Report of Preliminary Geotechnical Exploration
Estate of Carroll Byers
Parcel ID 22 434012450230
Charlotte Drive, Alpharetta, Fulton County, Georgia
S&ME Project No. 21680007

PREPARED FOR:

JJ Smith, CPA
Executor for the Estate of Carroll Byers
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May 11, 2022

May 11, 2022

JJ Smith, CPA
Executor for the Estate of Carroll Byers
c/o Smith Accounting Services, LLC
247 Lake Forrest Lane, NE
Atlanta, Georgia 30342

Attention: Mr. J.J. Smith, CPA

Reference: **Report of Preliminary Geotechnical Exploration**
Estate of Carroll Byers
Parcel ID 22 434012450230
Charlotte Drive, Alpharetta, Fulton County, Georgia
S&ME Project No. 21680007

Dear Mr. Smith:

S&ME, Inc. (S&ME) has completed our preliminary geotechnical exploration for the project referenced above. Our services were performed in general accordance with our Proposal No. 21680007 dated December 6, 2021, as authorized under the Professional Services Agreement between S&ME, Inc. (S&ME) and the Estate of Carroll Byers dated December 10, 2021. This report describes our understanding of the project and the subsurface conditions encountered and presents our geotechnical recommendations for the planned construction.

S&ME has also prepared a Phase I Environmental Site Assessment and Limited Phase II Environmental Site Assessment. These are presented in standalone reports which have been submitted separately.

We appreciate the opportunity to be of service on this project. Please contact us with any questions concerning this report or any of our services.

Sincerely,

S&ME, Inc.

Joseph M Sura

Joseph M. Sura
Project Engineer/Manager

Timothy J. Mirocha, P.E.
Principal Engineer
GA Registration No. 21386

No. 21386

5-11-22

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Appendix

1.0 Introduction

The primary purpose of our work was to explore the subsurface conditions at the site, evaluate those conditions, and provide preliminary recommendations for site preparation, foundation, and pavement support. No site plan, grading plan or structural details were available at the time of this report. Therefore, our recommendations are preliminary in nature. This report describes our understanding of the project, presents the results of the field exploration, and discusses our conclusions and preliminary recommendations relative to the above considerations. This report provides the following:

- A summary of the project and provided information;
- A summary of current site conditions, topography, and area geology;
- A summary of the field exploration methods;
- Conclusions;
- Preliminary recommendations for site preparation, structural fill placement, undercutting (if needed) and groundwater control (if needed);
- Preliminary recommendations for foundation design and construction;
- Earth pressure recommendations for conventional concrete retaining walls;
- Slab and pavement subgrade preparation recommendations; and
- An Appendix with Site Location Plan, Boring Location Plan, and individual boring logs for each soil test boring.

2.0 Project Information

Our understanding of the project is based on a December 2, 2021 e-mail between Mr. Ed Terry and Ms. Mary Stacy, PG of S&ME. Appended to the email was a scanned map from the Fulton County Assessor's Office.

The site is made up of a single tax parcel encompassing approximately 35 acres, located on the east side of Charlotte Drive just north of Rucker Road in Alpharetta, Georgia, as shown on the Site Vicinity Map included as Figure 1 in the Appendix. The majority of the site is grassed, with wooded areas located near the northwest, north central, and northeastern portions of the property. A total of four structures were present on the northwest portion of the property, including a residence, a storage building, a barn, and a collapsed building. A small pond is present in the south-central part of the site. A Google Earth aerial photograph of the site location and existing structures is included as Figure 2 in the Appendix.

No existing topographic survey, proposed site plan or proposed grading were available at the time of preparation of this report. Based on further emails, we understand that the forecasted potential future use for the site will likely be to develop it as single-family townhomes, with a maximum density of approximately 10 townhomes per acre. Information regarding the structural types and loading conditions was not provided. For the purposes of this report, we have assumed that the structures will likely be wood framed, three (or less) stories tall, and have the floor slabs on-grade. Structural loads have been assumed to be 50 kips or less for any columns, 3 kips per foot or less for walls, and 150 psf for floor slab loads. We have assumed that the site will be graded to reduce cuts and fills as much as practical and maximum cuts and fills for mass grading will be less than 10 feet each.

The project information and assumptions detailed above should be reviewed and confirmed by the appropriate team members. If structural loads are expected to be heavier, or grading is more significant than we assumed, additional testing and analysis may be warranted. Modifications to our conclusions and preliminary recommendations may be required if the actual conditions vary from the project information and assumptions described herein.

3.0 Exploratory and Testing Procedures

3.1 Soil Test Borings

Members of S&ME's professional staff made a site reconnaissance to observe pertinent site features and to mark the test boring locations. The locations of the 18 planned soil test borings were established by overlaying project plans into Google Earth ™ and transferring the data into a hand-held GPS unit which was used in the field. The borings are identified as B-1 through B-18. Ground surface elevations at the boring locations were estimated to the nearest foot using the hand-held GPS unit and should be considered very approximate. No surveying was included in S&ME's scope or performed as part of this project. The approximate boring locations are shown on the Boring Location Map (Figure No. 3) in the Appendix. If more accurate borehole location or elevation data is desired, we recommend a registered land surveyor be retained to survey the borings.

The soil test borings for this exploration were made by mechanically twisting hollow stem augers into the soil in general accordance with ASTM D6151, *Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling*. Soil samples were obtained at approximately 2 ½-foot intervals in the upper 10 feet and at 5-foot intervals thereafter in general accordance with ASTM D1586, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils* until the planned termination depth was reached for each boring. During standard penetration testing, the sampler was first seated 6 inches and then driven an additional foot with blows of 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot was recorded and is designated the "standard penetration resistance" (SPT) or "N-value" with units of blows per foot (bpf).

An automatic hammer was used during the standard penetration testing. Automatic hammers are typically more efficient than manual hammers and can thus yield lower standard penetration resistances than would be recorded using a traditional manual hammer. We have accounted for this improved efficiency in our analysis, but the consistency descriptions shown on the boring logs are based on traditional relationships between soil consistency and standard penetration resistance values.

3.2 Laboratory Testing

The samples obtained during the field exploration were transported to our laboratory and visually classified by members of our professional staff in general accordance with ASTM D2488 *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. The purposes of this review were to check the field descriptions, visually estimate the relative percentages of the soils' constituents (sand, clay, etc.), determine soil origin, and identify pertinent structural features such as foliation planes and slickensides. The stratification lines shown on the appended Boring Logs represent the approximate boundaries between soil types, but the transitions may be more gradual than shown. No other laboratory tests were included in our scope or performed as part of this project.

4.0 Site, Geologic, and Subsurface Conditions

4.1 Site Conditions

The site is made up of a single tax parcel encompassing approximately 35 acres, located on the east side of Charlotte Drive just north of Rucker Road in Alpharetta, Georgia. The majority of the site is grassed, with wooded areas located near the northwest, north-central, and northeastern portions of the property. A total of four structures were present on the northwest portion of the property, including a residence, a storage building, a barn, and a collapsed building. A "draw" or drainage feature drains southward across the middle of the site. A small pond has been impounded across the draw in the south-central part of the site.

4.2 Geologic Conditions

The project site is in Georgia's Piedmont physiographic province. The soil overburden of this area was formed by in-place weathering of the parent metamorphic and igneous rocks. Published geologic mapping indicates that the site is underlain by parent rocks consisting of biotitic gneiss, mica schist, amphibolite, and quartzite. A typical Piedmont residual soil profile consists of a thin layer of topsoil underlain by a silty or clayey soil stratum that transitions with increasing depth into coarser grained soils with varying mica content. Separating the completely weathered soil overburden from the unaltered parent rock is a transition zone of very high consistency materials locally referred to as *partially weathered rock*. Partially weathered rock retains much of the appearance and fabric of the parent rock formation and may consist of alternating layers of high consistency soil and rock. Partially weathered rock exhibits standard penetration resistances of 100 blows per foot (bpf) or more (ie. 50/6").

The weathering processes that formed the overburden soils and partially weathered rock were extremely variable, depending on such factors as rock mineralogy, past groundwater conditions, and the tectonic history (joints, faults, igneous intrusions, etc.) of the specific area. Differential weathering of the rock mass has resulted in erratically varying subsurface conditions, evidenced by abrupt changes in soil type and consistency in relatively short horizontal and vertical distances. Furthermore, depths to rock can be irregular and isolated boulders, discontinuous rock layers, or rock pinnacles can be present within the overburden and transition zones.

Activities of man, such as excavation and fill placement, can also alter the typical Piedmont geologic profile. Fill materials can be comprised of different soil types from various sources and can also contain debris, organics, topsoil, and/or deleterious materials. The engineering properties of fill depend primarily on its composition, density, and moisture content. Fill soils should be expected in the pond embankment and other isolated areas at the site.

Soils which have been eroded, transported, and deposited in and adjacent to water courses (such as the small streams on site) are termed "alluvium". Alluvial soils differ significantly from the residual soil source and vary from clays to gravels depending on the depositional environment. Alluvial soils frequently are soft or loose, and differing soil types and consistencies/relative densities can occur in relatively short horizontal and vertical distances. Alluvium should be expected to be present in the draw and pond bottom.

4.3 Subsurface Conditions

The borings logs included in the Appendix should be reviewed for specific information at the individual boring locations. The depths and thicknesses of the subsurface strata indicated on the boring logs are generalized and the transition between materials may be more gradual than indicated. Information on actual subsurface conditions exists only at the specific boring locations and is relevant to the time the exploration was performed. Variations may occur and should be expected between and away from the boring locations. 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.

4.3.1 Surface Cover

The topsoil, as indicated by obvious organic staining, was encountered in the borings and ranged from 1 to 4 inches thick at the boring locations. Topsoil thickness should be expected to vary across the site and may be considerably deeper in some areas than indicated by the borings.

4.3.2 Fill Soils

No soils that appeared to be previously placed fill were identified in the borings. Historical aerial images and topographic maps indicate that the area has been farmland dating back several decades. However, while no fill material was encountered in the borings, it is possible that isolated portions of the site may have been previously graded for farming access purposes, building pad leveling, pond embankment construction, and fill soils may be encountered away from our boring locations.

4.3.3 Alluvial Soils

No alluvial soils were encountered in the borings performed for this project, but should be expected in the pond area and potentially along the base of the draw.

4.3.4 Residual Soils

Residual soils were encountered in each of the borings directly below the topsoil veneer. Within the depths drilled, the residual soils consisted of sandy lean clays, silts with sand, sandy silts, and silty sands, with varying mica content. The residuum was multi-colored but was primarily brown, red/brown, gray, or white. N-values in the residual soils ranged from 3 to 40 bpf but were typically between 8 and 15 bpf indicating a medium stiff or better soil consistency. During our review of the samples the residual soils generally appeared to be moist to wet.

4.3.5 Partially Weathered Rock

Partially weathered rock was not encountered within the depths of the borings performed for this project.

4.3.6 *Auger Refusal Materials*

Auger refusal materials were not encountered within the depths of the borings performed for this project.

4.3.7 *Boring Termination*

The borings reached their planned termination depths of 20 feet without encountering auger refusal materials. After checks for the presence of groundwater, the boreholes were backfilled with soil cuttings and a near surface borehole closure device.

4.3.8 *Groundwater*

Groundwater was encountered after drilling in 11 of the 18 borings at depths ranging from 7 to 18 feet below the existing ground surface. Delayed groundwater levels were recorded approximately two weeks after the completion of the borings. Groundwater was encountered in 12 of the 18 borings at depths ranging from 3.1 to 15.5 feet below the existing ground surface. The following table details the depths at which groundwater was encountered in our borings at the time of boring and the delayed groundwater levels recorded approximately two weeks after the completion of the borings.

Boring Location	Depth to Groundwater (feet)	
	Time of Drilling	Stabilized Groundwater
B-1	Caved at 14	Not Encountered
B-2	Caved at 15	Not Encountered
B-3	Caved at 15.5	Not Encountered
B-4	15	13.0
B-5	15	8.3
B-6	Caved at 13	Not Encountered
B-7	7	5.2
B-8	13	14.0
B-9	18	7.1
B-10	14	6.0
B-11	Not Encountered	Not Encountered
B-12	18	15.5
B-13	16	5.4
B-14	14	5.3
B-15	Not Encountered	14.4
B-16	17	3.1
B-17	15	11.3
B-18	Not Encountered	Not Encountered

We note that groundwater levels will fluctuate with seasonal and yearly rainfall and temperature variations as well as changes in the drainage characteristics of the site area. Therefore, future groundwater levels may be higher or lower than those measured during this exploration. Further, groundwater can exist in a perched condition above partially weathered rock, dense or clayey soil layers, and/or bedrock.

