep Fill Considerations*

Although planned grades for the site were not available at the time of this report, based on the existing grades across the site ranging from elevation 400 to 470 feet MSL, it is assumed that fills of up to 30 to 50 feet in depth may be required. Soils when subject to load may deflect, consolidate, or densify. Surcharge loading induced by these heights of fills will induce substantial compression of the underlying soils. The placed fill itself will also undergo significant volume change due to self-weight.

Based on our experience with deep fills in the Coastal Plain and Piedmont, consolidation of the fill under self-weight will mostly occur while the fill is being placed. Planned fill soils will lie above the water table and will therefore be only partially saturated. Primary consolidation will for that reason be very rapid and difficult to tell apart from immediate settlement. A small amount of additional settlement or creep will occur shortly after topping out the fill. Secondary compression will be very small and is usually neglected in settlement estimates.

Native/Residual soils in-place consisting of silts and clays (fine grained, cohesive) exhibit consolidation behavior which is dependent on stress history, mineralogy, age, moisture content, and geologic formation. The time rate of consolidation of silt and clay materials is greatly dependent on particle sizes of the soil and drainage paths. Above the water table consolidation occurs mostly as immediate settlement. Thick deposits of high clay content materials may take years to consolidate, even under high stress. Soils with significant silt content, or free drainage conditions (such as sand seams), may consolidate relatively rapidly.

It is important to note that fill surcharge loads may equal or exceed building and rail loads. It is essential that construction be sequenced to allow fill settlement to have largely ceased prior to erection of the building frame, placement of slabs or construction of rail.

5.5.6 *Settlement Monitoring*

We recommend settlement monitoring points be placed within select deep fill portions of the site, as it is understood that fills approaching 80 feet may be required. Monitoring would typically include installation of settlement plates and hubs.

Settlement plates are installed to monitor the consolidation settlement of the in-situ soils at and beneath the existing ground surface. These monitoring points should consist of metal plates bearing at the base of the fill, with extendable metal rods through the fill mass to the surface. The metal rods should be enclosed by a PVC sheath to break contact between the rod and the surrounding soils. Settlement plates should be embedded in residual soils at the base of the fill at the beginning of fill placement, and additional rod sections screwed on as needed to extend vertically to the surface throughout placement. If these points become damaged during construction, additional points should be placed on the fill after topping out. Building construction should not start in deep fill areas until settlement has substantially ended.

Settlement hubs are installed to monitor the consolidation settlement of the newly placed fill soils. These monitoring points should consist of metal plates bearing within the newly placed fill. Settlement hubs should be embedded in the newly placed fill soils at the completion of fill placement. The settlement hubs should be barricaded to prevent damage during construction. Building construction should not start in deep fill areas until settlement has substantially ended.

Care should be taken in installing the plates, reading elevations, and extending riser pipes. Settlement plates should be located such that construction traffic in the vicinity is minimized, if at all possible. Plate installations and riser pipes should be clearly and adequately marked to protect the riser pipes from impact or obliteration during fill placement, grading, and other construction activities that will be ongoing during the monitoring process.

Note also that the bench-mark (or fixed reference elevation) used to survey the settlement plates must also remain intact through the monitoring process. A stadia rod may be used to obtain the fill elevation if the top of fill is not visible from the survey point; both the elevation of the riser pipe and the top of fill should be surveyed for use in settlement data analysis.

It is essential that the settlement plates/hubs be surveyed as soon as they are placed. During initial construction of the fill and any time thereafter when fill is being actively placed, the settlement plates/hubs should be read every two to three days. After the fill placement has been completed, the plates/hubs should be read weekly. When fill is being placed, the amount of fill (lift heights) should be recorded for use in settlement data interpretation. Any extreme or unusual events should also be recorded, such as rainstorms, local flooding, or seismic activity (either natural or nearby blasting).

Settlement data shall be sent to the Geotechnical Engineer for his input and interpretation. It is preferred that the same surveyors read the settlement plates/hubs over the course of the monitoring period to reduce the opportunity for error. Project data and elevation readings should be reported in U.S. Customary Units. The locations of the plates should be surveyed at the time of installation and include project station coordinates as well as the elevation. The survey reference system and benchmark should be indicated.

5.5.7 Monitoring and Testing

Fill placement should be witnessed by an experienced soils technician working under the guidance of the geotechnical engineer. We recommend full time observation by a qualified soils technician with testing at random intervals to confirm compaction is being achieved. Part-time testing may suffice for the parking area and utility trench fills.

5.6 Shallow Foundation Support

Based on our existing boring data and experience in the area, the soil profile encountered across the site appears generally suitable for development for static loading of up to 200 kips. Under these conditions, we anticipate net allowable bearing pressure ranging from 3,000 pounds per square foot (psf) on well-engineered, compacted fill and 4,500 psf on undisturbed or stabilized soils, provided that settlements of about 1 inch are able to be tolerated.

If heavier loading (approaching 500 kips) or stricter settlement tolerance are anticipated, a more rigorous evaluation of foundation settlements will need to be carried out to demonstrate acceptable settlements under these loads. Preliminary settlement estimates given above are based on widely-spaced borings and are subject to change once a final geotechnical exploration of specific building areas is carried out.

Alternately, deep ground improvement including, but not limited to, compacted aggregate piers (CAP) and/or rigid inclusions (RI) could be used to improve the allowable bearing pressure up to 6,000 psf.

A compacted aggregate pier (CAP) system is a practical refinement on the traditional over-excavation and replacement method of strengthening subsoils for foundation settlement control and bearing capacity improvement and is implemented as an intermediate step between mass grading and shallow foundation construction activities.

The CAP support elements are constructed by drilling a hole to create a cavity, removing a volume of compressible subsoil materials, then building a bottom bulb of clean, open-graded stone while vertically pre-stressing and pre-straining subsoils underlying the bottom bulb. The drilled hole must remain open and not cave to install the CAP elements. Therefore, these elements are more suited in "dirty" sands and more cohesive soils and are typically more shallow elements. The shaft is built on top of the bottom bulb, placed in thin lifts (12 inches compacted thickness). Densification of the bottom bulb and of the shaft lifts is accomplished by using the impact ramming action of a modified hydraulic hammer. The tamper consists of a special steel alloy shaft and a round, beveled tamper head. The beveled tamper head assists in transferring force laterally during impact densification, resulting in pushing of aggregate against the confined walls of the cavity. The nature of the soil is to "push back", creating significant lateral pressure buildup in the matrix soil resulting in lateral confinement to the CAP elements. In addition to increasing shear resistance at the CAP element perimeter, the increased horizontal stress in the matrix soil improves the matrix soil and makes it stiffer.

In developing design criteria for the CAP system, the actual diameter, depth and spacing should be determined by requesting a cost proposal from selected specialty contractors experienced with the method. The goal of the ground improvement program should be specified (i.e. settlement reduction/bearing capacity improvement), and the contractor should submit a proposed ground improvement program with associated costs. The proposals should be evaluated by the design engineers, and a contractor should be selected after any necessary negotiations.

Rigid Inclusions (RI) are a ground improvement technique that partially shares and transfers loads through weak strata to a firm underlying stratum, using high modulus grout columns. This technique has been used in the US for a couple decades to increase allowable bearing pressure and decrease settlement for structures, roadway embankments, and retaining walls.

The RI support elements are constructed by drilling a hole to create a cavity, removing a volume of compressible subsoil materials, then constructing a cast-in-place grout column. The grout is installed using a positive displacement pump. Grout should be pumped with sufficient pressure to prevent suction as the tooling is withdrawn and avoid necking or collapse of the hole. The drilled hole for the RI element is typically cased with the drill tooling, and is therefore more suited for deeper element installation.

The composition, diameter, depth, and number of inclusions are designed based on the planned loading and the foundation performance requirements. Rigid inclusions are typically not in direct contact with the foundations or slab, depending on planned spacing. A load transfer platform (LTP) is typically constructed of dense graded and well compacted crushed stone on top of the inclusions for the foundations or slab to bear on.

Design of the rigid inclusions including but not limited to diameter, spacing, grout strength, reinforcement, LTP requirement, thickness and material requirements is the responsibility of the selected specialty geotechnical contractor. The design package for the rigid inclusions should include a Design Calculation Report and Construction Drawings stamped by a licensed professional engineer, and a Means and Methods Submittal.

A design-level geotechnical exploration will be required to explore specific building areas once a specific plan for the development has been prepared. Bearing pressures used in design of specific foundations will need to be individually evaluated for the service loads of the proposed structure(s).

5.7 Grade Slab Support

Based on the existing boring data to date, our experience in the area and the soil profile encountered, we anticipate a modulus of subgrade reaction (k) of about 150 to 200 psi/in will be available in cut areas and well-engineered, compacted fill for use in reinforcing design for typical, lightly loaded (i.e. on the order of 500 psf floor loads) grade slabs, assuming a subgrade consisting of compacted soils without segregation by composition. This value is based on published correlations between the type and condition of the subgrade and/or fill to be placed at this site and small-diameter plate load tests. The modulus value is considered appropriate for point loads and small-diameter wheel loads but must be modified (reduced) for wide area loads.

For heavily loaded grade slab areas the above-described ground improvements for shallow foundation support may be required due to the potential for deep-seated/soil wedge settlement concerns.

5.8 Pavement Support

The existing sandy to silty/clayey soils encountered in our existing borings across the site appear suitable to marginally suitable and are typically considered to provide excellent to fair pavement support. Future exploration at the site should include classification and physical tests of the near surface soils to determine suitability of subgrade support.

Pavement performance is very dependent on drainage. Drainage should be designed to result in subsurface water levels being at least 2 feet below the top of the pavement subgrade. Design should not result in water standing on the pavement surface or behind curbing. Landscaped areas behind curbing should be at or above the elevation of the curbing.

Design should result in positive drainage being available from the stone base material. Areas adjacent to pavements (embankments, landscaped island, ditching, etc.) which can drain water (rainwater or sprinklers) should be designed so that water does not seep below the pavements. This may require the use of French drains or swales.

6.0 Qualifications 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 representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

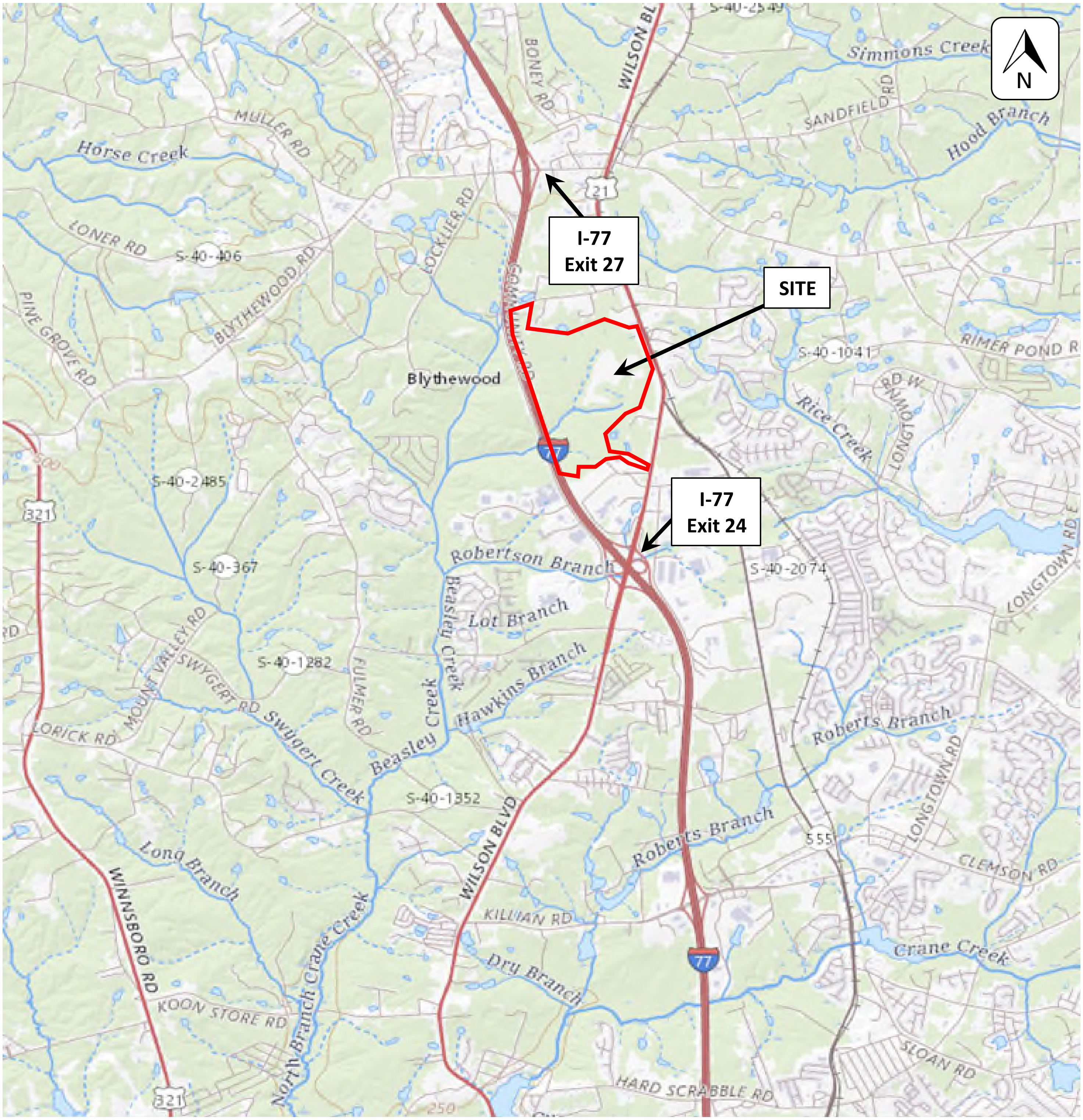
Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

Again, we note that the information provided herein is preliminary with regard to future development of the site. A final geotechnical exploration tailored to the actual development specifics must be performed before final recommendations for the proposed foundations, grade slabs and pavements can be provided.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

Appendices

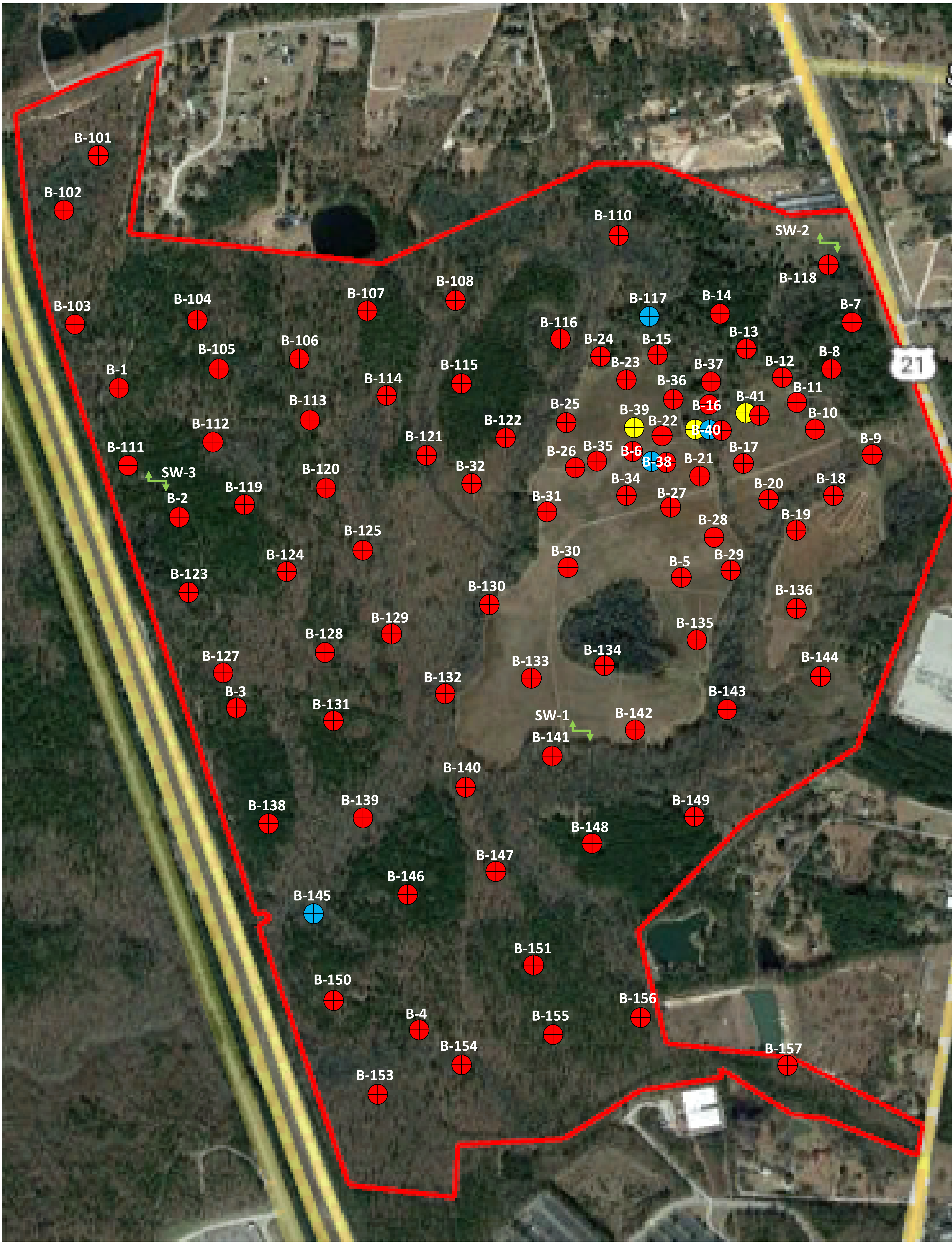
Appendix I – Figures



SOURCE: USGS National Map

SITE LOCATION PLAN

JOB NAME:	Project Connect - Arum Tract		FIGURE NO.
LOCATION:	Wilson Boulevard		1
CITY, STATE:	Blythewood, SC		
JOB NO.:	22610625A		
SCALE:	NTS	CHECKED BY:	MFC
DATE:	4/19/2023	DRAWN BY:	RCB



Approximate Previous SPT Boring Location

Approximate Previous DMT Sounding Location

Approximate Previous CPT Sounding Location

Approximate Previous Surface Shear Wave Velocity Test

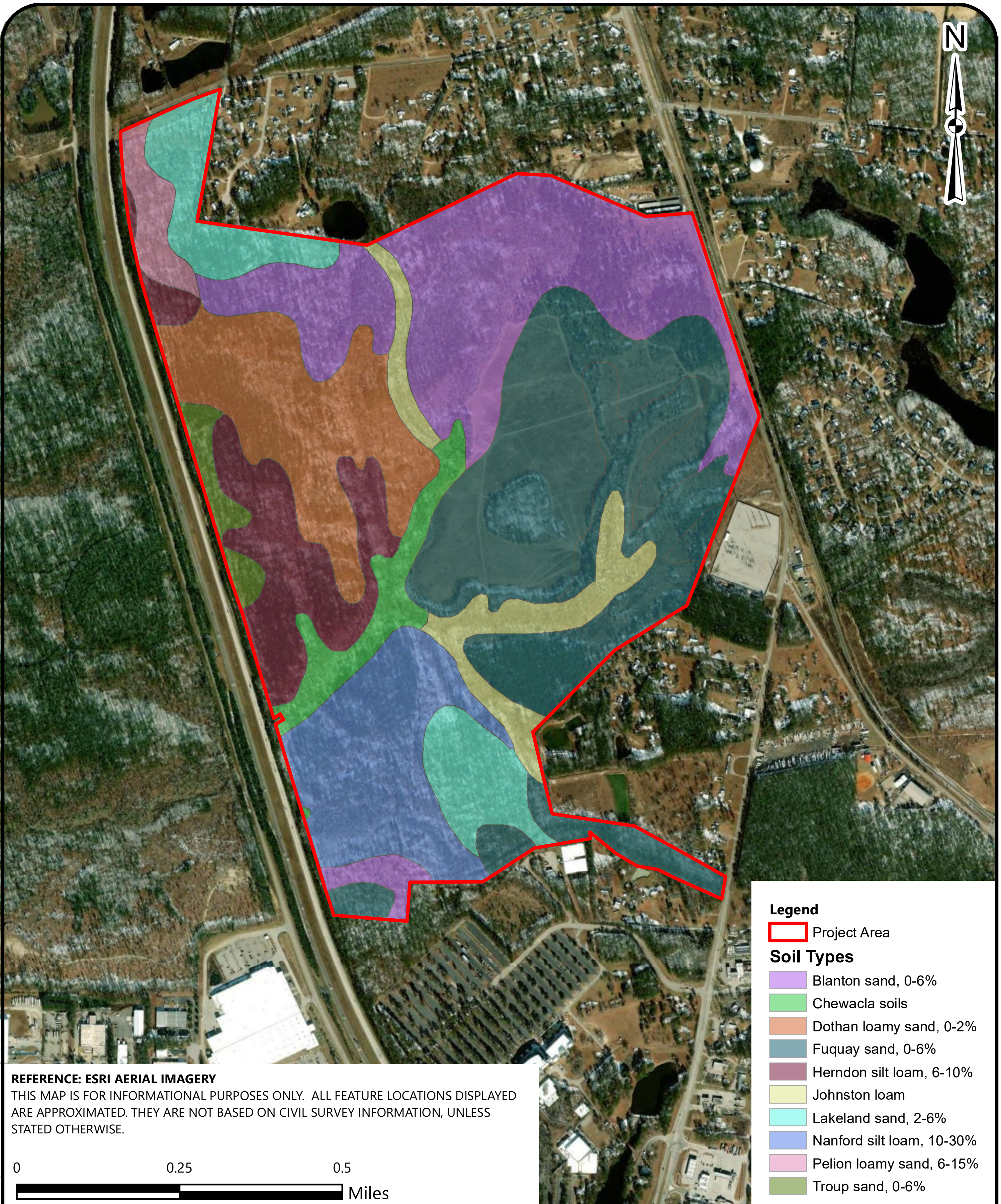
N

SOURCE: Google Earth

TESTING LOCATION PLAN

JOB NAME:	Project Connect - Arum Tract		FIGURE NO.
LOCATION:	Wilson Boulevard		2
CITY, STATE:	Blythewood, SC		
JOB NO.:	22610625A		
SCALE: NTS		CHECKED BY: MFC	
DATE: 4/19/2023		DRAWN BY: RCB	

Drawing Path: T:\Columbia-1610\Projects\2023\22610625A_Thomas & Hutton_Project Connect NR_Blythewood, SC\ENV\Project Docs\Phase 440 Cultural Resources\Project Arum\GIS\Figures\Figure 2-1 soils.mxd plotted by KNagle 03-06-2023



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USDA Soil Survey Map

Project Connect - Arum Tract
Blythewood, South Carolina

DATE:
4-19-23

PROJECT NUMBER
22610625A

FIGURE NO
3

Appendix II – Previous Exploration Data

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)

- Fill
- Asphalt
- Concrete
- Topsoil
- Gravel
- Sand
- Silt
- Clay
- Organic
- Silty Sand
- Clayey Sand
- Sandy Silt
- Clayey Silt
- Sandy Clay
- Silty Clay
- Partially Weathered Rock
- Cored Rock

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%.

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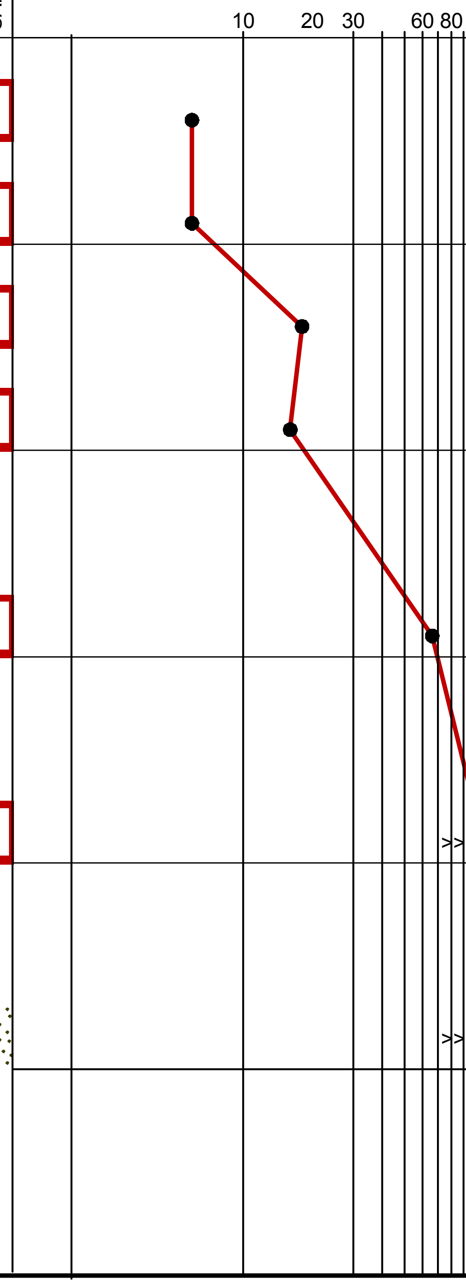
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-1**

DATE DRILLED:	9/26/2000	ELEVATION:	459
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	RPF	WATER LEVEL:	16.0 Ft at Time of Boring; 8.0 Ft. at 6 hrs
DRILLER:	D. Turner	DRILL RIG:	CME-45

NOTES:
Area previously graded - no topsoil at boring location. Water level influenced by perched water table near surface.

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	POORLY-GRADED SAND (SP)- Aeolian. Mostly fine to medium sands, clean, tan, moist, loose.			1	6
5	**CLAYEY/SILTY SAND (SC/SM)**- Coastal Plain Residuum. Mostly fine to medium sands, some low to medium plasticity fines, red/brown/gray mottled, moist, loose.		454.0	2	6
	SILTY SAND (SM)- Mostly medium sands, some low plasticity kaolinitic fines, trace fine subrounded gravel, light red, moist, medium dense.	▼		3	18
10	**ELASTIC SILT (MH)**- Mostly medium to high plasticity kaolinitic fines, trace fine sand, small nodules of red or tan clay, light gray, dry, overconsolidated, very stiff.		449.0	4	16
15	**SANDY ELASTIC SILT (MH)**- Mostly medium to high plasticity kaolinitic fines, some fine sands, light gray to tan, dry, overconsolidated, very hard.	▽	444.0	5	66
20	- Difficult drilling below 18 feet in very hard, very dry, kaolinitic silt.		439.0	6	50/ 3"
25			434.0	7	50/ 0"
	BORING TERMINATED AT 25.0 FT.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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.***

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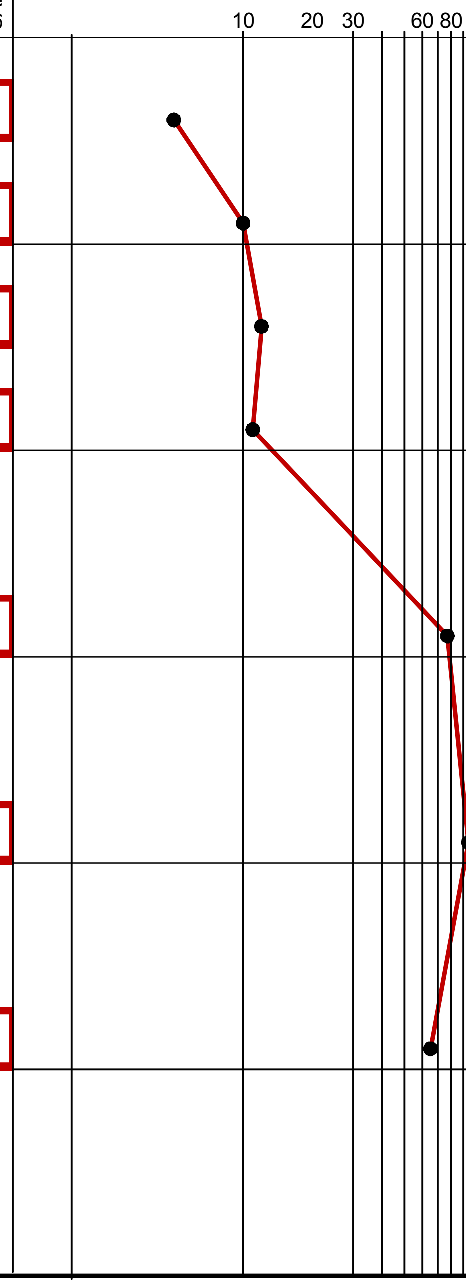
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-2**

DATE DRILLED:	9/26/2000	ELEVATION:	451
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	RPF	WATER LEVEL:	8.5 Ft at Time of Boring; 4.0 Ft. at 4 hrs
DRILLER:	D. Turner	DRILL RIG:	CME-45

NOTES: Area previously graded - no topsoil at boring location. Water level influenced by perched water table near surface.

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**POORLY-GRADED SAND (SP)**- Aeolian. Mostly fine to medium sands, trace fines, trace roots, tan, moist, loose.			1	5
3.5	**CLAYEY/SILTY SAND (SC/SM)**- Coastal Plain Residuum. Mostly fine to medium sands, some low to medium plasticity fines, red/brown/gray mottled, moist, loose.	▼ (4.0 ft)	446.0 (5 ft)	2	10
5.5	**SILTY SAND (SM)**- Mostly fine to medium sands, some low plasticity kaolinitic fines, yellow/light gray, moist, medium dense.	▽ (8.5 ft)		3	12
8.5	**CLAYEY SAND (SC)**- Mostly fine to coarse sands, some high plasticity kaolinitic fines, some nodules of gray fat clay, light gray, wet to saturated, medium dense.		441.0 (10 ft)	4	11
12	**ELASTIC SILT (MH)**- Mostly medium to high plasticity kaolinitic fines, trace fine sand, light gray, dry, overconsolidated, very hard. Difficult drilling.		436.0 (15 ft)	5	77
16	**SANDY ELASTIC SILT (MH)**- Mostly medium to high plasticity kaolinitic fines, some fine sands, light gray to tan, dry, overconsolidated, very hard. Difficult drilling.		431.0 (20 ft)	6	95
			426.0 (25 ft)	7	65
25	BORING TERMINATED AT 25.0 FT.				

STANDARD PENETRATION TEST DATA (blows/ft)



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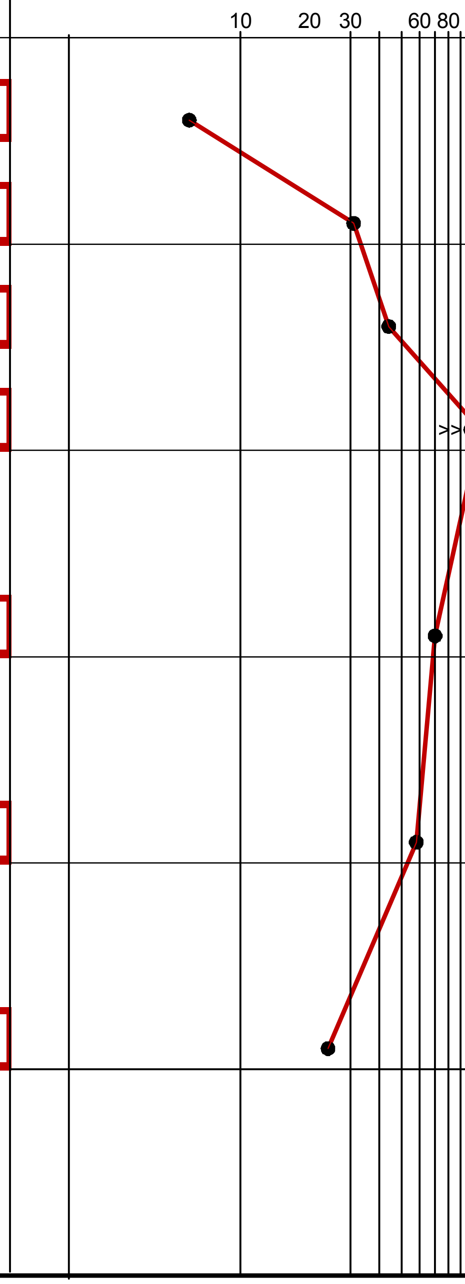
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-3**

DATE DRILLED:	9/26/2000	ELEVATION:	441
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	RPF	WATER LEVEL:	Dry at Time of Boring
DRILLER:	D. Turner	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- Approximately 4 inches.				
	POORLY-GRADED SAND (SP)- Aeolian. Mostly fine to medium sands, trace fines, roots, brown, moist, very loose.			1	6
	POORLY-GRADED SAND WITH CLAY (SP-SC)- Aeolian. Mostly fine to medium sands, few plastic fines, trace roots, brown, moist, loose.			2	31
5	**CLAYEY/SILTY SAND (SC/SM)**- Coastal Plain Residuum. Mostly fine to medium sands, some low to medium plasticity fines, trace coarse sands, red/brown/gray mottled, dry, medium dense to dense.		436.0		
	- Contains kaolin nodules, moist, dense.			3	44
	SILTY SAND (SM)- Mostly fine to medium sands, some low plasticity fines, few kaolin nodules, trace fine angular gravel, red/tan/gray, dry, very hard. Difficult drilling.			4	50/ 1"
10			431.0		
	SANDY SILT (ML)- Mostly low to medium plasticity fines, some fine sands, yellow/tan, dry, structured, overconsolidated, very hard.			5	70
15			426.0		
	ELASTIC SILT (MH)- Mostly high plasticity fines, trace fine sands, contains black oxidized seams, brown/purple, dry, structured, overconsolidated, very hard.			6	58
20			421.0		
	- Very stiff.			7	24
25	BORING TERMINATED AT 25.0 FT.		416.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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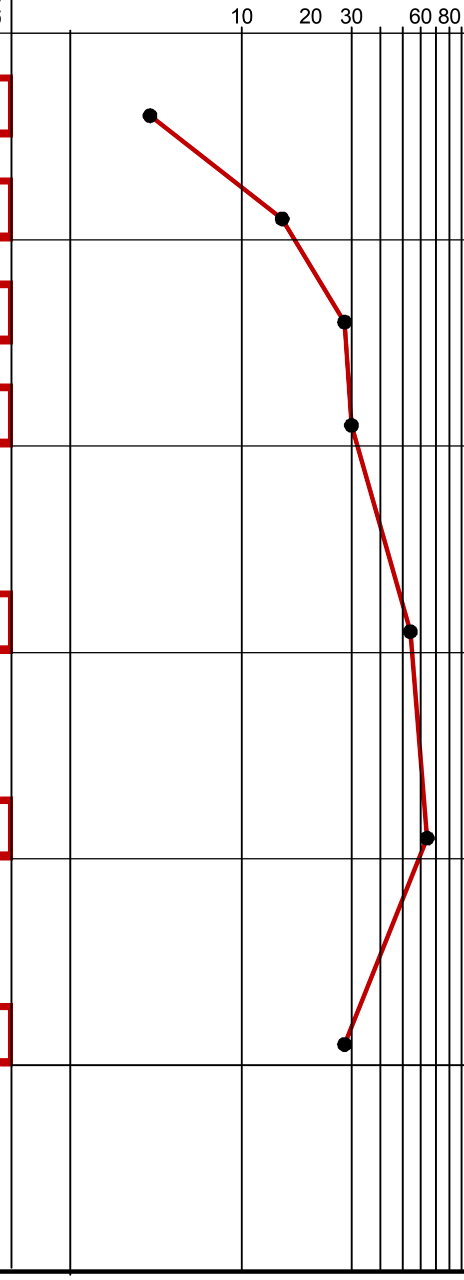
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-4

DATE DRILLED:	9/26/2000	ELEVATION:	447
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	RPF	WATER LEVEL:	23 Ft. at Time of Boring
DRILLER:	D. Turner	DRILL RIG:	CME-45

NOTES:
Area previously graded - no topsoil at boring location.

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–5.5	**POORLY-GRADED SAND (SP)**- Aeolian. Mostly fine to medium sands, trace fines, brown, moist, very loose.			1	4
5	- Tan, wet, medium dense.		442.0	2	15
5.5–8	**SILTY SAND (SM)**- Coastal Plain Residuum. Mostly fine to medium sands, some low plasticity fines, red/tan/gray mottled, dry, medium dense.			3	28
8–15	**FAT CLAY (CH)**- Mostly medium to high plasticity kaolinitic fines, trace fine sand, light gray, dry, overconsolidated, very stiff to hard.			4	30
10			437.0		
	- Contains trace fine sand, gray/tan.			5	54
15	**SANDY SILT (ML)**- Mostly low to medium plasticity fines, some fine to medium sands, yellow/tan, dry, structured, overconsolidated, very hard.		432.0		
18.5	**ELASTIC SILT (MH)**- Almost all medium to high plasticity kaolinitic fines, white/tan, dry, structured, overconsolidated, very hard.			6	64
20			427.0		
23		∇			
	- Very stiff.			7	28
25	BORING TERMINATED AT 25.0 FT.		422.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

NOTES:

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PROJECT: **Project Y**
Blythewood, South Carolina
1611-06-293

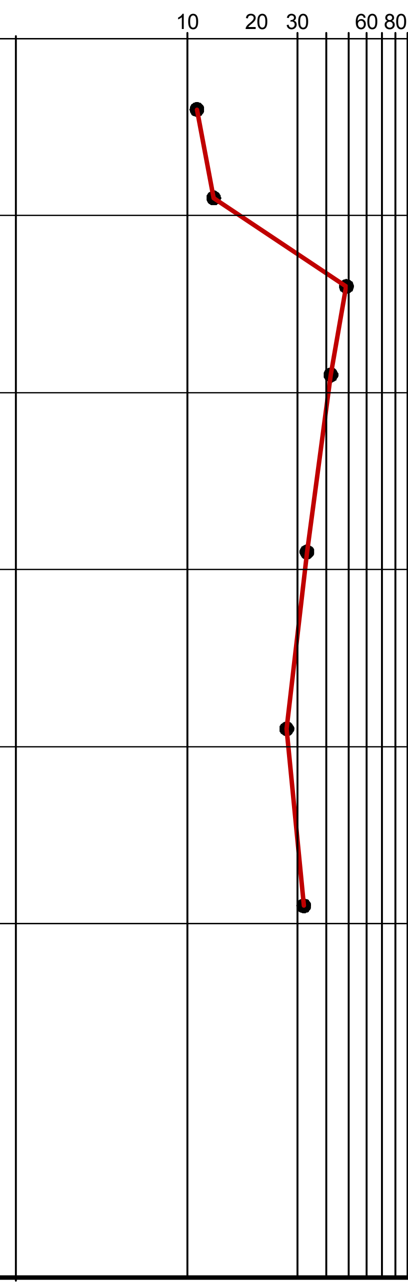
BORING LOG **B-05**

DATE DRILLED:	ELEVATION: **447**
DRILLING METHOD: **3¼" H.S.A.**	BORING DEPTH: **25**
LOGGED BY:	WATER LEVEL:
DRILLER:	DRILL RIG:

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	ORGANIC TOPSOIL- grass and roots to 3 inches.				
	POORLY GRADED SAND (SP) - Aeolian. Mostly fine to medium sands, tan, dry, gray, medium dense.			1	11
	CLAYEY SAND (SC) - mostly fine to medium sands, some low to medium plasticity fines, brown, moist, medium dense.			2	13
5	Slightly kaolinitic, red/tan/gray, moist, medium dense.		442.0		
		▼		3	49
	Increasing density and fines content, becoming more kaolinitic with depth, dense.				
	SILTY SAND (SM)- mostly fine to coarse sands, some low plasticity fines, light red/yellow, moist, dense.			4	42
10			437.0		
		▽			
	- Wet cutting at 12 feet.				
	POORLY-GRADED SAND (SP)- mostly medium sands, traces of fines, dark red, saturated, dense.			5	33
15	**SILTY SAND (SM)**- mostly fine to medium sands, some low plasticity fines, contains seams of poorly graded sand, white/tan, wet, dense.		432.0		
	POORLY-GRADED SAND (SP)- mostly medium to coarse sands, traces fines, dark red/brown, saturated, medium dense.			6	27
20	**SILTY SAND (SM)**- mostly fine sands, some nonplastic to low plasticity fine, white, moist, medium dense.		427.0		
	White/tan/red, interbedded with seams of poorly-graded sand, dense.			7	32
25	Boring Terminated at 25 feet.		422.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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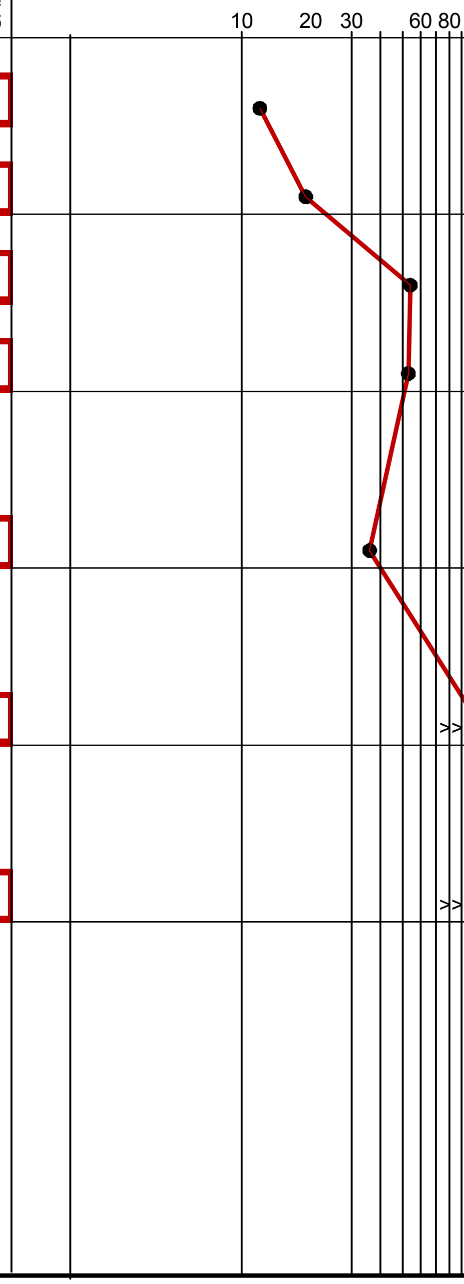
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293

BORING LOG B-06

DATE DRILLED:	ELEVATION: 455	NOTES:
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 25	
LOGGED BY:	WATER LEVEL:	
DRILLER:	DRILL RIG:	

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	ORGANIC TOPSOIL- grass and roots to 3 inches, organic soil to 9 inches.				
	POORLY-GRADED SAND (SP)- aeolian. Mostly fine to medium sands, light tan, dry, medium dense.			1	12
5	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, slightly kaolinitic, red/tan/gray, moist, medium dense.	▼	450.0	2	19
	mostly medium sands, kaolinitic, light gray/tan, moist, dense to very dense.			3	54
	mostly fine to medium sands, non-kaolinitic, brown, moist, very dense.			4	53
10	**SILTY SAND (SP)**- mostly fine sands, some low plasticity fines, contains lenses of poorly-graded sand, white/yellow, wet, very dense.		445.0		
	POORLY-GRADED SAND (SP)- mostly fine to medium sands, trace fines, dark red, saturated, dense.				
15	**SILTY SAND (SM)**- mostly fine to medium sands, some low plasticity fines, white, saturated, dense.		440.0	5	36
20	**SANDY SILT (ML)**- mostly medium plasticity fines, some fine sands, gray/tan, moist, very hard, structured. Very difficult augering from 18.5 to 22.5 feet,	∇	435.0	6	50/ 4"
	FAT CLAY (CH)- mostly high plasticity fines, trace fine sands, brown/gray, moist, very stiff to very hard.			7	50/ 3"
25	**PARTIALLY-WEATHERED ROCK (PWR)**- light gray, dry, high structure, very hard, contains rock fragments.		430.0		
	Boring Terminated at 25 feet.				

