GEOTECHNOLOGY INC
FROM THE GROUND UP

GEOTECHNICAL DATA REPORT REPORT
CITY OF LAKELAND
CLEAR CREEK INTERCEPTOR
SANITARY SEWER PHASE A
LAKELAND, TENNESSEE

Prepared for:Regional Manager

BUCHART HORN
MEMPHIS, TENNESSEE

Prepared by:

GEOTECHNOLOGY, INC.
MEMPHIS, TENNESSEE

Date:

MAY 9, 2019

Geotechnology Project No.:

J028447.01

SAFETY
QUALITY
INTEGRITY
PARTNERSHIP
OPPORTUNITY
RESPONSIVENESS

GEOTECHNOLOGY INC
FROM THE GROUND UP

May 9, 2019

Ms. Diane Vesely, P.E.
Regional Manager
Buchart Horn
3150 Lenox Park Boulevard, Suite 300
Memphis, Tennessee 38115

Re: Geotechnical Data Report
City of Lakeland
Clear Creek Interceptor Sanitary Sewer Phase A
Lakeland, Tennessee
Geotechnology Project No. J028447.01

Dear Ms. Vesely:

Presented in this Geotechnical Data Report (GDR) are the results of the geotechnical exploration performed by Geotechnology, Inc. for the referenced project. The GDR includes our understanding of the project, observed site conditions, support data, and subsequent revisions for the modified flowline elevations as listed in the Table of Contents. Design considerations and recommendations are included in a separate Geotechnical Interpretive Report (GIR).

We appreciate the opportunity to provide geotechnical services for this project. If you have any questions regarding this report, or if we can be of any additional service to you, please do not hesitate to contact us.

Respectfully submitted,
GEOTECHNOLOGY, INC.

Dale M. Smith, P.E.
Geotechnical Manager

Amber Stoner-Meadows
Project Engineer

DALE SMITH
REGISTERED
ENGINEER
No. 120765
STATE OF TENNESSEE

5/10/19

ABM/DMS/JKH:abm

Copies submitted: Client (email/2 mail)

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CITY OF LAKELAND
CLEAR CREEK INTERCEPTOR SANITARY SEWER PHASE A
LAKELAND, TENNESSEE

May 9, 2019 | Geotechnology Project No. J028447.01

1.0 INTRODUCTION

Geotechnology, Inc., prepared this geotechnical data report (GDR) for Buchart Horn for the Clear Creek Sanitary Sewer Phase A Interceptor to be constructed along a portion of Chambers Chapel Road, Chapel Hill Road, the Tennessee Valley Authority (TVA) transmission line easement and CSX railway to the Scotts Creek Waste Water Treatment Plant (WTTP) in Lakeland, Tennessee. Our services documented in this report were provided in general accordance with the terms and scope of services described in our Proposal P028447.01, dated April 3, 2017. Our services documented in this report were authorized by your signed acceptance of our terms dated March 15, 2018.

The purposes of the GDR is to document and summarize the technical information collected during the subsurface exploration for the project. Our scope of services included site reconnaissance, geotechnical borings, laboratory testing and preparation of this report.

A copy of "Important Information about This Geotechnical-Engineering Report," published by the Geotechnical Business Council of the Geoprofessional Business Association, is included in Appendix A for your review. The publication discusses report limitations and ways to manage risk associated with subsurface conditions.

2.0 SITE DESCRIPTION

The project alignment is approximately 18,000 linear feet (lf) long, passing through grassy areas, wooded areas, residential and agricultural development in Lakeland, Tennessee as shown on Figure 1 (Site Location and Topography) in Appendix B. The proposed sanitary sewer interceptor alignment runs north approximately 140 feet along Chambers Chapel Road to its intersection with Chapel Hill Road. The interceptor continues east along Chapel Hill Road into the TVA transmission line easement, runs north along the TVA easement, crossing Memphis-Arlington Road and US Highway 70 and continues west along the CSX railway Right of Way (ROW) to the Scotts Creek WTTP. Based on the provided civil drawings[1], elevations at the site range from El[2] 252 to 286. The site is bounded to the east by Clear Creek Canal, wooded areas, agricultural and residential development, to the north by agricultural development and to the southwest by Seed

[1] *Clear Creek Interceptor Sanitary Sewer Phase A.* Provided by Buchart Horn, dated August 27, 2018
[2] Elevations are referenced to National Geodetic Vertical Datum in units of feet.

Tick Road, Chambers Chapel Road, wooded areas and residential, commercial and agricultural development. Several ponds are located within approximately 50 to 150 yards of the interceptor alignment. Based on review of civil drawings and plans, the interceptor flow line will be constructed approximately 14 to 25 feet below surface grade.

3.0 PROJECT INFORMATION

The project consists of modifying 4,000 lf of the existing Clear Creek Interceptor along the CSX railway from a 15-inch to 42-inch diameter. The design and construction of approximately 10,000 and 4,800 lf of 42- and 18-inch diameter interceptors, respectively, is planned along a portion of Chambers Chapel Road to the newly expanded section of interceptor along the CSX railway as detailed in the Site Description section. Manholes of 4- and 6-foot diameter are planned along the interceptor route. The expansion and extension of the interceptor will serve current and future development east of Seed Tick Road.

4.0 PROJECT REVIEW

4.1 Project Documents

The following information was reviewed for this project:

- Civil plans for Clear Creek Interceptor Phase A provided by Buchart Horn, dated January 16, 2018
- Soil Boring Location Plan for Clear Creek Interceptor Phase A provided by Buchart Horn, dated August 27, 2018
- Correspondence with Ms. Diane Vesely, P.E. of Buchart Horn.

5.0 GEOTECHNICAL EXPLORATION

The geotechnical exploration consisted of twenty-four borings, designated as B-1 through B-24. The borings were located in the field by the client. The boring locations shown on Figure 2 – Aerial Photograph of Site and Boring Locations in Appendix B are approximate.

The borings were drilled September 17 through November 9, 2018 with rotary drill rigs (Diedrich D-50, CME 550X and CME 55) advancing hollow-stem augers, as indicated on the boring logs presented in Appendix C. Wash rotary drilling methods were used in Borings B-1, -6, -7, -10 and -13 at depths ranging from approximately 19 to 25 feet. Sampling of the soils was accomplished ahead of the augers at the depths indicated on the boring logs, using 2-inch-outside-diameter (O.D.) split-spoons and 3-inch-O.D., thin-walled Shelby tube samplers in general accordance with the procedures outlined by ASTM D1586 and ASTM D1587, respectively. Standard Penetration

Tests (SPTs) were performed on the split-spoon samples using an automatic hammer to obtain the standard penetration resistance or N-value[3] of the sampled material.

The drill crew prepared a field log of the subsurface profile noting the soil types and stratifications, groundwater, SPT results and other pertinent data. Observations for groundwater were made in the borings during drilling.

Representative portions of the split-spoon samples were placed in glass jars to preserve sample moisture. The Shelby tubes were capped and taped at their ends to preserve sample moisture and unit weight, and the tubes were transported and stored in an upright position. The glass jars and Shelby tubes were marked and labeled in the field for identification, then returned to our laboratory in Memphis.

6.0 LABORATORY REVIEW AND TESTING

Laboratory testing was performed on soil samples to assess engineering and index properties. The soil testing consisted of moisture contents, Atterberg limits, grain size analyses, and unconsolidated-undrained triaxial compression (UU). Most of the laboratory test results are presented on the boring logs in Appendix C. The Atterberg limit, grain size analyses, and UU test results are also included in Appendix D. The laboratory test and corresponding test method standard used are presented in the following table.

Table 1. Summary of laboratory tests and methods.

Laboratory Test	Test Method
Moisture Content	ASTM D2216
Atterberg Limits	ASTM D4318
Grain Size Determination	ASTM D6913
Unconsolidated-Undrained Triaxial Compression (UU)	ASTM D2850

The boring logs were prepared by the project geotechnical engineer from the field logs, visual classification of the soil samples in the laboratory, and laboratory test results. Terms and symbols used on the boring logs are presented on the Boring Log: Terms and Symbols in Appendix C. Stratification lines on the boring logs indicate approximate changes in strata. The transition between strata could be abrupt or gradual.

[3] The standard penetration resistance, or N-value, is defined as the number of blows required to drive the split-spoon sampler 12 inches with a 140-pound hammer falling 30 inches. Since the split spoon sampler is driven 18 inches or until refusal, the blows for the first 6 inches are for seating the sampler, and the number of blows for the final 12 inches is the N-value. Additionally, "refusal" of the split-spoon sampler occurs when the sampler is driven less than 6 inches with 50 blows of the hammer.

7.0 SUBSURFACE CONDITIONS

7.1 Stratigraphy

The site stratigraphy generally consisted of fine-grained soils overlying predominantly coarse-grained soils. Underlying the pavement (1 to 10 inches thick) and base materials (2 to 6 inches thick) in Borings B-21 through -24 and at the ground surface in the remaining borings, the fine-grained stratum was comprised primarily of silt, lean clay and high plasticity, fat clay overlying predominantly coarse-grained soils at depths ranging from 13 to 32 feet and extended to the maximum depth of exploration (36 feet) with the exception of Borings B-10, -13, -17, and -18. The stratigraphy encountered in Borings B-10 and -13 consisted of a fine-grained stratum underlain by a predominantly coarse-grained stratum, which was underlain, in turn by a high plasticity clay stratum extending to the maximum depth of exploration (36 feet). The stratigraphy encountered in Borings B-17 and -18 consisted of predominantly fine-grained soils underlain by interbedded layers of fine- and coarse-grained soils to the boring termination depth (32 feet). More specific descriptions of the soil layers are provided below and on the boring logs in Appendix C.

Upper, Fine-Grained Soil. Lean clay (CL), fat clay (CH), and silt (ML) soils with varying amounts of sand were encountered near the ground surface and extended to depths of 13 to 32 feet. Moisture contents of the tested soils ranged from 1 to 178 percent. Atterberg limits performed on selected samples yielded liquid limits (LL) ranging from 27 to 70 percent and plasticity indices (PI) ranging 10 to 50 percent. The SPT N-values measured in the fine-grained soil ranged from 0 to 41 blows per foot (bpf). The UU tests performed on relatively undisturbed Shelby tube samples recovered from this stratum yielded undrained shear strengths ranging from 780 to 2,860 psf. The results of the field and laboratory testing were indicative of very soft to hard consistencies for the fine-grained soils.

Predominantly Coarse-Grained Soil. Sand (SP), gravel (GP), clayey sand (SC), silty sand (SM), sand with silt (SP-SM) and sand with clay (SP-SC) soils were encountered below the fine-grained stratum to approximate depths of 13 to 35 feet. An Atterberg limit performed on a selected sample yielded a LL of 61 percent and a PI of 38 percent. SPT N-values measured in the predominately coarse-grained soils ranged from 1 to 41 bpf, indicative of very loose to dense consistencies.

Fat Clay. Fat clay (CH) was encountered below the coarse-grained soils in Borings B-10 and -13 at approximate depths of 23 and 28 feet and extended to the maximum depth of exploration (36 feet). Moisture contents ranged from 34 to 43 percent. Atterberg limits yielded a LL of 77 percent and PI of 51 percent. The SPT N-values ranged from 4 to 7 bpf. A Shelby tube sample recovered from Boring B-13 at approximately 23 feet yielded an undrained shear strength of 1,100 psf. The results of field and laboratory testing were indicative of soft to stiff consistencies.

Interbedded Fine- and Coarse-grained Soils. Layers of interbedded fine- and coarse-grained soils were encountered in Borings B-17 and -18 at depths ranging from 13 to 16 feet and extended to the boring termination depth (27 feet). The predominantly fine-grained layers were classified as silt (ML), elastic silt (MH) and lean clay (CL). Moisture contents ranged from 30 to 56 percent. Atterberg limits performed on selected samples yielded LL ranging from 20 to 73 percent and PI

from 2 to 33 percent. UU tests performed on Shelby Tubes samples recovered from Borings B-18 and -17 at approximately 17 and 18 feet, respectively yielded undrained shear strengths of 1,120 and 1,280 psf, respectively. The results of laboratory tests indicate stiff consistencies in the fine-grained soils. The predominantly coarse-grained soils were classified as silty sand (SM), clayey sand (SC) and sand (SP). The SPT N-values in the coarse-grained soils ranged from 3 to 11 bpf, indicative of very loose to medium dense consistencies.

7.2 Organic Materials

Organic material such as decaying wood was encountered in Boring B-11 near the approximate revised interceptor flow line depth and deeper as indicated on the boring logs in Appendix C.

7.3 Groundwater

Groundwater was observed in Borings B-1 through -24 with the exception of Boring B-12 at depths ranging from approximately 14 to 29 feet during drilling. Groundwater was measured in Borings B-21, -23 and -24 at depths ranging from 16 to 30 feet approximately one hour after drilling and in Boring B-5 at approximately 9 feet, 17 hours after drilling. Groundwater levels might not have stabilized before backfilling of the borehole. Consequently, the observed groundwater levels might not represent present or future levels. Groundwater levels vary over time due to the effects of seasonal variation in precipitation or other factors not evident at the time of exploration.

7.4 OSHA Excavation Classification

The overburden encountered within the reported excavation depths of the interceptor alignment is expected to consist of soft to very stiff lean clay, fat clay, and silt underlain by clayey and silty sand soils. These materials are typically defined as OSHA Type A and B soils.

8.0 LIMITATIONS

This report has been prepared on behalf of, and for the exclusive use of, the client for specific application to the named project as described herein. If this report is provided to other parties, it should be provided in its entirety with all supplementary information. In addition, the client should make it clear that the information is provided for factual data only, and not as a warranty of subsurface conditions presented in this report.

Geotechnology has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions. The recommendations and conclusions contained in this report are professional opinions. The report is not a bidding document and should not be used for that purpose.

Our scope for this phase of the project did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors noted or unusual or suspicious items or conditions observed

are strictly for the information of our client. Our scope did not include an assessment of the effects of flooding and erosion of creeks or rivers adjacent to or on the project site.

Our scope did not include: any services to investigate or detect the presence of mold or any other biological contaminants (such as spores, fungus, bacteria, viruses, and the by-products of such organisms) on and around the site; or any services, designed or intended, to prevent or lower the risk of the occurrence of an infestation of mold or other biological contaminants.

The analyses, conclusions, and recommendations contained in this report are based on the data obtained from the geotechnical exploration. The field exploration methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Consequently, subsurface conditions could vary gradually, abruptly, and/or nonlinearly between sample locations and/or intervals.

The conclusions or recommendations presented in this report should not be used without Geotechnology's review and assessment if the nature, design, or location of the facilities is changed, if there is a lapse in time between the submittal of this report and the start of work at the site, or if there is a substantial interruption or delay during work at the site. If changes are contemplated or delays occur, Geotechnology must be allowed to review them to assess their impact on the findings, conclusions, and/or design recommendations given in this report. Geotechnology will not be responsible for any claims, damages, or liability associated with any other party's interpretations of the subsurface data or with reuse of the subsurface data or engineering analyses in this report.

The recommendations included in this report have been based in part on assumptions about variations in site stratigraphy that can be evaluated further during earthwork and foundation construction. Geotechnology should be retained to perform construction observation and continue its geotechnical engineering service using observational methods. Geotechnology cannot assume liability for the adequacy of its recommendations when they are used in the field without Geotechnology being retained to observe construction.

