Report of Preliminary Geotechnical Exploration

Epps Mill Road Interchange Project Mainline Report

TDOT Project No. 75IO24-S1-010
GES File No. 7513321 / PIN No. 124683.06
Murfreesboro, Rutherford County, Tennessee

Prepared for
Neel-Schaffer, Inc.
Nashville, Tennessee

Prepared by:
TTL, Inc.
Nashville, Tennessee

Project No. 00024082902.00
September 23, 2025

September 23, 2025

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Mr. Michael Biggs, PE, CPESC
Neel-Schaffer, Inc. (NS)
210 25th Avenue North, Suite 800
Nashville, Tennessee 37203

RE: Report of Preliminary Geotechnical Exploration
Epps Mill Road Interchange Project – Mainline Report
Murfreesboro, Rutherford County, Tennessee
TTL Project No. 000240802902.00
TDOT Project No. 75I024-S1-010
GES File No. 7513321 / PIN No. 124683.06

Dear Mr. Biggs:

TTL has completed the preliminary geotechnical exploration for the roadway realignment (mainline) as part of the Epps Mill Road Interchange project in Murfreesboro, Tennessee. Our services were provided in accordance with our proposal, dated October 11, 2024. This report documents our preliminary geotechnical exploration, including results of the field exploration and laboratory testing program; presents soil and bedrock information for analyses; and provides recommendations for design and construction. The report appendices provide typed boring logs, laboratory test data, and results of engineering analyses. Our services also included providing preliminary geotechnical exploration information for the planned bridge replacement over Interstate 24, as well as pavement recommendations for the planned construction. These reports and supporting documents have been submitted under separate covers.

As always, we enjoy working with your staff and appreciate the opportunity to support your design process. If we can be of further assistance, please contact our office at your convenience.

Sincerely,

TTL, Inc.

ETHAN P. LAIRD
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 128060
STATE OF TENNESSEE
9/23/2025

Ethan P. Laird, PE
Project Engineer

Leanna S. Whitwell, PE
Principal Engineer

Attachments

CONTENTS

EXECUTIVE SUMMARY

Neel-Schaffer is performing civil design for the improvements planned along Epps Mill Road in Murfreesboro, Tennessee. The improvements will be approximately 4,500 linear feet, beginning at the intersection with Capital Way and ending at the intersection with State Route 2. The improvements consist of widening and re-aligning Epps Mill Road, new on- and off-ramps along Interstate 24 (I-24), and a new bridge over I-24. The project is in the early stages of development; therefore no drawings or stationing is available for reference in this preliminary report.

This Preliminary Geotechnical report addresses the planned re-alignment and widening of Epps Mill Road. This project also includes a new bridge that will be reported separately. This report provides the results of the field exploration and laboratory testing program, soil and bedrock information for analyses, and recommendations for design and construction of the roadway widening and re-alignment. The report appendices provide typed boring logs and laboratory test data, including boring locations.

The boring data generally showed a relatively shallow depth to bedrock across most of the site. Therefore, we anticipate that some areas of subgrade repairs will likely be required depending on final grades. We also anticipate underdrains may also be required where bedrock will be within a few feet of final grade. We recommend additional geotechnical exploration be performed to develop final design and construction recommendations for the project once final plans are available.

1.0 PROJECT INFORMATION

Project information was provided by Messer's Michael Biggs and Matt Lifsey (NS) in several e-mail transmissions and telephone calls. We were provided with a pdf document titled "124683.06-Concept Report 8-2-24.pdf" prepared by TDOT and STV, dated August 26, 2024. The document contained a summary of the project including a conceptual layout. We were also provided a set of drawings (11 sheets) titled "Proposed Layout," undated, prepared by NS. This drawing set shows the planned alignment and existing site grades.

Information provided suggests TDOT plans to procure a Design-Building Contractor for this project in 2026. Therefore, the project is in a preliminary design phase. We understand our services will be included as part of Owner Representative services within a Functional Design and Procurement Assistance program with final design and ultimate construction completed by the Design-Build contractor awarded the project to be constructed in 2028.

Our understanding of the project is summarized below:

1.1 Project Description

Item	Description
Project Location	The project is located along Epps Mill Road starting at Capital Way (west) and ending at State Route 2 (east) in Murfreesboro, Tennessee. Reference the Site Location Plan in Appendix A.
Proposed Improvements	We understand TDOT is planning to widen and re-align Epps Mill Road from State Route 2 (US Highway 41) to just past Capital Way (about 0.86 miles long) including ramp improvements at the interchange (Exit 89) with Interstate 24 (I-24) and a bridge replacement.
Bridge	A new bridge is planned over the I-24 to replace the existing bridge. The new bridge will be about 250 feet long and include at least one pier. Preliminary recommendations for this bridge are provided in a separate report.
Cut and Fill Slopes	Since final details about the alignment including existing or proposed grades are not available, we have assumed maximum cut depths and fill thicknesses will be less than 5 feet relative to existing grades. However, fills approaching 30 feet may be required for the new bridge abutments.

If the above information is not correct, please contact us so that we can make the necessary modifications to this document and our evaluation and recommendations, if needed.

1.2 Scope of Services

The purposes of the services were to explore subsurface conditions and develop preliminary geotechnical recommendations for the project. We drilled 18 soil test borings, excluding off-set borings, performed eight pavement cores, and performed laboratory testing of recovered samples to assist with development of our recommendations. Assessment of environmental conditions was beyond the scope of our services. As noted previously, our scope included providing a preliminary geotechnical report for the planned bridge replacement, as well as pavement recommendations for the project. These reports will be submitted under separate covers.

2.0 EXPLORATION FINDINGS

2.1 Site Conditions

Item	Description
Existing Improvements	Epps Mill Road is currently a paved two lane road with turns lanes at various locations within the project limits, as well as a bridge over I-24. Markings (surface paint and flags) for underground utilities (natural gas, water, and petroleum) were observed in the vicinity of the project site, mostly on the east of the project limits. Overhead electrical lines were present parallel to Epps Mill Road for most of the project limits.
Current Ground Cover	The ground surface adjacent to Epps Mill Road is mostly grass covered. Asphalt pavements are present at various locations where local roads or parking lot entrances intersect Epps Mill Road.

Photographs depicting general conditions of the study area at the time of our field activities are shown below.

View of Epps Mill Road near its intersection with Miller Lane

View of Epps Mill Road near its intersection with Forbus Drive

View of Epps Mill Road near its intersection with Capital Way

View of Epps Mill Road looking north towards its intersection with SR2

2.2 Site Geology

The Geologic Map of the Webbs Jungle Quadrangle, Tennessee, dated 1964, indicates the project site is underline by the Lebanon Limestone formation. This formation is typically a fine-grained, thinly bedded, gray, fossiliferous limestone with clay/shale partings. The limestone weathers to produce a thin layer (less than 5 feet thick) of residual soil which is typically a high plasticity clay. Glades (i.e., areas of very thin soil) are common on which only limited vegetation, other than cedar trees, will grow. This formation is susceptible to solution weathering and sinkhole development.

Limestone is susceptible to solution weathering and development of karst features, such as sinkholes. We did not observe indications of karst features or sinkholes at the site during our field activities and review of the geologic map did not indicate mapped depressions at the site. The scale of the map often precludes the mapping of smaller features and the historical development of the site could have masked indicators of karst.

Some geologic settings in Tennessee contain rock that can produce acid when degraded with water. We did not observe acid producing rock during our exploration.

A few of the borings encountered existing fill below the surface materials of the site. Fill material is typically soil, but may include rock particles, placed by the actions of man. Fill can be problematic for site development when it has not been compacted in thin lifts. Uncompacted or poorly compacted fill can be a source of unpredictable and excessive settlements or other measures of poor structural performance. Fill that has been placed without engineering observation or documentation can sometimes contain objectionable inclusions or constituents, such as fibrous organic pieces (tree trunks or brush piles), junk and debris, trash, excessively wet or high plasticity soils, or large rock boulders. When such undesirable inclusions are present, the consistency or density of the fill cannot necessarily be correlated with conventional indicators, such as drive-sample blow counts or estimates of unconfined compressive strength of cohesive soils. For this reason, consistency descriptions of fill layers are typically not included on boring logs.

2.3 Exploration Procedures

Exploratory borings and pavement cores were located in the field using a recreational grade hand-held GPS unit (Montana 680t) and should be considered approximate. Elevations of the ground surface shown on the respective logs or profiles were interpolated from topographic contours shown on the provided drawings and should be considered approximate. Surveying the test locations for vertical and horizontal control was beyond the scope of this exploration.

The borings were drilled using conventional hollow-stem auger drilling methods by an all-terrain-vehicle drill rig. Soil samples were obtained at selected depths in general accordance with the Standard Penetration Test (SPT) described in ASTM D1586. For this test, a split-barrel sampler is driven into the soil through three increments of 6 inches with blows from a 140-pound hammer falling 30 inches. The number of hammer blows required to advance the split-barrel sampler through each increment is recorded, and the sum of the final two blow counts is called the "N-value," with units of blows per foot (bpf). Where it was not possible to advance the sampler through a full 6-inch increment with 50

hammer blows, driving the sampler was terminated and the sampler penetration was measured. N-values for this condition are reported as "50/x," where x is the sampler penetration in inches. The N-values recorded during the sampling process provide an index to the strength and compressibility of the soil.

Each borehole was checked for the presence of groundwater after removing the drill tools by lowering a measuring tape down the open borehole. The depth to groundwater or the depth at which the borehole caved-in was recorded.

Where rock coring was performed, the borehole was checked for the presence of groundwater through the hollow-stem auger or drill casing after reaching auger refusal but before the start of rock coring. The borehole was again checked for the depth to water after removal of rock coring tools and casing.

Each borehole was backfilled to the ground surface with auger cuttings after making final groundwater measurements. Where rock coring was performed the borings were backfilled with bentonite chips up to the bedrock/soil interface and then cuttings were used up to the surface. Where pavements were penetrated, a patch of asphalt was applied at the surface. Auger cuttings sometimes consolidate after backfilling causing the top of the backfill column to settle and leaving an open hole at the ground surface. Return trips to the site to top-off backfill that has settled were not part of our scope of services.

2.4 Subsurface Stratigraphy

Subsurface conditions within the project limits were evaluated by drilling 14 exploratory borings at the approximate locations shown on the ELP in Appendix A. Soil descriptions follow the Unified Soil Classification System (USCS), which is described in ASTM D2487 and D2488. Our geoprofessional also logged the recovered core samples for lithology and measured recovery (REC) and Rock Quality Designation (RQD). The results of the measurements, as well as photographs of the recovered rock core are provided in Appendix A.

Information about the subsurface stratigraphy encountered at the test locations is provided on the logs and generalized subsurface cross-section (profiles) in Appendix A. The logs and profile represent our interpretation of the subsurface conditions at the test locations based on tests and observations performed during the exploration, visual classification of the soil samples by a geoprofessional, and laboratory tests conducted on select soil samples. The lines designating the interfaces between various strata on the logs and profiles represent the approximate strata boundary. The transition between strata may be gradual. Conditions may vary at locations away from or between the boring locations.

BORING SUMMARY

Boring No.	Depth to Refusal (feet)	Total Hole Depth (feet)
B-02	28-½	38-½
B-03	4-½	14-½
B-07	1-½	1-½
B-08	5-½	5-½
B-09	6	6
B-10	8-½	8-½
B-11	11	11
B-12	17	17
B-13	4	4
B-14	4	4
B-15	5-½	5-½
B-16	½	½
B-17	2-½	2-½
B-18	3	3

Information from the exploratory borings advanced is summarized in the table below.