5.0 Conclusions and Recommendations

5.1 Site Assessment

Based on the subsurface conditions encountered during this geotechnical exploration and our experience with similar projects, it is our professional opinion that this site is adaptable for the proposed construction provided the recommendations presented in this report are followed. We note the following items that may impact construction schedules and budgets:

- While partially weathered rock and intact rock were not encountered during our exploration, rock elevations can change considerably over short horizontal distances in the Piedmont geology and may be encountered at higher elevations between our boring locations.

- Groundwater was encountered within 10 feet of the existing ground surface at seven boring locations. Depending on the proposed grades within these areas, groundwater control options may be required. Once site grades are developed, we should be provided the site grading plan and allowed to review the groundwater data and offer additional recommendations if needed. If groundwater is encountered in utility excavations during construction, it can usually be addressed with local pumps in temporary sumps and use of pipe bedding stone.
- Alluvial soils were not encountered in our borings but may be present immediately adjacent to the existing pond. If encountered, very soft to soft alluvial soils should be undercut from beneath the building areas and to at least 10 feet beyond the building footprints in each direction prior to fill placement. If these soft materials are present in other areas they will also need to be undercut from structural areas and parking and drive areas with less than 8 feet of fill.
- Fill soils were not encountered in the borings; however, it is possible that fill soils may exist in unexplored areas or between the borings. If fill soils are encountered, they should be undercut from beneath all structural areas. The strength of such soils in non-structural areas should be thoroughly evaluated at the time of construction by proofrolling and test pits to determine whether remedial actions such as undercutting and replacement are necessary.
- The exploration findings indicate that the buildings can be supported by conventional spread and wall footings bearing on residual soil or new compacted structural fill after site preparation as recommended. We recommend use of a maximum allowable net soil bearing pressure of 2,000 psf to size column and strip footings supported by these materials.
- The floor slabs can be supported by the undisturbed residual soils or new structural fill after implementation of the recommended site preparation and fill placement measures. We recommend that a subgrade modulus, Ks, of up to 125 pci be used in floor slab design for short term loadings over small areas.
- We recommend that a Seismic Site Class of "D" be used for design of the buildings.
- Structural fill should be placed in relatively thin layers and compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D698). Because pavement support characteristics of Piedmont soils typically improve with greater density, we recommend increased compaction of 98 percent in the upper 12 inches of the pavement subgrades.
- The overburden soils are expected to be satisfactory for use as structural fill. Some moisture content adjustment should be expected.

The preceding has been an overview of the key geotechnical issues we expect may affect the proposed development of the site based on the current development plans discussed in this report. Our recommendations regarding these issues as well as other geotechnical aspects of the planned site construction are discussed in the subsequent report sections. Our conclusions and recommendations will need to be reviewed once project plans are more fully developed.

5.2 Preliminary Earthwork Recommendations

5.2.1 Stripping and Initial Subgrade Preparation

To prepare the site for construction, existing structures, foundations, organics, debris, stumps, topsoil, and large root systems should be stripped from the planned building areas, retaining wall areas and from pavement areas that will be filled 8 feet or less. Only a relatively thin layer of topsoil was identified during our exploration, but it is common in wooded areas to have to strip below the topsoil layer to remove concentrations of tree and brush roots. In non-structural areas and in pavement areas that will receive more than 8 feet of fill, only major organics need to be removed prior to fill placement.

After the site has been stripped, at-grade areas and those that are to receive fill should be evaluated by a member of our staff. This should include observing proofrolling of the subgrade with a loaded tandem-axle dump truck, off-road dump truck or earth-moving scraper. Proofrolling consists of applying repeated passes to the subgrade with this equipment. Materials judged to deflect excessively under the wheel loads and which cannot be densified by continued rolling should be undercut to stable soils before placing fill.

While no very soft to soft alluvial soils were encountered in the borings of this exploration, it is possible that such soils may exist in the bottom of the draw and the existing pond. If very soft to soft alluvial soils are encountered, they should be undercut from beneath the building areas and to at least 10 feet beyond the buildings in each direction. Some undercutting of old fills or soft alluvium soils may also be needed if present below retaining walls, or paved areas. If such soft soils are encountered, they should be evaluated by our firm and undercut and replaced with structural fill as recommended to provide adequate support for the construction.

Outside of the building areas, in non-structural areas and parking and drive areas with more than 8 feet of fill, topsoil or soft soils can usually be stabilized with an initial bridging lift of soils (or blasted rock). This stabilization layer should be about 2 to 3 feet thick and should be pushed out over the unstable area and "tracked in" until a stable mass is created. Once the area is stabilized, placement and compaction of fill materials by traditional methods can proceed.

5.2.2 Excavation Conditions

Residual soils with standard penetration resistance values up to about 30 bpf can generally be excavated using conventional earthmoving equipment such as tracked excavators and pusher-assisted scrapers. Higher consistency residual soils (greater than about 30 bpf) may require pre-loosening with a tracked excavator or with a single-tooth hydraulic ripping hook attached to a large bulldozer such as a Caterpillar D8K prior to being productively loaded by scrapers. Such higher consistency soils were present, but not common in the borings, but could be present in other areas.

Neither partially weathered rock nor intact bedrock were encountered in encountered in any of the 18 borings. However, in this geologic region, the depth to partially weathered rock and rock can be highly variable, and it is possible that partially weathered rock or rock could be encountered at additional locations or higher elevations between or away from the widely spaced borings. Thus, we offer the following recommendations for your consideration.

Excavating partially weathered rock from mass areas will require concentrated effort with large, tracked excavators or ripping with a large bulldozer as discussed for the high consistency residual soils. Excavating these materials in confined areas (such as utility trenches) generally requires large, tracked excavators such as a Caterpillar 320 trackhoe and may require rock excavation methods in some cases.

Excavation of intact rock would require the use of explosives or pneumatic tools, depending on the necessary depth and area of rock removal. It is also possible that removal of some partially weathered rock layers may require blasting or use of pneumatic tools.

We recommend that the project specifications include a performance type definition of rock to help limit disputes regarding material classifications. A sample rock definition is included in the Appendix. We recommend classifying excavated materials as either rock or soil. "Rip-rock" is difficult to quantify and to define in the field, which often results in disputes.

5.2.3 Groundwater Control

Groundwater was encountered at depths ranging from approximately 3 to 18 feet below the existing ground surface at the borings performed for this project. At seven of the 18 borings performed for this project, groundwater was located within 10 feet of the existing ground surface. Depending on the proposed grades within these areas, groundwater control options may be required. Once the site grading plan is developed, it should be provided to us for review. Additional groundwater control recommendations can be provided after that review if needed. If groundwater is encountered during utility excavations, it can usually be addressed with local pumps in temporary sumps and use of pipe bedding stone. The contract documents should require the contractor to be ultimately responsible for the effectiveness of the dewatering systems.

5.2.4 Earth Material Utilization and Fill Placement

After subgrade evaluation/preparation, areas to receive fill may be brought to design subgrade levels with structural fill. Structural fill is defined as inorganic natural soil with maximum particle sizes of about 6 inches and Plasticity Indexes of about 30 or less. Structural fill should be placed in relatively thin (4- to 8-inch) layers and compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D698). Because pavement support characteristics of Piedmont soils typically improve with greater density, we recommend increased compaction of 98 percent in the upper 12 inches of the pavement areas. The silty nature of many of the onsite soils may cause marginal stability even at the recommended compaction.

The overburden soils (at proper moisture contents), including ripped partially weathered rock (if encountered), are expected to be satisfactory for use as structural fill. This assumes that the partially weathered rock can be broken down into acceptable particle sizes. At times, moisture conditioning of excavated soil and partially weathered rock may be needed to achieve moisture contents compatible with achieving a high degree of compaction. Depending on the depths of excavations and the time of year grading takes place, drying of soils may be required prior to compaction as structural fill. The amount of drying (or wetting) required will likely depend on the time of year grading is being performed.

Maximum particle sizes for structural fill placed as backfill around utilities should be limited to about 3 inches to reduce the chance of damaging the conduits and to help facilitate adequate compaction using the smaller equipment usually necessary when backfilling utility trenches. If utilities are installed through zones of partially weathered rock or rock, the excavated materials will likely be too coarse for re-use as backfill around the utilities. Thus, they will need to be hauled to pavement area fills and soil fill hauled to backfill the utility trenches.

Stripped topsoil with low organic content or organic topsoil blended with "clean" soil can be placed as fill in the lower elevations (5+ feet below finished subgrade) of pavement areas, pond areas or in slopes provided it is kept at least 15 feet outside of the building lines. If placed as fill, the topsoil or topsoil blend should be compacted to the same degree as structural fill. This may require wetting or drying of the material, depending upon seasonal conditions. Use of topsoil in slopes may decrease the stability of a 2H:1V inclined slope compared to a similar slope constructed of structural fill. Also, using topsoil in pavement areas may result in some differential settlement over time.

5.2.5 *Fill Density Testing*

In-place density testing must be performed as a check that the previously recommended compaction criteria have been achieved. We recommend that these tests be performed on an essentially full-time basis during grading in the building areas. Part-time testing should suffice for utility trench backfills and pavement area fills. A suggested part-time testing frequency is one test for every 7,500 to 10,000 square feet of pavement area fill and every 100 to 150 linear feet of utility trench backfilled. Tests should be performed at vertical intervals of 2 feet or less as the fill is being placed. We recommend density testing by a technician working under the direction of our project engineer.

5.3 Earth Slopes

While the grading plan was not available at the time of preparation of this report, it is expected that varying height earth slopes may need to be constructed for the project. We recommend that any permanent slopes be inclined no steeper than 2H:1V. Temporary slopes should be no steeper than $1^1/_2$H:1V and should conform to OSHA guidelines. Buildings should be set back at least 10 feet from any slope crest of up to 25 feet in height and pavement areas should be set back at least 3 feet from any slope crest. If topsoil is to be used in the slopes, flattening the slope inclination to 2½H:1V should be considered.

Drop inlets or storm sewers should not be installed at the crests of slopes because leakage can result in maintenance problems or possible slope failure. The crests should be sloped to prevent surface runoff from flowing over the slope face.

It is difficult to construct fill slopes without leaving a loose, poorly compacted zone on the slope face. For this reason, we recommend that fill slopes be slightly over-built, then cut back to firm, well compacted soils prior to applying a vegetative cover. If the slopes cannot be slightly over-built and cut back, we recommend that finished soil slopes be compacted to reduce, as much as practical, the thickness of this soft surficial veneer. The compaction may be done by making several coverages from top to bottom of the slopes using a moderate-sized bulldozer.

5.4 Preliminary Foundation Recommendations

The exploration findings indicate that the residential buildings can be supported by conventional spread and wall footings bearing on residual soil or new compacted structural fill after site preparation as previously recommended. We recommend use of a maximum allowable net soil bearing pressure of 2,000 psf to size column and strip footings supported by these materials.

Even though computed footing dimensions may be less, column footings should be at least 24 inches wide and strip footings should be at least 18 inches wide. These dimensions facilitate reinforcing steel placement and hand cleaning of footing subgrades disturbed by the excavation process. They also reduce the potential for localized punching shear failure. All exterior footing bottoms should be at least 12 inches below the lowest adjacent exterior grade for protection against frost penetration.

Footing excavations must be evaluated by a representative of a geotechnical firm to observe field conditions in light of our design recommendations. We can provide geotechnical guidance to the owner’s design team if unforeseen soil conditions are encountered during construction.

Footing excavation often produces a thin veneer of disturbed soil at the footing subgrade. We recommend that this disturbed soil be hand cleaned prior to placing reinforcing steel. Furthermore, the footing excavation bottom should be free of all fall-in soil prior to placing concrete.

The strength properties of soil exposed at the footing subgrade will change if exposed to wetting, drying, or freezing. Whenever possible, concrete should be placed during the day the excavation is completed. If subgrades will be left open for more than one day, they should be covered with polyethylene sheeting. Excavation of disturbed soil may be required if protective measures are not implemented.