STANDARD PENETRATION TEST DATA (blows/ft)



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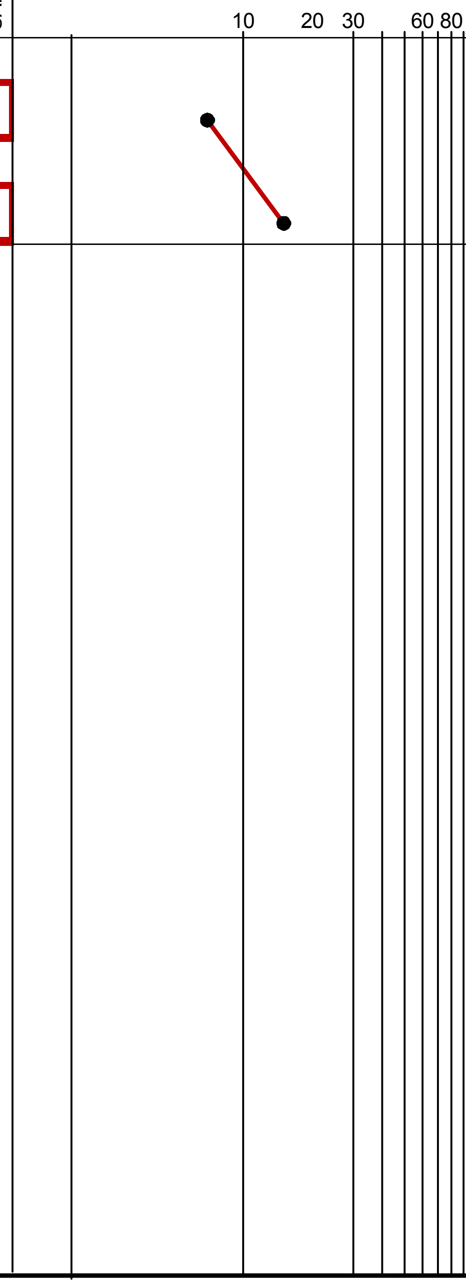
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-07**

DATE DRILLED:		ELEVATION:	463
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	5
LOGGED BY:	CMG	WATER LEVEL:	Dry at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		TOPSOIL- approximately 12 inches of topsoil.						
		POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine to medium sands, few non-plastic fines, very moist, tan, loose.			1			7
		CLAYEY SAND (SC)- mostly fine to medium sands, some to many low to medium plasticity fines, moist, brown with orange, medium dense.			2			15
5				458.0				
		BORING TERMINATED AT 5 FEET						



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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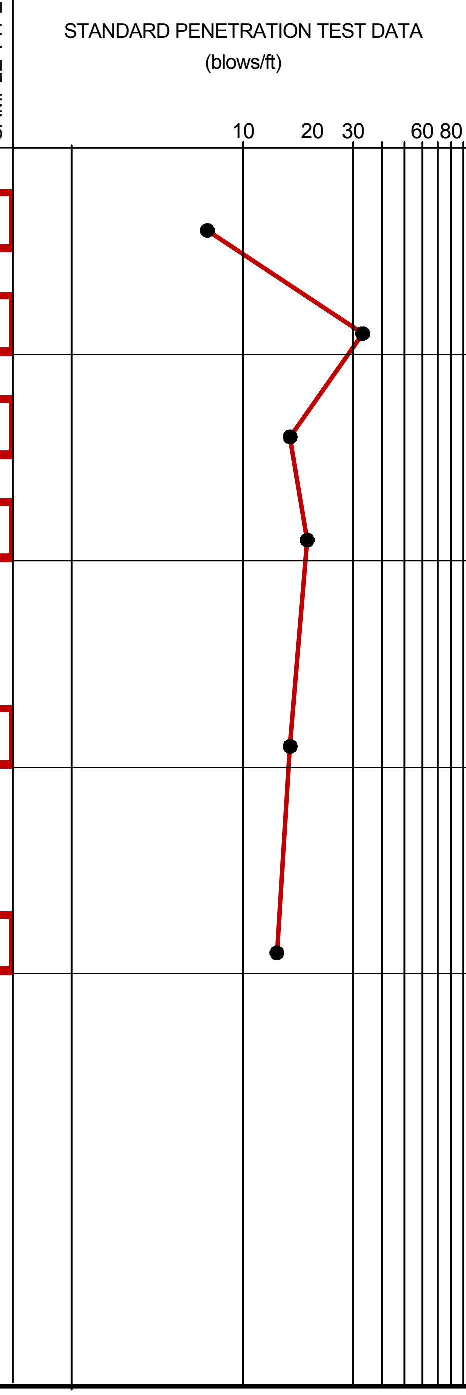
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-08**

DATE DRILLED:		ELEVATION:	460
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	7 Feet at Time of Boring, 4 Feet at 24 Hours
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 8 inches of topsoil.				
	POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine to medium sands, few low to medium plasticity fines, trace organics, slightly moist, grayish tan, loose.			1	7
5	**SANDY LEAN CLAY (CL)**- mostly low to medium plasticity fines, some fine to medium sands, slightly moist, gray with orangish brown, hard.	▼	455.0	2	33
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly medium sands, few low to medium plasticity fines, saturated, reddish orange, medium dense.	▽ HC		3	16
10	**POORLY-GRADED SAND (SP)**- mostly fine sands, few medium sands, trace fines, saturated, reddish orange, medium dense.		450.0	4	19
15	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity kaolinitic fines, saturated, light gray to white with tan, medium dense.		445.0	5	16
20	**POORLY-GRADED SAND (SP)**- mostly fine sands, few medium sands, trace nodules of gray **SILTY SAND (SM)**, saturated, tan, medium dense.		440.0	6	14
	BORING TERMINATED AT 20 FEET				



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-09

DATE DRILLED:		ELEVATION:	451
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring, 3 Feet at 24 Hours
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 10 inches of topsoil.			
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, wet, brown with orange, loose.		1	7
	- gray/orangish brown mottled, medium dense.		2	20
5		446.0		
	- increased sand content.		3	24
	POORLY-GRADED SAND (SP)- mostly fine sands, saturated, medium dense. No recovery. Sample logged from driller's notes.		4	25
10		441.0		
	POORLY-GRADED SAND (SP)- mostly medium to coarse sands, few lenses of **LEAN CLAY (CL)**, saturated, tannish gray, medium dense.		5	27
15		436.0		
	LEAN CLAY (CL)- mostly low to medium plasticity kaolinitic fines, few very fine to fine sands, wet, tan/light gray, hard.		6	42
20		431.0		
	BORING TERMINATED AT 20 FEET			

STANDARD PENETRATION TEST DATA (blows/ft)

NOTES:

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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
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BORING LOG B-10

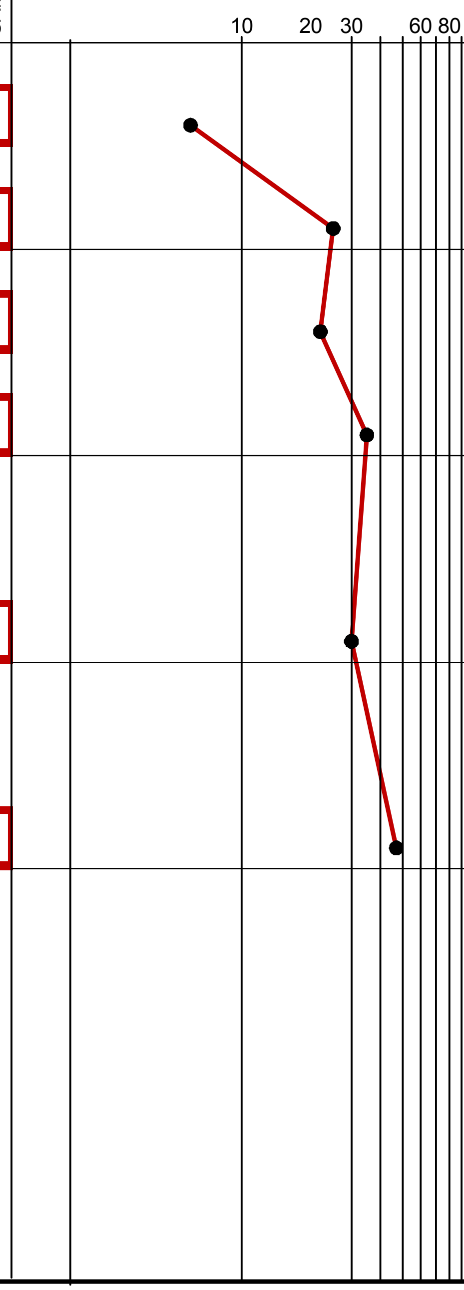
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293

DATE DRILLED:		ELEVATION:	455
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	9 Feet at Time of Boring, 5 Feet at 24 Hours
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 12 inches of topsoil.				
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, wet, brown/gray, loose.			1	6
	- orangish brown/gray, medium dense.	▼		2	25
5			450.0		
	- gray/red.	HC		3	22
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly fine to medium sands, few low to medium plasticity fines, saturated, orangish tan, dense.	▽		4	35
10			445.0		
	- mostly medium sands, orangish tan/gray.			5	30
15			440.0		
	LEAN CLAY (CL)- mostly low to medium plasticity kaolinitic fines, few very fine to fine sands, moist, gray with tan, hard.			6	47
20			435.0		
	BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



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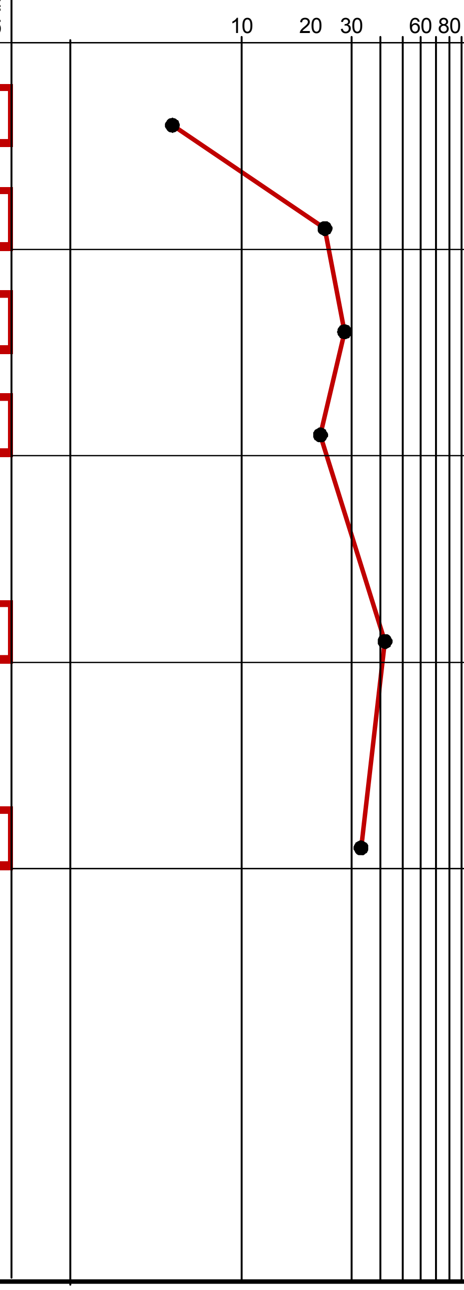
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-11
DATE DRILLED:		ELEVATION:	458
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring, 5 Feet at 24 Hours
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL**- approximately 5 inches of topsoil.				
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, wet, orangish brown, loose.			1	5
	- increased fines content, red/brown/gray mottled, medium dense.			2	23
5		▼	453.0		
	- few lenses of clean, red, fine sand.			3	28
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, some pokcets of light gray **LEAN CLAY (CL)**, saturated, orangish tan, medium dense.	▽			
		HC		4	22
10			448.0		
	LEAN CLAY (CL)- mostly low to medium plasticity kaolinitic fines, few very fine to fine sands, dry, light gray with tan, hard.				
				5	42
15			443.0		
				6	33
20	BORING TERMINATED AT 20 FEET		438.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293

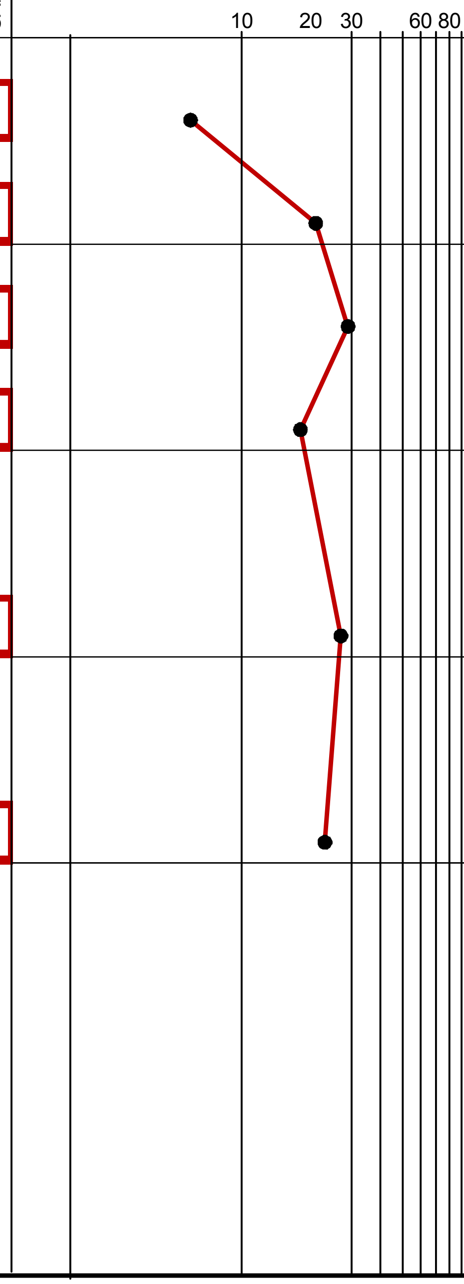
BORING LOG B-12

DATE DRILLED:		ELEVATION:	458
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8.5 Feet at Time of Boring, 6.5 Feet at 24 Hours
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL**- approximately 8 inches of topsoil.				
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, wet, brown, loose.			1	6
	- gray/red/brown mottled, medium dense.			2	21
5			453.0		
		▼ (6.5 ft)		3	29
		▽ (8.5 ft)			
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly fine to medium sands, few to some low to medium plasticity fines, wet, pinkish red, medium dense.			4	18
10			448.0		
	LEAN CLAY (CL)- mostly low to medium plasticity kaolinitic fines, few very fine to fine sands, wet, light gray/ tan with red, very stiff.			5	27
15			443.0		
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly medium sands, few low to medium plasticity fines, saturated, tan, medium dense.			6	23
20	BORING TERMINATED AT 20 FEET		438.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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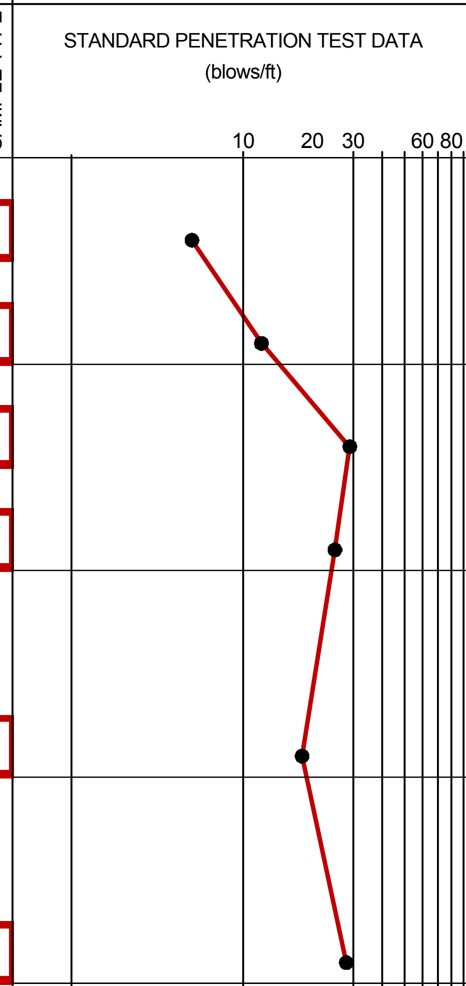
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-13**

DATE DRILLED:		ELEVATION:	460	NOTES:
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20	
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring, 5.7 Feet at 24 Hours	
DRILLER:	MDT	DRILL RIG:	CME-45	

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 7 inches of topsoil.			
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, wet, orangish brown, loose.		1	6
	- gray/orangish brown, medium dense.		2	12
5		455.0		
	- increased fines content, orangish brown/red.		3	29
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly fine to medium sands, few low to medium plasticity fines, saturated, tannish red, medium dense.		4	25
10		450.0		
	- increased fines content, orangish tan.		5	18
15		445.0		
	LEAN CLAY (CL)- mostly low to medium plasticity kaolinitic fines, few very fine to fine sands, moist, light gray/tan, very stiff.		6	28
20		440.0		
	BORING TERMINATED AT 20 FEET			



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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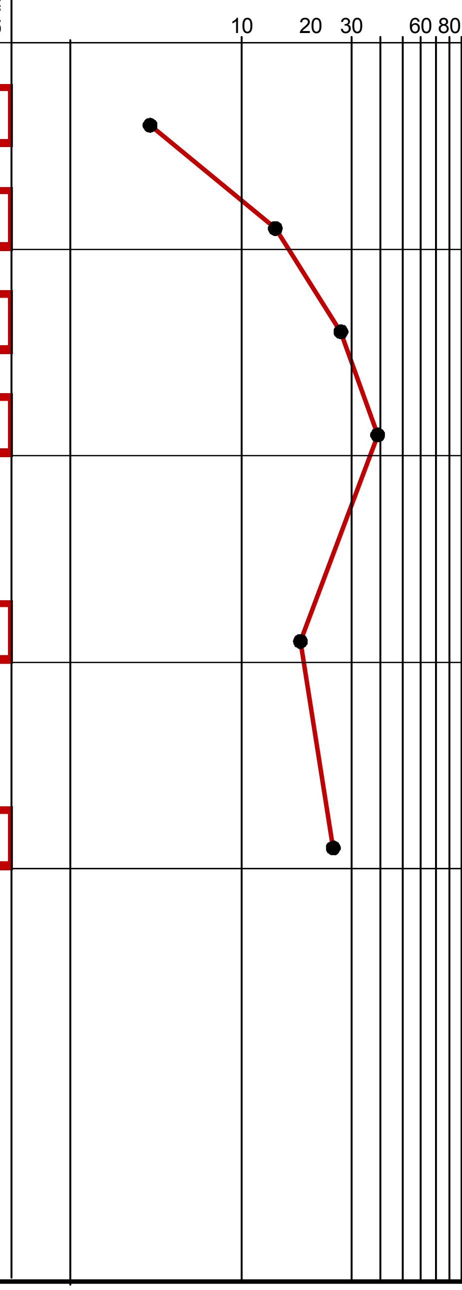
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-14**

DATE DRILLED:		ELEVATION:	463
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	7 Feet at Time of Boring, 4.5 Feet at 24 Hours
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 9 inches of topsoil.				
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, moist, grayish brown, very loose.			1	4
5	- gray/tan, medium dense.	▼	458.0	2	14
	- some pockets of gray **SANDY LEAN CLAY (CL)**, few medium sands.	▽		3	27
10	**POORLY-GRADED SAND (SP)**- mostly medium to coarse sands, trace to few low to medium plasticity fines, saturated, gray/tan, dense.		453.0	4	39
15	**LEAN CLAY (CL)**- mostly low to medium plasticity kaolinitic fines, trace very fine to fine sands, moist to wet, light gray/tan, very stiff.		448.0	5	18
20			443.0	6	25
	BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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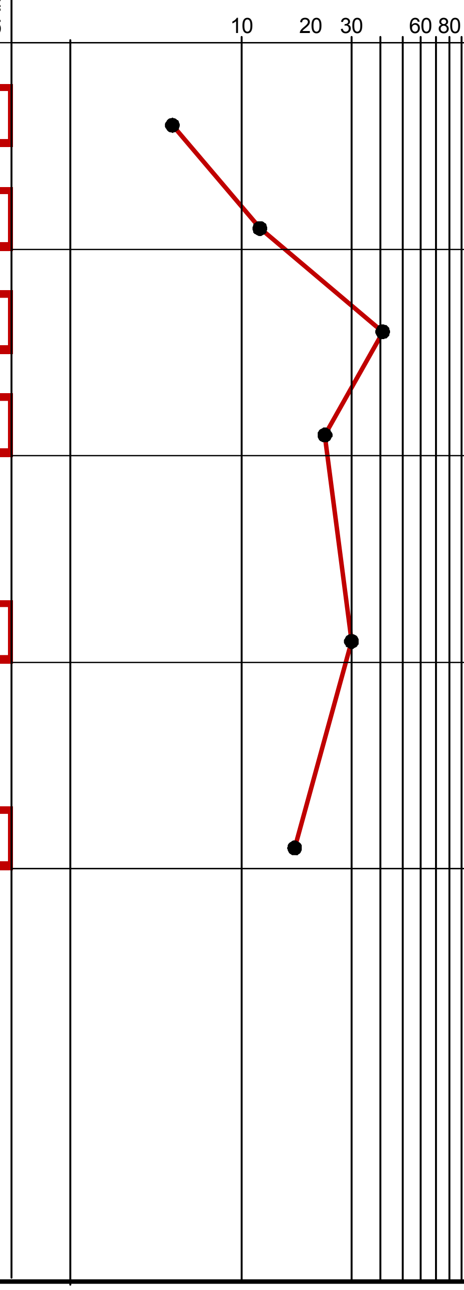
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-15**

DATE DRILLED:	ELEVATION: 458	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 20	
LOGGED BY: CMG	WATER LEVEL: 6 Feet at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–0.75	**TOPSOIL**- approximately 9 inches of topsoil.				
0.75–3	**SANDY LEAN CLAY (CL)**- mostly low to medium plasticity fines, some fine to medium sands, very moist, brown, firm.			1	5
3–5.5	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, slightly moist, gray/orange/tan/red, medium dense.	▼	453.0 (at 5)	2	12
5.5–13	**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly medium sands, few fine sands, few low to medium plasticity fines, saturated, reddish orange, dense.	▽		3	41
	- tan/light gray, some lenses of **CLAYEY SAND (SC)**, medium dense.		448.0 (at 10)	4	23
13–20	**SANDY SILT (ML)**- mostly low to medium plasticity fines, some very fine to fine sands, dry, light gray/tan, hard.		443.0 (at 15)	5	30
	- very stiff, no recovery.		438.0 (at 20)	6	17
	BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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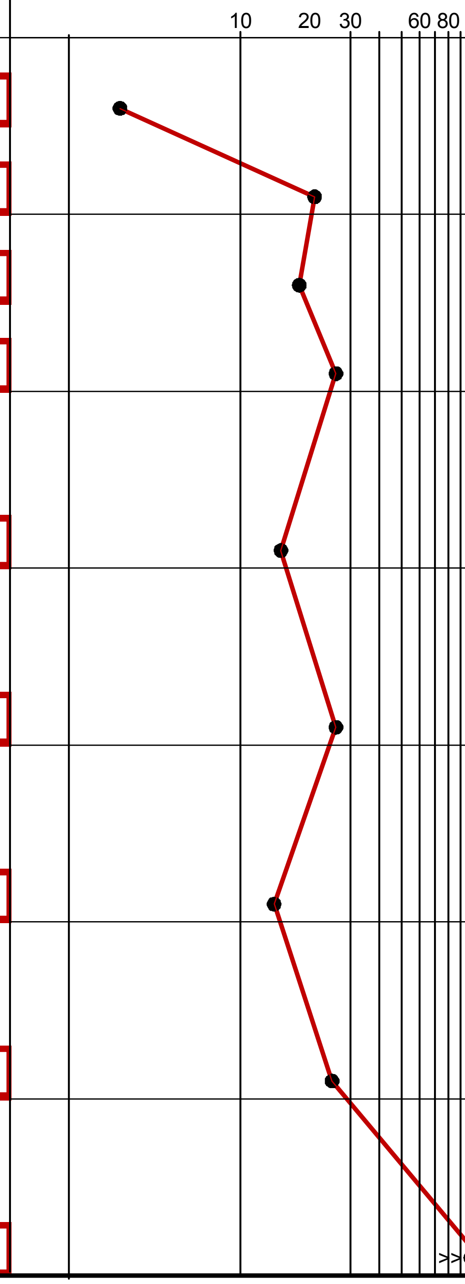
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-16

DATE DRILLED:	ELEVATION: 454	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 50	
LOGGED BY: CMG	WATER LEVEL: 3 Feet at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	N VALUE
		TOPSOIL- approximately 12 inches of topsoil.				
		POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine to medium sands, few low to medium plasticity fines, moist, brownish gray, very loose.			1	3
			▼ (3 ft)			
		- increased fines content, saturated, gray/tan with orange, medium dense.			2	21
5				449.0		
					3	18
		- few pockets of **CLAYEY SAND (SC)**, orange/tan.			4	26
10		**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine to medium sand, few medium plasticity fines, saturated, light gray, medium dense, lenses of medium to high plasticity SILT.		444.0		
15				439.0	5	15
		CLAYEY SAND (SC) - mostly fine to medium sands, some medium plasticity fines, wet, light gray with tan, few red cemented pieces, medium dense.				
20				434.0	6	26
25		Reduced fines content, fine sands, light gray to white.		429.0	7	14
30		Trace coarse sand to very fine angular gravel.		424.0	8	25
		Penetration refusal, likely PWR.			9	50/

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-16**

DATE DRILLED:		ELEVATION:	454
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	CMG	WATER LEVEL:	3 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
						0"
40	**SANDY SILT (ML)** - mostly low plasticity fines, some fine sand, yellow, dry, hard. (Piedmont Residuum)		414.0	10		44
45	**PARTIALLY WEATHERED ROCK (PWR)** - mostly low plasticity fines, some fine sand, yellow, dry, very dense.		409.0	11	>>	50/ 2"
	AUGER REFUSAL					
50			404.0			

SPT scale: 10, 20, 30, 60, 80

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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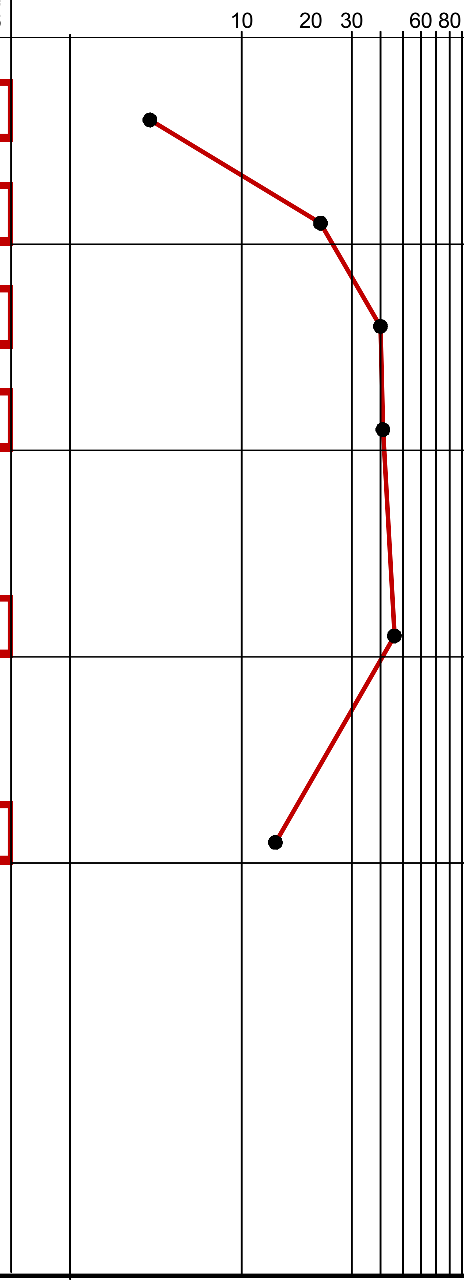
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-17

DATE DRILLED:		ELEVATION:	455
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	N VALUE
		TOPSOIL- approximately 12 inches of topsoil.				
		POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine to medium sands, few low plasticity fines, moist, tannish light gray, very loose.			1	4
5		**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, moist, tan/red/gray, medium dense.	▼	450.0	2	22
		- increased fines content, gray, dense.			3	40
10		**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly fine to medium sands, some low to medium plasticity fines, saturated, orangish tan with red, dense.	▽	445.0	4	41
15		**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly medium sands, few low to medium plasticity fines, some lenses of kaolinitic **LEAN CLAY (CL)**, yellow/light gray, dense.		440.0	5	46
20		- medium to coarse sands, orangish tan, medium dense.		435.0	6	14
		BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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BORING LOG B-18

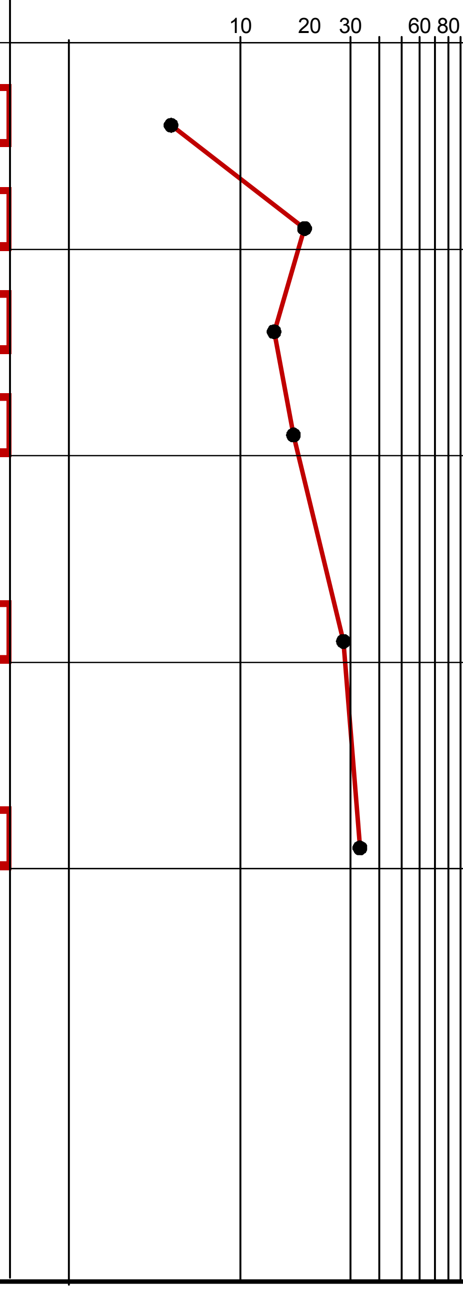
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293

DATE DRILLED:		ELEVATION:	449
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	4.5 at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL**- approximately 11 inches of topsoil.				
	SANDY LEAN CLAY (CL)- mostly medium plasticity fines, some fine to medium sands, few fine roots, very moist to wet, brown, firm.			1	5
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, moist, gray with tan/red, medium dense.	▼ ▽		2	19
5	- brown.	HC	444.0	3	14
	POORLY-GRADED SAND (SP)- mostly fine to medium sands, trace fines, few lenses of **CLAYEY SAND (SC)**, saturated, white, medium dense.			4	17
10	**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly fine to medium sands, few low to medium plasticity fines, some lenses of **CLAYEY SAND (SC)**, saturated, tan/light gray/red, medium dense.		439.0		
15			434.0	5	28
	- mostly medium sands, tan/light gray, dense.			6	33
20	BORING TERMINATED AT 20 FEET		429.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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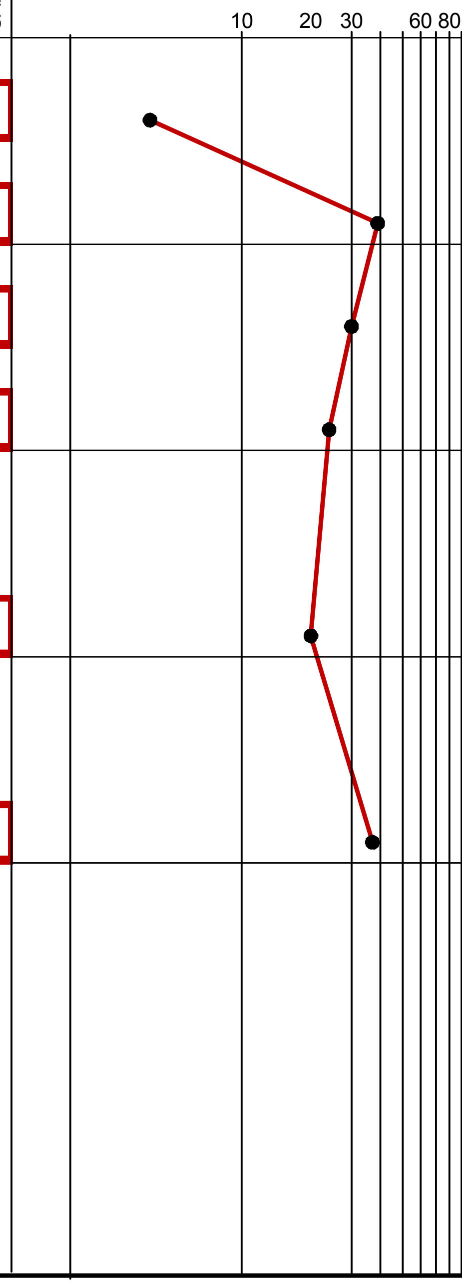
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-19**

DATE DRILLED:	ELEVATION: 449	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 20	
LOGGED BY: CMG	WATER LEVEL: 8 Feet at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 4 inches of topsoil.			
	POORLY-GRADED SAND (SP)- mostly fine sands, few medium sands, trace fines, moist, brownish gray, very loose.		1	4
5	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, moist, orange/tan/red/gray, dense.	444.0	2	39
			3	30
10	**CLAYEY SAND (SC)**- mostly medium to coarse sands, some low to medium plasticity fines, saturated, tan/light gray, medium dense.	439.0	4	24
15	**POORLY-GRADED SAND (SP)**- mostly medium sands, trace fines, saturated, light gray, medium dense.	434.0	5	20
20	**LEAN CLAY (CL)**- mostly low to medium plasticity kaolinitic fines, few very fine to fine sands, dry, light gray with tan, hard.	429.0	6	37
	BORING TERMINATED AT 20 FEET			

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

NOTES:

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

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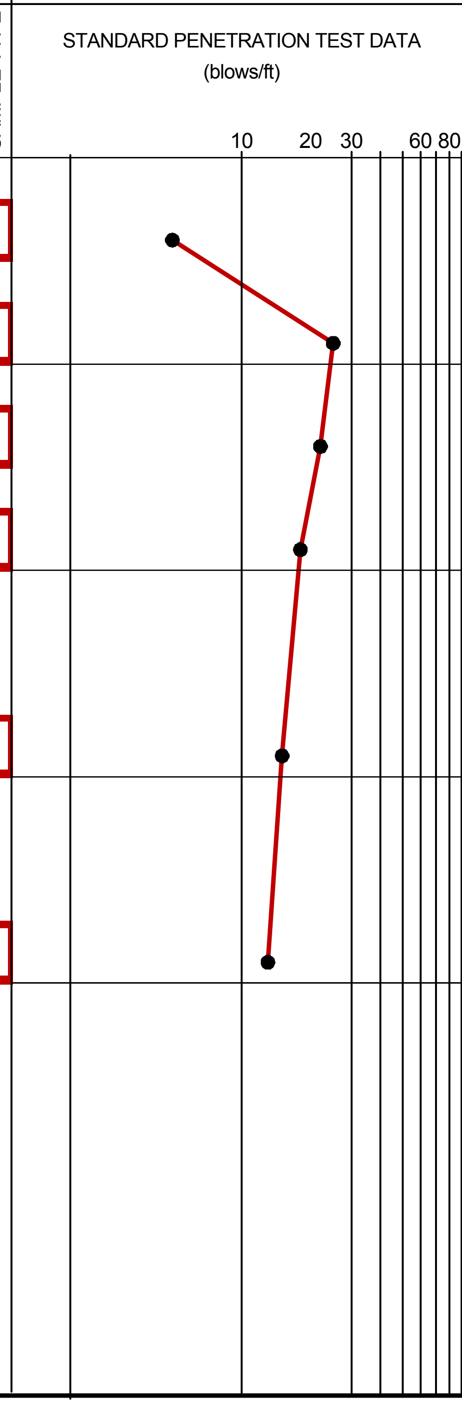
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-20**

