**ARKANSAS DEPARTMENT OF TRANSPORTATION**

# SUBSURFACE INVESTIGATION

**STATE JOB NO.** 040904

**FEDERAL AID PROJECT NO.** FEDERAL AID PROJECT CPFCDS-NHPP-40-1(268)

CLEAR CREEK RD. – I-40 (PHASE 1) (F)

**STATE HIGHWAY** 549 **SECTION** 6

**IN** CRAWFORD **COUNTY**

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April 17, 2026
UES Project No. A23184.00083

HNTB Corporation
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**SECTION 904 GEOTECHNICAL DATA REPORT**
**JOB No. 040748: HWY. 22 - I-40 (ARKANSAS RIVER) (F)**
**CRAWFORD and SEBASTIAN COUNTIES, ARKANSAS**

## INTRODUCTION

This report provides the geotechnical data report (GDR) for the geotechnical study related to Section 904 of ARDOT Job No. 040748: Hwy. 22 - I-40 (Arkansas River) (F) in Crawford and Sebastian Counties, Arkansas. These services were authorized by the Subconsultant Agreement for On-Call Design Services (2017-2020 extended to 2021) with HNTB Corporation and acknowledged on May 25, 2021. This study has been performed in general accordance with the outlined scope in that agreement and in discussions throughout the project. Preliminary results of the Section 904 study have been submitted as data were developed throughout the course of this study phase. The draft GDR for Section 904 was provided in our submittal of September 20, 2024.

The ARDOT Job No. 040748 future I-49 alignment extends north from Highway 22 and Interstate 40 approximately 13.7 miles. The new I-49 alignment will connect Highway 22 in Sebastian County to the Interstate 40 and Interstate 49 interchange in Crawford County. The southern end of the alignment will extend over the Arkansas River to Hwy. 22 in Barling, Sebastian County, Arkansas. The project will consist of bridges and roadways designed and constructed to interstate standards. Section 904 of the project is limited to the alignment in a portion of Crawford County which includes the Interstate 40 Interchange and extends south to Hwy. 162 (Kibler Highway).

The purpose of this Phase II geotechnical investigation has been to perform the final exploration of subsurface conditions in the alignment, drill borings at representative locations selected by the Engineer (HNTB), and obtain samples for laboratory testing. This report is limited to the results developed from the study performed for Section 904. The geotechnical data discussed herein are

intended for use in design and construction planning for Section 904. The results of the field and laboratory studies are presented in the following report sections. Site, geologic, and subsurface conditions are also discussed.

## SUBSURFACE EXPLORATION

Subsurface conditions in the Section 904 portion of the future Interstate 49 alignment have been explored by drilling a total of 107 sample and core borings at or near the locations selected by the Engineer. The total scope of Section 904 includes 108 borings. The site vicinity is shown on Plate 1. The exploration program is summarized on Plates 2a through 2c. Logs of the borings drilled for the Phase II Section 904 study as of September 19, 2024, presenting descriptions of the soil and rock strata encountered in the borings and the results of field and laboratory tests, are included as Plates 3 through 161. The surveyed ground surface elevation, as provided by the Surveyor (Crafton Tull) or the Engineer, is also shown on the logs. Where survey data was not available, the surface elevation was inferred from the available topographic information. It must be recognized that the elevations shown are approximate and actual elevations may vary. The latitude and longitude, obtained from survey data or a hand-portable GPS unit, are also shown on the logs. Keys to the terms and symbols used on the logs are presented as Plates 162 and 163.

Pavement cores were performed at selected locations chosen by the Engineer (HNTB). The pavement cores were performed using an electric core drill and 6-in.-diameter diamond core barrel. All cores were advanced through asphalt cement concrete and into the subgrade. A summary of the core results is provided in the attached Appendix A. Detailed core logs are also provided in Appendix A.

The borings were drilled using a truck-mounted SIMCO 2800 rotary-drilling rig, a rubber-tired ATV CME-550, and track-mounted Diedrich D-50 and CME-55 rotary-drilling rigs. The drill rig utilized for each boring is noted on the appropriate boring log. The borings were advanced using dry-auger drilling procedures or a combination of dry-auger and rotary-wash procedures. For boring intervals advanced with dry-auger methods, either 4.5-in.-diameter continuous flight augers or hollow stem augers were used.

Samples of the overburden soils and weathered rock were typically obtained using a 2-in.-diameter split-barrel sampler driven into the strata by blows of a 140-lb automatic hammer with 30-in. drop in accordance with Standard Penetration Test (SPT) procedures (AASHTO T 206). The number of blows required to drive the standard split-barrel sampler the final 12 in. of an 18-in. total drive, or a portion thereof, is defined as the Standard Penetration Number (N). Recorded N-values are

shown on the boring logs in the "Blows Per Ft" column. Where rock hardness precluded obtaining samples via the SPT, cuttings were obtained for use in visual classification. The SPT auto hammer calibration reports are provided in Appendix B.

Representative undisturbed samples of cohesive soils were obtained using a 3-in.-diameter thin-walled tube hydraulically advanced into the soil (AASHTO T 207). Undrained shear strength of the cohesive soils was estimated in the field using a calibrated hand penetrometer. The estimated shear strength value was determined, in tons per sq ft, by dividing the penetrometer value by 3, as per UES standard procedure. Estimated shear strength values are plotted on the log forms, in tons per sq ft, as circles enclosing an "x".

Competent shale and sandstone were cored using 5-ft-long $NQ_{WL}$- or NQ2-size double-tube core barrel with a diamond bit (AASHTO T 225). For each core run, the percent recovery was determined as the ratio of recovery to total length of core run. Rock Quality Designation (RQD) was also determined for each core run as the sum of intact, sound rock core greater than 4-in. length divided by the total length of the run and expressed in percent. For the purposes of determining RQD, mechanical core breaks were not deleted from sound rock intervals. Both these values are presented in the right-hand columns of the log forms, opposite the corresponding core run.

Photographs of the recovered rock cores are provided in Appendix C. It should be noted that the very poor to poor rock quality of some interbedded shale and sandstone units limited core recovery. Where rock was not coreable, cuttings were collected for use in visual classification.

All samples were removed from sampling tools in the field, examined and visually classified by the field geologist or field engineer. Samples were then placed in appropriate containers to prevent moisture loss and/or change in condition during transfer to our laboratory for further examination by a geotechnical engineer and testing. Rock cores were placed in waxed cardboard boxes.

The borings were advanced using dry-auger drilling procedures to the extent possible to facilitate evaluation of shallow groundwater conditions. Observations regarding groundwater are noted in the lower-right portion of each log and are discussed in subsequent sections of this report. All boreholes were backfilled with cuttings after obtaining the final water level readings.

## LABORATORY TESTING

Pertinent physical and engineering characteristics of the overburden soil and rock were measured by performing laboratory tests on selected representative soil and rock core samples. Laboratory testing was assigned by the Engineer. In some cases, assigned sample intervals were adjusted with respect to sample recovery and suitability of selected samples.

The laboratory testing program included the following.

- Natural water content determinations (AASHTO T 265)
- Liquid and plastic (Atterberg) limit determinations (AASHTO T 89 and T 90)
- Grain size analysis through No. 200 sieve (AASHTO T 88)
- Grain size analysis through No. 200 sieve with hydrometer (AASHTO T 88)
- Unconfined compression tests of soil (AASHTO T 208)
- Consolidated-drained direct shear test on soil (AASHTO T 236)
- Consolidation tests (AASHTO T 216)
- Analytical tests of soil
    - Water-Soluble Sulfate Ion Content in Soil (AASHTO T 290)
    - Water-Soluble Chloride Ion Content in Soil (AASHTO T 291)
    - Soil pH (AASHTO T 289)
    - Minimum Laboratory Soil Resistivity (AASHTO T 288)
- Uniaxial compression on rock (AASHTO T 226)

Water content results are plotted on the boring log forms in accordance with the scale and symbols shown in the legend located in the upper-right corner of the logs. The Atterberg limits are plotted on the logs as small pluses inter-connected with a dashed line using the water content scale. The percent of soil passing the No. 200 sieve is noted in the "- No. 200%" column on the log forms. Classification test results, as well as soil classification by the Unified Soil Classification System (ASTM D2487) and the AASHTO Classification System (AASHTO M 145), are summarized in Appendix D. Grain-size distribution curves are provided in Appendix E. The results of hydrometer analyses are provided in Appendix F.

Laboratory soil strength testing consisted of unconfined compression tests performed on tube samples. Undrained shear strength (cohesion) determined from the results of the compression tests is plotted on the logs at the appropriate depth, in tons per sq ft, as an open circle. Unit dry weight and natural water content were also determined as a part of each strength test. In addition, unit weight was measured on selected samples. The unit weight measure and water content are also shown on the logs. The results of soil compression tests are summarized in Appendix G.

To evaluate the effective shear strength of the subgrade soils, one (1) consolidated-drained (CD) direct shear test was performed on a representative remolded sample. For a direct shear test, a sample is sheared at a constant strain rate for three (3) normal loads. A plot of shear stress versus normal stress and the angle of internal friction ($\phi'$) and cohesion intercept ($c'$) are then determined. These test results are presented graphically in Appendix H.

Consolidation tests were performed on selected samples as directed by the Engineer. The consolidation tests typically included loading in increments up to 16 tons per sq foot. The consolidation test results are shown in Appendix I. The consolidation test results were also utilized to develop square root of time curves and determine coefficient of consolidation values. These results are summarized in Appendix J.

Laboratory testing included measurement of water-soluble chlorides and sulfates, soil pH, and soil resistivity. Analytical test results are summarized in Appendix K.

Unconfined compressive strength of representative core samples of shale, sandstone, and shale with interbedded sandstone were evaluated by performing uniaxial compression tests. Results of the laboratory compression tests are shown in lbs per sq in. at the appropriate depth on the boring logs. The total unit weight of intact cores was also measured, and these data are also shown on the logs. The compression test results are summarized in the Summary of Rock Compression Test Results provided in Appendix L. The summary includes the boring number, sample depth, total unit weight, measured compressive strength, failure description, and rock visual classification.

Moisture-Density Relationship (Proctor) tests were performed on two (2) representative bulk samples. These tests were performed in accordance with AASHTO T 99 methods. Pavement subgrade support properties were evaluated at the Boring FP-38 and FP-39 locations by performing two (2) California Bearing Ratio (CBR) tests (AASHTO T 193), with one (1) test performed for each bulk sample obtained from the test pits. For the CBR tests, the specimens were molded at approximately the optimum water content and 95 percent of the maximum dry density as determined by the corresponding laboratory Proctor tests. A 20-lb surcharge was used for each CBR test. Proctor and CBR test results are presented graphically in Appendix M.

Based on the results of CBR tests and correlations with the AASHTO classification of the anticipated subgrade soils, subgrade support is expected to be very poor to poor for these fine-grained, low-plasticity soils. In light of the correlation with laboratory test data and factoring for environmental and serviceability criteria, the following parameters have been developed for each CBR test.

Boring FP-38

- Resilient Modulus ($M_R$): 2940 lbs per sq in.
- R value: 9.7

Boring FP-39

- Resilient Modulus ($M_R$): 2730 lbs per sq in.
- R value: 9.4

## SITE and SUBSURFACE CONDITIONS

### Site Conditions

The 040748 I-49 Section 904 portion of the alignment extends generally north from the south side of Waterfront Road through a mixture of rural subdivisions and farm fields. The topography of this area consists primarily of low-lying areas with a few scattered small trees and thick underbrush and unimproved roads. Several low-lying areas in this section are poorly drained and prone to water ponding and flooding during periods of heavy rain months.

The alignment crosses Waterfront Road at an existing rural subdivision. This area's terrain is generally flat in developed areas and undulating with some small hills in pastoral and undeveloped areas. The alignment crosses Frog Bayou just north of Waterfront Road, extending through a relatively flat and generally low-lying area of farm fields. This portion of the alignment is a partially wooded area with multiple farmed plots and fairly level terrain extending to the southwestern edge of the City of Alma.

The Section 904 future I-49 alignment crosses Hwy. 64 about 2000 ft south of the I-40 alignment, approximately 1 mile west of Alma. The alignment between Waterfront Road and I-40 primarily has flat to undulating terrain with variable very poor to fair surface drainage. The alignment crosses numerous drainage features, both natural and excavated features for agricultural irrigation.

### Site Geology

Information shown on the Geologic Map of Arkansas[1] indicates that the project alignment is primarily located in the mapped exposures of Holocene Alluvium and a few areas of the Pleistocene Terrace deposits. The alluvium and terrace deposits are variable flood-plain deposits typically comprised of terraces of gravel, sand, silt, and clay and mixtures of these clastic materials. The alluvial deposits characteristically consist of an upper zone of fine-grained clay and/or silt units underlain by sand and gravel units. The alluvial deposits are variable deposits of small streams over bank deposits of major streams or older meander belt deposits of major streams. Locally, the alluvial units are a result of channel fill, natural levee, and backswamp activity. The terrace deposits are comprised of a complex sequence of unconsolidated gravel, sand, silt and clay. Individual Terrace deposits are often lenticular and discontinuous. The thickness of the terrace and alluvial deposits is variable.

In areas of higher terrain, and below the alluvial and terrace deposits, are Paleozoic bedrock units of the Pennsylvanian Period McAlester Formation and the Hartshorne Sandstone. The

[1] Geologic Map of Arkansas, Arkansas Geological Commission and U.S. Geological Survey; 1993

McAlester Formation consists of several hundred feet of shale with thin sandstone and coal beds, several hundred feet of shale with a few sandstone beds and coal and is capped by several hundred feet of shale with occasional coal beds. The McAlester Formation rests conformably on the Hartshorne Sandstone and the Lower Hartshorne Coal is just above the base of the McAlester. The McAlester Formation is about 500 to 2300 feet thick.

The Hartshorne Sandstone is generally comprised of medium-grained sandstone which is massive and frequently cross-bedded. This formation is the first continuous sandstone underlying the Lower Hartshorne Coal. The formation rests with minor unconformity on the Atoka Formation. The thickness of the Hartshorne Sandstone is reported to range from about 10 to 300 feet.

Subsurface Conditions

The results of the borings drilled for Section 904 indicate that the overburden soils and the depth to bedrock vary widely along the alignment. The variable overburden soils range from less than 1 ft to 40 ft below existing grades with an average thickness of about 20 ft. The overburden soils in areas of higher terrain and/or overlying shallow rock tend to be residual soil units of clayey silt, silty clay, and/or clay derived from the underlying shale and sandstone units of the Paleozoic rock. In the areas of lower terrain, particularly around major streams like the Arkansas River and Frog Bayou, the overburden soils consist of a widely-variable mixture of fine-grained silt and clay units overlying granular soil units of sand and gravel as well as mixtures of these soils.

The rock units encountered in the Phase II borings are predominantly comprised of shale and sandstone. These rock units are frequently interbedded, with shale generally predominant. Weathered shale or weathered sandstone units are often overlying the predominant slightly weathered shale to fresh shale strata. The weathered rock zone, where present, varies from 1 ft or less to 22 ft thick at the boring locations. The weathered rock zone typically consists of highly weathered to moderately weathered shale with subordinate units of weathered sandstone. Fractures and ferrous stains are common in the weathered rock zones.

The basal bedrock consists primarily of moderately hard to hard gray and dark gray shale with subordinate units of moderately hard to hard gray fine-grained sandstone. The core borings indicate the rock quality varies from poor to excellent. Overall, the rock quality is considered good to excellent.

In some areas, the shale has interbedded, very thin, close to very close, gray fine-grained sandstone partings, seams, and layers. Where sandstone is predominant in the stratigraphy, the sandstone will sometimes contain very thin interbedded close to very close dark gray shale

inclusions, laminations, and seams. The shale and sandstone are generally flat bedded. The shale is generally silty, but some shale units are arenaceous or carbonaceous. Rare clayey shale units are also present. Localized and discontinuous inclusions, seams, and layers of coal are present in the shale. However, the amount of coal and the thickness of these localized units was limited.

Groundwater Conditions

Groundwater was encountered at widely variable depths of 1.5 to 23 ft (±El 390 to ±El 371) at the time of drilling in September 2023 to August 2025. The shallow groundwater depths are considered to represent shallow perched water in the overburden soils, particularly in alluvial units. The depth of groundwater in soil units in proximity to major streams like the Arkansas River and Frog Bayou will be strongly influenced by surface water levels in those streams. Normal pool of the Arkansas River at the alignment location is reported to be El 389. Groundwater levels will vary with seasonal precipitation, surface runoff and infiltration, and stream levels in nearby surface water features.

## CLOSING

The data and conclusions provided herein have been developed based on the results of this study phase. The interpretation of soil, rock, and groundwater conditions has been based on our knowledge of site geology, the results of the borings performed for this study phase, observations made during the subsurface investigation, and our understanding of the project. Although consideration has been given to minor variations in subsurface conditions, the results and conclusions of this report may not be appropriate for localized, but potentially significant, variations in subsurface conditions. Variations from the conditions shown on the boring logs could be encountered.

The following attachments are included and complete this submittal of the Phase II geotechnical data report.

| | |
|---|---|
| Plate 1 | Site Vicinity |
| Plate 2a through 2c | Summary of Phase II Section 904 Exploration Program |
| Plates 3 through 98 | Logs – Final Bridge (“FB”) Borings |
| Plates 99 through 116 | Logs – Final Embankment (“FE”) Borings |
| Plates 117 through 130 | Logs – Final Pavement (“FP”) Borings |
| Plates 131 through 138 | Logs – Final Wall (“FW”) Borings |
| Plates 139 through 161 | Logs – High Mast Tower (“HMT”) Borings |
| Plates 162 and 163 | Keys to Terms and Symbols |
| Appendix A | Pavement Core Summary and Core Details |
| Appendix B | SPT Auto Hammer Calibration |
| Appendix C | Rock Core Photographs |
| Appendix D | Summary of Classification Test Results |
| Appendix E | Grain-Size Distribution Curves |
| Appendix F | Hydrometer Particle-Size Distribution Curves |
| Appendix G | Soil Compression Test Results (UC Tests) |
| Appendix H | Direct Shear Test Results (Consolidated-Drained) |
| Appendix I | Consolidation Test Results |
| Appendix J | Summary of Coefficients of Consolidation |
| Appendix K | Analytical Test Results |
| Appendix L | Rock Compression Test Results |
| Appendix M | Proctor and CBR Test Results |

*  *  *  *  *

We appreciate the opportunity to be of service to you on this Section 904 project phase. Should you have any questions regarding this report, or when we may be of assistance during final design and construction, please call on us.

Sincerely,

**UES PROFESSIONAL, SOLUTIONS 25, LLC**

Justin Ferguson
Project Geologist

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Principal

STATE OF ARKANSAS
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VELLETA SCOTT

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Attn: Mr. Wayne Duryee, P.E. (1-electronic)




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**SITE VICINITY MAP**
**040748 Hwy 22 to I-40**
**Sebastian & Crawford Counties, Arkansas**

**Job No. 23184.00083**

**Plate 1**

# SUMMARY of PHASE II, SECTION 904 EXPLORATION PROGRAM

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49)
LOCATION: Crawford County, Arkansas
UES JOB No.: 23184.00083 (21-071)

| Boring No. | Project Facet | GPS Coordinates | | Approx Surf El, ft | Boring Depth, ft |
|---|---|---|---|---|---|
| | | Latitude | Longitude | | |
| FB-99 | Bridge 6 | 35.435134 | -94.212814 | 397.2 | 15.8 |
| FB-100 | Bridge 6 | 35.435149 | -94.212512 | 403.3 | 50 |
| FB-101 | Bridge 6 | 35.435149 | -94.211978 | 416.1 | 46 |
| FB-102 | Bridge 6 | 35.435179 | -94.211551 | 418.9 | 43 |
| FB-103 | Bridge 7 | 35.436182 | -94.211733 | 408.8 | 41 |
| FB-104 | Bridge 7 | 35.436454 | -94.211336 | 391± | 26 |
| FB-105 | Bridge 7 | 35.436543 | -94.211457 | 389.3 | 36 |
| FB-106 | Bridge 7 | 35.436621 | -94.211041 | 393.8 | 40 |
| FB-107 | Bridge 7 | 35.436724 | -94.211509 | 384± | 37 |
| FB-108 | Bridge 7 | 35.436790 | -94.210930 | 388± | 44.5 |
| FB-109 | Bridge 7 | 35.437279 | -94.211188 | 387.1 | 50 |
| FB-110 | Bridge 7 | 35.437338 | -94.210785 | 382.6 | 49 |
| FB-111 | Bridge 7 | 35.437547 | -94.211170 | 384.0 | 50 |
| FB-112 | Bridge 7 | 35.437624 | -94.210768 | 386.7 | 49 |
| FB-113 | Bridge 7 | 35.437913 | -94.210963 | 388.0 | 35 |
| FB-114 | Bridge 7 | 35.437988 | -94.210557 | 388.4 | 35 |
| FB-115 | Bridge 8 | 35.453730 | -94.216962 | 397.3 | 26 |
| FB-115A | Bridge 8 | 35.453730 | -94.216962 | 397± | 31.1 |
| FB-116 | Bridge 8 | 35.454432 | -94.217214 | 398.5 | 52 |
| FB-117 | Bridge 8 | 35.454561 | -94.217803 | 400.2 | 55 |
| FB-118 | Bridge 8 | 35.454746 | -94.217536 | 399.4 | 50 |
| FB-210 | Bridge 8 | 35.454059 | -94.217094 | 397± | 51 |
| FB-211 | Bridge 8 | 35.454380 | -94.217103 | 398± | 51.3 |
| FB-165 | Bridge 14 | 35.480114 | -94.241686 | 426± | 62 |
| FB-167 | Bridge 14 | 35.480534 | -94.246892 | 420.4 | 59 |
| FB-171 | Bridge 14 | 35.481041 | -94.246457 | 423.1 | 46.5 |
| FB-175 | Bridge 14 | 35.481636 | -94.245914 | 424± | Not Drilled due to access |
| FB-176 | Bridge 14 | 35.481944 | -94.245571 | 429.2 | 50 |
| FB-179 | Bridge 14 | 35.482660 | -94.242283 | 433.4 | 85 |
| FB-180 | Bridge 14 | 35.482730 | -94.241328 | 434.1 | 54 |
| FB-181 | Bridge 14 | 35.482847 | -94.241985 | 433.8 | 85 |
| FB-182 | Bridge 14 | 35.482970 | -94.241781 | 434.1 | 30 |
| FB-182A | Bridge 14 | 35.482970 | -94.241781 | 434.1 | 65 |
| FB-183 | Bridge 14 | 35.483117 | -94.241567 | 433.9 | 40 |
| FB-183A | Bridge 14 | 35.483143 | -94.241544 | 433.9 | 70 |
| FB-184 | Bridge 14 | 35.482984 | -94.242497 | 420± | 54 |
| FB-185 | Bridge 14 | 35.483482 | -94.242291 | 449.3 | 65 |
| FB-185A | Bridge 14 | 35.484006 | -94.242451 | 427± | 85 |
| FB-186 | Bridge 14 | 35.483661 | -94.241247 | 427.9 | 58.5 |
| FB-187 | Bridge 14 | 35.483800 | -94.242706 | 449.8 | 97 |
| FB-188 | Bridge 14 | 35.484396 | -94.242681 | 425.1 | 73.5 |
| FB-189 | Bridge 14 | 35.484709 | -94.243187 | 438.3 | 80 |
| FB-190 | Bridge 14 | 35.484882 | -94.239762 | 434.5 | 31.5 |
| FB-191 | Bridge 14 | 35.485141 | -94.242977 | 426.2 | 55 |
| FB-192 | Bridge 14 | 35.485389 | -94.243456 | 433.9 | 59 |

# SUMMARY of PHASE II, SECTION 904 EXPLORATION PROGRAM

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49)
LOCATION: Crawford County, Arkansas
UES JOB No.: 23184.00083 (21-071)

| Boring No. | Project Facet | GPS Coordinates | | Approx Surf El, ft | Boring Depth, ft |
|---|---|---|---|---|---|
| | | Latitude | Longitude | | |
| FB-193 | Bridge 14 | 35.485820 | -94.243246 | 433.0 | 70 |
| FB-194 | Bridge 14 | 35.486069 | -94.243726 | 434.3 | 59 |
| FB-195 | Bridge 14 | 35.486408 | -94.243861 | 434.7 | 58 |
| FB-196 | Bridge 14 | 35.486839 | -94.243650 | 427.0 | 58 |
| FB-197 | Bridge 14 | 35.487087 | -94.244130 | 435.6 | 59 |
| FB-198 | Bridge 14 | 35.487519 | -94.243919 | 428.3 | 63 |
| FB-199 | Bridge 14 | 35.487751 | -94.244396 | 436.5 | 50 |
| FB-200 | Bridge 14 | 35.487673 | -94.244366 | 436.5 | 42 |
| FB-201 | Bridge 14 | 35.487784 | -94.244336 | 433.7 | 32 |
| FB-202 | Bridge 14 | 35.487842 | -94.244118 | 427.8 | 32.5 |
| FB-203 | Bridge 14 | 35.487773 | -94.244011 | 428.2 | 46.5 |
| FB-204 | Bridge 14 | 35.487964 | -94.243749 | 434.1 | 40 |
| | | | | | |
| FC-1 | I-40 SHOULDER PAVEMENT | 35.481838 | -94.243715 | 434± | --- |
| FC-2 | I-40 SHOULDER PAVEMENT | 35.484733 | -94.239233 | 434± | --- |
| FC-3 | I-40 SHOULDER PAVEMENT | 35.481728 | -94.243604 | 434± | --- |
| FC-4 | I-40 SHOULDER PAVEMENT | 35.484592 | -94.329123 | 434± | --- |
| FC-5 | I-40 SHOULDER PAVEMENT | 35.483438 | -94.240742 | 434± | --- |
| FC-6 | I-40 SHOULDER PAVEMENT | 35.483474 | -94.241366 | 434± | --- |
| FC-7 | I-40 SHOULDER PAVEMENT | 35.482867 | -94.242282 | 434± | --- |
| FC-8 | I-40 SHOULDER PAVEMENT | 35.482920 | -94.241564 | 434± | --- |
| | | | | | |
| FE-42 | Embankment | 35.482920 | -94.241564 | 440± | 15 |
| FE-43 | Embankment | 35.482920 | -94.241564 | 418.5 | 4.5 |
| FE-44 | Embankment | 35.482920 | -94.241564 | 403.7 | 5 |
| FE-45 | Embankment | 35.482920 | -94.241564 | 407.4 | 6 |
| FE-46 | Embankment | 35.440657 | -94.210716 | 411.0 | 6.5 |
| FE-47 | Embankment | 35.440657 | -94.210716 | 385.2 | 19 |
| FE-48 | Embankment | 35.441370 | -94.210136 | 386.7 | 16 |
| FE-49 | Embankment | 35.443682 | -94.210797 | 388.1 | 19 |
| FE-50 | Embankment | 35.451219 | -94.213756 | 393.7 | 18.8 |
| FE-51 | Embankment | 35.451493 | -94.214822 | 394.6 | 18.9 |
| FE-52 | Embankment | 35.455227 | -94.217587 | 399.9 | 24.5 |
| FE-53 | Embankment | 35.455877 | -94.219481 | 399.7 | 21.8 |
| FE-54 | Embankment | 35.479237 | -94.248309 | 447 | 25 |
| FE-55 | Embankment | 35.479214 | -94.248299 | 428 | 15 |
| FE-56 | Embankment | 35.481160 | -94.239503 | 411 | 20 |
| FE-57 | Embankment | 35.489156 | -94.244528 | 434± | 25 |
| FE-58 | Embankment | 35.489635 | -94.245214 | 436± | 30 |
| FE-61 | Embankment | 35.435158 | -94.211217 | 407.4 | 5.2 |
| | | | | | |
| FP-32 | WATERFRONT RD PVT | 35.435133 | -94.213841 | 402.6 | 9.5 |
| FP-33 | WATERFRONT RD PVT | 35.435508 | -94.210365 | 413.3 | 9.5 |
| FP-34 | I-49-PVT | 35.446125 | -94.211053 | 389± | 10 |
| FP-35 | I-49-PVT/CULVERT | 35.458075 | -94.221664 | 399.2 | 16.3 |
| FP-36 | I-49-PVT/CULVERT | 35.458626 | -94.221246 | 399.1 | 15.1 |

# SUMMARY of PHASE II, SECTION 904 EXPLORATION PROGRAM

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49)
LOCATION: Crawford County, Arkansas
UES JOB No.: 23184.00083 (21-071)

| Boring No. | Project Facet | GPS Coordinates | | Approx Surf El, ft | Boring Depth, ft |
|---|---|---|---|---|---|
| | | Latitude | Longitude | | |
| FP-37 | I-49-PVT/CULVERT | 35.462292 | -94.226116 | 401.6 | 17.5 |
| FP-38 | I-49-PVT | 35.466271 | -94.229391 | 409.2 | 5.5 |
| FP-39 | I-49-PVT/CULVERT | 35.469764 | -94.233663 | 411.5 | 17.5 |
| FP-40 | I-40 WB PVT | 35.478220 | -94.250681 | 444.2 | 10 |
| FP-41 | I-40 EB PVT/CULVERT | 35.485008 | -94.237160 | 428.6 | 10 |
| FP-42 | I-40 WB RAMP TO I-49 NB PVT | 35.490549 | -94.246116 | 431.5 | 10 |
| FP-43 | I-49 SB FRONTAGE RD PVT | 35.491381 | -94.245220 | 435.2 | 10 |
| FP-44 | I-49 SB FRONTAGE RD PVT | 35.490549 | -94.246116 | 434± | 10 |
| FP-45 | I-49 NB PVT | 35.491380 | -94.245286 | 438± | 10 |
| | | | | | |
| FW-1 | I-49 WALL | 35.487993 | -94.244225 | 427.8 | 31 |
| FW-2 | I-49 WALL | 35.488344 | -94.244360 | 428.2 | 29 |
| FW-3 | I-49 WALL | 35.489116 | -94.244684 | 430.0 | 37.1 |
| FW-4 | I-49 WALL | 35.489968 | -94.244976 | 436.7 | 35 |
| FW-5 | I-49 WALL | 35.490590 | -94.245210 | 437.0 | 39 |
| FW-6 | I-49 WALL | 35.491132 | -94.245363 | 437.1 | 38 |
| FW-7 | I-49 WALL | 35.482923 | -94.245089 | 427.2 | 27 |
| FW-8 | I-49 WALL | 35.482281 | -94.245557 | 428.8 | 30.5 |
| | | | | | |
| HMT-1 | HIGH MAST TOWER | 35.477058 | -94.252240 | 469.5 | 19 |
| HMT-2 | HIGH MAST TOWER | 35.477832 | -94.250562 | 461.3 | 50 |
| HMT-3 | HIGH MAST TOWER | 35.478444 | -94.248983 | 435.0 | 59 |
| HMT-4 | HIGH MAST TOWER | 35.478880 | -94.247449 | 426.8 | 69.75 |
| HMT-5 | HIGH MAST TOWER | 35.480287 | -94.246686 | 419.3 | 65 |
| HMT-6 | HIGH MAST TOWER | 35.480316 | -94.245027 | 415± | 69 |
| HMT-7 | HIGH MAST TOWER | 35.481544 | -94.245390 | 429.4 | 55.5 |
| HMT-8 | HIGH MAST TOWER | 35.484298 | -94.238306 | 423.7 | 60 |
| HMT-9 | HIGH MAST TOWER | 35.485441 | -94.239463 | 425.8 | 56.5 |
| HMT-10 | HIGH MAST TOWER | 35.486102 | -94.237794 | 429.7 | 61.5 |
| HMT-14 | HIGH MAST TOWER | 35.486531 | -94.242949 | 435± | 80 |
| HMT-15 | HIGH MAST TOWER | 35.486044 | -94.244260 | 421± | 65 |

Notes: 1. Lat/long coordinates provided by Surveyor (Crafton Tull) or obtained with a hand-portable GPS unit.
2. Surface elevations are as provided by the Surveyor or the Engineer. Elevations are approximate and actual surface elevation may vary.

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-99

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 10.8 ft /NQ2 Core-CME-550

LOCATION: 35.435055°N, -94.212856°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 398± | | | | | | |
| | | | Very stiff brown and tan silty clay w/sandstone fragments (CL) (fill) | 50/3" | | | | | |
| | | | Moderately hard dark gray and tan highly weathered shale | 50/3" | | | | | |
| 5 | | | Moderately hard dark gray slightly weathered shale w/interbedded very close, very thin gray fine-grained weathered sandstone partings and seams, horizontal bedding - auger refusal at 5.8 ft in shale | 50/3" | | | | 77 | 0 |
| 10 | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings and seams, horizontal bedding | | | $q_u$= 2480 psi, TUW= 167 pcf | | 100 | 100 |
| 15 | | | | | | $q_u$= 2150 psi, TUW= 168 pcf | | 100 | 100 |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.37. | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |

COMPLETION DEPTH: 15.8 ft
DATE: 9-20-24

DEPTH TO WATER IN BORING: Dry to 5.8 ft
DATE: 9/20/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

PLATE 3

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-100

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in. HSA 12 ft /NQ Core - SIMCO 2800

LOCATION: 35.435149°N, -94.212512°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 403.3 | | | | | | |
| | | | Very soft brown and tan silty clay (CL) (fill) | 4 | | | | | |
| | | | Soft reddish brown silty clay (CL) w/occasional sandstone fragments (possible fill) | 5 | | | | | |
| 5 | | | Stiff reddish tan and gray silty clay (CL) w/some ferrous nodules and stains | 20 | | | | | |
| | | | - stiff to very stiff, w/some shale and sandstone fragments below 6.5 ft | 50/2" 50/1" 50/3" | | | | | |
| 10 | | | Low hardness to moderately hard dark gray slightly weathered shale w/some sandstone seams | | | | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 92 |
| 15 | | | | | | $q_u$= 6670 psi, TUW= 162 pcf | | | |
| 20 | | | | | | $q_u$= 3470 psi, TUW= 162 pcf | | 100 | 100 |
| 25 | | | | | | | | 98 | 98 |
| 30 | | | | | | $q_u$= 3540 psi, TUW= 166 pcf | | 100 | 100 |
| 35 | | | | | | $q_u$= 2490 psi, TUW= 164 pcf | | 97 | 97 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | NOTE 1: Backfilled with cuttings<br>NOTE 2: Drilled by BR.<br>NOTE 3: Logged by DRM.<br>NOTE 4: ECF = 1.19. | | | | | | |

COMPLETION DEPTH: 41.0 ft
DATE: 1-24-24

DEPTH TO WATER IN BORING: Dry to 12 ft

DATE: 1/18/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-101

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 16 ft /NQ Core-Diedrich D-50 LOCATION: 35.435149°N, -94.211978°E

SURF. EL: 416.1

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 0 | Stiff reddish tan and tan silty clay (CL), very dry | 17 | | | | | |
| | | 16 | | | | | |
| 5 | - w/sandstone fragments below 6 ft | 14 | | | | | |
| 10 | Low hardness reddish tan and tan highly weathered shale w/ferrous stains and occassional silty clay seams, horizontal bedding | 50/11" | | | | | |
| 15 | - dark gray and tan below 14 ft | 50/11" | | | | | |
| | | | | $q_u$= 2370 psi, TUW= 163 pcf | | | |
| 20 | Moderately hard gray slightly weathered fine-grained sandstone w/dark gray shale laminations and some ferrous stains, horizontal bedding | | | | | 83 | 52 |
| | | | | $q_u$= 4260 psi, TUW= 161 pcf | | | |
| | - hard weathered light gray fine-grained sandstone layer w/ some shale laminations from 21.8 to 23.1 ft | | | | | 96 | 56 |
| 25 | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| | | | | $q_u$= 4930 psi, TUW= 166 pcf | | 100 | 100 |

COMPLETION DEPTH: 46.0 ft
DATE: 10-9-24

DEPTH TO WATER IN BORING: Dry to 16 ft
DATE: 10/7/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-101

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 16 ft /NQ Core-Diedrich D-50 LOCATION: 35.435149°N, -94.211978°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 35 | | | | | | | | 100 | 100 |
| 40 | | | $q_u$= 4190 psi, TUW= 162 pcf | | | | | 100 | 100 |
| 45 | | | | | | | | 100 | 100 |
| 50 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 46.0 ft
DATE: 10-9-24

DEPTH TO WATER
IN BORING: Dry to 16 ft

DATE: 10/7/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-102

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 16 ft /NQ Core-Diedrich D-50 LOCATION: 35.435179°N, -94.211551°E

SURF. EL: 418.9

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | Stiff reddish tan and tan silty clay (CL), very dry | 13 | | | | | |
| | Low hardness reddish tan and tan highly weathered shale w/ferrous stains and occassional silty clay seams, horizontal bedding | 32 | | | | | |
| 5 | | 50/11" | | | | | |
| | | 46 | | | | | |
| | - dark gray and tan below 8.5 ft | | | | | | |
| 10 | | 44 | | | | | |
| | - auger refusal at 13.5 ft in shale | | | | | | |
| | Low hardness to moderately hard dark gray shale | 50/3" | | | | | |
| 15 | | | | | | | |
| | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 67 | 50 |
| | | | | $q_u$= 2760 psi, TUW= 173 pcf | | | |
| 20 | | | | | | 98 | 90 |
| | | | | $q_u$= 2990 psi, TUW= 164 pcf | | | |
| | | | | | | | |
| 25 | | | | | | 100 | 100 |
| | | | | $q_u$= 4600 psi, TUW= 167 pcf | | | |

COMPLETION DEPTH: 43.0 ft
DATE: 9-24-24

DEPTH TO WATER
IN BORING: Dry to 13.5 ft

DATE: 9/24/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-102

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 16 ft /NQ Core-Diedrich D-50 LOCATION: 35.435179°N, -94.211551°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 30 | | | (continued) | | | $q_u$= 2960 psi, TUW= 164 pcf | | 100 | 100 |
| 35 | | | | | | | | 100 | 100 |
| 40 | | | | | | | | 98 | 98 |
| 45 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 50 | | | | | | | | | |

COMPLETION DEPTH: 43.0 ft
DATE: 9-24-24

DEPTH TO WATER
IN BORING: Dry to 13.5 ft

DATE: 9/24/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-103

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 20 ft /NQ Core-Diedrich D-50 LOCATION: 35.436182°N, -94.211733°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 408.8 | | | | | | |
| | | | Stiff reddish tan and tan clay (CH) w/ferrous stains, weathered shale seams and fragments | 12 | | | | | |
| | | | Low hardness tan and dark gray highly weathered shale w/some silty clay seams and ferrous stains, horizontal bedding | 26 | | | | | |
| 5 | | | | 22 | | | | | |
| | | | | 30 | | | | | |
| 10 | | | | 53 | | | | | |
| | | | Low hardness to moderately hard dark gray and tan weathered shale, micaceous, w/some ferrous stains, horizontal bedding | 50/4" | | | | | |
| 15 | | | | | | | | | |
| | | | | 50/3" | | | | | |
| 20 | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings and seams, horizontal bedding | | | $q_u$= 1940 psi, TUW= 166 pcf | | 92 | 50 |
| | | | | | | | | 92 | 85 |
| 25 | | | | | | $q_u$= 1620 psi, TUW= 168 pcf | | | |

COMPLETION DEPTH: 41.0 ft
DATE: 9-25-24

DEPTH TO WATER IN BORING: 12 ft
DATE: 9/25/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

PLATE 9

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-103

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 20 ft /NQ Core-Diedrich D-50 LOCATION: 35.436182°N, -94.211733°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 30 | | | Low hardness to moderately hard dark gray slightly weathered shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 37 |
| 35 | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2690 psi, TUW= 169 pcf<br>$q_u$= 4110 psi, TUW= 169 pcf | | 95<br>100 | 44<br>100 |
| 40 | | | | | | | | | |
| 45 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 50 | | | | | | | | | |

COMPLETION DEPTH: 41.0 ft
DATE: 9-25-24

DEPTH TO WATER IN BORING: 12 ft
DATE: 9/25/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-104

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 6 ft /NQ Core-Diedrich D-50 LOCATION: 35.436540°N, -94.211337°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 391± | | | | | | |
| | | | Very stiff reddish tan and tan silty clay w/shale and sandstone fragments (CL), very dry | 26 | | | | | |
| | | | Low hardness gray and reddish tan highly weathered sandstone, fractured, w/some clayey sand seams | 50/11" | | | | | |
| 5 | | | | 50/5" | | | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings and seams, horizontal bedding | | | | | | |
| | | | - hard weathered light gray fine-grained sandstone layer w/ some shale laminations from 7.9 to 8.3 ft | | | $q_u$= 3050 psi, TUW= 167 pcf | | 93 | 93 |
| 10 | | | | | | | | 100 | 100 |
| 15 | | | | | | $q_u$= 2490 psi, TUW= 167 pcf | | 100 | 100 |
| 20 | | | | | | | | 100 | 100 |
| 25 | | | | | | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 30 | | | | | | | | | |

COMPLETION DEPTH: 26.0 ft
DATE: 9-27-24

DEPTH TO WATER
IN BORING: Dry to 6 ft
DATE: 9/27/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-105

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 6 ft /NQ Core-Diedrich D-50

LOCATION: 35.436543°N, -94.211457°E

SURF. EL: 389.3

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | Very stiff reddish tan and tan silty clay w/shale and sandstone fragments (CL), very dry | 50/5" | | | | | |
| | Low hardness gray and reddish tan highly weathered sandstone, fractured, w/some clayey sand seams | 50/4" 50/6" 50/3" | | | | | |
| 5 | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings and seams, horizontal bedding<br>- hard weathered light gray fine-grained sandstone layer from 7.8 to 8.3 ft | | | $q_u$= 3070 psi, TUW= 166 pcf | | 85 | 70 |
| 10 | | | | $q_u$= 3080 psi, TUW= 167 pcf | | 96 | 96 |
| 15 | | | | $q_u$= 3890 psi, TUW= 163 pcf | | 100 | 100 |
| 20 | | | | | | | |
| 25 | | | | $q_u$= 4610 psi, TUW= 167 pcf | | 100 | 100 |
| 30 | | | | | | 100 | 100 |
| 35 | | | | | | 100 | 100 |
| 40 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |

COMPLETION DEPTH: 36.0 ft
DATE: 9-26-24

DEPTH TO WATER IN BORING: Dry to 6 ft
DATE: 9/26/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-106

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 10 ft /NQ Core-Diedrich D-50 LOCATION: 35.436621°N, -94.211041°E

SURF. EL: 393.8

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 0 | Stiff reddish tan silty clay, sandy (CL) | 16 | | | | | |
| | - very stiff below 2 ft | 31 | | | | | |
| 5 | | 47 | | | | | |
| | Low hardness to moderately hard dark gray and tan weathered shale w/occasional gray fine-grained sandstone partings and seams and ferrous stains, horizontal bedding | 50/8" | | | | | |
| 10 | | 50/1" | | | | | |
| | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 85 |
| 15 | | | | $q_u$= 1510 psi, TUW= 167 pcf | | 100 | 100 |
| 20 | | | | $q_u$= 4990 psi, TUW= 167 pcf | | 100 | 100 |
| 25 | | | | $q_u$= 2970 psi, TUW= 174 pcf | | 100 | 100 |
| 30 | | | | | | 100 | 100 |
| 35 | | | | $q_u$= 2690 psi, TUW= 166 pcf | | 100 | 100 |
| 40 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |

COMPLETION DEPTH: 40.0 ft
DATE: 10-1-24

DEPTH TO WATER IN BORING: Dry to 10 ft

DATE: 10/1/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-107

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 7 ft /NQ Core-Diedrich D-50 LOCATION: 35.436693°N, -94.211481°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 384± | | | | | | |
| | | | Stiff reddish tan clayey silt, sandy (CL-ML), very dry | 10 | | | | | |
| | | | - w/some sandstone fragments below 2 ft | 18 | | | | | |
| 5 | | | Firm reddish tan fine sandy clay (CL) w/occasional sandstone fragments | 9 | | | | | |
| | | | | 50/4" | | | | | |
| | | | Low hardness to moderately hard dark gray and tan weathered shale w/occasional gray fine-grained sandstone partings and seams and ferrous stains, horizontal bedding | | | | | 94 | 62 |
| 10 | | | | | | $q_u$= 1500 psi, TUW= 170 pcf | | 100 | 100 |
| | | | Moderately hard weathered light gray fine-grained sandstone w/some shale laminations, horizontal bedding | | | | | | |
| 15 | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 5970 psi, TUW= 166 pcf | | 90 | 98 |
| 20 | | | | | | | | 88 | 73 |
| | | | - clayey shale seam at 23.5 ft | | | $q_u$= 3050 psi, TUW= 167 pcf | | | |
| 25 | | | | | | | | 100 | 100 |
| 30 | | | | | | $q_u$= 2750 psi, TUW= 157 pcf | | 98 | 90 |
| 35 | | | - clayey shale seam at 34.5 ft | | | $q_u$= 3990 psi, TUW= 168 pcf | | 100 | 100 |
| 40 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM/MTD.<br>NOTE 4: ECF = 1.33. | | | | | | |

COMPLETION DEPTH: 38.0 ft
DATE: 10-4-24

DEPTH TO WATER IN BORING: Dry to 7 ft

DATE: 10/3/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-108

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 13.5 ft /NQ Core-Diedrich D-50 LOCATION: 35.43679°N, -94.21093°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 388± | | | | | | |
| | | | Stiff reddish tan clayey silt, sandy (CL-ML), very dry | 18 | | | | | |
| | | | - very stiff below 2.5 ft | 45 | | | | | |
| 5 | | | | 42 | | | | | |
| | | | | 38 | | | | | |
| 10 | | | Low hardness to moderately hard dark gray and tan weathered shale w/occasional gray fine-grained sandstone partings and seams and ferrous stains, horizontal bedding | 50/2" | | | | | |
| | | | Moderately hard dark gray shale w/some gray fine-grained sandstone partings, slightly weathered, jointed, horizontal bedding | | | | | 100 | 0 |
| 15 | | | Moderately hard dark gray shale w/some gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 80 |
| 20 | | | Moderately hard dark gray shale w/interbedded very close, very thin, gray fine-grained sandstone partings, horizontal bedding | | | | | 98 | 98 |
| 25 | | | | | | | | 100 | 100 |

COMPLETION DEPTH: 44.5 ft
DATE: 10-3-24

DEPTH TO WATER
IN BORING: Dry to 13.5 ft

DATE: 10/3/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-108

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 13.5 ft /NQ Core-Diedrich D-50 LOCATION: 35.43679°N, -94.21093°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 30 | | | | | | | | 100 | 100 |
| 35 | | | | | | | | 100 | 100 |
| 40 | | | - sandstone partings less frequent below 42 ft | | | | | 100 | 100 |
| 45 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 50 | | | | | | | | | |

COMPLETION DEPTH: 44.5 ft
DATE: 10-3-24

DEPTH TO WATER
IN BORING: Dry to 13.5 ft

DATE: 10/3/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-109

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 20 ft /NQ Core - CME-55

LOCATION: 35.437279°N, -94.211188°E

SURF. EL: 387.1

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| 5 | Very soft brown clayey silt, sandy (CL-ML) | 4<br>4<br>3 | | | | |
| 10 | Medium dense reddish brown fine sandy silt (ML) | 8<br>13 | | | | |
| 15 | - w/shale fragments below 14 ft | 18 | | | | |
| 20 | Low hardness dark gray weathered shale | 50/6" | | | | |
| 25 | Low hardness to moderately hard dark gray shale w/some gray fine-grained sandstone partings, horizontal bedding | | | | 100 | 92 |
| | $q_u$= 3910 psi, TUW= 164 pcf | | | | | |
| | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | 93 | 93 |
| | $q_u$= 7190 psi, TUW= 168 pcf | | | | | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT
10 20 30 40 50 60 70

COMPLETION DEPTH: 50.0 ft
DATE: 2-6-24

DEPTH TO WATER IN BORING: 14 ft
DATE: 2/6/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-109

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 20 ft /NQ Core - CME-55

LOCATION: 35.437279°N, -94.211188°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 97 | 97 |
| 35 | | | | | | $q_u$= 5170 psi, TUW= 169 pcf | | 100 | 100 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | | | | $q_u$= 2290 psi, TUW= 165 pcf | | 98 | 98 |
| 50 | | | NOTE 1: Backfilled with cuttings<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 2-6-24

DEPTH TO WATER IN BORING: 14 ft

DATE: 2/6/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-110

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 48.5 ft /NQ 2 Core-CME-55

LOCATION: 35.437338°N, -94.210785°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 382± | | | | | | |
| | | | Very soft brown silty clay, sandy (CL) | 4 | | | | | |
| | | | | 3 | | | | | |
| 5 | | | | 4 | | | | | |
| | | | - firm below 6.5 ft | 7 | | | | | |
| | | | Loose brown fine sandy silt (ML) | 5 | | | | | |
| 10 | | | | | | | | | |
| | | | Loose gray silty fine sand (SM) w/occasional sandstone fragments | 8 | | | | | |
| 15 | | | | | | | | | |
| | | | Low hardness to moderately hard dark gray shale w/interbedded very close, very thin fine-grained sandstone partings, horizontal bedding | 50/7" | | $q_u$= 6450 psi, TUW= 162 pcf | | 100 | 98 |
| 20 | | | | | | | | | |
| 25 | | | | | | $q_u$= 2710 psi, TUW= 166 pcf | | 100 | 100 |

COMPLETION DEPTH: 49.0 ft
DATE: 2-7-24

DEPTH TO WATER IN BORING: Dry to 19 ft

DATE: 2/7/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-110

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 48.5 ft /NQ 2 Core-CME-55

LOCATION: 35.437338°N, -94.210785°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | 100 | 100 |
| 35 | | | $q_u$= 4030 psi, TUW= 166 pcf | | | | | 100 | 98 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | $q_u$= 3480 psi, TUW= 161 pcf | | | | | 100 | 100 |
| 50 | | | NOTE 1: Backfilled with cuttings<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by DRM/IJM.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 49.0 ft
DATE: 2-7-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 2/7/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-111

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 20 ft /NQ Core-CME-55

LOCATION: 35.437338°N, -94.211170°E

SURF. EL: 384.0

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 0 | Firm brown clayey silt (CL-ML) | 7 | | | | | |
| | Soft brown and tan silty clay (CL) | 5 | | | | | |
| 5 | | 5 | | | | | |
| | Medium dense brown and tan clayey fine sand (SC) w/some ferrous nodules and stains and occassional sandstone fragments | 16 | | -NON-PLASTIC- | | | |
| 10 | | | | | | | |
| 15 | | 20 | | | | | |
| | - dense w/more sandstone and shale fragments below 18 ft | 50/1" | | | | | |
| 20 | Low hardness to moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 4160 psi, TUW= 165 pcf | | 100 | 95 |
| 25 | | | | | | 100 | 100 |
| | | | | $q_u$= 1310 psi, TUW= 159 pcf | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 2-2-24

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 2/1/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-111

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 20 ft /NQ Core-CME-55

LOCATION: 35.437338°N, -94.211170°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 35 | | | | | | $q_u$= 3900 psi, TUW= 162 pcf | | 98 | 98 |
| 40 | | | | | | | | 95 | 95 |
| 45 | | | | | | $q_u$= 2510 psi, TUW= 161 pcf | | 95 | 80 |
| 50 | | | NOTE 1: Backfilled with cuttings<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 2-2-24

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 2/1/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-112

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 25.5 ft /NQ Core-CME-55

LOCATION: 35.437624°N, -94.210768°E

SURF. EL: 386.6

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 5 | Very loose to loose brown fine sandy silt, trace clay (ML) | 4<br>5 | 109 | -NON-PLASTIC- | 66<br>68 | | |
| 10 | Very loose brown and dark brown fine sandy silt (ML) | 4<br>2 | | -NON-PLASTIC- | | | |
| 15 | Very soft reddish brown silty clay (CL)<br>- reddish brown and gray below 14 ft | 3 | | | | | |
| 20 | Low hardness to moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | 50/6" | | $q_u$= 6620 psi, TUW= 166 pcf | | 100 | 100 |
| 25 | | | | $q_u$= 4100 psi, TUW= 168 pcf | | 100 | 100 |

COMPLETION DEPTH: 49.0 ft
DATE: 1-31-24

DEPTH TO WATER IN BORING: 19 ft
DATE: 1/31/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-112

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 25.5 ft /NQ Core-CME-55

LOCATION: 35.437624°N, -94.210768°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 35 | | | | | | | | 100 | 100 |
| | | | | | | $q_u$= 6820 psi, TUW= 173 pcf | | | |
| 40 | | | | | | | | 97 | 97 |
| | | | | | | $q_u$= 7380 psi, TUW= 175 pcf | | | |
| 45 | | | | | | | | 98 | 98 |
| 50 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 49.0 ft
DATE: 1-31-24

DEPTH TO WATER IN BORING: 19 ft

DATE: 1/31/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-113

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 25.5 ft /NQ Core-CME-55

LOCATION: 35.437913°N, -94.210963°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 388.0 | | | | | | |
| | | | Loose reddish tan silty fine sand (SM) | 5 | | | | | |
| | | | - very loose below 2 ft | 3 | | | | | |
| 5 | | | | 3 | | -NON-PLASTIC- | 41 | | |
| | | | Very loose brown clayey silt (CL-ML) | 2 | | | | | |
| 10 | | | | | | | | | |
| | | | Medium dense reddish brown fine sandy silt w/ sandstone fragments (ML) | 24 | | -NON-PLASTIC- | | | |
| 15 | | | | | | | | | |
| | | | - loose below 18 ft | 7 | | | | | |
| 20 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | 50/5" | | | | | |
| 25 | | | | | | $q_u$= 4980 psi, TUW= 167 pcf | | 100 | 100 |
| 30 | | | | | | $q_u$= 6100 psi, TUW= 167 pcf | | 100 | 100 |
| 35 | | | | | | | | | |

NOTE 1: Backfilled with cuttings.
NOTE 2: Drilled by CL.
NOTE 3: Logged by TRS.
NOTE 4: ECF = 1.42.

COMPLETION DEPTH: 35.0 ft
DATE: 1-31-24

DEPTH TO WATER IN BORING: 18.5
DATE: 1/30/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-114

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 25.5 ft /NQ Core-CME-55

LOCATION: 35.437988°N, -94.210557°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 388.3 | | | | | | |
| | | | Soft reddish brown fine sandy clay (CL) | 5 | | | | | |
| | | | - stiff from 2.5 to 3.5 ft | 11 | | | | | |
| 5 | | | - firm below 4.5 ft | 9 | 103 | | 60 | | |
| | | | Loose reddish brown fine sandy silt (ML) | 5 | | | | | |
| 10 | | | | | | | | | |
| | | | - very loose below 14 ft | 3 | | -NON PLASTIC- | | | |
| 15 | | | | | | | | | |
| | | | Loose grayish brown clayey fine sand (SC) w/sandstone fragments | 7 | | | | | |
| 20 | | | | | | | | | |
| | | | | 36 | | | | | |
| 25 | | | Low hardness to moderately hard dark gray shale w/interbedded close to very close, very thin fine-grained sandstone partings, horizontal bedding | | | $q_u$= 3990 psi, TUW= 162 pcf | | 100 | 80 |
| 30 | | | | | | $q_u$= 3590 psi, TUW= 168 pcf | | 100 | 97 |
| 35 | | | | | | | | | |

NOTE 1: Backfilled with cuttings.
NOTE 2: Drilled by CL.
NOTE 3: Logged by TRS.
NOTE 4: ECF = 1.42.

COMPLETION DEPTH: 35.0 ft
DATE: 1-30-24

DEPTH TO WATER IN BORING: 14 ft
DATE: 1/30/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-115

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 21 ft /NQ Core-CME-55

LOCATION: 35.453730°N, -94.216962°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 397.3 | | | | | | |
| | | | Firm brown silty clay (CL) | 9 | | | | | |
| | | | - soft below 2.5 ft | 5 | | | | | |
| 5 | | | | 6 | | | | | |
| | | | - firm below 6.5 ft | 8 | | | | | |
| | | | Stiff reddish brown and tan silty clay (CL) with some ferrous nodules and stains | 11 | | | | | |
| 10 | | | | | | | | | |
| | | | Very stiff reddish brown and tan clayey silt w/sandstone fragments and ferrous stains | 26 | | | | | |
| 15 | | | | | | | | | |
| | | | - stiff below 18 ft | 22 | | | | | |
| 20 | | | | | | | | | |
| | | | Low hardness to moderately hard gray fine-grained sandstone w/ interbedded very thin, very close to close dark gray shale partings, horizontal bedding | | | | | 92 | 85 |
| 25 | | | | | | | | | |
| | | | NOTE 1: Boring not complete, terminated due to access.<br>NOTE 2: Backfilled with cuttings.<br>NOTE 3: Drilled by CL.<br>NOTE 4: Logged by IJM/TRS.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 30 | | | | | | | | | |

COMPLETION DEPTH: 26.0 ft
DATE: 3-8-24

DEPTH TO WATER IN BORING: 13.3 ft
DATE: 3/8/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

# LOG OF BORING NO. FB-115A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 18.7 ft /NQ2 Core-CME-550

LOCATION: 35.453730°N, -94.216962°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 397.3 | | | | | | |
| | | | Firm to stiff brown clayey silt (CL-ML) | 10 | | | | | |
| | | | | 7 | | | | | |
| 5 | | | - soft below 4.5 ft | 6 | | | | | |
| | | | Soft reddish brown and tan silty clay (CL) with some ferrous nodules and stains | | | | | | |
| | | | Firm reddish brown and tan clayey silt w/sandstone fragments and ferrous stains | 8 | | | | | |
| 10 | | | | | | | | | |
| 15 | | | - stiff below 14 ft | 18 | | | | | |
| | | | Low hardness to moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | 50/4" | | | | 80 | 50 |
| 20 | | | | | | | | | |
| | | | | | | | | 96 | 75 |
| 25 | | | Moderately hard gray fine-grained sandstone w/interbedded very close to close dark gray shale laminations, horizontal bedding | | | $q_u$= 2690 psi, TUW= 166 pcf | | 100 | 90 |
| 30 | | | Moderately hard dark gray shale w/some very thin, very close to close gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| 35 | | | NOTE 1: Boring offset 5 ft East.<br>NOTE 2: Backfilled with cuttings.<br>NOTE 3: Drilled by BMF.<br>NOTE 4: Logged by MSE.<br>NOTE 4: ECF = 1.47. | | | | | | |

COMPLETION DEPTH: 31.1 ft
DATE: 8-15-24

DEPTH TO WATER IN BORING: Dry to 18.7 ft

DATE: 8/15/2024



Form 108-6(74) Job No. 21-071
RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-116

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 22 ft /NQ Core-CME-55

LOCATION: 35.454432°N, -94.217214°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 398.5 | | | | | | |
| | | | Soft brown clayey silt, sandy (CL-ML) | 6<br>5 | | $G_s$ = 2.62 | 68 | | |
| 5 | | | Very soft to soft reddish brown and tan silty clay (CL) with some ferrous nodules and stains<br>- firm below 6.5 ft | 4<br>9 | | | | | |
| 10 | | | - soft below 9 ft | 5 | | | | | |
| 15 | | | Medium dense reddish tan silty fine sand w/sandstone fragments (SM) | 21 | | | 21 | | |
| 20 | | | | 25 | | | | | |
| 25 | | | Low hardness to moderately hard gray fine-grained sandstone w/ interbedded very close to close dark gray shale partings, horizontal bedding | 50/4" | | $q_u$= 4780 psi, TUW= 166 pcf | | 97 | 97 |
| 30 | | | Low hardness to moderately hard dark gray shale w/ interbedded, very thin, very close to close gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1520 psi, TUW= 167 pcf<br>$q_u$= 1480 psi, TUW= 166 pcf | | 97 | 94 |
| | | | | | | $q_u$= 1600 psi, TUW= 166 pcf | | 97 | 87 |

COMPLETION DEPTH: 52.0 ft
DATE: 3-7-24

DEPTH TO WATER IN BORING: 15 ft
DATE: 3/5/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-116

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 22 ft /NQ Core-CME-55

LOCATION: 35.454432°N, -94.217214°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | - w/some coal seams from 37 to 41 ft | | | | | | |
| 40 | | | | | | | | 93 | 93 |
| 45 | | | | | | $q_u$= 1250 psi, TUW= 171 pcf | | 100 | 100 |
| 50 | | | | | | | | 100 | 93 |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE2: Drilled by CL.<br>NOTE 3: Logged by IJM/TRS.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 52.0 ft
DATE: 3-7-24

DEPTH TO WATER IN BORING: 15 ft

DATE: 3/5/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-117

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 25 ft /NQ Core-CME-55

LOCATION: 35.454561°N, -94.217803°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 400.0 | | | | | | |
| | | | Firm brown clayey silt (CL-ML) | 7 | | | | | |
| | | | Firm reddish brown and tan silty clay (CL) w/some shale and sandstone fragments | 7 | | | | | |
| 5 | | | - very soft from 4.5 to 5.5 ft | 4 | | | | | |
| | | | - stiff below 6.5 ft | 14 | | | | | |
| 10 | | | Firm reddish brown and brown fine sandy clay (CL) | 8 | | | | | |
| 15 | | | Dense tan and brown clayey fine sand w/weathered sandstone fragments (SC) | 31 | | | | | |
| 20 | | | | 33 | | | | | |
| 25 | | | Low hardness to moderately hard gray fine-grained sandstone w/interbedded close to very close, very thin dark gray shale partings, horizontal bedding | | | $q_u$= 3180 psi, TUW= 161 pcf | | 96 | 92 |

COMPLETION DEPTH: 55.0 ft
DATE: 3-1-24

DEPTH TO WATER IN BORING: 13 ft
DATE: 2/29/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-117

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 25 ft /NQ Core-CME-55

LOCATION: 35.454561°N, -94.217803°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $q_u$= 4710 psi, TUW= 167 pcf | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 96 | 96 |
| 35 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/occassional gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1370 psi, TUW= 162 pcf | | 93 | 93 |
| 40 | | | | | | | | 96 | 96 |
| 45 | | | | | | | | 88 | 75 |
| 50 | | | | | | $q_u$= 2330 psi, TUW= 169 pcf | | 100 | 100 |
| 55 | | | NOTE 1: Backfilled with cuttings.<br>NOTE2: Drilled by CL.<br>NOTE 3: Logged by IJM/TRS.<br>NOTE 4: ECF = 1.42. | | | | | | |

COMPLETION DEPTH: 55.0 ft
DATE: 3-1-24

DEPTH TO WATER IN BORING: 13 ft

DATE: 2/29/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-118

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 20 ft /NQ Core-CME-55

LOCATION: 35.454746°N, -94.217536°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 399.0 | | | | | | |
| | | | Very soft brown silty clay (CL) | 4 | | | | | |
| | | | - soft below 2.5 ft | 5 | | | | | |
| 5 | | | Stiff reddish brown and tan silty clay (CL) w/some shale and sandstone fragments | 10 | | | | | |
| | | | Soft reddish brown and brown fine sandy clay (CL) | 6 | | | | | |
| 10 | | | - stiff below 9 ft | 17 | | | | | |
| | | | | 24 | | | | | |
| 15 | | | Medium dense tan and brown clayey fine sand w/ weathered sandstone fragments (SC) | | | | | | |
| 20 | | | Low hardness to moderately hard gray fine-grained sandstone w/interbedded close to very close, very thin dark gray shale partings, horizontal bedding | | | | | 20 | 10 |
| 25 | | | | | | | | 98 | 98 |

$q_u$= 3590 psi, TUW= 168 pcf

$q_u$= 4060 psi, TUW= 161 pcf

COMPLETION DEPTH: 50.0 ft
DATE: 2-29-24

DEPTH TO WATER IN BORING: 13 ft

DATE: 2/24/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-118

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 20 ft /NQ Core-CME-55

LOCATION: 35.454746°N, -94.217536°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 90 | 80 |
| 35 | | | | | | $q_u$= 1420 psi, TUW= 164 pcf | | 88 | 75 |
| 40 | | | | | | | | 97 | 83 |
| | | | Moderately hard dark gray shale w/occassional gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| 45 | | | | | | | | 100 | 100 |
| | | | | | | $q_u$= 2530 psi, TUW= 172 pcf | | | |
| 50 | | | NOTE 1: Backfilled with cuttings.<br>NOTE2: Drilled by CL.<br>NOTE 3: Logged by IJM/TRS.<br>NOTE 4: ECF = 1.42. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 2-29-24

DEPTH TO WATER IN BORING: 13 ft

DATE: 2/24/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-165

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in. HSA 22 ft/NQ Core - SIMCO 2800

LOCATION: 35.480114°N, -94.241686°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 416± | | | | | | |
| | | | Loose reddish tan silt (ML) | 6 | | | | | |
| | | | - medium dense below 2 ft | 11 | | | | | |
| 5 | | | - slightly clayey below 4 ft | 11 | | | | | |
| | | | | 13 | | | | | |
| | | | Medium dense brown fine sandy silt (ML) | 14 | | | | | |
| 10 | | | | | | | | | |
| | | | Dense tan sandy fine to coarse gravel with some sandstone cobbles (GP) | 46 | | | | | |
| 15 | | | | | | | | | |
| | | | | 50/2" | | | | | |
| 20 | | | Low hardness dark gray weathered shale, horizontal bedding | | | | | | |
| | | | Moderately hard dark gray shale w/some very thin highly weathered shale laminations and seams, horizontal bedding | | | | | 94 | 65 |
| 25 | | | | | | | | | |
| | | | | | | | | 80 | 70 |
| 30 | | | | | | | | | |
| | | | | | | | | 80 | 68 |

COMPLETION DEPTH: 62.0 ft
DATE: 12-22-24

DEPTH TO WATER IN BORING: 7.8 ft

DATE: 12/22/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-165

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in. HSA 22 ft/NQ Core - SIMCO 2800

LOCATION: 35.480114°N, -94.241686°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 40 | | | - w/more highly weathered seams from 42 to 47 ft | | | | | 100 | 45 |
| 45 | | | | | | | | 68 | 0 |
| 50 | | | | | | | | 100 | 45 |
| 55 | | | | | | | | 98 | 80 |
| 60 | | | | | | | | 100 | 100 |
| 65 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by DM/IM.<br>NOTE 4: ECF = 1.19. | | | | | | |

COMPLETION DEPTH: 62.0 ft
DATE: 12-22-24

DEPTH TO WATER IN BORING: 7.8 ft

DATE: 12/22/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-167

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 29 ft /NQ Core-CME-55

LOCATION: 35.480450°N, -94.246925°E

SURF. EL: 420.4

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 5 | Loose brown fine sandy silt (ML) w/occasional silt pockets<br>- medium dense from 2 to 3.5 ft | 7<br>10<br>7<br>27 | | -NON PLASTIC- | | | |
| 10 | Medium dense brown and tan fine sand (SP) w/sandstone fragments and cobbles and shale fragments | 21 | | | | | |
| 15 | Low hardness to moderately hard brown and tan weathered sandstone w/ferrous stains | 50/3" | | | | | |
| 20 | Moderately hard dark gray and tan weathered shale | 50/2" | | | | | |
| 25 | | 50/4" | | | | | |
| | | 50/3" | | | | | |
| 30 | Moderately hard dark gray shale w/occassional gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 38 |
| | | | | | | 83 | 80 |

$q_u$ = 540 psi, TUW= 160 pcf

COMPLETION DEPTH: 59.0 ft
DATE: 12-21-23

DEPTH TO WATER IN BORING: Dry to 29 ft

DATE: 12/21/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-167

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 29 ft /NQ Core-CME-55

LOCATION: 35.480450°N, -94.246925°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 720 psi, TUW= 159 pcf | | 100 | 85 |
| 40 | | | | | | | | | |
| | | | | | | | | 97 | 80 |
| 45 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding<br>- sandstone seam at 48.8 ft | | | $q_u$= 3320 psi, TUW= 161 pcf | | 100 | 100 |
| 50 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1130 psi, TUW= 166 pcf | | 91 | 86 |
| 55 | | | | | | | | | |
| | | | | | | | | 83 | 74 |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM, TRS, and MSE.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 59.0 ft
DATE: 12-21-23

DEPTH TO WATER IN BORING: Dry to 29 ft

DATE: 12/21/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-171

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 30.ft /NQ Core-CME-55

LOCATION: 35.481041°N, -94.246457°E

SURF. EL: 423.1

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|---|---|
| | | | Medium dense brown clayey fine sand w/sandstone fragments (SC) | 18 | |
| | | | | 12 | |
| 5 | | | | 22 | |
| | | | - dense below 6.5 ft | 33 | |
| | | | Dense to very dense tan sandy fine to coarse gravel (GP) w/some cobbles | 50/11" | |
| 10 | | | | | |
| | | | - medium dense below 14 ft | 27 | |
| 15 | | | | | |
| | | | Low hardness dark gray weathered shale w/some clayey shale laminations and seams | 50/6" | |
| 20 | | | | | |
| 25 | | | | | |
| | | | | 50/6" | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT
10 20 30 40 50 60 70

- No. 200 %
% Recovery
% RQD

COMPLETION DEPTH: 46.5 ft
DATE: 1-18-24

DEPTH TO WATER IN BORING: 8 ft

DATE: 1/4/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-171

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 30.ft /NQ Core-CME-55

LOCATION: 35.481041°N, -94.246457°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 35 | | | Low hardness to moderately hard dark gray shale, slightly weathered, horizontal bedding | | | $q_u$= 3770 psi, TUW= 176 pcf | | 82 | 42 |
| 40 | | | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 3900 psi, TUW= 170 pcf<br>$q_u$= 1630 psi, TUW= 165 pcf | | 98 | 83 |
| 45 | | | Moderately hard dark gray shale w/interbedded close, very thin gray fine-grained sandstone partings and seams, horizontal bedding | | | $q_u$= 3450 psi, TUW= 164 pcf | | 97<br>100 | 97<br>100 |
| 50 | | | NOTE: 1. Backfilled w/cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 46.5 ft
DATE: 1-18-24

DEPTH TO WATER IN BORING: 8 ft

DATE: 1/4/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-176

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft/Wash 25 ft /NQ2 Core-CME-550 LOCATION: 35.481945°N, -94.245549°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 429.2 | | | | | | |
| | | | Firm brown clayey silt (CL-ML) | 7 | | | | | |
| | | | Firm brown silty clay (CL) | | 113 | | | | |
| 5 | | | - stiff w/some shale fragments below 6 ft | 8<br>15<br>11 | | | | | |
| 10 | | | Stiff reddish brown and brown fine sandy clay (CL) w/ some sandstone fragments | | | | | | |
| 15 | | | - very stiff, w/more sandstone fragments below 13 ft | 36 | | | | | |
| | | | Moderately hard tan and brown weathered fine-grained sandstone w/some clayey shale partings and seams, horizontal bedding | | | | | 80 | 33 |
| 20 | | | Moderately hard dark gray weathered shale w/some clayey shale partings and seams, horizontal bedding | | | | | 98 | 98 |
| | | | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 4760 psi, TUW= 163 pcf | | 97 | 97 |
| 25 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 12-6-23

DEPTH TO WATER IN BORING: 13.5 ft
DATE: 12/5/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-176

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft/Wash 25 ft /NQ2 Core-CME-550 LOCATION: 35.481945°N, -94.245549°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 35 | | | | | | | | | |
| | | | | | | $q_u$= 4140 psi, TUW= 167 pcf | | 100 | 100 |
| | | | | | | $q_u$= 2310 psi, TUW= 165 pcf | | | |
| 40 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 45 | | | | | | | | | |
| | | | | | | $q_u$= 5050 psi, TUW= 166 pcf | | 100 | 100 |
| 50 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.47. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 12-6-23

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 12/5/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-179

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55LC

LOCATION: 35.482659°N, -94.242283°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 433.4 | | | | | | |
| 5 | | | Medium dense tan and gray fine sandy silt (ML) w/sandstone and shale fragments (FILL) | 25 | | | | | |
| | | | - w/fewer sandstone fragments below 2 ft | 12 | | | | | |
| | | | | 15 | | | | | |
| | | | - dense below 6.5 ft | 33 | | | | | |
| 10 | | | Stiff brown silty clay (CL) | 13 | | | | | |
| 15 | | | Soft tan fine sandy clay (CL) | | 109 | | 61 | | |
| 20 | | | | 5 | | | | | |
| 25 | | | Moderately hard dark gray shale, horizontal bedding | 50/5" | | $q_u$= 1620 psi, TUW= 163 pcf | | 98 | 98 |
| 30 | | | - w/occassional clayey shale partings and seams from 30-35 ft | | | $q_u$= 3670 psi, TUW= 164 pcf | | 92 | 87 |
| 35 | | | | | | $q_u$= 920 psi, TUW= 163 pcf | | 95 | 95 |
| 40 | | | - w/ more clayey shale seams and no recovery from 41.6 - 43 ft | | | | | 83 | 38 |

COMPLETION DEPTH: 85.0 ft
DATE: 10-12-23

DEPTH TO WATER IN BORING: 23 ft
DATE: 10/10/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-179

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55LC

LOCATION: 35.482659°N, -94.242283°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 1230 psi, TUW= 163 pcf | | 93 | 93 |
| 50 | | | | | | | | | |
| | | | | | | $q_u$= 2220 psi, TUW= 167 pcf | | 100 | 100 |
| 55 | | | - w/occassional gray fine grained sandstone partings below 53 ft<br>Moderately hard dark gray shale w/some very thin, close to very close gray fine-grained sandstone partings | | | | | 98 | 98 |
| | | | | | | $q_u$= 4040 psi, TUW= 166 pcf | | | |
| 60 | | | | | | | | 100 | 100 |
| 65 | | | | | | | | 100 | 90 |
| | | | | | | $q_u$= 1850 psi, TUW= 164 pcf | | | |
| 70 | | | - high angle fracture at 72.4 to 72.7 ft | | | | | 97 | 88 |
| 75 | | | | | | $q_u$= 4030 psi, TUW= 169 pcf | | 100 | 100 |
| 80 | | | | | | | | 97 | 97 |
| 85 | | | NOTE 1: Backfilled w/cuttings.<br>NOTE 2: Drilled by KH.<br>NOTE 3: Logged by DRM.<br>NOTE 4: ECF = 1.40. | | | | | | |

COMPLETION DEPTH: 85.0 ft
DATE: 10-12-23

DEPTH TO WATER IN BORING: 23 ft

DATE: 10/10/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-180

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 24 ft /NQ Core - CME-55

LOCATION: 35.482730°N, -94.241328°E

SURF. EL: 434.1

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| | Loose reddish brown and tan silt (ML) w/some sandstone fragments | 7 | | | | |
| | Medium dense reddish brown fine sandy silt (ML), slightly clayey with occassional sandstone fragments | 14 | | | | |
| 5 | | 15 | | | | |
| | - loose to medium dense below 6.5 ft | 10 | | | | |
| 10 | | 6 | | | | |
| | Low hardness yellowish-tan and tan highly weathered fine-grained sandstone with occassional clayey sand seams | 34 | | | | |
| 15 | | | | | | |
| | Low hardness to moderately hard dark gray weathered shale | 50/7" | | | | |
| 20 | | 25/2.5" | | | | |
| | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings, horizontal bedding, with occassional pyrite inclusions | | | | 90 | 90 |
| 25 | | | | | | |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT: 10 20 30 40 50 60 70

$q_u$= 1200 psi, TUW= 149 pcf

COMPLETION DEPTH: 54.0 ft
DATE: 9-14-23

DEPTH TO WATER IN BORING: Dry to 24 ft
DATE: 9/14/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-180

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 24 ft /NQ Core - CME-55

LOCATION: 35.482730°N, -94.241328°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | $q_u$= 2930 psi, TUW= 168 pcf | | 98 | 98 |
| 35 | | | | | | | | 100 | 100 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | | | | $q_u$= 3970 psi, TUW= 163 pcf | | 96 | 95 |
| 50 | | | | | | $q_u$= 4700 psi, TUW= 166 pcf | | 98 | 98 |
| 55 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by DM/IM.<br>NOTE 4: ECF = 1.42. | | | | | | |

COMPLETION DEPTH: 54.0 ft
DATE: 9-14-23

DEPTH TO WATER
IN BORING: Dry to 24 ft

DATE: 9/14/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-181

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55

LOCATION: 35.482847°N, -94.241985°E

SURF. EL: 433.8

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | Stiff tan and reddish tan silty clay (CL), slightly sandy with ferrous stains and occassional sandstone fragments (fill) | 14 | | | | | |
| | | | | 8 | | | | | |
| 5 | | | Loose brown and tan silt (ML), slightly sandy w/occassional sandstone fragments (fill) | 12 | | | | | |
| | | | Stiff reddish tan silty clay (CL), slightly sandy (fill) | 50/11" | | | | | |
| 10 | | | Dense tan sandy fine gravel (GP-GM), slighly silty (fill) - medium dense below 8 ft | 17 | | | | | |
| | | | Loose reddish tan fine sandy silt (ML) | 7 | | | | | |
| 15 | | | | | | | | | |
| | | | Dense tan sandy fine to coarse gravel with some cobbles (GP) | 30 | | | | | |
| 20 | | | | 34 | | | | | |
| | | | Low hardness dark gray weathered shale | 50/3" | | | | | |
| 25 | | | | | | | | 95 | 83 |
| 30 | | | | | | $q_u$= 3030 psi, TUW= 171 pcf | | 100 | 90 |
| 35 | | | | | | $q_u$= 3680 psi, TUW= 162 pcf | | 93 | 88 |
| 40 | | | | | | $q_u$= 4130 psi, TUW= 167 pcf | | 77 | 50 |
| 45 | | | Moderately hard dark gray shale with close, very thin gray fine-grained sandstone partings | | | $q_u$= 1270 psi, TUW= 169 pcf | | 98 | 98 |

COMPLETION DEPTH: 85.0 ft
DATE: 10-13-23

DEPTH TO WATER IN BORING: 18.5

DATE: 10/12/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-181

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55

LOCATION: 35.482847°N, -94.241985°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 55 | | | | | | | | 100 | 97 |
| 60 | | | | | | $q_u$= 3540 psi, TUW= 163 pcf | | 100 | 100 |
| 65 | | | | | | $q_u$= 2990 psi, TUW= 170 pcf | | 100 | 95 |
| 70 | | | | | | $q_u$= 2570 psi, TUW= 168 pcf | | 100 | 95 |
| 75 | | | Moderately hard dark gray shale with occassional gray fine-grained sandstone partings | | | $q_u$= 4690 psi, TUW= 174 pcf | | 90 | 85 |
| 80 | | | | | | | | 100 | 77 |
| 85 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by RR.<br>NOTE 3: Logged by DRM and IJM.<br>NOTE 4: ECF = 1.63. | | | | | | |
| 90 | | | | | | | | | |
| 95 | | | | | | | | | |

COMPLETION DEPTH: 85.0 ft
DATE: 10-13-23

DEPTH TO WATER IN BORING: 18.5

DATE: 10/12/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-182

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in. HSA 24 ft /NQ Core - SIMCO 2800 LOCATION: 35.482970°N, -94.241781°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 434.06 | | | | |
| | | | Loose brown fine sandy silt (ML) w/numerous sandstone fragments (fill) | 7 | | | |
| | | | - medium dense, w/more sandstone fragments below 2 ft | 24 | | ● | |
| 5 | | | | 16 | | | |
| | | | Firm brown clayey silt, slightly sandy (CL-ML) w/ occassional shale fragments (fill) | 8 | | ● | |
| | | | Medium dense tan silt (ML) w/crushed sandstone (fill) | 25 | | | |
| 10 | | | | | | | |
| | | | Stiff reddish tan clayey silt, sandy (CL-ML) | | 116 | ● + + ⊗ ○ | 57 |
| 15 | | | | | | | |
| | | | Dense tan sandy fine to coarse gravel (GP) | 31 | | ● | |
| 20 | | | | | | | |
| | | | Moderately hard dark gray w/tan weathered shale | 50/4" | | | |
| 25 | | | | | | | |
| 30 | | | | | | | |
| | | | NOTE 1: Hole terminated at 30 ft due to loosing hole in fill.<br>NOTE 2: Backfilled w/cuttings.<br>NOTE 3: Drilled by BR.<br>NOTE 4: Logged by DRM.<br>NOTE 5: ECF = 1.19. | | | | |

