WINSTEAD ARCHITECTURE

J. Stan Winstead, AIA

22 North Main Ave., p.o. box 321 Telephone: (828) 464-2827
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ADDENDUM #3

Catawba County
Catawba County EMS Base Station – Hickory, NC
Bid Number #25-1015
Hickory, North Carolina

January 17, 2025

Applying to all bidders.

This addendum is issued for the purpose of clarifying the intent of the contract documents for making necessary corrections, deletions, and/or additions to the documents on all items of discrepancy raised up to the time of the issuance of this addendum.

Each bidder is hereby instructed and authorized to incorporate into his proposal the instructions contained in this addendum.

TO ALL BIDDERS

1. A Revised Bid Opening Date: Bid opening date for this project is now being pushed out to February 13, 2025. A mandatory pre-bid conference was held on December 18th, 2024 on the site at 3:00 pm. You must have had a representative of your company there to be eligible to bid this project. The new details are as follows: Catawba County will receive sealed bids for the construction of a new Catawba County EMS Base Station, Bid Number 25-1015, in the 2nd Floor Meeting Room, Government Center, 25 Government Drive, Newton, North Carolina, 28658 until 3:00 PM, local prevailing time, on February 13, 2025. The clock/Apple phone in the Government Center, 2nd Floor Meeting Room will be used to determine bid submission closure. Bids received after 3:00 PM on February 13, 2025, will not be accepted. Immediately thereafter bids shall be publicly opened and read by the Architect for furnishing of labor, materials, and equipment for the construction of the new Catawba County EMS Base Station - Hickory. The project location is 827 E Ave SE, Hickory, North Carolina 28602.

2. A Revised Due Date for Contractor Questions: Questions regarding the Scope of Work, bid process or bid documents must be delivered in writing to Stan Winstead in the office of the Architect, Post Office Box 321, Newton, North Carolina 28658, Phone (828) 464-2827, Fax (828) 464-3229, Email winarch@bellsouth.net no later than 4:00 PM. Eastern Time, on January 29, 2025. All questions received before the deadline will be addressed in an Addendum. Any questions received after the deadline will not be addressed prior to the Bid Opening. Do not contact the owner with questions.

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3. Please find attached to this addendum the revised Soil Test Report from Catawba Valley Engineering and Testing.

J. Stan Winstead, AIA
Winstead Architecture, PLLC

PLEASE ATTACH THIS ADDENDUM TO THE FRONT COVER OF THE SPECIFICATIONS AND ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID.

GEOTECHNICAL ENGINEERING REPORT
REV. 2

Hickory EMS Base
Catawba County Parcel #371205090654
827 East Avenue S.E.
Hickory, Catawba County, North Carolina

CVET Project No. 25-500

January 16, 2025

PREPARED FOR:

Catawba County
P.O. Box 389
Newton, North Carolina 28658

PREPARED BY:

CATAWBA VALLEY
ENGINEERING & TESTING

GEOTECHNICAL • CONSTRUCTION MATERIALS • ENVIRONMENTAL

CATAWBA VALLEY
ENGINEERING & TESTING

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NC Firm No. C-3833
SC Firm No. 5201
VA Firm No. F2134437
TN Firm No. 10724
Massachusetts

January 16, 2025

Mr. Bryan Morales-Gonzalez
Construction Project Coordinator
Facility Services
Catawba County North Carolina
bmorales@catawbacountync.gov

Re: Geotechnical Engineering Report – Rev. 2
Hickory EMS Base
827 East Avenue S.E.
Hickory, North Carolina
CVET Project No.: 25-500

Dear Mr. Morales-Gonzalez:

Catawba Valley Engineering and Testing (CVET) is pleased to submit to you our Geotechnical Engineering Report – Revision 2 for the proposed Hickory EMS Base located at 827 East Avenue S.E. in Hickory, North Carolina. This report presents the findings of our subsurface explorations and provides updated geotechnical recommendations for the design and construction of the project.

CVET appreciates the opportunity to provide our geotechnical engineering services for this project. If you have any questions regarding the contents of this report, or if we can provide additional services for the project such as construction materials testing or special inspection observations, please do not hesitate to contact us.

Sincerely,

CATAWBA VALLEY ENGINEERING AND TESTING, P.C.

01-16-2025

Neill A. Belk, PhD, PE
Senior Engineer
NC 052399

David M. LeGrand, Jr, PE
Principal Engineer
NC 041419

AASHTO ACCREDITED

Geotechnical Engineering

Environmental Services

CMT/Special Inspections

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1.0 PURPOSE AND SCOPE OF SERVICE

The purpose of the Revision 2 subsurface exploration and geotechnical engineering evaluation was to combine the findings from the initial and supplemental subsurface explorations performed at the subject site and prepare updated conclusions and recommendations for design and construction for the proposed EMS Base located at 827 East Avenue S.E. in Hickory, North Carolina. CVET's scope of services performed at the site includes the following:

- Drilling of eleven (11) Standard Penetration Test (SPT) borings at the site (CVET Project No. 24-524 – Report dated May 9, 2024);
- Advancing eight (8) Cone Penetration Test (CPT) soundings at the site (CVET Project No. 24-524 – Revision 1 Report dated, July 17, 2024);
- Excavation of six (6) test pits at the site (CVET Project No. 24-524 – Revision 1 Report dated, July 17, 2024);
- Excavation of two (2) additional test pits at the site;
- Preparation of boring/sounding logs and boring location plan;
- Evaluation of the encountered subsurface conditions at the site; and
- Preparation of this Revision 2 Geotechnical Report.

The Revision 2 – Geotechnical Engineering Report is intended to supersede the initial report dated May 9, 2024 and the Revision 1 report dated July 17, 2024. The Geoprofessional Business Association (GBA) organization has prepared important information for studies of the type performed, and we have included their document for your review in Appendix A. An assessment of the environmental aspects, regulated wetlands, groundwater recharge, or stormwater runoff conditions at the site is beyond the scope of this study.

2.0 PROJECT INFORMATION

Based on the updated site civil drawings dated November 1, 2024 and prepared by Wright & Associates, we understand that the project will consist of the construction of an approximately 5,995 square foot EMS Base containing a 4-vehicle high bay area, office space, conference space, and other amenities. Site development will consist of the construction paved parking, driveways, and associated site infrastructure. The updated civil drawings show modifications to the overall building layout and shifts the building envelope plan north, away, from F Avenue.

Existing elevations across the site range from about EL 1168 to 1140 feet above mean sea level (amsl) and generally slopes down gradient from northwest to southeast. The site grading plan (sheet C6) indicates the building finished floor elevation (FFE) will be 1168.75 feet above mean sea level (amsl). We estimate structural fill depths on the order of 3 to 12 feet will be required within the building envelope to facilitate the proposed FFE.

Structural fill depths up to approximately 15 feet will be required to facilitate finished site grades within the southwestern portion of the project site.

Based upon our experience with projects of this nature, we anticipate that the EMS Base will be constructed of structural masonry and structural steel with a slab on grade, supported by a shallow foundation system. We assume maximum wall and column loads of 200 kips and 4 kips per linear foot, respectively. If these assumed loads are not correct, CVET must be given an opportunity to revisit the recommendations presented herein and revise them, if necessary.

3.0 EXPLORATION PROCEDURES

Exploration procedures for this project included drilling Standard Penetration Test (SPT) borings, Cone Penetration Test (CPT) soundings, excavation of test pits, and laboratory testing of representative soil samples at our laboratory in Hickory, North Carolina.

3.1 Field Exploration

SPT Exploration

CVET drilled eleven (11) soil test borings (denoted B01 to B11) at the locations indicated on Figure 2 – Boring Location Plan in Appendix B. The borings were drilled on April 1 and 2, 2024 and extended to depths ranging from approximately 10 to 20 feet below existing site grades. CVET personnel located the boring locations utilizing hand-held GPS, and these locations should be considered accurate to the degree in which they were located. We approximated boring elevations from the site civil drawings (sheet C6); therefore, the boring locations and elevations on Figure 2 and Figure 3, and the boring logs (Appendix C) should be considered approximate.

Drilling was performed with a Geoprobe 7822-DT track-mounted drill rig using continuous-flight hollow stem augers (HSA). Soil samples were obtained by means of the split-barrel sampling procedures performed in general accordance with ASTM D1586. A 2-inch O.D., split-barrel sampler was driven into the soil a distance of 18 inches by means of an automatic hammer. The number of blows required to drive the sampler through the final 12-inch interval is termed the Standard Penetration Test (SPT) "N" value and is indicated for each sample on the boring logs. This value can be used to provide an indication of the in-place relative density of cohesionless soils but is a less reliable indicator of the consistency of cohesive soils. For cohesive soils, the measurement of unconfined compressive strength Q_u is a better indicator of consistency; this value is also listed on the boring logs.

CVET selected representative portions of each SPT sample, sealed them in airtight containers, and returned the samples to our laboratory in Hickory, North Carolina for

classification and storage. See the individual soil test boring logs in Appendix C for more details. Note that the soil samples will be discarded after 60 days from this report date, unless otherwise directed by Catawba County.

CPT Exploration

The subsurface conditions at the site were further explored by advancing eight (8) CPT soundings (denoted C01 to C08) at the locations indicated on Figure 2 – Boring Location Plan in Appendix B. The CPT soundings were advanced on June 3, 2024 and July 12, 2024 and extended to depths ranging from approximately 3 to 40 feet below existing site grades. CVET personnel located the sounding locations utilizing hand-held GPS, and these locations should be considered accurate to the degree in which they were located. We approximated sounding elevations from the site grading plan (sheet C6); therefore, the sounding locations and elevations on Figure 2 and Figure 3, and the sounding logs (Appendix C) should be considered approximate.

CVET advanced the CPT sounding in general accordance with ASTM D5778 utilizing a Geoprobe 20CPT Press on a track-mounted skid steer anchored to the existing subgrade. The cone used in the sounding has a tip area of 10cm^2 and a sleeve area of 150 cm^2. The CPT sounding recorded tip resistance, sleeve friction, and pore water pressure measurements to assist in estimating index and engineering properties of the site soils and the depth to subsurface water at the sounding location. The ratio of the sleeve friction to tip resistance is then used to aid in assessing the soil types through which the tip is advanced.

Test Pit Exploration

CVET excavated a total of eight (8) test pits (denoted TP-1 to TP-8) at the locations indicated on Figure 2 – Boring Location Plan in Appendix B. The test pits were extended on June 4, 2024 and January 09, 2025 by CVET personnel using a Kubota KX-040 track-mounted excavator. The test pits were extended to depths ranging from approximately 2.5 to 8.0 feet below existing site grades. The test pit locations were selected based upon the information collected from the previous SPT and CPT borings/soundings and new data within the re-located building envelope.

3.2 Laboratory Testing

CVET geotechnical personnel examined and visually classified the soil in general accordance with the Unified Soil Classification System (USCS) (ASTM D2487). We then selected representative soil samples for laboratory testing, which included Soil Moisture Content (ASTM D2216), Grain Size Distribution (ASTM D422), Atterberg Limits for Plasticity (ASTM D4318), and Organic Content (ASTM D2974). Laboratory results are included in Appendix D.

4.0 SUBSURFACE CONDITIONS

The subsurface conditions at the site are described in the following paragraphs.

4.1 Site Geology

The site is located in the Piedmont Physiographic Province of North Carolina. The name "piedmont" means "foot-of-the-mountains" which reflect remnants of an ancient mountain range that has since been extensively weathered, decomposed and eroded to form rolling terrain and hillsides. The bedrock is metamorphic in nature (igneous or sedimentary rocks that have been changed by heat and/or pressure) and typically consists of schist, gneiss and/or granite. Extensive weathering over time has reduced the bedrock in-place to form overburden residual soils that range from clay topsoil to sandy silts and silty sand that grade with depth back to saprolite and partially-weathered-bedrock. The degree of weathering varies both laterally and vertically. Based on the 1985 North Carolina Geologic Map, the site is underlain by mica schist.

Published soil data (Soil Survey, Catawba County, North Carolina, USDA) indicates that native site soils belonging to the Clifford and Fairview map units, which consists of sandy loam, sandy clay loam, and clay/clay loam residual soil weathered saprolite derived from granite and gneiss and/or schist.

Undocumented fill

Fill soils are those that have been placed or reworked in conjunction with past construction, grading, or farming. Fill soils can range from compacted engineered fills where no construction records exist to a heterogenous mix of soil types, organics, cobbles, boulders, construction debris, building rubble, trash, industrial waste, and contaminants. In some limited cases, properly engineered fills can be sampled and tested and their shear strength and compressibility determined for design purposes. However, no practical amount of exploration and testing can be attempted to try to characterize the shear strength and compressibility for the wide range of deleterious materials found in most uncontrolled fill soils. There is an inherent risk of construction and fill placement over areas of existing undocumented fill that may impact construction scheduling and costs.

We have considered the existing fill on-site to be undocumented based on lack of documentation during previous site-grading activities and the variable density/consistency of the fill we encountered during our investigation.

4.2 Soils

Soil boring logs are included in Appendix C. The surface across the area being evaluated generally consists of topsoil underlain by undocumented fill and residual soils. The generalized subsurface conditions are described below.

Surficial topsoil was encountered in soil test borings B01 to B11. The topsoil was found to average approximately 3 inches in thickness.

Existing, undocumented fill was encountered in all eleven (11) soil test borings to depths ranging from approximately 3.0 to 14.0 feet below existing site grades. The existing fill soil section generally increases in thickness across the site, toward the southeast. The existing fill generally consists of dry to moist silty sand (SM) and sandy silt (ML/MH) with fine mica. Rock fragments with traces of root material, organics, concrete, brick, and asphalt debris were also observed within the fill soil section. The SPT N-Value within the cohesive fill soil ranges from 8 to 15 blows per foot (bpf), indicating medium stiff to stiff soil consistencies. The SPT N-Value within the cohesionless fill soil ranges from 2 to 14 bpf, indicating very loose to medium dense soil consistencies. Elevated blow counts (50+ bpf) observed in test borings B05, B08, and B09 are likely due to the rock, concrete, brick, and asphalt debris observed within the fill soil section at these locations.

Residual soil was encountered in all eleven (11) soil test borings underlying the existing fill soils. The residual soil generally consists of dry to moist, slightly micaceous, silty sand (SM). The SPT N-Value within the residual soil ranges from 4 to 73 bpf, indicating very loose to very dense soil consistencies.

CPT Interpretation

The CPT soundings encountered a mixture of interpreted fine- and coarse-grained soils, which are consistent with the soil encountered in the SPT soil test borings performed during the initial exploration. The soil consisted of several Soil Behavior Types (SBT). The shallow refusal encountered in soundings C04 and C05 appears to be a result of large concrete and asphalt fragments encountered throughout the existing fill.

The fine-grained soil materials include organic soil (SBT = 2), clay (SBT = 3), and silty clay (SBT = 4). The cone tip resistance (q_t) within the fine-grained soil ranged from less than 5 tons per square foot (tsf) to as high as 80 tsf indicating very soft to hard soil consistencies. The CPT recorded very soft (q_t less than 5 tsf) material (interpreted as "organic soil") in C08 from a depth of about 13 to 14.5 feet bgs. The sleeve friction (f_s) in the fine-grained material ranged from less than 0.25 tsf to about 2 tsf.

The coarse-grained soil materials include silty sand & sandy silt (SBT = 5) and sand & silty sand (SBT = 6). The cone tip resistance within the coarse-grained soil ranged from

about 50 tsf to greater than 400 tsf indicating loose to very dense relative soil densities. The sleeve friction in the coarse-grained soil ranged from about 1 to greater than 4 tsf.

Test Pit Observations

TP-1 was performed adjacent B01 and was extended to a depth of approximately 2.5 feet below existing site grades. The surficial fill soil encountered consists of sandy silt/silty sand with layers of 1- to 3-inch diameter surge stone. Residual soil was observed at the bottom of the test pit and generally consists of brown silty sand. See photographs 1 through 6 in Appendix E.

TP-2 was performed near C01 and was extended to a depth of approximately 4.5 feet below existing site grades. The surficial fill soil encountered consists of sandy silt/silty sand with inclusions of concrete and asphalt fragments. Residual soil was observed at the bottom of the test pit and generally consists of tan-brown silty sand. See photographs 7 through 12 in Appendix E.

TP-3 was performed adjacent B02 and was extended to a depth of approximately 6.5 feet below existing site grades. The surficial fill soil encountered consists of sandy silt/silty sand with inclusions of sandy elastic silt, large concrete and asphalt fragments, and silt fence material. Residual soil was observed at the bottom of the test pit and generally consists of tan-brown silty sand. See photographs 13 through 20 in Appendix E.

TP-4 was performed directly east of the high-bay garage area and was extended to a depth of approximately 7.5 feet below existing site grades. The surficial fill soil encountered consists of sandy silt/silty sand with inclusions of sandy elastic silt, large concrete and asphalt fragments, silt fence material and T-post. Residual soil was observed at the bottom of the test pit and generally consists of red-brown silty sand. See photographs 21 through 30 in Appendix E.