DATE DRILLED:	ELEVATION: **449**	NOTES:
DRILLING METHOD: **2¼" H.S.A.**	BORING DEPTH: **20**	
LOGGED BY: **CMG**	WATER LEVEL:	
DRILLER: **MDT**	DRILL RIG: **CME-45**	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	N VALUE
		TOPSOIL- approximately 8 inches of topsoil.				
		POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine to medium sands, few low to medium plasticity fines, moist, gray, loose.			1	5
5		**SANDY LEAN CLAY (CL)**- mostly low to medium plasticity fines, some fine to medium sands, wet, gray, very stiff.	▼	444.0	2	25
		POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly medium to coarse sands, few low to medium plasticity fines, wet, orangish tan, medium dense.			3	22
10		- increased fines content.		439.0	4	18
15		**POORLY-GRADED SAND (SP)**- mostly fine to medium sands, trace coarse sands, clean, saturated, white, medium dense.		434.0	5	15
20		**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity kaolinitic fines, saturated, light gray with tan, medium dense.		429.0	6	13
		BORING TERMINATED AT 20 FEET				



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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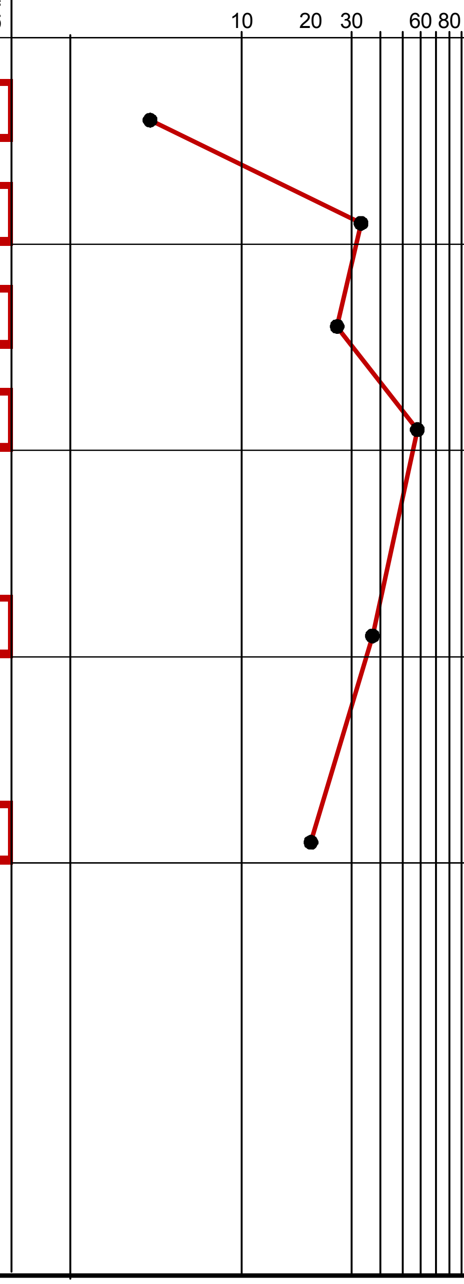
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-21**

DATE DRILLED:		ELEVATION:	452
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	6 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0		**TOPSOIL**- approximately 12 inches of topsoil.				
1		**POORLY-GRADED SAND WITH SILT (SP-SM)**- mostly fine to medium sands, few low plasticity fines, slightly moist, gray, very loose.			1	4
3		**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, slightly moist, red/brown with gray, dense.	▼		2	33
5			▽	447.0		
		- decreased fines content, medium dense.			3	26
7.5		**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly medium sands, few low to medium plasticity fines, few lenses of white kaolinitic **LEAN CLAY (CL)**, saturated, pink/orange/light gray, very dense.			4	58
10				442.0		
13		**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity kaolinitic fines, saturated, light gray/tan, dense.			5	37
15				437.0		
16		**LEAN CLAY (CL)**- mostly low to medium plasticity kaolinitic fines, dry, tan, very stiff.			6	20
20		BORING TERMINATED AT 20 FEET		432.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	**Project Y** **Blythewood, South Carolina** **1611-06-293**

BORING LOG **B-22**

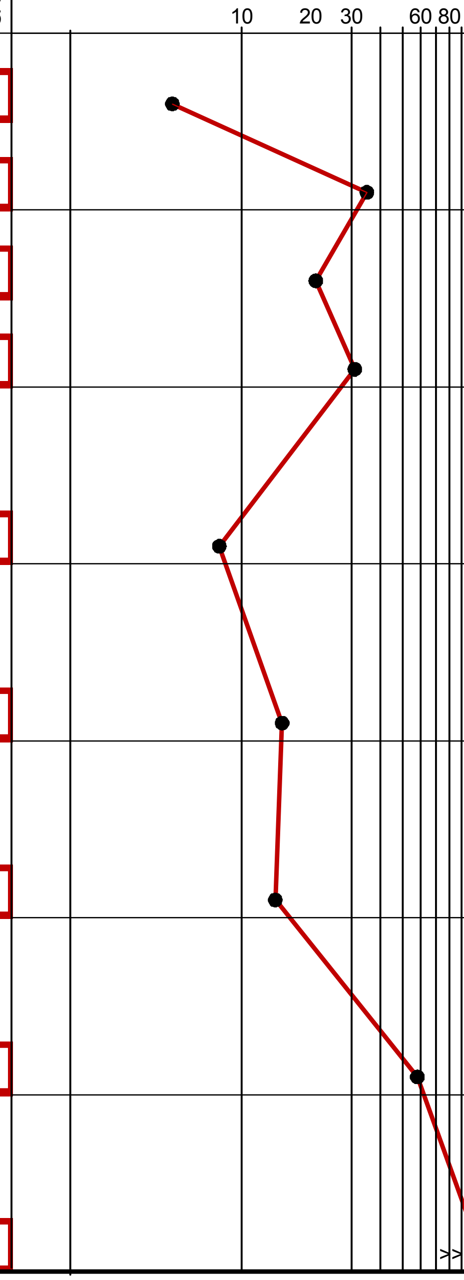
DATE DRILLED:		ELEVATION:	**455**
DRILLING METHOD:	**2¼" H.S.A.**	BORING DEPTH:	**50**
LOGGED BY:	**CMG**	WATER LEVEL:	**8.5 Feet at Time of Boring**
DRILLER:	**MDT**	DRILL RIG:	**CME-45**

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)
	TOPSOIL- approximately 7 inches of topsoil.	
	POORLY-GRADED SAND (SP)- mostly fine sands, trace non-plastic fines, moist, gray, loose.	
5	**SANDY LEAN CLAY (CL)**- mostly low to medium plasticity fines, some fine to medium sands, slightly moist, orangish brown/gray/red, hard. Liquid Limit = 48, Plastic Limit = 24, Plastic Index = 24, Natural Moisture Content = 23.3 percent. Dry Unit Weight = 103.2 pcf.	450.0
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly fine to medium sands, trace coarse sands, few low to medium plasticity fines, moist, orangish tan, medium dense.	
10	**POORLY-GRADED SAND (SP)**- mostly fine to medium sands, clean, orangish red/white, dense.	445.0
15	**SILTY CLAY (CL-ML)**- mostly low plasticity kaolinitic fines, trace very fine sands, wet, purplish light gray, firm. Plastic Limit = 20 %, Liquid Limit = 14 %, Plastic Index = 6 %, Natural Moisture Content = 18.9 %.	440.0
20	**POORLY-GRADED SAND (SP)**- mostly medium sands, few lenses of kaolinitic **CLAYEY SAND (SC)**, saturated, white/light gray, medium dense.	435.0
25	**CLAYEY SAND (SC)**- mostly medium sands, some low to medium plasticity fines, saturated, orange, medium dense.	430.0
30	**SANDY SILT (ML)** - mostly low plasticity fines, some fine to medium sands, dry, yellow and white, very hard (Piedmont Residuum).	425.0
	Partially Weathered Rock (PWR) - mostly low plasticity fines, some fine to coarse sands, dry, yellow and white with small black pieces at 43.5 feet, very hard.	

SAMPLE NO.	N VALUE
1	5
2	35
3	21
4	31
5	8
6	15
7	14
8	58
9	50/

STANDARD PENETRATION TEST DATA (blows/ft)



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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-22

DATE DRILLED:		ELEVATION:	455
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	CMG	WATER LEVEL:	8.5 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		Partially Weathered Rock (PWR) - mostly low plasticity fines, some fine to coarse sands, dry, yellow and white with small black pieces at 43.5 feet, very hard. *(continued)*					2"
40				415.0	10	>>	50/ 4"
45				410.0	11	>>	50/ 2"
		Auger Refusal					
50				405.0			

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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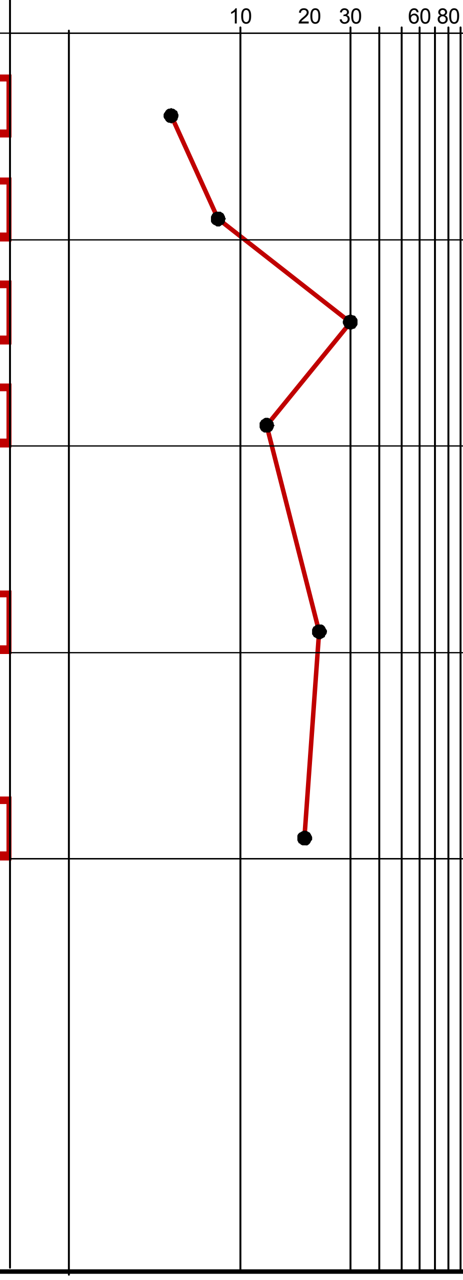
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-23

DATE DRILLED:		ELEVATION:	457
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 5 inches of topsoil.				
	CLAYEY SAND (SC)- mostly fine to medium sands, some to many low to medium plasticity fines, moist, orangish brown/light gray, loose.			1	5
5	- brown with red.	▼	452.0	2	8
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly medium to coarse sands, few to some low to medium plasticity fines, slightly moist, red, dense.	▽		3	30
10	**CLAYEY SAND (SC)**- mostly medium to coarse sands, some low to medium plasticity kaolinitic fines, saturated, light gray, medium dense.		447.0	4	13
15	**SILTY SAND (SM)**- mostly fine sands, some low to medium plasticity kaolinitic fines, saturated, light gray, medium dense.		442.0	5	22
20			437.0	6	19
	BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



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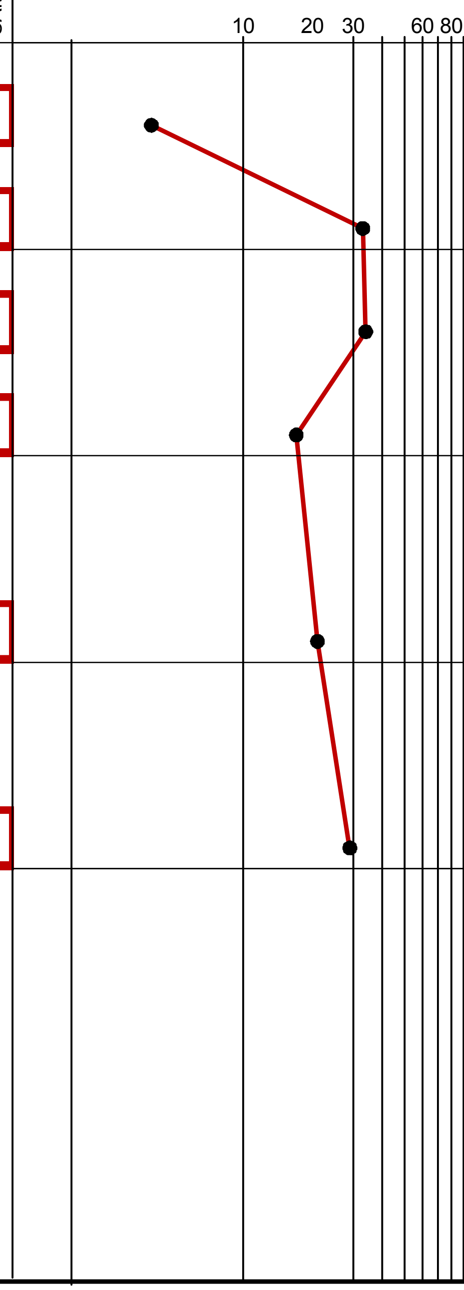
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG B-24

DATE DRILLED:	ELEVATION: 458	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 20	
LOGGED BY: CMG	WATER LEVEL: 8 Feet at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL**- approximately 9 inches of topsoil.				
	POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine to medium sands, few non-plastic fines, dry, gray, very loose.			1	4
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly fine to medium sands, few to some low to medium plasticity fines, dry, red/gray/orange, dense.	▼		2	33
5			453.0		
		▽		3	34
	SILTY SAND (SM)- mostly fine to medium sands, some low to medium plasticity fines, wet, light gray with tan, medium dense.			4	17
10			448.0		
	- mostly medium sands, becoming clayey, light gray to white.			5	21
15			443.0		
	LEAN CLAY (CL)- mostly low to medium plasticity kaolinitic fines, few lenses of orange **CLAYEY SAND (SC)**, light gray with tan, very stiff to hard.			6	29
20	BORING TERMINATED AT 20 FEET		438.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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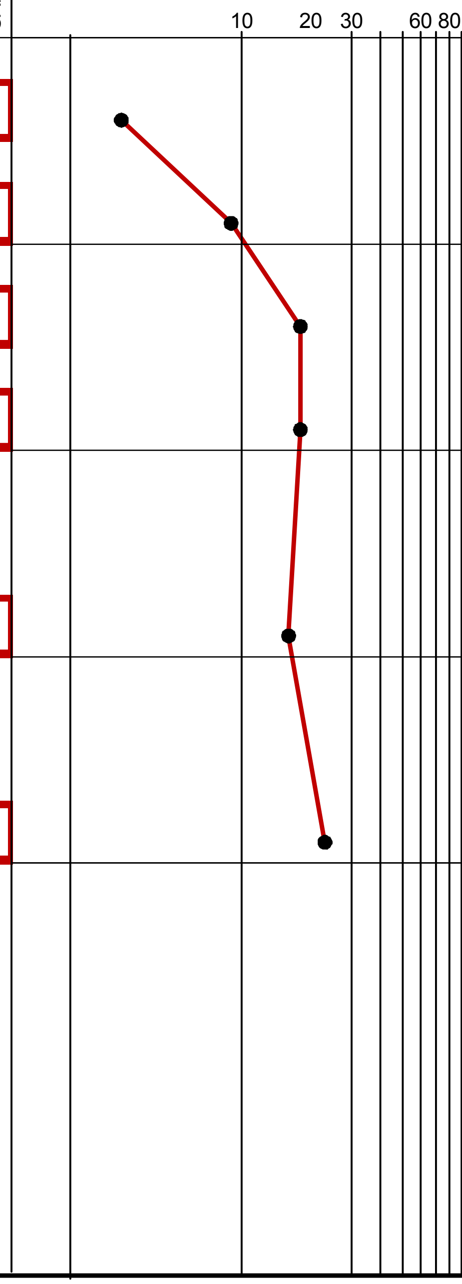
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-25

DATE DRILLED:		ELEVATION:	453
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–1	**TOPSOIL**- approximately 12 inches of topsoil.			
1–3	**POORLY-GRADED SAND (SP)**- mostly fine to medium sands, trace fines, organically-stained, moist, gray, very loose.		1	3
3–7	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, very moist, gray with orange, loose.			
5		448.0	2	9
	- grayish tan, medium dense.		3	18
7–12	**POORLY-GRADED SAND (SP)**- mostly medium sands, trace coarse sands, trace lenses of kaolinitic **CLAYEY SAND (SC)**, saturated, white/tan, medium dense.		4	18
10		443.0		
12–20	**SILTY SAND (SM)**- mostly fine to medium sands, some low plasticity kaolinitic fines, saturated, white, medium dense.		5	16
15		438.0		
20		433.0	6	23
	BORING TERMINATED AT 20 FEET			

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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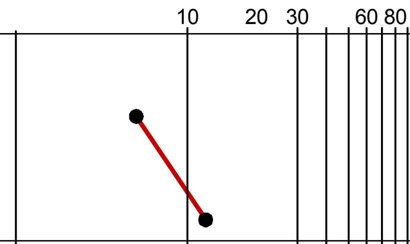
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-26**

DATE DRILLED:	ELEVATION: 455	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 5	
LOGGED BY: CMG	WATER LEVEL: Dry at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		TOPSOIL- approximately 11 inches of topsoil.						
		POORLY-GRADED SAND (SP)- mostly fine to medium sands, trace fines, dry, grayish brown, loose.	HC		1			6
		CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, moist, orangish brown, medium dense.			2			12
5		BORING TERMINATED AT 5 FEET		450.0				



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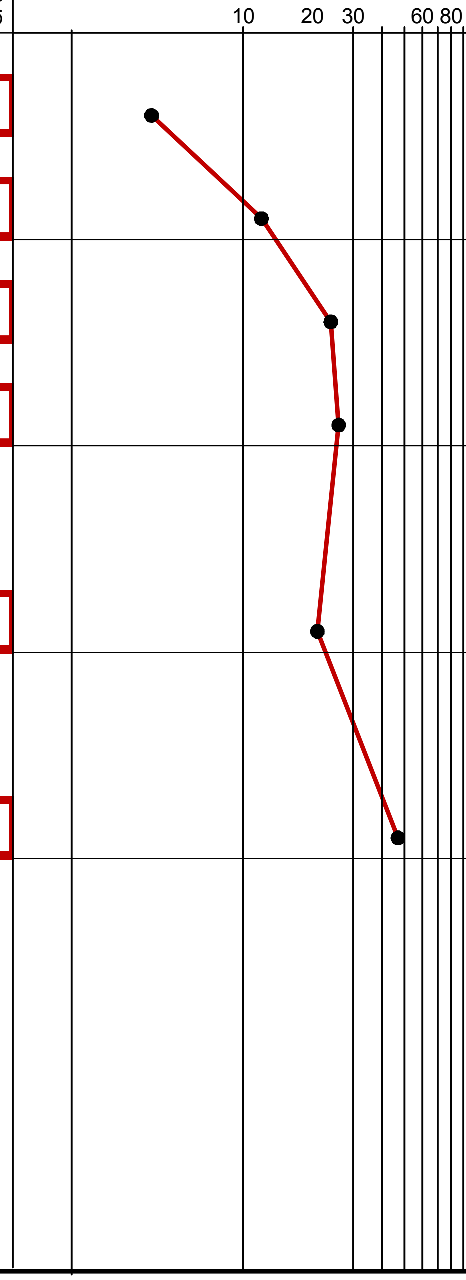
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-27**

DATE DRILLED:	ELEVATION: 453	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 20	
LOGGED BY: CMG	WATER LEVEL: 9 Feet at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–0.5	**TOPSOIL**- approximately 6 inches of topsoil.				
0.5–2.5	**POORLY-GRADED SAND (SP)**- mostly fine to medium sands, trace fines, slightly moist, tan, very loose.			1	4
2.5–5.5	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, moist, gray/orangish brown, medium dense.	▼	448.0 (5)	2	12
5.5–11	**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly fine to medium sands, few low to medium plasticity fines, wet, pink/gray, medium dense.			3	24
	- mostly medium sands, trace coarse sands, reddish pink.	▽	443.0 (10)	4	26
11–17	**SILTY SAND (SM)**- mostly fine to medium sands, some to many low plasticity kaolinitic fines, saturated, white with tan, medium dense.		438.0 (15)	5	21
17–20	**LEAN CLAY (CL)**- mostly low to medium plasticity kaolinitic fines, trace very fine to fine sands, dry, light gray/tan, hard.		433.0 (20)	6	47
20	BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



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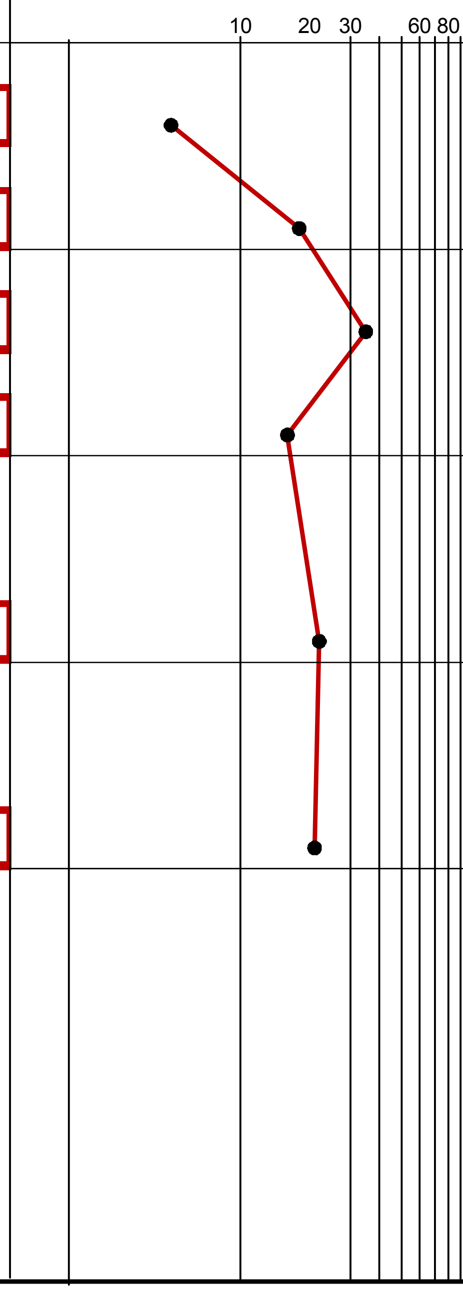
PROJECT:	**Project Y** **Blythewood, South Carolina** **1611-06-293**	**BORING LOG**	**B-28**

DATE DRILLED:		ELEVATION:	**448**
DRILLING METHOD:	**2¼" H.S.A.**	BORING DEPTH:	**20**
LOGGED BY:	**CMG**	WATER LEVEL:	**9 Feet at Time of Boring**
DRILLER:	**MDT**	DRILL RIG:	**CME-45**

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–0.5	**TOPSOIL**- approximately 6 inches of topsoil.				
0.5–3.5	**POORLY-GRADED SAND (SP)**- mostly fine to medium sands, trace fines, dry, tan, loose.			1	5
3.5–6	**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, slightly moist, orangish brown, medium dense.	▼		2	18
5			443.0		
6–8	**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly medium sands, few low to medium plasticity fines, moist, orangish red, dense.			3	35
8–12	**POORLY-GRADED SAND (SP)**- mostly fine sands, trace to few non-plastic fines, saturated, brownish orange, medium dense.	▽		4	16
10			438.0		
12–20	**SILTY SAND (SM)**- mostly fine to medium sands, some low plasticity kaolinitic fines, saturated, light gray with tan, medium dense.			5	22
15			433.0		
	- mostly medium sands, trace coarse sands.			6	21
20			428.0		
	BORING TERMINATED AT 20 FEET				

STANDARD PENETRATION TEST DATA (blows/ft)



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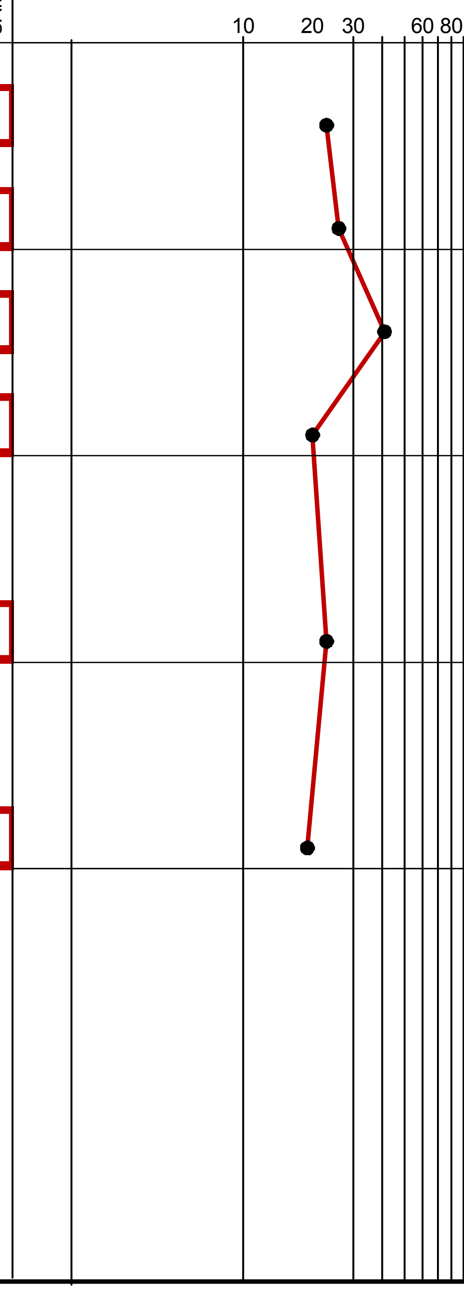
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-29

DATE DRILLED:		ELEVATION:	446
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	20
LOGGED BY:	CMG	WATER LEVEL:	8 Feet at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL**- approximately 5 inches of topsoil.				
	POORLY-GRADED SAND (SP)- mostly fine sands, trace fines, dry, grayish brown, very loose.			1	23
	CLAYEY SAND (SC)- mostly fine to medium sands, some low to medium plasticity fines, moist, orangish brown, medium dense.			2	26
5		▼	441.0		
				3	41
	POORLY-GRADED SAND WITH CLAY (SP-SC)- mostly medium to coarse sands, few low to medium plasticity fines, saturated, orangish brown, dense.	▽			
	POORLY-GRADED SAND WITH SILT (SP-SM)- mostly medium sands, trace coarse sands, few low to medium plasticity kaolinitic fines, saturated, light tan, medium dense.			4	20
10			436.0		
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity kaolinitic fines, saturated, light gray/tan, medium dense.			5	23
15			431.0		
	- light gray to white with tan.				
				6	19
20	BORING TERMINATED 20 FEET		426.0		

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.***

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-30

DATE DRILLED:		ELEVATION:	448
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	5
LOGGED BY:	CMG	WATER LEVEL:	Dry at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		TOPSOIL- approximately 9 inches of topsoil.						
		POORLY-GRADED SAND (SP)- mostly fine to medium sands, traced fines, slightly moist, grayish brown, loose.			1			5
		- grayish orange, medium dense.	HC		2			8
5		BORING TERMINATED AT 5 FEET		443.0				

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-31

DATE DRILLED:		ELEVATION:	452
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	5
LOGGED BY:	CMG	WATER LEVEL:	Dry at Time of Boring
DRILLER:	MDT	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		TOPSOIL- approximately 8 inches of topsoil.						
		POORLY-GRADED SAND (SP)- mostly fine to medium sands, trace fines, dry, brownish gray, very loose.			1		●	4
			HC					
5		**CLAYEY SAND (SC)**- mostly fine to medium sands, some low to medium plasticity fines, slightly moist, light gray/orangish brown, medium dense.		447.0	2		●	11
		BORING TERMINATED AT 5 FEET						

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG B-32

DATE DRILLED:	ELEVATION: 451	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 5	
LOGGED BY: CMG	WATER LEVEL: Dry at Time of Boring	
DRILLER: MDT	DRILL RIG: CME-45	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		TOPSOIL- approximately 8 inches of topsoil.						
		POORLY-GRADED SAND (SP)- mostly fine sands, few medium sands, trace fines, very moist, grayish tan, loose.	HC		1			5
5		**POORLY-GRADED SAND WITH CLAY (SP-SC)**- mostly fine to medium sands, few low to medium plasticity fines, moist, orangish brown, medium dense.		446.0	2			12
		BORING TERMINATED AT 5 FEET						

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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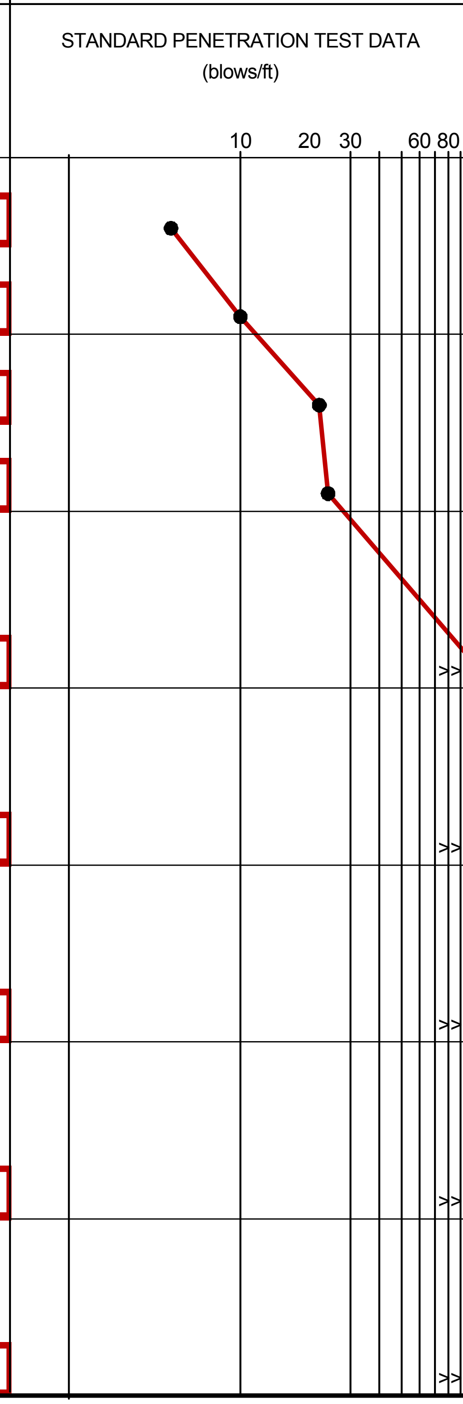
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-34

DATE DRILLED:	1/15/2001	ELEVATION:	454
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	11 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL**- approximately 6 inches of topsoil.			
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, tan, loose.		1	5
5	**CLAYEY SAND (SC)**- mostly fine to coarse sand, some medium plasticity fines, moist, tan, orange, and gray, medium dense.	449.0	2	10
	SILTY SAND (SM)- mostly fine sand, some low plasticity fines, micaceous, moist, tannish yellow, medium dense.		3	22
10	**SANDY SILT (ML)**- mostly low plasticity fines, some fine clayey sand, dry, light gray with tan, stiff to very hard. (Water level ∇ at 11 ft)	444.0	4	24
15		439.0	5	50/ 5"
	SILTY SAND (SM)- mostly fine to medium sands, some low to medium plasticity fines, dry, tan with light gray, very dense.			
20		434.0	6	50/ 1"
25	**PARTIALLY WEATHERED ROCK (PWR)**- mostly low plasticity fines, trace fine sands, dry, white with purple, very hard.	429.0	7	50/ 6"
30		424.0	8	50/ 4"
			9	50/



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-34

DATE DRILLED:	1/15/2001	ELEVATION:	454
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	11 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		PARTIALLY WEATHERED ROCK (PWR)- mostly low plasticity fines, trace fine sands, dry, white with purple, very hard. *(continued)*					5"
40				414.0	10	>>	50/ 4"
45				409.0	11	>>	50/ 3"
50				404.0	12	>>	50/ 2"
		Boring Terminated at 50 feet.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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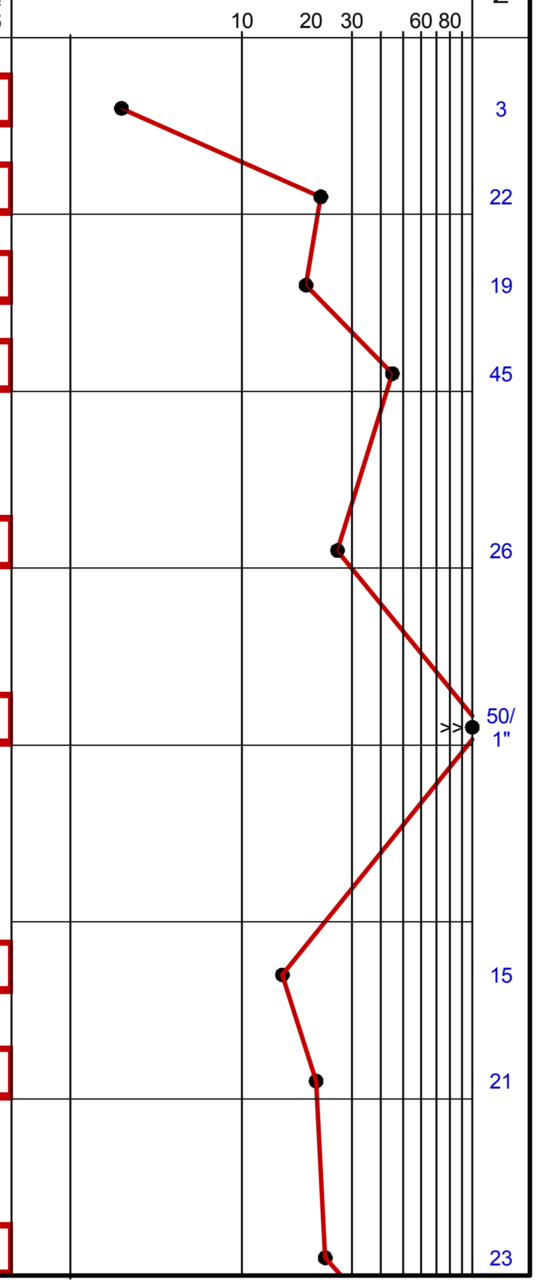
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-35
DATE DRILLED: 1/16/2001	ELEVATION: 454	NOTES:	
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 50		
LOGGED BY: JTP	WATER LEVEL: 6 feet 16 hour after drilling.		
DRILLER: BC	DRILL RIG: CME-45		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)
	TOPSOIL- approximately 7 inches of topsoil.		
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, tan, loose.		
	CLAYEY SAND (SC)- mostly fine to coarse sand, some medium plasticity fines, moist, tan orange and gray, medium dense.	▼ ▽	
5			449.0
10	**SILTY SAND (SM)**- moatly fine to coarse sand, some low plasticity fines, moist to wet, orange to tan, dense.		444.0
	- White micaceous, fine to medium sands, medium dense.		
15			439.0
	SILT WITH SAND (ML)- mostly low plasticity fines, trace fine sands, dry, light gray with yellow, very hard.		
20			434.0
	SANDY SILT (ML)- mostly low plasticity fines, trace fine sands, dry, light gray with yellow, very hard.		
25			429.0
30			424.0

STANDARD PENETRATION TEST DATA (blows/ft)



SAMPLE NO.	N VALUE
1	3
2	22
3	19
4	45
5	26
6	50/ 1"
7	15
8	21
9	23

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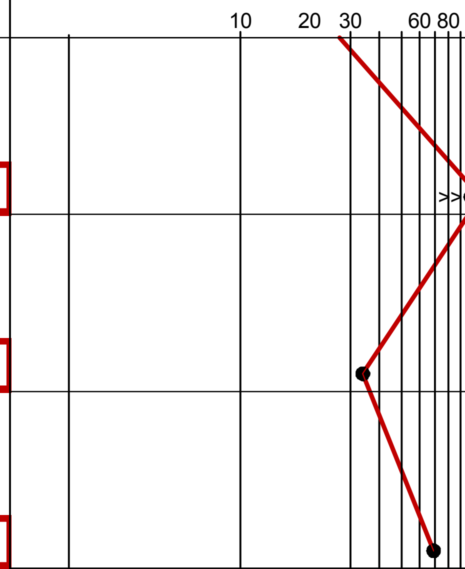
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-35

DATE DRILLED:	1/16/2001	ELEVATION:	454
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	6 feet 16 hour after drilling.
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		PARTIALLY WEATHERED ROCK (PWR)- mostly low plasticity fines, trace fine sands, dry, yellow to tan some white, very hard.			10		50/ 2"
40				414.0			
		SANDY SILT (ML)- mostly low plasticity fines, trace fine sands, dry, yellowish tan, hard.			11		34
45				409.0			
		- Very hard, gray, brown, and tan.			12		69
50		Boring Terminated at 50 feet.		404.0			



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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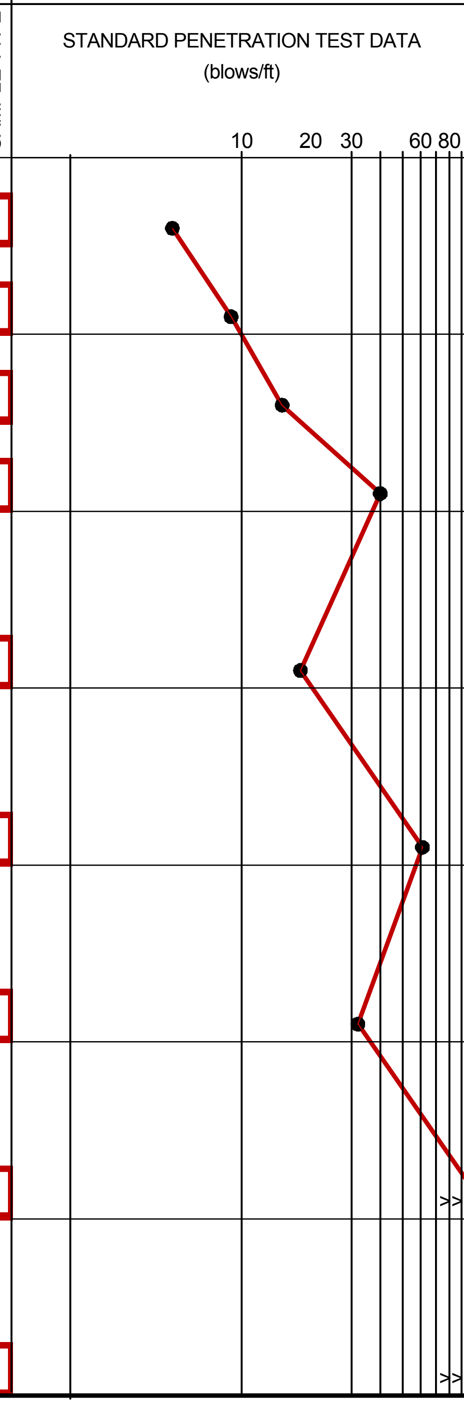
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-36

DATE DRILLED:	1/18/2001	ELEVATION:	455
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	8.5 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 12 inches of topsoil.			
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, tan, loose.		1	5
	CLAYEY SAND (SC)- mostly fine to coarse sand, some medium plasticity fines, moist, tan orange and gray, loose to medium dense.			
5		450.0	2	9
			3	15
10	**SILTY SAND (SM)**- mostly fine sands, some low plasticity fines, wet, tan, dense.	445.0	4	40
	- Saturated, fine to coarse sand.		5	18
15		440.0		
	CLAYEY SAND (SC)- mostly fine to coarse sand, some medium plasticity fines, moist, tan and white, micaceous, very dense.			
20		435.0	6	61
25		430.0	7	32
			8	50/ 2"
30		425.0		
	SANDY SILT (ML)- mostly low plasticity fines, some fine clayey sand, dry, white, very dense.		9	50/



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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG B-36

DATE DRILLED:	1/18/2001	ELEVATION:	455
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	8.5 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
						3"
	PARTIALLY WEATHERED ROCK (PWR)- mostly low plasticity fines, trace fine sands, dry, white, very dense.					
40			415.0	10	>>	50/ 5"
45			410.0	11	>>	50/ 5"
50			405.0	12	>>	50/ 4"
	Boring Terminated at 50 feet.					

