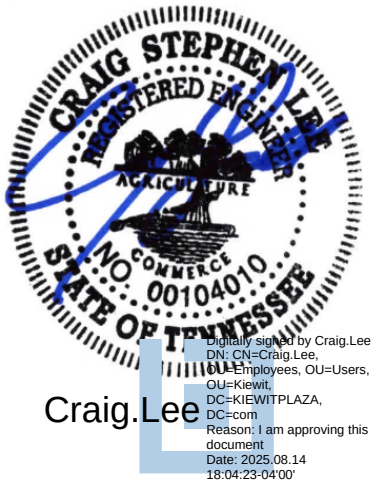
PROJECT IKE ENRICHMENT

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

KIEWIT NUCLEAR SOLUTIONS



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B	15-August-2025	ISSUED FOR FEED	JR/YC	CL	CL
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1.0 INTRODUCTION

This report presents preliminary geotechnical engineering recommendations for the proposed Project IKE located near Oak Ridge, Tennessee. Preliminary geotechnical recommendations are to support project development including facility siting, foundation system selection, site grading scheme, and project budget development. Preliminary geotechnical recommendations are based on two (2) S&ME Geotechnical Data Reports commissioned by Kiewit as well as published previous studies of the region for the U.S. Department of Energy. Access to large portions of the site were unavailable due to site clearing restrictions. A supplemental geotechnical exploration program will be required to finalize design recommendations once access to the entire site is available.

2.0 PROJECT BACKGROUND

2.1 PROJECT DESCRIPTION

The project involves incorporating Orano's Project IKE Enrichment Facility on a parcel near the City of Oak Ridge, TN. The site is currently located on Department of Energy (DOE) property, referred to as Self Sufficiency Parcel 2 (SSP2). The property is in the process of being procured by Orano.

2.2 SITE DESCRIPTION

The project site is located on an undeveloped parcel and consists predominately of dense hardwood forest with areas of dense brush vegetation, open meadows, and few gravel access roads. The open meadows are located where a transmission line traverses the property southwest to northeast, and the Right-of-Way is maintained between the tree lines. Abandoned homesteads including masonry structures and fencing is visible adjacent to portions of the gravel access roads. Figure 1. shows the approximate location of the project site.



Figure 1: Regional Site Map

2.3 PREVIOUS STUDIES

We reviewed two previous geologic studies (listed below) as well as Tennessee regulations relative to developing in Karst terrain. A report compiled by Robert D. Hatcher discusses the geologic framework of the Oak Ridge Reservation (ORR). Parr and Hughes discuss the physical characteristics of the ORR geology and mapped geologic hazards in the region including the project site.

1. *Oak Ridge Reservation: Physical Characteristics and Natural Resources* – Patricia Dreyer Parr and Joan F. Hughes, Prepared by UT-Battelle for the U.S. Department of Energy, October 2006.

2. *Environmental Sciences Division: Status Report on the Geology of the Oak Ridge Reservation* – Robert D. Hatcher, Jr. et. al., Oak Ridge National Laboratory, Oak Ridge, Tennessee, October 1992.

3. *Tennessee Department of Environment and Conservation, Tennessee Permanent Stormwater Management and Design Guidance Manual*, Appendix B: Stormwater Design Guidelines for Karst Terrain, December 2014.

2.4 PURPOSE AND SCOPE

The purpose of this study was to explore and develop a general characterization of subsurface conditions as revealed at the specific boring locations. This characterization was used to provide preliminary geotechnical analysis and recommendations for project design development. Our scope of services included the following:

- Review of the geologic setting

- Identification of potential geological hazards
- Site development recommendations and karst considerations
- Conduct preliminary geotechnical explorations
- Perform geophysical surveys
- Engineering analyses of the field and laboratory data
- Preparation of this preliminary report, which includes the following:
    - Summary of site geotechnical conditions
    - Site development recommendations
    - Foundation recommendations
    - Slope stability analysis

2.5 LIMITATIONS OF GEOTECHNICAL DATA

The boring locations were identified in the field by S&ME using a commercial-grade, hand-held GPS unit. As such, the recorded coordinates should be considered approximate, with potential horizontal deviations of approximately 50 to 100 feet, particularly for borings not located along established roadways. Additionally, boring elevations were derived from USGS topographic maps rather than field-surveyed data. This approach was taken because the vertical accuracy of the GPS unit is generally less reliable than its horizontal accuracy and is more susceptible to error. As a result, both the horizontal and vertical positions of the borings should be interpreted as approximate and used with appropriate caution in design and analysis.

