

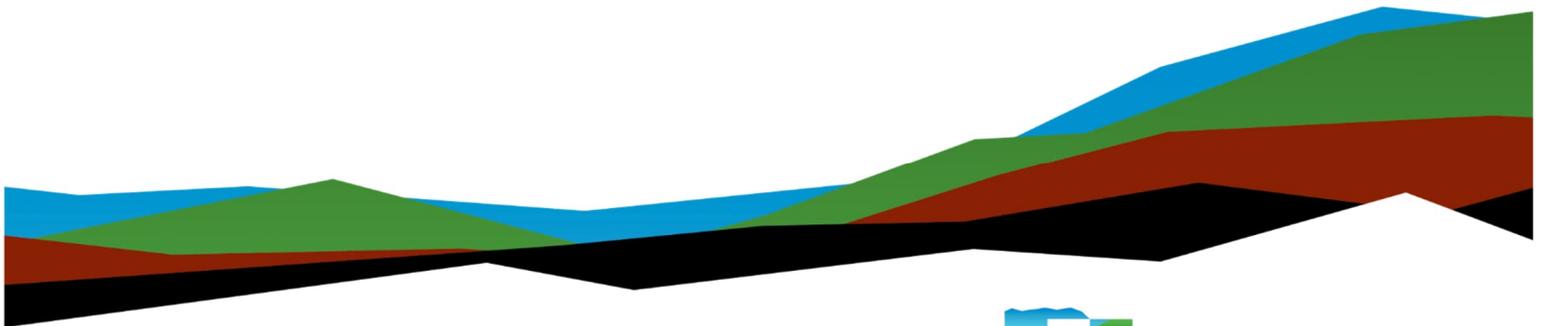
# Highway 67 Clark County Site Characterization

## Geotechnical Engineering Report

May 27, 2025 | Terracon Project No. 35245107

Prepared for:

Economic Development Corporation  
of Clark County, Arkansas  
Arkadelphia, Arkansas



Nationwide  
[Terracon.com](https://www.terracon.com)

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25809 I-30 Frontage Road  
Bryant, AR 72022  
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May 27, 2025

Economic Development Corporation of Clark County, Arkansas  
PO Box 400  
Arkadelphia, Arkansas

Attn: Shelley Short, IOM  
P: (501) 944-2028  
E: [shelley@arkadelphiaalliance.com](mailto:shelley@arkadelphiaalliance.com)

Re: Geotechnical Engineering Report  
Highway 67 Clark County Site Characterization  
Highway 67  
Arkadelphia, Arkansas  
Terracon Project No. 35245107

Dear Ms. Short:

We have completed a subsurface exploration and geotechnical engineering evaluation for the referenced project in general accordance with Terracon Proposal No. P35245107R2 dated March 27, 2025. This report presents the findings of the subsurface exploration and provides a geotechnical site characterization for the project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Derek B. Tennison, E.I.  
Staff Geotechnical Engineer

Christopher S. Handley, P.E.  
Principal

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Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  Terracon logo will bring you back to this page. For more interactive features, please view your project online at [client.terracon.com](http://client.terracon.com).

Refer to each individual Attachment for a listing of contents.

## Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed Highway 67 Clark County Site Characterization to be located at Highway 67 in Arkadelphia, Arkansas. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions

Drawings showing the site and boring locations are shown on the attached [Site Location](#) and [Exploration Plan](#). The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs in [Exploration Results](#).

## Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	An updated email request for proposal was provided by Shelley Short on March 17, 2025. The email included an updated pdf of the project boundary.
Project Description	We understand that the EDCCC is seeking updated geotechnical engineering services on property owned by Gum Springs. The project site does not have any specifics regarding development; therefore, the geotechnical scope of work for this phase is for site characterization purposes only. We also have previous geotechnical boring information in the southern portion of the site which we have included in this report.

## Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at Highway 67 in Arkadelphia, Arkansas. The updated site is approximately 991-acre Latitude/Longitude (34.0456°, -93.1094°) (approximate) See <a href="#">Site Location</a>
Existing Improvements	Existing substation and two residences on the eastern side of the property
Current Ground Cover	Grass and trees
Existing Topography	Based on a Google Earth aerial. The site appears to slope downhill to the southeast with an elevation difference of about 40 to 60 feet across the entire site.
Geology	<p><u>Arkadelphia Marl</u> – Fossiliferous marl and marly clay, calcareous sandstone, sandy clay, sandy limestone, limestone and chalk. Approximately 160 feet thick. Marl refers to loosely consolidated calcareous clays, silts and sands containing glauconite.</p> <p><u>Nacatoch Sand</u> – Unconsolidated quartz sand, fossiliferous sandy limestone, glauconitic sand, argillaceous sand, clay and marl. Approximately 400 feet thick.</p>

## Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based on the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical evaluation. Conditions observed at each boring location are indicated on the individual logs. The individual logs are in the [Exploration Results](#) and the GeoModel is in the [Figures](#) attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile.

Model Layer	Layer Name	Approximate Depth to Bottom of Stratum (ft)	General Description
1	Low-strength Fat Clay	2 to 7.5	Very soft to medium stiff fat clay soils and localized lean clay soils
2	Fat Clay	28.5 to 68.5	Medium stiff to hard fat clay soils
3	Sand	Below max termination depths of about 80 feet	Dense to very dense clayey sand and silty sand

The historic borings were observed during drilling and shortly after completion of drilling for the presence and level of water and groundwater levels are estimated in our CPT soundings based on the measured pore pressure. Groundwater was estimated at depths of about 10 to 11.5 feet in our recent CPT sounding CPT-7 and CPT-8. Based on our historic data, Groundwater was observed in Borings BH-16, BH-20, and BH-33 at depths of about 26 to 50 feet 24 hours after boring completion. Groundwater was not encountered in the other borings during or after boring completion. A longer period of time may be required for groundwater to develop and stabilize in a borehole. Longer term observations in piezometers or observation wells, sealed from the influence of surface water, are often required to define groundwater levels.

Groundwater levels may fluctuate due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. "Perched" water could occur above lower permeability soil layers and/or near the soil/bedrock interface, and "trapped" water could be present within existing fill materials. Therefore, groundwater conditions at other times may be different than the conditions encountered in our exploratory borings. The potential for water level fluctuations and perched water should be considered when developing design and construction plans and specifications for the project.

## Geotechnical Overview

Based on our more recent and historic exploration, the general soil stratigraphy at this site is typically comprised of soft to hard fat clay generally to depths of about 68.5 feet underlain by clayey sand and silty sand to maximum termination depths of about 80 feet. Groundwater was estimated at depths of about 10 to 11.5 feet in our recent CPT sounding CPT-7 and CPT-8. Based on our historic data, Groundwater was observed in Borings BH-16, BH-20, and BH-33 at depths of about 26 to 50 feet 24 hours after boring

completion. Groundwater was not encountered in the other borings during or after boring completion.

During our investigation, the following geotechnical conditions were identified:

- Expansive soils
- Low-strength soils
- Moisture-sensitive soils

The following discussion addresses these items and provides the basis for preliminary design recommendations presented in the subsequent sections. We recommend that a more in-depth and focused geotechnical investigation be performed when more specific site features and information is available.

## Expansive Soils

Fat clay soils were observed throughout our borings. These soils have a high-plasticity and are prone to volume changes with variations in moisture content. Based on the subsurface conditions observed at the boring locations, laboratory testing, and our experience with these types of soils, we estimate a potential vertical rise (PVR) of 3 to 5 inches at the existing surface. The typical method for mitigating the effects of expansive soils is to undercut some of the soil and construct a building pad of low volume change engineered fill below the floor slab of the thickness required to reduce the PVR to about 1 inch. Based on our analysis of the available data, we estimate that it will require about 6 feet of overexcavation and replacement of the existing soils with new low volume change engineered fill. This could also be accomplished through a combination of removal and replacement and raising grade, assuming that there is a 6-foot layer of low volume change structural fill below structural areas.

As an alternative to removal and replacement of the existing expansive soils, the structures could be supported on fill consisting of native soils which have been chemically treated with lime to reduce the plasticity to an acceptable magnitude as discussed in this report. This alternative would allow the on-site soils to be reused as new fill in structure areas and should significantly reduce the amount of import and export material required.

Further investigation of the expansive soils and potential chemical treatment can be undertaken as part of a more in-depth study once more specific site features are available.

## Low-Strength Soils

Surficial near surface low-strength (soils with SPT N-values less than or equal to 5 blows per foot) soils were observed to depths of about 2 to 7.5 feet in our SPT borings and CPT soundings, though typically to depths of about 2 to 3.5 feet.

We recommend that any low-strength soils encountered, be removed and replaced with new structural fill or improved through other means such as chemical treatment (with cement) or utilizing a geotextile or geogrid could be used rather than removal and replacement.

## Moisture-Sensitive Soils

The clay soils that were observed at or near the ground surface at the project site are moisture-sensitive and prone to further strength loss with increases in moisture content. These soils could become unstable with typical earthwork and construction traffic, especially after precipitation events; therefore, effective drainage should be implemented early in the construction sequence and maintained after construction. If possible, the grading should be performed during the warmer and drier times of the year. If grading or construction is performed during the winter months, an increased risk for possible treatment of unstable subgrade will persist.

## General Considerations

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the [Exploration Results](#)), engineering analyses, and our current understanding of the proposed project. The [General Comments](#) section provides an understanding of the report limitations.

## General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, cost estimating, excavation support, and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

## Figures

Contents:

## Attachments

# Exploration and Testing Procedures

## Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
10	20	At select locations as shown on the Exploration Plan
34 (historic SPT)	50 to 80	Historic borings along south portion of the site
13 (historic CPT)	25 to 40	Historic CPT soundings along southern portion of the site

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about  $\pm 10$  feet) and referencing existing site features. Approximate ground surface elevations were estimated using Google Earth. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: The cone penetrometer test (CPT) soundings were performed by pushing a 10-square centimeter electric cone penetrometer at an approximate rate of 20 millimeters/second using the hydraulic cylinders of the drilling rig. The cone penetrometer is equipped with electronic load cells to measure tip resistance and sleeve resistance, and a pressure transducer measures the generated ambient pore pressure. Digital data representing the tip resistance, the sleeve penetration, the pore pressure and the CPT sounding inclination are typically measured at 50 mm intervals during penetration using a CPT data acquisition system or logger. The testing and calibration of the Cone Penetrometer Test device will be conducted in general conformance with ASTM D 5778.

The historic borings were advanced a track-mounted rotary drill rig using continuous hollow stem augers and mud rotary techniques. At least four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are

indicated on the boring logs at the test depths. For safety purposes, all borings were backfilled with auger cuttings after their completion and 24 hour water readings.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. Groundwater was not observed at these times in the boreholes. OR The groundwater levels are shown on the attached boring logs.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

## Laboratory Testing

No samples are collected during the CPT soundings as part of our recent field exploration.

The historic borings included the following laboratory testing program included the following tests on selected samples:

- Moisture Content
- Dry Unit Weight
- Atterberg Limits
- Sieve analysis
- Unconfined Compression Strength
- Unconsolidated-undrained Triaxial Compressive Strength

The laboratory testing program included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

## Site Location and Exploration Plans

### Contents:

Site Location Plan  
Exploration Plan

Note: All attachments are one page unless noted above.

## Site Location

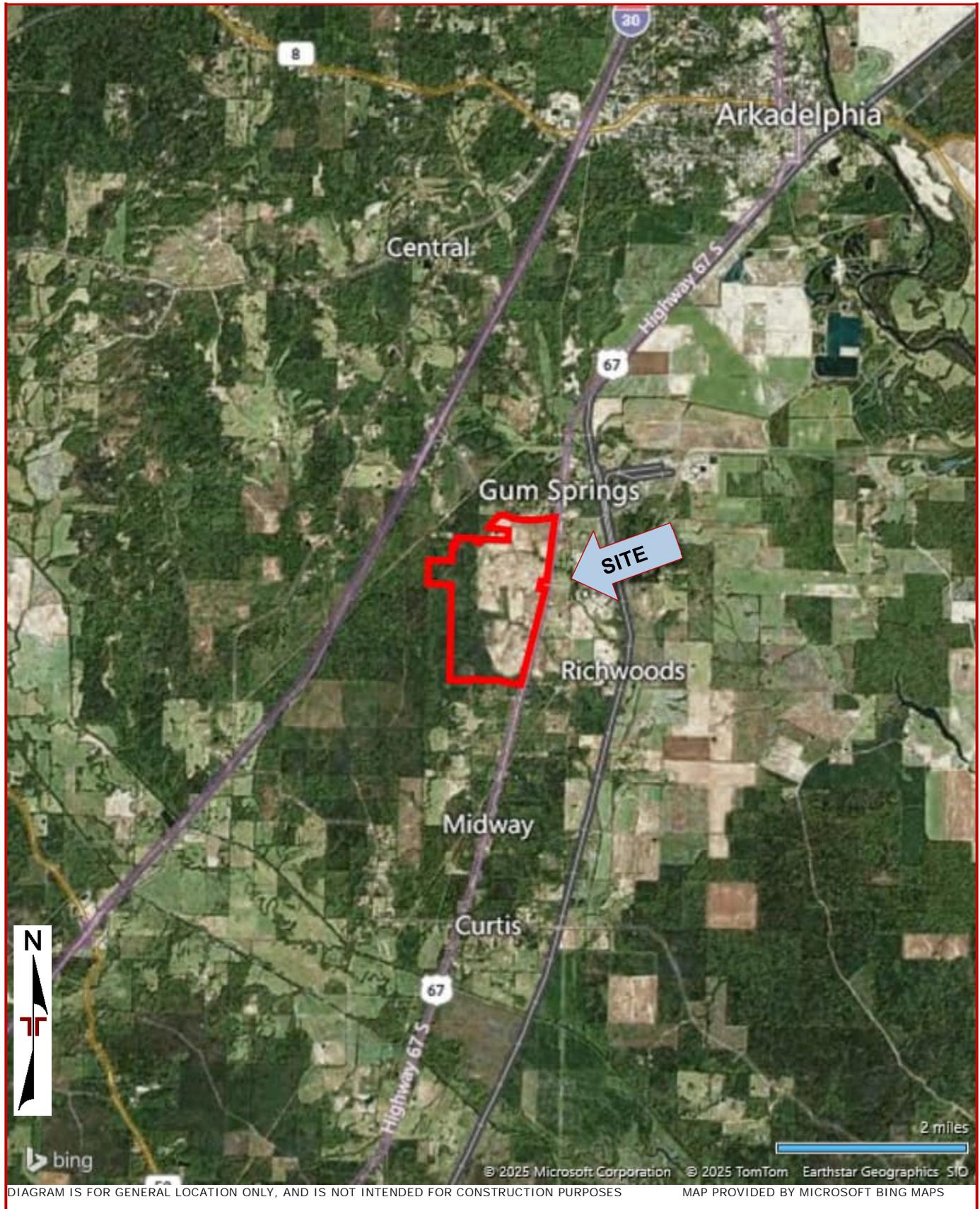
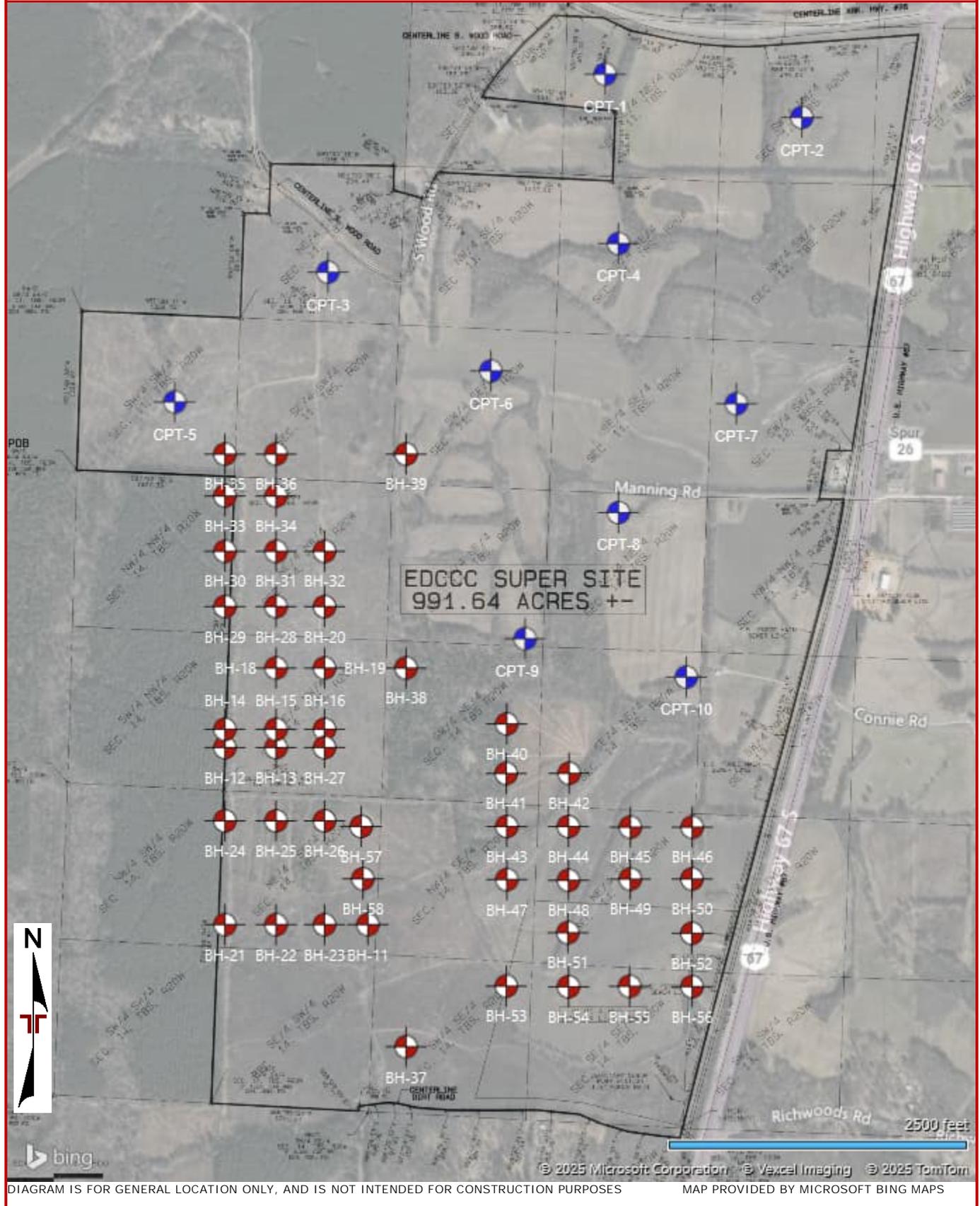


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

## Exploration Plan



## Exploration and Laboratory Results

Contents:

Recent Sounding Logs:  
CPT-1 through CPT-10

Historic Boring/Sounding Logs:  
BH-11 through BH-58

Note: All attachments are one page unless noted above.

# CPT Sounding ID CPT-1

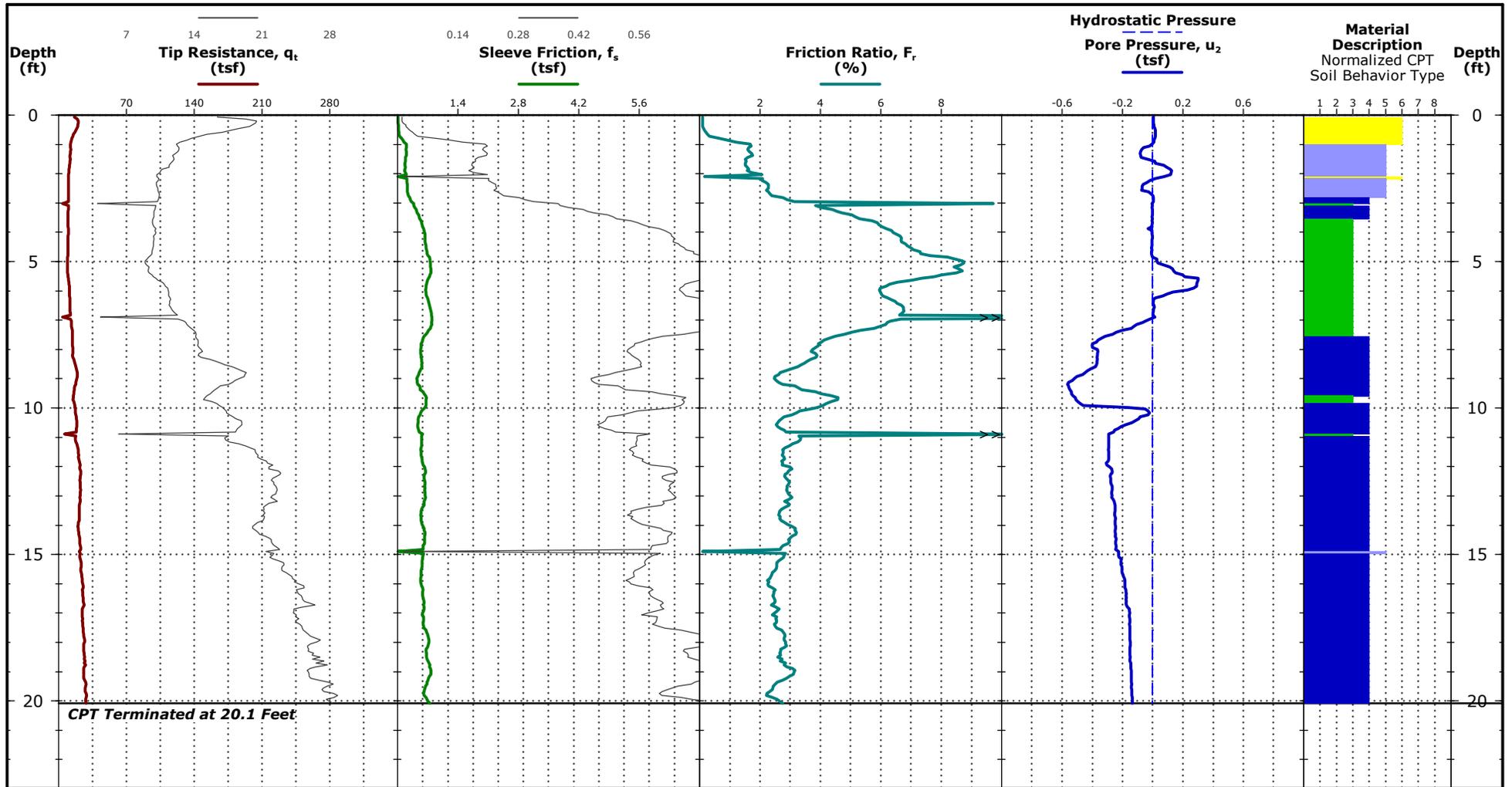
Latitude: 34.0586° Longitude: -93.1072°



25809 I 30  
 Bryant, AR

CPT Started: 4/30/2025

CPT Completed: 4/30/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

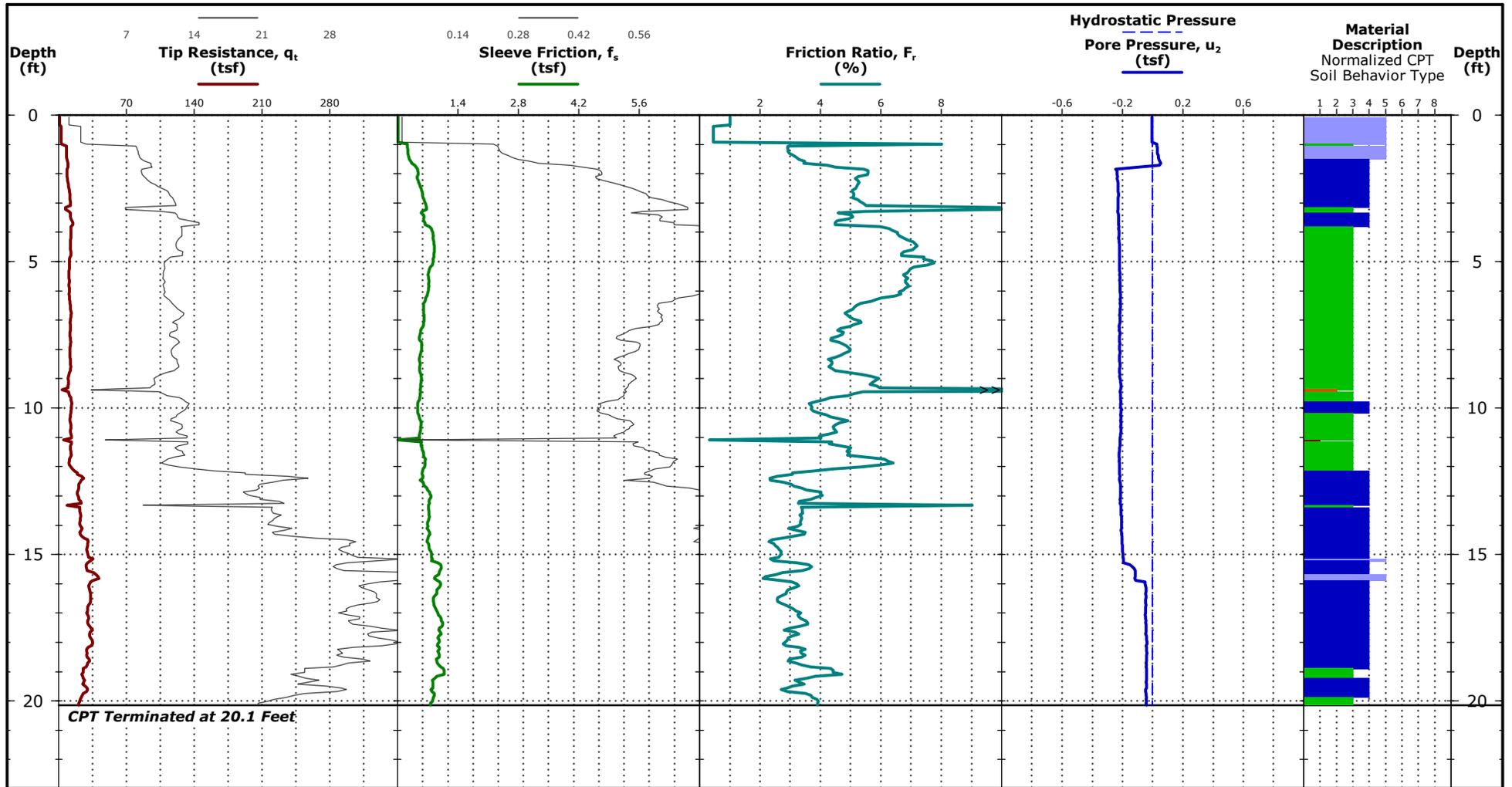
# CPT Sounding ID CPT-2

Latitude: 34.0576° Longitude: -93.1017°



25809 I 30  
 Bryant, AR

CPT Started: 4/30/2025  
 CPT Completed: 4/30/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