SPT scale: 10, 20, 30, 60, 80

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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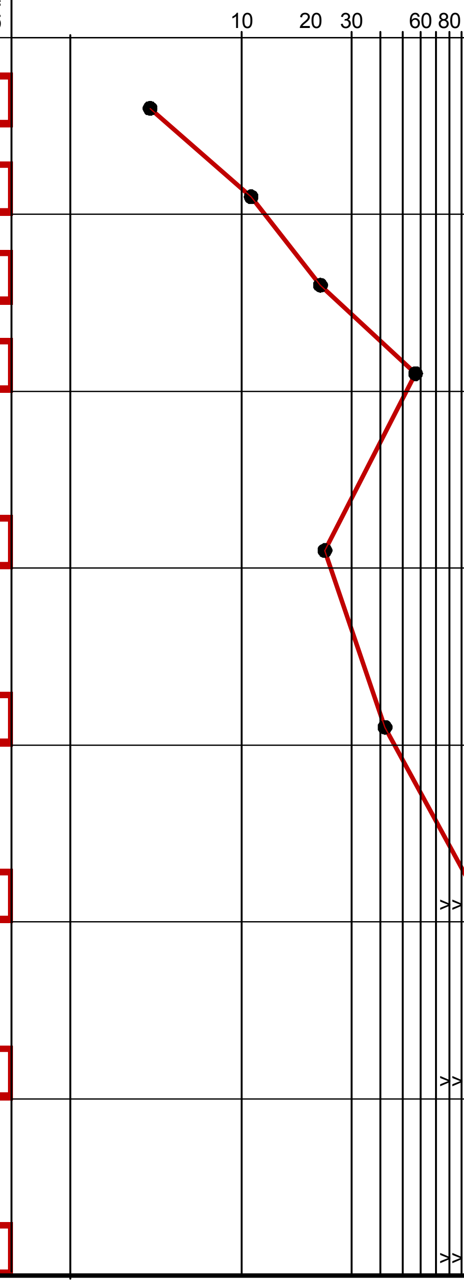
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG B-37

DATE DRILLED:	1/17/2001	ELEVATION:	456
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	7.5 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 10 inches of topsoil.				
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, brown, loose.	▼		1	4
	CLAYEY SAND (SC)- mostly fine to coarse sand, some medium plasticity fines, moist, tan orange and gray, loose.				
5	- Medium dense.		451.0	2	11
		▽		3	22
10	- White, very dense.		446.0	4	57
15	<<B>SILT WITH SAND (ML)**- mostly low plasticity fines, trace fine sands sand, moist, white, very stiff.**		441.0	5	23
20	- Hard.		436.0	6	42
25	- Light brown with tan, dry, micaceous, very hard.		431.0	7	50/ 3"
30	**SILTY SAND (SM)**- mostly fine sand, some low plasticity fines, micaceous, moist to wet, cream, very dense.		426.0	8	50/ 4"
	PARTIALLY WEATHERED ROCK (PWR)- mostly low plasticity fines, trace fine sands, dry, white with quartz rock fragments, very hard.			9	50/

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-37**

DATE DRILLED: 1/17/2001	ELEVATION: 456	NOTES:
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 50	
LOGGED BY: JTP	WATER LEVEL: 7.5 Feet at Time of Boring	
DRILLER: BC	DRILL RIG: CME-45	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		PARTIALLY WEATHERED ROCK (PWR)- mostly low plasticity fines, trace fine sands, dry, white with quartz rock fragments, very hard. *(continued)*						5"
40				416.0	10		>>	50/ 5"
45		- Yellowish white.		411.0	11		>>	50/ 5"
50		- Yellowish tan, no rock fragments.		406.0	12		>>	50/ 5"
		Boring Terminated at 50 feet.						

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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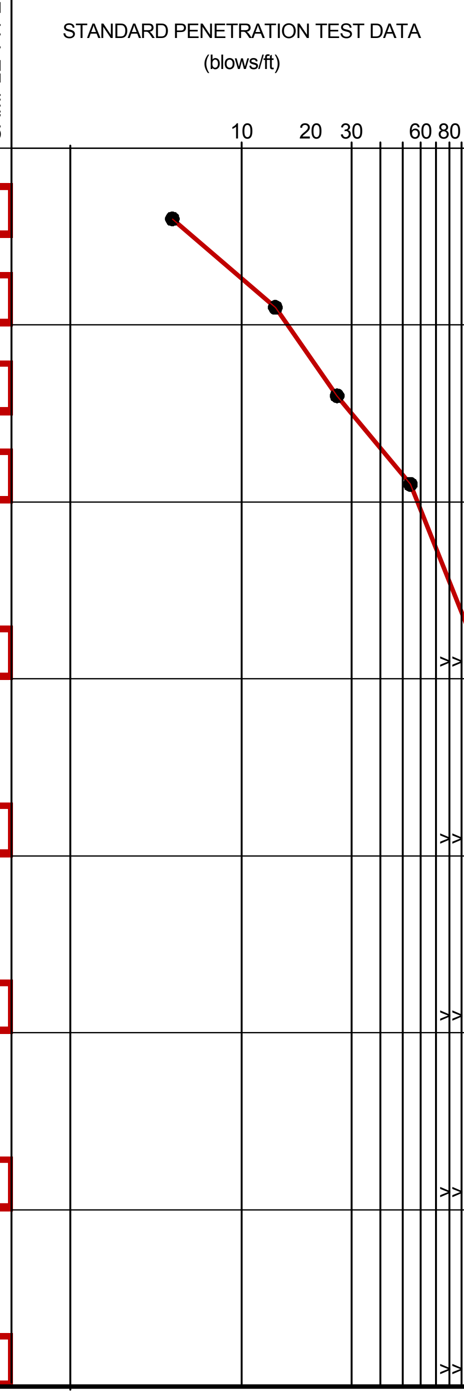
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293
BORING LOG	**B-38**

DATE DRILLED:	1/17/2001	ELEVATION:	455
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 7 inches of topsoil.				
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, tan, loose.			1	5
5	**CLAYEY SAND (SC)**- mostly fine to coarse sand, some medium plasticity fines, moist, tan orange and gray, medium dense.	▼	450.0	2	14
				3	26
10	- Reddish orange, medium sand content, dense.		445.0	4	54
15	**SANDY SILT (ML)**- mostly low plasticity fines, some fine to medium sands, dry, light gray with tan, very hard.		440.0	5	50/ 4"
20	**SILTY SAND (SM)**- mostly fine to medium sands, some low to medium plasticity fines, dry, tan with light gray, moist, very dense.		435.0	6	50/ 5"
25	**PARTIALLY WEATHERED ROCK (PWR)**- mostly low to medium plasticity fines, few fine to medium sands, dry, light gray, blocky, very hard.		430.0	7	50/ 2"
30			425.0	8	50/ 3"
				9	50/



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-38**

DATE DRILLED: 1/17/2001	ELEVATION: 455	NOTES:
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 50	
LOGGED BY: JTP	WATER LEVEL:	
DRILLER: BC	DRILL RIG: CME-45	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		PARTIALLY WEATHERED ROCK (PWR)- mostly low to medium plasticity fines, few fine to medium sands, dry, light gray, blocky, very hard. *(continued)*					5"
40				415.0	10	>>	50/ 6"
45				410.0	11	>>	50/ 5"
50				405.0	12	>>	50/ 4"
		Boring Terminated at 50 feet.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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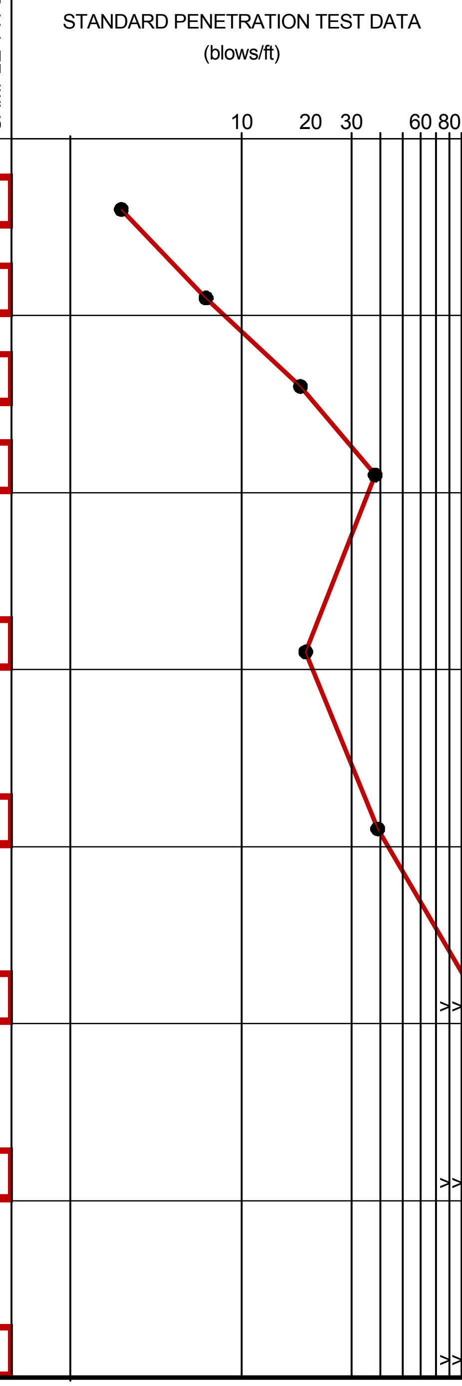
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-40

DATE DRILLED:	1/17/2001	ELEVATION:	452
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	4.5 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 10 inches of topsoil.			
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, dark gray, very loose.		1	3
	- Light gray, wet, loose.			
5		447.0	2	7
	-Medium dense.		3	18
	- Saturated, yellowish tan, dense.		4	38
10		442.0		
	POORLY-GRADED SAND (SP)- mostly medium sands, trace low plasticity fines, saturated, orangish tan, medium dense.			
15		437.0	5	19
	SILTY SAND (SM)- mostly fine clayey sand, some low plasticity fines, rock fragments wet, yellow tan to 19.5 feet, then light gray, dense.		6	39
20		432.0		
	-Very dense/		7	50/ 2"
25		427.0		
	- Sample contains mostly rock fragments, very dense.			
	- No recovery likely as above.		8	50/ 1"
30		422.0		
	- Rock fragments.		9	50/



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

NOTES:

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

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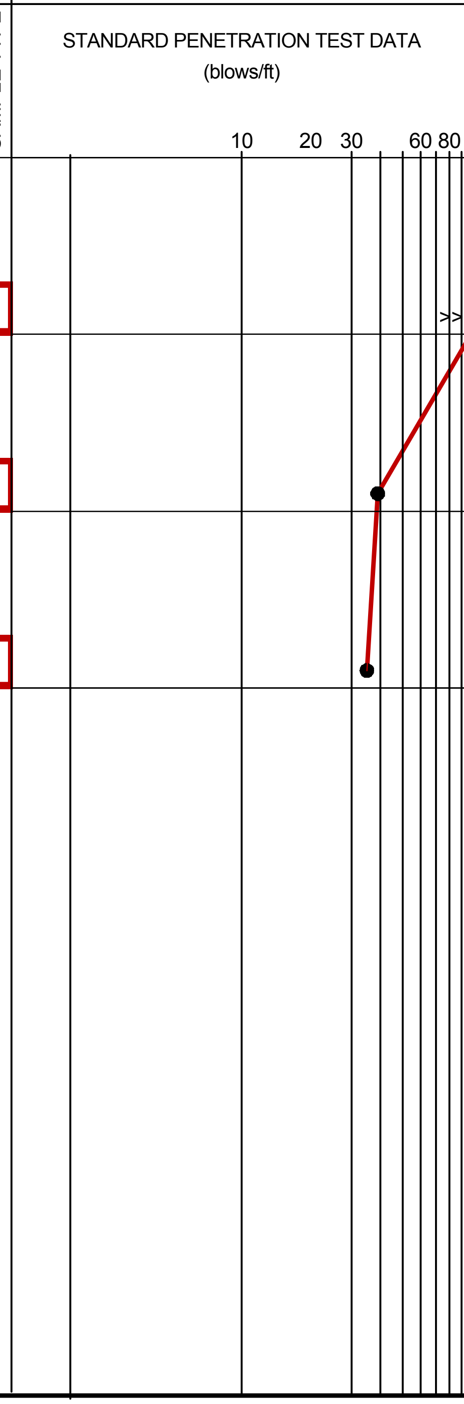
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-40

DATE DRILLED:	1/17/2001	ELEVATION:	452
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	4.5 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	N VALUE
							5"
		PARTIALLY WEATHERED ROCK (PWR)- mostly low plasticity fines, few fine to medium sands, dry, white with purple, very hard, partially weathered rock..					
40				412.0	10		50/ 4"
		SANDY SILT (ML)- mostly low to medium plasticity fines, little fine to medium sands, wet yellowish tan, dense.					
45				407.0	11		39
50				402.0	12		35
		Boring Terminated at 50 feet.					



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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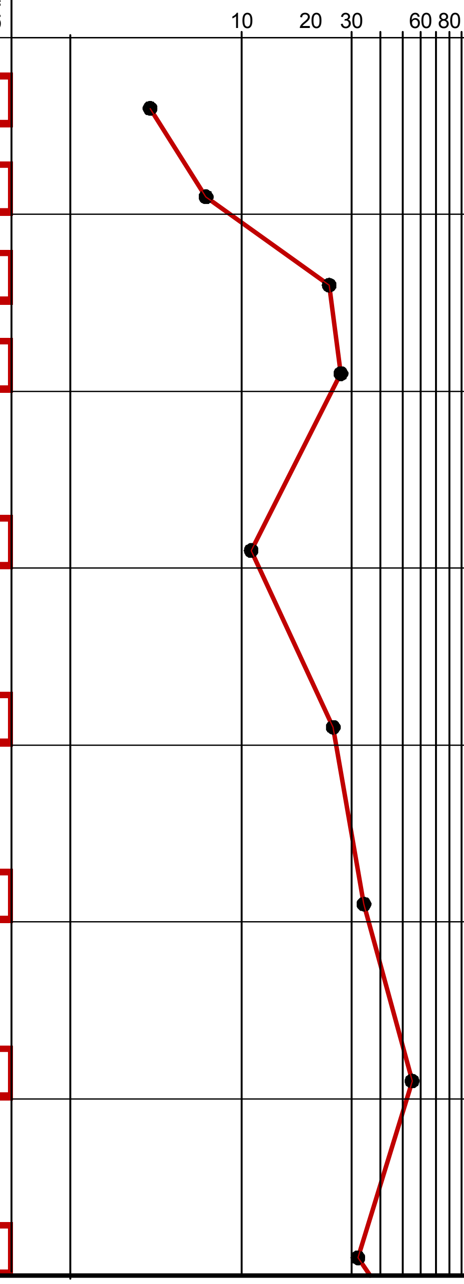
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-41**

DATE DRILLED:	1/16/2001	ELEVATION:	454
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	12 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	TOPSOIL- approximately 7 inches of topsoil.				
	SILTY SAND (SM)- mostly fine to medium sands, some low plasticity fines, moist, tan, loose.			1	4
	CLAYEY SAND (SC)- mostly fine to coarse sand, some medium plasticity fines, moist to wet, tan orange and gray, loose.	▼			
5			449.0	2	7
	- Moist, medium dense.			3	24
10			444.0	4	27
		▽			
15	**SILTY SAND (SM)**- mostly fine sand, some low plasticity fines, trace angular, medium gravel (quartz), wet, tan and gray, medium dense.		439.0	5	11
	SILT WITH SAND (ML)- mostly low to medium plasticity fines, little fine sands, slightly micaceous, dry to moist, light gray with tan, very stiff.				
20			434.0	6	25
	SILT (ML)- mostly low to medium plasticity fines, dry, gray with yellow, hard.				
25			429.0	7	34
	- Purplish gray, trace very fine sands, very hard.				
30			424.0	8	55
				9	32

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-41

DATE DRILLED:	1/16/2001	ELEVATION:	454
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	50
LOGGED BY:	JTP	WATER LEVEL:	12 Feet at Time of Boring
DRILLER:	BC	DRILL RIG:	CME-45

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		POORLY-GRADED SAND WITH SILT (SP-SM)- mostly fine sands, few low plasticity fines, slightly micaceous, saturated, cream, dense. *(continued)* - Fine to coarse sand with trace angular medium quartz gravel, yellowish tan.					
40				414.0	10	>>	50/ 3"
		PARTIALLY WEATHERED ROCK (pwr)- mostly low plasticity fines, trace fine sands, dry, white with purple, very hard, partially weathered rock with quartz rock fragments.					
45				409.0	11	>>	50/ 3"
50				404.0	12	>>	50/ 4"
		Boring Terminated at 50 feet.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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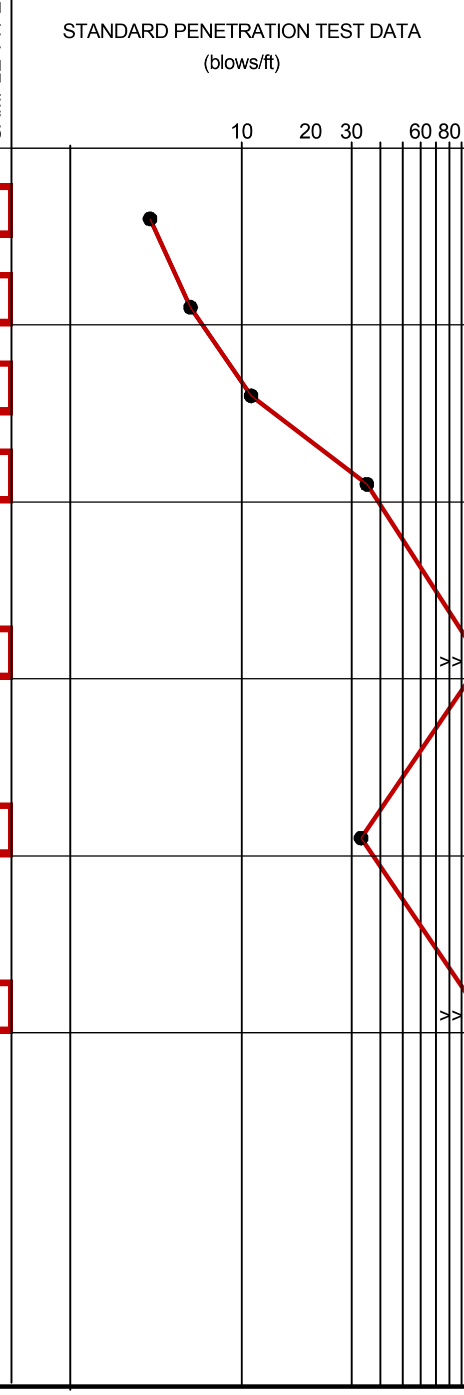
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-101
DATE DRILLED: 7/26/2006	ELEVATION: 476	NOTES:	
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 25		
LOGGED BY: PO	WATER LEVEL: 21 feet at T.O.B.		
DRILLER: S&ME-Tri-Cities	DRILL RIG: Mobile B-57		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0 – 3.5	**POORLY GRADED SAND (SP)** - mostly fine to medium sand, trace non-plastic fines, moist, tan, brown, orange, loose.			1	4
3.5 – 8.5	**POORLY GRADED SAND WITH CLAY (SP-SC)** - mostly fine to medium sand, few non-plastic fines, moist, tan, brown, orange, loose.			2	6
5			471.0		
	- few low plasticity fines, medium dense			3	11
8.5 – 13.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, light tan, brown, reddish/orange, dense.			4	35
10			466.0		
13.5 – 18.5	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, light gray, tan, orange, very dense.			5	50/ 5"
15			461.0		
18.5 – 23.5	**POORLY GRADED SAND WITH CLAY (SP-SC)** - mostly fine to medium sand, trace coarse sand, few low plasticity fines, moist to wet, brown, tan, orange, dense.			6	33
20			456.0		
21		∇			
23.5 – 25	**FAT CLAY (CH)** - mostly medium to high plasticity kaolinic fines, trace fine sand, moist, light gray, trace brown, very hard.			7	50/ 5"
25	BORING TERMINATED AT 25 FEET.		451.0		



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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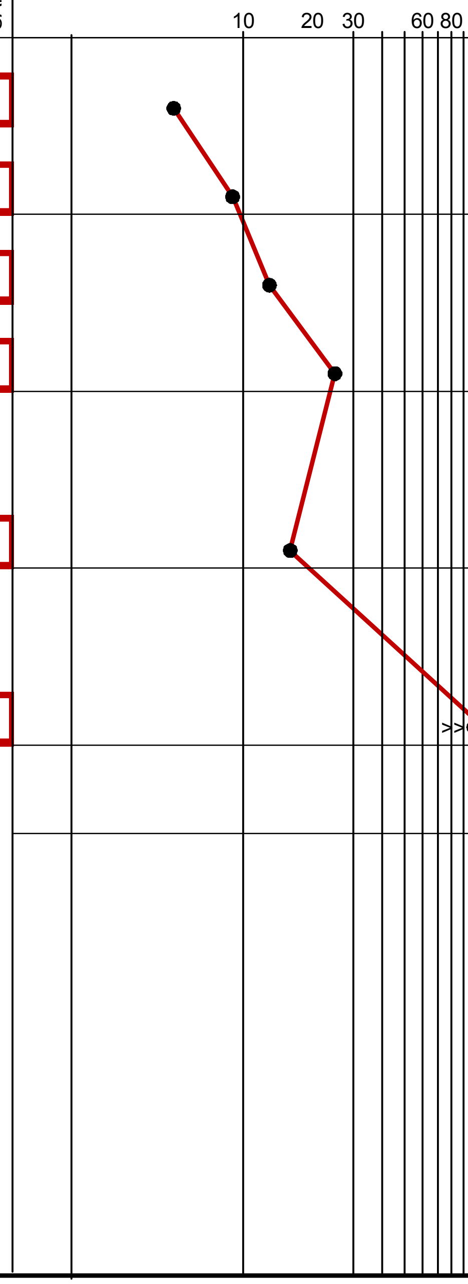
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-102

DATE DRILLED:	7/26/2006	ELEVATION:	450
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	22.5
LOGGED BY:	PO	WATER LEVEL:	5 feet at T.O.B., 2.5 ft. at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0 – 3.5	**POORLY GRADED SAND WITH CLAY (SP/SC)** - mostly fine to medium sand, few non-plastic fines, trace small roots, saturated, light tan, brown, loose.	▼		1	5
3.5 – 8.5	**CLAYEY SAND (SC)** mostly fine to medium sand, some low to medium plasticity fines, wet, light gray, loose to medium dense.	▽	445.0	2	9
	- some low plasticity fines			3	13
8.5 – 13.5	**SILTY SAND (SM)** - mostly coarse sand, some low plasticity fines, wet to saturated, light tan, white, medium dense.		440.0	4	25
13.5 – 18.5	**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly coarse sand, few low plasticity fines, wet to saturated, light tan, white, medium dense.		435.0	5	16
18.5 – 22.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, saturated, light brown very dense.		430.0	6	50/ 1"
	AUGER REFUSAL AT 22.5 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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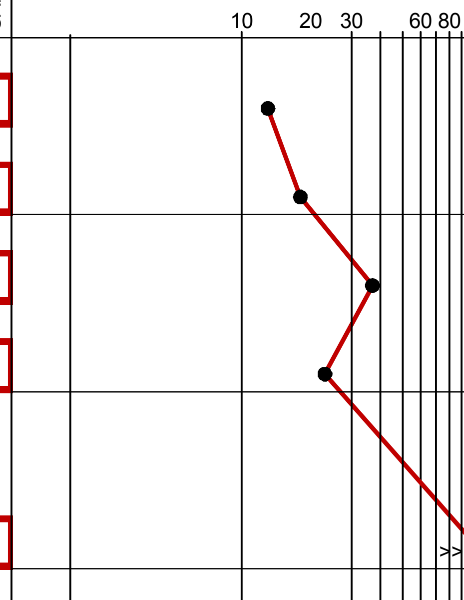
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-103**

DATE DRILLED:	7/26/2006	ELEVATION:	460
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	16
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 10 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–8.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, light brown, medium dense to dense.			1	13
	- tan, brown, orange.		455.0 (5 ft)	2	18
	- tan, brown, orange, gray.			3	37
8.5–13.5	**POORLY GRADED SAND WITH CLAY (SP-SC)** - mostly fine to medium sand, few low plasticity fines, moist, tan, brown, orange, dark gray, medium dense.	▼ (10 ft)	450.0 (10 ft)	4	23
13.5–16	**CLAYEY SAND (SC)** - mostly fine to coarse sand, some low to medium plasticity fines, moist, tan, orange, gray, very dense.		445.0 (15 ft)	5	50/1"
16	AUGER REFUSAL AT 16 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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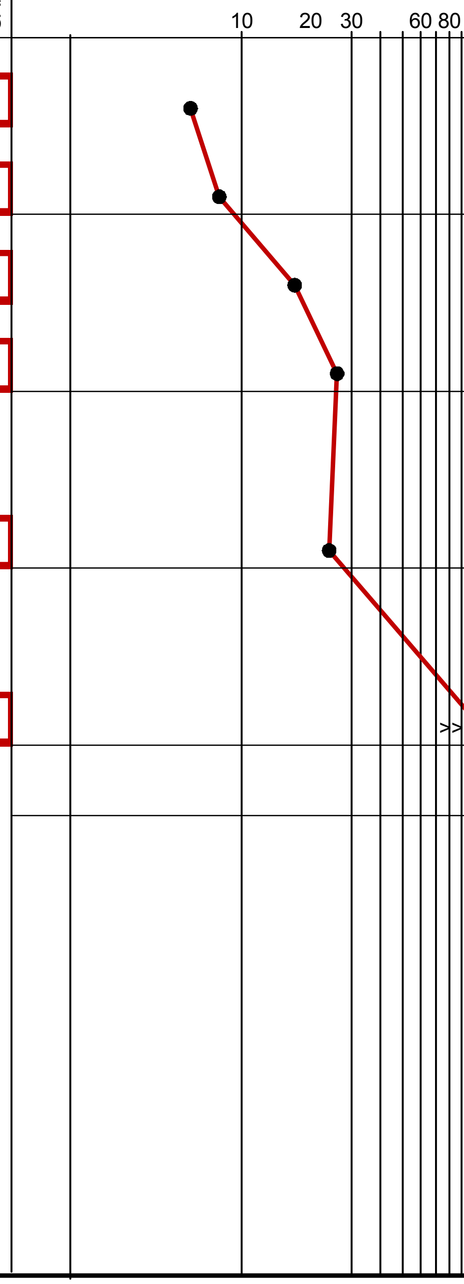
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-104

DATE DRILLED:	7/31/2006	ELEVATION:	472
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	22
LOGGED BY:	PO	WATER LEVEL:	15 feet at T.O.B., 12.4 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	N VALUE
		POORLY GRADED SAND (SP) - mostly fine to medium sand, trace non-plastic fines, moist, light tan, brown, loose.			1	6
5		**POORLY GRADED SAND (SP-SC)** - mostly fine to medium sand, few low plasticity fines, moist, brown, orange, loose.		467.0	2	8
		CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, moist, brown, orange, medium dense to very dense.			3	17
10		- low to medium plasticity fines, moist to wet, reddish/brown, gray, yellow		462.0	4	26
			▼			
15		- fine to coarse sand	▽	457.0	5	24
20		- wet		452.0	6	50/ 3"
		AUGER REFUSAL AT 22 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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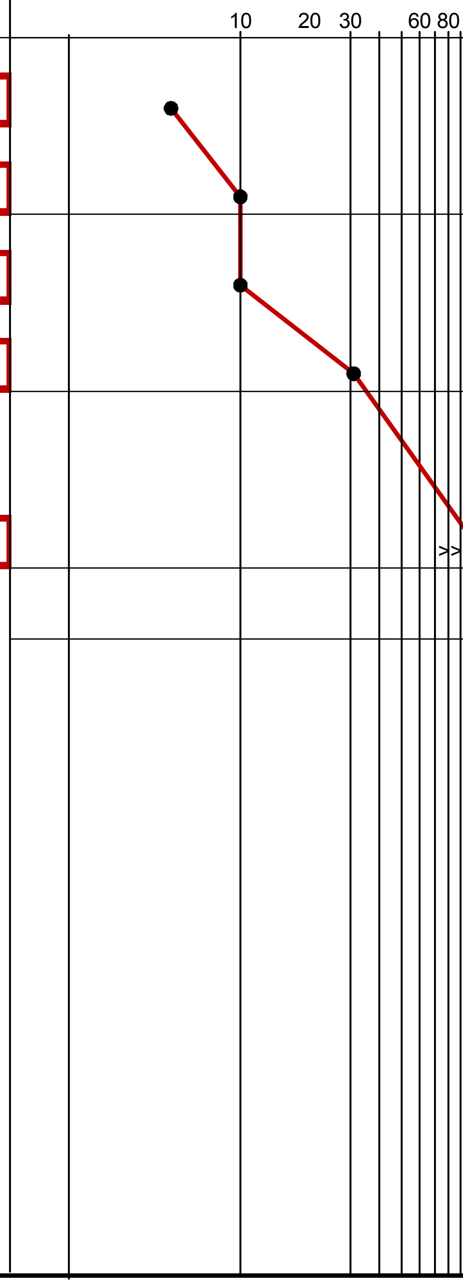
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-105**

DATE DRILLED:	7/26/2006	ELEVATION:	464
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	17
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 7.9 feet at 24 hr.s
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	N VALUE
0–8.5		**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, moist, brown, orange, loose.			1	5
5				459.0	2	10
		- brown, orange, gray	▼		3	10
8.5–17		**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine to coarse sand, few low plasticity fines, wet to saturated, light gray with white, dense.			4	31
10				454.0		
		- some wood fragments, few low to medium kaolinic fines, trace fine gravel, very dense			5	50/ 5"
15				449.0		
17		AUGER REFUSAL AT 17 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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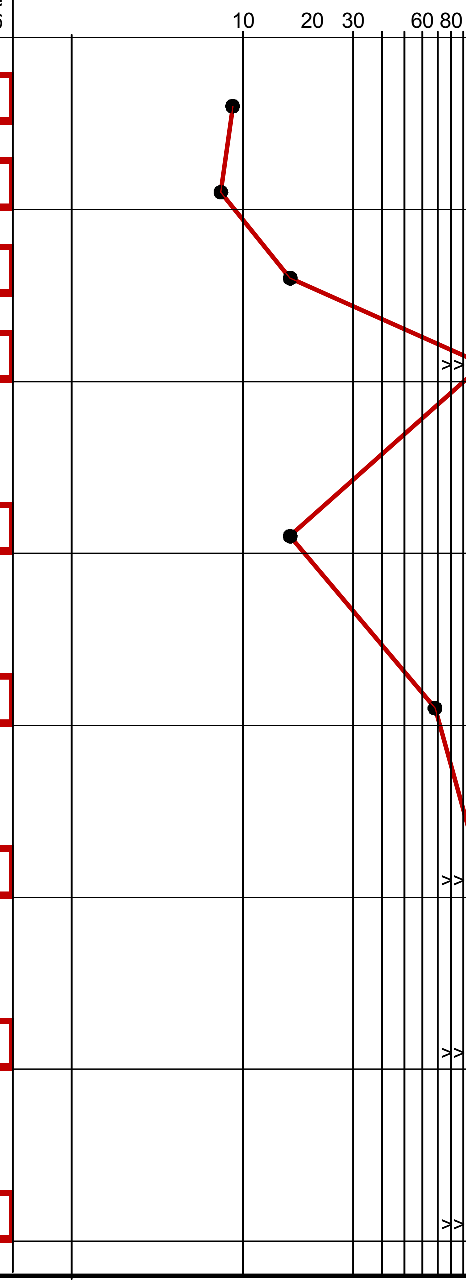
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-106

DATE DRILLED:	7/27/2006	ELEVATION:	458
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	35
LOGGED BY:	PO	WATER LEVEL:	5 feet at T.O.B., 4 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	CLAYEY SAND (SC) - mostly fine to medium sand, some low to medium plasticity fines, trace small roots, moist, tan, brown, orange, loose.			1	9
5	- trace black	▼ ▽	453.0	2	8
	POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine to coarse sand, few low plasticity fines, moist to wet, tan, brown, orange, medium dense.			3	16
10	**SILTY SAND (SM)** - mostly fine to medium sand, some low to medium plasticity fines, moist to wet, light gray, white, very dense to medium dense.		448.0	4	50/ 4"
15	- fine to coarse sand		443.0	5	16
20	**SANDY CLAY (CL)** - mostly low to medium plasticity kaolinic fines, some fine to medium sands, moist, light gray, yellow, very hard.		438.0	6	68
25	**PARTIALLY WEATHERED ROCK (PWR)** - mostly low to medium plasticity kaolinic fines, some fine to medium sands, relict rock structure, dry to moist, light yellow, gray, very hard.		433.0	7	50/ 5"
30			428.0	8	50/ 4"
35			423.0	9	50/ 4"

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-106**

DATE DRILLED:	7/27/2006	ELEVATION:	458
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	35
LOGGED BY:	PO	WATER LEVEL:	5 feet at T.O.B., 4 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		BORING TERMINATED AT 35 FEET.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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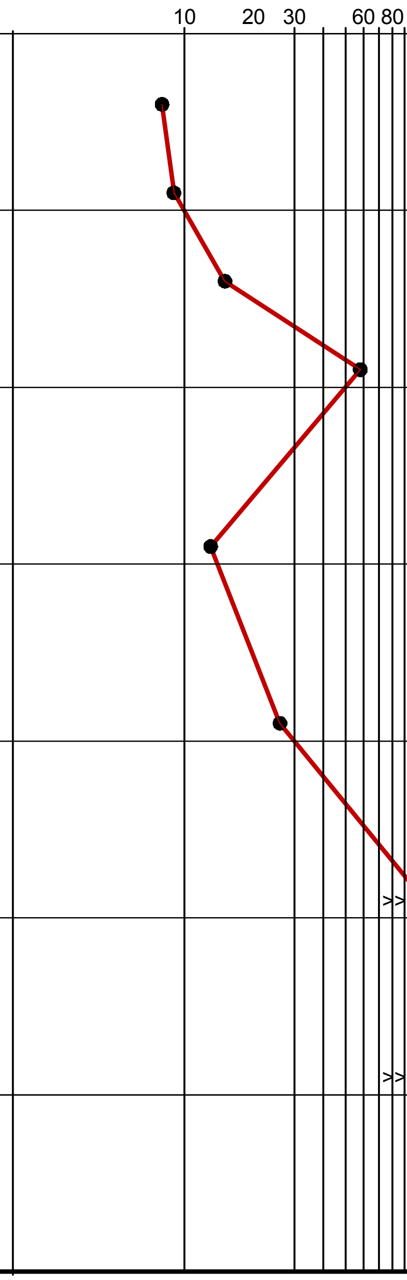
BORING LOG B-107

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293		
DATE DRILLED:	7/26/2006	ELEVATION:	458
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	30
LOGGED BY:	PO	WATER LEVEL:	14 feet at T.O.B., 4 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	POORLY GRADED SAND (SP) - mostly fine to medium sand, trace non-plastic fines, moist, tan, brown, loose.			1	8
5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, tan, brown, orange, loose to medium dense. - some low plasticity fines, trace light gray	▼	453.0	2 3	9 15
10	**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine to coarse sand, few low plasticity fines, wet, light tan, gray with orange, very dense.		448.0	4	58
15	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, micaceous, moist to wet, light gray, white, medium dense.	▽	443.0	5	13
20	**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine to coarse sand, trace fine gravel, few low plasticity fines, wet, light tan, light gray, white, medium dense.		438.0	6	26
25	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, tan, brown, orange, light gray, very dense.		433.0	7 8	50/ 6" 50/ 4"
30	BORING TERMINATED AT 30 FEET.		428.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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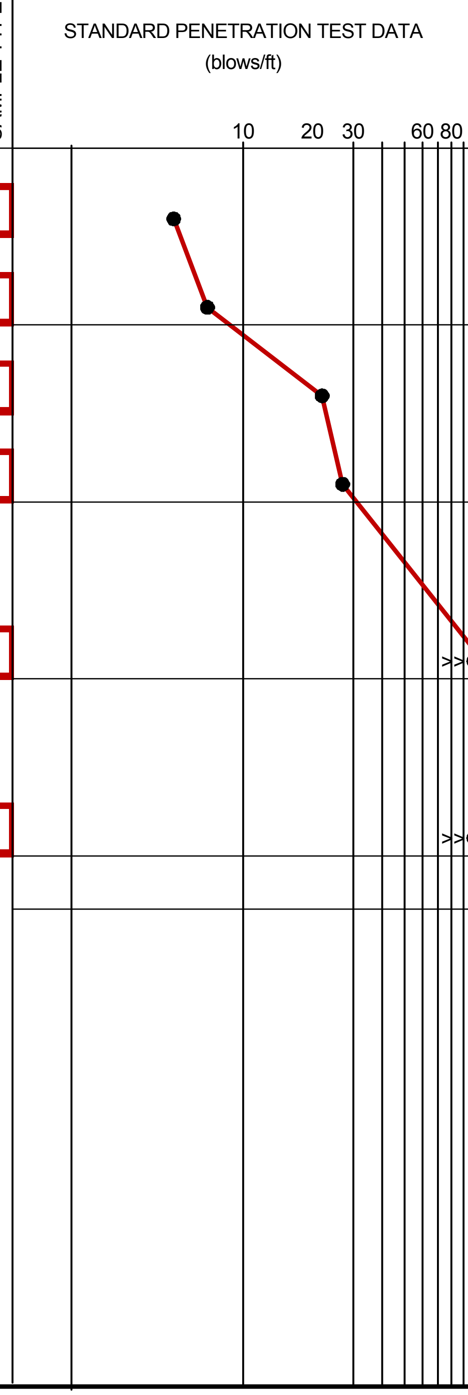
BORING LOG B-108

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293
DATE DRILLED:	8/1/2006
ELEVATION:	454
DRILLING METHOD:	3¼" H.S.A.
BORING DEPTH:	21.5
LOGGED BY:	PO
WATER LEVEL:	15 feet at T.O.B., 4.3 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities
DRILL RIG:	Mobile B-57
NOTES:	

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	POORLY GRADED SAND (SP) - mostly fine to medium sand, trace non-plastic fines moist, light tan, brown, loose.			1	5
5	**POORLY GRADED SAND WITH CLAY (SP-SC)** - mostly fine to medium sand, few low plasticity fines, moist, tan, brown, loose.	▼	449.0	2	7
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, moist, light tan, brown, orange, medium dense.			3	22
10	- moist to wet		444.0	4	27
15	**SANDY CLAY (CL)** - mostly low to medium plasticity fines, some fine to medium sand, relict rock structure, moist, light gray, orange, very hard.	▽	439.0	5	50/ 4"
20	- trace fine gravel		434.0	6	50/ 5"
	AUGER REFUSAL AT 21.5 FEET.				