APPENDIX A – IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING 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.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/ or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

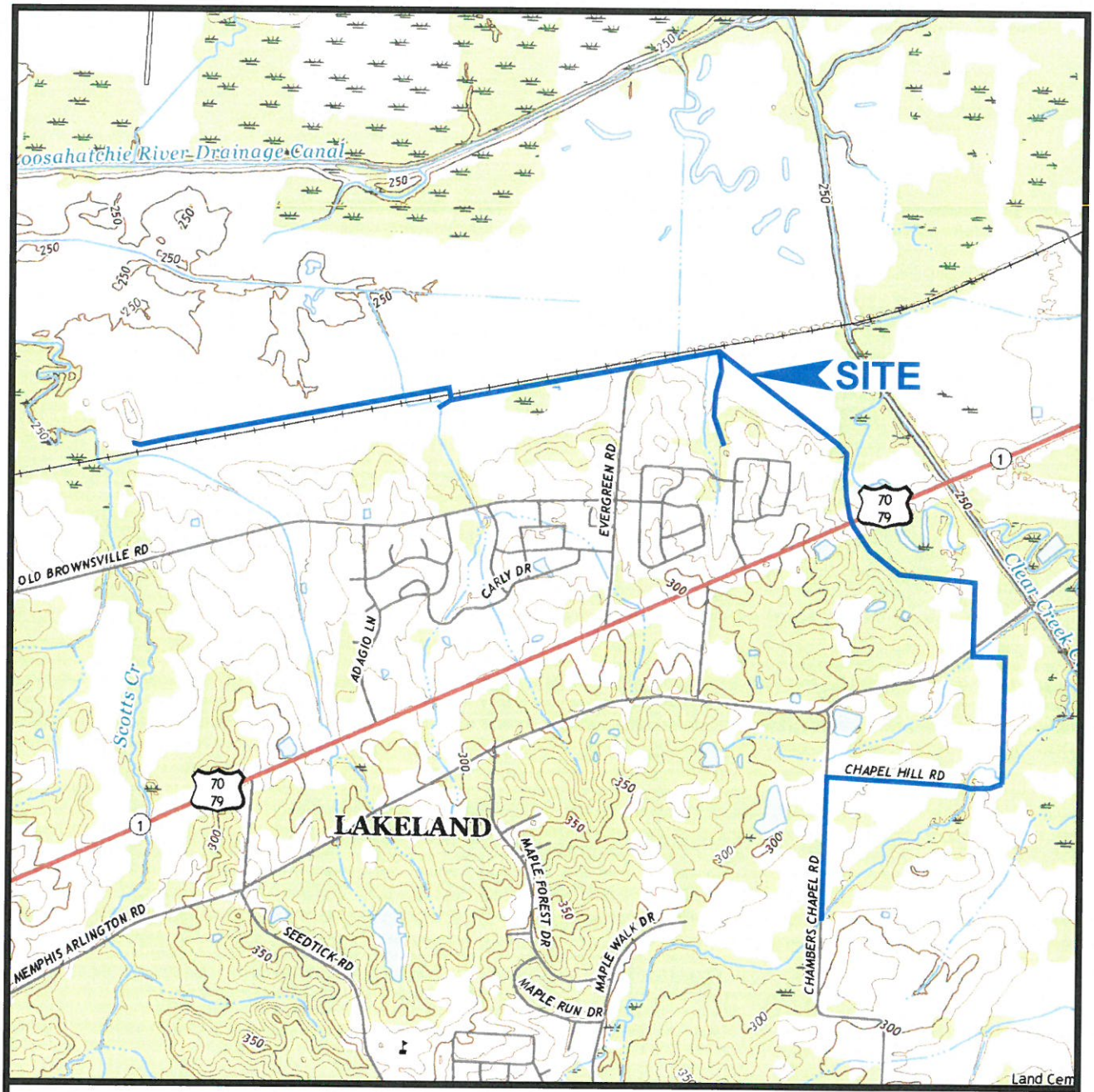
GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX B – FIGURES

Figure 1 - Site Location and Topography

Figure 2 - Aerial Photograph of Site and Boring Locations



NOTES

1. Plan adapted from 7.5 minute U.S.G.S. map for Arlington, Tennessee quadrangle, last revised in 2016.

0 2,000 4,000

SCALE IN FEET

N

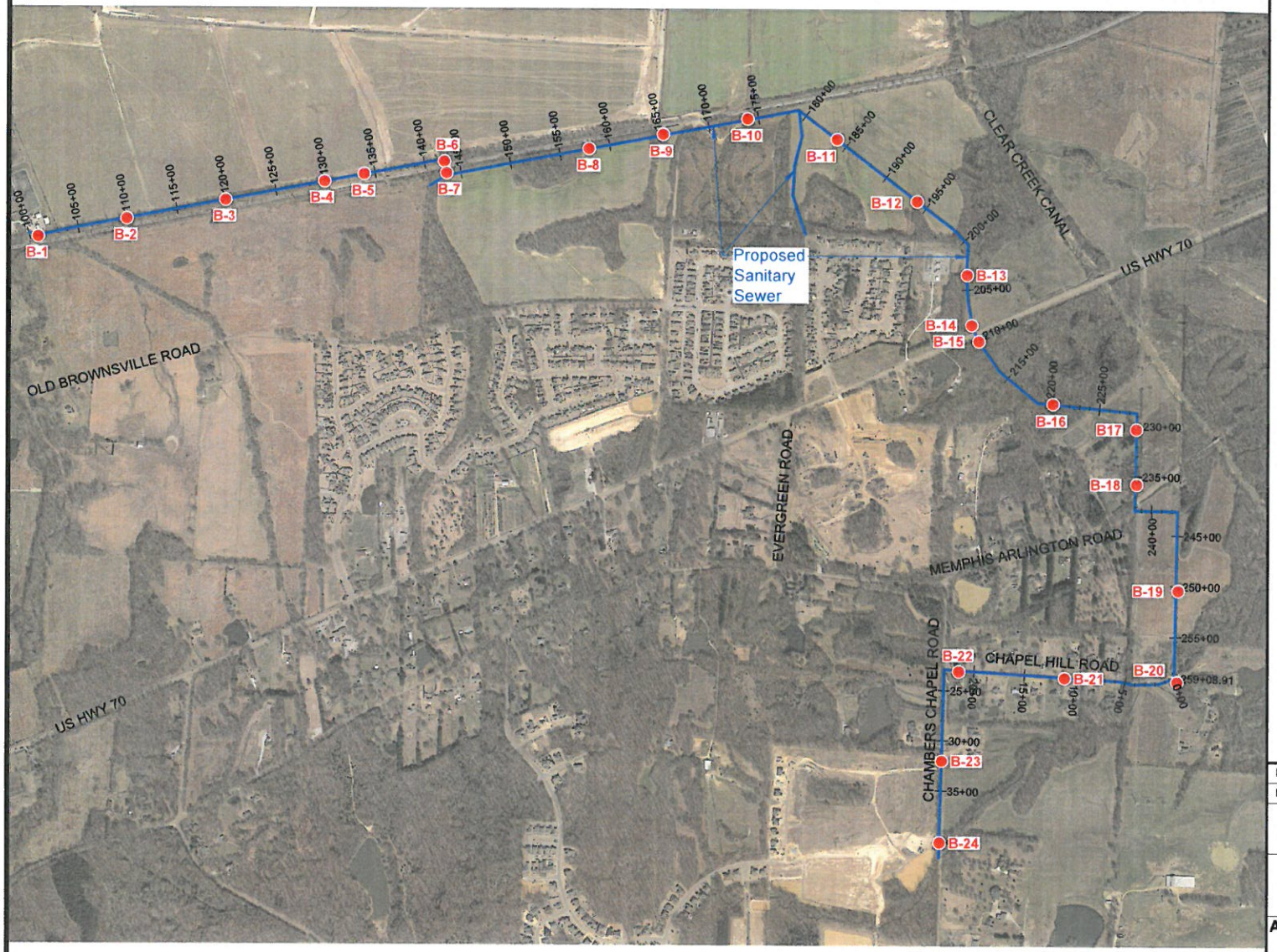
Drawn By: WAH	Ck'd By: ABM	App'vd By: DMS
Date: 11-20-18	Date: 11-21-18	Date: 11-21-18

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Sanitary Sewer
Phase A
Lakeland, Tennessee

SITE LOCATION AND TOPOGRAPHY

Project Number J028447.01	FIGURE 1



NOTES

1. Plan adapted from a March 14, 2018 aerial photograph courtesy of Google Earth.
2. Borings were staked in the field by Buchart Horn surveyors and are shown approximate only.

LEGEND

● Boring Location

N

0 1,000 2,000

SCALE IN FEET

Drawn By: WAH	Ck'd By: ABM	App'vd By: DMS
Date: 11-20-18	Date: 11-21-19	Date: 11-21-19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Sanitary Sewer
Phase A
Lakeland, Tennessee

AERIAL PHOTOGRAPH OF ALIGNMENT AND BORING LOCATIONS

Project Number J028447.01	FIGURE 2

APPENDIX C – BORING INFORMATION

Boring Logs

Boring Log Terms and Symbols

Surface Elevation: 259.07
Datum: NAVD 88
Completion Date: 9/26/18
Station: 101+00.83
Offset: 0.49

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Stiff to soft, brown and gray to gray, LEAN CLAY - CL			
		trace sand and gravel		3-4-9	SS1
5	254				
		trace sand		2-3-5	SS2
10	249			1-2-2	SS3
15	244				
		trace sand and organics		1-2-3	SS4
20	239		▽	2-2-4	SS5
		Loose, gray, CLAYEY SAND - SC		0-3-5	SS6
25	234	Gray, SILTY SAND, trace clay partings - (SM)			ST7
		15% passing No. 200 sieve			
		Medium dense, gray SAND - SP		8-11-14	SS8
30	229				
				8-9-10	SS9
35	224	Boring terminated at 35 feet.			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 235.06

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 20.5 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM 25 FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-1

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 254.64
Datum NAVD 88
Completion Date: 9/18/18
Station 109+99.51
Offset: -2.53

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Stiff, brown to brown and gray SILT - ML			
				4-5-8	SS1
5	250				
		Stiff to medium stiff, brown to gray, LEAN CLAY - (CL)		5-5-7	SS2
10	245			2-3-2	SS3
15	240			2-3-4	SS4
		with sand			
		77% passing No. 200 sieve		2-2-3	SS5
20	235	Loose, gray, SILTY SAND - SM ▽		4-3-6	SS6
				2-3-2	SS7
25	230				
		Medium dense, gray SAND - SP		5-5-8	SS8
30	225	Boring terminated at 30 feet.			
35	220				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 235.7

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 21 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/21/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B- 2

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 251.49
Datum: NAVD 88
Completion Date: 9/18/18
Station: 119+99.32
Offset: -1.52

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Very stiff, gray SILT - ML			
				7-13-14	SS1
5	246				
		Stiff to medium stiff, gray to brown and gray, LEAN CLAY - CL		5-5-6	SS2
10	241				
				2-3-4	SS3
		Medium stiff to soft, brown and gray, sandy, LEAN CLAY - (CL)		2-2-4	SS4
15	236	59% passing No. 200 sieve	▽	2-1-3	SS5
		Very loose to dense, gray SAND with silt - (SP-SM) 9% passing No. 200 sieve		0-0-1	SS6
20	231			15-13-22	SS7
25	226			18-19-22	SS8
		Boring terminated at 26 feet.			
30	221				
35	216				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 236.3

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

___ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM ___ FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/21/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B- 3

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 251.79
Datum NAVD 88
Completion Date: 9/18/18
Station: 130+00.05
Offset: 0.1

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Medium stiff, gray SILT - ML		3-3-4	SS1
5	247				
		Medium stiff, brown and gray, LEAN CLAY - CL		3-3-4	SS2
10	242				
		Medium stiff, gray, FAT CLAY, little sand - CH		2-2-3	SS3
		Stiff to soft, gray, LEAN CLAY - (CL)		1-2-2	SS4
15	237			95	ST5
				2-2-2	SS6
20	232			2-1-2	SS7
25	227	Very loose, gray SAND, trace gravel - SP		2-2-2	SS8
		Boring terminatedat 26 feet.			
30	222				
35	217				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 236.89

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 15.5 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/21/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-4

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 252.91
Datum: NAVD 88
Completion Date: 9/18/18
Station: 133+99.61
Offset: 3.83

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Stiff, gray SILT - ML		4-5-4	SS1
5	248				
		Soft to stiff, brown and gray, LEAN CLAY - (CL)		2-3-2	SS2
10	243			1-2-2	SS3
				91	ST4
15	238				
		Soft, gray, sandy, LEAN CLAY - CL		1-1-2	SS5
		Loose, gray, CLAYEY SAND - SC		2-2-4	SS6
20	233				
		Medium dense to loose, gray SAND - SP		5-5-7	SS7
25	228			6-4-4	SS8
		Boring terminated at 26 feet.			
30	223				
35	218				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 237.2

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽
AT 8.6 FEET AFTER 17 HOURS ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/21/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B- 5

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC.0638301.GPJ 5/9/19

Surface Elevation: 251.8
Datum: NAVD 88
Completion Date: 9/17/18
Station: 142+05.14
Offset: -13.77

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Medium stiff, gray to brown, LEAN CLAY - CL	2-3-2	SS1
5	247		2-2-3	SS2
10	242			*ST3
		Medium dense, gray, SILTY SAND - SM ▽	5-10-13	SS4
15	237	Medium dense, gray SAND with silt - (SP-SM) 6% passing No. 200 sieve	8-14-16	SS5
		Medium dense to dense, gray SAND - SP	6-12-13	SS6
20	232		7-13-18	SS7
25	227		9-12-15	SS8
		Boring terminated at 26 feet.		
30	222			
35	217			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 238.14

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 14 FEET ▽

DRILLING DATA

___ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM 18.5 FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS: *No recovery
Boring offset approximately 39 feet north of staked location due to enbankment.