TP-5 was performed about 15 feet north of B09 and C04 and was extended to a depth of 6 feet below existing site grades. The fill material encountered consists of sandy silt/silty sand with inclusions of sandy elastic silt, large asphalt and concrete fragments, bricks, cable, and rebar. The test pit did not penetrate the existing fill material. See photographs 31 through 39 in Appendix E.

TP-6 was performed adjacent to C05 and was extended to a depth of 5.5 feet below existing site grades. The fill material encountered consists of sandy silt/silty sand with inclusions of sandy elastic silt, and small asphalt and concrete fragments. The test pit did not penetrate the existing fill material. See photographs 40 through 46 in Appendix E.

TP-7 and TP-8 were performed within the northern portion of the new building layout and were extended to a depth of approximately 5 feet below existing site grades. The surficial fill material encountered consists of sandy silt/silty sand with inclusions of topsoil, trash, bricks, and concrete fragments to a depth of approximately 3 feet below existing site grades. See photographs 47 through 52 in Appendix E.

4.3 Partially Weathered Bedrock and Bedrock

Partially weathered bedrock (PWR) was not encountered in the test borings completed as part of this evaluation; however, very dense residual soils (N-Values ranging from 73 to 77 bpf) were encountered at termination depths in borings B03 and B09.

4.4 Groundwater

CVET did not encounter groundwater within the depth of exploration at the time of drilling. Note that boreholes are left open for only a short period of time during the drilling operation, so the detection of groundwater during this brief period is difficult. Also note that soil moisture and groundwater conditions vary depending on conditions such as temperature, precipitation, and season. Therefore, soil moisture and groundwater location at other times of the year may vary from those observed at the time of this subsurface exploration and as described in this report.

The borehole cave-in depths ranged from about 2.5 to 13.0 feet bgs. The cave-in depths are marked on each boring, if encountered. In this geology, the cave-in depth of a boring is sometimes an indication of the stabilized water level, although the water level may be a few feet below the cave-in depth and therefore cannot be directly observed. If the location of the groundwater elevation is important at this site, we recommend the installation of temporary observation wells.

5.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

The borings indicate the site is generally suited for the proposed development; however, the extents and depths of variable undocumented fill coupled with the proposed depth of new grade raised fill creates an elevated risk of post-construction settlement that may result in distresses within the structure and pavement. The existing fill soil contains rock fragments with traces of root material, organics, concrete, brick, and asphalt debris.

Based upon the observations and analysis performed for this newly located building envelope, we conclude that the risks associated with the existing, undocumented fill within the building envelope can be managed through complete undercut and replacement with approved structural fill soils before proposed grade raised fill placement. We conclude that it is not economically feasible for the project to completely remove and replace all existing undocumented fill within the pavement areas. Localized undercut and

replacement of the existing material should be anticipated prior to grade raised fill within the pavement areas. The risks associated with long term decomposition and possible settlement related distress within the pavement areas will be managed through construction to facilitate a stable platform to place and compact structure fill soils; however, the risks associated with the remainder of the deleterious materials shall be accepted by the owner.

We anticipate that post construction settlement of building foundations, slabs, pavement systems, and below grade infrastructure will occur. We recommend implementation of a settlement monitoring program to evaluate the time-rate of settlement and determine when settlements have reduced to an acceptable level to begin building construction, pavement construction, and storm drain installation.

The following recommendations are for the construction of the proposed development based on the results of our understanding of the project, subsurface exploration, site observations, and experience in similar geologic settings. The recommendations stated herein shall not be applied to any other project, or used in conjunction with any other recommendation, and shall be used explicitly for this project.

5.1 Site Preparation

Site preparation should consist of removing the surface layer, razing of all existing structures and their foundations, relocation or proper abandonment of any existing utilities, as applicable, along with removing all other soft or unsuitable material from proposed building envelopes and associated pavement areas. All trees and accompanying root balls within the building and pavement footprint shall be removed and backfilled with structural fill. Site preparation operations should extend a minimum of 10 feet beyond the planned limits of any buildings and a minimum of 5 feet beyond the planned limits of the pavement areas. These limits should also extend beyond the perimeter of structural fill slopes, as applicable, laterally equal the depth of necessary structural fill to achieve finished grades.

Once stripping and rough excavation has been accomplished, the exposed subgrade should be evaluated by proofrolling. Proofrolling consists of driving the appropriate equipment, typically a dump truck with axle weights of 10 or 20 tons for single and double axles respectively, over the subgrade at a walking pace. The proofrolling equipment should first make overlapping passes across the subgrade in one direction, followed by passes in a perpendicular direction. We recommend that the proofrolling be observed by the geotechnical engineer or his qualified representative.

Based upon the presence of the encountered fill soil across the site, areas of instability are anticipated during proofrolling operations within the areas to receive structural fill and within areas where existing fill soils are present at exposed subgrade elevation. Instability during proofrolling of exposed subgrade soils should also be anticipated if

elevated in-place moisture content of the encountered site soils is observed. Any unstable areas shall be undercut and replaced with approved structural fill soil, as directed by CVET.

Any unstable areas shall be undercut and replaced with approved structural fill soil, as directed by CVET. If conditions revealed during site preparation operations vary from those described in this report, the on-site geotechnical engineer shall contact the engineer of this report to discuss potential options to address the varying site conditions.

5.2 Earthwork

At the time of this report, CVET understands that the proposed FFE for the building will be 1168.75 feet amsl and will require structural fill import to facilitate site development. We anticipate structural fill depths from approximately 2 to 15 feet will be required to facilitate proposed finished site grades.

Any required fill soils should be compacted to at least 98 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method, with a moisture content within +/- 3% of the optimum moisture content (OMC). Acceptable fill soils should be soil that has less than 5 percent organic content and a liquid limit and plasticity index less than 50 and 20, respectively. Soils with USCS group symbols of SP, SW, SM, SC, and ML are recommended for use as controlled fill, although it is important to note that silty soils are very moisture sensitive and not as strong as sandy soils. Soils having a plastic index of 20% or greater (MH, CH, and some SC and CL) should not be utilized within 5 feet of bearing elevation if utilized as structural fill. Organic laden soils shall not be utilized as structural fill. All fill soils should be placed in horizontal loose lifts and compacted with adequately-sized equipment. Loose lift thicknesses will vary depending on the size of the compaction equipment: we recommend a maximum of 8 inches for large self-propelled compactors, 6 inches for small self-propelled compactors, and 4 inches for remote-controlled compactors and hand-operated equipment (plate tampers, wacker-packers, or jumping jacks). Vibratory smooth-drum rollers are appropriate for cohesionless/coarse-grained soils while sheepsfoot rollers are appropriate for cohesive/fine-grained soils.

We anticipate the existing site fill soils will not be suitable for reuse as structural fill. If non-amended, existing site fill soils must be used as fill, they should be limited to non-structural bearing areas and only used at the direction of CVET.

Where structural fill embankments will be constructed, the new structural fill should be benched into the existing side slopes for subgrade slopes that exceed 4H:1V. The maximum bench height should not exceed 5 feet. Due to the variable nature of the fill, deeper localized undercutting may be required as benching operations progress.

We recommend that positive site drainage is maintained during earthwork operations to prevent the ponding of water on exposed subgrades. Soil subgrades should be protected from inclement weather (rain especially) by 'sealing' the subgrades prior to forecasted inclement weather. 'Sealing' can be performed by rolling with a smooth steel-drum roller without vibration. Ruts should not be created during the 'sealing' operation. Prior to the placement of additional fill, the 'sealed' subgrade should be scarified.

If earthwork is performed during winter months or after inclement weather, the subgrade soil conditions could potentially be more unstable due to wet soil conditions, which could potentially require stabilization or undercutting.

We recommend the implementation of a settlement monitoring program if structural fill depths exceed 10 feet. The settlement monitoring program should consist of a series of settlement monitoring plates at the base of the fill and brass settlement hubs at the top of the fill, once completed. The settlement should be monitored until it reaches an acceptable value to begin building and pavement construction. If this is not implemented, settlement resulting from self-weight consolidation of the new fill should be anticipated and cause distress within the new structures.

5.3 Excavation

The boring data indicate that the on-site soils are generally excavatable using conventional construction equipment. Trenches and other shallow excavations can be performed using medium to large, rubber-tired backhoes. Larger excavation equipment may be necessary for deeper excavations, such as utility lines, generally due to the mass of soil required to be moved.

All excavations and trenches shall be performed in accordance with Occupational Health and Safety Administration (OSHA) 1926 Subpart P regulations to provide stable and safe working conditions for any temporary excavations. Based on visual classification, we recommend that OSHA soil classification Type C be used during sloping and benching configurations for this project.

Construction site safety is the sole responsibility of the contractor, who controls the means and methods and sequencing of construction operations. CVET assumes no responsibility, implied nor inferred, for construction site safety.

5.4 Groundwater Control

We did not encounter groundwater within the depth of exploration at the time of drilling. We do not anticipate groundwater control will be necessary. Groundwater control is the purposeful drawdown of the groundwater levels to facilitate necessary construction. Temporary dewatering operations consist of well points and sump pumps, while

permanent dewatering operations typically consist of French underdrains which discharge by means of gravity flow into the site storm drainage system.

Note that soil moisture and groundwater conditions vary depending on conditions such as temperature, precipitation, and season. Therefore, soil moisture and groundwater location at other times of the year may vary from those observed at the time of this subsurface exploration and as described in this report.

5.5 Foundations

Pending the existing, undocumented fill soil is completely removed and replaced and a settlement monitoring plan is implemented, shallow foundations bearing on structural fill can be designed with an allowable net bearing pressure of up to 3,000 pounds per square foot (psf). We recommend minimum foundation widths and embedment depths of 24 and 18 inches, respectively.

A site-specific settlement analysis has not been performed. However, based upon assumed structural loading and the requirement that the foundation subgrade soils bear in the remedial measures stated above (to be verified by CVET or another qualified CMT firm), we expect total settlements of structures foundations to be less than 1 inch. In general, differential settlements between building components are expected to be on the order of 1/3 to 1/2 of the total settlements. We expect settlements in the building foundations to occur relatively soon after the loads are applied and after primary settlement due to any grade-raised fill has been achieved. The foundation subgrade should be thoroughly evaluated using a Dynamic Cone Penetrometer to verify the recommended bearing capacity.

5.6 Floor / Concrete Slabs

We recommend that grade slabs be supported on approved fill or newly compacted structural fill. As a result of the encountered site conditions, we recommend a modulus of subgrade reaction (ks) of up to 90 pounds per cubic inch (pci) for slabs supported by properly prepared non-elastic/plastic soil subgrade with drainage stone. This value is representative of a 1-ft square loaded area and may need to be adjusted depending on the size and shape of the loaded area and the method of structural analysis. The floor slab should be isolated from building foundations unless the connection is designed to accommodate anticipated differential settlement between the slab and foundation systems. We consider properly prepared soil subgrade to consist of approved residuum or approved structural fill soils within the top two feet of finished grades compacted to 100% of the standard Proctor method (ASTM D698). Compacted soils should be placed within ±3% of the optimum moisture content (OMC) as determined by the standard Proctor method.

CVET recommends the use of 4 to 6 inches of free-draining granular material (NCDOT No. 57 stone or recycled concrete) as both aggregate base course under the slab and capillary break. Prior to placing the granular material, the subgrade for the entire floor slab area should be proofrolled.

Please note that site preparation and earthwork operations shall be performed in accordance with our Geotechnical Engineering Report to ensure adequate subgrade soil conditions for direct slab on grade support. The structural engineer of record should be provided with the report for review.

The use of a vapor retarder should be considered beneath concrete slabs on grade which will be covered with wood, tile, carpet or other moisture-sensitive or impervious coverings, per ACI 302 and/or ACI 360. Construction joints, contraction joints, and isolation joints should be provided in the slab to reduce the impacts of cracking and shrinkage. See ACI 302 for additional details regarding slab joint design.

5.7 Permanent Slopes

We recommend that permanent embankment slopes be graded no steeper than 2H:1V assuming no deleterious material is encountered during benching operations. CVET should be retained to observe initial subgrade conditions and benching operations for the new embankment fill. Shallower slopes should be considered if mowing equipment will be used on the slopes. Building structure footings should be situated a minimum of 15 feet behind the crest of any permanent slopes. The edge of paved areas should be situated a minimum of 10 feet behind the crest of any permanent slopes.

The permanent slopes should be vegetated for long-term surficial stability. The Owner can expect minor sloughs that may need to be repaired until permanent vegetation has taken to the slope soils. Additionally, we recommend utilizing a drainage swale and/or grade the crest of permanent slopes such that stormwater surface runoff does not sheet flow over the slope crest.

5.8 Pavements

Traffic loading conditions for this project have not been provided. Pavement for this project is assumed to consist of light-duty asphalt parking areas (only personal vehicle traffic) and heavy-duty asphalt drives (drive lanes). Based on the subsurface conditions encountered in the test borings, and assuming all pavement areas pass a proofroll as described in section 5.2 of this report, we recommend thicknesses of 2.0 and 8 inches for surface course and compacted ABC crushed stone, respectively, for light-duty pavement. For heavy-duty pavement, we recommend thicknesses of 3.0, 2.0 and 8.0 inches for surface course, intermediate asphalt base course and compacted ABC crushed stone, respectively. We recommend an 8-inch thick Portland cement concrete slab bearing on 6 inches of compacted ABC crushed stone for the approach and slab for any trash

dumpster on site. If concrete pavements are desired, we recommend a minimum of 8 inches of reinforced concrete overlying 8 inches of compacted ABC crushed stone base. The concrete should be air-entrained and have a minimum of 4,500 psi after 28 days of laboratory curing per ASTM C-31. We recommend a minimum of 12 inches of compacted ABC stone be placed beneath pavement sections that are placed over newly placed utility trench backfill.

It should be noted that the design recommendations stated may not satisfy North Carolina Department of Transportation guidelines; therefore, we recommend that any roadways constructed for public use with maintenance provided by the State be designed in accordance with State regulatory requirements.

If a proofroll reveals unstable soils, stabilization and/or undercut should be anticipated. We recommend an undercut of at least 18 inches and replacement with quality non-plastic fill materials. Plastic/elastic soils are moisture sensitive and prone to shrink/swell with moisture changes. If fill soils will be placed to reach final grades, we recommend an 18-inch buffer of non-plastic fill soils between the pavement subgrade and the elastic soils. Stabilization could consist of the installation of a biaxial geogrid (Mirafi BX1200 or approved equivalent), a heavy woven geotextile fabric (Mirafi HP 370 or approved equivalent) or chemical stabilization depending on the exposed subgrade soil conditions. Pavements should not bear on plastic/elastic soils.

Careful control of storm water is one of the best ways to ensure adequate long-term performance of any pavement. The surface of the pavement should be sloped to gutters and/or catch basins to prevent water from ponding and infiltrating through the pavement into the sub-base and subgrade.

We recommend compaction testing of the ABC crushed stone base prior to asphalt/concrete placement, and full-time inspection during asphalt/concrete placement.

5.9 Construction Materials Testing and Special Inspections

Construction materials testing (CMT) and inspections should be performed at regular intervals throughout the course of the project. CVET is qualified for this work and would be pleased to provide these services during construction.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Catawba County and their agents for specific application to the referenced property, in accordance with generally accepted soils and foundation engineering practices. No warranties, express or implied, are intended or made. The recommendations presented in this report are based on the specific test borings and laboratory testing performed as part of our scope of service, and do not reflect variations in subsurface conditions that may exist between test boring

locations or in unexplored portions of the site. Note that the soil data presented in this report is for the specific time of this subsurface exploration. While the type of material encountered in the test borings will not likely change significantly over time, the properties of the materials can and will change over time, including soil moisture content, density, consistency, SPT "N" values, etc. Fluctuations in the groundwater level can have a significant impact on the material properties, as can seasonal changes. Site safety, excavation support related to OSHA requirements, and construction dewatering requirements are the responsibility of others, not CVET. In the event changes are made to the proposed construction plans, design or location of the project as described within this report, the recommendations provided in this report shall not be considered valid unless CVET is given the opportunity to review the changes, and either verifies or modifies the recommendations contained in this report in writing.