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.*

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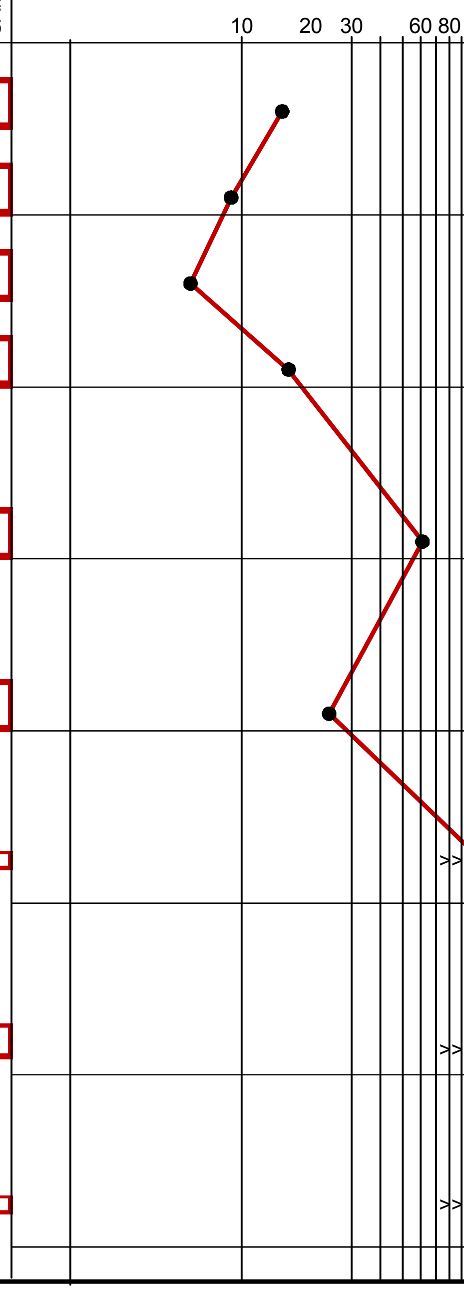
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-110**

DATE DRILLED:	8/3/2006	ELEVATION:	460
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	35
LOGGED BY:	PO	WATER LEVEL:	6 feet at T.O.B., dry cave at 2.3 feet at 24 hr.
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, trace fine roots, moist, grayish brown, medium dense.	HC		1	15
5	- increase in plasticity, gray, loose	∇	455.0	2	9
	- tan			3	6
10	- mostly medium sand, wet, tan, light brown, medium dense		450.0	4	16
15	**SANDY CLAY (CL)** - mostly low to medium plasticity fines, some fine sand, moist to wet, light brown, tan, very hard.		445.0	5	61
20	- tan, very stiff		440.0	6	24
25	- gray, pink, very hard		435.0	7	50/ 6"
30			430.0	8	50/ 6"
35	No Recovery.		425.0	9	50/ 6"

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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ENVIRONMENTAL SERVICES

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-110

				NOTES:
DATE DRILLED:	8/3/2006	ELEVATION:	460	
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	35	
LOGGED BY:	PO	WATER LEVEL:	6 feet at T.O.B., dry cave at 2.3 feet at 24 hr.	
DRILLER:	S&ME- Knoxville	DRILL RIG:		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		BORING TERMINATED AT 35 FEET.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

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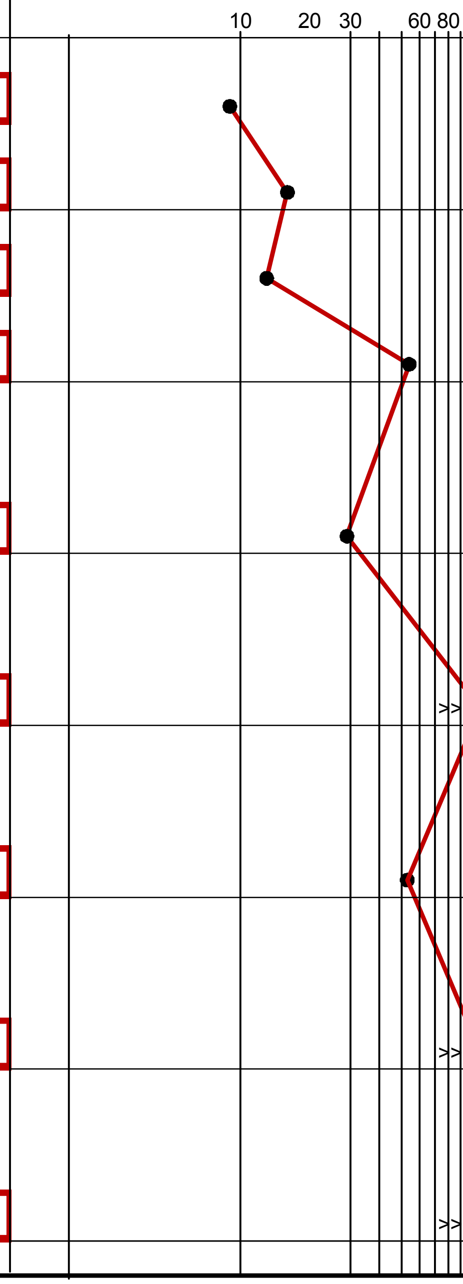
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-111
DATE DRILLED: 7/31/2006	ELEVATION: 459	NOTES:	
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 35		
LOGGED BY: PO	WATER LEVEL: Dry at T.O.B., 12.3 feet at 24 hr.		
DRILLER: S&ME-Tri-Cities	DRILL RIG: Mobile B-57		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		CLAYEY SAND (SC) - mostly fine to medium sand, trace coarse sand, some low to medium plasticity fines, moist, tan, brown, orange, loose to medium dense.			1			9
5				454.0	2			16
					3			13
		- some low plasticity fines, tan, yellow, reddish orange, very dense			4			54
10				449.0				
			▼					
		SANDY SILT (ML) - mostly low to medium plasticity kaolinic fines, some fine sand, trace medium sand, relict structure, moist, light tan, white, yellow, hard.			5			29
15				444.0				
					6		>>	50/ 5"
20		- very hard		439.0				
		- some fine to medium sand, trace coarse sand, hard			7			53
25				434.0				
		PARTIALLY WEATHERED ROCK (PWR) - mostly low to medium plasticity kaolinic fines, some fine sand, trace medium sand, relict structure, moist, light tan, white, yellow, gray, very hard.			8		>>	50/ 5"
30				429.0				
		- trace coarse sand			9		>>	50/ 5"
35				424.0				



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ENVIRONMENTAL SERVICES

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-111

				NOTES:
DATE DRILLED:	7/31/2006	ELEVATION:	459	
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	35	
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 12.3 feet at 24 hr.	
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		BORING TERMINATED AT 35 FEET.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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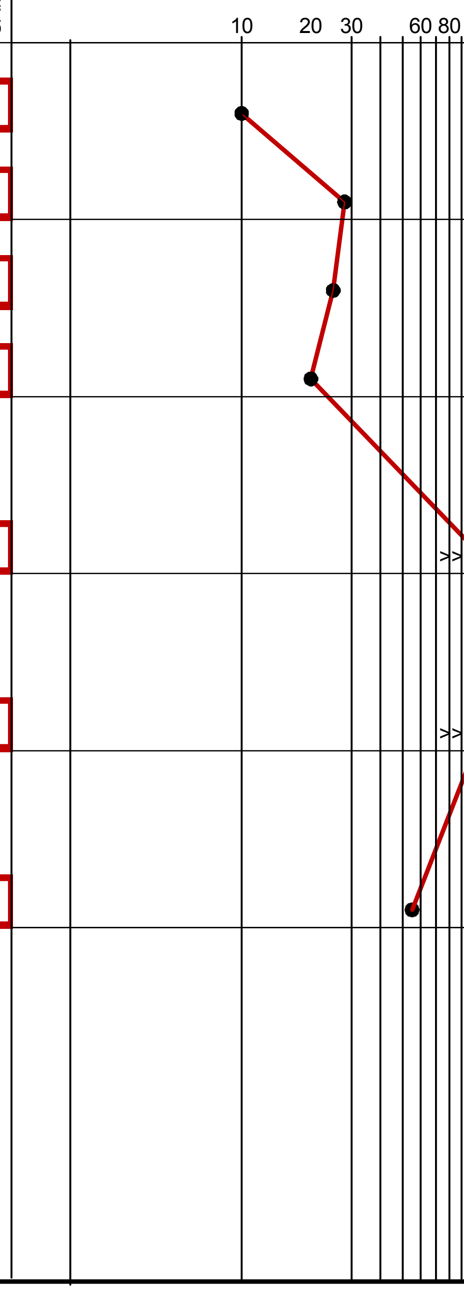
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-112**

DATE DRILLED:	7/27/2006	ELEVATION:	452
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	8 feet at T.O.B., 8 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine to medium sand, few low plasticity fines, moist, light tan, brown, loose.			1	10
5	**CLAYEY SAND (SC)** - mostly fine to medium sands, trace coarse sand, some low to medium plasticity fines, moist, orange, tan, brown, gray, medium dense.		447.0	2	28
	SANDY LEAN CLAY (CL) - mostly low plasticity fines, some fine to medium sand, moist, light gray white, trace tan, very stiff.	▼		3	25
10	**CLAYEY SAND (SC)** - mostly fine to medium sand, trace coarse sand, some low to medium plasticity fines, brown, orange, tan, medium dense.		442.0	4	20
15	**SANDY LEAN CLAY (CL)** - mostly low to medium plasticity kaolinic fines, some fine to medium sand, moist, light tan, yellow, gray, very hard.		437.0	5	50/ 4"
20	**SILTY SAND (SM)** - mostly fine to coarse sand, trace angular quartz gravel, some low to medium plasticity fines, wet, light gray, white, very dense.		432.0	6	50/ 3"
25	- light gray, yellow, brown, reddish-orange		427.0	7	55
	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES

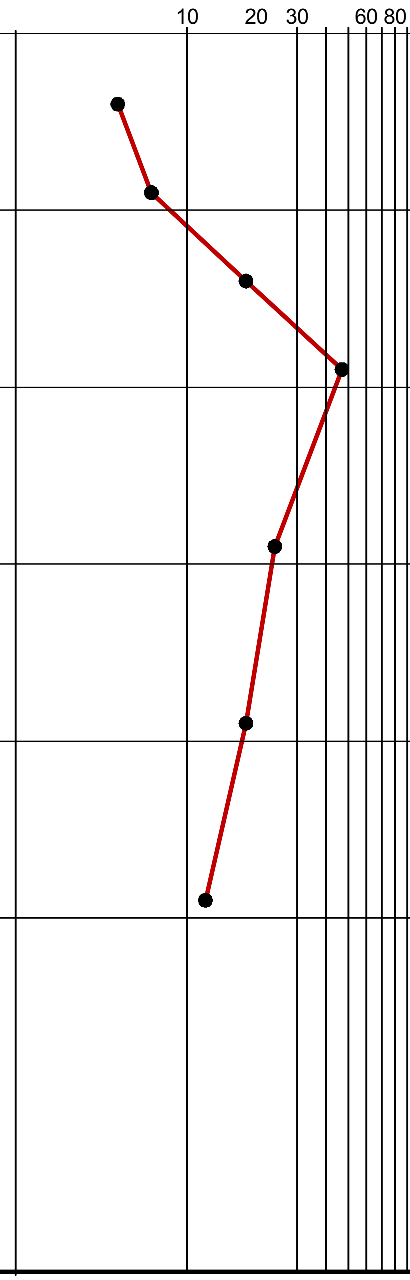
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-113

DATE DRILLED:	7/26/2006	ELEVATION:	451
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	10 feet at T.O.B., 9 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, light brown, orange, loose to medium dense.		1	5
5		446.0	2	7
	- light brown, orange, gray		3	18
8.5	**SILTY SAND (SM)** - mostly fine to coarse sand, trace fine gravel, some low plasticity fines, few low to medium plasticity silt nodules, moist to wet, tan, orange, gray, pink, dense.		4	47
10		441.0		
13.5	**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine to coarse sand, few low plasticity fines, saturated light tan, orange, medium dense.		5	24
15		436.0		
	- tan, brown, gray with black		6	18
20		431.0		
23.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist to wet, tan, brown, orange, medium dense.		7	12
25	BORING TERMINATED AT 25 FEET.	426.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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ENVIRONMENTAL SERVICES

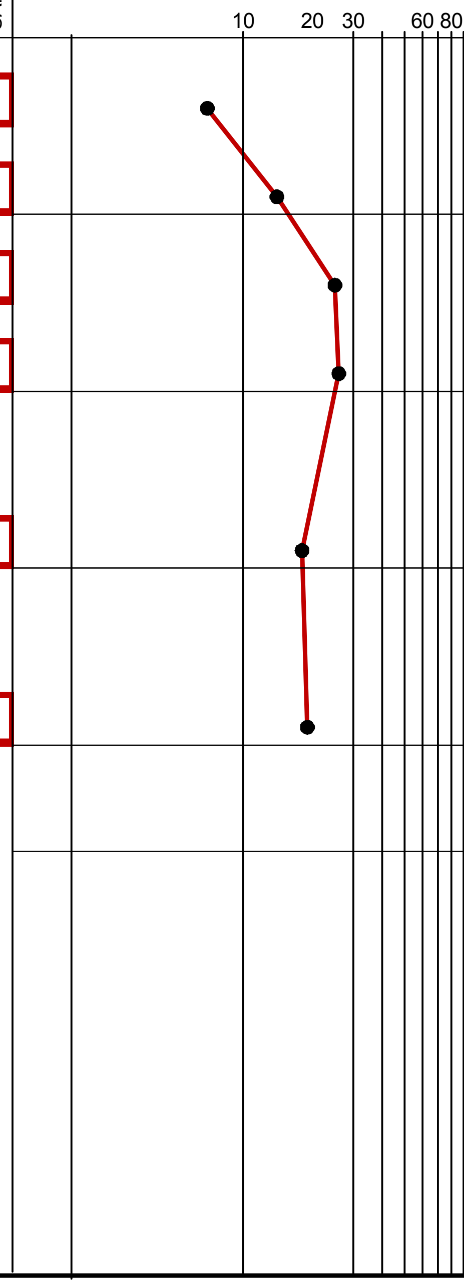
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-114

DATE DRILLED:	8/1/2006	ELEVATION:	451
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	23
LOGGED BY:	PO	WATER LEVEL:	10.5 feet at T.O.B., 4.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	N VALUE
		POORLY GRADED SAND (SP) - mostly fine to medium sand, trace non-plastic fines, moist tan, brown, loose.			1		7
5		**CLAYEY SAND (SC)** - mostly fine to medium sand, trace coarse sand, some low to medium plasticity fines, moist, tan, orange, brown, medium dense.	▼	446.0	2		14
		- gray, tan, brown, orange			3		25
10		**SILTY SAND (SM)** - mostly fine to coarse sand, some low plasticity fines, moist to wet, light gray, tan, white, medium dense.	▽	441.0	4		26
15		- wet		436.0	5		18
20		**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly coarse sand, few non-plastic fines, saturated, light tan, white, medium dense./		431.0	6		19
		AUGER REFUSAL AT 23 FEET.					

STANDARD PENETRATION TEST DATA (blows/ft)



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ENVIRONMENTAL SERVICES

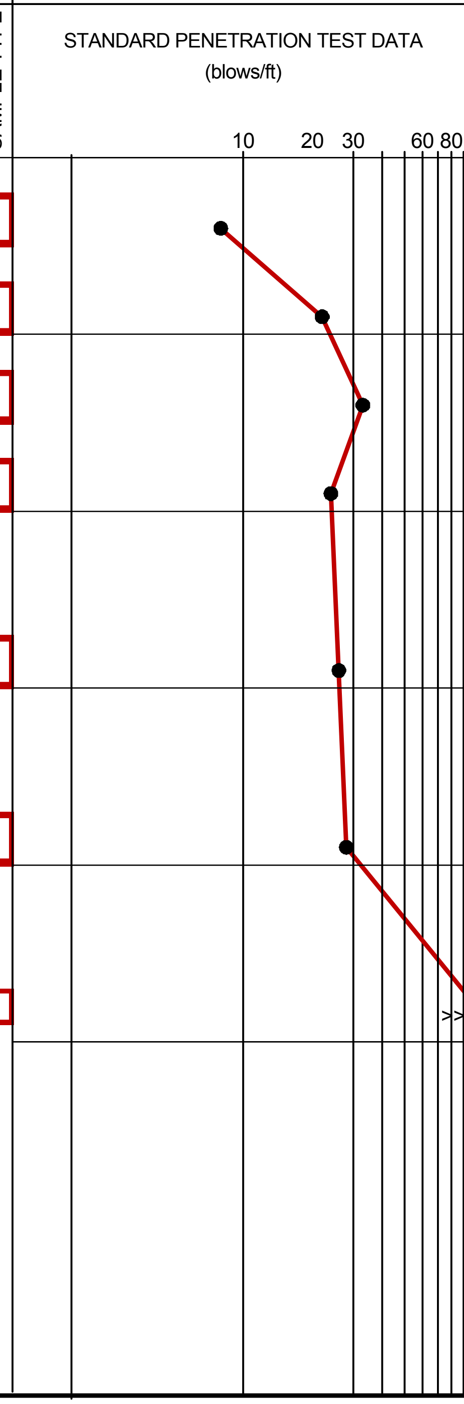
PROJECT: **Project Y**
Blythewood, South Carolina
1611-06-293

BORING LOG **B-115**

DATE DRILLED:	**8/4/2006**	ELEVATION:	**454**
DRILLING METHOD:	**3¼" H.S.A.**	BORING DEPTH:	**25**
LOGGED BY:	**PO**	WATER LEVEL:	**Not Encountered**
DRILLER:	**S&ME- Knoxville**	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	SM	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, moist, brown, loose.			1	8
		- brown, orange, medium dense			2	22
5				449.0		
		- mostly fine sand, decrease in plasticity, brown, pink, dense			3	33
		- mostly medium sand, moist to wet, brown, medium dense			4	24
10				444.0		
13.5	CL	**SANDY LEAN CLAY (CL)** - mostly low plasticity fines, some fine sand, dry, tan, brown, very stiff.			5	26
15				439.0		
		- dry to moist			6	28
20				434.0		
		- relict rock structure, very hard			7	50/ 3"
25		BORING TERMINATED AT 25 FEET.		429.0		



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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ENVIRONMENTAL SERVICES

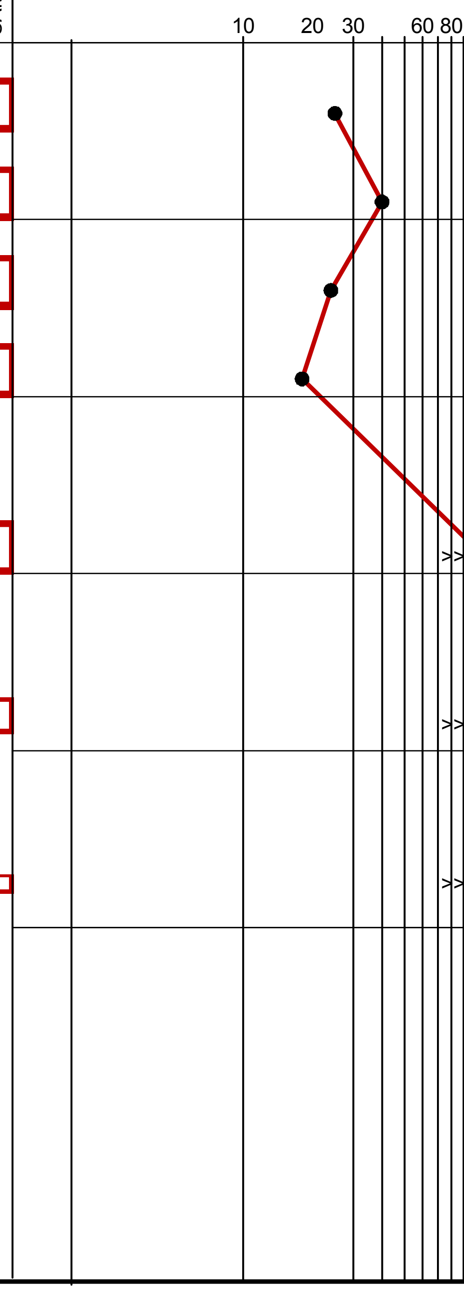
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-116

DATE DRILLED:	8/3/2006	ELEVATION:	450
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	12 feet at T.O.B.
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	SILTY SAND (SM) - mostly fine to medium sand, some low plasticity fines, dry, tan, medium dense.			1	25
5	**CLAYEY SAND (SC)** - mostly fine to coarse sand, some low plasticity fines, moist, brown, dense.		445.0	2	40
	- mostly fine to medium sand, moist to wet, tan, brown, orange, medium dense			3	24
10	- wet, white, light brown		440.0	4	18
		▽			
15	- mostly fine sand, dry, tannish gray, very dense		435.0	5	50/ 3"
20	**SANDY CLAY (CL)** - mostly low plasticity fines, some fine sand, relict rock structure, dry, tan, orange, very hard.		430.0	6	50/ 3"
25	- some fine to medium sand, tan, brown		425.0	7	50/ 3"
	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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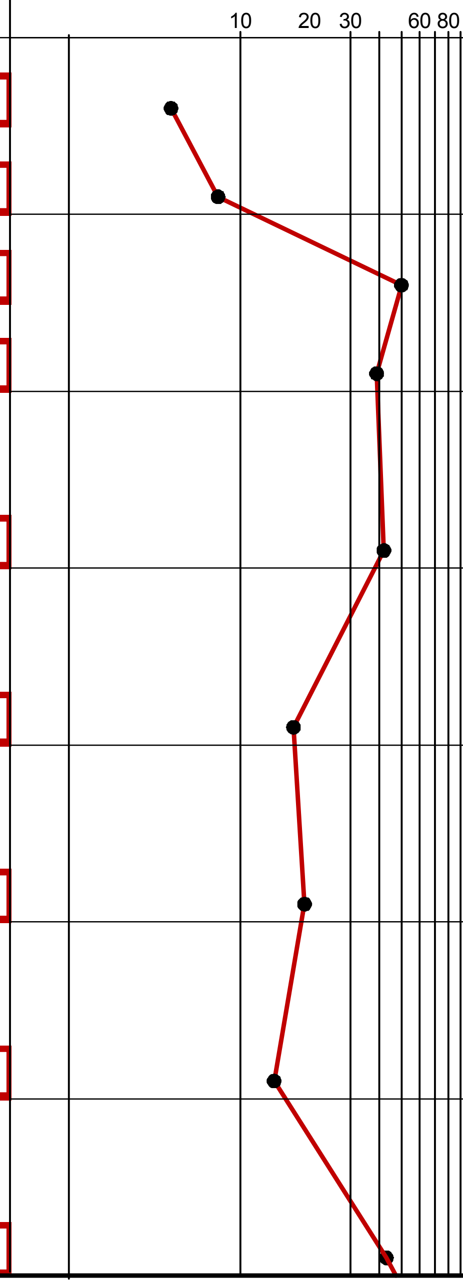
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-118**

DATE DRILLED:	8/3/2006	ELEVATION:	470
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	40
LOGGED BY:	PO	WATER LEVEL:	18 feet at T.O.B.
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine sand, some low plasticity fines, trace fine roots, moist, brown, loose.			1	5
5	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, trace fine roots, moist, brown, loose.		465.0	2	8
	CLAYEY SAND (SC) - mostly fine to coarse sand, some low plasticity fines, moist, brown, gray, red, dense.			3	50
10	- gray, brown, orange		460.0	4	39
15	**POORLY GRADED SAND WITH CLAY (SP-SC)** - mostly fine to medium sands, few low plasticity fines, wet, tan, brown, dense.	∇ (18 ft)	455.0	5	42
20	**SANDY SILT (ML)** - mostly low plasticity fines, some fine sand, dry, light brown, white, very stiff to very hard.		450.0	6	17
25			445.0	7	19
30			440.0	8	14
				9	43

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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ENVIRONMENTAL SERVICES

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-118

DATE DRILLED:	8/3/2006	ELEVATION:	470
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	40
LOGGED BY:	PO	WATER LEVEL:	18 feet at T.O.B.
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		SANDY SILT (ML) - mostly low plasticity fines, some fine sand, dry, light brown, white, very stiff to very hard. *(continued)*						
		- some fine to medium sand			10		>>	50/ 5"
40		BORING TERMINATED AT 40 FEET.		430.0				

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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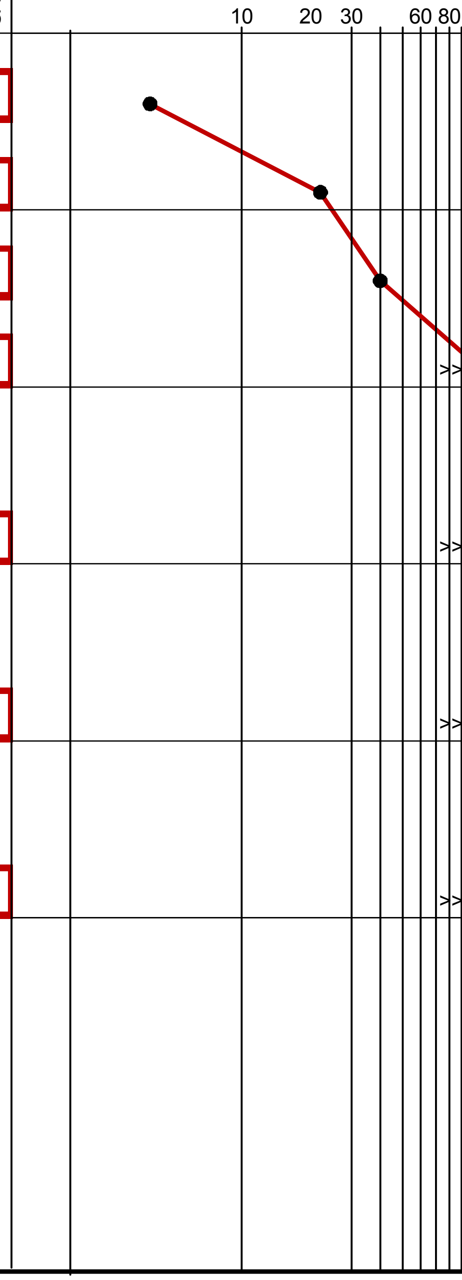
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-119**

DATE DRILLED:	7/28/2006	ELEVATION:	450
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	12 feet at T.O.B., 5.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–8.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, brown, tan, orange, loose to medium dense.		1	4
	- light gray, brown		2	22
5	(water level, 24 hr.)	445.0	3	40
8.5–25	**SANDY ELASTIC SILT (MH)** - mostly low to medium plasticity kaolinitic fines, some fine to medium sand, few rock fragments, moist, light gray, tan, brown.		4	50/1"
10		440.0		
12	(water level, T.O.B.)			
	- fine to coarse sand, some small wood fragments, trace small roots		5	50/2"
15		435.0		
	No Sample Recovery.		6	50/1"
20		430.0		
	No Sample Recovery.		7	50/1"
25	BORING TERMINATED AT 25 FEET.	425.0		

STANDARD PENETRATION TEST DATA (blows/ft)



NOTES:

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

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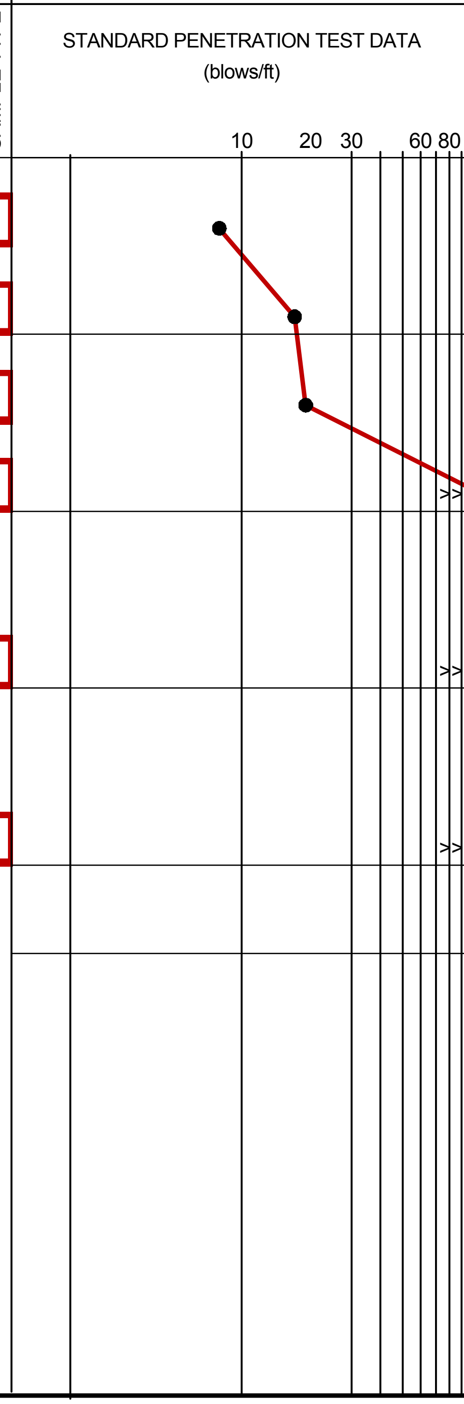
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-120**

DATE DRILLED:	7/27/2006	ELEVATION:	441
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	22.5
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 10 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. / SAMPLE TYPE	N VALUE
0–3.5		**POORLY GRADED SAND WITH CLAY (SP/SC)** - mostly fine to medium sand, few low plasticity fines, trace small roots, dry to moist, light tan, loose.			1	8
5		**CLAYEY SAND (SC)** - mostly fine to medium sand, trace coarse sand, some low to medium plasticity fines, moist, light brown, orange, medium dense to very dense.		436.0	2	17
		- fine to coarse sand.			3	19
10		- fine wood fragments, trace small roots, light gray, tan, brown.	▼	431.0	4	50/ 2"
15		**SANDY ELASTIC SILT (MH)** - mostly low to medium plasticity kaolinitic fines, some fine sand, moist, light gray, tan, brown, very hard.		426.0	5	50/ 5"
20				421.0	6	50/ 3"
22.5		AUGER REFUSAL AT 22.5 FEET.				



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-121

DATE DRILLED:	8/3/2006	ELEVATION:	440
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	10 feet at T.O.B.
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–3.5	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, moist, light brown, loose.			1	10
3.5–18.5	**SANDY CLAY (CL)** - mostly low plasticity fines, some fine sand, moist, light brown, tan, stiff.		435.0 (5 ft)	2	14
	- some fine to medium sand, white/tan, light brown, very stiff			3	19
	- some fine sand, tan, presence of silt	∇ (10 ft)	430.0 (10 ft)	4	24
	- some fine to medium sand, dry, light brown, very hard		425.0 (15 ft)	5	50/ 4"
18.5–25	**SILTY SAND (SM)** - mostly fine sand, some low plasticity fines, moist, tan, dense.		420.0 (20 ft)	6	35
	- mostly fine to medium sand, trace coarse sand, wet, light brown, medium dense		415.0 (25 ft)	7	11

BORING TERMINATED AT 25 FEET.

STANDARD PENETRATION TEST DATA (blows/ft)

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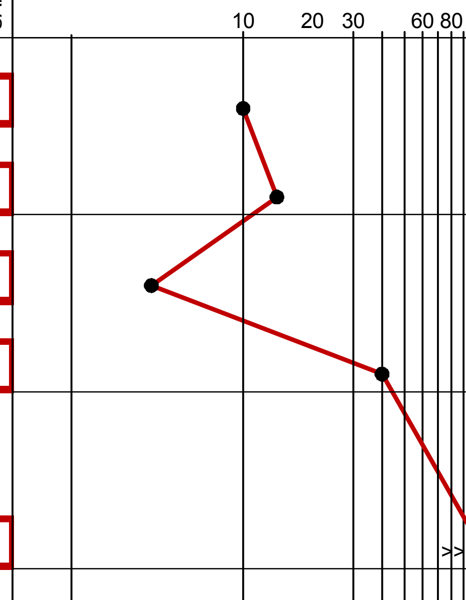
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-122

DATE DRILLED:	8/4/2006	ELEVATION:	449
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	16
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., dry cave at 3.8 feet at 24 hr.
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	POORLY GRADED SAND WITH SILT (SP-SM) - mostly fine to medium sand, trace non-plasticity fines, trace coarse sand, trace fine roots, moist, brown, loose.			1	10
	- wet, medium dense	HC		2	14
5			444.0		
	SANDY CLAY (CL) - mostly low plasticity fines, some fine to medium sand, moist to saturated, brown, tan, orange, soft.			3	4
	- trace coarse sand, moist, hard			4	40
10			439.0		
	- tan, gray, orange, very hard			5	50/3"
15			434.0		
	AUGER REFUSAL AT 16 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-123
DATE DRILLED: 7/27/2006	ELEVATION: 455	NOTES:	
DRILLING METHOD: 3¼" H.S.A.	BORING DEPTH: 25		
LOGGED BY: PO	WATER LEVEL: Dry at T.O.B., 15 feet at 24 hr.		
DRILLER: S&ME-Tri-Cities	DRILL RIG: Mobile B-57		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		SANDY CLAY (CL) - mostly low plasticity fines, some fine to medium sand, moist, light gray, tan, brown, stiff to very stiff.			1			11
		- trace fine quartz gravel			2			18
5				450.0				
					3			16
		SILTY SAND (SM) - mostly fine to coarse sand, some fine quarz gravel, some low plasticity fines, moist to wet, light tan, yellow, brown, gray, dense.			4			32
10				445.0				
		SANDY SILT (ML) - mostly low to medium plasticity fines, trace fine sand, moist, light gray, white, very stiff.	▼		5			27
15				440.0				
		- very hard			6		>>	50/ 6"
20				435.0				
		No Recovery.			7		>>	50/ 6"
25				430.0				
		BORING TERMINATED AT 25 FEET.						