5.5 Preliminary Floor Slab Recommendations

5.5.1 Slab Underdrain Recommendations

If there are buildings where the floor slab will be located within 5 feet of the groundwater levels encountered in our borings, a permanent drainage system will likely be needed. The drainage system should be planned to consist of at least 8 inches of No. 57 stone over a nonwoven geotextile filter fabric with collector drains of perforated 6-inch diameter PVC pipe installed in thickened sections on about 30-foot centers across the area needing drainage. The collector drains should gravity drain away from the structure.

5.5.2 General Floor Slab Recommendations

The floor slabs can be supported by the undisturbed residual soils (over the drainage layer) or new structural fill after implementation of the previously recommended site preparation and fill placement measures. We recommend that a subgrade modulus, K_s, of up to 125 pci be used in floor slab design for short term loadings over small areas.

To reduce the possibility of slab cracking due to minor differential settlement, the floor slabs should be structurally separate from the foundations. The floor slabs should be underlain by an effective and durable vapor retarder to reduce the possibility of slab dampness due to upward migration of soil moisture. If a specialized floor covering (such as an epoxy coating, etc) will be placed in residential areas, "waterproofing" materials may need to be installed beneath affected portions of the slab in lieu of a "vapor retarder."

While not structurally necessary, protecting the slab subgrade with a layer of crushed stone or by cement stabilization is becoming more common to reduce downtime and damage from rain events after the slab subgrade has been prepared. If stone is used, we suggest 6 inches of Graded Aggregate Base (GAB) compacted to at least 100 percent of its standard Proctor maximum dry density (ASTM D698).

5.6 Seismic Site Classification

Based on the borings of this exploration, assuming minimal cuts/fills of 10 feet or less, we recommend the code allowed Seismic Site Class of "D" be used for design of the buildings. We have calculated the following seismic coefficients.

Site Class	Ss	S1	PGA	Fa	Fv	SMS	SM1	SDS	SD1
D	0.216	0.09	0.113	1.6	2.4	0.346	0.217	0.231	0.144

5.7 Mechanically Stabilized Earth Site Retaining Walls

We are not aware if mechanically stabilized earth (MSE) walls or reinforced soil slopes (RSS) are currently proposed for the site. Such walls are proprietary designs and usually require field and laboratory soil testing specific to the requirements or assumptions by the particular designer. If MSE walls or RSS are required, we would be pleased to perform laboratory testing and drilling needed by the wall designer to allow them to confirm that the on-site soils meet the intent of their design or to adjust their design to accommodate the on-site soils and other conditions. While this can be done on behalf of the Estate of Carroll Byers, we feel that such services should be part of the wall contractor's design/build package. We note that the wall design must take into account special conditions such as: foundation soil conditions, any planned sloping backfill; sloping ground surface beyond the toe of the wall area; groundwater in the foundation zone, nearby utility lines; and any adjacent features.

5.8 Final Subgrade Preparation

Floor slab and pavement area subgrades often are disturbed between completion of site grading and floor slab or pavement construction due to weather, footing or utility installation, and other construction activities. For this reason, it is important that the subgrades be evaluated just before slab or pavement construction. At that time, as much of the subgrade as practical should be proofrolled with a loaded dump truck in the presence of our representative. The silty nature of much of the on-site soils leads us to expect that the stability of the finished subgrades could be marginal in some areas. Areas that deflect significantly under the proofrolling load, or which are otherwise assessed to be soft or unstable, should be undercut to firm materials. The undercut areas should be backfilled with compacted soil or crushed stone. Our representative can provide recommendations for repairing unstable areas that are observed.

6.0 Limitations

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and preliminary 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 is expressed or implied.

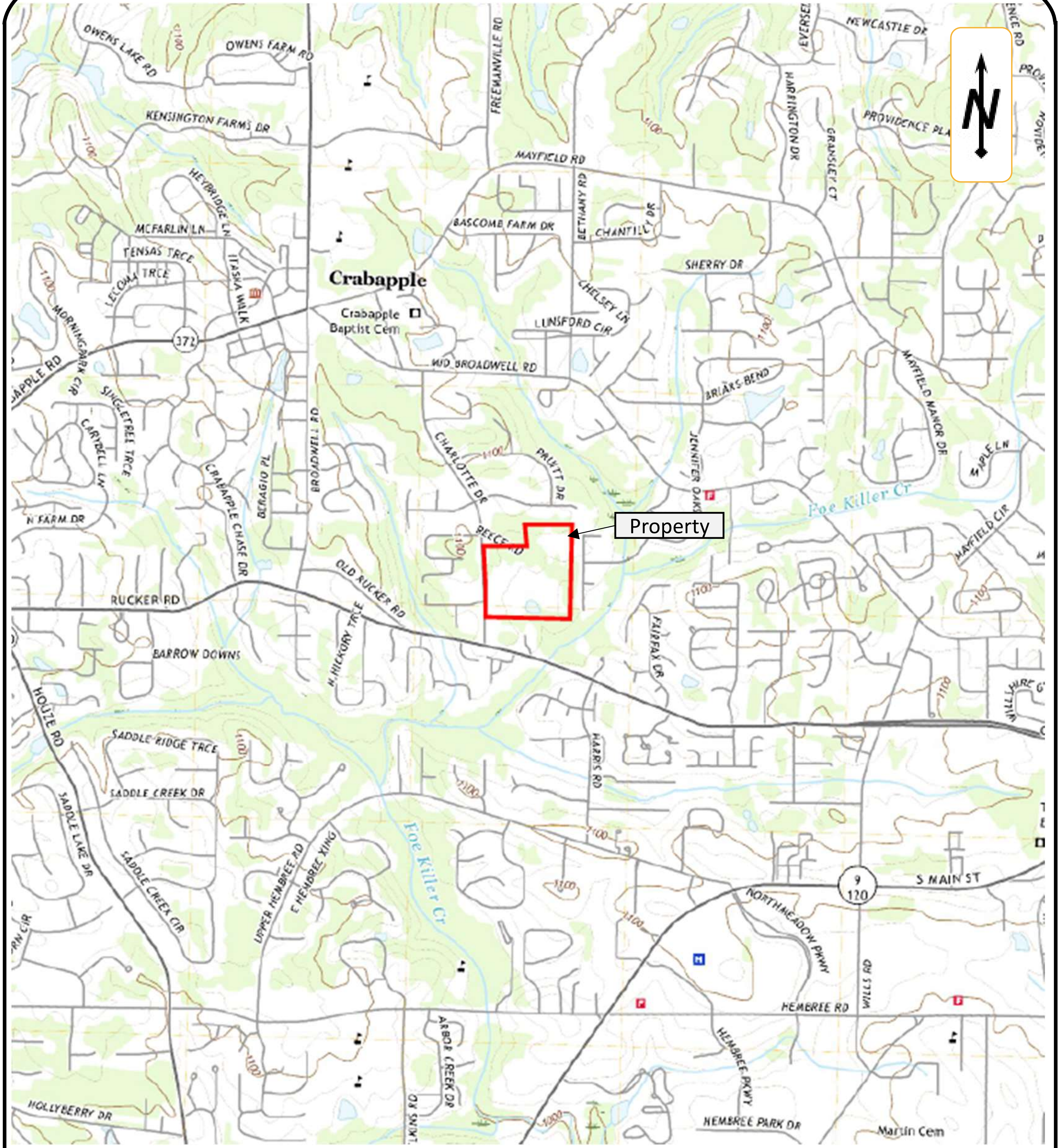
We relied on project information given to us or assumed by us based on similar recent Atlanta area townhome construction to develop our conclusions and preliminary recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our preliminary recommendations based on this additional information, if appropriate.

Our conclusions and preliminary 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 geotechnical 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.

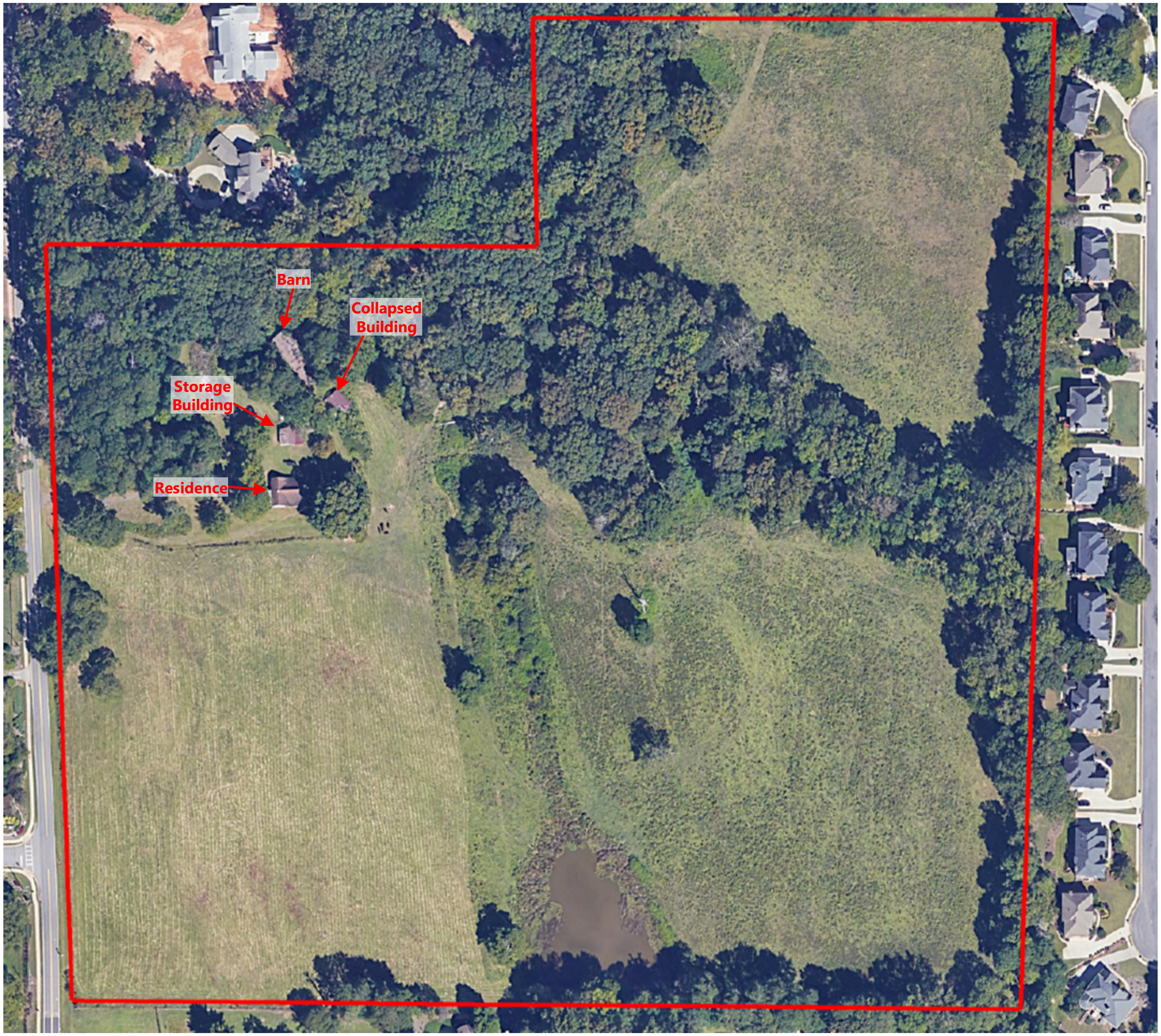
S&ME should be retained to review the final plans and specifications to check that earthwork, foundation, and other preliminary recommendations are properly interpreted and implemented. For additional information regarding the use and limitations of this report, please read the *Important Information about your Geotechnical Engineering Report* document included in the Appendix.

Appendix



REFERENCE:
TP, Roswell, 2020, 7.5-minute Quadrangle

	SITE VICINITY MAP	SCALE: 1 = 24,000	FIGURE NO.
		DATE: 2-11-2022	**1**
	CHARLOTTE DRIVE ALPHARETTA, FULTON COUNTY, GEORGIA	PROJECT NUMBER 21680007	



NOTE: This drawing was prepared for the purpose of visually representing information collected by S&ME, Inc. for this project. No other use for this drawing is expressed or implied. All drawing features, locations, and dimensions are approximate.