SUMMARY OF SUBSURFACE STRATIGRAPHY

Stratum	Approximate Thickness of Stratum[1]	Material Description	Properties [2]
Surface Material	1 to 6 inches	Topsoil (absent in B-02)	N/A
	6 inches	Asphalt (B-02)	
	16 inches	Basestone (B-02)	
Possible Fill or Fill *(Absent in B-08 and B-09)*	3 feet to as much as 22 feet	Lean Clay (USCS – CL), brown, red-brown, and light brown, with variable amounts of chert and limestone fragments and black mineral staining, moist OR Fat Clay (USCS – CH), dark brown and red-brown, with variable amounts of chert and limestone fragments and black mineral staining, moist	N-values: 7 to 29 bpf, with most values between 9 and 15 bpf MC: 14% to 27% LL: 45 to 62 PI: 25 to 36
Residuum *(Absent in B-07, B-13, B-17, and B-18)*	Auger Refusal Depths	Fat Clay (USCS – CH) stiff to very stiff, red-brown and brown with some light brown and gray mottling, with variable amounts of limestone fragments, moist OR Lean Clay (USCS – CL), very stiff, brown and red-brown, with variable amounts of fine roots and limestone fragments, moist	N-values: 9 to 43 bpf, with most values between 9 and 24 bpf MC: 15% to 42%, with most values between 15% and 25% LL: 37 to 61 PI: 15 to 34
Weathered Bedrock *(above auger refusal in B-07, B-12, and B-13)*	1-½ feet (B-07) to 17 feet (B-12)	Weathered Limestone Bedrock with interbedded clay or possibly a limestone boulder within the overburden or bedrock pinnacle	N/A
Auger refusal was encountered at depths ranging between ½ and 28-½ feet below existing grades at each location. Refusal materials were explored using rock coring techniques in boring B-02.			
Bedrock	38-½ feet	Limestone, moderately hard, gray, fine to medium grained, thin to medium bedded, moderately fractured, slightly weathered to fresh	RQD: 26% to 86% REC: 88% to 100%

Stratum	Approximate Thickness of Stratum[1]	Material Description	Properties [2]

[1] Depths rounded to the nearest half-foot or nearest inch.
[2] Includes N-values of applicable samples, not including amplified N-values, bpf = blows per foot, MC = Moisture Content, LL = Liquid Limit, PI = Plasticity Index. REC = recovered rock core and RQD = rock quality designation

SUMMARY OF BORING EXTENDED INTO BEDROCK

Boring No.	Auger Refusal and Start of Rock Core Depth (feet)	Length of Rock Core (feet)	Bottom of Hole Depth (feet)
B-02	28-½	10	38-½
B-03	4-½	10	14-½

2.5 Pavement Cores

The existing pavements were cored at eight locations (C-01 to C-08) along Epps Mill Road. The approximate location of these cores is shown on the ELP in Appendix A. At each location, we measure the asphalt and basestone thickness. Photographs of the recovered asphalt cores are included in Appendix A. Evaluation of the underlying subgrade was beyond our scope of services. The table below summarizes our findings.

PAVEMENT CORING SUMMARY

Coring ID	Asphalt Thickness (inches)	Basestone Thickness (inches)
C-01	13	2
C-02	4-½	11-½
C-03	6-½	14-½
C-04	4	11
C-05	10	4
C-06	7	8
C-07	11	8-½
C-08	10	4-½

2.6 Laboratory Testing and Results

Laboratory testing was performed in general accordance with ASTM and/or AASHTO procedures. Our geoprofessional reviewed the boring results and selected samples for laboratory testing to best represent the goals of the testing program. Laboratory testing included soils classification testing (Atterberg Limits) and natural moisture content testing. Some of the soil and rock samples were selected for advanced laboratory testing. These tests included unconfined compressive strength of rock cores, Proctor compaction, and California Bearing Ration (CBR). The results of Proctor compaction and CBR test are reported separately in our report for the roadway re-alignment. Results of Proctor compaction, CBR test, and unconfined compressive strength tests are summarized in the tables below.

SUMMARY OF ADVANCED LABORATORY TESTING ON SOIL

Sample Location	Compaction (ASTM D698)		CBR (ASTM D1883)	
	OMC, %	MDD, pcf	% MDD	CBR
B-02	19.4	104.9	98.1	6.27
B-03	18.9	103.8	98.4	3.97
OMC = optimum moisture content; MDD = maximum dry density; CBR = California Bearing Ratio.				

Results of the laboratory tests performed are provided in Appendix A.

2.7 Groundwater Conditions

Groundwater was not encountered in the borings at refusal depths. Water level measurements made in the borings after rock coring was completed showed groundwater at depths ranging between 1 and 3 feet below ground surface (bgs), except for B-02 and B-03 where the water level was measured at 13 and 2 feet bgs, respectively. In our opinion, this water level was likely influenced by fluids introduced into the borehole during rock coring.

The groundwater surface can fluctuate throughout the year due to seasonal changes in climate, precipitation, vegetation, surface runoff, water levels in nearby water bodies, and other factors. The groundwater level below the site may fluctuate in response to such changes and be different after the exploration.

3.0 PRELIMINARY GEOTECHNICAL COMMENTS

The boring data generally showed a shallow depth to bedrock across most of the site and bedrock was particularly shallow on the north end of Epps Mill Road near the intersection with State Route 2. Due to this shallow bedrock condition the possibility exists that shallow perched ground water may build up near the soil bedrock interface. Consideration should be given to incorporating an underdrain where bedrock will be within a few feet of pavement subgrade, otherwise the pavement subgrade may become saturated leading to premature pavement failures. Therefore, construction plans should include a provision for water removal, such as underdrains. The location and limits will be determined based on final line and grade.

Although we did not observe widespread areas that will require subgrade repair during our field activity, the possibility exists that subgrade repairs may be required for the project. Typical repairs including undercut and replacement with Graded Solid Rock (GSR). The actual location and limits of potential repairs should be determined based on final line and grade.

In review of available subsurface data and laboratory testing, we recommend a CBR of 4.0 be utilized for pavement design on the project.

4.0 ADDITIONAL EXPLORATION

We recommend additional exploration be performed at the site once additional project information is available. The additional geotechnical exploration should include a sufficient number of soil test borings or test pits to assess the depth to bedrock, including rock coring, as appropriate. The final exploration should be completed in general accordance with TDOT standards and include applicable

geotechnical sheets (G-Sheets) with recommended remediation and estimated quantities based on final line and grade plans.

5.0 CLOSING

The preliminary analyses and information submitted in this report are based upon the data obtained from soil borings at the approximate locations shown on the appended test location plans and generalized profiles, as well as on a general understanding of the project scope. As the design process advances, we welcome the opportunity to refine and update geotechnical information to fit the project's specific needs.

This report does not reflect any variations which may occur away from the location of borings. The nature and extent of variations may not become evident until construction has begun. If variations are then evident, it will be necessary for us to re-evaluate the recommendations of this report after we have conducted further evaluation of the situation.

Sampling and testing of the soil, rock, groundwater, surface water, and air for the presence of environmental contamination was beyond the scope of this exploration.

All information (written or electronic) from TTL concerning TTL's work is for the sole use and reliance of the client. TTL intends no third-party beneficiaries (expressed or implied) and copies of such information received by any third parties are not for reliance unless TTL first receives a signed Secondary Client Agreement from the third party.

Additional information about the use and limitations of a geotechnical report is provided within the Geoprofessional Business Association document included at the end of this report.

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.

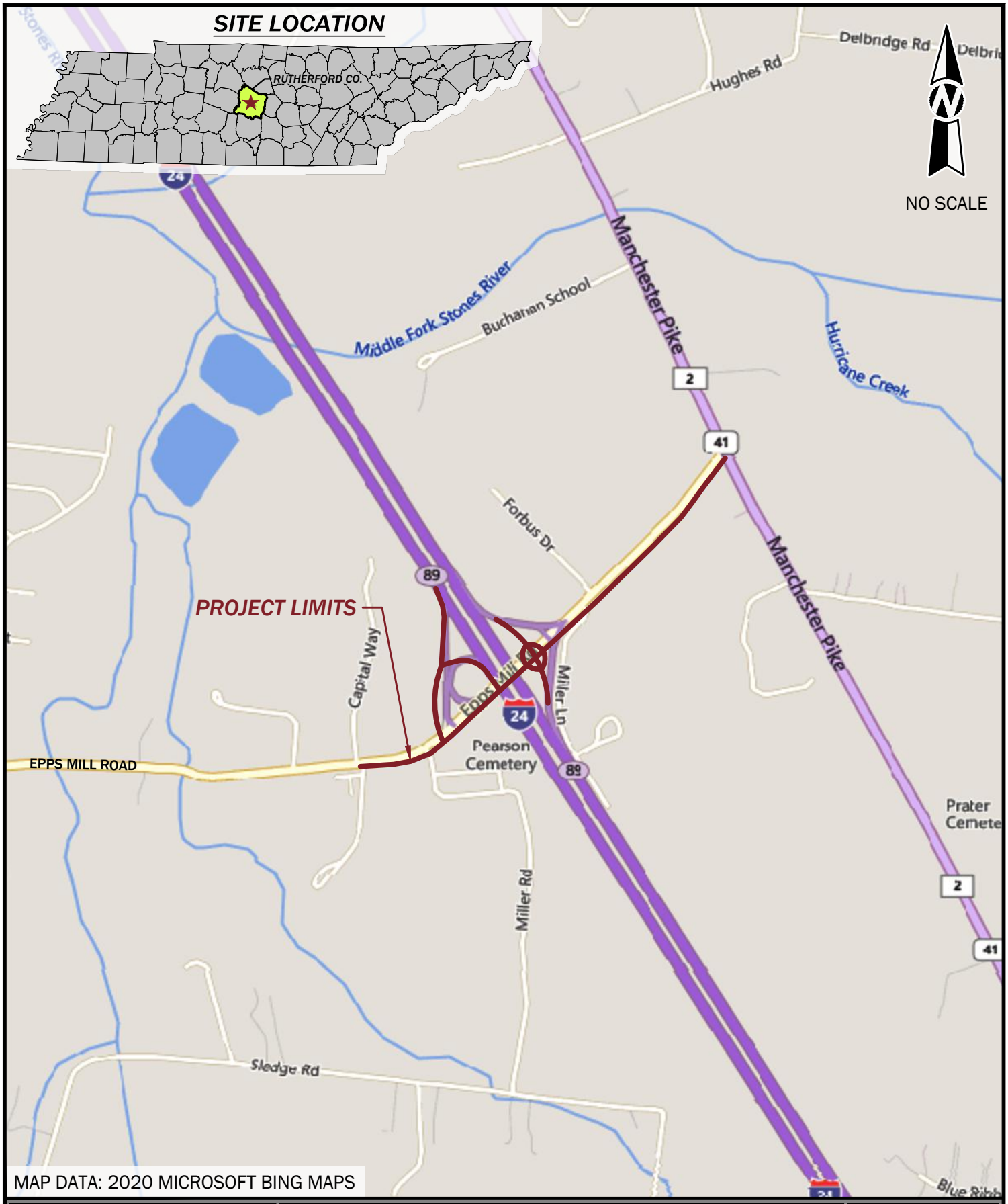
Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

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 A
ILLUSTRATIONS



TTL

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615.331.7770 | www.ttlusa.com