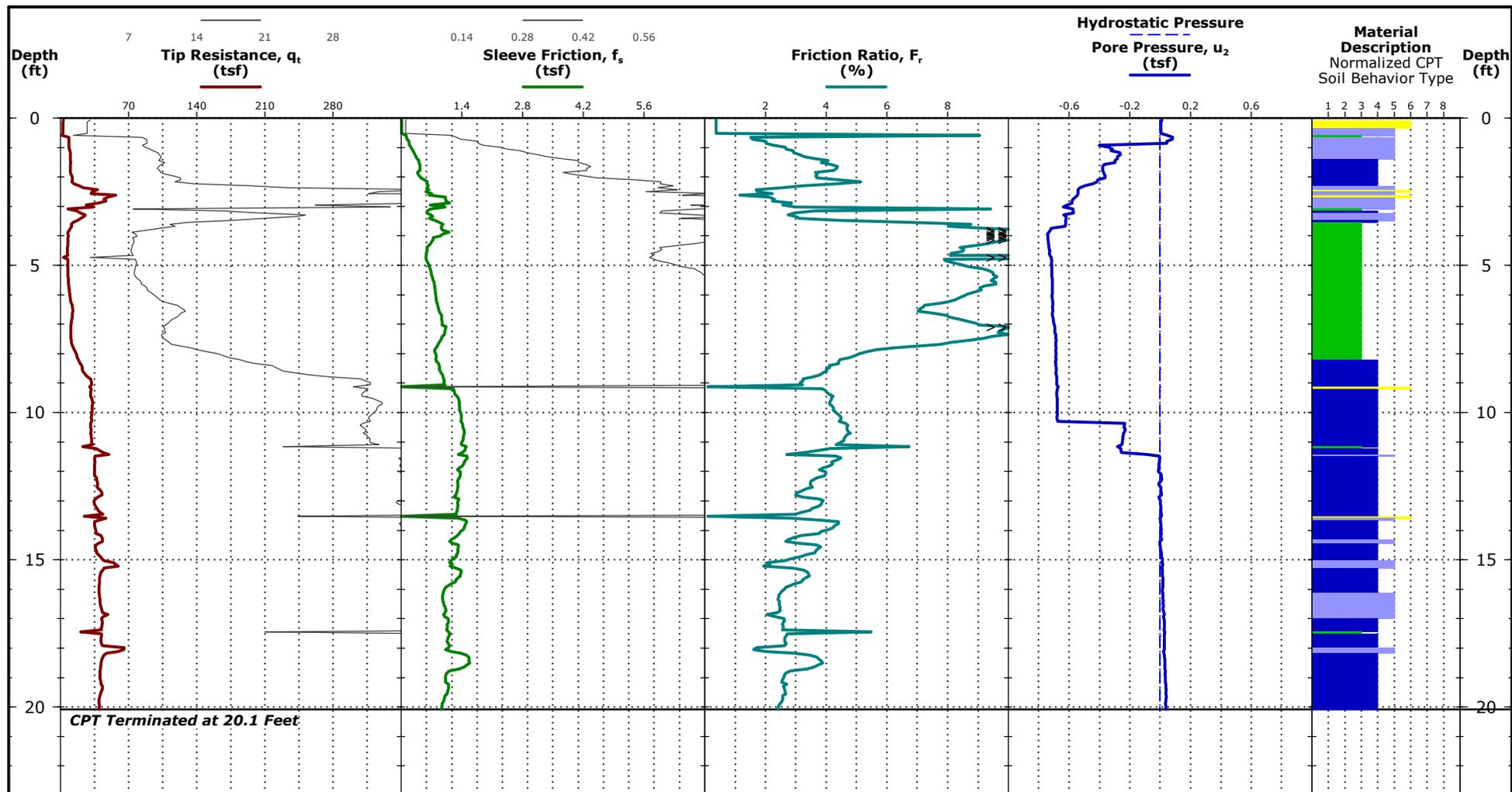
# CPT Sounding ID CPT-3

Latitude: 34.0540° Longitude: -93.1149°



25809 I 30  
 Bryant, AR

CPT Started: 5/1/2025  
 CPT Completed: 5/1/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B. - Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

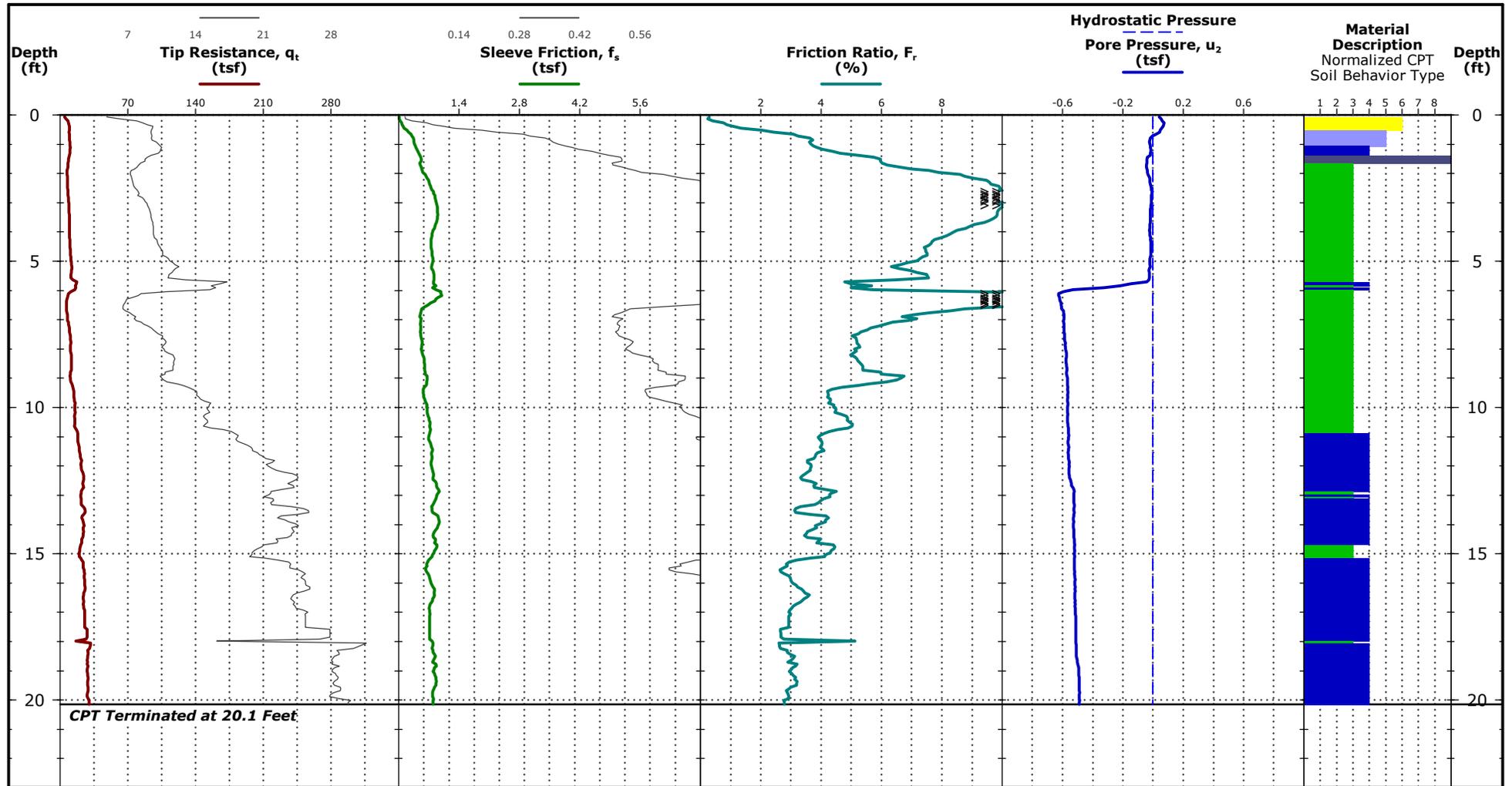
# CPT Sounding ID CPT-4

Latitude: 34.0547° Longitude: -93.1068°



25809 I 30  
 Bryant, AR

CPT Started: 5/1/2025  
 CPT Completed: 5/1/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

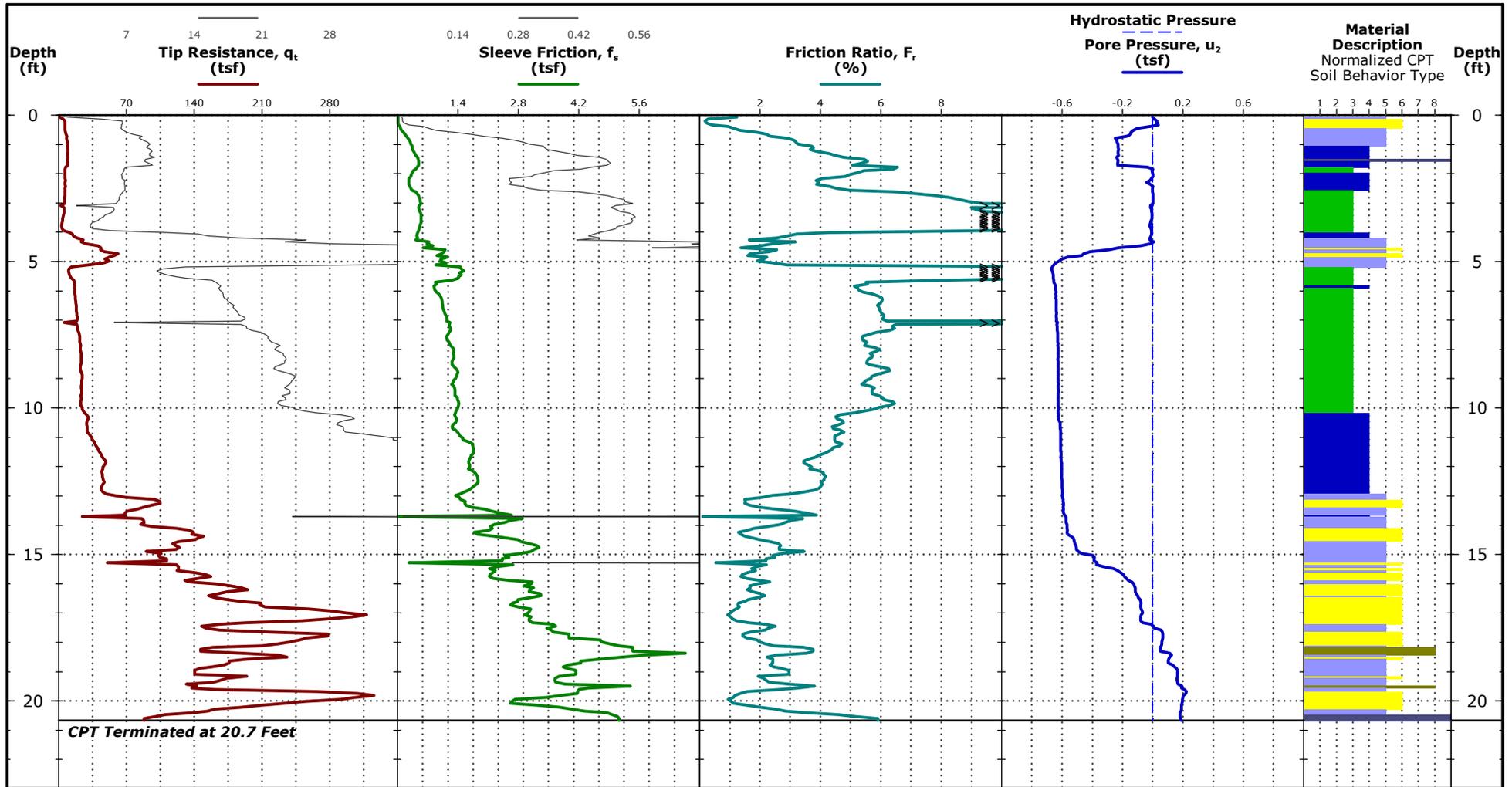
# CPT Sounding ID CPT-5

Latitude: 34.0511° Longitude: -93.1191°



25809 I 30  
 Bryant, AR

CPT Started: 5/1/2025  
 CPT Completed: 5/1/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

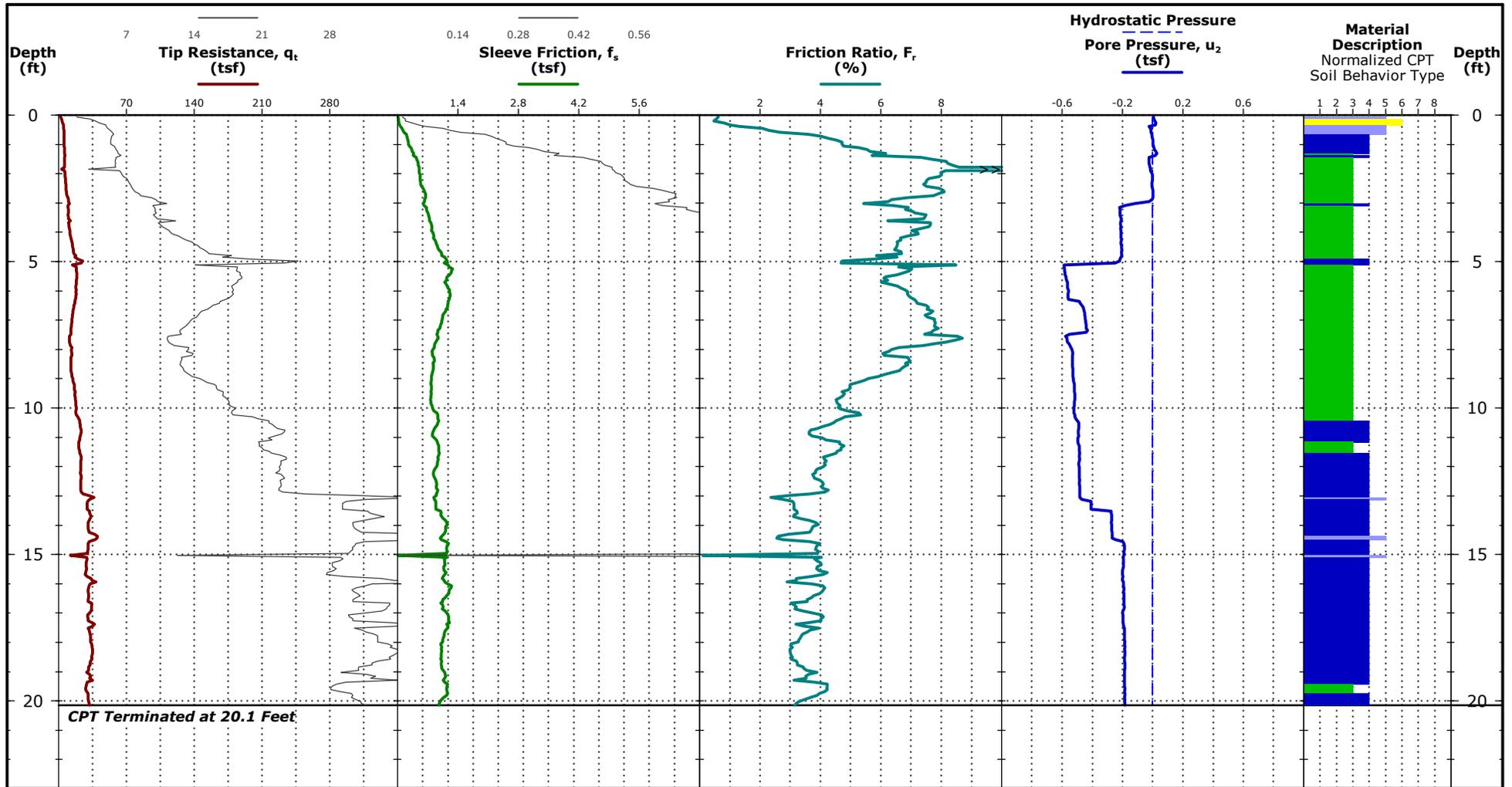
# CPT Sounding ID CPT-6

Latitude: 34.0518° Longitude: -93.1103°



25809 I 30  
 Bryant, AR

CPT Started: 5/1/2025  
 CPT Completed: 5/1/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

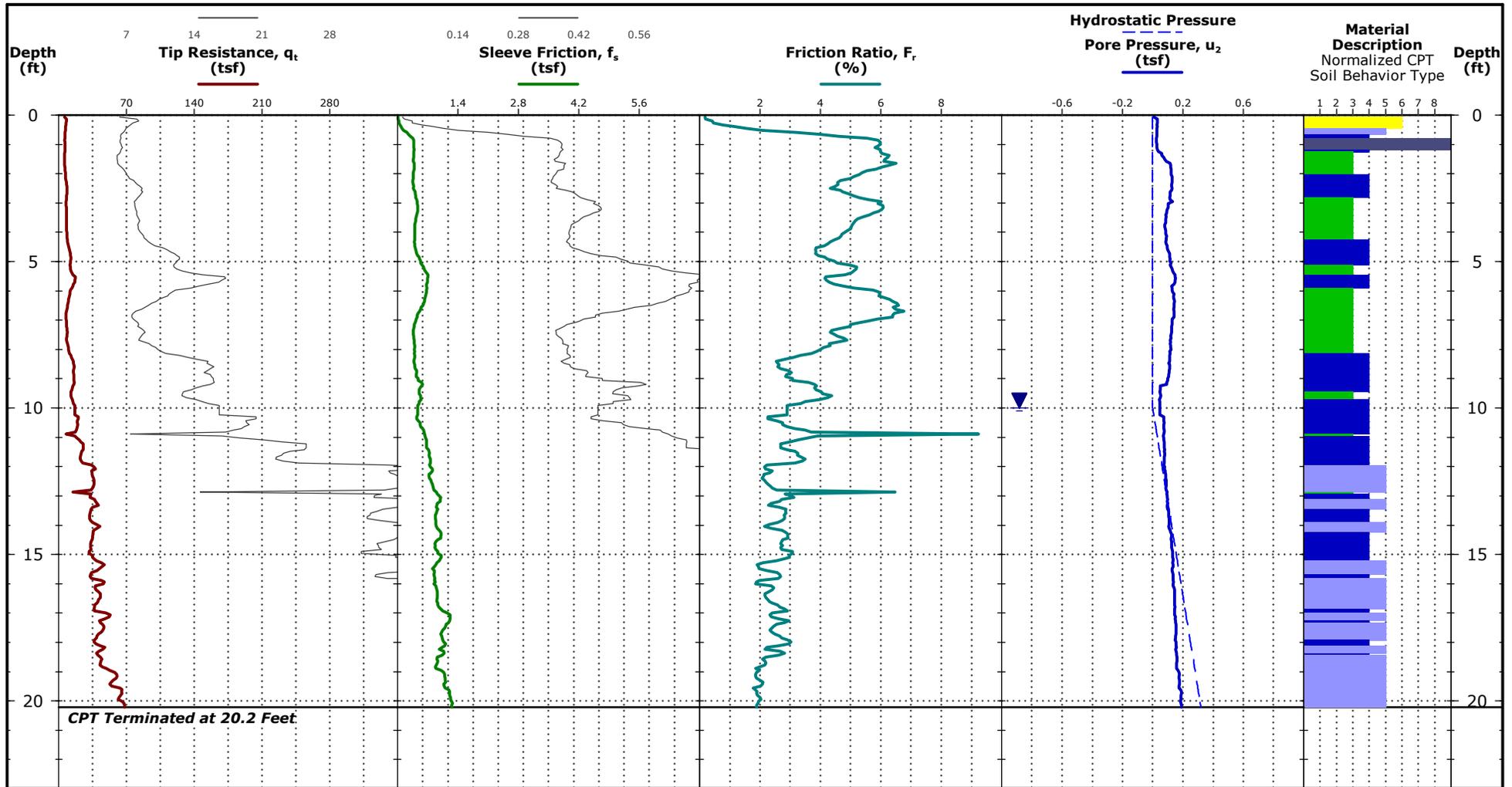
# CPT Sounding ID CPT-7

Latitude: 34.0510° Longitude: -93.1036°



25809 I 30  
 Bryant, AR

CPT Started: 4/30/2025  
 CPT Completed: 4/30/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 10 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