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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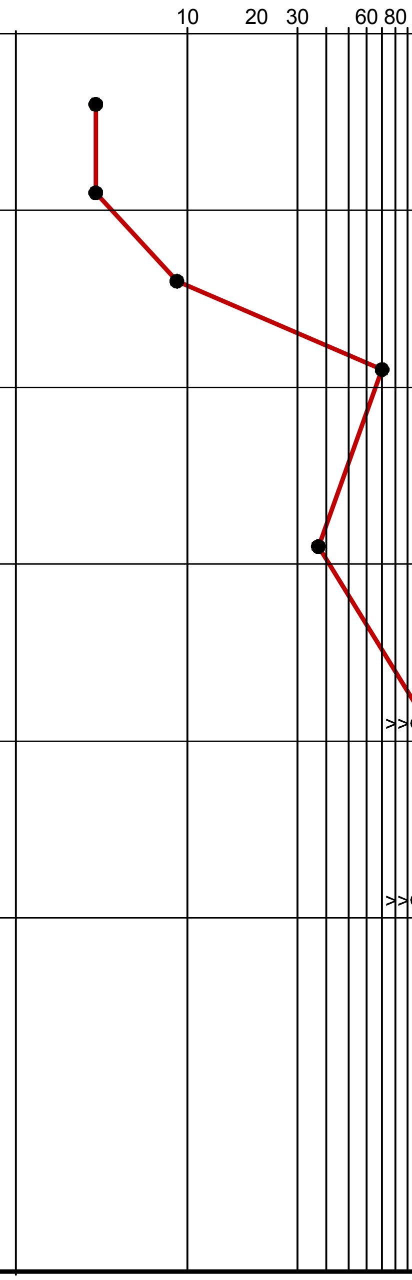
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-124
DATE DRILLED:	7/28/2006	ELEVATION:	450
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	15 feet at T.O.B., 20.3 feet at 24 hr.
DRILLER:	S&ME-Charleston	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–8.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, trace small roots, moist, tan, brown, orange, loose.			1	4
	- trace coarse sand, few small roots, moist to wet			2	4
5			445.0		
	- brown, gray, tan			3	9
8.5–13.5	**SANDY LEAN CLAY (CL)** - mostly low to medium plasticity fines, some fine to coarse sand, moist, light gray orange, very hard.			4	70
10			440.0		
13.5–23.5	**SILTY SAND (SM)** - mostly fine to coarse sand, some low plasticity fines, wet, light gray to white, dense.	∇ (15 ft)		5	37
15			435.0		
	- trace fine to coarse angular to subrounded quartz gravel, trace small roots, moist to wet, tan, brown, orange, light gray, very dense.			6	50/3"
20		▼ (20.3 ft)	430.0		
23.5–25	**PARTIALLY WEATHERED ROCK (PWR)** - mostly low to medium plasticity fines, some fine to medium sand, relict structure, moist, tan, brown, orange, very hard.			7	50/4"
25	BORING TERMINATED AT 25 FEET.		425.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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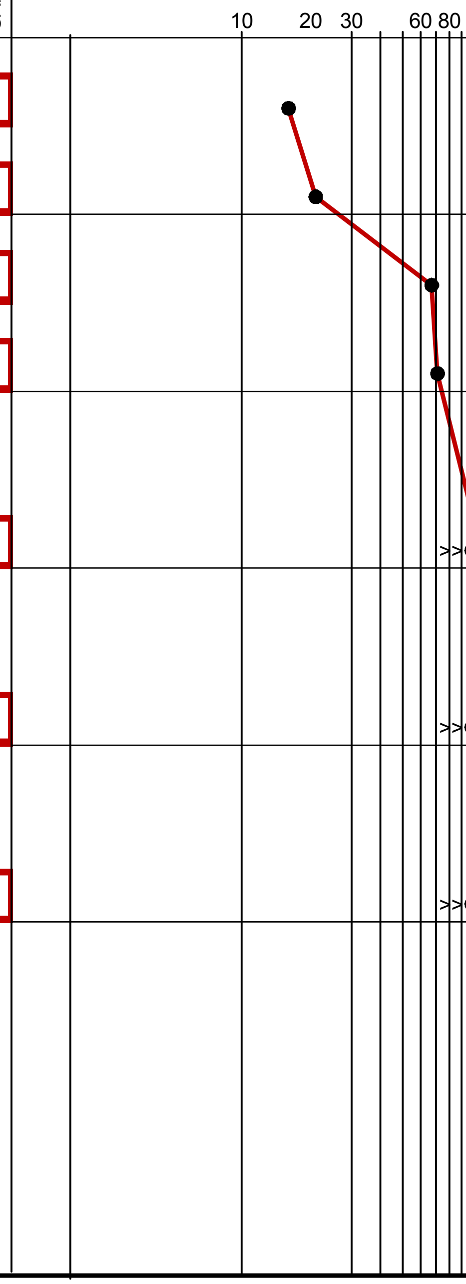
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-125

DATE DRILLED:	7/27/2006	ELEVATION:	435
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 11 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–3.5	**POORLY GRADED SAND (SP)** - mostly fine to medium sand, trace non-plastic fines, moist, light tan, brown, medium dense.			1	16
3.5–6	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, tan, brown, orange, medium dense.		430.0 (5)	2	21
6–18.5	**SANDY LEAN CLAY (CL)** - mostly low to medium plasticity fines, some fine to medium sand, moist, light gray, tan, orange, hard to very hard.			3	67
	- low to medium kaolinic fines, light gray, white		425.0 (10)	4	71
		▼ (11 ft)			
	- trace small root, light gray, light tan, brown		420.0 (15)	5	50/ 3"
18.5–25	**PARTIALLY WEATHERED ROCK (PWR)** - mostly medium to high plasticity fines, some fine to medium sand, some rock fragments, very hard.		415.0 (20)	6	50/ 5"
			410.0 (25)	7	50/ 5"
25	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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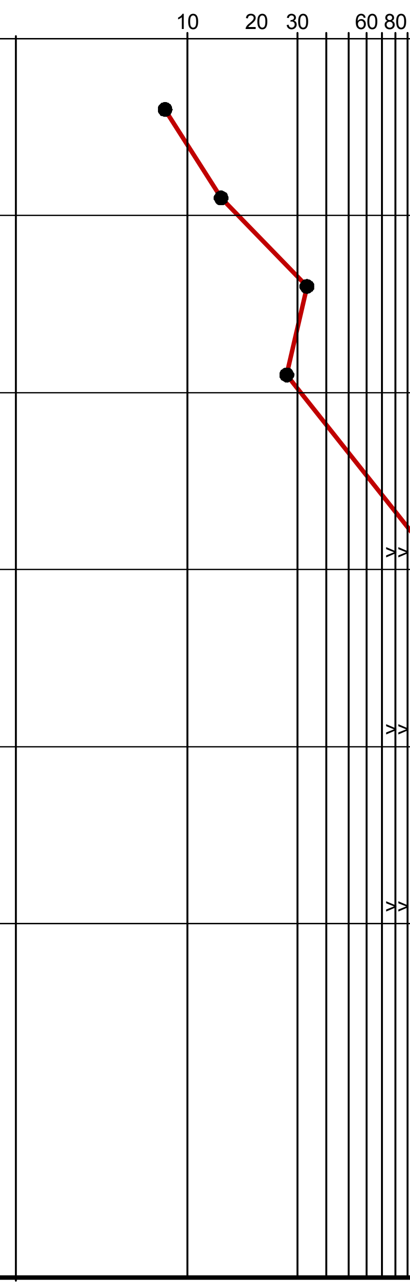
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-127**

DATE DRILLED:	8/1/2006	ELEVATION:	444
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 14 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, moist, brown, tan, reddish-orange, loose.			1	8
5	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, moist, brown, tan, reddish orange, medium dense to dense.		439.0	2	14
	- mostly fine to coarse sand, trace fine gravel, gray, tan, orange			3	33
10	**LEAN CLAY WITH SAND (CL)** - mostly medium to high plasticity fines, few fine sands, moist, gray, tan, brown, very stiff.		434.0	4	27
15	**SILTY CLAYEY SAND (SC/SM)** - mostly fine to coarse sand, some fine to coarse angular quartz gravel, some low plasticity fines, moist light gray, very dense.	▼	429.0	5	50/3"
20	**SANDY SILT (ML)** - mostly low to medium plasticity kaolinic fines, some fine sands, relict structure, moist, light tan, white, very dense.		424.0	6	50/3"
25	- light tan, orange.		419.0	7	50/5"
	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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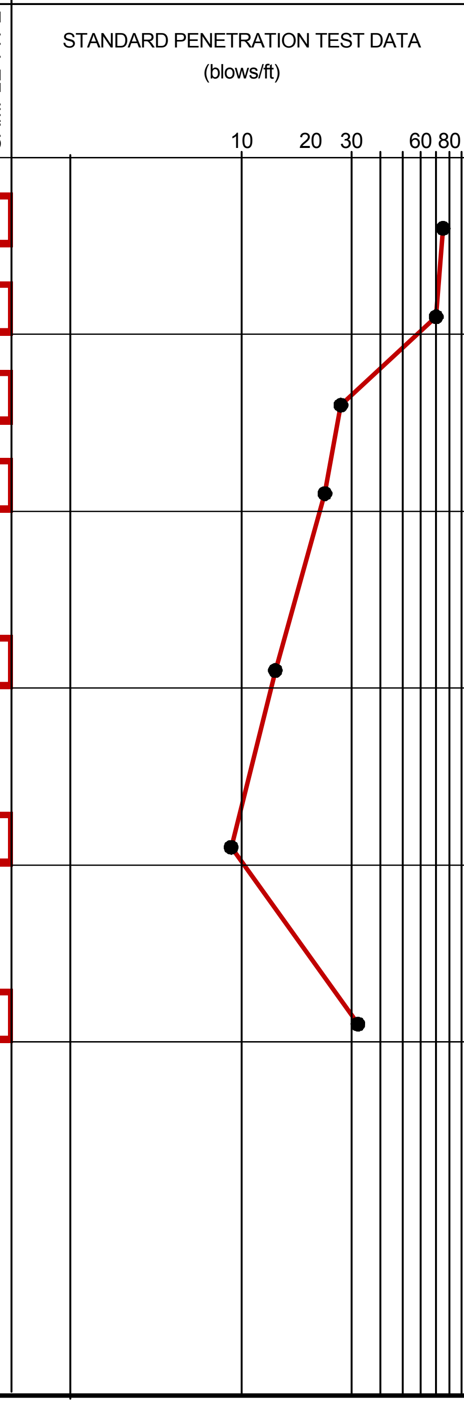
ENVIRONMENTAL SERVICES

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-128

DATE DRILLED:	8/1/2006	ELEVATION:	430
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 23 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–3.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, tan, brown, orange, very dense.			1	75
3.5–8.5	**SILTY SAND (SM)** - mostly coarse sand, few fine gravel, some low plasticity fines, tan, gray, brown, very dense to medium dense.		425.0 (5 ft)	2	70
	- gray, brown			3	27
8.5–18.5	**SANDY SILT (ML)** - mostly low to medium plasticity fines, some fine sands, moist, tan, brown, yellow, medium dense.		420.0 (10 ft)	4	23
			415.0 (15 ft)	5	14
18.5–23.5	**ELASTIC SILT (MH)** - mostly medium to high plasticity fines, moist, pink, reddish-brown, tan, stiff.	▼ (23 ft)	410.0 (20 ft)	6	9
23.5–25	**SANDY LEAN CLAY (CL)** - mostly medium plasticity fines, some fine sand, moist, tan, brown, hard.		405.0 (25 ft)	7	32
	BORING TERMINATED AT 25 FEET.				



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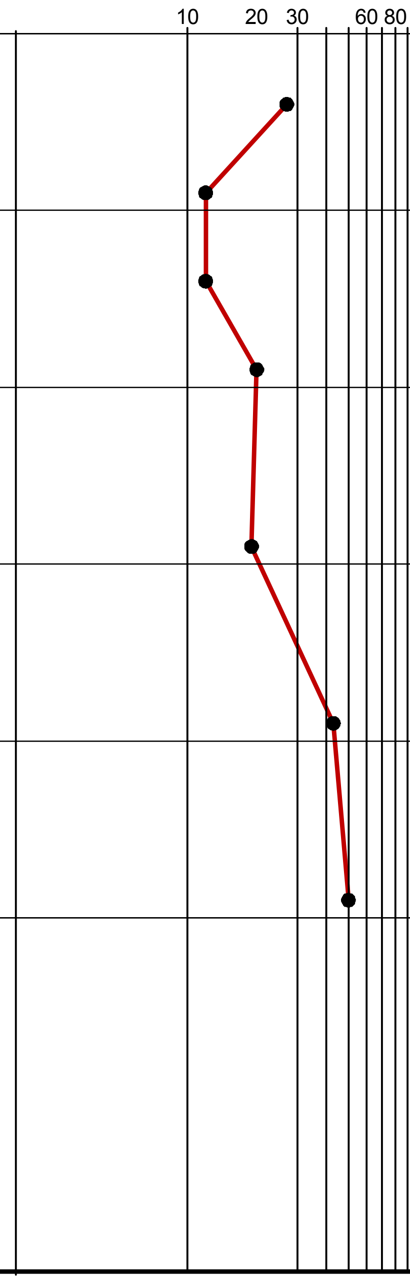
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-129

DATE DRILLED:	8/1/2006	ELEVATION:	428
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 6.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	N VALUE
		SILTY SAND (SM) - mostly fine to medium sand, some low plasticity fines, trace fine angular quartz gravel, trace small roots, moist, light gray, yellow, white, medium dense.			1		27
5		**SANDY CLAY (CL)** - mostly low plasticity fines, some fine to medium sand, trace coarse sand, slightly structured, moist, light gray, white, tan, medium dense.		423.0	2		12
		- some fine to coarse quatrz rock fragments, yellow, brown	▼		3		12
10		**SANDY CLAY (CL)** - mostly low to medium plasticity fines, some fine to medium sand, moist, brown, yellow, medium dense.		418.0	4		20
15		**SANDY SILT (ML)** - mostly low to medium plasticity fines, some fine to medium sand, moist, relict structure, bluish/gray, medium dense to dense.		413.0	5		19
20				408.0	6		43
25		- moist to wet, brown, gray, tan		403.0	7		50
		BORING TERMINATED AT 25 FEET.					

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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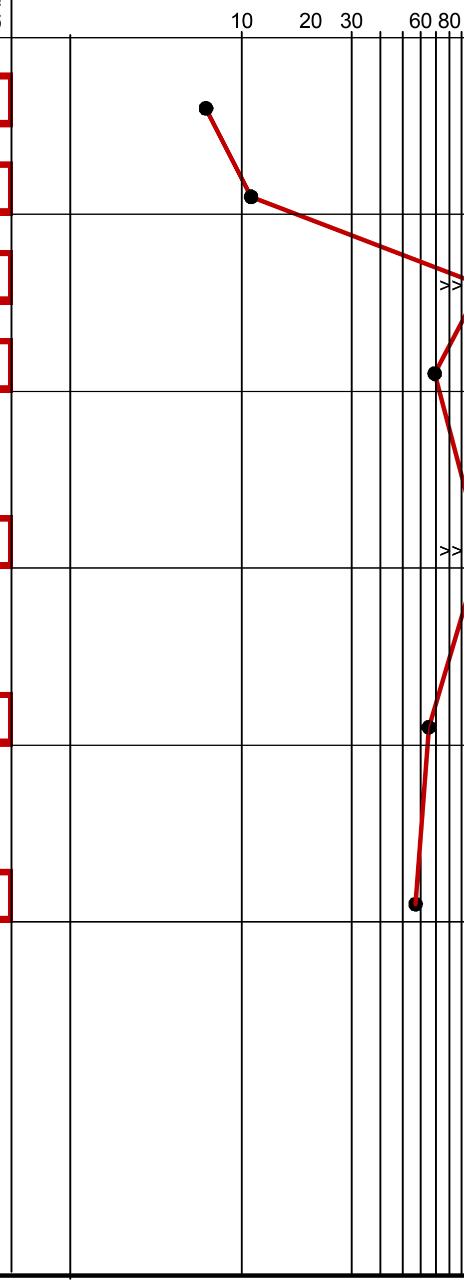
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-130

DATE DRILLED:	8/4/2006	ELEVATION:	435
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 7.4 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
		SANDY LEAN CLAY (CL) - mostly low plasticity fines, some fine to medium sand, moist, brown, gray, white, firm to very hard.			1	7
5				430.0	2	11
		- dry, orange, tan/gray, very hard	▼		3	50/ 5"
10		- mostly coarse sands, some fine to coarse sand, orange, brown		425.0	4	69
15		- some fine to medium sand		420.0	5	50/ 5"
20				415.0	6	65
25		- relict rock structure, brown, red, light gray, white		410.0	7	57
		BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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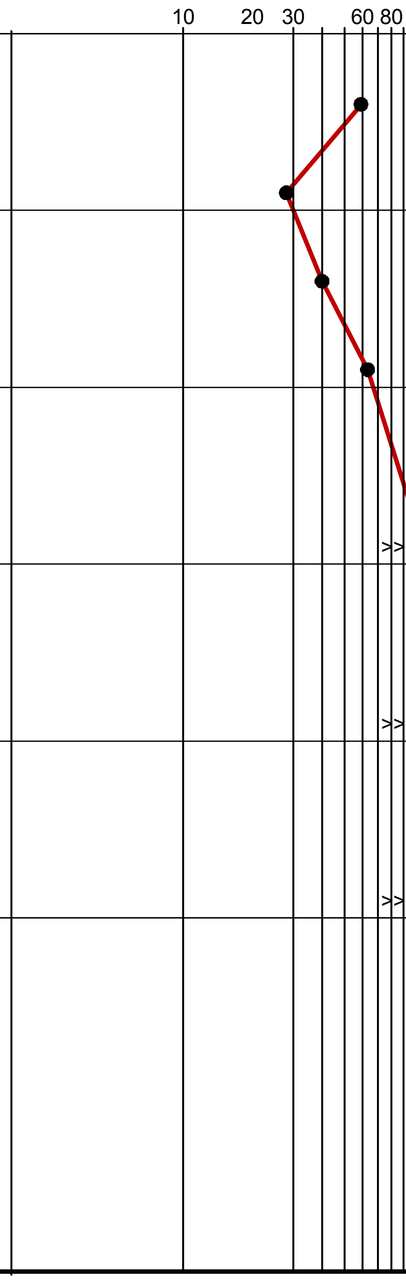
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-131
DATE DRILLED:	8/2/2006	ELEVATION:	431
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Not Encountered
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. / SAMPLE TYPE	N VALUE
		SILTY SAND (SM) - mostly fine to medium sand, trace coarse sand, some low plasticity fines, moist, light tan, brown, very dense.			1	59
5		**SANDY SILT (ML)** - mostly low to medium plasticity fines, some fine to medium sand, micaceous, relict structure, moist, tan, brown, orange, very hard.		426.0	2	28
		- light brown, tan			3	40
10		- laminated relict rock structure, brown, orange, bluish-gray		421.0	4	63
15		**PARTIALLY WEATHERED ROCK (PWR)** - mostly low to medium plasticity fines, some fine to medium sands micaceous, relict rock structure, brown, orange, bluish-gray, very hard.		416.0	5	50/ 6"
20				411.0	6	50/ 5"
25		- fine to medium sand, few fine rock fragments		406.0	7	50/ 4"
		BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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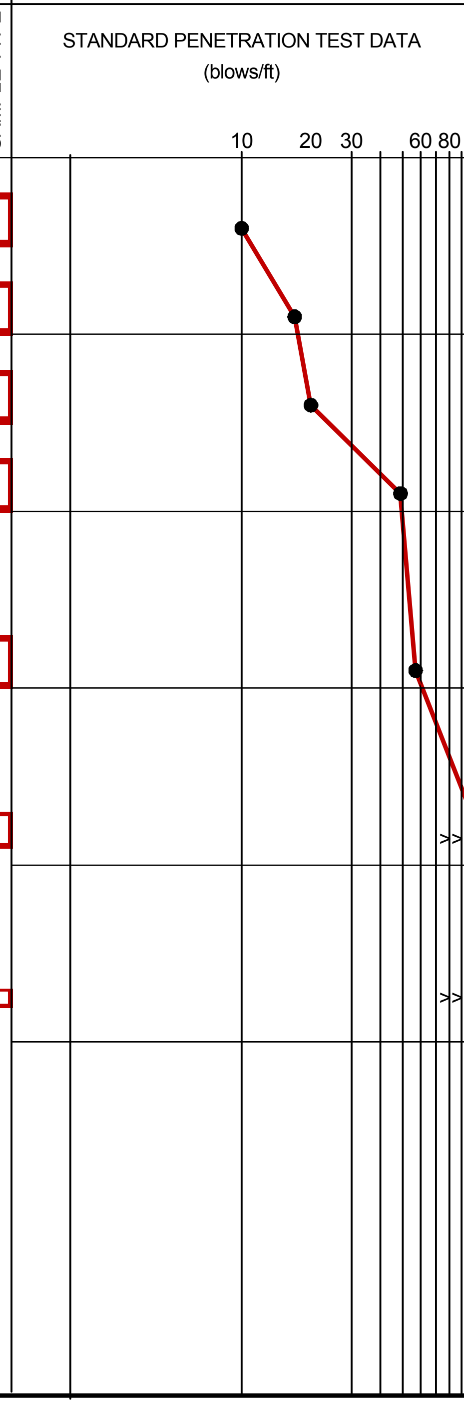
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-132

DATE DRILLED:	8/3/2006	ELEVATION:	420
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	18 feet at T.O.B., 8 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	Approximately six inches of topsoil.				
	SANDY SILT (ML) - mostly low plasticity fines, some fine to medium sand, trace small roots, moist, light brown, stiff.			1	10
5	- some low kaolinitic fines, relict rock structure, white, light gray, yellow, medium dense		415.0	2	17
	SILTY CLAYEY SAND (SC/SM) - mostly fine to medium sand, some low kaolinitic fines, trace small roots, relict rock structure, moist, white, light gray, yellow, medium dense.	▼		3	20
10	-light brown, white, light gray, dense		410.0	4	49
15	- very dense		405.0	5	57
		▽			
20	**PARTIALLY WEATHERED ROCK (PWR)** - mostly fine sand, some low plasticity fines, relict rock structure, moist, brown, very dense.		400.0	6	50/ 5"
	- trace fine quartz gravel			7	50/ 5.5"
25	BORING TERMINATED AT 25 FEET.		395.0		



NOTES:

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

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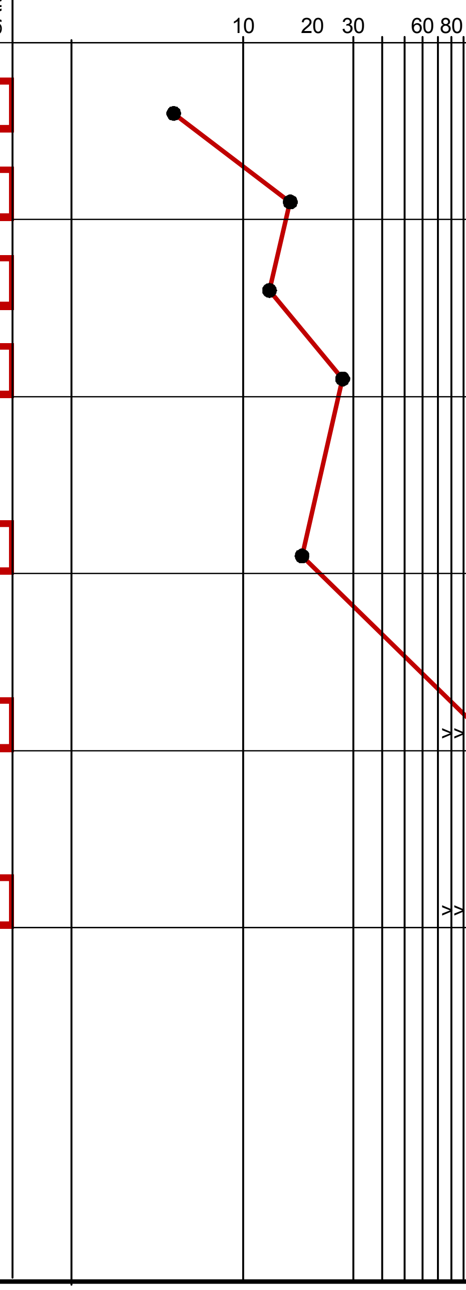
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-133

DATE DRILLED:	8/3/2006	ELEVATION:	440
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	19 feet at T.O.B., 15.6 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–1	**TOPSOIL** - approximately 1 foot of topsoil.				
1–3.5	**POORLY GRADED SAND (SP-SC)** - mostly fine to medium sand, little low plasticity fines, moist, brown, loose.			1	5
3.5–8.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, moist, brown, orange, gray, medium dense.		435.0 (5)	2	16
				3	13
8.5–18.5	**SANDY CLAY (CL)** - mostly low plasticity kaolinitic fines, some fine to coarse sand, few fine to medium gravel, light brown, tan, red, very stiff.			4	27
			430.0 (10)		
	- brown, orange, gray			5	18
15		▼	425.0		
18.5–25	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity kaolinitic fines, moist, light brown, gray, very dense.	▽		6	50/2
20			420.0		
	- mostly fine sand, wet			7	50/5"
25	BORING TEMINATED AT 25 FEET		415.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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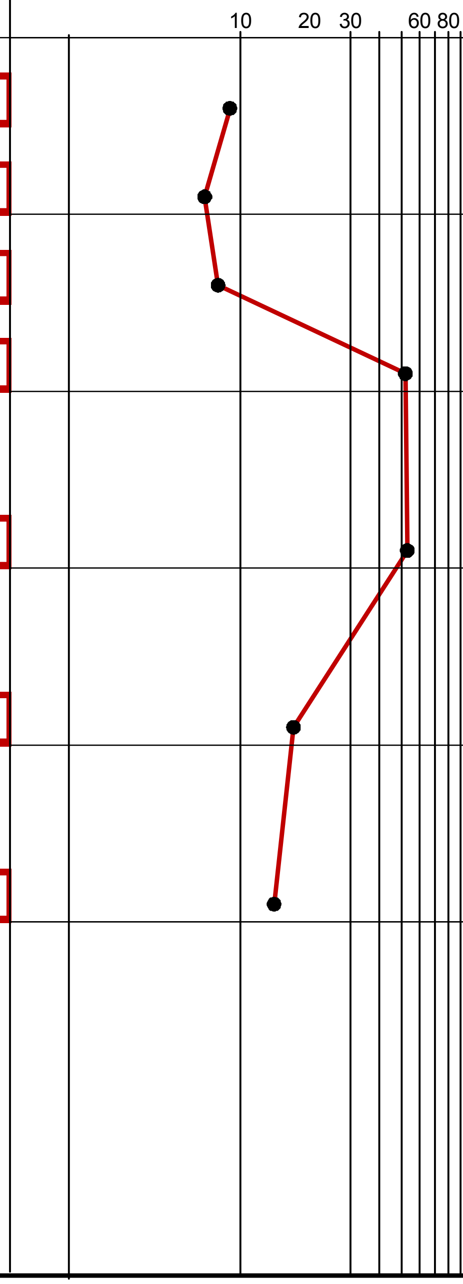
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-134**

DATE DRILLED:	8/3/2006	ELEVATION:	442
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	10.5 feet at T.O.B., 9 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–1	**TOPSOIL** - approximately 1 foot of topsoil.				
1–6	**CLAYEY SAND** - mostly fine to medium sand, some low plasticity fines, moist, brown, loose.			1	9
				2	7
5			437.0		
6–8.5	**SANDY CLAY (CL)** - mostly low plasticity fines, some fine to medium sand, moist, brown, firm.			3	8
8.5–25	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, moist, brown, orange, very dense.	▼ (9 ft, 24 hr.)		4	52
10		▽ (10.5 ft, T.O.B.)	432.0		
15			427.0	5	53
	- trace kaolin, white, medium dense			6	17
20			422.0		
25			417.0	7	14
	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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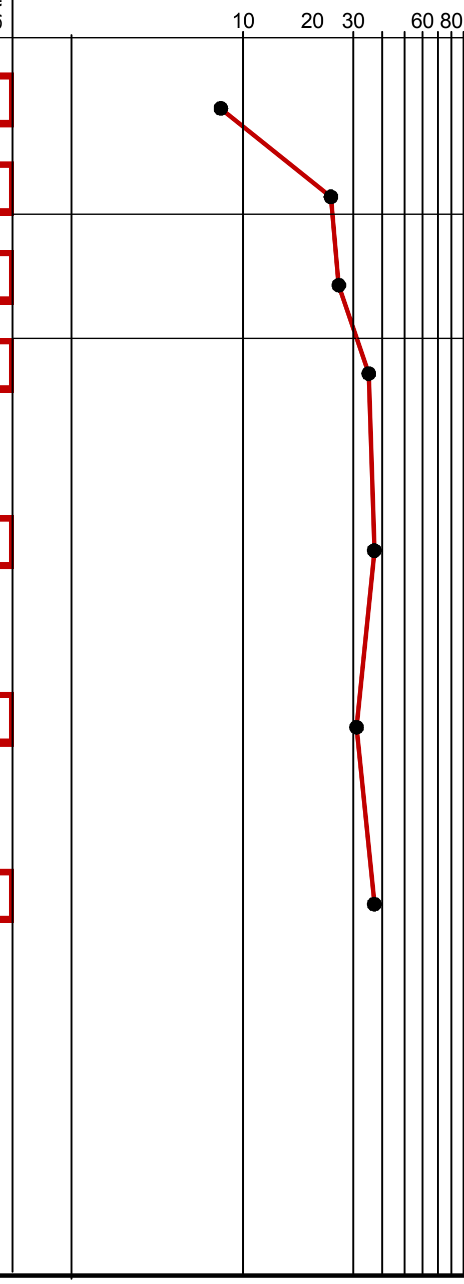
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-135

DATE DRILLED:	8/3/2006	ELEVATION:	441
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	8.5
LOGGED BY:	PO	WATER LEVEL:	8.5 feet at T.O.B., 8 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. / SAMPLE TYPE	N VALUE
		Approximately twelve inches of cultivated topsoil.				
		SANDY CLAY (CL) - mostly low plasticity fines, some fine to medium sand, moist, brown, firm.			1	8
5		**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, moist, light brown, medium dense.		436.0	2	24
		SANDY CLAY (CL) - mostly low plasticity fines, some fine to medium sand, moist, brown, very stiff.	▼ ▽		3	26
		CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, moist to wet, gray, dense.			4	35
		- wet			5	37
					6	31
					7	37
		BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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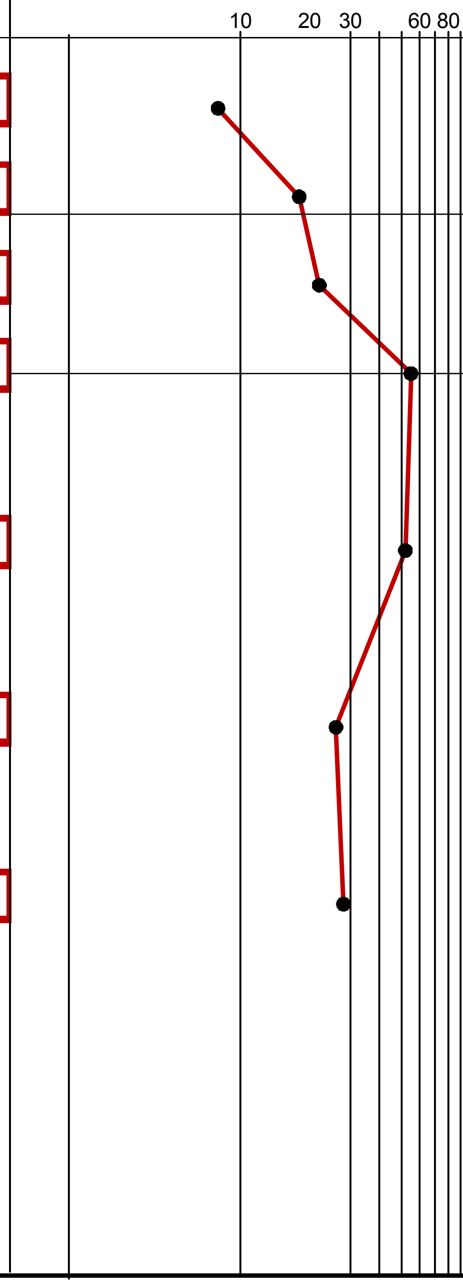
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-136

DATE DRILLED:	8/3/2006	ELEVATION:	442
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	9.5
LOGGED BY:	PO	WATER LEVEL:	9.5 feet at T.O.B., 8 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	N VALUE
		Approximately twelve inches of cultivated topsoil.				
		POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine to medium sand, little low plasticity fines, moist, brown, loose.			1	8
5		**SANDY CLAY (CL)** - mostly low plasticity fines, some fine to medium sand, moist, brown, tan, very stiff.		437.0	2	18
		- brown, gray	▼		3	22
		SILTY SAND (SM) - mostly fine to medium sand, some low plasticity fines, wet, orangish brown, tan, very dense.	▽		4	55
		- some low plasticity kaolinitic fines, tan-brown, yellow			5	52
		- wet spoon				
		- trace coarse sand, tan, yellow, white, medium dense			6	26
		SANDY SILT (ML) - mostly low plasticity fines, some fine to medium sand, moist, light brown, tan, very stiff.			7	28
		BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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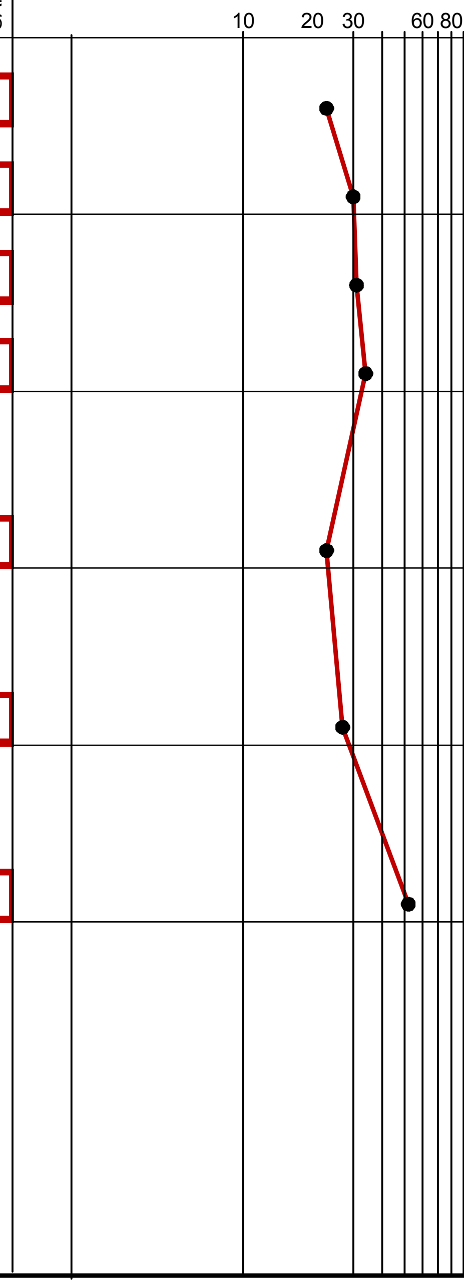
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-138

DATE DRILLED:	8/2/2006	ELEVATION:	410
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 15 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0		**SANDY SILTY (ML)** - mostly low to medium plasticity fines, some fine to coarse sand, relict structure, moist, tan, brown, purple, very stiff to very hard.			1	23
5				405.0	2	30
					3	31
10				400.0	4	34
15		- tan, brown with orange, very stiff	▼	395.0	5	23
20		- light tan, white, brown		390.0	6	27
25		- brown, tan, reddish-orange with black		385.0	7	52
		BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-139

DATE DRILLED:	8/2/2006	ELEVATION:	413
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	20 feet at T.O.B., 7.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

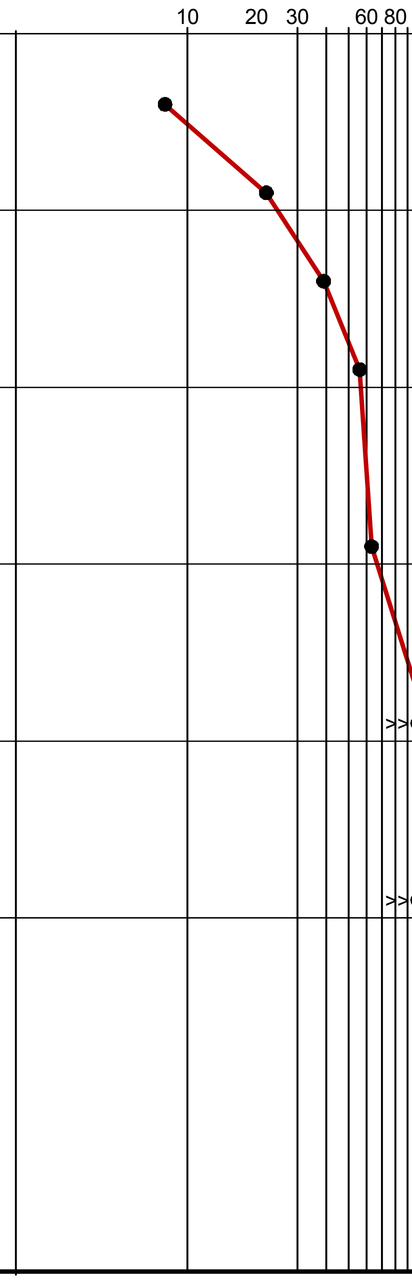
NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION
0 – 8.5	**SANDY CLAY (CL)** - mostly low to medium plasticity fines, some fine to medium sand, moist, brown, gray, loose to dense. - trace small roots
8.5 – 19	**SILTY SAND (SM)** - mostly fine to coarse sand, some low to medium plasticity fines, relict structure, moist, brown, tan, orange, dense to very dense. - fine to coarse gravel
19 – 25	**PARTIALLY WEATHERED ROCK (PWR)** - mostly fine to coarse sand, some low to medium plasticity fines, relict structure, moist, brown, tan, orange, very dense. - mostly low to medium plasticity fines, some fine to coarse sand, moist, bluish-gray
	BORING TERMINATED AT 25 FEET.

DEPTH (feet)	ELEVATION (feet-MSL)
5	408.0
10	403.0
15	398.0
20	393.0
25	388.0

SAMPLE NO.	N VALUE
1	8
2	22
3	39
4	56
5	63
6	50/ 5"
7	50/ 4"

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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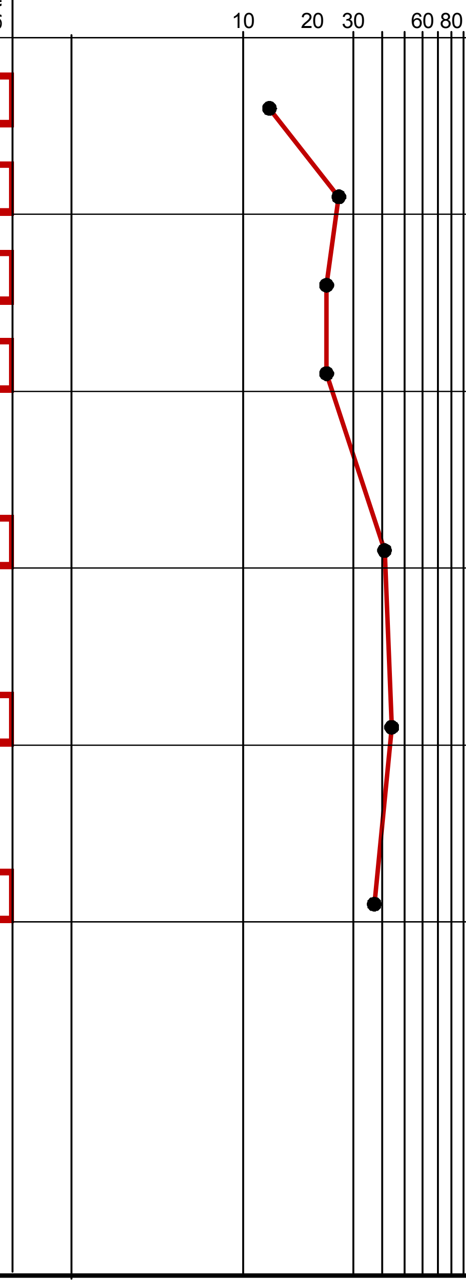
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-140**

DATE DRILLED:	8/2/2006	ELEVATION:	423
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 13 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	SANDY SILTY (ML) - mostly low to medium plasticity fines, some fine to coarse sand, relict structure, moist, light tan, yellow, stiff to hard.			1	13
5	- fine to medium sand, very stiff		418.0	2	26
	- some fine to medium sand, light tan, gray, brown, yellow			3	23
10	- micaceous, light tan, brown, gray, hard		413.0	4	23
		▼			
15			408.0	5	41
20			403.0	6	44
25			398.0	7	37
	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft)



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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-141

DATE DRILLED:	8/3/2006	ELEVATION:	424
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	6.5
LOGGED BY:	PO	WATER LEVEL:	Not Encountered
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		Approximately six inches of topsoil.					
		CLAYEY SAND (SC) - mostly fine sand, some low plasticity fines, trace fine roots, dry, brown, medium dense.			1		18
		PARTIALLY WEATHERED ROCK (PWR) - mostly fine sand, some low plasticity fines, dry, brown, white, very dense.			2	>>	50/ 4"
5				419.0			
					3	>>	50/ 0
		AUGER REFUSAL AT 6.5 FEET.					

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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BORING LOG B-142

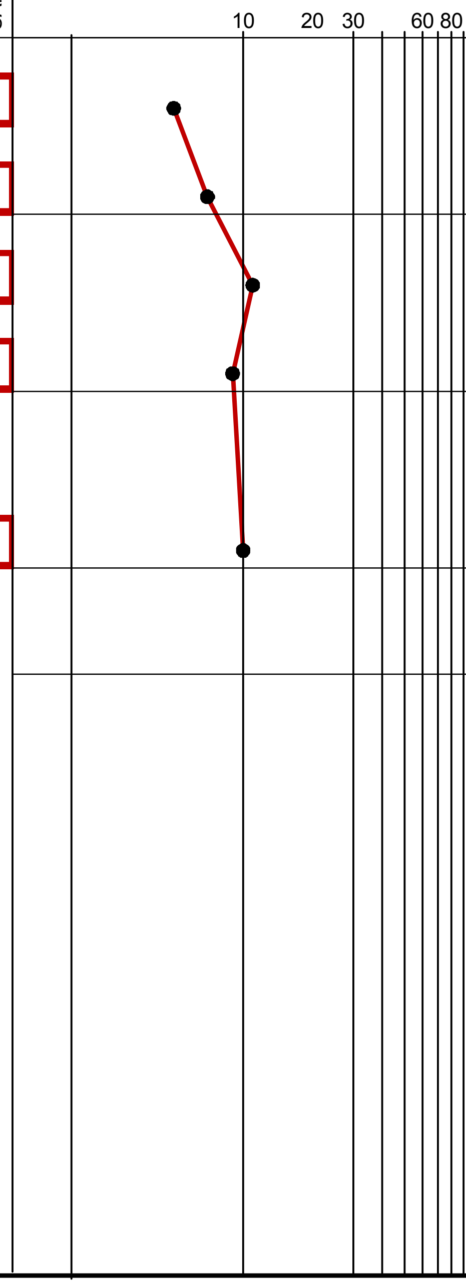
PROJECT: Project Y
Blythewood, South Carolina
1611-06-293

DATE DRILLED:	8/3/2006	ELEVATION:	428
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	18
LOGGED BY:	PO	WATER LEVEL:	18 feet at T.O.B., 3.2 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	Approximately six inches of topsoil.				
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, trace fine to small roots, moist to wet, gray, loose.			1	5
		▼ (3.2 ft, 24 hr.)			
5			423.0	2	7
	- medium dense			3	11
	- mostly fine to coarse sand, light brown, yellow, loose			4	9
10	- wet spoon		418.0		
15			413.0	5	10
18	AUGER REFUSAL AT 18 FEET.	▽ (18 ft, T.O.B.)			