REFERENCE: Google Earth 2020

SITE LOCATION MAP

CHARLOTTE DRIVE
ALPHARETTA, FULTON COUNTY, GEORGIA

SCALE: NOT TO SCALE

DATE: 2-11-2022

PROJECT NUMBER 21680007

FIGURE NO. 2

🟥 Approximate Site Boundary
● Boring Location

NOTE: This drawing was prepared for the purpose of visually representing information collected by S&ME, Inc. for this project. No other use for this drawing is expressed or implied. All drawing features, locations, and dimensions are approximate.

REFERENCE:
Google Earth
2020

BORING LOCATION MAP

CHARLOTTE DRIVE
ALPHARETTA, FULTON COUNTY, GEORGIA

SCALE:
NOT TO SCALE

DATE:
5-6-2022

PROJECT NUMBER
21680007

FIGURE NO.
3

TEST BORING LOG LEGEND

FINE AND COARSE GRAINED SOIL INFORMATION

COARSE GRAINED SOILS (SANDS & GRAVELS)

N	Relative Density
0-4	Very Loose
5-10	Loose
11-30	Medium Dense
31-50	Dense
Over 50	Very Dense

FINE GRAINED SOILS (CLAYS & SILTS)

N	Consistency
0-2	Very Soft
3-4	Soft
5-8	Firm
9-15	Stiff
16-30	Very Stiff
31-50	Hard
Over 50	Very Hard

PARTICLE SIZE

Boulders	Greater than 300 mm (12 in)
Cobbles	75 mm to 300 mm (3 to 12 in)
Gravel	4.75 mm to 75 mm ($\frac{3}{16}$ to 3 in)
Coarse Sand	2 mm to 4.74 mm
Medium Sand	.425 mm to 2 mm
Fine Sand	0.075 mm to 0.425 mm
Silts and Clays	Less than 0.075 mm

The **STANDARD PENETRATION TEST as defined by ASTM D 1586 is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./20inch O.D. split barrel sampler is driven three 6-inch increments with a 140 lb. hammer falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The blow counts required to drive the sampler the final two 6-inch increments are added together and designated the N-value defined in the above tables.**

ROCK PROPERTIES

ROCK QUALITY DESIGNATION (RQD)

Percent RQD	Quality
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

ROCK HARDNESS

Very Hard	Rock can be broken by heavy hammer blows
Hard	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows
Moderately Hard	Small pieces can be broken off along sharp edges by considerable thumb pressure; can be broken with light hammer blows.
Soft	Rock is coherent but breaks very easily with thumb pressure at sharp edges and crumbles with firm hand pressure.
Very Soft	Rock disintegrates or easily compresses when touched; can be hard to very hard soil

$$\text{RQD} = \frac{\text{Sum of 4 in. and longer Rock Pieces Recovered}}{\text{Length of Core Run}} \text{ X } 100$$

$$\text{RQD} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \text{ X } 100$$

43 RQD
NQ
63 REC

Core Diameter	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

SYMBOLS

KEY TO MATERIAL TYPES

- ▨ Conglomerate
- ▨ Sandstone
- ▨ Calcareous Sandstone
- ▨ Dolomitic Sandstone
- ▨ Siltstone
- ▨ Cherty Shale
- ▨ Marl
- ▨ Shale
- ▨ Limestone
- ▨ Dolomite
- ▨ Bedded Chert
- ▨ USCS CH
- ▨ USCS CL-ML
- ▨ USCS CL
- ▨ USCS GC-GM
- ▨ USCS GC
- ▨ USCS GM
- ▨ USCS GP-GC
- ▨ USCS GP-GM
- ▨ USCS GP
- ▨ USCS GW-GC
- ▨ USCS GW-GM
- ▨ USCS GW
- ▨ USCS MH
- ▨ USCS ML
- ▨ USCS OH
- ▨ USCS OL-OH
- ▨ USCS OL
- ▨ USCS PT
- ▨ USCS SC-SM
- ▨ USCS SC
- ▨ USCS SM
- ▨ USCS SP-SC
- ▨ USCS SP-SM
- ▨ USCS SP
- ▨ USCS SW-SM
- ▨ USCS SW

SOIL PROPERTY SYMBOLS

N:	Standard Penetration, BPF
M:	Moisture Content, %
LL:	Liquid Limit, %
PL:	Plastic Limit, %
PI:	Plasticity Index, %
Qp:	Pocket Penetrometer Value, TSF
Qu:	Unconfined Compressive Strength, TSF
γ_d:	Dry Unit Weight, PCF
F:	Fines Content

LOG SYMBOLS

- ■ Undisturbed Sample
- ☒ Standard Penetration Test Sample
- ▯ Rock Core Sample
- ◀ - Proposed Grade Marker
- HC - Borehole Cave Depth
- ▽ - Water Level at Time of Drilling
- ▼ ▽ ▽ ▽ ▼ - Delayed Water Level Markers

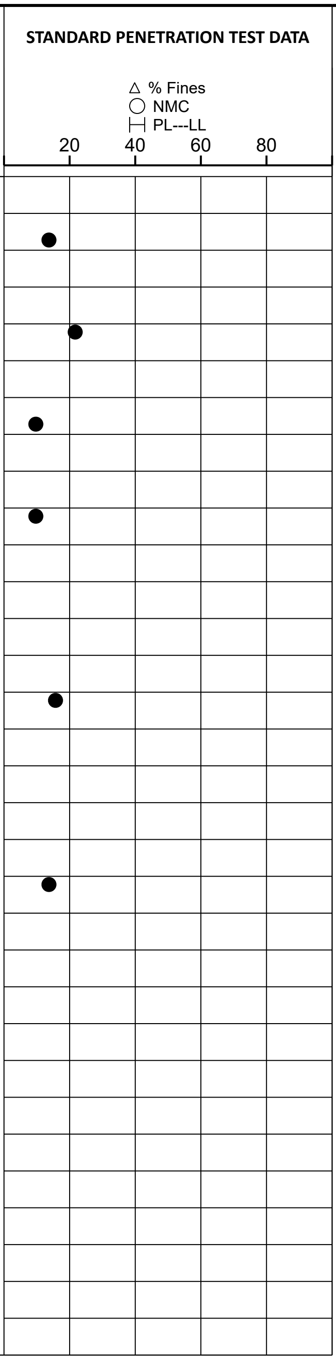
PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-01

Sheet 1 of 1

DATE DRILLED: 04/25/2022
ELEVATION: 1077 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0						1077
	0.3			TOPSOIL		
		Residuum	SS-1	SANDY SILT (ML), stiff to very stiff, light red and gray, fine grained	3-4-10 N = 14	
			SS-2		10-10-12 N = 22	
5	5.0			SILTY SAND (SM), with rock fragments, loose to medium dense, light gray, fine grained		1072
			SS-3		3-4-6 N = 10	
			SS-4		3-4-6 N = 10	
10						1067
			SS-5		7-9-7 N = 16	
15	Hole Cave at 14.0 feet					1062
			SS-6		6-7-7 N = 14	
20	20.0			Borehole terminated at 20.0 feet		1057
25						1052
30						1047



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/25/2022		Caved at 14 ft
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022		Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

PROJECT:

Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-02

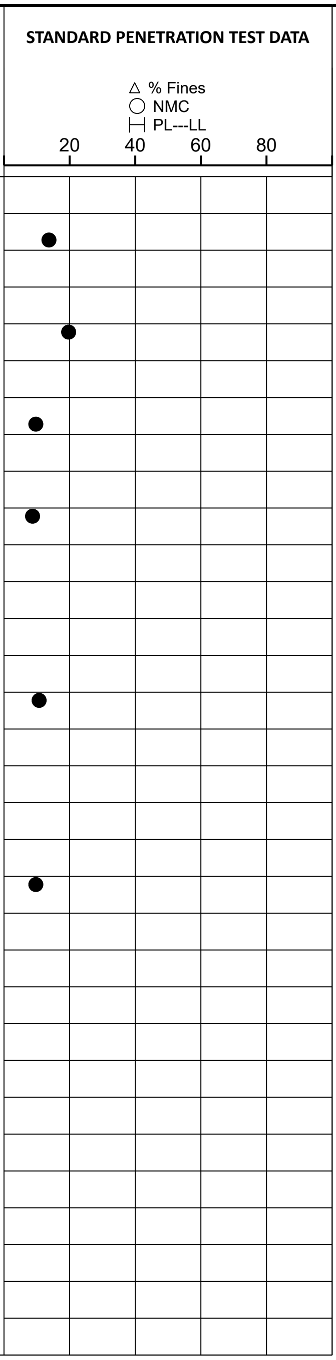
Sheet 1 of 1

DATE DRILLED: 04/25/2022	**ELEVATION:** 1074 ft	**NOTES:**
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88	
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:** **LONGITUDE:**

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0	0.2				TOPSOIL		1074
		Residuum		SS-1	SANDY LEAN CLAY (CL), stiff to very stiff, light red	3-6-8 N = 14	
				SS-2		3-8-12 N = 20	
5							1069
	6.0			SS-3	SANDY SILT (ML), stiff, light red and brown, fine grained	4-4-6 N = 10	
				SS-4		3-4-5 N = 9	
10							1064
	13.0			SS-5	SILTY SAND (SM), loose to medium dense, gray and brown, fine grained	4-4-7 N = 11	
15	Hole Cave at 15.0 feet						1059
				SS-6		3-4-6 N = 10	
20	20.0				Borehole terminated at 20.0 feet		1054
25							1049
30							1044



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/25/2022		Caved at 15 ft
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022		Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

PROJECT:

Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-03

Sheet 1 of 1

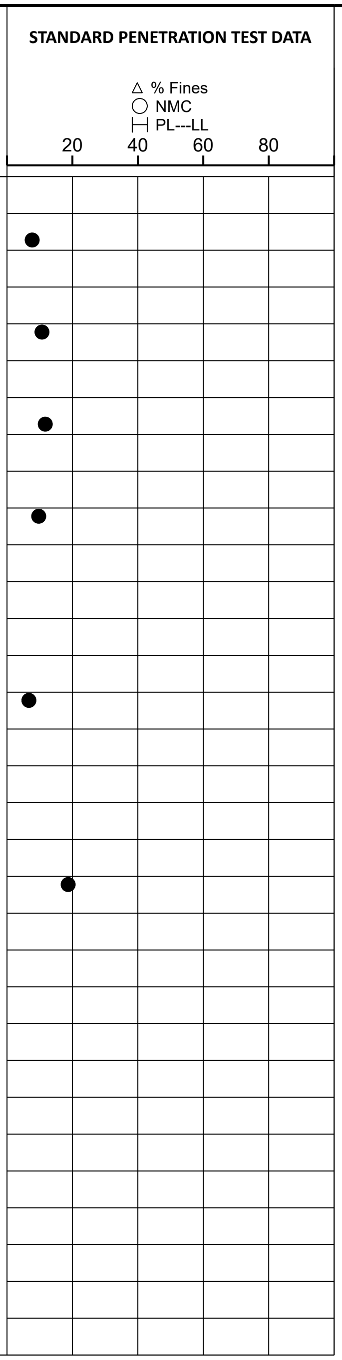
DATE DRILLED: 04/27/2022	**ELEVATION:** 1084 ft
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)

NOTES:

LATITUDE:

LONGITUDE:

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0							1084
	0.3				TOPSOIL		
		Residuum		SS-1	SANDY LEAN CLAY (CL), trace organics, firm to stiff, red	2-4-4 N = 8	
				SS-2		2-4-7 N = 11	
5							1079
	6.0			SS-3	SANDY SILT (ML), stiff, red brown and tan	4-5-7 N = 12	
				SS-4		3-4-6 N = 10	
10							1074
	12.0			SS-5	SILTY SAND (SM), with mica, loose to medium dense, brown pink and gray, fine grained	2-3-4 N = 7	
15							1069
	Hole Cave at 15.5 feet						
				SS-6		4-9-10 N = 19	
20							1064
	20.0				Borehole terminated at 20.0 feet		
25							1059
30							1054



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/27/2022		Caved at 15.5 ft
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022		Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-04

Sheet 1 of 1

DATE DRILLED: 04/25/2022
ELEVATION: 1069 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0				TOPSOIL		1069
	0.3	Residuum	SS-1	SANDY SILT (ML), stiff, light brown and red, fine grained	6-6-8 N = 14	
			SS-2		4-5-8 N = 13	
5	5.0		SS-3	SANDY SILT (ML), with mica, firm to stiff, light gray black and red, fine grained, dry to moist	5-5-9 N = 14	1064
			SS-4		3-3-5 N = 8	
10						1059
	▼					
15	▽		SS-5		4-4-5 N = 9	1054
			SS-6		3-4-6 N = 10	
20	20.0			Borehole terminated at 20.0 feet		1049
25						1044
30						1039