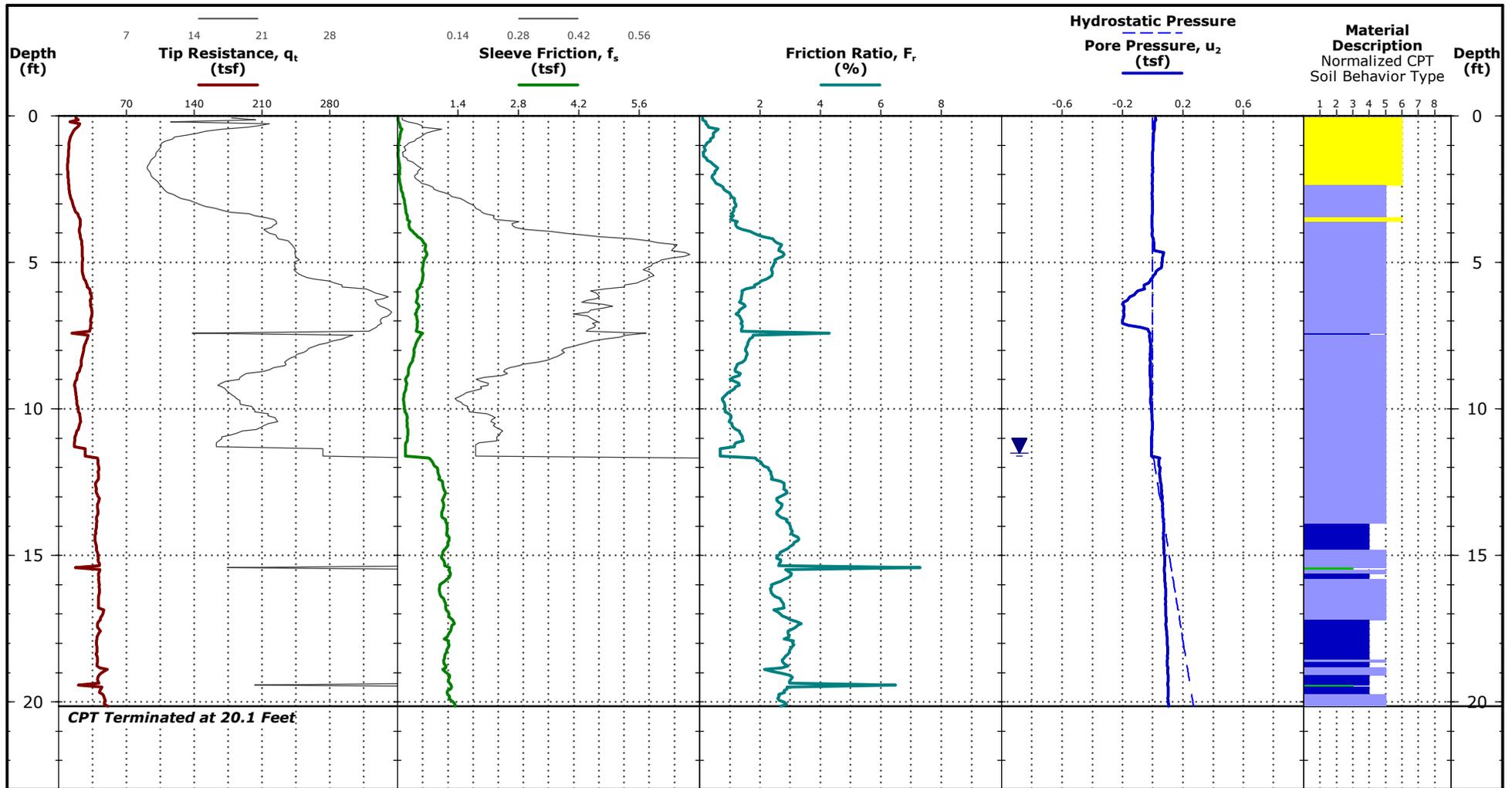
# CPT Sounding ID CPT-8

Latitude: 34.0485° Longitude: -93.1068°



25809 I 30  
 Bryant, AR

CPT Started: 4/30/2025  
 CPT Completed: 4/30/2025



CPT Terminated at 20.1 Feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 11.5 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

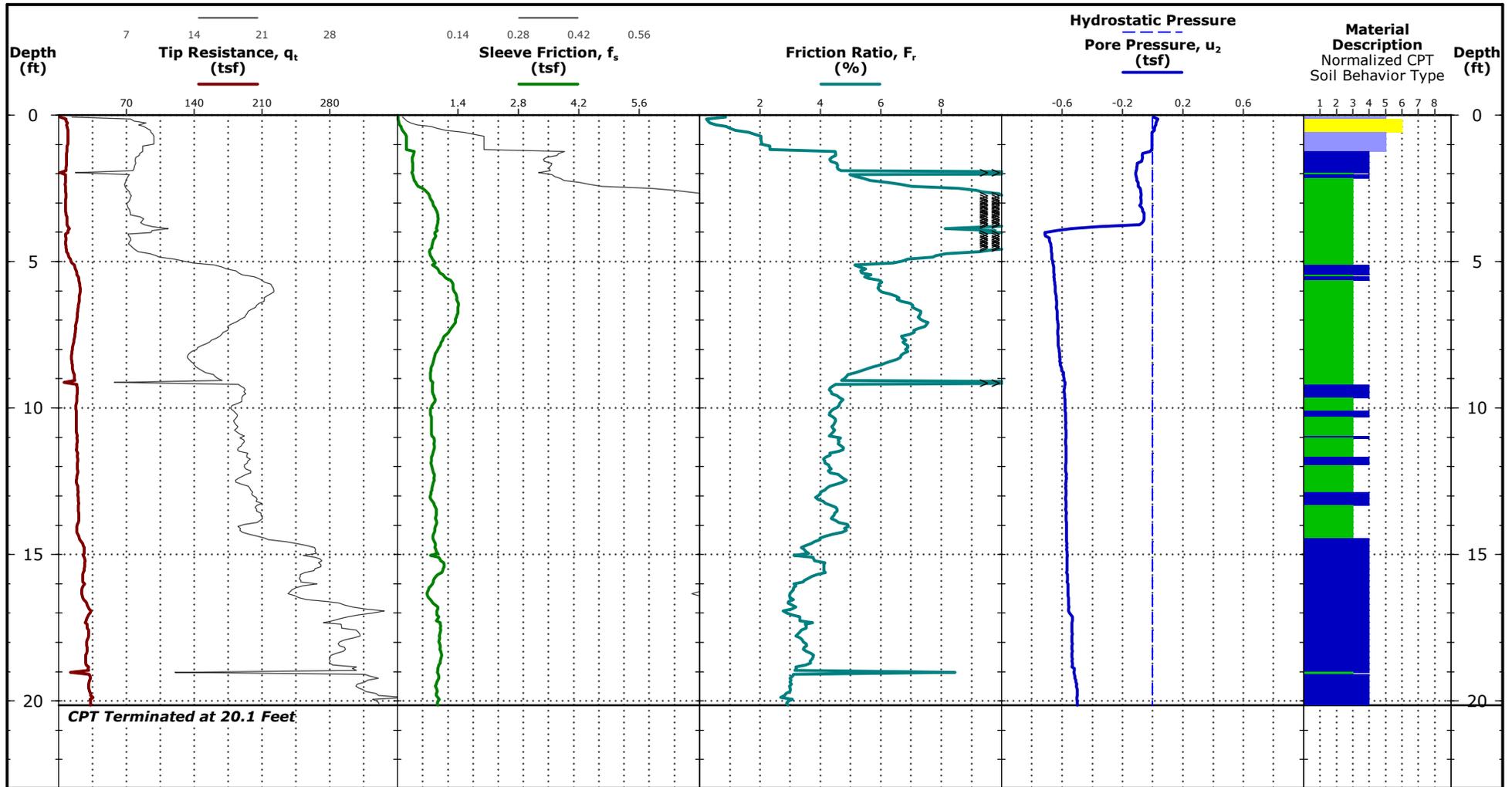
# CPT Sounding ID CPT-9

Latitude: 34.0456° Longitude: -93.1094°



25809 I 30  
 Bryant, AR

CPT Started: 5/1/2025  
 CPT Completed: 5/1/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

# CPT Sounding ID CPT-10

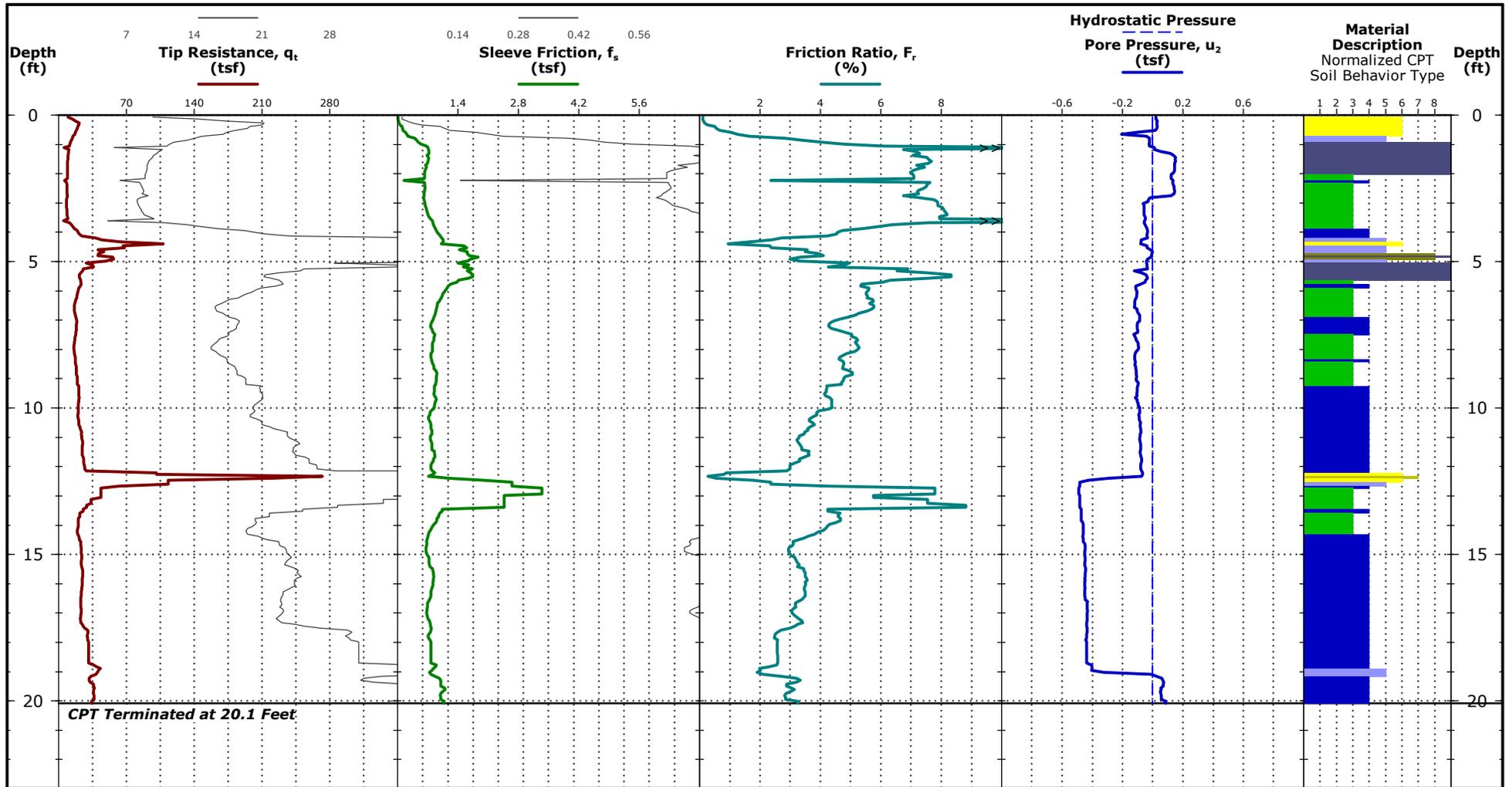
Latitude: 34.0447° Longitude: -93.1049°



25809 I 30  
 Bryant, AR

CPT Started: 4/30/2025

CPT Completed: 4/30/2025



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data, if any.  
 See [Supporting Information](#) for explanation of symbols and abbreviations.

**Notes**

Test Location: See [Exploration Plan](#)

**CPT Equipment**

CPT Rig: 1244  
 Operator: JMP  
 CPT sensor calibration reports available upon request  
 Probe No. 5903 with net area ratio of 0.829  
 Manufactured by Geotech A.B.- Calibrated 1/2/2023  
 Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>

**Water Level Observation**

▼ 25 ft estimated water depth  
 (used in normalizations and correlations)

**Normalized Soil Behavior Type (Robertson 1990)**

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

# BORING LOG NO. BH-11

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.113747°  Surface Elev.: 274 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
	<b>FAT CLAY (CH)</b> , reddish-brown and brown, medium stiff  <b>FAT CLAY (CH)</b> , reddish-brown, brown and gray, stiff	5.0		X	0-2-2 N=4	4000 (HP)				25		110-23-87		
		5		X	2-3-5 N=8	4000 (HP)				34				
		5		■			4000 (HP)				26	88	76-21-54	91
		5		X	3-5-6 N=11	6000 (HP)				32				
		10		■			9000 (HP)				29	90	85-21-64	95
		10		X	3-5-8 N=13	9000 (HP)				29				
		15		X	4-6-8 N=14	9000 (HP)				32		92-22-70		
		20		X	4-6-7 N=13	9000 (HP)				34				
25		X	5-6-8 N=14	9000 (HP)				30						
28.5	28.5													

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10ft; Wash bore with 3 7/8" drag bit from 10 ft to 79.5 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes: Bulk Sample BH-11: 1 to 3 feet
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	<p>25809 I 30 Bryant, AR</p>	Boring Started: 4/10/2016 Boring Completed: 4/10/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-11

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.113747°  Surface Elev.: 274 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Hatched Area]	[REDACTED] <b>FAT CLAY (CH)</b> , brown and dark gray, very stiff to hard	30		X	6-7-9 N=16	9000 (HP)				34		94-24-70	
		35		X	7-9-15 N=24	9000 (HP)				30			
		40		X	12-15-22 N=37	9000 (HP)				28		89-27-62	
		45		X	10-15-19 N=34	9000 (HP)				28			
		50		X	12-13-17 N=30	9000 (HP)				28			
		55		X	13-15-25 N=40	9000 (HP)				28			

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10ft; Wash bore with 3 7/8" drag bit from 10 ft to 79.5 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	25809 I 30 Bryant, AR	Boring Started: 4/10/2016 Boring Completed: 4/10/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-11

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.113747° Surface Elev.: 274 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH ELEVATION (Ft.)												
	<b>FAT CLAY (CH)</b> , brown and dark gray, very stiff to hard <i>(continued)</i>												
		60		X	13-17-23 N=40	9000 (HP)			28				
		65		X	18-19-24 N=43	9000 (HP)			24				
		68.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, dark gray, very dense												
		70		X	32-50/5"				28		36-30-6	20	
		75		X	50/4"				42				
		78.5											
	<b>SILTY SAND (SM)</b> , fine grained, gray, very dense												
		79.7		X	22-42-50/2"				28			16	
	<b>Boring Terminated at 79.7 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10ft; Wash bore with 3 7/8" drag bit from 10 ft to 79.5 ft

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

Water level not determined



25809 I 30  
Bryant, AR

Boring Started: 4/10/2016

Boring Completed: 4/10/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-12

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043133° Longitude: -93.117703° Surface Elev.: 293 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH ELEVATION (Ft.)													
<div style="display: flex; flex-direction: column; align-items: center; justify-content: center;"> <div style="width: 100%; text-align: center;"> <p><b>FAT CLAY (CH)</b>, brown and gray, soft to medium stiff</p> </div> <div style="display: flex; width: 100%; justify-content: space-between;"> <span>2.0</span> <span>291</span> </div> <hr/> <div style="width: 100%; text-align: center;"> <p><b>FAT CLAY (CH)</b>, mottled light gray and brown, medium stiff to stiff</p> </div> <div style="display: flex; width: 100%; justify-content: space-between;"> <span>5.0</span> <span>288</span> </div> <hr/> <div style="width: 100%; text-align: center;"> <p><b>FAT CLAY (CH)</b>, brown to olive-brown, medium stiff to stiff</p> </div> <div style="display: flex; width: 100%; justify-content: space-between;"> <span>8.5</span> <span>284.5</span> </div> <hr/> <div style="width: 100%; text-align: center;"> <p><b>FAT CLAY (CH)</b>, brown and gray, stiff</p> </div> <div style="display: flex; width: 100%; justify-content: space-between;"> <span>10</span> <span></span> </div> <hr/> <div style="width: 100%; text-align: center;"> <p><b>FAT CLAY (CH)</b>, gray and brown, very stiff</p> </div> <div style="display: flex; width: 100%; justify-content: space-between;"> <span>23.5</span> <span>269.5</span> </div> </div>				X	0-2-2 N=4								
							3000 (HP)						
					X	3-4-4 N=8	5500 (HP)						
					X	3-6-7 N=13	6000 (HP)						
					X	3-5-7 N=12	8000 (HP)						
					X	4-6-9 N=15	9000 (HP)						

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 78.5 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:  Bulk Sample BH-12: 1 to 3 feet
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	<p style="font-size: small;">25809   30 Bryant, AR</p>	Boring Started: 3/30/2016 Boring Completed: 3/30/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-12

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043133° Longitude: -93.117703° Surface Elev.: 293 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , gray and brown, very stiff <i>(continued)</i>	30		X	5-7-12 N=19	9000 (HP)							
		33.5											
	<b>FAT CLAY (CH)</b> , gray to dark gray, hard	35		X	9-13-17 N=30	9000 (HP)							
		43.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, dark gray, medium dense to dense	45		X	7-7-7 N=14	6000 (HP)							
		50		X	13-20-27 N=47	9000 (HP)							
		55		X	50/5"								

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 78.5 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b>		
<i>Water level not determined</i>		
	25809 I 30 Bryant, AR	Boring Started: 3/30/2016 Boring Completed: 3/30/2016
		Drill Rig: Acker Renegade #679 Driller: TF
		Project No.: 35165046 Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-12

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043133° Longitude: -93.117703°  Surface Elev.: 293 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Hatched Pattern]	<b>CLAYEY SAND (SC)</b> , fine grained, dark gray, medium dense to dense <i>(continued)</i>	60		X	23-9-18 N=27	9000 (HP)							
[Dotted Pattern]	<b>SILTY SAND (SM)</b> , fine to coarse grained, gray, very dense	65		X	25-32-44 N=76	9000 (HP)							
[Dotted Pattern]		70		X	15-28-50/4"								
[Dotted Pattern]		75		X	12-25-50/2"								
	<b>Boring Terminated at 78.6 Feet</b>	50/1"											

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 78.5 ft  Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
<b>WATER LEVEL OBSERVATIONS</b>		
<i>Water level not determined</i>	Boring Started: 3/30/2016	Boring Completed: 3/30/2016
	Drill Rig: Acker Renegade #679	Driller: TF
	Project No.: 35165046	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-13

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043133° Longitude: -93.117702° Surface Elev.: 292 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
	DEPTH ELEVATION (Ft.)													
	<b>FAT CLAY (CH)</b> , mottled brown, red and light gray, stiff	2.0	290	X	3-4-5 N=9	2500 (HP)				34				
	<b>FAT CLAY WITH SAND (CH)</b> , brown and light gray, very soft to soft	5.0	287	X	0-0-3 N=3									
	<b>FAT CLAY (CH)</b> , brown, stiff to very stiff			5	X	3-5-7 N=12	5500 (HP)			30				
				10	X	5-6-10 N=16	9000 (HP)			29				
				15						40	78	79-23-56	81	
	<b>FAT CLAY (CH)</b> , brown, hard	18.5	273.5	20	X	6-7-25 N=32	9000 (HP)			30		87-22-65		
<b>FAT CLAY (CH)</b> , brown, stiff	23.5	268.5	25	X	4-5-7 N=12	7500 (HP)			35		95-25-70			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

Water level not determined



25809 | 30  
Bryant, AR

Boring Started: 4/5/2016

Boring Completed: 4/5/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-13

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043133° Longitude: -93.117702° Surface Elev.: 292 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , brown, stiff (continued)	30		X	4-6-8 N=14	7000 (HP)				33			
		33.5	258.5										
	<b>FAT CLAY (CH)</b> , gray to dark gray, very stiff to hard	35		X	10-13-17 N=30	9000 (HP)				31			
		40		X	7-13-16 N=29	9000 (HP)				29			
		45		X	10-12-18 N=30	9000 (HP)				29			
		50		X	10-15-20 N=35	9000 (HP)				29			
	55		X	10-15-21 N=36	9000 (HP)				28				

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	25809 I 30 Bryant, AR	Boring Started: 4/5/2016 Boring Completed: 4/5/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-13

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043133° Longitude: -93.117702° Surface Elev.: 292 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , gray to dark gray, very stiff to hard (continued)	60		X	11-11-11 N=22	9000 (HP)				24			
	<b>CLAYEY SAND (SC)</b> , dark gray, dense	65		X	12-17-24 N=41					33		47	
	<b>SILTY SAND (SM)</b> , gray, very dense	70		X	50/6"					31		23	
		75		X	50/6"								
		78.9		X	50/5"								
<b>Boring Terminated at 78.9 Feet</b>													

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	 25809 I 30 Bryant, AR	Boring Started: 4/5/2016 Drill Rig: Acker Renegade #679 Project No.: 35165046
		Boring Completed: 4/5/2016 Driller: TF Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-14

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043552° Longitude: -93.117702° Surface Elev.: 293 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
<div style="display: flex; justify-content: space-between; padding: 5px;"> <span>3.5</span> <span>289.5</span> </div> <p style="text-align: center;"><b>FAT CLAY (CH)</b>, brown, very soft to soft</p>					0-0-0 N=0				34		71-22-49		
					0-0-2 N=2				30		71-20-51		
			5		3-4-4 N=8	1000 (HP)			36				
					3-3-4 N=7	3500 (HP)			37		91-18-73		
			10		4-4-5 N=9	5500 (HP)			35				
			15		4-5-6 N=11	6000 (HP)			36				
			20		4-5-8 N=13	7000 (HP)			36				
			25		5-6-8 N=14	8000 (HP)			34		97-27-70		
	olive-brown and gray												
	<span>28.5</span> <span>264.5</span>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80 ft

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

Water level not determined



25809 | 30  
Bryant, AR

Boring Started: 4/1/2016

Boring Completed: 4/1/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-14

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043552° Longitude: -93.117702°  Surface Elev.: 293 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , gray, very stiff to hard	30		X	5-8-11 N=19								
		35		X	9-12-24 N=36	9000 (HP)			29				
		40		X	13-15-20 N=35	9000 (HP)							
		45		X	5-7-15 N=22	9000 (HP)							
	48.5	48.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, dark gray, dense to very dense	50		X	16-17-24 N=41				30				
		55		X	10-18-24 N=42				40				

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> <i>Water level not determined</i>		Boring Started: 4/1/2016 Drill Rig: Acker Renegade #679 Project No.: 35165046
	25809 I 30 Bryant, AR	Boring Completed: 4/1/2016 Driller: TF Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-14

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043552° Longitude: -93.117702°  Surface Elev.: 293 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<p><b>CLAYEY SAND (SC)</b>, fine grained, dark gray, dense to very dense (<i>continued</i>)</p>	60			10-20-50/5"				27				
		65			19-24-34 N=58			39					
		68.5			21-50/6"								
		70			33-33-50/5"								
		75			25-22-50/5"								
	<p><b>SILTY SAND (SM)</b>, fine grained, gray, very dense</p>	79.9											
	<b>Boring Terminated at 79.9 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b>		
<i>Water level not determined</i>	25809   30 Bryant, AR	
	Boring Started: 4/1/2016	Boring Completed: 4/1/2016
	Drill Rig: Acker Renegade #679	Driller: TF
	Project No.: 35165046	Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-16

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and AR Hwy 26**  
**Arkadelphia, Arkansas** **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043553° Longitude: -93.114947° Surface Elev.: 280 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , brown and reddish-brown, very soft	2.0		X	0-0-0 N=0	4000 (HP)				28			
	<b>FAT CLAY WITH SAND (CH)</b> , reddish-brown and gray, medium stiff to stiff	5.0		X	4-5-6 N=11	2000 (HP)				48	77-17-60	85	
			5		X	0-2-3 N=5	3000 (HP)			43			
	<b>FAT CLAY (CH)</b> , light brown and gray, stiff to very stiff		5		X	4-6-7 N=13	5500 (HP)			24			
			10		X	6-7-8 N=15				58			
			15		X	6-6-10 N=16				52			
			20		X	5-7-8 N=15				60			
			25		X	5-9-11 N=20	3000 (HP)						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79.5 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS	
	46.5 ft at 48 hours after completion
	65.7 ft



Boring Started: 3/29/2016	Boring Completed: 3/29/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-16