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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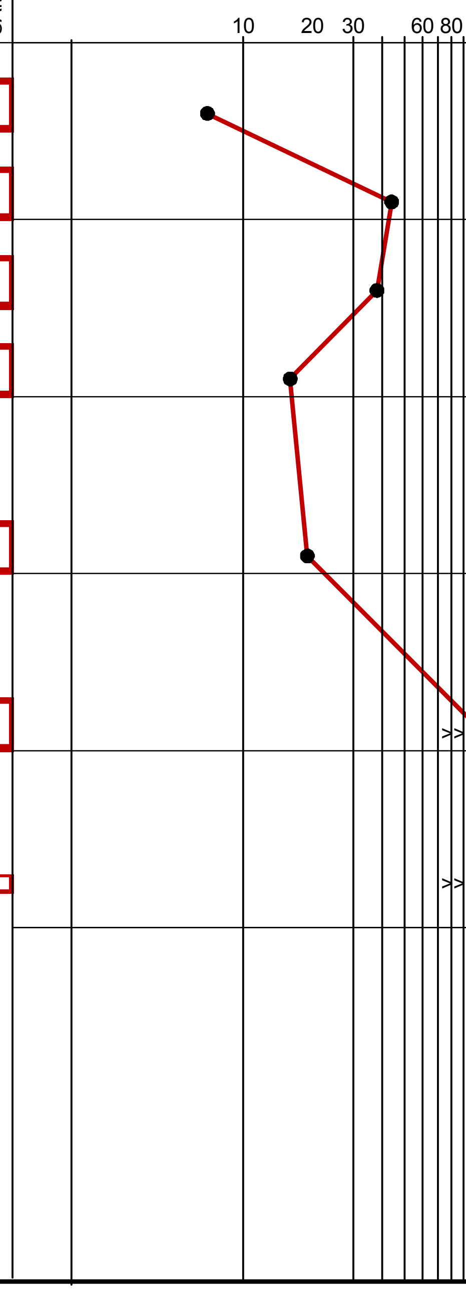
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-143**

DATE DRILLED:	8/3/2006	ELEVATION:	433
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	5 feet at T.O.B., 2 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
	Approximately six inches of topsoil.				
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, moist, tan-brown, gray, loose.	▼		1	7
5	**SILTY CLAYEY SAND (SC/SM)** - mostly fine to medium sand, some low plasticity fines, moist, tan-brown, dense.	▽	428.0	2	44
				3	38
10	**SANDY SILT (ML)** - mostly low plasticity fines, some fine to medium sand, moist to wet, tan, gray, very stiff.		423.0	4	16
15	- trace coarse sand, moist, tan, orange		418.0	5	19
20	**SANDY CLAY (CL)** - mostly low plasticity kaolinitic fines, some fine sand, trace medium sand, relict rock structure, moist, gray, brown, very hard.		413.0	6	50/ 4"
				7	50/ 5.5"
25	BORING TERMINATED AT 25 FEET.		408.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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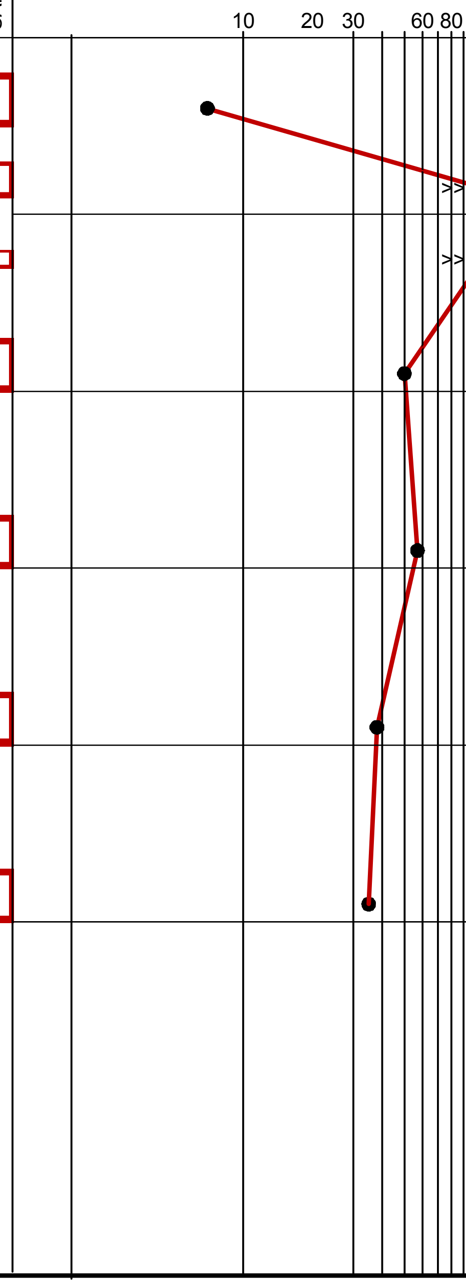
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-144**

DATE DRILLED:	8/4/2006	ELEVATION:	438
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	7 feet at T.O.B., 3 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	Approximately eight inches of topsoil.			
	POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine to medium sand, little low plasticity fines, moist, brown, loose.		1	7
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, dry to moist, brown, red, gray, very dense.		2	50/ 3"
5		433.0	3	50/ 2.5"
	POORLY GRADED SAND WITH SILT (SP-SM) - mostly fine to coarse sand, little low plasticity fines, moist to wet, light brown, very dense.		4	50
10		428.0		
	SANDY SILT (ML) - mostly low plasticity fines, some fine sand, moist, light gray, light brown, very hard.		5	57
15		423.0		
	- gray, hard		6	38
20		418.0		
			7	35
25	BORING TERMINATED AT 25 FEET.	413.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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

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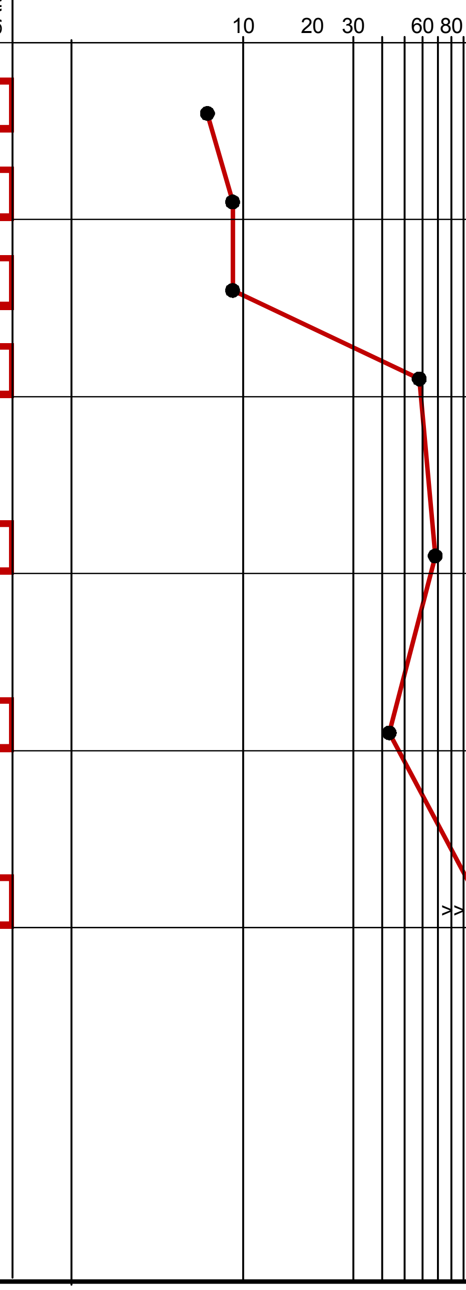
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-146

DATE DRILLED:	8/2/2006	ELEVATION:	432
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Dry at T.O.B., 11.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–6	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, light tan, brown, loose.			1	7
	- tan, light gray, orange			2	9
5			427.0		
6–8.5	**SANDY SILT (ML)** - mostly low to medium plasticity fines, some fine sand, moist, gray, tan, orange, stiff.			3	9
8.5–13.5	**SILTY SAND (SM)** - mostly fine sand, some low plasticity fines, tan, brown, yellow, very dense.			4	58
10			422.0		
11.5		▼			
13.5–23.5	**SANDY SILT (ML)** - mostly low to medium plasticity kaolinitic fines, some fine to medium sand, relict structure, moist, tan, brown, gray, orange, very hard.			5	68
15			417.0		
	-bluish-gray, tan, brown, orange			6	43
20			412.0		
23.5–25	**PARTIALLY WEATHERED ROCK (PWR)** - mostly low to medium plasticity kaolinitic fines, some fine to medium sand, relict structure, moist, tan, brown with gray, very hard.			7	50/ 3"
25	BORING TERMINATED AT 25 FEET.		407.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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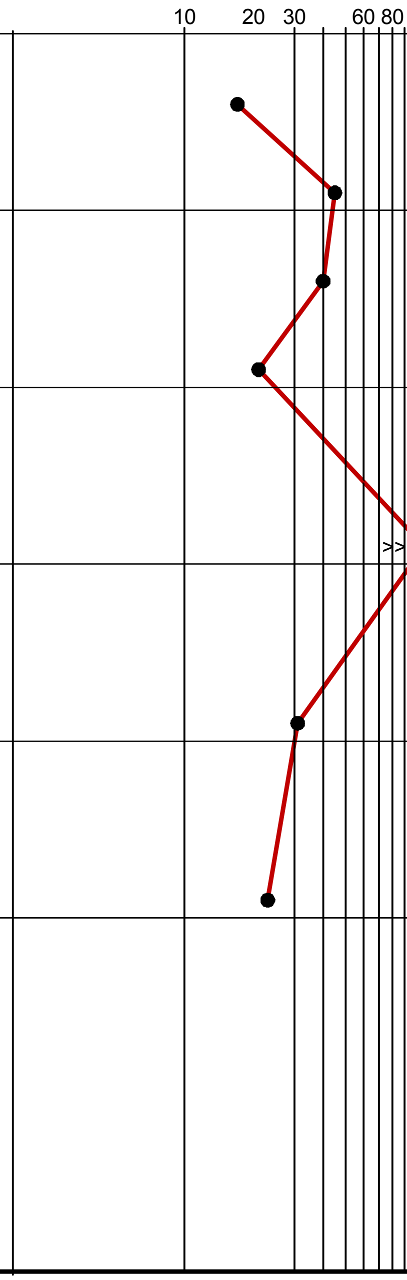
BORING LOG B-147

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293
DATE DRILLED:	8/2/2006
ELEVATION:	440
DRILLING METHOD:	3¼" H.S.A.
BORING DEPTH:	25
LOGGED BY:	PO
WATER LEVEL:	Not Encountered
DRILLER:	S&ME-Tri-Cities
DRILL RIG:	Mobile B-57
NOTES:	

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)
0–3.5	**POORLY GRADED SAND (SP)** - mostly fine to medium sand, trace non-plastic fines, moist, light tan, medium dense.	
3.5–8.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, trace coarse sand, some low to medium plasticity fines, moist, tan, brown, gray, dense. - some low plasticity fines	435.0 (at 5)
8.5–13.5	**SILTY SAND (SM)** - mostly fine sand, some low plasticty fines, micaceous, dry to moist, light gray, medium dense.	430.0 (at 10)
13.5–18.5	**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine to coarse sand, some low to medium plasticiy fines, tan, brown, orange, very dense.	425.0 (at 15)
18.5–25	**SANDY SILT (ML)** - mostly low to medium, some fine sand, relict structure, tan, brown, yellow, medium dense.	420.0 (at 20)
25	BORING TERMINATED AT 25 FEET	415.0

SAMPLE NO.	N VALUE
1	17
2	45
3	40
4	21
5	50/ 5"
6	31
7	23

STANDARD PENETRATION TEST DATA (blows/ft)



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4. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG **B-148**

DATE DRILLED:	8/4/2006	ELEVATION:	431
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	8.5 feet at T.O.B., dry cave at 7 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE (STANDARD PENETRATION TEST DATA (blows/ft))
	Approximately eight inches of topsoil.				
	POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine to medium sand, little low plasticity fines, trace fine roots, moist, brown, medium dense.			1	11
5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, moist, gray, brown, yellow, medium dense.		426.0	2	29
	- dense	HC ∇		3	38
10	- decrease in plasticity, tan, white, brown		421.0	4	38
15	- wet, medium dense		416.0	5	26
20	- mostly fine to coarse sand, white, light gray, yellow		411.0	6	18
25	- light gray, light brown		406.0	7	15
	BORING TERMINATED AT 25 FEET.				

BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-149**

DATE DRILLED:	8/4/2006	ELEVATION:	444
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	8 feet at T.O.B., dry cave at 8.6 feet at 24 hr.
DRILLER:	Howard Wessinger	DRILL RIG:	

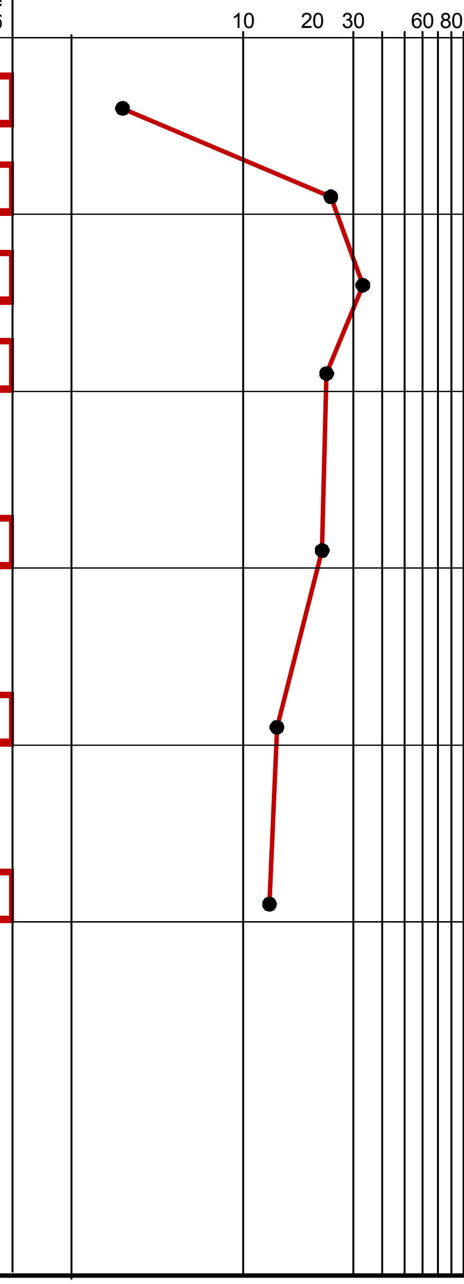
NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)
0	Approximately eight inches of topsoil.	
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, trace fine roots, moist, brown, very loose.	
5	**SANDY CLAY (CL)** - mostly low plasticity fines, some fine to medium sand, moist, gray, brown, very stiff.	439.0
	- gray, red, brown, hard	
10	**SANDY SILT (ML)** - mostly low plasticity fines, some fine to medium sand, moist, grayish tan, very stiff.	434.0
15	- trace coarse sand, light brown, gray	429.0
20	**SILTY SAND (SM)** - mostly fine to medium sand, some low plasticity fines, wet, white, light gray, medium dense.	424.0
25	BORING TERMINATED AT 25 FEET.	419.0

WATER LEVEL: ▽ HC (at approx. 8 feet)

SAMPLE NO.	N VALUE
1	3
2	24
3	33
4	23
5	22
6	14
7	13

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG B-150**

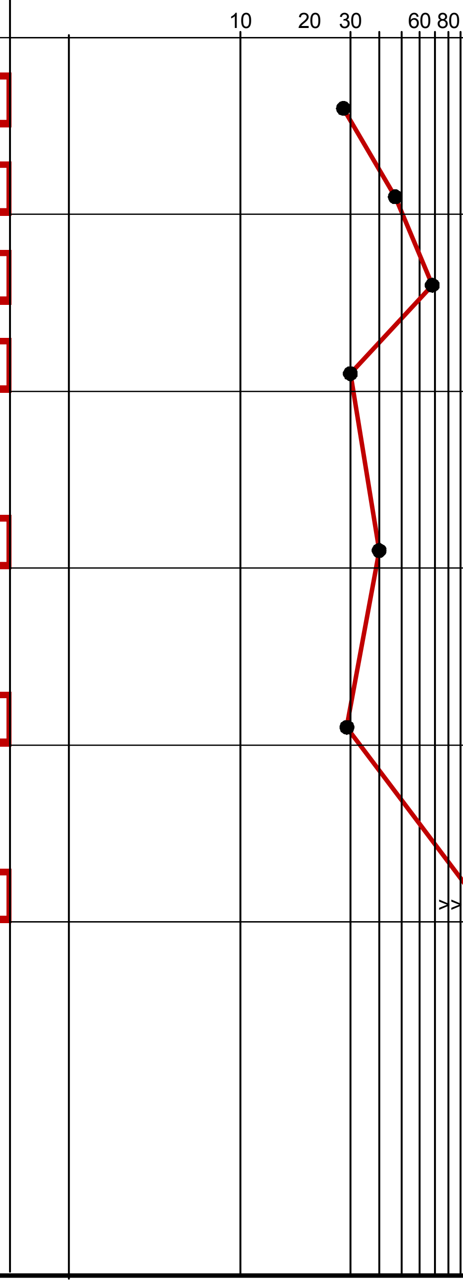
DATE DRILLED:	8/2/2006	ELEVATION:	430
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	Not Encountered
DRILLER:	S&ME- Knoxville	DRILL RIG:	

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)
0–6		**SANDY LEAN CLAY (CL)** - mostly low plasticity fines, some fine to medium sand, moist, brown, tan, orange, very stiff to very hard.		
		- trace coarse sand, gray, tan, yellow, light brown, reddish-orange		
5				425.0
6–8.5		**POORLY GRADED SAND WITH CLAY (SP-SC)** - mostly fine to coarse sand, trace fine gravel, few low plasticity fines, moist, light tan, brown, very dense.		
8.5–25		**SANDY SILT (ML)** mostly low to medium plasticity fines, some fine sand, relict structure, moist, tan, brown, yellow, very stiff to very hard.		
10				420.0
		No Sample Recovery.		
15				415.0
		- tan, brown		
20				410.0
		- some fine to medium sand, light tan, yellow		
25		BORING TERMINATED AT 25 FEET.		405.0

SAMPLE NO.	N VALUE
1	28
2	47
3	68
4	30
5	40
6	29
7	50/ 5"

STANDARD PENETRATION TEST DATA (blows/ft)



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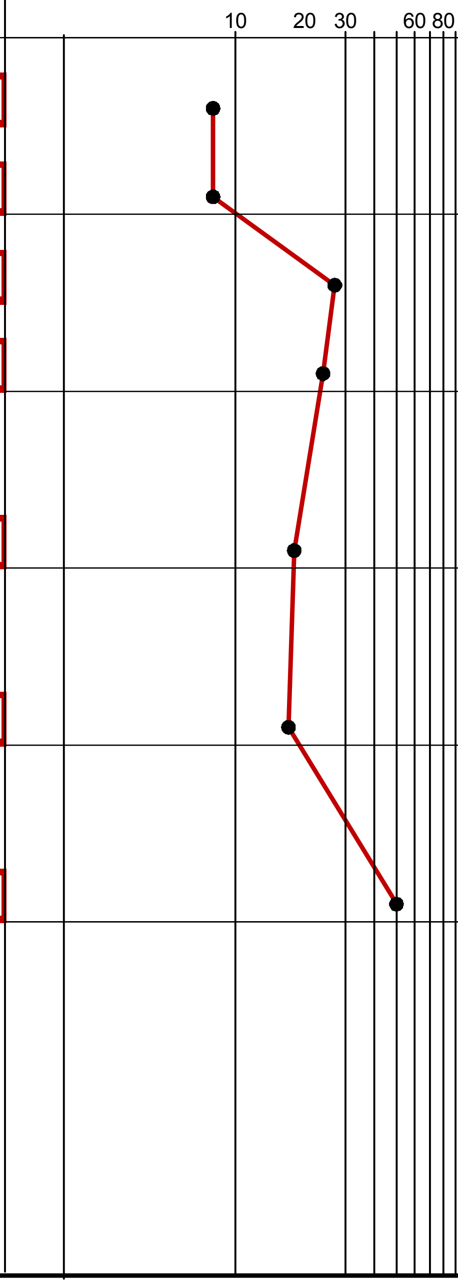
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-151

DATE DRILLED:	8/3/2006	ELEVATION:	434
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	15 feet at T.O.B., 13.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)
	POORLY GRADED SAND (SP) - mostly fine to medium sand, trace non-plastic fines, few small roots, moist, light brown, loose.	
5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, light tan, brown with orange, loose to medium dense.	429.0
10	**SILTY SAND (SM)** - mostly fine to coarse sand, some low plasticity fines, moist, gray, tan, brown, medium dense.	424.0
15	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist to wet, tan, gray, medium dense.	419.0
20	**SILTY SAND (SM)** - mostly fine to coarse sand, some low plasticity fines, wet, light tan, white, medium dense to dense.	414.0
	No Sample Recovery.	
25	BORING TERMINATED AT 25 FEET.	409.0

STANDARD PENETRATION TEST DATA (blows/ft)



SAMPLE NO.	N VALUE
1	8
2	8
3	27
4	24
5	18
6	17
7	50

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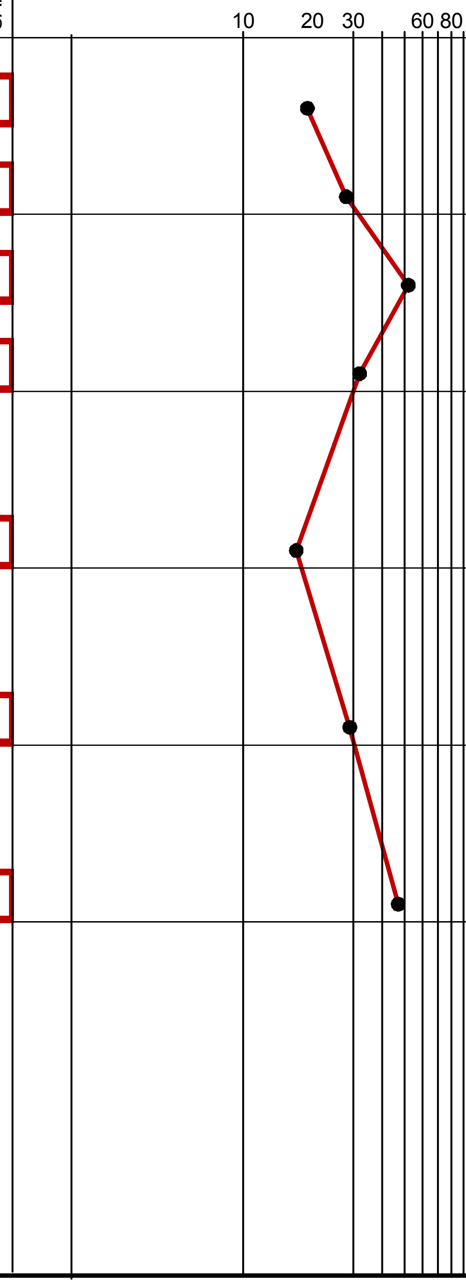
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-153

DATE DRILLED:	8/2/2006	ELEVATION:	427	NOTES:
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25	
LOGGED BY:	PO	WATER LEVEL:	16 feet at T.O.B., 16.5 feet at 24 hr.	
DRILLER:	S&ME- Knoxville	DRILL RIG:		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low to medium plasticity fines, moist, tan, brown, orange, medium dense.			1	19
				2	28
5			422.0		
	POORLY GRADED SAND WITH CLAY (SP-SC) - mostly fine to coarse sand, few low plasticity fines, moist, tan, brown, very dense to dense.			3	52
	SILTY SAND (SM) - mostly fine to coarse sand, some low plasticity fines, micaceous, moist, light tan, orange, brown, dense.			4	32
10			417.0		
	- mostly fine to medium sand, moist to wet, medium dense			5	17
15			412.0		
		▼			
	- wet to saturated, light gray to white			6	29
20			407.0		
	- some fine to coarse sand, trace fine gravel, some low to medium plasticity fines, moist, light, brown, orange, dense			7	47
25	BORING TERMINATED AT 25 FEET.		402.0		

STANDARD PENETRATION TEST DATA (blows/ft)



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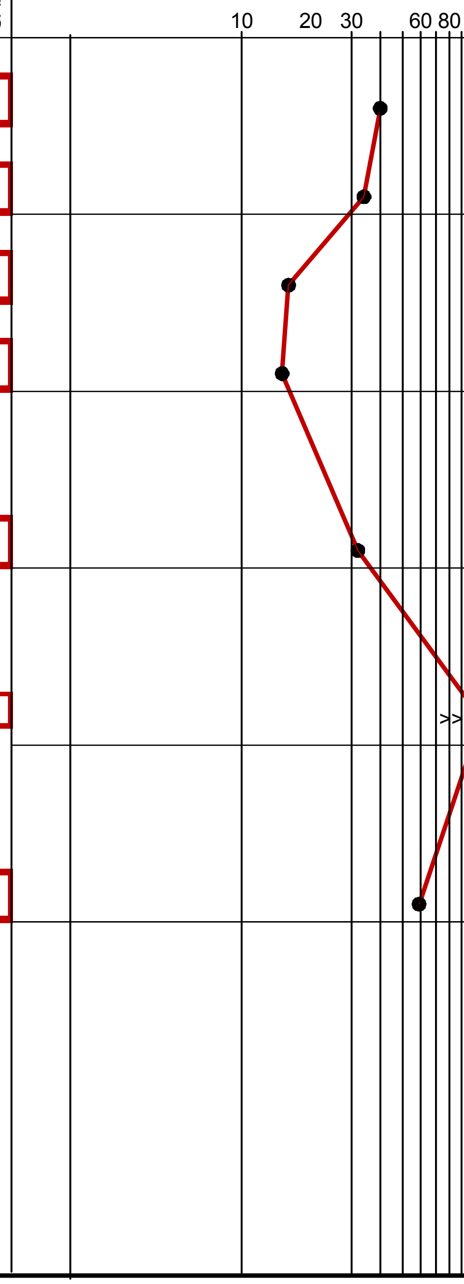
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	**BORING LOG**	**B-154**

DATE DRILLED:	8/2/2006	ELEVATION:	430
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	6.5 feet at T.O.B., 5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	Approximately twelve inches of dry brown sand.			
	CLAYEY SAND (SC) - mostly fine to medium sand, some low plasticity fines, moist, orange, brown, medium dense.		1	40
	- mostly fine to coarse sand, brown		2	34
5		425.0		
	SILTY CLAYEY SAND (SC/SM) - mostly fine to coarse sand, some low plasticity fines, moist, tan, light brown, loose.		3	16
	- mostly fine to medium sand, white		4	15
10		420.0		
	SANDY CLAY (CL) - mostly low to medium plasticity fines, some fine sand, moist, tannish gray, very stiff.		5	32
15		415.0		
	WELL GRADED SAND WITH SILT (SW-SM) - mostly fine to coarse sand, few non-plastic fines, wet, tan, light brown, very dense.		6	50/ 3"
20		410.0		
	SILTY SAND (SM) - mostly fine to medium sand, little low plasticity fines, few coarse sand, wet, white, tan, light brown, dense.		7	59
25	BORING TERMINATED AT 25 FEET.	405.0		

STANDARD PENETRATION TEST DATA (blows/ft)



BORING LOG 06-293.GPJ WITH CPT.GDT 9/6/06

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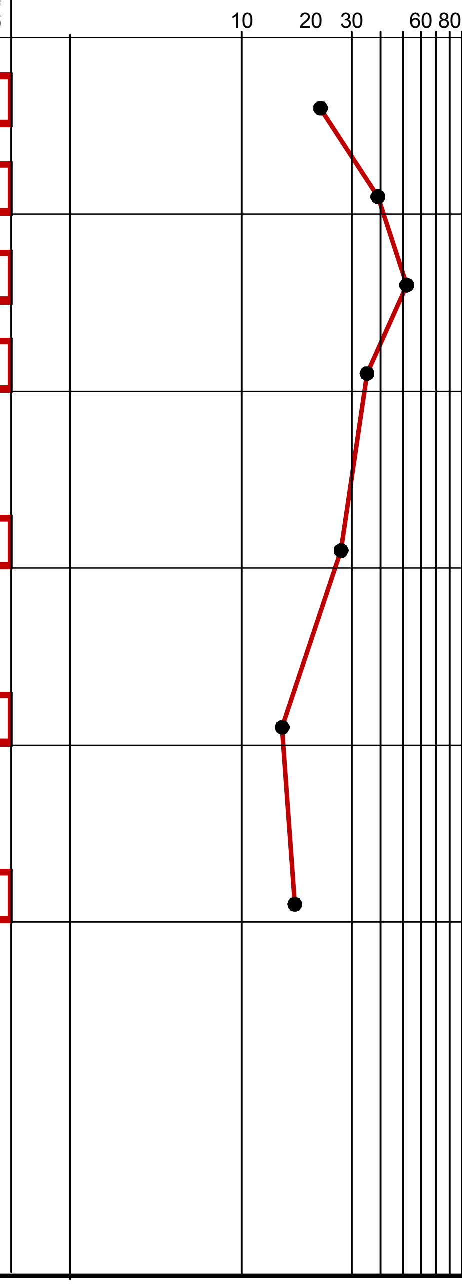
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-155

DATE DRILLED:	8/2/2006	ELEVATION:	443
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	15 feet at T.O.B., 10.5 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	N VALUE
		CLAYEY SAND (SC) - mostly fine to medium sand, some low to medium plasticity fines, moist, tan, brown, orange, medium dense to very dense.			1		22
5				438.0	2		39
		- tan, gray, brown, orange			3		52
		POORLY GRADED SAND WITH SILT (SP-SM) - mostly fine to coarse sand, few low plasticity fines, moist, light tan, orange, yellow, medium dense.			4		35
10			▼	433.0			
		CLAYEY SAND (CL) - mostly fine to medium sand, trace coarse sand, some low to medium plasticity fines, wet, tan, brown, orange, medium dense.					
15			▽	428.0	5		27
		SILTY SAND (SM) - mostly fine to coarse sand, some low plasticity fines, saturated, light tan, white, medium dense.					
20				423.0	6		15
		- mostly fine to medium sand, few medium sand, moist to wet, light gray, white			7		17
25				418.0			
		BORING TERMINATED AT 25 FEET.					

STANDARD PENETRATION TEST DATA (blows/ft)



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PROJECT:	**Project Y** **Blythewood, South Carolina** **1611-06-293**

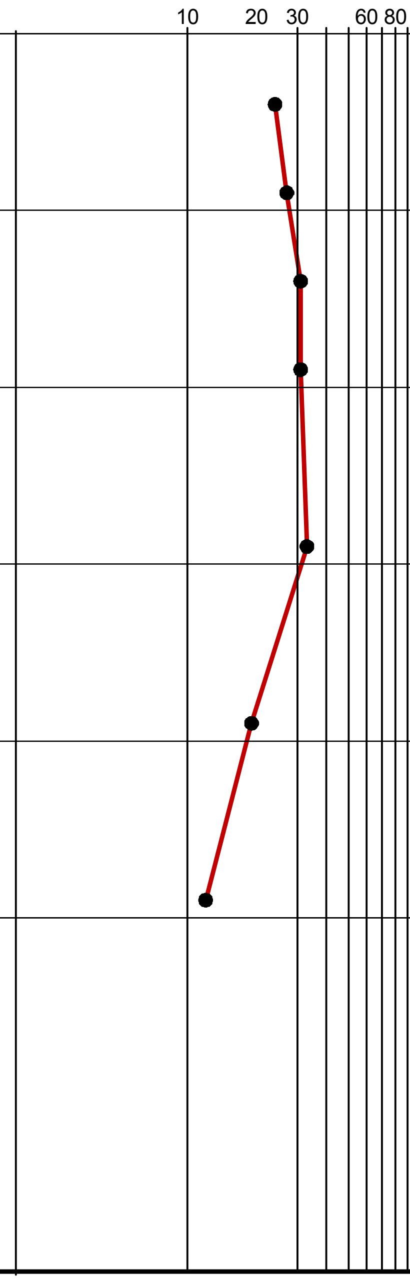
BORING LOG **B-156**

DATE DRILLED:	**8/3/2006**	ELEVATION:	**432**
DRILLING METHOD:	**3¼" H.S.A.**	BORING DEPTH:	**25**
LOGGED BY:	**PO**	WATER LEVEL:	**12 feet at T.O.B., 7 feet at 24 hr.**
DRILLER:	**S&ME-Tri-Cities**	DRILL RIG:	**Mobile B-57**

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0–3.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, moist, tan- brown, medium dense.		1	24
3.5–8.5	**SANDY CLAY (CL)** - mostly low to medium plasticity fines, some fine to medium sand, dry, gray, brown, orange, stiff to very stiff.	427.0 (5)	2	27
			3	31
8.5–18.5	**SILTY SAND (SM)** - mostly fine sand, some low plasticity fines, moist to wet, yellow, gray, dense.	422.0 (10)	4	31
	- light gray, white	417.0 (15)	5	33
18.5–25	**POORLY GRADED SAND WITH SILT (SP-SM)** - mostly fine sand, little low plasticity fines, wet, light gray, medium dense.	412.0 (20)	6	19
		407.0 (25)	7	12
25	BORING TERMINATED AT 25 FEET.			

STANDARD PENETRATION TEST DATA (blows/ft)



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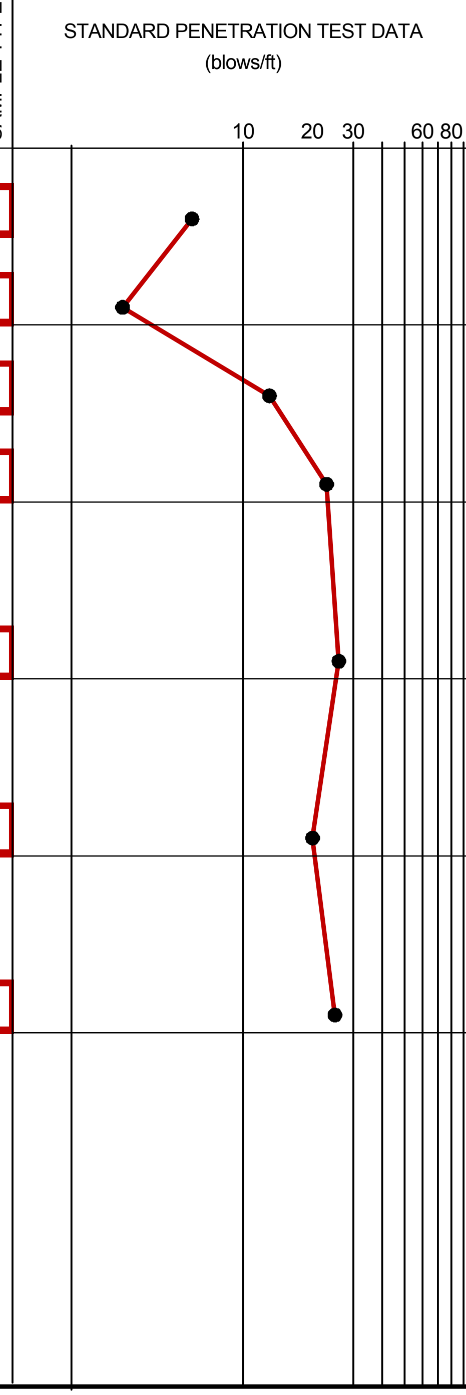
PROJECT:	Project Y Blythewood, South Carolina 1611-06-293	BORING LOG	B-157

DATE DRILLED:	8/3/2006	ELEVATION:	442
DRILLING METHOD:	3¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	PO	WATER LEVEL:	11 feet at T.O.B., 7.8 feet at 24 hr.
DRILLER:	S&ME-Tri-Cities	DRILL RIG:	Mobile B-57

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0 – 6	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, trace fine roots, moist, charcoal gray, loose.			1	6
	- increase in moisture content, gray, very loose		437.0 (5)	2	3
6 – 8.5	**SANDY CLAY (CL)** - mostly low plasticity fines, some fine to medium sand, moist, tan, light gray, stiff.	▼ (7.8 ft, 24 hr.)		3	13
8.5 – 23.5	**CLAYEY SAND (SC)** - mostly fine to medium sand, some low plasticity fines, wet, light brown, medium dense.	▽ (11 ft, T.O.B.)	432.0 (10)	4	23
	- mostly medium sand, decrease in plasticity		427.0 (15)	5	26
	- mostly fine to coarse sand		422.0 (20)	6	20
23.5 – 25	**SANDY CLAY (CL)** - mostly low plasticity fines, some fine sand, moist, tan, tan, brown, very stiff.		417.0 (25)	7	25

BORING TERMINATED AT 25 FEET.