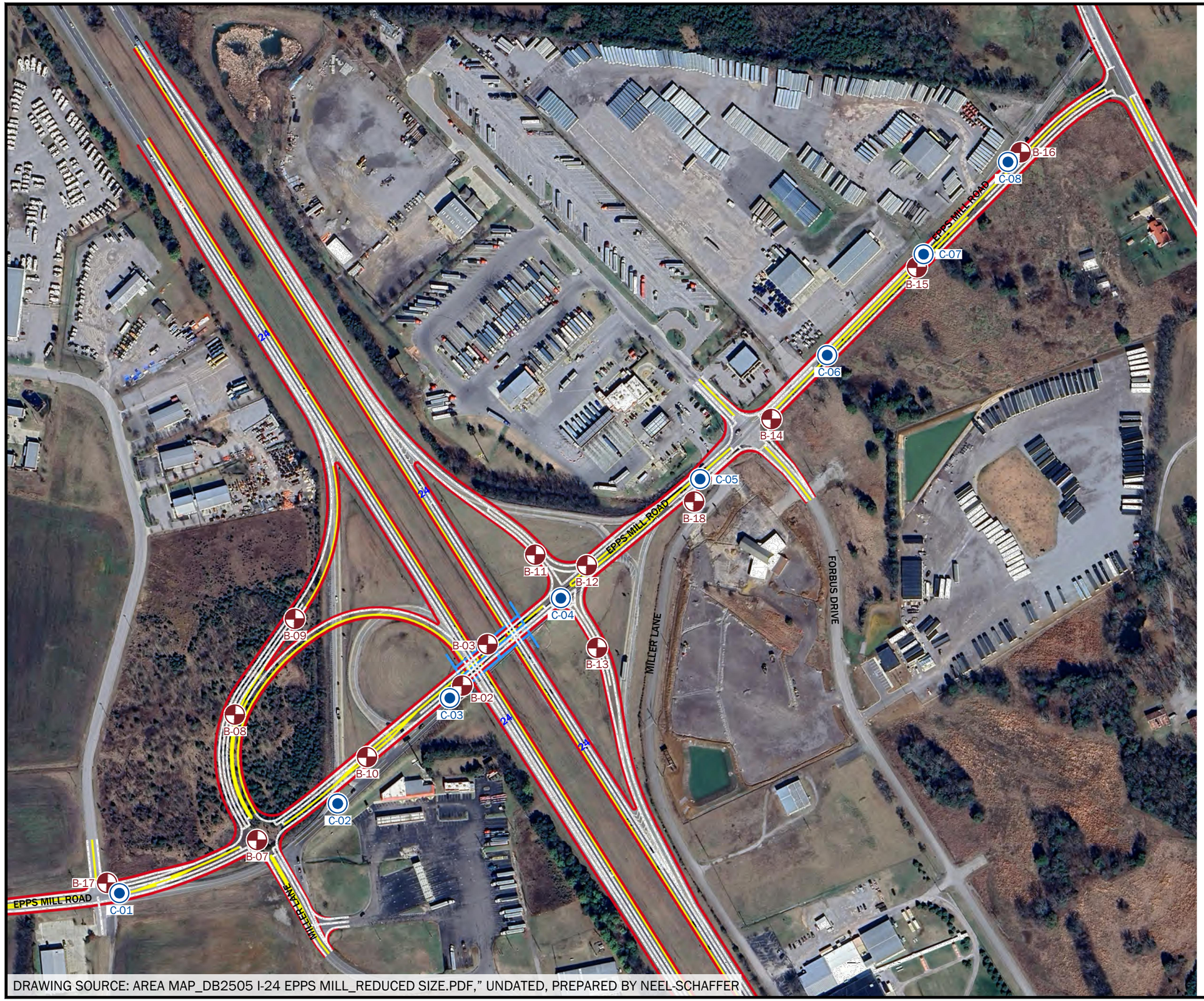
EPPS MIL ROAD INTERCHANGE PROJECT

NEEL-SCHAFFER, INC.

EPPS MILL ROAD
MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

Drawn By:	M H M
Checked By:	L S W
Date:	07/14/2025
Proj. No.:	000240802902.00
File Name:	240802902 SLM.dwg

Sheet Title
SITE LOCATION MAP



DRAWING SOURCE: AREA MAP_DB2505 I-24 EPPS MILL_REDUCED SIZE.PDF," UNDATED, PREPARED BY NEEL-SCHAFFER

0 300 600

SCALE IN FEET

NOTES:

1. TEST LOCATIONS SHOWN ON THIS DRAWING ARE APPROXIMATE.

LEGEND

B-01 SOIL BORING LOCATION AND IDENTIFIER

C-01 PAVEMENT CORING LOCATION AND IDENTIFIER

TTL
624 Grassmere Park, Suite #14 | Nashville, TN 37211
615.331.7770 | www.ttlusa.com

EPPS MIL ROAD INTERCHANGE PROJECT

NEEL-SCHAFFER, INC.
EPPS MILL ROAD
MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

Drawn By:	M H M
Checked By:	L S W
Date:	07/14/2025
Proj. No.:	000240802902.00
File Name:	240802902 ELP.dwg

Sheet Title

EXPLORATION LOCATION PLAN 1

SOIL LEGEND

FINE- AND COARSE-GRAINED SOIL INFORMATION

FINE-GRAINED SOILS (SILTS AND CLAYS)

SPT N-Value	Consistency	Estimated Q_u (TSF)
0 - 1	Very Soft	0 - 0.25
2 - 4	Soft	0.25 - 0.5
5 - 8	Firm	0.5 - 1.0
9 - 15	Stiff	1.0 - 2.0
16 - 30	Very Stiff	2.0 - 4.0
31+	Hard	4.0+

Q_u = Unconfined Compression Strength

COARSE-GRAINED SOILS (SANDS AND GRAVELS)

SPT N-Value	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
51+	Very Dense

PARTICLE SIZE

Name	Size (US Std. Sieve)
Boulders	>300 mm (>12 in.)
Cobbles	75 mm to 300 mm (3 - 12 in.)
Coarse Gravel	19 mm to 75 mm (3/4 - 3 in.)
Fine Gravel	4.75 mm to 19 mm (#4 - 3/4 in.)
Coarse Sand	2 mm to 4.75 mm (#10 - #4)
Medium Sand	0.425 mm to 2 mm (#40 - #10)
Fine Sand	0.075 mm to 0.425 mm (#200 - #40)
Silts and Clays	< 0.075 mm (< #200)

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Terms	Percent of Dry Weight
"Trace"	< 15
"With"	15 - 30
Modifier	> 30

RELATIVE PROPORTIONS OF CLAYS AND SILTS

Descriptive Terms	Percent of Dry Weight
"Trace"	< 5
"With"	5 - 12
Modifier	> 12

CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below water table

CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

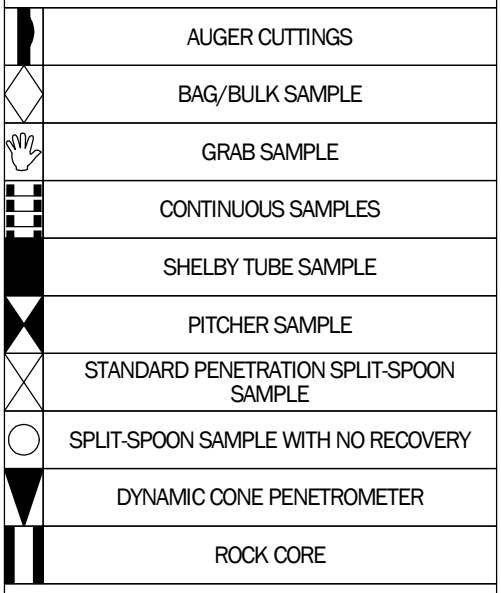
CRITERIA FOR DESCRIBING STRUCTURE

Description	Criteria
Stratified	Alternating layers of varying material or color with layers at least 6 mm thick; note the thickness
Laminated	Alternating layers of varying material or color with the layers less than 6 mm thick; note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

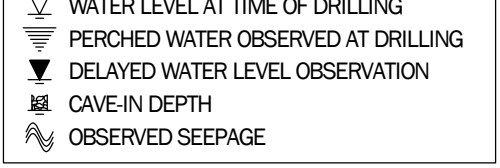
ABBREVIATIONS AND ACRONYMS

WOH	Weight of Hammer	N-Value	Sum of the blows for last two 6-in increments of SPT
WOR	Weight of Rod		
Ref.	Refusal	NA	Not Applicable or Not Available
ATD	At Time of Drilling	OD	Outside Diameter
DCP	Dynamic Cone Penetrometer	PPV	Pocket Penetrometer Value
Elev.	Elevation	SFA	Solid Flight Auger
ft.	feet	SH	Shelby Tube Sampler
HSA	Hollow Stem Auger	SS	Split-Spoon Sampler
ID	Inside Diameter	SPT	Standard Penetration Test
in.	inches	USCS	Unified Soil Classification System
lbs	pounds		

SAMPLERS AND DRILLING METHODS



WATER LEVEL SYMBOLS



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UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

COARSE GRAINED SOILS (>50% of the material is larger than the #200 sieve)	GRAVELS (>50% of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu > 4 Cc = 1-3	GW	Well-graded gravels, gravel-sand mixtures with trace or no fines
			Cu < 4 and/or Cc < 1 Cc > 3	GP	Poorly-graded gravels, gravel-sand mixtures with trace or no fines
		GRAVEL WITH 5% TO 12% FINES	Cu > 4 Cc = 1-3	GW-GM	Well-graded gravels, gravel-sand mixtures with silt fines
				GW-GC	Well-graded gravels, gravel-sand mixtures with clay fines
			Cu < 4 and/or Cc < 1 Cc > 3	GP-GM	Poorly-graded gravels, gravel-sand mixtures with silt fines
				GP-GC	Poorly-graded gravels, gravel-sand mixtures with clay fines
		GRAVEL WITH MORE THAN 12% FINES		GM	Silty gravels, gravel-silt-sand mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
				GC-GM	Clayey gravels, gravel-sand-clay-silt mixtures
	SANDS (>50% of coarse fraction is smaller than the #4 sieve)	CLEAN SAND WITH <5% FINES	Cu > 6 Cc = 1-3	SW	Well-graded sands, sand-gravel mixtures with trace or no fines
			Cu < 6 and/or Cc < 1 Cc > 3	SP	Poorly-graded sands, sand-gravel mixtures with trace or no fines
		SAND WITH 5% TO 12% FINES	Cu > 6 Cc = 1-3	SW-SM	Well-graded sands, sand-gravel mixtures with silt fines
				SW-SC	Well-graded sands, sand-gravel mixtures with clay fines
			Cu < 6 and/or Cc < 1 Cc > 3	SP-SM	Poorly-graded sands, sand-gravel mixtures with silt fines
				SP-SC	Poorly-graded sands, sand-gravel mixtures with clay fines
		SAND WITH MORE THAN 12% FINES		SM	Silty sands, sand-gravel-silt mixtures
				SC	Clayey sands, sand-gravel-clay mixtures
				SC-SM	Clayey sands, sand-gravel-clay-silt mixtures
FINE GRAINED SOILS (>50% of material is smaller than the #200 sieve)		SILTS & CLAYS (Liquid Limit less than 50)		ML	Inorganic silts with low plasticity
				CL	Inorganic clays of low plasticity, gravelly or sandy clays, silty clays, lean clays
				CL-ML	Inorganic clay-silts of low plasticity, gravelly clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
		SILTS & CLAYS (Liquid Limit more than 50)		MH	Inorganic silts of high plasticity, elastic silts
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays and organic silts of high plasticity

USCS - HIGHLY ORGANIC SOILS

Primarily organic matter, dark in color, organic odor

PT	Peat, humus, swamp soils with high organic contents

OTHER MATERIALS

- BITUMINOUS CONCRETE (ASPHALT)
- CONCRETE
- CRUSHED STONE/AGGREGATE BASE
- TOPSOIL
- FILL
- UNDIFFERENTIATED ALLUVIUM
- UNDIFFERENTIATED OVERBURDEN
- BOULDERS AND COBBLES