3.0 FIELD AND LABORATORY EXPLORATION

3.1 FIELD EXPLORATION

Fieldwork was performed by S&ME, Inc. under the direction of Kiewit and included the following:

- Twenty-seven (27) exploratory borings with Standard Penetration Tests (SPT). Ten (10) boring locations had offset holes for additional sampling collection
- Twenty-two (22) thin-walled (Shelby) tube samples
- Geophysical surveys including fourteen (14) Seismic Refraction Tomography (SRT) profiles and Four (4) Surface Wave Surveys. Surface Wave Surveys were a combination of the active Multi-Channel Analysis of Surface Waves (MASW) and passive Microtremeor Array Measurements (MAM) methods.

Soil borings were performed in three phases:

- Phase 1 South East Borings including B-01-SE through B-05-SE;
- Phase 2 Series B Borings including B-1 through B-9, and B-11;
- Phase 3 Series A Borings including A-1 through A-12.

Figure 2 below shows the boring locations, with Phase 1 in red, Phase 2 in yellow, and Phase 3 in blue. The phases were performed between July 2024 to February 2025.

The Exploration Location Plan is provided in Attachment 2. Subsurface profiles are provided in Attachment 3. S&ME exploration procedures, laboratory testing results, and geophysical survey data are provided in Attachment 7.

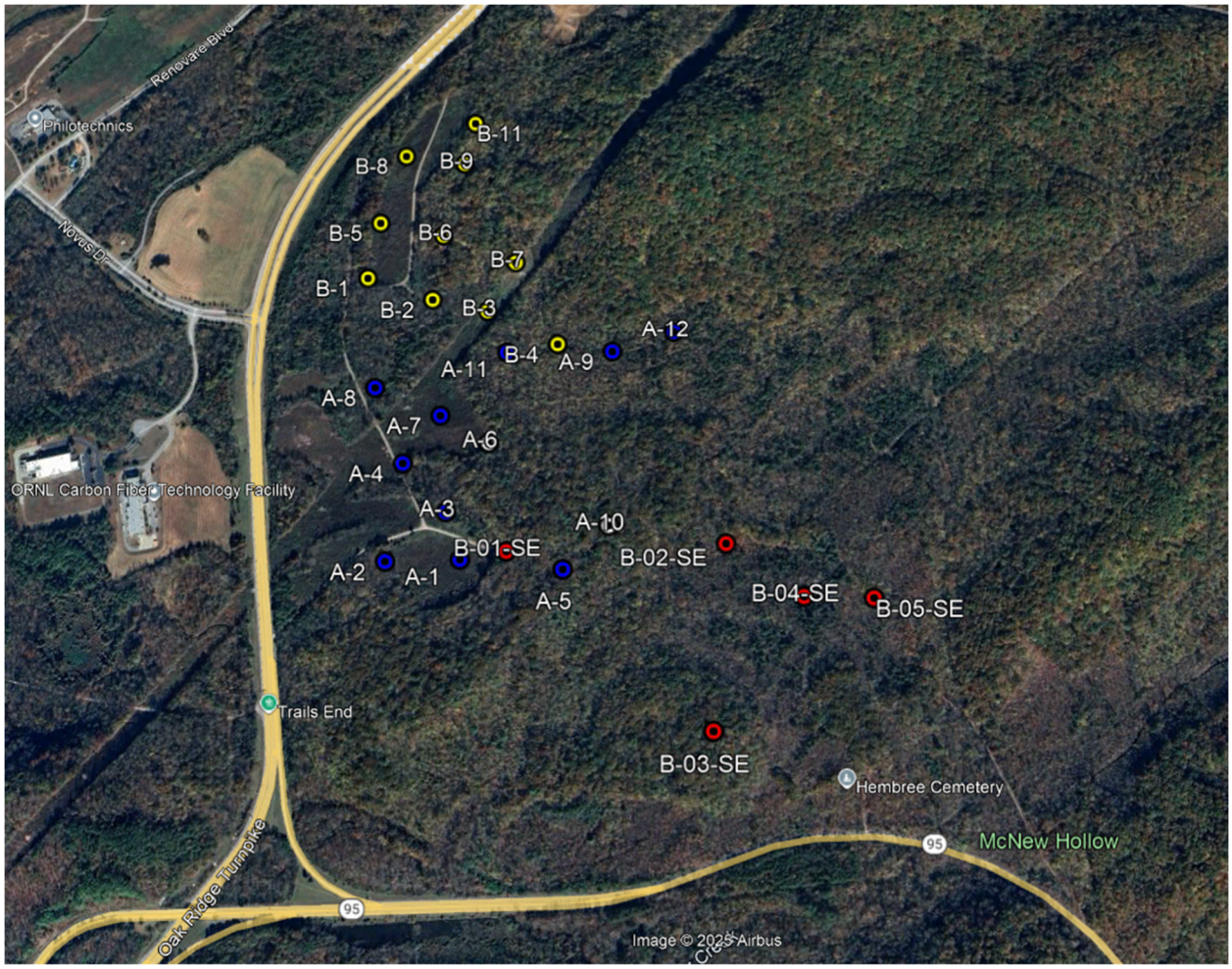


Figure 2: Boring Locations

3.2 LABORATORY TESTING

Table 1 presents the laboratory tests assigned by Kiewit and performed by S&ME. The laboratory test results are provided in the S&ME data report in Attachment 7.