COMPLETION DEPTH: 30.0 ft
DATE: 9-27-23

DEPTH TO WATER IN BORING: 18 ft
DATE: 9/27/2023

LGBNEW 21-071 FB LOGS.GPJ 4-15-26

# LOG OF BORING NO. FB-182A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55

LOCATION: 35.482946°N, -94.241803°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 434.1 | | | | | | |
| | | | Loose brown clayey sand (SC) | 7<br>5<br>8 | | | | | |
| 5 | | | Dense brown clayey fine to coarse gravel (GC) | 50/3" | | | | | |
| 10 | | | Friable yellowish tan and tan highly weathered sandstone with clayey sand seams and ferrous stains | 35 | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | 35 | | | | | |
| 25 | | | Low hardness to moderately hard dark gray shale w/occassional gray fine-grained sandstone partings, horizontal bedding - moderately hard below 25 ft | 50/6" | | $q_u$= 5530 psi, TUW= 176 pcf | | 62 | 50 |
| 30 | | | | | | $q_u$= 2780 psi, TUW= 165 pcf<br>$q_u$= 2420 psi, TUW= 165 pcf | | 95 | 62 |
| 35 | | | | | | $q_u$= 3940 psi, TUW= 170 pcf | | 88 | 88 |

COMPLETION DEPTH: 65.0 ft
DATE: 10-14-23

DEPTH TO WATER IN BORING: 17.6 ft

DATE: 10/13/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 3-24-26

# LOG OF BORING NO. FB-182A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55

LOCATION: 35.482946°N, -94.241803°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 45 | | | Moderately hard dark gray shale with some close gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 4260 psi, TUW= 167 pcf | | 100 | 100 |
| | | | | | | $q_u$= 3250 psi, TUW= 168 pcf | | 90 | 85 |
| 50 | | | | | | $q_u$= 4240 psi, TUW= 167 pcf | | 98 | 98 |
| 55 | | | | | | $q_u$= 4840 psi, TUW= 169 pcf | | 100 | 100 |
| 60 | | | | | | $q_u$= 4020 psi, TUW= 167 pcf | | 100 | 100 |
| 65 | | | Note: 1. Backfilled w/cuttings.<br>2. Drilled by RR.<br>3. Logged by SD.<br>4. ECF = 1.63. | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |

COMPLETION DEPTH: 65.0 ft
DATE: 10-14-23

DEPTH TO WATER IN BORING: 17.6 ft

DATE: 10/13/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 3-24-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-183

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in. HSA 24 ft /NQ Core - SIMCO 2800

LOCATION: 35.483117°N, -94.241567°E

SURF. EL: 433.9

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| 0 | Stiff reddish tan silty clay (CL) w/crushed stone and shale fragments (fill) | 11 | | | | |
| | - soft at 2 to 4 ft | 5 | | | | |
| 5 | - stiff to very stiff below 4 ft | 12 | | | | |
| | - with more crushed sandstone below 6 ft | 22 | | | | |
| 10 | | 31 | | | | |
| 15 | | 12 | | | | |
| 20 | | 50/11 | | | | |
| 25 | Medium dense to dense gray, dark gray, and tan shale fragments w/some sandstone fragments and silt (fill/backfill) | 43 | | | | |
| 30 | | | | | 0 | 0 |
| 35 | | | | | 0 | 0 |
| 40 | NOTE 1: Hole terminated at 40 ft due to loosing hole in apparent shale fragment fill.<br>NOTE 2: Borehole backfilled with cuttings.<br>NOTE 3: Drilled by BR.<br>NOTE 4: Logged by DRM.<br>NOTE 5: ECF = 1.19. | | | | | |
| 45 | | | | | | |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT: 10 20 30 40 50 60 70

COMPLETION DEPTH: 40.0 ft
DATE: 9-26-23

DEPTH TO WATER IN BORING: 18 ft
DATE: 9/26/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

# LOG OF BORING NO. FB-183A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55

LOCATION: 35.483143°N, -94.241544°E

SURF. EL: 433.9

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 5 | Firm reddish tan silty clay (CL) w/crushed stone and shale fragments (fill) | 8 | | | | | |
| | | 8 | | | | | |
| | - stiff below 4 ft | 14 | | | | | |
| 10 | Medium dense to dense gray and tan fine sandy silt (ML) w/silty clay seams and layers and some sandstone fragments | 31 | | | | | |
| | | 23 | | -NON-PLASTIC- | | | |
| 15 | | | 119 | | | | |
| | - with more sandstone fragments below 18 ft | | | | | | |
| 20 | | 36 | | | | | |
| 25 | Moderately hard dark gray w/tan weathered shale, w/occassional gray fine-grained sandstone partings, horizontal bedding | 50/5" | | $q_u$= 2420 psi, TUW= 161 pcf | | 92 | 52 |
| 30 | Moderately hard dark gray shale w/some close to very close, very thin gray fine-grained sandstone partings below 30 ft | | | $q_u$= 2150 psi, TUW= 160 pcf | | 100 | 77 |
| 35 | - with pyrite inclusions below 33 ft | | | $q_u$= 2300 psi, TUW= 161 pcf | | 100 | 85 |

COMPLETION DEPTH: 70.0 ft
DATE: 10-27-23

DEPTH TO WATER IN BORING: 17.9 ft

DATE: 10/27/2023



Form 108-6(74) Job No. 21-071
RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-183A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 25 ft /NQ2 Core - CME-55

LOCATION: 35.483143°N, -94.241544°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 87 |
| 45 | | | | | | $q_u$= 2610 psi, TUW= 166 pcf | | 100 | 86 |
| 50 | | | | | | $q_u$= 1760 psi, TUW= 166 pcf | | 100 | 93 |
| 55 | | | - with very close multiple fractures, slickensides, and some weathered laminations and seams from 55 to 69.5 ft | | | $q_u$= 2160 psi, TUW= 164 pcf | | 100 | 65 |
| 60 | | | | | | | | 75 | 0 |
| 65 | | | | | | | | 100 | 0 |
| 70 | | | NOTE 1: Offset from FB-183<br>NOTE 2: Borehole backfilled with cuttings.<br>NOTE 3: Drilled by RR.<br>NOTE 4: Logged by SD/DRM.<br>NOTE 5: ECF = 1.63. | | | | | | |
| 75 | | | | | | | | | |

COMPLETION DEPTH: 70.0 ft
DATE: 10-27-23

DEPTH TO WATER IN BORING: 17.9 ft

DATE: 10/27/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-184

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 24 ft /NQ Core-Diedrich D-50 LOCATION: 35.482984°N, -94.242497°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 420± | | | | | | |
| | | | Stiff reddish tan and brown silty clay w/some sandstone fragments (CL) (fill), very dry | 13 | | | | | |
| | | | - very stiff below 2.5 ft | 42 | | | | | |
| 5 | | | | 50/6" | | | | | |
| | | | Dense reddish brown fine sandy silt (ML) | 35 | | -NON PLASTIC- | | | |
| | | | - medium dense below 8 ft | 17 | | | | | |
| 10 | | | | | | | | | |
| | | | | 10 | | | 71 | | |
| 15 | | | | | | | | | |
| | | | - dense, w/numerous sandstone fragments below 19 ft | 50/6" | | | | | |
| 20 | | | Low hardness tan and gray fine-grained weathered sandstone, fractured, w/ferrous stains | | | | | 44 | 21 |
| 25 | | | Low hardness to moderately hard dark gray shale w/occassional gray fine-grained sandstone partings | | | $q_u$= 2330 psi, TUW= 168 pcf | | 83 | 70 |

COMPLETION DEPTH: 54.0 ft
DATE: 9-18-24

DEPTH TO WATER IN BORING: 12 ft
DATE: 9/18/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-184

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 24 ft /NQ Core-Diedrich D-50 LOCATION: 35.482984°N, -94.242497°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 90 |
| 35 | | | | | | | | 93 | 77 |
| 40 | | | | | | | | 90 | 70 |
| 45 | | | | | | | | 100 | 80 |
| 50 | | | | | | | | 88 | 88 |
| 55 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by DP.<br>NOTE 4: ECF = 1.33. | | | | | | |

COMPLETION DEPTH: 54.0 ft
DATE: 9-18-24

DEPTH TO WATER IN BORING: 12 ft

DATE: 9/18/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-185

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 50 ft /NQ Core-Diedrich D-50 LOCATION: 35.483451°N, -94.242328°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 435± | | | | | | |
| | | | Very stiff brown clayey silt w/sandstone and shale fragments (CL-ML) (fill) | 34 | | | | | |
| | | | Stiff brown silty clay w/some sandstone and shale fragments (CL-ML) (fill) | 11 | | | | | |
| 5 | | | | 19 | | | | | |
| | | | | 19 | | | | | |
| 10 | | | | 11 | | | | | |
| 15 | | | | 16 | | | | | |
| 20 | | | | 23 | | | | | |
| | | | Dense to very dense brown sandy silt with sandstone fragments and some cobbles (ML) | 50/1" | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | 50/1" | | | | | |
| 35 | | | | 40 | | | | | |
| | | | - w/more cobbles below 39 ft | 50/7" | | | | | |

COMPLETION DEPTH: 65.0 ft
DATE: 6-4-24

DEPTH TO WATER
IN BORING: Dry to 39 ft
DATE: 6/4/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-185

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 50 ft /NQ Core-Diedrich D-50 LOCATION: 35.483451°N, -94.242328°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 45 | | | (continued) | 50/6" | | | | | |
| | | | Low hardness to moderately hard dark gray weathered shale w/some gray fine-grained sandstone partings, horizontal bedding | 50/6" | | | | | |
| 50 | | | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2990 psi, TUW= 166 pcf | | 75 | 75 |
| 55 | | | | | | | | 100 | 100 |
| 60 | | | | | | $q_u$= 2770 psi, TUW= 164 pcf | | 100 | 100 |
| 65 | | | NOTE 1: Boring terminated at 65 ft due to gravel cave in above bedrock.<br>NOTE 2: Backfilled with cuttings.<br>NOTE 3: Drilled by CL.<br>NOTE 4: Logged by IJM.<br>NOTE 5: ECF = 1.33. | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |

COMPLETION DEPTH: 65.0 ft
DATE: 6-4-24

DEPTH TO WATER
IN BORING: Dry to 39 ft

DATE: 6/4/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-185A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 24 ft /NQ2 Core-Diedrich D-50 LOCATION: 35.484006°N, -94.242451°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 427± | | | | | | |
| | | | Medium dense brown and tan fine sandy silt w/ organics (ML) | 15<br>13 | | -NON PLASTIC- | | | |
| 5 | | | Medium dense reddish brown and brown clayey fine sand w/occasional sandstone fragments (SC) | 13<br>12 | | | | | |
| 10 | | | - loose below 8.5 ft | 5 | | | | | |
| 15 | | | Dense brown and tan sandy fine to coarse gravel (GP) | 38 | | | | | |
| 20 | | | Low hardness to moderately hard dark gray weathered shale | 50/4" | | | | | |
| 25 | | | Moderately hard to hard dark gray shale w/some very thin, close gray fine-grained sandstone partings, horizontal bedding<br>- sandstone seam at 25.8 ft | 50/2" | | $q_u$= 6330 psi, TUW= 166 pcf<br>$q_u$= 1570 psi, TUW= 166 pcf | | 100<br>100 | 100<br>100 |
| 30 | | | Moderately hard dark gray shale w/occasional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1770 psi, TUW= 165 pcf | | 98 | 98 |
| 35 | | | Moderately hard dark gray shale w/some very thin, close gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 4290 psi, TUW= 168 pcf | | 85 | 85 |
| 40 | | | Hard dark gray shale w/interbedded very thin, very close to close gray fine-grained sandstone partings and some seams, horizontal bedding | | | $q_u$= 5160 psi, TUW= 170 pcf | | 100 | 100 |

COMPLETION DEPTH: 85.0 ft
DATE: 8-1-25

DEPTH TO WATER IN BORING: 16 ft
DATE: 7/16/2025

RECRQDN200-2 21-071_FB LOGS.GPJ 10-20-25

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-185A

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA 24 ft /NQ2 Core-Diedrich D-50 LOCATION: 35.484006°N, -94.242451°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 50 | | | (continued) | | | $q_u$= 6410 psi, TUW= 168 pcf | | 97 | 97 |
| | | | | | | $q_u$= 5890 psi, TUW= 165 pcf | | 100 | 100 |
| 55 | | | Hard gray fine-grained sandstone w/interbedded very thin, very close dark gray shale laminations and seams, horizontal bedding | | | | | | |
| | | | | | | $q_u$= 2510 psi, TUW= 162 pcf | | 100 | 100 |
| 60 | | | | | | $q_u$= 5770 psi, TUW= 167 pcf | | 100 | 100 |
| 65 | | | | | | | | 97 | 97 |
| 70 | | | | | | $q_u$= 3830 psi, TUW= 165 pcf | | 100 | 100 |
| | | | - with less shale laminations below 73 ft | | | | | | |
| 75 | | | | | | | | 93 | 93 |
| 80 | | | Hard dark gray shale w/some very thin, close gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 100 |
| 85 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.33. | | | | | | |

COMPLETION DEPTH: 85.0 ft
DATE: 8-1-25

DEPTH TO WATER IN BORING: 16 ft

DATE: 7/16/2025

RECRQDN200-2 21-071_FB LOGS.GPJ 10-20-25

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-186

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 14.5 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.483657°N, -94.241249°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 428± | | | | | | |
| | | | Firm brown clayey silt (CL-ML) | 7 | | | | | |
| | | | Stiff brown silty clay (CL) | | 109 | | | | |
| 5 | | | Medium dense brown silt (ML) | 18 | | -NON PLASTIC- | | | |
| | | | Very stiff brown and tan fine sandy clay (CL) w/occasional sandstone fragments | 50/1" | | | | | |
| 10 | | | | 40 | | | | | |
| | | | Moderately hard dark gray w/tan slightly weathered shale, flat bedded | 50/2" | | | | | |
| 15 | | | Low hardness to moderately hard dark gray weathered shale w/some gray fine-grained sandstone partings, horizontal bedding | | | | | 100 | 44 |
| | | | | | | | | 93 | 22 |
| 20 | | | | | | $q_u$= 5610 psi, TUW= 166 pcf | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2660 psi, TUW= 163 pcf | | 100 | 88 |
| 25 | | | | | | $q_u$= 3830 psi, TUW= 163 pcf | | 100 | 100 |
| 30 | | | | | | | | 100 | 100 |

COMPLETION DEPTH: 58.5 ft
DATE: 12-19-23

DEPTH TO WATER IN BORING: 9.5 ft
DATE: 12/19/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-186

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 14.5 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.483657°N, -94.241249°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | Moderately hard to hard gray fine-grained sandstone w/ interbedded very close dark gray shale laminations, horizontal bedding | | | $q_u$= 4160 psi, TUW= 161 pcf | | 98 | 98 |
| 40 | | | | | | | | | |
| | | | | | | | | 100 | 97 |
| 45 | | | | | | $q_u$= 7130 psi, TUW= 161 pcf | | | |
| | | | | | | | | 100 | 100 |
| 50 | | | - w/less shale laminations below 51 ft | | | | | | |
| | | | | | | | | 100 | 100 |
| 55 | | | | | | $q_u$= 4420 psi, TUW= 169 pcf | | | |
| | | | | | | | | 100 | 100 |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by NE.<br>NOTE 3: Logged by TRS and MSF.<br>NOTE 4: ECF = 1.52. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 58.5 ft
DATE: 12-19-23

DEPTH TO WATER IN BORING: 9.5 ft

DATE: 12/19/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-187

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 40 ft /NQ2 Core-CME-55

LOCATION: 35.483800°N, -94.242706°E

SURF. EL: 449.8

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|
| 5 | Stiff brown clayey silt w/sandstone and shale fragments (CL-ML) (fill) | 16 | |
| | | 17 | |
| | - very stiff from 4 to 6 ft | 30 | |
| | | 21 | |
| 10 | Stiff brown silty clay w/some sandstone and shale fragments (CL-ML) (fill) | 22 | |
| 15 | - very stiff below 13 ft | 24 | |
| 20 | | 35 | |
| 25 | Loose reddish brown and tan clayey fine sand w/some sandstone fragments (SC) | 7 | |
| 30 | | 6 | |
| 35 | | 5 | |
| | - w/shale fragments below 38 ft | | |
| 40 | Low hardness to moderately hard dark gray shale w/interbedded close, very thin gray fine-grained sandstone partings, horizontal bedding | 50/6" | |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT | WATER CONTENT | LIQUID LIMIT

10 20 30 40 50 60 70

$q_u$= 3030 psi, TUW= 169 pcf

| - No. 200 % | % Recovery | % RQD |
|---|---|---|
| | 80 | 80 |

COMPLETION DEPTH: 97.0 ft
DATE: 2-1-24

DEPTH TO WATER IN BORING: 32 ft
DATE: 1/30/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-187

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 40 ft /NQ2 Core-CME-55

LOCATION: 35.483800°N, -94.242706°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 3700 psi, TUW= 171 pcf | | 93 | 93 |
| 50 | | | | | | | | 100 | 100 |
| 55 | | | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 4200 psi, TUW= 168 pcf | | 90 | 90 |
| 60 | | | | | | $q_u$= 4640 psi, TUW= 167 pcf | | 96 | 96 |
| 65 | | | - w/more sandstone partings below 65 ft | | | | | 100 | 100 |
| 70 | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 3830 psi, TUW= 172 pcf | | 100 | 100 |
| 75 | | | | | | | | 95 | 95 |
| 80 | | | Moderately hard gray fine-grained sandstone w/interbedded very close, very thin dark gray shale laminations, horizontal bedding | | | $q_u$= 3470 psi, TUW= 177 pcf | | 100 | 100 |
| 85 | | | | | | $q_u$= 4660 psi, TUW= 176 pcf | | 97 | 97 |

COMPLETION DEPTH: 97.0 ft
DATE: 2-1-24

DEPTH TO WATER IN BORING: 32 ft

DATE: 1/30/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-187

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 40 ft /NQ2 Core-CME-55

LOCATION: 35.483800°N, -94.242706°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 3250 psi, TUW= 169 pcf | | 100 | 100 |
| 95 | | | | | | | | 100 | 100 |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by RR.<br>NOTE 3: Logged by IJM.<br>NOTE 5: ECF = 1.63. | | | | | | |
| 100 | | | | | | | | | |
| 105 | | | | | | | | | |
| 110 | | | | | | | | | |
| 115 | | | | | | | | | |
| 120 | | | | | | | | | |
| 125 | | | | | | | | | |
| 130 | | | | | | | | | |

COMPLETION DEPTH: 97.0 ft
DATE: 2-1-24

DEPTH TO WATER IN BORING: 32 ft

DATE: 1/30/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-188

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 13.5 ft /NQ2 Core-CME-550

LOCATION: 35.484396°N, -94.242681°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 425.1 | | | | | | |
| | | | Firm brown clayey silt (CL-ML) w/trace organics | 7 | | | | | |
| | | | - stiff to very stiff below 2 ft | | 111 | | | | |
| 5 | | | | 13 | | | | | |
| | | | Medium dense reddish brown clayey fine sand w/some sandstone fragments (SC) | 16 | | | | | |
| | | | Dense reddish tan and tan sandy fine to coarse gravel (GP) | 42 | | | | | |
| 10 | | | | | | | | | |
| | | | | 50/2" | | | | | |
| | | | Moderately hard dark gray slightly weathered shale, flat bedded w/close gray fine-grained sandstone partings | | | | | | |
| 15 | | | | | | | | | |
| | | | Moderately hard dark gray shale, flat bedded w/close gray fine-grained sandstone partings | | | $q_u$= 4110 psi, TUW= 166 pcf | | | |
| 20 | | | | | | | | | |
| | | | - with very close sandstone partings and seams below 22 ft | | | $q_u$= 3210 psi, TUW= 166 pcf | | | |
| 25 | | | Moderately hard dark gray shale, flat bedded w/close to very close, very thin interbedded gray fine-grained sandstone partings | | | | | | |
| | | | - heterolithic bedding from 29 to 30.5 and 33 to 33.5 ft | | | | | | |
| 30 | | | | | | | | | |
| | | | - sandstone layer from 34.5 to 35.5 ft | | | $q_u$= 4530 psi, TUW= 165 pcf | | | |
| 35 | | | | | | | | | |

COMPLETION DEPTH: 73.5 ft
DATE: 1-3-24

DEPTH TO WATER IN BORING: 8.5 ft
DATE: 1/2/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-188

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 13.5 ft /NQ2 Core-CME-550

LOCATION: 35.484396°N, -94.242681°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 45 | | | (continued) | | | | | | |
| | | | | | | $q_u$= 3310 psi, TUW= 158 pcf | | | |
| 50 | | | Hard gray fine-grained sandstone, flat bedded w/very close, very thin interbedded dark gray shale laminations and seams | | | | | | |
| 55 | | | | | | | | | |
| 60 | | | | | | $q_u$= 2030 psi, TUW= 162 pcf | | | |
| 65 | | | - sandstone layer from 64.5 to 65.6 ft | | | | | | |
| | | | Moderately hard dark gray shale, flat bedded w/close to very close, very thin gray fine-grained sandstone partings | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by TRS/MJE.<br>NOTE 4: ECF = 1.46. | | | | | | |

COMPLETION DEPTH: 73.5 ft
DATE: 1-3-24

DEPTH TO WATER IN BORING: 8.5 ft
DATE: 1/2/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-189

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 20 ft /NQ Core-Diedrich D-50 LOCATION: 35.484709°N, -94.243187°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 438.3 | | | | | | |
| | | | Stiff reddish brown and brown clayey silt w/some organics (CL-ML), very dry | 15<br>16 | | | | | |
| 5 | | | Stiff reddish brown and tan silty clay w/some ferrous nodules and stains (CL) | 20 | | | | | |
| | | | Medium dense reddish brown and brown fine sandy silt, clayey (CL-ML) w/occasional sandstone fragments and ferrous stains | 15<br>26 | | | | | |
| 10 | | | | | | | | | |
| 15 | | | Low hardness dark gray weathered shale | 50/5"<br>50/1" | | | | | |
| 20 | | | Moderately hard dark gray shale w/some close to very close, very thin interbedded gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 3170 psi, TUW= 160 pcf | | 100 | 100 |
| 25 | | | Moderately hard dark gray shale w/interbedded close to very close, very thin to thin interbedded gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 16,230 psi, TUW= 168 pcf | | 100 | 100 |
| 30 | | | Hard gray fine-grained sandstone w/interbedded very close dark gray shale laminations, horizontal bedding | | | $q_u$= 13,920 psi, TUW= 163 pcf | | 100 | 100 |
| 35 | | | Moderately hard dark gray shale w/interbedded close to very close, very thin to thin interbedded gray fine-grained sandstone partings, horizontal bedding<br>- sandstone seam at 33.8 ft | | | $q_u$= 4210 psi, TUW= 165 pcf | | 96 | 96 |
| 40 | | | | | | | | 98 | 98 |

COMPLETION DEPTH: 80.0 ft
DATE: 6-28-24

DEPTH TO WATER IN BORING: 7 ft
DATE: 6/27/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-189

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 20 ft /NQ Core-Diedrich D-50 LOCATION: 35.484709°N, -94.243187°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 50 | | | (continued) | | | $q_u$= 5470 psi, TUW= 171 pcf | | 95 | 95 |
| | | | | | | | | 96 | 96 |
| 55 | | | | | | $q_u$= 6530 psi, TUW= 162 pcf | | 100 | 100 |
| 60 | | | - sandstone seam at 60.8 ft | | | $q_u$= 7380 psi, TUW= 166 pcf | | 100 | 100 |
| 65 | | | Moderately hard dark gray shale w/some close to very close, very thin interbedded gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 3580 psi, TUW= 164 pcf | | 100 | 100 |
| 70 | | | - sandstone partings are less frequent below 70 ft | | | $q_u$= 3070 psi, TUW= 164 pcf | | 98 | 98 |
| 75 | | | | | | $q_u$= 1910 psi, TUW= 167 pcf | | 100 | 100 |
| 80 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 85 | | | | | | | | | |

COMPLETION DEPTH: 80.0 ft
DATE: 6-28-24

DEPTH TO WATER IN BORING: 7 ft
DATE: 6/27/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-190

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 20.5 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.484722°N, -94.239444°E

SURF. EL: 409±

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | Loose brown fine sandy silt (ML) w/occasional sandstone fragments | 9 | | | | | |
| | Very soft reddish brown silty clay (CL) | 3 | | | 40 | | |
| 5 | Medium dense reddish brown fine sandy silt (ML) | | 117 | NON PLASTIC- | 52 | | |
| | - brown below 6 ft | | | | | | |
| | - loose below 8 ft | 7 | | | | | |
| 10 | | | | | | | |
| | Firm brown and gray fine sandy clay (CL) | 8 | | | | | |
| 15 | | | | | | | |
| | Very stiff brown fine sandy clay (CL) w/occasional sandstone fragments | 50/5" | | | | | |
| 20 | | | | | | 92 | 0 |
| | Moderately hard gray fine-grained weathered sandstone w/interbedded very close, very thin dark gray shale laminations, horizontal bedding | | | $q_u$= 3420 psi, TUW= 161 pcf<br>$q_u$= 2900 psi, TUW= 164 pcf | | 97 | 85 |
| 25 | Moderately hard dark gray shale w/interbedded, very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 6090 psi, TUW= 167 pcf | | 82 | 82 |
| 30 | | | | | | | |
| 35 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by NE.<br>NOTE 3: Logged by TRS and MSE.<br>NOTE 4: ECF = 1.52. | | | | | | |

COMPLETION DEPTH: 31.5 ft
DATE: 12-19-23

DEPTH TO WATER IN BORING: 19 ft
DATE: 12/19/2023

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-191

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 13.5 ft /NQ2 Core-CME-550

LOCATION: 35.485141°N, -94.242977°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 426.2 | | | | | | |
| | | | Firm reddish brown clayey silt (CL-ML) w/ some organics | 7 | | | | | |
| | | | - stiff to very stiff below 2 ft | | 113 | | | | |
| 5 | | | Stiff reddish tan and tan fine sandy clay (CL) | 14 | | | | | |
| | | | - w/numerous sandstone fragments below 6 ft | 15 | | | | | |
| 10 | | | Medium dense brown and tan sandy fine to coarse gravel (GP) | 16 | | | | | |
| 15 | | | | 50/6" | | | | | |
| | | | Moderately hard dark gray weathered shale w/very close clayey shale laminations and seams, horizontal bedding | | | | | 100 | 0 |
| | | | Moderately hard gray slightly weathered fine-grained sandstone w/very close, very thin dark gray shale laminations, horizontal bedding | | | $q_u$= 5930 psi, TUW= 168 pcf | | 100 | 60 |
| 20 | | | Moderately hard dark gray shale w/very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2160 psi, TUW= 168 pcf | | 100 | 90 |
| | | | Moderately hard gray fine-grained sandstone w/very close, interbedded very thin dark gray shale laminations, horizontal bedding | | | $q_u$= 2480 psi, TUW= 167 pcf | | 100 | 85 |
| 25 | | | | | | | | | |

COMPLETION DEPTH: 55.0 ft
DATE: 1-4-24

DEPTH TO WATER IN BORING: 6 ft

DATE: 1/3/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-191

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA 13.5 ft /NQ2 Core-CME-550

LOCATION: 35.485141°N, -94.242977°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 90 |
| 35 | | | | | | $q_u$= 4030 psi, TUW= 168 pcf | | | |
| | | | | | | | | 100 | 95 |
| 40 | | | | | | | | | |
| | | | | | | | | 100 | 75 |
| 45 | | | | | | | | | |
| | | | | | | | | 100 | 90 |
| 50 | | | | | | $q_u$= 3280 psi, TUW= 168 pcf | | | |
| | | | | | | | | 100 | 90 |
| 55 | | | | | | | | | |

NOTE 1: Backfilled with cuttings.
NOTE 2: Drilled by BF.
NOTE 3: Logged by TRS/MJE.
NOTE 4: ECF = 1.47.

COMPLETION DEPTH: 55.0 ft
DATE: 1-4-24

DEPTH TO WATER IN BORING: 6 ft

DATE: 1/3/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-192

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.485389°N, -94.243456°E

SURF. EL: 433.9

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | Firm reddish brown silty clay w/some fine sand and organics (CL) (fill) | 7 | | | | | |
| | | 7 | | | | | |
| 5 | - firm to stiff below 4.5 ft | 10 | | | | | |
| | Medium dense reddish brown clayey fine sand (SC) (possible fill) | 11 | | | | | |
| 10 | | 21 | | | 55 | | |
| | Dense brown fine sandy silt w/some sandstone fragments (ML) | 30 | | | | | |
| 15 | | 50/5" | | | | | |
| 20 | Low hardness dark gray shale w/very close, very thin gray fine-grained sandstone partings, slightly weathered, horizontal bedding | | | $q_u$= 2270 psi, TUW= 165 pcf | | 98 | 98 |
| | Moderately hard dark gray shale w/interbeded, very close, thin to very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2650 psi, TUW= 168 pcf | | 100 | 100 |
| 25 | | | | | | | |
| 30 | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 5680 psi, TUW= 163 pcf | | 100 | 100 |
| | | | | $q_u$= 3620 psi, TUW= 162 pcf | | | |

COMPLETION DEPTH: 59.0 ft
DATE: 6-11-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/11/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-192

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.485389°N, -94.243456°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 40 | | | Moderately hard dark gray shale w/interbedded, very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | | | 98 | 98 |
| 45 | | | | | | $q_u$= 3920 psi, TUW= 164 pcf | | 95 | 95 |
| | | | Hard light gray and gray fine-grained sandstone with occassional dark gray shale partings and inclusions, horizontal bedding | | | | | | |
| 50 | | | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings and inclusions, horizontal bedding | | | $q_u$= 11,790 psi, TUW= 166 pcf | | 98 | 98 |
| 55 | | | Moderately hard dark gray shale w/interbeded, very close, thin to very thin gray fine-grained sandstone partings and inclusions, horizontal bedding | | | | | 100 | 100 |
| | | | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 59.0 ft
DATE: 6-11-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/11/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

# LOG OF BORING NO. FB-193

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.485820°N, -94.243246°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 433.0 | | | | | | |
| | | | Firm reddish brown clayey silt (CL-ML) (fill) | 9 | | | | | |
| | | | Firm to stiff reddish brown and tan silty clay w/some sandstone fragments (CL) (fill) | 10 | | | | | |
| 5 | | | - very stiff, w/more sandstone fragments below 4 ft | 39 | | | | | |
| | | | | 54 | | | | | |
| 10 | | | - stiff, w/less sandstone fragments below 9 ft | 11 | | | | | |
| | | | Loose dense yellowish tan and brown silty fine sand (SM) | 7 | | -NON-PLASTIC- | 37 | | |
| 20 | | | Low hardness to moderately hard yellowish tan, reddish tan and tan fine-grained weathered sandstone w/some clayey fine sand seams and ferrous stains | 50/4" | | | | | |
| 25 | | | Low hardness dark gray weathered shale w/occassional gray fine-grained sandstone partings and seams, horizontal bedding | 50/1" | | | | | |
| 30 | | | Low hardness to moderately hard dark gray shale w/interbedded very thin to thin, very close gray fine-grained sandstone partings and seams, horizontal bedding | 50/1" | | | | | |
| | | | - sandstone seams more frequent below 32 ft | | | $q_u$= 3220 psi, TUW= 164 pcf | | 99 | 94 |
| 35 | | | - sandy shale layer from 36.2 to 37.8 ft | | | $q_u$= 4620 psi, TUW= 165 pcf | | 100 | 100 |

COMPLETION DEPTH: 70.0 ft
DATE: 6-25-24

DEPTH TO WATER IN BORING: 23 ft
DATE: 6/21/2024



Form 108-6(74) Job No. 21-071
RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-193

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.485820°N, -94.243246°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 45 | | | Low hardness dark gray shale w/occassional gray fine-grained sandstone partings and seams, horizontal bedding | | | $q_u$= 4110 psi, TUW= 164 pcf | | 100 | 100 |
| 50 | | | | | | | | 100 | 100 |
| 55 | | | | | | $q_u$= 2350 psi, TUW= 164 pcf | | 90 | 90 |
| 60 | | | | | | | | 100 | 100 |
| 65 | | | | | | $q_u$= 6940 psi, TUW= 162 pcf | | 92 | 92 |
| 70 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 75 | | | | | | | | | |

COMPLETION DEPTH: 70.0 ft
DATE: 6-25-24

DEPTH TO WATER IN BORING: 23 ft

DATE: 6/21/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-194

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.486069°N, -94.243726°E

SURF. EL: 434.3

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | Firm reddish brown silty clay, sandy (CL) (fill) | 7 | | | | | |
| | | | - stiff below 2.5 ft | 11 | | | | | |
| 5 | | | | 11 | | | | | |
| | | | | 23 | | | | | |
| 10 | | | Stiff brown and tan fine sandy clay w/sandstone fragments (CL) | 17 | | | 70 | | |
| 15 | | | Low hardness dark gray weathered shale w/sandstone seams | 26 | | | | | |
| | | | | 50/2" | | | | | |
| 20 | | | Moderately hard light gray and gray fine-grained sandstone w/interbedded, very close, very thin dark gray shale laminations and partings, horizontal bedding | | | $q_u$= 5700 psi, TUW= 161 pcf | | 96 | 96 |
| | | | | | | $q_u$= 4460 psi, TUW= 167 pcf | | | |
| 25 | | | Hard light gray and gray fine-grained sandstone with occassional dark gray shale partings and inclusions, horizontal bedding | | | | | 96 | 96 |
| 30 | | | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings and inclusions, horizontal bedding | | | | | | |
| | | | Moderately hard dark gray shale w/interbeded, very close, thin to very thin gray fine-grained sandstone partings and inclusions, horizontal bedding | | | | | 96 | 100 |

COMPLETION DEPTH: 59.0 ft
DATE: 6-11-24

DEPTH TO WATER IN BORING: Dry to 19 ft
DATE: 6/10/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-194

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.486069°N, -94.243726°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | - w/some sandstone seams below 30 ft<br>Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1730 psi, TUW= 166 pcf | | 100 | 100 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | | | | | | 100 | 100 |
| 50 | | | | | | | | 100 | 100 |
| 55 | | | | | | $q_u$= 8010 psi, TUW= 168 pcf | | 100 | 100 |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 59.0 ft
DATE: 6-11-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/10/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-195

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.486408°N, -94.243861°E

SURF. EL: 434.7

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | Stiff reddish brown silty clay (CL) (fill) | 16 | | | | | |
| | | 12 | | | | | |
| 5 | - firm to stiff below 4.5 ft | 10 | | | | | |
| | Firm brown, gray and tan clayey silt, sandy (CL-ML) w/some ferrous nodules and stains | 7 | | | | | |
| 10 | - firm to stiff below 9 ft | 10 | | | | | |
| | Loose gray and tan clayey fine sand w/some sandstone fragments and ferrous nodules and stains (SC) | 5 | | | | | |
| 15 | Low hardness tan and dark gray weathered shale w/some sandstone seams and ferrous stains | 50/5" | | | | | |
| 20 | Moderately hard to hard dark gray shale w/interbeded, very close, thin to very thin gray fine-grained sandstone partings and inclusions, horizontal bedding | | | $q_u$= 7260 psi, TUW= 164 pcf | | 100 | 100 |
| | | | | $q_u$= 3630 psi, TUW= 163 pcf | | 90 | 85 |
| 25 | | | | | | | |
| | Hard light gray and gray fine-grained sandstone with occassional dark gray shale partings and inclusions, horizontal bedding | | | $q_u$= 2420 psi, TUW= 168 pcf | | 100 | 100 |
| 30 | Moderately hard to hard dark gray shale w/interbeded, very close, thin to very thin gray fine-grained sandstone partings and inclusions, horizontal bedding | | | $q_u$= 3590 psi, TUW= 164 pcf | | | |

COMPLETION DEPTH: 58.0 ft
DATE: 6-7-24

DEPTH TO WATER IN BORING: 6.3 ft
DATE: 6/6/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-195

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.486408°N, -94.243861°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | - gray fine-grained sandstone layer from 32.3 to 32.9 ft | | | | | 88 | 88 |
| 40 | | | Moderately hard dark gray shale w/some sandstone partings and occassional inclusions | | | $q_u$= 2110 psi, TUW= 164 pcf | | 100 | 95 |
| 45 | | | | | | $q_u$= 2190 psi, TUW= 167 pcf | | 100 | 100 |
| 50 | | | -several mechanical breaks from 48 to 48.5 and 50 to 51.5 ft | | | $q_u$= 7950 psi, TUW= 174 pcf | | 95 | 95 |
| 55 | | | | | | | | 100 | 100 |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 58.0 ft
DATE: 6-7-24

DEPTH TO WATER IN BORING: 6.3 ft
DATE: 6/6/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-196

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.486839°N, -94.243650°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 427.0 | | | | | | |
| | | | Firm to stiff brown and gray silty clay (CL) w/some ferrous nodules and stains | 10 | | | | | |
| | | | - stiff below 2.5 ft | 17 | | | | | |
| 5 | | | | 12 | | | | | |
| | | | - soft below 6.5 ft | 6 | | | | | |
| | | | - firm below 9 ft | 7 | | | | | |
| 10 | | | | | | | | | |
| | | | | 7 | | | | | |
| 15 | | | | | | | | | |
| | | | Low hardness to moderately hard dark gray shale w/ some very thin gray fine-grained sandstone partings, horizontal bedding | 50/1" | | | | | |
| 20 | | | - moderately hard below 19 ft | | | | | 100 | 100 |
| | | | | | | $q_u$= 7380 psi, TUW= 166 pcf | | | |
| 25 | | | | | | $q_u$= 1220 psi, TUW= 171 pcf | | 80 | 72 |
| | | | | | | | | | |
| 30 | | | | | | | | 98 | 98 |

COMPLETION DEPTH: 58.0 ft
DATE: 6-13-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/13/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-196

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.486839°N, -94.243650°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | 90 | 90 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | | | | $q_u$= 2060 psi, TUW= 164 pcf | | 90 | 90 |
| 50 | | | | | | | | 100 | 100 |
| 55 | | | | | | $q_u$= 1900 psi, TUW= 166 pcf | | 100 | 100 |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 58.0 ft
DATE: 6-13-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/13/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-197

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.487087°N, -94.244130°E

SURF. EL: 435.6

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 0 | Very stiff reddish brown clayey silt, sandy with some sandstone fragments (CL-ML) (fill) | 26 | | | | | |
| | - stiff below 2.5 ft | 12 | | | | | |
| 5 | - firm below 4.5 ft | 7 | | | | | |
| | | 8 | | | | | |
| | Very loose reddish brown fine sandy silt (ML) | 3 | | | | | |
| 10 | | | | | | | |
| | Medium dense reddish brown and tan clayey fine sand w/some sandstone fragments (SC) | 25 | | | | | |
| 15 | | | | | | | |
| | Low hardness to moderately hard dark gray shale, slightly weathered | 50/3" | | | | | |
| 20 | Moderately hard dark gray w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 3080 psi, TUW= 162 pcf | | 100 | 100 |
| 25 | | | | $q_u$= 4240 psi, TUW= 164 pcf | | 100 | 100 |
| 30 | | | | $q_u$= 3080 psi, TUW= 162 pcf | | 97 | 97 |

COMPLETION DEPTH: 59.0 ft
DATE: 6-17-24

DEPTH TO WATER IN BORING: Dry to 19 ft

DATE: 6/16/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-197

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.487087°N, -94.244130°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 2060 psi, TUW= 166 pcf | | 100 | 100 |
| 40 | | | | | | | | 100 | 100 |
| 45 | | | | | | $q_u$= 6510 psi, TUW= 167 pcf | | 95 | 95 |
| 50 | | | | | | | | 100 | 100 |
| 55 | | | | | | | | 100 | 100 |
| 60 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 59.0 ft
DATE: 6-17-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/16/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-198

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.487519°N, -94.243919°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 428.4 | | | | | | |
| | | | Stiff reddish brown clayey silt w/some orgaincs (CL-ML) (possible fill) | 13 | | | | | |
| | | | Firm brown and tan silty clay w/some ferrous nodules and stains (CL) | 9 | | | | | |
| 5 | | | - soft from 4.5 to 6.5 ft | 4 | | | | | |
| | | | - stiff from 6.5 to 8.5 ft | 11 | | | | | |
| 10 | | | - soft, w/some sandstone fragments below 9 ft | 6 | | | | | |
| 15 | | | - firm to stiff below 14 ft | 10 | | | | | |
| 20 | | | Low hardness tan and dark gray weathered shale w/some sandstone seams and ferrous stains | 50/6" | | | | | |
| 25 | | | Moderately hard dark gray shale w/some very thin sandstone partings and occassional inclusions, horizontal bedding | | | $q_u$= 5690 psi, TUW= 172 pcf | | 98 | 98 |
| 30 | | | | | | | | 97 | 97 |

COMPLETION DEPTH: 63.0 ft
DATE: 6-20-24

DEPTH TO WATER IN BORING: Dry to 19 ft
DATE: 6/19/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-198

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 19 ft /NQ Core-Diedrich D-50 LOCATION: 35.487519°N, -94.243919°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 40 | | | | | | | | 100 | 100 |
| | | | | | | $q_u$= 2000 psi, TUW= 167 pcf | | | |
| 45 | | | | | | | | 100 | 100 |
| | | | | | | | | | |
| 50 | | | | | | $q_u$= 2010 psi, TUW= 161 pcf | | 90 | 90 |
| | | | | | | | | | |
| 55 | | | | | | | | 100 | 100 |
| | | | | | | $q_u$= 4070 psi, TUW= 166 pcf | | | |
| 60 | | | | | | | | 100 | 100 |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM/DP.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 63.0 ft
DATE: 6-20-24

DEPTH TO WATER
IN BORING: Dry to 19 ft

DATE: 6/19/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-199

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 40 ft /NQ Core-Diedrich D-50 LOCATION: 35.487751°N, -94.244396°E

SURF. EL: 436.5

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | Very stiff brown clayey silt w/numerous sandstone and shale fragments (GC-GP) (fill) | 37 | | | | | |
| | - stiff below 2 ft | 13 | | | | | |
| 5 | - very stiff below 4 ft | 31 | | | | | |
| | | 32 | | | | | |
| 10 | - stiff below 8 ft | 22 | | | 8 | | |
| 15 | Very stiff reddish brown fine sandy clay w/sandstone fragments (CL) | | | | 19 | | |
| 20 | | 28 | | | | | |
| 25 | | 50/6" | | | | | |
| 30 | - w/more sandstone fragments below 29 ft | 50/2" | | | | | |
| | | 50/5" | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 5-14-24

DEPTH TO WATER IN BORING: 18.5 ft
DATE: 5/13/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-199

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 40 ft /NQ Core-Diedrich D-50 LOCATION: 35.487751°N, -94.244396°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 40 | | | - auger refusal at 40 ft | 50/1" | | | | | |
| | | | Moderately hard dark gray shale w/occssional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1490 psi, TUW= 175 pcf | | 90 | 85 |
| 45 | | | | | | $q_u$= 1270 psi, TUW= 164 pcf | | 100 | 100 |
| 50 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 5-14-24

DEPTH TO WATER IN BORING: 18.5 ft
DATE: 5/13/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-200

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 33 ft /NQ Core-Diedrich D-50 LOCATION: 35.487799°N, -94.244348°E

SURF. EL: 434±

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 5 | Firm reddish brown silty clay w/sandstone and shale fragments (CL) (possible fill) | 7<br>8 | 107 | -NON PLASTIC- | 71 | | |
| 10 | Stiff reddish brown fine sandy clay w/sandstone fragments, slightly silty (CL) | 22<br>12 | | | | | |
| 15 | - soft from 14 to 19 ft | 6 | | | | | |
| 20 | - stiff below 18 ft | 22 | | | | | |
| 25 | - very stiff w/more sandstone fragments below 24 ft | 50/5" | | | | | |
| 30 | | 50/6" | | | | | |
| | - auger refusal at 33 ft | | | | | | |
| 35 | Moderately hard dark gray shale w/occssional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1830 psi, TUW= 168 pcf | | 100 | 100 |
| 40 | | | | $q_u$= 3600psi, TUW= 166 pcf | | 98 | 98 |
| 45 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.43. | | | | | | |

COMPLETION DEPTH: 42.0 ft
DATE: 5-14-24

DEPTH TO WATER IN BORING: 23.5 ft
DATE: 5/14/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-201

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 22.5 ft /NQ Core-Diedrich D-50 LOCATION: 35.487848°N, -94.244206°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 427.7 | | | | | | |
| | | | Firm to stiff brown clayey silt with some sandstone fragments (CL-ML) (fill) | 10 | | | | | |
| 5 | | | Soft reddish tan and tan silty clay with some sandstone fragments (CL)<br>- stiff below 6 ft | 5<br>11 | | | | | |
| 10 | | | Firm brown and tan fine sandy clay with sandstone and shale fragments (CL) | 7 | | | | | |
| 15 | | | - stiff with more sandstone fragments below 14 ft | 22 | | | | | |
| 20 | | | | 50/3" | | | | | |
| | | | - auger refusal at 21.5 ft in shale | | | | | | |
| 25 | | | Moderately hard dark gray shale with some very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1930 psi, TUW= 169 pcf | | 95 | 90 |
| 30 | | | | | | $q_u$= 2200 psi, TUW= 164 pcf | | 95 | 95 |
| 35 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.43. | | | | | | |

COMPLETION DEPTH: 32.0 ft
DATE: 5-15-24

DEPTH TO WATER IN BORING: 13.5 ft
DATE: 5/15/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-202

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 53 ft /NQ Core-Diedrich D-50 LOCATION: 35.487842°N, -94.244118°E

SURF. EL: 427.8

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | Firm brown silty clay with some sandstone fragments (CL) (fill) | 7 | | | | | |
| 5 | | | Firm reddish tan and tan silty clay with some sandstone fragments (CL) | 9<br>8 | | | | | |
| 10 | | | Firm brown and tan fine sandy clay with some sandstone and shale fragments (CL) | 9 | | | | | |
| 15 | | | - very stiff with more sandstone fragments below 14 ft | 33 | | | | | |
| 20 | | | | 50/5" | | | | | |
| | | | - auger refusal at 22 ft in shale | | | | | | |
| 25 | | | Moderately hard dark gray shale with some very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2080 psi, TUW= 164 pcf | | 94 | 94 |
| 30 | | | | | | $q_u$= 2260 psi, TUW= 167 pcf | | 100 | 100 |
| 35 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.43. | | | | | | |

COMPLETION DEPTH: 32.5 ft
DATE: 5-16-24

DEPTH TO WATER IN BORING: 13.5 ft
DATE: 5/15/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-203

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 37 ft /NQ Core-Diedrich D-50

LOCATION: 35.4878752°N, -94.243990°E

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|
| | SURF. EL: 434.1 | | |
| | Very stiff brown clayey silt with sandstone fragments (CL-ML) (fill) | 37 | |
| | Stiff reddish tan and tan clayey silt with some sandstone fragments (CL-ML) | 19 | |
| 5 | | | 105 |
| | | 16 | |
| | Very stiff brown and tan fine sandy clay with some sandstone and shale fragments (CL) | 41 | |
| 10 | | | |
| | - firm with less sandstone fragments below 14 ft | 9 | |
| 15 | | | |
| | - very stiff below 19 ft | 50 | |
| 20 | | | |
| | | 50/6" | |
| 25 | | | |
| | | 50/4" | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT
10 20 30 40 50 60 70

- No. 200 %
% Recovery
% RQD

COMPLETION DEPTH: 46.5 ft
DATE: 5-20-24

DEPTH TO WATER IN BORING: 23.5 ft
DATE: 5/17/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-203

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 37 ft /NQ Core-Diedrich D-50 LOCATION: 35.4878752°N, -94.243990°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 35 | | | | 50/4" | | | | | |
| | | | - auger refusal at 37 ft in shale | | | | | | |
| | | | Moderately hard dark gray shale with some very thin gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| 40 | | | | | | | | 83 | 83 |
| | | | | | | $q_u$= 2410 psi, TUW= 164 pcf | | | |
| | | | | | | $q_u$= 1540 psi, TUW= 163 pcf | | | |
| 45 | | | | | | | | 94 | 94 |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.43. | | | | | | |
| 50 | | | | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 46.5 ft
DATE: 5-20-24

DEPTH TO WATER IN BORING: 23.5 ft
DATE: 5/17/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-204

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA to 30 ft /NQ Core-Diedrich D-50 LOCATION: 35.487964°N, -94.243749°E

SURF. EL: 434.1

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 0 | Very stiff brown clayey silt with numerous sandstone fragments (CL-ML) (fill) | 50/11" | | | | | |
| | | 50/6" | | | | | |
| 5 | - stiff below 4 ft | 19 | | -NON-PLASTIC- | | | |
| | - very stiff below 6 ft | 30 | | | | | |
| 10 | Medium dense reddish tan clayey fine sand with some sandstone fragments (SC) | 17 | | | | | |
| 15 | | 15 | | | | | |
| 20 | Very stiff brown and tan fine sandy clay with some sandstone and shale fragments (CL) | 28 | | | | | |
| 25 | - w/some more sandstone fragments below 24 ft | 38 | | | | | |
| 30 | Moderately hard tan and dark gray weathered shale with some very thin gray fine-grained sandstone partings and seams, horizontal bedding | 50/3" | | $q_u$= 2890 psi, TUW= 168 pcf | | 100 | 92 |
| 35 | Moderately hard dark gray shale w/some verythin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1550 psi, TUW= 168 pcf | | 100 | 93 |
| 40 | | | | | | | |
| 45 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by DP.<br>NOTE 4: ECF = 1.33. | | | | | | |

COMPLETION DEPTH: 40.0 ft
DATE: 9-11-24

DEPTH TO WATER IN BORING: 22.5 ft
DATE: 9/10/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-210

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 18.5 ft /NQ2 Core-CME-550

LOCATION: 35.454059°N, -94.217094°E

SURF. EL: 397±

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | Firm to stiff brown and tan silty clay (CL), very dry | 10 | | | | | |
| | | | | 11 | | | | | |
| 5 | | | - tan and reddish-tan below 4.5 ft | 13 | | | | | |
| | | | Loose brown and tan clayey fine sand (SC) w/some ferrous nodules and stains, damp | 8 | | | | | |
| | | | Low hardness tan, brown and reddish-tan highly weathered fine-grained sandstone w/ferrous stains and clayey fine sand seams | 33 | | | | | |
| 10 | | | | | | | | | |
| | | | | | | | | | |
| 15 | | | | 19 | | | | | |
| | | | Low hardness to moderately hard dark gray weahtered shale w/ some gray fine-grained sandstone partings, horizontal bedding | 50/5" | | | | 68 | 13 |
| 20 | | | - w/some sandstone inclusions below 21.5 ft | | | $q_u$= 1660 psi, TUW= 157 pcf | | 98 | 67 |
| | | | Moderately hard gray fine-grained sandstone w/some dark gray shale laminations, horizontal bedding | | | | | | |
| 25 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, | | | | | 95 | 95 |

COMPLETION DEPTH: 51.0 ft
DATE: 8-14-24

DEPTH TO WATER IN BORING: 13 ft
DATE: 8/14/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-210

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 18.5 ft /NQ2 Core-CME-550

LOCATION: 35.454059°N, -94.217094°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1680 psi, TUW= 160 pcf | | | |
| | | | Moderately hard dark gray shale woccasional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1370 psi, TUW= 159 pcf | | 98 | 98 |
| 35 | | | - multiple mechanical breaks below 36 ft | | | | | | |
| | | | | | | | | 83 | 62 |
| 40 | | | | | | | | | |
| | | | | | | | | 92 | 83 |
| 45 | | | | | | | | | |
| | | | | | | $q_u$= 2190 psi, TUW= 164 pcf | | 96 | 96 |
| 50 | | | | | | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 51.0 ft
DATE: 8-14-24

DEPTH TO WATER IN BORING: 13 ft

DATE: 8/14/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-211

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 19 ft /NQ2 Core-CME-550

LOCATION: 35.454380°N, -94.217103°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 398± | | | | | | |
| | | | Stiff brown and tan silty clay (CL), very dry | 11 | | | | | |
| | | | | 18 | | | | | |
| 5 | | | | 17 | | | | | |
| | | | - soft below 6.5 ft | 5 | | | | | |
| | | | | | 96 | | | | |
| 10 | | | Loose brown and tan clayey fine sand (SC) w/some ferrous nodules and stains | | | | | | |
| | | | Low hardness tan, brown and reddish-tan highly weathered fine-grained sandstone w/ferrous stains and clayey fine sand seams | 20 | | | | | |
| 15 | | | | | | | | | |
| | | | Low hardness to moderately hard dark gray weahtered shale w/some gray fine-grained sandstone partings and seams, horizontal bedding | 50/5" | | | | 60 | 15 |
| 20 | | | | | | | | | |
| | | | Moderately hard gray fine-grained sandstone w/some dark gray shale laminations, horizontal bedding | | | $q_u$= 2240 psi, TUW= 161 pcf | | 100 | 75 |
| 25 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal | | | $q_u$= 1920 psi, TUW= 164 pcf | | 96 | 83 |

COMPLETION DEPTH: 51.3 ft
DATE: 8-13-24

DEPTH TO WATER IN BORING: 10.8 ft

DATE: 8/13/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FB-211

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 19 ft /NQ2 Core-CME-550

LOCATION: 35.454380°N, -94.217103°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | bedding | | | | | | |
| | | | Moderately hard dark gray shale woccassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2310 psi, TUW= 166 pcf | | 96 | 96 |
| 35 | | | - multiple mechanical breaks below 35.5 ft | | | | | 83 | 35 |
| 40 | | | | | | $q_u$= 3180 psi, TUW= 165 pcf | | 95 | 95 |
| 45 | | | | | | | | | |
| 50 | | | | | | | | 100 | 100 |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47. | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 51.3 ft
DATE: 8-13-24

DEPTH TO WATER IN BORING: 10.8 ft

DATE: 8/13/2024

RECRQDN200-2 21-071_FB LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-42

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55

LOCATION: 35.431652°N, -94.213679°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 440± | | | | | | |
| | | | Soft reddish tan and brown silty clay (CL) w/some ferrous nodules and stains | 4<br>6 | | | 81 | | |
| 5 | | | Low hardness tan and dark gray weathered shale w/weathered sandstone seams and partings | 55<br>50/5"<br>50/8" | | | | | |
| 10 | | | | | | | | | |
| | | | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings | 50/1" | | | | 83 | 30 |
| 15 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by SI.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.31. | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |

COMPLETION DEPTH: 15.0 ft
DATE: 11-7-24

DEPTH TO WATER IN BORING: Dry

DATE: 11/7/2024

RECRQDN200-2 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-43

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA - CME-550 LOCATION: 35.432421°N, 94.215763°E

SURF. EL: 418.5

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| 1 | | | Very soft brown silty clay w/rootlets (CL) | 0 | | | |
| 2 | | | | | | | |
| 3 | | | Very soft tan and reddish tan silty clay w/ferrous nodules and stains (CL) | 2 | | | |
| 4 | | | Moderately hard tan and gray weathered shale<br>- auger refusal at 4.5 ft | 50/5" | | | |
| 5 | | | Notes:<br>1. Backfilled with cuttings<br>2. Drilled by BF<br>3. Logged by IJM<br>4. ECF = 1.47 | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |

COMPLETION DEPTH: 4.5 ft
DATE: 6-9-25

DEPTH TO WATER IN BORING: 3.5

DATE: 6/9/2025

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-44

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA - D50 LOCATION: 35.432489°N, -94.212594°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 403.7 | | | | |
| | | | Stiff brown clayey silt w/shale fragments (CL-ML) | 12 | | | |
| 1 | | | Low hardness to moderately hard tan and dark gray weathered shale w/ferrous stains | 50/6" | | ● | |
| 2 | | | | 50/4" | | | |
| 3 | | | Moderately hard dark gray shale | | | | |
| 4 | | | | 50/2" | | | |
| 5 | | | | | | | |
| 6 | | | Notes:<br>1. Backfilled with cuttings<br>2. Drilled by CL<br>3. Logged by IJM<br>4. ECF = 1.33 | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |

COMPLETION DEPTH: 5.0 ft
DATE: 7-10-25

DEPTH TO WATER
IN BORING: Dry

DATE: 7/10/2025

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

# LOG OF TEST PIT NO. FE-45

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: Backhoe

LOCATION: 35.433249°N, -94.212952°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 407.4 | | | | |
| 1 | | | Loose reddish brown clayey silt, slightly sandy w/sandstone fragments (CL-ML) | | | ⊗ | |
| 2 | | | | | | | |
| 3 | | | Stiff brown and reddish brown silty clay w/very thin shale seams (CL), sandy | | | ⊗→ | |
| 4 | | | | | | | |
| 5 | | | Very stiff gray and tan silty clay w/numerous ferrous nodules and stains and very thin weathered shale seams (CL) | | | ⊗→ | |
| 6 | | | Moderately hard tan and dark gray weathered shale w/silty clay laminations, horizontal bedding<br>- refusal at 6 ft in shale<br>1. Backfilled with cuttings<br>2. Excavated w/a Bobcat430 mini-ex<br>3. Logged by IJM | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |

COMPLETION DEPTH: 6.0 ft
DATE: 7-15-25

DEPTH TO WATER IN TEST PIT: Dry

DATE: 7/15/2025

LTPNEW 21-071 FE LOGS.GPJ 4-15-26

PLATE 102

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-46

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.434521°N, -94.212087°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 411.0 | | | | |
| | | | Stiff reddish tan clayey silt w/some organics (CL-ML) | 16 | | | |
| | | | | 21 | | | |
| 5 | | | Low hardness tan, dark gray and gray weathered shale w/ferrous stains, horizontal bedding | 40 | | | |
| | | | | 50/6" | | | |
| | | | NOTE 1: Backfilled with cuttings. | | | | |
| | | | NOTE 2: Drilled by BF. | | | | |
| | | | NOTE 3: Logged by MSE. | | | | |
| | | | NOTE 4: ECF = 1.47 | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 6.5 ft
DATE: 9-17-24

DEPTH TO WATER
IN BORING: Dry

DATE: 9/17/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-47

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55 LOCATION: 35.440657°N, -94.210716°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 385.1 | | | | |
| | | | Firm to stiff brown silty clay (CL) | 10 | | | |
| | | | - soft below 2.5 ft | 6 | | | |
| 5 | | | - very soft below 4.5 ft | 2 | | | |
| | | | | 3 | | | |
| | | | Stiff gray clayey silt (CL-ML) | 19 | | | |
| 10 | | | Medium dense dark gray silty fine sand (SM) | | | | |
| 15 | | | - dense w/sandstone fragments below 14 ft | 50/5" | | | |
| | | | Low hardness to moderately hard dark gray weathered shale | 50/5" | | | |
| 20 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.42 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 19.0 ft
DATE: 1-30-24

DEPTH TO WATER IN BORING: 10 ft

DATE: 1/30/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

PLATE 104

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-48

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55 LOCATION: 35.441370°N, -94.210136°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 386.6 | | | | |
| | | | Soft brown and tan clayey silt, sandy (CL-ML) | 5 | | | |
| | | | Firm brown and tan silty clay (CL) | 7 | | | |
| 5 | | | - very soft to soft below 4.5 ft | 4 | | | |
| | | | | 3 | | | |
| 10 | | | | 4 | | | |
| | | | Very stiff gray clayey silt w/some decayed organics (CL-ML) | 31 | | | |
| 15 | | | | | | | |
| | | | Dense gray fine sandy silt w/some sandstone fragments (ML) | 50 | | | |
| 20 | | | | | | | |
| | | | - medium dense below 24 ft | 11 | | | |
| 25 | | | | | | | |
| | | | | 25 | | | |
| 30 | | | - auger refusal at 30.5 ft in shale | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.42 | | | | |
| 35 | | | | | | | |

COMPLETION DEPTH: 30.5 ft
DATE: 1-29-24

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 1/29/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-49

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55 LOCATION: 35.443682°N, -94.210797°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 388.1 | | | | |
| | | | Firm brown clayey silt (CL-ML) | 8 | | | |
| | | | Very soft to soft brown and tan silty clay (CL) | 4 | | | |
| 5 | | | | 2 | | | |
| | | | Very soft brown clayey silt (CL-ML) | 3 | | | |
| 10 | | | Loose gray and dark gray fine sandy silt w/some decaying organics (ML) | 5 | | | |
| 15 | | | - dense below 14 ft | 50/10" | | | |
| | | | Low hardness to moderately hard dark gray weathered shale | 50/6" | | | |
| 20 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.42 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 19.0 ft
DATE: 1-26-24

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 1/26/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

PLATE 106

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-50

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 HSA-CME-550 LOCATION: 35.451219°N, -94.213756°E

SURF. EL: 393.7

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | Stiff tan, gray and reddish tan clayey silt (CL-ML) | 22 | | | |
| | | | Stiff brown and tan silty clay (CL), very dry | 24 | | | |
| 5 | | | | 19 | | | |
| | | | - firm below 6 ft | 9 | | | |
| | | | Dense brown and tan fine sandy silt w/sandstone fragments (ML) | 32 | | -NON-PLASTIC- | |
| 10 | | | | | | | |
| | | | Loose brown and tan sandy fine to coarse gravel (GP) | 9 | | | |
| 15 | | | | | | | |
| | | | Moderately hard dark gray weathered shale | 50/3" | | | |
| | | | - auger refusal at 18.8 ft in shale | | | | |
| 20 | | | NOTE 1: Backfilled with cuttings. | | | | |
| | | | NOTE 2: Drilled by BF. | | | | |
| | | | NOTE 3: Logged by MSE. | | | | |
| | | | NOTE 4: ECF = 1.47 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 18.8 ft
DATE: 8-8-24

DEPTH TO WATER IN BORING: 9.8 ft
DATE: 8/8/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-51

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 HSA-CME-550 LOCATION: 35.333546°N, -94.214822°E

SURF. EL: 394.6

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|
| | Stiff tan, gray and reddish tan clayey silt (CL-ML) | 10 | |
| | Stiff brown and tan silty clay (CL), very dry | 11 | |
| 5 | - firm below 4.5 ft | 9 | |
| | Firm brown and tan fine sandy clay w/sandstone fragments (CL) | 5 | |
| 10 | - stiff below 8 ft | 23 | |
| | Medium dense brown and tan sandy fine to coarse gravel (GP) | 15 | |
| 15 | | | |
| | Moderately hard dark gray weathered shale | 50/3" | |
| 20 | - auger refusal at 18.9 ft in shale | | |
| | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | |
| 25 | | | |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT: 10 20 30 40 50 60 70

- No. 200 %

COMPLETION DEPTH: 18.9 ft
DATE: 8-8-24

DEPTH TO WATER IN BORING: 14.3 ft

DATE: 8/8/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-52

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA-CME-55 LOCATION: 35.455227°N, -94.217587°E

SURF. EL: 399.9

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | Dense brown and tan silty fine to coarse crushed stone base (GM) (fill) | 42 | | | 28 |
| | | | Dense brown fine sandy silt (ML) w/numerous crushed stone fragments (fill)<br>- medium dense below 2.5 ft | 10 | | | |
| 5 | | | Loose brown and tan silty fine to medium sand, clayey (SC-SM) w/some ferrous nodules and stains | 6 | | | 41 |
| | | | Firm brown and gray silty clay (CL) w/shale fragments | 9 | | | |
| 10 | | | - stiff below 9 ft | 14 | | | |
| 15 | | | Stiff grayish brown clayey silt (CL-ML) w/some weathered sandstone fragments | 13 | | | |
| 20 | | | | 23 | | | |
| | | | Low hardness to moderately hard dark gray weathered shale | 50/4" | | | |
| 25 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.42 | | | | |

COMPLETION DEPTH: 24.5 ft
DATE: 3-5-24

DEPTH TO WATER IN BORING: 20 ft
DATE: 3/5/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-53

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 HSA-CME-550 LOCATION: 35.45594°N, -94.21945°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 399± | | | | |
| | | | Firm brown silty clay (CL) | 7 | | | |
| | | | Very loose brown fine sandy silt (ML) | 3 | | -NON-PLASTIC- | |
| 5 | | | Very loose brown and tan and reddish tan clayey fine sand (SC-SM) w/some ferrous nodules and stains<br>- medium dense, w/some sandstone fragments below 6 ft | 1<br>22 | | | |
| 10 | | | - very loose to loose below 9 ft | 4 | | | |
| 15 | | | Low hardness tan and reddish tan weathered sandstone, fractured w/some clayey fine sand seams and ferrous stains | 27 | | | |
| 20 | | | | 12 | | | |
| | | | Low hardness to moderately hard dark gray weathered shale | 50/3" | | | |
| | | | - auger refusal at 22.8 ft in shale | | | | |
| 25 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | | | |

COMPLETION DEPTH: 21.8 ft
DATE: 8-16-24

DEPTH TO WATER IN BORING: 12.6 ft

DATE: 8/16/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-54

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55 LOCATION: 35.4479237°N, -94.248309°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 447± | | | | |
| | | | Soft dark brown clayey silt w/organics (CL-ML) | 6 | | | |
| | | | Soft reddish brown clayey silt (CL-ML) | | | | |
| | | | - very soft to soft below 2.5 ft | 4 | | | |
| 5 | | | | 3 | | | |
| | | | - firm below 6 ft | 7 | | | |
| | | | Medium dense reddish brown and tan silty fine sand, slightly clayey w/ weathered sandstone fragments (SM) | 15 | | | |
| 10 | | | | | | | |
| | | | - dense w/more sandstone fragments below 14 ft | 32 | | | |
| 15 | | | | | | | |
| | | | | 41 | | | |
| 20 | | | | | | | |
| | | | Low hardness to moderately hard dark gray weathered shale | 25/0" | | | |
| 25 | | | | | | | |

NOTE 1: Backfilled with cuttings.
NOTE 2: Drilled by CL.
NOTE 3: Logged by IJM.
NOTE 4: ECF = 1.42

COMPLETION DEPTH: 25.0 ft
DATE: 11-28-23

DEPTH TO WATER IN BORING: 17 ft
DATE: 11/28/2023

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-55

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55 LOCATION: 35.479214°N, -94.248299°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 428 ± | | | | |
| | | | Soft brown silty clay (CL) | 5 | | | |
| | | | | 5 | | | |
| 5 | | | Loose brown clayey fine sand w/some fine sand pockets (SM-SC) and some sandstone fragments | 8 | | | |
| | | | | 32 | | | |
| | | | Dense reddish tan and brown silty fine sand, slightly clayey w/sandstone fragments (SM) | 50/7" | | | |
| 10 | | | | | | | |
| | | | Low hardness dark gray weathered shale | 50/2" | | | |
| 15 | | | | 25/0" | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.42 | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 15.0 ft
DATE: 11-28-23

DEPTH TO WATER IN BORING: 8 ft
DATE: 11/28/2023

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-56

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in. HSA - Simco 2800 LOCATION: 35.481160°N, -94.239503°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 411± | | | | |
| | | | Soft reddish tan silty clay (CL) | 6 | | | |
| | | | - stiff from 2.5 ft to 4.5 ft | 13 | | | |
| 5 | | | | 6 | | | |
| | | | Loose brown fine sandy silt (ML) | 5 | | | |
| | | | Dense to very dense tan sandy fine to coarse gravel (GP) with some sandstone cobbles | 50/11" | | | |
| 10 | | | | | | | |
| | | | | 50/11" | | | |
| 15 | | | | | | | |
| | | | Low hardness dark gray weathered shale | 50/4" | | | |
| 20 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BR.<br>NOTE 3: Logged by DRM.<br>NOTE 4: ECF = 1.19 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 20.0 ft
DATE: 9-29-23

DEPTH TO WATER IN BORING: 7.5 ft
DATE: 9/29/2023

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-57

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 HSA-CME-55LC

LOCATION: 35.489028°N, -94.244525°E

SURF. EL: 436.7

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT |
|---|---|---|
| | Soft dark brown clayey silt (CL-ML) w/organics (fill) | 17 |
| | Stiff brown and dark brown clayey silt w/shale and sandstone fragments (CL-ML) (fill) | 50/6" |
| 5 | - w/some sandstone cobbles below 4 ft | 25 |
| | Firm dark brown clayey silt (CL-ML) | 8 |
| 10 | - very soft below 9 ft, damp<br>- water at 10 ft | 3 |
| | Stiff reddish brown and gray silty clay w/some sandstone fragments (CL) | 14 |
| 15 | | |
| | Dense brown and tan silt w/sandstone fragments (ML) | 31 |
| 20 | | |
| | Low hardness dark gray weathered shale | 50/3" |
| 25 | | |

UNIT DRY WT LB/CU FT

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT
10 20 30 40 50 60 70

- No. 200 %

NOTE 1: Backfilled with cuttings.
NOTE 2: Drilled by KA.
NOTE 3: Logged by IJM.
NOTE 4: ECF = 1.40

COMPLETION DEPTH: 25.0 ft
DATE: 1-9-24

DEPTH TO WATER IN BORING: 10 ft

DATE: 1/9/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-58

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 HSA-CME-55LC

LOCATION: 35.489635°N, -94.245214°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 434± | | | | |
| | | | Stiff brown clayey silt (CL-ML) w/sandstone fragments (fill) | 10 | | | |
| | | | | 20 | | | |
| 5 | | | Soft gray silty clay (CL) | 5 | | | |
| | | | | 12 | | | 28 |
| | | | Stiff tan and brown silty clay w/some sandstone fragments (CL) | 12 | | | |
| 10 | | | | | | | |
| | | | Loose brown sandy silt w/sandstone fragments (ML) | 8 | | | |
| 15 | | | | | | | |
| | | | Low hardness dark gray shale, slightly weathered | 38 | | | |
| 20 | | | | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by KA.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.40 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 20.0 ft
DATE: 1-12-24

DEPTH TO WATER IN BORING: 6 ft

DATE: 1/12/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FE-61

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.435154°N, -94.211194°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 407± | | | | |
| | | | Firm reddish tan clayey silt w/some organics (CL-ML) | 7 | | | |
| | | | | 7 | | | |
| 5 | | | Low hardness tan and gray weathered shale, horizontal bedding | 50/3" | | | |
| | | | NOTE 1: Backfilled with cuttings. | | | | |
| | | | NOTE 2: Drilled by BF. | | | | |
| | | | NOTE 3: Logged by MSE. | | | | |
| | | | NOTE 4: ECF = 1.47 | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 5.2 ft
DATE: 9-17-24

DEPTH TO WATER
IN BORING: Dry

DATE: 9/17/2024

LGBNEW 21-071_FE LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-32

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55LC

LOCATION: 35.435132°N, -94.213841°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 402.6 | | | | |
| | | | 4 inches Asphalt Concrete, 2 inches crushed stone base | | | | |
| | | | Low hardness dark gray weathered shale w/ferrous stains | 19 | | | |
| 5 | | | - low hardness to moderately hard below 4.5 ft | 55 | | | |
| | | | | 50/5" | | | |
| | | | | 50/6" | | | |
| 10 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by RR.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.40 | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 9.5 ft
DATE: 2-4-24

DEPTH TO WATER IN BORING: Dry

DATE: 2/4/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-33

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55LC

LOCATION: 35.435508°N, -94.210365°E

SURF. EL: 413.3

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | 4 inches Asphalt Concrete, 2 inches crushed stone base | | | | |
| | | | Firm tan clay w/shale fragments and ferrous nodules and stains (CH) | 7 | | | |
| 5 | | | Low hardness dark gray and tan weathered shale w/ferrous stains<br>- moderately hard below 6 ft | 31<br>50/5"<br>50/4" | | | |
| 10 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by RR.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.40 | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 9.5 ft
DATE: 2-4-24

DEPTH TO WATER IN BORING: Dry

DATE: 2/4/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-34

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.446125°N, -94.211053°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 389± | | | | |
| | | | Firm to stiff brown clayey silt (CL-ML) | 10 | | | |
| | | | Firm brown silty clay (CL) | 8 | | | |
| 5 | | | | | 115 | 2.41 | |
| | | | Firm reddish brown clay (CH) | 7 | | | |
| | | | - soft below 8 ft | 5 | | | |
| 10 | | | | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 10.0 ft
DATE: 8-15-24

DEPTH TO WATER IN BORING: Dry

DATE: 8/15/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-35

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.45811°N, -94.22164°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|---|---|
| | | | SURF. EL: 399± | | |
| | | | Medium dense brown silty fine sand w/crushed stone gravel (SM) (fill) | 13 | |
| | | | Stiff brown sandy clay with some fine to coarse gravel (CL) | 12 | |
| 5 | | | Very soft brown and tan silty clay (CL), wet | 1 | |
| 10 | | | Dense tan and brown silty fine sand w/weathered sandstone fragments and some clayey sand seams (SM) | 33 | |
| 15 | | | - medium dense, with more clayey sand seams below 14 ft | 13 | |
| | | | Moderately hard yellowish tan and brown weathered fine-grained sandstone w/ ferrous stains<br>- auger refusal in sandstone at 16.3 ft | 50/1" | |
| 20 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | |
| 25 | | | | | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT + WATER CONTENT ● LIQUID LIMIT +
10 20 30 40 50 60 70

- No. 200 %

COMPLETION DEPTH: 16.3 ft
DATE: 8-16-24

DEPTH TO WATER IN BORING: 15.7 ft

DATE: 8/16/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-36

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.458626°N, -94.221246°E

SURF. EL: 399.1

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | Firm brown silty clay, sandy (CL) | 8 | | | |
| | | | Very soft brown and tan silty clay w/some silt pockets and organic stains (CL) | 4 | | | |
| | | | - firm below 4 ft | 8 | | | 83 |
| 5 | | | - stiff below 6 ft | | 110 | | |
| | | | | 15 | | | |
| 10 | | | | | | | |
| | | | Moderately hard dark gray weathered shale | 50/1" | | | |
| 15 | | | - auger refusal in shale at 15.1 ft | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 15.1 ft
DATE: 8-16-24

DEPTH TO WATER
IN BORING: Dry

DATE: 8/16/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-37

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.46230°N, -94.22598°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 399± | | | | |
| | | | Stiff brown and gray silty clay, sandy (CL) with some silt pockets and ferrous nodules and stains | 13 | | | |
| | | | - very stiff below 2.5 ft | 27 | | | |
| 5 | | | Stiff brown and gray fine sandy clay (CL) w/some ferrous nodules and stains | 20 | | | |
| | | | Very loose reddish tan silty fine sand w/sandstone fragments, ferrous nodules and stains | 3 | | -NON PLASTIC- | 29 |
| 10 | | | | | | | |
| | | | Medium dense reddish tan and tan sandy fine to coarse gravel (GC-GP), slightly clayey | 17 | | | |
| 15 | | | | | | | |
| | | | Low hardness to moderately hard dark gray weathered shale | 50/4" | | | |
| | | | - auger refusal in shale at 17.5 ft | | | | |
| 20 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 17.5 ft
DATE: 8-16-24

DEPTH TO WATER IN BORING: 15 ft

DATE: 8/16/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-38

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.466271°N, -94.229391°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 409.2 | | | | |
| | | | Firm brown and tan clayey silt w/some organics (CL-ML) | 9 | | | |
| | | | - soft below 2.5 ft | 4 | | | |
| 5 | | | Stiff tan and reddish tan fine sandy clay w/some ferrous stains (CL) | 11 | | | |
| | | | NOTE 1: Backfilled with cuttings. | | | | |
| | | | NOTE 2: Drilled by FB. | | | | |
| | | | NOTE 3: Logged by MSE. | | | | |
| | | | NOTE 4 : ECF = 1.47 | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 5.5 ft
DATE: 9-16-24

DEPTH TO WATER
IN BORING: Dry
DATE: 9/16/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-39

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.469764°N, -94.233663°E

SURF. EL: 411.5

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | Stiff brown and tan clayey silt w/some organics (CL-ML) | 13 | | | |
| | | | | 7 | | | |
| 5 | | | Firm tan and reddish tan fine sandy clay w/some sandstone fragments, ferrous nodules and stains (CL) | 7 | | | |
| | | | Very soft tan and gray silty fine sand w/some sandstone fragments, ferrous nodules and stains (SM) | | | -NON PLASTIC- | 41 |
| 10 | | | | 2 | | | |
| 15 | | | - loose w/numerous sandstone fragments below 13.5 ft | 7 | | | |
| | | | Low hardness tan and dark gray weathered shale w/ferrous stains, horizontal bedding | 50/6" | | | |
| | | | - auger refusal at 17.5 ft | | | | |
| 20 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by FB.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | | | |
| 25 | | | | | | | |

COMPLETION DEPTH: 17.5 ft
DATE: 9-16-24

DEPTH TO WATER IN BORING: 7 ft
DATE: 9/16/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

# LOG OF BORING NO. FP-40

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-Geoprobe

LOCATION: 35.478220°N, -94.250681°E

SURF. EL: 444.2

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|---|---|
| | | | Stiff dark brown and dark gray silty clay w/some asphalt debris and fine to coarse gravel (CL) (fill) | 14 | |
| | | | Stiff reddish brown, gray and tan fine sandy clay (CL) | 14 | |
| 5 | | | - firm below 4 ft | 9 | |
| | | | - stiff below 6 ft | 21 | |
| | | | Medium dense light gray clayey fine sand (SC) | 25 | |
| 10 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by CL.<br>NOTE 3: Logged by DP.<br>NOTE 4: ECF = 1.41. | | |
| 15 | | | | | |
| 20 | | | | | |
| 25 | | | | | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT | WATER CONTENT | LIQUID LIMIT
10 20 30 40 50 60 70

- No. 200 %

COMPLETION DEPTH: 10.0 ft
DATE: 7-16-25

DEPTH TO WATER IN BORING: Dry
DATE: 7/16/2025

LGBNEW 21-071_FP LOGS.GPJ 7-17-25

# LOG OF BORING NO. FP-41

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-Geoprobe LOCATION: 35.485008°N, -94.237160°E

SURF. EL: 415±

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | Very soft reddish brown and tan silty clay, slightly sandy (CL) | 3 | | | |
| | | | Loose brown silty fine sand w/numerous sandstone fragments (SM) | 8 | | | |
| 5 | | | Medium dense reddish brown and brown clayey fine sand w/some fine gravel and shale fragments (SC) | 20 | | | |
| | | | Medium dense dark brown clayey fine to coarse gravel (GC) | 19 | | | |
| 10 | | | | 20 | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BR.<br>NOTE 3: Logged by DP.<br>NOTE 4: ECF = 1.41. | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 10.0 ft
DATE: 7-16-25

DEPTH TO WATER
IN BORING: Dry

DATE: 7/16/2025

LGBNEW 21-071_FP LOGS.GPJ 3-24-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-42

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-SIMCO 2800 LOCATION: 35.490549°N, -94.246116°E

SURF. EL: 431.5

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|---|---|
| | | | Soft brown silty clay w/silt pockets (CL-ML) | 5 | |
| | | | | 1 | |
| | | | Very soft brown clayey silt (CL-ML) w/ferrous stains and some silty clay pockets and shale fragments | | |
| | | | - soft below 4 ft | | |
| 5 | | | | 5 | |
| | | | | 5 | |
| | | | - firm below 9 ft | 7 | |
| 10 | | | | | |
| | | | NOTE 1: Backfilled with cuttings. | | |
| | | | NOTE 2: Drilled by BR. | | |
| | | | NOTE 3: Logged by IJM. | | |
| | | | NOTE 4: ECF = 1.19 | | |
| 15 | | | | | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT WATER CONTENT LIQUID LIMIT
10 20 30 40 50 60 70

- No. 200 %

COMPLETION DEPTH: 10.0 ft
DATE: 12-28-23

DEPTH TO WATER IN BORING: 5.5 ft
DATE: 12/28/2023

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-43

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.485866°N, -94.238300°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 420± | | | | |
| | | | Firm brown silty clay w/some sandstone fragments (CL) (fill) | 9 | | | |
| | | | Very soft brown clayey silt (CL-ML) | 2 | | | |
| 5 | | | - stiff below 4 ft | 22 | | | |
| | | | Stiff brown fine sandy clay w/ some sandstone fragments | 22 | | | |
| | | | | 24 | | | |
| 10 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.47 | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 10.0 ft
DATE: 12-26-23

DEPTH TO WATER IN BORING: 6 ft
DATE: 12/26/2023

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-44

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-550 LOCATION: 35.490549°N, -94.246116°E

SURF. EL: 424.4

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT |
|---|---|---|---|---|---|
| | | | Stiff brown silty clay w/some sandstone fragments (CL) (fill) | 13 | |
| | | | - firm below 2 ft | 8 | |
| | | | - water at 4 ft<br>Very soft gray silty clay (CL), damp | | |
| 5 | | | | 2 | |
| | | | Firm brown and tan silty clay (CL) w/some sandstone fragments | 8 | |
| | | | | 8 | |
| 10 | | | | | |
| | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.47 | | |
| 15 | | | | | |