UNIFORMITY COEFFICIENT

$$C_u = D_{60}/D_{10}$$

COEFFICIENT OF CURVATURE

$$C_C = (D_{30})^2/(D_{60} \times D_{10})$$

Where:

D_{60} = grain diameter at 60% passing

D_{30} = grain diameter at 30% passing

D_{10} = grain diameter at 10% passing

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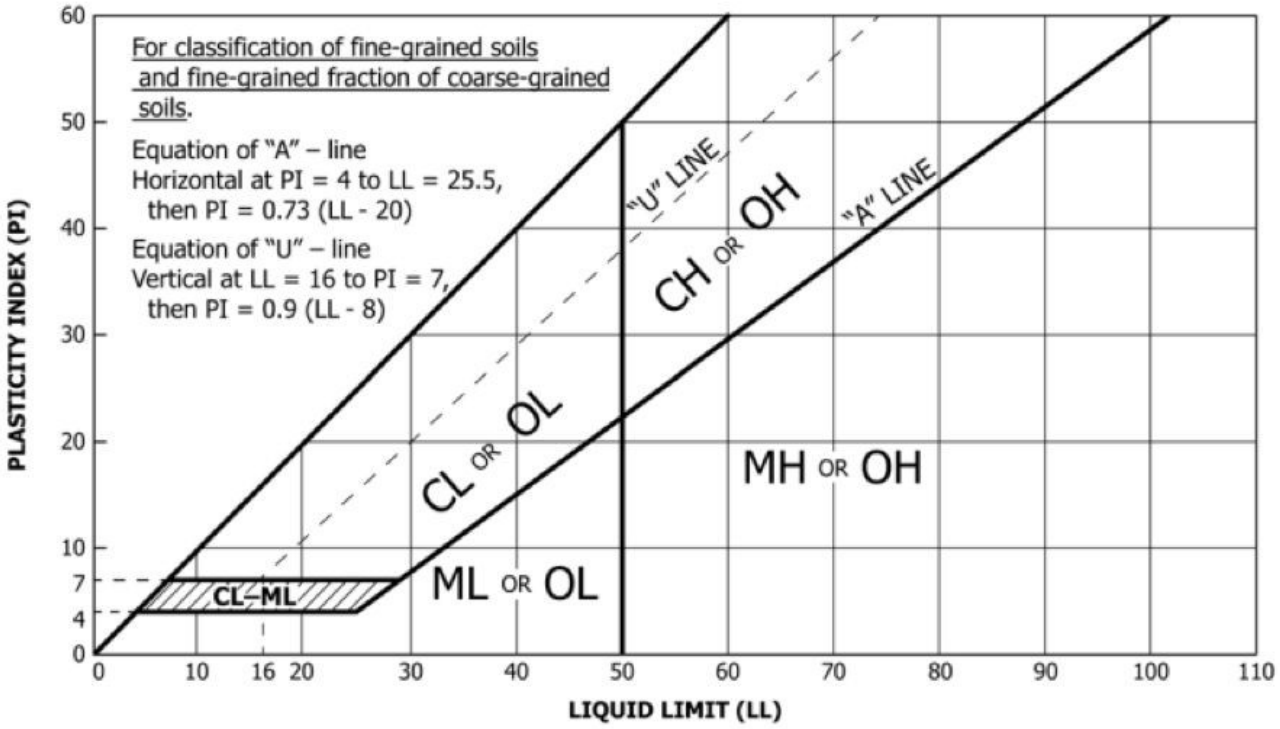
PLASTICITY CHART FOR USCS CLASSIFICATION OF FINE-GRAINED SOILS



IMPORTANT NOTES ON TEST BORING RECORDS

1) The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.

2) Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown. Solid lines are used to indicate a change in the material type, particularly a change in the USCS classification. Dashed lines are used to separate two materials that have the same material type, but that differ with respect to two or more other characteristics (e.g. color, consistency).

3) No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.

4) Logs represent general soil and rock conditions observed at the point of exploration on the date indicated.

5) In general, Unified Soil Classification System (USCS) designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.

6) Fine-grained soils that plot within the hatched area on the Plasticity Chart, and coarse-grained soils with between 5% and 12% passing the #200 sieve require dual USCS symbols as presented on the previous page.

7) If the sampler is not able to be driven at least 6 inches, then 50/X" indicates that the sampler advanced X inches when struck 50 times with a 140-pound hammer falling 30 inches.

8) If the sampler is driven at least 6 inches, but cannot be driven either of the subsequent two 6-inch increments, then either 50/X" or the sum of the second 6-inch increment plus 50/X" for the third 6-inch increment will be indicated.
Example 1: Recorded SPT blow counts are 16 - 50/4", the SPT N-value will be shown as N = 50/4"
Example 2: Recorded SPT blow counts are 18 - 25 - 50/2", the SPT N-value will be shown as N = 75/8"

TEST BORING RECORD LEGEND FOR ROCK

ROCK CORE INFORMATION

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 CRITERIA

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 hard thumb pressure; can be broken with light hammer blows
Soft	Rock is cohesive 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 soil

$$\text{Recovery (\%)} = \frac{\text{Length of Core Sample Recovered}}{\text{Length of the Core Run}} \times 100$$

$$\text{RQD (\%)} = \frac{\text{Sum of Lengths of Intact Rock Pieces of 4 in. and Longer}}{\text{Length of the Core Run}} \times 100$$

WEATHERING OR ALTERATION

Term	Description
Fresh	No evidence of alteration
Slightly Weathered	Slight discoloration on surface
Moderately Weathered	Discoloring evident; alteration penetrating well below rock surface
Highly Weathered	Entire rock mass discolored
Decomposed	Rock reduced to a soil with relict rock texture

JOINT ROUGHNESS COEFFICIENT (JRC)

Coefficient	Description
14 - 20	Very Rough: Near vertical edges evident
10 - 14	Rough: Smooth ridges, surface abrasion
6 - 10	Slightly Rough: Asperities on surface can be felt
2 - 6	Smooth: Appears and feels smooth
0 - 2	Slickensided: Visible polishing, striated surface

FRACTURE/JOINT DENSITY

Description	Observed Fracture Density
Intact	No fractures or joints less than 6 ft. apart
Slightly Fractured/Jointed	Lengths from 3 ft. to 6 ft.
Moderately Fractured/Jointed	Lengths from 1 ft. to 3 ft.
Highly Fractured/Jointed	Lengths from 4in. to 1 ft.
Intensely Fractured/Jointed	Lengths less than 4 inches

DISCONTINUITY TERMS

Fracture: Collective term for any natural break excluding shears, shear zones, and faults

Joint (JT): Planar break with little or no displacement

Foliation Joint (FJ) or Bedding Joint (BJ): Joint along foliation or bedding

Incipient Joint (IJ) or Incipient Fracture (IF): Joint or fracture not evident until wetted and dried; breaks along existing surface

Random Fracture (RF): Natural, very irregular fracture that does not belong to a set

Bedding Plane Separation or Parting: A separation along bedding after extraction from stress relief or slaking

Fracture Zone (FZ): Planar zone of broken rock without gouge

Mechanical Break (MB): Breaks due to drilling or handling; drilling break is denoted as (DB) and hammer break is denoted as (HB)

Shear (SH): Surface of differential movement evident by presence of slickensides, striations, or polishing

Shear Zone (SZ): Zone of gouge and rock fragments bounded by planar shear surfaces

Fault (FT): Shear zone of significant extent; differentiation from shear zone may be site-specific

BEDDING THICKNESS

Massive	> 3 ft.
Thick	1 ft. to 3 ft.
Medium	4 in. to 1 ft.
Thin	1-1/4 in. to 4 in.
Banded	1/4 in. to 1-1/4 in.
Parting	< 1/4 in.

APERTURE WIDTH

Term	Spacing
Very Tight	< 0.1 mm
Tight	0.1 to 0.25 mm
Partly Open	0.25 to 0.5 mm
Open	0.5 to 2.5 mm
Moderately Wide	2.5 to 10 mm
Wide	10 mm to 1 cm
Very Wide	1 to 10 cm
Extremely Wide	10 cm to 1 m
Cavernous	> 1 m

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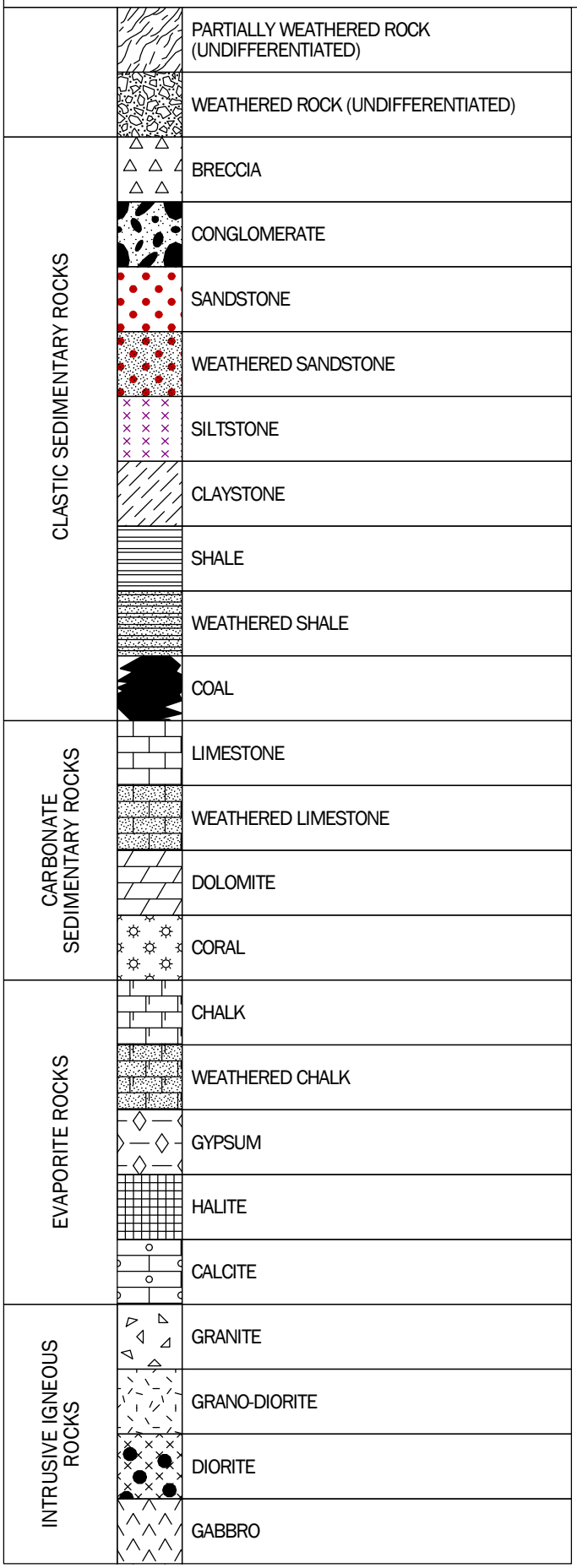
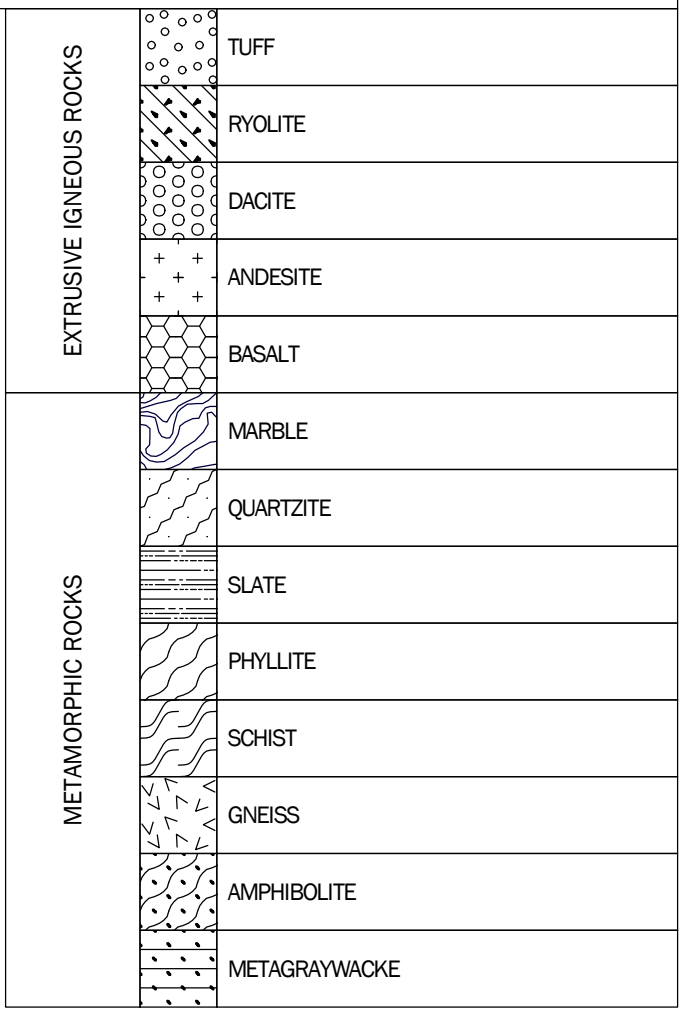
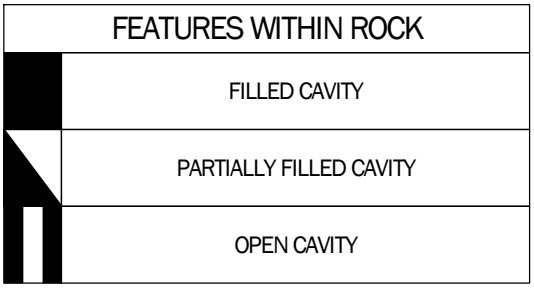
ROCK CLASSIFICATION