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043553° Longitude: -93.114947°  Surface Elev.: 280 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 20px; background-color: #d4edda; margin-right: 5px;"></div> <div style="font-size: 8px; margin-left: 5px;">33.5</div> </div>	<b>FAT CLAY (CH)</b> , light brown and gray, stiff to very stiff ( <i>continued</i> )	30		X	5-8-14 N=22	3000 (HP)							
			35		X	6-9-12 N=21	9000 (HP)						
			40		X	9-11-18 N=29	5000 (HP)		29		91-26-65	99	
			45	▽	X	10-15-20 N=35							
			50		X	10-15-19 N=34							
			55		X	10-13-19 N=32	8000 (HP)						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79.5 ft

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
▽ 46.5 ft at 48 hours after completion
65.7 ft



Boring Started: 3/29/2016	Boring Completed: 3/29/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-16

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043553° Longitude: -93.114947°  Surface Elev.: 280 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard <i>(continued)</i>	60		X	11-16-24 N=40	9000 (HP)							
		65		X	10-15-19 N=34								
		68.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, gray, very dense	70		X	25-50/4"								
		75		X	40-50/3"								
	<b>SILTY SAND (SM)</b> , fine grained, gray	79.3		X	20-50/4"				41		34-16-18	25	
	<b>Boring Terminated at 79.3 Feet</b>	200.5											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79.5 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

46.5 ft at 48 hours after completion

65.7 ft



25809 I 30  
Bryant, AR

Boring Started: 3/29/2016

Boring Completed: 3/29/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-18

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.044956° Longitude: -93.116289° Surface Elev.: 281 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
<div style="display: flex; justify-content: space-between;"> <span>3.5</span> <span>277.5</span> </div> <p><b>FAT CLAY (CH)</b>, reddish-brown and brown, medium stiff to stiff with large well-rounded gravel</p> <div style="display: flex; justify-content: space-between;"> <span>5</span> <span>272.5</span> </div> <p><b>FAT CLAY (CH)</b>, gray and reddish-brown, brown, stiff</p> <div style="display: flex; justify-content: space-between;"> <span>8.5</span> <span>272.5</span> </div> <p><b>FAT CLAY (CH)</b>, with thin sand seams, light brown and gray, stiff to very stiff, blocky fracture</p> <div style="display: flex; justify-content: space-between;"> <span>10</span> <span></span> </div> <div style="display: flex; justify-content: space-between;"> <span>15</span> <span></span> </div> <div style="display: flex; justify-content: space-between;"> <span>20</span> <span></span> </div> <div style="display: flex; justify-content: space-between;"> <span>25</span> <span></span> </div> <div style="display: flex; justify-content: space-between;"> <span>28.5</span> <span>252.5</span> </div>					0-3-3 N=6	5000 (HP)				24			
						3-4-5 N=9	5000 (HP)				24		
						3-3-6 N=9	5000 (HP)				36		
						5-7-7 N=14	5000 (HP)				34	104-20-84	
						4-6-8 N=14	9000 (HP)				28		
						5-6-9 N=15	9000 (HP)				33		
						6-6-7 N=13	9000 (HP)				34		
						6-6-7 N=13	9000 (HP)						

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79 ft

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

**Notes:**  
Bulk Sample BH-18: 1 to 3 feet

WATER LEVEL OBSERVATIONS
<i>Water level not determined</i>

25809 | 30  
Bryant, AR

Boring Started: 3/24/2016	Boring Completed: 3/24/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-18

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.044956° Longitude: -93.116289° Surface Elev.: 281 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , with gypsum crystals, brown and gray, very stiff  33.5 247.5  <b>FAT CLAY (CH)</b> , dark gray, very stiff to hard  48.5 232.5  <b>CLAYEY SAND (SC)</b> , dark gray, dense to very dense	30		X	5-6-7 N=13	9000 (HP)							
		35		X	6-9-13 N=22	9000 (HP)							
		40		X	11-13-18 N=31	9000 (HP)							
		45		X	13-15-18 N=33	4000 (HP)							
		50		X	9-14-24 N=38								
		55		X	40-50/5"							19	

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined		Boring Started: 3/24/2016 Boring Completed: 3/24/2016
	25809 I 30 Bryant, AR	Drill Rig: Acker Renegade #679 Driller: TF
42 ft		Project No.: 35165046 Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - ALL TESTING GPJ

# BORING LOG NO. BH-18

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.044956° Longitude: -93.116289° Surface Elev.: 281 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Pattern]	<b>CLAYEY SAND (SC)</b> , dark gray, dense to very dense <i>(continued)</i>	58.5		X	42-50/3"								
[Pattern]	<b>SILTY CLAY (SM)</b> , fine grained, dark gray, very dense	60		X	50/4"								
[Pattern]		65		X	50/6"								
[Pattern]		70		X	18-36-50/4"								
[Pattern]		75		X	50/6"								
[Pattern]	<b>Boring Terminated at 79 Feet</b>	79.0		X	50/6"								
Stratification lines are approximate. In-situ, the transition may be gradual.													Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79 ft

See Exhibit A-3 for description of field procedures.

**Notes:**

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
<i>Water level not determined</i>
42 ft



Boring Started: 3/24/2016	Boring Completed: 3/24/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-19

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.044956° Longitude: -93.114947°  Surface Elev.: 276 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
	<b>FAT CLAY (CH)</b> , reddish-brown and gray, medium stiff to stiff  <b>FAT CLAY (CH)</b> , brown and gray, stiff to very stiff, blocky fracture  very stiff to hard below 13 feet	5.0		X	1-2-3 N=5	4000 (HP)				36				
		5					4000 (HP)				26	54-14-40	87	
		5					3000 (HP)	UC	1897	11	34	86	112-18-94	97
		10		X	3-4-6 N=10	9000 (HP)					29			
		10		X	5-6-10 N=16						27			
		15					9000 (HP)				28			
		15		X	5-5-8 N=13	9000 (HP)					31			
		20		X	4-6-8 N=14	9000 (HP)					34			
25		X	5-6-9 N=15	9000 (HP)										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
<i>Water level not determined</i>
16 ft



Boring Started: 3/24/2016	Boring Completed: 3/24/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ



# BORING LOG NO. BH-19

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.044956° Longitude: -93.114947°  Surface Elev.: 276 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard <i>(continued)</i>	60		X	13-16-24 N=40	9000 (HP)							
		63.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, gray to dark gray, very dense	65		X	8-17-50/4"								
		70		X	18-50/4"								
		75		X	23-50/2"								
		79.7		X	28-28-50/2"								
	<b>Boring Terminated at 79.7 Feet</b>	196.5											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 80 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Water level not determined*



25809 I 30  
Bryant, AR

Boring Started: 3/24/2016

Boring Completed: 3/24/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-20

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.046364° Longitude: -93.114947°  Surface Elev.: 273 (Ft.)  DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
<div style="text-align: center; padding: 5px;"> <p><b>FAT CLAY (CH)</b>, reddish-brown and gray, soft to medium stiff</p> <p>stiff</p> <p>brown and gray, very stiff</p> </div>													
					0-2-2 N=4	4500 (HP)			29				
					3-3-4 N=7	4000 (HP)			33				
					4-4-4 N=8	4000 (HP)			34				
					1-5-6 N=11	5500 (HP)			31				
					5-8-9 N=17	9000 (HP)			28				
					3-4-6 N=10	6000 (HP)			36		96-23-73		
				5-6-8 N=14	8500 (HP)			31					
				6-6-9 N=15	9000 (HP)								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79 ft

See Exhibit A-3 for description of field procedures.

Notes:

Bulk Sample BH-20: 1 to 3 feet

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

50 ft After One Day

69.5 ft After One Day



25809 | 30  
Bryant, AR

Boring Started: 3/23/2016

Boring Completed: 3/23/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-20

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.046364° Longitude: -93.114947°  Surface Elev.: 273 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , blocky, light brown to brown, stiff to very stiff ( <i>continued</i> )	30		X	6-6-10 N=16	9000 (HP)							
	brown and gray	35		X	6-6-10 N=16	8000 (HP)							
	38.5	40		X	12-13-17 N=30	9000 (HP)							
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard	45		X	13-14-20 N=34	9000 (HP)							
		50	▽	X	15-15-23 N=38	9000 (HP)							
		55		X	18-15-24 N=39	9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
▽ 50 ft After One Day
[Symbol] 69.5 ft After One Day



Boring Started: 3/23/2016	Boring Completed: 3/23/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-20

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.046364° Longitude: -93.114947° Surface Elev.: 273 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
	DEPTH ELEVATION (Ft.)												
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard <i>(continued)</i>	58.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, gray, very dense	60		X	15-28-40 N=68								
		65		X	50/4"								
		70		X	50/6"								
		75		X	50/6"								
	<b>SILTY SAND (SM)</b> , fine grained, gray, very dense <b>Boring Terminated at 79.4 Feet</b>	78.5 79.4		X	40-50/5"								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 79 ft

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

50 ft After One Day

69.5 ft After One Day



25809 I 30  
Bryant, AR

Boring Started: 3/23/2016

Boring Completed: 3/23/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-22

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.116288°  Surface Elev.: 275 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
DEPTH		ELEVATION (Ft.)												
	2.0	273		X	0-0-2 N=2	3000 (HP)				32				
	<b>FAT CLAY WITH GRAVEL (CH)</b> , brown, soft													
			5		X	2-3-3 N=6	2000 (HP)				48			
					■		3000 (HP)				31	101-26-75	78	
					X	3-4-6 N=10	6000 (HP)				35			
	- gypsum crystals present													
			10		X	4-6-6 N=12	9000 (HP)				29			
				■		9000 (HP)				36	83	97-34-63		
		15		X	3-6-7 N=13	9000 (HP)				37				
				■		9000 (HP)				39				
		20												
		23.5												
		25		X	3-7-9 N=16	9000 (HP)				32				
<b>FAT CLAY (CH)</b> , with iron staining, brown and dark gray, very stiff to hard														

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

Water level not determined



25809 I 30  
Bryant, AR

Boring Started: 4/8/2016

Boring Completed: 4/8/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-22

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.116288°  Surface Elev.: 275 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , with iron staining, brown and dark gray, very stiff to hard <i>(continued)</i>	30		X	6-11-15 N=26	9000 (HP)				27			
		35		X	11-15-19 N=34					26			
		40		X	11-14-27 N=41					29			
		43.5	231.5										
	<b>CLAYEY SAND (SC)</b> , fine grained, dark gray, very dense	45		X	24-28-32 N=60					23			
		48.5	226.5										
	<b>SILTY SAND (SM)</b> , fine grained, gray, very dense	49.9	225	X	22-38-50/5"								
	<b>Boring Terminated at 49.9 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Water level not determined</i>



Boring Started: 4/8/2016	Boring Completed: 4/8/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-23

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.114947° Surface Elev.: 272 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES		
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)						
	<b>FAT CLAY (CH)</b> , reddish-brown, brown and gray, medium stiff  - with sand at about 5 feet  <b>FAT CLAY (CH)</b> , brown and gray, stiff  - with gypsum crystals and iron staining	5				5000 (HP)				18	99	66-26-40	91		
					X	2-3-4 N=7	5000 (HP)				31				
								8000 (HP)				24	94	90-22-68	78
		8.5	263.5												
				10		X	4-4-6 N=10	9000 (HP)				28		89-24-65	94
				15		X	4-5-6 N=11	9000 (HP)				35			
		20		X	4-5-6 N=11	9000 (HP)				35					
		25		X	5-6-7 N=13	9000 (HP)				33					
28.5	243.5														

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	<p>25809   30 Bryant, AR</p>	Boring Started: 4/8/2016
		Boring Completed: 4/8/2016
		Drill Rig: Acker Renegade #679
		Driller: TF
		Project No.: 35165046
		Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-23

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.039075° Longitude: -93.114947°  Surface Elev.: 272 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard	30		X	4-7-9 N=16	9000 (HP)				31			
		35		X	9-12-17 N=29	9000 (HP)				28			
		40		X	11-14-18 N=32	9000 (HP)				29			
		45		X	11-15-17 N=32	9000 (HP)				29			
		50		X	12-16-27 N=43	9000 (HP)				22			
	<b>Boring Terminated at 50 Feet</b>	50											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Water level not determined</i>



Boring Started: 4/8/2016	Boring Completed: 4/8/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-25

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041453° Longitude: -93.116289° Surface Elev.: 289 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH	ELEVATION (Ft.)												
5.0	<b>FAT CLAY (CH)</b> , brown, soft to medium stiff	284											
8.5	<b>FAT CLAY (CH)</b> , olive-brown and gray, stiff	280.5		X	3-4-6 N=10								
23.5	<b>FAT CLAY (CH)</b> , brown and gray, stiff to very stiff	265.5		X	3-4-5 N=9								
23.5	<b>FAT CLAY (CH)</b> , with gypsum crystals, gray and brown, stiff to very stiff	265.5		X	0-9-12 N=21								
23.5	<b>FAT CLAY (CH)</b> , with gypsum crystals, gray and brown, stiff to very stiff	265.5		X	4-6-7 N=13								
23.5	<b>FAT CLAY (CH)</b> , with gypsum crystals, gray and brown, stiff to very stiff	265.5		X	4-5-8 N=13								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft

See Exhibit A-3 for description of field procedures.

Notes:

Bulk Sample BH-25: 1 to 3 feet

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

Water level not determined



25809 I 30  
Bryant, AR

Boring Started: 3/30/2016

Boring Completed: 3/30/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-25

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041453° Longitude: -93.116289° Surface Elev.: 289 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Green Hatched Area]	[REDACTED]	30		X	5-6-9 N=15								
		33.5	255.5										
		35		X	7-12-17 N=29								
		40		X	10-12-17 N=29								
		45		X	10-12-14 N=26								
		50		X	12-17-19 N=36								
	<b>Boring Terminated at 50 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	25809 I 30 Bryant, AR	Boring Started: 3/30/2016
		Boring Completed: 3/30/2016
		Drill Rig: Acker Renegade #679
		Drillers: TF
		Project No.: 35165046
		Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-29

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.046364° Longitude: -93.117703° Surface Elev.: 270 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
<div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-left: 5px;">THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_35165046 - ALL TESTING.GPJ</div>	<b>FAT CLAY (CH)</b> , reddish-brown and brown, medium stiff	2.0		X	1-3-3 N=6	6000 (HP)				33		86-16-70		
	<b>FAT CLAY (CH)</b> , reddish-brown and brown, very soft	3.5		X	0-0-0 N=0	3500 (HP)				30 26				
	<b>FAT CLAY (CH)</b> , reddish-brown, brown and gray, stiff to very stiff  brown and gray, very stiff to stiff	5		X	4-4-6 N=10	5000 (HP)				30				
		5		X	6-7-9 N=16	7000 (HP)				30				
			10		X	5-6-8 N=14	8000 (HP)				33			
			15		X	3-5-6 N=11	7500 (HP)				39			
	- with gypsum crystals		20		X	3-4-7 N=11	8000 (HP)				37			
		23.5			X	4-4-14 N=18	8000 (HP)							
<b>FAT CLAY (CH)</b> , with silty sand lenses, dark gray to gray, very stiff	28.5	241.5		X										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Water level not determined*



25809 I 30  
Bryant, AR

Boring Started: 3/22/2016

Boring Completed: 3/22/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-15

6.8 ft After One Day

# BORING LOG NO. BH-29

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.046364° Longitude: -93.117703° Surface Elev.: 270 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>CLAYEY SAND (SC)</b> , fine grained, brown to gray, very dense	30		X	45-50/4"						38-15-23	22	
	<b>SILTY SAND (SM)</b> , trace clay seams, medium grained, gray, very dense	35		X	38-50/6"								
	<b>CLAYEY SAND (SC)</b> , fine grained, gray, dense	40		X	13-18-24 N=42								
	<b>SILTY SAND (SM)</b> , medium grained, gray, very dense	45		X	21-41-50/5"								
	<b>CLAYEY SAND (SC)</b> , medium grained, gray, very dense	50		X	10-18-36 N=54								
	<b>Boring Terminated at 50 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 50 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	25809 I 30 Bryant, AR	Boring Started: 3/22/2016 Boring Completed: 3/22/2016
6.8 ft After One Day		Drill Rig: Acker Renegade #679 Driller: TF
		Project No.: 35165046 Exhibit: A-15

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-31

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.047631° Longitude: -93.116288°  Surface Elev.: 275 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Hatched Area]	[REDACTED]	5		[REDACTED]	0-2-3 N=5	3000 (HP)				27		60-28-32	78
						4000 (HP)				30			
[Hatched Area]	[REDACTED]	8.5		[REDACTED]		6000 (HP)				26			
						6000 (HP)							
[Hatched Area]	[REDACTED]	10		[REDACTED]	4-7-8 N=15	9000 (HP)				29			
[Hatched Area]	[REDACTED]	15		[REDACTED]		9000 (HP)				36	81	93-19-74	94
[Hatched Area]	[REDACTED]	20		[REDACTED]	5-6-8 N=14	9000 (HP)				34			
[Hatched Area]	[REDACTED]	25		[REDACTED]	4-6-7 N=13	9000 (HP)				33			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 49 ft

See Exhibit A-3 for description of field procedures.

Notes:

Bulk Sample BH-31: 1 to 3 feet

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Water level not determined</i>



Boring Started: 4/4/2016	Boring Completed: 4/4/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-31

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.047631° Longitude: -93.116288° Surface Elev.: 275 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , gray, light brown to dark brown, stiff to very stiff <i>(continued)</i>	30		X	5-6-9 N=15	9000 (HP)				36			
		35		X	8-11-19 N=30	9000 (HP)				28			
	<b>CLAYEY SAND (SC)</b> , dark gray, dense	38.5 236.5		X	7-13-17 N=30					30			35
	<b>SILTY SAND (SM)</b> , dark gray, very dense	43.5 231.5		X	39-50/4"					27			20
	<b>Boring Terminated at 48.9 Feet</b>	48.9 226		X	50/5"								

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 49 ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Water level not determined	 <p>25809   30 Bryant, AR</p>	Boring Started: 4/4/2016 Boring Completed: 4/4/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-33

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.048897° Longitude: -93.117703° Surface Elev.: 268 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH ELEVATION (Ft.)													
	<b>FAT CLAY (CH)</b> , with organics, reddish-brown and brown, medium stiff	2.0 - 266		X	0-3-3 N=6	3000 (HP)				33			
	<b>FAT CLAY (CH)</b> , with coarse gravel, brown, soft to medium stiff	5.0 - 263		X	1-2-3 N=5					17			
	<b>FAT CLAY (CH)</b> , gray and reddish-brown, soft	7.5 - 260.5		X	0-0-2 N=2	4000 (HP)				35			
	<b>FAT CLAY (CH)</b> , blocky, with fine gravel, gray, very stiff to hard	8.5 - 259.5		X	5-7-9 N=16	9000 (HP)				28			
	<b>FAT CLAY (CH)</b> , with gypsum crystals and iron staining, gray and brown, very stiff to stiff	10.0 - 259.5		X		9000 (HP)				31	68-19-49	31	
	<b>FAT CLAY (CH)</b> , with silty sand seams and iron staining, gray and brown, stiff	15.0 - 249.5		X	4-5-6 N=11	9000 (HP)				36			
	<b>FAT CLAY (CH)</b> , with silty sand seams and iron staining, gray and brown, stiff	20.0 - 244.5		X	3-5-5 N=10	9000 (HP)				36			
	<b>SANDY FAT CLAY (CH)</b> , some silt, gray, very stiff	23.5 - 244.5		X	4-5-14 N=19	9000 (HP)							
		28.5 - 239.5	▽										

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 4 1/4" Hollow stem auger to 10ft; Wash bore with 3 7/8" drag bit from 10ft to 50ft	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> ▽ 26 ft at 72 hours after completion	<p>25809 I 30 Bryant, AR</p>	Boring Started: 3/18/2016 Boring Completed: 3/22/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-17
40 ft 72 hours after completion		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-33

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.048897° Longitude: -93.117703°  Surface Elev.: 268 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<p><b>CLAYEY SAND (SC)</b>, fine grained, gray, dense to very dense</p>	30		X	9-37-50/5"								
		35		X	40-30-30 N=60						47-14-33	35	
		40		X	20-23-27 N=50								
		45		X	20-21-42 N=63								
		50		X	22-22-27 N=49								
<p><b>Boring Terminated at 50 Feet</b></p>		50											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10ft; Wash bore with 3 7/8" drag bit from 10ft to 50ft

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

26 ft at 72 hours after completion

40 ft 72 hours after completion



25809 I 30  
Bryant, AR

Boring Started: 3/18/2016

Boring Completed: 3/22/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-36

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and AR Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.049858° Longitude: -93.116289° Surface Elev.: 280 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH	ELEVATION (Ft.)												
	<b>LEAN CLAY WITH SAND (CL)</b> , reddish-brown and brown, soft to medium stiff												
		3.5			0-0-3 N=3					37		42-19-23	
	<b>FAT CLAY (CH)</b> , reddish-brown and brown, soft to medium stiff									38		87-15-72	95
		5			1-3-4 N=7					37			
		8.5											
	<b>FAT CLAY (CH)</b> , blocky, gray, stiff												
		10			5-6-8 N=14					32			
		15			4-4-4 N=8					35			
		20			5-6-6 N=12					35			
		25			4-4-6 N=10								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 49 ft

See Exhibit A-3 for description of field procedures.