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT WATER CONTENT LIQUID LIMIT
10 20 30 40 50 60 70

- No. 200 %

COMPLETION DEPTH: 10.0 ft
DATE: 12-26-23

DEPTH TO WATER IN BORING: 4 ft
DATE: 12/26/2023

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FP-45

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: CFA-CME-55LC LOCATION: 35.491380°N, -94.245286°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % |
|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 429± | | | | |
| | | | Stiff tan and brown clayey silt, sandy (CL-ML) w/some sandstone fragments (fill) | 22 | | | |
| | | | | 15 | | ● | |
| 5 | | | - very stiff w/more sandstone fragments below 4 ft | 42 | | | |
| | | | Stiff brown and tan silty clay (CL) w/some shale and sandstone fragments | 13 | | ● | |
| | | | - firm below 9 ft | 7 | | | |
| 10 | | | | | | | |
| | | | NOTE 1: Backfilled with cuttings. | | | | |
| | | | NOTE 2: Drilled by BF. | | | | |
| | | | NOTE 3: Logged by TRS. | | | | |
| | | | NOTE 4: ECF = 1.40 | | | | |
| 15 | | | | | | | |

COMPLETION DEPTH: 10.0 ft
DATE: 1-11-24

DEPTH TO WATER
IN BORING: Dry

DATE: 1/11/2024

LGBNEW 21-071_FP LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-1

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA to 21 ft/NQ core - D50

LOCATION: 35.488111°N, -94.244312°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 427± | | | | | | |
| | | | Firm brown clayey silt (CL-ML) | 9 | | | 62 | | |
| 5 | | | Very soft brown and tan fine sandy clay with some sandstone fragments (CL) | 3 | | | | | |
| | | | | 2 | | | | | |
| 10 | | | - firm below 9 ft | 7 | | | | | |
| 15 | | | - stiff below 14 ft | 19 | | | | | |
| 20 | | | Stiff brown, tan and reddish tan fine sandy clay with shale and sandstone fragments (CL) | 50/6" | | | | | |
| | | | - auger refusal in shale at 21 ft | | | | | | |
| 25 | | | Low hardness to moderately hard dark gray shale w/some very thin fine-grained sandstone partings | | | $q_u$= 3300 psi, TUW= 162 pcf | | 100 | 98 |
| | | | | | | $q_u$= 2020 psi, TUW= 164 pcf | | 100 | 100 |
| 30 | | | | | | | | | |
| 35 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by KA.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43 | | | | | | |

COMPLETION DEPTH: 31.0 ft
DATE: 5-28-24

DEPTH TO WATER IN BORING: Dry to 21 ft

DATE: 5/21/2024

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-2

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in. HSA to 19 ft/NQ core - D50

LOCATION: 35.488344°N, -94.244360°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 428.2 | | | | | | |
| | | | Stiff reddish brown clayey silt, sandy w/ some sandstone fragments (CL-ML) (possible fill) | 14 | | | | | |
| | | | Firm brown and gray silty clay (CL) | 9 | | | | | |
| 5 | | | | 7 | | | | | |
| | | | - soft below 6.5 ft | 6 | | | | | |
| | | | Stiff brown and gray silty clay w/some ferrous stains (CL) | 11 | | | | | |
| 10 | | | | | | | | | |
| | | | Stiff brown and tan fine sandy clay with some sandstone fragments (CL) | 17 | | | | | |
| 15 | | | | | | | | | |
| | | | Low hardness to moderately hard dark gray shale with some gray and tan fine-grained sandstone partings, horizontal bedding | 50/6" | | | | 95 | 95 |
| 20 | | | | | | $q_u$= 1790 psi, TUW= 167 pcf | | | |
| 25 | | | | | | $q_u$= 2180 psi, TUW= 166 pcf | | 100 | 100 |
| 30 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by KA.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.43 | | | | | | |

COMPLETION DEPTH: 29.0 ft
DATE: 5-29-24

DEPTH TO WATER IN BORING: Dry to 19 ft

DATE: 5/29/2024

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-3

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA to 24.6 ft/NQ-2 core - CME-550 LOCATION: 35.489116°N, -94.244684°E

SURF. EL: 430.0

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| 0 | Stiff reddish brown clayey silt, sandy w/ some sandstone fragments (CL-ML) (fill) | 20 | | | | | |
| 5 | - very stiff, with more sandstone fragments below 2 ft | 54 | | | | | |
| | | 31 | | | | | |
| | Soft reddish brown and tan fine sandy clay w/some sandstone fragments (CL) | 6 | | | | | |
| 10 | Firm brown and gray silty clay w/some shale fragments and ferrous stains (CL) | 8 | | | | | |
| 15 | | 8 | | | | | |
| 20 | Very stiff brown and gray clayey silt w/sandstone fragments (CL-ML) | 44 | | | | | |
| 25 | Low hardness dark gray weathered shale | 50/3" | | | | | |
| | - auger refusal at 24.7 ft in shale | | | | | 91 | 85 |
| | Moderately hard dark gray shale w/occassional very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2020 psi, TUW= 169 pcf | | | |
| 30 | | | | $q_u$= 1510 psi, TUW= 167 pcf | | 93 | 90 |
| 35 | | | | $q_u$= 1920 psi, TUW= 164 pcf | | 100 | 100 |
| 40 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BMF.<br>NOTE 3: Logged by MSE.<br>NOTE 4: ECF = 1.47 | | | | | | |

COMPLETION DEPTH: 37.1 ft
DATE: 8-21-24

DEPTH TO WATER
IN BORING: Dry to 24.6 ft
DATE: 8/21/2024

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-4

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA to 25 ft/NQ-2 core - CME 55LC

LOCATION: 35.489968°N, -94.244976°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 436.7 | | | | | | |
| | | | Stiff tan and dark brown silty clay (CL) w/some shale and sandstone fragments (fill) | 24 | | | | | |
| | | | | 21 | | | | | |
| 5 | | | | 17 | | | | | |
| | | | Very soft dark brown clayey silt (CL-ML), wet | WOH | | | | | |
| | | | - stiff below 8 ft | | 109 | | | | |
| 10 | | | | | | | | | |
| | | | Firm to stiff brown clayey silt (CL-ML) w/sandstone fragments | | | | | | |
| 15 | | | | 10 | | | | | |
| | | | - very stiff below 18 ft | | | | | | |
| 20 | | | | 34 | | | | | |
| | | | | 50/3" | | | | | |
| 25 | | | Moderately hard dark gray shale w/very close gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1120 psi, TUW= 160 pcf | | 95 | 80 |
| 30 | | | | | | $q_u$= 2440 psi, TUW= 162 pcf | | 100 | 100 |
| 35 | | | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by KA.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.40 | | | | | | |

COMPLETION DEPTH: 35.0 ft
DATE: 1-10-24

DEPTH TO WATER IN BORING: 10 ft
DATE: 1/10/2024

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-5

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA to 25 ft/NQ-2 core - CME 55LC

LOCATION: 35.490590°N, -94.245709°E

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | SURF. EL: 436.9 | | | 0.2 0.4 0.6 0.8 1.0 1.2 1.4 / 10 20 30 40 50 60 70 | | | |
| | Stiff tan and dark brown clayey silt (CL-ML) w/some shale and sandstone fragments (fill) | 11 | | | | | |
| | - very stiff at 2-4 ft | 27 | | | | | |
| 5 | - stiff below 4 ft | 11 | | | | | |
| | - water at 7 ft | 19 | | | | | |
| | Soft dark brown silty clay (CL), damp | 5 | | | | | |
| 10 | Firm brown silty clay, sandy w/sandstone fragments (CL) | | | | | | |
| 15 | | 9 | | | | | |
| | - stiff below 18 ft | | 95 | | 74 | | |
| 20 | | | | | | | |
| | | 21 | | | | | |
| 25 | Low hardness to moderately hard dark gray shale w/occassional gray fine-grained sandstone partings | | | | | 85 | 80 |
| | | | | $q_u$= 1640 psi, TUW= 160 pcf | | | |
| 30 | - some weathered seams from 30-35 ft | | | | | 60 | 60 |
| | | | | $q_u$= 1390 psi, TUW= 164 pcf | | | |
| 35 | | | | | | 96 | 96 |
| | | | | $q_u$= 1680 psi, TUW= 162 pcf | | | |
| 40 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by KA.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.40 | | | | | | |

COMPLETION DEPTH: 39.0 ft
DATE: 1-10-24

DEPTH TO WATER IN BORING: 7 ft
DATE: 1/10/2024

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-6

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA to 25 ft/NQ-2 core - CME 55LC

LOCATION: 35.491132°N, -94.245363°E

SURF. EL: 427±

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| 5 | Stiff brown clayey silt (CL-ML) w/sandstone fragments (fill) | 14<br>13<br>13 | | | | |
| | - very stiff below 6 ft | 25 | | | | |
| 10 | Very soft to soft tan and gray silty clay (CL) | 4 | | | | |
| 15 | - soft at 16 to 18 ft | 6 | | | | |
| | - stiff below 18 ft | 12 | | | | |
| 20 | Very loose brown fine sandy silt (ML) w/numerous sandstone fragments | 3 | | | | |
| 25 | Moderately hard dark gray and tan weathered shale | 50/4" | | | | |
| 30 | Moderately hard dark gray shale w/very close gray fine-grained sandstone partings, horizontal bedding | | | | 97 | 97 |
| | | | | | | |
| 35 | | | | | 97 | 97 |
| | | | | | 100 | 100 |
| 40 | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by KA.<br>NOTE 3: Logged by IJM.<br>NOTE 4: ECF = 1.40 | | | | | |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT: 10 20 30 40 50 60 70

$q_u$= 2490 psi, TUW= 162 pcf
$q_u$= 1610 psi, TUW= 164 pcf
$q_u$= 2190 psi, TUW= 169 pcf
$q_u$= 2560 psi, TUW= 165 pcf

COMPLETION DEPTH: 38.0 ft
DATE: 1-11-24

DEPTH TO WATER IN BORING: 7 ft
DATE: 1/11/2024

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-7

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA to 19 ft/NQ-2 core - CME-550 LOCATION: 35.483104°N, -94.244962°E

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|
| | SURF. EL: 427.1 | | | | | | |
| | Loose brown fine sandy silt (ML) | 8 | | | | | |
| | Firm reddish brown clayey silt (CL-ML) | 8 | | | | | |
| 5 | | 8 | | | | | |
| | Firm reddish brown fine sandy clay w/some sandstone fragments (CL) | 9 | | | | | |
| 10 | | | | | | | |
| | - stiff with more sandstone fragments below 14 ft | 16 | | | | | |
| 15 | | | | | | | |
| | Low hardness dark gray shale - auger refusal at 17 ft in shale | 25/0" | | | | | |
| | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 4080 psi, TUW= 162 pcf | | 100 | 77 |
| 20 | | | | $q_u$= 3400 psi, TUW= 166 pcf | | 98 | 85 |
| 25 | | | | | | 100 | 100 |
| | NOTE 1: Backfilled with cuttings.<br>NOTE 2: Drilled by BF.<br>NOTE 3: Logged by TRS.<br>NOTE 4: ECF = 1.47 | | | | | | |
| 30 | | | | | | | |

COMPLETION DEPTH: 27.0 ft
DATE: 12-4-23

DEPTH TO WATER IN BORING: 13.5 ft
DATE: 12/4/2023

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. FW-8

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in. HSA to 19 ft/NQ-2 core - CME-550

LOCATION: 35.482270°N, -94.245603°E

SURF. EL: 428.7

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| | Firm brown clayey silt (CL-ML) | 8 | | | | |
| | - stiff, sandy below 2.5 ft | 14 | | | | |
| 5 | Medium dense reddish brown clayey fine sand (SC) | 26 | | | | |
| | Stiff brown and tan silty clay (CL) | 21 | | | | |
| 10 | | 18 | | | | |
| 15 | Medium dense silty fine sand and weathered sandstone fragments (GM) | 22 | | | | |
| 20 | Low hardness to moderately hard dark gray weathered shale with some clayey shale laminations | 50/2" | | | 100 | 0 |
| | - Auger refusal at 19 ft | | | | | |
| | Moderately hard dark gray shale, horizontal bedding | | | | 100 | 80 |
| 25 | | | | | | |
| 30 | | | | | 100 | 100 |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT: 10 20 30 40 50 60 70

$q_u$= 2870 psi, TUW= 170 pcf

$q_u$= 4860 psi, TUW= 167 pcf

$q_u$= 4080 psi, TUW= 163 pcf

NOTE 1: Backfilled with cuttings.
NOTE 2: Drilled by BF.
NOTE 3: Logged by TRS.
NOTE 4: ECF = 1.47

COMPLETION DEPTH: 30.5 ft
DATE: 12-4-23

DEPTH TO WATER IN BORING: 13.5 ft
DATE: 11/28/2023

RECRQDN200-2 21-071_FW LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-1

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 9 ft /NQ Core-CME-55

LOCATION: 35.477058°N, -94.252240°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 469.5 | | | | | | |
| | | | Medium dense tan and brown silty fine sand w/sandstone fragments and cobbles (SM (possible fill) | 12 | | | | | |
| | | | - dense below 2 ft | 33 | | | | | |
| 5 | | | | 50/8" | | | | | |
| | | | | 50/3" | | | | | |
| | | | Moderately hard tan and gray weathered fine-grained sandstone w/interbedded very close dark gray shale laminations, horizontal bedding | | | | | 72 | 28 |
| 10 | | | | | | | | | |
| 15 | | | | | | | | 98 | 78 |
| 20 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by IJM.<br>NOTE: 4. ECF = 1.42 | | | | | | |
| 25 | | | | | | | | | |

COMPLETION DEPTH: 19.0 ft
DATE: 3-28-24

DEPTH TO WATER
IN BORING: Dry to 9 ft
DATE: 3/26/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-2

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 3.5 ft /Wash 10 ft/NQ Core-CME-55 LOCATION: 35.478444°N, -94.248983°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 461.3 | | | | | | |
| | | | Medium dense tan and brown silty fine sand (SM) w/numerous sandstone fragments (fill) | 23 | | | 15 | | |
| | | | - w/more sandstone fragments below 1 ft | 50/11" | | | | | |
| | | | Low hardness tan and brown highly weathered sandstone | | | | | | |
| 5 | | | | 50/6" | | | | | |
| | | | Moderately hard tan and gray weathered fine-grained sandstone w/interbedded very close dark gray shale laminations, horizontal bedding | 50/6" | | | | | |
| | | | | 25/0" | | | | | |
| 10 | | | - hard below 10 ft | | | | | | |
| | | | | | | | | 98 | 65 |
| | | | | | | $q_u$= 3040 psi, TUW= 165 pcf | | | |
| 15 | | | | | | $q_u$= 1700 psi, TUW= 167 pcf | | | |
| | | | | | | | | 90 | 90 |
| 20 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 25 | | | | | | $q_u$= 2480 psi, TUW= 165 pcf | | | |
| | | | | | | | | 100 | 100 |

COMPLETION DEPTH: 50.0 ft
DATE: 3-20-24

DEPTH TO WATER
IN BORING: Dry to 10 ft
DATE: 3/13/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-2

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 3.5 ft /Wash 10 ft/NQ Core-CME-55 LOCATION: 35.478444°N, -94.248983°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 35 | | | | | | $q_u$= 2320 psi, TUW= 168 pcf | | | |
| | | | Moderately hard dark gray shale w/interbedded very thin, very close gray fine-grained sandstone partings, horizontal bedding | | | | | 98 | 98 |
| 40 | | | | | | | | 95 | 85 |
| 45 | | | | | | $q_u$= 5030 psi, TUW= 176 pcf | | 78 | 78 |
| 50 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by IJM.<br>NOTE: 4. ECF = 1.42 | | | | | | |
| 55 | | | | | | | | | |

COMPLETION DEPTH: 50.0 ft
DATE: 3-20-24

DEPTH TO WATER
IN BORING: Dry to 10 ft
DATE: 3/13/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-3

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 21 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.478444°N, -94.248983°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 435.0 | | | | | | |
| | | | Medium dense reddish brown sandy silt, slightly clayey (CL-ML) (fill) | 24 | | | | | |
| | | | Stiff reddish tan and brown silty clay with some sandstone and shale fragments (fill) | 20 | | | | | |
| 5 | | | | 20 | | | | | |
| | | | Very stiff dark brown clayey silt, sandy (CL-ML) | 36 | | | | | |
| 10 | | | - soft below 9 ft | 6 | | | | | |
| | | | Medium dense reddish tan and tan sandy fine to coarse gravel w/some cobbles (GP) | 17 | | | | | |
| 15 | | | | | | | | | |
| | | | | 50/2" | | | | | |
| 20 | | | Low hardness dark gray shale with some very thin gray fine-grained sandstone partings, slightly weathered, horizontal bedding | | | | | 96 | 42 |
| | | | Moderately hard dark gray shale, horizontal bedding | | | $q_u$= 2900 psi, TUW= 166 pcf | | 98 | 98 |
| 25 | | | | | | | | | |
| | | | | | | $q_u$= 1790 psi, TUW= 163 pcf | | 100 | 100 |
| 30 | | | | | | | | | |
| | | | | | | | | 100 | 100 |

COMPLETION DEPTH: 59.0 ft
DATE: 12-12-23

DEPTH TO WATER IN BORING: 13 ft

DATE: 12/12/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-3

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 21 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.478444°N, -94.248983°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 40 | | | | | | $q_u$= 2590 psi, TUW= 160 pcf | | 95 | 95 |
| 45 | | | | | | $q_u$= 1830 psi, TUW= 169 pcf | | 100 | 100 |
| 50 | | | | | | $q_u$= 1510 psi, TUW= 166 pcf | | 100 | 100 |
| 55 | | | | | | $q_u$= 1870 psi, TUW= 160 pcf | | 100 | 100 |
| 60 | | | NOTE: 1. Backfilled with cuttings<br>NOTE: 2. Drilled by NE<br>NOTE: 3. Logged by IJM<br>NOTE: 4. ECF = 1.52 | | | | | 100 | 100 |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 59.0 ft
DATE: 12-12-23

DEPTH TO WATER IN BORING: 13 ft

DATE: 12/12/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-4

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in HSA 20 ft /NQ2 Core-CME-55LC

LOCATION: 35.478880°N, -94.247449°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 426.8 | | | | | | |
| | | | Very loose to loose reddish brown fine sandy silt (ML) w/some organics | 4 | 108 | | | | |
| | | | | 4 | | -NON-PLASTIC- | | | |
| 5 | | | | 4 | | | | | |
| | | | | | 111 | -NON-PLASTIC- | 57 | | |
| | | | Loose reddish brown silty fine sand (SM) with occassional sandstone fragments | 6 | | -NON-PLASTIC- | 11 | | |
| 10 | | | | | | | | | |
| | | | Friable to low hardness reddish brown and tan highly weathered fine-grained sandstone | | | | | | |
| 15 | | | | 30 | | | | | |
| | | | | | | | | | |
| 20 | | | | 18 | | | | | |
| | | | - w/shale partings and seams below 21 ft | 50/1" | | | | | |
| | | | Moderately hard gray fine-grained sandstone w/interbedded dark very close, very thin, dark gray shale partings, horizontal bedding | | | $q_u$= 4340 psi, TUW= 168 pcf | | 100 | 80 |
| 25 | | | | | | | | 50 | 50 |
| 30 | | | | | | | | | |
| | | | Low hardness black coal, fractured, severe water loss from 31.5 to 33.5 ft | | | | | | |
| | | | | 50/4 | | | | | |
| 35 | | | Moderately hard dark gray shale w/some very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1310 psi, TUW= 166 pcf | | 53 | 50 |

COMPLETION DEPTH: 69.8 ft
DATE: 9-18-23

DEPTH TO WATER IN BORING: 14 ft
DATE: 9/19/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-4

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 4.25 in HSA 20 ft /NQ2 Core-CME-55LC

LOCATION: 35.478880°N, -94.247449°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 45 | | | (continued) | | | $q_u$= 2150 psi, TUW= 169 pcf | | 100 | 100 |
| | | | | | | $q_u$= 2230 psi, TUW= 164 pcf | | 100 | 100 |
| 50 | | | | | | | | 93 | 70 |
| 55 | | | | | | $q_u$= 1560 psi, TUW= 156 pcf | | 100 | 100 |
| 60 | | | | | | $q_u$= 2880 psi, TUW= 166 pcf | | 92 | 92 |
| 65 | | | | | | | | 100 | 100 |
| 70 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by KA.<br>NOTE: 3. Logged by RW.<br>NOTE: 4. ECF = 1.40 | | | | | | |
| 75 | | | | | | | | | |

COMPLETION DEPTH: 69.8 ft
DATE: 9-18-23

DEPTH TO WATER IN BORING: 14 ft
DATE: 9/19/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-5

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 29 ft /NQ Core-CME-55

LOCATION: 35.480287°N, -94.246686°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 419.3 | | | | | | |
| | | | Firm brown clayey silt (CL-ML) | 8 | | | | | |
| | | | Dense tan and brown silty fine sandy, slightly clayey (SM) | 32 | | | | | |
| 5 | | | | 50 | | | 25 | | |
| | | | Dense brown and tan sandy fine to coarse gravel with some cobbles (GP) | 50 | | | | | |
| | | | - loose to medium dense from 8 to 13 ft | 10 | | | | | |
| 10 | | | | | | | | | |
| | | | - dense below 13 ft | 50/8" | | | | | |
| 15 | | | | | | | | | |
| | | | | 50/6" | | | | | |
| 20 | | | | | | | | | |
| | | | Low hardness dark gray weathered shale w/some clayey shale partings and seams, horizontal bedding | 25/0" | | | | 33 | 0 |
| 25 | | | | | | | | | |
| 30 | | | Moderately hard dark gray shale, horizontal bedding | | | | | 83 | 62 |

$q_u$= 920 psi, TUW= 167 pcf

COMPLETION DEPTH: 65.0 ft
DATE: 12-7-23

DEPTH TO WATER IN BORING: 6.3 ft
DATE: 11/29/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-5

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 29 ft /NQ Core-CME-55

LOCATION: 35.480287°N, -94.246686°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 3150 psi, TUW= 169 pcf | | 93 | 85 |
| 40 | | | | | | | | | |
| | | | | | | $q_u$= 2920 psi, TUW= 165 pcf | | 98 | 98 |
| 45 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 50 | | | | | | $q_u$= 3790 psi, TUW= 172 pcf | | 98 | 98 |
| 55 | | | | | | $q_u$= 2170 psi, TUW= 170 pcf | | 98 | 98 |
| 60 | | | | | | | | 100 | 100 |
| 65 | | | | | | | | | |

NOTE: 1. Backfilled with cuttings.
NOTE: 2. Drilled by CL.
NOTE: 3. Logged by IJM.
NOTE: 4. ECF = 1.42

COMPLETION DEPTH: 65.0 ft
DATE: 12-7-23

DEPTH TO WATER IN BORING: 6.3 ft
DATE: 11/29/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-6

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 29 ft /NQ Core-CME-55

LOCATION: 35.480316°N, -94.245027°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 415± | | | | | | |
| | | | Medium dense brown silt (ML) w/some fine to coarse gravel and occassional cobbles | 13 | | | | | |
| | | | Medium dense reddish brown fine sandy silt (ML), sandy with some sandstone gravel | 17 | | | | | |
| 5 | | | | 24 | | -NON PLASTIC- | | | |
| | | | | 10 | | | | | |
| 10 | | | | 27 | | | | | |
| | | | | 10 | | | | | |
| 15 | | | Stiff reddish tan and yellowish tan fine sand (SM-SP), slightly silty with some sandstone fragments and ferrous stains | | | | | | |
| 20 | | | | 27 | | -NON PLASTIC- | 8 | | |
| 25 | | | Low hardness dark gray weathered shale with some clayey shale partings | 50/1" | | | | | |
| | | | | 50/1" | | | | | |
| 30 | | | Moderately hard dark gray shale, horizontal bedding | | | $q_u$= 3740 psi, TUW= 160 pcf | | 100 | 100 |
| 35 | | | | | | $q_u$= 1350 psi, TUW= 165 pcf | | 98 | 98 |

COMPLETION DEPTH: 69.0 ft
DATE: 9-8-23

DEPTH TO WATER IN BORING: Dry to 29 ft
DATE: 9/7/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-6

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 29 ft /NQ Core-CME-55

LOCATION: 35.480316°N, -94.245027°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL (continued) | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $q_u$= 1640 psi, TUW= 169 pcf | | 100 | 100 |
| 45 | | | | | | | | 95 | 88 |
| 50 | | | | | | $q_u$= 1260 psi, TUW= 162 pcf | | 98 | 88 |
| 55 | | | | | | | | 93 | 93 |
| 60 | | | Moderately hard dark gray arenaceous shale, horizontal bedding | | | $q_u$= 1810 psi, TUW= 169 pcf | | 98 | 98 |
| | | | Moderately hard dark gray shale with some very thin gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| 65 | | | | | | $q_u$= 6990 psi, TUW= 167 pcf | | 96 | 96 |
| 70 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by IJM.<br>NOTE: 4. ECF = 1.42 | | | | | | |
| 75 | | | | | | | | | |

COMPLETION DEPTH: 69.0 ft
DATE: 9-8-23

DEPTH TO WATER
IN BORING: Dry to 29 ft

DATE: 9/7/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-7

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 20 ft /NQ2 Core-CME-550

LOCATION: 35.481544°N, -94.245390°E

SURF. EL: 429.4

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| 0 | Firm brown clayey silt (CL-ML) | 7 | | | | |
| | - very soft below 2 ft | 4 | | | | |
| 5 | | | 107 | | | |
| | Very soft brown silty clay (CL) | 3 | | | | |
| 10 | Soft brown fine sandy clay (CL) | 5 | | | | |
| 15 | Loose brown sandy fine to coarse gravles w/ some cobbles (GP) | 5 | | | | |
| 20 | Low hardness to moderately hard dark gray shale w/ very close, very thin gray fine grained sandstone partings, horizontal bedding | | $q_u$= 1510 psi, TUW= 167 pcf | | 100 | 100 |
| | | | | | 98 | 98 |
| 25 | | | $q_u$= 2290 psi, TUW= 170 pcf | | 100 | 90 |
| 30 | | | $q_u$= 2210 psi, TUW= 164 pcf | | 100 | 80 |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT: 10 20 30 40 50 60 70

COMPLETION DEPTH: 55.5 ft
DATE: 12-11-23

DEPTH TO WATER IN BORING: 13 ft
DATE: 12/7/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-7

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 20 ft /NQ2 Core-CME-550

LOCATION: 35.481544°N, -94.245390°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | | | 100 | 100 |
| 40 | | | Moderately hard dark gray shale w/occassional gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2330 psi, TUW= 164 pcf | | 98 | 98 |
| 45 | | | | | | | | 100 | 100 |
| 50 | | | | | | $q_u$= 2760 psi, TUW= 163 pcf | | 98 | 80 |
| 55 | | | | | | $q_u$= 3050 psi, TUW= 168 pcf | | 100 | 90 |
| 60 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by BF.<br>NOTE: 3. Logged by TRS.<br>NOTE: 4. ECF = 1.47 | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 55.5 ft
DATE: 12-11-23

DEPTH TO WATER IN BORING: 13 ft

DATE: 12/7/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-8

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 20 ft /NQ Core-CME-55

LOCATION: 35.484298°N, -94.238306°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 423.7 | | | | | | |
| | | | Medium dense reddish brown silt (ML) w/ferrous stains and orgainics | 19<br>21 | | | | | |
| 5 | | | Low hardness reddish tan and yellowish-tan highly weathered fine-grained sandstone with ferrous stains | 50/10" | | | | | |
| | | | | 37 | | | | | |
| 10 | | | | 26 | | | | | |
| | | | | 50/2" | | | | | |
| 15 | | | | | | | | | |
| | | | | 50/6"<br>25/0" | | | | | |
| 20 | | | Moderately hard gray weathered fine-grained sandstone with some dark gray shale partings, horizontal bedding | | | $q_u$= 5440 psi, TUW= 168 pcf | | 68 | 68 |
| | | | Moderately hard dark gray shale w/some gray fine-grained sandstone partings, horizontal bedding | | | | | | |
| 25 | | | | | | $q_u$= 2020 psi, TUW= 163 pcf | | 93 | 86 |
| 30 | | | | | | $q_u$= 2740 psi, TUW= 163 pcf | | 93 | 93 |
| | | | Moderately hard dark gray | | | | | | |

COMPLETION DEPTH: 60.0 ft
DATE: 9-15-23

DEPTH TO WATER IN BORING: 17 ft
DATE: 9/15/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-8

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 20 ft /NQ Core-CME-55

LOCATION: 35.484298°N, -94.238306°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | shale, horizontal bedding | | | | | | |
| | | | | | | $q_u$= 1110 psi, TUW= 163 pcf | | 100 | 100 |
| 40 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 45 | | | | | | | | | |
| | | | | | | | | 100 | 81 |
| 50 | | | | | | $q_u$= 4580 psi, TUW= 163 pcf | | | |
| | | | | | | $q_u$= 1770 psi, TUW= 164 pcf | | 98 | 98 |
| 55 | | | | | | | | | |
| | | | | | | $q_u$= 3040 psi, TUW= 165 pcf | | 100 | 100 |
| 60 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by IJM.<br>NOTE: 4. ECF = 1.42 | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 60.0 ft
DATE: 9-15-23

DEPTH TO WATER IN BORING: 17 ft

DATE: 9/15/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-9

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 16.5 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.485278°N, -94.239440°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 431± | | | | | | |
| | | | Very soft brown and red clayey silt (CL-ML) | 3 | | | | | |
| 5 | | | Loose reddish brown silt (ML) | 6 | 115 | -NON PLASTIC- | | | |
| 10 | | | Stiff brown sandy clay (CL) w/sandstone fragments and cobbles | 22 | | | | | |
| 15 | | | Moderately hard dark gray weathered shale | 50/2" | | | | | |
| 20 | | | Moderately hard light gray fine-grained sandstone, slightly weathered, w/very close dark gray shale laminations and seams, horizontal bedding | | | $q_u$= 2680 psi, TUW= 162 pcf | | 98 | 36 |
| 25 | | | Moderately hard dark gray shale w/some close, very thin, gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 1930 psi, TUW= 162 pcf | | 100 | 75 |
| 30 | | | Moderately hard light gray fine-grained sandstone, w/very close dark gray shale laminations and seams, horizontal bedding | | | | | 100 | 97 |
| | | | Moderately hard dark gray shale w/occassional close, very thin, gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 2140 psi, TUW= 163 pcf | | 97 | 97 |

COMPLETION DEPTH: 56.5 ft
DATE: 12-13-23

DEPTH TO WATER IN BORING: 9 ft
DATE: 12/13/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-9

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 16.5 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.485278°N, -94.239440°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | (continued) | | | | | 100 | 95 |
| | | | | | | $q_u$= 3040 psi, TUW= 170 pcf | | 100 | 100 |
| 45 | | | | | | | | | |
| | | | | | | $q_u$= 1200 psi, TUW= 163 pcf | | 98 | 97 |
| 50 | | | | | | | | | |
| | | | | | | | | 100 | 92 |
| 55 | | | | | | | | | |
| | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by NE.<br>NOTE: 3. Logged by TRS.<br>NOTE: 4. ECF = 1.52 | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |

COMPLETION DEPTH: 56.5 ft
DATE: 12-13-23

DEPTH TO WATER IN BORING: 9 ft

DATE: 12/13/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-10

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 21 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.486135°N, -94.237911°E

SURF. EL: 433±

| DEPTH, FT | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|
| | Firm brown clayey silt (CL-ML) | 7 | | | | |
| | - very soft below 2 ft | 3 | | | | |
| 5 | Very loose to loose brown fine sandy silt, slightly clayey (CL-ML) | | | 57 | | |
| 10 | | 5 | | | | |
| 15 | | 4 | | | | |
| 20 | Low hardness to moderately hard dark gray weathered shale w/gray fine-grained sandstone partings and seams, horizontal bedding | 50/2" | | | 100 | 0 |
| 25 | Moderately hard dark gray shale w/occassional close to very close gray fine-grained sandstone partings, horizontal bedding | | | | 98 | 52 |
| 30 | | | | | 95 | 85 |
| | | | | | 98 | 86 |

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT: 10 20 30 40 50 60 70

$q_u$= 2700 psi, TUW= 168 pcf

$q_u$= 2360 psi, TUW= 166 pcf

COMPLETION DEPTH: 61.5 ft
DATE: 12-13-23

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 12/13/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-10

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.75 in HSA 21 ft /NQ2 Core-Geoprobe 3230DT LOCATION: 35.486135°N, -94.237911°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| 40 | | | | | | $q_u$= 2770 psi, TUW= 167 pcf | | 100 | 95 |
| 45 | | | | | | | | 100 | 100 |
| 50 | | | | | | | | 95 | 85 |
| 55 | | | | | | $q_u$= 2020 psi, TUW= 163 pcf | | 100 | 95 |
| 60 | | | | | | | | 98 | 77 |
| 65 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by NE.<br>NOTE: 3. Logged by TRS.<br>NOTE: 4. ECF = 1.52 | | | | | | |

COMPLETION DEPTH: 61.5 ft
DATE: 12-13-23

DEPTH TO WATER IN BORING: 13.5 ft

DATE: 12/13/2023

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-14

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 29 ft /NQ Core-D50

LOCATION: 35.486531°N, -94.242949°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 435± | | | | | | |
| | | | Very stiff reddish brown and tan silty clay w/sandstone and shale fragments (CL) (fill) | 38<br>45 | | | | | |
| 5 | | | Very stilff reddish tan and tan clayey silt w/some sandstone fragments (CL-ML) (fill)<br>- stiff below 6 ft | 31<br>23 | | | | | |
| 10 | | | Stiff brown and tan fine sandy clay w/some sandstone and shale fragments (CL) | 20 | | | | | |
| 15 | | | - very stiff at 13-23 ft | 27 | | | | | |
| 20 | | | | 50/11" | | | | | |
| 25 | | | - stiff below 23 ft | 12 | | | | | |
| 30 | | | | 24 | | | | | |
| 35 | | | Low hardness reddish tan and tan weathered sandstone, fractured, w/some clayey sand seams and ferrous stains | 22 | | | | | |
| 40 | | | Low hardness gray slightly weathered fine-grained sandstone w/interbeded very close, dark gray shale laminations, horizontal bedding | 50/1" | | $q_u$= 4700 psi, TUW= 169 pcf | | 97 | 88 |
| | | | Moderately hard dark gray shale w/occassional gray | | | $q_u$= 2340 psi, TUW= 169 pcf | | 100 | 100 |

COMPLETION DEPTH: 80.0 ft
DATE: 9-12-24

DEPTH TO WATER IN BORING: 37 ft
DATE: 9/11/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-14

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 29 ft /NQ Core-D50

LOCATION: 35.486531°N, -94.242949°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | fine-grained sandstone partings, horizontal bedding | | | | | | |
| | | | | | | $q_u$= 3460 psi, TUW= 170 pcf | | | |
| 50 | | | | | | | | 88 | 88 |
| | | | | | | $q_u$= 3280 psi, TUW= 166 pcf | | 85 | 85 |
| 55 | | | | | | | | | |
| | | | | | | $q_u$= 5250 psi, TUW= 171 pcf | | 100 | 100 |
| 60 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 65 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 70 | | | | | | | | | |
| | | | | | | | | 100 | 100 |
| 75 | | | | | | | | | |
| | | | | | | | | 88 | 88 |
| 80 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by DP.<br>NOTE: 4. ECF = 1.33 | | | | | | |
| 85 | | | | | | | | | |

COMPLETION DEPTH: 80.0 ft
DATE: 9-12-24

DEPTH TO WATER IN BORING: 37 ft

DATE: 9/11/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-15

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 24 ft /NQ Core-D50

LOCATION: 35.486044°N, -94.244260°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | SURF. EL: 421± | | | | | | |
| | | | Medium dense brown fine sandy silt, slightly clayey (ML) | 13 | | | | | |
| | | | | 13 | | $G_s$=2.72 | 55 | | |
| 5 | | | - loose to medium dense at 4 to 13 ft | 9 | | | | | |
| | | | | 10 | | | | | |
| 10 | | | | 9 | | | | | |
| | | | - dense below 13 ft | | | | | | |
| 15 | | | | 32 | | | | | |
| | | | Dense brown and tan fine sandy gravel (GP) | | | | | | |
| 20 | | | | 50/6" | | | | | |
| | | | Low hardness dark gray weathered shale w/some gray fine-grained sandstone partings | 25/0" | | | | | |
| 25 | | | Moderately hard dark gray shale w/interbedded very close, very thin gray fine-grained sandstone partings, horizontal bedding | | | $q_u$= 5570 psi, TUW= 163 pcf | | 66 | 50 |
| | | | | | | | | 100 | 100 |
| 30 | | | | | | $q_u$= 4770 psi, TUW= 164 pcf | | 88 | 10 |

COMPLETION DEPTH: 65.0 ft
DATE: 8-2-24

DEPTH TO WATER IN BORING: 12 ft

DATE: 8/1/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

Form 108-6(74) Job No. 21-071

# LOG OF BORING NO. HMT-15

040748 Hwy 22 to I-40 (Arkansas River)
Crawford & Sebastian Co., Arkansas

TYPE: 3.25 in HSA 24 ft /NQ Core-D50

LOCATION: 35.486044°N, -94.244260°E

| DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | BLOWS PER FT | UNIT DRY WT LB/CU FT | COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70) | - No. 200 % | % Recovery | % RQD |
|---|---|---|---|---|---|---|---|---|---|
| | | | (continued) | | | | | | |
| | | | | | | $q_u$= 3950 psi, TUW= 166 pcf | | 85 | 82 |
| 40 | | | Moderately hard dark gray shale w/some gray fine-grained sandstone partings, horizontal bedding | | | | | 98 | 98 |
| 45 | | | | | | $q_u$= 1620 psi, TUW= 166 pcf | | 100 | 100 |
| 50 | | | | | | $q_u$= 4430 psi, TUW= 167 pcf | | 75 | 75 |
| 55 | | | | | | | | 95 | 60 |
| 60 | | | | | | | | 100 | 100 |
| 65 | | | NOTE: 1. Backfilled with cuttings.<br>NOTE: 2. Drilled by CL.<br>NOTE: 3. Logged by IJM.<br>NOTE: 4. ECF = 1.33 | | | | | | |

COMPLETION DEPTH: 65.0 ft
DATE: 8-2-24

DEPTH TO WATER IN BORING: 12 ft

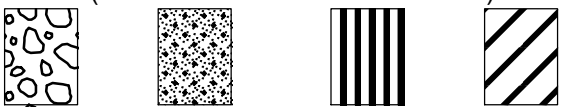
DATE: 8/1/2024

RECRQDN200-2 21-071_HMT LOGS.GPJ 4-15-26

# SYMBOLS AND TERMS USED ON BORING LOGS

## SOIL TYPES

(SHOWN IN SYMBOLS COLUMN)



Gravel | Sand | Silt | Clay

Predominant type shown heavy

## SAMPLER TYPES

(SHOWN ON SAMPLES COLUMN)



Shelby Tube | Rock Core | Split Spoon | No Recovery | Cutting

## TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on No. 200 sieve): Includes (I) Clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as determined by laboratory tests.

| DESCRIPTIVE TERM | N-VALUE | RELATIVE DENSITY |
|---|---|---|
| VERY LOOSE | 0-4 | 0-15% |
| LOOSE | 4-10 | 15-35% |
| MEDIUM DENSE | 10-30 | 35-65% |
| DENSE | 30-50 | 65-85% |
| VERY DENSE | 50 and above | 85-100% |

FINE GRAINED SOILS (major portion passing No. 200 sieve): Includes (1) Inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests.

| DESCRIPTIVE TERM | UNCONFINED COMPRESSIVE STRENGTH TON/SQ. FT. |
|---|---|
| VERY SOFT | Less than 0.25 |
| SOFT | 0.25-0.50 |
| FIRM | 0.50-1.00 |
| STIFF | 1.00-2.00 |
| VERY STIFF | 2.00-4.00 |
| HARD | 4.00 and higher |

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil. The consistency ratings of such soils are based on penetrometer readings.

## TERMS CHARACTERIZING SOIL STRUCTURE

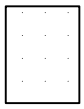
SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance.
FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
LAMINATED - composed of thin layers of varying color and texture.
INTERBEDDED - composed of alternate layers of different soil types.
CALCAREOUS - containing appreciable quantities of calcium carbonate.
WELL GRADED - having a wide range in grain sizes and substantial amounts of all intermediate particle sizes.
POORLY GRADED - predominantly of one grain size, or having a range of sizes with some intermediate sizes missing.

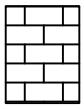
Terms used on this report for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in Technical Memorandum No.3-357, Waterways Experiment Station, March 1953

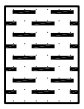
KEY 3-14-12

# BORING LOG TERMS – ROCK

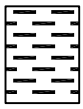
ROCK TYPES
(SHOWN IN SYMBOLS COLUMN)


Sandstone


Limestone


Siltstone


Coal


Shale

**Joint Characteristics –**

| Spacing | |
|---|---|
| Very Close | 0.75 to 2.5 in. |
| Close | 2.5 to 8 in. |
| Moderately Close | 8 to 24 in. |
| Wide | 2 to 6 ft |
| Very Wide | More than 6 ft |

**Bedding Characteristics –**

| | |
|---|---|
| Very Thin | 0.75 to 2.5 in. |
| Thin | 2.5 to 8 in. |
| Medium | 8 to 24 in. |
| Thick | 2 to 6 ft |
| Massive | More than 6 ft |

**Lithologic Characteristics –**

Clayey
Shaly
Calcareous (limy)
Siliceous
Sandy (Arenaceous)
Silty
Plastic Seams

**Parting –** Less than 1/16 inch
**Seam –** 1/16 to 1/2 inch
**Layer –** 1/2 to 12 inches
**Stratum –** Greater than 12 inches

**Hardness–**

Soft (S) – Reserved for plastic material alone.

Friable (F) – Easily crumbled by hand, pulverized or reduced to powder and is too soft to be cut with a pocket knife.

Low Hardness (LH) – Can be gouged deeply or carved with a pocket knife.

Moderately Hard (MH) – Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and scratch is readily visible after the powder has been blown away.

Hard (H) – Can be scratched with difficulty; scratch produces little powder and is often faintly visible; traces of the knife steel may be visible.

Very hard (VH) – Cannot be scratched with a pocket knife. Knife steel marks left on surface.

**Texture –**

Fine – Barely seen with naked eye
Medium – Barely seen up to 1/8 in.
Coarse – 1/8 in. to 1/4 in.

**Structure –**

Bedding
- Flat – 0° – 5°
- Gently Dipping – 5° – 35°
- Moderately Dipping – 35° – 55°
- Steeply Dipping – 55° – 85°

Fractures, scattered
- Open
- Cemented or Tight

Fractures, closely spaced
- Open
- Cemented or Tight

Brecciated (Sheared and Fragmented)
- Open
- Cemented or Tight

Joints
- Faulted
- Slickensides

**Degree of Weathering –**

Fresh – No visible signs of decomposition or discoloration. Rings under hammer impact.

Slighty Weathered – Slight discoloration inwards from open fractures, otherwise similar to fresh.

Moderately Weathered – Discoloration throughout. Weaker minerals such as feldspar decomposed. Strength somewhat less than fresh rock, but cores cannot be broken by hand or scraped by knife. Texture preserved.

Highly Weathered – Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric

Completely Weathered – Minerals decomposed to soil but fabric and structure preserved (Saprolite). Specimens easily crumbled or penetrated.

Residual Soil – Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

**Solution and Void Conditions –**

Solid, contains no voids
Vuggy (pitted)
Vesicular (igneous)
Porous
Cavities
Cavernous

**Swelling Properties –**

Nonswelling
Swelling

**Slaking Properties –**

Nonslaking
Slakes slowly on exposure
Slakes readily on exposure

**Rock Quality Designation (RQD) –**

| RQD (Percent) | Diagnostic Description |
|---|---|
| Greater than 90 | Excellent |
| 75 – 90 | Good |
| 50 – 75 | Fair |
| 25 – 50 | Poor |
| Less than 25 | Very Poor |

KEYROCK FHWA 3-2-12

# APPENDIX A

# SUMMARY OF PAVEMENT CORE RESULTS

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| Core No. | Structure | Location | Directional lane | Date Cored | Total Core length, in. | Asphalt Layer #1, in. | Asphalt Layer #2, in. | Aggregate Base, in. |
|---|---|---|---|---|---|---|---|---|
| FC-1 | I-40 | INSIDE SHOULDER | WB | 9/5/24 | 17.5 | 4.25 | 13.25 | >5 |
| FC-2 | I-40 | INSIDE SHOULDER | WB | 9/5/24 | 17.75 | 4 | 13.75 | >6 |
| FC-6 | I-40 | OUTSIDE SHOULDER | WB | 9/5/24 | 8.5 | 4.5 | NA | >9 |
| FC-7 | I-40 | OUTSIDE SHOULDER | WB | 9/5/24 | 4.5 | 4.5 | NA | 15 |
| FC-3 | I-40 | INSIDE SHOULDER | EB | 9/5/24 | 15.25 | 4.75 | 10.5 | >5 |
| FC-4 | I-40 | INSIDE SHOULDER | EB | 9/5/24 | 13.75 | 4.5 | 9.25 | >7 |
| FC-5 | I-40 | OUTSIDE SHOULDER | EB | 9/5/24 | 6.75 | 6.75 | NA | >3.5 |
| FC-8 | I-40 | OUTSIDE SHOULDER | EB | 9/5/24 | 7.25 | 7.25 | NA | >4 |

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Inside Shoulder | |
| **Directional lane:** | Westbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 17.5 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 4.25 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed<br><br>13.25 in. ACHM base course - crushed sandstone aggregate with sizes up to1-1/4", well distributed | | |

**Core No. FC-1**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Inside Shoulder | |
| **Directional lane:** | Westbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 17.75 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 4 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed<br><br>13.75 in. ACHM base course - crushed sandstone aggregate with sizes up to1-1/4", well distributed | | |

**Core No. FC-2**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Outside Shoulder | |
| **Directional lane:** | Westbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 8 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 4.5 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed<br><br>3.5 inches of the crushed stone base material was intact after coring and shown below. | | |

**Core No. FC-6**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Outside Shoulder | |
| **Directional lane:** | Westbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 4.5 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 4.5 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed | | |

**Core No. FC-7**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

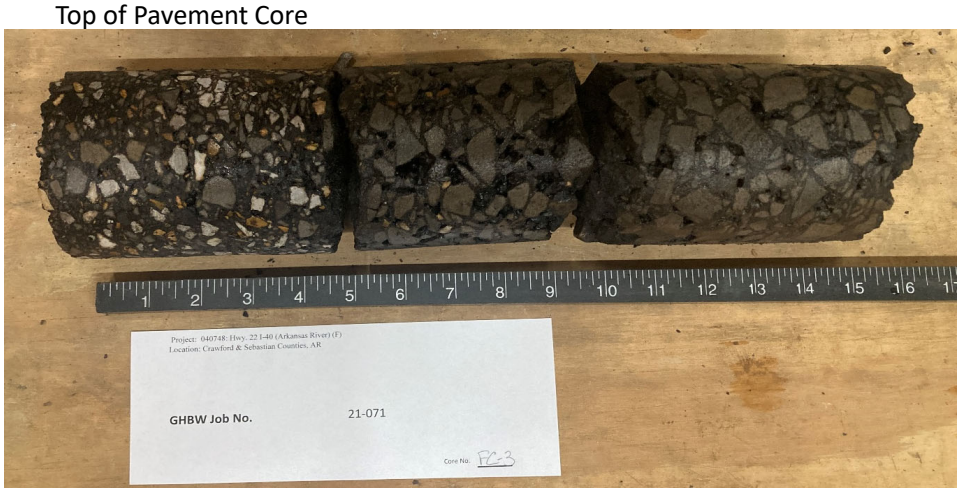
2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Inside Shoulder | |
| **Directional lane:** | Eastbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 15.25 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 4.75 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed<br><br>10.5 in. ACHM base course - crushed sandstone aggregate with sizes up to1-1/4", well distributed | | |

**Core No. FC-3**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

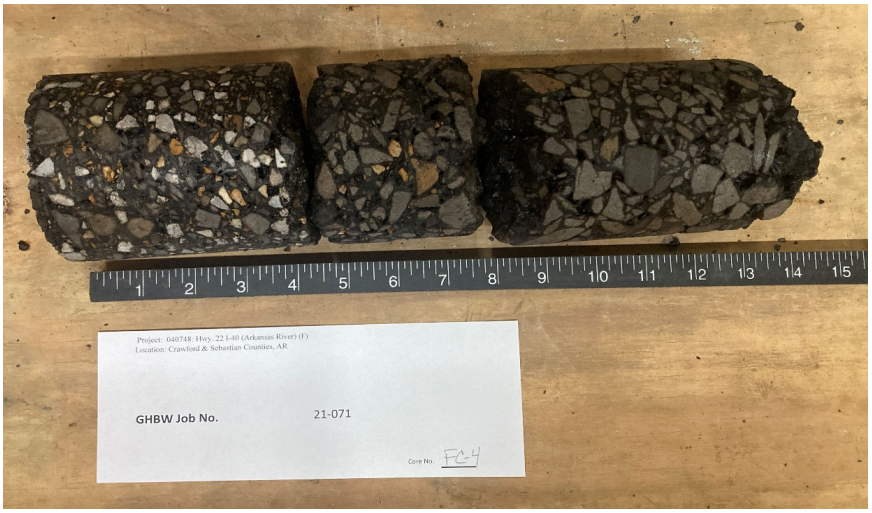
2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Inside Shoulder | |
| **Directional lane:** | Eastbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 13.75 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 4.5 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed<br><br>9.25 in. ACHM base course - crushed sandstone aggregate with sizes up to1-1/4", well distributed | | |

**Core No. FC-4**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Outside Shoulder | |
| **Directional lane:** | Eastbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 6.75 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 6.75 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed | | |

**Core No. FC-5**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

2) Unless otherwise noted fractured pavement cores resulted from the coring process.

PROJECT: Job. No. 040748: Hwy 22 - I-40 (I-49) (F)
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| | | | |
|---|---|---|---|
| **Structure:** | I-40 | **Location:** Outside Shoulder | |
| **Directional lane:** | Eastbound | | |
| **Date cored:** | 9/5/2024 | | |
| **Total core length, in.** | 7.25 | **Core Diameter, in.** | 3.75 |
| **Comments:** | 7.25 in. ACHM surface course - crushed sandstone aggregate with sizes up to 1/4", well distributed | | |

**Core No. FC-8**

Top of Pavement Core




Notes: 1) Top of pavement to the left.

2) Unless otherwise noted fractured pavement cores resulted from the coring process.

# APPENDIX B

July 23, 2024

Duncan Adrian
Grubbs, Hoskyn, Barton & Wyatt, Inc., dba UES
1 Trigon Plaza
Little Rock, Arkansas 72209

Mark Wyatt
Grubbs, Hoskyn, Barton & Wyatt, Inc., dba UES
1 Trigon Plaza
Little Rock, Arkansas 72209

Re: Automatic SPT Hammer Dynamic Measurements
CME 55 (S/N 300905), SIMCO 2800 (S/N 092147), and Diedrich D50 HD Track (S/N 245)
UES Project No. J043634.01

Dear Mr. Adrian and Mr. Wyatt:

Presented in this report are the results of dynamic measurements performed on the subject drill rig by Geotechnology, LLC dba UES (UES). The purpose of the testing was to measure the average transferred energy from the automatic standard penetration test (SPT) hammer to the drill rods for each drill rig and calculate the average hammer efficiency. The testing was performed in accordance with ASTM D4633.

## DRILL RIG AND SPT HAMMER INFORMATION

It is our understanding that the SIMCO 2800 drill rig utilizes a CME automatic SPT hammer. Therefore, the drill rigs are equipped with a CME or Diedrich automatic SPT hammers. The CME and Diedrich hammers utilize a mechanical drop system to create a 30-inch free fall condition of a 140-lb hammer. In general, the CME and Diedrich hammers are designed to be operated at a rate around 50 to 55 blows per minute. AWJ drill rods and a standard 2-inch diameter split spoon sampler were used for testing. The distance from the hammer impact surface to the gauges was constant during testing.

## DATA COLLECTION AND EVALUATION

SPT energy measurements were collected at 5-foot centers between depths of approximately 28.5 and 60 feet below the ground surface. The dynamic measurements were obtained using an instrumented AWJ rod, piezoresistive accelerometers, and a Pile Driving Analyzer (PDA) Model PDA 8G manufactured by Pile Dynamics, Inc. A copy of the calibration certificates for the piezoresistive accelerometers and strain gauges is presented as Appendix A.

Mr. Paul Bess, P.E. [1] operated the PDA and observed the associated drilling and sampling. The recorded force and velocity curves were viewed on screen to determine the data quality. Data were digitally stored on the PDA for subsequent processing and analysis. The PDA data and representative force and velocity records for the CME 55, SIMCO 2800, and Diedrich D50 are presented in Appendices B, C and D, respectively. The following data are included in the PDA data summaries.

- FMX – the maximum compressive force at the sensor location
- VMX – the maximum downward velocity at the sensor location
- EFV – energy transfer at the sensor location
- ETR – energy transfer ratio (EMX divided by maximum rated energy)
- BPM – hammer operating rate in blows per minute
- EMX – maximum energy transfer at the sensor location
- EF2 – energy transfer value at time equals 2L/c, where L is the rod length and c is the stress wave speed in steel (i.e., 16,807.9 feet per second)
- DFN – the final calculated downward displacement at the sensor location
- FVP – force versus velocity proportionality at first peak

## RESULTS

A summary of the field measurements are presented in Tables 1 through 3. The standard penetration resistance, or N-value, is defined as the number of blows required to drive the split-spoon sampler 12 inches with a 140-pound hammer falling 30 inches. Since the split spoon sampler is driven 18 inches or until refusal, the blows for the first 6 inches are for seating the sampler, and the number of blows for the final 12 inches is the N-value. Data from the initial 6-inch interval (i.e., seating blows) were not used in the analysis.

**TABLE 1: SUMMARY OF SPT ENERGY MEASUREMENTS – CME 55 (S/N 300905)**

| Boring | Sample Depth (feet) | Effective Rod Length (feet) | Blow Count (blows/6 in) | SPT Field N Value | Average Energy Transferred[1] (ft-lbs) | Average Energy Transfer Ratio[2] (%) | Energy Transfer Ratio Standard Deviation | Blow per Minute (bpm) |
|---|---|---|---|---|---|---|---|---|
| LRPA Supersite B-9 | 28.5 to 30 | 31.83 | 14-20-20 | 40[3] | 281.3 | 80.4 | 0.8 | 48.4 |
| | 38.5 to 40 | 43.83 | 11-10-8 | 18 | 278.1 | 79.5 | 0.8 | 48.5 |
| | 43.5 to 45 | 48.83 | 6-7-3 | 10 | 276.6 | 79.0 | 1.4 | 48.8 |
| | 53.5 to 55 | 58.83 | 11-16-21 | 37 | 271.2 | 77.5 | 1.3 | 48.4 |
| | 58.5 to 60 | 63.83 | 2-7-13 | 20[3] | 273.8 | 78.2 | 1.0 | 48.7 |
| Average[4] | | | | | 275.7 | **78.8** | NA | 48.5 |
| Standard Deviation[4] | | | | | 5.5 | **1.6** | NA | 0.3 |

[1] Average energy transferred is calculated using the FV method (i.e., EMX or EFV calculation).
[2] Energy transfer ratio (ETR) is the measured average energy transferred divided by the potential energy of the SPT hammer (i.e., 140-lb hammer multiplied by a 2.5-foot drop height or 0.350 ft-kips) presented as a percent.
[3] Due to poor data quality, some N-Value blows were deleted from the dataset.
[4] Average and standard deviation are calculated from the full dataset prior to rounding.

[1] Licensed in Missouri and Tennessee.

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**TABLE 2: SUMMARY OF SPT ENERGY MEASUREMENTS – SIMCO 2800 (S/N 092147)**

| Boring | Sample Depth (feet) | Effective Rod Length (feet) | Blow Count (blows/6 in) | SPT Field N Value | Average Energy Transferred[1] (ft-lbs) | Average Energy Transfer Ratio[2] (%) | Energy Transfer Ratio Standard Deviation | Blow per Minute (bpm) |
|---|---|---|---|---|---|---|---|---|
| LRPA Supersite B-10 | 28.5 to 30 | 31.83 | 9-32-20 | 52[3] | 288.0 | 82.3 | 1.4 | 47.4 |
| | 33.5 to 35 | 38.83 | 5-4-5 | 9 | 284.7 | 81.3 | 0.9 | 47.5 |
| | 38.5 to 40 | 43.83 | 14-14-20 | 34 | 281.7 | 80.5 | 0.9 | 47.1 |
| | 43.5 to 45 | 48.83 | 13-12-11 | 23 | 279.7 | 79.9 | 2.2 | 47.1 |
| | 48.5 to 50 | 53.83 | 9-10-10 | 20 | 283.3 | 80.9 | 1.1 | 46.3 |
| Average[4] | | | | | 283.9 | **81.1** | NA | 47.1 |
| Standard Deviation[4] | | | | | 5.8 | **1.7** | NA | 0.7 |

[1] Average energy transferred is calculated using the FV method (i.e., EMX or EFV calculation).
[2] Energy transfer ratio (ETR) is the measured average energy transferred divided by the potential energy of the SPT hammer (i.e., 140-lb hammer multiplied by a 2.5-foot drop height or 0.350 ft-kips) presented as a percent.
[3] Due to poor data quality, some N-Value blows were deleted from the dataset.
[4] Average and standard deviation are calculated from the full dataset prior to rounding.

**TABLE 3: SUMMARY OF SPT ENERGY MEASUREMENTS – DIEDRICH D50 HD TRACK (S/N 245)**

| Boring | Sample Depth (feet) | Effective Rod Length (feet) | Blow Count (blows/6 in) | SPT Field N Value | Average Energy Transferred[1] (ft-lbs) | Average Energy Transfer Ratio[2] (%) | Energy Transfer Ratio Standard Deviation | Blow per Minute (bpm) |
|---|---|---|---|---|---|---|---|---|
| LRPA Supersite B-13 | 28.5 to 30 | 33.83 | 21-29-40 | 69 | 285.7 | 81.6 | 1.5 | 49.9 |
| | 33.5 to 35 | 38.83 | 5-6-7 | 13 | 259.3 | 74.1 | 0.8 | 43.3 |
| | 38.5 to 40 | 43.83 | 8-6-5 | 11 | 258.5 | 73.8 | 0.8 | 44.0 |
| | 43.5 to 45 | 48.83 | 11-10-10 | 20 | 282.7 | 80.8 | 1.4 | 51.3 |
| | 48.5 to 50 | 53.83 | 4-5-9 | 14 | 273.3 | 78.1 | 1.5 | 49.9 |
| Average[3] | | | | | 278.8 | **79.7** | NA | 48.9 |
| Standard Deviation[3] | | | | | 11.4 | **3.3** | NA | 2.8 |

[1] Average energy transferred is calculated using the FV method (i.e., EMX or EFV calculation).
[2] Energy transfer ratio (ETR) is the measured average energy transferred divided by the potential energy of the SPT hammer (i.e., 140-lb hammer multiplied by a 2.5-foot drop height or 0.350 ft-kips) presented as a percent.
[3] Average and standard deviation are calculated from the full dataset prior to rounding.

## DISCUSSION

During the testing of the Diedrich D50 drill rig, the Diedrich hammer operated at a variable rate from around 43 up to 51 blows per minute.

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**LIMITATIONS**

This report has been prepared on behalf of and for the exclusive use of the client for specific application to the named project as described herein. UES has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions. The recommendations and conclusions contained in this report are professional opinions. No other representation, expressed or implied, is included or intended.

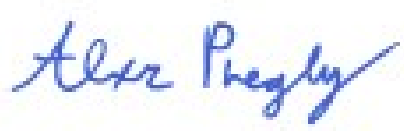
The energy transfer of a hammer is dependent on the amount of hammer wear, frequency of hammer use, maintenance, hammer stroke, anvil, and connection of each rod section. UES will not be responsible for any claims, damages, or liability associated with any other party's interpretations or use of the data.

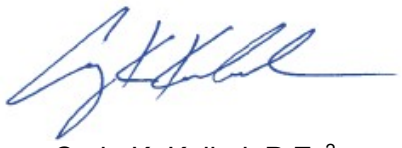
* * * * *

If we can provide further information or services please contact the undersigned.

Very truly yours,

**UES**





Alexander Phegley, E.I.
Project Engineer

Craig K. Kaibel, P.E. [2]
Principal Engineer

ADP/CKK:adp/ckk

Attachments: Appendix A – Calibration Certificates
Appendix B – CME 55 (S/N 300905) PDA Data Summary
Appendix C – SIMCO 2800 (S/N 092147) PDA Data Summary
Appendix D – Diedrich D50 HD Track (S/N 245) PDA Data Summary

Copies submitted: PDF

[2] Licensed in Missouri and Illinois.

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# APPENDIX A

## CALIBRATION CERTIFICATES

# Accelerometer Calibration Certificate
# Pile Dynamics, Inc.

**Calibrated by Pile Dynamics, Inc.**
**Calibration performed on 19Feb2024**

| | | | |
|---|---|---|---|
| **Serial No:** | K10886 | **Temperature:** | 22.6 °C |
| **Model:** | PR | **Humidity:** | 25% |
| **Calibrated on:** | Channel 3 on 8G 5161 LE | | |

| | | | |
|---|---|---|---|
| **Ref Acc 1:** | 72517!<br>1049 g's/volt | **Cal on:** | 24Mar2022 |
| **Ref Acc 2:** | 72505!<br>1035 g's/volt | **Cal on:** | 24Mar2022 |

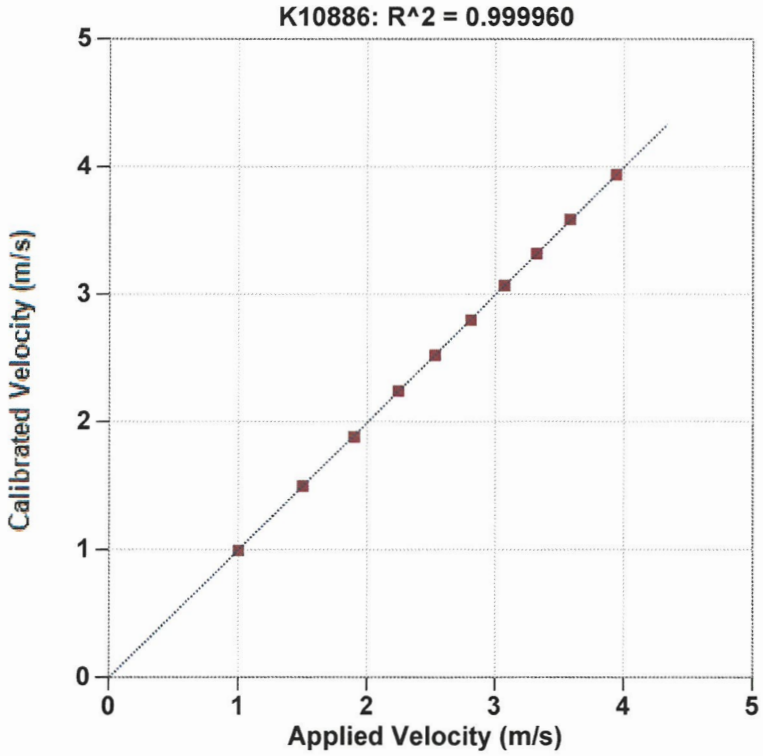
**Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).**

**PDA CALIBRATION FACTOR**

**407.1 mv/5000g**
(81.4 µv/g)
R^2: 0.999960 [Chip programmed]

Operator: William Johnson

Signed




| Reference Velocity | S/N K10886 Velocity |
|---|---|
| m/s | m/s |
| 1.002 | 0.994 |
| 1.501 | 1.500 |
| 1.895 | 1.884 |
| 2.243 | 2.244 |
| 2.526 | 2.525 |
| 2.807 | 2.801 |
| 3.070 | 3.071 |
| 3.317 | 3.320 |
| 3.578 | 3.588 |
| 3.938 | 3.938 |

Maximum Acceleration: 841 g's

# Accelerometer Calibration Certificate
# Pile Dynamics, Inc.

**Calibrated by Pile Dynamics, Inc.**
**Calibration performed on** JUN 2 2 2022

| | | | |
|---|---|---|---|
| **Serial No:** | K12738 | **Temperature:** | 74.5 °F |
| **Model:** | PR | **Humidity:** | 48% |
| **Calibrated on:** | Channel 3 on 8G 5161 LE | | |

| | | | |
|---|---|---|---|
| **Ref Acc 1:** | 72517!<br>1049 g's/volt | **Cal on:** | 24Mar2022 |
| **Ref Acc 2:** | 72505!<br>1035 g's/volt | **Cal on:** | 24Mar2022 |

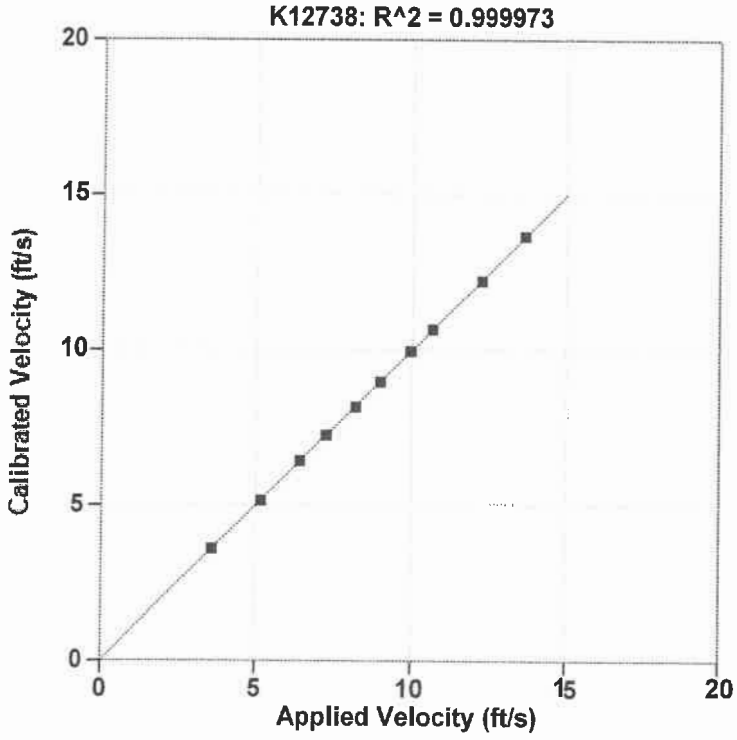
**Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).**

**PDA CALIBRATION FACTOR**

**441.9 mv/5000g**
(88.4 µv/g)
R^2: 0.999973 [Chip programmed]

Operator: William Johnson

Signed



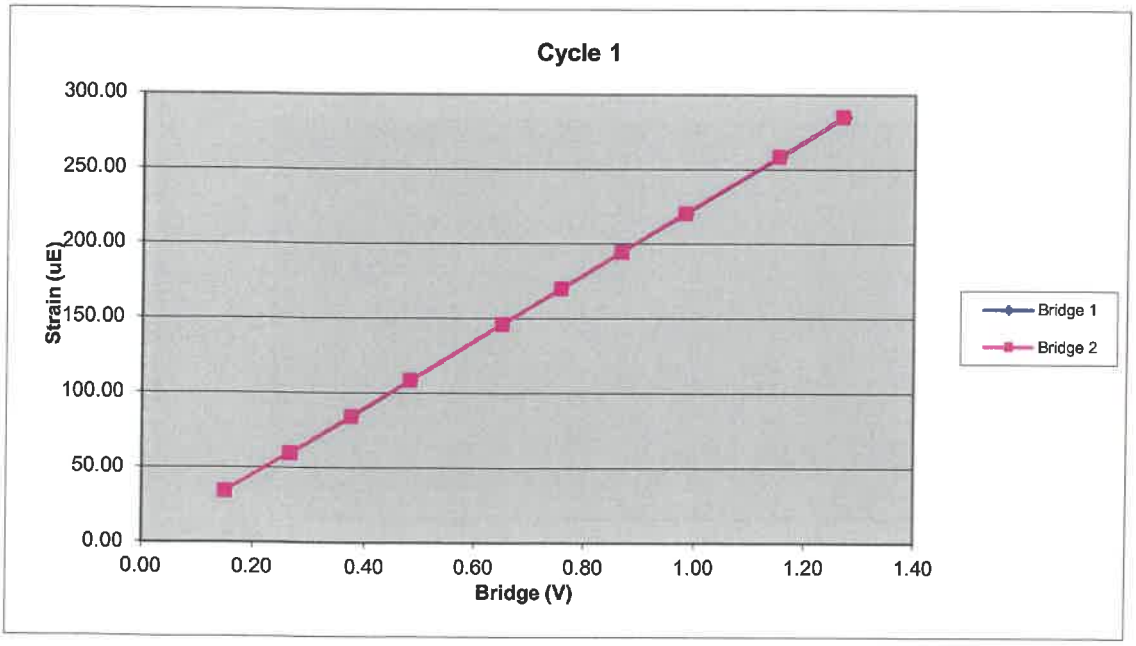

| Reference Velocity | S/N K12738 Velocity |
|---|---|
| ft/s | ft/s |
| 3.607 | 3.595 |
| 5.166 | 5.148 |
| 6.419 | 6.431 |
| 7.255 | 7.251 |
| 8.184 | 8.165 |
| 8.986 | 8.967 |
| 9.946 | 9.960 |
| 10.648 | 10.666 |
| 12.234 | 12.221 |
| 13.643 | 13.661 |

Maximum Acceleration: 920 g's

| 405AWJ | | Cycle 1 | | |
|---|---|---|---|---|
| **Sample** | **Force (lb)** | **Strain (µE)** | **Bridge 1 (V)** | **Bridge 2 (V)** |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1194.37 | 34.08 | 0.15 | 0.15 |
| 3 | 2103.24 | 59.64 | 0.26 | 0.26 |
| 4 | 3007.72 | 84.20 | 0.38 | 0.38 |
| 5 | 3866.78 | 108.43 | 0.48 | 0.48 |
| 6 | 5210.69 | 145.93 | 0.65 | 0.65 |
| 7 | 6083.10 | 170.02 | 0.76 | 0.76 |
| 8 | 6944.30 | 194.54 | 0.87 | 0.87 |
| 9 | 7874.22 | 220.46 | 0.98 | 0.98 |
| 10 | 9237.33 | 258.43 | 1.15 | 1.15 |
| 11 | 10176.52 | 285.10 | 1.27 | 1.27 |

| **Bridge 1** | | **Bridge 2** | |
|---|---|---|---|
| **Force Calibration (lb/V)** | **8008.32** | **Force Calibration (lb/V)** | **8028.99** |
| Offset | -9.05 | Offset | -11.44 |
| Correlation | 0.999998 | Correlation | 0.999998 |
| **Strain Calibration (µE/V)** | **223.67** | **Strain Calibration (µE/V)** | **224.25** |
| Offset | 0.26 | Offset | 0.20 |
| Correlation | 0.999994 | Correlation | 0.999996 |

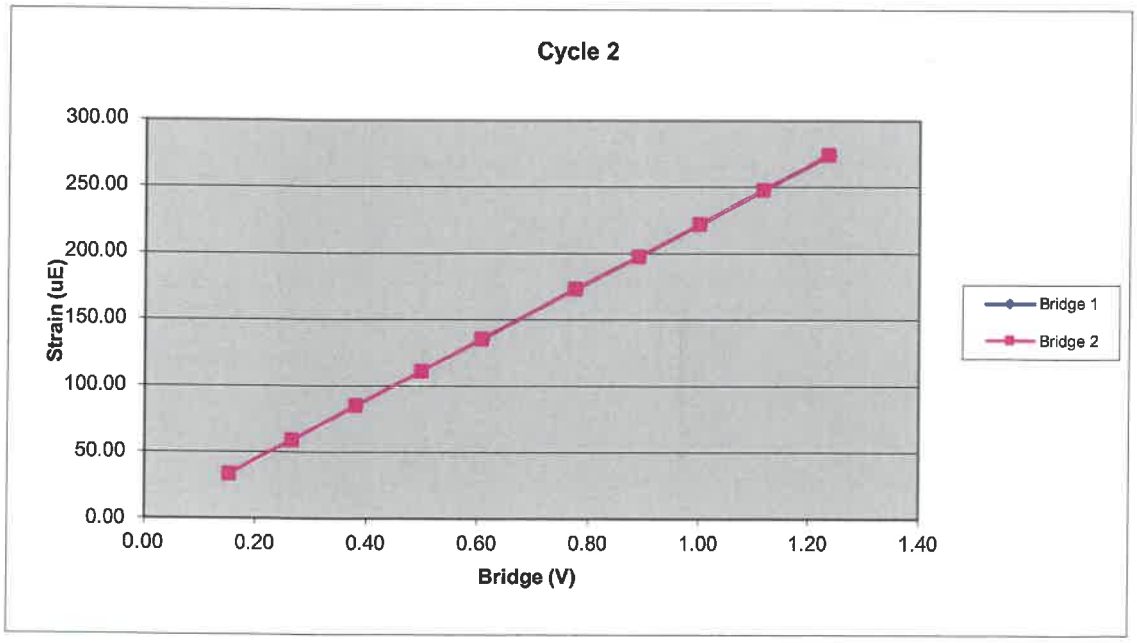
| **Force Strain Calibration** | |
|---|---|
| **EA (Kips)** | **35803.06** |
| Offset | -18.39 |
| Correlation | 0.999995 |



| 405AWJ | | Cycle 2 | | |
|---|---|---|---|---|
| **Sample** | **Force (lb)** | **Strain (µE)** | **Bridge 1 (V)** | **Bridge 2 (V)** |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1210.85 | 33.17 | 0.15 | 0.15 |
| 3 | 2127.42 | 58.55 | 0.27 | 0.27 |
| 4 | 3040.48 | 84.73 | 0.38 | 0.38 |
| 5 | 3982.29 | 110.54 | 0.50 | 0.50 |
| 6 | 4868.54 | 134.98 | 0.61 | 0.61 |
| 7 | 6203.97 | 172.76 | 0.78 | 0.78 |
| 8 | 7121.51 | 197.22 | 0.89 | 0.89 |
| 9 | 8014.88 | 221.69 | 1.00 | 1.00 |
| 10 | 8946.46 | 247.55 | 1.12 | 1.12 |
| 11 | 9895.69 | 273.74 | 1.24 | 1.24 |

| **Bridge 1** | | **Bridge 2** | |
|---|---|---|---|
| **Force Calibration (lb/V)** | **8003.00** | **Force Calibration (lb/V)** | **8018.87** |
| Offset | **-7.67** | Offset | **-9.45** |
| Correlation | **0.999998** | Correlation | **0.999998** |
| **Strain Calibration (µE/V)** | **221.52** | **Strain Calibration (µE/V)** | **221.96** |
| Offset | **-0.10** | Offset | **-0.15** |
| Correlation | **0.999992** | Correlation | **0.999991** |

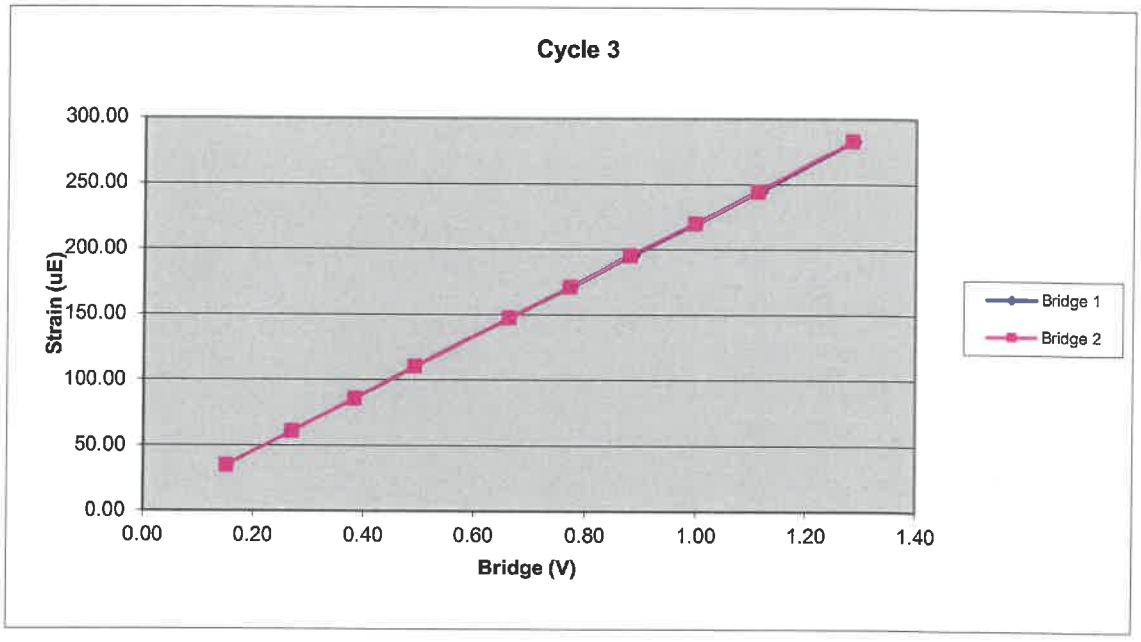
| **Force Strain Calibration** | |
|---|---|
| **EA (Kips)** | **36126.45** |
| Offset | **-3.89** |
| Correlation | **0.999986** |



| 405AWJ | | Cycle 3 | | |
|---|---|---|---|---|
| **Sample** | **Force (lb)** | **Strain (µE)** | **Bridge 1 (V)** | **Bridge 2 (V)** |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1216.21 | 34.84 | 0.15 | 0.15 |
| 3 | 2153.83 | 60.58 | 0.27 | 0.27 |
| 4 | 3072.06 | 85.65 | 0.39 | 0.38 |
| 5 | 3960.16 | 110.19 | 0.49 | 0.49 |
| 6 | 5307.67 | 147.40 | 0.66 | 0.66 |
| 7 | 6195.00 | 171.11 | 0.78 | 0.77 |
| 8 | 7063.61 | 195.13 | 0.89 | 0.88 |
| 9 | 7994.22 | 219.84 | 1.00 | 1.00 |
| 10 | 8915.66 | 244.48 | 1.12 | 1.11 |
| 11 | 10298.75 | 282.97 | 1.29 | 1.28 |

| **Bridge 1** | | **Bridge 2** | |
|---|---|---|---|
| **Force Calibration (lb/V)** | **7993.28** | **Force Calibration (lb/V)** | **8022.07** |
| Offset | **-3.76** | Offset | **-7.56** |
| Correlation | **0.999997** | Correlation | **0.999998** |
| **Strain Calibration (µE/V)** | **218.03** | **Strain Calibration (µE/V)** | **218.82** |
| Offset | **1.88** | Offset | **1.78** |
| Correlation | **0.999985** | Correlation | **0.999988** |

| **Force Strain Calibration** | |
|---|---|
| **EA (Kips)** | **36659.79** |
| Offset | **-72.54** |
| Correlation | **0.999989** |



| | |
|---|---|
| Bridge Excitation (V) | 5 |
| Shunt Resitor (ohm) | 60.4k |

| Calibration Factors | 405AWJ | | |
|---|---|---|---|
| Bridge 1 (µE/V) | 221.08 | Bridge 2 (µE/V) | 221.68 |
| EA Factor (Kips) | 36196.43 | Area (in^2) | 1.21 |