APPENDIX A – GEOPROFESSIONAL BUSINESS ASSOCIATION PAMPHLET

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

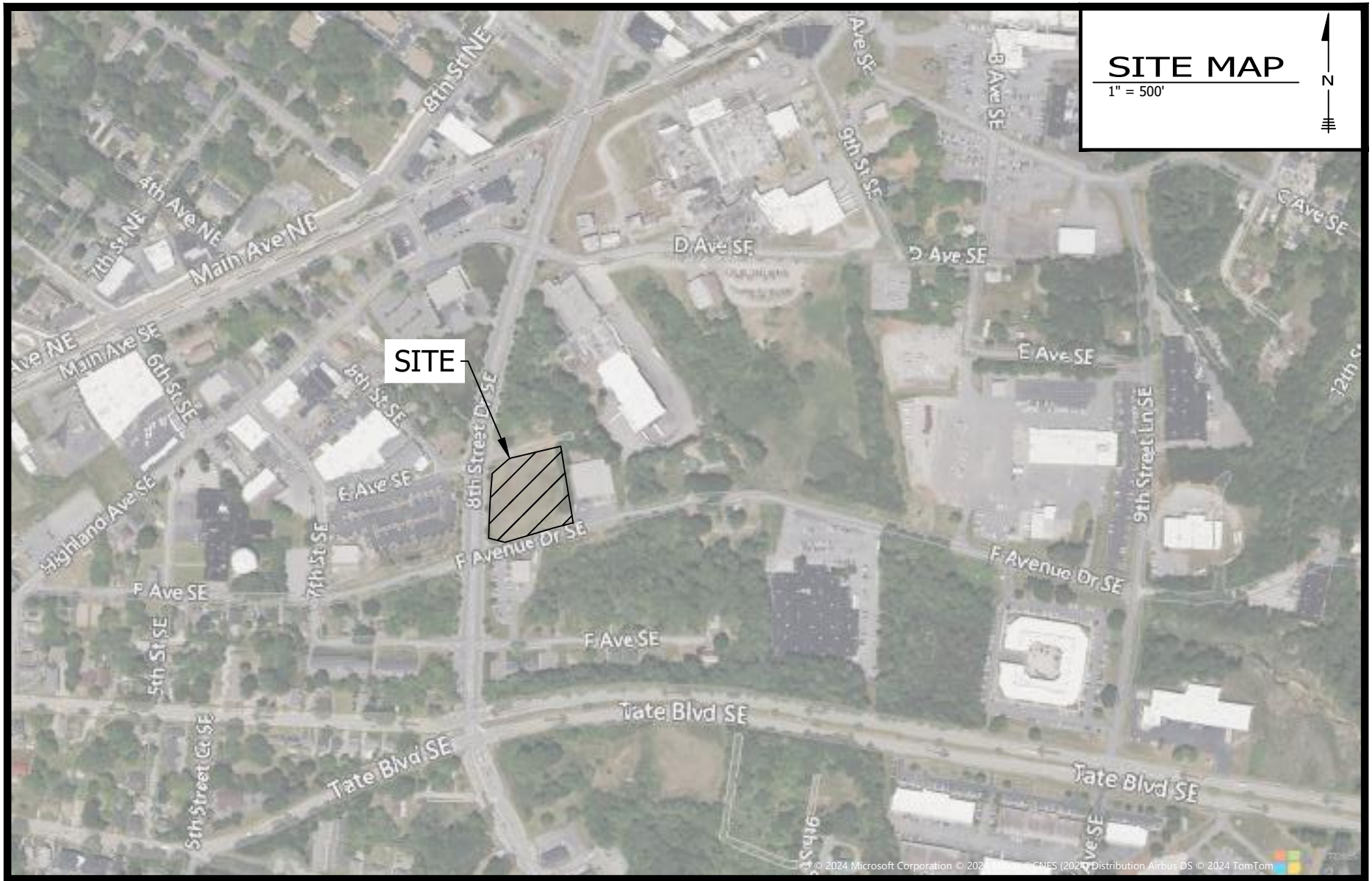
Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX B – PROJECT FIGURES



CATAWBA VALLEY
ENGINEERING & TESTING

P.O.B. 747 HICKORY, NORTH CAROLINA 28603
TELE: 828-578-9972

HICKORY EMS

8TH STREET DRIVE SOUTHEAST
HICKORY, NC 28602

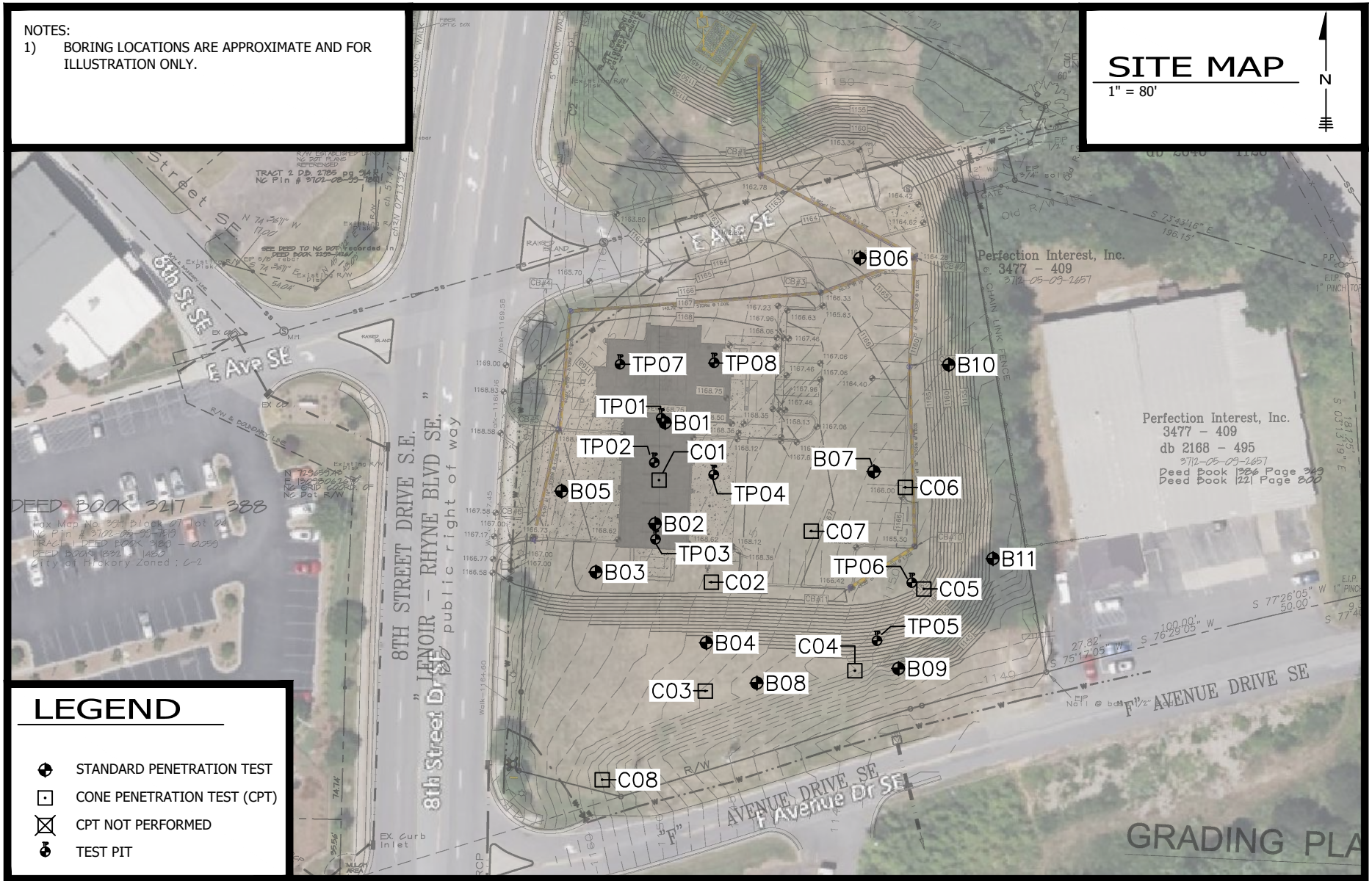
DRAWN BY	PROJECT NO.
SBS	25-500
DATE	SHEET NO.
01/03/2024	FIG. 1

NOTES:
1) BORING LOCATIONS ARE APPROXIMATE AND FOR ILLUSTRATION ONLY.

SITE MAP

1" = 80'

N



LEGEND

- STANDARD PENETRATION TEST
- CONE PENETRATION TEST (CPT)
- CPT NOT PERFORMED
- TEST PIT

CATAWBA VALLEY
ENGINEERING & TESTING

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TELE: 828-578-9972

HICKORY EMS

8TH STREET DRIVE SOUTHEAST
HICKORY, NC 28602

DRAWN BY	PROJECT NO.
SBS	24-500
DATE	SHEET NO.
01/03/2024	FIG. 2

Description	Elevation	Northing	Easting	Description	Elevation	Northing	Easting
B01	1159	729694.16	1309982.54	C04	1150	729553.40	1310090.16
B02	1158	729636.83	1309976.89	C05	1149	729599.83	1310129.30
B03	1160	729609.41	1309943.31	C06	1151	729657.43	1310118.82
B04	1150	729569.24	1310005.96	C07	1153	729632.65	1310065.38
B05	1163	729655.31	1309923.80	C08	1158	729491.54	1309946.84
B06	1155	729787.50	1310093.09	TP01	1159	729696.72	1309979.00
B07	1152	729666.37	1310100.93	TP02	1159	729671.53	1309975.11
B08	1152	729546.40	1310034.58	TP03	1156	729628.03	1309975.74
B09	1148	729554.64	1310114.97	TP04	1155	729664.67	1310008.76
B10	1152	729727.05	1310143.45	TP05	1146	729570.47	1310101.39
B11	1148	729616.98	1310168.56	TP06	1148	729603.38	1310121.12
C01	1159	729661.62	1309979.08	TP07	1163	729727.31	1309955.63
C02	1156	729603.67	1310008.77	TP08	1159	729728.17	1310009.00
C03	1154	729541.88	1310005.28				

BORING LOCATIONS AND ELEVATIONS ARE APPROXIMATE. BORING ELEVATIONS ARE BASED ON NC ONEMAP ACCESSED DURING PREPARATION OF THIS REPORT.

CATAWBA VALLEY
ENGINEERING & TESTING
P.O.B. 747 HICKORY, NORTH CAROLINA 28603
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HICKORY EMS

8TH STREET DRIVE SOUTHEAST
HICKORY, NC 28602

DRAWN BY	PROJECT NO.
SBS	25-500
DATE	SHEET NO.
01/03/2024	FIG. 3

APPENDIX C – BORING LOGS

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressure meter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash Sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistance to Soil Properties

Standard penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density	*Adjective Form*
Under 4 blows/ft	Very Loose
5 to 10 blows/ft	Loose
11 to 30 blows/ft	Medium Dense
31 to 50 blows/ft	Dense
Over 51 blows/ft	Very Dense

Particle Size Identification		
Boulders		8 inches and larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch
	Medium	0.42 to 2.0 mm
	Fine	0.074 to 0.42 mm
Silt and Clay		0.0 to 0.074 mm

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to Slight	0-4
3 to 4	Soft	0.25-0.49	Slight	5-7
5 to 8	Medium Stiff	0.50-0.99	Medium	8-22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00-8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL Water Level	BCR Before Casing Removal	DCI Dry Cave-in
WS While Sampling	ACR After Casing Removal	WCI Wet Cave-in
WD While Drilling	▽ Est. Groundwater Level	▽ Est. Seasonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

KEY TO SYMBOLS

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

CLIENT Catawba County **PROJECT NAME** HKY EMS

PROJECT NUMBER 24-524 **PROJECT LOCATION** Hickory, NC

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


FILL: Fill (made ground)


SM: USCS Silty Sand


SM-ML: Silty Sand w/ Sandy Silt


TOPSOIL: Topsoil

SAMPLER SYMBOLS


Split Spoon

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION


Water Level at Time Drilling, or as Shown


Water Level at End of Drilling, or as Shown


Water Level After 24 Hours, or as Shown

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B01

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1159 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 10.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0		TOPSOIL: (3 Inches) 1158.8					
		(SM) FILL: Silty SAND, Trace Fine Mica, Brown, Tan, Black, Gray, Dry, Medium Dense	SS 1	100	3-6-5 (11)		
		1156.0					
		(SM) RESIDUAL: Silty SAND, Brown, Tan, Gray, Dry, Loose to Dense	SS 2	100	9-10-9 (19)		
5			SS 3	100	11-15-15 (30)		
			SS 4	100	4-4-6 (10)		
10							
			SS 5	100	6-6-7 (13)		
15							
			SS 6	100	9-16-23 (39)		
20		1139.0					

▲ SPT N VALUE ▲
20 40 60 80

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B02

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1158 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 11
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0	TOPSOIL: (3 Inches) 1157.8					
	(SM) FILL: Silty SAND, Brown, Orange Brown, Tan, Gray, Dry to Moist, Loose to Medium Dense	SS 1	100	4-4-4 (8)		
		SS 2	100	1-4-7 (11)		
5		SS 3	100	4-6-6 (12)		
	1150.0 (SM) RESIDUAL: Silty SAND, Yellow Brown, Tan, Brown, Gray, Dry, Loose to Medium Dense	SS 4	100	3-3-2 (5)		
10						
		SS 5	100	6-7-13 (20)		
15						
		SS 6	100	5-7-8 (15)		
20	1138.0 Bottom of borehole at 20.0 feet.					

SPT N VALUE
20 40 60 80

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B03

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1160 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 7.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0	TOPSOIL: (3 Inches) 1159.8 (SM) FILL: Silty SAND, Fine Mica, Brown, Gray, Black, Dry to Moist, Very Loose to Loose	SS 1	100	4-3-3 (6)		
5		SS 2	100	1-1-2 (3)		
	1153.5 (SM) RESIDUAL: Silty Fine SAND, Trace Fine Mica, Dark Red Brown, Brown, Gray, Tan, Black, Dry to Moist, Loose to Medium Dense	SS 3	100	4-5-7 (12)		
10		SS 4	100	4-5-6 (11)		
15		SS 5	100	3-3-4 (7)		
20	1140.0	SS 6	100	20-27-50 (77)		

▲ SPT N VALUE ▲
20 40 60 80

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B04

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1155 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 6.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲
0		TOPSOIL: (3 Inches) 1154.8						
		(SM) FILL: Silty SAND, Trace Mica, Trace Rock Fragments, Dark Brown, Dark Red Brown, Dry to Moist, Loose to Medium Dense	SS 1	72	1-2-4 (6)			
			SS 2	100	4-5-6 (11)			
5			SS 3	100	5-5-6 (11)			
		1147.0						
		(SM) RESIDUAL: Silty Fine SAND, Mica, Orange, Red Brown, Brown, Gray, Dry to Moist, Medium Dense	SS 4	100	5-6-7 (13)			
10								
			SS 5	100	4-5-6 (11)			
15								
			SS 6	100	4-5-6 (11)			
20		1135.0						

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B05

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1163 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 4.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	SPT N VALUE (20 40 60 80)
0.0		TOPSOIL: (3 Inches) 1162.8						
		(SM) FILL: Silty SAND, Fine Mica, Trace Rock Fragments, Dark Red Brown, Moist, Very Loose	SS 1	100	3-2-2 (4)			
2.5		1160.0						
		(SM) FILL: Silty SAND, Rock/Concrete Debris, Red Brown, Brown, Gray, Dry, Medium Dense	SS 2	100	48-8-50/2"			>>
5.0								
			SS 3	44	8-7-7 (14)			
7.5		1155.0						
		(SM) RESIDUAL: Silty SAND, Fine Mica, Dark Red Brown, Black, Moist, Loose	SS 4	100	3-4-5 (9)			
10.0		1153.0						

Bottom of borehole at 10.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
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BORING NUMBER B06

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 1156 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 3.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲
0.0		TOPSOIL: (3 Inches)	1155.8						
		(ML/MH) FILL: Sandy SILT or Sandy Elastic SILT, Trace Fine Mica, Red Brown, Dry, Medium Stiff		SS 1	100	3-4-4 (8)			
2.5									
			1152.0	SS 2	100	3-4-5 (9)			
		(SM) RESIDUAL: Silty SAND, Fine Mica, Red Brown, Brown, Gray, Yellow Brown, Tan, Dry, Loose to Medium Dense							
5.0									
				SS 3	100	4-6-10 (16)			
7.5									
				SS 4	100	2-2-3 (5)			
10.0			1146.0						

Bottom of borehole at 10.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B07

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 1152 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 2.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲
0.0		TOPSOIL: (3 Inches)	1151.8						
		(SM) FILL: Silty Fine SAND, Fine Mica, Brown, Dry to Moist, Loose		SS 1	100	4-4-5 (9)			
2.5									
				SS 2	100	3-4-6 (10)			
5.0									
				SS 3	100	4-4-6 (10)			
7.5									
			1144.0						
		(SM) RESIDUAL: Silty SAND, Fine Mica, Brown, Gray, Red Brown, Dry to Moist, Medium Dense		SS 4	100	10-6-5 (11)			
10.0			1142.0						

Bottom of borehole at 10.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B08

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1154 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0.0	TOPSOIL: (3 Inches) 1153.8					
	(SM-ML) FILL: Silty Fine SAND w/ Sandy Silt, Trace Rock Fragments, Trace Fine Root Material, Trace Fine Mica, Dark Brown, Orange Brown, Dry to Moist, Loose	SS 1	80	21-50/4"		
2.5						
		SS 2	28	5-3-3 (6)		
5.0						
		SS 3	78	2-2-3 (5)		
7.5	1146.0					
	(CH) FILL: Sandy Fat CLAY, Trace Root Material, Red Brown, Orange Brown, Moist, Stiff	SS 4	100	4-7-8 (15)	27	28
10.0						
12.5						
	1140.0					
	(SM-ML) RESIDUAL: Silty Fine SAND w/ Sandy Silt, Fine Mica, Brown, Moist, Loose	SS 5	100	3-3-5 (8)		
15.0	1139.0					

▲ SPT N VALUE ▲ (20, 40, 60, 80; >> at SS 1)

Bottom of borehole at 15.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
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BORING NUMBER B09

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/1/24 **COMPLETED** 4/1/24
GROUND ELEVATION 1146 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 5.25
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲
0.0	TOPSOIL: (3 Inches) 1145.8						
	(SM-ML) FILL: Silty SAND w/ Sandy Silt, Rock Fragments, Brown, Moist, Very Loose	SS 1	28	2-2-1 (3)			
2.5							
		SS 2	38	3-50/2"			>>
5.0	1140.0 Shelby Tube						
7.5	1138.5 (SC) FILL: Clayey SAND with Gravel, Brick and Asphalt Debris, Trace Fine Mica, Red Brown, Moist, Stiff	SS 4	67	4-5-4 (9)	16	19	
10.0							
	1134.0 (SM) RESIDUAL: Silty SAND, Brown, Gray, Yellow, Tan, Black, Dry, Very Dense						
12.5							
		SS 5	100	22-32-41 (73)			
15.0	1131.0 Bottom of borehole at 15.0 feet.						