Notes:

Bulk Sample BH-36: 1 to 3 feet

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Water level not determined*



25809 I 30  
Bryant, AR

Boring Started: 3/17/2016

Boring Completed: 3/17/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-18

8 ft 12 hours after completion

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-36

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and AR Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.049858° Longitude: -93.116289° Surface Elev.: 280 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
	<b>FAT CLAY (CH)</b> , blocky, gray, stiff ( <i>continued</i> ) - with gypsum crystals at about 28.5 feet	30		X	4-5-6 N=11									
	<b>FAT CLAY (CH)</b> , gray, very stiff to hard	35		X	11-11-17 N=28									
		40		X	9-12-18 N=30									
	<b>CLAYEY SAND (SC)</b> , medium grained, gray, dense	45		X	7-17-26 N=43									
	<b>SILTY SAND (SM)</b> , medium grained, gray, very dense <b>Boring Terminated at 48.8 Feet</b>	50/4"		X	50/4"									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
4 1/4" Hollow stem auger to 10 ft; Wash bore with 3 7/8" drag bit from 10 ft to 49 ft

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Water level not determined*



25809 I 30  
Bryant, AR

Boring Started: 3/17/2016

Boring Completed: 3/17/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-18

8 ft 12 hours after completion

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - ALL TESTING.GPJ

# BORING LOG NO. BH-40

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043674° Longitude: -93.109908° Approximate Surface Elev: 251 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , brown to grayish-brown, soft to medium stiff  <b>FAT CLAY (CH)</b> , yellowish brown and light gray, stiff, blocky  - with gypsum crystals below about 18.5 feet	5		X	0-1-2 N=3								
		8.5		X	1-2-3 N=5	1000 (HP)					97-18-79		
		10		X	2-6-6 N=12	8000 (HP)					89-21-68		
		15			X	4-5-8 N=13	7000 (HP)				99-25-74		
		20			X	4-5-6 N=11	6000 (HP)						
		25											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.3 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft. Not observed to 30 ft. in offset boring	<p>25809 I 30 Bryant, AR</p>	Boring Started: 12/5/2016 Boring Completed: 1/3/2017  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-40

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043674° Longitude: -93.109908° Approximate Surface Elev: 251 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH 29.0 ELEVATION (Ft.) 222+/-												
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30		X	6-7-9 N=16	6000 (HP)							
		35		X	8-10-15 N=25	9000 (HP)							
		40		X	12-15-20 N=35	9000 (HP)							
		45		X	12-16-23 N=39	9000 (HP)							
		50		X	22-22-30 N=52	9000 (HP)							
	DEPTH 53.5 ELEVATION (Ft.) 197.5+/-												
	<b>CLAYEY SAND (SC)</b> , dark gray, dense to very dense	55		X	9-16-18 N=34	3500 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.3 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 12/5/2016	Boring Completed: 1/3/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-40

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.043674° Longitude: -93.109908°  Approximate Surface Elev: 251 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
	<p><b>CLAYEY SAND (SC)</b>, dark gray, dense to very dense <i>(continued)</i></p>	60		X	50/6"									
		65		X	50/5"									
		70		X	39-50/3"									
		75		X	39-50/4"									
		79.3	171.5+/-	X	30-50/4"									
<p><b>Boring Terminated at 79.3 Feet</b></p>														

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.3 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>

25809 | 30  
Bryant, AR

Boring Started: 12/5/2016	Boring Completed: 1/3/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-41

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.042539° Longitude: -93.109921°  Approximate Surface Elev: 266 (Ft.) +/- DEPTH _____ ELEVATION (Ft.) _____	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Green Hatched Area]	<b>FAT CLAY (CH)</b> , brown to grayish-brown, medium stiff to stiff	5		X	2-2-4 N=6	3000 (HP)					103-18-85		
		10		X	3-4-5 N=9	5000 (HP)							
		15			X	3-5-7 N=12	6000 (HP)					91-19-72	
		20			X	3-4-6 N=10	6000 (HP)						
		25											
	<b>FAT CLAY (CH)</b> , yellowish brown and light gray, stiff to very stiff, with gypsum crystals, blocky	13.5											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.4 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b>  Not observed while dry drilling to 10 ft.  Water was injected for wash boring below 10 ft.	 25809 I 30 Bryant, AR	Boring Started: 1/17/2017 Boring Completed: 1/17/2017  Drill Rig: Acker Renegade Driller: TF  Project No.: 35165046 Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-41

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.042539° Longitude: -93.109921°  Approximate Surface Elev: 266 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , yellowish brown and light gray, stiff to very stiff, with gypsum crystals, blocky ( <i>continued</i> )	30		X	3-8-10 N=18	7000 (HP)							
		33.5	232.5+/-		X	9-15-21 N=36	9000 (HP)					96-24-72	
			35		X	10-15-23 N=38	9000 (HP)						
			40		X	15-18-21 N=39	9000 (HP)						
			45		X	12-18-23 N=41	9000 (HP)						
			50		X	15-18-23 N=41	9000 (HP)						
		55		X									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.4 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.
Abandonment Method: Boring backfilled with soil cuttings upon completion.	
<b>WATER LEVEL OBSERVATIONS</b>	
<i>Not observed while dry drilling to 10 ft.</i>	
<i>Water was injected for wash boring below 10 ft.</i>	

25809 | 30  
Bryant, AR

Notes:	
Boring Started: 1/17/2017	Boring Completed: 1/17/2017
Drill Rig: Acker Renegade	Driller: TF
Project No.: 35165046	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-41

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.042539° Longitude: -93.109921°  Approximate Surface Elev: 266 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, hard, blocky <i>(continued)</i>	60		X	19-28-31 N=59								
		63.5											
	<b>CLAYEY SAND (SC)</b> , dark gray, medium dense to very dense	65		X	8-12-15 N=27								
		70		X	28-50/5"								
		75		X	34-50/5"								
		79.4		X	39-50/5"								
	<b>Boring Terminated at 79.4 Feet</b>	186.5+/-											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.4 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

*Not observed while dry drilling to 10 ft.*

*Water was injected for wash boring below 10 ft.*



Boring Started: 1/17/2017

Boring Completed: 1/17/2017

Drill Rig: Acker Renegade

Driller: TF

Project No.: 35165046

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-42

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas** **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.042542° Longitude: -93.108182°  Approximate Surface Elev: 240 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , grayish-brown to dark brown, medium stiff to very stiff, trace rootlets	5				7000 (HP)	UC	737	8	32	81		
		3-6-7 N=13		7000 (HP)					26				
		5					3000 (HP)	UC	4381	11.1	24	98	
		8.5		231.5+/-		2-3-2 N=5		3000 (HP)			40		
		15					6000 (HP)	UC	1135	3	33	85	
		20		4-8-10 N=18		6000 (HP)				32			
25		25.0		215+/-		8000 (HP)			46	76			
	<b>FAT CLAY (CH)</b> , yellowish brown and light gray, medium stiff to very stiff, with gypsum crystals, blocky												
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.5 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 1/4/2017  
Drill Rig: Acker Renegade #679  
Project No.: 35165046

Boring Completed: 1/5/2017  
Driller: TF  
Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-42

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.042542° Longitude: -93.108182° Approximate Surface Elev: 240 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Green Diagonal Hatching]	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky (continued)	30		X	8-9-14 N=23	9000 (HP)				30			
		35		X	8-13-15 N=28	9000 (HP)				32			
		40		X	11-15-23 N=38	9000 (HP)				29			
		45		X	11-14-15 N=29	9000 (HP)				28			
		48.5	191.5+/-		X	9-18-35 N=53					33		
[Yellow Diagonal Hatching]	<b>CLAYEY SAND (SC)</b> , dark gray, very dense	50		X	18-50/4"					31			
		55		X									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.5 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b>  Not observed while dry drilling to 10 ft.  Water was injected for wash boring below 10 ft.	 25809   30 Bryant, AR	Boring Started: 1/4/2017 Drill Rig: Acker Renegade #679 Project No.: 35165046
		Boring Completed: 1/5/2017 Driller: TF Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-42

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas** **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.042542° Longitude: -93.108182°  Approximate Surface Elev: 240 (Ft.) +/- DEPTH _____ ELEVATION (Ft.) _____	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				

	<b>CLAYEY SAND (SC)</b> , dark gray, very dense <i>(continued)</i>	60		X	16-31-50/6"					35		
		65		X	17-29-46 N=75					28		
		70		X	11-50/6"					44		
		75		X	31-50/5"					45		
		79.5		X	35-50/6"					24		

**Boring Terminated at 79.5 Feet**

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.5 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>



Boring Started: 1/4/2017	Boring Completed: 1/5/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-43

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041323° Longitude: -93.109906° Approximate Surface Elev: 257 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES		
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)						
	<b>FAT CLAY (CH)</b> , brown to grayish-brown, medium stiff to stiff  <b>FAT CLAY (CH)</b> , olive-brown, yellowish brown and light gray, medium stiff to stiff  - hard below about 23.5 feet	5.0			0-1-3 N=4	5000 (HP)				31		93-19-74			
						3-5-5 N=10	8000 (HP)				28		94-18-76		
								9000 (HP)				27	90		
							2-2-3 N=5	6000 (HP)				34		113-21-92	
								7000 (HP)				29	93		
							4-5-7 N=12	9000 (HP)				32			
					7-50/3"					30					
		28.5													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.4 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft.	25809 I 30 Bryant, AR	Boring Started: 12/6/2016 Boring Completed: 12/6/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-43

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041323° Longitude: -93.109906°  Approximate Surface Elev: 257 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30		X	7-10-14 N=24					30		95-22-73	
		35		X	12-14-17 N=31					30			
		40		X	14-15-22 N=37					29			
		45		X	10-16-21 N=37					27			
		50		X	9-15-23 N=38					29			
		55		X	12-15-24 N=39					28			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.4 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 12/6/2016

Boring Completed: 12/6/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-43

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041323° Longitude: -93.109906° Approximate Surface Elev: 257 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky (continued)	60			12-14-24 N=38				26				
	<b>CLAYEY SAND (SC)</b> , with fat clay seams, gray and dark gray, very dense	65			20-28-34 N=62				35				
	<b>CLAYEY SAND (SC)</b> , dark gray, very dense	70			47-50/4"				33			31	
		75			22-50/4"				28				
		79.4			23-50/5"				34				
	<b>Boring Terminated at 79.4 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.4 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

Not observed while dry drilling to 10 ft.

Water was injected for wash boring below 10 ft.



Boring Started: 12/6/2016

Boring Completed: 12/6/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ





# BORING LOG NO. BH-44

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041323° Longitude: -93.108199° Approximate Surface Elev. 244 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH ELEVATION (Ft.)												
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky <i>(continued)</i>	58.5											
	<b>SANDY FAT CLAY (CH)</b> , dark gray and gray, hard	60		X	14-14-27 N=41					35			
	<b>CLAYEY SAND (SC)</b> , gray, very dense	63.5		X	50/4"					34			
		65		X	50/5"					30			
		70		X	38-50/5"					39			
		75		X	50/6"					30			
	<b>Boring Terminated at 79 Feet</b>	79.0		X									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

*Not observed while dry drilling to 10 ft.*

*Water was injected for wash boring below 10 ft.*



Boring Started: 12/13/2016

Boring Completed: 12/13/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-45

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041308° Longitude: -93.106487°  Approximate Surface Elev: 238 (Ft.) +/- ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
<div style="display: flex; align-items: center; justify-content: center;"> <div style="width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, #008000 2px, #008000 4px); border: 1px solid #008000;"></div> <div style="margin-left: 10px;"> <p>8.5</p> <p>229.5+/-</p> </div> </div>	<b>FAT CLAY (CH)</b> , grayish-brown to dark brown, stiff, trace rootlets	5		X	2-4-5 N=9	3000 (HP)							
					X	1-2-3 N=5	3000 (HP)						
			15		X	25-6-6 N=12							
			20		X	3-5-6 N=11	6000 (HP)						
			25		X	4-6-7 N=13	6000 (HP)						

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.4 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b>  Not observed while dry drilling to 10 ft.  Water was injected for wash boring below 10 ft.	 25809 I 30 Bryant, AR	Boring Started: 1/16/2017 Boring Completed: 1/17/2017  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-45

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041308° Longitude: -93.106487° Approximate Surface Elev: 238 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
		29.5		X	4-6-8 N=14	7000 (HP)							
<b>FAT CLAY (CH)</b> , dark gray, hard, blocky													
		30											
		35		X	7-12-16 N=28	9000 (HP)							
		40		X	8-16-20 N=36	9000 (HP)							
		45		X	9-15-21 N=36	9000 (HP)							
		50		X	11-15-22 N=37	9000 (HP)							
		53.5		X	10-15-23 N=38								
<b>CLAYEY SAND (SC)</b> , dark gray, very dense													
		55											

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 79.4 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b>		Boring Started: 1/16/2017 Drill Rig: Acker Renegade #679 Project No.: 35165046
Not observed while dry drilling to 10 ft.  Water was injected for wash boring below 10 ft.	25809 I 30 Bryant, AR	Boring Completed: 1/17/2017 Driller: TF Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-45

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041308° Longitude: -93.106487° Approximate Surface Elev: 238 (Ft.) +/- DEPTH _____ ELEVATION (Ft.) _____	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>CLAYEY SAND (SC)</b> , dark gray, very dense <i>(continued)</i>	60		X	8-16-25 N=41								
		65		X	10-25-48 N=73								
		70		X	12-28-32 N=60								
		75		X	25-42-38 N=80								
		79.4	158.5+/-	X	31-50/5"								
<b>Boring Terminated at 79.4 Feet</b>													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.4 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 1/16/2017

Boring Completed: 1/17/2017

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ



# BORING LOG NO. BH-46

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041308° Longitude: -93.104776°  Approximate Surface Elev: 245 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30		X	9-12-18 N=30	9000 (HP)							
		35		X	9-16-21 N=37	9000 (HP)							
		40		X	9-17-23 N=40	9000 (HP)							
		45		X	10-15-21 N=36	9000 (HP)							
		50		X	11-18-22 N=40	9000 (HP)							
		55		X	11-14-22 N=36	9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.5 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 1/13/2017	Boring Completed: 1/13/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-46

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041308° Longitude: -93.104776° Approximate Surface Elev: 245 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky (continued)	60		X	10-17-26 N=43	9000 (HP)							
		63.5											
	<b>CLAYEY SAND (SC)</b> , dark gray, dense to very dense	65		X	16-50/6"								
		70		X	14-36-40 N=76								
		75		X	13-22-31 N=53								
		79.5		X	20-50/6"								
	<b>Boring Terminated at 79.5 Feet</b>	181.5+/-											
		165.5+/-											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 79.5 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 1/13/2017	Boring Completed: 1/13/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-47

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040107° Longitude: -93.109904° Approximate Surface Elev: 264 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
	<b>FAT CLAY (CH)</b> , brown, medium stiff	2.0		■		4000 (HP)	UC	1481	8	37	83	81-22-59		
	<b>FAT CLAY (CH)</b> , brown and olive-brown, medium stiff	5.0		⊗	1-2-4 N=6	6000 (HP)				28				
	<b>FAT CLAY (CH)</b> , olive-brown, yellowish brown and light gray, soft to stiff, blocky fracture		5		■		6000 (HP)	UC	631	2.2	33	88	101-26-75	
			10		⊗	2-3-4 N=7					30			
			15		■			UU	3998	9.3	33	81		
			20		⊗	4-6-8 N=14					33			
		25		■			UU	763	14.1	32	98	91-24-67		
		28.5												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

<b>Advancement Method:</b> 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 78.9 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
<b>Abandonment Method:</b> Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft. Not observed to 30 ft. in offset boring	<p>25809 I 30 Bryant, AR</p>	Boring Started: 12/13/2016 Boring Completed: 12/14/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-47

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040107° Longitude: -93.109904° Approximate Surface Elev: 264 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
		30		X	7-10-14 N=24					29				
		33.5												
		35			X	7-12-16 N=28	8500 (HP)				31			
		40			X	12-17-20 N=37	9000 (HP)				29			
		45			X	11-13-20 N=33	9000 (HP)				27			
		50			X	11-17-21 N=38	9000 (HP)				28			
		55		X	11-14-22 N=36	9000 (HP)				28				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>

25809 | 30  
Bryant, AR

Boring Started: 12/13/2016	Boring Completed: 12/14/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-47

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040107° Longitude: -93.109904° Approximate Surface Elev: 264 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky (continued)	60		X	9-11-19 N=30	9000 (HP)				28			
		65		X	11-15-20 N=35	9000 (HP)				30			
		70		X	12-17-28 N=45	9000 (HP)				26			
		73.5		X									
	<b>CLAYEY SAND (SC)</b> , fine grained, gray and dark gray, dense to very dense	75		X	9-12-21 N=33	4500 (HP)				34			
		78.9		X	50/5"					27			
	<b>Boring Terminated at 78.9 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 12/13/2016	Boring Completed: 12/14/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-48

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.04009° Longitude: -93.108199° Approximate Surface Elev: 251 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES												
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					CONFINING PRESSURE (psi)											
5.0	246+/-	5																							
														10	2-3-4 N=7	9000 (HP)									
														20	3-4-7 N=11										
25	9-11-12 N=23																								

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft.	25809 I 30 Bryant, AR	
	Boring Started: 12/12/2016 Drill Rig: Acker Renegade Project No.: 35165046	Boring Completed: 12/13/2016 Driller: TF Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-48

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.04009° Longitude: -93.108199° Approximate Surface Elev: 251 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Vertical Green Hatched Bar]	FAT CLAY (CH), dark gray, very stiff to hard (continued)	30		X	7-12-19 N=31					29			
		35		X	9-12-16 N=28					29			
		40		X	11-12-24 N=36					30			
		45		X	12-15-19 N=34					28			
		50		X	11-16-22 N=38					28			
		55		X	13-17-25 N=42					29			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

<b>Advancement Method:</b> 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
<b>Abandonment Method:</b> Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft.	 25809 I 30 Bryant, AR	Boring Started: 12/12/2016 Drill Rig: Acker Renegade Project No.: 35165046 Boring Completed: 12/13/2016 Driller: TF Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-48

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.04009° Longitude: -93.108199° Approximate Surface Elev: 251 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH ELEVATION (Ft.)												
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard <i>(continued)</i>	60			11-15-24 N=39					29			
	<b>CLAYEY SAND WITH FAT CLAY SEAMS (SC)</b> , dark gray and gray, dense	65			11-17-32 N=49					35			
	<b>CLAYEY SAND (SC)</b> , gray, very dense	70			50/6"					41			
		75			50/6"					26			
		80			27-37-42 N=79					27			
	<b>Boring Terminated at 80 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).

**Notes:**

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>

25809 I 30  
Bryant, AR

Boring Started: 12/12/2016	Boring Completed: 12/13/2016
Drill Rig: Acker Renegade	Driller: TF
Project No.: 35165046	Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-49

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas** **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040118° Longitude: -93.106489° Approximate Surface Elev: 249 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES		
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					CONFINING PRESSURE (psi)	
	<b>FAT CLAY (CH)</b> , dark olive, medium stiff  5.0 244 +/-  <b>FAT CLAY (CH)</b> , olive-brown, yellowish brown and light gray, medium stiff to stiff  28.5 220.5 +/-	5		X	0-2-3 N=5	4000 (HP)	UC	1278	8.2	38	80	101-20-81			
		5		X	2-3-6 N=9	9000 (HP)					34		106-21-85		
		15			X	4-6-7 N=13	9000 (HP)				36				
		15				X	4-6-7 N=13	9000 (HP)				36			
		25				X	4-6-7 N=13	9000 (HP)				36			
		25				X	4-6-7 N=13	9000 (HP)				36			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*

25809 I 30  
Bryant, AR

**Notes:**

Boring Started: 12/8/2016	Boring Completed: 12/8/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-49

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas** **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040118° Longitude: -93.106489° Approximate Surface Elev. 249 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					CONFINING PRESSURE (psi)
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30		X	11-13-16 N=29					29		92-23-69		
		35								54	89			
		40			X	12-18-25 N=43					27			
		45			X	12-15-20 N=35					29			
		50			X	11-18-24 N=42					28			
		55			X	13-19-27 N=46					30			
		60												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

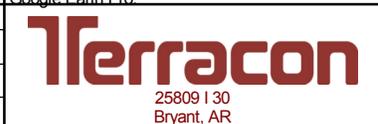
See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 12/8/2016	Boring Completed: 12/8/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-49

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040118° Longitude: -93.106489° Approximate Surface Elev. 249 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky ( <i>continued</i> )	60			15-20-23 N=43					29			
		65			15-20-20 N=40					21			
	<b>CLAYEY SAND (SC)</b> , dark gray, very dense	70			22-36-50/5"					33			
		75			50/4"							14	
		78.9			50/5"					27			
	<b>Boring Terminated at 78.9 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

*Not observed while dry drilling to 10 ft.*

*Water was injected for wash boring below 10 ft.*



Boring Started: 12/8/2016

Boring Completed: 12/8/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ



# BORING LOG NO. BH-50

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas**

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.04012° Longitude: -93.104783°  Approximate Surface Elev: 261 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30		X	7-10-15 N=25	9000 (HP)							
		35		X	8-12-16 N=28	9000 (HP)							
		40		X	10-13-19 N=32	9000 (HP)							
		45		X	8-16-23 N=39	9000 (HP)							
		50		X	11-14-21 N=35	9000 (HP)							
		55		X	13-17-20 N=37	9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

**Notes:**

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 1/13/2017	Boring Completed: 1/13/2017
Drill Rig: Acker Renegade #679	Driller: JF
Project No.: 35165046	Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-50

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.04012° Longitude: -93.104783°  Approximate Surface Elev: 261 (Ft.) +/-  DEPTH _____ ELEVATION (Ft.) _____	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	

80.0	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky ( <i>continued</i> )	181+/-	80										
			60	X	12-17-22 N=39	9000 (HP)							
			65	X	10-18-22 N=40	9000 (HP)							
			70	X	10-17-23 N=40	9000 (HP)							
			75	X	12-19-28 N=47	9000 (HP)							
			80	X	13-17-23 N=40	9000 (HP)							

**Boring Terminated at 80 Feet**

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

Notes:

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 1/13/2017	Boring Completed: 1/13/2017
Drill Rig: Acker Renegade #679	Driller: JF
Project No.: 35165046	Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ



# BORING LOG NO. BH-51

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.03898° Longitude: -93.10844° Approximate Surface Elev: 257 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , olive-brown, yellowish brown and light gray, medium stiff to very stiff (continued)	30		X	6-8-12 N=20					30			
	33.5	223.5+/-											
	<b>FAT CLAY (CH)</b> , olive and dark gray, very stiff	35		X	6-11-13 N=24					30			
	38.5	218.5+/-											
	<b>FAT CLAY (CH)</b> , dark gray, hard	40		X	12-16-20 N=36					28			
	45			X	11-16-22 N=38					27			
50			X	12-17-21 N=38					28				
55			X	10-17-25 N=42					27				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 70 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>



Boring Started: 12/9/2016	Boring Completed: 12/9/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-15

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-51

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.03898° Longitude: -93.10844° Approximate Surface Elev: 257 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Green Hatched Area]	<b>FAT CLAY (CH)</b> , dark gray, hard ( <i>continued</i> )	60			15-20-27 N=47					29			
		65			15-24-25 N=49					26			
		70			17-45-50/2"					26			
		70.0			- hard drilling in calcified clay at about 69 feet								
	<b>Drag bit refusal at 70 Feet</b>	187+/-											

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

<b>Advancement Method:</b> 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 70 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
<b>Abandonment Method:</b> Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b>  Not observed while dry drilling to 10 ft.  Water was injected for wash boring below 10 ft.	 25809 I 30 Bryant, AR	Boring Started: 12/9/2016 Boring Completed: 12/9/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-15

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-52

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.038877° Longitude: -93.104785° Approximate Surface Elev: 262 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES													
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)																	
5.0	257+/-	5																								
														<b>FAT CLAY (CH)</b> , olive-brown, soft to medium stiff												
10		15																								
														<b>FAT CLAY (CH)</b> , yellowish brown and light gray, medium stiff to stiff, blocky												
20		25																								
														- with gypsum crystals and veins at about 18.5 feet												
25																										
														- harder drilling below 22 feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 12/7/2016	Boring Completed: 12/7/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-52

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.038877° Longitude: -93.104785° Approximate Surface Elev: 262 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
[Green Hatched Area]	33.5 228.5+/-	30		X	5-7-8 N=15					34			
		35		X	8-10-16 N=26					31	99-25-74		
		40		X	10-12-18 N=30					30			
		45		X	12-17-20 N=37					26			
		50			■			UC	1164	15	28	92	
		55		X	12-23-23 N=46					29			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

<b>Advancement Method:</b> 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
<b>Abandonment Method:</b> Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft.	 25809 I 30 Bryant, AR	Boring Started: 12/7/2016 Drill Rig: Acker Renegade #679 Project No.: 35165046 Boring Completed: 12/7/2016 Driller: TF Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ



# BORING LOG NO. BH-53

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037665° Longitude: -93.109919° Approximate Surface Elev: 268 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
5.0	<b>FAT CLAY (CH)</b> , brown to grayish-brown, stiff, trace rootlets  <b>FAT CLAY (CH)</b> , yellowish brown and light gray, stiff, with gypsum crystals, blocky	5				3000 (HP)	UC	737	8	36	83	95-17-78		
		5		X	3-4-6 N=10	4000 (HP)				31				
		5					6000 (HP)	UC	737	8	30	89	87-17-70	
		10		X	3-7-7 N=14	8000 (HP)					26			
		15					7000 (HP)	UC	632	15	28	95	74-18-56	
		20		X	4-5-6 N=11	6000 (HP)					36			
25					9000 (HP)	UC	737	8	30	91				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings	
<b>WATER LEVEL OBSERVATIONS</b>	
<i>Not observed while dry drilling to 10 ft.</i>	
<i>Water was injected for wash boring below 10 ft.</i>	
<i>Not observed to 30 ft. in offset boring</i>	

25809 I 30  
Bryant, AR

Notes:	
Boring Started: 1/5/2017	Boring Completed: 1/5/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-53

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037665° Longitude: -93.109919° Approximate Surface Elev: 268 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	29.0		X	7-9-10 N=19	9000 (HP)				30			
		30		X	7-9-12 N=21	9000 (HP)				32			
		35		X	10-15-17 N=32	9000 (HP)				27			
		40		X	11-18-18 N=36	9000 (HP)				26			
		45		X	9-16-17 N=33	9000 (HP)				28			
		50		X	11-17-20 N=37	9000 (HP)				28			
55													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).