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/18/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B- 6

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 255.26
Datum: NAVD 88
Completion Date: 9/21/18
Station: 143+74.25
Offset: -4.53

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD
		Stiff, brown SILT - ML	SS1	3-4-5
5	250			
		Medium stiff to very soft, brown to gray, LEAN CLAY - (CL) trace sand and gravel	SS2	3-3-4
10	245		SS3	1-2-1
15	240		SS4	0-1-2
		trace sand and organics	SS5	0-0-1
20	235		*ST6	
		Medium dense, gray, SILTY SAND - SM	SS7	3-6-7
		Medium dense, gray SAND - SP	SS8	6-11-18
25	230		SS9	8-11-13
		Boring terminated at 28 feet.		
30	225			
35	220			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 239.84

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM 21 FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS: *No recovery

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-7

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 254.51
Datum: NAVD 88
Completion Date: 9/21/18
Station: 158+04.83
Offset: 7.25

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Stiff, brown, LEAN CLAY, trace organics - CL		4-6-8	SS1
5	250				
		Medium stiff, brown and gray, FAT CLAY, trace organics - CH		2-3-4	SS2
10	245				
		Very soft, brown and gray, LEAN CLAY - CL		0-0-0	SS3
		Medium stiff to soft, brown and gray to gray SILT - (ML)		92	ST4
15	240	little sand		0-2-2	SS5
		Very loose to medium dense, gray SAND - SP ▽		3-0-4	SS6
20	235			3-4-6	SS7
25	230			8-8-9	SS8
		Boring terminated at 26 feet.			
30	225				
35	220				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 240.51

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B- 8

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 259.6
Datum NAVD 88
Completion Date: 9/17/18
Station: 165+50.24
Offset: 0.22

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Medium stiff, brown SILT - ML trace roots			
				5-3-4	SS1
5	255				
		Soft, brown and gray, FAT CLAY - CH		1-1-2	SS2
10	250				
		Stiff to soft, gray, LEAN CLAY - (CL)		1-2-4	SS3
				2-2-3	SS4
15	245			91	ST5
			▽		
20	240			2-2-1	SS6
		Soft, gray, sandy, LEAN CLAY - CL		1-1-3	SS7
25	235	Medium stiff, gray, sandy SILT - ML		1-2-4	SS8
		Boring terminated at 26 feet.			
30	230				
35	225				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 241.43

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/18/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B- 9

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 256.77
Datum NAVD 88
Completion Date: 9/19/18
Station 173+97.83
Offset: 10.03

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Stiff, brown and gray SILT - ML			
				4-6-5	SS1
5	252				
		Soft, brown and gray, LEAN CLAY - CL		2-1-2	SS2
10	247				
		Medium stiff, brown and gray SILT - ML		2-3-4	SS3
15	242				
		Medium stiff, gray, sandy, LEAN CLAY, trace gravel - CL		1-2-6	SS4
20	237				
		Loose to medium dense, gray, SILTY SAND - (SM)		2-3-5	SS5
		25% passing No. 200 sieve		7-7-10	SS6
25	232				
		Loose, gray SAND - SP		5-6-2	SS7
		Soft to medium stiff, gray, FAT CLAY - CH		2-2-2	SS8
30	227				
				2-2-3	SS9
35	222			2-2-4	SS10
		Boring terminated at 36 feet.			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 242.11

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM 20 FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/21/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-10

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 256.43
Datum: NAVD 88
Completion Date: 9/21/18
Station: 184+03.04
Offset: 5.91

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Stiff, brown SILT - ML		3-6-6	SS1
5	251				
		Medium stiff, gray, LEAN CLAY - CL		2-2-3	SS2
10	246			2-3-4	SS3
				2-3-3	SS4
15	241	WOOD, some lean clay		0-0-1	SS5
		Gray sand, some wood, trace gravel			ST6
		WOOD			
20	236	Loose, gray, CLAYEY SAND and wood, trace gravel - (SC) 29% passing No. 200 sieve little organics		0-1-5	SS7
		Very loose, gray SAND, trace silt - SP-SM		3-2-2	SS8
25	231	Boring terminated at 25 feet.			
30	226				
35	221				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 243.01

178

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

GROUNDWATER DATA

ENCOUNTERED AT 16.5 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-11

Geotechnology Project No. J028447.01

Surface Elevation: 257.55
Datum NAVD 88
Completion Date: 9/20/18
Station: 194+00.6
Offset: 0.62

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Soft to stiff, brown to brown and gray, LEAN CLAY - CL		1-2-1	SS1
5	253			3-6-7	SS2
10	248	trace sand		1-3-2	SS3
		Soft, brown and gray, sandy SILT - ML		1-1-2	SS4
15	243	SILTY SAND - (SM)			ST5
		15% passing N0. 200 sieve			
		Loose, gray, CLAYEY SAND - (SC)		1-2-4	SS6
20	238	27% passing No. 200 sieve			
		little gravel		3-4-6	SS7
25	233				
		Loose, gray, SILTY SAND, trace gravel - SM		4-2-7	SS8
		Boring terminated at 27 feet.			
30	228				
35	223				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El.244.77

61 >>

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/21/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-12

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC.0638301.GPJ 5/9/19

Surface Elevation: 259.55
Datum: NAVD 88
Completion Date: 10/22/18
Station: 203+67.41
Offset: -17.11

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	SAMPLES	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SHEAR STRENGTH, tsf (Δ - UU/2, ○ - QU/2, □ - SV; 0.5, 1.0, 1.5, 2.0, 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % PL — LL (10, 20, 30, 40, 50)
		Very stiff to medium stiff, brown to brown and gray, LEAN CLAY - CL			
		little sand, trace roots	SS1	3-4-5	
			SS2	3-7-10	
5	255		SS3	2-3-4	
		trace roots	SS4	1-2-3	
10	250		SS5	2-2-3	
		trace roots			Design Flowline El 245.5
		trace roots	SS6	1-3-2	
15	245				
		Medium stiff, brown and gray, sandy, LEAN CLAY - CL	SS7	3-2-4	
20	240				
		Medium stiff, brown and gray, CLAYEY SAND, trace gravel - SC ▽	SS8	3-3-5	
		Medium stiff to stiff, gray, FAT CLAY - (CH)	ST9	84	77 >>
25	235		SS10	2-3-4	
			SS11	3-3-4	
30	230				
			SS12	3-3-3	
35	225	Boring terminated at 35 feet.			

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 22.5 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM 25 FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS: Boring offset approximately 15 feet northeast of staked location due to terrain.

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-13

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 262.22
Datum NAVD 88
Completion Date: 10/23/18
Station: 208+62.94
Offset: -0.03

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Medium stiff, brown and gray SILT - ML trace gravel			
				1-3-4	SS1
5	257	Medium stiff to soft, brown and gray, LEAN CLAY - CL			
				2-4-4	SS2
10	252				
				1-2-2	SS3
15	247				
		Stiff, gray, sandy SILT - ML		4-5-7	SS4
20	242				
		Loose, gray, CLAYEY SAND - SC		1-3-5	SS5
		Loose to medium dense, gray, SILTY SAND - (SM) 21% passing No. 200 sieve		1-3-3	SS6
25	237			7-8-11	SS7
				8-9-13	SS8
30	232			10-11-12	SS9
		Boring terminated at 33 feet.			
35	227				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 245.2

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-14

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 262.74 | Completion Date: 10/23/18
Datum: NAVD 88 | Station: 210+40

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Very stiff, brown to brown and gray SILT - ML			
		trace sand		5-8-9	SS1
5	258	Medium stiff to soft, brown and gray, LEAN CLAY - CL		1-2-3	SS2
10	253			1-2-2	SS3
15	248	trace sand		0-3-3	SS4
				0-1-2	SS5
20	243	silt partings		2-3-5	SS6
		Stiff, brown and gray, sandy, LEAN CLAY - CL		2-5-5	SS7
25	238	Medium stiff to very stiff, brown, gray and orange, FAT CLAY - (CH)		84	ST8
		trace sand			
		96% passing No. 200 sieve			
		some sand ▽		3-17-8	SS9
30	233	Boring terminated at 30 feet.			
35	228				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 245.4

70 >>

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 29 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-15

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 259.88 Datum: NAVD 88

Completion Date: 11/8/18
Station: 220+40

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Medium stiff to stiff, brown, LEAN CLAY - CL			
				2-1-4	SS1
5	255			4-5-9	SS2
10	250			2-2-4	SS3
					ST4
15	245				
		Medium stiff to soft, brown and gray to gray-brown SILT - (ML)		94	ST5
		95% passing No. 200 sieve		2-1-2	SS6
20	240				
		Soft, gray-brown, sandy, LEAN CLAY, little wood - CL ▽		2-1-1	SS7
25	235	Dense, gray SAND - SP		4-10-21	SS8
		Boring terminated at 26 feet.			
30	230				
35	225				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 246.52

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 23 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
MMH DRILLER TJB LOGGER
Deidrich D-50 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 73 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 11/9/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-16

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 260.38
Datum NAVD 88
Completion Date: 10/24/18
Station: 229+29.48
Offset: 20.68

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Very soft to stiff, brown to brown and gray, LEAN CLAY - CL			
		trace sand		0-0-1	SS1
5	255				
		trace sand and gravel		2-6-7	SS2
10	250				
		Soft to very soft, gray SILT - ML		2-2-2	SS3
		little sand			
		trace sand		0-0-1	SS4
15	245				
		Loose, gray, SILTY SAND - (SM)		1-2-3	SS5
		37% passing No. 200 sieve			
		lean clay seam			
		Stiff, gray SILT with sand - (ML)		91	ST6
20	240	74% passing No. 200 sieve			
25	235				
		Medium dense, gray SAND - SP		2-1-10	SS7
		Gray, CLAYEY SAND, trace gravel - SC			
		Boring terminated at 27 feet.			
30	230				
35	225				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 247.52

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 16.5 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-17

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC.0638301.GPJ 5/9/19

Surface Elevation: 260.74
Datum: NAVD 88
Completion Date: 10/26/18
Station: 234+97.16
Offset: 21.11

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Soft to medium stiff, brown to brown and gray, LEAN CLAY - CL			
		trace sand, gravel and organics		0-1-3	SS1
5	256			2-3-5	SS2
10	251	little sand		3-3-5	SS3
		Very loose, gray, CLAYEY SAND - SC		0-1-2	SS4
15	246	Stiff, gray, ELASTIC SILT - (MH)			ST5
		some decaying wood, trace sand		65	ST6
20	241	Very soft, gray, sandy, LEAN CLAY - CL		1-1-1	SS7
25	236	Loose, tan SAND - SP		4-4-5	SS8
		Boring terminated at 27 feet.			
30	231				
35	226				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 248.45

73 >>

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 25 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS: Boring offset approximately 270 feet northwest of staked location due to utilities.

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-18

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 266.75 | Completion Date: 10/26/18
Datum: NAVD 88 | Station: 249+53.87 | Offset: 15.75

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Medium stiff to very stiff, brown to brown and gray, LEAN CLAY - CL			
				3-6-5	SS1
5	262				
				3-3-5	SS2
10	257	little sand			
				4-8-9	SS3
15	252	Very stiff, brown and gray SILT - ML		12-13-14	SS4
					ST5
20	247	Stiff, brown and gray, LEAN CLAY - (CL)		106	ST6
		Medium dense to dense, orange and gray to orange SAND, some gravel, trace clay - SP-SC		10-10-8	SS7
25	242			16-16-18	SS8
		Medium dense, brown and gray, SILTY SAND, some gravel - SM		6-6-8	SS9
30	237	Boring terminated at 30 feet.			
35	232				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 249.42

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 20 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS: Boring offset approximately 16 feet east due to overhead utiities.

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-19

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 269.27
Datum NAVD 88
Completion Date: 10/30/18
Station: 1+62.42
Offset: 13.35

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Soft to stiff, brown to gray, LEAN CLAY - (CL)			
		trace roots and sand		1-2-2	SS1
5	264			0-2-3	SS2
10	259			1-2-3	SS3
				2-2-4	SS4
15	254		▽	96	ST5
				105	ST6
20	249	trace sand		0-2-2	SS7
		Medium dense, gray, CLAYEY SAND - SC		1-12-13	SS8
		some gravel			
25	244	Boring terminated at 24 feet.			
30	239				
35	234				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El.256.57

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 15 FEET ▽

DRILLING DATA

___ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM ___ FEET
JSW DRILLER TJB LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 92 %

REMARKS: Boring offset approximately 200 feet northeast dut to overhead utilities.

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 10/31/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-20

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 276 | Completion Date: 9/27/18
Datum NAVD 88 | Station: 10+91.93 | Offset: 2.85

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Asphalt: 9 inches		
		Base Material: 3 inches of gravel and brown silt		
		Very stiff, gray SILT, trace organics - ML	11-12-6	SS1
5	271			
		Soft, brown and gray, sandy, LEAN CLAY - CL	1-1-1	SS2
10	266			
		Soft to very stiff, brown and gray, LEAN CLAY - (CL)	1-2-2	SS3
			1-1-2	SS4
15	261			
			1-1-2	SS5
			112	ST6
20	256			
		Medium stiff to soft, brown and gray, sandy, LEAN CLAY - CL	2-2-3	SS7
			2-2-2	SS8
25	251			
		Very stiff, brown and gray, sandy, FAT CLAY, little gravel - CH	6-11-5	SS9
		Boring terminated at 28 feet.		
30	246			
35	241			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 259.6

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

GROUNDWATER DATA

ENCOUNTERED AT 16 FEET ▽
AT 16 FEET AFTER completion HOURS ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
MMH DRILLER SAS LOGGER
CME 55 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 90 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-21

Geotechnology Project No. J028447.01

Surface Elevation: 285.79
Datum: NAVD 88
Completion Date: 9/27/18
Station: 21+51.5
Offset: 0.41

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Asphalt: 1 inch			
		Base Material: 6 inches of crushed limestone			
		Subbase Material: 4 inches of gravel and orange silt		4-5-4	SS1
		Stiff to very soft, brown and gray, LEAN CLAY - CL			
5	281			0-2-2	SS2
10	276			0-0-1	SS3
15	271			1-2-4	SS4
		little sand			
20	266	little sand		1-2-2	SS5
		Medium stiff to stiff, brown and gray to gray, sandy, LEAN CLAY - CL		3-3-5	SS6
		trace gravel			
25	261			3-4-7	SS7
				7-8-7	SS9
30	256	Medium dense, tan, CLAYEY SAND - SC		1-5-8	SS10
		Medium dense, brown and red GRAVEL - GP		16-9-20	SS11
35	251	Boring terminated at 34 feet.			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El.261.51

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 26 FEET ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
MMH DRILLER SAS LOGGER
CME 55 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 90 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-22

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 284.61
Datum NAVD 88
Completion Date: 9/27/18
Station: 32+09.8
Offset: -2.75

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Asphalt: 10 inches		
		Base Material: 2 inches of brown silt and gravel		
		Medium stiff to soft, brown and gray, LEAN CLAY - CL little sand	5-4-3	SS1
5	280		2-1-3	SS2
10	275		1-3-2	SS3
15	270			
		Medium stiff to very stiff, brown to brown and gray, sandy, LEAN CLAY - CL	4-5-6	SS4
20	265		10-13-8	SS5
			6-8-5	SS6
		trace gravel	3-2-4	SS7
25	260		15-12-7	SS8
		little gravel		
30	255			
		Medium stiff, tan, FAT CLAY - CH	2-3-3	SS9
		Gray, sandy, LEAN CLAY - CL		
		Boring terminated at 32 feet.		
35	250			

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 263.02

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 16 FEET ▽
AT 30 FEET AFTER completion HOURS ▽

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
MMH DRILLER SAS LOGGER
CME 55 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 90 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

GEOTECHNOLOGY INC
FROM THE GROUND UP

Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-23

Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

Surface Elevation: 284.8 | Completion Date: 9/27/18
Datum: NAVD 88 | Station: 40+00.07 | Offset: -0.96

DEPTH IN FEET	ELEVATION IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
		Asphalt: 10 inches			
		Base Material: 2 inches of brown silt and gravel			
		Very stiff, brown and gray SILT - ML		13-10-7	SS1
5	280				
		Soft, brown and gray, LEAN CLAY, trace organics - CL		0-1-1	SS2
10	275				
		Medium stiff, brown SILT - ML		1-2-3	SS3
15	270				
		Soft to very stiff, brown and gray, LEAN CLAY - (CL)		1-1-1	SS4
				111	ST5
20	265	little sand		3-3-4	SS6
		trace sand		2-3-5	SS7
25	260	Stiff, gray, FAT CLAY, some organics - CH		3-5-5	SS8
		Hard, black, organic material		7-17-24	SS9
30	255	Boring terminated at 30 feet.			
35	250				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

Design Flowline El 264.98

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 16 FEET ▼
AT 18 FEET AFTER completion HOURS ▼

DRILLING DATA

__ AUGER 3 3/4 HOLLOW STEM
WASHBORING FROM __ FEET
MMH DRILLER SAS LOGGER
CME 55 DRILL RIG
HAMMER TYPE Auto
HAMMER EFFICIENCY 90 %

REMARKS:

Drawn by: ABM	Checked by: ABM	App'vd. by: DMS
Date: 9/28/18	Date: 1/16/19	Date: 1/16/19

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Clear Creek Interceptor Sanitary Sewer Phase A Lakeland, Tennessee