Calibrated by: _____

Calibrated Date: 4/26/2022

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

# APPENDIX B

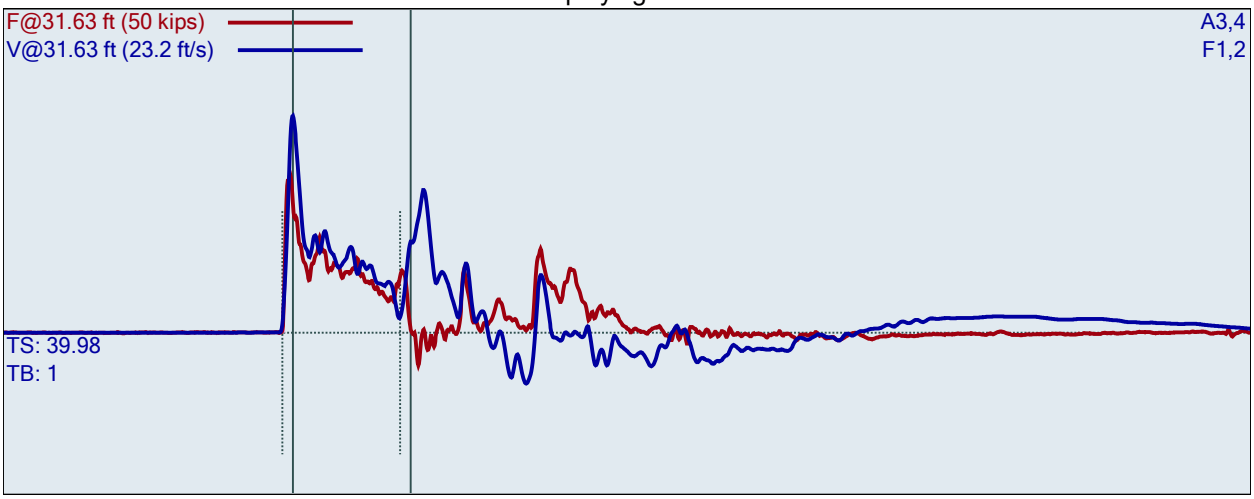
## CME 55 (S/N 300905) PDA DATA SUMMARY

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 28.5-30
S/N 300905
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 31.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 24.4 | 15.5 | 283.9 | 81.1 | 48.7 | 283.9 | 226.7 | 0.30 | 0.59 |
| 2 | 20 | 24.9 | 15.5 | 284.9 | 81.4 | 48.4 | 284.9 | 225.6 | 0.30 | 0.60 |
| 3 | 20 | 25.1 | 15.4 | 282.4 | 80.7 | 48.6 | 282.4 | 225.9 | 0.30 | 0.62 |
| 4 | 20 | 24.6 | 15.3 | 280.5 | 80.1 | 48.6 | 280.5 | 226.8 | 0.30 | 0.62 |
| 5 | 20 | 24.4 | 15.4 | 287.9 | 82.3 | 48.4 | 287.9 | 224.6 | 0.30 | 0.61 |
| 6 | 20 | 24.5 | 15.2 | 278.6 | 79.6 | 48.5 | 278.6 | 220.4 | 0.30 | 0.59 |
| 7 | 20 | 24.6 | 15.4 | 279.9 | 80.0 | 48.4 | 279.9 | 225.1 | 0.30 | 0.60 |
| 8 | 20 | 24.9 | 15.4 | 282.7 | 80.8 | 48.4 | 282.7 | 223.4 | 0.30 | 0.59 |
| 9 | 20 | 24.7 | 15.4 | 279.3 | 79.8 | 48.8 | 279.3 | 222.0 | 0.30 | 0.61 |
| 10 | 20 | 24.6 | 15.3 | 276.9 | 79.1 | 48.6 | 276.9 | 222.3 | 0.30 | 0.58 |
| 11 | 20 | 24.8 | 15.7 | 282.0 | 80.6 | 48.3 | 282.0 | 222.5 | 0.30 | 0.60 |
| 12 | 20 | 25.2 | 15.4 | 282.0 | 80.6 | 48.5 | 282.0 | 224.1 | 0.30 | 0.61 |
| 13 | 20 | 24.8 | 15.7 | 280.7 | 80.2 | 48.5 | 280.7 | 223.0 | 0.30 | 0.59 |
| 14 | 20 | 25.0 | 16.0 | 282.8 | 80.8 | 48.3 | 282.8 | 223.7 | 0.30 | 0.58 |
| 15 | 20 | 25.0 | 15.8 | 282.8 | 80.8 | 48.3 | 282.8 | 222.9 | 0.30 | 0.60 |
| 16 | 20 | 24.9 | 15.5 | 283.2 | 80.9 | 48.5 | 283.2 | 223.5 | 0.30 | 0.60 |
| 17 | 20 | 24.7 | 15.5 | 279.2 | 79.8 | 48.2 | 279.2 | 220.4 | 0.30 | 0.62 |
| 18 | 20 | 24.7 | 15.3 | 281.4 | 80.4 | 48.3 | 281.4 | 223.1 | 0.30 | 0.61 |
| 19 | 20 | 25.1 | 15.5 | 281.7 | 80.5 | 48.3 | 281.7 | 224.5 | 0.30 | 0.61 |
| 20 | 20 | 24.7 | 15.8 | 281.8 | 80.5 | 48.5 | 281.8 | 224.7 | 0.30 | 0.61 |
| 21 | 20 | 25.0 | 15.8 | 284.8 | 81.4 | 47.9 | 284.8 | 223.1 | 0.30 | 0.59 |
| 22 | 20 | 24.9 | 15.5 | 283.3 | 80.9 | 48.4 | 283.3 | 224.3 | 0.30 | 0.61 |
| 23 | 20 | 24.9 | 15.3 | 275.5 | 78.7 | 48.2 | 275.5 | 218.3 | 0.30 | 0.63 |
| 24 | 20 | 25.0 | 15.6 | 280.5 | 80.1 | 48.3 | 280.5 | 224.9 | 0.30 | 0.59 |
| 25 | 20 | 25.1 | 15.3 | 277.3 | 79.2 | 48.3 | 277.3 | 223.9 | 0.30 | 0.60 |
| 26 | 20 | 25.3 | 15.3 | 276.3 | 78.9 | 48.4 | 276.3 | 224.5 | 0.30 | 0.61 |
| | Average | 24.8 | 15.5 | 281.3 | 80.4 | 48.4 | 281.3 | 223.6 | 0.30 | 0.60 |

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 28.5-30 S/N 300905
OP: PDB Date: 11-July-2024

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |
| | Std. Dev. | 0.2 | 0.2 | 2.8 | 0.8 | 0.2 | 2.8 | 1.9 | 0.00 | 0.01 |
| | Maximum | 25.3 | 16.0 | 287.9 | 82.3 | 48.8 | 287.9 | 226.8 | 0.30 | 0.63 |
| | @ Blow# | 26 | 14 | 5 | 5 | 9 | 5 | 4 | 24 | 23 |

Total number of blows analyzed: 26

| BL# | Sensors |
|---|---|
| 1-26 | F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00) |

Time Summary

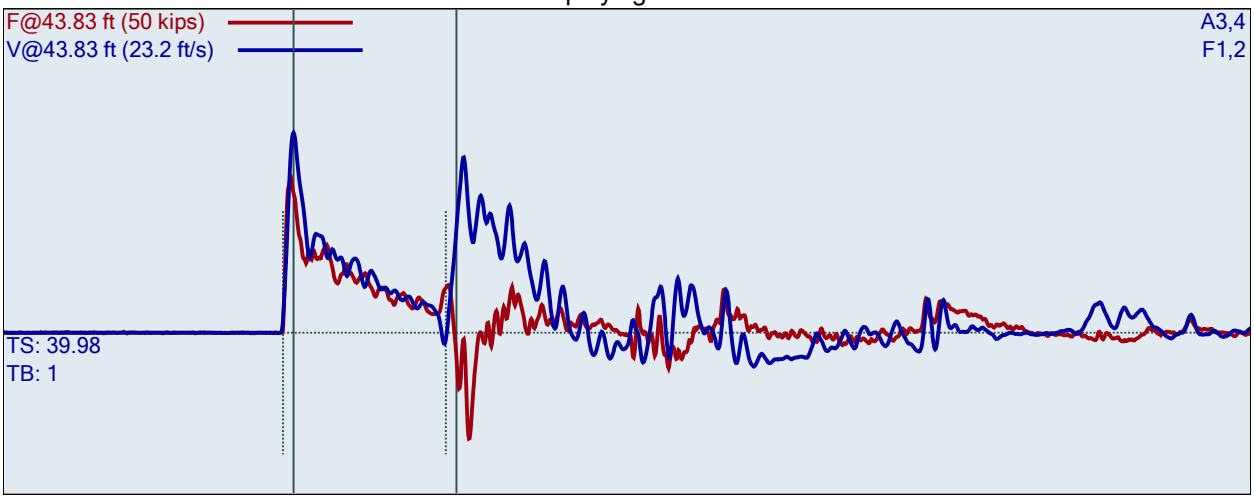
Drive 30 seconds 3:41 PM - 3:41 PM BN 1 - 26

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 38.5-40
OP: PDB
S/N 300905
Date: 11-July-2024

AR: 1.21 in²
LE: 43.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 24.0 | 14.3 | 274.5 | 78.4 | 48.9 | 274.5 | 235.9 | 0.60 | 0.70 |
| 2 | 10 | 24.1 | 14.9 | 281.7 | 80.5 | 48.7 | 281.7 | 239.4 | 0.60 | 0.68 |
| 3 | 10 | 23.9 | 14.6 | 281.2 | 80.3 | 48.8 | 281.2 | 244.1 | 0.60 | 0.68 |
| 4 | 10 | 23.6 | 14.6 | 278.8 | 79.7 | 48.9 | 278.8 | 239.8 | 0.59 | 0.69 |
| 5 | 10 | 23.7 | 15.1 | 283.2 | 80.9 | 48.5 | 283.2 | 240.6 | 0.60 | 0.68 |
| 6 | 10 | 24.4 | 14.4 | 279.3 | 79.8 | 48.5 | 279.3 | 236.6 | 0.60 | 0.69 |
| 7 | 10 | 24.1 | 14.6 | 274.8 | 78.5 | 48.8 | 274.8 | 230.2 | 0.60 | 0.68 |
| 8 | 10 | 23.4 | 14.7 | 281.9 | 80.6 | 48.5 | 281.9 | 236.5 | 0.60 | 0.69 |
| 9 | 10 | 23.6 | 14.4 | 279.9 | 80.0 | 48.5 | 279.9 | 236.0 | 0.60 | 0.70 |
| 10 | 10 | 23.0 | 14.4 | 276.5 | 79.0 | 48.6 | 276.5 | 231.8 | 0.60 | 0.70 |
| 11 | 8 | 23.4 | 14.5 | 279.3 | 79.8 | 48.3 | 279.3 | 237.0 | 0.75 | 0.69 |
| 12 | 8 | 22.5 | 14.8 | 279.2 | 79.8 | 48.5 | 279.2 | 231.7 | 0.75 | 0.66 |
| 13 | 8 | 22.0 | 14.9 | 274.8 | 78.5 | 48.3 | 274.8 | 225.7 | 0.75 | 0.67 |
| 14 | 8 | 22.7 | 14.5 | 276.8 | 79.1 | 48.2 | 276.8 | 232.0 | 0.75 | 0.69 |
| 15 | 8 | 21.9 | 14.8 | 276.3 | 78.9 | 48.5 | 276.3 | 227.8 | 0.75 | 0.66 |
| 16 | 8 | 22.6 | 14.9 | 272.7 | 77.9 | 48.4 | 272.7 | 229.5 | 0.75 | 0.67 |
| 17 | 8 | 22.8 | 14.6 | 275.8 | 78.8 | 48.2 | 275.8 | 231.0 | 0.75 | 0.68 |
| 18 | 8 | 23.2 | 14.8 | 279.2 | 79.8 | 48.3 | 279.2 | 230.5 | 0.75 | 0.70 |
| | Average | 23.3 | 14.7 | 278.1 | 79.5 | 48.5 | 278.1 | 234.2 | 0.67 | 0.68 |
| | Std. Dev. | 0.7 | 0.2 | 2.9 | 0.8 | 0.2 | 2.9 | 4.8 | 0.08 | 0.01 |
| | Maximum | 24.4 | 15.1 | 283.2 | 80.9 | 48.9 | 283.2 | 244.1 | 0.75 | 0.70 |
| | @ Blow# | 6 | 5 | 5 | 5 | 4 | 5 | 3 | 17 | 10 |

Total number of blows analyzed: 18

BL# Sensors

1-18 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

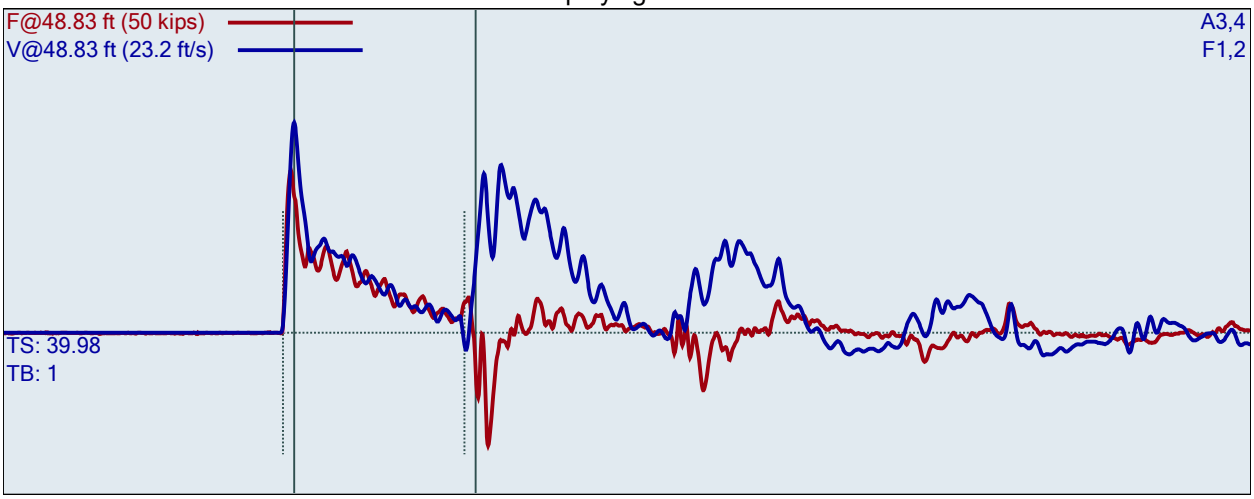
Drive 29 seconds 4:02 PM - 4:03 PM BN 1 - 18

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 43.5-45
OP: PDB
S/N 300905
Date: 11-July-2024

AR: 1.21 in²
LE: 48.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 25.1 | 15.0 | 275.9 | 78.8 | 48.6 | 275.9 | 240.4 | 0.85 | 0.65 |
| 2 | 7 | 25.3 | 15.2 | 274.4 | 78.4 | 48.8 | 274.4 | 243.0 | 0.85 | 0.66 |
| 3 | 7 | 25.2 | 15.3 | 275.9 | 78.8 | 48.7 | 275.9 | 244.1 | 0.85 | 0.65 |
| 4 | 7 | 25.1 | 15.2 | 271.4 | 77.5 | 49.1 | 271.4 | 236.8 | 0.85 | 0.64 |
| 5 | 7 | 25.3 | 15.2 | 277.2 | 79.2 | 48.9 | 277.2 | 243.3 | 0.86 | 0.62 |
| 6 | 7 | 25.0 | 15.4 | 268.9 | 76.8 | 48.8 | 268.9 | 241.0 | 0.85 | 0.62 |
| 7 | 7 | 25.1 | 15.7 | 273.8 | 78.2 | 49.1 | 273.8 | 242.1 | 0.86 | 0.62 |
| 8 | 3 | 23.9 | 15.1 | 282.1 | 80.6 | 48.6 | 282.1 | 242.9 | 2.00 | 0.65 |
| 9 | 3 | 25.0 | 15.6 | 280.6 | 80.2 | 49.0 | 280.6 | 245.2 | 2.00 | 0.61 |
| 10 | 3 | 25.8 | 16.0 | 285.7 | 81.6 | 48.7 | 285.7 | 247.9 | 2.00 | 0.56 |
| | Average | 25.1 | 15.4 | 276.6 | 79.0 | 48.8 | 276.6 | 242.7 | 1.20 | 0.63 |
| | Std. Dev. | 0.4 | 0.3 | 4.8 | 1.4 | 0.2 | 4.8 | 2.8 | 0.53 | 0.03 |
| | Maximum | 25.8 | 16.0 | 285.7 | 81.6 | 49.1 | 285.7 | 247.9 | 2.00 | 0.66 |
| | @ Blow# | 10 | 10 | 10 | 10 | 4 | 10 | 10 | 9 | 2 |

Total number of blows analyzed: 10

BL# Sensors

1-10 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

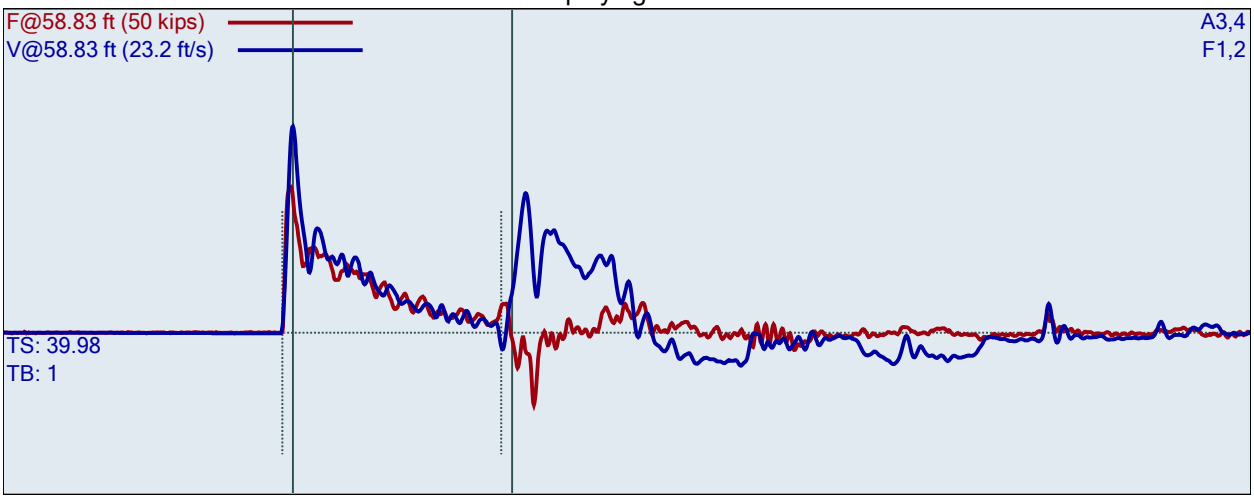
Drive 12 seconds 4:14 PM - 4:15 PM BN 1 - 10

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 53.5-55
S/N 300905
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 58.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 22.5 | 14.8 | 264.5 | 75.6 | 49.0 | 264.5 | 229.8 | 0.37 | 0.65 |
| 2 | 16 | 22.3 | 14.7 | 266.1 | 76.0 | 48.9 | 266.1 | 229.0 | 0.37 | 0.65 |
| 3 | 16 | 22.1 | 14.6 | 271.9 | 77.7 | 48.9 | 271.9 | 225.5 | 0.37 | 0.67 |
| 4 | 16 | 22.5 | 14.8 | 277.2 | 79.2 | 48.7 | 277.2 | 234.2 | 0.37 | 0.67 |
| 5 | 16 | 22.4 | 14.6 | 268.0 | 76.6 | 48.6 | 268.0 | 230.6 | 0.37 | 0.66 |
| 6 | 16 | 22.3 | 14.7 | 262.9 | 75.1 | 48.7 | 262.9 | 228.3 | 0.37 | 0.66 |
| 7 | 16 | 22.2 | 14.5 | 266.1 | 76.0 | 48.7 | 266.1 | 230.9 | 0.37 | 0.68 |
| 8 | 16 | 22.1 | 14.7 | 276.2 | 78.9 | 48.9 | 276.2 | 231.2 | 0.37 | 0.67 |
| 9 | 16 | 22.4 | 14.7 | 264.8 | 75.7 | 48.7 | 264.8 | 229.9 | 0.37 | 0.68 |
| 10 | 16 | 22.4 | 14.9 | 277.0 | 79.1 | 48.4 | 277.0 | 234.3 | 0.37 | 0.67 |
| 11 | 16 | 22.1 | 14.7 | 264.7 | 75.6 | 48.6 | 264.7 | 226.4 | 0.37 | 0.68 |
| 12 | 16 | 22.4 | 14.7 | 273.3 | 78.1 | 48.6 | 273.3 | 229.8 | 0.37 | 0.68 |
| 13 | 16 | 21.9 | 14.6 | 273.6 | 78.2 | 48.5 | 273.6 | 228.0 | 0.37 | 0.67 |
| 14 | 16 | 22.2 | 14.6 | 271.9 | 77.7 | 48.5 | 271.9 | 228.4 | 0.37 | 0.66 |
| 15 | 16 | 21.9 | 14.7 | 271.2 | 77.5 | 48.7 | 271.2 | 225.7 | 0.37 | 0.66 |
| 16 | 16 | 22.1 | 14.7 | 272.3 | 77.8 | 48.3 | 272.3 | 229.1 | 0.37 | 0.67 |
| 17 | 21 | 22.3 | 14.7 | 273.4 | 78.1 | 48.3 | 273.4 | 229.3 | 0.29 | 0.67 |
| 18 | 21 | 22.3 | 15.0 | 276.2 | 78.9 | 48.3 | 276.2 | 227.8 | 0.29 | 0.67 |
| 19 | 21 | 22.1 | 15.2 | 275.1 | 78.6 | 48.2 | 275.1 | 225.4 | 0.29 | 0.66 |
| 20 | 21 | 22.1 | 14.8 | 271.9 | 77.7 | 48.3 | 271.9 | 225.7 | 0.29 | 0.67 |
| 21 | 21 | 21.8 | 14.9 | 264.2 | 75.5 | 48.3 | 264.2 | 227.0 | 0.28 | 0.66 |
| 22 | 21 | 22.0 | 15.4 | 274.6 | 78.5 | 48.4 | 274.6 | 228.2 | 0.29 | 0.65 |
| 23 | 21 | 22.1 | 14.7 | 259.2 | 74.1 | 48.3 | 259.2 | 226.3 | 0.28 | 0.69 |
| 24 | 21 | 22.2 | 15.3 | 269.9 | 77.1 | 48.1 | 269.9 | 227.8 | 0.28 | 0.65 |
| 25 | 21 | 22.1 | 15.2 | 271.3 | 77.5 | 48.4 | 271.3 | 226.0 | 0.29 | 0.67 |
| 26 | 21 | 22.1 | 15.2 | 271.3 | 77.5 | 48.3 | 271.3 | 225.9 | 0.29 | 0.66 |
| 27 | 21 | 22.2 | 15.3 | 270.9 | 77.4 | 48.2 | 270.9 | 223.1 | 0.29 | 0.67 |

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 53.5-55 S/N 300905
OP: PDB Date: 11-July-2024

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |
| 28 | 21 | 22.2 | 15.2 | 275.2 | 78.6 | 48.1 | 275.2 | 228.1 | 0.29 | 0.66 |
| 29 | 21 | 22.4 | 15.1 | 272.7 | 77.9 | 48.1 | 272.7 | 227.6 | 0.29 | 0.67 |
| 30 | 21 | 22.2 | 15.4 | 275.9 | 78.8 | 48.2 | 275.9 | 226.1 | 0.29 | 0.65 |
| 31 | 21 | 22.4 | 15.3 | 274.5 | 78.4 | 48.3 | 274.5 | 224.3 | 0.29 | 0.66 |
| 32 | 21 | 22.5 | 15.4 | 272.8 | 78.0 | 48.0 | 272.8 | 227.2 | 0.29 | 0.65 |
| 33 | 21 | 22.7 | 15.2 | 274.4 | 78.4 | 47.9 | 274.4 | 226.2 | 0.29 | 0.68 |
| 34 | 21 | 22.4 | 15.3 | 274.1 | 78.3 | 48.3 | 274.1 | 223.7 | 0.29 | 0.67 |
| 35 | 21 | 22.5 | 15.5 | 275.4 | 78.7 | 48.0 | 275.4 | 227.2 | 0.29 | 0.65 |
| 36 | 21 | 22.8 | 15.0 | 274.5 | 78.4 | 48.1 | 274.5 | 226.0 | 0.29 | 0.69 |
| 37 | 21 | 22.8 | 15.3 | 266.3 | 76.1 | 48.1 | 266.3 | 224.2 | 0.28 | 0.68 |
| | Average | 22.3 | 14.9 | 271.2 | 77.5 | 48.4 | 271.2 | 227.7 | 0.32 | 0.67 |
| | Std. Dev. | 0.2 | 0.3 | 4.5 | 1.3 | 0.3 | 4.5 | 2.5 | 0.04 | 0.01 |
| | Maximum | 22.8 | 15.5 | 277.2 | 79.2 | 49.0 | 277.2 | 234.3 | 0.37 | 0.69 |
| | @ Blow# | 37 | 35 | 4 | 4 | 1 | 4 | 10 | 16 | 36 |

Total number of blows analyzed: 37

BL# Sensors

1-37 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

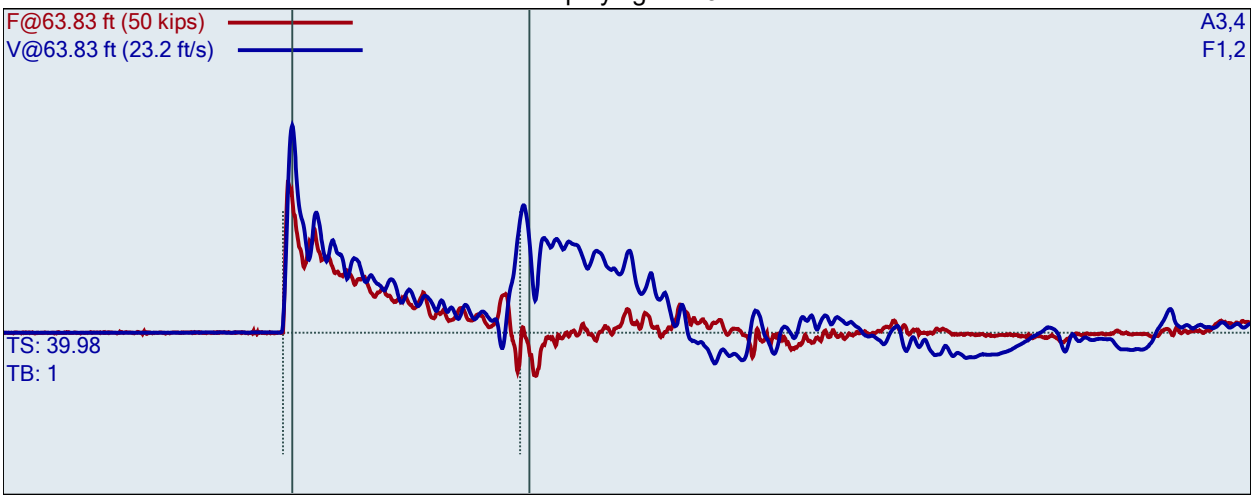
Drive 44 seconds 4:53 PM - 4:53 PM BN 1 - 37

Case Method & iCAP® Results

2024 UES Grubbs - CME55 - 58.5-60
S/N 300905
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 63.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 3




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute
EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 22.3 | 14.4 | 275.8 | 78.8 | 49.1 | 275.8 | 227.2 | 0.86 | 0.70 |
| 2 | 7 | 22.5 | 14.7 | 274.7 | 78.5 | 48.9 | 274.7 | 228.1 | 0.86 | 0.67 |
| 3 | 7 | 23.1 | 14.8 | 277.3 | 79.2 | 48.8 | 277.3 | 229.7 | 0.86 | 0.64 |
| 4 | 7 | 22.7 | 14.8 | 278.1 | 79.4 | 48.8 | 278.1 | 227.8 | 0.86 | 0.68 |
| 5 | 13 | 22.5 | 14.3 | 274.3 | 78.4 | 48.9 | 274.3 | 225.5 | 0.46 | 0.68 |
| 6 | 13 | 23.1 | 14.5 | 265.4 | 75.8 | 48.9 | 265.4 | 226.4 | 0.46 | 0.65 |
| 7 | 13 | 22.5 | 14.8 | 269.7 | 77.1 | 48.3 | 269.7 | 227.9 | 0.46 | 0.66 |
| 8 | 13 | 22.1 | 14.7 | 280.7 | 80.2 | 48.9 | 280.7 | 230.3 | 0.46 | 0.67 |
| 9 | 13 | 21.9 | 14.6 | 270.0 | 77.1 | 48.8 | 270.0 | 228.3 | 0.46 | 0.64 |
| 10 | 13 | 22.8 | 14.5 | 274.2 | 78.4 | 48.6 | 274.2 | 229.1 | 0.46 | 0.66 |
| 11 | 13 | 22.3 | 14.9 | 274.3 | 78.4 | 48.5 | 274.3 | 225.8 | 0.46 | 0.62 |
| 12 | 13 | 22.3 | 14.9 | 271.2 | 77.5 | 48.6 | 271.2 | 224.3 | 0.46 | 0.63 |
| 13 | 13 | 22.5 | 14.7 | 273.7 | 78.2 | 48.6 | 273.7 | 220.7 | 0.46 | 0.63 |
| 14 | 13 | 22.8 | 15.0 | 276.9 | 79.1 | 48.4 | 276.9 | 222.6 | 0.46 | 0.63 |
| 15 | 13 | 22.7 | 14.9 | 275.5 | 78.7 | 48.4 | 275.5 | 228.5 | 0.46 | 0.64 |
| 16 | 13 | 22.1 | 14.7 | 273.6 | 78.2 | 48.5 | 273.6 | 226.4 | 0.46 | 0.64 |
| 17 | 13 | 22.4 | 14.5 | 269.4 | 77.0 | 48.6 | 269.4 | 223.3 | 0.46 | 0.65 |
| | Average | 22.5 | 14.7 | 273.8 | 78.2 | 48.7 | 273.8 | 226.6 | 0.55 | 0.65 |
| | Std. Dev. | 0.3 | 0.2 | 3.6 | 1.0 | 0.2 | 3.6 | 2.6 | 0.17 | 0.02 |
| | Maximum | 23.1 | 15.0 | 280.7 | 80.2 | 49.1 | 280.7 | 230.3 | 0.86 | 0.70 |
| | @ Blow# | 3 | 14 | 8 | 8 | 1 | 8 | 8 | 3 | 1 |

Total number of blows analyzed: 17

BL# Sensors

1-17 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

Drive 19 seconds 5:13 PM - 5:13 PM BN 1 - 17

# APPENDIX C

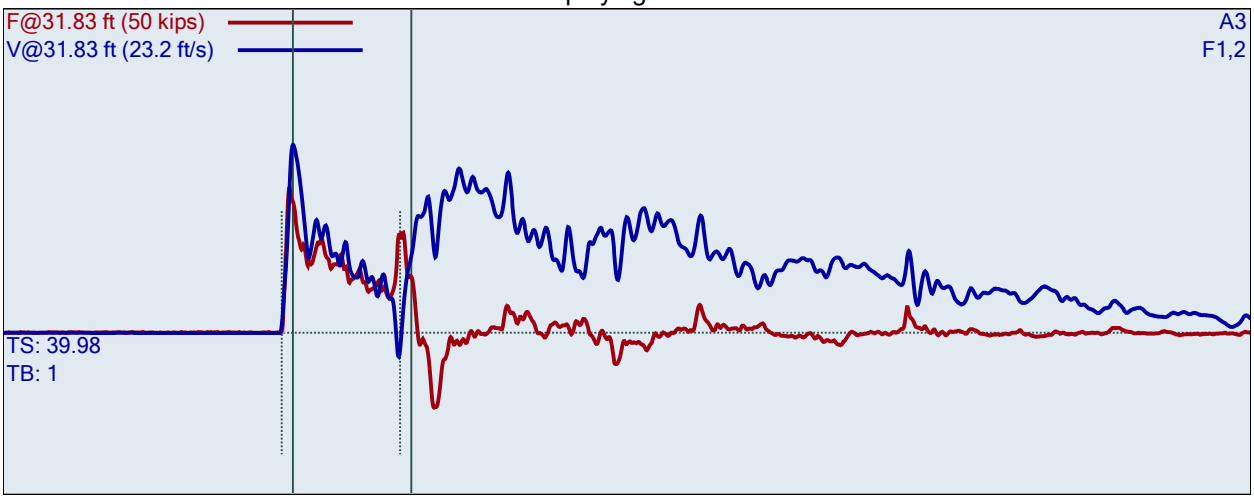
## SIMCO 2800 (S/N 092147) PDA DATA SUMMARY

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 28.5-30
S/N 092147
OP: PDB
Date: 10-July-2024

AR: 1.21 in²
LE: 31.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute
EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |
| 1 | 32 | 22 | 13.4 | 272.4 | 77.8 | 47.7 | 272.4 | 251.7 | 0.19 | 0.7 |
| 2 | 32 | 22 | 13.8 | 278.0 | 79.4 | 47.8 | 278.0 | 252.7 | 0.19 | 0.7 |
| 3 | 32 | 23 | 14.9 | 282.5 | 80.7 | 47.6 | 282.5 | 251.9 | 0.19 | 0.6 |
| 4 | 32 | 23 | 15.1 | 288.2 | 82.3 | 47.2 | 288.2 | 251.9 | 0.19 | 0.6 |
| 5 | 32 | 23 | 14.9 | 286.5 | 81.8 | 47.6 | 286.5 | 253.8 | 0.19 | 0.6 |
| 6 | 32 | 23 | 15.1 | 286.4 | 81.8 | 47.7 | 286.4 | 253.1 | 0.19 | 0.6 |
| 7 | 32 | 23 | 14.7 | 282.4 | 80.7 | 47.6 | 282.4 | 248.2 | 0.19 | 0.7 |
| 8 | 32 | 24 | 15.9 | 288.1 | 82.3 | 47.4 | 288.1 | 255.6 | 0.19 | 0.6 |
| 9 | 32 | 24 | 15.3 | 288.8 | 82.5 | 47.6 | 288.8 | 256.5 | 0.19 | 0.6 |
| 10 | 32 | 23 | 15.5 | 285.9 | 81.7 | 47.6 | 285.9 | 252.8 | 0.19 | 0.6 |
| 11 | 32 | 24 | 15.1 | 293.6 | 83.9 | 47.4 | 293.6 | 256.6 | 0.19 | 0.6 |
| 12 | 32 | 24 | 15.2 | 288.1 | 82.3 | 47.5 | 288.1 | 255.4 | 0.19 | 0.6 |
| 13 | 32 | 24 | 15.1 | 292.0 | 83.4 | 47.4 | 292.0 | 253.4 | 0.19 | 0.6 |
| 14 | 32 | 23 | 15.4 | 292.5 | 83.6 | 47.5 | 292.5 | 257.3 | 0.19 | 0.6 |
| 15 | 32 | 23 | 15.4 | 288.8 | 82.5 | 47.5 | 288.8 | 286.7 | 0.19 | 0.6 |
| 16 | 32 | 25 | 15.3 | 296.5 | 84.7 | 47.4 | 296.5 | 320.1 | 0.19 | 0.6 |
| 17 | 32 | 25 | 14.0 | 295.2 | 84.3 | 47.6 | 295.2 | 347.4 | 0.19 | 0.8 |
| 18 | 32 | 27 | 13.4 | 293.3 | 83.8 | 47.3 | 293.3 | 387.3 | 0.19 | 0.8 |
| 19 | 32 | 27 | 12.9 | 291.6 | 83.3 | 47.6 | 291.6 | 421.4 | 0.19 | 1.0 |
| 20 | 32 | 28 | 13.4 | 295.5 | 84.4 | 47.4 | 295.5 | 324.5 | 0.19 | 0.9 |
| 21 | 32 | 26 | 14.9 | 291.9 | 83.4 | 47.3 | 291.9 | 272.9 | 0.19 | 0.7 |
| 22 | 32 | 24 | 15.8 | 294.8 | 84.2 | 47.1 | 294.8 | 258.6 | 0.19 | 0.6 |
| 23 | 20 | 24 | 15.3 | 289.0 | 82.6 | 47.3 | 289.0 | 256.0 | 0.30 | 0.6 |
| 24 | 20 | 23 | 15.8 | 287.4 | 82.1 | 47.0 | 287.4 | 251.7 | 0.30 | 0.6 |
| 25 | 20 | 23 | 15.0 | 286.6 | 81.9 | 47.5 | 286.6 | 254.6 | 0.30 | 0.6 |
| 26 | 20 | 23 | 14.7 | 284.5 | 81.3 | 47.2 | 284.5 | 250.5 | 0.30 | 0.7 |
| 27 | 20 | 23 | 15.4 | 288.9 | 82.5 | 47.2 | 288.9 | 254.8 | 0.30 | 0.6 |

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 28.5-30 S/N 092147
OP: PDB Date: 10-July-2024

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |
| 28 | 20 | 23 | 15.2 | 290.0 | 82.9 | 47.2 | 290.0 | 252.5 | 0.30 | 0.7 |
| 29 | 20 | 23 | 15.2 | 287.3 | 82.1 | 47.2 | 287.3 | 255.0 | 0.30 | 0.7 |
| 30 | 20 | 24 | 15.4 | 291.8 | 83.4 | 47.2 | 291.8 | 257.5 | 0.30 | 0.7 |
| 31 | 20 | 23 | 15.4 | 286.9 | 82.0 | 47.1 | 286.9 | 252.7 | 0.30 | 0.7 |
| 32 | 20 | 24 | 15.6 | 288.8 | 82.5 | 47.2 | 288.8 | 256.3 | 0.30 | 0.6 |
| 33 | 20 | 24 | 15.7 | 292.6 | 83.6 | 47.2 | 292.6 | 254.9 | 0.30 | 0.7 |
| 34 | 20 | 24 | 16.0 | 292.6 | 83.6 | 47.2 | 292.6 | 254.4 | 0.30 | 0.6 |
| 35 | 20 | 25 | 14.9 | 285.1 | 81.5 | 47.6 | 285.1 | 255.4 | 0.30 | 0.7 |
| 36 | 20 | 25 | 15.2 | 283.0 | 80.9 | 47.3 | 283.0 | 250.9 | 0.30 | 0.7 |
| 37 | 20 | 24 | 15.0 | 280.0 | 80.0 | 47.3 | 280.0 | 250.9 | 0.30 | 0.7 |
| 38 | 20 | 24 | 15.2 | 288.0 | 82.3 | 47.2 | 288.0 | 254.9 | 0.30 | 0.7 |
| 39 | 20 | 24 | 15.1 | 283.0 | 80.9 | 47.3 | 283.0 | 248.5 | 0.30 | 0.7 |
| 40 | 20 | 24 | 15.1 | 285.9 | 81.7 | 47.3 | 285.9 | 250.8 | 0.30 | 0.7 |
| 41 | 20 | 24 | 15.0 | 283.0 | 80.9 | 47.2 | 283.0 | 252.4 | 0.30 | 0.7 |
| 42 | 20 | 24 | 15.2 | 288.5 | 82.4 | 47.2 | 288.5 | 254.5 | 0.30 | 0.7 |
| Average | | 24 | 15.0 | 288.0 | 82.3 | 47.4 | 288.0 | 267.6 | 0.24 | 0.7 |
| Std. Dev. | | 1 | 0.7 | 4.9 | 1.4 | 0.2 | 4.9 | 37.1 | 0.06 | 0.1 |
| Maximum | | 28 | 16.0 | 296.5 | 84.7 | 47.8 | 296.5 | 421.4 | 0.30 | 1.0 |
| @ Blow# | | 20 | 34 | 16 | 16 | 2 | 16 | 19 | 23 | 19 |

Total number of blows analyzed: 42

BL# Sensors

1-34 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: off
35-42 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

BL# Comments

35 LE = 32.83 ft; WC = 16,750.0 f/s

Time Summary

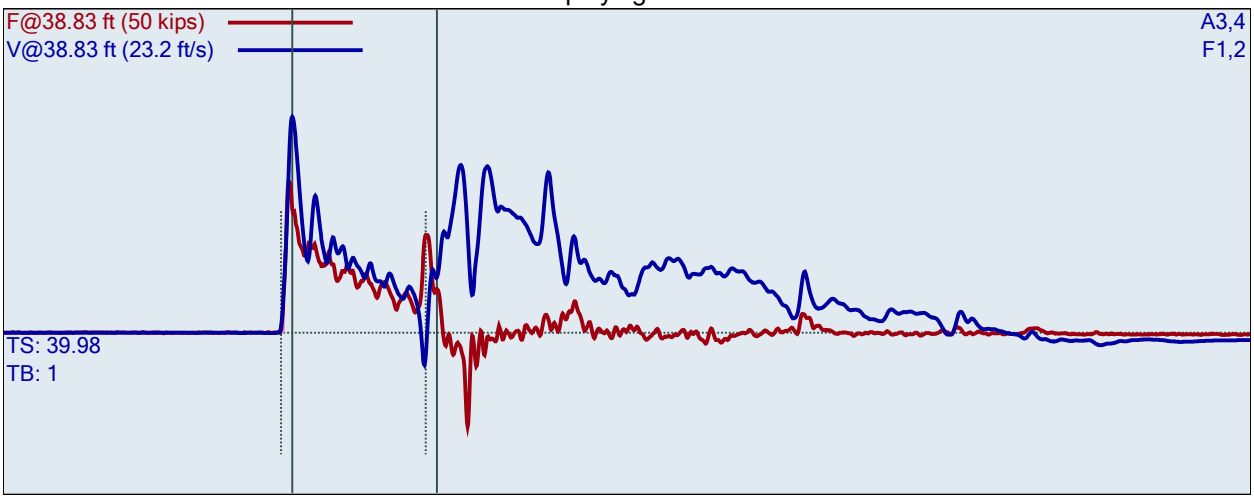
Drive 4 minutes 50 seconds 12:52 PM - 12:57 PM BN 1 - 42

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 33.5-35
S/N 092147
OP: PDB
Date: 10-July-2024

AR: 1.21 in²
LE: 38.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute
EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 23.3 | 15.4 | 291.9 | 83.4 | 47.4 | 291.9 | 248.4 | 1.50 | 0.57 |
| 2 | 4 | 23.9 | 14.2 | 284.6 | 81.3 | 47.6 | 284.6 | 244.3 | 1.50 | 0.64 |
| 3 | 4 | 24.9 | 14.7 | 281.8 | 80.5 | 47.7 | 281.8 | 248.0 | 1.50 | 0.61 |
| 4 | 4 | 25.3 | 14.7 | 281.5 | 80.4 | 47.5 | 281.5 | 245.4 | 1.50 | 0.62 |
| 5 | 5 | 25.3 | 15.8 | 285.9 | 81.7 | 47.4 | 285.9 | 251.1 | 1.20 | 0.61 |
| 6 | 5 | 25.8 | 15.8 | 287.1 | 82.0 | 47.6 | 287.1 | 260.0 | 1.20 | 0.60 |
| 7 | 5 | 26.1 | 16.3 | 281.8 | 80.5 | 47.4 | 281.8 | 257.9 | 1.20 | 0.59 |
| 8 | 5 | 26.2 | 16.3 | 285.1 | 81.5 | 47.4 | 285.1 | 263.2 | 1.19 | 0.59 |
| 9 | 5 | 26.1 | 15.9 | 282.4 | 80.7 | 47.5 | 282.4 | 259.2 | 1.20 | 0.59 |
| | Average | 25.2 | 15.5 | 284.7 | 81.3 | 47.5 | 284.7 | 253.1 | 1.33 | 0.60 |
| | Std. Dev. | 1.0 | 0.7 | 3.2 | 0.9 | 0.1 | 3.2 | 6.7 | 0.15 | 0.02 |
| | Maximum | 26.2 | 16.3 | 291.9 | 83.4 | 47.7 | 291.9 | 263.2 | 1.50 | 0.64 |
| | @ Blow# | 8 | 8 | 1 | 1 | 3 | 1 | 8 | 1 | 2 |

Total number of blows analyzed: 9

BL# Sensors

1-9 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

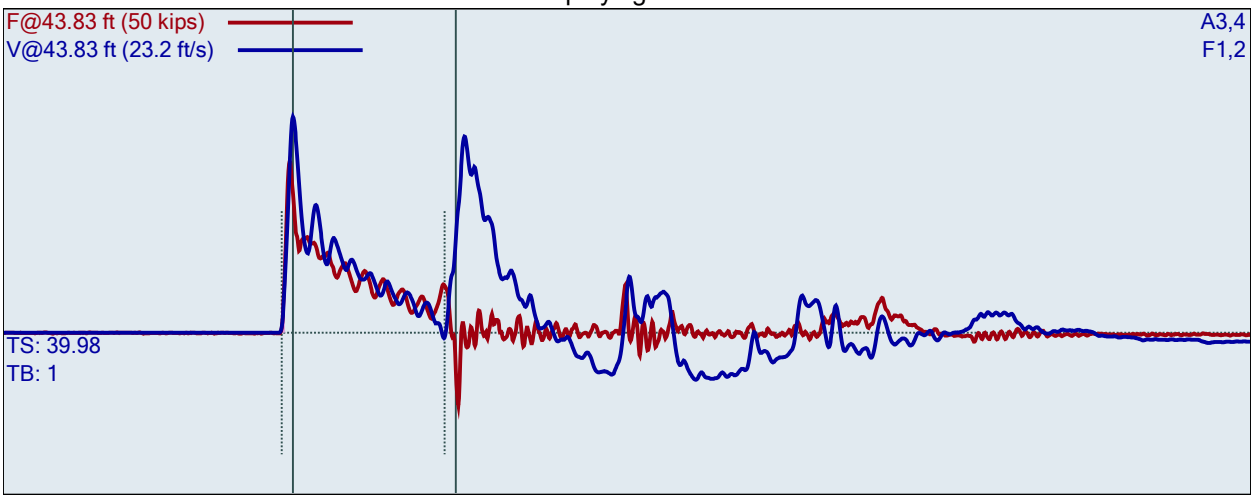
Drive 10 seconds 1:52 PM - 1:52 PM BN 1 - 9

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 38.5-40
S/N 092147
OP: PDB
Date: 10-July-2024

AR: 1.21 in²
LE: 43.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14 | 26.5 | 15.4 | 283.9 | 81.1 | 47.2 | 283.9 | 247.8 | 0.42 | 0.65 |
| 2 | 14 | 26.5 | 15.3 | 282.5 | 80.7 | 47.2 | 282.5 | 247.9 | 0.42 | 0.66 |
| 3 | 14 | 25.5 | 15.0 | 279.6 | 79.9 | 47.3 | 279.6 | 245.9 | 0.42 | 0.64 |
| 4 | 14 | 26.7 | 15.2 | 282.5 | 80.7 | 47.3 | 282.5 | 250.5 | 0.42 | 0.64 |
| 5 | 14 | 26.3 | 15.3 | 282.1 | 80.6 | 47.0 | 282.1 | 247.0 | 0.43 | 0.64 |
| 6 | 14 | 25.3 | 15.2 | 281.8 | 80.5 | 47.1 | 281.8 | 244.2 | 0.42 | 0.63 |
| 7 | 14 | 24.9 | 15.3 | 276.7 | 79.1 | 47.2 | 276.7 | 238.9 | 0.42 | 0.61 |
| 8 | 14 | 25.8 | 15.2 | 278.0 | 79.4 | 47.1 | 278.0 | 243.5 | 0.42 | 0.63 |
| 9 | 14 | 26.6 | 15.3 | 278.2 | 79.5 | 47.2 | 278.2 | 245.5 | 0.42 | 0.67 |
| 10 | 14 | 26.0 | 15.3 | 286.2 | 81.8 | 47.1 | 286.2 | 249.4 | 0.43 | 0.63 |
| 11 | 14 | 26.0 | 15.2 | 282.7 | 80.8 | 47.0 | 282.7 | 245.9 | 0.42 | 0.64 |
| 12 | 14 | 26.8 | 15.5 | 284.4 | 81.3 | 47.2 | 284.4 | 251.5 | 0.43 | 0.64 |
| 13 | 14 | 26.6 | 15.5 | 283.7 | 81.1 | 47.2 | 283.7 | 249.7 | 0.42 | 0.65 |
| 14 | 14 | 26.0 | 15.2 | 279.6 | 79.9 | 47.2 | 279.6 | 246.1 | 0.42 | 0.62 |
| 15 | 20 | 26.7 | 15.2 | 280.4 | 80.1 | 47.0 | 280.4 | 249.4 | 0.29 | 0.62 |
| 16 | 20 | 26.7 | 15.2 | 280.4 | 80.1 | 47.2 | 280.4 | 246.7 | 0.29 | 0.63 |
| 17 | 20 | 26.5 | 14.8 | 275.7 | 78.8 | 47.2 | 275.7 | 244.3 | 0.29 | 0.63 |
| 18 | 20 | 26.5 | 14.9 | 278.2 | 79.5 | 47.0 | 278.2 | 248.0 | 0.29 | 0.61 |
| 19 | 20 | 26.7 | 15.1 | 282.0 | 80.6 | 47.1 | 282.0 | 248.4 | 0.30 | 0.64 |
| 20 | 20 | 27.1 | 15.2 | 280.3 | 80.1 | 47.2 | 280.3 | 246.4 | 0.30 | 0.64 |
| 21 | 20 | 26.9 | 15.3 | 283.9 | 81.1 | 46.9 | 283.9 | 251.7 | 0.30 | 0.62 |
| 22 | 20 | 26.7 | 15.4 | 279.2 | 79.8 | 47.3 | 279.2 | 246.7 | 0.29 | 0.64 |
| 23 | 20 | 26.7 | 15.0 | 290.9 | 83.1 | 46.9 | 290.9 | 250.8 | 0.30 | 0.64 |
| 24 | 20 | 26.4 | 14.8 | 278.1 | 79.5 | 47.1 | 278.1 | 247.5 | 0.30 | 0.60 |
| 25 | 20 | 27.0 | 15.4 | 283.9 | 81.1 | 47.2 | 283.9 | 246.5 | 0.30 | 0.64 |
| 26 | 20 | 26.2 | 15.0 | 281.5 | 80.4 | 47.2 | 281.5 | 248.1 | 0.29 | 0.63 |
| 27 | 20 | 26.3 | 15.1 | 283.3 | 80.9 | 47.0 | 283.3 | 244.9 | 0.30 | 0.63 |

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 38.5-40 S/N 092147
OP: PDB Date: 10-July-2024

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |
| 28 | 20 | 26.2 | 14.1 | 278.1 | 79.5 | 47.2 | 278.1 | 244.9 | 0.30 | 0.62 |
| 29 | 20 | 26.7 | 15.3 | 286.9 | 82.0 | 47.1 | 286.9 | 248.6 | 0.30 | 0.64 |
| 30 | 20 | 26.6 | 15.0 | 282.4 | 80.7 | 47.2 | 282.4 | 246.5 | 0.30 | 0.63 |
| 31 | 20 | 26.7 | 14.8 | 285.4 | 81.6 | 47.1 | 285.4 | 244.3 | 0.30 | 0.63 |
| 32 | 20 | 26.8 | 14.9 | 283.0 | 80.9 | 47.2 | 283.0 | 246.1 | 0.30 | 0.66 |
| 33 | 20 | 26.3 | 14.3 | 279.7 | 79.9 | 47.0 | 279.7 | 245.4 | 0.30 | 0.60 |
| 34 | 20 | 26.5 | 15.3 | 283.1 | 80.9 | 47.2 | 283.1 | 242.2 | 0.30 | 0.69 |
| | Average | 26.4 | 15.1 | 281.7 | 80.5 | 47.1 | 281.7 | 246.8 | 0.35 | 0.63 |
| | Std. Dev. | 0.5 | 0.3 | 3.1 | 0.9 | 0.1 | 3.1 | 2.6 | 0.06 | 0.02 |
| | Maximum | 27.1 | 15.5 | 290.9 | 83.1 | 47.3 | 290.9 | 251.7 | 0.43 | 0.69 |
| | @ Blow# | 20 | 12 | 23 | 23 | 4 | 23 | 21 | 10 | 34 |

Total number of blows analyzed: 34

BL# Sensors

1-34 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

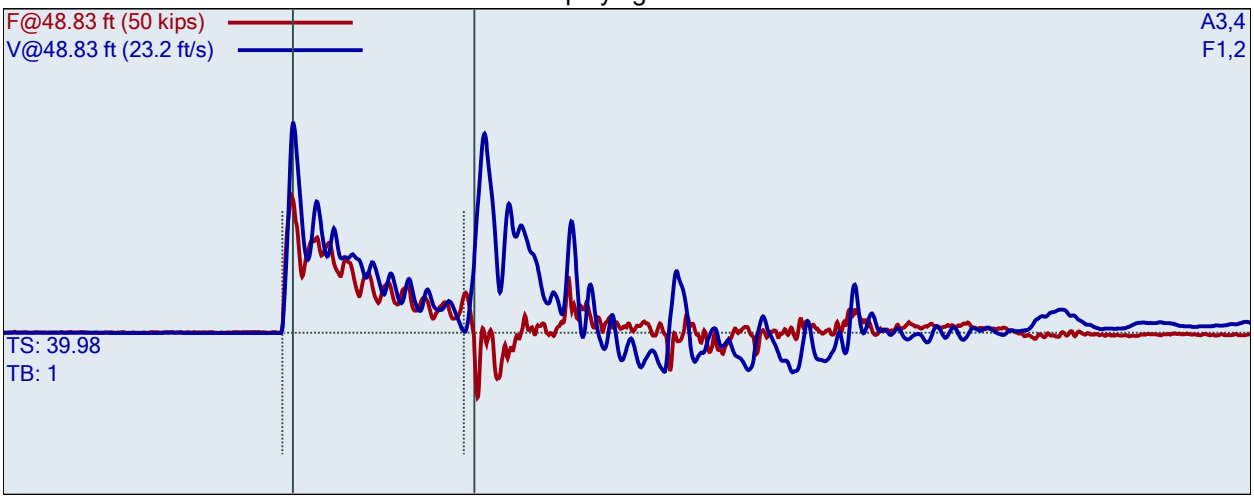
Drive 42 seconds 2:47 PM - 2:48 PM BN 1 - 34

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 43.5-45
S/N 092147
OP: PDB
Date: 10-July-2024

AR: 1.21 in²
LE: 48.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12 | 21.1 | 15.0 | 288.8 | 82.5 | 47.4 | 288.8 | 232.7 | 0.50 | 0.64 |
| 2 | 12 | 21.4 | 14.9 | 273.1 | 78.0 | 47.3 | 273.1 | 234.1 | 0.49 | 0.63 |
| 3 | 12 | 22.4 | 14.6 | 270.0 | 77.1 | 47.2 | 270.0 | 230.2 | 0.49 | 0.62 |
| 4 | 12 | 20.3 | 14.7 | 273.9 | 78.3 | 47.4 | 273.9 | 234.2 | 0.49 | 0.60 |
| 5 | 12 | 21.2 | 15.0 | 291.5 | 83.3 | 47.2 | 291.5 | 234.2 | 0.50 | 0.63 |
| 6 | 12 | 20.5 | 14.9 | 273.0 | 78.0 | 47.1 | 273.0 | 230.0 | 0.49 | 0.61 |
| 7 | 12 | 21.3 | 15.1 | 287.9 | 82.3 | 47.4 | 287.9 | 228.4 | 0.50 | 0.63 |
| 8 | 12 | 21.9 | 14.8 | 272.4 | 77.8 | 47.0 | 272.4 | 236.1 | 0.49 | 0.65 |
| 9 | 12 | 22.2 | 15.0 | 278.7 | 79.6 | 47.2 | 278.7 | 235.4 | 0.49 | 0.63 |
| 10 | 12 | 22.4 | 15.2 | 280.6 | 80.2 | 47.2 | 280.6 | 235.6 | 0.49 | 0.65 |
| 11 | 12 | 21.7 | 14.9 | 273.5 | 78.1 | 47.1 | 273.5 | 234.8 | 0.49 | 0.62 |
| 12 | 12 | 21.3 | 14.9 | 285.4 | 81.5 | 47.2 | 285.4 | 227.2 | 0.50 | 0.63 |
| 13 | 11 | 22.0 | 14.8 | 270.9 | 77.4 | 46.9 | 270.9 | 233.3 | 0.54 | 0.63 |
| 14 | 11 | 22.8 | 14.9 | 273.5 | 78.1 | 47.1 | 273.5 | 234.9 | 0.54 | 0.61 |
| 15 | 11 | 21.5 | 14.7 | 274.0 | 78.3 | 47.2 | 274.0 | 230.1 | 0.54 | 0.65 |
| 16 | 11 | 21.9 | 14.7 | 274.8 | 78.5 | 47.1 | 274.8 | 233.4 | 0.54 | 0.63 |
| 17 | 11 | 21.7 | 14.3 | 270.7 | 77.3 | 47.1 | 270.7 | 229.4 | 0.54 | 0.67 |
| 18 | 11 | 22.7 | 14.6 | 277.7 | 79.3 | 46.9 | 277.7 | 235.6 | 0.54 | 0.67 |
| 19 | 11 | 22.3 | 14.1 | 283.4 | 81.0 | 47.2 | 283.4 | 230.0 | 0.55 | 0.68 |
| 20 | 11 | 22.5 | 14.3 | 290.3 | 82.9 | 46.9 | 290.3 | 233.7 | 0.55 | 0.70 |
| 21 | 11 | 22.4 | 14.5 | 294.2 | 84.0 | 46.9 | 294.2 | 236.4 | 0.55 | 0.71 |
| 22 | 11 | 22.1 | 14.3 | 290.0 | 82.9 | 46.9 | 290.0 | 230.4 | 0.55 | 0.70 |
| 23 | 11 | 22.3 | 14.4 | 284.2 | 81.2 | 46.9 | 284.2 | 236.1 | 0.54 | 0.63 |
| Average | | 21.8 | 14.7 | 279.7 | 79.9 | 47.1 | 279.7 | 232.9 | 0.52 | 0.64 |
| Std. Dev. | | 0.7 | 0.3 | 7.7 | 2.2 | 0.2 | 7.7 | 2.7 | 0.02 | 0.03 |
| Maximum | | 22.8 | 15.2 | 294.2 | 84.0 | 47.4 | 294.2 | 236.4 | 0.55 | 0.71 |
| @ Blow# | | 14 | 10 | 21 | 21 | 1 | 21 | 21 | 19 | 21 |

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 43.5-45 S/N 092147
OP: PDB Date: 10-July-2024

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |

Total number of blows analyzed: 23

| BL# | Sensors |
|---|---|
| 1-23 | F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00) |

Time Summary

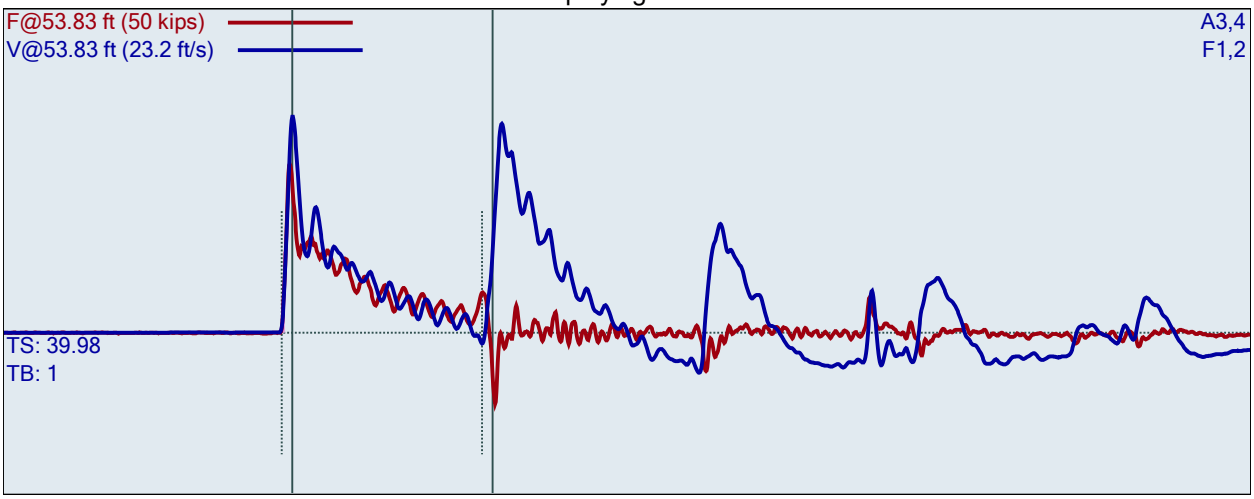
Drive 34 seconds 2:57 PM - 2:57 PM BN 1 - 23

Case Method & iCAP® Results

2024 UES Grubbs - SIMCO 2800 - 48.5-50
S/N 092147
OP: PDB
Date: 10-July-2024

AR: 1.21 in²
LE: 53.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute
EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 26.0 | 15.4 | 278.0 | 79.4 | 44.0 | 278.0 | 243.9 | 0.59 | 0.69 |
| 2 | 10 | 26.0 | 15.2 | 272.2 | 77.8 | 43.4 | 272.2 | 238.1 | 0.60 | 0.67 |
| 3 | 10 | 26.9 | 15.5 | 275.7 | 78.8 | 42.9 | 275.7 | 241.4 | 0.60 | 0.65 |
| 4 | 10 | 26.5 | 15.2 | 282.9 | 80.8 | 44.6 | 282.9 | 247.6 | 0.59 | 0.65 |
| 5 | 10 | 26.2 | 15.6 | 284.4 | 81.2 | 46.5 | 284.4 | 246.5 | 0.60 | 0.68 |
| 6 | 10 | 26.8 | 15.6 | 280.9 | 80.3 | 46.9 | 280.9 | 244.8 | 0.60 | 0.64 |
| 7 | 10 | 26.2 | 15.4 | 284.2 | 81.2 | 45.9 | 284.2 | 248.1 | 0.60 | 0.66 |
| 8 | 10 | 26.5 | 15.5 | 287.5 | 82.2 | 45.5 | 287.5 | 247.9 | 0.60 | 0.60 |
| 9 | 10 | 26.8 | 15.9 | 286.2 | 81.8 | 47.3 | 286.2 | 247.2 | 0.60 | 0.64 |
| 10 | 10 | 27.0 | 15.6 | 284.4 | 81.3 | 47.0 | 284.4 | 248.8 | 0.60 | 0.63 |
| 11 | 10 | 26.4 | 16.0 | 285.0 | 81.4 | 47.3 | 285.0 | 242.8 | 0.60 | 0.64 |
| 12 | 10 | 26.2 | 15.6 | 282.3 | 80.7 | 47.3 | 282.3 | 241.6 | 0.60 | 0.66 |
| 13 | 10 | 25.6 | 15.9 | 285.0 | 81.4 | 46.8 | 285.0 | 250.6 | 0.59 | 0.61 |
| 14 | 10 | 25.6 | 16.2 | 286.8 | 81.9 | 47.2 | 286.8 | 246.0 | 0.59 | 0.62 |
| 15 | 10 | 25.0 | 16.1 | 287.1 | 82.0 | 47.2 | 287.1 | 243.3 | 0.60 | 0.62 |
| 16 | 10 | 27.5 | 15.7 | 280.6 | 80.2 | 47.3 | 280.6 | 247.8 | 0.60 | 0.61 |
| 17 | 10 | 26.3 | 16.2 | 284.4 | 81.3 | 47.1 | 284.4 | 241.8 | 0.59 | 0.64 |
| 18 | 10 | 24.8 | 15.8 | 285.5 | 81.6 | 47.0 | 285.5 | 243.2 | 0.60 | 0.59 |
| 19 | 10 | 24.4 | 16.2 | 285.3 | 81.5 | 47.2 | 285.3 | 238.3 | 0.60 | 0.58 |
| 20 | 10 | 24.4 | 15.9 | 287.2 | 82.1 | 47.1 | 287.2 | 244.6 | 0.60 | 0.59 |
| | Average | 26.1 | 15.7 | 283.3 | 80.9 | 46.3 | 283.3 | 244.7 | 0.60 | 0.63 |
| | Std. Dev. | 0.8 | 0.3 | 3.9 | 1.1 | 1.4 | 3.9 | 3.4 | 0.00 | 0.03 |
| | Maximum | 27.5 | 16.2 | 287.5 | 82.2 | 47.3 | 287.5 | 250.6 | 0.60 | 0.69 |
| | @ Blow# | 16 | 17 | 8 | 8 | 12 | 8 | 13 | 20 | 1 |

Total number of blows analyzed: 20

| BL# | Sensors |
|---|---|
| 1-20 | F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00) |

Time Summary

Drive 31 seconds 3:19 PM - 3:19 PM BN 1 - 20

# APPENDIX D

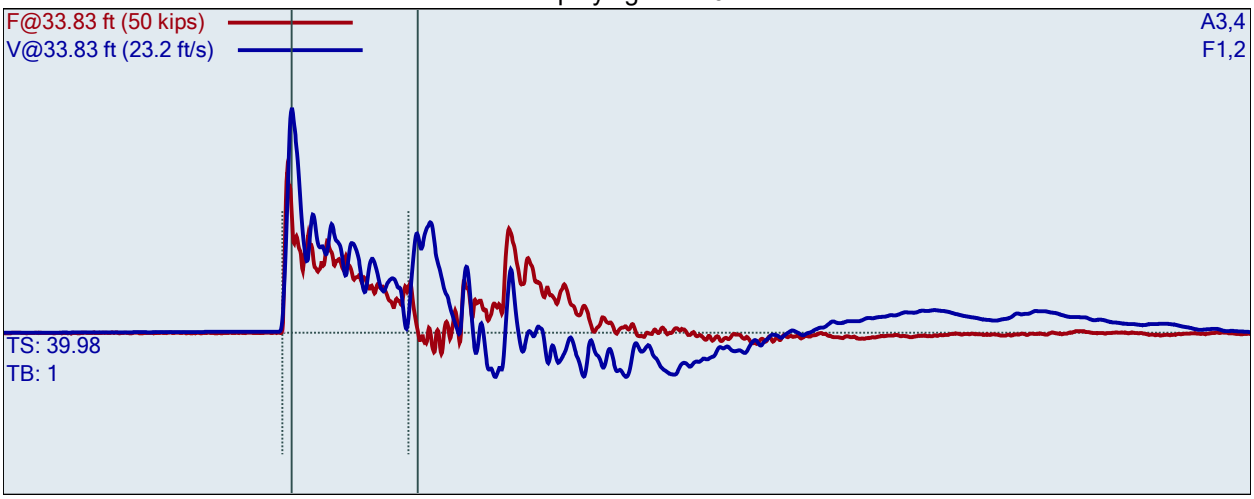
## DIEDRICH D50 HD Track (S/N 245) PDA DATA SUMMARY

Case Method & iCAP® Results

2024 UES Grubbs - Diedrich D50 HD Track - 28.5-30
S/N 245
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 33.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 26




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 29 | 25.4 | 15.2 | 273.4 | 78.1 | 47.2 | 273.4 | 215.8 | 0.21 | 0.49 |
| 2 | 29 | 25.4 | 15.2 | 272.0 | 77.7 | 47.3 | 272.0 | 216.6 | 0.21 | 0.52 |
| 3 | 29 | 25.2 | 15.4 | 269.6 | 77.0 | 47.3 | 269.6 | 216.9 | 0.21 | 0.51 |
| 4 | 29 | 25.6 | 15.4 | 272.6 | 77.9 | 47.2 | 272.6 | 218.4 | 0.21 | 0.48 |
| 5 | 29 | 25.4 | 15.2 | 269.6 | 77.0 | 47.3 | 269.6 | 212.4 | 0.21 | 0.49 |
| 6 | 29 | 25.4 | 15.7 | 277.0 | 79.1 | 47.0 | 277.0 | 218.3 | 0.21 | 0.52 |
| 7 | 29 | 25.1 | 15.6 | 276.9 | 79.1 | 47.4 | 276.9 | 212.9 | 0.20 | 0.51 |
| 8 | 29 | 25.2 | 15.8 | 284.9 | 81.4 | 47.1 | 284.9 | 220.3 | 0.21 | 0.51 |
| 9 | 29 | 24.8 | 15.9 | 279.7 | 79.9 | 47.3 | 279.7 | 211.5 | 0.20 | 0.51 |
| 10 | 29 | 25.2 | 15.9 | 288.6 | 82.5 | 48.6 | 288.6 | 221.1 | 0.20 | 0.49 |
| 11 | 29 | 24.8 | 15.6 | 286.8 | 81.9 | 49.9 | 286.8 | 218.6 | 0.21 | 0.53 |
| 12 | 29 | 25.3 | 15.6 | 284.6 | 81.3 | 50.0 | 284.6 | 219.2 | 0.21 | 0.50 |
| 13 | 29 | 25.4 | 15.6 | 287.0 | 82.0 | 50.0 | 287.0 | 218.7 | 0.21 | 0.49 |
| 14 | 29 | 24.9 | 15.7 | 287.7 | 82.2 | 49.9 | 287.7 | 219.7 | 0.21 | 0.49 |
| 15 | 29 | 25.1 | 15.8 | 290.6 | 83.0 | 50.0 | 290.6 | 220.5 | 0.20 | 0.49 |
| 16 | 29 | 24.9 | 15.7 | 286.2 | 81.8 | 50.0 | 286.2 | 217.3 | 0.21 | 0.52 |
| 17 | 29 | 24.9 | 16.2 | 295.7 | 84.5 | 49.9 | 295.7 | 222.8 | 0.21 | 0.50 |
| 18 | 29 | 24.7 | 15.6 | 287.2 | 82.0 | 50.1 | 287.2 | 221.0 | 0.21 | 0.53 |
| 19 | 29 | 24.7 | 15.9 | 285.1 | 81.5 | 49.9 | 285.1 | 217.8 | 0.21 | 0.51 |
| 20 | 29 | 24.6 | 15.6 | 284.3 | 81.2 | 50.0 | 284.3 | 218.3 | 0.21 | 0.52 |
| 21 | 29 | 24.8 | 15.7 | 286.8 | 82.0 | 50.1 | 286.8 | 221.5 | 0.20 | 0.51 |
| 22 | 29 | 25.1 | 15.5 | 283.8 | 81.1 | 49.9 | 283.8 | 220.1 | 0.21 | 0.52 |
| 23 | 29 | 25.4 | 15.8 | 291.6 | 83.3 | 50.0 | 291.6 | 225.5 | 0.21 | 0.51 |
| 24 | 29 | 24.9 | 16.1 | 291.4 | 83.3 | 49.8 | 291.4 | 225.5 | 0.21 | 0.53 |
| 25 | 29 | 25.0 | 15.8 | 283.0 | 80.9 | 50.0 | 283.0 | 220.6 | 0.20 | 0.52 |
| 26 | 29 | 24.7 | 16.0 | 291.0 | 83.2 | 49.9 | 291.0 | 220.4 | 0.21 | 0.55 |
| 27 | 29 | 24.7 | 15.7 | 290.5 | 83.0 | 50.1 | 290.5 | 225.6 | 0.21 | 0.53 |

Case Method & iCAP® Results

2024 UES Grubbs - Diedrich D50 HD Track - 28.5-30 S/N 245

OP: PDB Date: 11-July-2024

| BL# | BLC | FMX | VMX | EFV | ETR | BPM | EMX | EF2 | DFN | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| | bl/6in | kips | f/s | ft-lb | (%) | bpm | ft-lb | ft-lb | in | |
| 28 | 29 | 24.5 | 15.8 | 287.9 | 82.3 | 50.0 | 287.9 | 217.7 | 0.21 | 0.51 |
| 29 | 29 | 24.8 | 15.8 | 287.1 | 82.0 | 49.9 | 287.1 | 218.5 | 0.21 | 0.51 |
| 30 | 40 | 24.8 | 15.5 | 282.5 | 80.7 | 49.9 | 282.5 | 219.8 | 0.15 | 0.50 |
| 31 | 40 | 25.1 | 16.1 | 285.8 | 81.6 | 49.9 | 285.8 | 217.2 | 0.15 | 0.53 |
| 32 | 40 | 25.0 | 15.9 | 287.5 | 82.1 | 49.9 | 287.5 | 220.7 | 0.15 | 0.51 |
| 33 | 40 | 25.3 | 16.0 | 285.7 | 81.6 | 49.6 | 285.7 | 224.8 | 0.15 | 0.53 |
| 34 | 40 | 25.0 | 15.5 | 285.6 | 81.6 | 50.0 | 285.6 | 219.4 | 0.15 | 0.51 |
| 35 | 40 | 25.2 | 16.1 | 287.5 | 82.1 | 49.6 | 287.5 | 219.0 | 0.15 | 0.51 |
| 36 | 40 | 24.5 | 15.7 | 287.7 | 82.2 | 50.0 | 287.7 | 222.1 | 0.14 | 0.56 |
| 37 | 40 | 25.1 | 15.9 | 285.3 | 81.5 | 49.7 | 285.3 | 220.3 | 0.16 | 0.51 |
| 38 | 40 | 24.9 | 15.6 | 284.9 | 81.4 | 49.8 | 284.9 | 218.4 | 0.15 | 0.54 |
| 39 | 40 | 25.1 | 16.2 | 290.1 | 82.9 | 49.8 | 290.1 | 224.4 | 0.15 | 0.53 |
| 40 | 40 | 24.5 | 15.7 | 282.8 | 80.8 | 49.5 | 282.8 | 217.7 | 0.15 | 0.56 |
| 41 | 40 | 24.5 | 16.0 | 286.4 | 81.8 | 49.5 | 286.4 | 220.9 | 0.15 | 0.50 |
| 42 | 40 | 24.7 | 15.9 | 282.1 | 80.6 | 49.8 | 282.1 | 219.0 | 0.15 | 0.54 |
| 43 | 40 | 25.0 | 16.1 | 290.2 | 82.9 | 49.7 | 290.2 | 225.3 | 0.16 | 0.54 |
| 44 | 40 | 25.1 | 16.0 | 286.8 | 82.0 | 49.5 | 286.8 | 219.8 | 0.15 | 0.55 |
| 45 | 40 | 24.8 | 16.2 | 285.8 | 81.6 | 49.5 | 285.8 | 219.2 | 0.15 | 0.49 |
| 46 | 40 | 24.8 | 16.1 | 286.6 | 81.9 | 49.8 | 286.6 | 221.7 | 0.15 | 0.50 |
| 47 | 40 | 24.7 | 16.0 | 282.8 | 80.8 | 49.6 | 282.8 | 218.4 | 0.15 | 0.53 |
| 48 | 40 | 24.8 | 16.3 | 286.6 | 81.9 | 49.6 | 286.6 | 222.2 | 0.15 | 0.54 |
| 49 | 40 | 24.8 | 16.1 | 286.1 | 81.7 | 49.5 | 286.1 | 225.5 | 0.15 | 0.50 |
| 50 | 40 | 25.3 | 16.2 | 293.5 | 83.8 | 49.4 | 293.5 | 227.9 | 0.15 | 0.54 |
| 51 | 40 | 25.0 | 15.8 | 283.4 | 81.0 | 50.6 | 283.4 | 219.6 | 0.15 | 0.53 |
| 52 | 40 | 25.0 | 16.1 | 289.4 | 82.7 | 50.6 | 289.4 | 223.2 | 0.15 | 0.55 |
| 53 | 40 | 25.0 | 16.1 | 285.8 | 81.6 | 50.8 | 285.8 | 225.4 | 0.15 | 0.52 |
| 54 | 40 | 25.0 | 16.3 | 285.8 | 81.7 | 51.5 | 285.8 | 226.6 | 0.15 | 0.53 |
| 55 | 40 | 25.0 | 16.3 | 288.5 | 82.4 | 51.4 | 288.5 | 222.4 | 0.15 | 0.54 |
| 56 | 40 | 24.9 | 16.2 | 290.3 | 82.9 | 51.4 | 290.3 | 224.1 | 0.15 | 0.53 |
| 57 | 40 | 25.1 | 16.4 | 293.8 | 84.0 | 51.5 | 293.8 | 228.0 | 0.15 | 0.56 |
| 58 | 40 | 25.1 | 16.4 | 289.5 | 82.7 | 51.4 | 289.5 | 220.6 | 0.15 | 0.55 |
| 59 | 40 | 25.0 | 16.3 | 284.0 | 81.1 | 51.4 | 284.0 | 222.1 | 0.15 | 0.56 |
| 60 | 40 | 25.1 | 16.3 | 284.5 | 81.3 | 51.5 | 284.5 | 224.0 | 0.15 | 0.54 |
| 61 | 40 | 25.0 | 16.5 | 284.7 | 81.3 | 51.6 | 284.7 | 219.9 | 0.15 | 0.55 |
| 62 | 40 | 24.8 | 16.5 | 286.4 | 81.8 | 51.4 | 286.4 | 221.9 | 0.15 | 0.56 |
| 63 | 40 | 24.9 | 16.2 | 284.9 | 81.4 | 51.5 | 284.9 | 225.7 | 0.15 | 0.56 |
| 64 | 40 | 24.9 | 16.4 | 284.1 | 81.2 | 51.6 | 284.1 | 218.1 | 0.15 | 0.54 |
| 65 | 40 | 24.9 | 16.5 | 290.3 | 82.9 | 51.4 | 290.3 | 223.2 | 0.15 | 0.53 |
| 66 | 40 | 24.5 | 16.5 | 286.6 | 81.9 | 51.3 | 286.6 | 224.2 | 0.15 | 0.56 |
| 67 | 40 | 24.9 | 16.6 | 291.9 | 83.4 | 51.5 | 291.9 | 220.8 | 0.14 | 0.54 |
| 68 | 40 | 24.7 | 16.5 | 288.3 | 82.4 | 51.6 | 288.3 | 220.2 | 0.15 | 0.55 |
| 69 | 40 | 25.0 | 16.4 | 295.0 | 84.3 | 51.4 | 295.0 | 229.4 | 0.15 | 0.54 |
| Average | | 25.0 | 15.9 | 285.7 | 81.6 | 49.9 | 285.7 | 220.8 | 0.17 | 0.52 |
| Std. Dev. | | 0.2 | 0.3 | 5.3 | 1.5 | 1.3 | 5.3 | 3.5 | 0.03 | 0.02 |
| Maximum | | 25.6 | 16.6 | 295.7 | 84.5 | 51.6 | 295.7 | 229.4 | 0.21 | 0.56 |
| @ Blow# | | 4 | 67 | 17 | 17 | 61 | 17 | 69 | 23 | 57 |

Total number of blows analyzed: 69

BL# Sensors

1-69 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

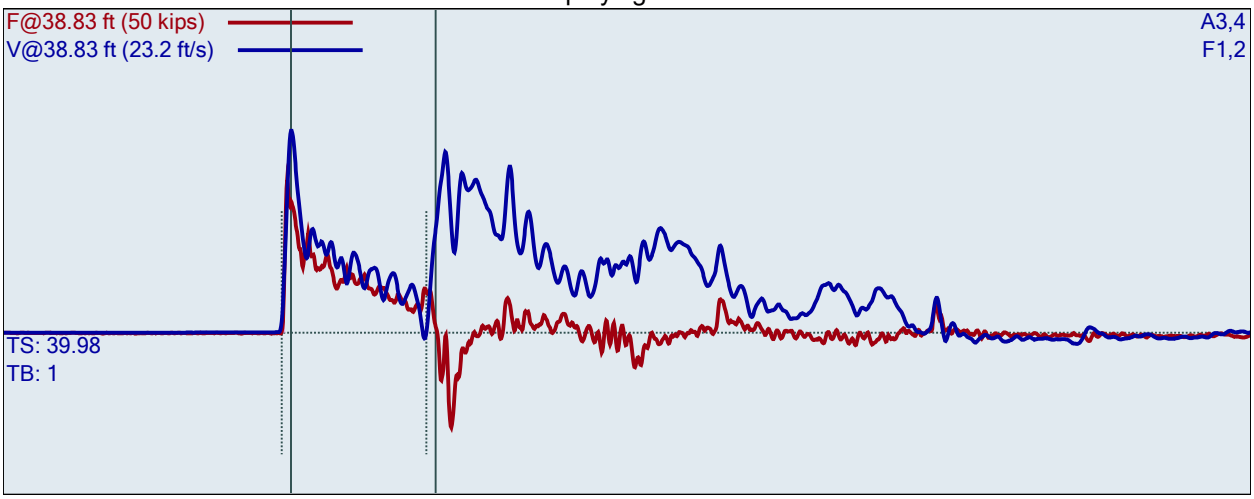
Drive 1 minute 21 seconds 9:31 AM - 9:33 AM BN 1 - 69