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Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-02

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00
Driller:	R. Bell	Date Drilled:	04/22/2025
Logged By:	B. Miller	Boring Depth:	38.5 ft
Equipment:	CME-550X	Boring Elevation:	~702 ft
Hammer Type:	Auto	Coordinates:	N/A
Drilling Method:	Hollow-stem auger w/SPT sampling and NQ wireline	Water Level At Time Of Drilling	N.E.
		Cave In	N/A
		Delayed Water Level	13 ft
		Delayed Water Date	04/22/25

Remarks:
Backfilled with bentonite and auger cuttings upon and a patch of asphalt was applied at the surface completion. Delayed water level indicates post rock coring water level. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
			ASPHALT, 6 inches — 0.5										
700			BASESTONE; 16 inches — 1.8		24-21-10 (31)	10			3.5				
			FILL: LEAN CLAY, dark brown and brown, moist (CL)										
			- N-value amplified at 1 foot due to basestone		4-5-5 (10)	33			27.4				
	5		- Bulk Sample obtained from auger cutting between 3 and 10 feet										
695					3-4-5 (9)	100			23.6				
									26.8	45-20-25			
					3-5-9 (14)	67			24.0				
	10												
690			12.0										
			FILL: FAT CLAY, dark brown with brown mottling, with trace of limestone fragments, moist (CH)		10-13-13 (26)	33			24.9				
	15												
685													
					16-16-13 (29)	67			18.1				
	20												
680			22.0										
			RESIDUUM: FAT CLAY, very stiff, brown, with some chert gravel (coarse),, moist (CH)		5-12-14 (26)	67			27.7	61-27-34			
	25												
675			Auger refusal at 28.5 feet; begin NQ coring										
			28.5										
			LIMESTONE, moderately hard, gray, fine to medium grained, moderately fractured, slightly weathered to fresh, with shale partings throughout			100	76						
	30												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.
Murfreesboro, Tennessee
Rutherford County

Log of Soil Boring B-02

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			LIMESTONE, moderately hard, gray, fine to medium grained, moderately fractured, slightly weathered to fresh, with shale partings throughout			100	76						
	35					100	86						
665			38.5										
			Boring terminated at 38.5 feet										
	40												
660													
	45												
655													
	50												
650													
	55												
645													
	60												
640													

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-03

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with bentonite and auger cuttings upon completion. Delayed water level indicates post rock coring water level. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/23/2025	
Logged By:	B. Miller	Boring Depth:	14.5 ft	
Equipment:	CME-550X	Boring Elevation:	~680 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling and NQ wireline	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: 2 ft
		Cave In	N/A	Delayed Water Date: 04/23/25

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			TOPSOIL, 6 inches (0.5)										
			POSSIBLE FILL: FAT CLAY, red-brown, with black mineral staining, trace fine roots, and limestone fragments, moist (CH)		5-4-3 (7)	67			24.4	62-26-36			
			- bulk sample obtained between 1 and 3 feet										
					46-50/3" (50/3")	33							
675	5		Auger refusal at 4.5 feet; begin NQ coring (4.5)			94	66						
			LIMESTONE, moderately hard, gray, fine to medium grained, slightly fractured, slightly weathered to fresh, with shale partings throughout										
			- soil seam at 5.6 to 5.7 feet										
670	10					100	74						
			(14.5)										
665	15		Boring terminated at 14.5 feet										
660	20												
655	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-07

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Offset boring attempted 5 feet west with similar refusal. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	1.5 ft	
Equipment:	CME-550X	Boring Elevation:	~680 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level N/A
		Cave In	N/A	Delayed Water Date N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			TOPSOIL, 1 inch 0.1										
			WEATHERED LIMESTONE 1.5		50/3" (50/3")	5			6.7				
			Auger refusal at 1.5 feet										
675	5												
670	10												
665	15												
660	20												
655	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-08

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	5.5 ft	
Equipment:	CME-550X	Boring Elevation:	~676 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
675			TOPSOIL, 4 inches (0.3)										
			RESIDUUM: LEAN CLAY, brown, with trace fine roots and limestone fragments, moist (CL)		20-50/3" (50/3")	33							
			- N-values amplified by limestone fragments		50/4" (50/4")	33							
670	5		(5.5) Auger refusal at 5.5 feet										
665	10												
660	15												
655	20												
	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-09

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	6 ft	
Equipment:	CME-550X	Boring Elevation:	~670 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level N/A
		Cave In	N/A	Delayed Water Date N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			TOPSOIL, 2 inches 0.2										
			RESIDUUM: LEAN CLAY, very stiff, brown, with black mineral staining, trace fine roots, and occasional limestone fragments, moist (CL)		50/5" (50/5")	33			14.6	37-22-15			
			- N-values amplified due to limestone fragments		10-50/1" (50/1")	33							
665	5		6.0 Auger refusal at 6 feet										
660	10												
655	15												
650	20												
645	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-10

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/21/2025	
Logged By:	B. Miller	Boring Depth:	8.5 ft	
Equipment:	CME-550X	Boring Elevation:	~687 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
			TOPSOIL, 4 inches (0.3)										
685			**POSSIBLE FILL**: LEAN CLAY, brown, with trace fine roots and some limestone fragments, moist (CL)		4-7-9 (16)	33							
	5				7-3-8 (11)	33							
			(5.5)										
680			**RESIDUUM**: FAT CLAY, very stiff, red-brown with gray mottling, with trace chert fragments and some limestone fragments, which amplified N-value, moist (CH)		11-19-25 (44)	67							
			(8.5) Auger refusal at 8.5 feet										
	10												
675													
	15												
670													
	20												
665													
	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-11

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	11 ft	
Equipment:	CME-550X	Boring Elevation:	~685 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
			TOPSOIL, 6 inches — 0.5										
			POSSIBLE FILL: LEAN CLAY, brown, with some limestone fragments (coarse to fine), moist (CL)		4-5-7 (12)	33			18.8				
			— 3.0										
			RESIDUUM: FAT CLAY, stiff to very stiff, red-brown to light brown, with some chert fragments and limestone fragments, (CH)		4-4-7 (11)	100			25.8				
680	5												
					3-5-11 (16)	100			24.6				
			- N-value for sample at 8.5 feet amplified due to limestone fragments		14-50/3" (50/3")	33			15.4				
675	10		— 11.0										
			Auger refusal at 11 feet										
670	15												
665	20												
660	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-12

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	17 ft	
Equipment:	CME-550X	Boring Elevation:	~695 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
			TOPSOIL, 6 inches										
			0.5										
			POSSIBLE FILL: LEAN CLAY, red-brown to brown, with some limestone fragments, moist (CL)		8-7-9 (16)	67			13.8				
					7-10-9 (19)	67			15.9				
690	5												
			5.5										
			RESIDUUM: FAT CLAY, very stiff, brown with gray mottling, with abundant limestone fragments, moist (CH)		6-13-11 (24)	67			19.6				
			- N-value for sample at 8.5 feet amplified due to limestone fragments		23-17-26 (43)	67			6.3				
685	10												
			12.5										
			WEATHERED LIMESTONE, with interbedded clay		37-50/3" (50/3")	67			8.7				
680	15												
			17.0										
			Auger refusal at 17 feet										
675	20												
670	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-13

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Offset boring attempted 5 feet east with similar refusal. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/23/2025	
Logged By:	B. Miller	Boring Depth:	4 ft	
Equipment:	CME-550X	Boring Elevation:	~688 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			TOPSOIL, 6 inches — 0.5										
685			**POSSIBLE FILL**: LEAN CLAY, light brown, with some black mineral staining, moist (CL) — 3.0		50/5" (50/5")	15							
			WEATHERED LIMESTONE — 4.0		50/5" (50/5")	0							
			Boring terminated at 4 feet										
680	5												
	10												
675													
	15												
670													
	20												
665													
	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-14

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Offset boring attempted 5 feet south with similar refusal. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	4 ft	
Equipment:	CME-550X	Boring Elevation:	~687 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
					Samples				Lab				
			TOPSOIL, 4 inches — 0.3										
685			**WEATHERED LIMESTONE**, brown, with some interbedded clay		30-50/3" (50/3")	33			6.8				
			3.0										
			RESIDUUM: LEAN CLAY, very stiff, brown, with trace fine roots, moist (CL)		50/3" (50/3")	10			42.2	42-25-17			
	5		- N- Value amplified due to refusal — 4.0										
680			Auger refusal at 4 feet										
	10												
675													
	15												
670													
	20												
665													
	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-15

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	5.5 ft	
Equipment:	CME-550X	Boring Elevation:	~685 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
			TOPSOIL, 4 inches (0.3)										
			RESIDUUM: LEAN CLAY, very stiff, red-brown, with trace fine roots, and limestone fragments, moist (CL)		50/5" (50/5")	33			24.0				
			- N-value amplified due to limestone fragments (3.0)										
680	5		FAT CLAY, very stiff, red-brown with light brown mottling, with some limestone fragments, which amplified N-values, moist (CH)		10-15-50/5" (65/11")	67			25.3				
			(5.5) Auger refusal at 5.5 feet										
675	10												
670	15												
665	20												
660	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-16

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00
Driller:	R. Bell	Date Drilled:	04/22/2025
Logged By:	B. Miller	Boring Depth:	0.5 ft
Equipment:	CME-550X	Boring Elevation:	~685 ft
Hammer Type:	Auto	Coordinates:	N/A
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.
		Cave In	N/A
		▼ Delayed Water Level	N/A
		Delayed Water Date	N/A

Remarks:
Backfilled with auger cuttings upon completion.
Offset boring attempted 5 feet East with refusal at 1 foot.
Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			TOPSOIL, 6 inches										
			0.5 Auger refusal at 0.5 foot										
680	5												
675	10												
670	15												
665	20												
660	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-17

Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Offset boring attempted 5 feet east with similar refusal. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/24/2025	
Logged By:	B. Miller	Boring Depth:	2.5 ft	
Equipment:	CME-550X	Boring Elevation:	~677 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level N/A
		Cave In	N/A	Delayed Water Date N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Sample Graphic	Blow Counts (N/Refusal)	Recovery (%)	RQD (%)	Pocket Penetrometer (tsf)	Moisture Content (%)	Atterberg Limits (LL-PL-PI)	% Fines	Dry Density (pcf)	Compressive Strength (ksf)
			TOPSOIL, 4 inches 0.3										
675			**POSSIBLE FILL**: LEAN CLAY, brown, with some limestone fragments moist (CL) 2.5		8-7-10 (17)	50			22.8	47-21-26			
			Auger refusal at 2.5 feet										
	5												
670													
	10												
665													
	15												
660													
	20												
655													
	25												

BoreDM Template: AEP

Epps Mill Road Interchange Project

Neel-Schaffer, Inc.