CATAWBA VALLEY ENGINEERING & TESTING
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BORING NUMBER B10

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 1152 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	SPT N VALUE
0.0	TOPSOIL: (3 Inches) 1151.8						
	(SM-ML) FILL: Silty Fine SAND w/ Sandy Silt, Trace Rock Fragments, Fine Mica, Red Brown, Gray, Moist, Very Loose to Loose	SS 1	100	2-2-2 (4)			
2.5							
		SS 2	100	1-2-3 (5)			
5.0	1146.5						
	(SM-ML) FILL: Silty Fine SAND w/ Sandy Silt, Trace Roots, Organics, Red Brown, Black, Moist, Very Loose - 4.5% organics by weight in SS3	SS 3	100	3-1-1 (2)		24	
7.5							
	1143.0						
	(SM) RESIDUAL: Silty SAND, Brown, Red Brown, Gray, Tan, Black, Dry to Moist, Loose	SS 4	100	2-2-3 (5)			
10.0							
12.5							
		SS 5	100	4-4-5 (9)			
15.0	1137.0						

Bottom of borehole at 15.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
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BORING NUMBER B11

CLIENT Catawba County
PROJECT NAME HKY EMS
PROJECT NUMBER 24-524
PROJECT LOCATION Hickory, NC
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 1148.5 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 4.5
LOGGED BY TV **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲
0.0		TOPSOIL: (3 Inches) 1148.3						
		(SM) FILL: Silty SAND, Rock Fragments, Mica, Red Brown, Moist, Loose	SS 1	56	2-2-3 (5)	11	18	
2.5		1144.5						
		(SM) RESIDUAL: Silty SAND, Fine Mica, Orange Brown, Brown, Tan, Gray, Black, Dry to Moist, Very Loose to Medium Dense	SS 2	100	2-2-2 (4)			
5.0			SS 3	100	4-6-8 (14)	NP	17	
7.5			SS 4	100	2-6-6 (12)	NP	20	
10.0								
12.5								
15.0		1133.5	SS 5	100	4-6-8 (14)			

Bottom of borehole at 15.0 feet.

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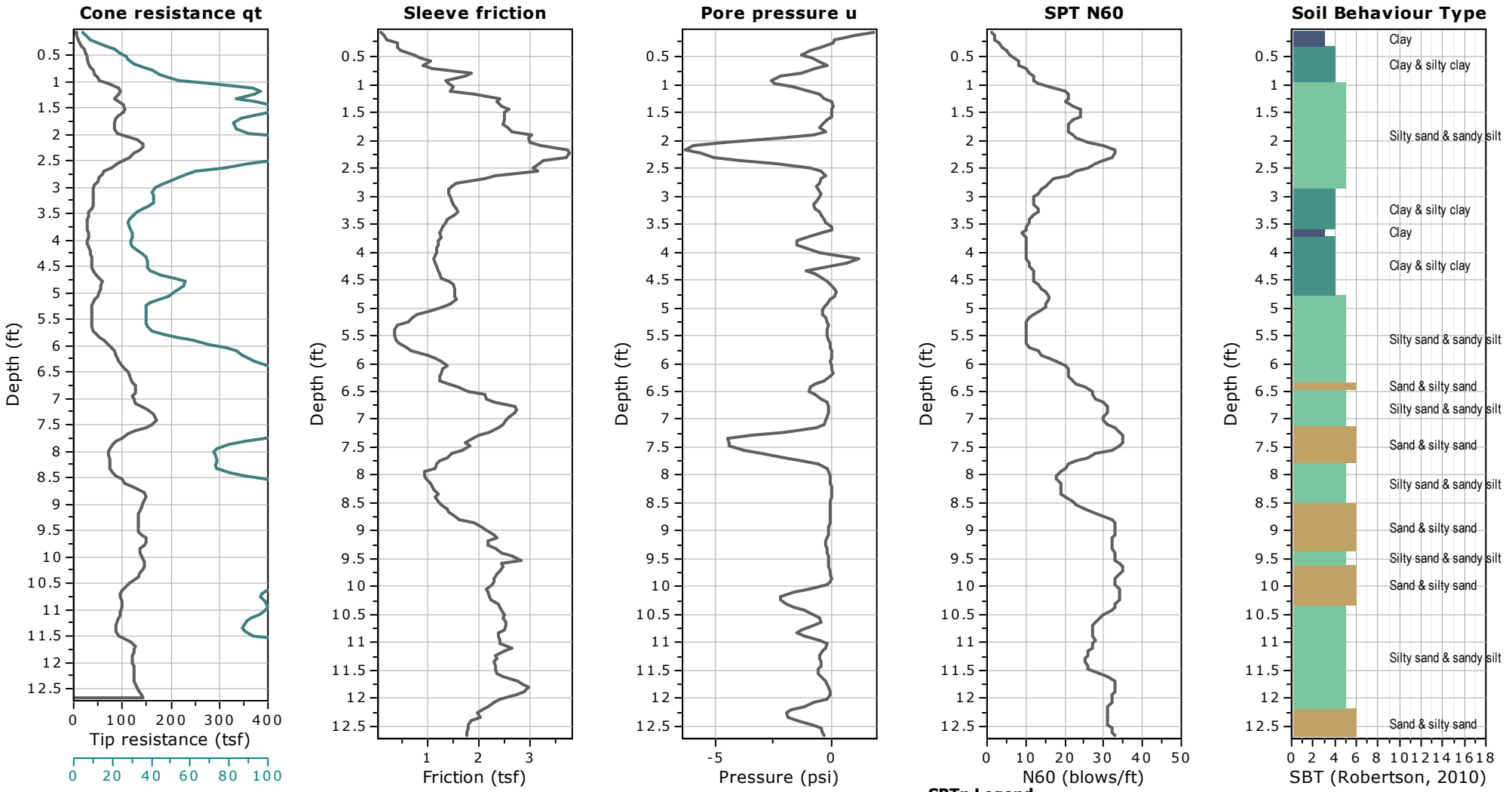
CPT: C01
Total depth: 12.66 ft, Date: 6/3/2024
Surface Elevation: 1159.00 ft
Cone Type: AB Nova

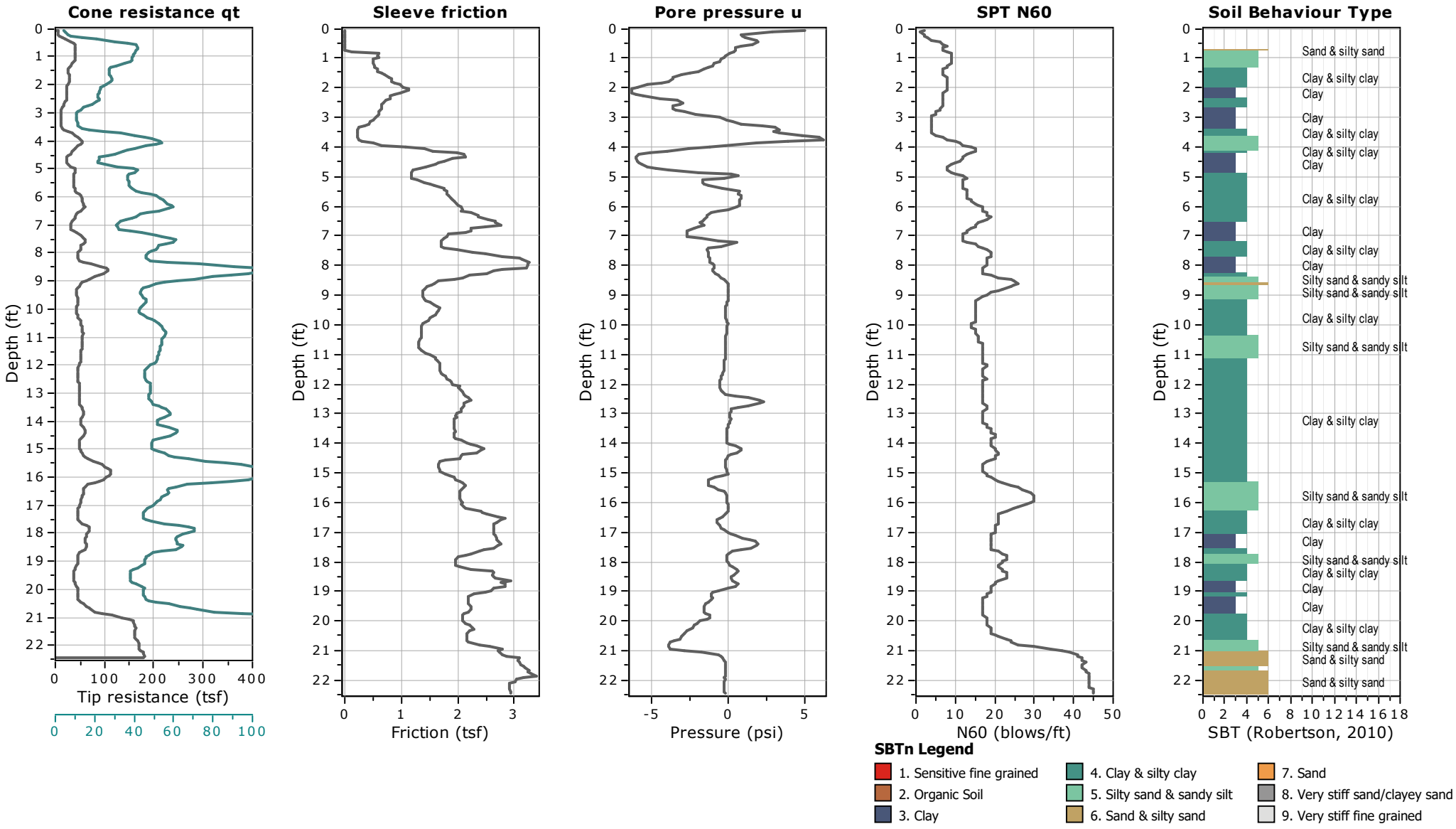
Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
Hickory, North Carolina
www.cvet.net