Case Method & iCAP® Results

2024 UES Grubbs - Diedrich D50 HD Track - 33.5-35
S/N 245
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 38.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 23.6 | 14.4 | 256.0 | 73.1 | 42.1 | 256.0 | 206.0 | 1.00 | 0.66 |
| 2 | 6 | 23.3 | 14.6 | 255.4 | 73.0 | 42.2 | 255.4 | 210.5 | 1.00 | 0.63 |
| 3 | 6 | 23.9 | 14.7 | 258.6 | 73.9 | 42.1 | 258.6 | 211.3 | 1.01 | 0.62 |
| 4 | 6 | 22.5 | 14.5 | 253.8 | 72.5 | 42.2 | 253.8 | 208.7 | 1.01 | 0.66 |
| 5 | 6 | 23.6 | 14.9 | 263.5 | 75.3 | 42.6 | 263.5 | 210.9 | 0.98 | 0.60 |
| 6 | 6 | 23.2 | 15.0 | 258.4 | 73.8 | 43.9 | 258.4 | 210.3 | 1.02 | 0.62 |
| 7 | 7 | 23.5 | 15.3 | 261.6 | 74.7 | 44.1 | 261.6 | 207.8 | 0.85 | 0.59 |
| 8 | 7 | 23.2 | 15.1 | 261.2 | 74.6 | 44.0 | 261.2 | 211.1 | 0.85 | 0.58 |
| 9 | 7 | 23.1 | 15.4 | 259.0 | 74.0 | 44.0 | 259.0 | 206.7 | 0.87 | 0.59 |
| 10 | 7 | 23.0 | 15.6 | 260.4 | 74.4 | 44.0 | 260.4 | 206.7 | 0.86 | 0.56 |
| 11 | 7 | 23.0 | 16.0 | 260.5 | 74.4 | 43.9 | 260.5 | 203.8 | 0.86 | 0.54 |
| 12 | 7 | 22.9 | 15.7 | 259.3 | 74.1 | 44.0 | 259.3 | 205.8 | 0.87 | 0.55 |
| 13 | 7 | 23.3 | 15.7 | 263.0 | 75.1 | 44.0 | 263.0 | 209.8 | 0.86 | 0.57 |
| Average | | 23.2 | 15.2 | 259.3 | 74.1 | 43.3 | 259.3 | 208.4 | 0.93 | 0.60 |
| Std. Dev. | | 0.4 | 0.5 | 2.8 | 0.8 | 0.9 | 2.8 | 2.3 | 0.07 | 0.04 |
| Maximum | | 23.9 | 16.0 | 263.5 | 75.3 | 44.1 | 263.5 | 211.3 | 1.02 | 0.66 |
| @ Blow# | | 3 | 11 | 5 | 5 | 7 | 5 | 3 | 6 | 4 |

Total number of blows analyzed: 13

BL# Sensors

1-13 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

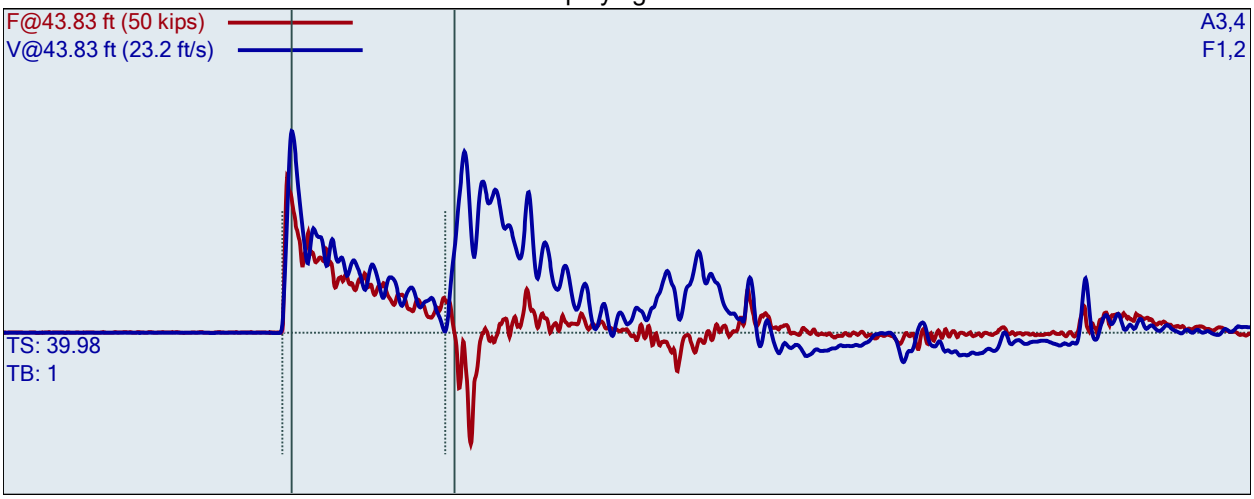
Drive 16 seconds 9:42 AM - 9:42 AM BN 1 - 13

Case Method & iCAP® Results

2024 UES Grubbs - Diedrich D50 HD Track - 38.5-40
S/N 245
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 43.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute
EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 24.2 | 14.4 | 262.6 | 75.0 | 43.0 | 262.6 | 219.6 | 1.00 | 0.67 |
| 2 | 6 | 23.9 | 14.3 | 255.3 | 72.9 | 43.6 | 255.3 | 218.4 | 1.00 | 0.67 |
| 3 | 6 | 24.4 | 14.4 | 258.6 | 73.9 | 43.6 | 258.6 | 220.5 | 1.00 | 0.64 |
| 4 | 6 | 24.5 | 14.4 | 253.4 | 72.4 | 43.6 | 253.4 | 219.3 | 1.00 | 0.65 |
| 5 | 6 | 24.0 | 14.6 | 260.3 | 74.4 | 43.6 | 260.3 | 215.7 | 1.00 | 0.63 |
| 6 | 6 | 24.0 | 14.9 | 260.3 | 74.4 | 43.6 | 260.3 | 219.5 | 1.00 | 0.61 |
| 7 | 5 | 23.2 | 14.8 | 261.0 | 74.6 | 43.7 | 261.0 | 216.9 | 1.20 | 0.63 |
| 8 | 5 | 23.4 | 14.7 | 258.4 | 73.8 | 43.6 | 258.4 | 214.4 | 1.20 | 0.63 |
| 9 | 5 | 23.7 | 14.8 | 260.9 | 74.5 | 44.3 | 260.9 | 218.5 | 1.20 | 0.63 |
| 10 | 5 | 24.2 | 15.2 | 256.8 | 73.4 | 45.3 | 256.8 | 220.2 | 1.19 | 0.59 |
| 11 | 5 | 24.9 | 14.9 | 255.6 | 73.0 | 46.2 | 255.6 | 218.1 | 1.20 | 0.59 |
| | Average | 24.0 | 14.7 | 258.5 | 73.8 | 44.0 | 258.5 | 218.3 | 1.09 | 0.63 |
| | Std. Dev. | 0.5 | 0.3 | 2.8 | 0.8 | 0.9 | 2.8 | 1.8 | 0.10 | 0.03 |
| | Maximum | 24.9 | 15.2 | 262.6 | 75.0 | 46.2 | 262.6 | 220.5 | 1.20 | 0.67 |
| | @ Blow# | 11 | 10 | 1 | 1 | 11 | 1 | 3 | 7 | 2 |

Total number of blows analyzed: 11

BL# Sensors

1-11 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

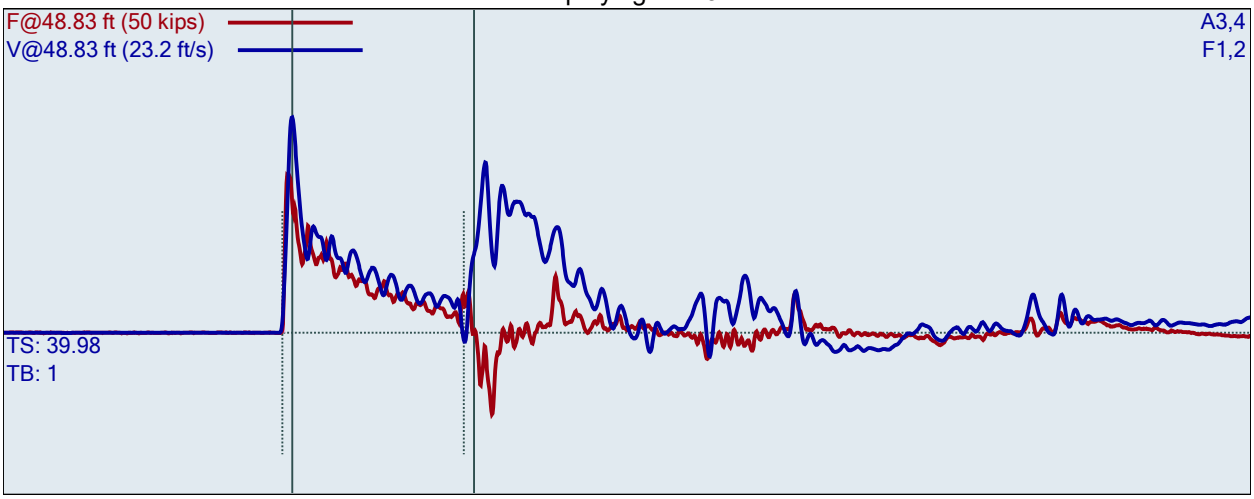
Drive 13 seconds 9:55 AM - 9:55 AM BN 1 - 11

Case Method & iCAP® Results

2024 UES Grubbs - Diedrich D50 HD Track - 43.5-45
S/N 245
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 48.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 3




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 24.4 | 15.3 | 284.3 | 81.2 | 51.3 | 284.3 | 239.7 | 0.60 | 0.62 |
| 2 | 10 | 24.0 | 15.2 | 285.4 | 81.5 | 51.4 | 285.4 | 235.4 | 0.60 | 0.60 |
| 3 | 10 | 24.3 | 15.4 | 289.3 | 82.7 | 51.3 | 289.3 | 239.9 | 0.60 | 0.60 |
| 4 | 10 | 24.2 | 15.3 | 286.5 | 81.9 | 51.3 | 286.5 | 240.7 | 0.60 | 0.63 |
| 5 | 10 | 24.2 | 15.4 | 284.4 | 81.2 | 51.4 | 284.4 | 239.0 | 0.60 | 0.63 |
| 6 | 10 | 24.2 | 15.4 | 287.9 | 82.3 | 51.3 | 287.9 | 241.7 | 0.60 | 0.62 |
| 7 | 10 | 24.2 | 15.2 | 273.7 | 78.2 | 51.4 | 273.7 | 243.2 | 0.60 | 0.65 |
| 8 | 10 | 24.6 | 15.3 | 287.9 | 82.2 | 51.3 | 287.9 | 242.9 | 0.60 | 0.60 |
| 9 | 10 | 24.0 | 15.7 | 277.3 | 79.2 | 51.3 | 277.3 | 241.0 | 0.60 | 0.63 |
| 10 | 10 | 24.0 | 15.5 | 285.3 | 81.5 | 51.3 | 285.3 | 241.2 | 0.60 | 0.61 |
| 11 | 10 | 24.0 | 15.4 | 288.6 | 82.4 | 51.3 | 288.6 | 239.9 | 0.60 | 0.63 |
| 12 | 10 | 24.0 | 15.5 | 275.9 | 78.8 | 51.4 | 275.9 | 244.4 | 0.60 | 0.64 |
| 13 | 10 | 24.0 | 15.6 | 286.0 | 81.7 | 51.3 | 286.0 | 243.7 | 0.60 | 0.66 |
| 14 | 10 | 24.0 | 15.6 | 276.8 | 79.1 | 51.3 | 276.8 | 242.3 | 0.59 | 0.63 |
| 15 | 10 | 23.8 | 15.6 | 286.2 | 81.8 | 51.4 | 286.2 | 240.8 | 0.60 | 0.66 |
| 16 | 10 | 24.0 | 15.8 | 278.5 | 79.6 | 51.3 | 278.5 | 242.4 | 0.60 | 0.64 |
| 17 | 10 | 23.8 | 15.5 | 275.4 | 78.7 | 51.3 | 275.4 | 243.1 | 0.59 | 0.65 |
| 18 | 10 | 23.7 | 15.5 | 284.0 | 81.1 | 51.3 | 284.0 | 240.8 | 0.60 | 0.64 |
| 19 | 10 | 23.8 | 15.6 | 280.3 | 80.1 | 51.3 | 280.3 | 245.6 | 0.60 | 0.65 |
| 20 | 10 | 23.8 | 15.6 | 281.4 | 80.4 | 51.3 | 281.4 | 244.1 | 0.60 | 0.65 |
| | Average | 24.0 | 15.5 | 282.7 | 80.8 | 51.3 | 282.7 | 241.6 | 0.60 | 0.63 |
| | Std. Dev. | 0.2 | 0.2 | 4.8 | 1.4 | 0.0 | 4.8 | 2.2 | 0.00 | 0.02 |
| | Maximum | 24.6 | 15.8 | 289.3 | 82.7 | 51.4 | 289.3 | 245.6 | 0.60 | 0.66 |
| | @ Blow# | 8 | 16 | 3 | 3 | 5 | 3 | 19 | 1 | 13 |

Total number of blows analyzed: 20

| BL# | Sensors |
|---|---|
| 1-20 | F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00) |

Time Summary

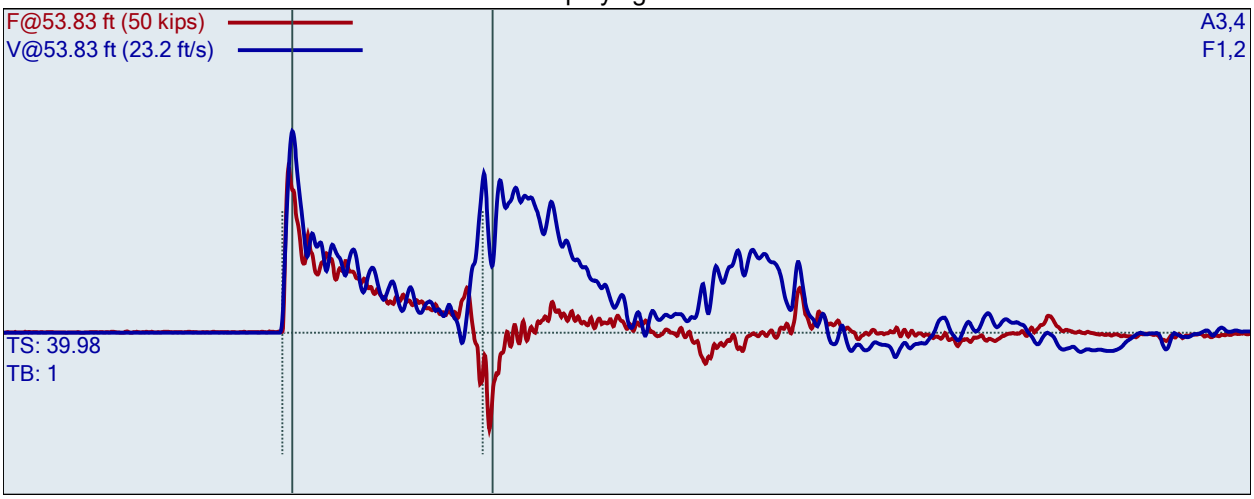
Drive 22 seconds 10:09 AM - 10:09 AM BN 1 - 20

Case Method & iCAP® Results

2024 UES Grubbs - Diedrich D50 HD Track - 48.5-50
S/N 245
OP: PDB
Date: 11-July-2024

AR: 1.21 in²
LE: 53.83 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.90

Displaying BN: 1




FMX: Maximum Force
VMX: Maximum Velocity
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated
BPM: Blows/Minute

EMX: Maximum Energy
EF2: Energy of F² (ASTM D4633)
DFN: Final Displacement
FVP: Force/Velocity Proportionality

| BL# | BLC bl/6in | FMX kips | VMX f/s | EFV ft-lb | ETR (%) | BPM bpm | EMX ft-lb | EF2 ft-lb | DFN in | FVP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 26 | 14.4 | 277.6 | 79.3 | 49.8 | 277.6 | 239.4 | 1.20 | 0.7 |
| 2 | 5 | 26 | 14.1 | 276.8 | 79.1 | 49.8 | 276.8 | 232.3 | 1.20 | 0.7 |
| 3 | 5 | 26 | 14.4 | 285.4 | 81.5 | 49.8 | 285.4 | 239.5 | 1.20 | 0.7 |
| 4 | 5 | 26 | 14.4 | 278.9 | 79.7 | 49.9 | 278.9 | 236.5 | 1.20 | 0.7 |
| 5 | 5 | 26 | 14.2 | 273.9 | 78.3 | 49.9 | 273.9 | 232.0 | 1.20 | 0.7 |
| 6 | 9 | 26 | 14.3 | 265.8 | 76.0 | 49.9 | 265.8 | 230.4 | 0.66 | 0.7 |
| 7 | 9 | 26 | 14.1 | 264.9 | 75.7 | 49.8 | 264.9 | 233.1 | 0.66 | 0.7 |
| 8 | 9 | 26 | 14.3 | 268.6 | 76.7 | 49.9 | 268.6 | 234.9 | 0.66 | 0.7 |
| 9 | 9 | 26 | 14.4 | 272.0 | 77.7 | 49.9 | 272.0 | 235.8 | 0.66 | 0.7 |
| 10 | 9 | 27 | 14.4 | 275.4 | 78.7 | 49.9 | 275.4 | 241.1 | 0.66 | 0.7 |
| 11 | 9 | 27 | 14.6 | 274.0 | 78.3 | 49.8 | 274.0 | 239.1 | 0.66 | 0.7 |
| 12 | 9 | 26 | 14.5 | 268.7 | 76.8 | 49.8 | 268.7 | 234.3 | 0.66 | 0.7 |
| 13 | 9 | 26 | 14.6 | 273.2 | 78.1 | 49.9 | 273.2 | 236.8 | 0.66 | 0.7 |
| 14 | 9 | 26 | 14.6 | 271.0 | 77.4 | 49.9 | 271.0 | 236.0 | 0.66 | 0.7 |
| | Average | 26 | 14.4 | 273.3 | 78.1 | 49.9 | 273.3 | 235.8 | 0.85 | 0.7 |
| | Std. Dev. | 0 | 0.2 | 5.3 | 1.5 | 0.0 | 5.3 | 3.1 | 0.26 | 0.0 |
| | Maximum | 27 | 14.6 | 285.4 | 81.5 | 49.9 | 285.4 | 241.1 | 1.20 | 0.7 |
| | @ Blow# | 10 | 13 | 3 | 3 | 6 | 3 | 10 | 3 | 2 |

Total number of blows analyzed: 14

BL# Sensors

1-14 F1: [405AWJ2] 221.7 (1.00); F2: [405AWJ] 221.1 (1.00); A3: [K10886] 407.1 (1.00); A4: [K12738] 441.9 (1.00)

Time Summary

Drive 15 seconds 11:20 AM - 11:20 AM BN 1 - 14

## Geotechnology Automatic Hammer Efficiency Summary

| Office Location | Drill Rig | Serial Number | Energy Transfer Ratio (%) 2023 | | Energy Transfer Ratio (%) 2022 | | Energy Transfer Ratio (%) 2021 | | Energy Transfer Ratio (%) 2020 | | Energy Transfer Ratio (%) 2019 | | Energy Transfer Ratio (%) 2018 | | Energy Transfer Ratio (%) 2017 | | Energy Transfer Ratio (%) 2015/2016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Average | Std Dev | Average | Std Dev | Average | Std Dev | Average | Std Dev | Average | Std Dev | Average | Std Dev | Average | Std Dev | Average | Std Dev |
| St. Louis | CME 55HTX | 314225 | 80 | 2.9 | - | - | 77 | 2.0 | 81 | 2.7 | 91 | 2.7 | 85 | 2.2 | 76 | 2.4 | 87 | 2.7 |
| | CME 55 LC | 390755 | - | - | 84 | 2.2 | 93 | 1.7 | 92 | 2.7 | 85 | 1.2 | 96 | 1.4 | 92 | 2.4 | 92 | 2.1 |
| | CME 550X | 343063 | 91 | 2.1 | 80 | 2.9 | 84 | 1.7 | 75 | 3.7 | 82 | 2.4 | 87 | 3.8 | 86 | 1.5 | 88 | 1.9 |
| | CME 750Y | 404788 | 95 | 2.0 | 92 | 1.8 | 90 | 2.5 | 98 | 1.6 | 91 | 1.2 | 96 | 2.1 | Rig Purchased May 2018 | | | |
| | CME 85 | 254746 | 89 | 2.6 | - | - | 73 | 2.1 | 87 | 3.1 | 87 | 2.1 | 80 | 2.8 | 87 | 2.4 | 89 | 1.6 |
| | Geoprobe | 3230DT1810011 | 91 | 3.1 | 89 | 3.0 | 98 | 3.5 | 98 | 3.4 | 97 | 2.5 | Rig Purchased March 2019 | | | | | |
| | CME 75 (Rental) | 229417 | Rig Rental Sept. 22 | | 88 | 2.0 | Rig Rental September 2022 (PDP) | | | | | | | | | | | |
| Overland Park | CME 55LC | 424035 | 89 | 2.0 | Rig Purchased Spring 2023 | | | | | | | | | | | | | |
| | CME 550 | 357883 | - | - | 82 | 1.5 | - | - | 89 | 1.9 | - | - | 87 | 1.9 | - | - | 80 | 1.6 |
| | TD-2 CME 55 | 325345 | 88 | 1.8 | - | - | 88 | 1.8 | - | - | 88 | 1.3 | 88 | 2.2 | - | - | 86 | 2.6 |
| | Diedrich D-50 | D50-245 | | | - | - | 86 | 2.2 | 85 | 2.3 | - | - | 87 | 3.2 | - | - | 88 | 3.4 |
| Memphis | Geoprobe | 7822T4V3191015 | 98 | 2.7 | - | - | - | - | Rig Purchased 2021 | | | | | | | | | |
| | CME 550X | 382933 | - | - | 88 | 1.9 | 88 | 2.1 | 94 | 2.0 | 92 | 2.4 | - | - | 92 | 1.8 | 92 | 1.7 |
| | CME 750X | 303608 | - | - | 81 | 2.1 | - | - | 84 | 2.1 | 90 | 2.6 | 81 | 2.0 | 85 | 2.0 | 83 | 3.8 |
| | CME 75 | 183277 | - | - | - | - | Previous Data in Erlanger Row | | | | | | | | | | | |
| | Diedrich D-50 | D50-308 | - | - | - | - | 93 | 3.2 | - | - | 97 | 3.2 | Rig Purchased Fall 2019 | | | | | |
| Erlanger | Sonic-2 | TS-1263 | | | 86 | 2.6 | Rig Purchased 2022 | | | | | | | | | | | |
| | BD-1(L) CME 550X | 359083 | - | - | 73 | 5.6 | - | - | 80 | 2.4 | - | - | 77 | 1.5 | - | - | 90 | 1.9 |
| | TD-4(L) CME 850 | 377922 | - | - | - | - | 100* | 2.9 | 97 | 2.1 | - | - | 91 | 2.5 | - | - | 90 | 2.3 |
| | TD-5(L) CME 55 | 388255 | - | - | - | - | 88 | 2.0 | 93 | 1.4 | 95 | 1.5 | 89 | 2.7 | - | - | 92 | 2.1 |
| | TD-6 CME 55LC | 401375 | - | - | - | - | 94 | 1.8 | 88 | 1.8 | 95 | 2.5 | - | - | 95 | 2.6 | Purchased 2017 | |
| | CME 75 | 183277 | - | - | Rig Moved to Memphis Office | | - | - | 80 | 2.2 | - | - | - | - | 87 | 2.1 | 94 | 1.9 |
| | | | - | - | | | - | - | 83 | 1.5 | | | | | | | | |
| Sold | CME 55 Track | 294795 | - | - | - | - | 88 | 2.6 | - | - | 85 | 1.8 | 83 | 2.4 | 91 | 1.9 | 88 | 1.8 |
| | CME 55 | 204395 | - | - | - | - | - | - | - | - | 92 | 1.6 | - | - | 90 | 2.2 | 89 | 1.8 |
| | CME 45 Track | 304214 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 88 | 2.3 |
| | Diedrich D-50 (Old) | 74960 | - | - | - | - | - | - | - | - | 80 | 4.1 | - | - | 79 | 6.1 | 83 | 5.5 |
| | CME 55HT | 253335 | - | - | - | - | - | - | - | - | - | - | - | - | 87 | 1.7 | 78 | 2.9 |

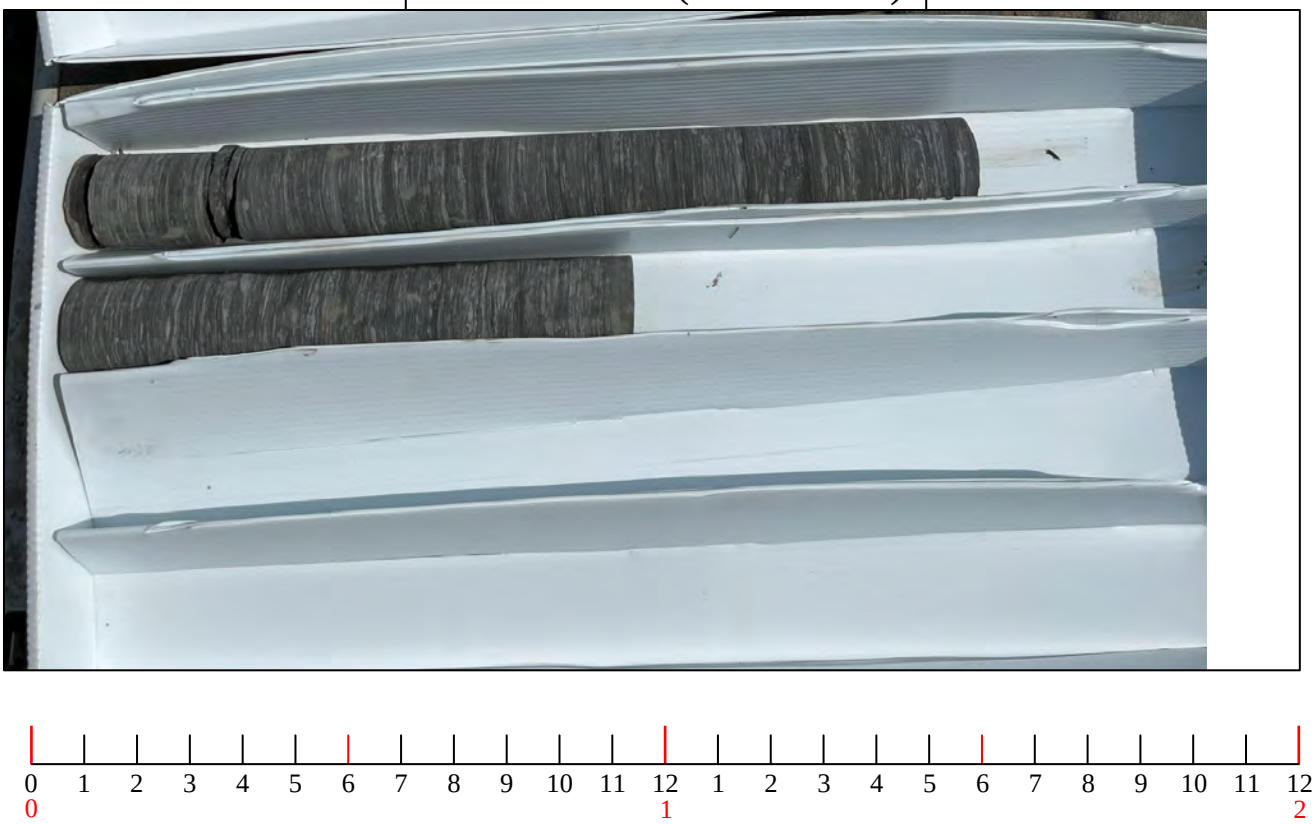
*SPT Hammer was observed to have a stroke greater than 30 inches.

# APPENDIX C

**FB-99**: Run 1 (5.8-8.2 ft), Run 2 (8.2-13.3 ft)




**FB-99**: Run 3 (13.3-15.8 ft)




| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-100**: Run 1 (12-17 ft), Run 2 (17-22 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-100**: Run 3 (22-27 ft), Run 4 (27-32 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

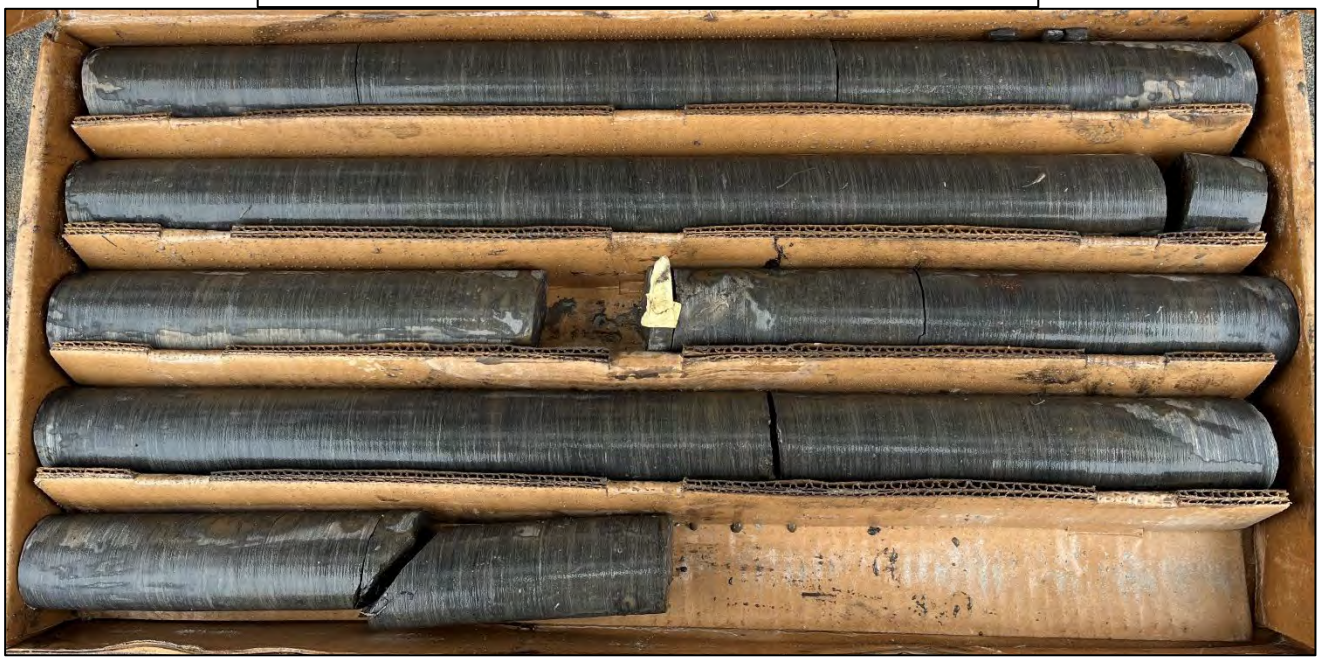
UES™

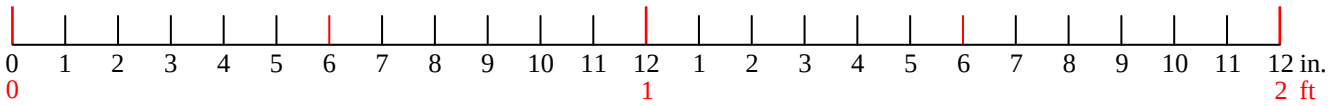
**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**FB-100**: Run 5 (32-37 ft), Run 6 (37-41 ft)






| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-101**: Run 1 (16-21 ft), Run 2 (21-26 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-101**: Run 3 (26-31 ft), Run 4 (31-36 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

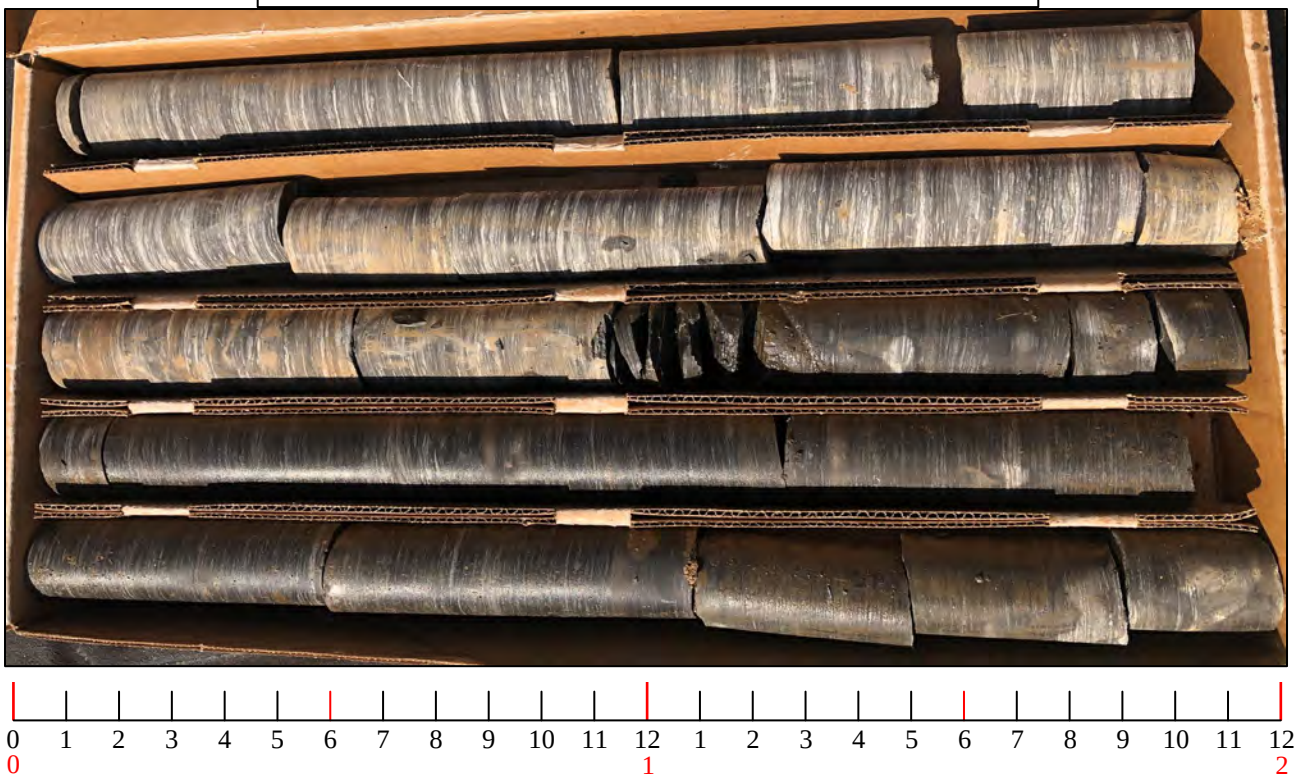
UES™

**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**FB-101**: Run 5 (36-41 ft), Run 6 (41-46 ft)




| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-102**: Run 1 (16-18 ft), Run 2 (18-23 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

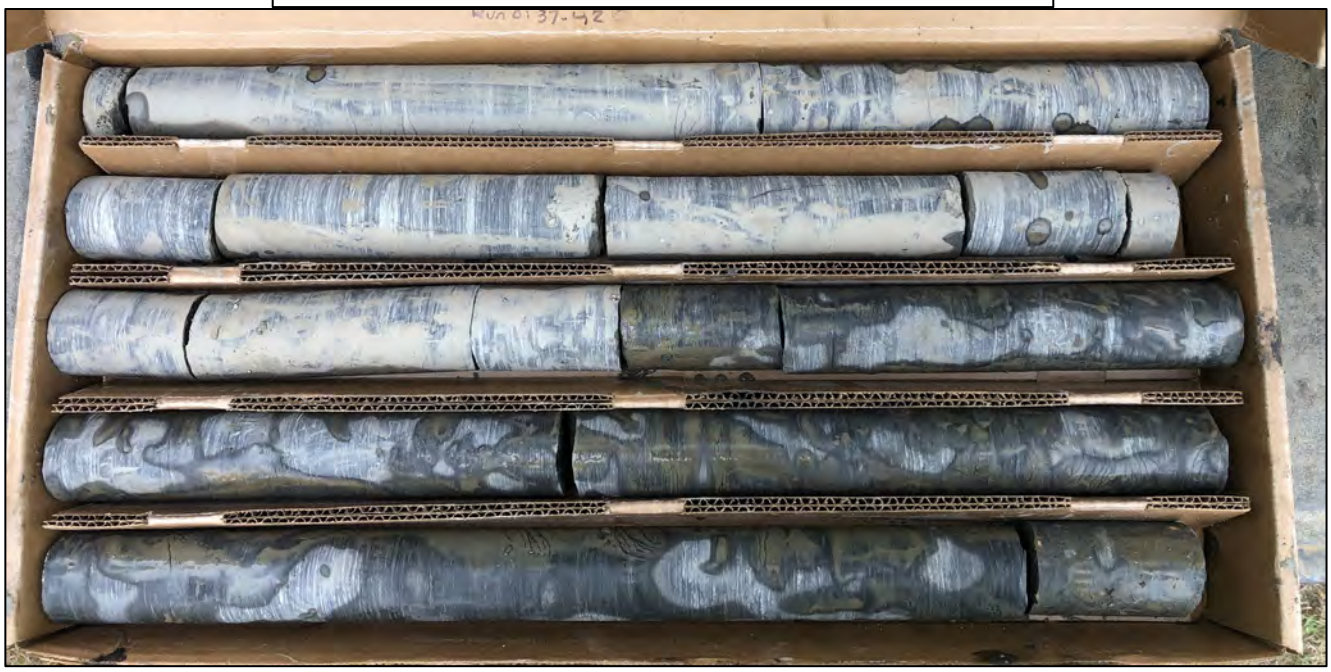
**FB-102**: Run 3 (23-28 ft), Run 4 (28-33 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-102**: Run 5 (33-38 ft), Run 6 (38-43 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-103**: Run 1 (20-21 ft), Run 2 (21-26 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

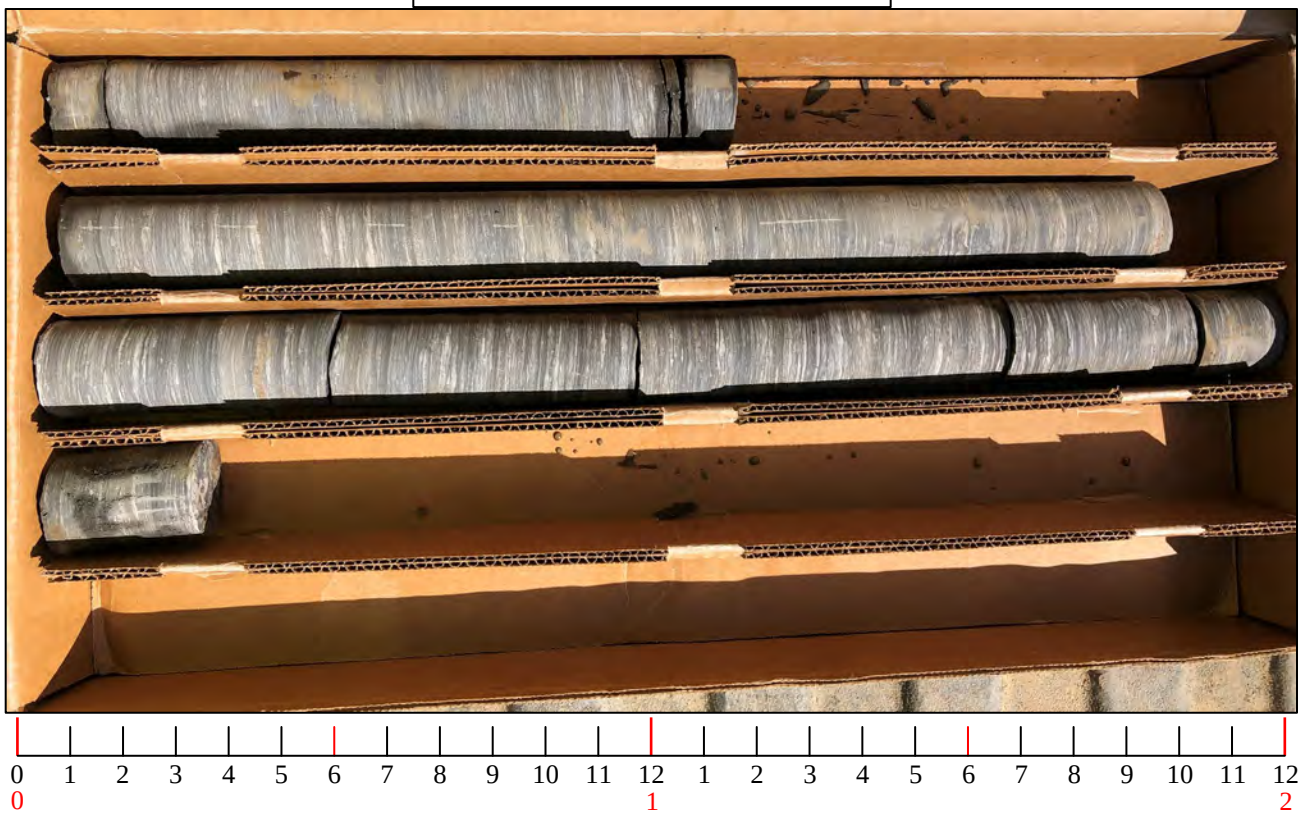
**FB-103**: Run 3 (26-31 ft), Run 4 (31-36 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-103**: Run 5 (36-41 ft)




| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-104**: Run 1 (6-11 ft), Run 2 (11-16 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-104**: Run 3 (16-21 ft), Run 4 (21-26 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-105**: Run 1 (6-11 ft), Run 2 (11-16 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

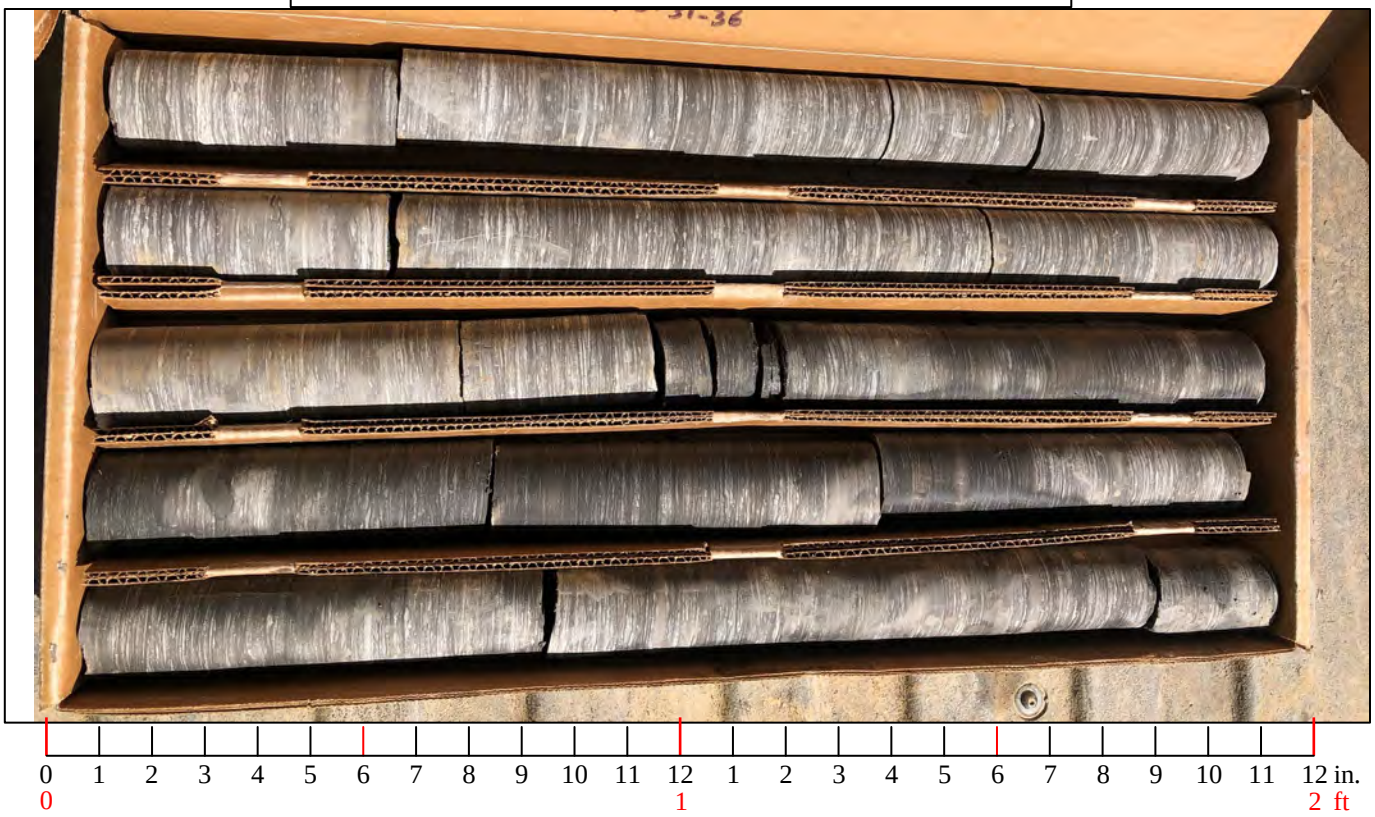
**FB-105**: Run 3 (16-21 ft), Run 4 (21-26 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-105**: Run 5 (26-31 ft), Run 6 (31-36 ft)




| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-106**: Run 1 (10-15 ft), Run 2 (15-20 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

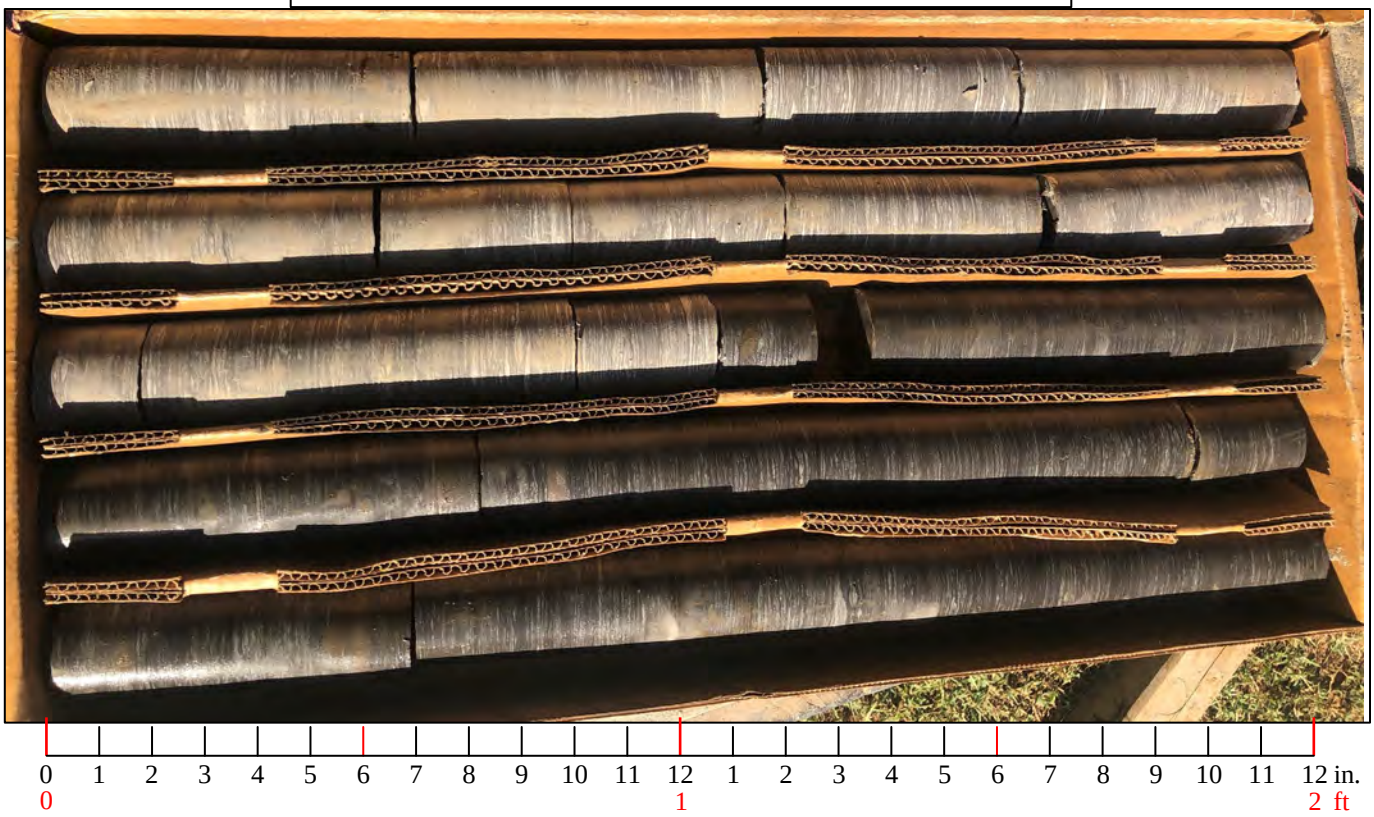
**FB-106**: Run 3 (20-25 ft), Run 4 (25-30 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-106**: Run 5 (30-35 ft), Run 6 (35-40 ft)




| | | |
|---|---|---|
| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-107**: Run 1 (7-10 ft), Run 2 (10-15 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

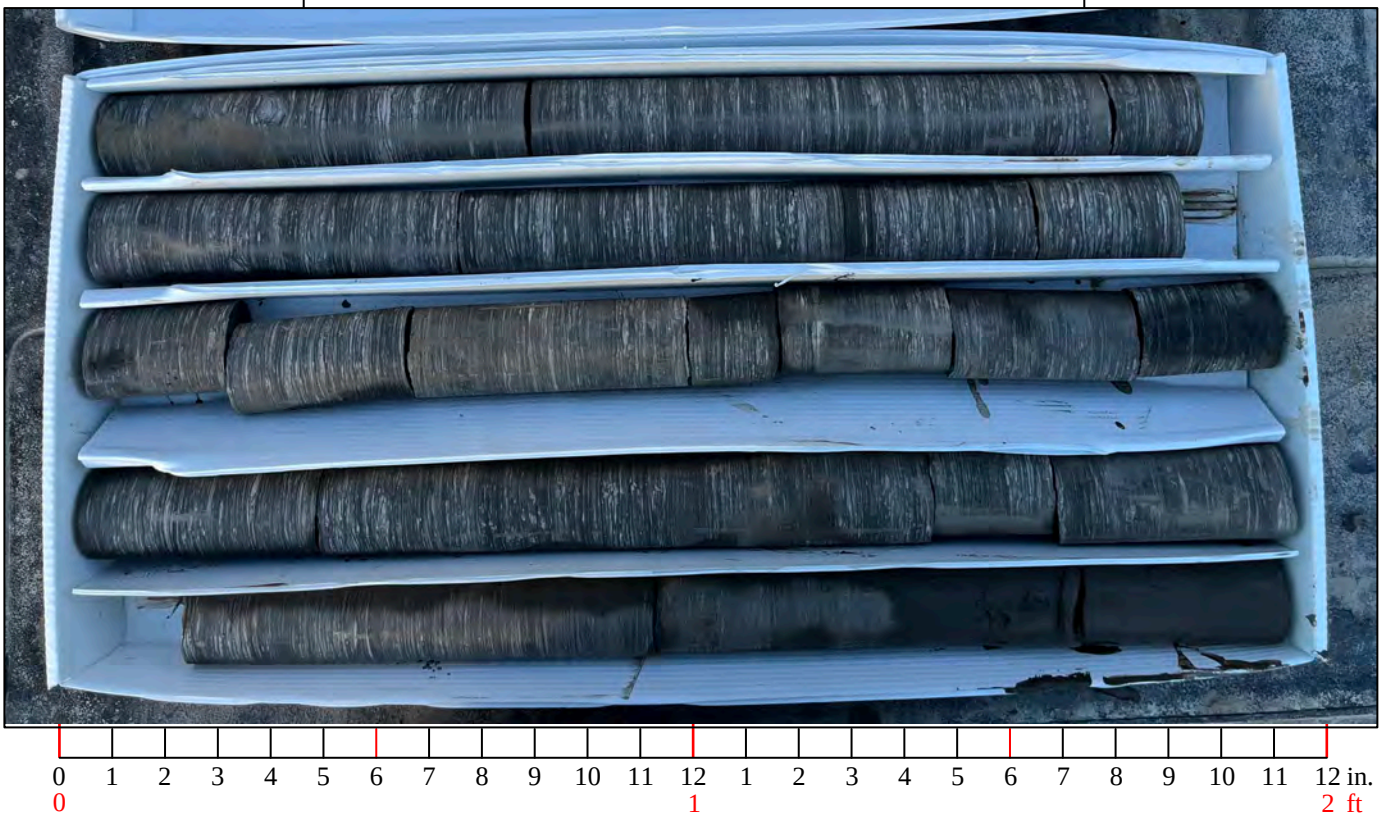
**FB-107**: Run 3 (15-20 ft), Run 4 (20-25 ft)



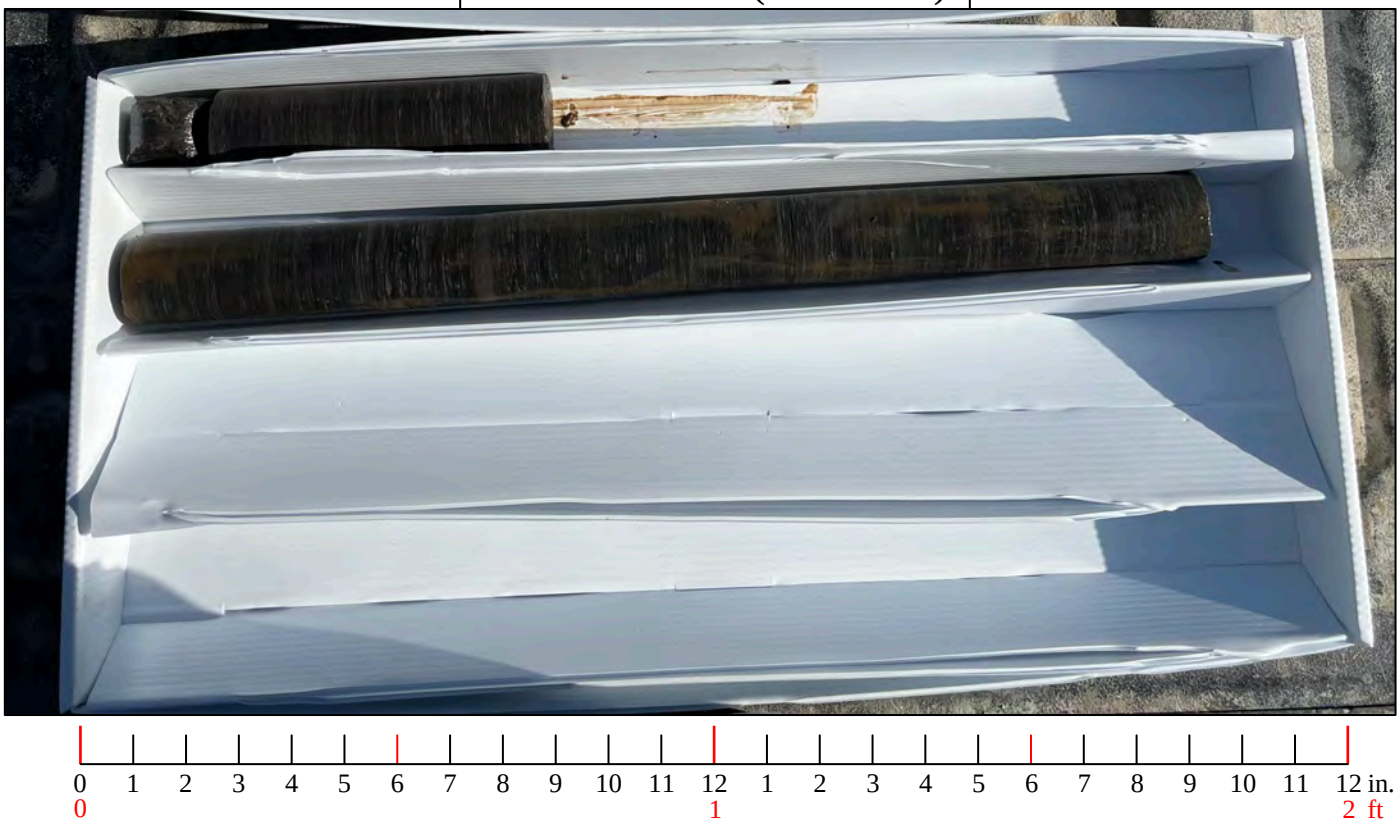
0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-107**: Run 5 (25-30 ft), Run 6 (30-35 ft)




**FB-107**: Run 7 (35-37.5 ft)




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**FB-108**: Run 1 (13.5-14.5 ft), Run 2 (14.5-19.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-108**: Run 3 (19.5-24.5 ft), Run 4 (24.5-29.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-108**: Run 5 (29.5-34.5 ft), Run 6 (34.5-39.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-108**: Run 7 (39.5-44.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-109**: Run 1 (20-25 ft), Run 2 (25-30 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-109**: Run 3 (30-35 ft), Run 4 (35-40 ft)

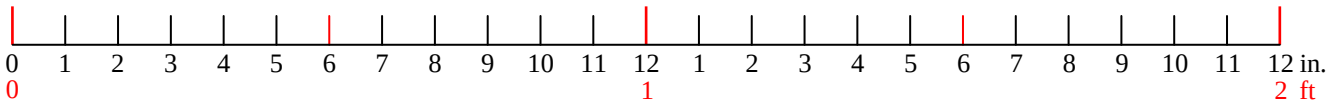


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-109**: Run 5 (40-45 ft), Run 6 (45-50 ft)






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**FB-110**: Run 1 (19-24 ft), Run 2 (24-29 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-110**: Run 3 (29-34 ft), Run 4 (34-39 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

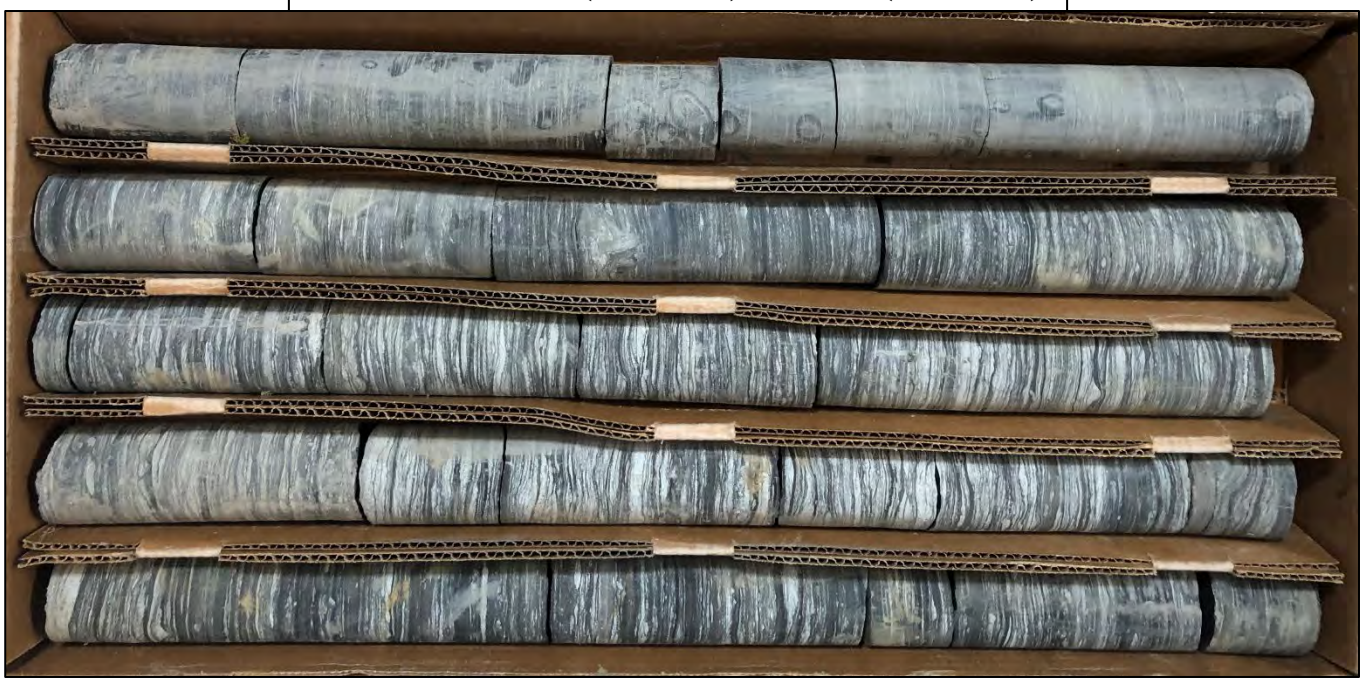
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**FB-110**: Run 5 (39-44 ft), Run 6 (44-49 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-111**: Run 1 (20-25 ft), Run 2 (25-30 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-111**: Run 3 (30-35 ft), Run 4 (35-40 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

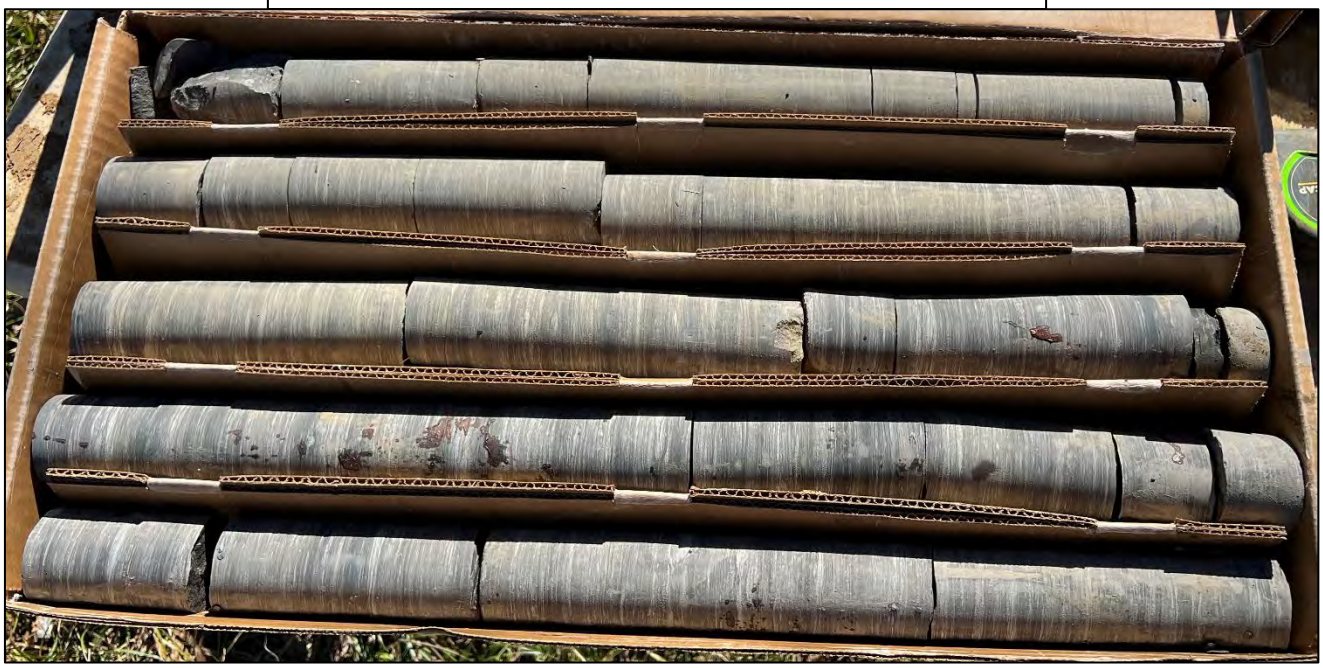
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**FB-112**: Run 1 (19-24 ft), Run 2 (24-29 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-112**: Run 3 (29-34 ft), Run 4 (34-39 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

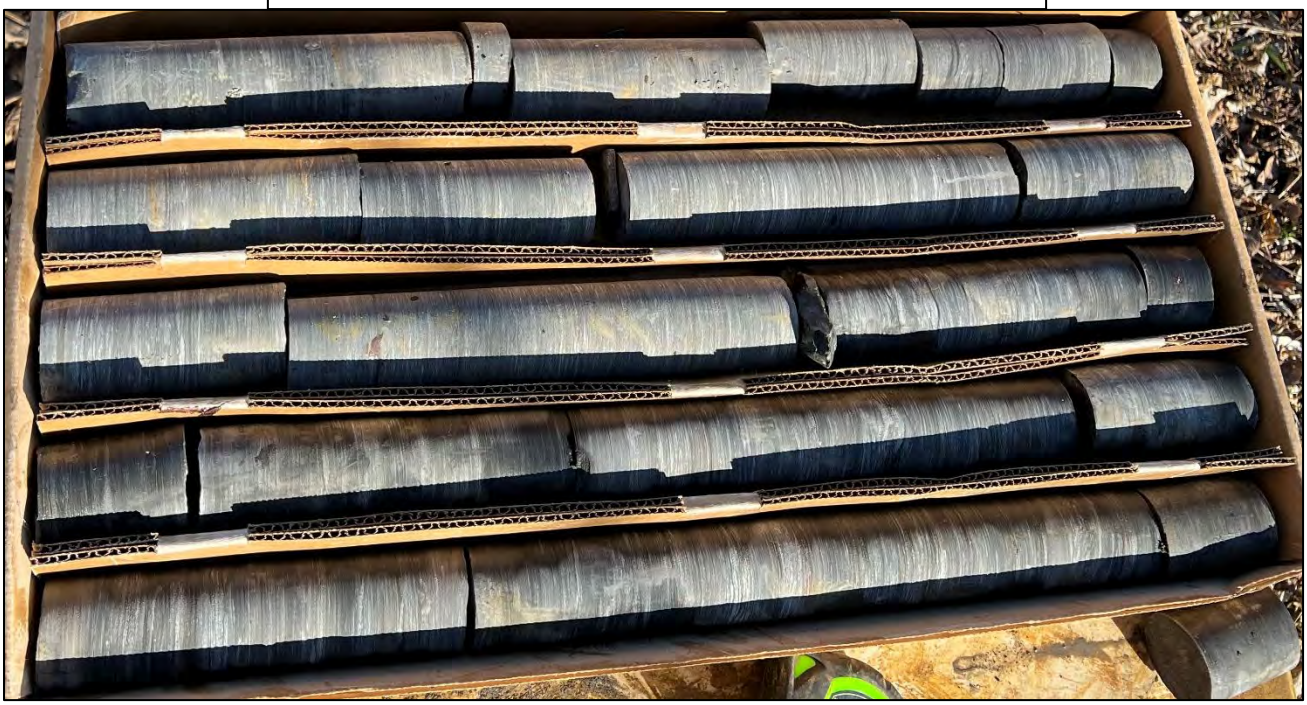
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**FB-113**: Run 1 (25-30 ft), Run 2 (30-35 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-114**: Run 1 (25-30 ft), Run 2 (30-35 ft)




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**FB-115A**: Run 1 (18.7-21.2 ft), Run 2 (21.2-26.2 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-115A**: Run 3 (26.2-31.2 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-116**: Run 1 (22-27 ft), Run 2 (27-32 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-116**: Run 3 (32-37 ft), Run 4 (37-42 ft)

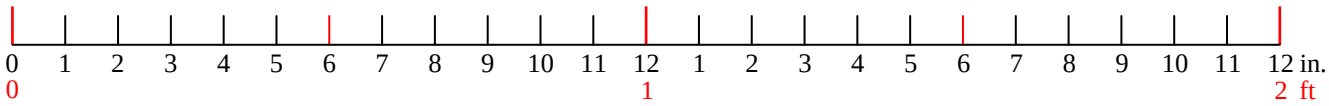


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-116**: Run 5 (42-47 ft), Run 6 (47-52 ft)






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**FB-117**: Run 1 (25-30 ft), Run 2 (30-35 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-117**: Run 3 (35-40 ft), Run 4 (40-45 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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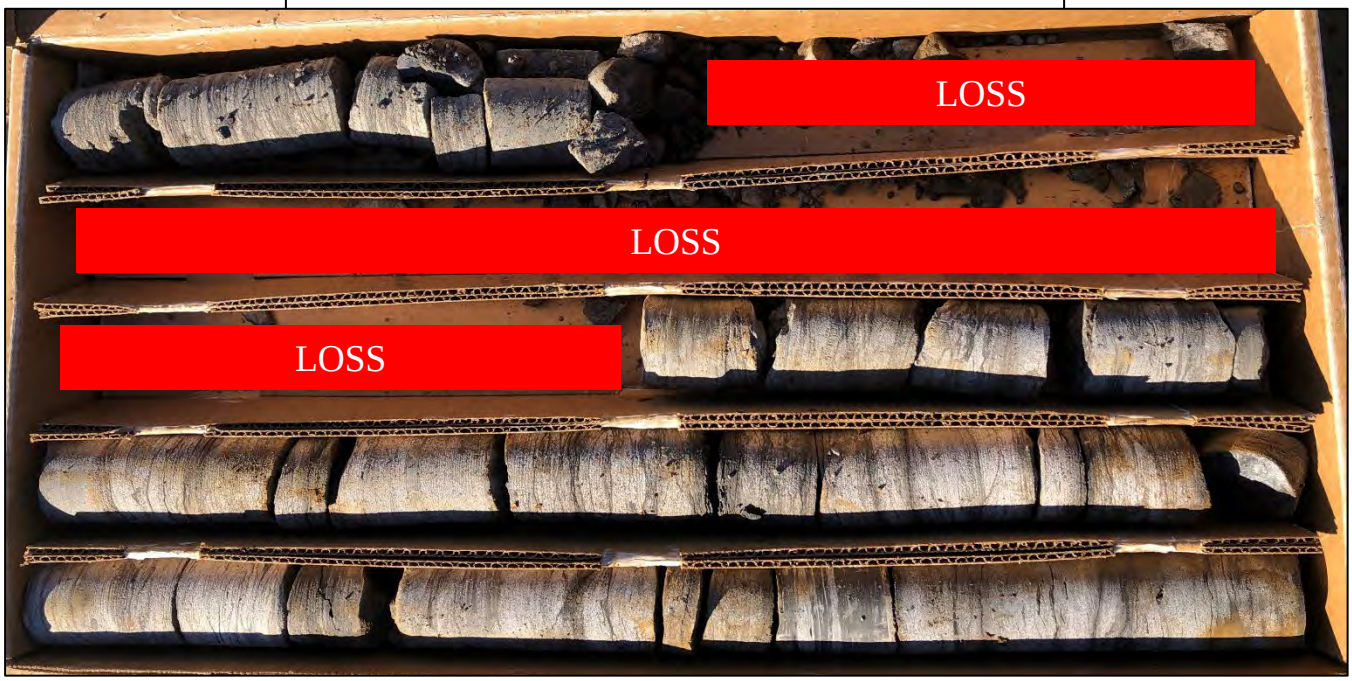
**Plate**

**FB-117**: Run 5 (45-50 ft), Run 6 (50-55 ft)




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**FB-118**: Run 1 (20-25 ft), Run 2 (25-30 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-118**: Run 3 (30-35 ft), Run 4 (35-40 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-118**: Run 5 (40-45 ft), Run 6 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-165**: Run 1 (22-27 ft), Run 2 (27-32 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-165**: Run 3 (32-37 ft), Run 4 (37-42 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-165**: Run 5 (42-47 ft), Run 6 (47-52 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-165**: Run 7 (52-57 ft), Run 8 (57-62 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-167**: Run 1 (29-31 ft), Run 2 (31-36 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-167**: Run 3 (36-41 ft), Run 4 (41-46 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-167**: Run 5 (46-51 ft), Run 6 (51-56 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-167**: Run 7 (56-59 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-171**: Run 1 (30-35 ft), Run 2 (35-40 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-171**: Run 3 (40-45 ft)

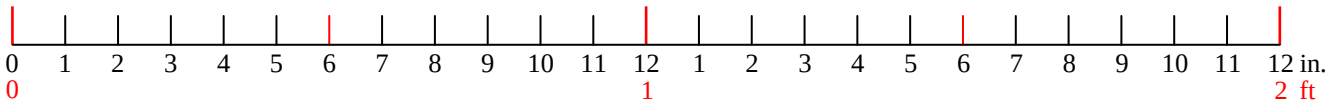


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-171**: Run 4 (45-46.5 ft)






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**FB-176**: Run 1 (17.5-20 ft), Run 2 (20-25 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-176**: Run 3 (25-30 ft), Run 4 (30-35 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-176**: Run 5 (35-40 ft), Run 6 (40-45 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-176**: Run 7 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-185**: Run 1 (50-55 ft), Run 2 (55-60 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-185**: Run 3 (60-65 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

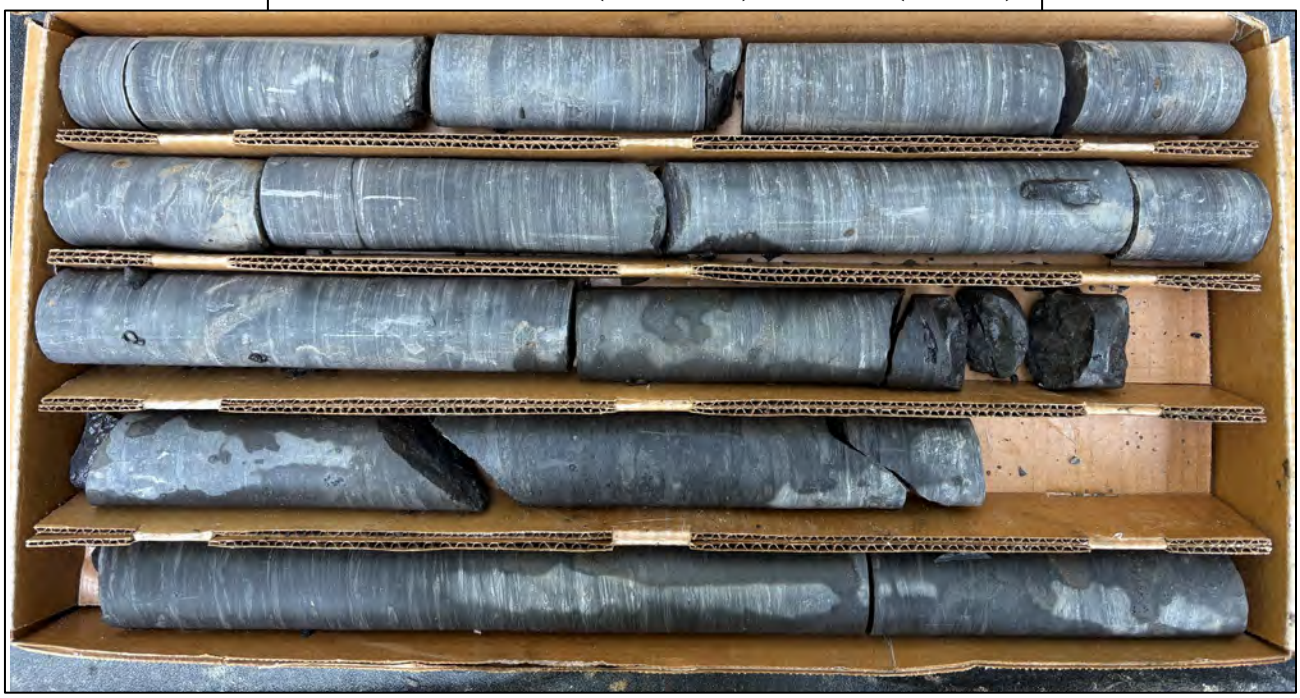
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**FB-185A**: Run 1 (24-25 ft), Run 2 (25-30 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-185A**: Run 3 (30-35 ft), Run 4 (35-40)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

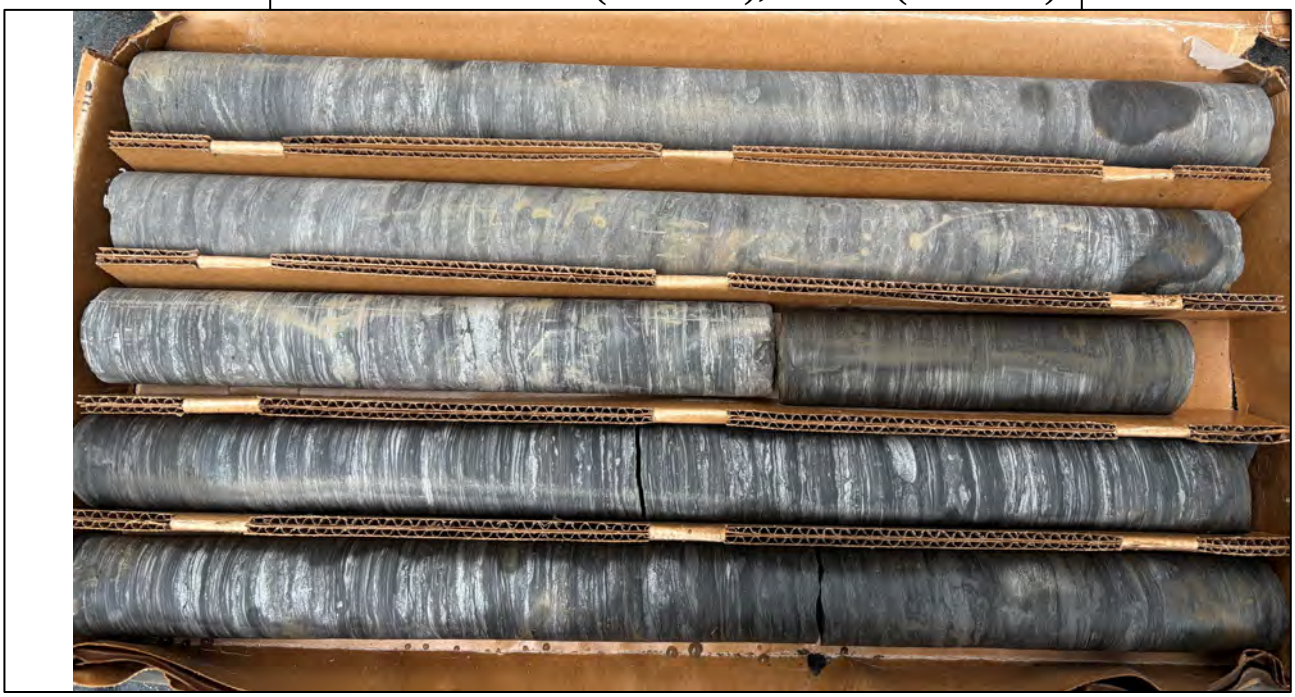
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**FB-185A**: Run 5 (40-45 ft), Run 6 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-185A**: Run 7 (50-55 ft), Run 8 (55-60)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-185A**: Run 9 (60-65 ft), Run 10 (65-70 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-185A**: Run 11 (70-75 ft), Run 12 (75-80)

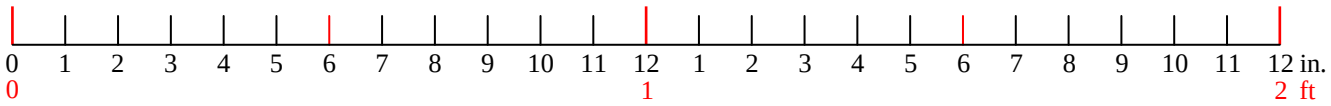


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-185A**: Run 13 (80-85 ft)






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**FB-186**: Run 1 (14.5-16.5 ft), Run 2 (16.5-21.5 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