LOG OF BORING: B-24

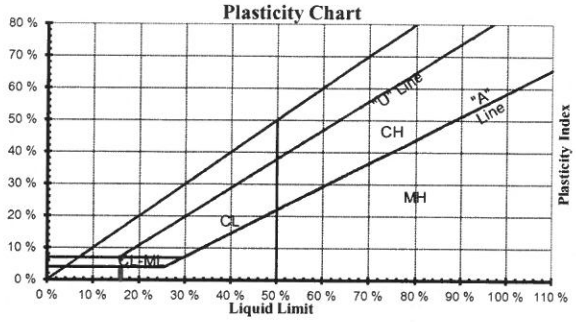
Geotechnology Project No. J028447.01

LOG OF BORING 2002 WL J028447.01.GPJ GTINC 0638301.GPJ 5/9/19

BORING LOG: TERMS AND SYMBOLS

LEGEND

CS	Continuous Sampler
GB	Grab Sample
NQ	NQ Rock Core
PST	Three-Inch Diameter Piston Tube Sample
SS	Split-Spoon Sample (Standard Penetration Test)
ST	Three-Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
PL	Plastic Limit (ASTM D4318)
LL	Liquid Limit (ASTM D4318)
SV	Shear Strength from Field Vane (ASTM D2573)
UU	Shear Strength from Unconsolidated-Undrained Triaxial Compression Test (ASTM D2850)
QU	Shear Strength from Unconfined Compression Test (ASTM D2166)



SOIL GRAIN SIZE

US STANDARD SIEVE

12"	3"	3/4"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
300	76.2	19.1	4.76	2.00	0.42	0.074	0.005	

SOIL GRAIN SIZE IN MILLIMETERS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			*Symbol*	*Description*
Coarse-Grained Soils (More than 50% Larger than No. 200 Sieve Size)	Gravel and Gravelly Soil	Clean Gravels Little or no Fines	GW	Well-Graded Gravel, Gravel- Sand Mixture
			GP	Poorly-Graded Gravel, Gravel-Sand Mixture
		Gravels with Appreciable Fines	GM	Silty Gravel, Gravel-Sand-Silt Mixture
			GC	Clayey-Gravel, Gravel-Sand-Clay Mixture
	Sand and Sandy Soils	Clean Sands Little or no Fines	SW	Well-Graded Sand, Gravelly Sand
			SP	Poorly-Graded Sand, Gravelly Sand
		Sands with Appreciable Fines	SM	Silty Sand, Sand-Silt Mixture
			SC	Clayey-Sand, Sand-Clay Mixture
Fine-Grained Soils (More than 50% Smaller than No. 200 Sieve Size)	Silts and Clays	Liquid Limit Less Than 50	ML	Silt, Sandy Silt, Clayey Silt, Slight Plasticity
			CL	Lean Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity
			OL	Organic Silts or Lean Clays, Low Plasticity
	Silts and Clays	Liquid Limit Greater Than 50	MH	Silt, High Plasticity
			CH	Fat Clay, High Plasticity
			OH	Organic Clay, Medium to High Plasticity
	Highly Organic Soils		PT	Peat, Humus, Swamp Soil

STRENGTH OF COHESIVE SOILS

Consistency	*Undrained Shear Strength (tsf)*	*Unconfined Comp. Strength (tsf)*
Very Soft	less than 0.125	less then 0.25
Soft	0.125 to 0.25	0.25 to 0.5
Medium Stiff	0.25 to 0.5	0.5 to 1.0
Stiff	0.5 to 1.0	1.0 to 2.0
Very Stiff	1.0 to 2.0	2.0 to 3.0
Hard	greater than 2.0	greater than 4.0

DENSITY OF GRANULAR SOILS

Descriptive Term	*Approximate N_{60}-Value Range*
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	>50

N-Value (Blow Count) is the last two, 6-inch drive increments (i.e. 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on the grid plot and shown in the Unit Dry Weight/SPT column.

RELATIVE COMPOSITION

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35 to 50%

OTHER TERMS

Layer - Inclusion greater than 3 inches thick.

Seam - Inclusion 1/8-inch to 3 inches thick

Parting - Inclusion less than 1/8-inch thick

Pocket - Inclusion of material that is smaller than sample diameter

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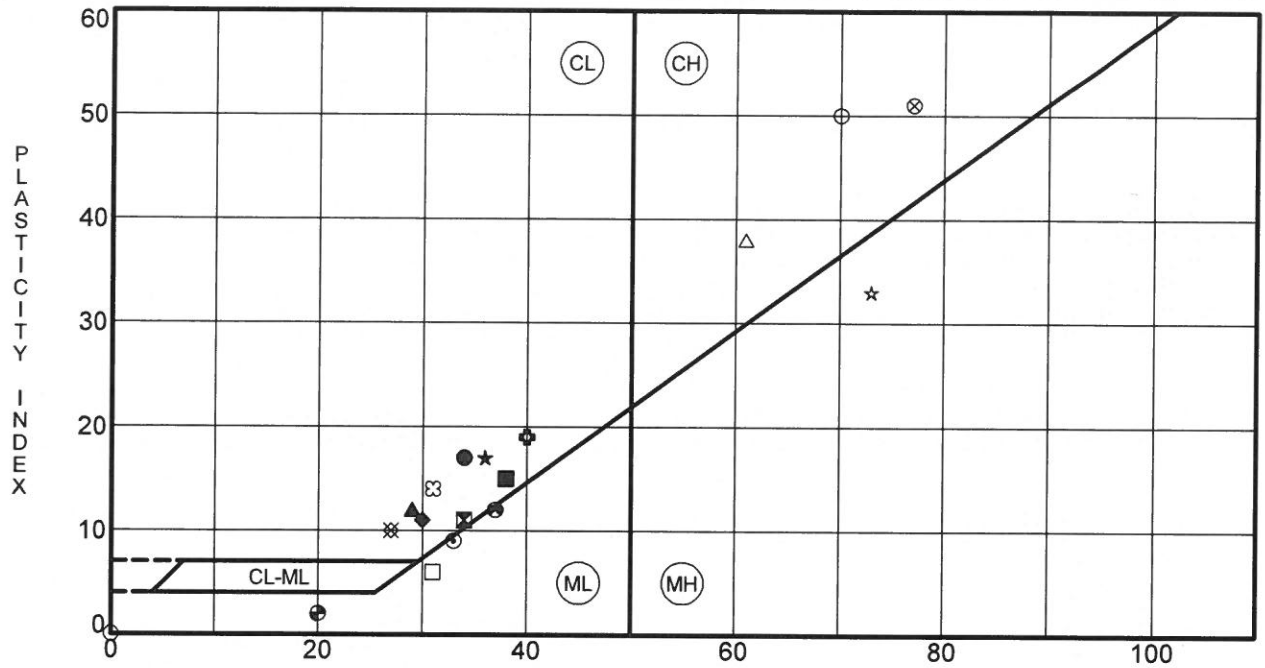
Relative composition and Unified Soil Classification System (USCS) designations are based on visual descriptions and are approximate only. If laboratory tests were performed to classify the soil, the USCS designation is shown in parenthesis.

APPENDIX D – LABORATORY TEST DATA

Atterberg Limits

Grain Size Distributions

Unconsolidated-Undrained Triaxial Compression



Specimen Identification			LL	PL	PI	Fines	Classification
●	B- 3	16.0	34	17	17	59	SANDY LEAN CLAY(CL)
⊠	B- 4	15.0	34	23	11		LEAN CLAY(CL)
▲	B- 5	13.0	29	17	12		LEAN CLAY(CL)
★	B- 7	16.0	36	19	17		LEAN CLAY(CL)
⊙	B- 8	13.0	33	24	9		SILT(ML)
✿	B- 9	15.0	40	21	19		LEAN CLAY(CL)
○	B-12	15.0	NP	NP	NP	15	SILTY SAND(SM)
△	B-12	18.5	61	23	38	27	CLAYEY SAND(SC)
⊗	B-13	23.0	77	26	51		FAT CLAY(CH)
⊕	B-15	25.0	70	20	50	96	FAT CLAY(CH)
□	B-16	16.0	31	25	6		SILT(ML)
⊗	B-16	18.5	37	25	12	95	SILT(ML)
◕	B-17	18.0	20	18	2	74	SILT with SAND(ML)
☆	B-18	17.0	73	40	33		ELASTIC SILT(MH)
⊠	B-19	20.0	31	17	14		LEAN CLAY(CL)
■	B-20	14.0	38	23	15		LEAN CLAY(CL)
◆	B-20	16.0	30	19	11		LEAN CLAY(CL)
◇	B-21	18.0	27	17	10		LEAN CLAY(CL)
×	B-24	17.5	27	17	10		LEAN CLAY(CL)

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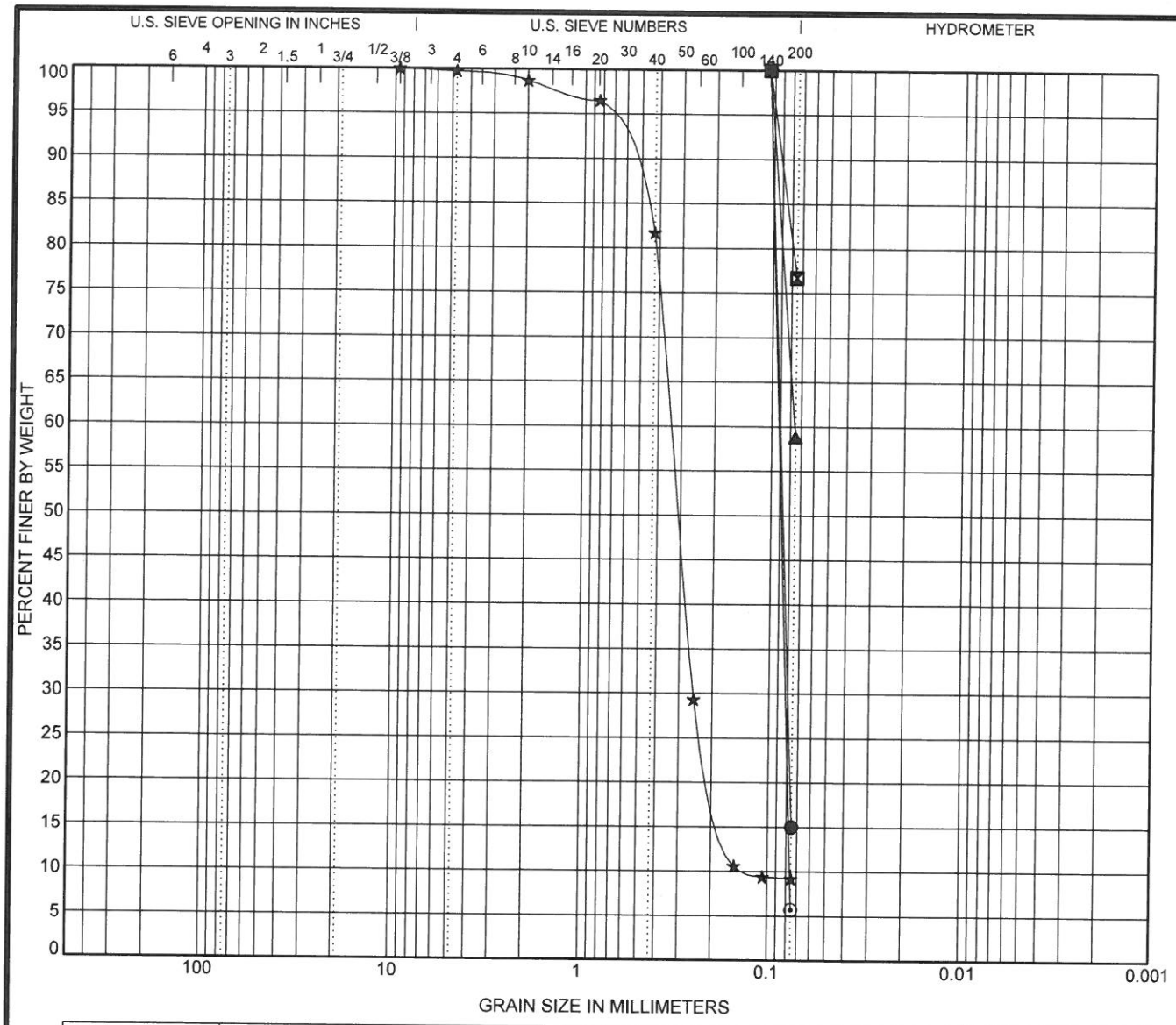
ATTERBERG LIMITS RESULTS

Clear Creek Interceptor
Sanitary Sewer Phase A
Lakeland, Tennessee
J028447.01

US_ATTERBERG_LIMITS_J028447.01.GPJ US_LAB.GDT 11/15/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B- 1	25.0	SILTY SAND(SM)					
⊠	B- 2	17.5	LEAN CLAY with SAND(CL)					
▲	B- 3	16.0	SANDY LEAN CLAY(CL)	34	17	17		
★	B- 3	18.5	POORLY GRADED SAND with SILT(SP-SM)				1.47	2.71
⊙	B- 6	16.0	POORLY GRADED SAND with SILT(SP-SM)				0.96	1.20

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B- 1	25.0	0.106	0.09	0.08		0.0	85.0	15.0	
⊠	B- 2	17.5	0.106				0.0	23.3	76.7	
▲	B- 3	16.0	0.106	0.076			0.0	41.2	58.8	
★	B- 3	18.5	9.5	0.341	0.252	0.126	0.3	90.5	9.2	
⊙	B- 6	16.0	0.106	0.092	0.082	0.076	0.0	94.3	5.7	

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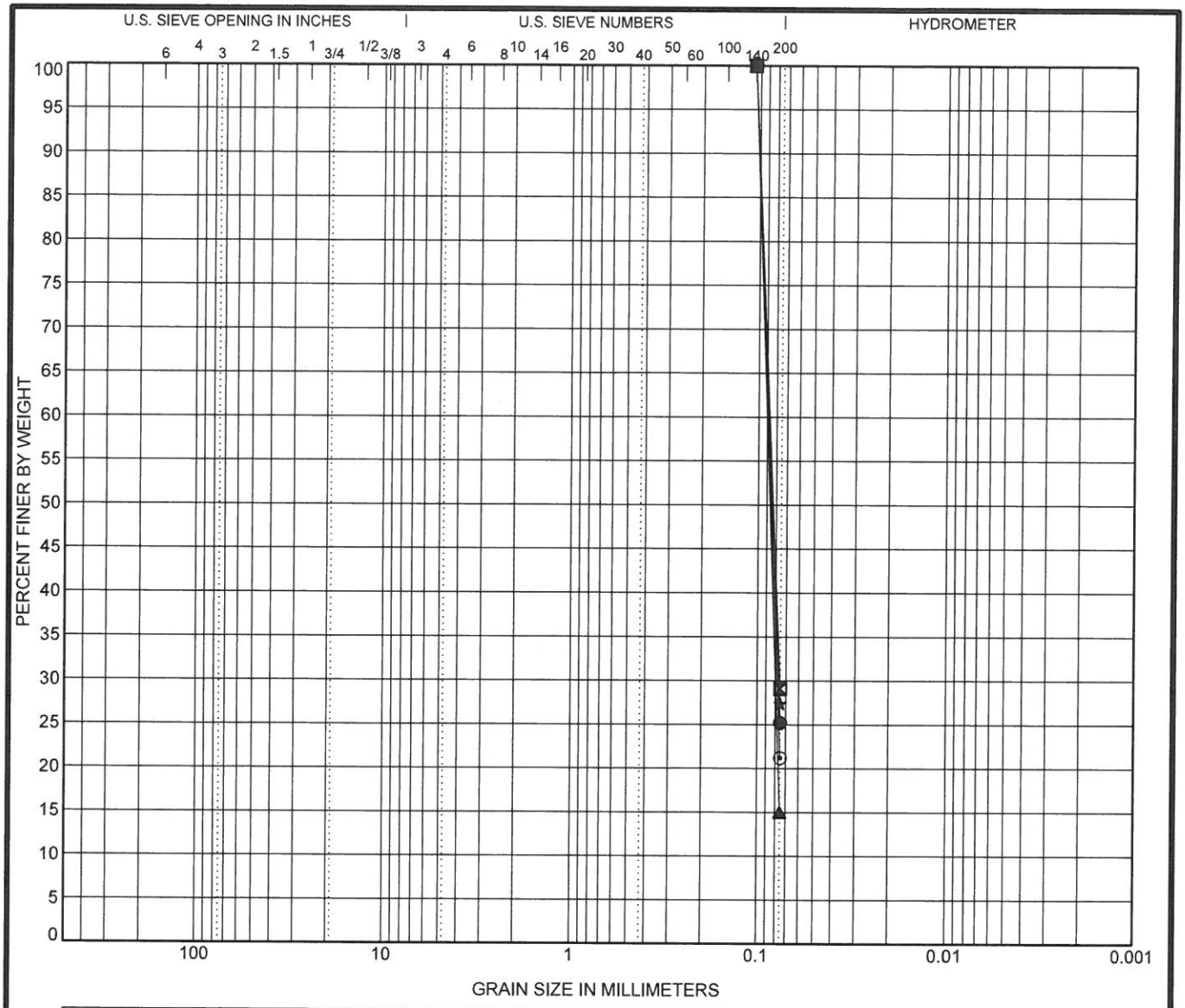
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Clear Creek Interceptor
Sanitary Sewer Phase A
Lakeland, Tennessee
J028447.01