**Notes:**

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>

25809 I 30  
Bryant, AR

Boring Started: 1/5/2017	Boring Completed: 1/5/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-53

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037665° Longitude: -93.109919°  Approximate Surface Elev: 268 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky (continued)	60		X	12-19-21 N=40	9000 (HP)				28			
		65		X	16-18-20 N=38	9000 (HP)				29			
		70		X	14-18-19 N=37	9000 (HP)				30			
		75		X	17-19-26 N=45	9000 (HP)				29			
		80		X	16-20-28 N=48	9000 (HP)				29			
		80.0	188+/-										
<b>Boring Terminated at 80 Feet</b>													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 1/5/2017	Boring Completed: 1/5/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ



# BORING LOG NO. BH-54

<b>PROJECT:</b> ██████████	<b>CLIENT:</b> ██████████
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> ██████████

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.03765° Longitude: -93.108197° Approximate Surface Elev: 270 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30		X	7-7-10 N=17	9000 (HP)							
		35		X	6-9-14 N=23	9000 (HP)							
		40		X	7-12-16 N=28	9000 (HP)							
		45		X	12-17-24 N=41	9000 (HP)							
		50		X	11-14-22 N=36	9000 (HP)							
		55		X	11-16-21 N=37	9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b>	<p style="font-size: small;">25809   30 Bryant, AR</p>	Boring Started: 1/10/2017
<i>Not observed while dry drilling to 10 ft.</i>		Boring Completed: 1/10/2017
<i>Water was injected for wash boring below 10 ft.</i>		Drill Rig: Acker Renegade #679
		Driller: TF
		Project No.: 35165046
		Exhibit: A-18

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-54

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.03765° Longitude: -93.108197°  Approximate Surface Elev: 270 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky ( <i>continued</i> )	60		X	13-15-22 N=37	9000 (HP)							
		65		X	11-18-22 N=40	9000 (HP)							
		70		X	11-19-22 N=41	9000 (HP)							
		75		X	17-22-24 N=46	9000 (HP)							
		80		X	16-21-27 N=48	9000 (HP)							
	<b>Boring Terminated at 80 Feet</b>	80											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>



Boring Started: 1/10/2017	Boring Completed: 1/10/2017
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-18

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-55

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037661° Longitude: -93.106508° Approximate Surface Elev: 265 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , grayish-brown to dark brown, medium stiff  <b>FAT CLAY (CH)</b> , yellowish brown and light gray, stiff, with gypsum crystals, blocky	3.5		X	2-2-3 N=5	3000 (HP)							
		5		X		4000 (HP)							
		10		X	4-5-5 N=10	8000 (HP)							
		15				9000 (HP)							
		20		X	3-5-6 N=11	5000 (HP)							
		25				9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 1/11/2017

Boring Completed: 1/11/2017

Drill Rig: Acker Renegade #679

Driller: JF

Project No.: 35165046

Exhibit: A-19

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-55

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037661° Longitude: -93.106508° Approximate Surface Elev: 265 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH		ELEVATION (Ft.)											
29.0				X	5-6-8 N=14	6000 (HP)							
	<b>FAT CLAY (CH)</b> , dark gray, stiff to hard, blocky	30											
		35		X	5-6-10 N=16	9000 (HP)							
		40		X	10-13-15 N=28	9000 (HP)							
		45		X	11-50/4"	9000 (HP)							
		50		X	10-17-17 N=34	9000 (HP)							
		55		X	10-18-20 N=38	9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**  
*Not observed while dry drilling to 10 ft.*  
*Water was injected for wash boring below 10 ft.*



Boring Started: 1/11/2017

Boring Completed: 1/11/2017

Drill Rig: Acker Renegade #679

Driller: JF

Project No.: 35165046

Exhibit: A-19

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046-STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-55

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037661° Longitude: -93.106508°  Approximate Surface Elev: 265 (Ft.) +/-  DEPTH _____ ELEVATION (Ft.) _____	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	

	<b>FAT CLAY (CH)</b> , dark gray, stiff to hard, blocky <i>(continued)</i>	60		X	13-16-22 N=38	9000 (HP)								
		65		X	11-18-20 N=38	9000 (HP)								
		70		X	12-18-22 N=40	9000 (HP)								
		75		X	15-16-25 N=41	9000 (HP)								
		80	185+/-	X	15-20-23 N=43	9000 (HP)								
	80.0				<b>Boring Terminated at 80 Feet</b>									

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling  Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:   Boring Started: 1/11/2017 Boring Completed: 1/11/2017  Drill Rig: Acker Renegade #679 Driller: JF  Project No.: 35165046 Exhibit: A-19
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft.		<p style="font-size: x-small;">25809   30 Bryant, AR</p>

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-56

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037653° Longitude: -93.104779° Approximate Surface Elev: 249 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
<div style="position: absolute; top: 0; left: 0; width: 100%; height: 100%; pointer-events: none;"> <span style="position: absolute; top: 0; left: 0; width: 100%; height: 100%; font-size: 8px; line-height: 1;">THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_35165046 - STAGE 3 FINAL LOGS.GPJ</span> </div>	<b>FAT CLAY (CH)</b> , grayish-brown to dark gray, stiff 4.0	4.0		X		4000 (HP)								
	<b>FAT CLAY (CH)</b> , yellowish brown and light gray, stiff, blocky 245+/-	5			X	4-5-6 N=11	9000 (HP)							
		5					9000 (HP)							
		10			X	2-4-5 N=9	5000 (HP)							
		15					4000 (HP)							
		20			X	3-4-6 N=10	6000 (HP)							
	25					9000 (HP)								

Stratification lines are approximate. In-situ, the transition may be gradual.
Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 78.9 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with bentonite hole plug and soil cuttings		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft. Not observed to 30 ft. in offset boring	 25809 I 30 Bryant, AR	Boring Started: 1/12/2017 Boring Completed: 1/12/2017  Drill Rig: Acker Renegade #679 Driller: JF  Project No.: 35165046 Exhibit: A-20

# BORING LOG NO. BH-56

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037653° Longitude: -93.104779° Approximate Surface Elev: 249 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
		29.0		X	5-9-10 N=19	9000 (HP)							
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky	30											
		35		X	9-14-15 N=29	9000 (HP)							
		40		X	11-13-16 N=29								
		45		X	10-13-17 N=30	9000 (HP)							
		50		X	10-14-21 N=35	9000 (HP)							
		55		X	10-16-19 N=35	9000 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

*Not observed while dry drilling to 10 ft.*

*Water was injected for wash boring below 10 ft.*

*Not observed to 30 ft. in offset boring*



Boring Started: 1/12/2017

Boring Completed: 1/12/2017

Drill Rig: Acker Renegade #679

Driller: JF

Project No.: 35165046

Exhibit: A-20

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-56

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.037653° Longitude: -93.104779° Approximate Surface Elev: 249 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard, blocky ( <i>continued</i> )	60		X	11-14-22 N=36	9000 (HP)							
		65		X	15-18-22 N=40	9000 (HP)							
		70		X	17-19-34 N=53	9000 (HP)							
		75		X	16-18-22 N=40	9000 (HP)							
		78.5 78.9	170.5+/- 170+/-		X	50/5"							
	<b>CLAYEY SAND (SC)</b> , dark gray, very dense <b>Boring Terminated at 78.9 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with bentonite hole plug and soil cuttings

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

*Not observed while dry drilling to 10 ft.*

*Water was injected for wash boring below 10 ft.*

*Not observed to 30 ft. in offset boring*



Boring Started: 1/12/2017

Boring Completed: 1/12/2017

Drill Rig: Acker Renegade #679

Driller: JF

Project No.: 35165046

Exhibit: A-20

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-57

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041383° Longitude: -93.113935° Approximate Surface Elev: 279 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
	<b>LEAN CLAY/FAT CLAY (CL/CH)</b> , brown and reddish-brown, medium stiff  <b>FAT CLAY (CH)</b> , brown, reddish-brown and light gray, very stiff  <b>FAT CLAY (CH)</b> , olive-brown, yellowish brown and light gray, stiff to very stiff, blocky	0		X		3500 (HP)	UC	1209	7	22	97	46-16-30		
		5.0	274+/-	5		X	2-2-4 N=6							
		8.5	270.5+/-	10		X	4-6-8 N=14	8500 (HP)			32			
		15		15		X	4-5-7 N=12	8000 (HP)			32			
		25		25		X	6500 (HP)	UC	840	4.7	36	79	106-26-80	
28.5	250.5+/-			X										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

**WATER LEVEL OBSERVATIONS**

Not observed while dry drilling to 10 ft.

Water was injected for wash boring below 10 ft.



Boring Started: 12/20/2016

Boring Completed: 12/21/2016

Drill Rig: Acker Renegade #679

Driller: TF

Project No.: 35165046

Exhibit: A-21

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-57

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041383° Longitude: -93.113935°  Approximate Surface Elev: 279 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS  LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard	30		X	7-9-10 N=19	9000 (HP)				32			
		35		X	8-14-13 N=27	9000 (HP)				30			
		40		X	10-14-16 N=30	9000 (HP)				30			
		45		X	11-15-19 N=34	9000 (HP)				28			
		50		X	12-15-20 N=35	9000 (HP)				30			
		55		X	14-17-24 N=41	9000 (HP)				29			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 80 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>



Boring Started: 12/20/2016	Boring Completed: 12/21/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-21

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-57

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.041383° Longitude: -93.113935° Approximate Surface Elev: 279 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard <i>(continued)</i>	60		X	11-17-18 N=35	9000 (HP)			24				
		63.5	215.5+/-		—	50/2"	9000 (HP)			20			
		68.5	210.5+/-		X	28-31-50/5"				30			
		75			X	13-35-50/4"				46			
		80.0	199+/-	80		X	29-35-44 N=79			26			
	<b>Boring Terminated at 80 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 80 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b>		
<i>Not observed while dry drilling to 10 ft.</i>	Boring Started: 12/20/2016	Boring Completed: 12/21/2016
<i>Water was injected for wash boring below 10 ft.</i>	Drill Rig: Acker Renegade #679	Driller: TF
	Project No.: 35165046	Exhibit: A-21

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-58

**PROJECT:** [REDACTED] **CLIENT:** [REDACTED]

**SITE:** **US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas** **ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040124° Longitude: -93.113885° Approximate Surface Elev: 277 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , brown, stiff	2.0				5500 (HP)				22	91		
	<b>FAT CLAY (CH)</b> , brown, reddish-brown and light gray, medium stiff to stiff			X	3-5-5 N=10	3500 (HP)				29			
		5					9000 (HP)	UC	1234	5.6	32	88	
		8.5			X	3-5-6 N=11	9000 (HP)				29		
		15					9000 (HP)	UC	1636	10.3	30	94	
		20			X	3-4-8 N=12	8000 (HP)				32		
	25			X	6-7-9 N=16	9000 (HP)				33			
	28.5												

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic

Advancement Method: 0 to 10 feet: 4 1/4" Hollow stem auger 10 to 78.9 feet: Rotary wash drilling	See Exhibit A-3 for description of field procedures.  See Appendix B for description of laboratory procedures and additional data (if any).  See Appendix C for explanation of symbols and abbreviations. The ground surface elevation was obtained from Google Earth Pro.	Notes:
Abandonment Method: Boring backfilled with soil cuttings upon completion.		
<b>WATER LEVEL OBSERVATIONS</b> Not observed while dry drilling to 10 ft. Water was injected for wash boring below 10 ft. Not observed to 30 ft. in offset boring	25809 I 30 Bryant, AR	Boring Started: 12/15/2016 Boring Completed: 12/19/2016  Drill Rig: Acker Renegade #679 Driller: TF  Project No.: 35165046 Exhibit: A-22

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-58

<b>PROJECT:</b> [REDACTED]	<b>CLIENT:</b> [REDACTED]
<b>SITE:</b> US Hwy 67 and State Hwy 26 Arkadelphia, Arkansas	<b>ENGINEER:</b> [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040124° Longitude: -93.113885° Approximate Surface Elev: 277 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard  - hard below about 38.5 feet	30		X	4-7-12 N=19	9000 (HP)				29			
		35		X	8-12-16 N=28	9000 (HP)				29			
		40		X	9-12-21 N=33	9000 (HP)				29			
		45		X	11-16-23 N=39	9000 (HP)				29			
		50		X	11-18-22 N=40	9000 (HP)				30			
		55		X	15-22-25 N=47	9000 (HP)				21			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 12/15/2016	Boring Completed: 12/19/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-22

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# BORING LOG NO. BH-58

**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**SITE:** US Hwy 67 and State Hwy 26  
Arkadelphia, Arkansas

**ENGINEER:** [REDACTED]

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.040124° Longitude: -93.113885° Approximate Surface Elev: 277 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
							TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	<b>FAT CLAY (CH)</b> , dark gray, very stiff to hard <i>(continued)</i>	58.5											
	<b>CLAYEY SAND (SC)</b> , fine grained, gray with thin gray seams, very dense, fine to medium grained	60		X	18-28-50/4"				28				
		65		X	23-23-37 N=60				33				
		70		X	15-48-50/5"				33				
	<b>CLAYEY SAND (SC)</b> , trace fine gravel, fine grained, gray, very dense	75		X	12-22-34 N=56				41				
		78.9		X	50/5"				30				
	<b>Boring Terminated at 78.9 Feet</b>												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

**Advancement Method:**  
0 to 10 feet: 4 1/4" Hollow stem auger  
10 to 78.9 feet: Rotary wash drilling

See Exhibit A-3 for description of field procedures.

Notes:

**Abandonment Method:**  
Boring backfilled with soil cuttings upon completion.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.  
The ground surface elevation was obtained from Google Earth Pro.

<b>WATER LEVEL OBSERVATIONS</b>
<i>Not observed while dry drilling to 10 ft.</i>
<i>Water was injected for wash boring below 10 ft.</i>
<i>Not observed to 30 ft. in offset boring</i>



Boring Started: 12/15/2016	Boring Completed: 12/19/2016
Drill Rig: Acker Renegade #679	Driller: TF
Project No.: 35165046	Exhibit: A-22

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_35165046 - STAGE 3 FINAL LOGS.GPJ

# CPT LOG NO. BH - 21

**PROJECT:** [REDACTED]

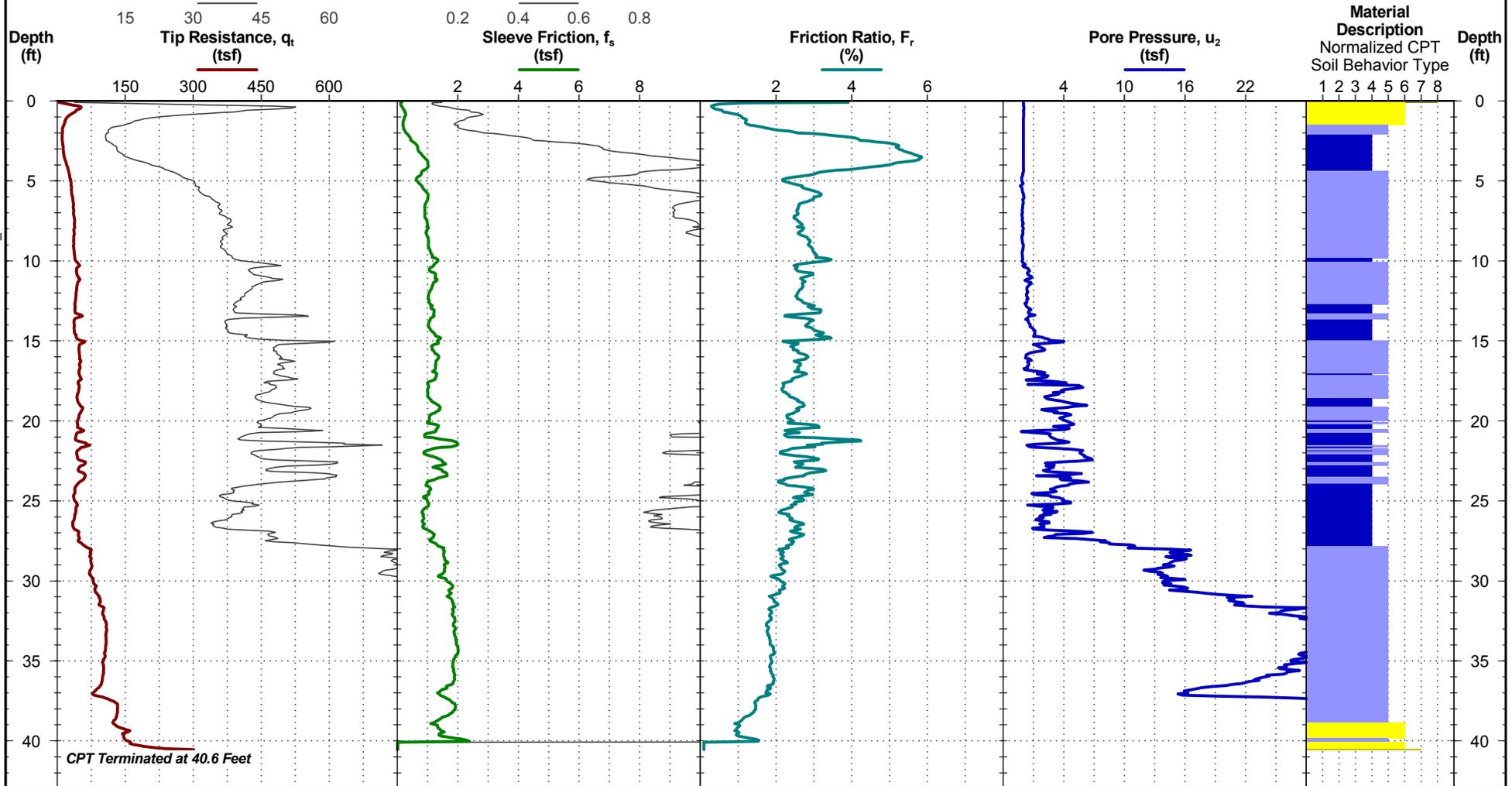
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.03935°  
Longitude: -93.11743°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-1

# CPT LOG NO. BH - 24

**PROJECT:** [REDACTED]

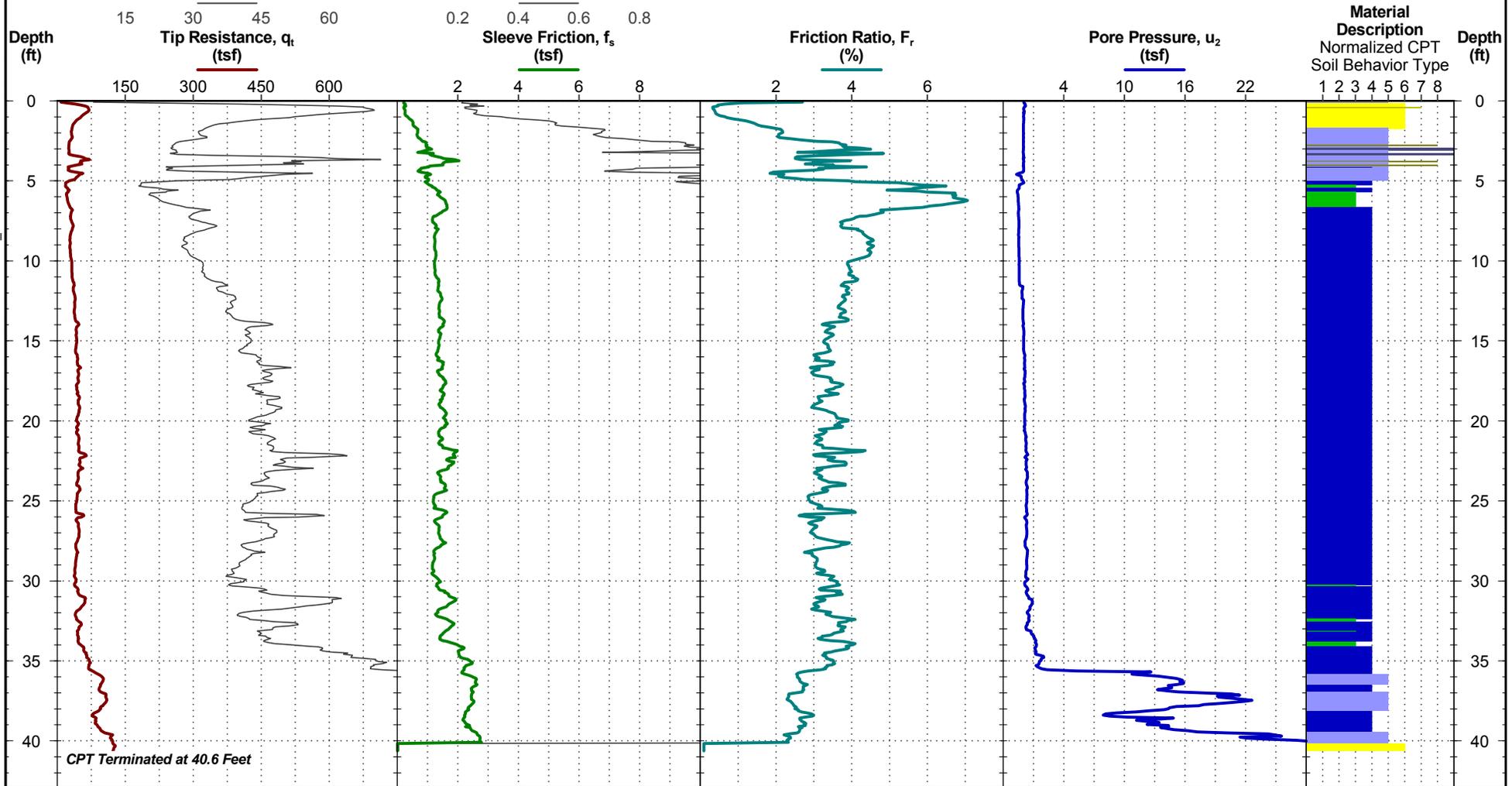
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04192°  
Longitude: -93.11746°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016  
Rig:  
Project No.: 35165046

CPT Completed: 9/15/2016  
Operator: M. May  
Exhibit: A-2

# CPT LOG NO. BH - 26

**PROJECT:** [REDACTED]

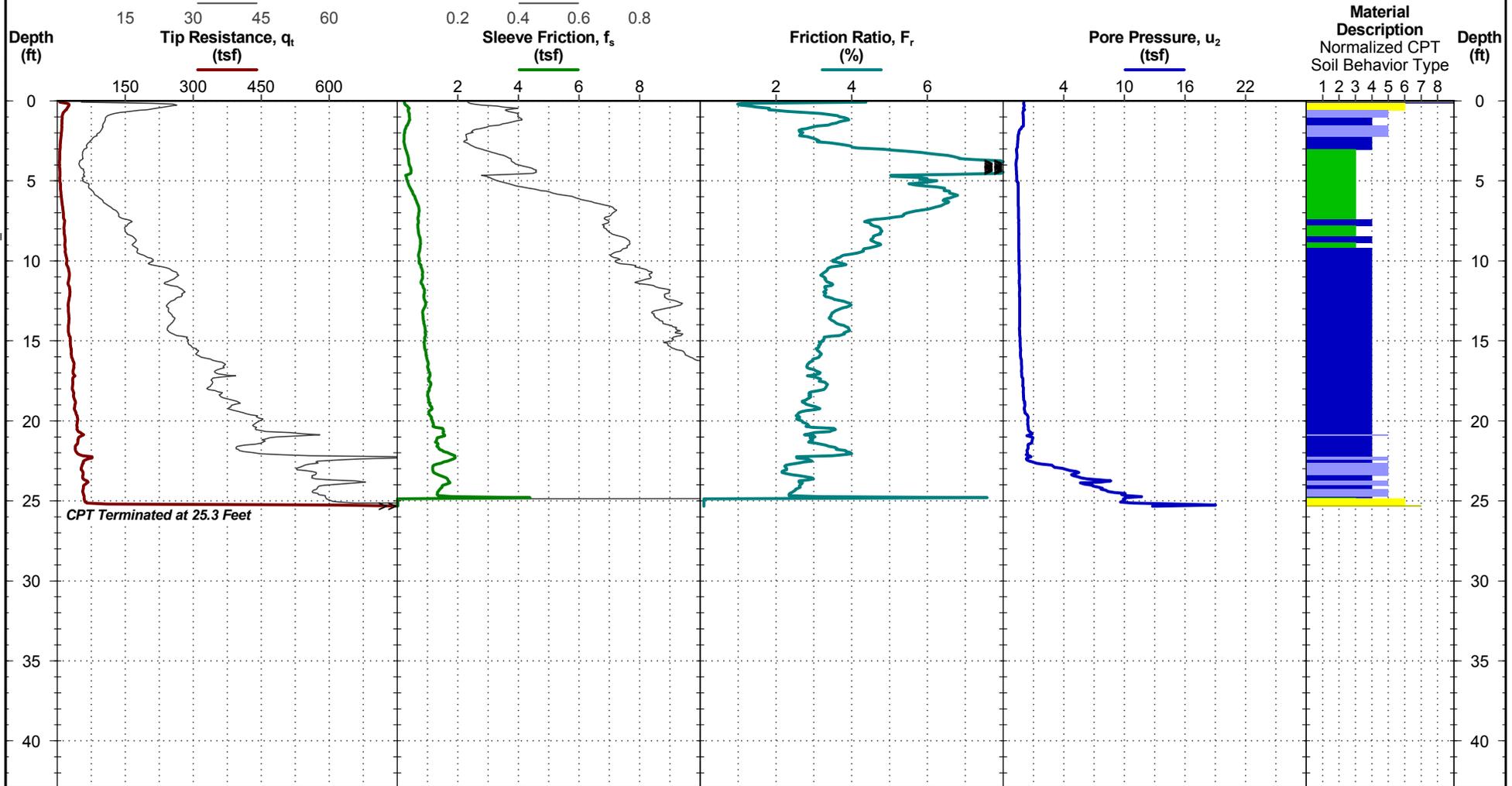
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04183°  
Longitude: -93.11538°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-3