CPT: C02
Total depth: 22.44 ft, Date: 6/3/2024
Surface Elevation: 1155.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
Hickory, North Carolina
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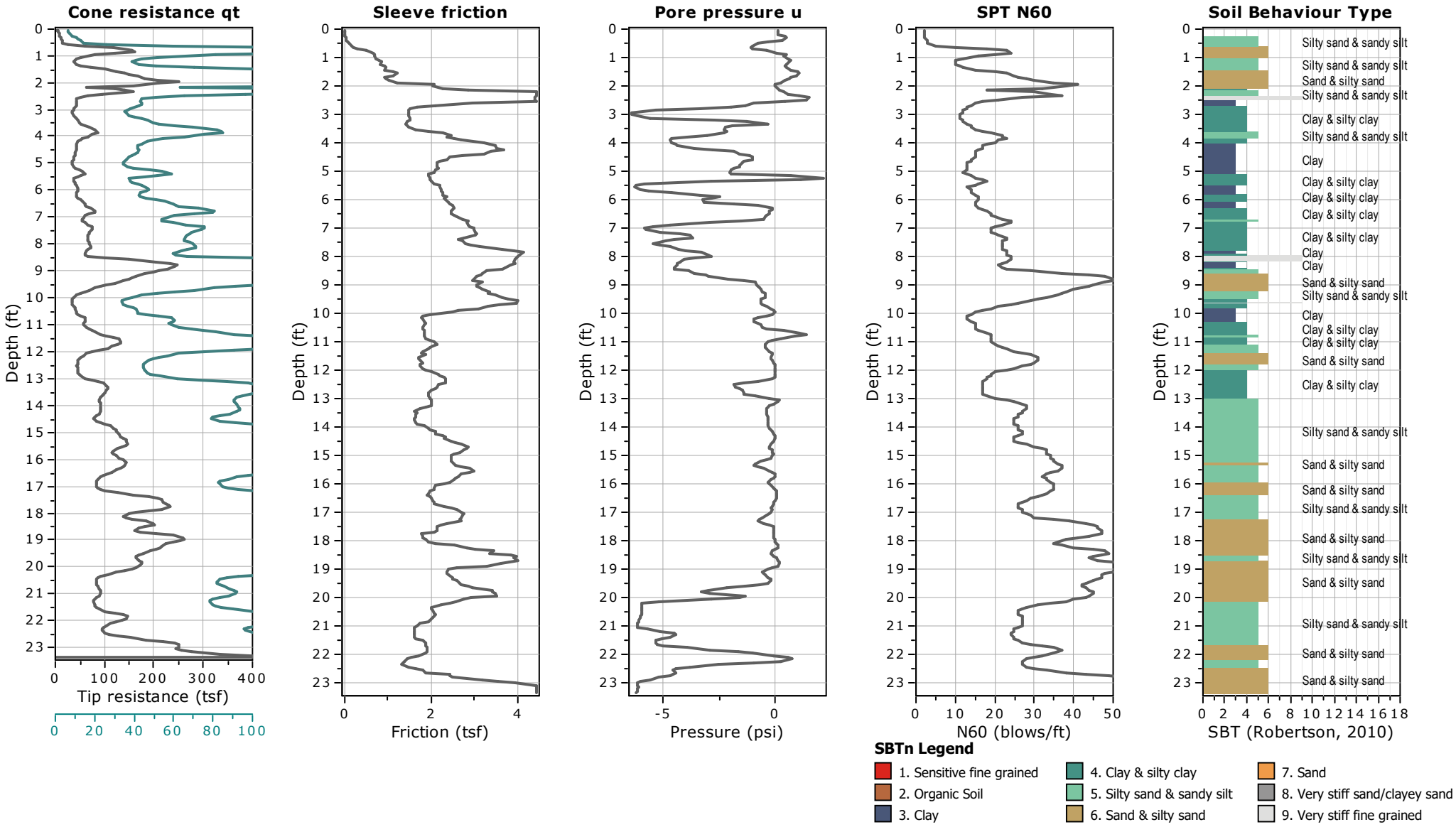
CPT: C03
Total depth: 23.36 ft, Date: 6/3/2024
Surface Elevation: 1154.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
Hickory, North Carolina
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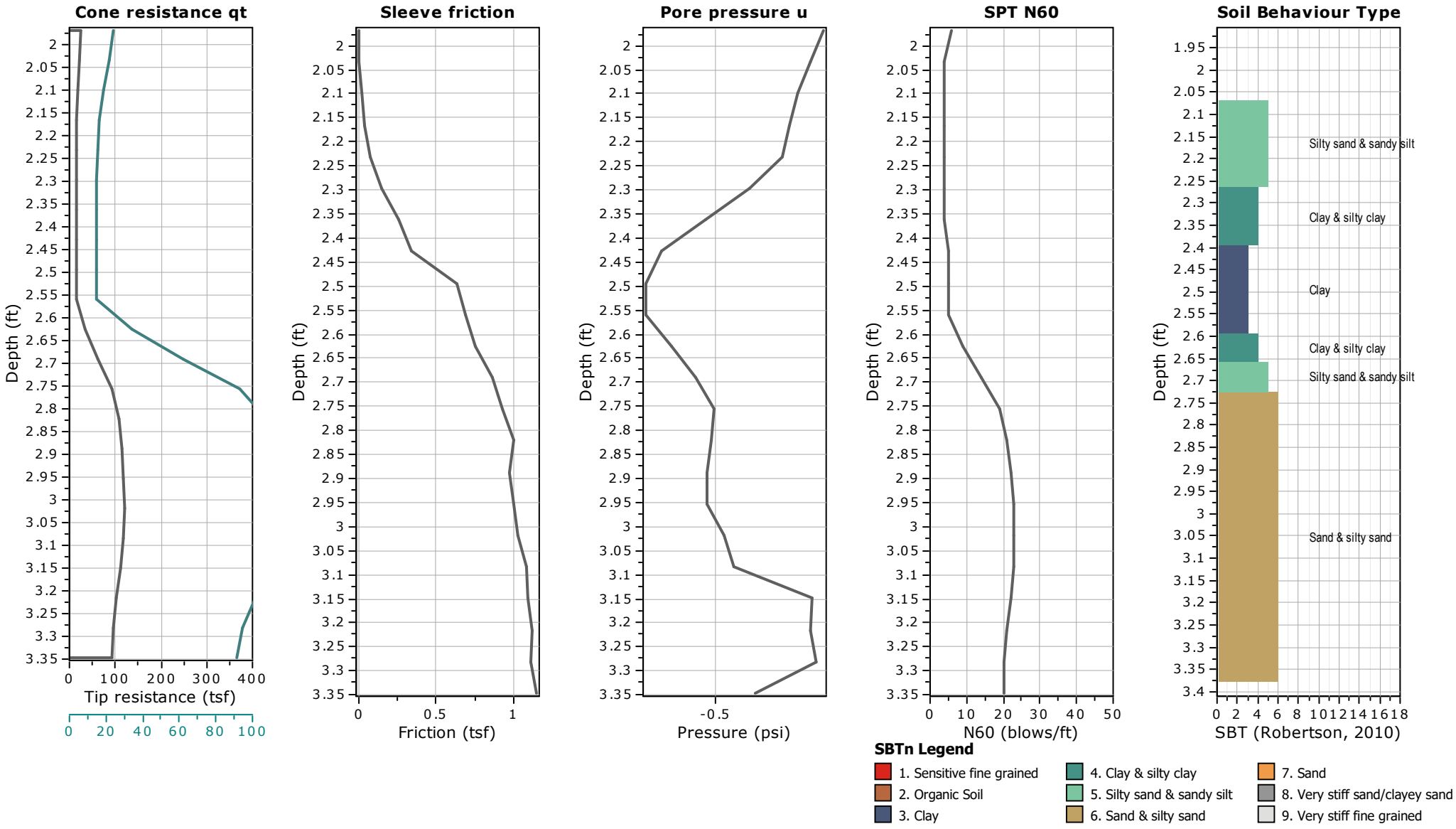
CPT: C04
Total depth: 3.35 ft, Date: 6/20/2024
Surface Elevation: 1150.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
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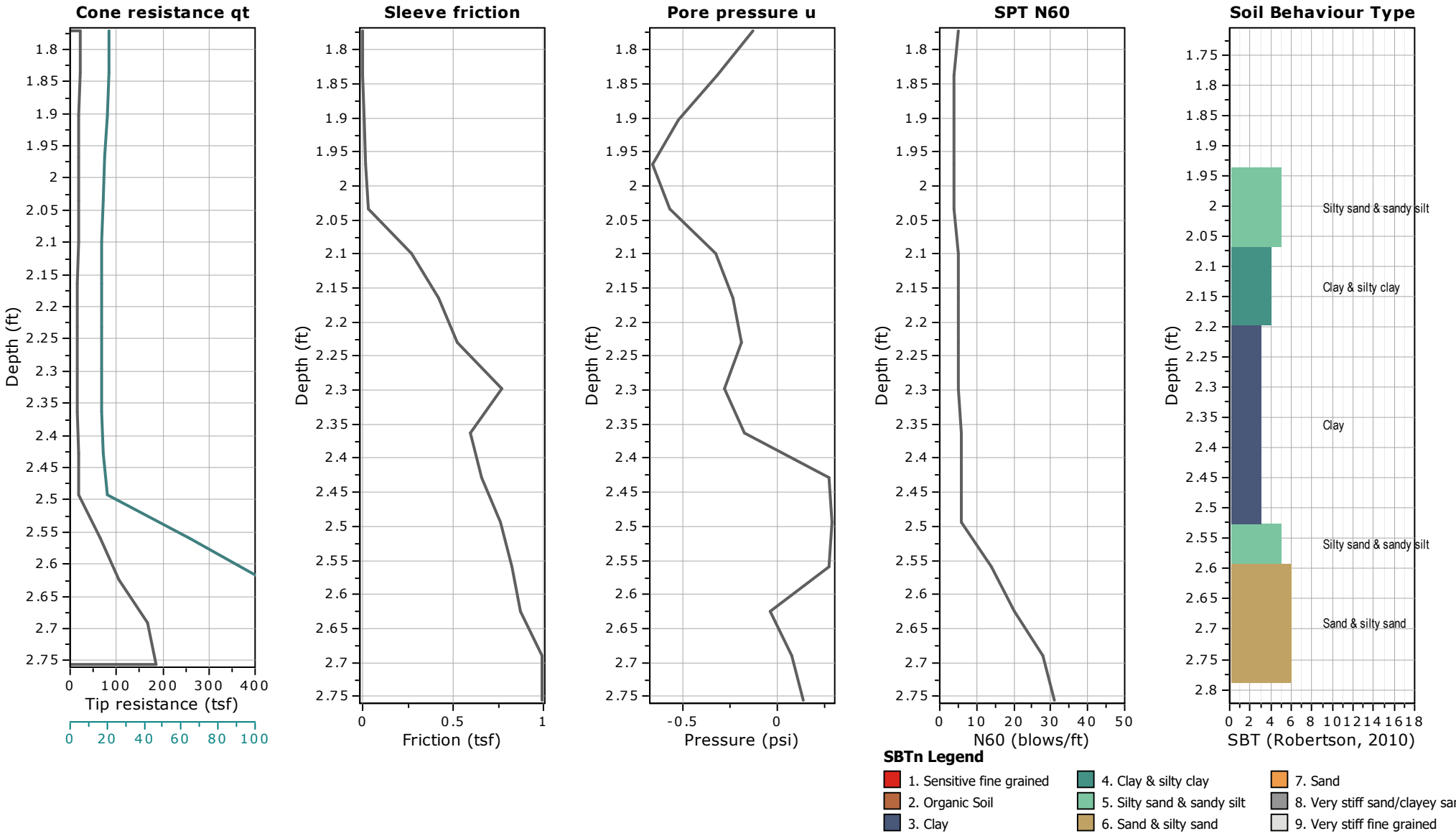
CPT: C04A
Total depth: 2.76 ft, Date: 6/20/2024
Surface Elevation: 1150.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
Hickory, North Carolina
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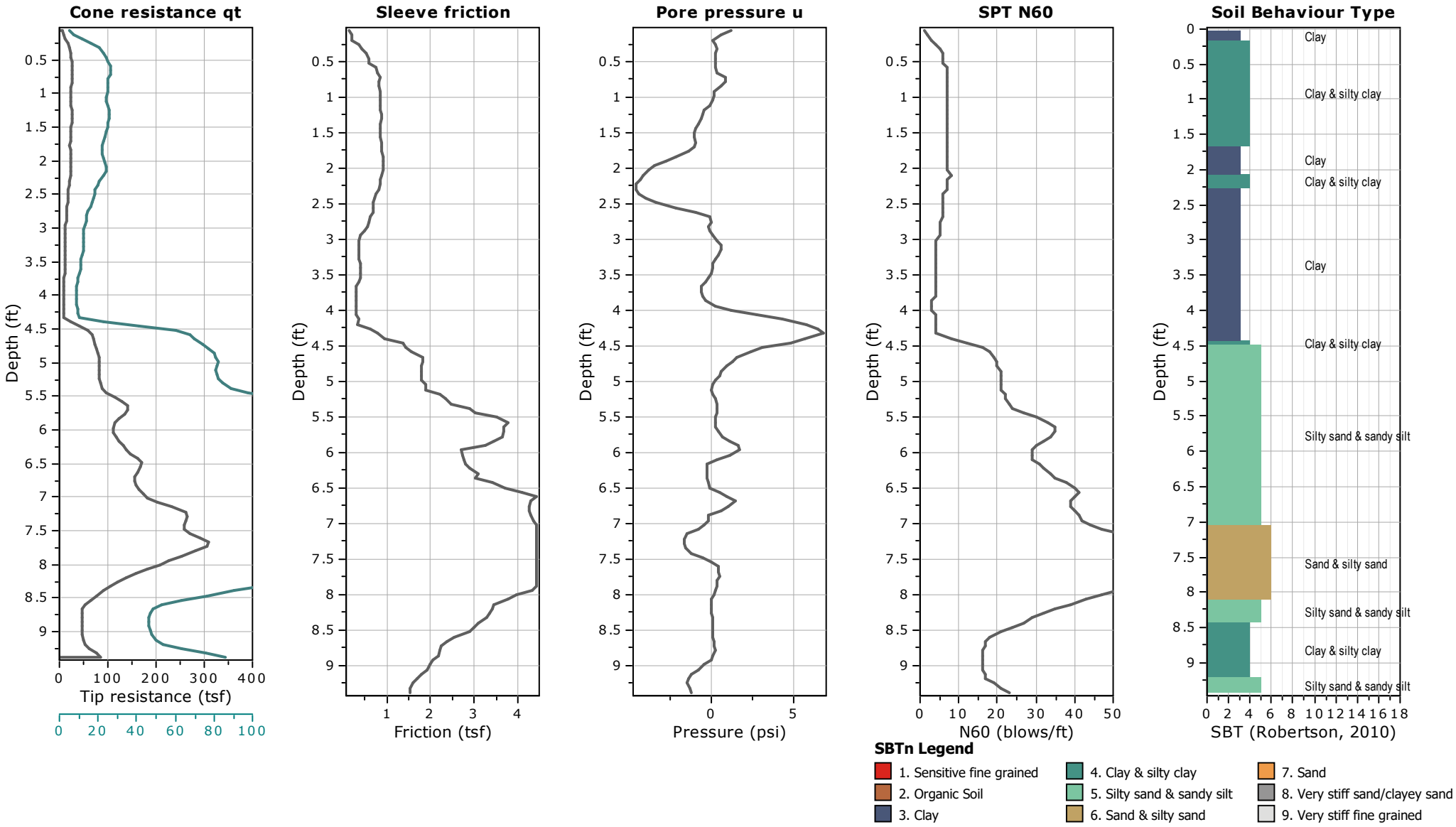
CPT: C05
Total depth: 9.38 ft, Date: 6/3/2024
Surface Elevation: 1149.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
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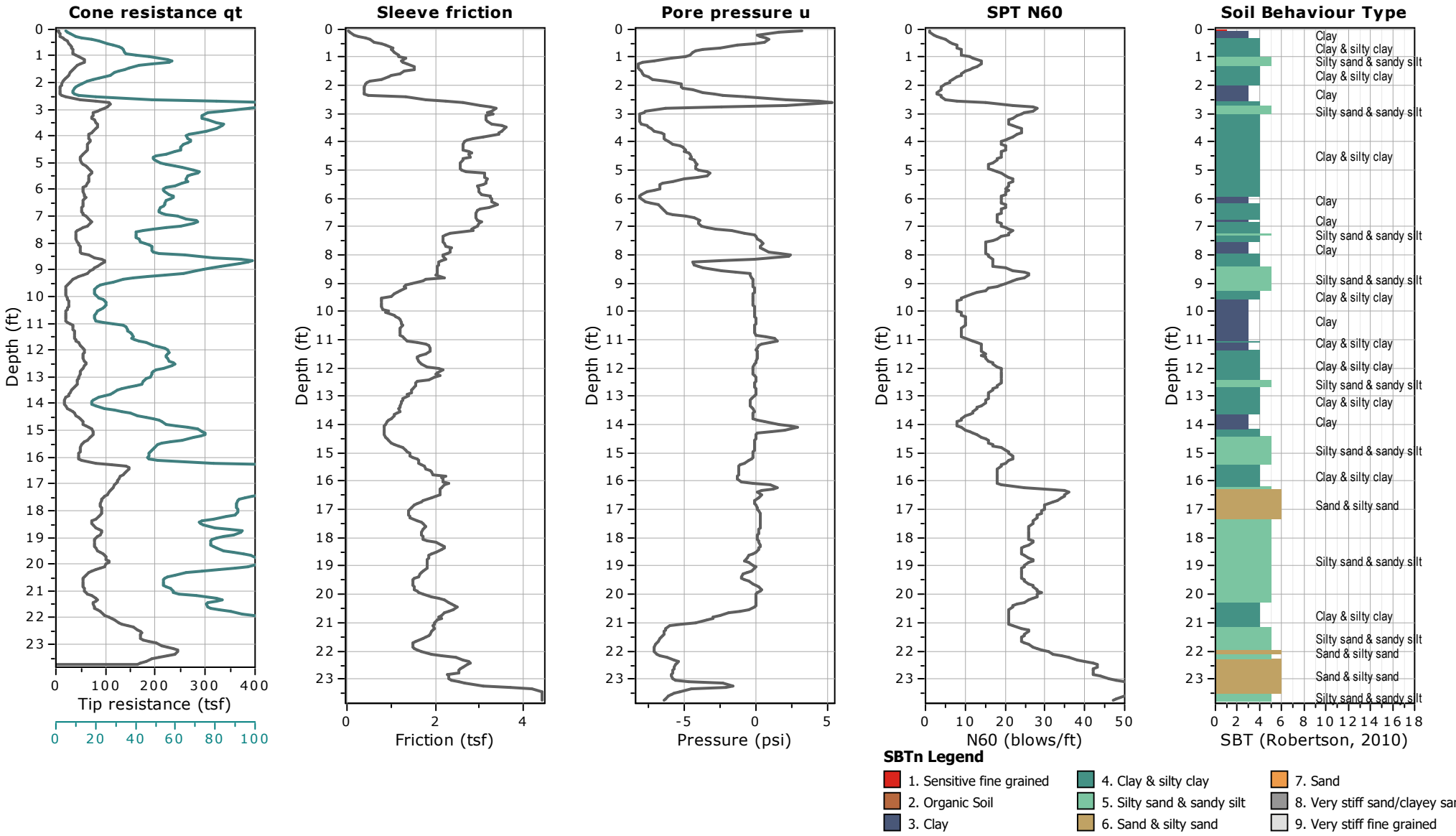
CPT: C06
Total depth: 23.75 ft, Date: 6/3/2024
Surface Elevation: 1151.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
Hickory, North Carolina
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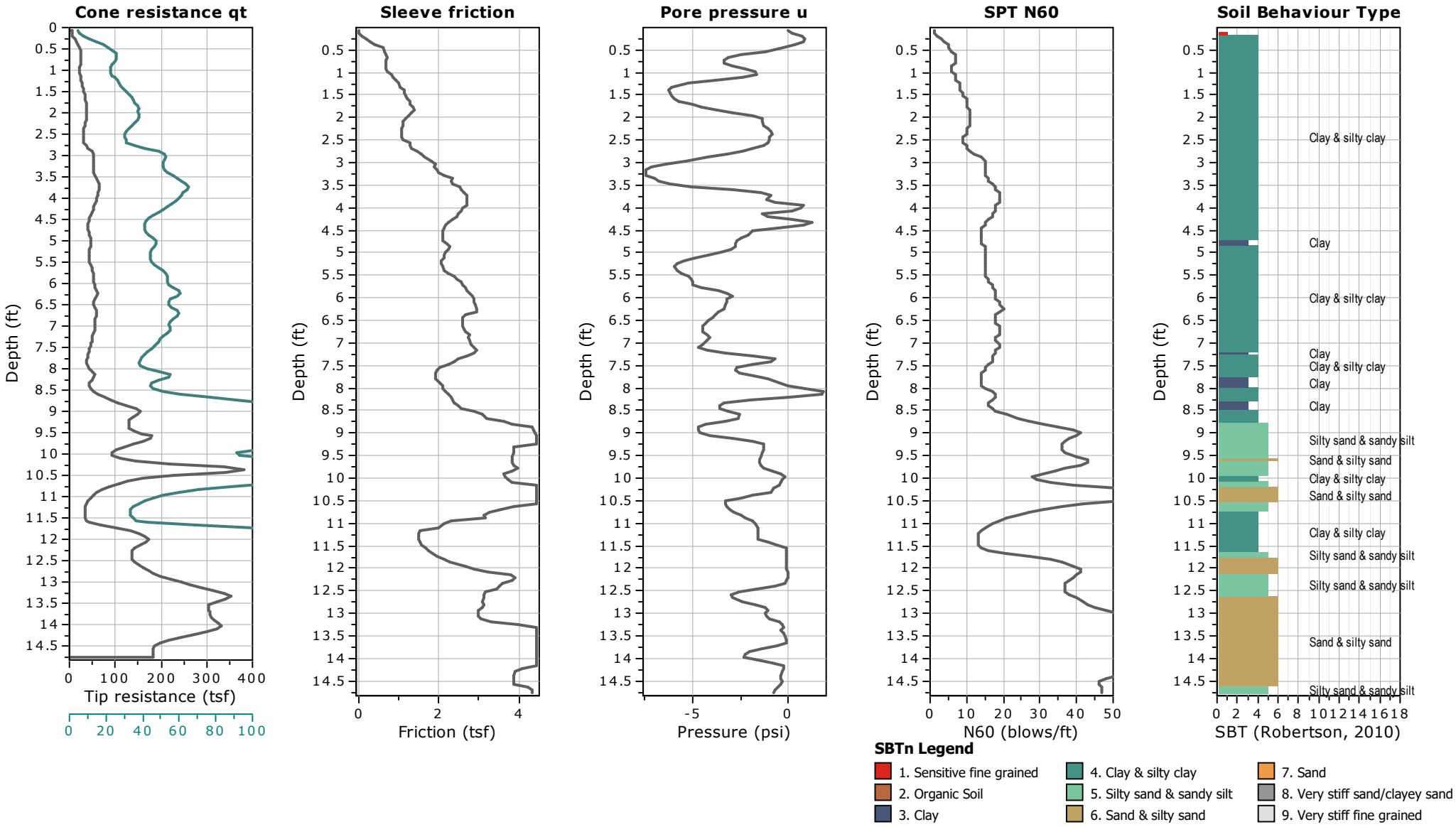
CPT: C07
Total depth: 14.76 ft, Date: 6/3/2024
Surface Elevation: 1155.00 ft
Cone Type: AB Nova