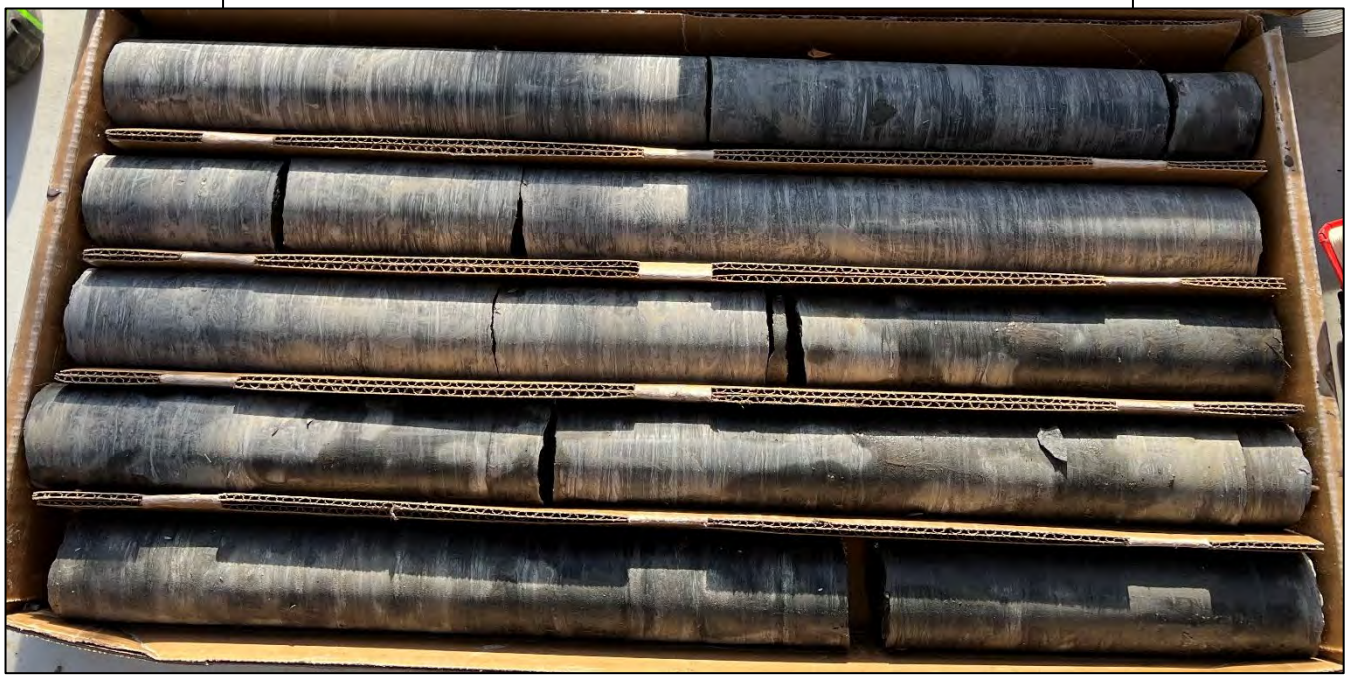
**FB-186**: Run 3 (21.5-26.5 ft), Run 4 (26.5-31.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-186**: Run 5 (31.5-36.5 ft), Run 2 (36.5-41.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-186**: Run 7 (41.5-46.5 ft), Run 8 (46.5-51.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

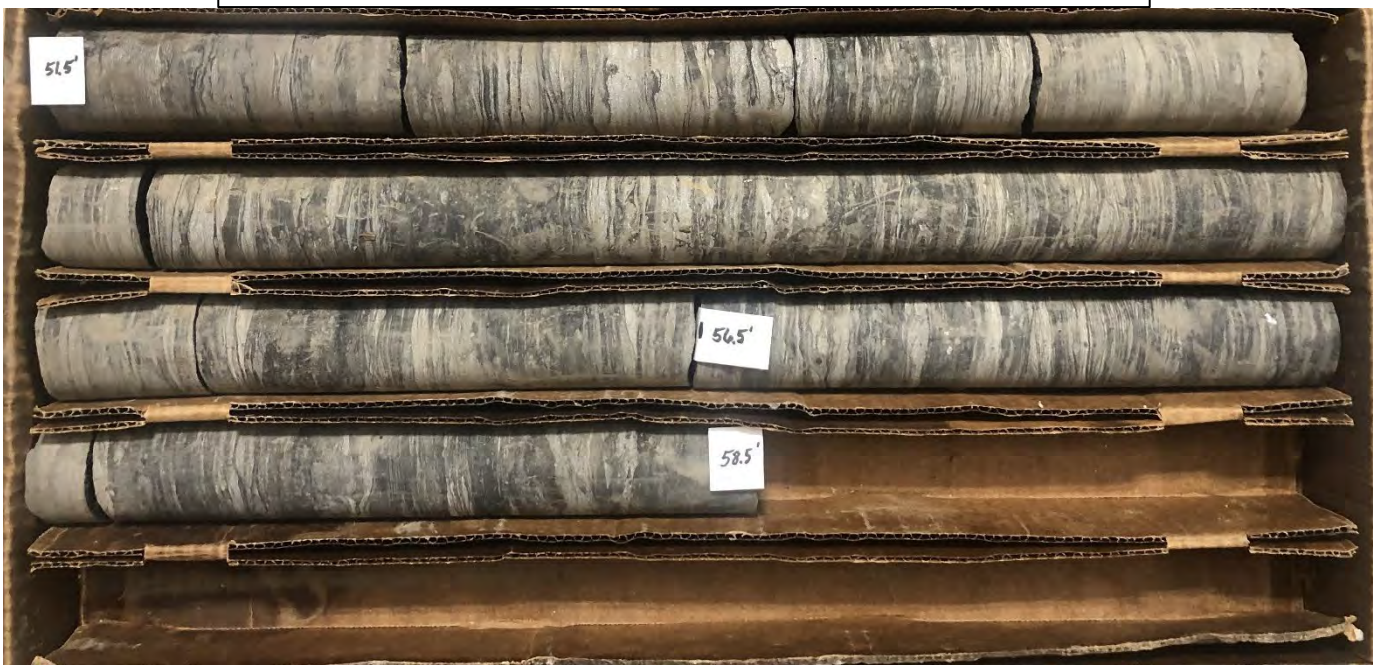
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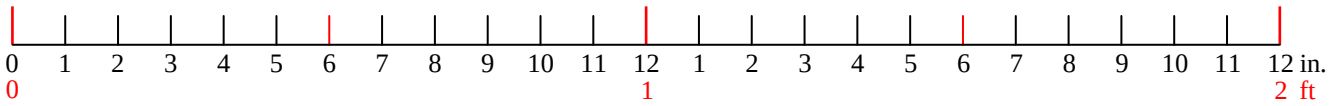
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**FB-186**: Run 9 (51.5-56.5 ft), Run 10 (56.5-58.5 ft)

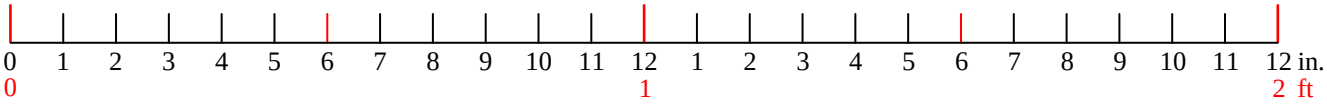


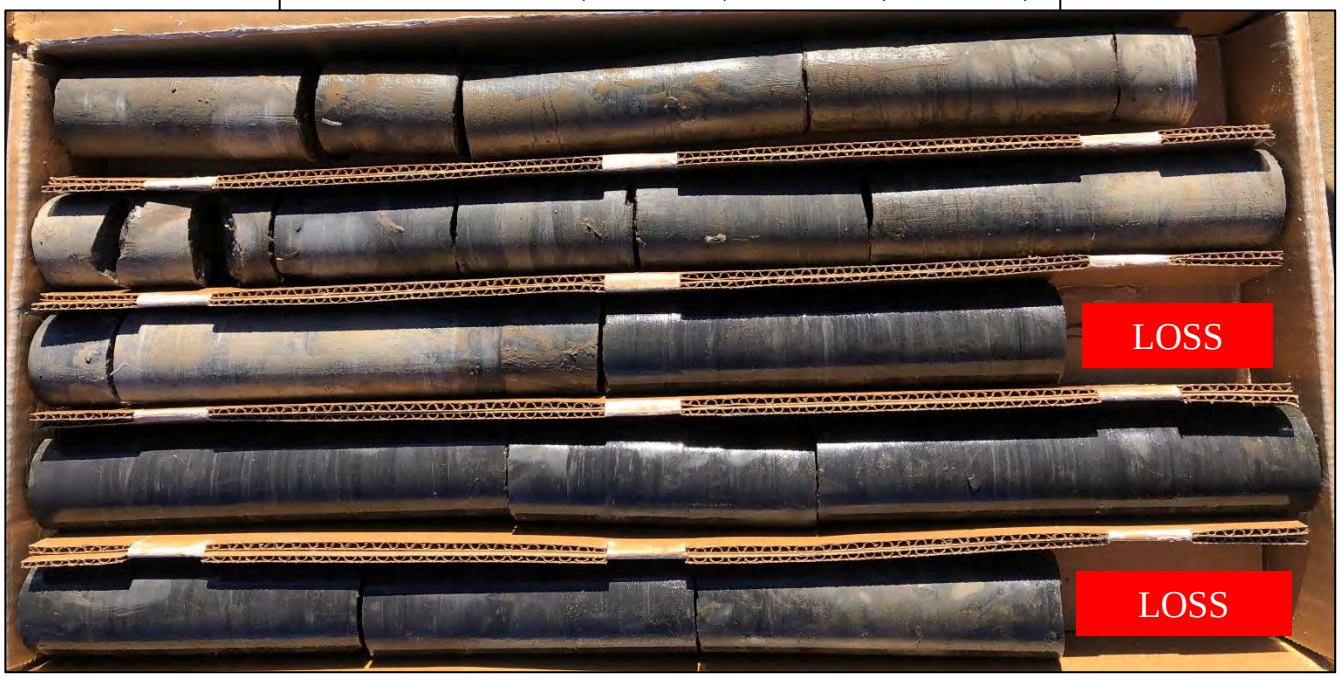

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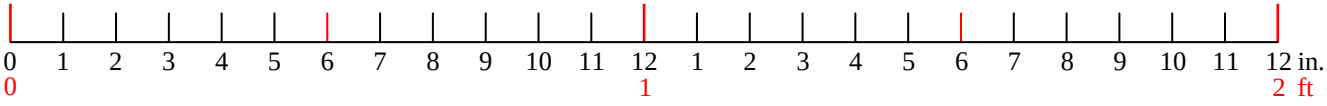
**FB-187**: Run 1 (40-45 ft), Run 2 (45-50 ft)




**FB-187**: Run 3 (50-55 ft), Run 4 (55-60 ft)




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**FB-187**: Run 5 (60-65 ft), Run 6 (65-70 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-187**: Run 7 (70-75 ft), Run 8 (75-80 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-187**: Run 9 (80-85 ft), Run 10 (85-90 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-187**: Run 11 (90-95 ft), Run 12 (95-97 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**Job No. 23184.00083**

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**FB-188**: Run 1 (13.5-15.5 ft), Run 2 (15.5-20.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-188**: Run 3 (20.5-25.5 ft), Run 4 (25.5-30.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-188**: Run 5 (30.5-35.5 ft), Run 6 (35.5-40.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-188**: Run 7 (40.5-45.5 ft), Run 8 (45.5-50.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-188**: Run 9 (50.5-55.5 ft), Run 10 (55.5-60.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-188**: Run 11 (60.5-65.5 ft), Run 12 (65.5-70.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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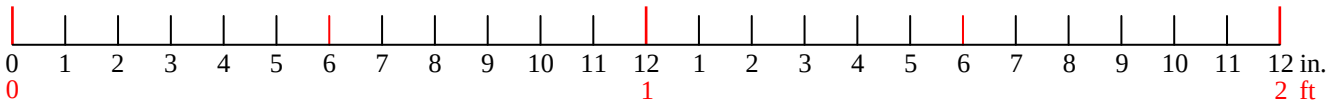
**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**FB-188**: Run 13 (70.5-73.5 ft)





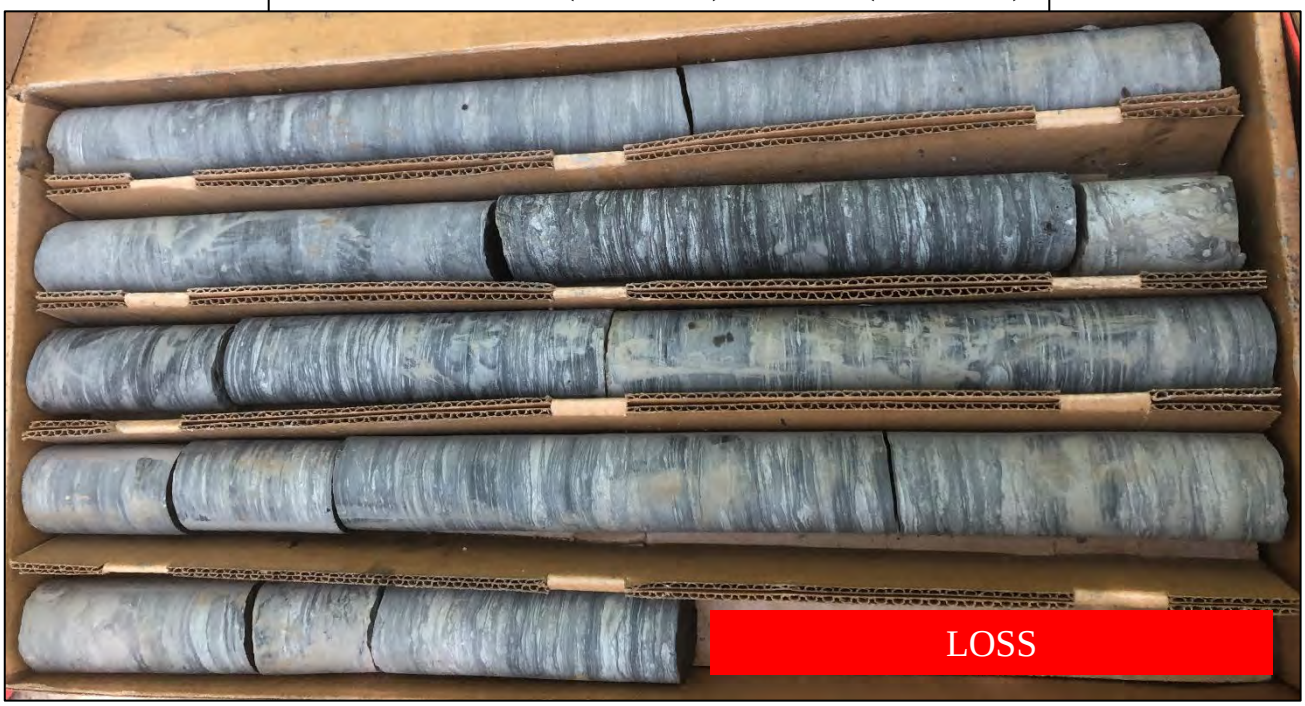

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**FB-189**: Run 1 (20-25 ft), Run 2 (25-30 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-189**: Run 3 (30-35 ft), Run 4 (35-40 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

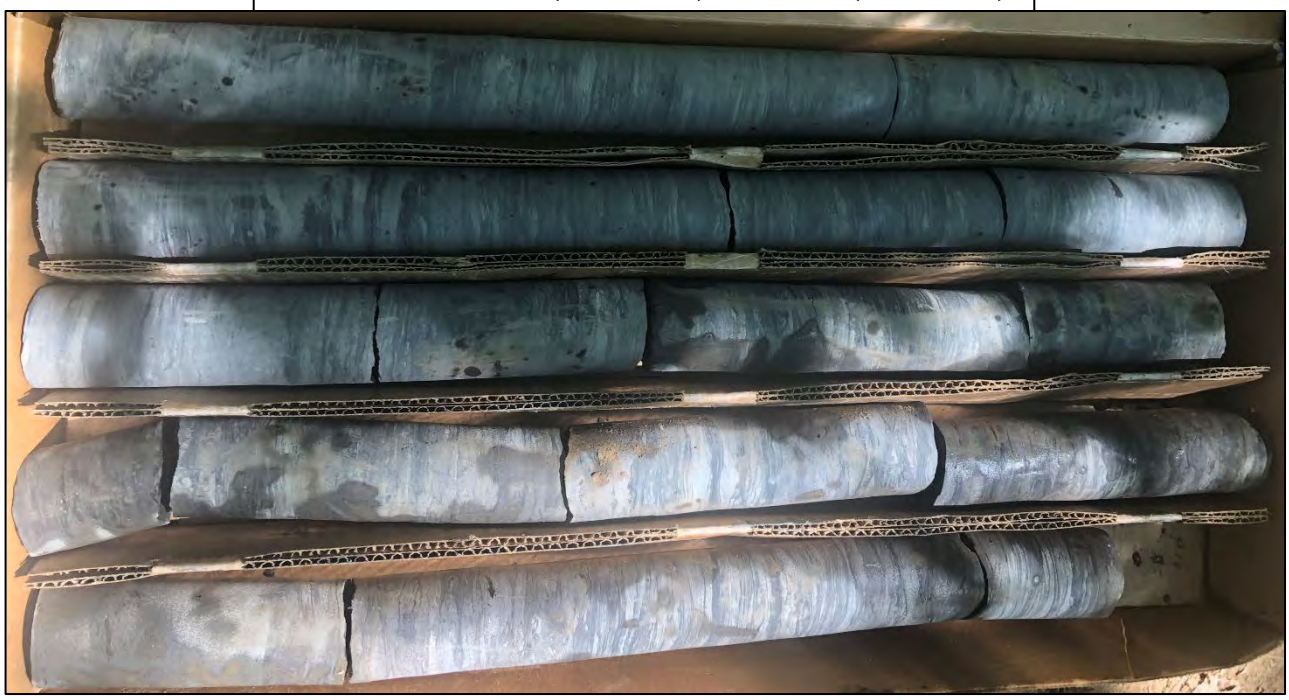
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**FB-189**: Run 5 (40-45 ft), Run 6 (45-50 ft)



**FB-189**: Run 7 (50-55 ft), Run 8 (55-60 ft)



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**FB-189**: Run 9 (60-65 ft), Run 10 (65-70 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-189**: Run 11 (70-75 ft), Run 12 (75-80 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-190**: Run 1 (20.5-21.5 ft), Run 2 (21.5-26.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-190**: Run 3 (26.5-31.5 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-191**: Run 1 (15-16 ft), Run 2 (16-21 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-191**: Run 3 (21-26 ft), Run 4 (26-31 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**Job No. 23184.00083**

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**FB-191**: Run 5 (31-36 ft), Run 6 (36-41 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-191**: Run 7 (41-46 ft), Run 8 (46-51 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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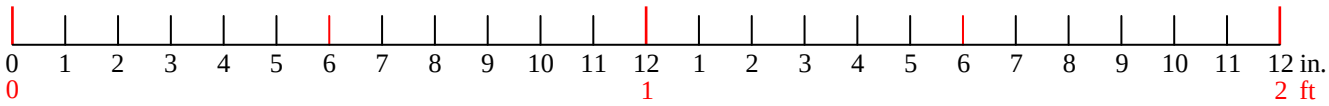
**ROCK CORE PHOTOS**
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**FB-191**: Run 59(51-55 ft)






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**FB-192**: Run 1 (19-24 ft), Run 2 (24-29 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-192**: Run 3 (29-34 ft), Run 4 (34-39 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-192**: Run 5 (39-44 ft), Run 6 (44-49 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-192**: Run 7 (49-54 ft), Run 8 (54-59 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

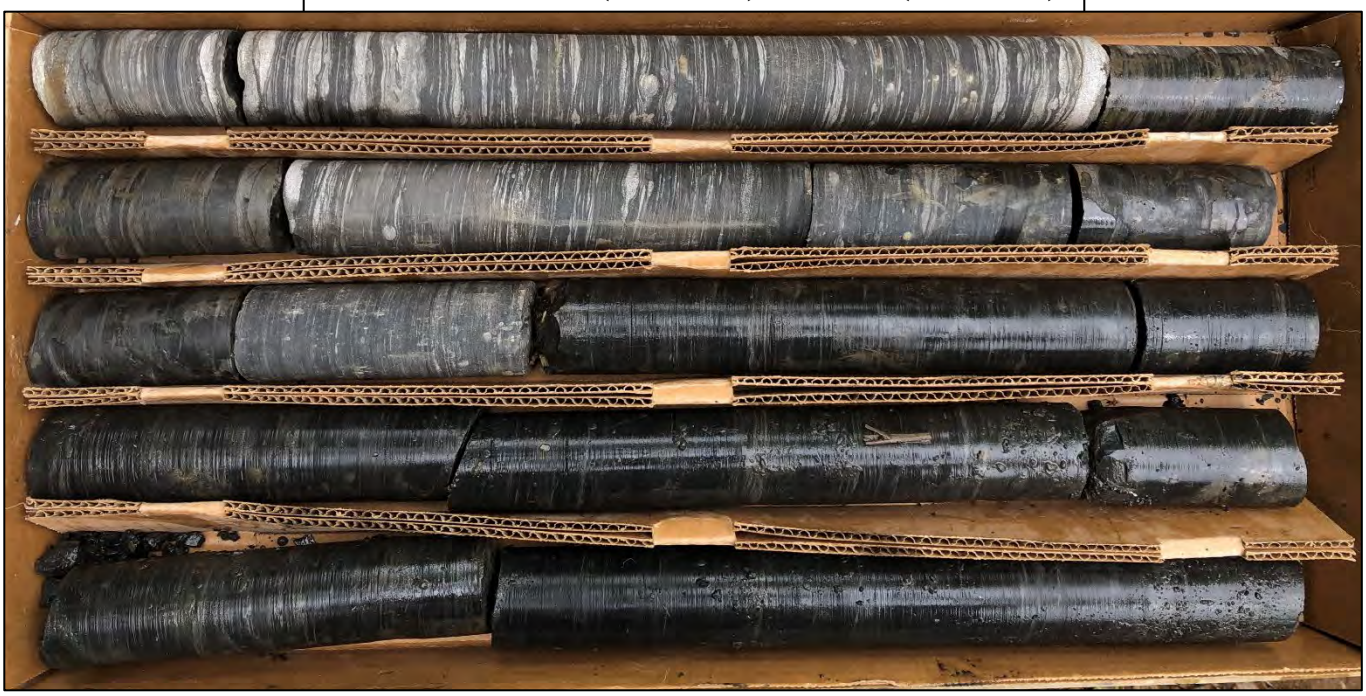
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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-193**: Run 1 (30-35 ft), Run 2 (35-40 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-193**: Run 3 (40-45 ft), Run 4 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-193**: Run 5 (50-55 ft), Run 6 (55-60 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-193**: Run 7 (60-65 ft), Run 8 (65-70 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-194**: Run 1 (19-24 ft), Run 2 (24-29 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

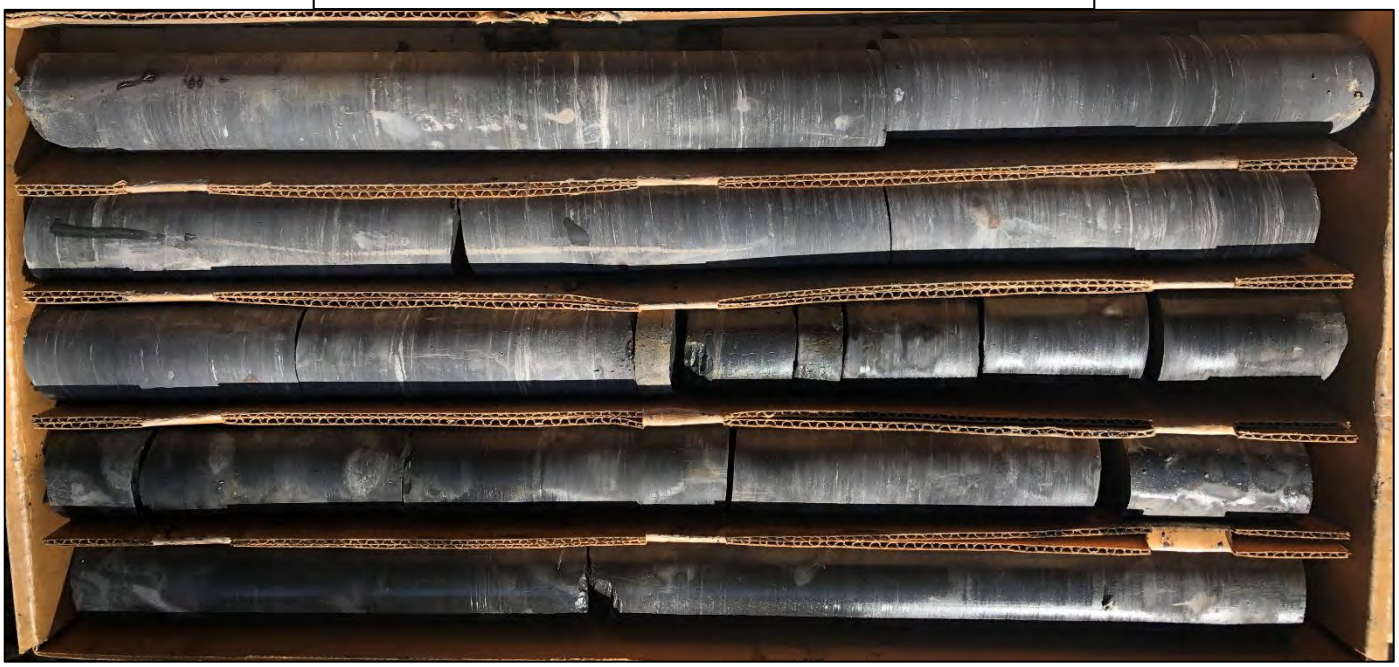
**FB-194**: Run 3 (29-34 ft), Run 4 (34-39 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-194**: Run 5 (39-44 ft), Run 6 (44-49 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-194**: Run 7 (49-54 ft), Run 8 (54-59 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-195**: Run 1 (19-23 ft), Run 2 (23-28 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-195**: Run 3 (28-33 ft), Run 4 (33-38 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-195**: Run 5 (38-43 ft), Run 6 (43-48 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-195**: Run 7 (48-53 ft), Run 8 (53-58 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-196**: Run 1 (19-24 ft), Run 2 (24-28 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-196**: Run 3 (28-33 ft), Run 4 (33-38 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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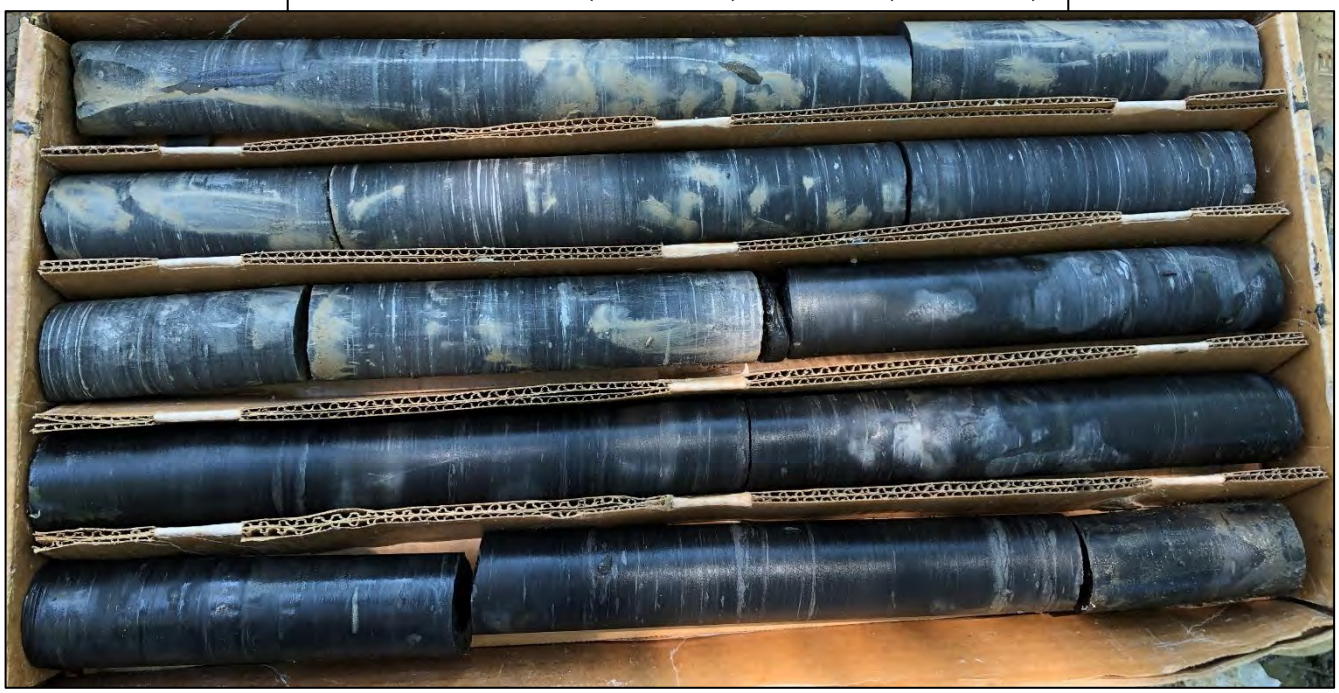
**Plate**

**FB-196**: Run 5 (38-43 ft), Run 6 (43-48 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-196**: Run 7 (48-53 ft), Run 8 (53-58 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**Job No. 23184.00083**

**Plate**

**FB-197**: Run 1 (19-24 ft), Run 2 (24-29 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-197**: Run 3 (29-34 ft), Run 4 (34-39 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**Job No. 23184.00083**

**Plate**

**FB-197**: Run 5 (39-44 ft), Run 6 (44-49 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-197**: Run 7 (49-54 ft), Run 8 (54-59 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-198**: Run 1 (23-28 ft), Run 2 (28-33 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-198**: Run 3 (33-38 ft), Run 4 (38-43 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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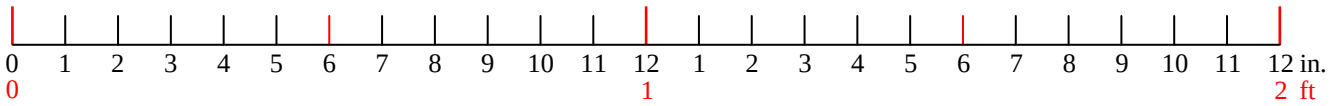
**ROCK CORE PHOTOS**
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**Crawford County, Arkansas**

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**Plate**

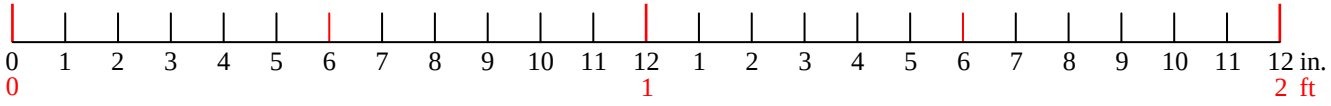
**FB-198**: Run 5 (43-48 ft), Run 6 (48-53 ft)




**FB-198**: Run 7 (53-58 ft), Run 8 (58-63 ft)






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**FB-199**: Run 1 (40-45 ft), Run 2 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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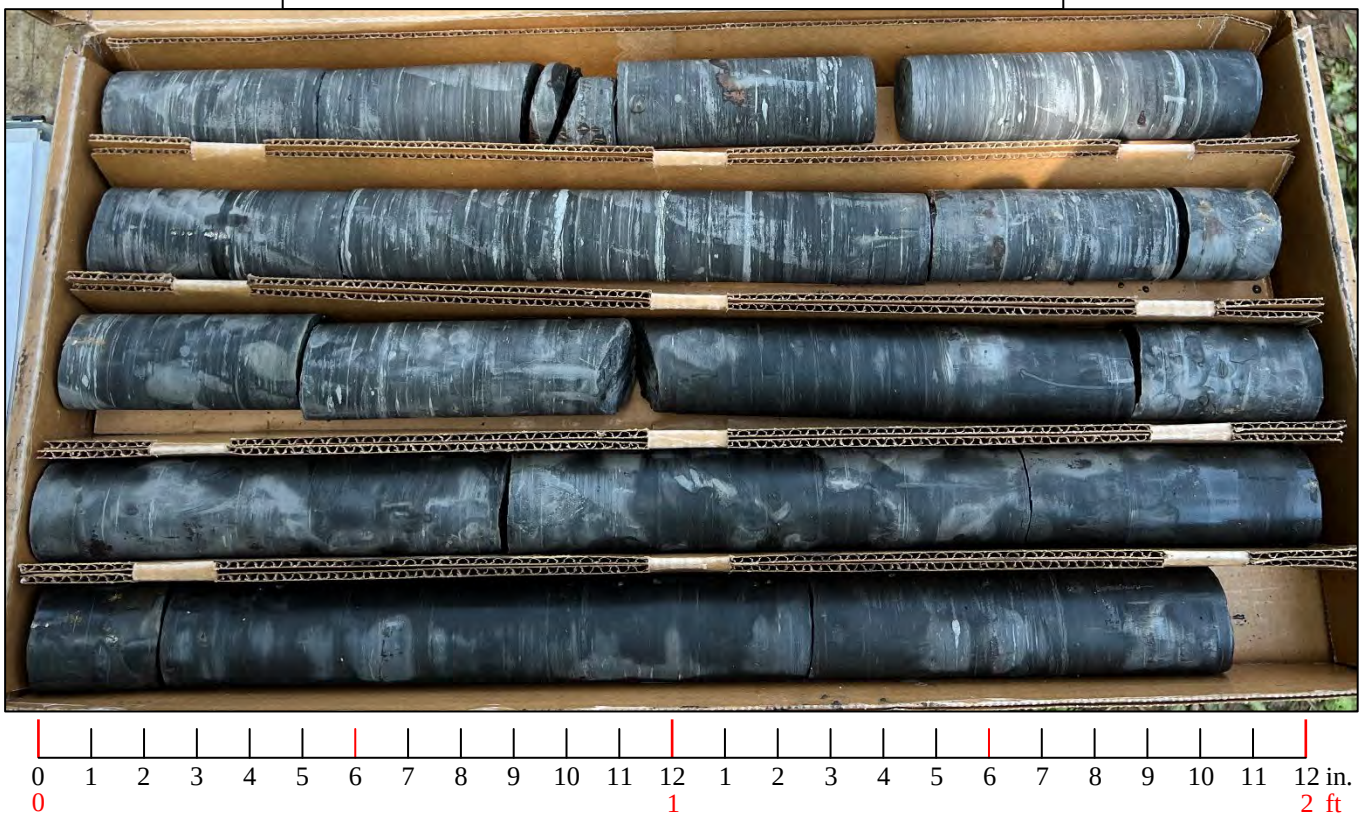
**FB-200**: Run 1 (33-38 ft), Run 2 (38-43 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-201**: Run 1 (22-27 ft), Run 2 (27-32 ft)




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**FB-202**: Run 1 (22.5-27.5 ft), Run 2 (27.5-32.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-203**: Run 1 (37-42 ft), Run 2 (42-46.5 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

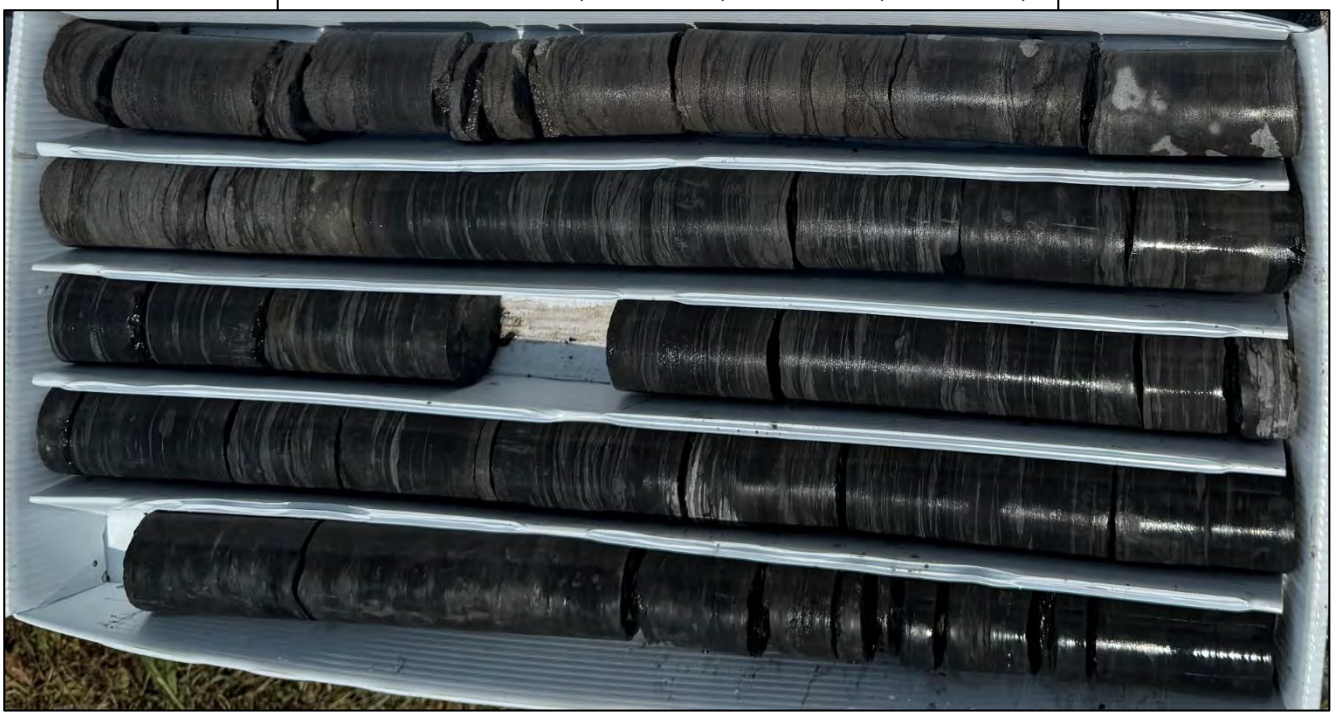
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| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FB-210**: Run 1 (18.5-21 ft), Run 2 (21-26 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-210**: Run 3 (26-31 ft), Run 4 (31-36 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-210**: Run 5 (36-41 ft), Run 6 (41-46 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-210**: Run 7 (46-51 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-211**: Run 1 (18.9-21.3 ft), Run 2 (21.3-26.3 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-211**: Run 3 (26.3-31.3 ft), Run 4 (31.3-36.3 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FB-211**: Run 5 (36.3-41.3 ft), Run 6 (41.3-46.3 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FB-211**: Run 7 (46.3-51.3 ft)

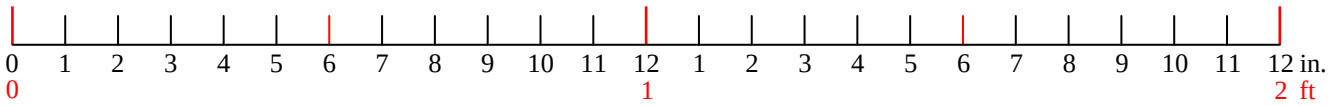


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FW-1**: Run 1 (21-26 ft), Run 2 (26-31 ft)

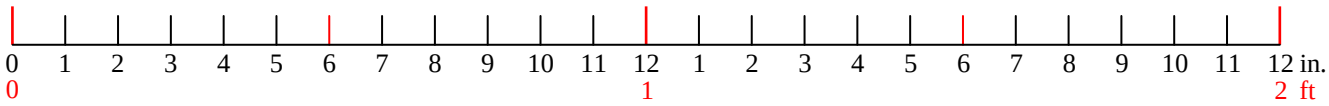





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**FW-2**: Run 1 (19-24 ft), Run 2 (24-29 ft)






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**FW-3**: Run 1 (24.6-27.1 ft), Run 2 (27.1-32.1 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

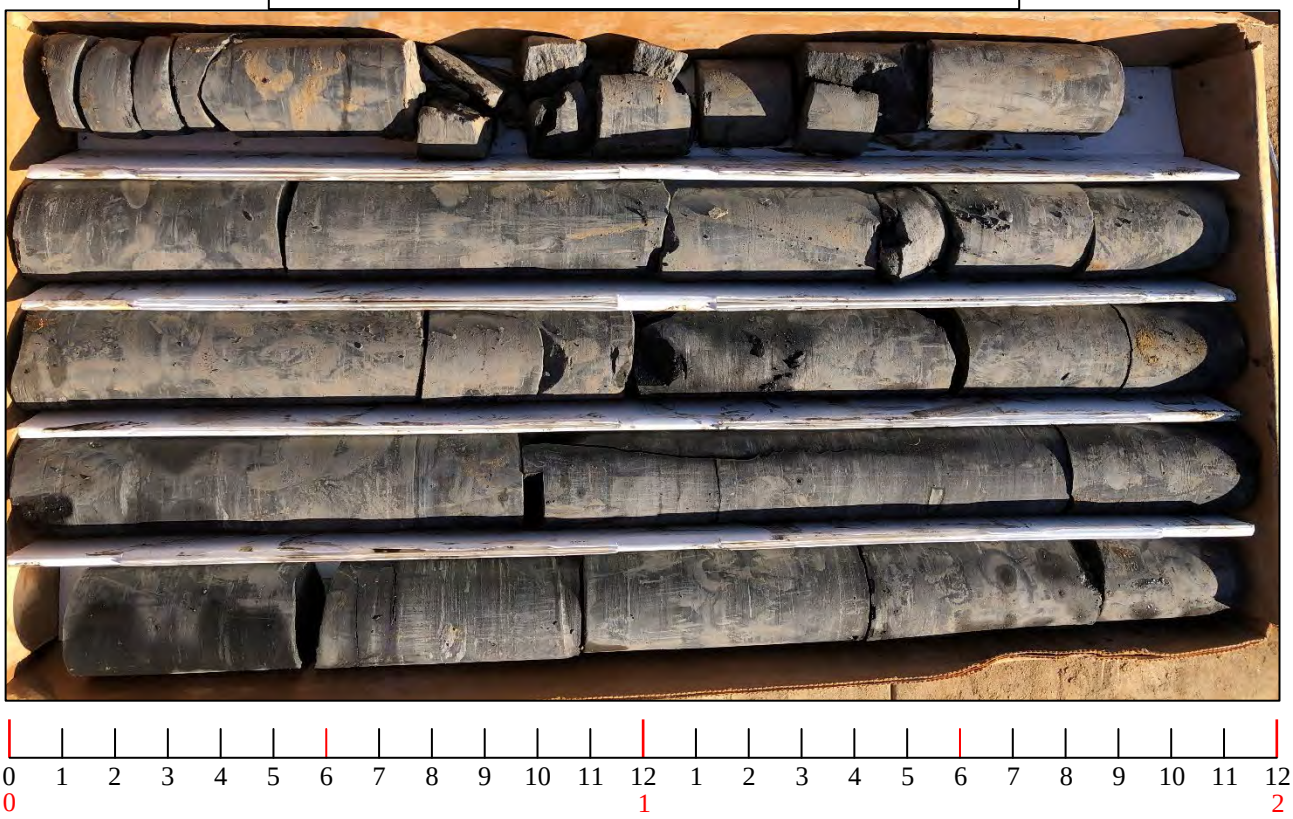
**FW-3**: Run 3 (32.1-37.1 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**FW-4**: Run 1 (25-30 ft), Run 2 (30-35 ft)




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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FW-5**: Run 1 (25-30 ft), Run 2 (30-35 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

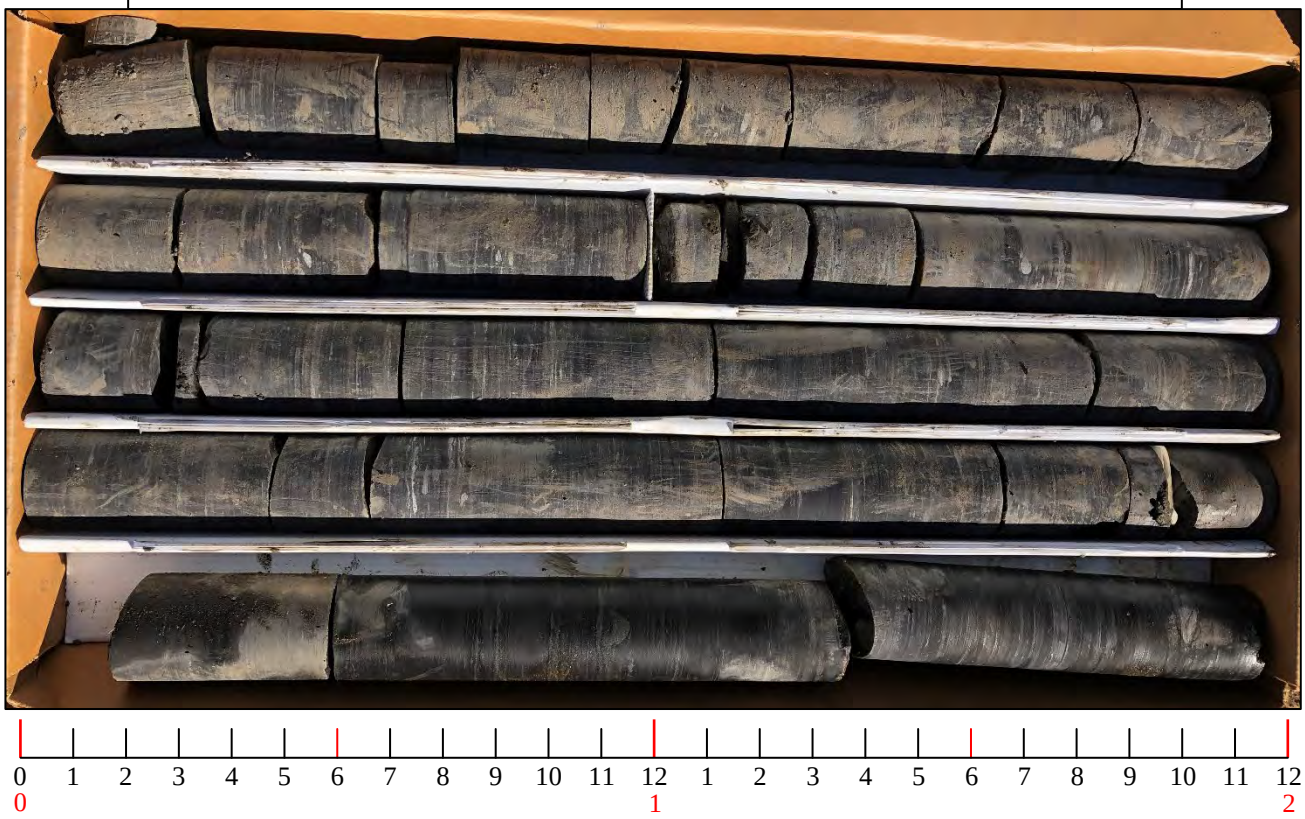
**FW-5**: Run 3 (35-39 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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|---|---|---|
| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

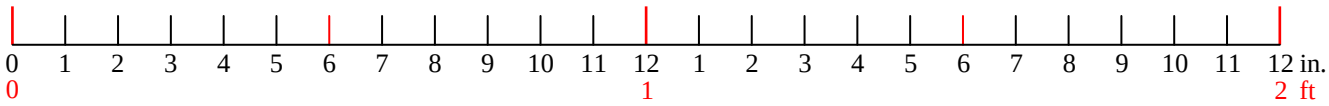
**FW-6**: Run 1 (28-31 ft), Run 2 (31-36 ft), Run 3 (36-38 ft)




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| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FW-7**: Run 1 (17-21 ft), Run 2 (21-26 ft), Run 3 (26-27 ft)






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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**FW-8**: Run 1 (18.5-20.3 ft), Run 2 (20.3-25.3 ft), Run 3 (25.3-30 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**FW-8**: Run 3 cont. (25.3-30 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

UES™

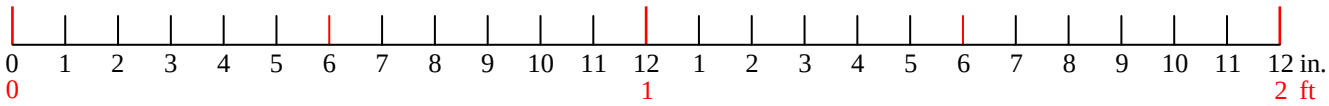
**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**HMT-1**: Run 1 (9-14 ft), Run 2 (14-19 ft)




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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-2**: Run 1 (10-15 ft), Run 2 (15-20 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-2**: Run 3 (20-25 ft), Run 4 (25-30 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-2**: Run 5 (30-35 ft), Run 6 (35-40 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-2**: Run 7 (40-45 ft), Run 8 (45-50 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

UES™

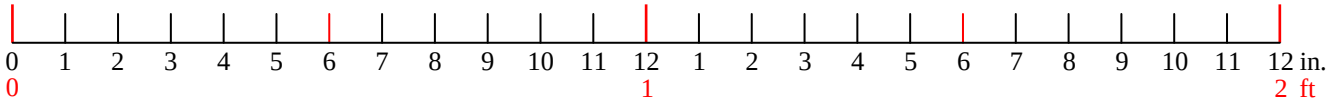
**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

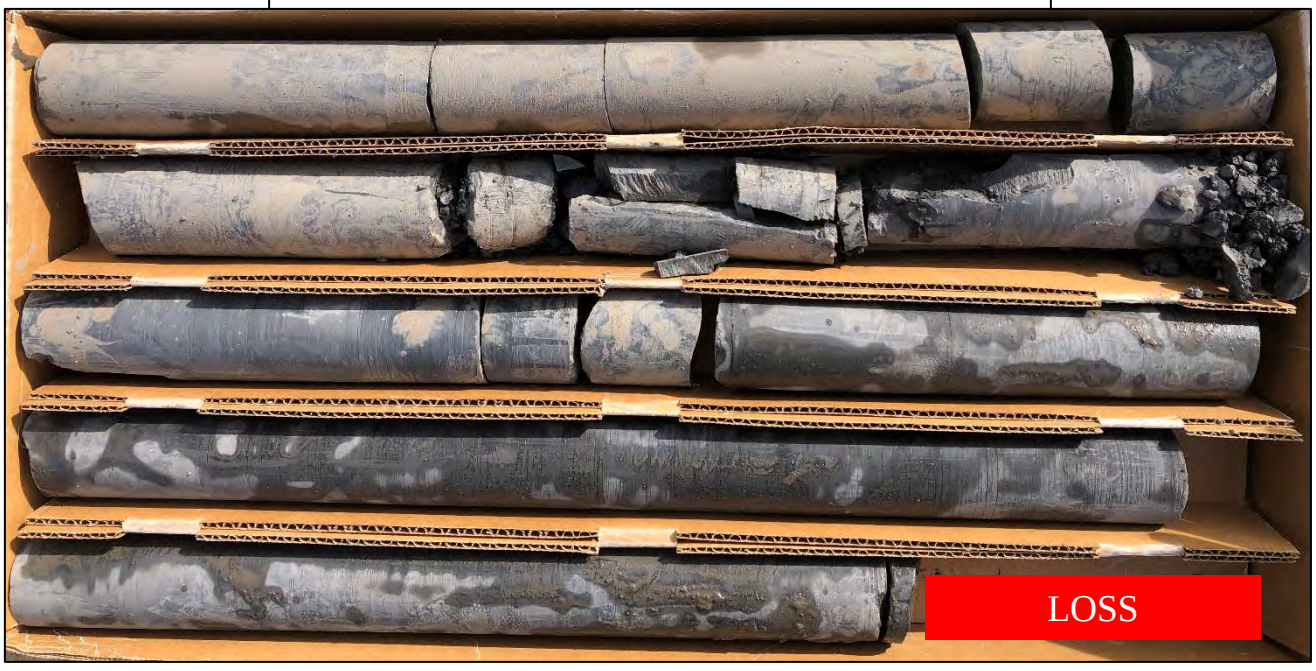
**Plate**

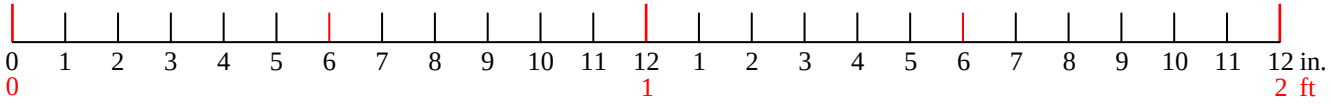
**HMT-3**: Run 1 (19-21 ft), Run 2 (21-26 ft)




**HMT-3**: Run 3 (26-31 ft), Run 4 (31-36 ft)




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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-3**: Run 4 cont. (31-36 ft), Run 5 (36-41 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-3**: Run 6 (41-46 ft), Run 7 (46-51 ft)

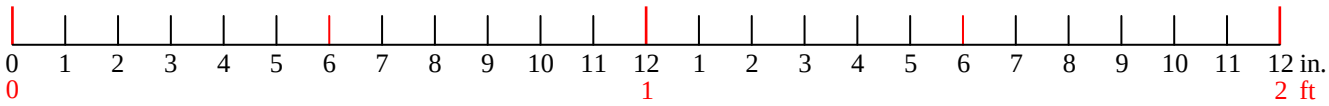


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-3**: Run 8 (51-56 ft), Run 9 (56-59 ft)

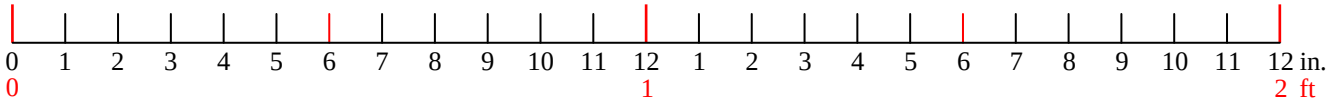





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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

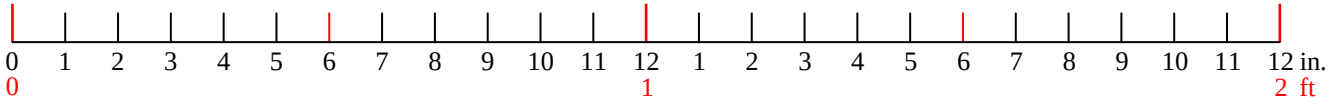
**HMT-4**: Run 1 (22-26 ft), Run 2 (26-31 ft)




**HMT-4**: Run 3 (34.75-39.75 ft), Run 4 (39.75-44.75 ft)




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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-4**: Run 5 (44.75-49.75 ft), Run 6 (49.75-54.75 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-4**: Run 7 (54.75-59.75 ft), Run 8 (59.75-64.75 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

UES™

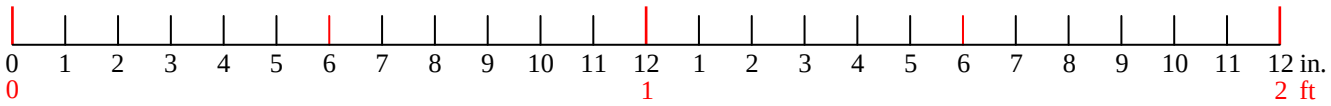
**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**HMT-4**: Run 9 (64.75-69.75 ft)






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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-5**: Run 1 (25-30 ft), Run 2 (30-35 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-5**: Run 3 (35-40 ft), Run 4 (40-45 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-5**: Run 5 (45-50 ft), Run 6 (50-55 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-5**: Run 7 (55-60 ft), Run 8 (60-65 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

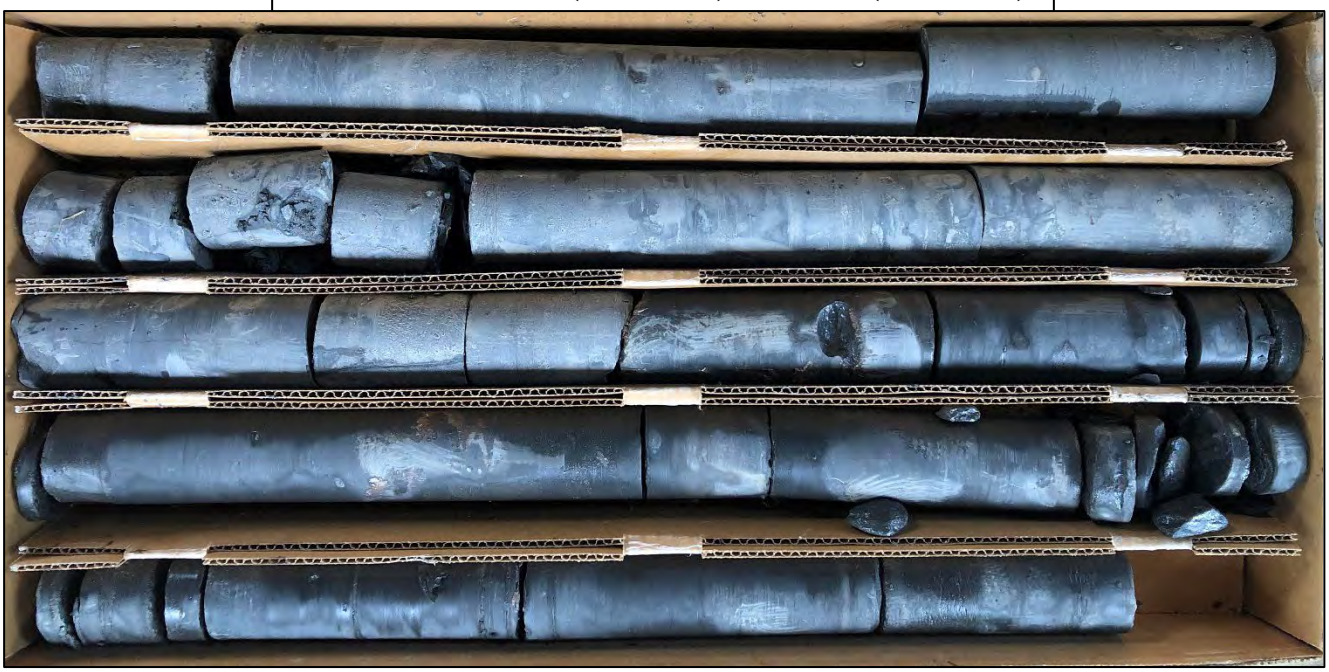
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| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-6**: Run 1 (29-34 ft), Run 2 (34-39 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-6**: Run 3 (39-44 ft), Run 4 (44-49 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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|---|---|---|
| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-6**: Run 5 (49-54 ft), Run 6 (54-59 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-6**: Run 7 (59-64 ft), Run 8 (64-69 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-7**: Run 1 (18.5-20.5 ft), Run 2 (20.5-25.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-7**: Run 3 (25.5-30.5 ft), Run 4 (30.5-35.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

UES™

**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**HMT-7**: Run 5 (35.5-40.5 ft), Run 6 (40.5-45.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

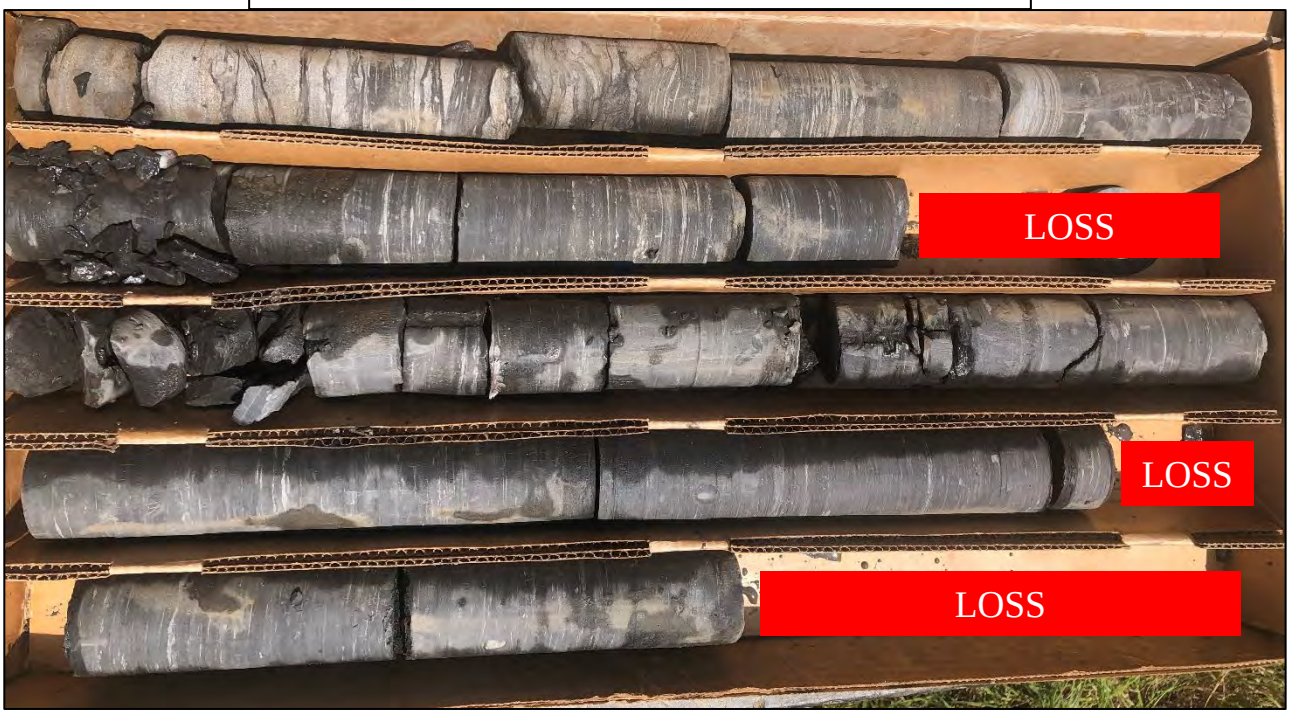
**HMT-7**: Run 7 (45.5-50.5 ft), Run 8 & 9 (50.5-55.5 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-8**: Run 1 (20-25 ft), Run 2 (25-30 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-8**: Run 3 (30-35 ft), Run 4 (35-40 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-8**: Run 5 (40-45 ft), Run 6 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-8**: Run 7 (50-55 ft), Run 8 (55-60 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-9**: Run 1 (16.5-21.5 ft), Run 2 (21.5-26.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-9**: Run 3 (26.5-31.5 ft), Run 4 (31.5-36.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-9**: Run 5 (36.5-41.5 ft), Run 6 (41.5-46.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-9**: Run 7 (46.5-51.5 ft), Run 8 (51.5-56.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-10**: Run 1 (21-21.5 ft), Run 2 (21.5-26.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-10**: Run 3 (26.5-31.5 ft), Run 4 (31.5-36.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**HMT-10**: Run 5 (36.5-41.5 ft), Run 6 (41.5-46.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-10**: Run 7 (46.5-51.5 ft), Run 8 (51.5-56.5 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

UES™

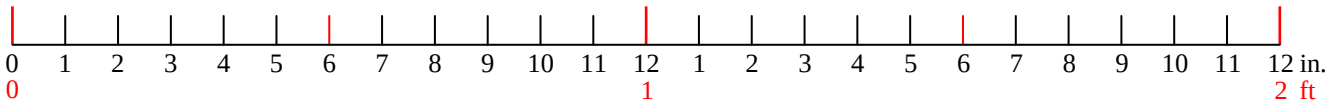
**ROCK CORE PHOTOS**
**040904 Hwy 22 to I-40**
**Crawford County, Arkansas**

**Job No. 23184.00083**

**Plate**

**HMT-10**: Run 9 (56.5-61.5 ft)






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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-14**: Run 1 (40-42 ft), Run 2 (42-47 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-14**: Run 3 (47-52 ft), Run 4 (52-57 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

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|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-14**: Run 5 (57-62 ft), Run 6 (62-67 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-14**: Run 7 (67-72 ft), Run 8 (72-77 ft)

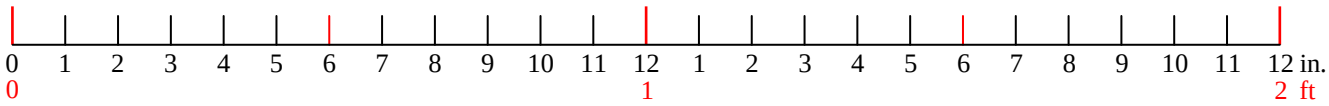


0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-14**: Run 9 (77-80 ft)






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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-15**: Run 1 (24-25 ft), Run 2 (25-30 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

**HMT-15**: Run 3 (30-35 ft), Run 4 (35-40 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-15**: Run 5 (40-45 ft), Run 6 (45-50 ft)



0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

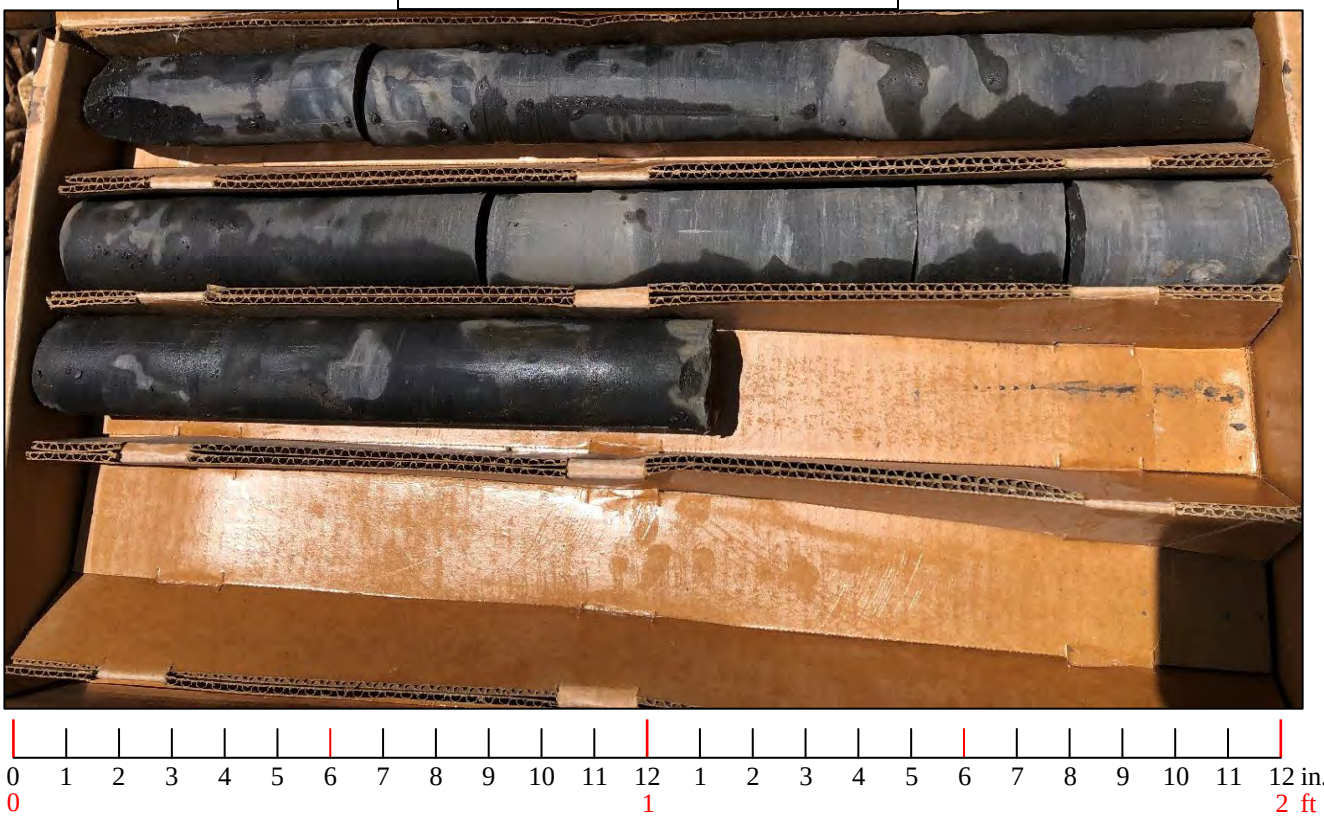
**HMT-15**: Run 7 (50-55 ft), Run 8 (55-60 ft)




0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 in.
0 1 2 ft

| | | |
|---|---|---|
| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

**HMT-15**: Run 9 (60-65 ft)




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| UES™ | **ROCK CORE PHOTOS**<br>**040904 Hwy 22 to I-40**<br>**Crawford County, Arkansas** | **Job No. 23184.00083**<br>**Plate** |

# APPENDIX D

# SUMMARY of CLASSIFICATION TEST RESULTS

PROJECT: 040904 Hwy 22 to I-40
LOCATION: Crawford & Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | ATTERBERG LIMITS | | | SIEVE ANALYSIS PERCENT PASSING | | | | | | | | USCS CLASS. | AASHTO CLASS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | 2 in. | 1 in. | 3/4 in. | 3/8 in. | #4 | #10 | #40 | #200 | | |
| FB-99 | 0.5-1.5 | 21 | 29 | 19 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-100 | 0.5-1.5 | 21 | 22 | 37 | 15 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-101 | 0.5-1.5 | 9 | 40 | 24 | 16 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-101 | 6.5-7.5 | 11 | 51 | 23 | 28 | --- | --- | --- | --- | --- | --- | --- | --- | CH | A-7-6 |
| FB-102 | 2.5-3.5 | 12 | 46 | 21 | 25 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-7-6 |
| FB-103 | 0.5-1.5 | 17 | 64 | 28 | 36 | --- | --- | --- | --- | --- | --- | --- | --- | CH | A-7-6 |
| FB-104 | 2.5-3.5 | 5 | 34 | 18 | 16 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-106 | 0.5-1.5 | 9 | 31 | 18 | 13 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-107 | 2.5-3.5 | | 28 | 21 | 7 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FB-109 | 2.5-3.5 | 23 | 29 | 23 | 6 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FB-110 | 4.5-5.5 | 24 | 28 | 19 | 9 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-112 | 2.5-3.5 | --- | ---Non Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-112 | 4-4.5 | 19 | 23 | 20 | 3 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 68 | ML | A-4 |
| FB-112 | 9-10 | 23 | ---Non Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-113 | 4.5-5.5 | 15 | ---Non Plastic--- | | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 41 | SM | A-4 |
| FB-113 | 14-15 | 14 | ---Non Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-114 | 5.5-6 | 18 | 28 | 17 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-114 | 6-6.5 | 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 60 | CL | A-6 |
| FB-114 | 14-15 | 22 | ---Non Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-115 | 2.5-3.5 | 21 | 36 | 20 | 16 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-115 | 9-10 | 21 | 43 | 22 | 21 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-7-6 |
| FB-116 | 0.5-1.5 | 20 | --- | --- | --- | 100 | 100 | 100 | 100 | 100 | 99 | 92 | 67 | ML | A-4 |
| FB-116 | 2.5-3.5 | 12 | 27 | 22 | 5 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FB-116 | 6.5-7.5 | 20 | 31 | 20 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |

# SUMMARY of CLASSIFICATION TEST RESULTS

PROJECT: 040904 Hwy 22 to I-40
LOCATION: Crawford & Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | ATTERBERG LIMITS | | | SIEVE ANALYSIS PERCENT PASSING | | | | | | | | USCS CLASS. | AASHTO CLASS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | 2 in. | 1 in. | 3/4 in. | 3/8 in. | #4 | #10 | #40 | #200 | | |
| FB-116 | 14-15 | 21 | --- | --- | --- | 100 | 100 | 100 | 100 | 100 | 93 | 69 | 21 | SM | A-2-4 |
| FB-117 | 1-1.5 | 21 | 28 | 21 | 7 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-117 | 4.5-5 | 20 | 30 | 20 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-117 | 19-20 | 28 | 29 | 19 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-118 | 2.5-3.5 | 23 | 29 | 19 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-118 | 4.5-5.5 | 21 | 29 | 19 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-118 | 14-15 | 8 | 29 | 18 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-167 | 2.5-3.5 | 13 | ---Non Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-176 | 6.5-7.5 | --- | 29 | 19 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-179 | 14-14.5 | 16 | 30 | 20 | 10 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 61 | CL | A-4 |
| FB-182 | 14-14.5 | 16 | 28 | 21 | 7 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 57 | CL-ML | A-4 |
| FB-183 | 4.5-5.5 | 12 | 31 | 22 | 9 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-184 | 2.5-3.5 | 4 | 25 | 16 | 9 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-184 | 6.5-7.5 | 7 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-184 | 14-15 | 20 | --- | --- | --- | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 71 | ML | A-4 |
| FB-185 | 6.5-7.5 | 4 | 28 | 15 | 13 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-185A | 2.5-3.5 | 20 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-186 | 0.5-1.5 | 26 | 33 | 26 | 7 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FB-186 | 4.5-5.5 | 12 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-189 | 4.5-5.5 | 16 | 29 | 21 | 8 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-190 | 2.5-3.5 | 13 | 28 | 20 | 10 | --- | --- | --- | --- | --- | --- | --- | 40 | SC | A-4 |
| FB-190 | 4.5-5.5 | 15 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | 52 | ML | A-4 |
| FB-192 | 9-10 | 13 | --- | --- | --- | --- | --- | --- | --- | 99 | --- | --- | 55 | ML | A-4 |

# SUMMARY of CLASSIFICATION TEST RESULTS

PROJECT: 040904 Hwy 22 to I-40
LOCATION: Crawford & Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | ATTERBERG LIMITS | | | SIEVE ANALYSIS PERCENT PASSING | | | | | | | | USCS CLASS. | AASHTO CLASS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | 2 in. | 1 in. | 3/4 in. | 3/8 in. | #4 | #10 | #40 | #200 | | |
| FB-193 | 14-15 | 15 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | 99 | 37 | SM | A-4 |
| FB-194 | 9-10 | 17 | 30 | 17 | 13 | 100 | 100 | 100 | 100 | 90 | 85 | 80 | 70 | CL | A-6 |
| FB-196 | 0.5-1.5 | 15 | 28 | 16 | 12 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FB-199 | 9-10 | 4 | 28 | 22 | 6 | --- | --- | --- | --- | 17 | --- | --- | 8 | GC-GM | A-1-a |
| FB-199 | 14-15 | 6 | --- | --- | --- | --- | --- | --- | --- | 37 | --- | --- | 19 | GC-GM | A-1-b |
| FB-200 | 4.5-5 | 18 | ---Non-Plastic--- | | | --- | --- | --- | --- | 100 | --- | --- | 71 | ML | A-4 |
| FB-200 | 14-15 | 21 | 25 | 20 | 5 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FB-201 | 0.5-1.5 | 20 | 26 | 19 | 7 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FB-202 | 4.5-5.5 | 22 | 28 | 20 | 8 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FB-203 | 5-5.5 | 13 | 23 | 19 | 4 | --- | --- | --- | --- | 99 | --- | --- | 65 | CL-ML | A-4 |
| FB-204 | 4.5-5.5 | 5 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FB-204 | 19-20 | 7 | 18 | 22 | 4 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FE-43 | 2.5-3.5 | 19 | 36 | 17 | 19 | --- | --- | --- | --- | --- | --- | --- | 81 | CL | A-6 |
| FE-46 | 2.5-3.5 | 9 | 27 | 19 | 8 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FE-47 | 2.5-3.5 | 28 | 35 | 21 | 14 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FE-50 | 9-10 | 6 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FE-52 | 0.5-1.5 | 6 | --- | --- | --- | 100 | 92 | 87 | 71 | 64 | 58 | 52 | 28 | GM | A-2-4 |
| FE-52 | 4.5-5.5 | 19 | --- | --- | --- | 100 | 100 | 87 | 83 | 75 | 70 | 64 | 41 | SC-SM | A-4 |
| FE-52 | 6.5-7.5 | 21 | 32 | 20 | 12 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FE-53 | 2.5-3.5 | 19 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FE-55 | 0.5-1.5 | 20 | 43 | 24 | 19 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-7-6 |

# SUMMARY of CLASSIFICATION TEST RESULTS

PROJECT: 040904 Hwy 22 to I-40
LOCATION: Crawford & Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | ATTERBERG LIMITS | | | SIEVE ANALYSIS PERCENT PASSING | | | | | | | | USCS CLASS. | AASHTO CLASS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | 2 in. | 1 in. | 3/4 in. | 3/8 in. | #4 | #10 | #40 | #200 | | |
| FE-56 | 2.5-3.5 | 20 | 46 | 21 | 25 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-7-6 |
| FE-57 | 14-15 | 18 | 35 | 25 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| FE-58 | 6.5-7 | 10 | 29 | 22 | 7 | --- | 52 | 51 | 51 | 50 | 47 | 44 | 28 | GC-GM | A-2-4 |
| FE-61 | 2.5-3.5 | 10 | 34 | 24 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FP-33 | 0.5-1.5 | 11 | 52 | 22 | 30 | --- | --- | --- | --- | --- | --- | --- | --- | CH | A-7-6 |
| FP-34 | 2.5-3.5 | 15 | 28 | 20 | 8 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FP-34 | 9-10 | 19 | 33 | 20 | 13 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FP-36 | 0.5-1.5 | 20 | 38 | 20 | 18 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FP-36 | 4.5-5.5 | 2 | 40 | 19 | 21 | --- | --- | --- | --- | --- | --- | --- | 83 | CL | A-6 |
| FP-37 | 2.5-3.5 | --- | 30 | 18 | 12 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FP-37 | 6.5-7.5 | 22 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | 29 | SM | A-2-4 |
| FP-38 | 2.5-3.5 | 12 | 25 | 18 | 7 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FP-39 | 2.5-3.5 | 13 | 20 | 26 | 6 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FP-39 | 4.5-5.5 | 21 | 19 | 24 | 5 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FP-39 | 6.5-7.5 | 20 | ---Non-Plastic--- | | | --- | --- | --- | --- | --- | --- | --- | --- | SM | A-4 |
| FP-43 | 2.5-3.5 | 19 | 24 | 20 | 4 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| FP-44 | 4.5-5.5 | 20 | 31 | 20 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FW-1 | 2.5-3 | 20 | 25 | 20 | 5 | --- | --- | --- | --- | --- | --- | --- | 62 | CL-ML | A-4 |
| FW-2 | 2.5-3.5 | 18 | 27 | 17 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FW-2 | 9-10 | 17 | 25 | 17 | 8 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-4 |
| FW-4 | 6.5-7.5 | --- | 26 | 21 | 5 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |

# SUMMARY of CLASSIFICATION TEST RESULTS

PROJECT: 040904 Hwy 22 to I-40
LOCATION: Crawford & Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | ATTERBERG LIMITS | | | SIEVE ANALYSIS PERCENT PASSING | | | | | | | | USCS CLASS. | AASHTO CLASS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | 2 in. | 1 in. | 3/4 in. | 3/8 in. | #4 | #10 | #40 | #200 | | |
| FW-5 | 18.5-19 | 26 | 44 | 23 | 21 | 100 | 100 | 100 | 100 | 100 | --- | --- | 74 | CL | A-7-6 |
| FW-6 | 9-10 | 26 | 39 | 25 | 14 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| FW-8 | 9-10 | 9 | 33 | 15 | 18 | --- | --- | --- | --- | --- | --- | --- | --- | CL | A-6 |
| HMT-2 | 0.5-1.5 | 4.5 | --- | --- | --- | 100 | 100 | 80 | 59 | 46 | 34 | 26 | 15 | GM | A-1-a |
| HMT-4 | 2.5-3.5 | 18 | --Non-Plastic-- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| HMT-4 | 7-7.5 | 18 | --Non-Plastic-- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| HMT-4 | 7.5-8.0 | 18 | --Non-Plastic-- | | | 100 | 100 | 100 | 100 | 100 | --- | --- | 57 | ML | A-4 |
| HMT-4 | 9-10 | 10 | --- | --- | --- | 100 | 100 | 66 | 49 | 41 | 33 | 27 | 11 | SANDSTONE | |
| HMT-5 | 4.5-5.5 | 5 | --- | --- | --- | 100 | 85 | 78 | 70 | 64 | 59 | 56 | 25 | SM | A-2-4 |
| HMT-6 | 4.5-5.5 | 7 | --Non-Plastic-- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| HMT-6 | 19-20 | 6 | --Non-Plastic-- | | | --- | --- | --- | --- | 30 | --- | --- | 8 | SM-SP | A-1-a |
| HMT-7 | 2.5-3.5 | 20 | 26 | 21 | 5 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-2-4 |
| HMT-9 | 2.5-3.5 | 16 | --Non-Plastic-- | | | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| HMT-10 | 4.5-5 | 22 | 27 | 23 | 4 | --- | --- | --- | --- | 98 | --- | --- | 57 | CL-ML | A-4 |
| HMT-14 | 4.5-5.5 | 8 | 21 | 18 | 3 | --- | --- | --- | --- | --- | --- | --- | --- | ML | A-4 |
| HMT-14 | 9-10 | 14 | 21 | 15 | 6 | --- | --- | --- | --- | --- | --- | --- | --- | CL-ML | A-4 |
| HMT-15 | 2.5-3.5 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 55 | ML | A-4 |