US_GRAIN_SIZE_J028447.01.GPJ_US_LAB.GDT 11/15/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-10	23.5	SILTY SAND(SM)					
⊠	B-11	18.5	CLAYEY SAND(SC)					
▲	B-12	15.0	SILTY SAND(SM)	NP	NP	NP		
★	B-12	18.5	CLAYEY SAND(SC)	61	23	38		
⊙	B-14	23.5	SILTY SAND(SM)					

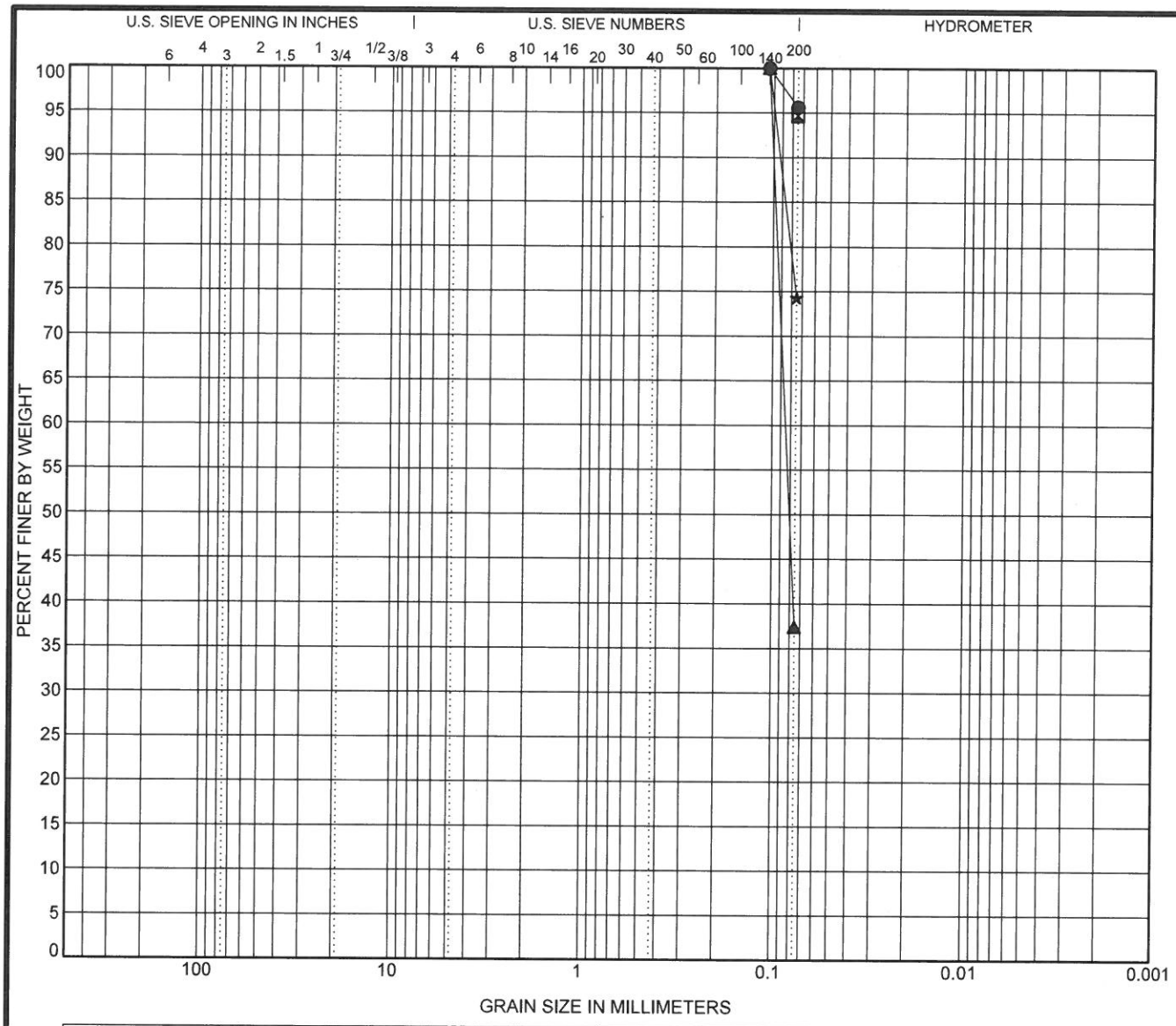
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-10	23.5	0.106	0.088	0.077		0.0	74.8	25.2	
⊠	B-11	18.5	0.106	0.087	0.075		0.0	70.9	29.1	
▲	B-12	15.0	0.106	0.09	0.08		0.0	85.0	15.0	
★	B-12	18.5	0.106	0.088	0.076		0.0	72.6	27.4	
⊙	B-14	23.5	0.106	0.089	0.078		0.0	78.8	21.2	

GEOTECHNOLOGY INC
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Clear Creek Interceptor
Sanitary Sewer Phase A
Lakeland, Tennessee
J028447.01

US_GRAIN_SIZE_J028447.01.GPJ US_LAB.GDT 11/15/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-15	25.0	FAT CLAY(CH)	70	20	50		
⊠	B-16	18.5	SILT(ML)	37	25	12		
▲	B-17	16.0	SILTY SAND(SM)					
★	B-17	18.0	SILT with SAND(ML)	20	18	2		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	25.0	0.106				0.0	4.4	95.6	
⊠	B-16	18.5	0.075				0.0	0.0	94.7	
▲	B-17	16.0	0.106	0.085			0.0	62.6	37.4	
★	B-17	18.0	0.106				0.0	25.7	74.3	

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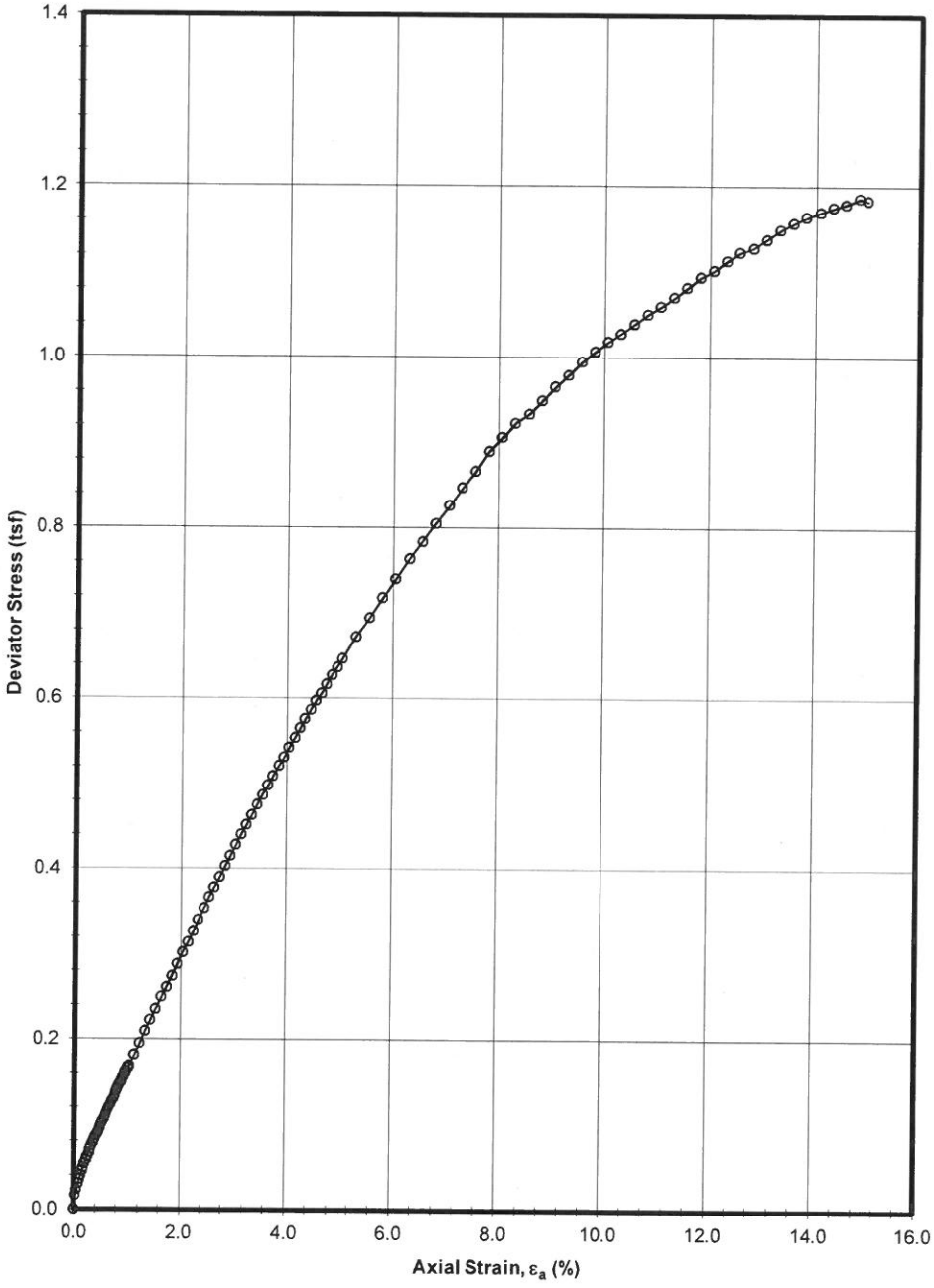
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Clear Creek Interceptor
Sanitary Sewer Phase A
Lakeland, Tennessee
J028447.01