Murfreesboro, Tennessee

Rutherford County

Log of Soil Boring B-18

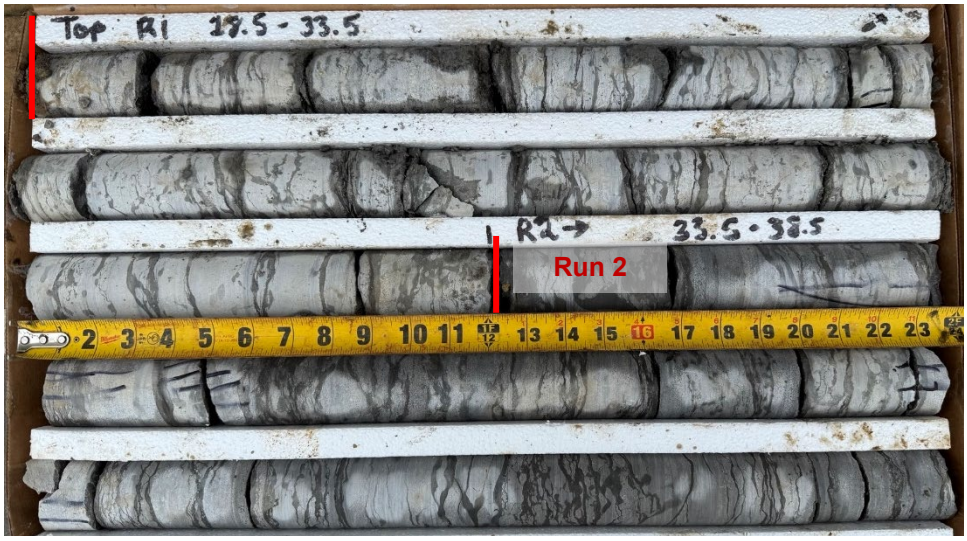
Drilling Co.:	TTL, Inc.	Project Number:	000240802902.00	Remarks: Backfilled with auger cuttings upon completion. Offset boring attempted 5 feet West with refusal at 3.5 feet. Elevation obtained by interpolating between contours on provided drawing. N.E. = Not encountered
Driller:	R. Bell	Date Drilled:	04/22/2025	
Logged By:	B. Miller	Boring Depth:	3 ft	
Equipment:	CME-550X	Boring Elevation:	~685 ft	
Hammer Type:	Auto	Coordinates:	N/A	
Drilling Method:	Hollow-stem auger w/SPT sampling	▽ Water Level At Time Of Drilling	N.E.	▼ Delayed Water Level: N/A
		Cave In	N/A	Delayed Water Date: N/A

Elevation (feet)	Depth (feet)	Graphic Log	Materials Description	Samples: Sample Graphic	Samples: Blow Counts (N/Refusal)	Samples: Recovery (%)	Samples: RQD (%)	Samples: Pocket Penetrometer (tsf)	Lab: Moisture Content (%)	Lab: Atterberg Limits (LL-PL-PI)	Lab: % Fines	Lab: Dry Density (pcf)	Lab: Compressive Strength (ksf)
			TOPSOIL, 6 inches (0.5)										
			POSSIBLE FILL: LEAN CLAY, brown with red and light brown mottling, with limestone fragments, moist (CL)		10-25-16 (41)	33							
			(3.0) Auger refusal at 3 feet										
680	5												
675	10												
670	15												
665	20												
660	25												

BoreDM Template: AEP

Boring B-02
28-½ feet to 38-½ feet

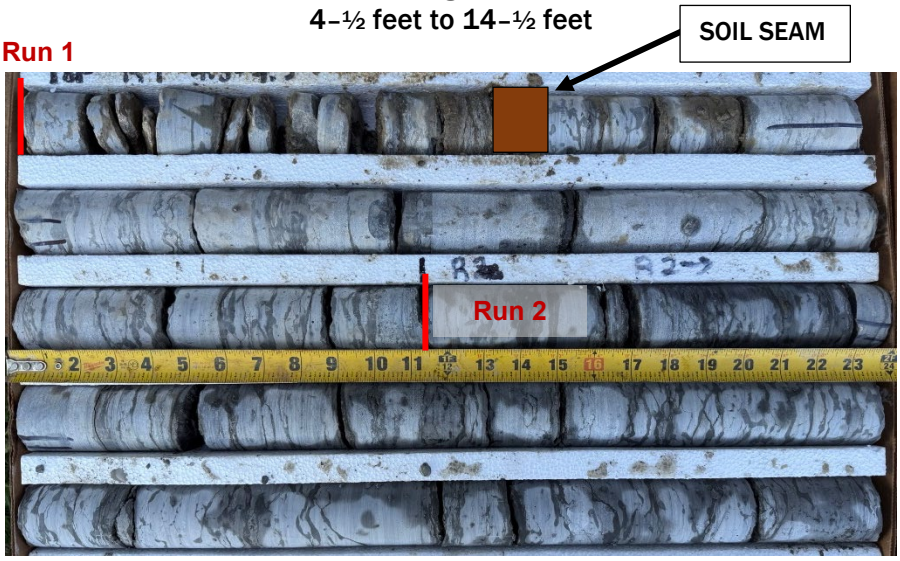
Run 1



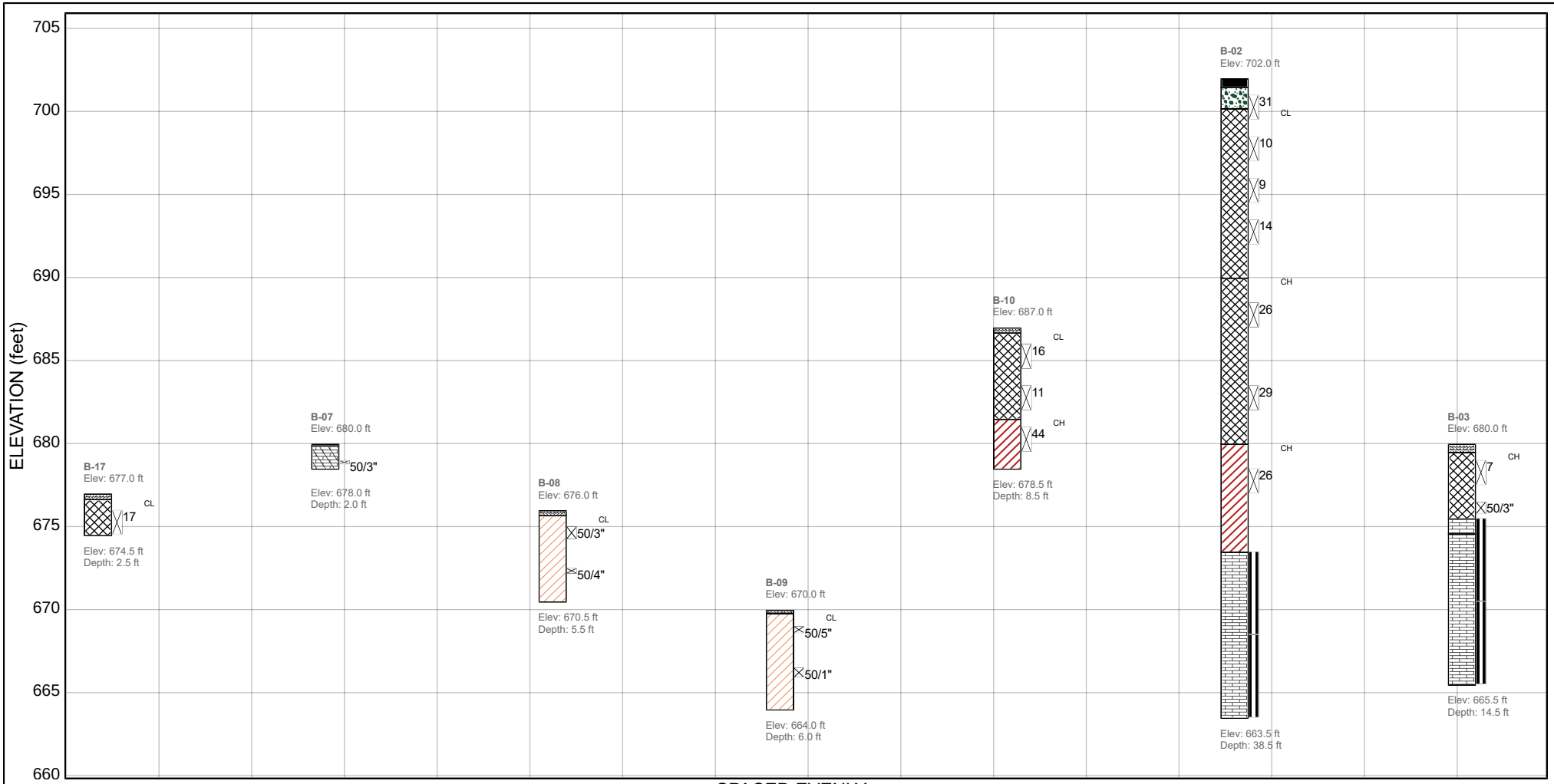
Run No.	Depth (feet)	Recovery (percent)	RQD (percent)	Rock Quality
1	28-½ to 33-½	100	76	Good
2	33-½ to 38-½	100	86	Good

ROCK CORE PHOTOGRAPHS
EPPS MILL ROAD INTERCHANGE PROJECT
MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE
TTL PROJECT NO. 000240802902.00

Boring B-03
4-½ feet to 14-½ feet

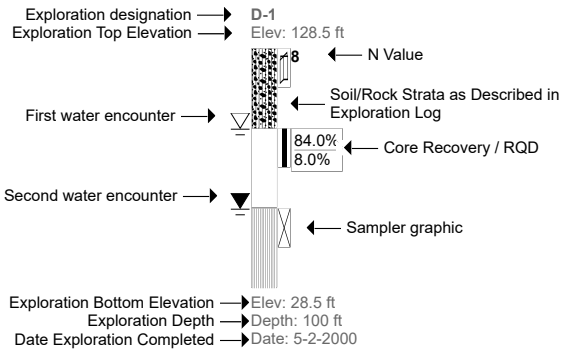


Run No.	Depth (feet)	Recovery (percent)	RQD (percent)	Rock Quality
1	4-½ to 9-½	94	66	Fair
2	9-½ to 14-½	100	74	Fair