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢⊣ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/25/2022	15.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	13.0	
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

PROJECT:	**Estate of Carroll Byers** **Alpharetta, Georgia** **S&ME Project No. 21680007**

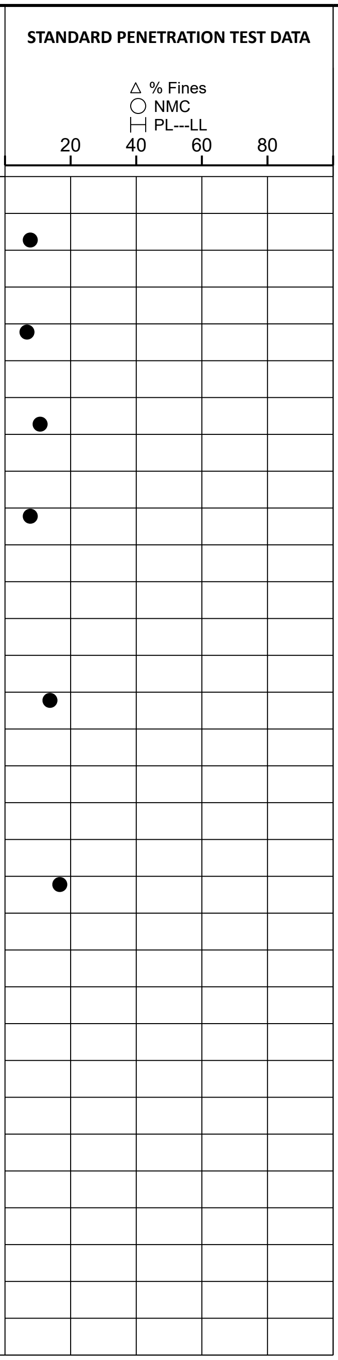
BORING LOG: B-05

Sheet 1 of 1

DATE DRILLED: 04/25/2022	**ELEVATION:** 1061 ft	**NOTES:**
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88	
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0	0.1			TOPSOIL		1061
		Residuum	SS-1	SANDY SILT (ML), firm, light brown and red, fine grained	2-3-5 N = 8	
			SS-2		3-3-4 N = 7	
5	5.0			SILTY SAND (SM), with mica, loose to medium dense, light gray, fine grained		1056
			SS-3		5-5-6 N = 11	
	▼					
			SS-4		3-3-5 N = 8	
10						1051
			SS-5		4-5-9 N = 14	
15	▽					1046
			SS-6		4-5-12 N = 17	
20	20.0			Borehole terminated at 20.0 feet		1041
25						1036
30						1031

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/25/2022	15.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	8.3	
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

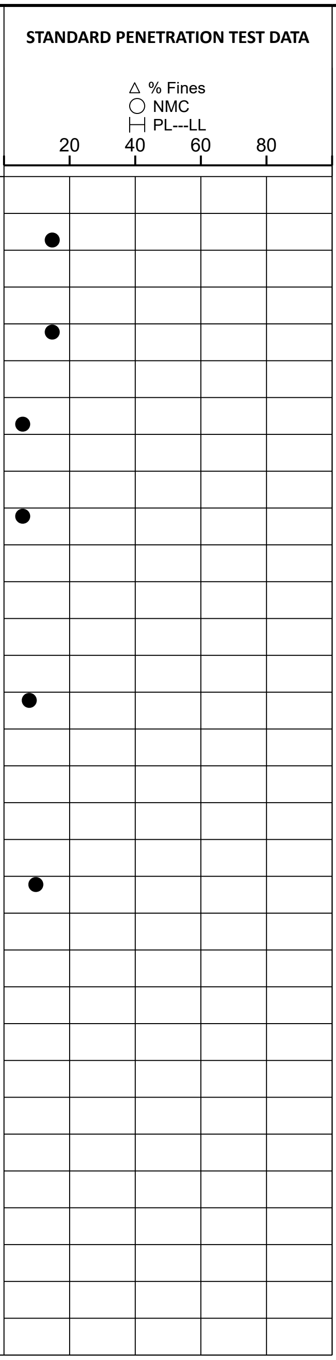
PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-06

Sheet 1 of 1

DATE DRILLED: 04/25/2022
ELEVATION: 1074 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)

DEPTH (feet)	NOTES		Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		0.1				TOPSOIL		1074
			Residuum		SS-1	SANDY SILT (ML), stiff, red and brown	6-6-9 N = 15	
					SS-2		6-6-9 N = 15	
5								1069
		6.0			SS-3	SILTY SAND (SM), loose, light brown and black, fine grained	3-3-3 N = 6	
					SS-4		2-3-3 N = 6	
10								1064
	Hole Cave at 13.0 feet				SS-5		1-2-6 N = 8	
15								1059
					SS-6		2-4-6 N = 10	
20		20.0				Borehole terminated at 20.0 feet		1054
25								1049
30								1044



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/25/2022		Caved at 13 ft
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022		Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

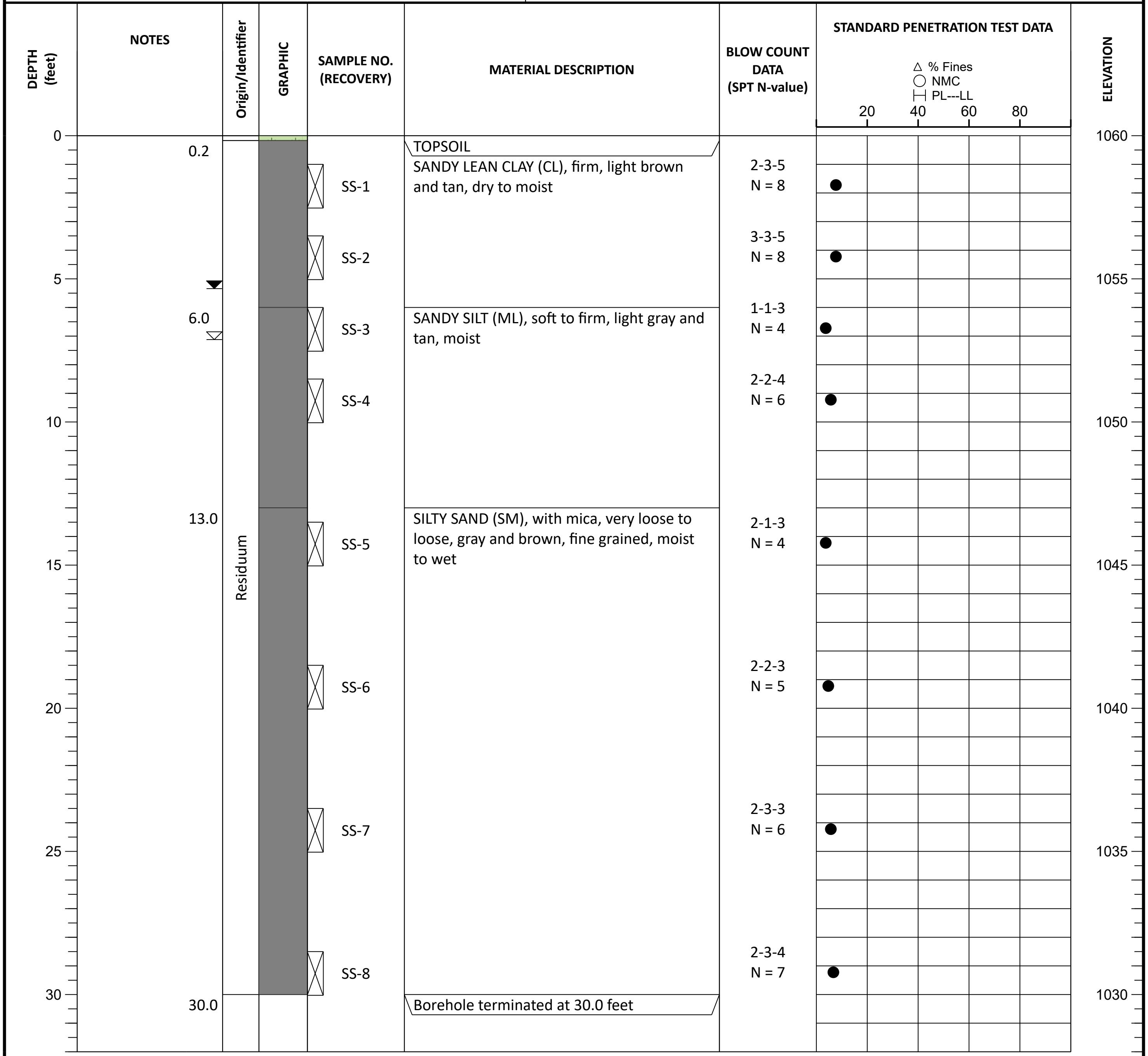
BORING LOG: B-07

Sheet 1 of 1

DATE DRILLED: 04/25/2022	**ELEVATION:** 1060 ft	**NOTES:**	
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88		
DRILLER: Piedmont	**BORING DEPTH:** 30.0 ft		
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level		
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:**	**LONGITUDE:**

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)



DEPTH (feet)	NOTES	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.2			TOPSOIL	
		SS-1	SANDY LEAN CLAY (CL), firm, light brown and tan, dry to moist	2-3-5 N = 8
		SS-2		3-3-5 N = 8
6.0		SS-3	SANDY SILT (ML), soft to firm, light gray and tan, moist	1-1-3 N = 4
		SS-4		2-2-4 N = 6
13.0		SS-5	SILTY SAND (SM), with mica, very loose to loose, gray and brown, fine grained, moist to wet	2-1-3 N = 4
		SS-6		2-2-3 N = 5
		SS-7		2-3-3 N = 6
		SS-8		2-3-4 N = 7
30.0			Borehole terminated at 30.0 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/25/2022	7.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	5.2	
AFTER DRILLING	▼			

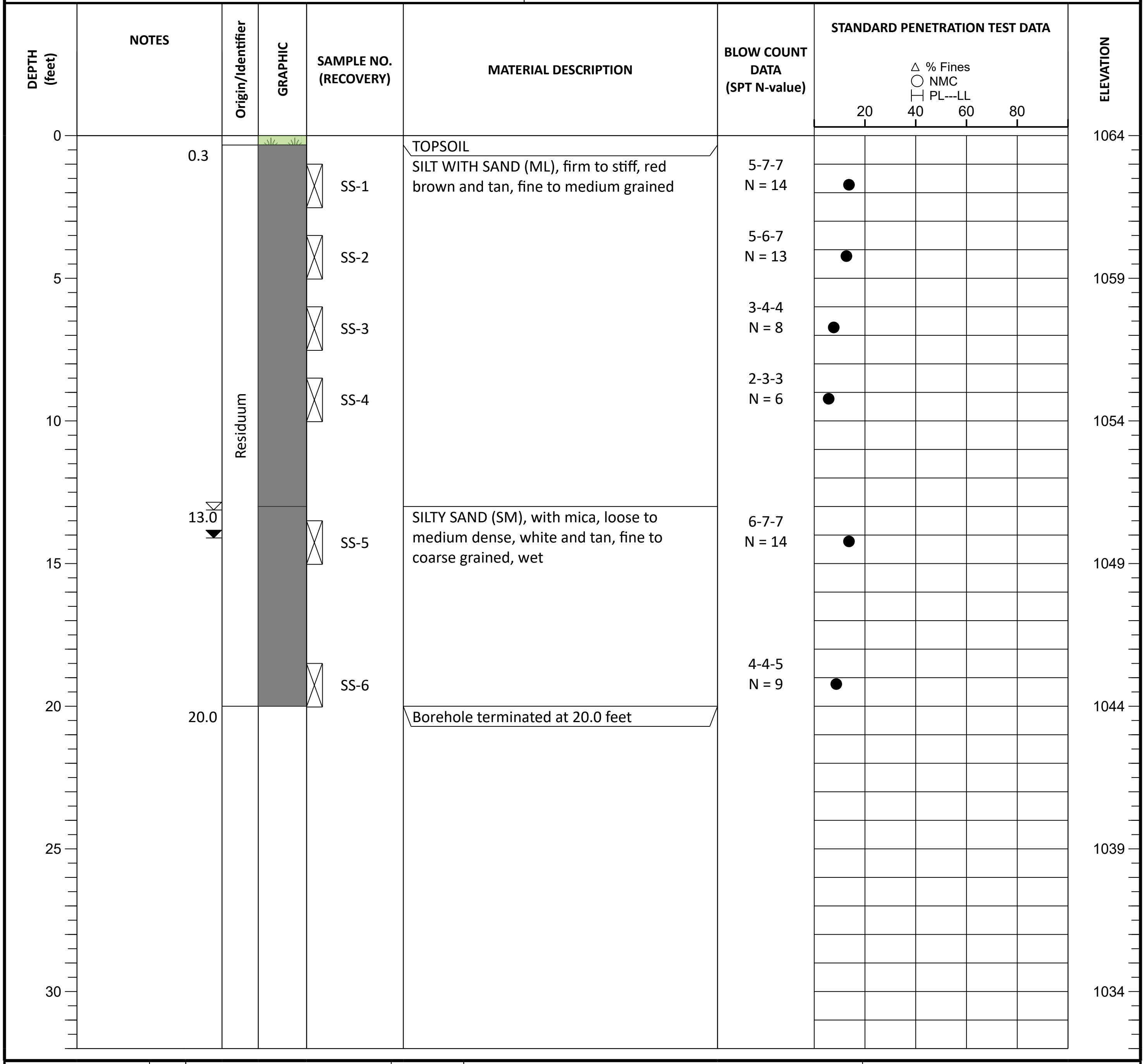
GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-08