# APPENDIX E

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

**Sample:** FB-116, 14-15
Description: Reddish tan silty fine SAND with sandstone fragments

**USCS Classification = SM**
**AASHTO Classification = A-2-4**

23184.00083

# GRAIN SIZE CURVE



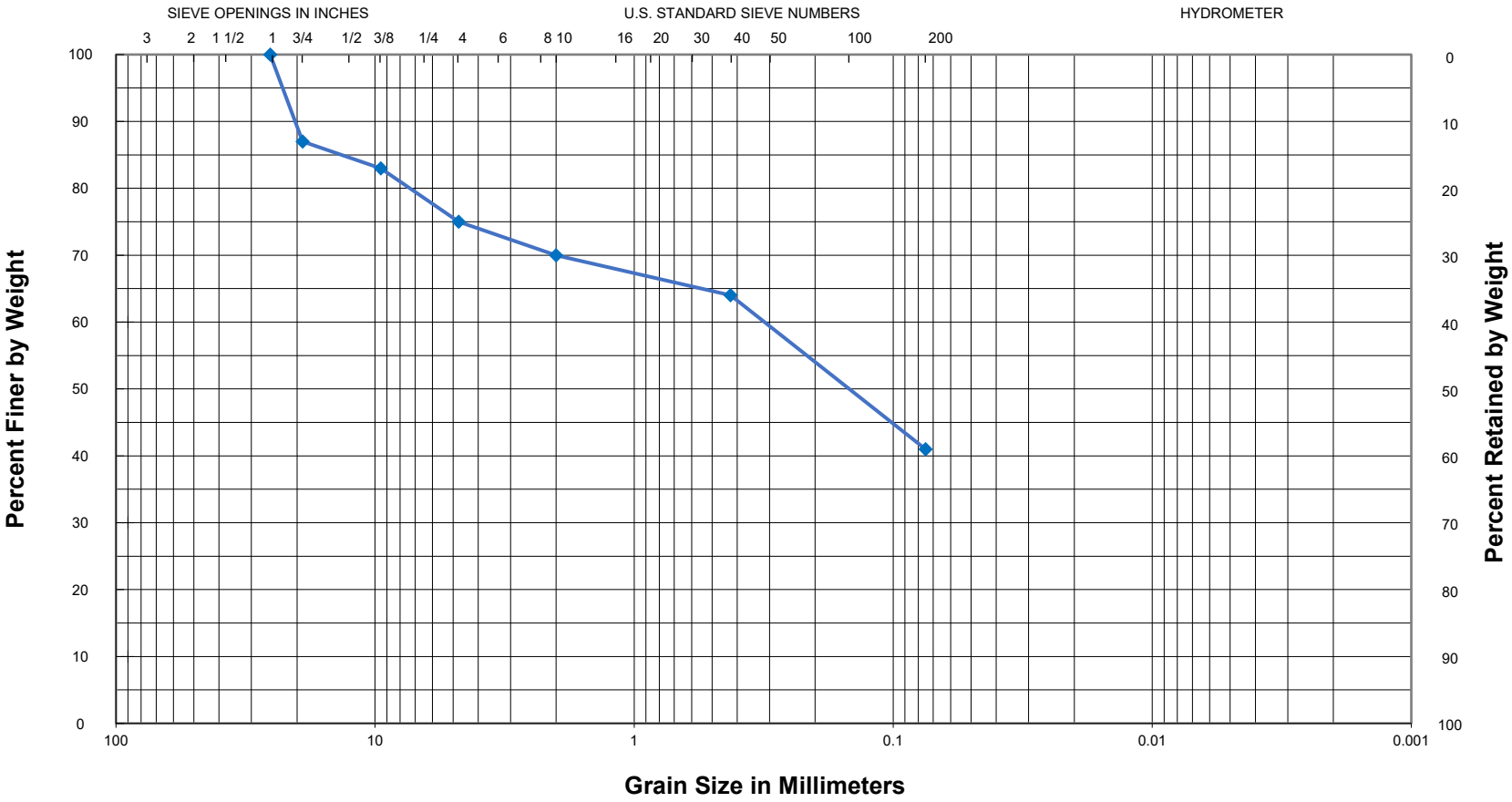

| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

**Sample:** Boring FE-52, 0.5-3.5 ft
**Description:** Brown and tan silty fine to coarse crushed stone, sandy (fill)

**USCS Classification = GM**
**AASHTO Classification = A-2-4**

23184.00083

# GRAIN SIZE CURVE



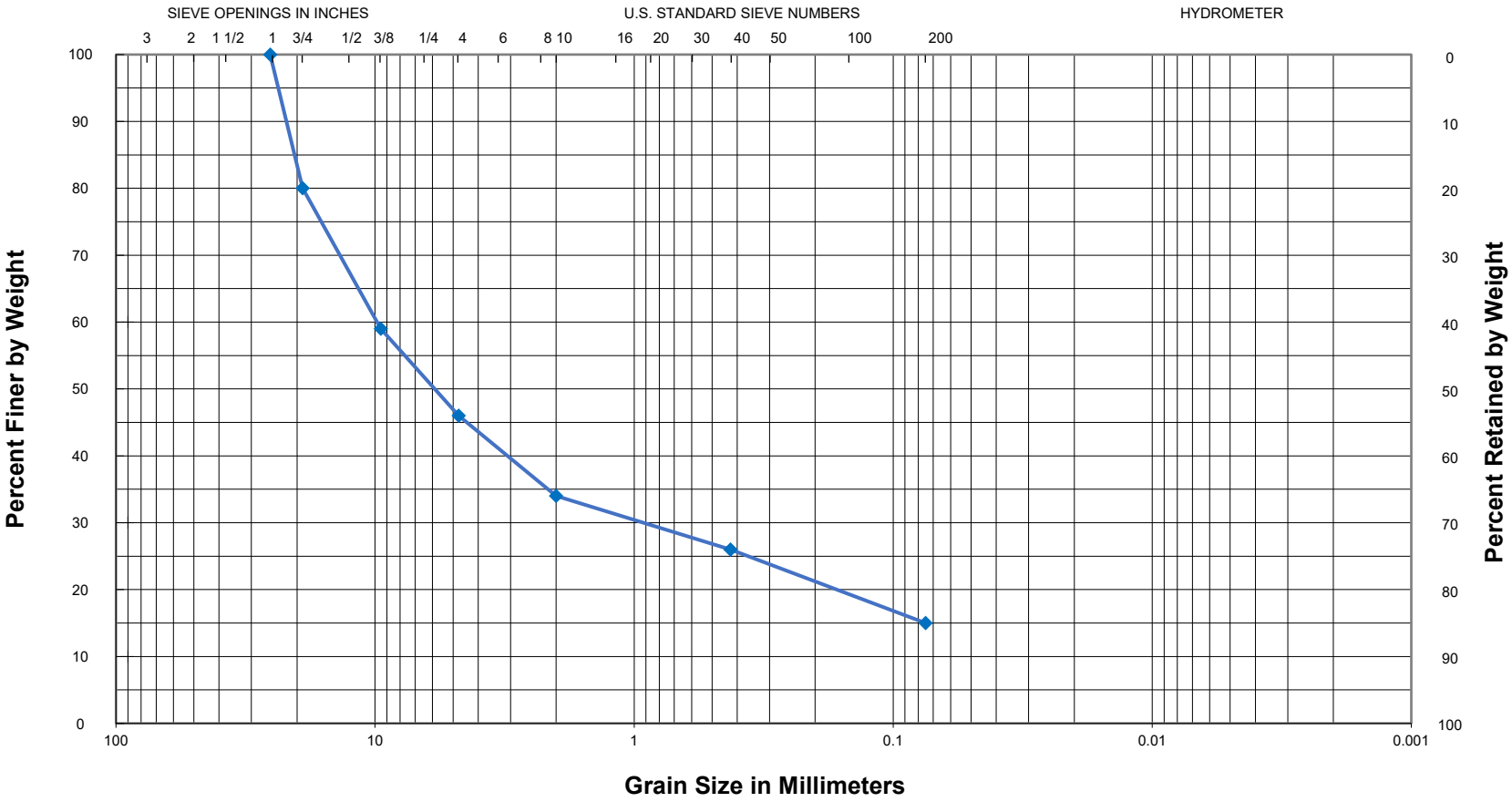

| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

**Sample:** Boring FE-52, 4.5-5.5 ft
**Description:** Brown and tan silty fine to medium sand, clayey w/some ferrous noduels and stains

**USCS Classification = SC-SM**
**AASHTO Classification = A-4**

23184.00083

# GRAIN SIZE CURVE



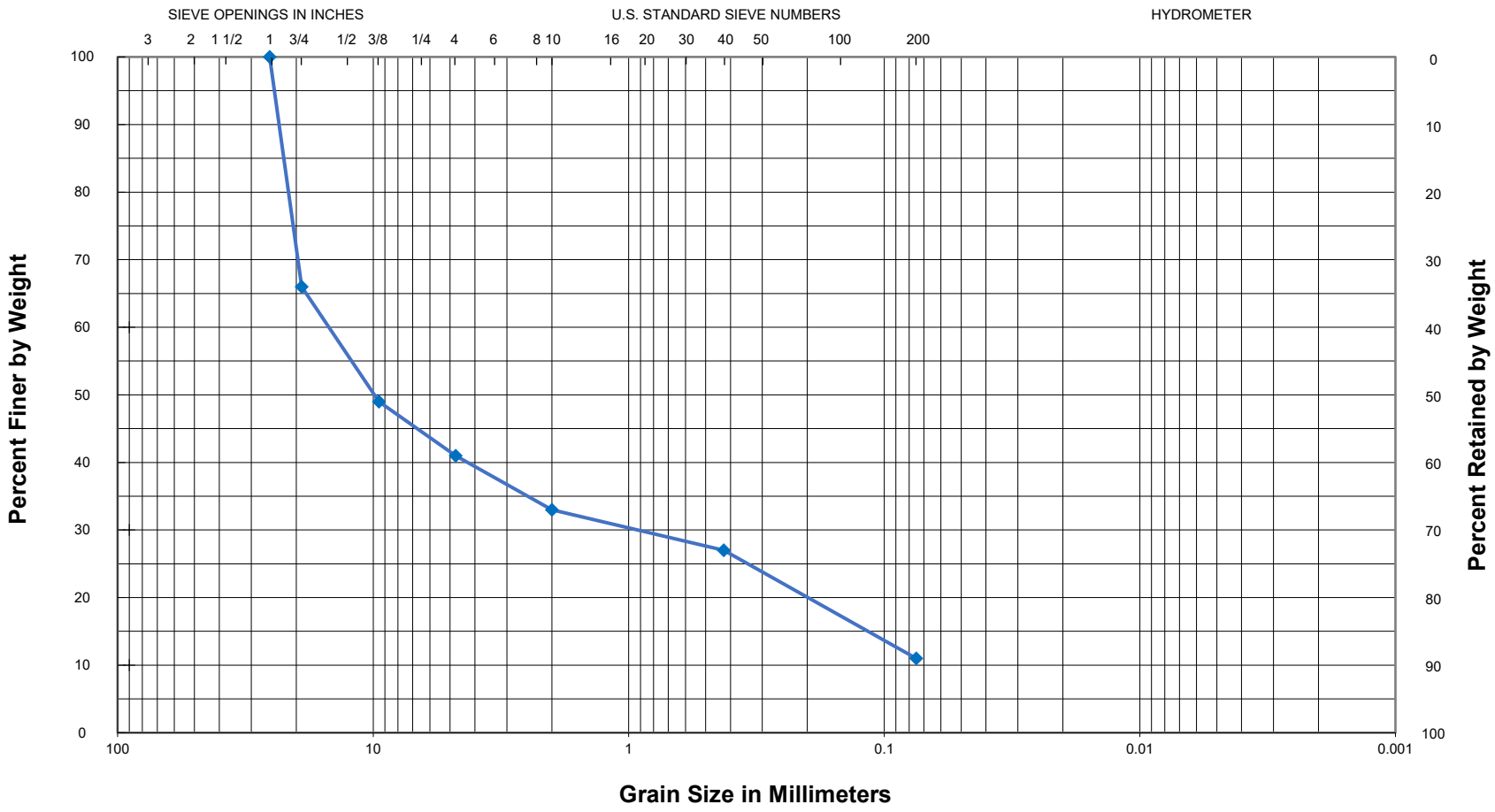

| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

**Sample:** Boring HMT-2, 0.5-3.5 ft
**Description:** Tan and brown fine sandy silt (ML) w/sandstone fragments (fill)

**USCS Classification = GM**
**AASHTO Classification = A-1-a**

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

**Sample:** Boring HMT-4, 9-10 ft
**Description:** Very loose reddish brown silty fine sand, slightly clayey, with some sandstone fragments

**USCS Classification = SM**
**AASHTO Classification = A-1-a**

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

**Sample:** Boring HMT-5, 4.5-5.5 ft
**Description:** Reddish brown and tan highly weathered fine-grained sandstone

**USCS Classification = SP**
**AASHTO Classification = A-2-4**

# APPENDIX F

# HYDROMETER ANALYSIS

(AASHTO T 88)

Job No. **23184.00083**
Project: **04078 Hwy 22 to I-40**
**Sebastian County**

Test Date:
Tested by: LLC
Reported by: JDF

Boring No.: **FB-116**
Sample Description: Brown clayey SILT (CL-ML)

Sample Depth, ft: **0.5-1.5**

$$P = \frac{(R - C)a}{W_d} \times 100$$

$$D = K \times 1\sqrt{\frac{L}{t}}$$

Moisture Content Determination

| | | | | | |
|---|---|---|---|---|---|
| Tin No. | **T1** | | %-No.10 | **98.60** | % |
| Wt. Tin + Wet | **484.13** | | Gs | **2.6240** | g/g |
| Wt. Tin + Dry | **429.39** | | Sample Wet Wt | **55.10** | g |
| Wt. Tin | **149.71** | | Sample Dry Wt | 54.80 | g - $W_d$ |
| Moisture Content | **19.60** | % | Corr. Factor, a | 1.006 | |

Time Start: Time Stop:

| Elapsed Time t, min | Temperature T, °C | Reading R, g/l | Correction C | Corr. RDG R - C, g/l | % Pasing P, % | Eff. Depth L, cm | K | Part Dia D, mm |
|---|---|---|---|---|---|---|---|---|
| 0.00 | | | | | | | | |
| 1 | **20.0** | **36.5** | **7** | 29.50 | 53.4 | 10.2 | 0.013804 | 0.0441 |
| 2 | **20.0** | **33** | **7** | 26.00 | 47.1 | 10.9 | 0.013804 | 0.0322 |
| 4 | **20.0** | **29.5** | **7** | 22.50 | 40.7 | 11.4 | 0.013804 | 0.0233 |
| 8 | **20.0** | **26.5** | **7** | 19.50 | 35.3 | 11.9 | 0.013804 | 0.0168 |
| 15 | **20.0** | **23.5** | **7** | 16.50 | 29.9 | 12.4 | 0.013804 | 0.0126 |
| 30 | **20.2** | **21** | **6.9** | 14.10 | 25.5 | 12.9 | 0.013764 | 0.0090 |
| 60 | **20.0** | **18.5** | **7** | 11.50 | 20.8 | 13.2 | 0.013804 | 0.0065 |
| 120 | **19.8** | **16** | **7.1** | 8.00 | 16.1 | 13.7 | 0.013824 | 0.0047 |
| 240 | **19.8** | **14.5** | **7.1** | 7.40 | 13.4 | 13.8 | 0.013824 | 0.0033 |
| 480 | **19.7** | **13.5** | **7.1** | 6.40 | 11.6 | 14.0 | 0.013834 | 0.0024 |
| 1440 | **20.0** | **13** | **7** | 6.00 | 10.9 | 14.2 | 0.013804 | 0.0014 |

**COARSE SIEVE ANALYSIS**

| Sieve | Opening Size mm | % Passing % |
|---|---|---|
| **2"** | **50.80** | 100.00 |
| 1" | 25.4000 | 100.00 |
| 3/4" | 19.0000 | 100.00 |
| 3/8" | 9.5000 | 100.00 |
| No.4 | 4.7500 | 100.00 |
| No.10 | 2.0000 | 98.60 |

**FINE SIEVE ANALYSIS**

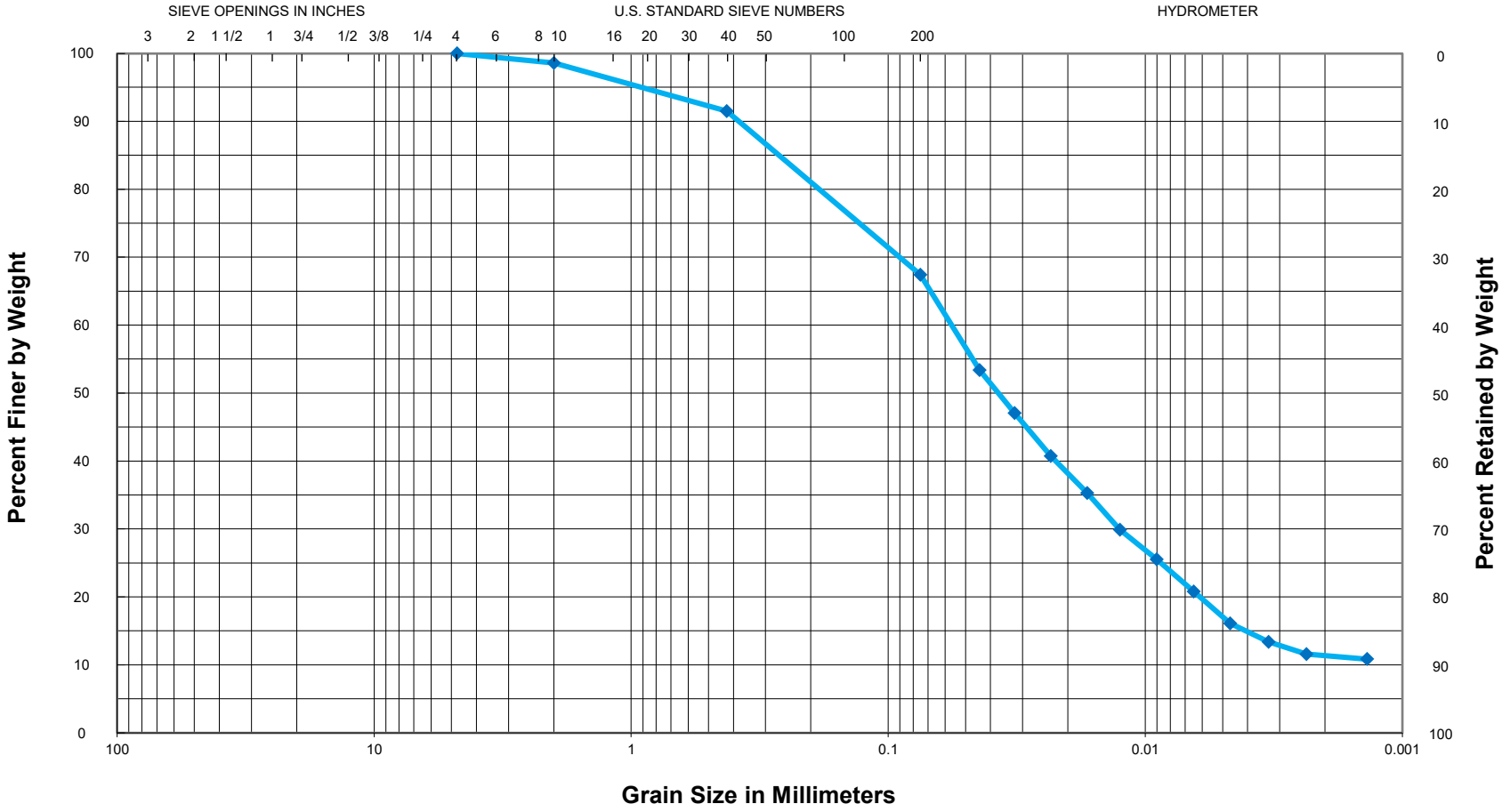
| Sieve | Opening Size mm | |
|---|---|---|
| No.10 | 2.0000 | 98.60 |
| No.40 | 0.4250 | 91.51 |
| No.200 | 0.0750 | 67.42 |

**COMPLETE CURVE**

| | Sieve | Opening Size mm | % Passing % | Mod. % Passing % |
|---|---|---|---|---|
| | **2"** | **50.80** | 100.00 | **100.00** |
| | 1" | 25.4000 | 100.00 | **100.00** |
| | 3/4" | 19.0000 | 100.00 | **100.00** |
| COARSE | 3/8" | 9.5000 | 100.00 | **100.00** |
| | No.4 | 4.7500 | 100.00 | **100.00** |
| | No.10 | 2.0000 | 98.60 | **98.60** |
| | No.40 | 0.4250 | 91.51 | **91.51** |
| FINE | No.200 | 0.0750 | 67.42 | **67.42** |
| | | 0.0441 | 53.40 | **53.40** |
| | | 0.0322 | 47.06 | **47.06** |
| | | 0.0233 | 40.73 | **40.73** |
| | | 0.0168 | 35.30 | **35.30** |
| | | 0.0126 | 29.87 | **29.87** |
| | | 0.0090 | 25.52 | **25.52** |
| HYDROMETER | | 0.0065 | 20.82 | **20.82** |
| | | 0.0047 | 16.11 | **16.11** |
| | | 0.0033 | 13.39 | **13.39** |
| | | 0.0024 | 11.58 | **11.58** |
| | | 0.0014 | 10.86 | **10.86** |
| | | 0.0000 | 0.00 | **0.00** |

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | | |

**Sample:** Boring FB-116, 0.5-1.5 ft
**Description:** Brown clayey SILT

**USCS Classification = CL-ML**
**AASHTO Classification = A-4**

# HYDROMETER ANALYSIS

(AASHTO T 88)

Job No. **23184.00083**
Project: **04078 Hwy 22 to I-40**
**Sebastian County**

Test Date:
Tested by: LLC
Reported by: JDF

Boring No.: **HMT-15**
Sample Description: Brown clayey SILT (CL-ML)

Sample Depth, ft: **2.5-3.5**

$$P = \frac{(R - C)a}{W_d} \times 100$$

$$D = K \times 1\sqrt{\frac{L}{t}}$$

Moisture Content Determination

| | | | | |
|---|---|---|---|---|
| Tin No. | **GOP-1** | %-No.10 | **100.00** | % |
| Wt. Tin + Wet | **726.99** | Gs | **2.6870** | g/g |
| Wt. Tin + Dry | **691.47** | Sample Wet Wt | **53.93** | g |
| Wt. Tin | **362.61** | Sample Dry Wt | 53.50 | g - $W_d$ |
| Moisture Content | **10.80** % | Corr. Factor, a | 0.992 | |

Time Start: Time Stop:

| Elapsed Time t, min | Temperature T, °C | Reading R, g/l | Correction C | Corr. RDG R - C, g/l | % Pasing P, % | Eff. Depth L, cm | K | Part Dia D, mm |
|---|---|---|---|---|---|---|---|---|
| 0.00 | | | | | | | | |
| 1 | **21.2** | **30** | **6.5** | 23.50 | 43.6 | 11.4 | 0.013312 | 0.0449 |
| 2 | **21.2** | **26.5** | **6.5** | 20.00 | 37.1 | 11.9 | 0.013312 | 0.0325 |
| 4 | **21.2** | **24** | **6.5** | 17.50 | 32.5 | 12.4 | 0.013312 | 0.0234 |
| 8 | **21.2** | **21.5** | **6.5** | 15.00 | 27.8 | 12.7 | 0.013312 | 0.0168 |
| 15 | **21.2** | **20** | **6.5** | 13.50 | 25.0 | 13.0 | 0.013312 | 0.0124 |
| 30 | **21.0** | **18.5** | **6.5** | 12.00 | 22.3 | 13.2 | 0.013352 | 0.0089 |
| 60 | **20.8** | **17.5** | **6.6** | 10.90 | 20.4 | 13.3 | 0.013392 | 0.0063 |
| 120 | **20.8** | **16.75** | **6.6** | 8.00 | 18.4 | 13.5 | 0.013392 | 0.0045 |
| 240 | **20.6** | **15.25** | **6.7** | 8.55 | 15.9 | 13.8 | 0.013432 | 0.0032 |
| 480 | **20.6** | **14** | **6.7** | 7.30 | 13.5 | 14.0 | 0.013432 | 0.0023 |
| 1440 | **20.6** | **12** | **6.7** | 5.30 | 9.8 | 14.3 | 0.013432 | 0.0013 |

**COARSE SIEVE ANALYSIS**

| Sieve | Opening Size mm | % Passing % |
|---|---|---|
| **2"** | **50.80** | 100.00 |
| 1" | 25.4000 | 100.00 |
| 3/4" | 19.0000 | 100.00 |
| 3/8" | 9.5000 | 100.00 |
| No.4 | 4.7500 | 100.00 |
| No.10 | 2.0000 | 100.00 |

**FINE SIEVE ANALYSIS**

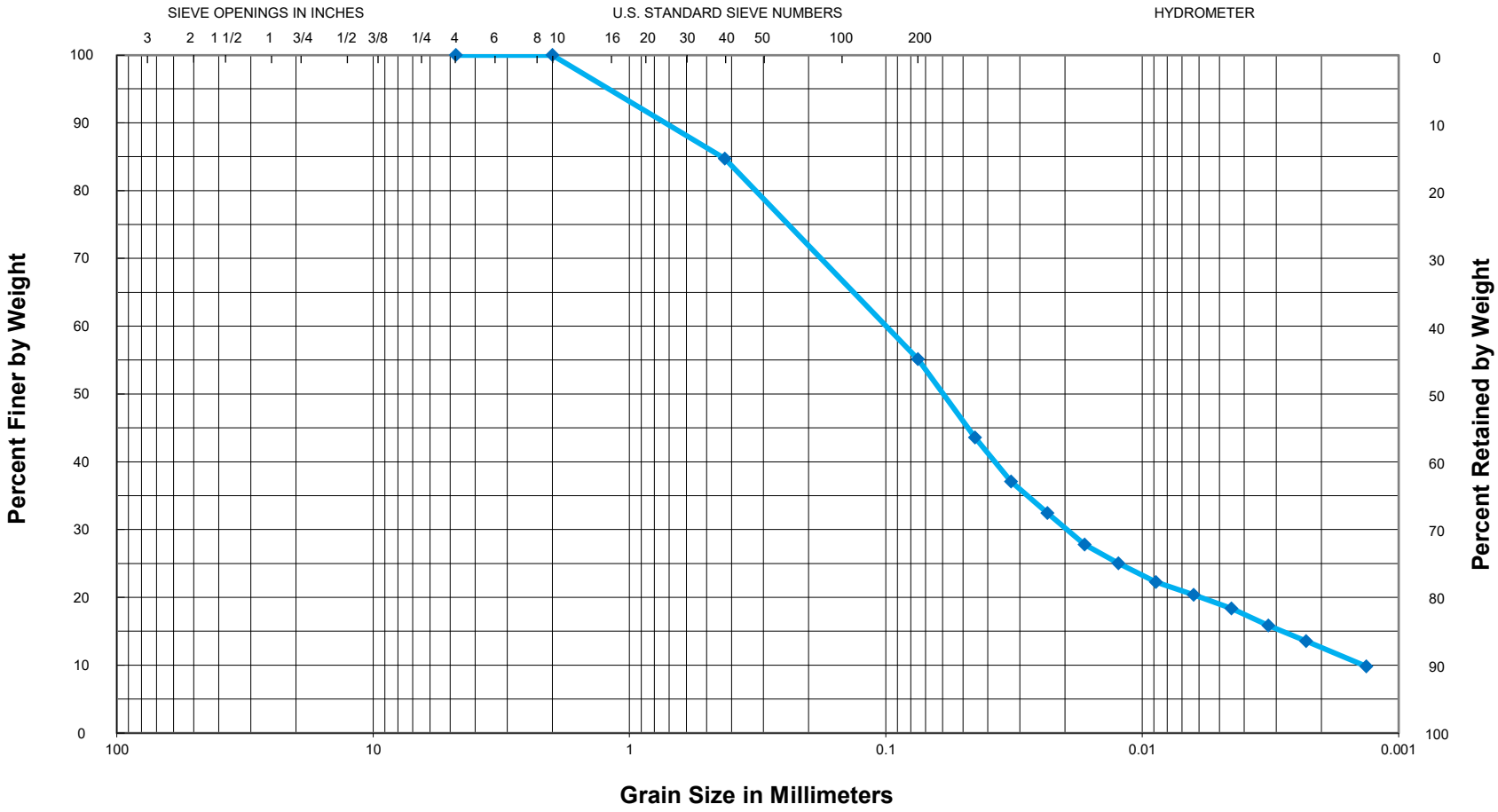
| Sieve | Opening Size mm | |
|---|---|---|
| No.10 | 2.0000 | 100.00 |
| No.40 | 0.4250 | 84.73 |
| No.200 | 0.0750 | 55.16 |

**COMPLETE CURVE**

| | Sieve | Opening Size mm | % Passing % | Mod. % Passing % |
|---|---|---|---|---|
| | **2"** | **50.80** | 100.00 | **100.00** |
| | 1" | 25.4000 | 100.00 | **100.00** |
| | 3/4" | 19.0000 | 100.00 | **100.00** |
| COARSE | 3/8" | 9.5000 | 100.00 | **100.00** |
| | No.4 | 4.7500 | 100.00 | **100.00** |
| | No.10 | 2.0000 | 100.00 | **100.00** |
| | No.40 | 0.4250 | 84.73 | **84.73** |
| FINE | No.200 | 0.0750 | 55.16 | **55.16** |
| | | 0.0449 | 43.57 | **43.57** |
| | | 0.0325 | 37.08 | **37.08** |
| | | 0.0234 | 32.45 | **32.45** |
| | | 0.0168 | 27.81 | **27.81** |
| | | 0.0124 | 25.03 | **25.03** |
| HYDROMETER | | 0.0089 | 22.25 | **22.25** |
| | | 0.0063 | 20.40 | **20.40** |
| | | 0.0045 | 18.36 | **18.36** |
| | | 0.0032 | 15.85 | **15.85** |
| | | 0.0023 | 13.54 | **13.54** |
| | | 0.0013 | 9.83 | **9.83** |
| | | 0.0000 | 0.00 | **0.00** |

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | | |

**Sample:** Boring HMT-15, 2.5-3.5 ft
**Description:** Brown fine sandy SILT

**USCS Classification = ML**
**AASHTO Classification = A-4**

# APPENDIX G

# SUMMARY of SOIL COMPRESSION TEST RESULTS and UNIT WEIGHTS

PROJECT: 040904 Hwy 22 to I-40
LOCATION: Crawford County, Arkansas
UES JOB NUMBER: A23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | DRY UNIT WEIGHT ($lbs/ft^3$) | CONFINING PRESSURE ($lbs/in.^2$) | UNDRAINED SHEAR STRENGTH (cohesion, $s_u$) ($lbs/ft^2$) |
|---|---|---|---|---|---|
| FB-102 | 0.5-1.5 | 14 | 101 | --- | --- |
| | | | | | |
| FB-103 | 2.5-3.5 | 13 | 122 | --- | --- |
| | | | | | |
| FB-107 | 0.5-1.5 | 12 | 111 | --- | --- |
| FB-107 | 4.5-5.5 | 18 | 107 | --- | --- |
| | | | | | |
| FB-112 | 4.5-5 | 19 | 109 | --- | --- |
| | | | | | |
| FB-115A | 4.5-5.5 | 22 | 99 | --- | --- |
| | | | | | |
| FB-165 | 2.5-3.5 | 14 | 109 | --- | --- |
| | | | | | |
| FB-176 | 2.5-3 | 17 | 113 | --- | 860 |
| | | | | | |
| FB-177 | 0.5-1.5 | 14 | 106 | --- | --- |
| | | | | | |
| FB-179 | 14-14.5 | 16 | 109 | --- | --- |
| | | | | | |
| FB-182 | 2.5-3.5 | 15 | 103 | --- | --- |
| FB-182 | 14-14.5 | 16 | 116 | --- | 1740 |
| | | | | | |
| FB-184 | 0.5-1.5 | 10 | 118 | --- | --- |
| | | | | | |
| FB-185 | 2.5-3.5 | 11 | 88 | --- | --- |
| | | | | | |
| FB-186 | 2.5-3 | 20 | 109 | --- | 1120 |
| | | | | | |
| FB-188 | 2.5-3 | 18 | 111 | --- | 3020 |
| | | | | | |
| FB-189 | 2.5-3.5 | 15 | 113 | --- | --- |

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | DRY UNIT WEIGHT ($lbs/ft^3$) | CONFINING PRESSURE ($lbs/in.^2$) | UNDRAINED SHEAR STRENGTH (cohesion, $s_u$) ($lbs/ft^2$) |
|---|---|---|---|---|---|
| FB-189 | 6.5-7.5 | 14 | 108 | --- | --- |
| | | | | | |
| FB-191 | 2.5-3 | 16 | 113 | --- | --- |
| | | | | | |
| FB-192 | 0.5-1.5 | 14 | 106 | --- | --- |
| FB-192 | 4.5-5.5 | 12 | 111 | --- | --- |
| | | | | | |
| FB-193 | 2.5-3.5 | 15 | 102 | --- | --- |
| FB-193 | 14-15 | 15 | 104 | --- | --- |
| | | | | | |
| FB-194 | 2.5-3.5 | 17 | 99 | --- | --- |
| | | | | | |
| FB-195 | 2.5-3.5 | 13 | 120 | --- | --- |
| FB-195 | 6.5-7.5 | 20 | 81 | --- | --- |
| | | | | | |
| FB-196 | 4.5-5.5 | 13 | 112 | --- | --- |
| | | | | | |
| FB-197 | 0.5-1.5 | 11 | 115 | --- | --- |
| | | | | | |
| FB-198 | 4.5-5.5 | 19 | 99 | --- | --- |
| | | | | | |
| FB-200 | 4.5-5 | 17 | 107 | --- | --- |
| | | | | | |
| FB-201 | 4.5-5.5 | 13 | 88 | --- | --- |
| FB-201 | 14-15 | 16 | 99 | --- | --- |
| | | | | | |
| FB-202 | 0.5-1.5 | 19 | 94 | --- | --- |
| | | | | | |
| FB-203 | 2.5-3.5 | 12 | 114 | --- | --- |
| FB-203 | 5-5.5 | 19 | 105 | --- | --- |
| FB-203 | 9-10 | 15 | 93 | --- | --- |
| | | | | | |
| FB-210 | 2.5-3.5 | 16 | 110 | --- | --- |
| | | | | | |
| FB-211 | 0.5-1.5 | 20 | 101 | --- | --- |
| FB-211 | 2.5-3.5 | 13 | 101 | --- | --- |
| FB-211 | 6.5-7.5 | 24 | 102 | --- | --- |
| FB-211 | 9-10 | 26 | 96 | --- | 900 |

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | DRY UNIT WEIGHT ($lbs/ft^3$) | CONFINING PRESSURE ($lbs/in.^2$) | UNDRAINED SHEAR STRENGTH (cohesion, $s_u$) ($lbs/ft^2$) |
|---|---|---|---|---|---|
| FE-46 | 0.5-1.5 | 9 | 116 | --- | --- |
| | | | | | |
| FE-50 | 2.5-3.5 | 16 | 104 | --- | --- |
| FE-50 | 4.5-5.5 | 19 | 101 | --- | --- |
| | | | | | |
| FE-51 | 4.5-5.5 | 16 | 114 | --- | --- |
| | | | | | |
| FP-33 | 4.5-5.5 | 11 | 116 | --- | --- |
| | | | | | |
| FP-34 | 4.5-5 | 16 | 115 | --- | 4820 |
| | | | | | |
| FP-36 | 6.5-7.5 | 14 | 110 | --- | --- |
| FP-36 | 9-10 | 18 | 109 | --- | --- |
| | | | | | |
| FP-37 | 0.5-1.5 | 14 | 104 | --- | --- |
| | | | | | |
| FP-38 | 4.5-5.5 | 17 | 108 | --- | --- |
| | | | | | |
| FW-3 | 14-15 | 15 | 111 | --- | --- |
| | | | | | |
| FW-4 | 9-10 | 21 | 109 | --- | 790 |
| | | | | | |
| FW-5 | 19-19.5 | 26 | 95 | --- | --- |
| | | | | | |
| HMT-4 | 7-7.5 | 17 | 111 | --- | 600 |
| | | | | | |
| HMT-6 | 0.5-1.5 | 9 | 128 | --- | --- |
| HMT-6 | 6.5-7.5 | 13 | 91 | --- | --- |
| | | | | | |
| HMT-7 | 4.5-5 | 21 | 107 | --- | --- |
| | | | | | |
| HMT-8 | 0.5-1.5 | 11 | 112 | --- | --- |
| HMT-8 | 4.5-5.5 | 4 | 114 | --- | --- |
| | | | | | |
| HMT-9 | 4.5-5 | 16 | 115 | --- | --- |
| | | | | | |
| HMT-14 | 4.5-5.5 | 8 | 103 | --- | --- |
| | | | | | |

| BORING No. | SAMPLE DEPTH (ft) | WATER CONTENT (%) | DRY UNIT WEIGHT ($lbs/ft^3$) | CONFINING PRESSURE ($lbs/in.^2$) | UNDRAINED SHEAR STRENGTH (cohesion, $s_u$) ($lbs/ft^2$) |
|---|---|---|---|---|---|
| HMT-15 | 2.5-3.5 | 11 | 114 | --- | --- |
| HMT-15 | 14-15 | 17 | 107 | --- | --- |

Notes:

1. If no confining pressure shown, test is an unconfined compression test performed per AASHTO T 296.
2. Where a confining pressure is indicated, the test is an Unconsolidated-Undrained Triaxial compression test performed per AASHTO T 208.

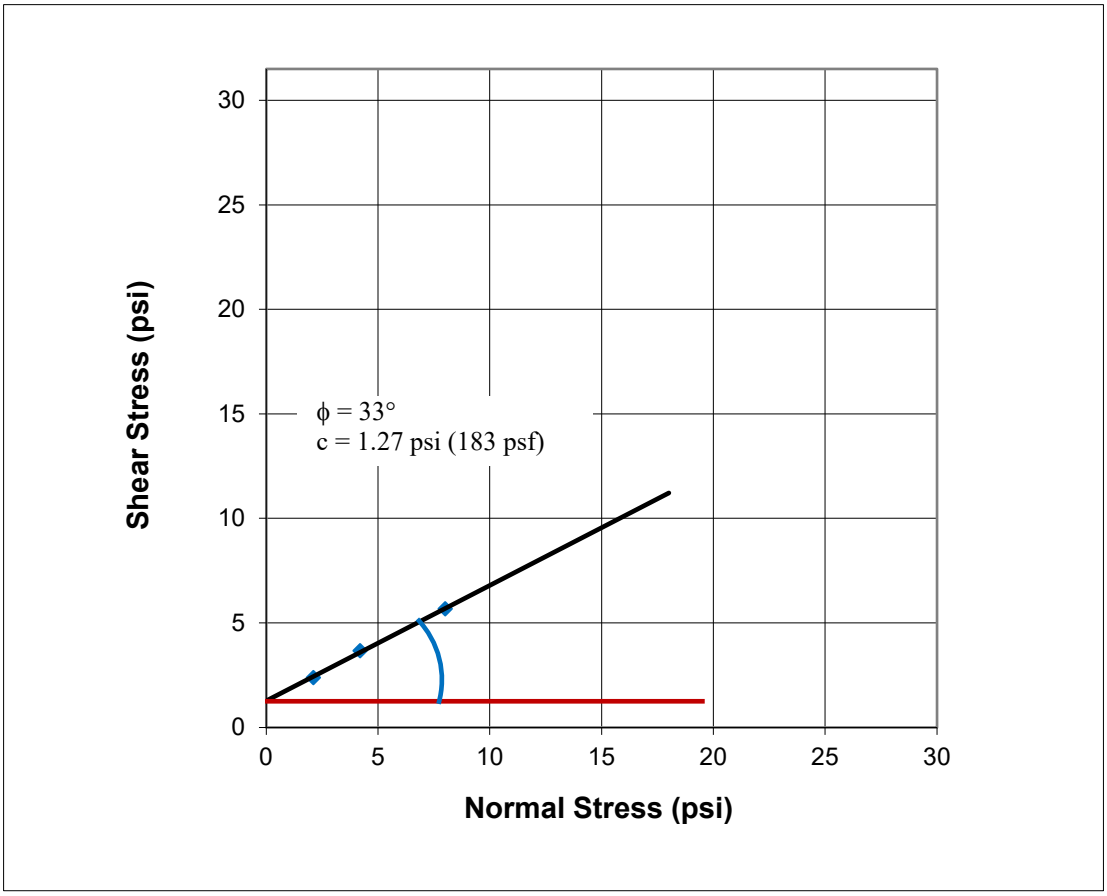
# APPENDIX H

# DIRECT SHEAR (AASHTO T 296) TEST RESULTS

(Consolidated Drained)

| | | | |
|---|---|---|---|
| Job Number: | 23184.00083 | Tested By: | LLC |
| Project: | 040748 Hwy 22 to I-40 | Reported by: | JDF |
| | Crawford County, Arkansas | Test Date: | 5/19/2024 |
| Sample Depth: | 2-2.5 | | |
| Source: | FW-7 | | |
| Sample Description: | Reddish brown clayey silt | | |
| Material Properties: | Percent Passing No. 200 Sieve = NA | | |
| | ASTM Classification: ML, AASHTO Classification = A-4 | | |

| Specimen | Normal Stress, $\sigma'_v$ (psi) | Shear at failure, $\tau_f$ (psi) | Unit Dry Wt, $\gamma_d$ (lb/ft$^3$) | Moisture Content, w (%) |
|---|---|---|---|---|
| 1 | 2.1 | 2.4 | 110.5 | 19.3 |
| 2 | 4.2 | 3.7 | 110.5 | 19.9 |
| 3 | 8.0 | 5.7 | 110.5 | 20.3 |

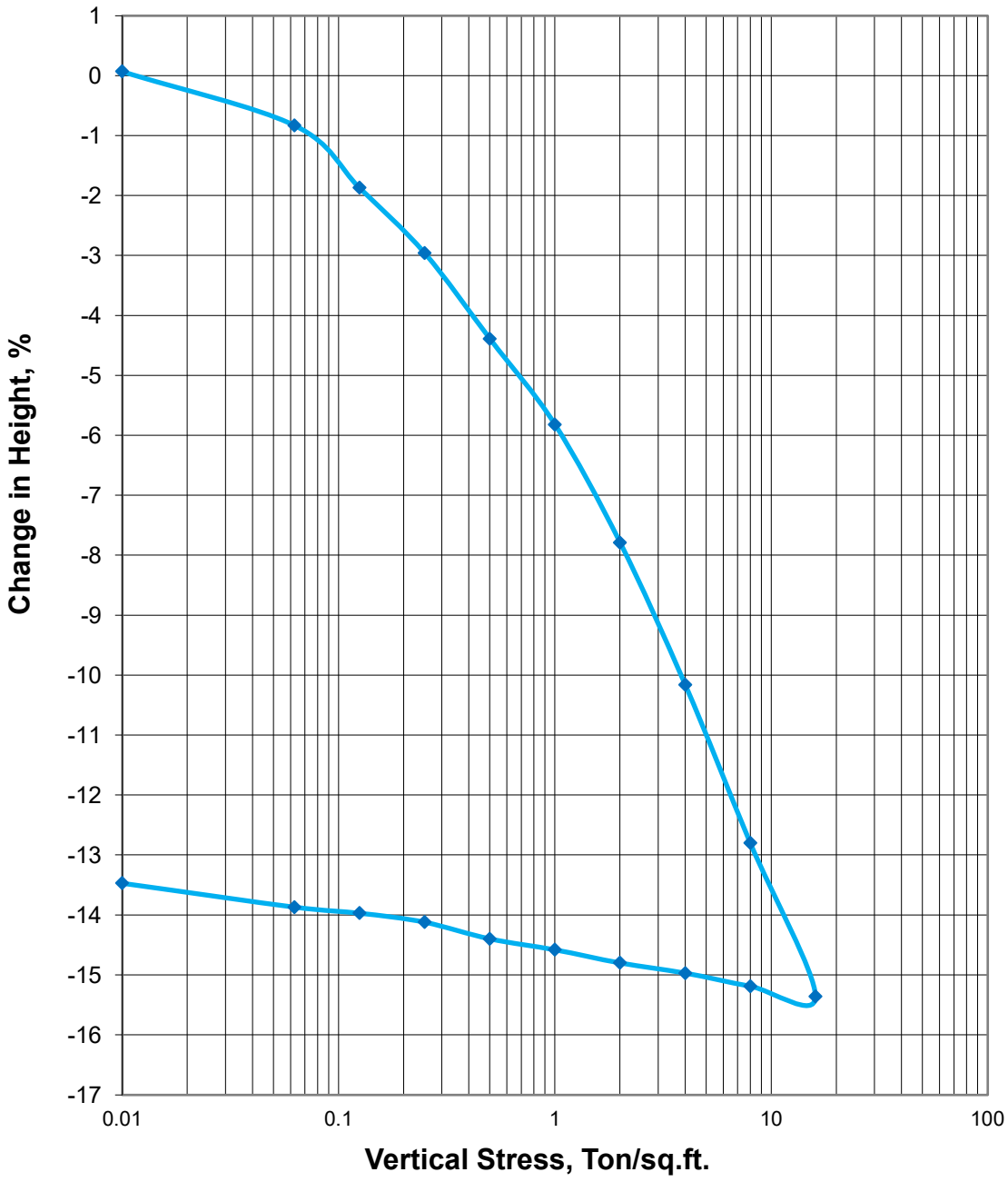


# APPENDIX I

# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-114
**Sample Depth:** 5.5-6 ft
**Description:** Reddish brown fine sandy CLAY
**USCS Classification:** CL
**AASHTO Classification:** A-6
**Specific Gravity:** 2.67

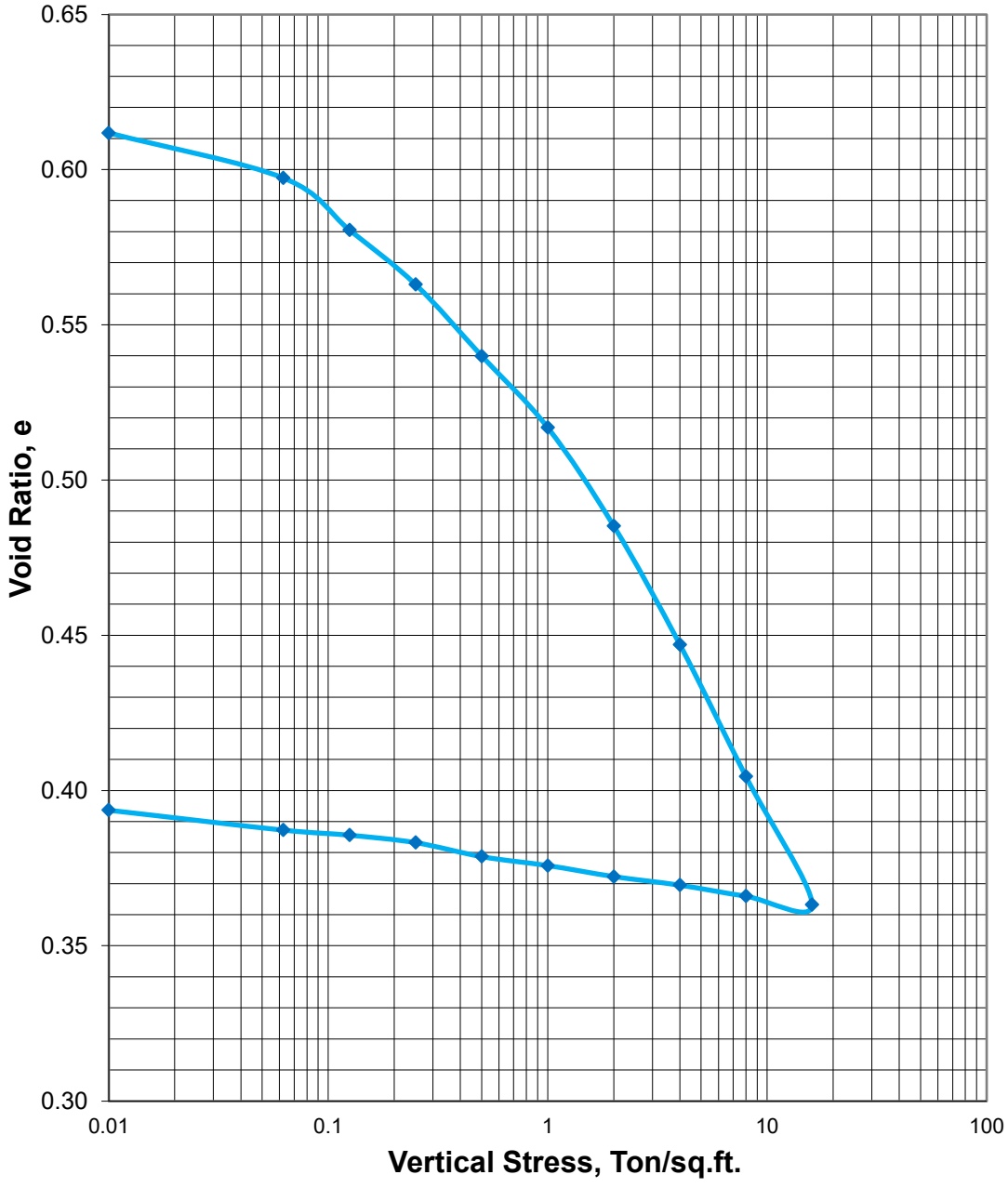
**Unit Dry Weight:** 103.4 lbs/cu ft
**Initial Water Content:** 18.3%
**Final Water Content:** 19.5%
**Initial Saturation:** 113.8%
**Final Saturation:** 10.7%
**Liquid Limit:** 28
**Plastic Limit:** 17
**Percent Passing #200:** 60%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-114
**Sample Depth:** 5.5-6 ft
**Description:** Reddish brown fine sandy CLAY
**USCS Classification:** CL
**AASHTO Classification:** A-6
**Specific Gravity:** 2.67

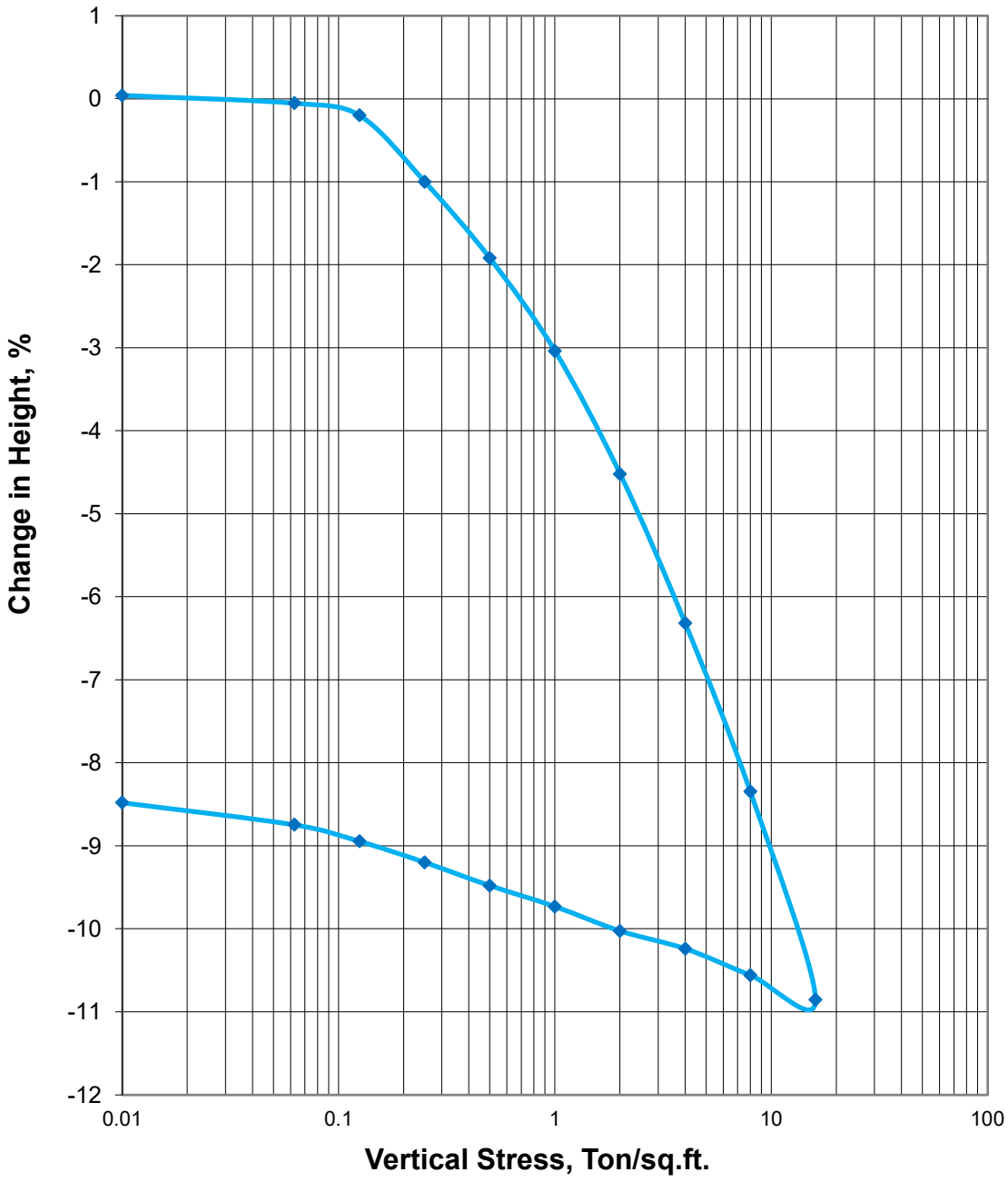
**Unit Dry Weight:** 103.4 lbs/cu ft
**Initial Water Content:** 18.3%
**Final Water Content:** 19.5%
**Initial Saturation:** 113.8%
**Final Saturation:** 10.7%
**Liquid Limit:** 28
**Plastic Limit:** 17
**Percent Passing #200:** 60%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-179
**Sample Depth:** 14-14.5 ft
**Description:** Tan fine sandy CLAY
**USCS Classification:** CL
**AASHTO Classification:** A-4
**Specific Gravity:** 2.67

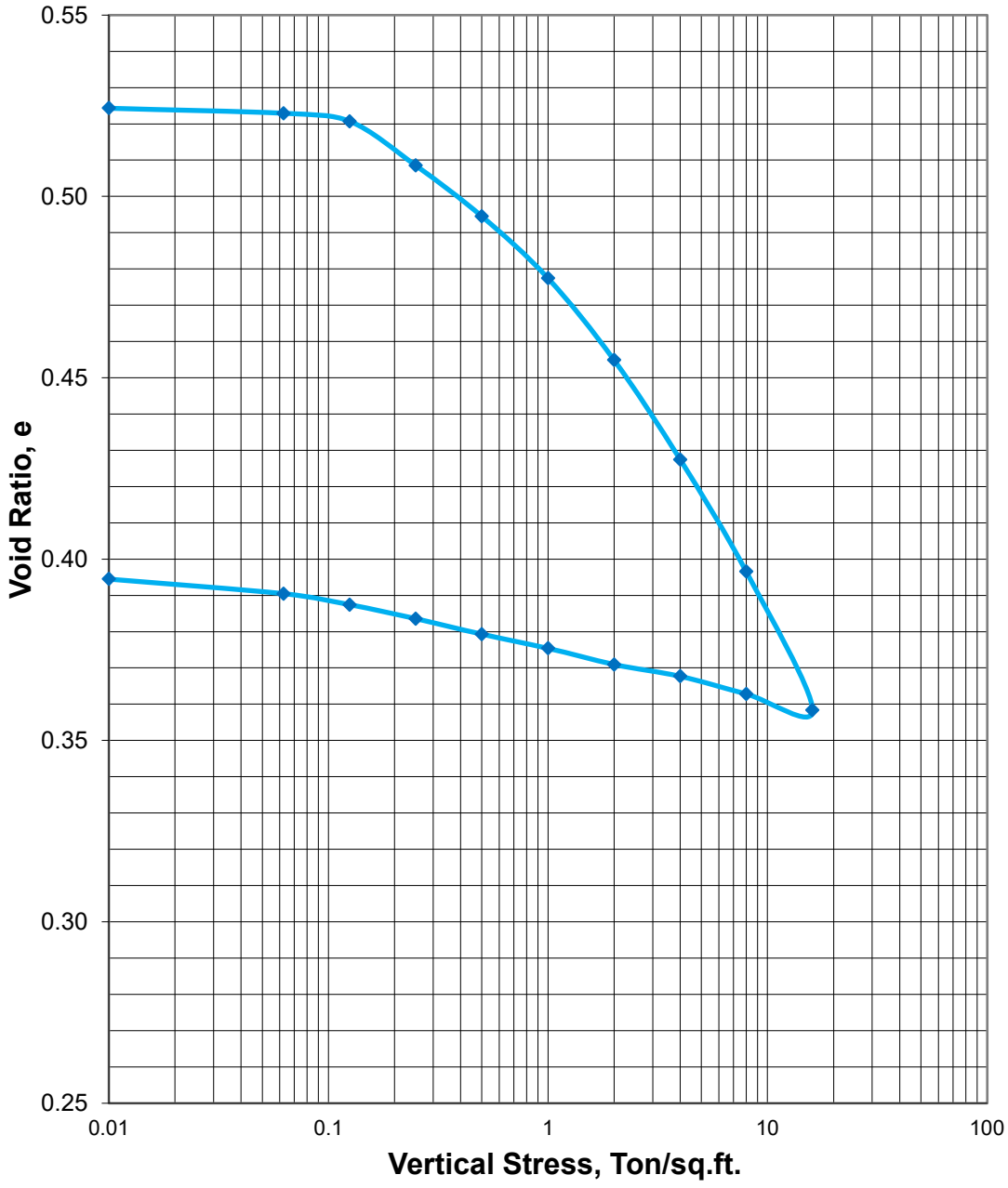
**Unit Dry Weight:** 109.34 lbs/cu ft
**Initial Water Content:** 16.4%
**Final Water Content:** 16.4%
**Initial Saturation:** 130.43%
**Final Saturation:** 10.46%
**Liquid Limit:** 30
**Plastic Limit:** 20
**Percent Passing #200:** 61%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-179
**Sample Depth:** 14-14.5 ft
**Description:** Tan fine sandy CLAY
**USCS Classification:** CL **AASHTO Classification:** A-4 **Specific Gravity:** 2.67

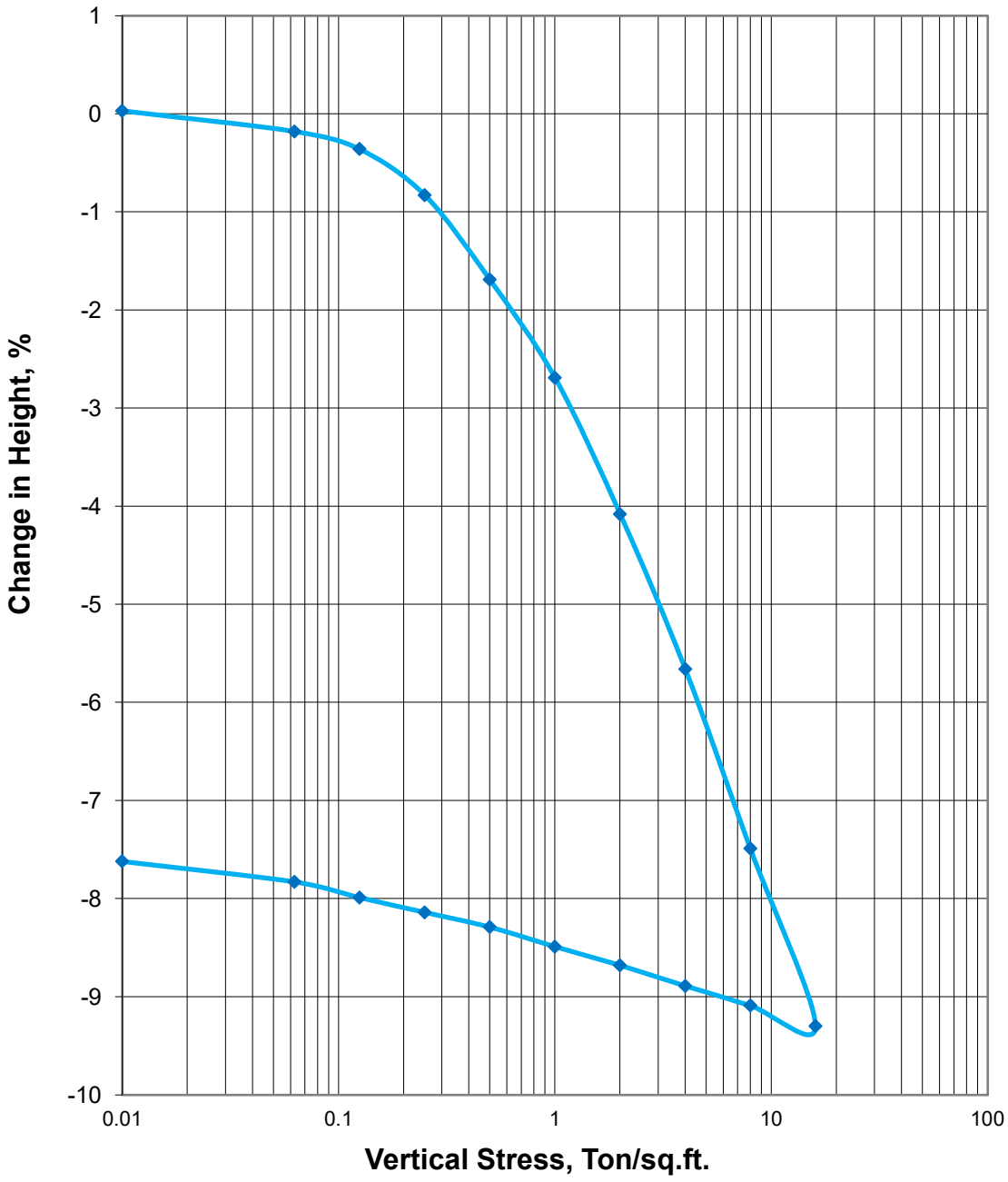
**Unit Dry Weight:** 109.34 lbs/cu ft
**Initial Water Content:** 16.4%
**Final Water Content:** 16.4%
**Initial Saturation:** 130.43%
**Final Saturation:** 10.46%
**Liquid Limit:** 30
**Plastic Limit:** 20
**Percent Passing #200:** 61%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-190
**Sample Depth:** 4.5-5 ft
**Description:** Reddish brown fine sandy SILT
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.65

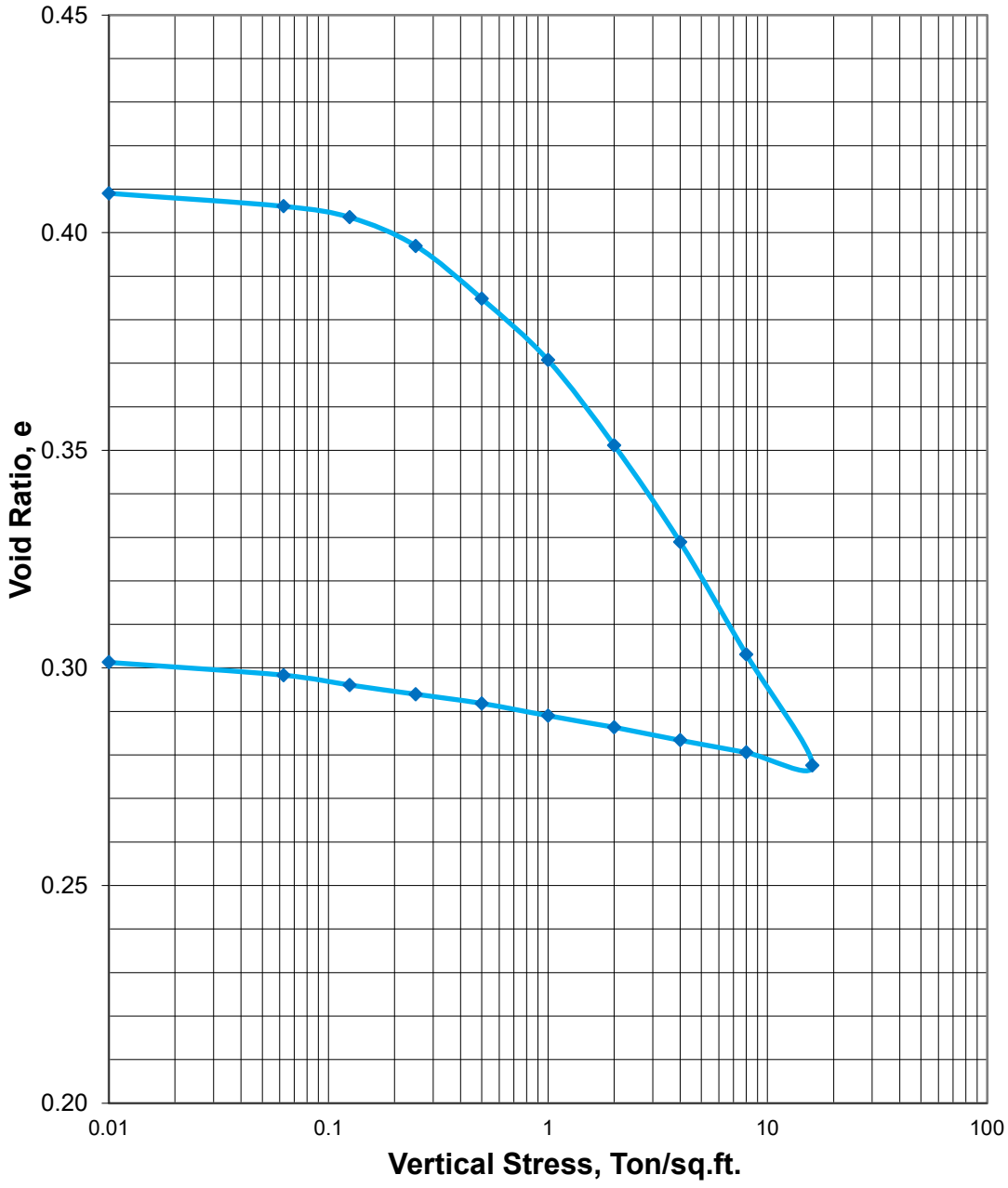
**Unit Dry Weight:** 117.4 lbs/cu ft
**Initial Water Content:** 14.9%
**Final Water Content:** 15%
**Initial Saturation:** 115.9%
**Final Saturation:** 8.8%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 52%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-190
**Sample Depth:** 4.5-5 ft
**Description:** Reddish brown fine sandy SILT
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.65

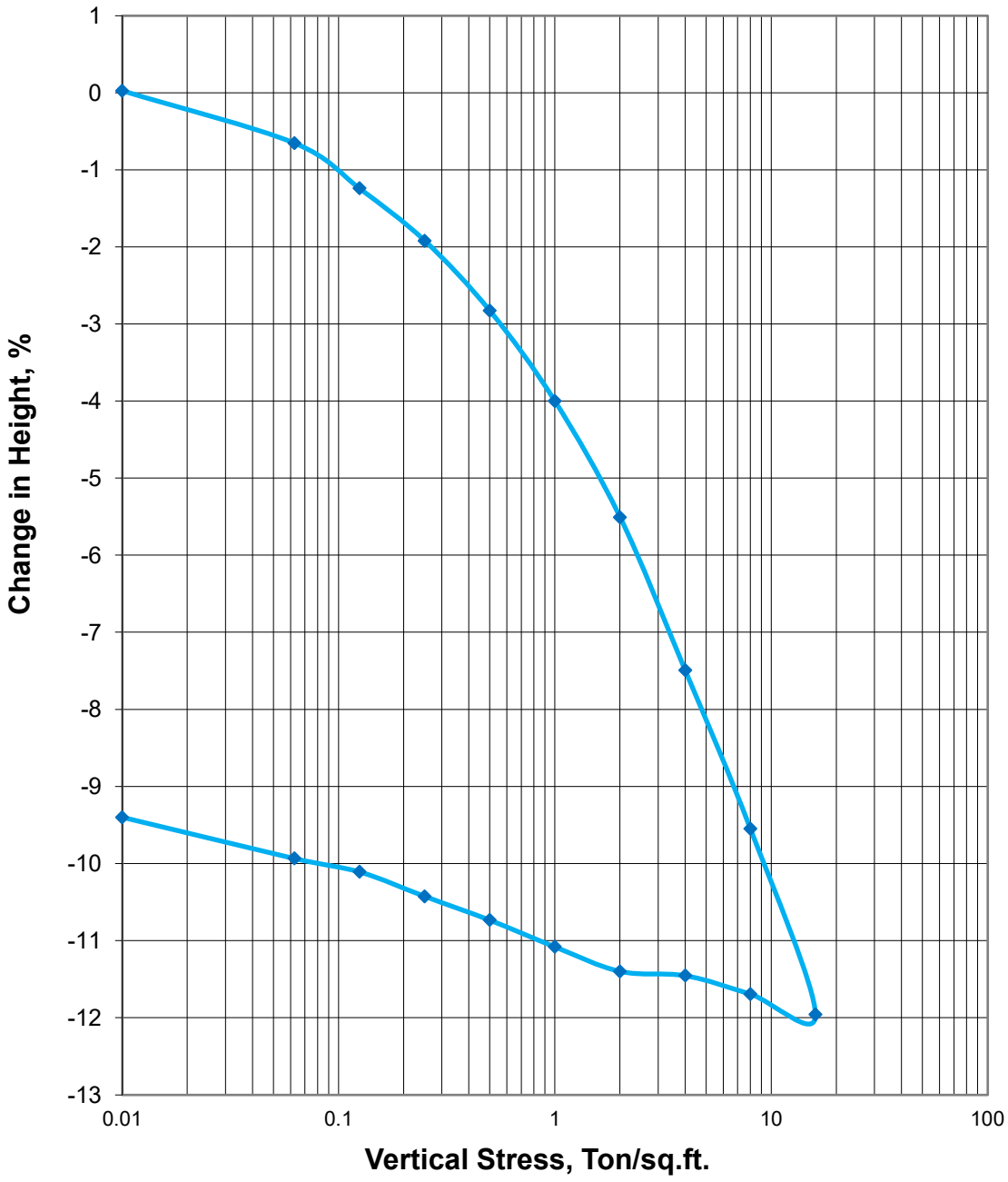
**Unit Dry Weight:** 117.4 lbs/cu ft
**Initial Water Content:** 14.9%
**Final Water Content:** 15%
**Initial Saturation:** 115.9%
**Final Saturation:** 8.8%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 52%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-200
**Sample Depth:** 4.5-5 ft
**Description:** Reddish brown fine sandy SILT w/sandstone and shale fragments
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.65

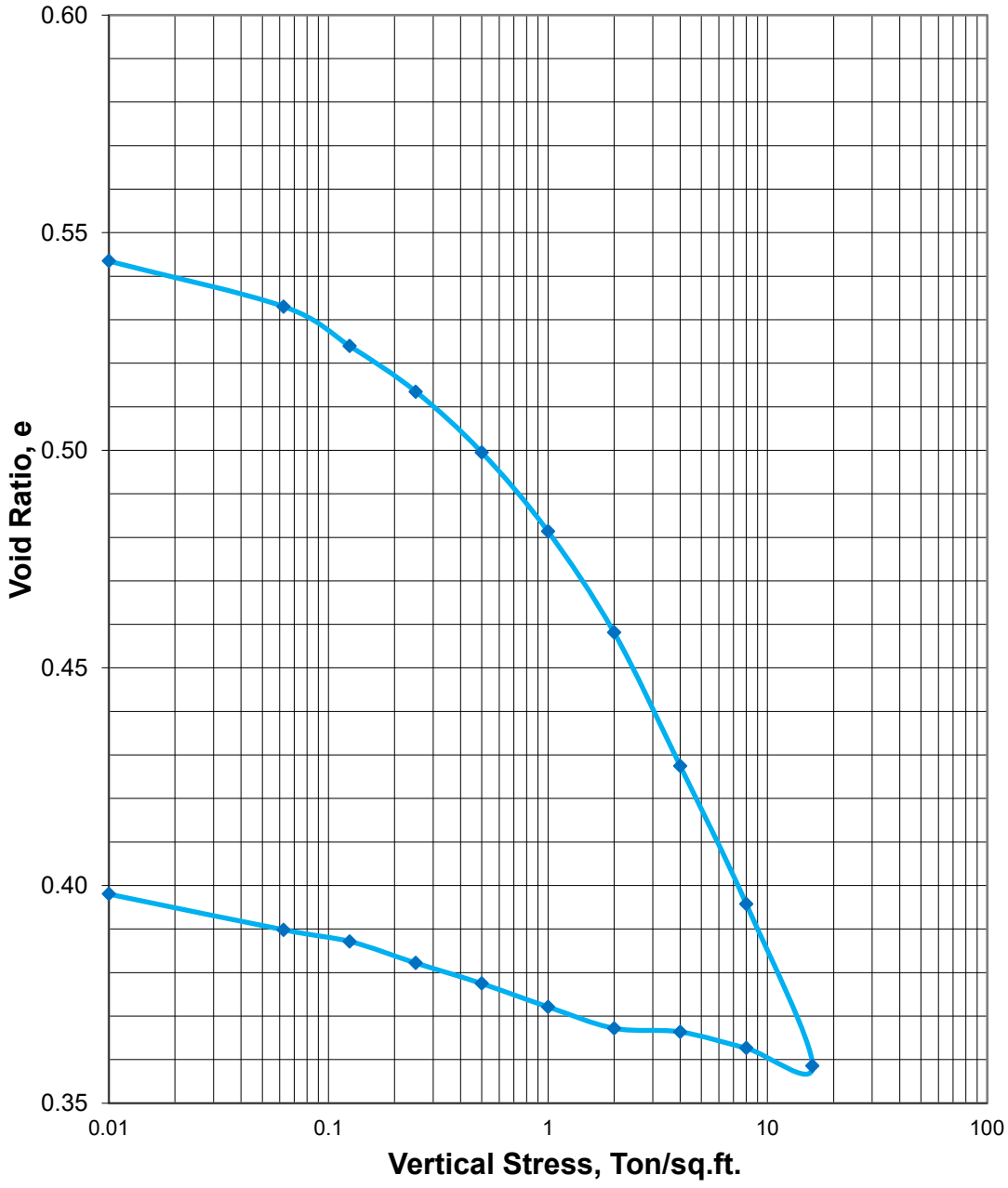
**Unit Dry Weight:** 107 lbs/cu ft
**Initial Water Content:** 17.3%
**Final Water Content:** 17%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 71%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-200
**Sample Depth:** 4.5-5 ft
**Description:** Reddish brown fine sandy SILT w/sandstone and shale fragments
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.65

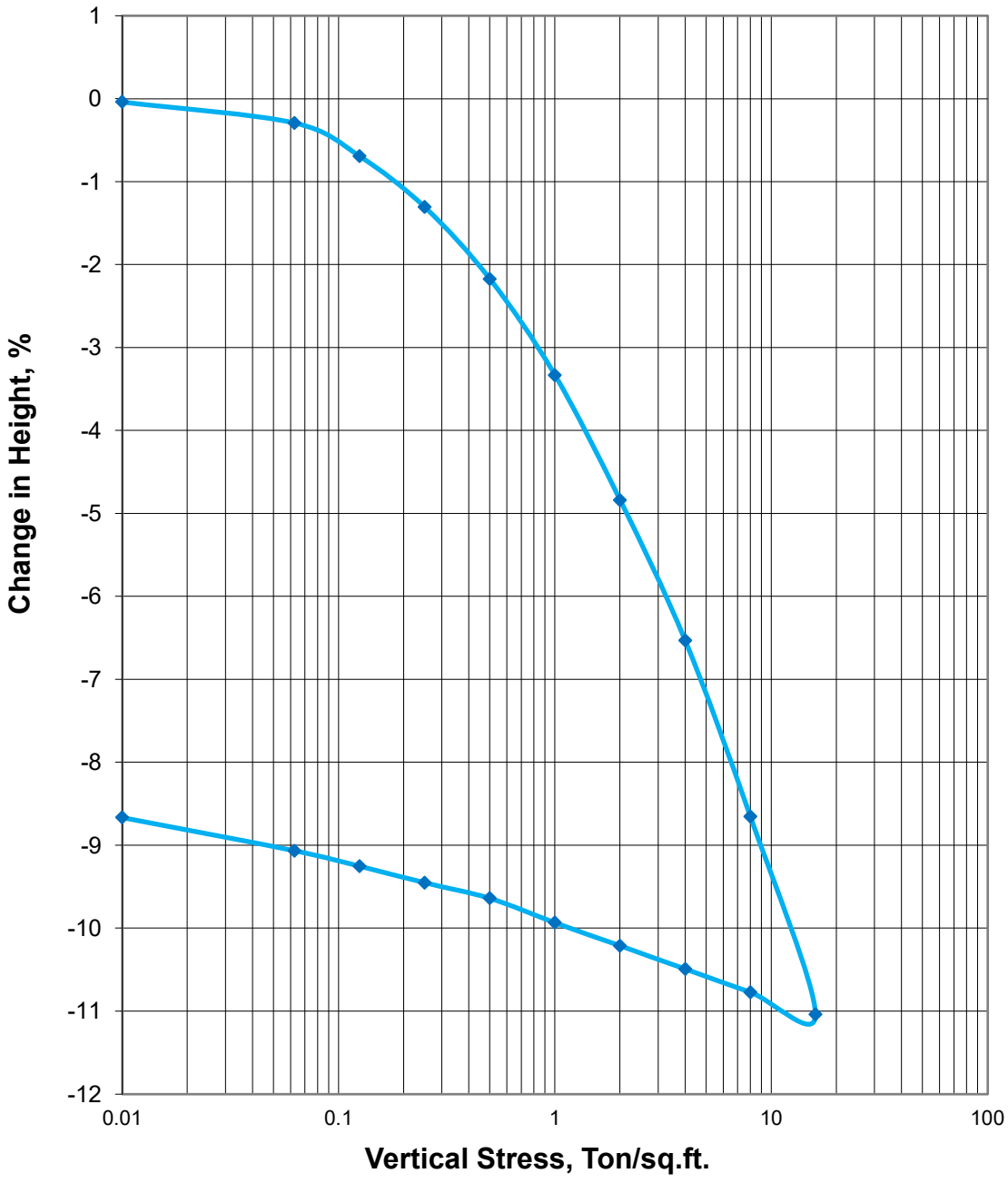
**Unit Dry Weight:** 107 lbs/cu ft
**Initial Water Content:** 17.3%
**Final Water Content:** 17%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 71%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-203
**Sample Depth:** 5-5.5 ft
**Description:** Reddish tan and tan silty CLAY w/sandstone fragments
**USCS Classification:** CL-ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.65

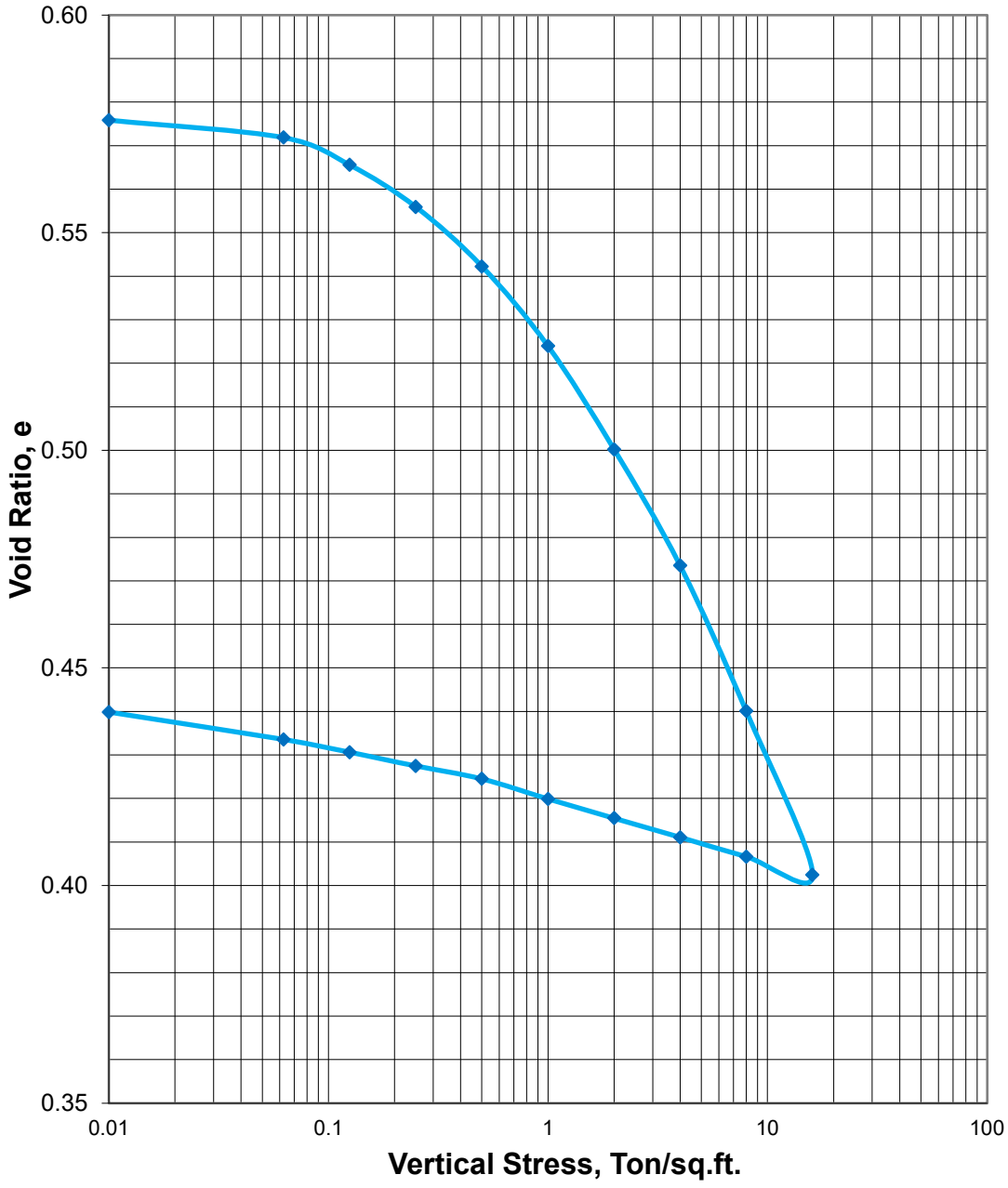
**Unit Dry Weight:** 105 lbs/cu ft
**Initial Water Content:** 19.3%
**Final Water Content:** 18%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 65%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FB-203
**Sample Depth:** 5-5.5 ft
**Description:** Reddish tan and tan silty CLAY w/sandstone fragments
**USCS Classification:** CL-ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.65