# CPT LOG NO. BH - 27

**PROJECT:** [REDACTED]

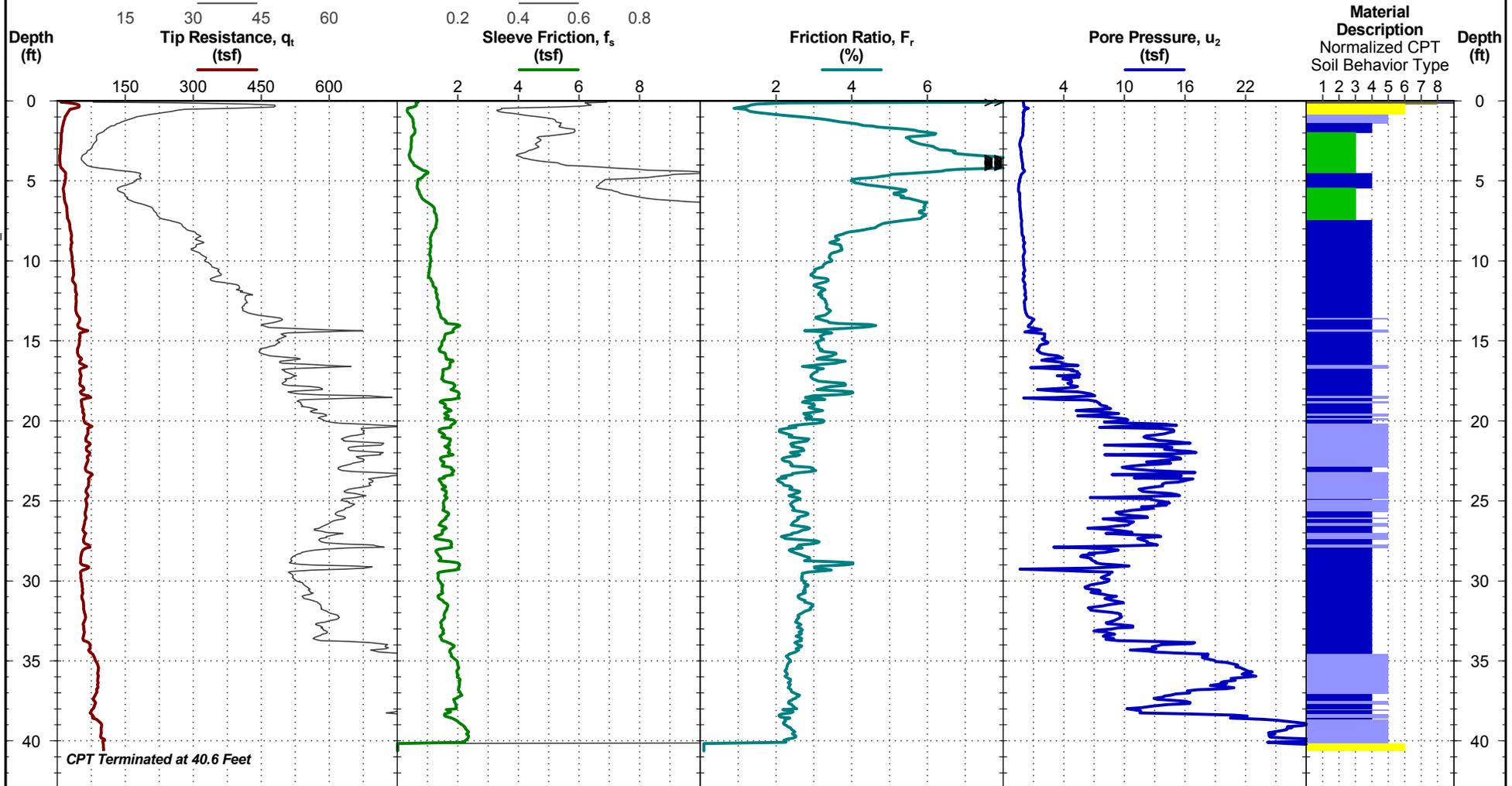
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04316°  
Longitude: -93.11499°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-4

# CPT LOG NO. BH - 28

**PROJECT:** [REDACTED]

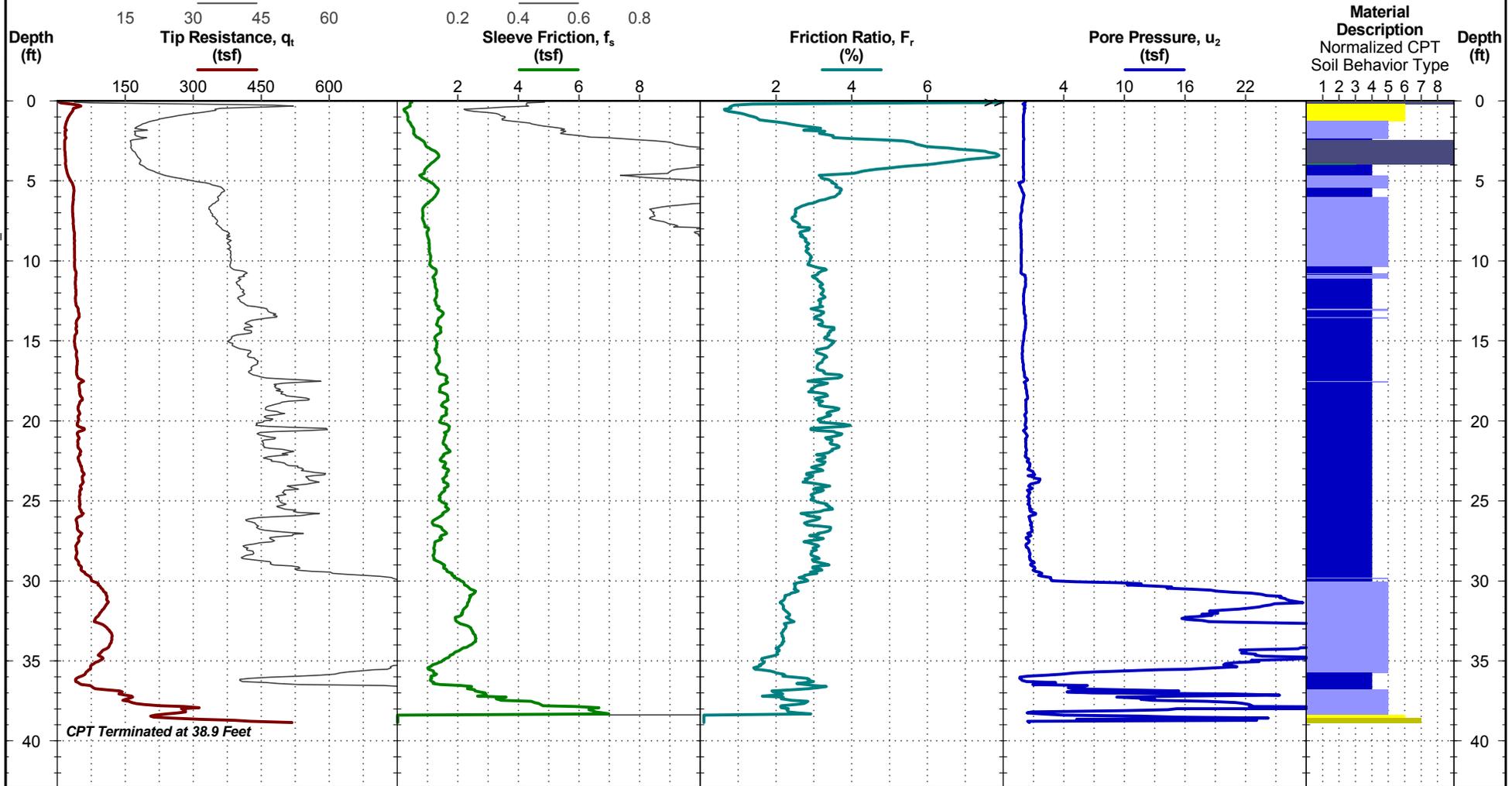
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04636°  
Longitude: -93.11634°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-5

# CPT LOG NO. BH - 29

**PROJECT:** [REDACTED]

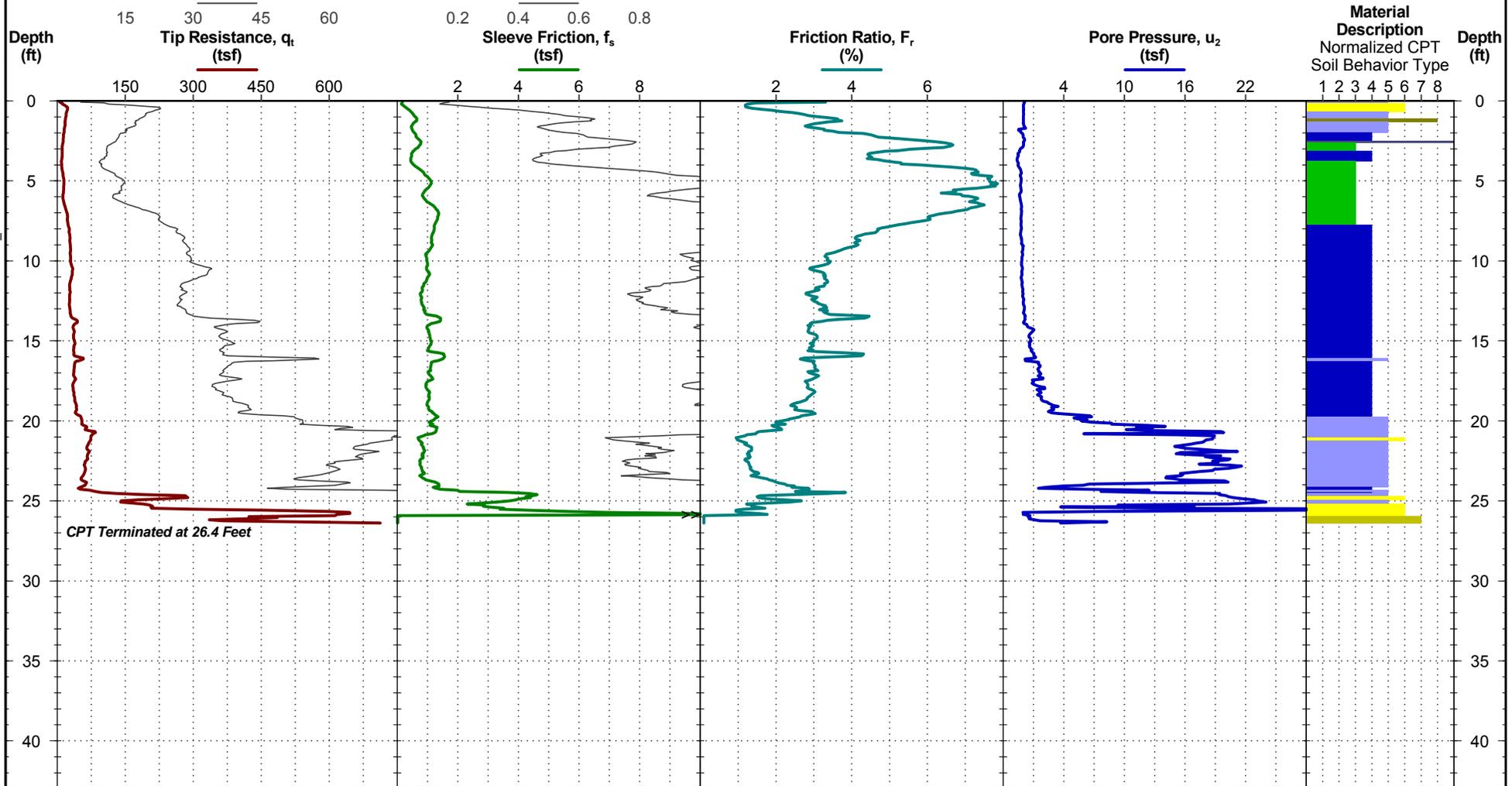
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04643°  
Longitude: -93.11742°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-6

# CPT LOG NO. BH - 30

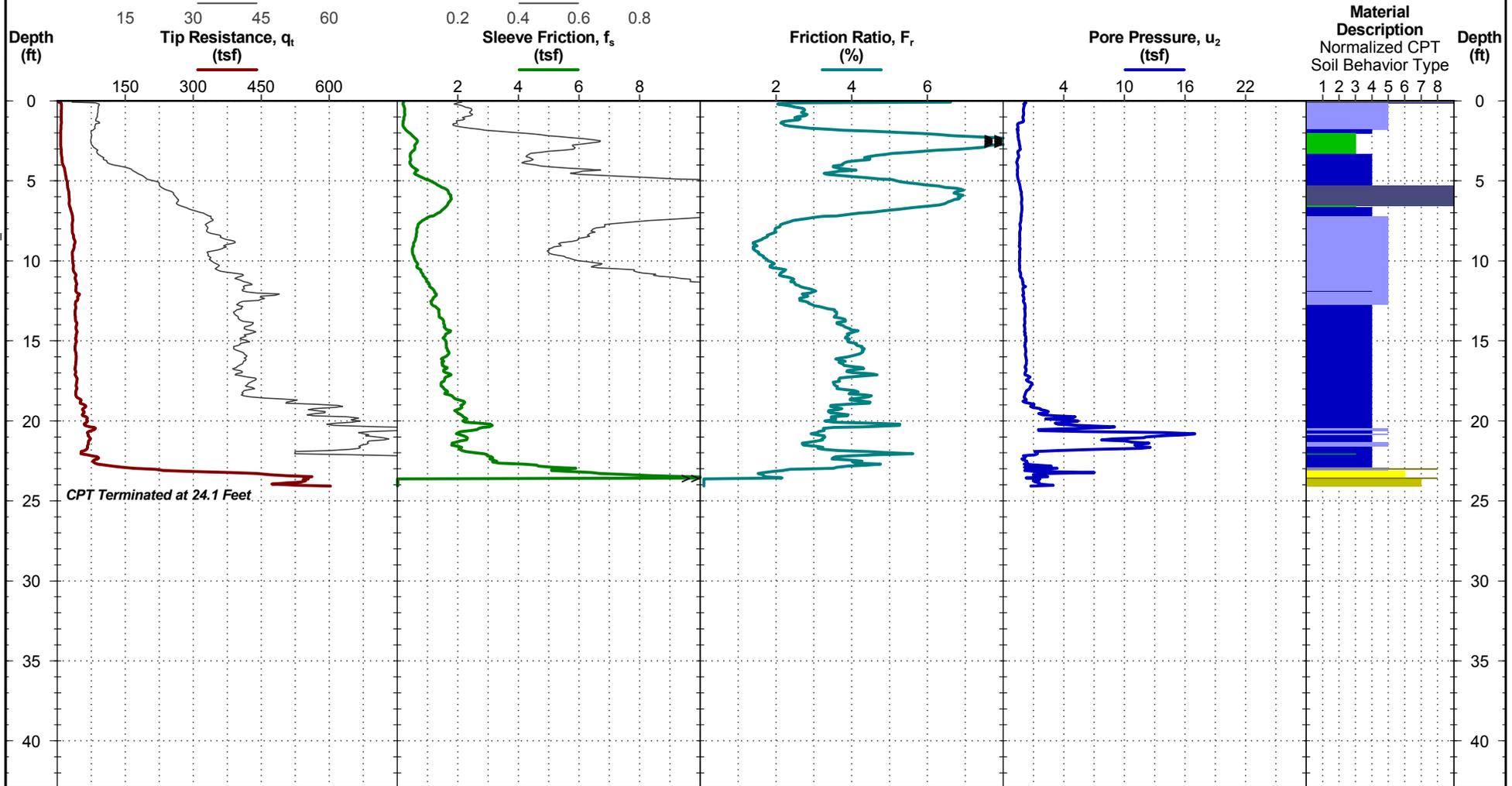
**PROJECT:** [REDACTED]

**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04757°  
Longitude: -93.11723°



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT: 35165046.CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16

# CPT LOG NO. BH - 32

**PROJECT:** [REDACTED]

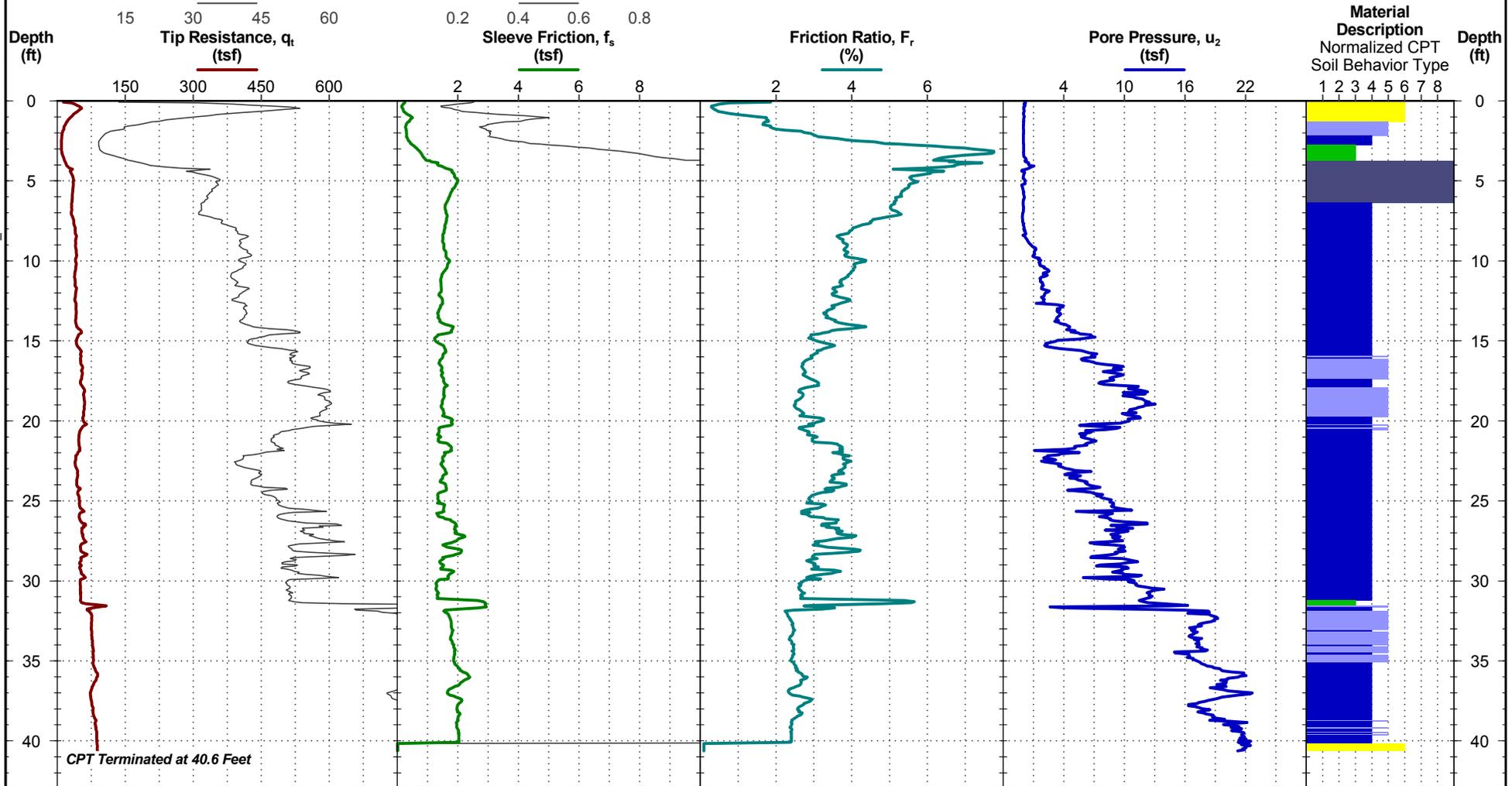
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04761°  
Longitude: -93.11482°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016  
Rig:  
Project No.: 35165046

CPT Completed: 9/15/2016  
Operator: M. May  
Exhibit: A-8

# CPT LOG NO. BH - 34

**PROJECT:** [REDACTED]

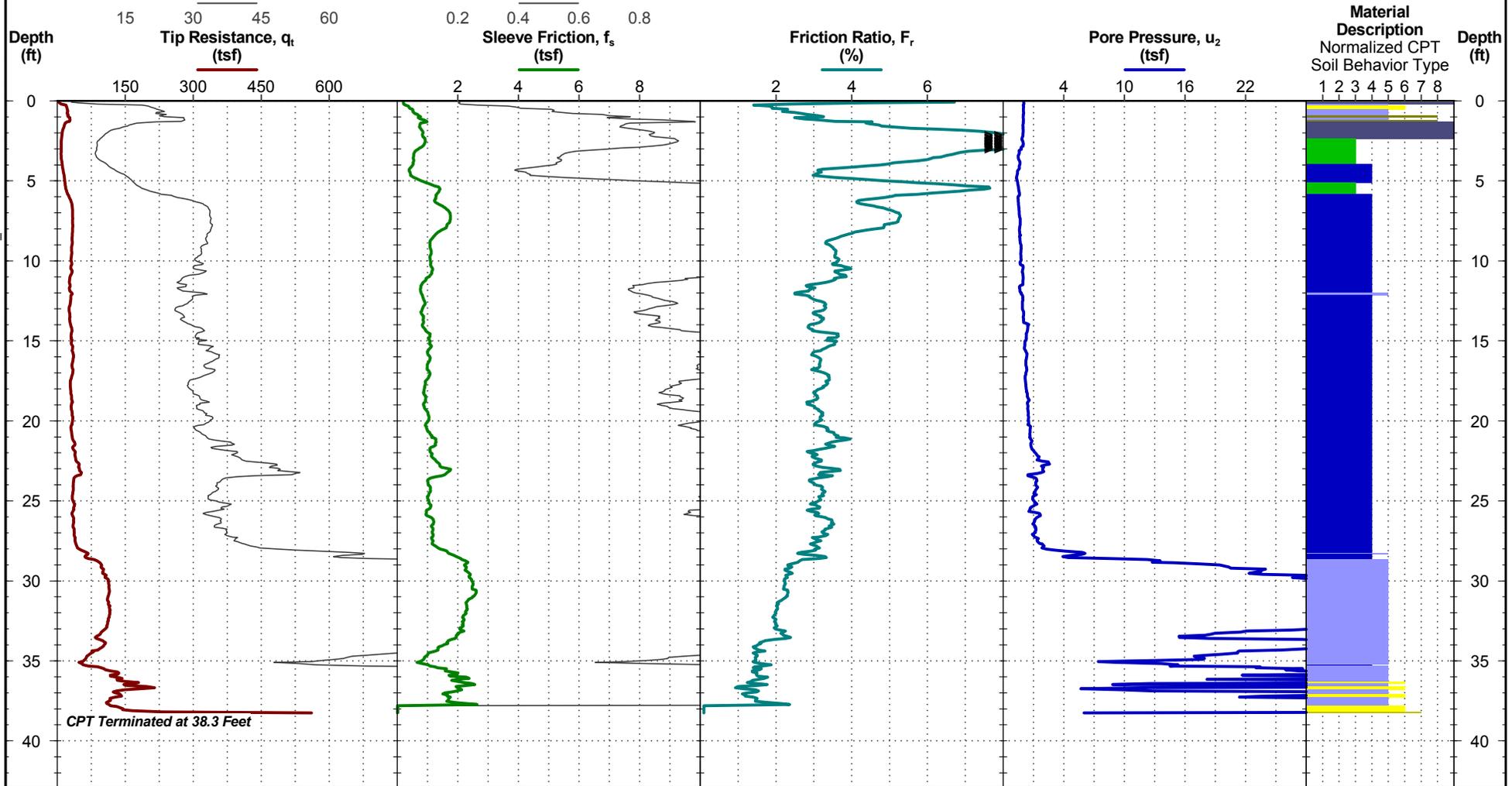
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04869°  
Longitude: -93.11679°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-9