Sheet 1 of 1

DATE DRILLED: 04/26/2022
ELEVATION: 1064 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)



NOTES	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
		TOPSOIL	
0.3	SS-1	SILT WITH SAND (ML), firm to stiff, red brown and tan, fine to medium grained	5-7-7 N = 14
	SS-2		5-6-7 N = 13
	SS-3		3-4-4 N = 8
	SS-4		2-3-3 N = 6
13.0	SS-5	SILTY SAND (SM), with mica, loose to medium dense, white and tan, fine to coarse grained, wet	6-7-7 N = 14
	SS-6		4-4-5 N = 9
20.0		Borehole terminated at 20.0 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/26/2022	13.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	14.0	
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal

PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-09

Sheet 1 of 1

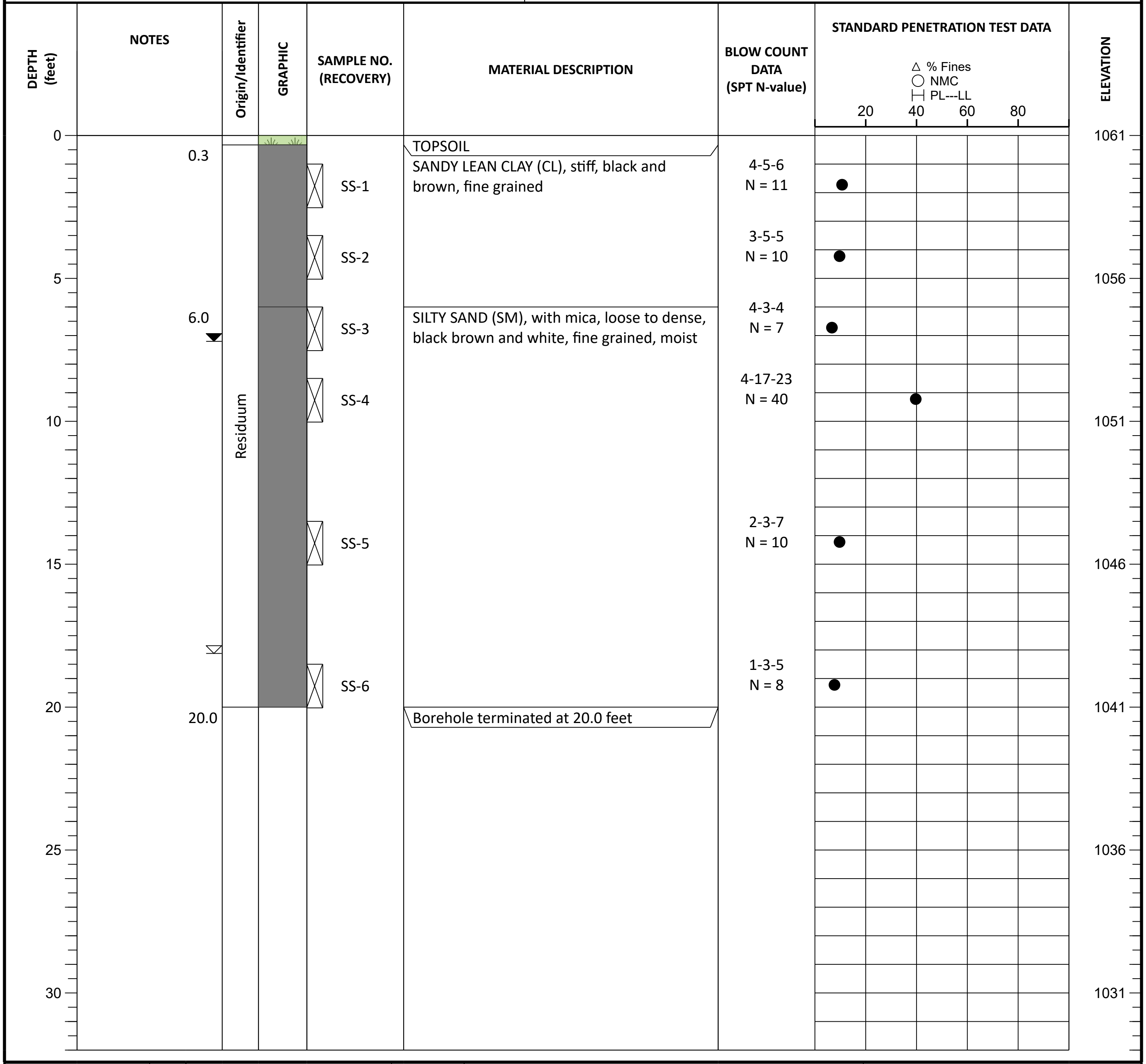
DATE DRILLED: 04/27/2022	**ELEVATION:** 1061 ft
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont

NOTES:

LATITUDE: **LONGITUDE:**

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)



DEPTH (feet)	NOTES	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0			TOPSOIL	
	0.3	SS-1	SANDY LEAN CLAY (CL), stiff, black and brown, fine grained	4-5-6 N = 11
		SS-2		3-5-5 N = 10
	6.0	SS-3	SILTY SAND (SM), with mica, loose to dense, black brown and white, fine grained, moist	4-3-4 N = 7
		SS-4		4-17-23 N = 40
		SS-5		2-3-7 N = 10
		SS-6		1-3-5 N = 8
	20.0		Borehole terminated at 20.0 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/27/2022	18.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	7.1	
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

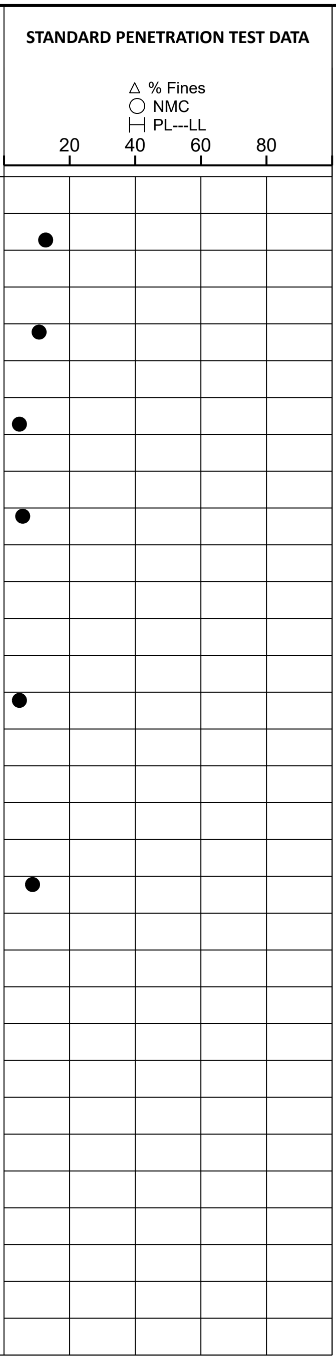
PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-10

Sheet 1 of 1

DATE DRILLED: 04/26/2022	**ELEVATION:** 1054 ft	**NOTES:**
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88	
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0				TOPSOIL		1054
	0.3	Residuum	SS-1	SANDY SILT (ML), stiff, red and brown, fine grained	5-6-7 N = 13	
5			SS-2		4-5-6 N = 11	1049
	▼ 6.0		SS-3	SILTY SAND (SM), with mica, loose, yellow brown and light gray, fine grained, moist to wet	2-2-3 N = 5	
10			SS-4		2-2-4 N = 6	1044
	▽		SS-5		2-2-3 N = 5	
15						1039
			SS-6		4-4-5 N = 9	
20	20.0			Borehole terminated at 20.0 feet		1034
25						1029
30						1024



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/26/2022	14.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	6.0	
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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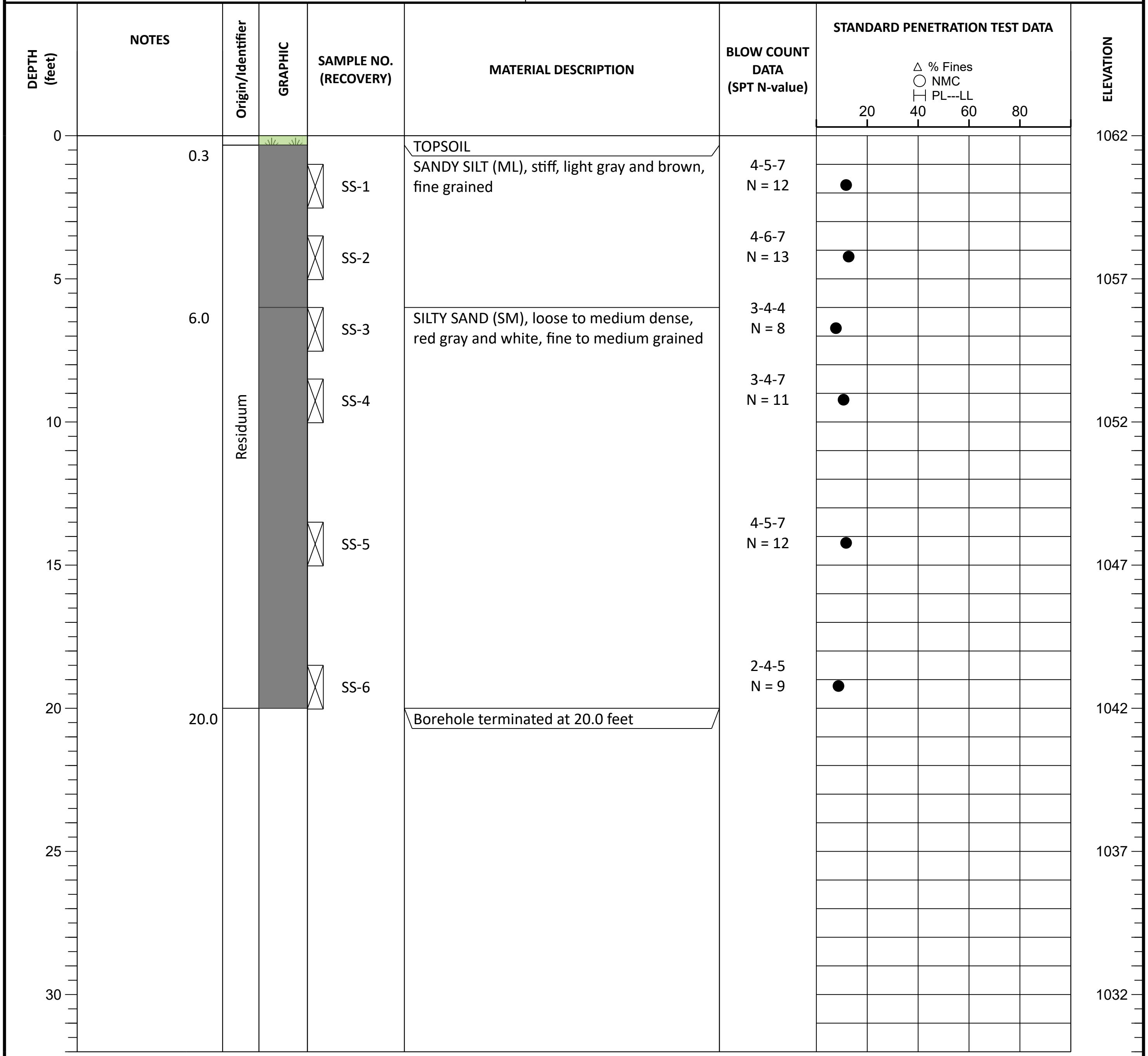
PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-11