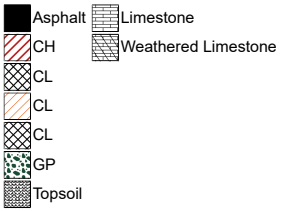


SPACED EVENLY

EXPLORATION LOG LEGEND



LEGEND KEY



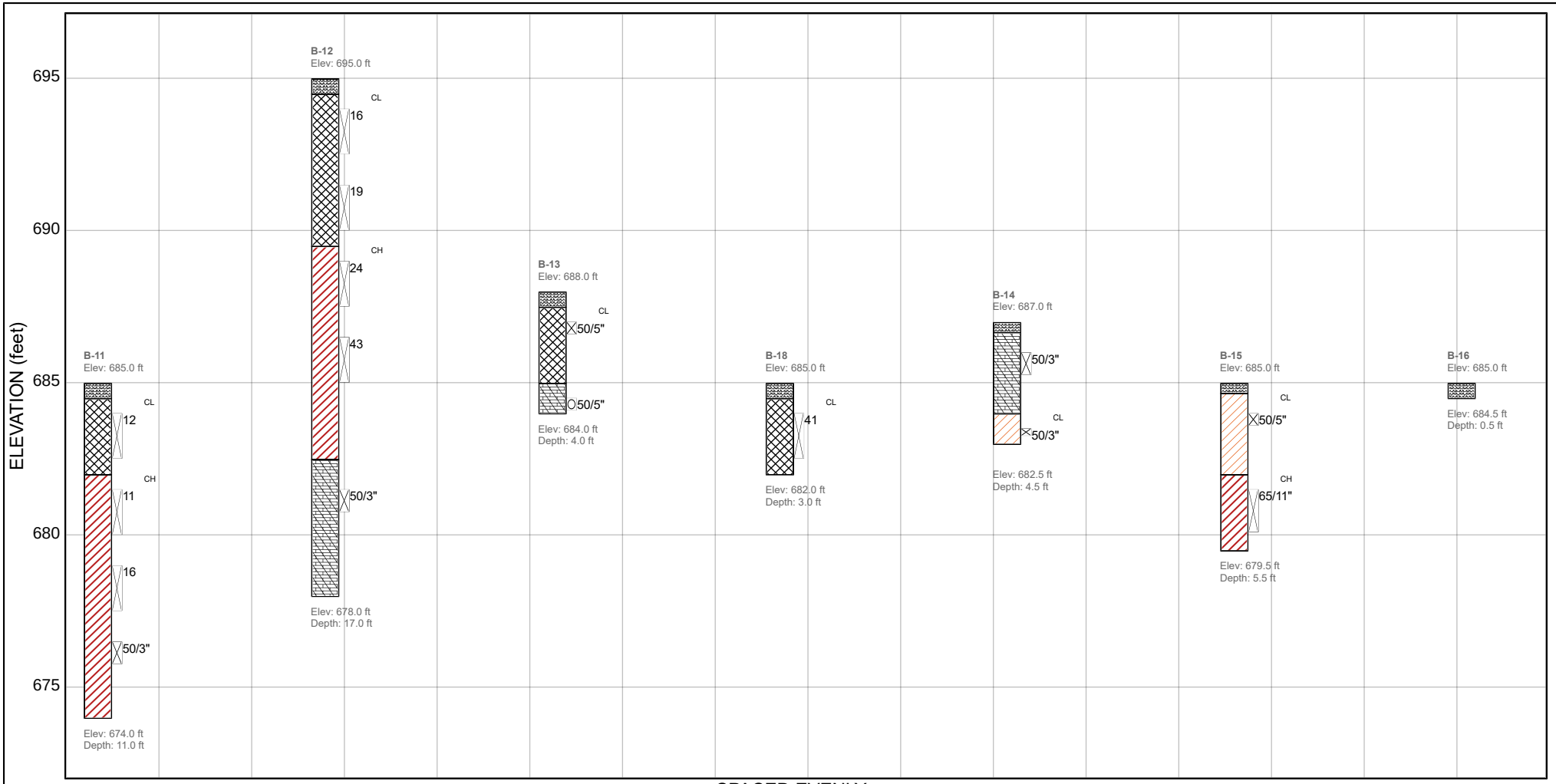
Scale:
Vertical = As Shown
Horizontal = None

Epps Mill Road Interchange Project
Murfreesboro, Tennessee

000240802902.00

CROSS SECTIONS REPORT

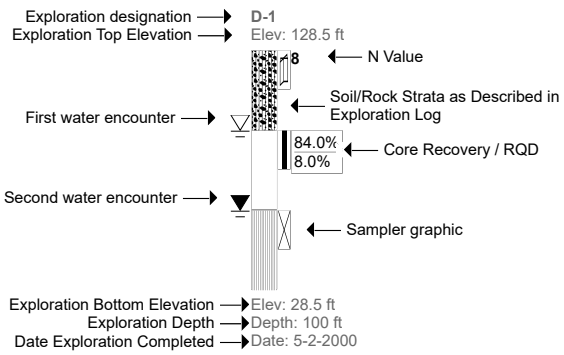
TTL



SPACED EVENLY

Scale:
Vertical = As Shown
Horizontal = None

EXPLORATION LOG LEGEND



LEGEND KEY

- CH
- CL
- CL
- Topsoil
- Weathered Limestone

Epps Mill Road Interchange Project
Murfreesboro, Tennessee

000240802902.00

CROSS SECTIONS REPORT

TTL

ASPHALT CORE PHOTOGRAPHS
EPPS MILL ROAD INTERCHANGE PROJECT
MURFREESBORO< RUTHERFORD COUNTY, TENNESSEE
TTL PROJECT NO. 000240802902.00

Asphalt Core C-01

Asphalt Core C-02

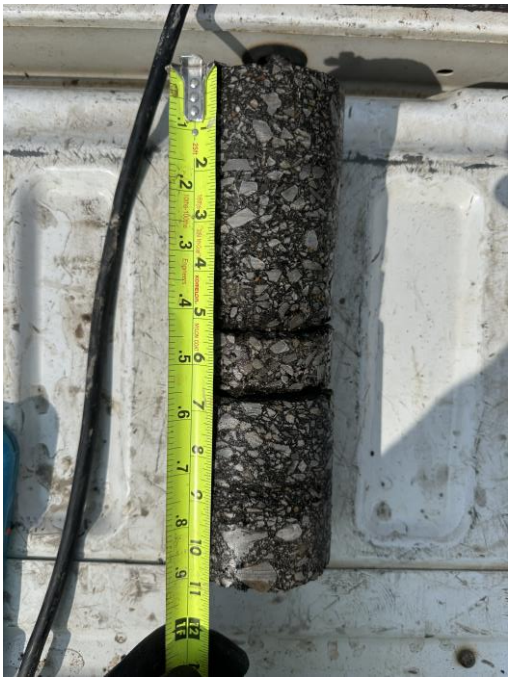
Asphalt Core C-03

Asphalt Core C-04

ASPHALT CORE PHOTOGRAPHS
EPPS MILL ROAD INTERCHANGE PROJECT
MURFREESBORO< RUTHERFORD COUNTY, TENNESSEE
TTL PROJECT NO. 000240802902.00

Asphalt Core C-05

Asphalt Core C-06



Asphalt Core C-07

Asphalt Core C-08

APPENDIX B
REFERENCE MATERIALS

TTL

Laboratory Results Summary

PROJECT Epps Mill Road Interchange Project
PROJECT NO. 000240802902.00
CLIENT Neel-Schaffer, Inc.
LOCATION Murfreesboro, Tennessee

Boring ID	Depth (ft)	Moisture Content (%)	LL	PL	PI	%Gravel	% Sand	% Fines	Dry Density (PCF)	AASHTO	USCS
B-02	1	3.5									
B-02	3	27.4									
B-02	3.5	23.7									
B-02	6	23.6									
B-02	3 - 10 (Bulk)	26.8	45	20	25					A-7-6	CL
B-02	8.5	24									
B-02	13.5	24.9									
B-02	18.5	18.1									
B-02	23.5	27.7	61	27	34					A-7-6	CH
B-07	1	6.7									
B-09	1	14.6	37	22	15					A-6	CL
B-11	1	18.8									
B-11	3.5	25.8									
B-11	6	24.6									
B-11	8.5	15.4									
B-12	1	13.8									
B-12	3.5	15.9									
B-12	6	19.6									
B-12	8.5	6.3									
B-12	13.5	8.7									
B-14	1	6.8									
B-14	3.5	42.2	42	25	17					A-7-6	CL
B-15	1	24									
B-15	3.5	25.3									
B-17	1	22.8	47	21	26					A-7-6	CL

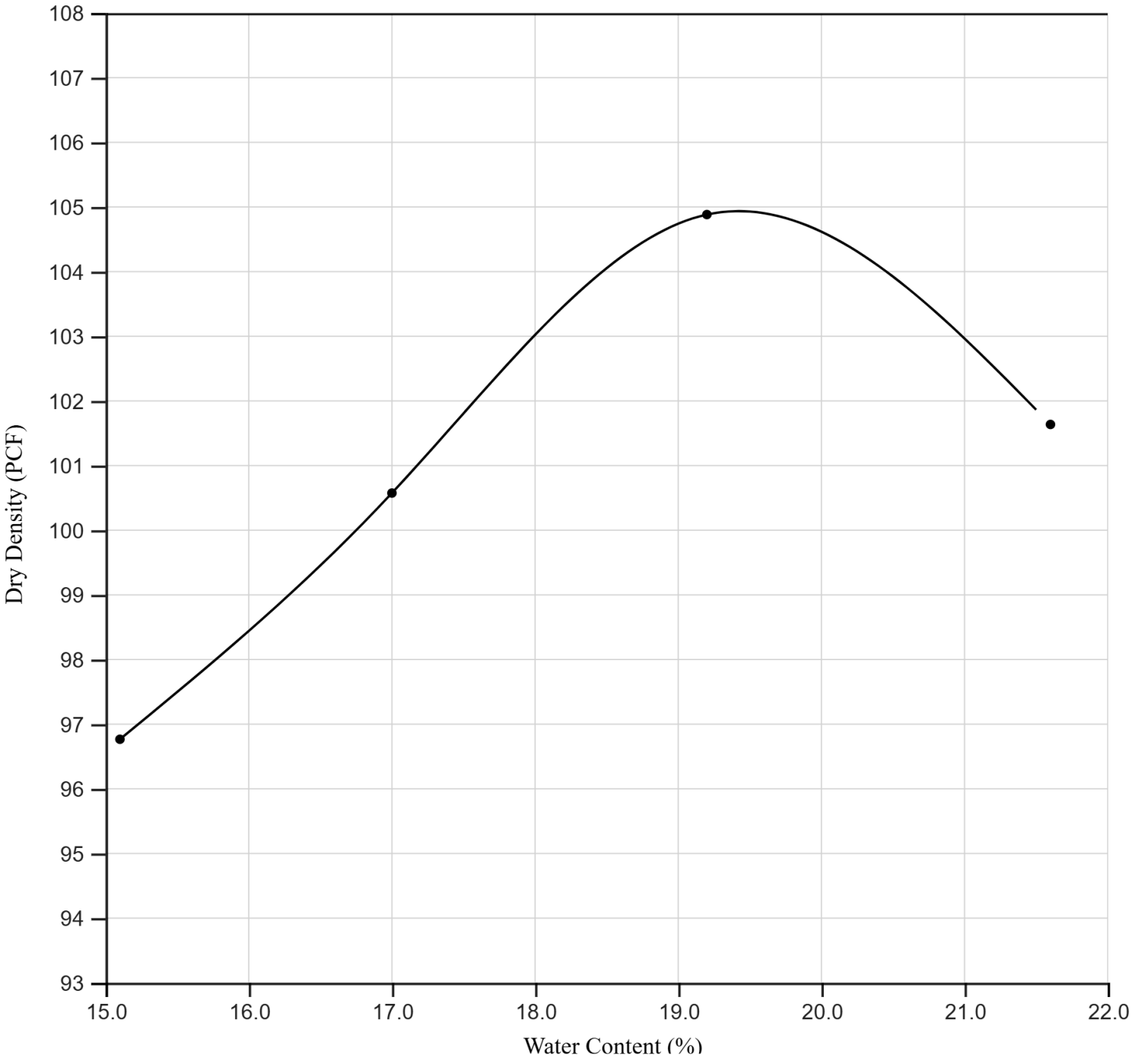
TTL

COMPACTION TEST RESULTS

Epps Mill Road Interchange Project
Murfreesboro, Tennessee

B-02,

Test Method: ASTM D0698 (Standard)-B
(9mm Sieve, 4" Mold Diameter)