Project: 24-524 Hickory EMS
Location: Hickory, NC



Catawba Valley Engineering & Testing, P.C.
1490 South Center Street
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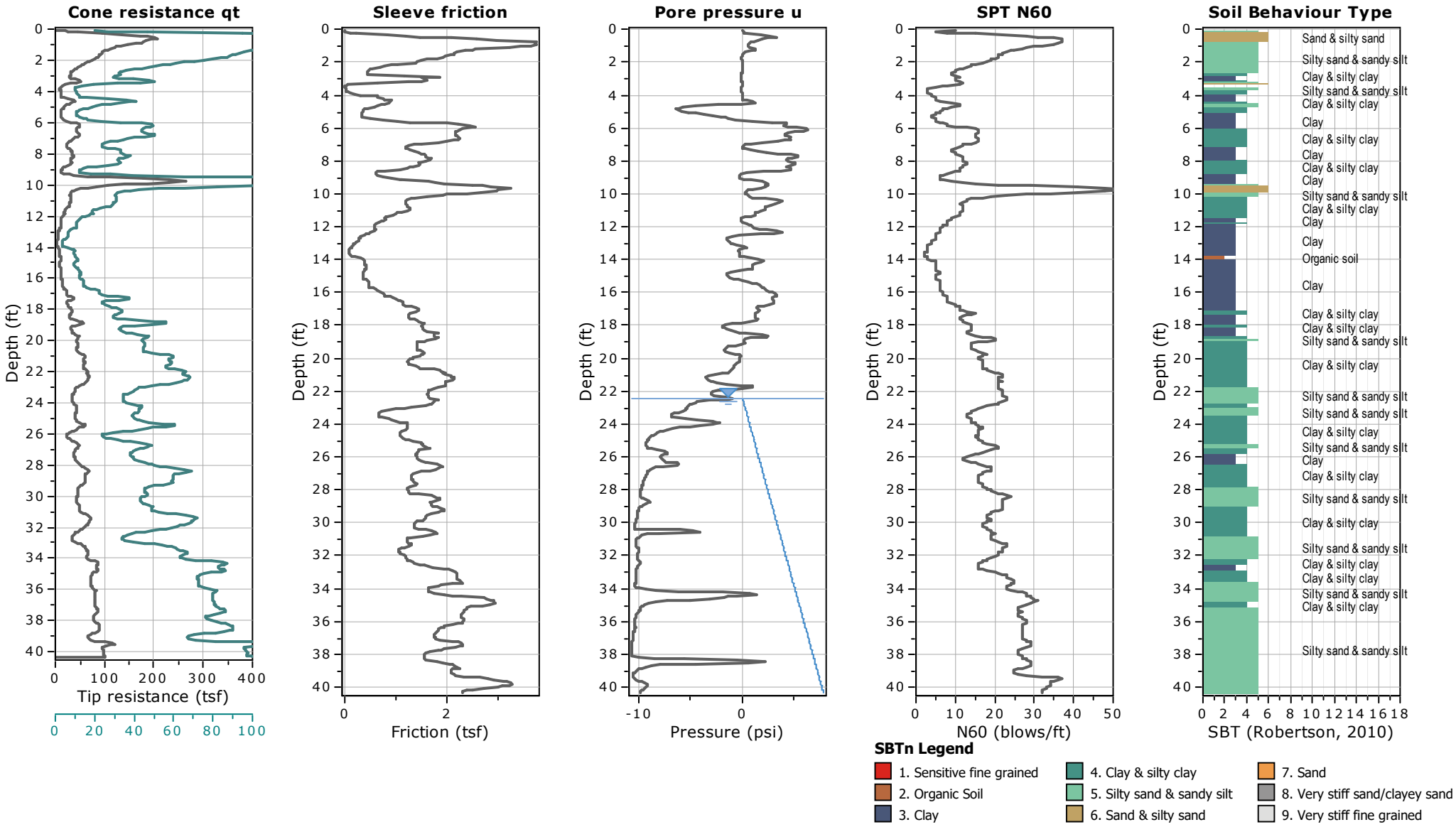
CPT: C08
Total depth: 40.35 ft, Date: 7/12/2024
Surface Elevation: 960.00 ft
Cone Type: NOVA

Project: 24-524 Hickory EMS
Location: Hickory, NC



APPENDIX D – SOIL LABORATORY RESULTS

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

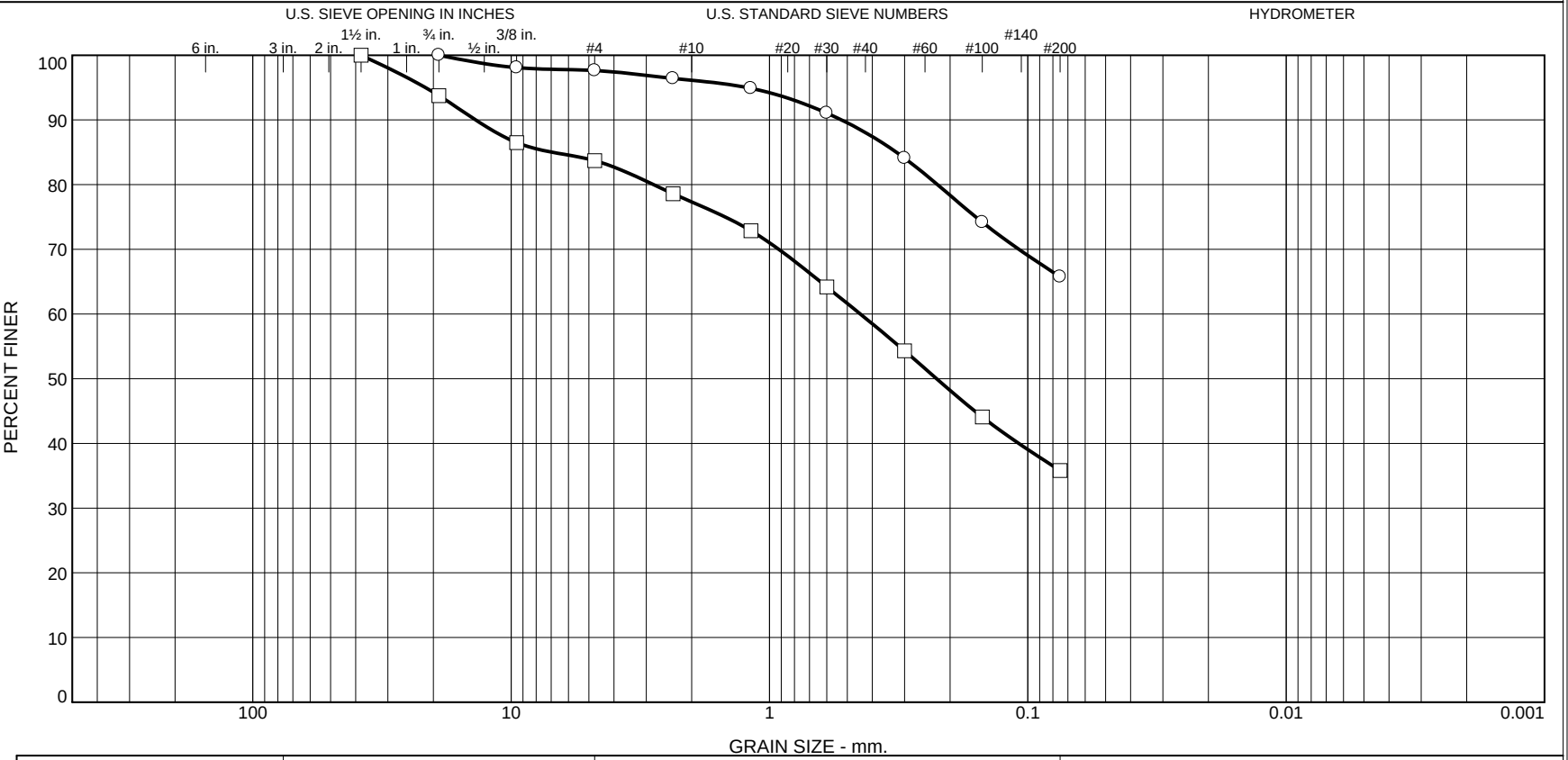
SUMMARY OF LABORATORY RESULTS

CLIENT Catawba County **PROJECT NAME** HKY EMS

PROJECT NUMBER 24-524 **PROJECT LOCATION** Hickory, NC

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Fines	Water Content (%)	Organics by Weight (%)
B08	8.5	57	30	27	2	32	66	27.8	
B09	8.5	41	25	16	16	48	36	19.0	
B10	6.0							23.9	4.5
B11	1.0	39	28	11	14	47	39	17.9	
B11	6.0	0	0	NP	0	63	37	17.0	
B11	8.5	0	0	NP	0	70	30	19.7	

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	2	2	8	22	66	
□	0	6	10	7	18	23	36	
△								

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	Test Borings	8152	B-08,8.5-10'	05/08/24	CH	Reddish Brown Sandy Fat CLAY	27.8	57	30
□	Test Borings	8153	B-09,8.5-10'	05/08/24	SC	Brown Clayey SAND with Gravel	19.0	41	25
△	Test Borings	8154	B-10,6-7.5'	05/08/24		Organic Content ONLY	23.9		

Client Catawba County

Project Hickory EMS

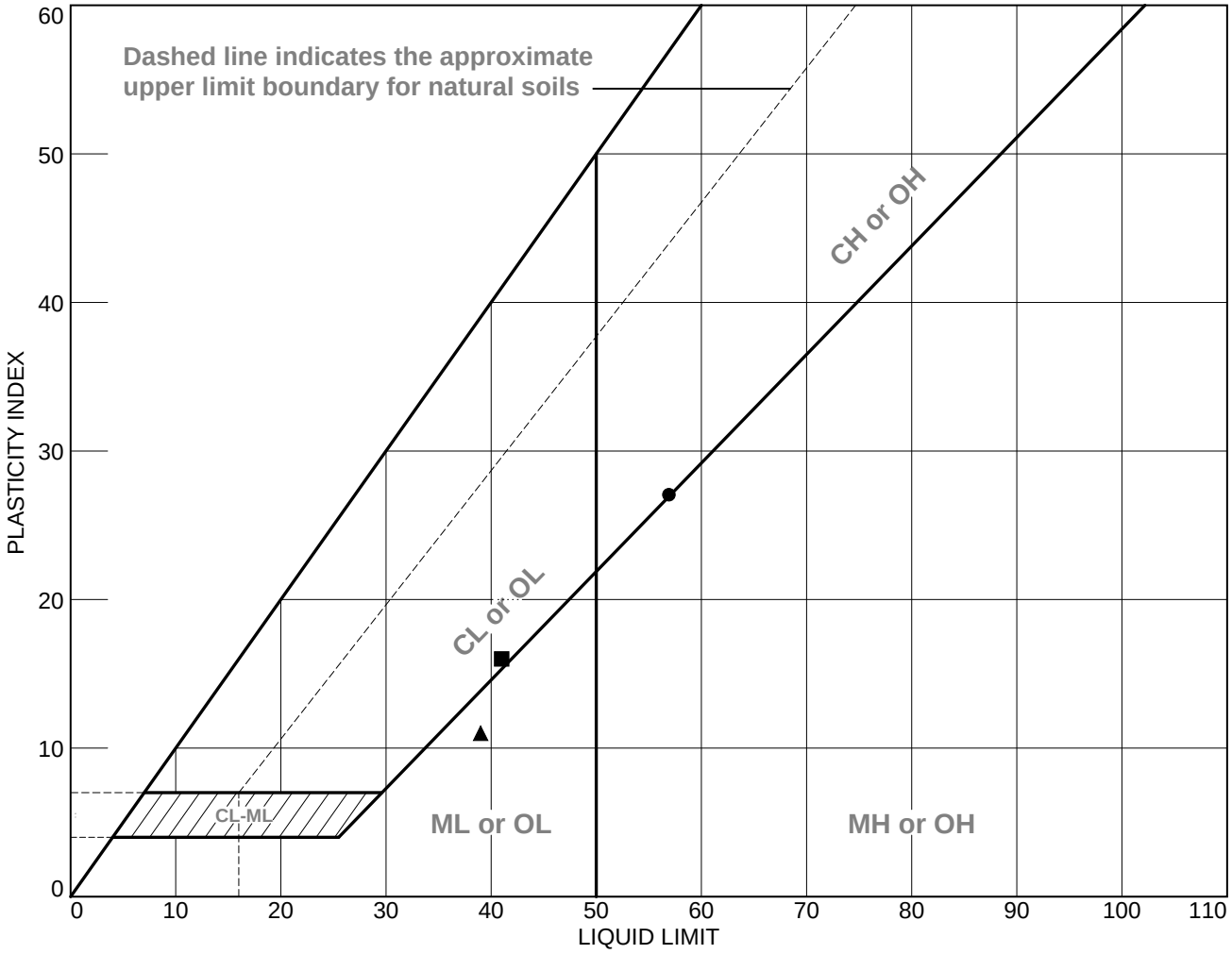
Project No. 24524 Figure

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

△ Orgainc content by weight: 4.5%

Tested By: BV **Checked By:** DR

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

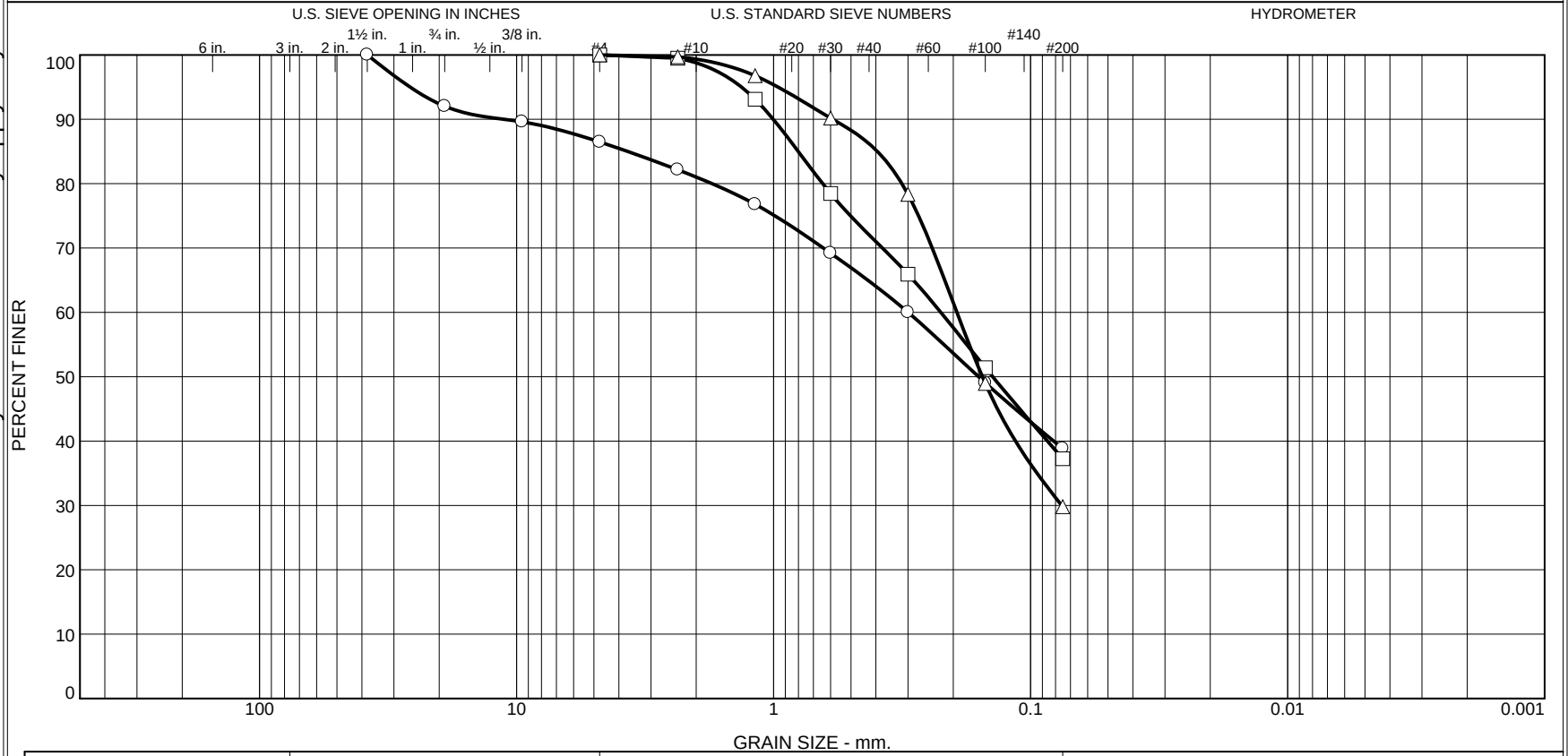
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Test Borings	8152	B-08,8.5-10'	27.8	30	57	27	CH
■	Test Borings	8153	B-09,8.5-10'	19.0	25	41	16	SC
▲	Test Borings	8155	B-11,1-2.5'	17.9	28	39	11	SM
◆	Test Borings	8156	B-11,6-7.5'	17.0	NP	NV	NP	SM
▼	Test Borings	8157	B-11,8.5-10'	19.7	NP	NV	NP	SM