Sheet 1 of 1

DATE DRILLED: 04/26/2022
ELEVATION: 1062 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)



NOTES	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.3		TOPSOIL	
	SS-1	SANDY SILT (ML), stiff, light gray and brown, fine grained	4-5-7 N = 12
	SS-2		4-6-7 N = 13
6.0	SS-3	SILTY SAND (SM), loose to medium dense, red gray and white, fine to medium grained	3-4-4 N = 8
	SS-4		3-4-7 N = 11
	SS-5		4-5-7 N = 12
	SS-6		2-4-5 N = 9
20.0		Borehole terminated at 20.0 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/26/2022		Not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022		Not encountered
AFTER DRILLING	▼			

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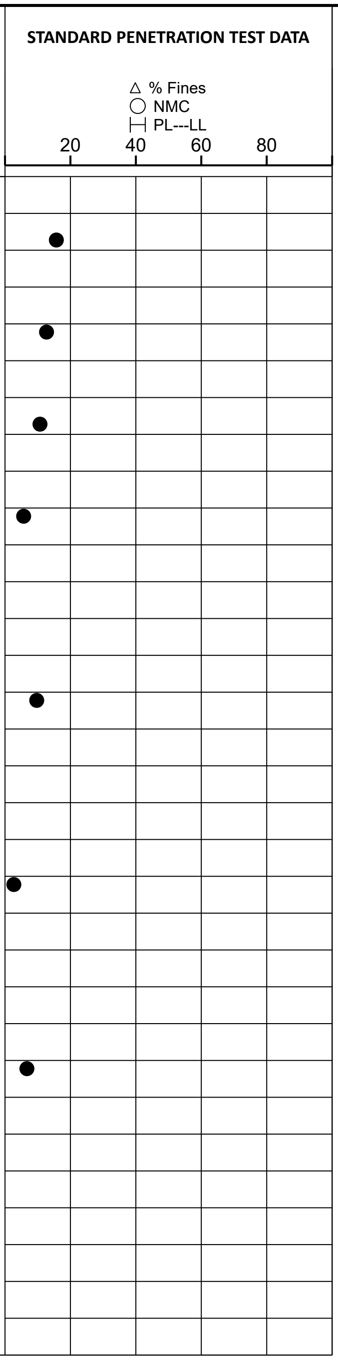
PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-12

Sheet 1 of 1

DATE DRILLED: 04/27/2022
ELEVATION: 1070 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 25.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0				TOPSOIL		1070
	0.3	Residuum		SANDY SILT (ML), firm to stiff, red, fine grained		
			SS-1		5-7-9 N = 16	
			SS-2		3-5-8 N = 13	
5						1065
			SS-3		3-5-6 N = 11	
			SS-4		2-3-3 N = 6	
10						1060
	12.0			SILTY SAND (SM), with mica, very loose to loose, red white and brown, fine grained, moist to wet		
			SS-5		2-5-5 N = 10	
15						1055
	▼					
	▽					
			SS-6		3-2-1 N = 3	
20						1050
			SS-7		1-2-5 N = 7	
25	25.0			Borehole terminated at 25.0 feet		1045
30						1040



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/27/2022	18.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	15.5	
AFTER DRILLING	▼			

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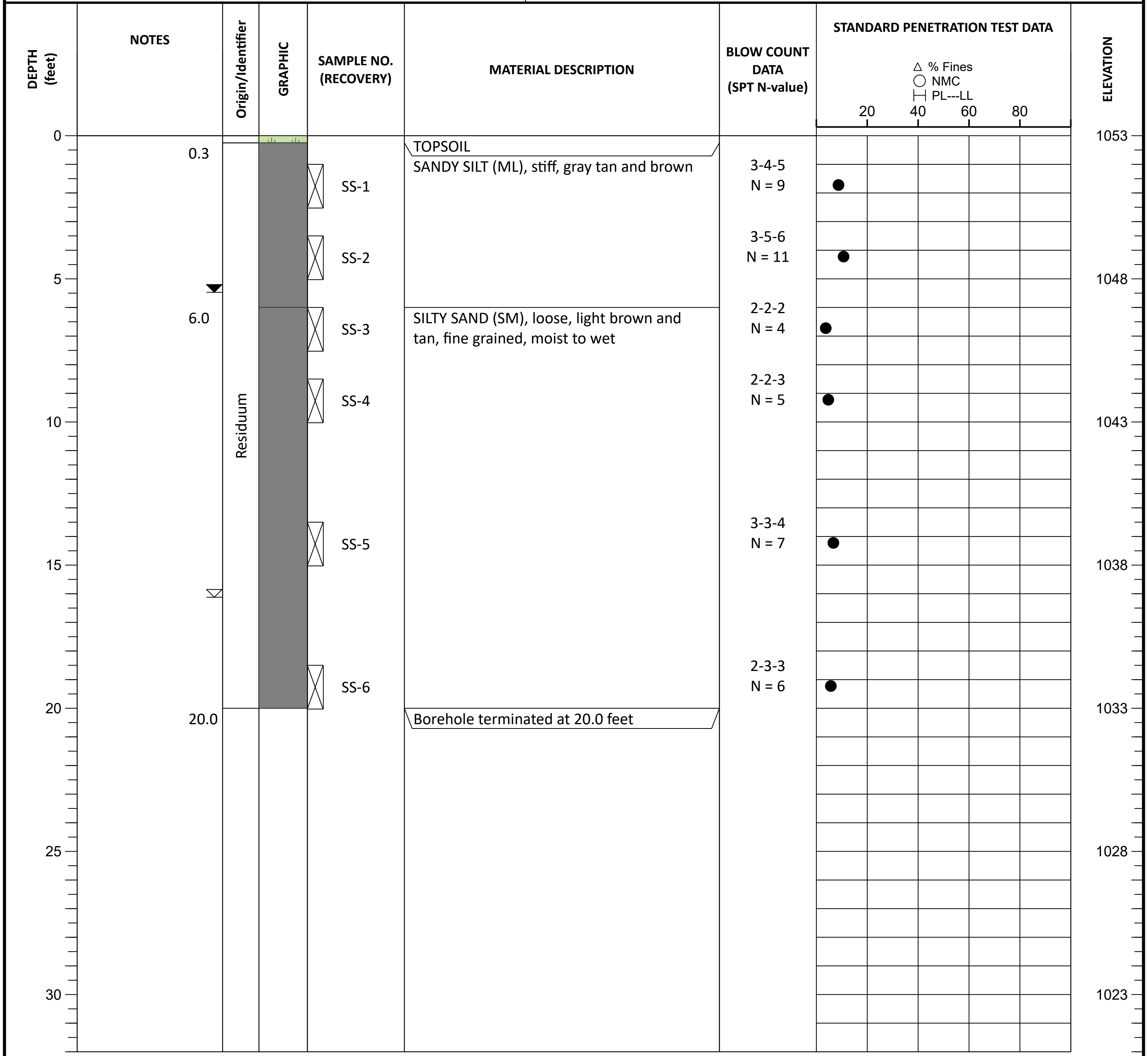
PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-13

Sheet 1 of 1

DATE DRILLED: 04/27/2022
ELEVATION: 1053 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)



NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
			TOPSOIL	
0.3	Residuum	SS-1	SANDY SILT (ML), stiff, gray tan and brown	3-4-5 N = 9
		SS-2		3-5-6 N = 11
6.0		SS-3	SILTY SAND (SM), loose, light brown and tan, fine grained, moist to wet	2-2-2 N = 4
		SS-4		2-2-3 N = 5
		SS-5		3-3-4 N = 7
		SS-6		2-3-3 N = 6
20.0			Borehole terminated at 20.0 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/27/2022	16.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	5.4	
AFTER DRILLING	▼			

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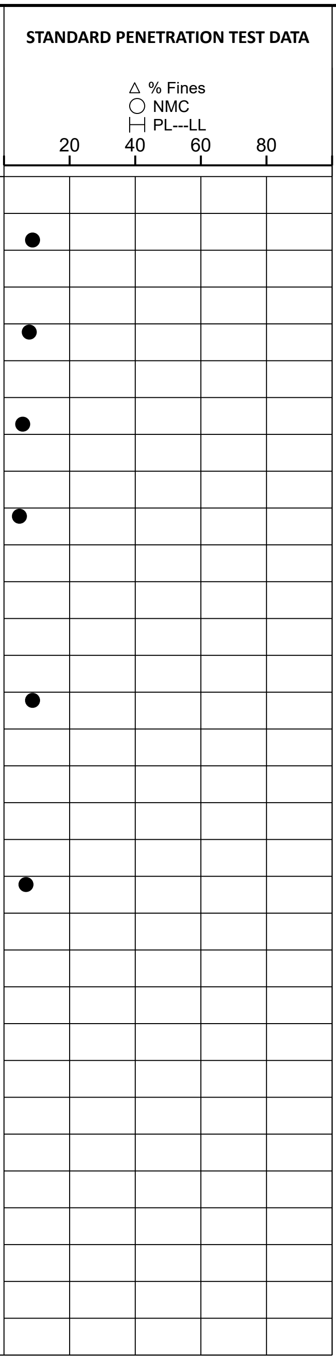
PROJECT:	Estate of Carroll Byers Alpharetta, Georgia S&ME Project No. 21680007	**BORING LOG: B-14** *Sheet 1 of 1*	
DATE DRILLED: 04/26/2022	**ELEVATION:** 1050 ft	**NOTES:**	
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88		
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft		
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level		
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:**	**LONGITUDE:**
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)		

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0					TOPSOIL		1050
	0.3	Residuum		SS-1	SANDY LEAN CLAY (CL), firm to stiff, brown and light gray	2-4-5 N = 9	
				SS-2		2-3-5 N = 8	
5	▼						1045
				SS-3		3-3-3 N = 6	
	8.0			SS-4	SANDY SILT (ML), firm to stiff, white yellow and brown, moist	1-2-3 N = 5	
10							1040
	▽			SS-5		3-4-5 N = 9	
15							1035
				SS-6		2-3-4 N = 7	
20	20.0				Borehole terminated at 20.0 feet		1030
25							1025
30							1020

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/26/2022	14.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	5.3	
AFTER DRILLING	▼			

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PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

BORING LOG: B-15

Sheet 1 of 1

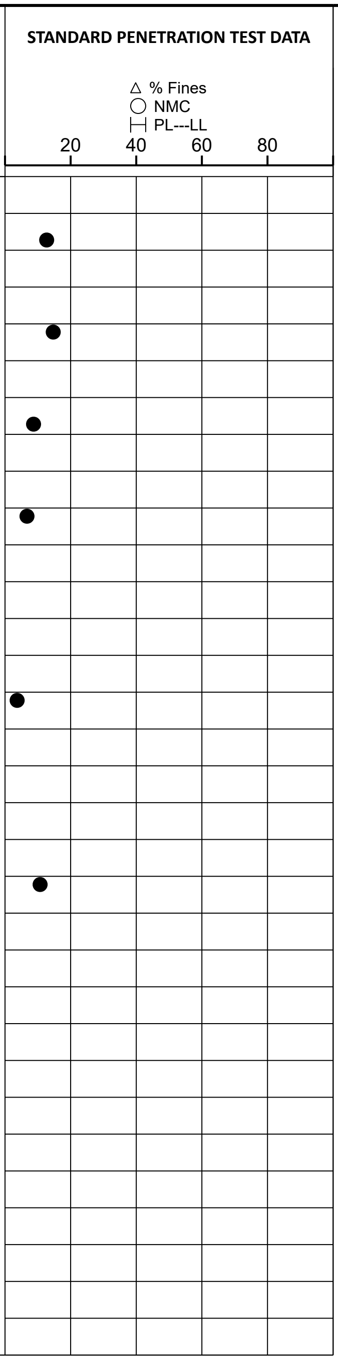
DATE DRILLED: 04/27/2022	**ELEVATION:** 1063 ft
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)