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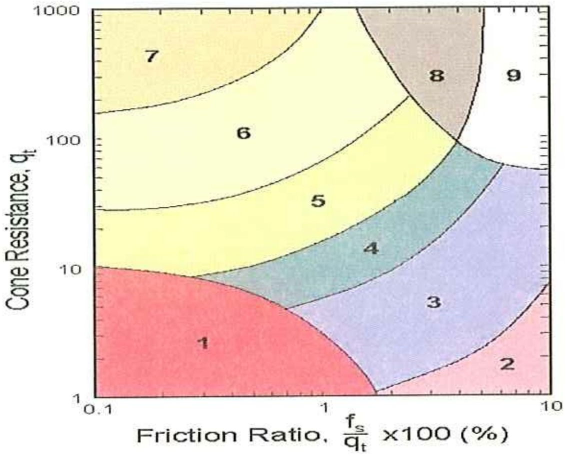
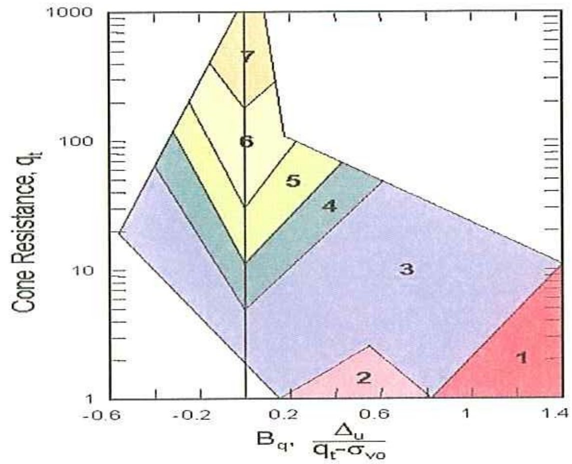
CPT Soil Behavior Type Legend
(Robertson et al. 1990)





Zone	Soil Behavior Type
1	Sensitive, Fine Grained
2	Organic Soils-Peats
3	Clays; Clay to Silty Clay
4	Silt Mixtures; Clayey Silt to Silty Clay
5	Sand Mixtures; Silty Sand to Sandy Silt
6	Sands; Clean Sands to Silty Sands
7	Gravelly Sand to Sand
8	Very Stiff Sand to Clayey Sand*
9	Very Stiff Fine Grained*

*Overconsolidated or Cemented

General Notes:

UNC – Uncorrected

COR – Corrected

Class. FR – Classification based on Friction Ratio, PK Robertson , 1990, see above graph, determines Soil Behavior Type (SBT)

N_{eq}, Blow Counts – after PK Robertson 1990, uses Tip Stress UNC, q_c; atmospheric pressure, p_a

ϕ', Friction Angle - Robertson & Campanella 1988,
uses Tip Stress UNC, q_c;
effective overburden stress, σ'_{vo};

$$\tan\phi' = \frac{1}{2.68} * \left[\log\left(\frac{q_c}{\sigma'_{vo}}\right) + 0.29\right]$$

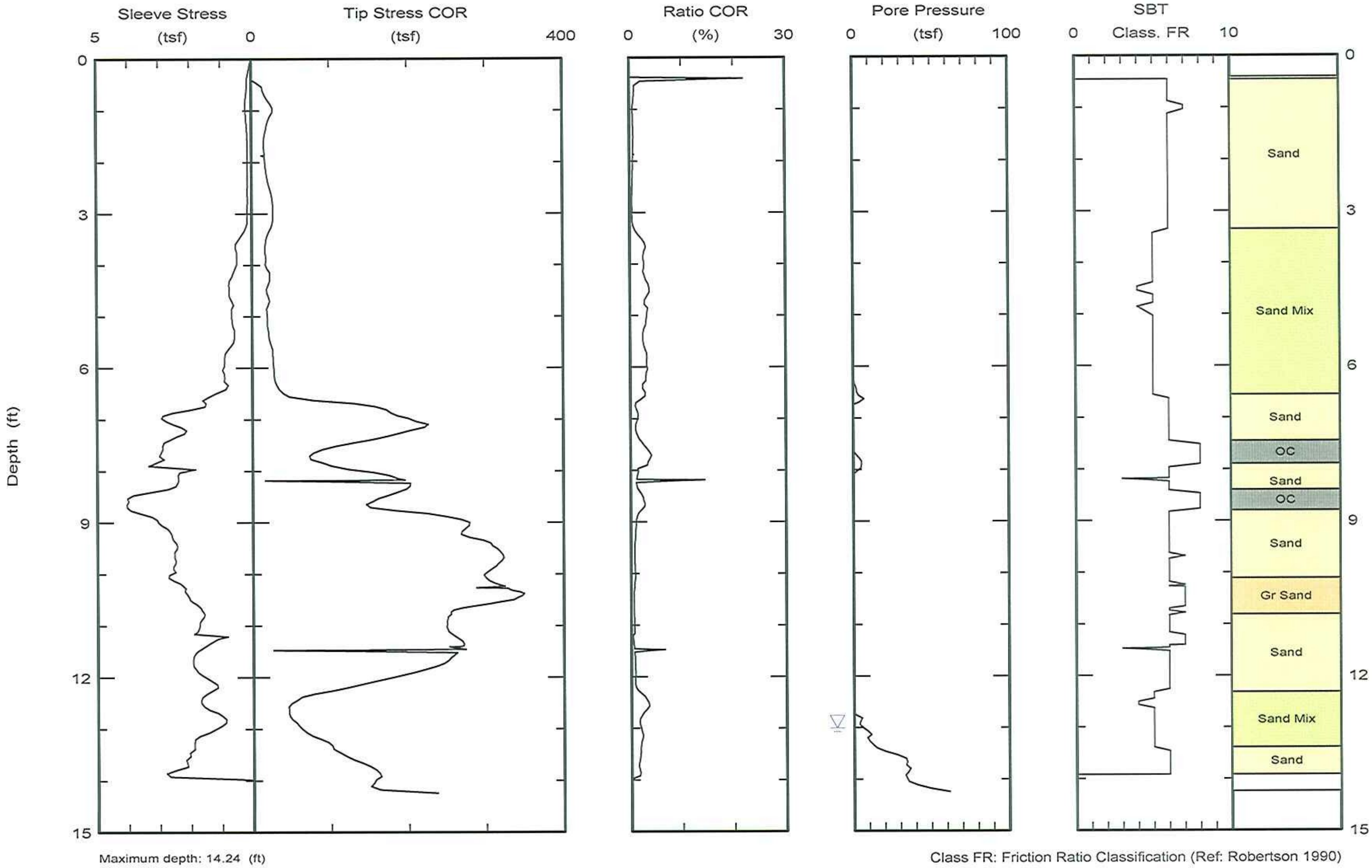
S_u, Undrained Shear Strength - Robertson & Campanella 1988;
uses Tip Stress COR, q_t;
overburden stress, σ_{vo};
$N_{kt} = 15$

$$S_u = \left(\frac{q_t - \sigma_{vo}}{N_{kt}}\right)$$

S&ME Inc. (843)884-0005
620 Wando Park Boulevard
Mt. Pleasant, SC 29464
TCleary@smeinc.com
www.smeinc.com

Northing:
Easting:
Elevation:
Customer:
Job Site: Project Spider

Date: 16/Jan/2001
Test ID: B-38
Project: 1611-00-025



Class FR: Friction Ratio Classification (Ref: Robertson 1990)

▽ Estimated Phreatic Surface

Test ID: B-38
File: A16J0102C.ECP

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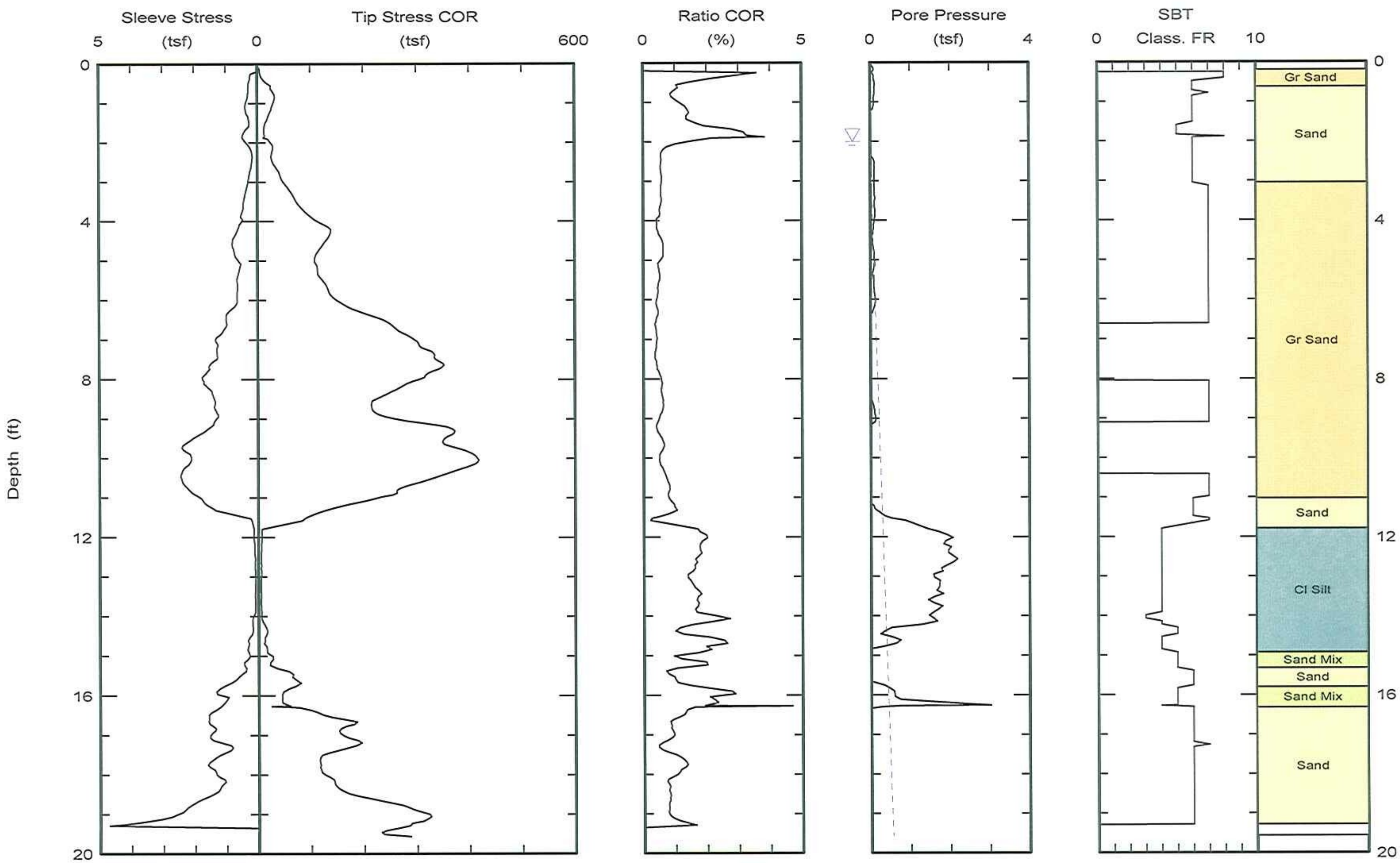
Easting:
Elevation:
Customer:
Job Site: Project Spider

Date: 16/Jan/2001
Test ID: B-40
Project: 1611-00-025



Maximum depth: 19.57 (ft)

Class FR: Friction Ratio Classification (Ref: Robertson 1990)

▽ Estimated Phreatic Surface

Test ID: B-40
File: A16J0103C.ECP

CPTU – PORE PRESSURE DISSIPATION TEST RESULTS

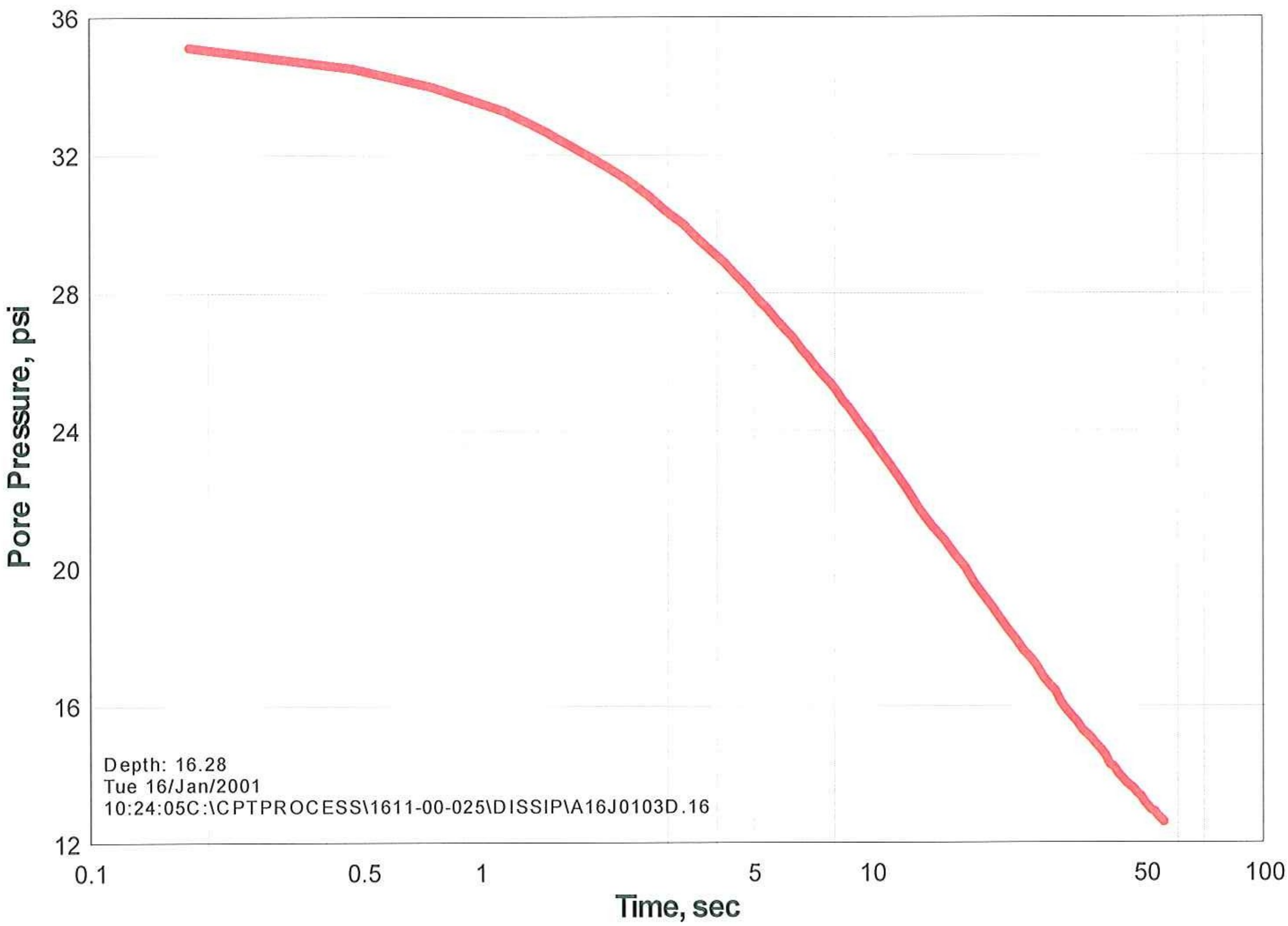
S&ME

Test ID: B-40, 16 ft
Site: Project Spider
Location: Columbia, SC
Project: 1611-00-025
Client:

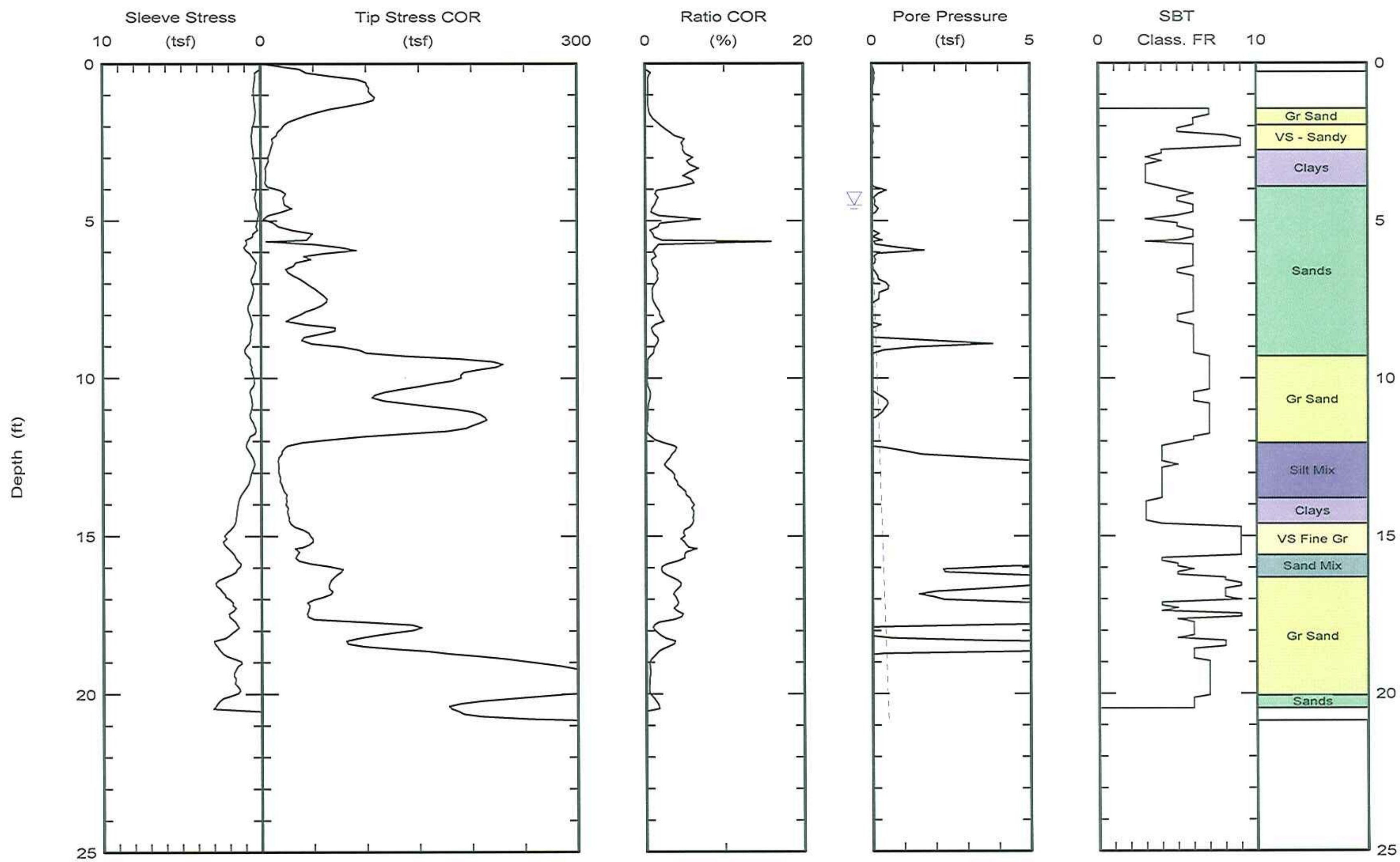
Date: January 16,2001
Cone Id: 128.034, 10cm^2

Interpretation Assumptions:

GWT (ft):	2
Depth (ft):	16



S&ME Inc. (843)884-0005 620 Wando Park Boulevard Mt. Pleasant, SC 29464 TCleary@smeinc.com www.smeinc.com	Northing: Easting: Elevation:	Date: 19/Jul/2006 Test ID: B-117 Project: 1611-06-293
	Client: N/A Job Site: FT Site (Project Y)	



Maximum depth: 20.87 (ft)

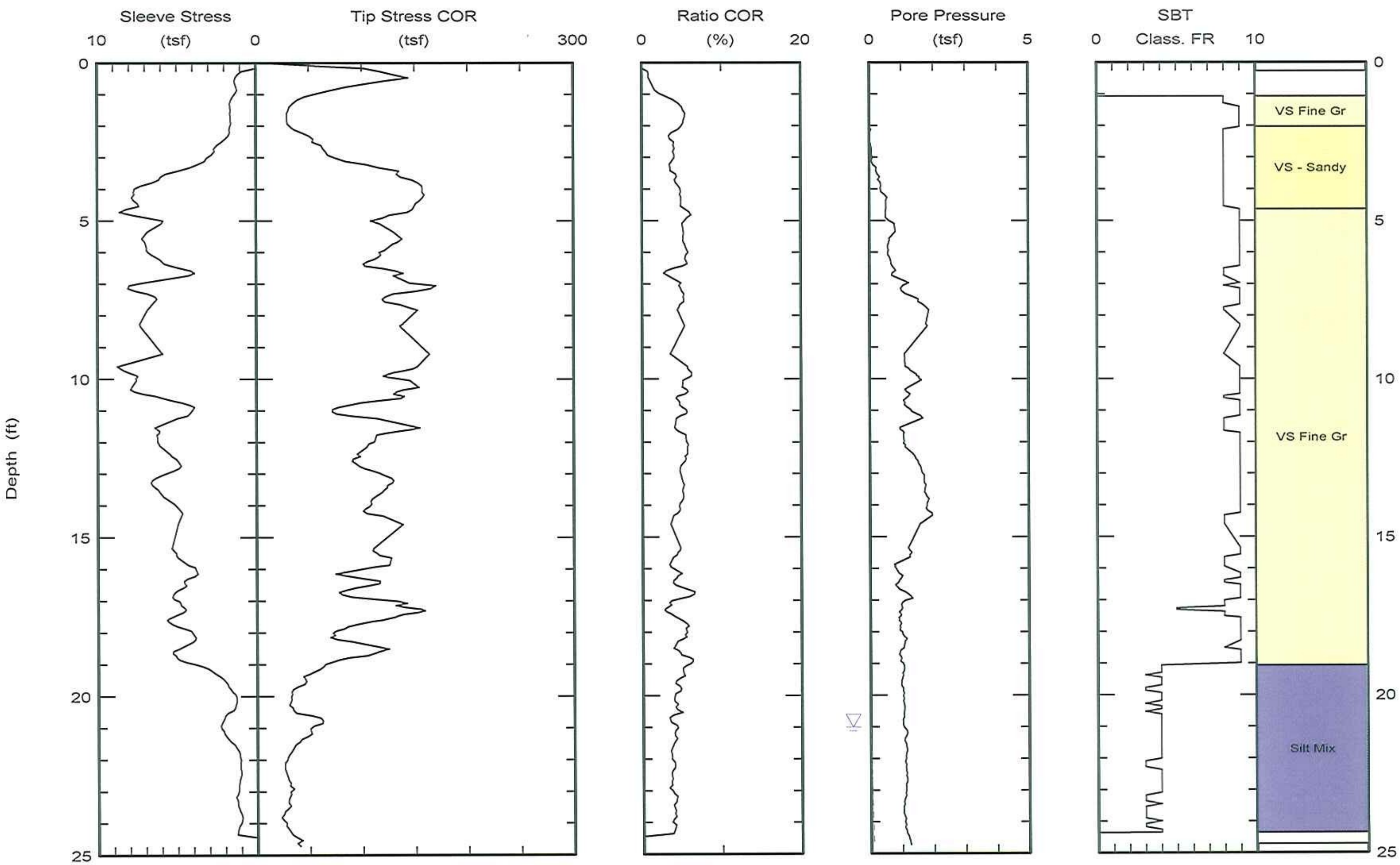
Class FR: Friction Ratio Classification (Ref: Robertson 1990)

▽ Estimated Phreatic Surface

Test ID: B-117

File: A19L0602C.ECP

S&ME Inc. (843)884-0005 620 Wando Park Boulevard Mt. Pleasant, SC 29464 TCleary@smeinc.com www.smeinc.com	Northing: Easting: Elevation:	Date: 19/Jul/2006 Test ID: B-145 Project: 1611-06-293
	Client: N/A Job Site: FT Site (Project Y)	



Maximum depth: 24.73 (ft)

Class FR: Friction Ratio Classification (Ref: Robertson 1990)

▽ Estimated Phreatic Surface

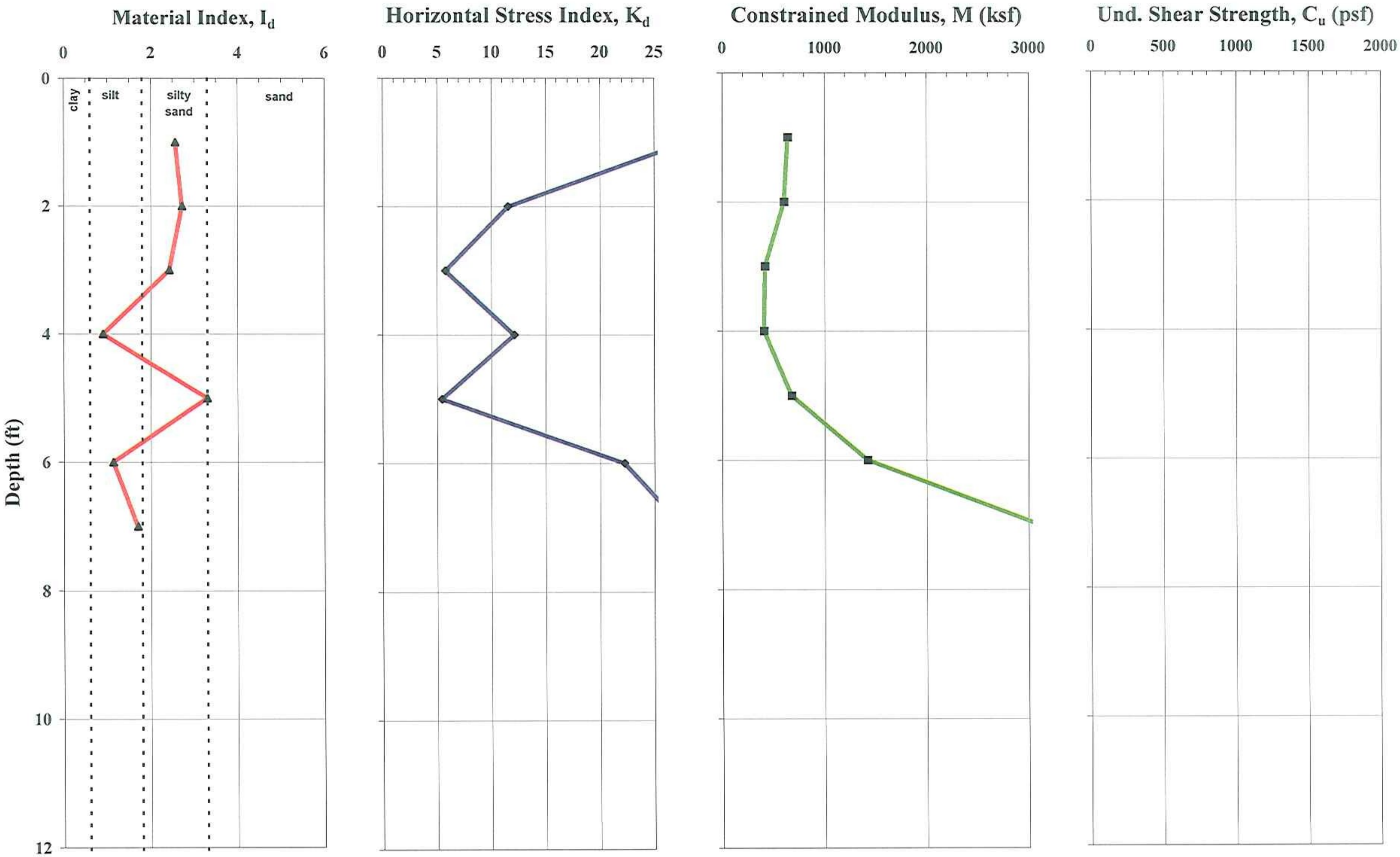
Test ID: B-145
File: A19L0609C.ECP

DILATOMETER TEST SOUNDING

S&ME

Test ID: B-39
Site: Project Spider
Location: Columbia, SC
Project No.: 1161-00-025
Client:

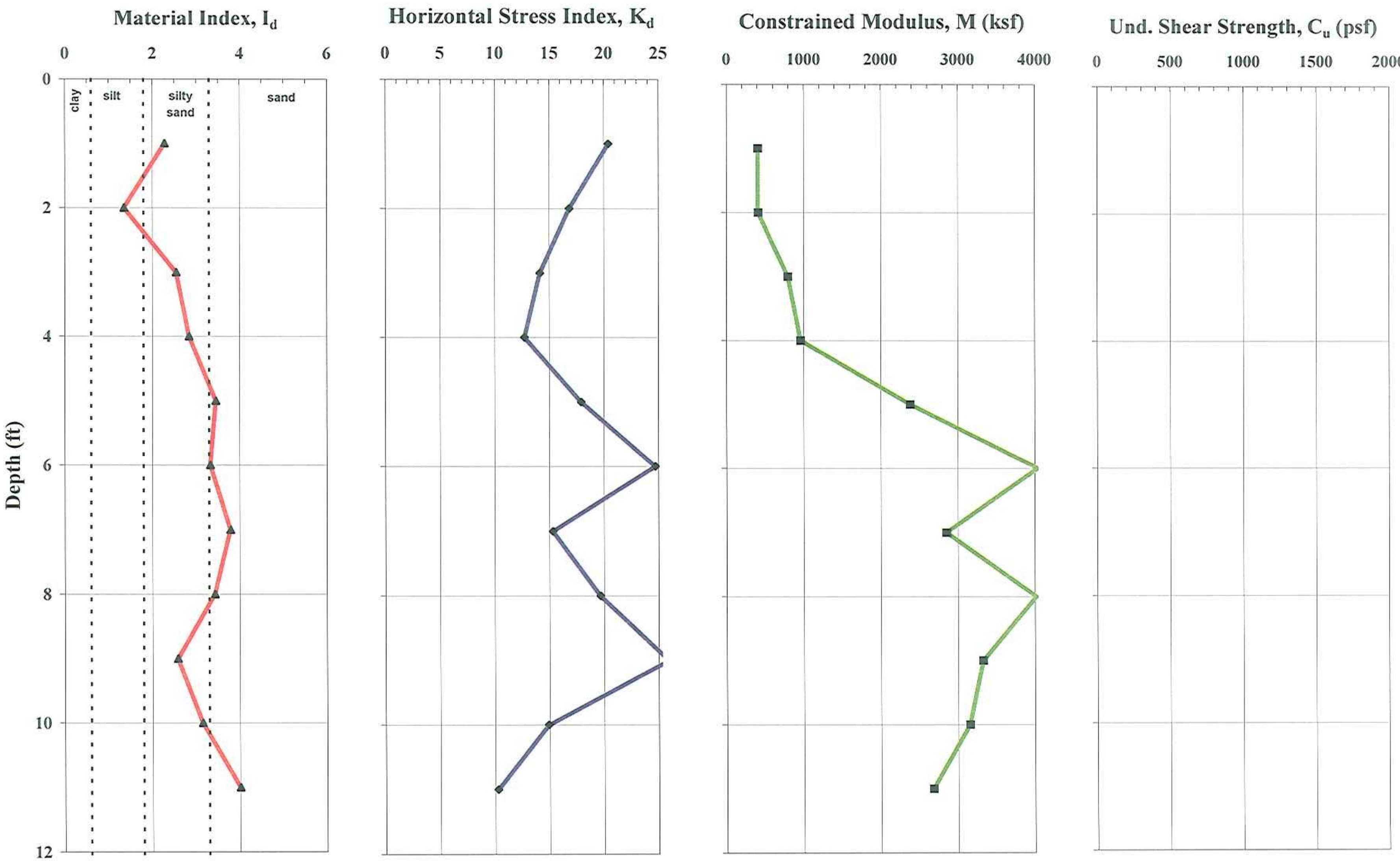
Date: 1/16/2000
GW Depth: 14 ft



DILATOMETER TEST SOUNDING

Test ID: B-40
Site: Project Spider
Location: Columbia, SC
Project No.: 1161-00-025
Client:

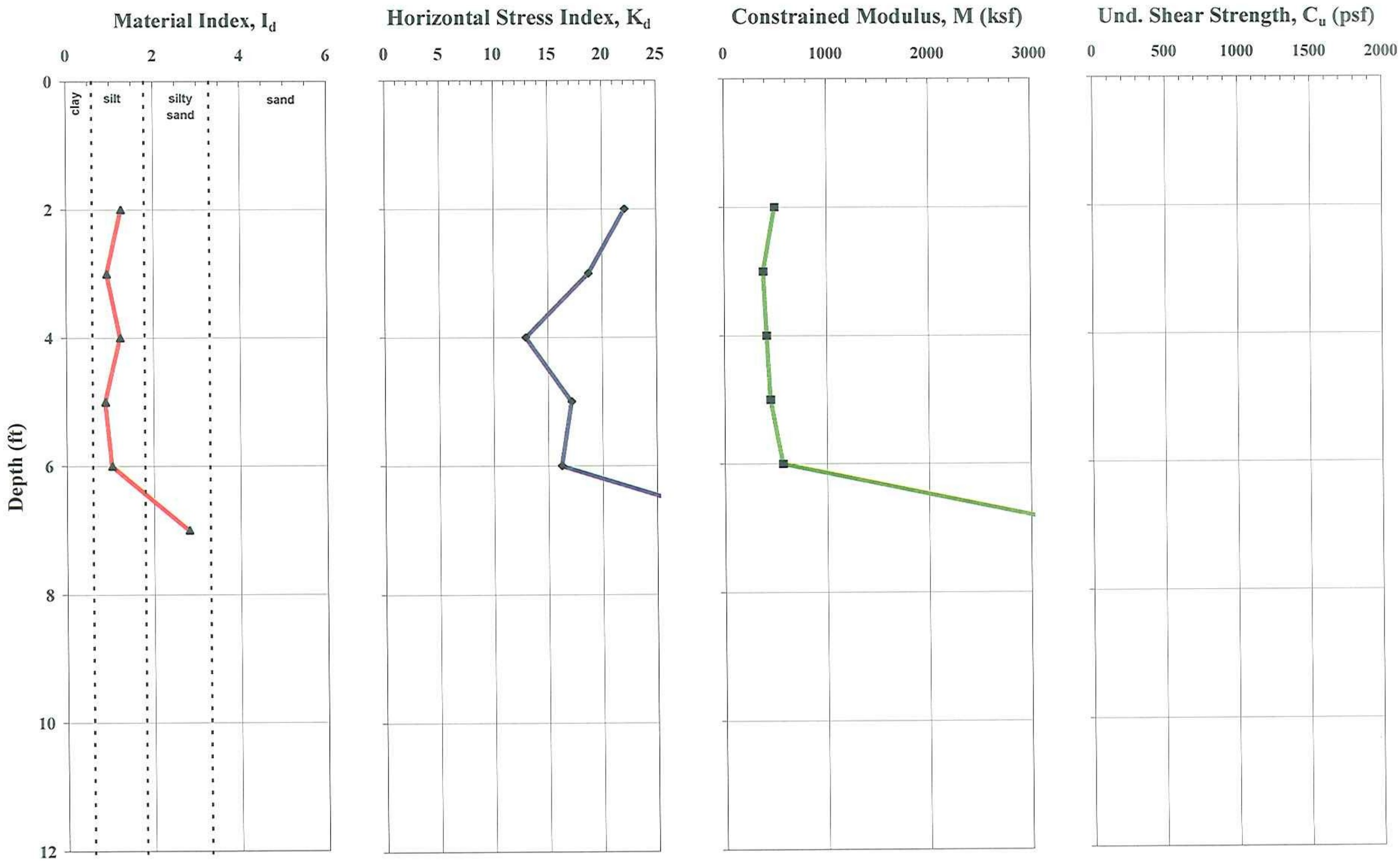
Date: 1/16/2000
GW Depth: 2 ft



DILATOMETER TEST SOUNDING

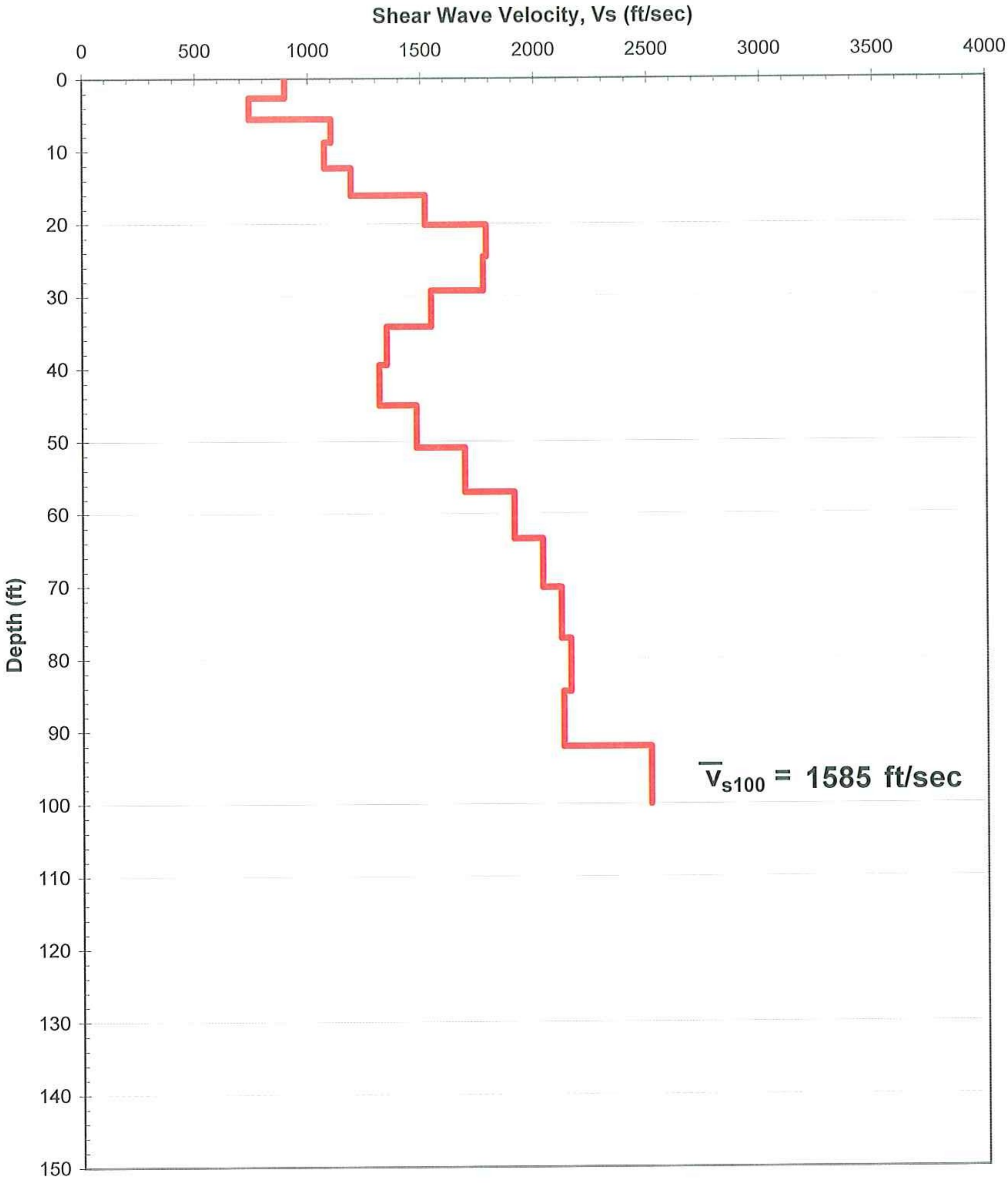
Test ID: B-41
Site: Project Spider
Location: Columbia, SC
Project No.: 1161-00-025
Client:

Date: 1/16/2000
GW Depth: 2 ft



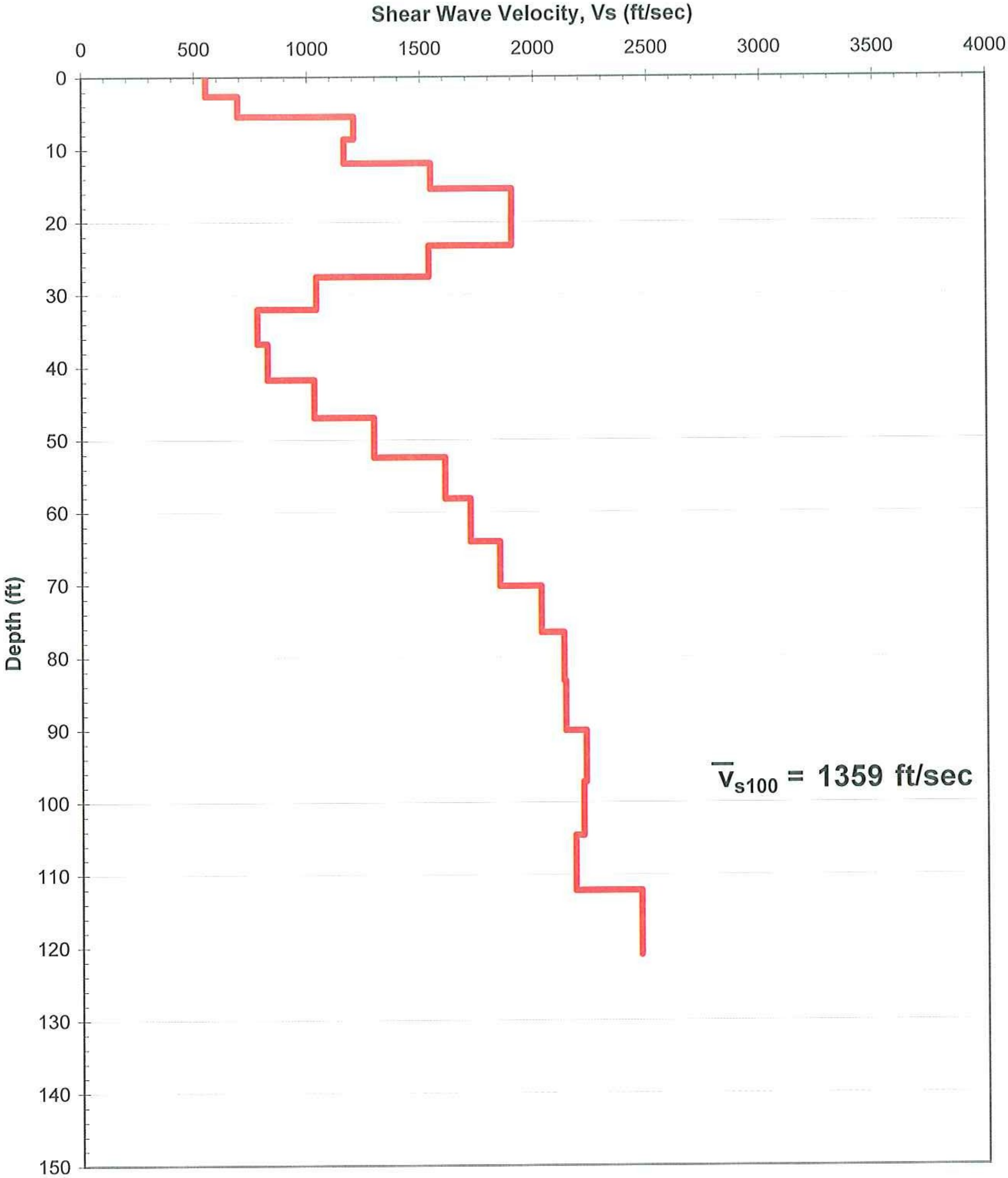
S&ME

Shear Wave Velocity Profile No. 1
Project Y
Columbia, South Carolina
1611-06-293



S&ME

Shear Wave Velocity Profile No. 2
Project Y
Columbia, South Carolina
1611-06-293



S&ME

Shear Wave Velocity Profile No. 3
Project Y
Columbia, South Carolina
1611-06-293