# CPT LOG NO. BH - 35

**PROJECT:** [REDACTED]

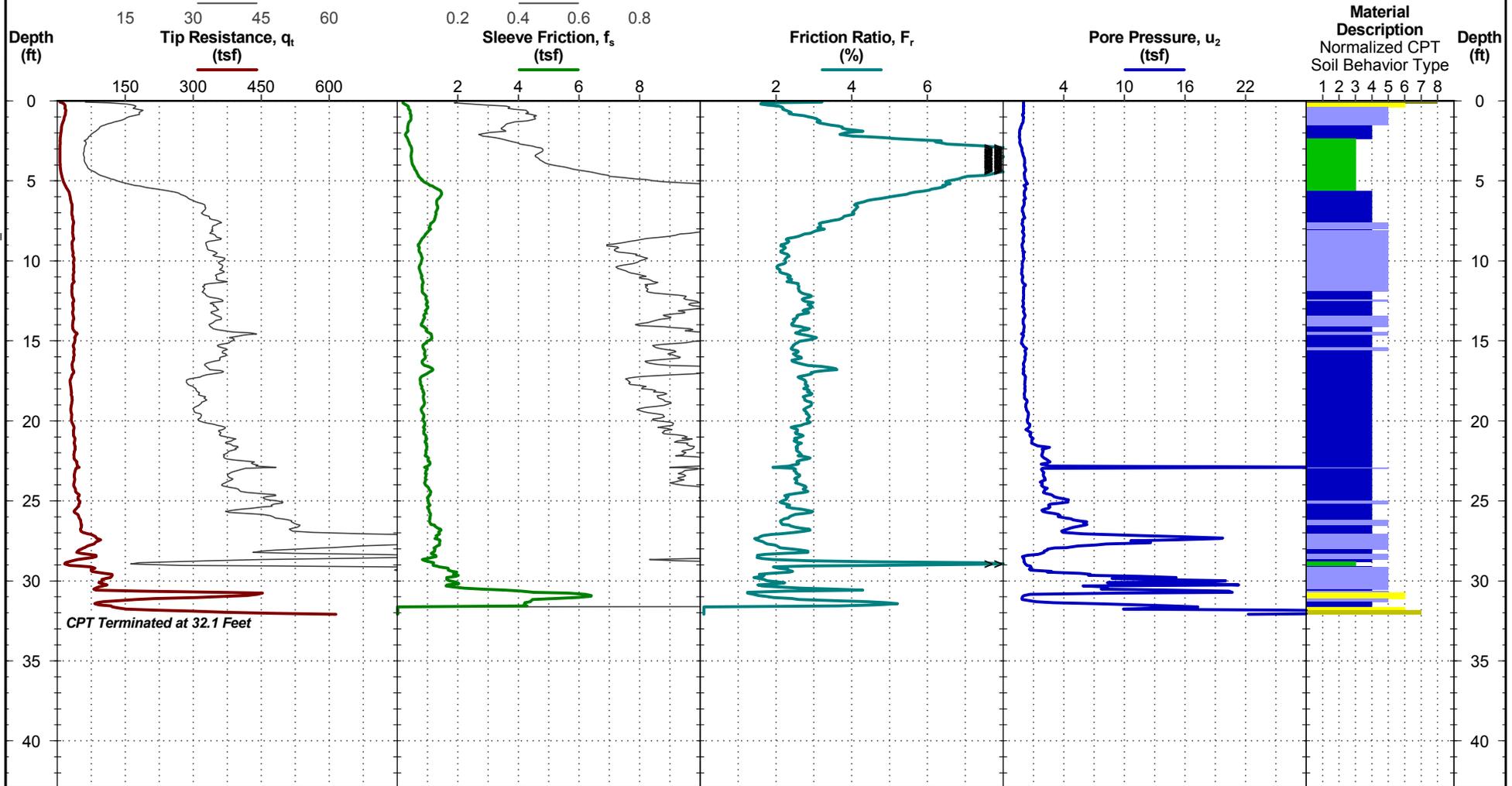
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.0498°  
Longitude: -93.11761°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT: 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
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- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-10

# CPT LOG NO. BH - 37

**PROJECT:** [REDACTED]

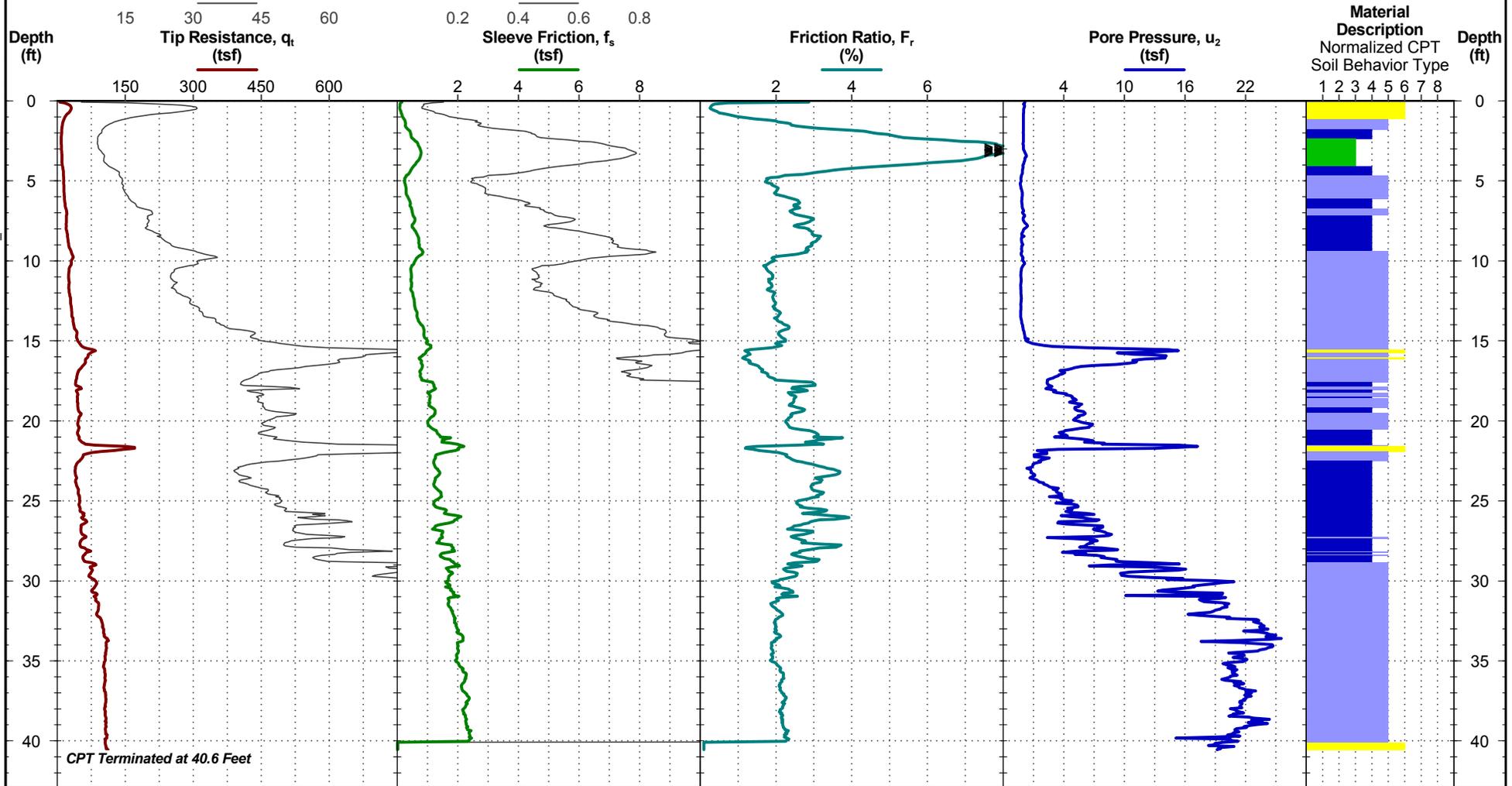
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.03666°  
Longitude: -93.11263°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
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- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-11

# CPT LOG NO. BH - 38

**PROJECT:** [REDACTED]

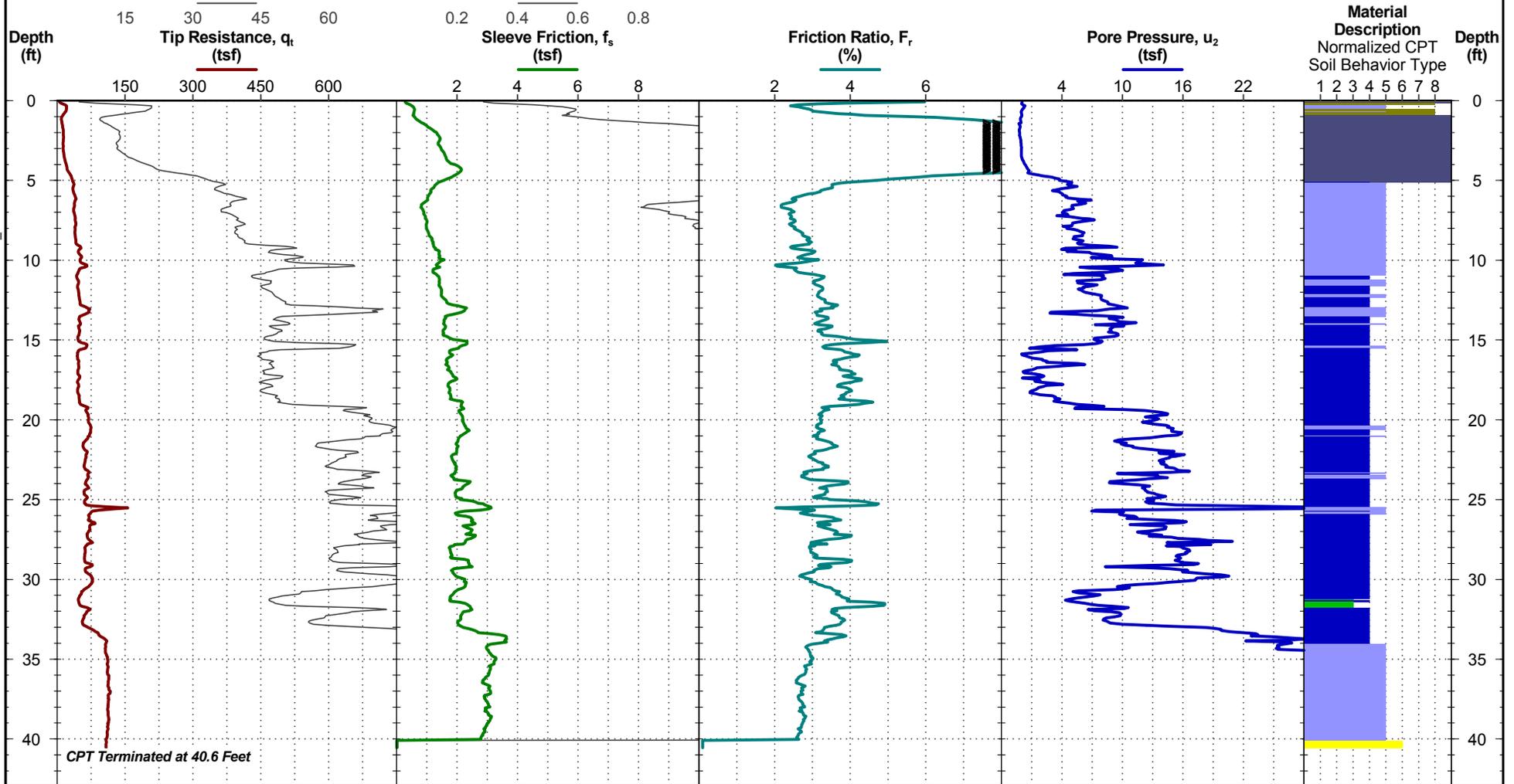
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04564°  
Longitude: -93.11321°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-12

# CPT LOG NO. BH - 39

**PROJECT:** [REDACTED]

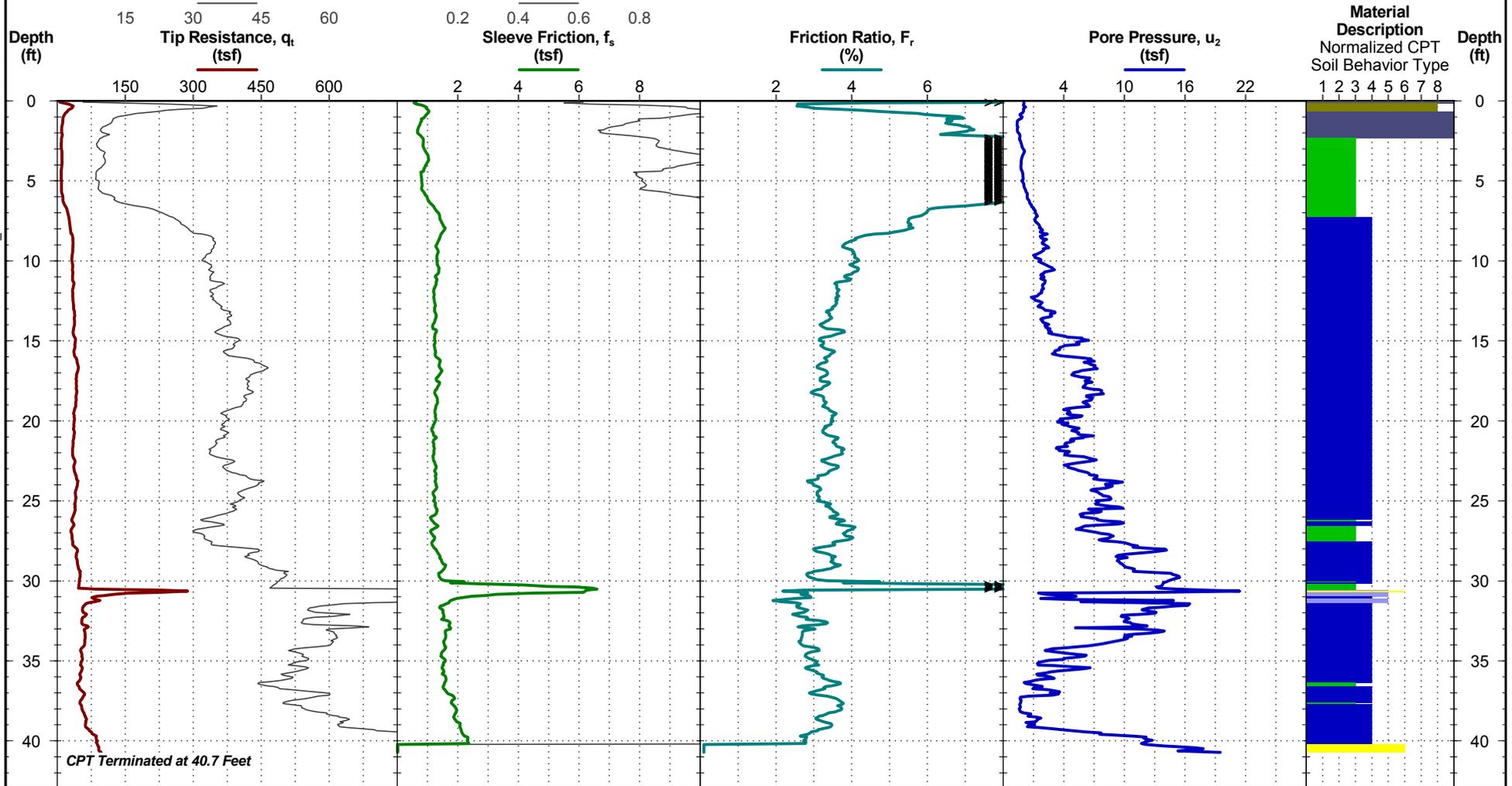
**CLIENT:** [REDACTED]

**TEST LOCATION:** See Exhibit A-2

**SITE:** Hwy 26 & Hwy 67  
Arkadelphia, AK

Latitude: 34.04967°  
Longitude: -93.11281°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 35165046 CPT.GPJ TERRACON\_DATATEMPLATE.GDT 9/21/16



See Exhibit A-3 for description of field procedures.  
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

Probe no. DPG1341 with net area ratio of 0.807  
U2 pore pressure transducer location  
Manufactured by Vertek; calibrated 4/19/2016  
Tip and sleeve areas of 15 cm<sup>2</sup> and 225 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 9/15/2016

CPT Completed: 9/15/2016

Rig:

Operator: M. May

Project No.: 35165046

Exhibit: A-13

## Supporting Information

Contents:

General Notes

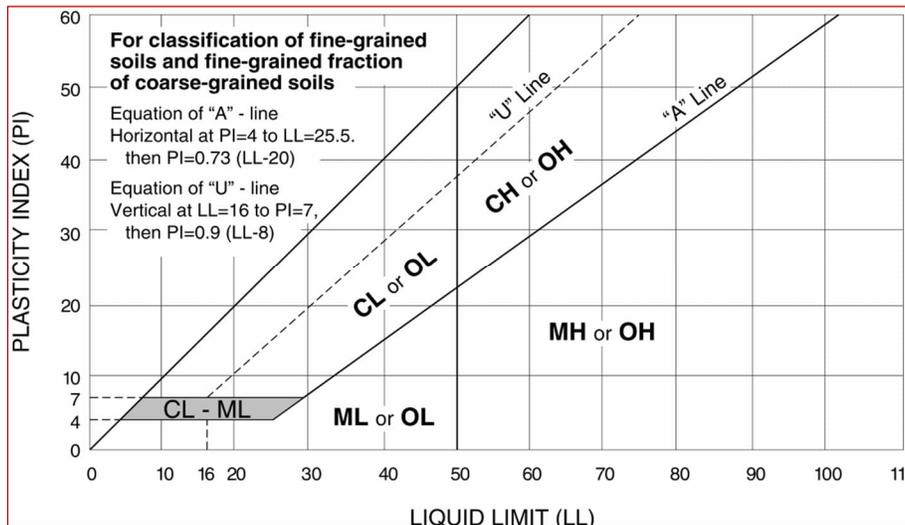
Unified Soil Classification System

Note: All attachments are one page unless noted above.

## Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>				Soil Classification	
				Group Symbol	Group Name <sup>B</sup>
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines <sup>C</sup>	$Cu \geq 4$ and $1 \leq Cc \leq 3$ <sup>E</sup>	GW	Well-graded gravel <sup>F</sup>
		Gravels with Fines: More than 12% fines <sup>C</sup>	$Cu < 4$ and/or $[Cc < 1$ or $Cc > 3.0]$ <sup>E</sup>	GP	Poorly graded gravel <sup>F</sup>
			Fines classify as ML or MH	GM	Silty gravel <sup>F, G, H</sup>
		Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines <sup>D</sup>	Fines classify as CL or CH	GC
	$Cu \geq 6$ and $1 \leq Cc \leq 3$ <sup>E</sup>			SW	Well-graded sand <sup>I</sup>
	Sands with Fines: More than 12% fines <sup>D</sup>		$Cu < 6$ and/or $[Cc < 1$ or $Cc > 3.0]$ <sup>E</sup>	SP	Poorly graded sand <sup>I</sup>
			Fines classify as ML or MH	SM	Silty sand <sup>G, H, I</sup>
	Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots above "A" line <sup>J</sup>	CL
$PI < 4$ or plots below "A" line <sup>J</sup>				ML	Silt <sup>K, L, M</sup>
Organic:			$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OL	Organic clay <sup>K, L, M, N</sup> Organic silt <sup>K, L, M, O</sup>
			Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line
PI plots below "A" line		MH			Elastic silt <sup>K, L, M</sup>
Organic:		$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$		OH	Organic clay <sup>K, L, M, P</sup> Organic silt <sup>K, L, M, Q</sup>
		Highly organic soils:		Primarily organic matter, dark in color, and organic odor	

- <sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve.
- <sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
- <sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
- <sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
- <sup>E</sup>  $Cu = D_{60}/D_{10}$      $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- <sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.
- <sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
- <sup>H</sup> If fines are organic, add "with organic fines" to group name.
- <sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.
- <sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
- <sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
- <sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.
- <sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.
- <sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.
- <sup>O</sup>  $PI < 4$  or plots below "A" line.
- <sup>P</sup>  $PI$  plots on or above "A" line.
- <sup>Q</sup>  $PI$  plots below "A" line.



## Rock Classification Notes

WEATHERING			
Term	Description		
Fresh	Mineral crystals appear bright; show no discoloration. Features show little or now staining on surfaces. Discoloration does not extend into intact rock.		
Slightly weathered	Rock generally fresh except along fractures. Some fractures stained and discoloration may extend <0.5 inches into rock.		
Moderately weathered	Significant portions of rock are dull and discolored. Rock may be significantly weaker than in fresh state near fractures. Soil zones of limited extent may occur along some fractures.		
Highly weathered	Rock dull and discolored throughout. Majority of rock mass is significantly weaker and has decomposed and/or disintegrated; isolated zones of stronger rock and/or soil may occur throughout.		
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The rock mass or fabric is still evident and largely intact. Isolated zones of stronger rock may occur locally.		
STRENGTH OR HARDNESS			
Description	Field Identification		Uniaxial Compressive Strength, psi
Extremely strong	Can only be chipped with geological hammer. Rock rings on hammer blows. Cannot be scratched with a sharp pick. Hand specimens require several hard hammer blows to break.		>36,000
Very strong	Several blows of a geological hammer to fracture. Cannot be scratched with a 20d common steel nail. Can be scratched with a geologist's pick only with difficulty.		15,000-36,000
Strong	More than one blow of a geological hammer needed to fracture. Can be scratched with a 20d nail or geologist's pick. Gouges or grooves to ¼ inch deep can be excavated by a hard blow of a geologist's pick. Hand specimens can be detached by a moderate blow.		7,500-15,000
Medium strong	One blow of geological hammer needed to fracture. Can be distinctly scratched with 20d nail. Can be grooved or gouged 1/16 in. deep by firm pressure with a geologist's pick point. Can be fractured with single firm blow of geological hammer. Can be excavated in small chips (about 1-in. maximum size) by hard blows of the point of a geologist's pick;		3,500-7,500
Weak	Shallow indent by firm blow with geological hammer point. Can be gouged or grooved readily with geologist's pick point. Can be excavated in pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.		700-3,500
Very weak	Crumbles under firm blow with geological hammer point. Can be excavated readily with the point of a geologist's pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.		150-700
DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		Bedding Spacing (May Include Foliation or Banding)	
Description	Spacing	Description	Spacing
Intensely fractured	< 2.5 inches	Laminated	< ½-inch
Highly fractured	2.5 – 8 inches	Very thin	½ – 2 inches
Moderately fractured	8 inches to 2 feet	Thin	2 inches – 1 foot
Slightly fractured	2 to 6.5 feet	Medium	1 – 3 feet
Very slightly fractured	> 6.5 feet	Thick	3 – 10 feet
		Massive	> 10 feet
ROCK QUALITY DESIGNATION (RQD) <sup>1</sup>			
Description		RQD Value (%)	
Very Poor		0 - 25	
Poor		25 – 50	
Fair		50 – 75	
Good		75 – 90	
Excellent		90 - 100	

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.