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

Client: Catawba County
Project: Hickory EMS
Project No.: 24524 **Figure**

Tested By: BV **Checked By:** DR

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	8	6	5	16	26	39	
□	0	0	0	1	27	35	37	
△	0	0	0	1	13	56	30	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	Test Borings	8155	B-11,1-2.5'	05/08/24	SM	Brown Silty SAND	17.9	39	28
□	Test Borings	8156	B-11,6-7.5'	05/08/24	SM	Tan Silty SAND	17.0	NV	NP
△	Test Borings	8157	B-11,8.5-10'	05/08/24	SM	Brown Silty SAND	19.7	NV	NP

Client Catawba County

Project Hickory EMS

Project No. 24524 Figure

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

Tested By: BV **Checked By:** DR

APPENDIX E – TEST PIT PHOTOGRAPHS

TEST PIT 1

Photograph 1

Photograph 2

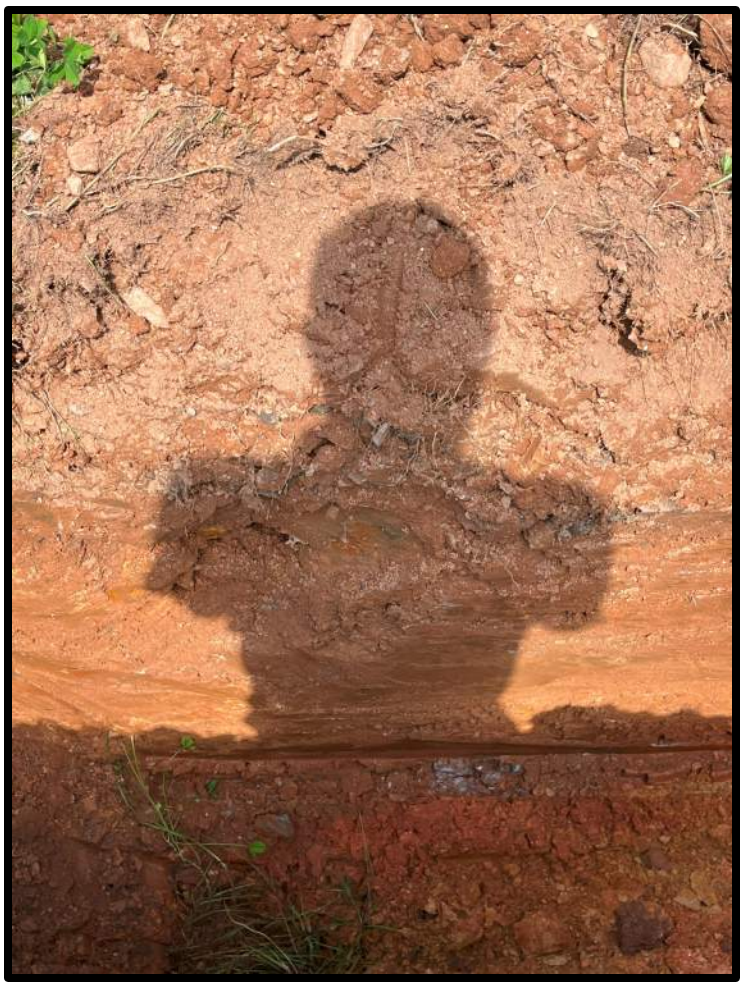
Photograph 3

Photograph 4

Photograph 5

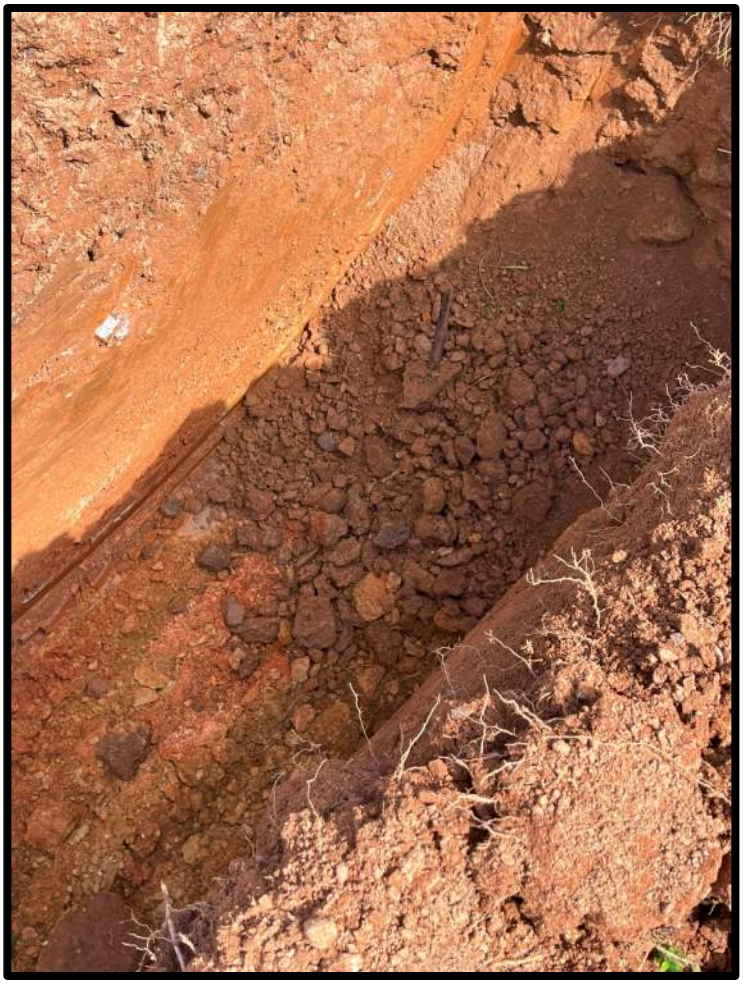
Photograph 6

TEST PIT 2

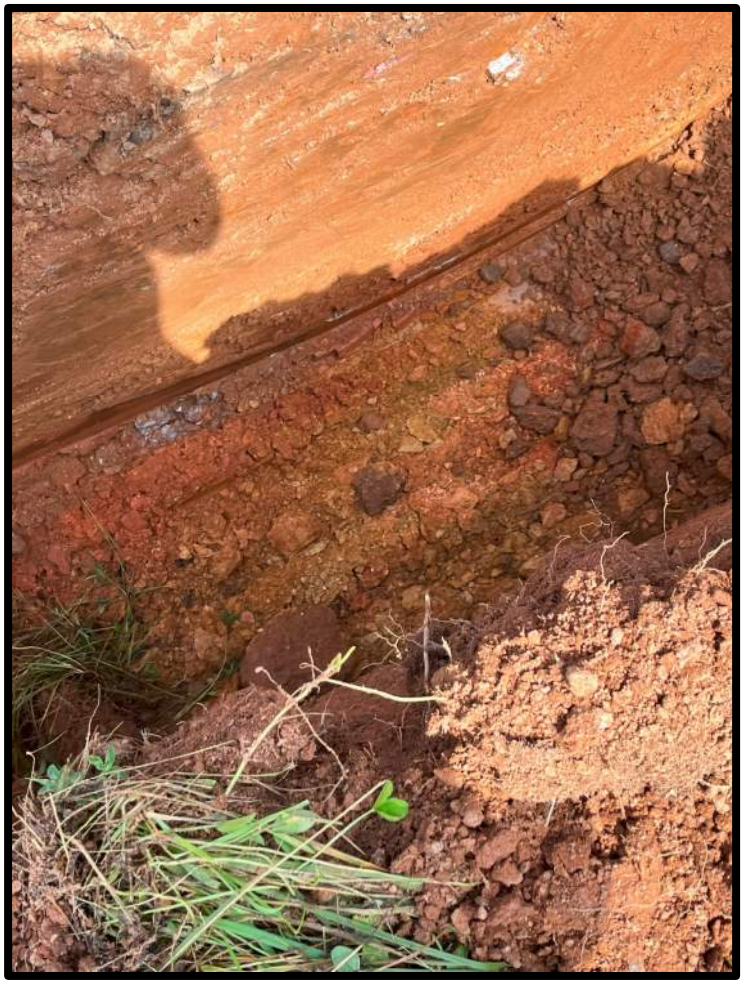


Photograph 7

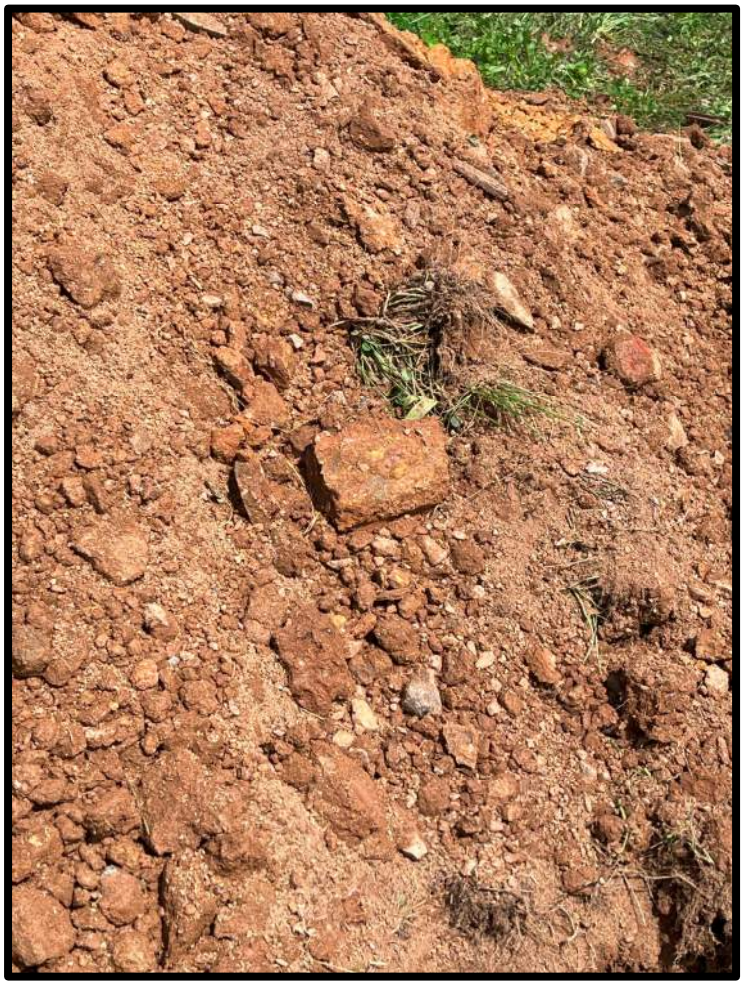
Photograph 8



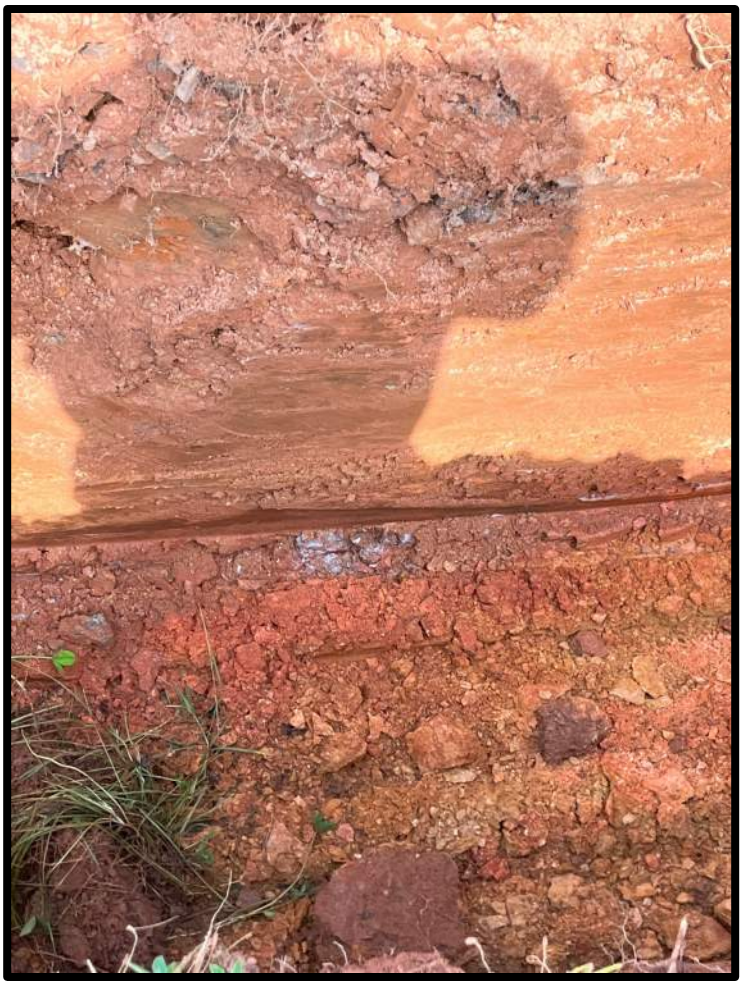