NOTES:

LATITUDE:

LONGITUDE:

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0							1063
	0.3				TOPSOIL		
		Residuum			SANDY SILT (ML), with mica, soft to stiff, red brown and black		
				SS-1		3-6-7 N = 13	
				SS-2		4-6-9 N = 15	
5							1058
				SS-3		3-4-5 N = 9	
				SS-4		3-3-4 N = 7	
10							1053
				SS-5		2-1-3 N = 4	
15							1048
				SS-6		3-4-7 N = 11	
20	20.0				Borehole terminated at 20.0 feet		1043
25							1038
30							1033



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/27/2022		Not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	14.4	
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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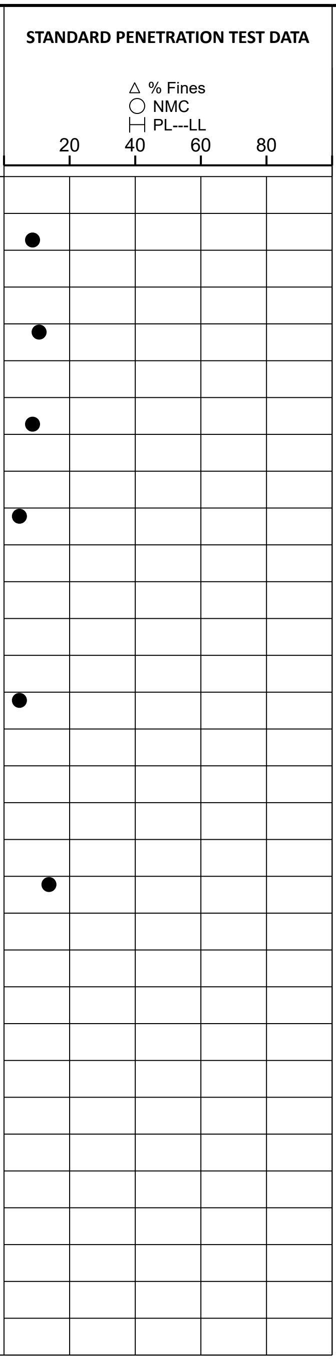
PROJECT:	**Estate of Carroll Byers** **Alpharetta, Georgia** **S&ME Project No. 21680007**	**BORING LOG: B-16** *Sheet 1 of 1*

DATE DRILLED: 04/27/2022	**ELEVATION:** 1048 ft	**NOTES:**
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88	
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0	0.3				TOPSOIL		1048
		Residuum		SS-1	SANDY LEAN CLAY (CL), with organics, stiff, gray and red	2-4-5 N = 9	
	▼			SS-2		3-5-6 N = 11	
5				SS-3		3-4-5 N = 9	1043
	8.0			SS-4	SILTY SAND (SM), loose, gray and white, fine grained	2-2-3 N = 5	
10							1038
	13.0			SS-5	SANDY SILT (ML), firm to stiff, tan and brown, wet	2-2-3 N = 5	
15							1033
	▽			SS-6		2-4-10 N = 14	
20	20.0				Borehole terminated at 20.0 feet		1028
25							1023
30							1018



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/27/2022	17.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	3.1	
AFTER DRILLING	▼			

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PROJECT: Estate of Carroll Byers
Alpharetta, Georgia
S&ME Project No. 21680007

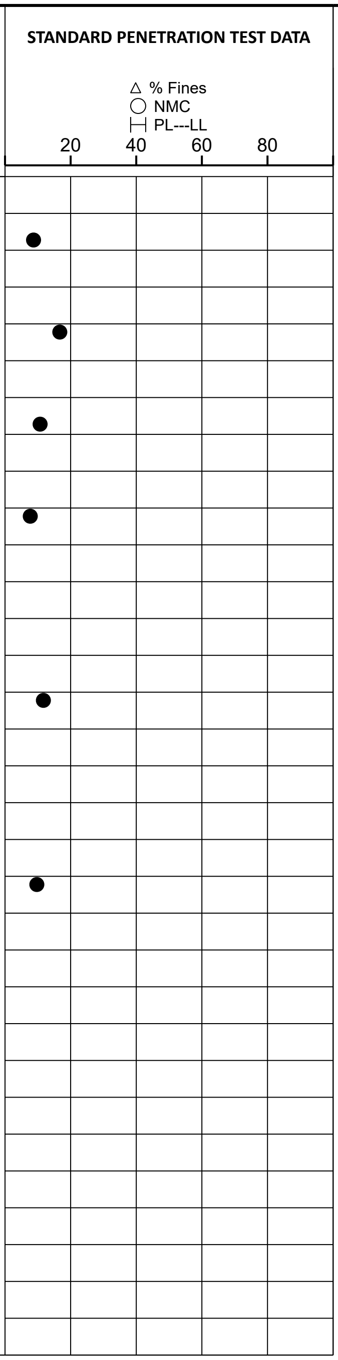
BORING LOG: B-17

Sheet 1 of 1

DATE DRILLED: 04/26/2022
ELEVATION: 1052 ft
DRILL RIG: CME-45 (Track)
DATUM: NAVD88
DRILLER: Piedmont
BORING DEPTH: 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)
CLOSURE: Cuttings after last H2O level
DRILLING METHOD: 3-1/4" HSA
LOGGED BY: Piedmont
SAMPLING METHOD: SS
NOTES:
LATITUDE:
LONGITUDE:
PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0	0.3			TOPSOIL		1052
		Residuum	SS-1	SANDY LEAN CLAY (CL), stiff to very stiff, tan and brown	2-4-5 N = 9	
5		Residuum	SS-2		4-8-9 N = 17	1047
	6.0	Residuum	SS-3	SILTY SAND (SM), loose to medium dense, brown tan and red, fine to medium grained	4-5-6 N = 11	
10	▼	Residuum	SS-4		3-3-5 N = 8	1042
	13.0	Residuum	SS-5	SILTY SAND (SM), with mica, loose to medium dense, white yellow and brown, fine grained, wet	4-5-7 N = 12	
15	▽	Residuum				1037
		Residuum	SS-6		3-5-5 N = 10	
20	20.0			Borehole terminated at 20.0 feet		1032
25						1027
30						1022

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/26/2022	15.0	
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022	11.3	
AFTER DRILLING	▼			

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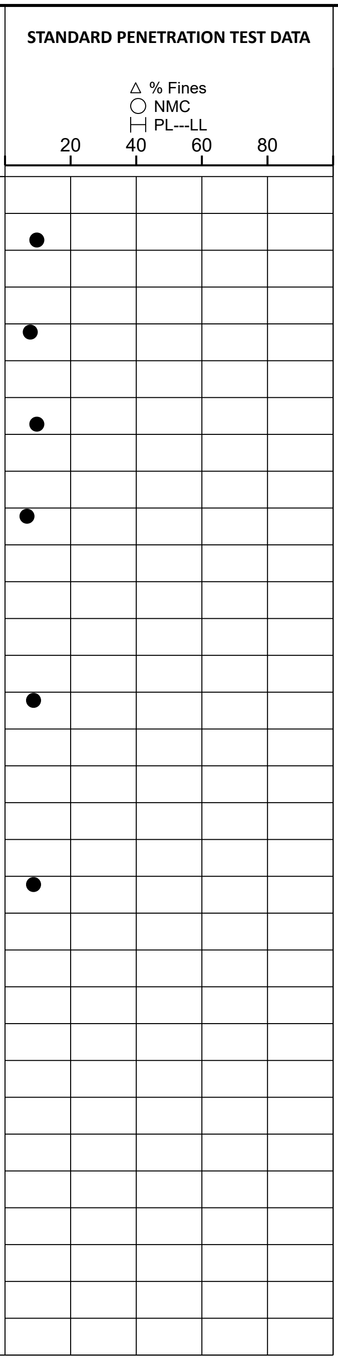
PROJECT:	Estate of Carroll Byers Alpharetta, Georgia S&ME Project No. 21680007	**BORING LOG: B-18** *Sheet 1 of 1*	
DATE DRILLED: 04/26/2022	**ELEVATION:** 1062 ft	**NOTES:**	
DRILL RIG: CME-45 (Track)	**DATUM:** NAVD88		
DRILLER: Piedmont	**BORING DEPTH:** 20.0 ft		
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings after last H2O level		
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Piedmont	**LATITUDE:**	**LONGITUDE:**
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)		

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0					TOPSOIL		1062
	0.3	Residuum		SS-1	SILTY SAND (SM), loose, brown and red, fine to medium grained	3-5-5 N = 10	
				SS-2		2-3-5 N = 8	
5							1057
				SS-3		3-4-6 N = 10	
				SS-4		2-3-4 N = 7	
10							1052
	13.0			SS-5	SANDY SILT (ML), stiff, brown and gray, fine grained	3-4-5 N = 9	
15							1047
				SS-6		3-4-5 N = 9	
20	20.0				Borehole terminated at 20.0 feet		1042
25							1037
30							1032



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/26/2022		Not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼	05/09/2022		Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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AR = Auger Refusal

ROCK DEFINITION

We suggest that *Rock* be defined as the following:

General Excavation:

Any material which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a draw bar pull rated at not less than 56,000 pounds (Caterpillar D8K or equivalent) or excavated by a front-end loader with a minimum bucket breakout force of 25,600 pounds (Caterpillar 977 or equivalent).

Trench Excavation:

Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 33,010 pounds (Caterpillar 225B or equivalent).

Important Information About Your
Geotechnical Engineering Report

Variations in subsurface conditions can be a principal cause of construction delays, cost overruns and claims. The following information is provided to assist you in understanding and managing the risk of these variations.

Geotechnical Findings Are Professional Opinions

Geotechnical engineers cannot specify material properties as other design engineers do. Geotechnical material properties have a far broader range on a given site than any manufactured construction material, and some geotechnical material properties may change over time because of exposure to air and water, or human activity.

Site exploration identifies subsurface conditions at the time of exploration and only at the points where subsurface tests are performed or samples obtained. Geotechnical engineers review field and laboratory data and then apply their judgment to render professional opinions about site subsurface conditions. Their recommendations rely upon these professional opinions. Variations in the vertical and lateral extent of subsurface materials may be encountered during construction that significantly impact construction schedules, methods and material volumes. While higher levels of subsurface exploration can mitigate the risk of encountering unanticipated subsurface conditions, no level of subsurface exploration can eliminate this risk.

Scope of Geotechnical Services

Professional geotechnical engineering judgment is required to develop a geotechnical exploration scope to obtain information necessary to support design and construction. A number of unique project factors are considered in developing the scope of geotechnical services, such as the exploration objective; the location, type, size and weight of the proposed structure; proposed site grades and improvements; the construction schedule and sequence; and the site geology.

Geotechnical engineers apply their experience with construction methods, subsurface conditions and exploration methods to develop the exploration scope. The scope of each exploration is unique based on available project and site information. Incomplete project information or constraints on the scope of exploration increases the risk of variations in subsurface conditions not being identified and addressed in the geotechnical report.

Services Are Performed for Specific Projects

Because the scope of each geotechnical exploration is unique, each geotechnical report is unique. Subsurface conditions are explored and recommendations are made for a specific project. Subsurface information and recommendations may not be adequate for other uses. Changes in a proposed structure location, foundation loads, grades, schedule, etc. may require additional geotechnical exploration, analyses, and consultation. The geotechnical engineer should be consulted to determine if additional services are required in response to changes in proposed construction, location, loads, grades, schedule, etc.

Geo-Environmental Issues

The equipment, techniques, and personnel used to perform a geo-environmental study differ significantly from those used for a geotechnical exploration. Indications of environmental contamination may be encountered incidental to performance of a geotechnical exploration but go unrecognized. Determination of the presence, type or extent of environmental contamination is beyond the scope of a geotechnical exploration.

Geotechnical Recommendations Are Not Final

Recommendations are developed based on the geotechnical engineer’s understanding of the proposed construction and professional opinion of site subsurface conditions. Observations and tests must be performed during construction to confirm subsurface conditions exposed by construction excavations are consistent with those assumed in development of recommendations. It is advisable to retain the geotechnical engineer that performed the exploration and developed the geotechnical recommendations to conduct tests and observations during construction. This may reduce the risk that variations in subsurface conditions will not be addressed as recommended in the geotechnical report.

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