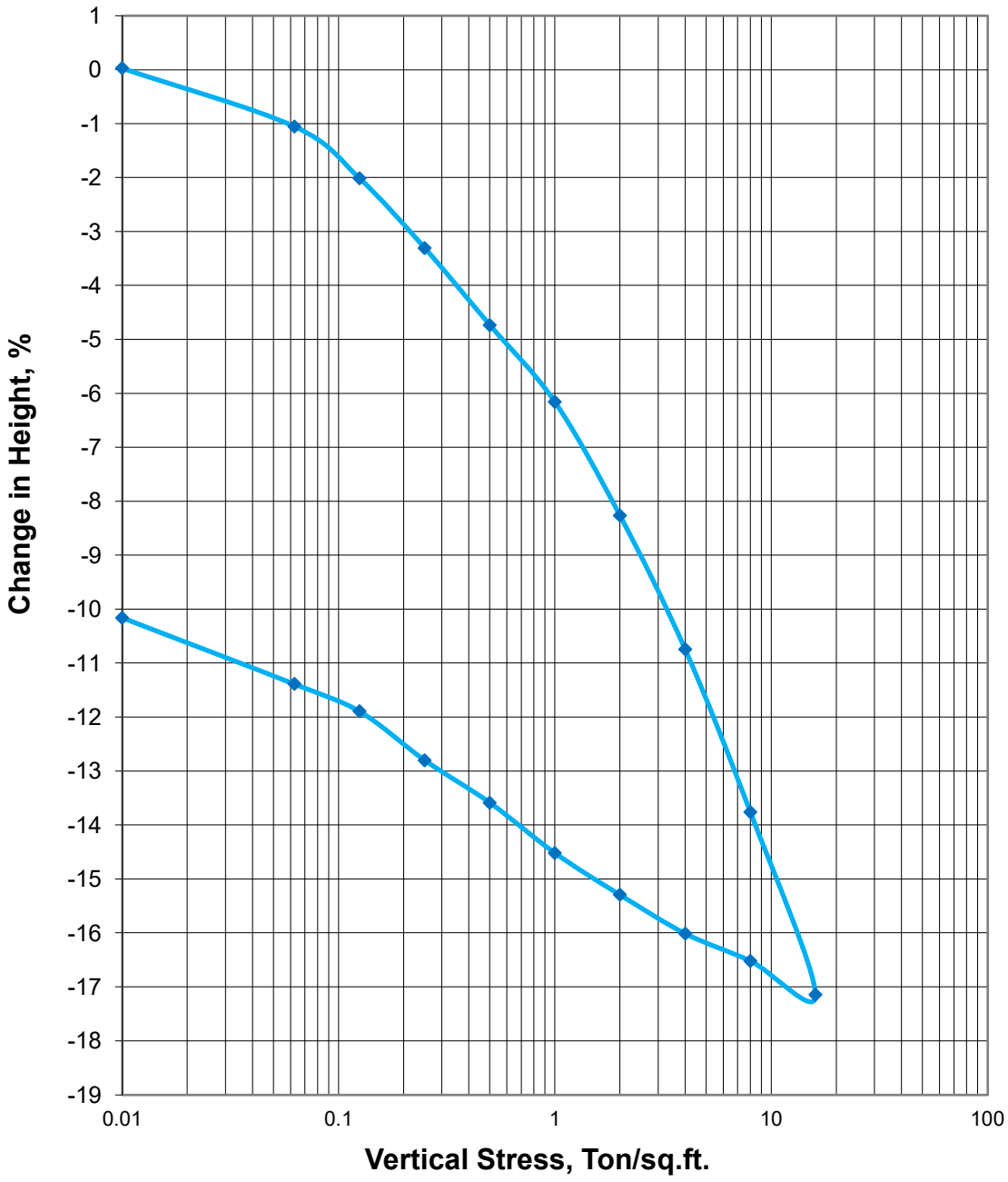
**Unit Dry Weight:** 105 lbs/cu ft
**Initial Water Content:** 19.3%
**Final Water Content:** 18%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 65%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FW-5
**Sample Depth:** 18.5-19 ft
**Description:** Brown silty clay, sandy w/sandstone fragments
**USCS Classification:** CL
**AASHTO Classification:** A-7-6
**Specific Gravity:** 2.65

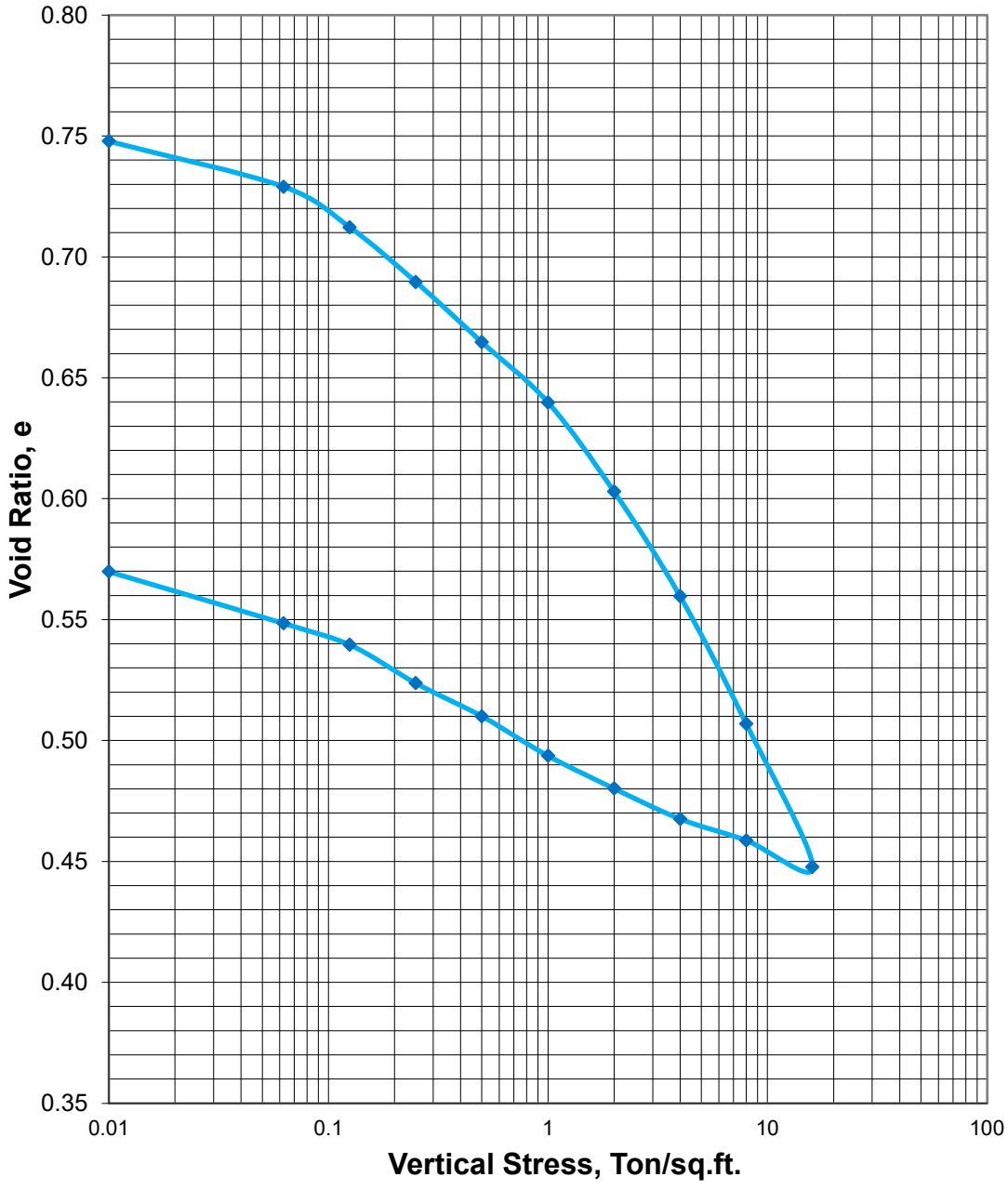
**Unit Dry Weight:** 94.63 lbs/cu ft
**Initial Water Content:** 26.4%
**Final Water Content:** 24.7%
**Initial Saturation:** 92%
**Final Saturation:** 317%
**Liquid Limit:** 44
**Plastic Limit:** 23
**Percent Passing #200:** 74%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** FW-5
**Sample Depth:** 18.5-19 ft
**Description:** Brown silty clay, sandy w/sandstone fragments
**USCS Classification:** CL
**AASHTO Classification:** A-7-6
**Specific Gravity:** 2.65

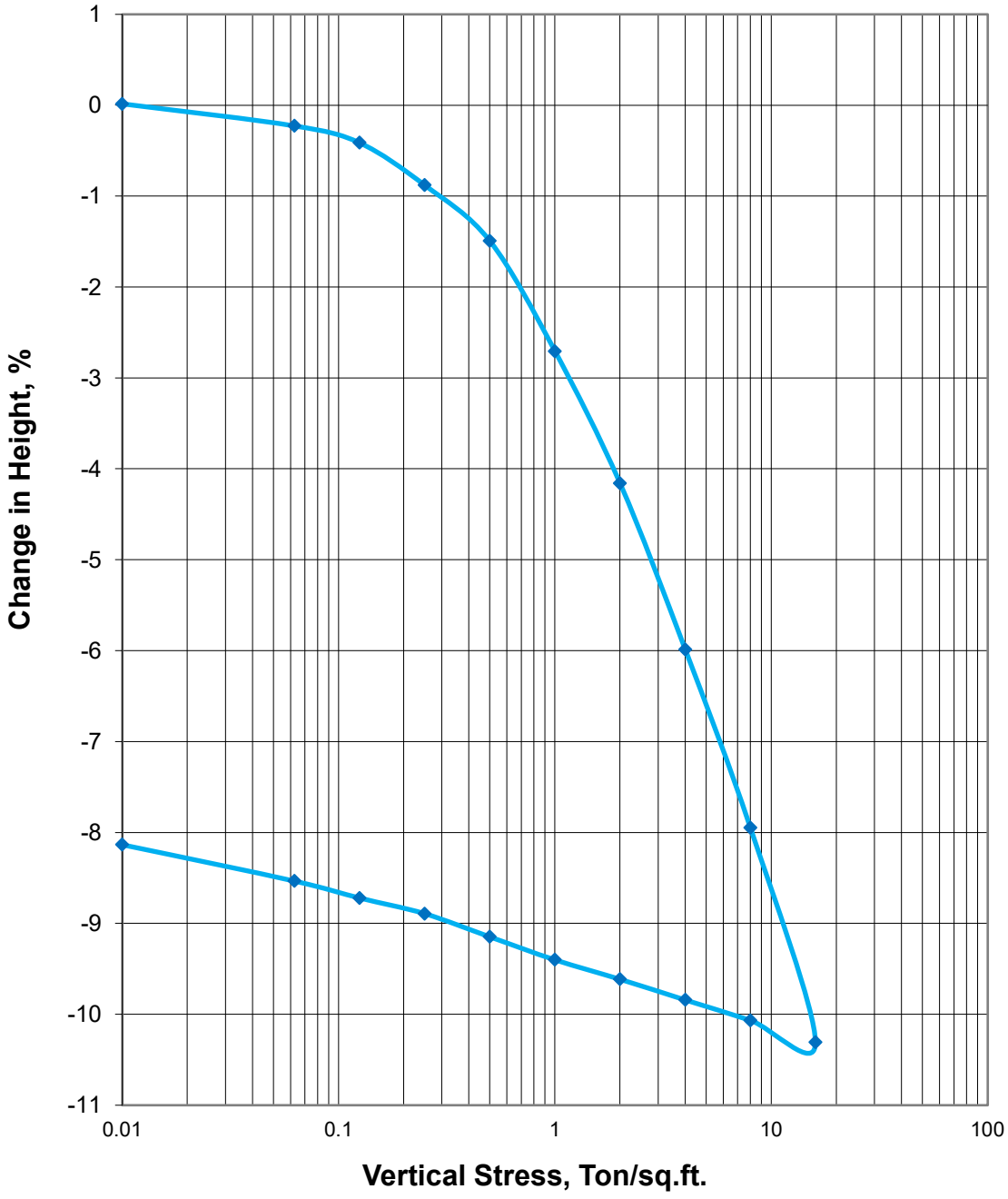
**Unit Dry Weight:** 94.63 lbs/cu ft
**Initial Water Content:** 26.4%
**Final Water Content:** 24.7%
**Initial Saturation:** 92%
**Final Saturation:** 317%
**Liquid Limit:** 44
**Plastic Limit:** 23
**Percent Passing #200:** 74%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** HMT-4
**Sample Depth:** 7.5-8 ft
**Description:** Reddish brown fine sandy SILT
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity (assumed):** 2.7

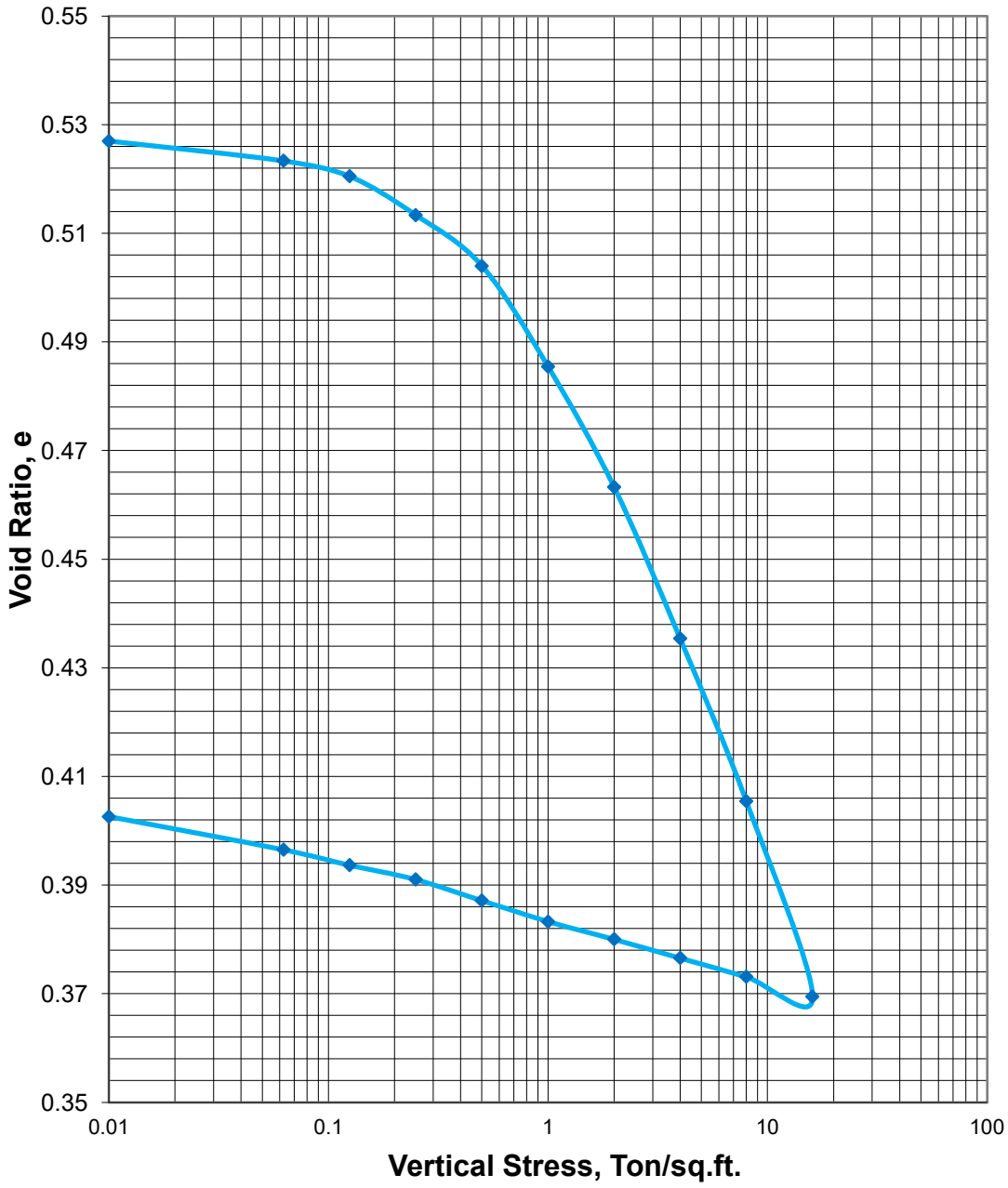
**Unit Dry Weight:** 111.7 lbs/cu ft
**Initial Water Content:** 17.5%
**Final Water Content:** 15.8%
**Initial Saturation:** %
**Final Saturation:** 65%
**Liquid Limit:** NP
**Plastic Limit:** NP
**Percent Passing #200:** 57%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** HMT-4
**Sample Depth:** 7.5-8 ft
**Description:** Reddish brown fine sandy SILT
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity (assumed):** 2.7

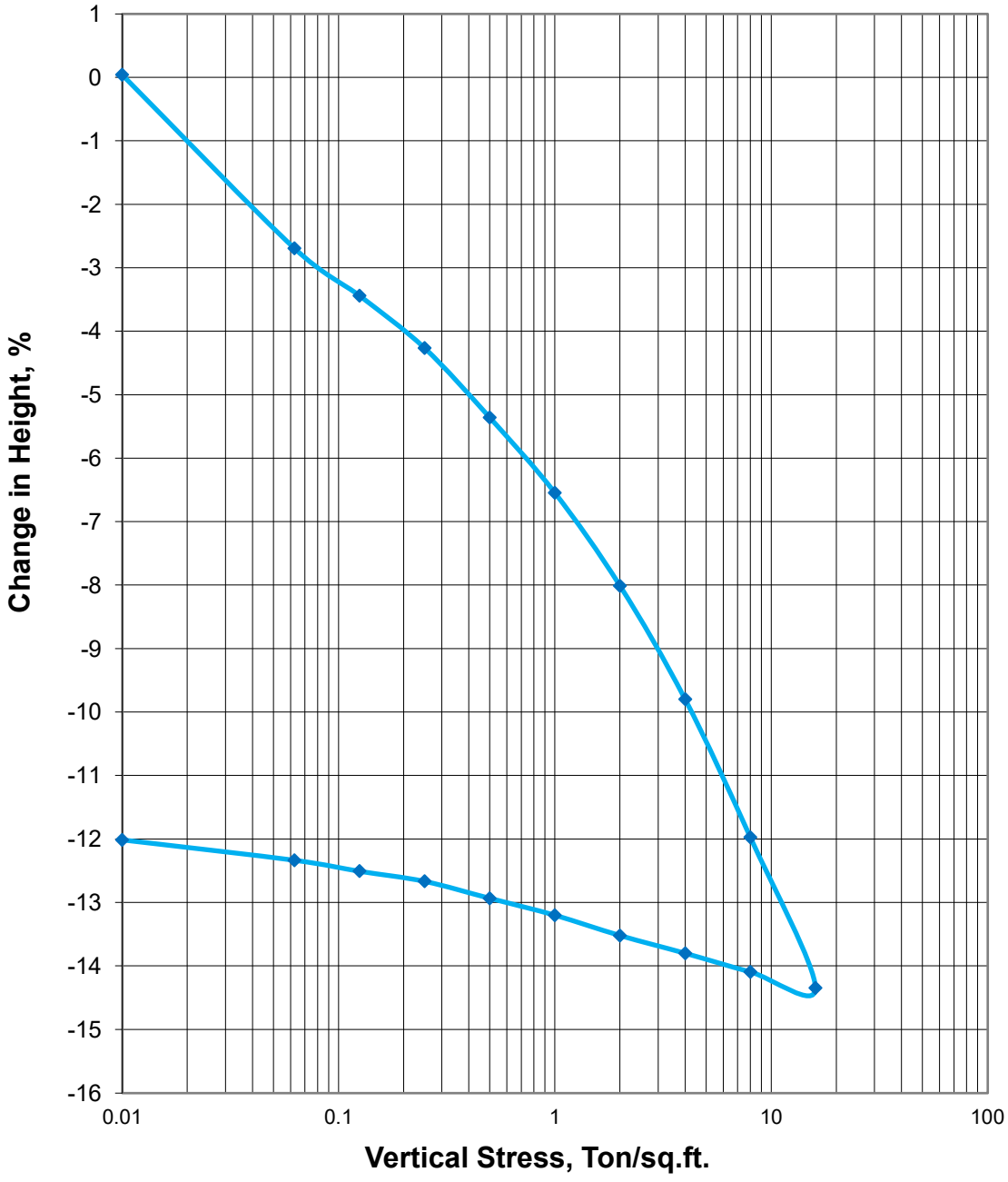
**Unit Dry Weight:** 111.7 lbs/cu ft
**Initial Water Content:** 17.5%
**Final Water Content:** 15.8%
**Initial Saturation:** %
**Final Saturation:** 65%
**Liquid Limit:** NONPLASTIC
**Plastic Limit:**
**Percent Passing #200:** 57%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** HMT-10
**Sample Depth:** 4.5-5 ft
**Description:** Brown silty clay, sandy w/sandstone fragments
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.67

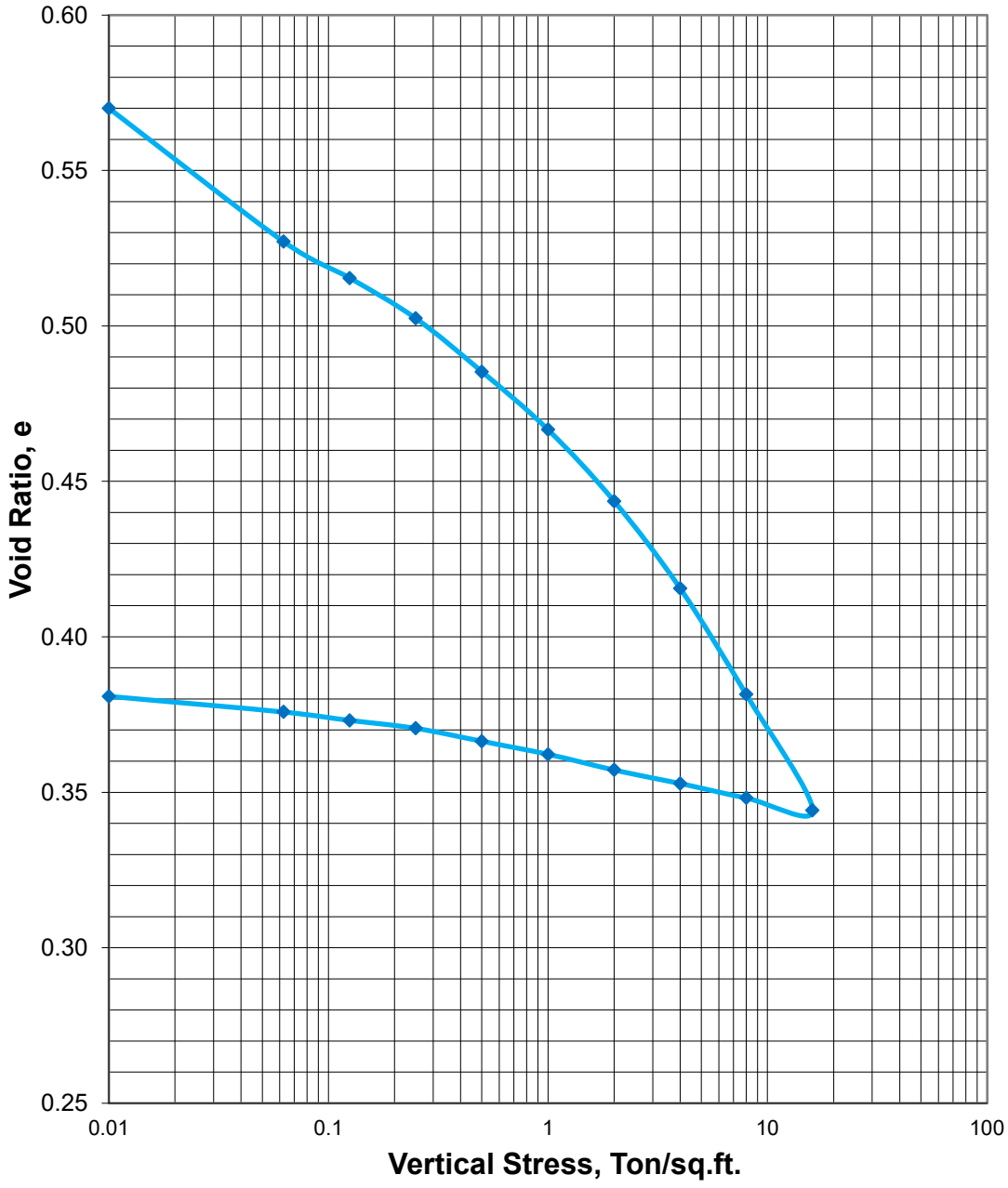
**Unit Dry Weight:** 106.16 lbs/cu ft
**Initial Water Content:** 22%
**Final Water Content:** 17.6%
**Initial Saturation:** %
**Final Saturation:** %
**Liquid Limit:** 27
**Plastic Limit:** 23
**Percent Passing #200:** 57%



# CONSOLIDATION TEST RESULTS
# (AASHTO T 216)

**Project:** 040748 Hwy 22 to I-40
**Job Number:** 23184.00083
**Boring:** HMT-10
**Sample Depth:** 4.5-5 ft
**Description:** Brown silty clay, sandy w/sandstone fragments
**USCS Classification:** ML
**AASHTO Classification:** A-4
**Specific Gravity:** 2.67

**Unit Dry Weight:** 106.16 lbs/cu ft
**Initial Water Content:** 22%
**Final Water Content:** 17.6%
**Initial Saturation:** %
**Final Saturation:** %
**Liquid Limit:** 27
**Plastic Limit:** 23
**Percent Passing #200:** 57%



# APPENDIX J

# SUMMARY of COEFFICIENTS OF CONSOLIDATION

PROJECT: 040748 - Hwy 22 to I-40, Section 904
LOCATION: Crawford and Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| BORING NO. | DEPTH, FT | ATTERBERG LIMITS | | | PERCENT PASSING #200 | Soil Description | UNIFIED CLASS. | AASHTO CLASS. | $c_v$, $cm^2/sec$ |
|---|---|---|---|---|---|---|---|---|---|
| | | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | | | | | |
| FB-112 | 4.5-5 | 23 | 20 | 3 | 68 | Brown fine sandy SILT, slightly clayey | ML | A-4 | $4x10^{-3}$ |
| FB-114 | 5.5-6 | 28 | 17 | 11 | 60 | Reddish brown fine sandy CLAY | CL | A-6 | $4x10^{-3}$ |
| FB-179 | 14-14.5 | 30 | 20 | 10 | 61 | Tan fine sandy CLAY | CL | A-4 | $3.5x10^{-3}$ |
| FB-190 | 4.5-5 | Non-plastic | | | 52 | Reddish brown fine sandy SILT | ML | A-4 | $8x10^{-3}$ |
| FB-200 | 4.5-5 | Non-plastic | | | 71 | Reddish brown fine sandy SILT | ML | A-4 | $4.2x10^{-3}$ |
| FB-203 | 5-5.5 | 23 | 19 | 4 | 65 | Dark brown clayey SILT with fine sand | CL-ML | A-4 | $3.9x10^{-3}$ |
| FW-5 | 18.5-19 | 43 | 21 | 22 | 74 | Brown silty clay, sandy | CL | A-6 | $1x10^{-3}$ |
| HMT-4 | 7.5-8 | Non-plastic | | | 57 | Reddish brown fine sandy SILT | ML | A-4 | $2x10^{-3}$ |
| HMT-10 | 4.5-5 | 27 | 23 | 4 | 57 | Brown clayey SILT, sandy | CL-ML | A-4 | $3x10^{-3}$ |

# APPENDIX K

# SUMMARY of ANALYTICAL TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Crawford & Sebastian Counties, Arkansas
UES JOB NUMBER: 23184.00083

| **Boring No.** | **Sample Depth, ft** | **Sulfate Content, ppm** (AASHTO T290) | **Chloride Content, ppm** (AASHTO T291) | **Soil pH** (AASHTO T 289) | **Soil Resistivity, ohm-cm** (AASHTO T288) | **Soil Description and Classification** (ASTM D2488) |
|---|---|---|---|---|---|---|
| FB-118 | 6.5-7.5 | 22 | < 10 | 5.50 | 15,700 | Reddish brown and brown fine sandy CLAY (CL) |
| | | | | | | |
| FW-7 | 4.5-5.5 | 18 | < 10 | 5.50 | 27,000 | Reddish brown clayey SILT (CL-ML) |
| | | | | | | |
| FB-198 | 0.5-1.5 | 14 | < 10 | 5.30 | 8,550 | Reddish brown clayey SILT (CL-ML) |

# APPENDIX L

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-99 | 11-11.5 | 167 | 2480 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-99 | 14-14.5 | 168 | 2150 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-100 | 15.5-16 | 162 | 6670 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-100 | 20-20.5 | 162 | 3470 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-100 | 27-27.5 | 166 | 3540 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-100 | 33-33.5 | 164 | 2490 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-101 | 16-16.5 | 163 | 2370 | Vertical and horizontal shears | Gray fine-grained SANDSTONE w/dark gray SHALE laminations |
| FB-101 | 20.5-21 | 161 | 4260 | Multiple vertical shears | Gray fine-grained SANDSTONE w/dark gray SHALE laminations |
| FB-101 | 28-28.5 | 166 | 4930 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-101 | 37-37.5 | 162 | 4190 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| | | | | | |
| FB-102 | 18-18.5 | 173 | 2760 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-102 | 21.5-22 | 164 | 2990 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-102 | 26.5-27 | 167 | 4600 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-102 | 30-30.5 | 164 | 2960 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-103 | 21-21.5 | 166 | 1940 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-103 | 27-27.5 | 168 | 1620 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-103 | 34-34.5 | 169 | 2690 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-103 | 36.5 | 169 | 4110 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-104 | 7-7.5 | 167 | 3050 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-104 | 16.5-17 | 167 | 2490 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-105 | 8.5-9 | 166 | 3070 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-105 | 12-12.5 | 167 | 3080 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-105 | 18-18.5 | 163 | 3890 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-105 | 24.5-25 | 167 | 4610 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-106 | 15-15.5 | 167 | 1510 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-106 | 21-21.5 | 167 | 4990 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-106 | 26.5-27 | 174 | 2970 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-106 | 36-36.5 | 166 | 2690 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-107 | 11-11.5 | 170 | 1500 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-107 | 17-17.5 | 166 | 5970 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-107 | 24-24.5 | 167 | 3050 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-107 | 32.5-33 | 157 | 2750 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-107 | 35-35.5 | 168 | 3990 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-109 | 24.5-25 | 164 | 3910 | Multiple vertical shears | Dark gray SHALE w/some very close fine-grained sandstone partings |
| FB-109 | 27-27.5 | 168 | 7190 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-109 | 35.5-36 | 169 | 5170 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-109 | 44.5-45 | 165 | 2290 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-110 | 19.5-20 | 162 | 6450 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-110 | 29.5-30 | 166 | 2710 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-110 | 35-35.5 | 166 | 4030 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-110 | 44-44.5 | 161 | 3480 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-111 | 21.5-22 | 165 | 4160 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-111 | 29-29.5 | 159 | 1310 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-111 | 35.5-36 | 162 | 3900 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-111 | 44.2-44.7 | 161 | 2510 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-112 | 20-20.5 | 166 | 6620 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-112 | 28.5-29 | 168 | 4100 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-112 | 36-36.5 | 173 | 6820 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-112 | 41-41.5 | 175 | 7380 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-113 | 25.5-26 | 167 | 4980 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-113 | 31.5-32 | 167 | 6100 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-114 | 26-26.5 | 162 | 3990 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-114 | 30-30.5 | 168 | 3590 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| | | | | | |
| FB-115A | 27-27.5 | 166 | 2690 | Multiple vertical shears | Gray fine-grained SANDSTONE w/interbedded very close to close SHALE laminations |
| | | | | | |
| FB-116 | 23-23.5 | 166 | 4780 | Diagonal shear | Gray fine-grained SANDSTONE w/interbedded very close to close SHALE partings |
| FB-116 | 29-29.5 | 167 | 1520 | Vertical shear | Dark gray SHALE w/interbedded, very thin, very close to close fine-grained SANDSTONE partings |
| FB-116 | 29.5-30 | 166 | 1480 | Vertical shear | Dark gray SHALE w/interbedded, very thin, very close to close fine-grained SANDSTONE partings |
| FB-116 | 34-34.7 | 166 | 1600 | Multiple vertical shears | Dark gray SHALE w/interbedded, very thin, very close to close fine-grained SANDSTONE partings |
| FB-116 | 46.5-47 | 171 | 1250 | Multiple vertical shears | Dark gray SHALE w/interbedded, very thin, very close to close fine-grained SANDSTONE partings |
| | | | | | |
| FB-117 | 27-27.5 | 161 | 3180 | Horizontal and vertical shears | Gray fine-grained SANDSTONE w/interbedded close to very close, very thin SHALE partings |
| FB-117 | 31-31.5 | 167 | 4710 | Multiple vertical shears | Gray fine-grained SANDSTONE w/interbedded close to very close, very thin SHALE partings |
| FB-117 | 37.3-37.6 | 162 | 1370 | Multiple vertical shears | Dark gray SHALE w/occasional fine-grained sandstone partings |
| FB-117 | 50-50.7 | 169 | 2330 | Multiple vertical shears | Dark gray SHALE w/occasional fine-grained sandstone partings |
| | | | | | |
| FB-118 | 28.5-29 | 168 | 3590 | Vertical and horizontal shears | Gray fine-grained SANDSTONE w/interbedded very close to close, very thin SHALE partings |
| FB-118 | 29.3-30 | 161 | 4060 | Vertical and horizontal shears | Gray fine-grained SANDSTONE w/interbedded very close to close, very thin SHALE partings |
| FB-118 | 37.5-38 | 164 | 1420 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-118 | 49-49.5 | 172 | 2530 | Diagonal shear | Dark gray SHALE w/occasional fine-grained sandstone partings |
| | | | | | |
| FB-167 | 34.5-35 | 160 | 540 | Vertical and horizontal shears | Dark gray SHALE |
| FB-167 | 36.7-.7.2 | 159 | 720 | Vertical and horizontal shears | Dark gray SHALE |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-167 | 45.5-46 | 161 | 3320 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| FB-167 | 52-52.5 | 166 | 1130 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| | | | | | |
| FB-171 | 33-33.5 | 176 | 3770 | Multiple vertical shears | Dark gray SHALE |
| FB-171 | 36.5-37 | 170 | 3900 | Multiple vertical shears | Dark gray SHALE |
| FB-171 | 37.75 | 165 | 1630 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained SANDSTONE partings |
| FB-171 | 44-44.5 | 164 | 3450 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| | | | | | |
| FB-176 | 25.5-26 | 163 | 4760 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained SANDSTONE partings |
| FB-176 | 37.5-38 | 167 | 4140 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained SANDSTONE partings |
| FB-176 | 37.5-38 | 165 | 2310 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained SANDSTONE partings |
| FB-176 | 48.5-49 | 166 | 5050 | Multiple vertical and horizontal shears | Dark gray SHALE w/some gray fine-grained SANDSTONE partings |
| | | | | | |
| FB-179 | 28-28.5 | 163 | 1620 | Multiple vertical shears | Dark gray SHALE |
| FB-179 | 32-32.5 | 164 | 3670 | Multiple vertical shears | Dark gray SHALE |
| FB-179 | 36-36.5 | 163 | 920 | Multiple vertical shears | Dark gray SHALE |
| FB-179 | 46-46.5 | 163 | 1230 | Multiple vertical shears | Dark gray SHALE |
| FB-179 | 53-53.5 | 167 | 2220 | Vertical and horizontal shears | Dark gray SHALE |
| FB-179 | 59.3-59.8 | 166 | 4040 | Multiple vertical shears | Dark gray SHALE w/some very thin, close to very close gray fine-grained sandstone partings |
| FB-179 | 69-69.5 | 164 | 1850 | Vertical and horizontal shears | Dark gray SHALE w/some very thin, close to very close gray fine-grained sandstone partings |
| FB-179 | 75-75.5 | 169 | 4030 | Vertical and horizontal shears | Dark gray SHALE w/some very thin, close to very close gray fine-grained sandstone partings |
| | | | | | |
| FB-180 | 24.3-24.8 | 149 | 1200 | Vertical shear | Dark gray SHALE |
| FB-180 | 29.8-30.3 | 168 | 2930 | Vertical shear | Dark gray SHALE |
| FB-180 | 46-46.5 | 163 | 3970 | Vertical and horizontal shears | Dark gray SHALE |
| FB-180 | 50-50.5 | 166 | 4700 | Vertical shear | Dark gray SHALE |
| | | | | | |
| FB-181 | 30.3-30.8 | 171 | 3030 | Vertical and horizontal shears | Dark gray SHALE |
| FB-181 | 36-36.5 | 162 | 3680 | Multiple vertical shears | Dark gray SHALE |
| FB-181 | 42-42.5 | 167 | 4130 | Vertical and horizontal shears | Dark gray SHALE |
| FB-181 | 47-47.5 | 169 | 1270 | Vertical and horizontal shears | Dark gray SHALE w/close, very thin gray fine-grained sandstone partings |
| FB-181 | 57-57.5 | 163 | 3540 | Multiple vertical shears | Dark gray SHALE w/close, very thin gray fine-grained sandstone partings |
| FB-181 | 61-61.5 | 170 | 2990 | Multiple vertical shears | Dark gray SHALE w/close, very thin gray fine-grained sandstone partings |
| FB-181 | 67-67.5 | 168 | 2570 | Vertical and horizontal shears | Dark gray SHALE w/close, very thin gray fine-grained sandstone partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-181 | 75-75.5 | 174 | 4690 | Vertical and horizontal shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| | | | | | |
| FB-182A | 26-26.5 | 176 | 5530 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-182A | 30-30.5 | 165 | 2780 | Vertical and horizontal shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-182A | 30.5-31 | 165 | 2420 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-182A | 38-38.7 | 170 | 3940 | Vertical and diagonal shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-182A | 44.5-45 | 167 | 4260 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-182A | 47-47.7 | 168 | 3250 | Multiple vertical shears | Dark gray SHALE w/some close gray fine-grained sandstone partings |
| FB-182A | 52.5-53 | 167 | 4240 | Multiple vertical shears | Dark gray SHALE w/some close gray fine-grained sandstone partings |
| FB-182A | 55-55.5 | 169 | 4840 | Vertical and horizontal shears | Dark gray SHALE w/some close gray fine-grained sandstone partings |
| FB-182A | 62.3-63 | 167 | 4020 | Multiple vertical shears | Dark gray SHALE w/some close gray fine-grained sandstone partings |
| | | | | | |
| FB-183A | 26.5-27 | 161 | 2420 | Multiple vertical shears | Dark gray SHALE |
| FB-183A | 32.5-33 | 160 | 2150 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-183A | 36.5-37 | 161 | 2300 | Vertical and horizontal shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-183A | 46.5-47 | 166 | 2610 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-183A | 51.5-52 | 166 | 1760 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-183A | 57-57.5 | 164 | 2160 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| | | | | | |
| FB-184 | 24.7-25.2 | 168 | 2330 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| | | | | | |
| FB-185 | 52-52.5 | 166 | 2990 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-185 | 62-62.5 | 164 | 2770 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-185A | 24-24.5 | 166 | 6330 | Multiple vertical shears | Moderately hard dark gray SHALE w/some very thin, close gray fine-grained sandstone partings |
| FB-185A | 27-27.5 | 166 | 1570 | Multiple vertical shears | Moderately hard dark gray SHALE w/some very thin, close gray fine-grained sandstone partings |
| FB-185A | 30.5-31 | 165 | 1770 | Multiple vertical shears | Moderately hard dark gray SHALE w/some very thin, close gray fine-grained sandstone partings |
| FB-185A | 35-35.5 | 168 | 4290 | Vertical and horizontal shears | Moderately hard dark gray SHALE w/some very thin, close gray fine-grained sandstone partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-185A | 40-40.5 | 170 | 5160 | Vertical and horizontal shears | Moderately hard dark gray SHALE w/interbedded very thin, very close to close gray fine-grained SANDSTONE partings and some seams |
| FB-185A | 46-46.5 | 168 | 6410 | Vertical and high angle fractures | Moderately hard dark gray SHALE w/interbedded very thin, very close to close gray fine-grained SANDSTONE partings and some seams |
| FB-185A | 51.5-52 | 165 | 5890 | Vertical and horizontal shears | Moderately hard dark gray SHALE w/interbedded very thin, very close to close gray fine-grained SANDSTONE partings and some seams |
| FB-185A | 58.5-59 | 162 | 2510 | Vertical and horizontal shears | Moderately hard dark gray SHALE w/interbedded very thin, very close to close gray fine-grained SANDSTONE partings and some seams |
| FB-185A | 61.5-62 | 167 | 5770 | Multiple vertical shears | Moderately hard dark gray SHALE w/interbedded very thin, very close to close gray fine-grained SANDSTONE partings and some seams |
| FB-185A | 69.5-70 | 165 | 3830 | Vertical and horizontal shears | Moderately hard dark gray SHALE w/interbedded very thin, very close to close gray fine-grained SANDSTONE partings and some seams |
| | | | | | |
| FB-186 | 20.9-21.3 | 166 | 5610 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-186 | 23.5-24 | 163 | 2660 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-186 | 27.5-28 | 163 | 3830 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-186 | 36.5-37 | 163 | 4760 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-186 | 47.5-48 | 163 | 7130 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-186 | 56.5-57 | 169 | 4420 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| | | | | | |
| FB-187 | 43.5-44 | 169 | 3030 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| FB-187 | 48-48.5 | 171 | 3700 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| FB-187 | 55-55.5 | 168 | 4200 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-187 | 62-62.5 | 167 | 4640 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| FB-187 | 72-72.5 | 172 | 3830 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| FB-187 | 80-80.5 | 177 | 3470 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| FB-187 | 86-86.5 | 176 | 4660 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-187 | 92.5-93 | 169 | 3250 | Vertical and diagonal shear | Dark gray SHALE w/interbedded very close, very thin gray fine-grained SANDSTONE partings |
| | | | | | |
| FB-188 | 18.8-19.2 | 166 | 4110 | Vertical shear | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-188 | 22.5-23 | 166 | 3210 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-188 | 35.7-36.5 | 165 | 4530 | Vertical and horizontal shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-188 | 46-46.5 | 158 | 3310 | Vertical and horizontal shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-188 | 59.8-60.3 | 162 | 2030 | Vertical and horizontal shears | Gray fine-grained SANDSTONE with very close, very thin shale laminations |
| | | | | | |
| FB-189 | 20.7-21.2 | 160 | 3170 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-189 | 25.5-26 | 168 | 16,230 | Explosive fracture | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |
| FB-189 | 31.5-32 | 163 | 13,920 | Multiple vertical shears | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |
| FB-189 | 36.5-37 | 165 | 4210 | Multiple vertical shears | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |
| FB-189 | 46-46.5 | 171 | 5470 | Multiple vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-189 | 55-55.5 | 162 | 6530 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-189 | 61.5-62 | 166 | 7380 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-189 | 66-66.5 | 164 | 3580 | Vertical and horizontal shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-189 | 70-70.5 | 164 | 3070 | Vertical and horizontal shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| FB-189 | 79.5-80 | 167 | 1910 | Multiple vertical shears | Dark gray SHALE w/some gray fine-grained sandstone partings |
| | | | | | |
| FB-190 | 22.5-23 | 161 | 3420 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-190 | 23-23.5 | 164 | 2900 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-190 | 28.5-29 | 167 | 6090 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| | | | | | |
| FB-191 | 18-18.5 | 168 | 5930 | Multiple vertical shears | Gray slightly weathered fine-grained SANDSTONE w/very close, very thin shale laminations |
| FB-191 | 21-21.8 | 168 | 2160 | Multiple vertical shears | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-191 | 25-25.8 | 167 | 2480 | Multiple vertical shears | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |
| FB-191 | 35-35.5 | 168 | 4030 | Multiple vertical shears | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |
| FB-191 | 49.5-50 | 168 | 3280 | Multiple vertical shears | Gray fine-grained SANDSTONE w/very close, very thin shale laminations |
| | | | | | |
| FB-192 | 20-20.5 | 165 | 2270 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-192 | 24-24.5 | 168 | 2650 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-192 | 30.5-31 | 163 | 5680 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-192 | 34.5-35 | 162 | 3620 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-192 | 45-45.5 | 164 | 3920 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-192 | 52-52.5 | 166 | 4340 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| | | | | | |
| FB-193 | 33-33.5 | 164 | 3220 | Vertical and horizontal shears | Dark gray SHALE, aernaceous w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-193 | 36.3-36.8 | 165 | 4620 | Vertical and horizontal shears | Dark gray SHALE, aernaceous w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-193 | 46-46.5 | 164 | 4110 | Vertical and horizontal shears | Dark gray SHALE, aernaceous w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-193 | 55.5-56 | 164 | 2350 | Vertical and horizontal shears | Dark gray SHALE, aernaceous w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-193 | 66-66.5 | 162 | 6940 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FB-194 | 19-19.5 | 161 | 5700 | Multiple vertical shears | Light gray and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE laminations |
| FB-194 | 24-24.5 | 167 | 4460 | Vertical and horizontal shears | Light gray and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE laminations |
| FB-194 | 36.5-37 | 166 | 1730 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-194 | 55-55.5 | 168 | 8010 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FB-195 | 21-21.5 | 164 | 7260 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-195 | 23.5-24 | 163 | 3630 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-195 | 28.5-29 | 168 | 2420 | Vertical and horizontal shears | Gray fine-grained SANDSTONE w/occassional very close, very thin shale laminations |
| FB-195 | 33.5-34 | 164 | 3590 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and inclusions |
| FB-195 | 39.5-40 | 164 | 2110 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-195 | 46-46.5 | 167 | 2190 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-195 | 49.5-50 | 174 | 7950 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-196 | 23.5-24 | 166 | 7380 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-196 | 25.5-26 | 171 | 1220 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-196 | 45-45.5 | 164 | 2060 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-196 | 54-54.5 | 166 | 1900 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-197 | 21-21.5 | 162 | 3080 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-197 | 28.3-28.8 | 164 | 4240 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-197 | 30-30.5 | 162 | 3080 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-197 | 37-37.5 | 166 | 2060 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-197 | 44.5-45 | 167 | 6510 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FB-198 | 24-24.5 | 172 | 5690 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-198 | 43.5-44 | 167 | 2000 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-198 | 50.5-51 | 161 | 2010 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-198 | 58.5-59 | 166 | 4070 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-199 | 40-40.5 | 175 | 1490 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-199 | 46-46.5 | 164 | 1270 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FB-200 | 33.5-34 | 168 | 1830 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-200 | 38.5-39 | 166 | 3600 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FB-201 | 24-24.5 | 169 | 1930 | Multiple vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-201 | 28-28.5 | 164 | 2200 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FB-202 | 24-24.5 | 164 | 2080 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-202 | 29-29.5 | 167 | 2260 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-203 | 40-40.5 | 164 | 2410 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-203 | 42-42.5 | 163 | 1540 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-204 | 31-31.5 | 168 | 2890 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-204 | 35-35.5 | 168 | 1550 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FB-210 | 23-23.5 | 157 | 1660 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FB-210 | 31-31.5 | 160 | 1680 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-210 | 33.5-34 | 159 | 1370 | Vertical and horizontal shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-210 | 47-47.5 | 164 | 2190 | Multiple vertical shears | Dark gray SHALE w/occasional gray fine-grained sandstone partings |
| | | | | | |
| FB-211 | 22-22.5 | 161 | 2240 | Multiple vertical shears | Gray fine-grained SANDSTONE w/some shale laminations |
| FB-211 | 29.5-30 | 164 | 1920 | Vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings |
| FB-211 | 33-33.5 | 166 | 2310 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FB-211 | 44-44.5 | 165 | 3180 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FW-1 | 22-22.5 | 162 | 3300 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FW-1 | 26.5-27 | 164 | 2020 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FW-2 | 22-22.5 | 167 | 1790 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FW-2 | 27-27.5 | 166 | 2180 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| FW-3 | 26-26.5 | 169 | 2020 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FW-3 | 28-28.5 | 167 | 1510 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FW-3 | 34.5-35 | 164 | 1920 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FW-4 | 27-27.5 | 160 | 1120 | Vertical shear | Dark gray SHALE |
| FW-4 | 31-31.8 | 162 | 2440 | Multiple vertical shears | Dark gray SHALE |
| | | | | | |
| FW-5 | 28-28.3 | 163 | 1640 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| FW-5 | 33-33.5 | 164 | 1390 | Vertical shear | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and |
| FW-5 | 37-37.5 | 162 | 1680 | Vertical shear | Dark gray SHALE |
| | | | | | |
| FW-6 | 31.5-32 | 162 | 2490 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FW-6 | 32.5-33 | 164 | 1610 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FW-6 | 36-36.8 | 169 | 2190 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FW-6 | 37-37.5 | 165 | 2560 | Vertical and horizontal shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| FW-7 | 18.5-19 | 162 | 4080 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| FW-7 | 22-22.5 | 166 | 3400 | Multiple vertical shears | Dark gray SHALE |
| FW-8 | 21.5-22 | 170 | 2870 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FW-8 | 22.5-23 | 167 | 4860 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| FW-8 | 28-28.5 | 163 | 4080 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| | | | | | |
| HMT-2 | 13.5-14 | 165 | 3040 | Partial vertical shears | Tan and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE |
| HMT-2 | 15-15.5 | 167 | 1700 | Diagonal shear | Tan and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE |
| HMT-2 | 25-25.5 | 165 | 2480 | Diagonal shear | Tan and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE |
| HMT-2 | 35.5-36 | 168 | 2320 | Diagonal shear | Tan and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE |
| HMT-2 | 47-47.7 | 176 | 5030 | Partial diagonal shear | Dark gray SHALE w/interbedded very thin, very close fine-grained SANDSTONE partings |
| | | | | | |
| HMT-3 | 21-21.5 | 166 | 2900 | Multiple vertical shears | Dark gray SHALE |
| HMT-3 | 28-28.5 | 163 | 1790 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-3 | 36.5-37 | 160 | 2590 | Multiple vertical shears | Dark gray SHALE |
| HMT-3 | 43.5-44 | 169 | 1830 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-3 | 49.5-50 | 166 | 1510 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-3 | 57-57.5 | 160 | 1870 | Vertical and horizontal shears | Dark gray SHALE |
| | | | | | |
| HMT-4 | 23-23.5 | 168 | 4340 | Multiple vertical shears | Dark gray SHALE |
| HMT-4 | 37.5-38 | 166 | 1310 | Multiple vertical shears | Dark gray SHALE |
| HMT-4 | 43-43.5 | 169 | 2150 | Multiple vertical shears | Dark gray SHALE |
| HMT-4 | 47-47.5 | 164 | 2230 | Multiple vertical shears | Dark gray SHALE |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| HMT-4 | 55-55.5 | 156 | 1560 | Multiple vertical shears | Dark gray SHALE |
| HMT-4 | 61-61.5 | 166 | 2880 | Vertical shears | Dark gray SHALE |
| | | | | | |
| HMT-5 | 30-30.5 | 167 | 920 | Vertical shears | Dark gray SHALE |
| HMT-5 | 35.4-35.9 | 169 | 3150 | Multiple vertical shears | Dark gray SHALE |
| HMT-5 | 43.5-44 | 165 | 2920 | Vertical shears | Dark gray SHALE |
| HMT-5 | 50-50.5 | 172 | 3790 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-5 | 57-57.5 | 170 | 2170 | Multiple vertical shears | Dark gray SHALE |
| | | | | | |
| HMT-6 | 30-30.5 | 160 | 3740 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-6 | 37.5-38 | 165 | 1350 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-6 | 40.5-41 | 169 | 1640 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-6 | 50-50.5 | 162 | 1260 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-6 | 60-60.5 | 169 | 1810 | Vertical and horizontal shears | Dark gray SHALE |
| HMT-6 | 67.5-68 | 167 | 6990 | Vertical and horizontal shears | Dark gray SHALE |
| | | | | | |
| HMT-7 | 19-19.5 | 167 | 1510 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| HMT-7 | 27-27.5 | 170 | 2290 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| HMT-7 | 31.5-32 | 164 | 2210 | Vertical and horizontal shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| HMT-7 | 39.5-40 | 164 | 2330 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| HMT-7 | 49-49.5 | 163 | 2760 | Multiple vertical shears | Dark gray SHALE |
| HMT-7 | 54-54.5 | 168 | 3050 | Multiple vertical shears | Dark gray SHALE |
| | | | | | |
| HMT-8 | 21.5-22 | 168 | 5440 | Vertical shear | Dark gray SHALE |
| HMT-8 | 26.3-26.8 | 163 | 2020 | Vertical shear | Dark gray SHALE |
| HMT-8 | 30-30.5 | 163 | 2740 | Multiple vertical shears | Dark gray SHALE |
| HMT-8 | 38.5-39 | 163 | 1110 | Multiple vertical shears | Dark gray SHALE |
| HMT-8 | 49.3-49.8 | 163 | 4580 | Vertical shear | Dark gray SHALE |
| HMT-8 | 51-51.5 | 164 | 1770 | Multiple vertical shears | Dark gray SHALE |
| HMT-8 | 57-57.5 | 165 | 3040 | Multiple vertical shears | Dark gray SHALE |
| HMT-9 | 19-19.5 | 162 | 2680 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |

# SUMMARY of COMPRESSION TEST RESULTS

PROJECT: 040748 Hwy 22 to I-40
LOCATION: Sebastian and Crawford Counties, Arkansas
UES JOB NUMBER: 23184.00083 (21-071)

| BORING No. | SAMPLE DEPTH (ft) | TOTAL UNIT WEIGHT (pcf) | COMPRESSIVE STRENGTH (psi) | FAILURE DESCRIPTION | DESCRIPTION |
|---|---|---|---|---|---|
| HMT-9 | 22.5-23 | 162 | 1930 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-9 | 31.5-32 | 163 | 2140 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-9 | 41.5-42 | 170 | 3040 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-9 | 47.5-48 | 163 | 1200 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| HMT-10 | 24-24.5 | 168 | 2700 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-10 | 33-33.5 | 166 | 2360 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-10 | 39.5-40 | 167 | 2770 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-10 | 51.5-52 | 163 | 2020 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| HMT-14 | 40-40.5 | 169 | 4700 | Vertical and horizontal shears | Tan and gray weathered fine-grained SANDSTONE w/interbedded very close SHALE |
| HMT-14 | 44-44.5 | 169 | 2340 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-14 | 47-47.5 | 170 | 3460 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-14 | 54-54.5 | 166 | 3280 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| HMT-14 | 58-58.5 | 171 | 5250 | Multiple vertical shears | Dark gray SHALE w/occasional very thin fine-grained sandstone partings |
| | | | | | |
| HMT-15 | 25-25.5 | 163 | 5570 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and |
| HMT-15 | 31-31.5 | 164 | 4770 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and |
| HMT-15 | 35.4-35.9 | 166 | 3950 | Multiple vertical shears | Dark gray SHALE w/interbedded very close, very thin fine-grained SANDSTONE partings and |
| HMT-15 | 45-45.5 | 166 | 1620 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |
| HMT-15 | 50-50.5 | 167 | 4430 | Multiple vertical shears | Dark gray SHALE w/some very thin fine-grained sandstone partings |

Notes:
1. All tests performed on NQwl rock cores.
2. Tested as per ASTM D7012

# APPENDIX M

P.O. Box 30970
Little Rock, Arkansas 72260-0970
#1 Trigon Place 72209
(501) 455-2536
FAX (501) 455-4137

# REPORT OF STANDARD PROCTOR TEST
## (AASHTO T-99)

Project: ARDOT Job No.040748 Hwy 22 to I-40 Crawford Co. Job No: 23184.00083
Material Description: Dark brown silty CLAY with organic stains
Location Sampled/Source: FP-38
Sample Depth, ft: 0.5-1.5
Date Sampled:
Date Tested: 9/26/2024
Tested By: RB
Report Date: 9/26/2024

| LAB COMPACTION PROCEDURE: AASHTO T-99 Method: A | |
|---|---|
| **Maximum Unit Dry Wt. (pcf):** | 105.7 |
| **Optimum Water Content (%):** | 17.5 |

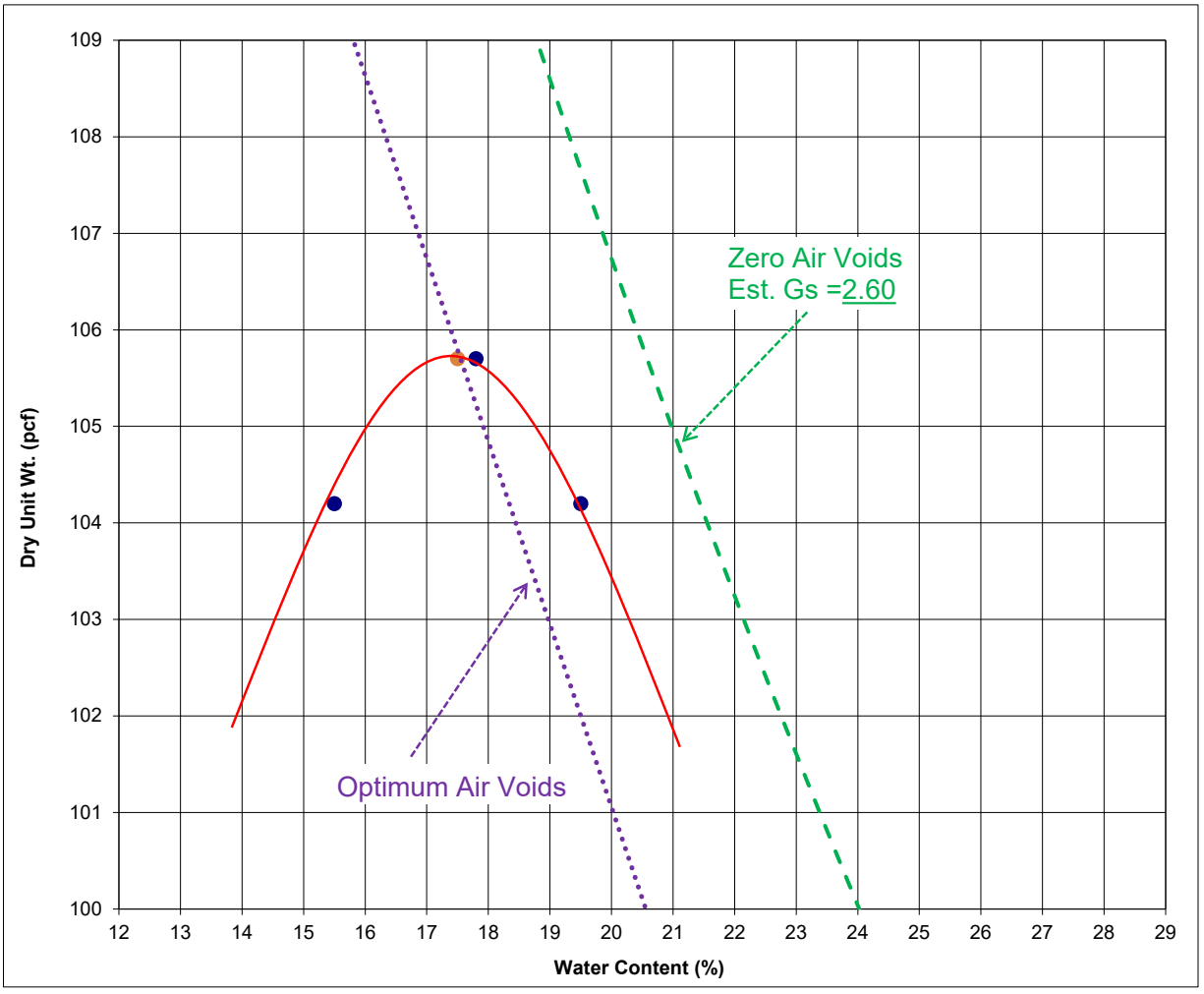
As Recieved Water Content: 3.4 %

| ATTERBERG LIMITS AASHTO T-89 & T-90 |
|---|
| Liquid Limit: 33 |
| Plastic Limit: 22 |
| Plasticity Index: 11 |

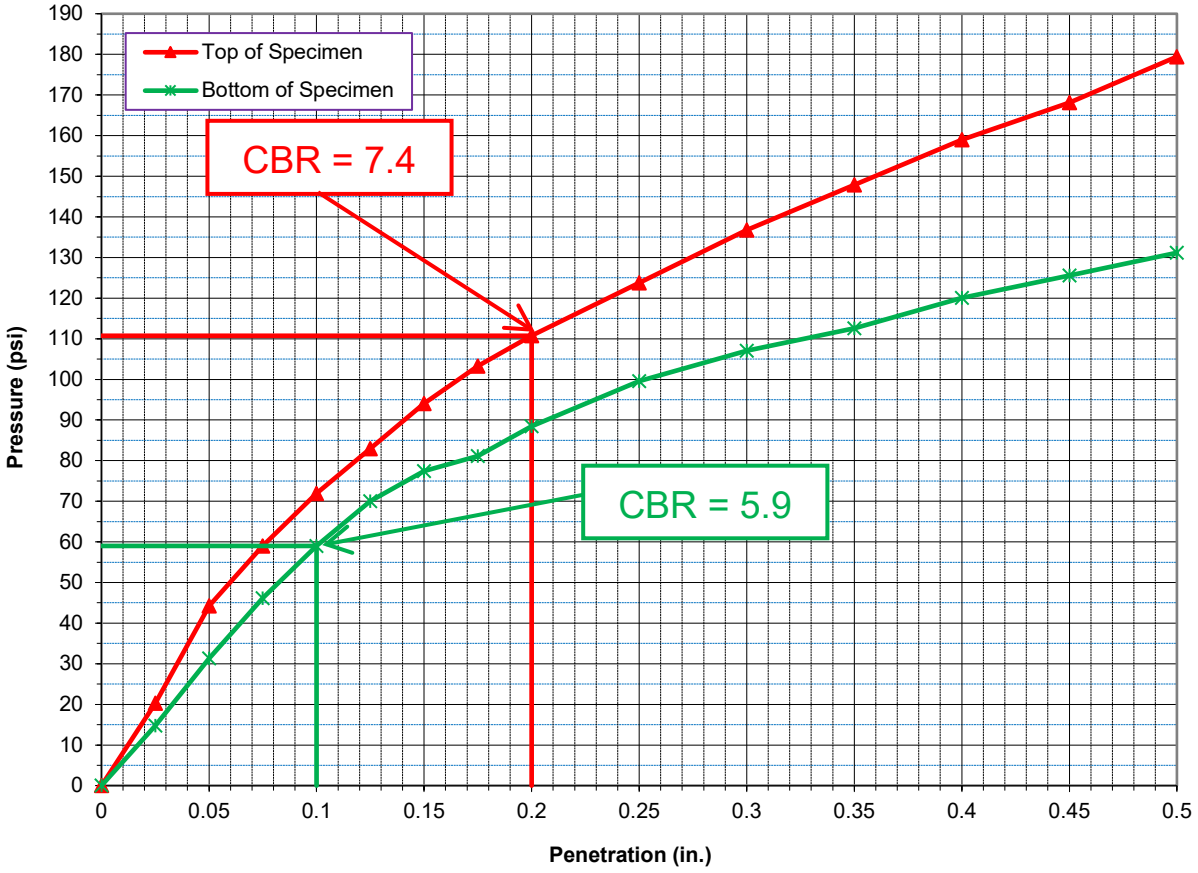
| USCS Classification: |
|---|
| **CL** |

| AASHTO Classification: |
|---|
| **A-6** |

| GRADATION AASHTO T-88 | |
|---|---|
| Sieve Number | Percent Passing |
| 3 in. | 100 |
| 2 in. | 100 |
| 3/4 in. | 100 |
| 3/8 in. | 100 |
| #4 | 100 |
| #10 | 96 |
| #40 | 88 |
| #200 | 69 |



# Laboratory CBR Test Report
# (AASHTO T-193)




| Boring No./Depth, ft | Classification | | Natural Moisture Content, % | Assumed Specific Gravity | Liquid Limit | Plastic Limit | % Retained No.4 | % Passing No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| FP-38 @ 0.5-1.5' | CL | A-6 | 3.4 | 2.6 | 33 | 22 | 0 | 69 |
| **PROCTOR TEST RESULTS (AASHTO T-99)** | | | | **MATERIAL DESCRIPTION** | | | | |
| Optimum Moisture Content = 17.5%<br>Maximum Dry Density = 105.7 pcf | | | | Dark brown silty CLAY with organic stains | | | | |

Remarks:
As Molded: 101.6 pcf @ 17.6%; Percent swell: 0.44%

UES™

| |
|---|
| Project: 040708 Hwy. 22 to I-40 |
| UES Project No.: 23184.00083 |
| Location: Crawford Co., Arkansas |
| Sample Date: 09/26/24 |
| Test Date: 10/04/24 |

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

Sample: FP-38, 0.5-1.5 ft
Atterberg Limits: LL = 33, PL = 22, PI = 11

Description: Dark brown silty CLAY with organic stains
Classification: **USCS = CL** ; **AASHTO = A-6**

P.O. Box 30970
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#1 Trigon Place 72209
(501) 455-2536
FAX (501) 455-4137

# REPORT OF STANDARD PROCTOR TEST
## (AASHTO T-99)

Project: ARDOT Job No.040748 Hwy 22 to I-40 Crawford Co. Job No: 23184.00083
Material Description: Dark brown silty CLAY with organic stains
Location Sampled/Source: FP-39
Sample Depth, ft: 0.5-1.5
Date Sampled:
Date Tested: 10/14/2024
Tested By: RB
Report Date: 10/14/2024

| LAB COMPACTION PROCEDURE: AASHTO T-99 Method: A | |
|---|---|
| **Maximum Unit Dry Wt. (pcf):** | 104.5 |
| **Optimum Water Content (%):** | 18.4 |

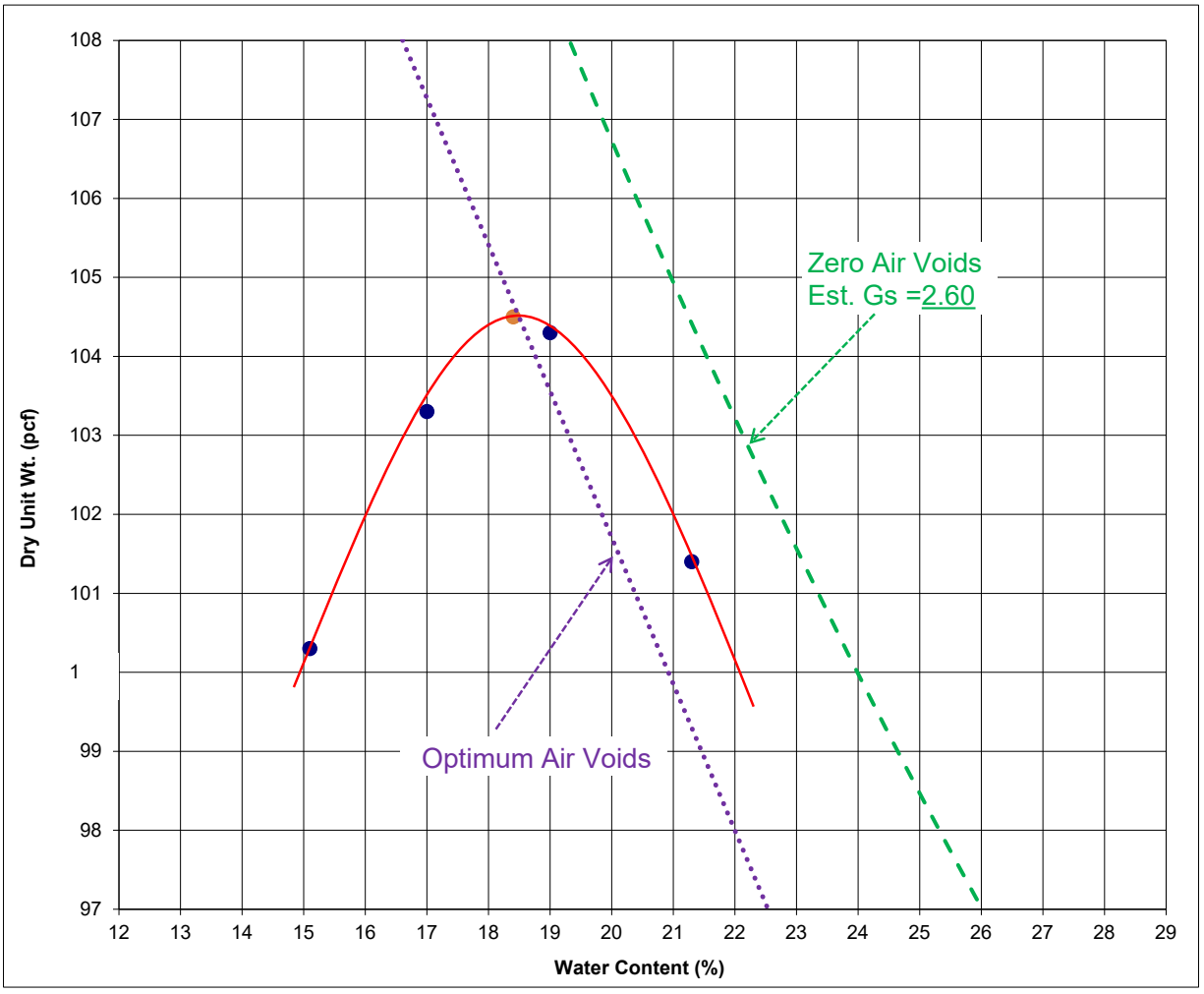
As Recieved Water Content: 2.9 %

| ATTERBERG LIMITS AASHTO T-89 & T-90 |
|---|
| Liquid Limit: 34 |
| Plastic Limit: 22 |
| Plasticity Index: 12 |

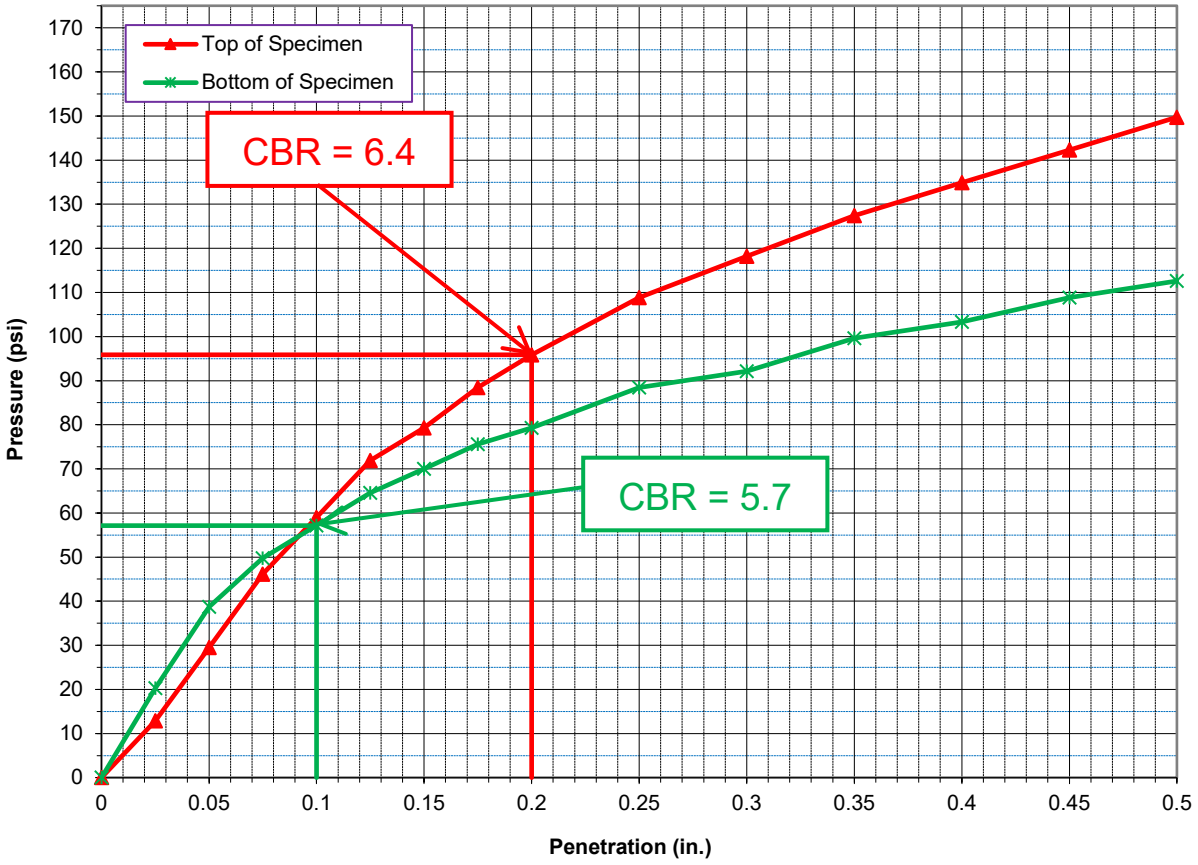
| USCS Classification: |
|---|
| **CL** |

| AASHTO Classification: |
|---|
| **A-6** |

| GRADATION AASHTO T-88 | |
|---|---|
| Sieve Number | Percent Passing |
| 3 in. | 100 |
| 2 in. | 100 |
| 3/4 in. | 100 |
| 3/8 in. | 100 |
| #4 | 100 |
| #10 | 98 |
| #40 | 94 |
| #200 | 74 |



# Laboratory CBR Test Report
# (AASHTO T-193)




| Boring No./Depth, ft | Classification | | Natural Moisture Content, % | Assumed Specific Gravity | Liquid Limit | Plastic Limit | % Retained No.4 | % Passing No.200 |
|---|---|---|---|---|---|---|---|---|
| | USCS | AASHTO | | | | | | |
| FP-39 @ 0.5-1.5' | CL | A-6 | 2.9 | 2.6 | 34 | 22 | 0 | 74 |
| **PROCTOR TEST RESULTS (AASHTO T-99)** | | | | **MATERIAL DESCRIPTION** | | | | |
| Optimum Moisture Content = 18.4%<br>Maximum Dry Density = 104.5 pcf | | | | Dark brown silty CLAY w/organic stains | | | | |

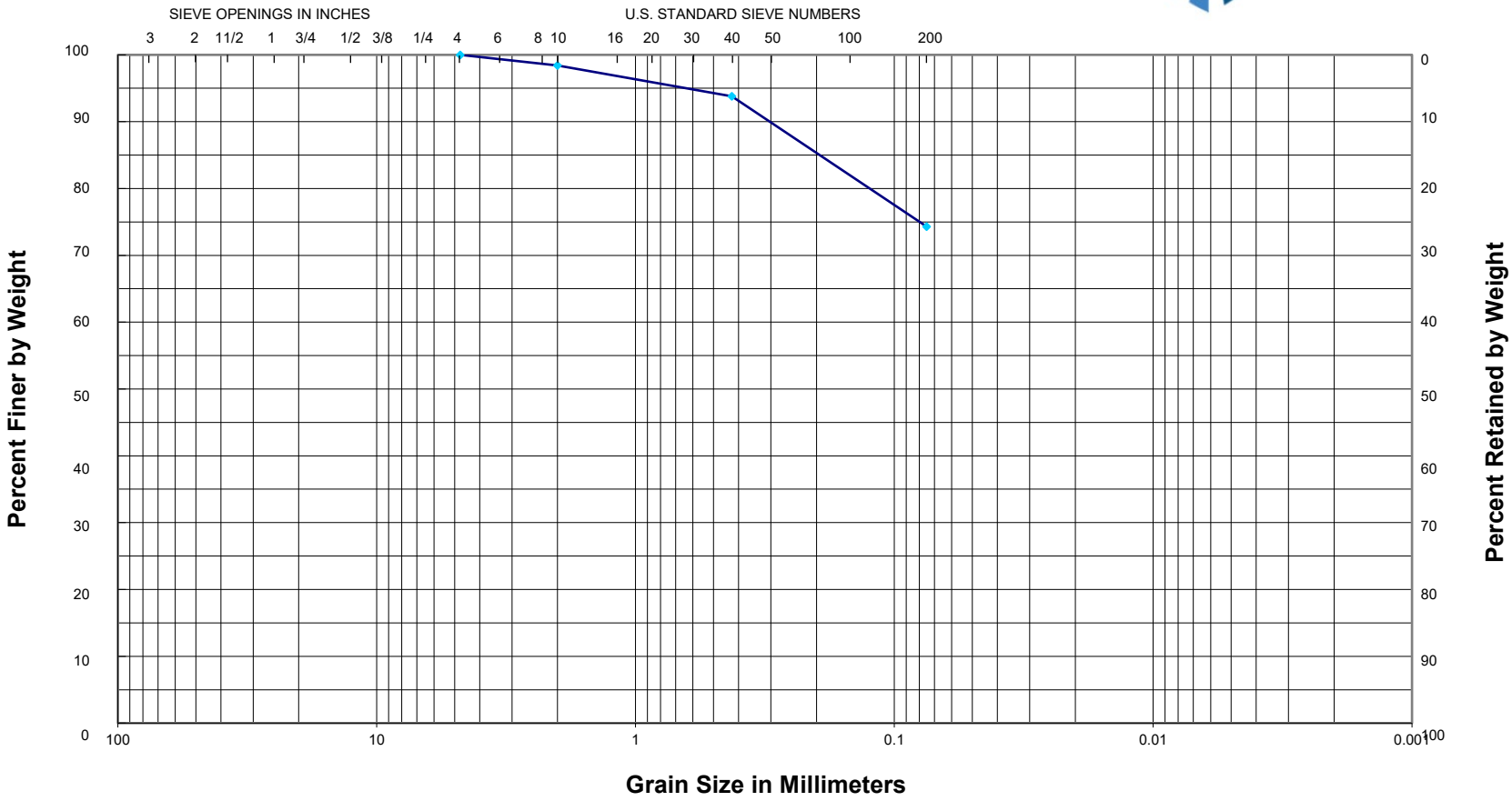
Remarks:
As Molded: 99.4 pcf @ 18.8%; Percent swell: 0.35%

UES™

| |
|---|
| Project: 040708 Hwy. 22 to I-40 |
| UES Project No.: 23184.00083 |
| Location: Crawford Co., Arkansas |
| Sample Date: 09/26/24 |
| Test Date: 10/04/24 |

23184.00083

# GRAIN SIZE CURVE




| GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | |

Sample: FP-39, 0.5-1.5 ft
Atterberg Limits: LL = 34, PL = 22, PI = 12

Description:Dark brown silty CLAY w/organic stains
Classification: **USCS = CL** ; **AASHTO = A-6**