US_GRAIN_SIZE_J028447.01.GPJ_US_LAB.GDT 11/15/18

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

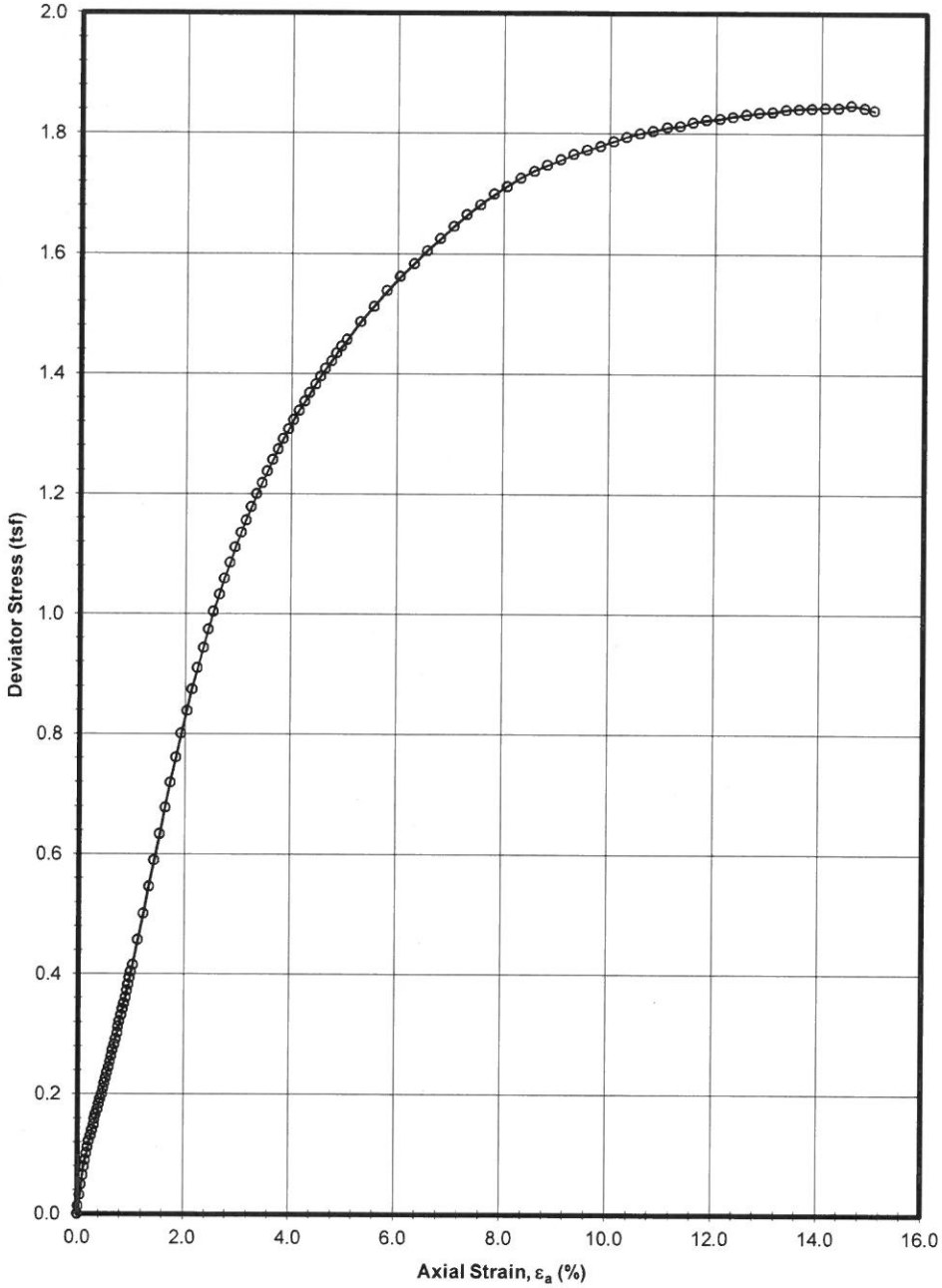
ASTM D 2850

Project No.: J028447.01

Boring: B-4

Sample: ST-5 - Depth: 15 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

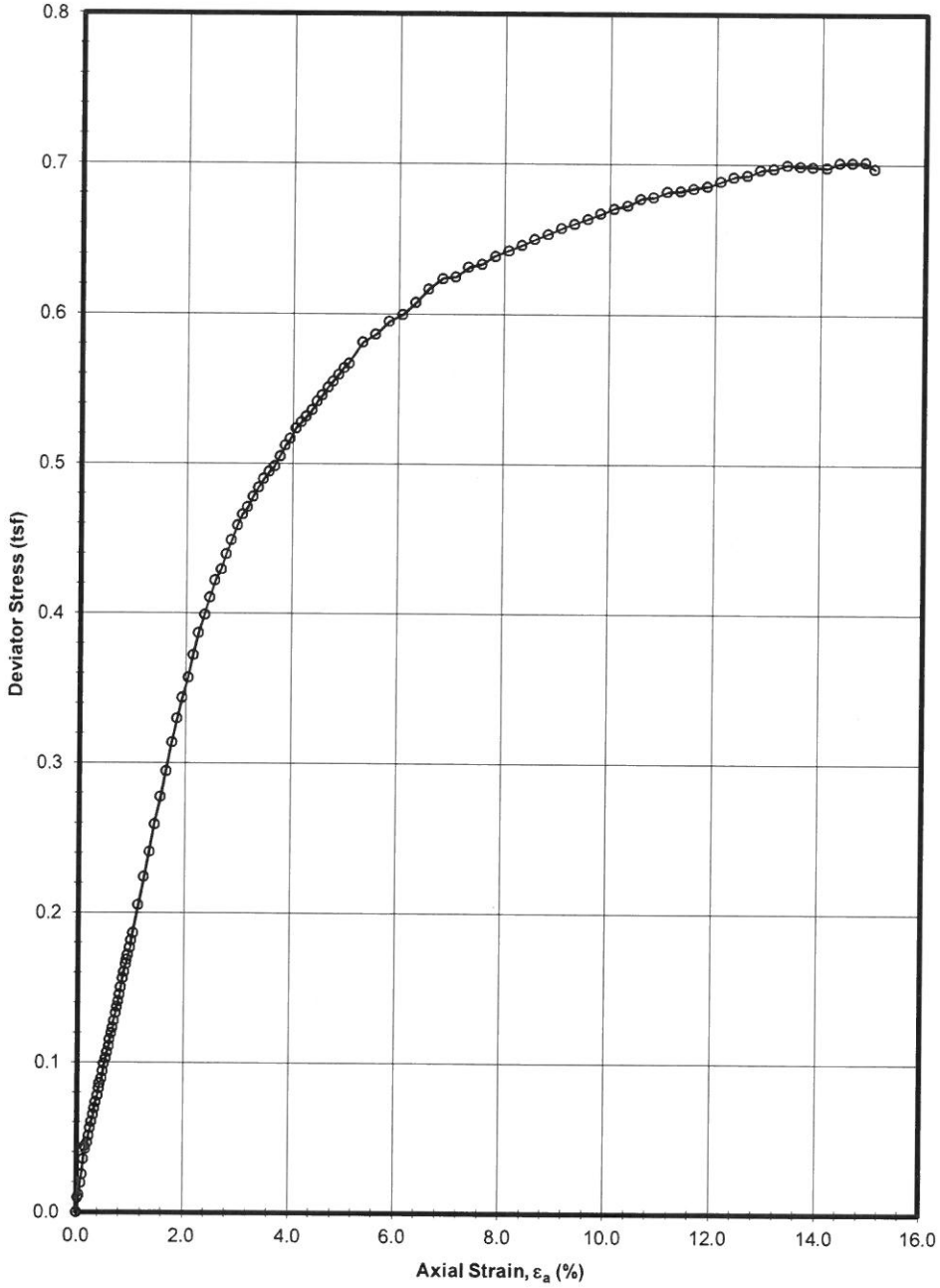
ASTM D 2850

Project No.: J028447.01

Boring: B-5

Sample: ST-4 - Depth: 13 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

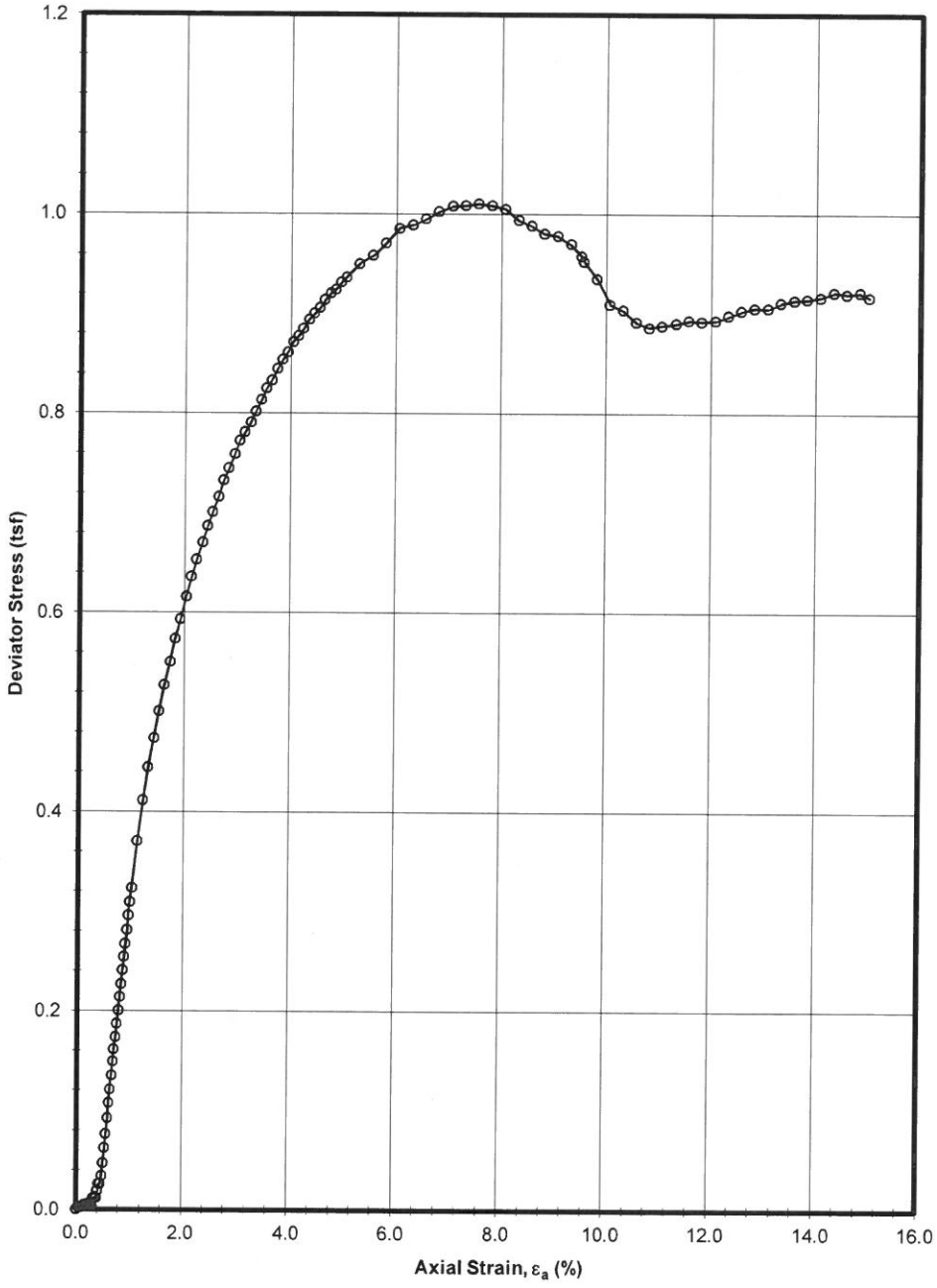
ASTM D 2850

Project No.: J028447.01

Boring: B-8

Sample: ST-4 - Depth: 13 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

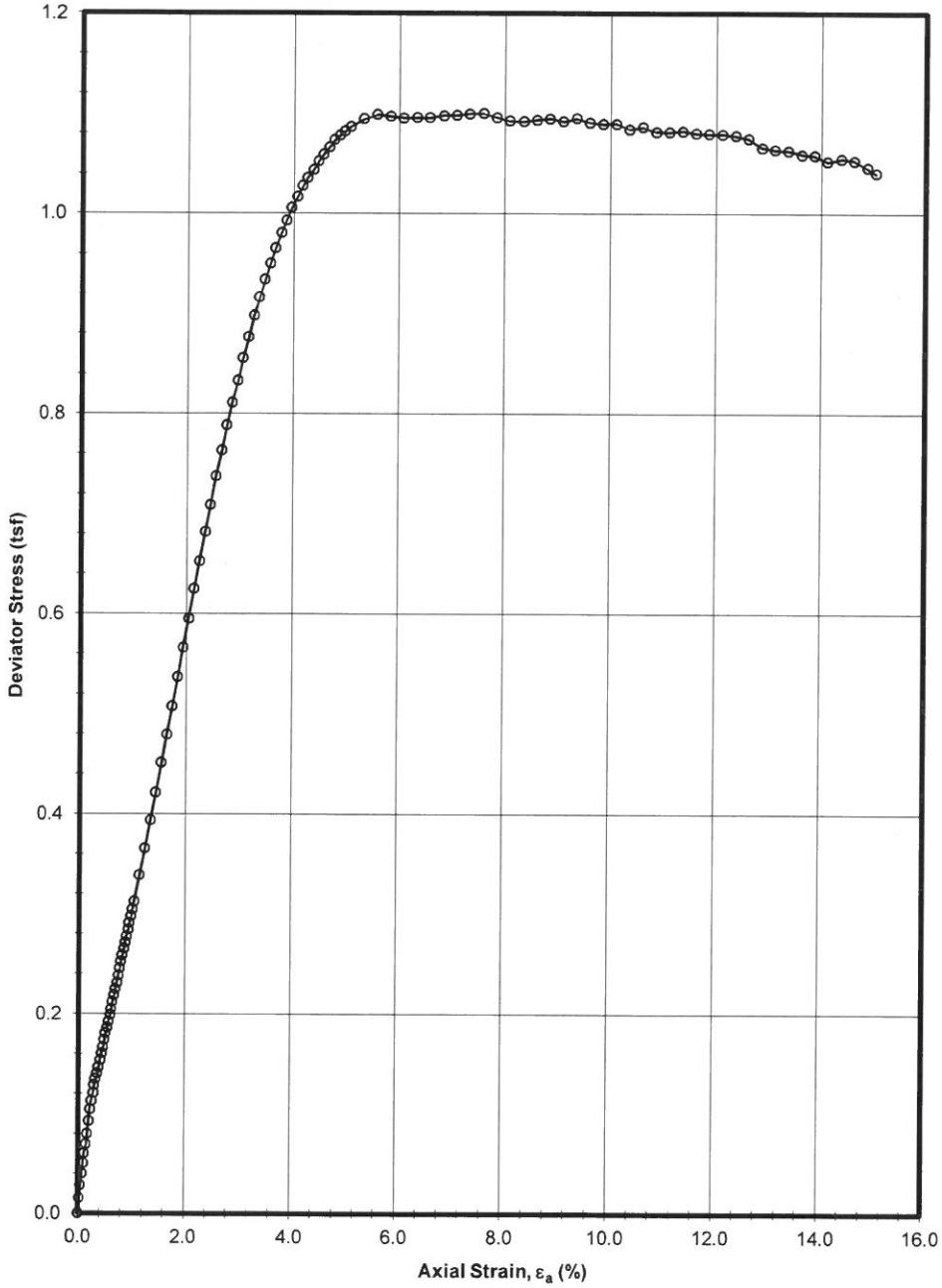
ASTM D 2850

Project No.: J028447.01

Boring: B-9

Sample: ST-5 - Depth: 15 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