SAMPLE INFORMATION	
Sample Identification:	
Date Sample Obtained:	-
Sample Depth/Elevation:	7.5'/694.5'
Sample USCS Description Before Test Preparation:	

TEST RESULTS	Uncorrected for Oversize Material	Corrected for Oversize Material
Natural Water Content:	18.2%	
Maximum Dry Density:	104.9PCF	
Optimum Moisture Content:	19.4%	
Remarks:		

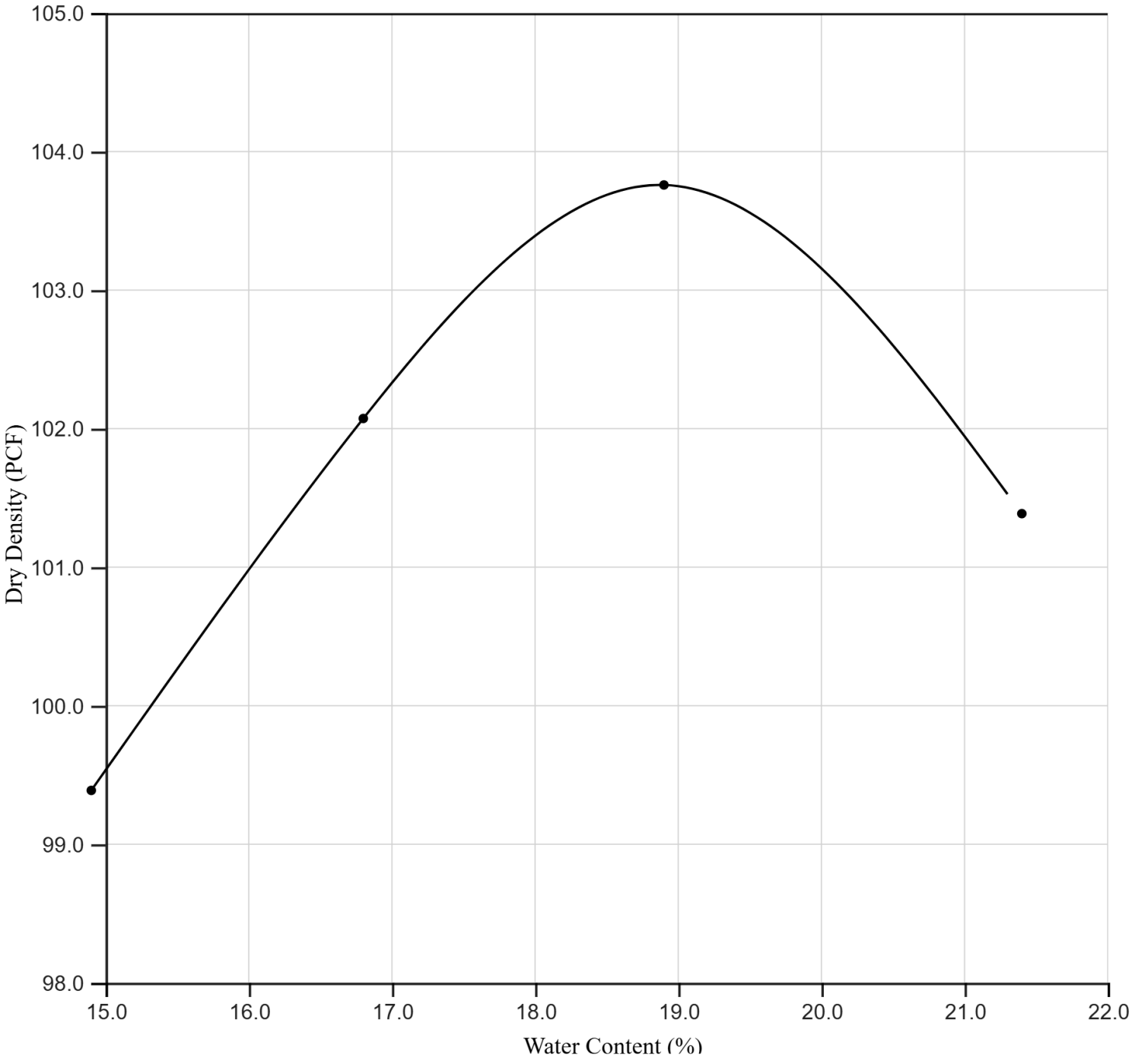
TTL

COMPACTION TEST RESULTS

Epps Mill Road Interchange Project
Murfreesboro, Tennessee

B-03,

Test Method: ASTM D0698 (Standard)-B
(9mm Sieve, 4" Mold Diameter)



SAMPLE INFORMATION	
Sample Identification:	
Date Sample Obtained:	-
Sample Depth/Elevation:	1.0'/679.0'
Sample USCS Description Before Test Preparation:	

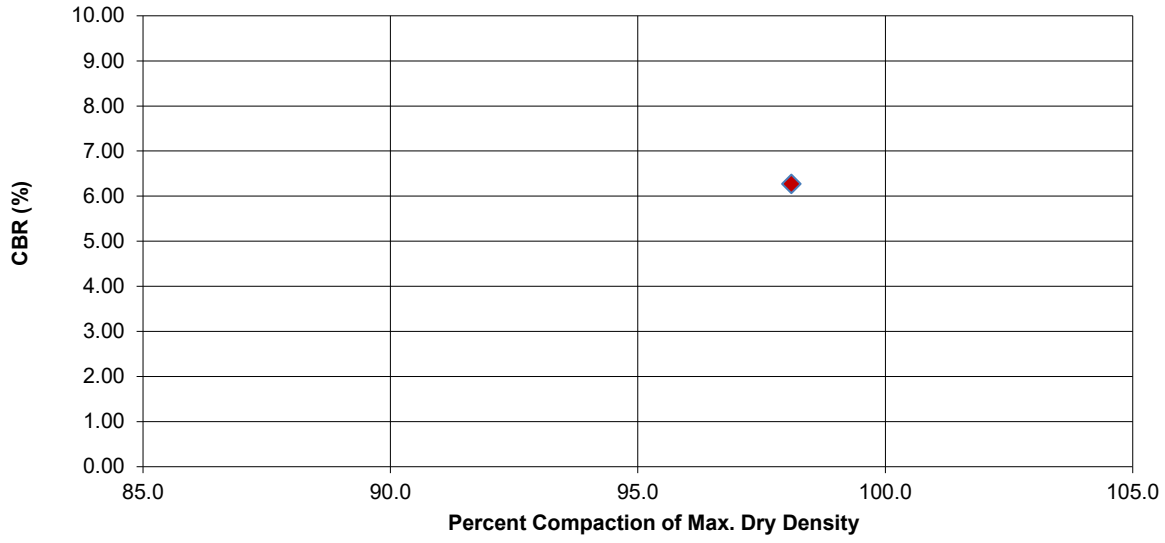
TEST RESULTS	Uncorrected for Oversize Material	Corrected for Oversize Material
Natural Water Content:	18%	
Maximum Dry Density:	103.8PCF	
Optimum Moisture Content:	18.9%	
Remarks:		

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193
ASTM D 1883-99

Project Name: Epps Mill Road Interchange
Project No.: 000240802902.00
Sample Identification: B-02 (3-10)
Sample Description: Brown CL / A-7-6

Sample Data			
Sample No.	1		
Hours Soaked	96		
Surcharge Amount (lbs)	10.0		
Wet Unit Weight (pcf)	122.1		
Dry Unit Weight (pcf)	102.9		
Moisture (% as compacted):			
Before Compaction	18.7		
After Compaction	18.7		
Top 1" after soaking	21.8		
Average after soaking	21.8		
Swell (% of initial height)	1.00		
% of Maximum Dry Density	***98.1***		
Bearing Ratio (%)	***6.27***		

Proctor Information: Optimum Moisture Content (%): 19.4 Max. Dry Density (pcf): 104.9



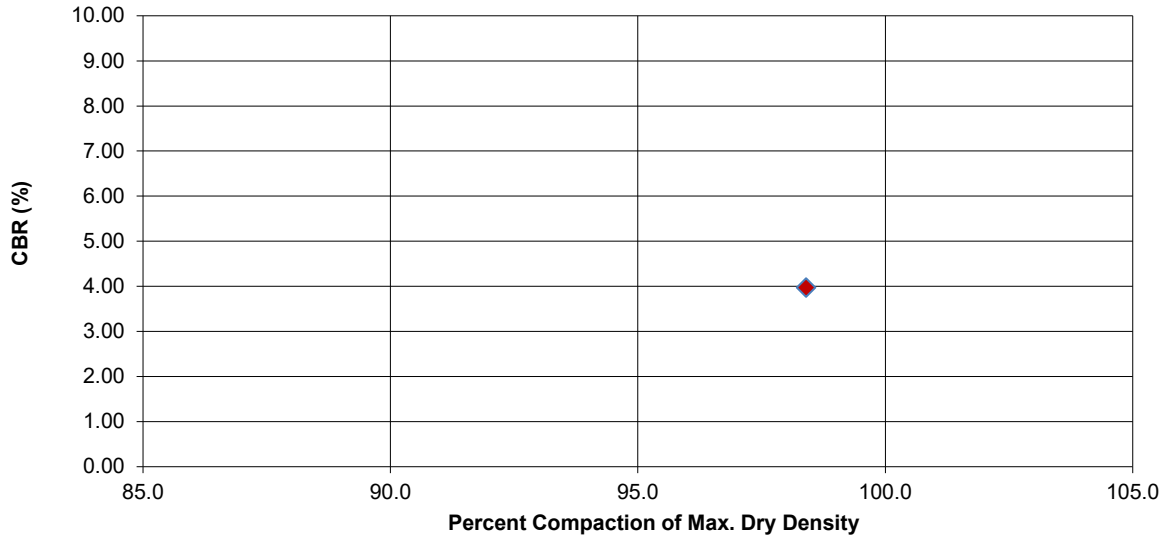
Special Sample Preparation (if applicable): N/A
Pertinent Testing: N/A
Percent Retained on 19-mm Sieve: N/A

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193
ASTM D 1883-99

Project Name: Epps Mill Road Interchange
Project No.: 000240802902.00
Sample Identification: B-03 (1-3)
Sample Description: Red-Brown CH / A-7-6

Sample Data			
Sample No.	1		
Hours Soaked	96		
Surcharge Amount (lbs)	10.0		
Wet Unit Weight (pcf)	121.8		
Dry Unit Weight (pcf)	102.1		
Moisture (% as compacted):			
Before Compaction	19.2		
After Compaction	18.9		
Top 1" after soaking	21.5		
Average after soaking	21.5		
Swell (% of initial height)	1.07		
% of Maximum Dry Density	***98.4***		
Bearing Ratio (%)	***3.97***		

Proctor Information: Optimum Moisture Content (%): 18.9 Max. Dry Density (pcf): 103.8



Special Sample Preparation (if applicable): N/A
Pertinent Testing: N/A
Percent Retained on 19-mm Sieve (if N/A