Photograph 9



Photograph 10



Photograph 11



Photograph 12

TEST PIT 3

Photograph 13

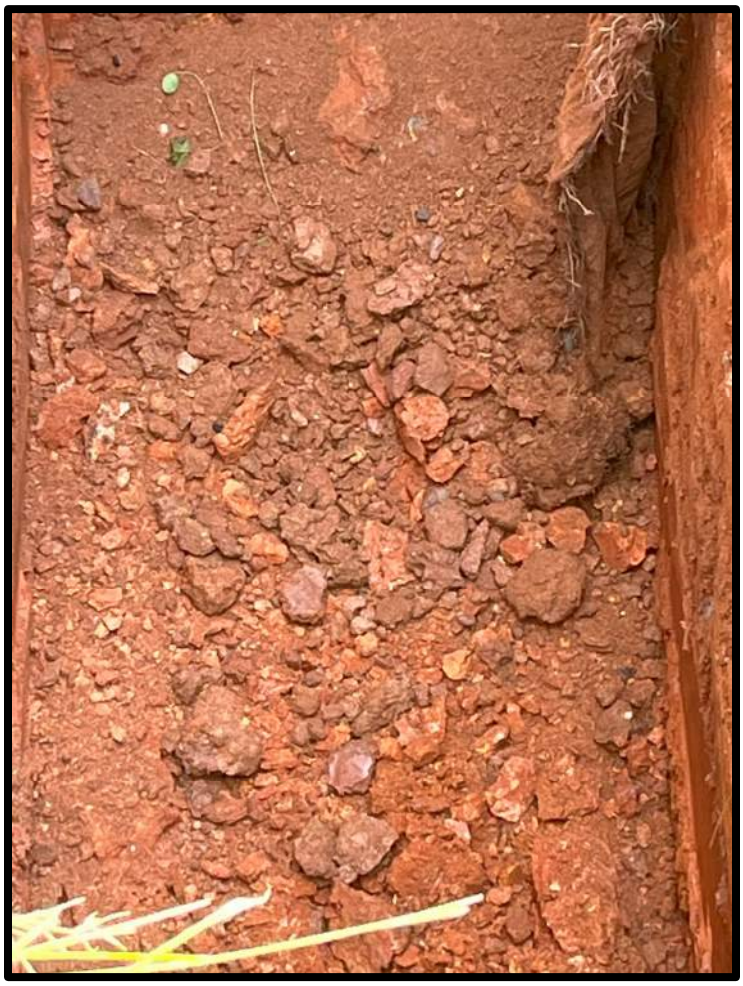
Photograph 14

Photograph 15

Photograph 16

Photograph 17

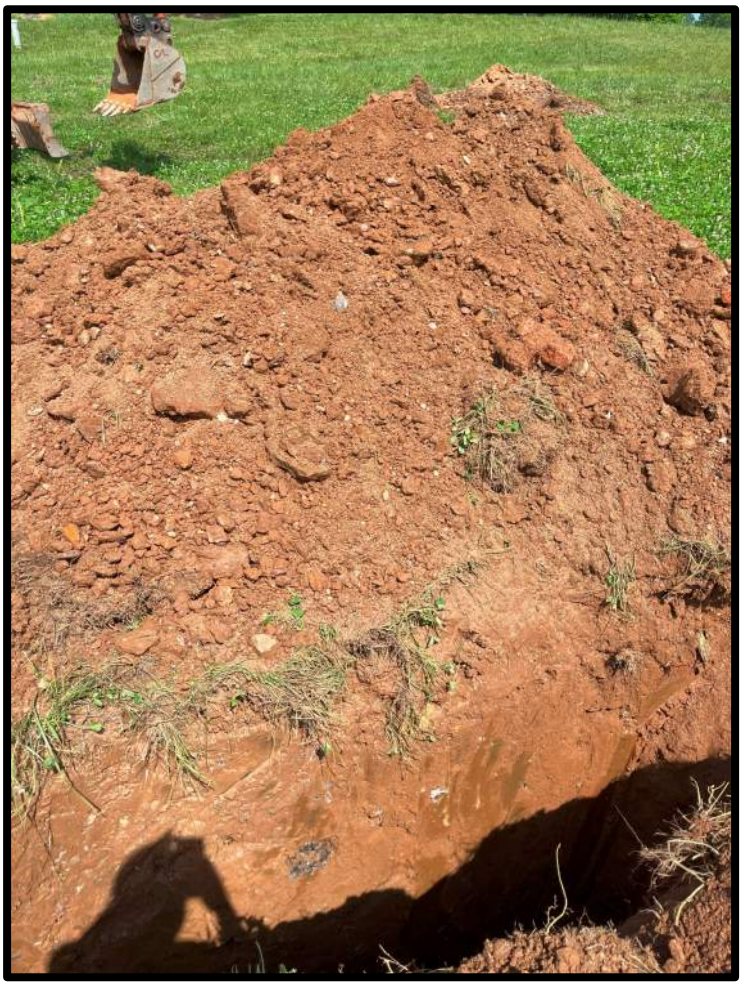
Photograph 18



Photograph 19

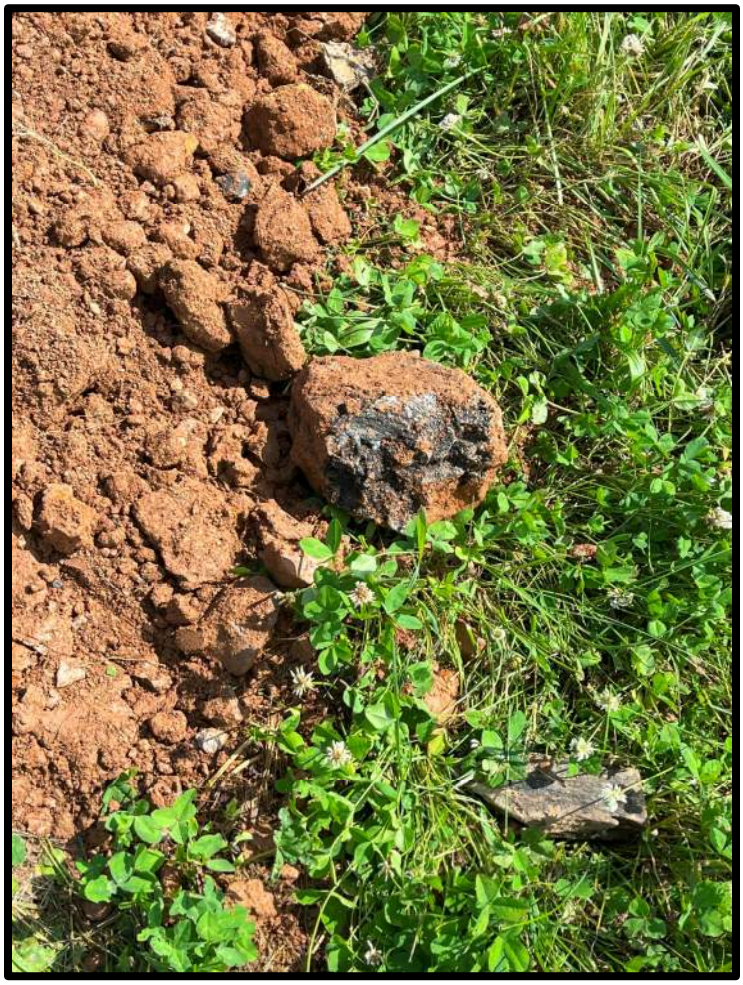
Photograph 20

TEST PIT 4



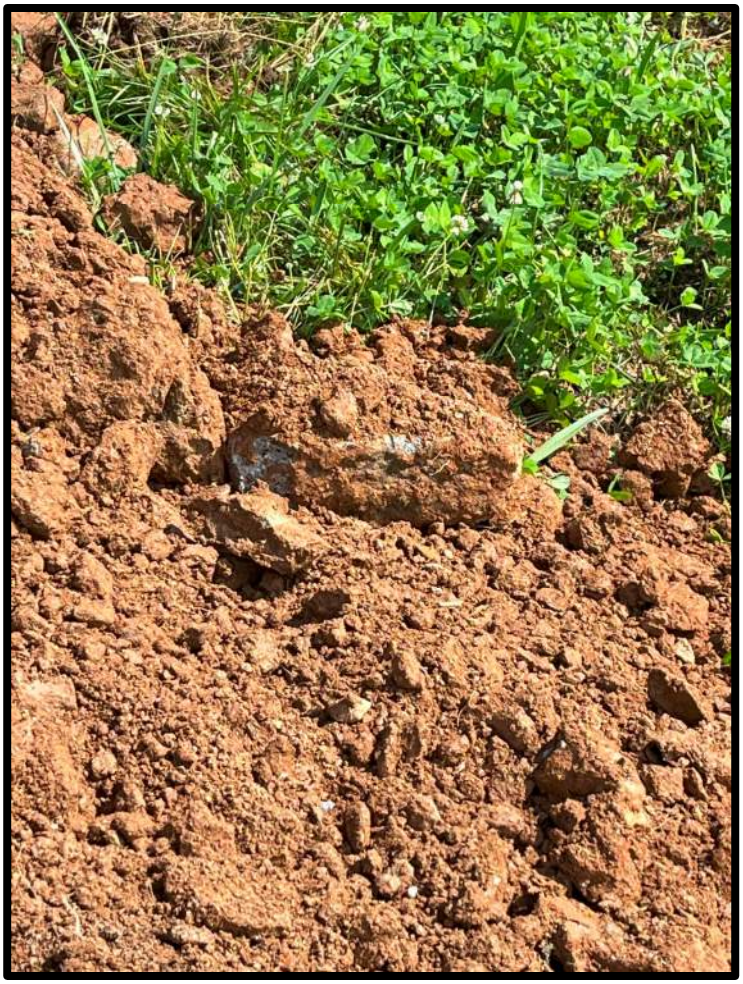
Photograph 21

Photograph 22



Photograph 23

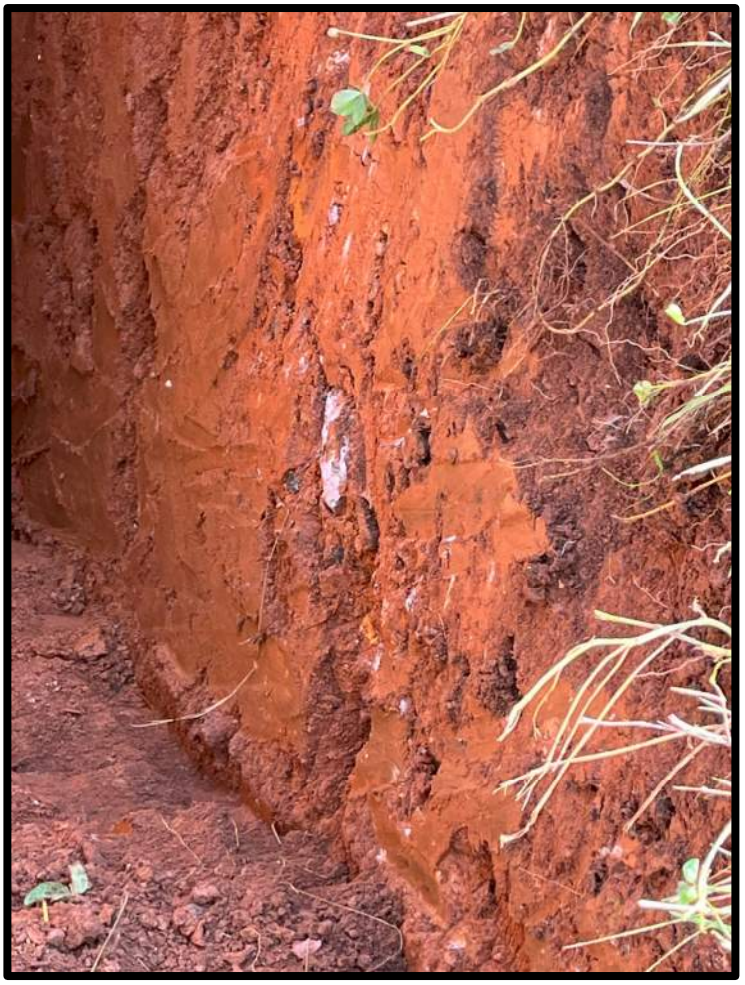
Photograph 24



Photograph 25

Photograph 26

Photograph 27



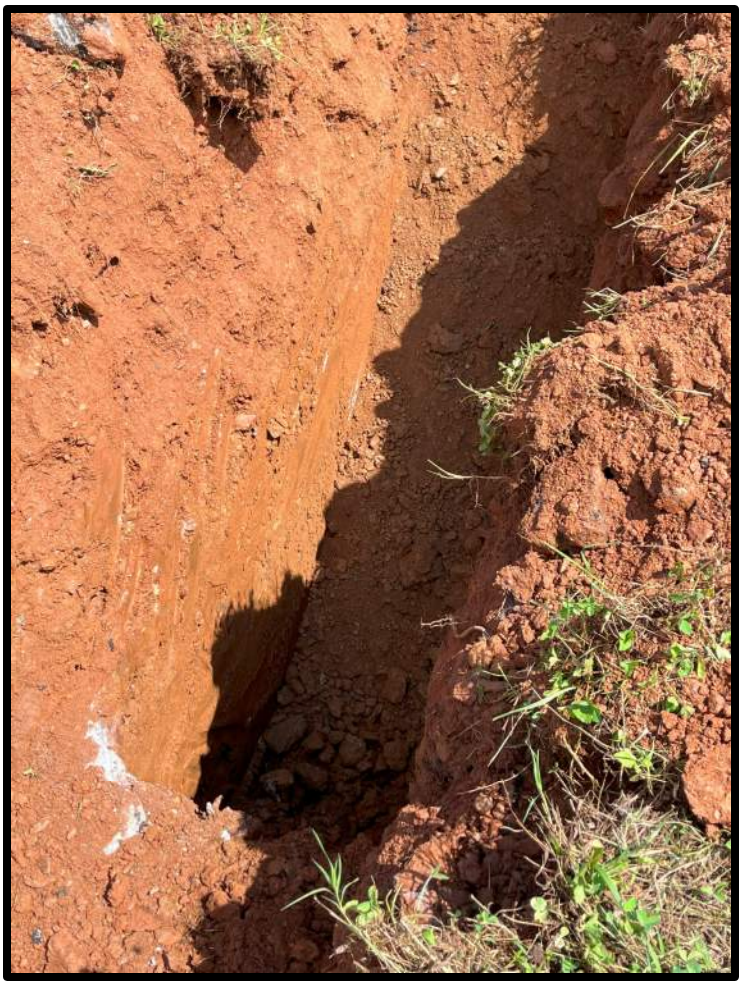
Photograph 28

Photograph 29

Photograph 30

TEST PIT 5

Photograph 31



Photograph 32

Photograph 33

Photograph 34

Photograph 35

Photograph 36

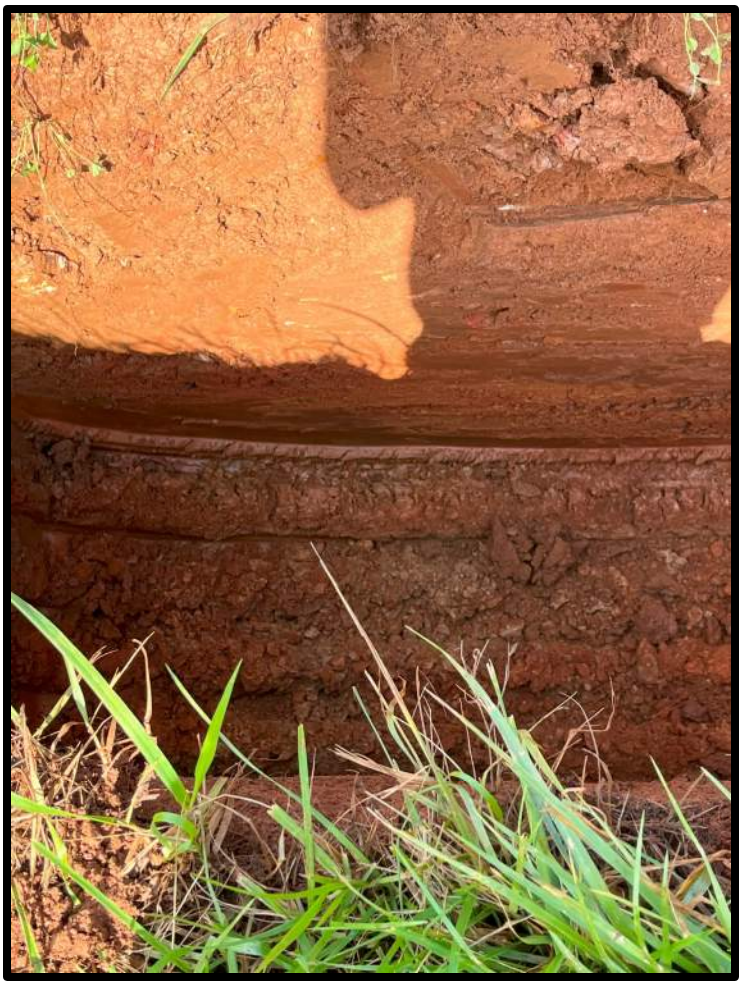
Photograph 37

Photograph 38

Photograph 39

TEST PIT 6

Photograph 40

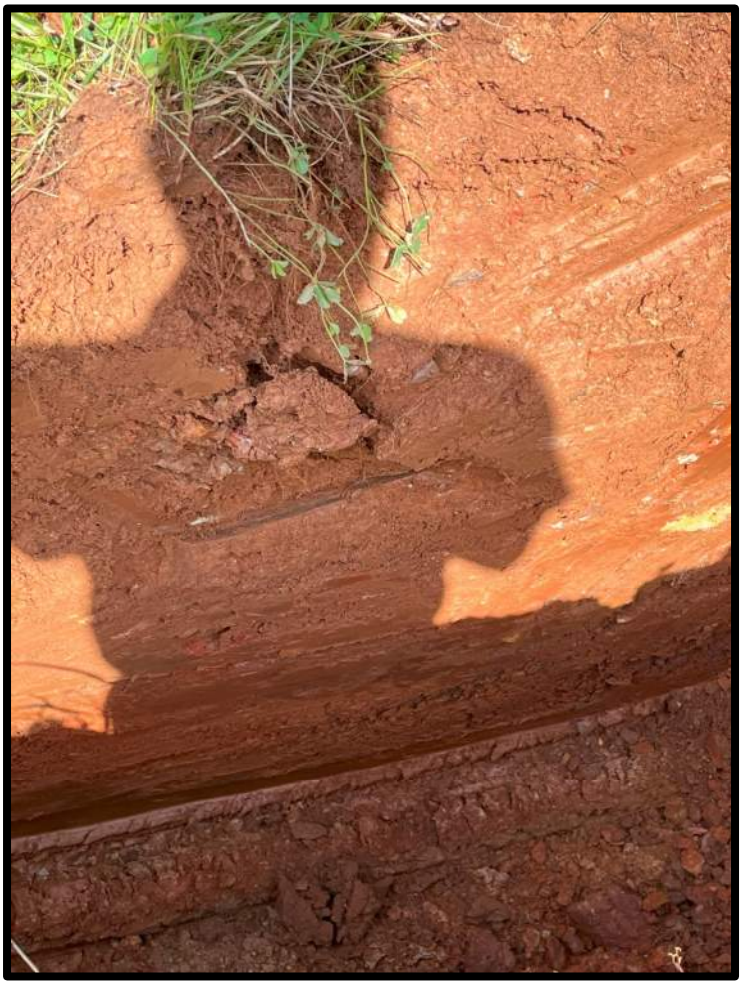


Photograph 41

Photograph 42

Photograph 43

Photograph 44



Photograph 45

Photograph 46

TEST PITS 7 &8

Photograph 47

Photograph 48

Photograph 49

Photograph 50

Photograph 51

Photograph 52