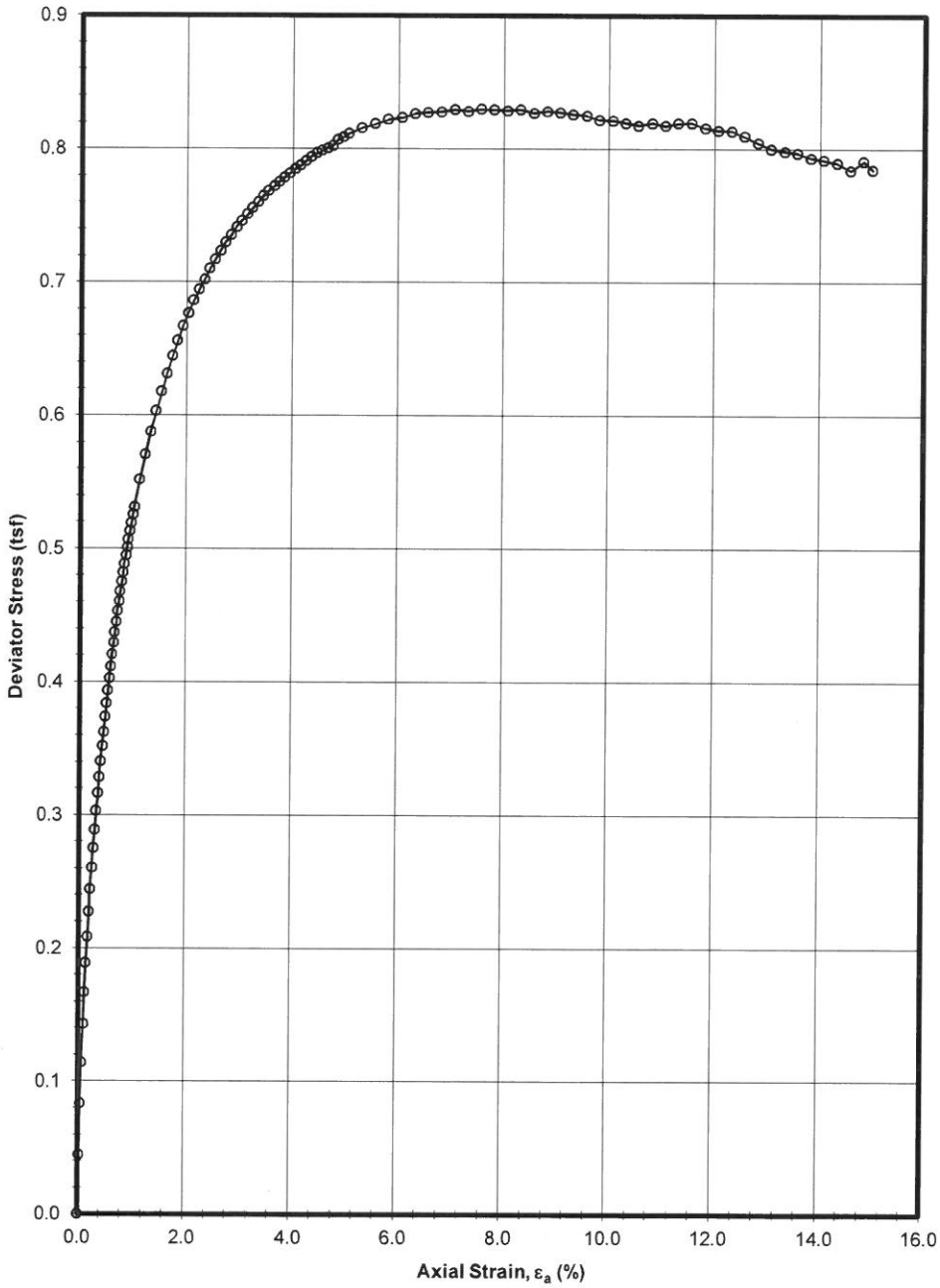
ASTM D 2850

Project No.: J028447.01

Boring: B-13

Sample: ST-9 - Depth: 23 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

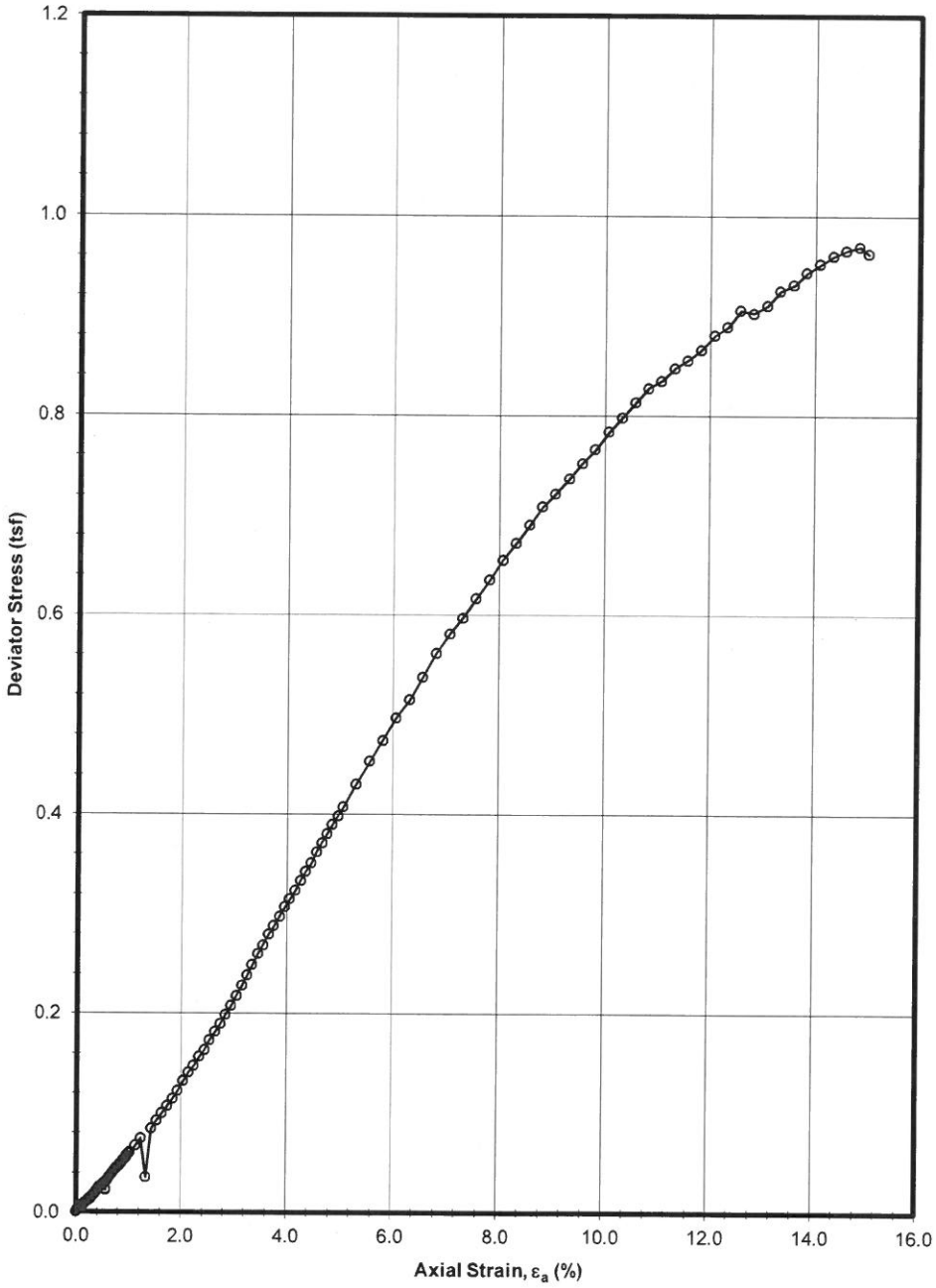
ASTM D 2850

Project No.: J028447.01

Boring: B-15

Sample: ST-8 - Depth: 25 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

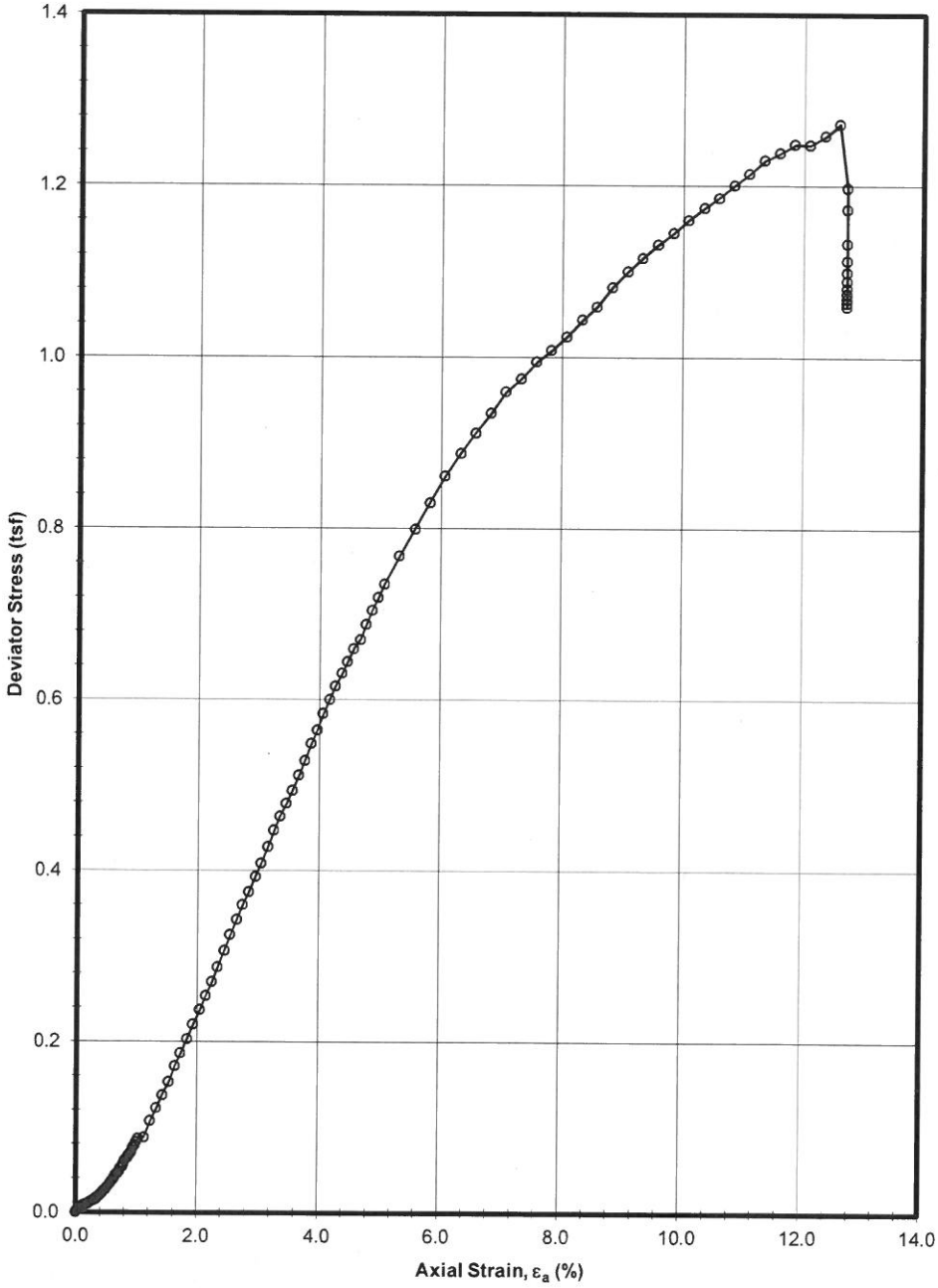
ASTM D 2850

Project No.: J028447.01

Boring: B-16

Sample: ST-6 - Depth: 16 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

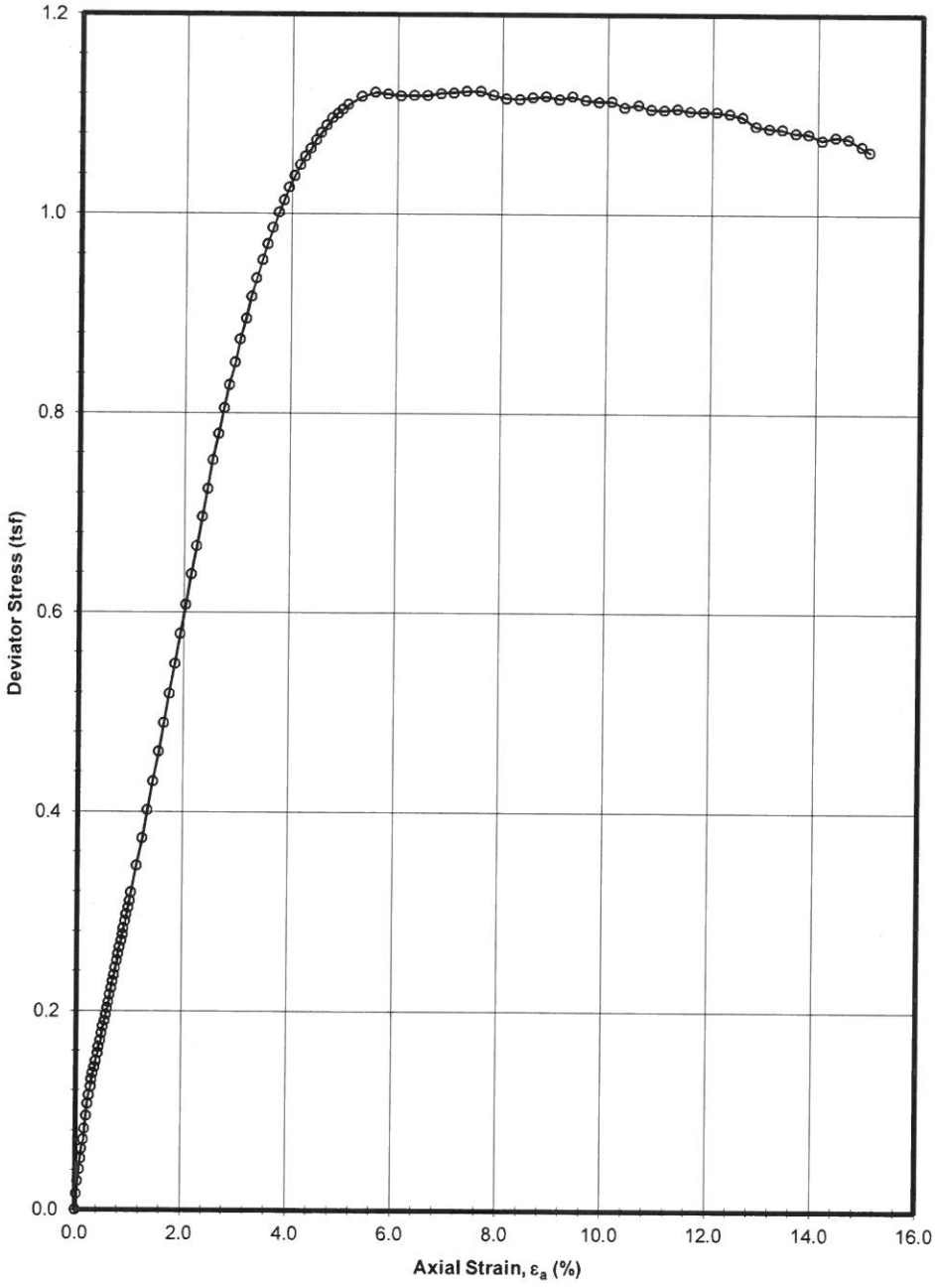
ASTM D 2850

Project No.: J028447.01

Boring: B-17

Sample: ST-6 - Depth: 18 ft.

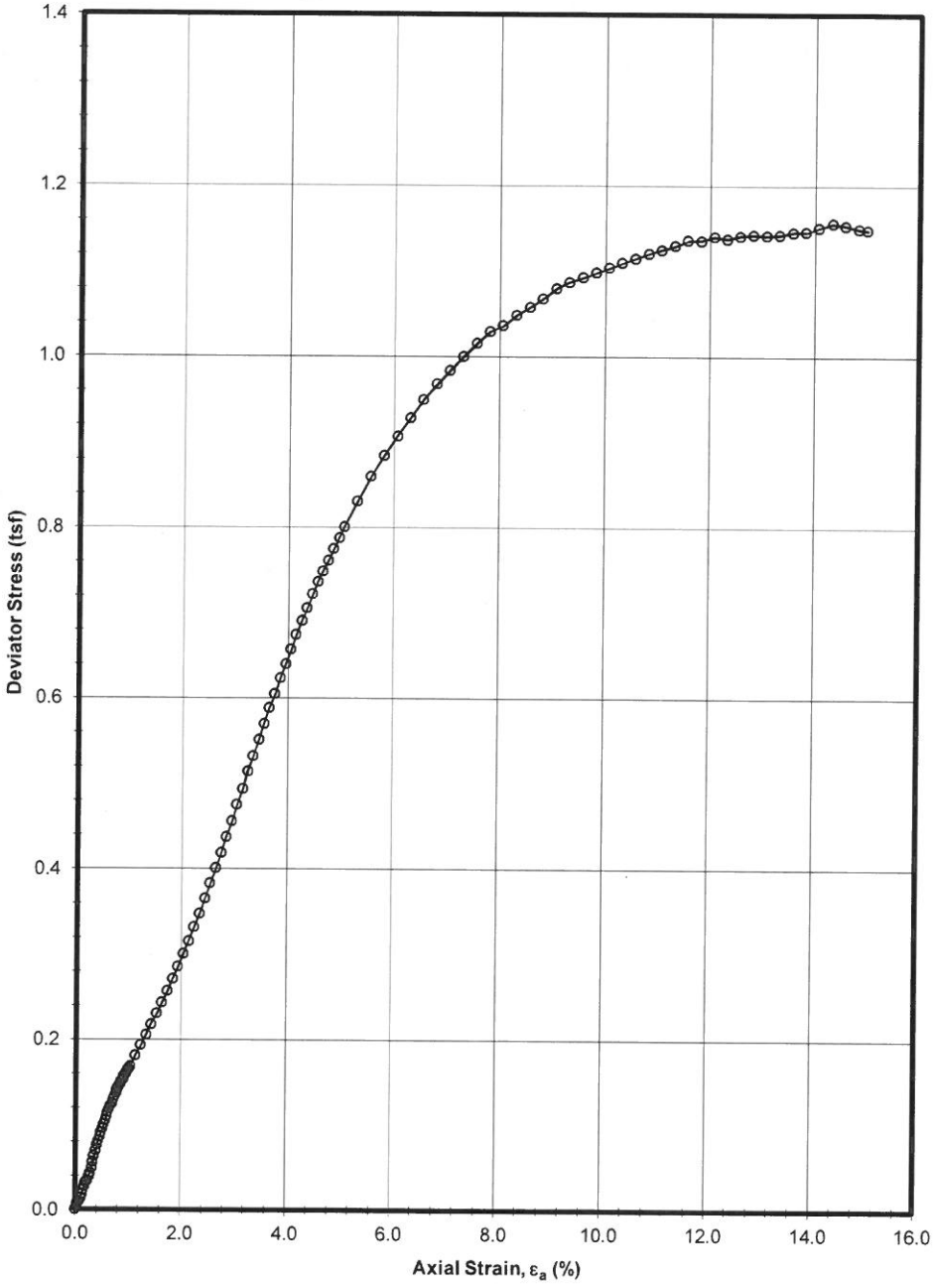
GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

ASTM D 2850
Project No.: J028447.01
Boring: B-18
Sample: ST-1 - Depth: 17 ft.

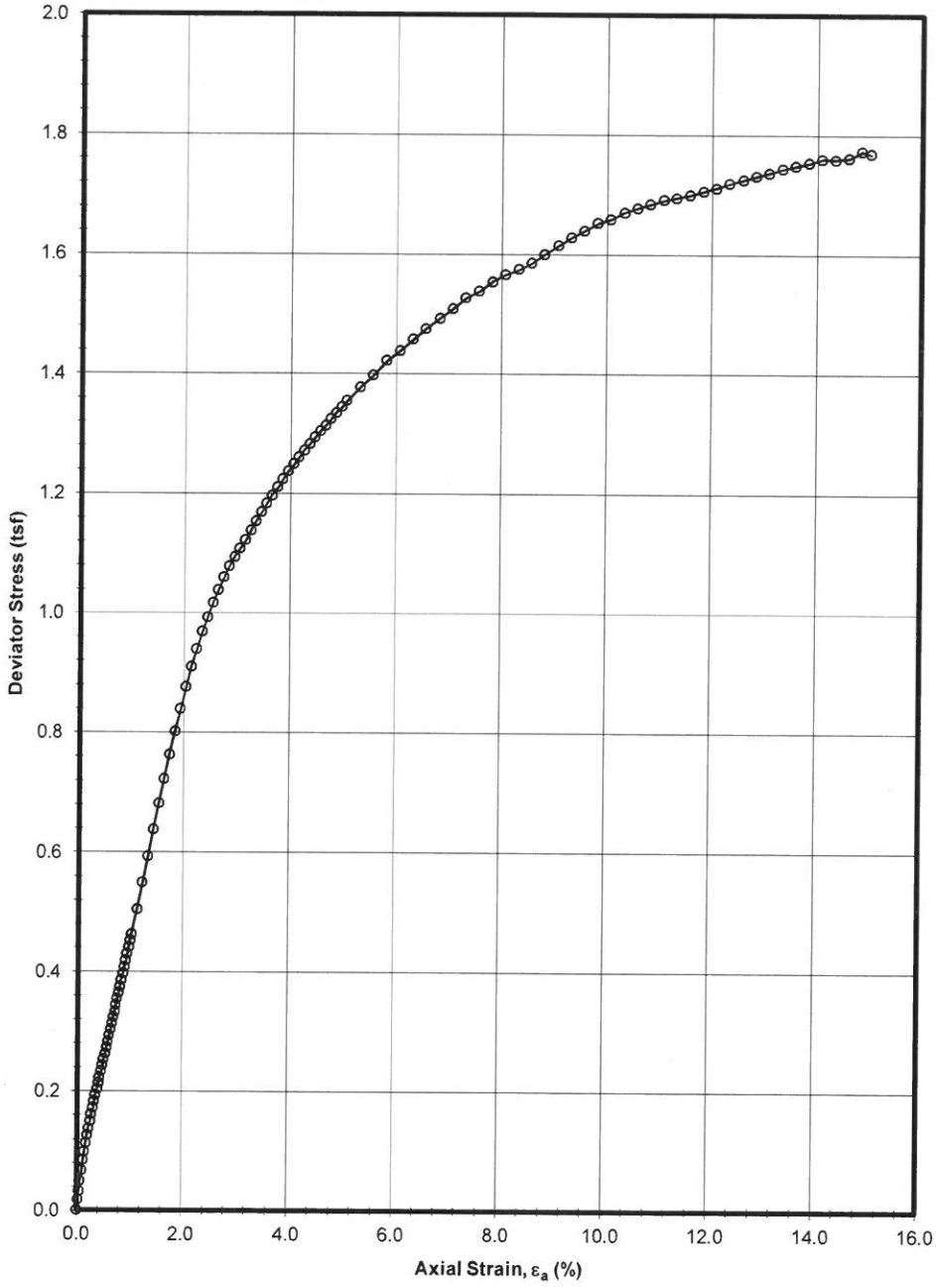
GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

ASTM D 2850
Project No.: J028447.01
Boring: B-19
Sample: ST-6 - Depth: 20 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

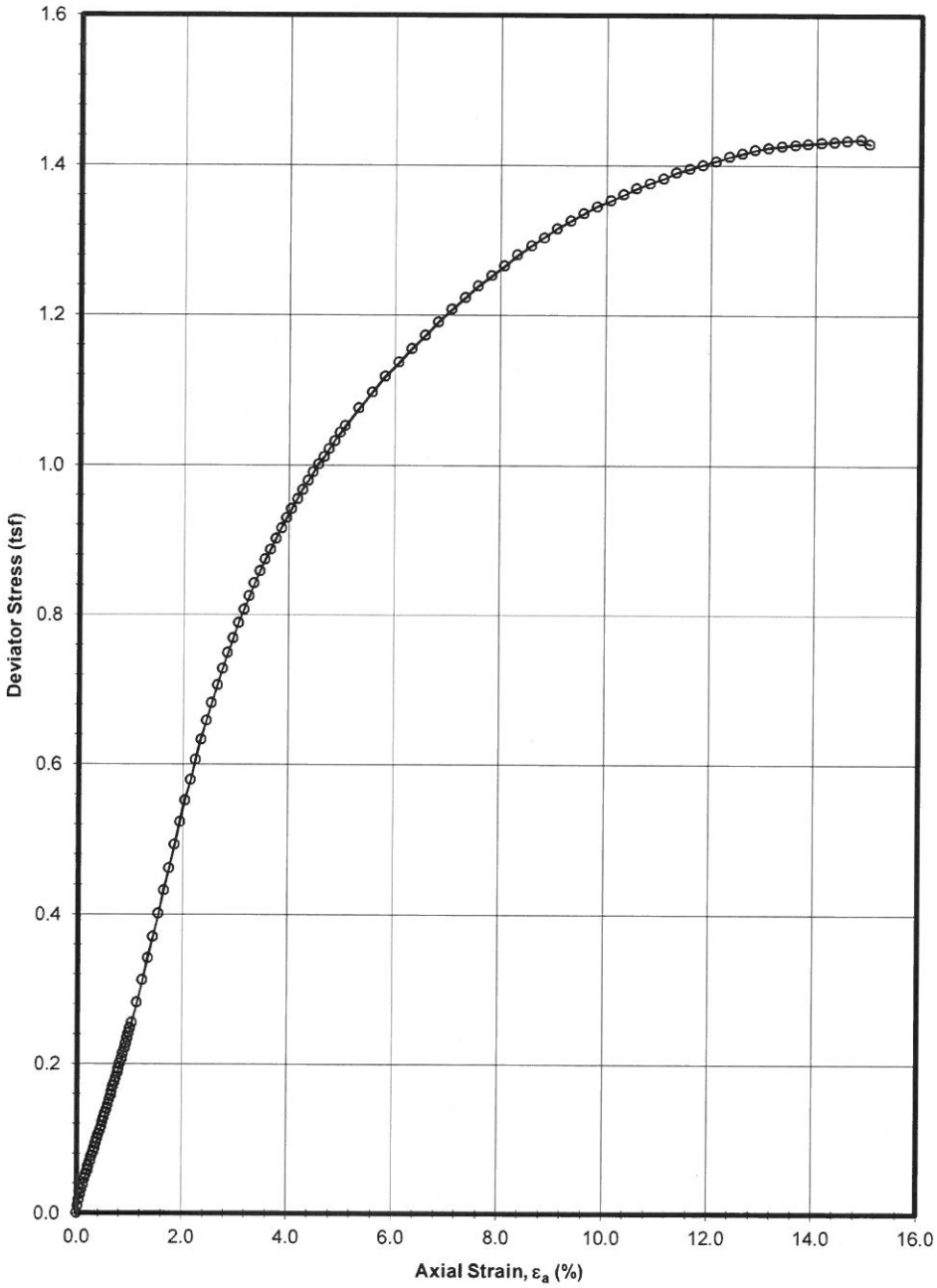
ASTM D 2850

Project No.: J028447.01

Boring: B-20

Sample: ST-5 - Depth: 14 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

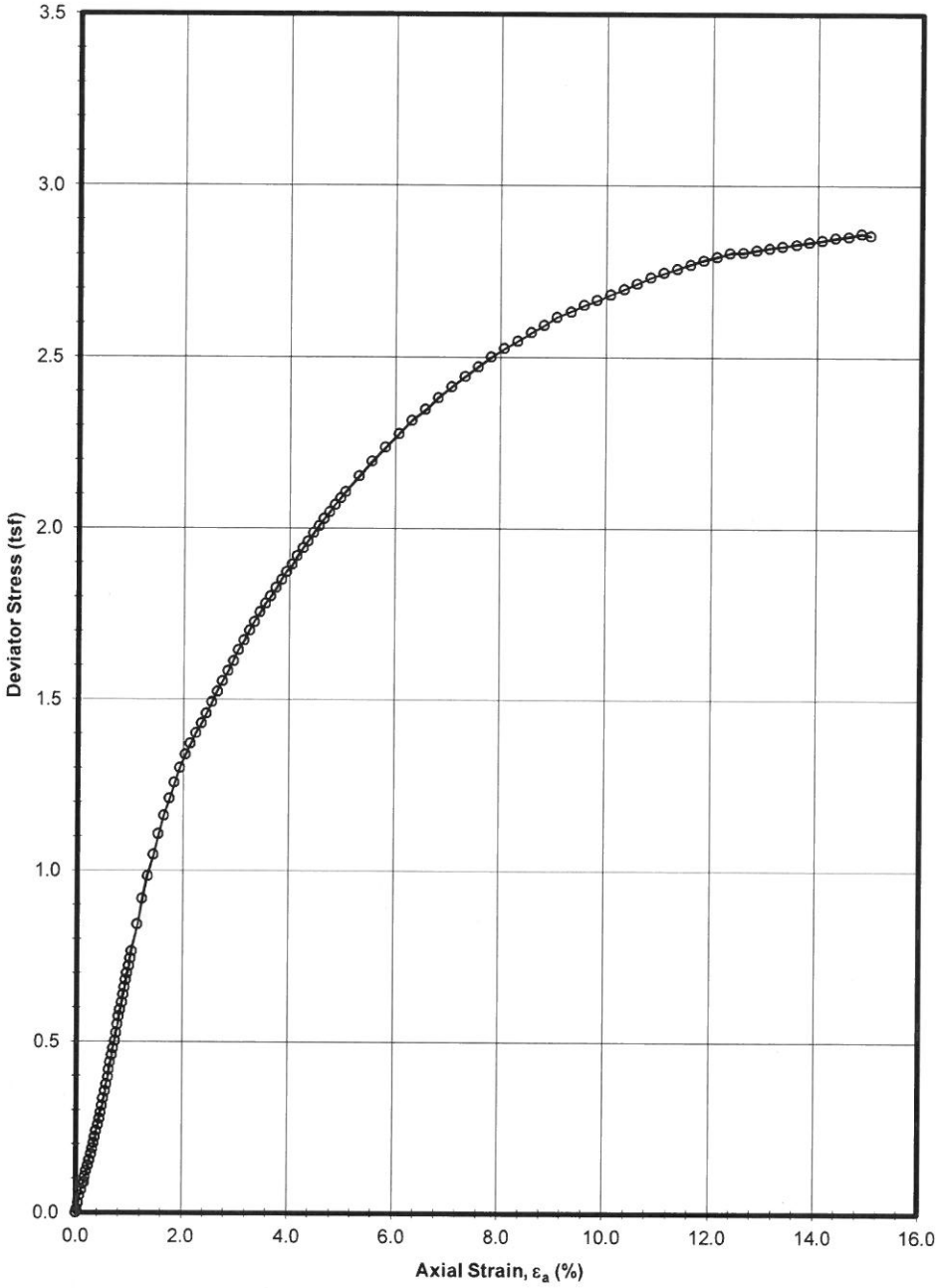
ASTM D 2850

Project No.: J028447.01

Boring: B-20

Sample: ST-6 - Depth: 16 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

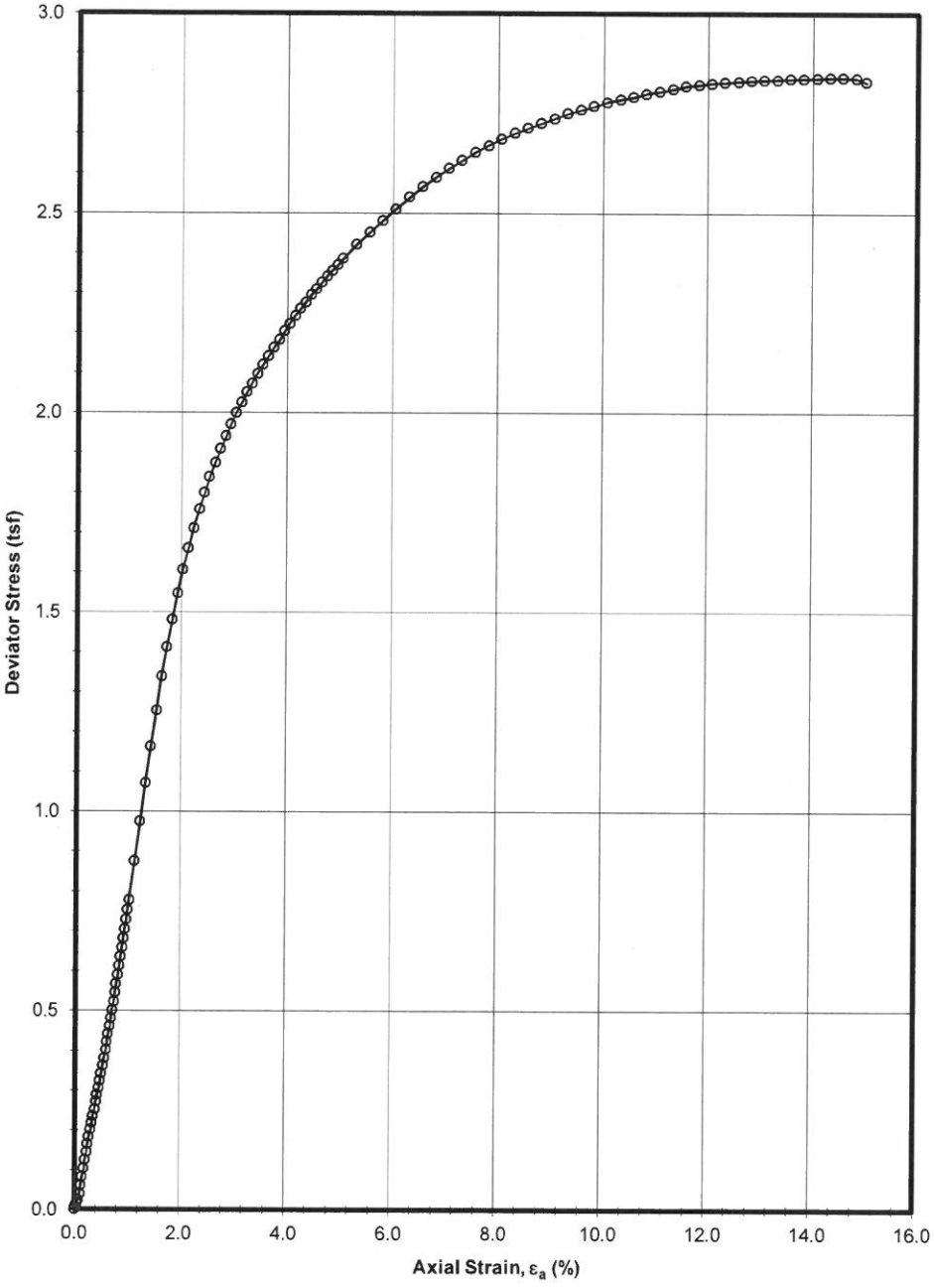
ASTM D 2850

Project No.: J028447.01

Boring: B-21

Sample: ST-6 - Depth: 19 ft.

GEOTECHNOLOGY INC
FROM THE GROUND UP



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

ASTM D 2850

Project No.: J028447.01

Boring: B-24

Sample: ST-5 - Depth: 18 ft.