Table 1: Laboratory Tests

Test Type	Test Standard
Sieve Analysis	ASTM D6913
Grain Size (Wash 200)	ASTM D1140-17

Unconfined Compressive Strength Test of Rock	ASTM D7012
Unconfined Compressive Strength of Soil	ASTM D2166
1-D Consolidation Test	ASTM D2435
Specific Gravity	ASTM D854
Atterberg Limits	ASTM D4318
Water Content	ASTM D2216
Soluble Chlorides	AASHTO T291
Soluble Sulfates	AASHTO T290
pH	AASHTO T289

4.0 SITE CONDITIONS

4.1 EXISTING SITE CONDITIONS

The project site is situated on the western flank of East Fork Ridge and is bordered on the south by Bear Creek and TN 95, to the west by the Oak Ridge Turnpike (TN58) and to the east by East Fork Ridge. This is an undeveloped parcel densely forested by hardwood trees with areas of dense underbrush, open meadows and gravel access roads. The open meadows are primarily associated with a transmission line right-of-way that traverses the property southwest to northeast. The Site drains to the south and west. West side drains to west via unnamed tributary, the east side drains to the south via ET-4 (between the proposed site and the white wing scrap yard) and south via ET-3 on the far east side of the property. Based on USGS LiDAR data, existing elevations within the project site range from approximately EL.+760 feet near the proposed roadway on the eastern portion of the site to EL. +1150 feet at the high point in the northern area.

4.2 PHYSIOGRAPHIC SETTING AND REGIONAL GEOLOGY

The project site is located on the western boundary of the Valley and Ridge Physiographic Province whose distinguishing feature is narrow parallel ridges and valleys trending southwest to northeast. The regional geology of the project site includes several thrust faults that upturned the normally flat lying bedrock resulting in a series of formation outcrops across the site. Figure 3 depicts the faulting and folding by the White Oak Mountain and Copper Creek faults that creates the steeply dipping bedrock on the project site.

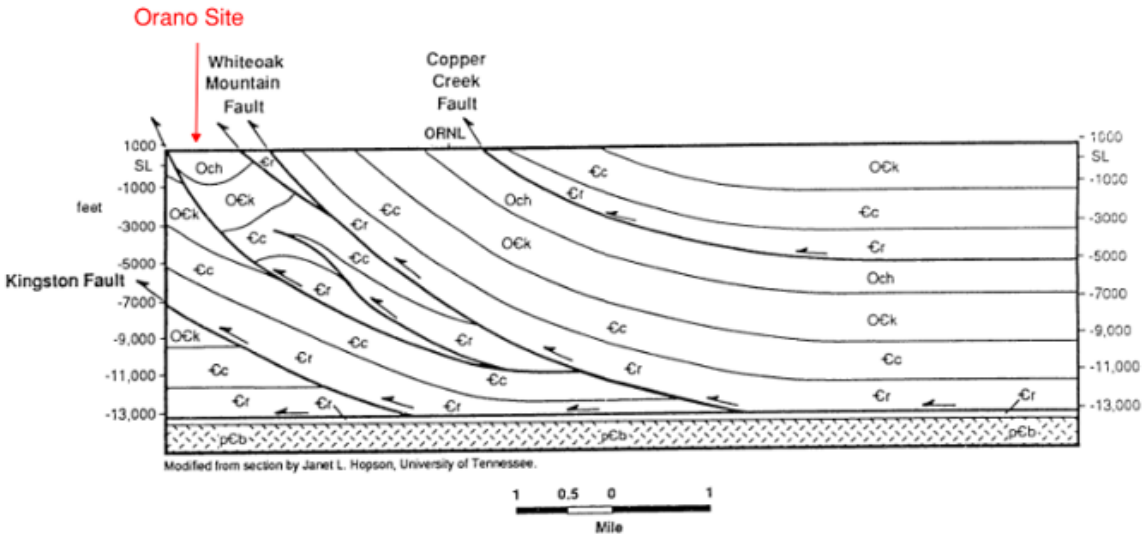


Fig. 1-2. (b) Geologic cross section based on seismic line on Tennessee 95. Modified from section by Janet L. Hopson, University of Tennessee. p€b - Precambrian basement. €r - Rome Formation. €c - Conasauga Group. O€K - Knox Group. Och - Chickamauga Group.

Figure 3: Regional Geologic Cross Section (from Fig 1-2 Hatcher)

Robert D. Hatcher, Jr., et. al., compiled the report titled *Status Report on the Geology of the Oak Ridge Reservation*, which was published in October 1992 by the Oak Ridge National Laboratory (ORNL).This report discusses the geologic framework and lithology of the Oak Ridge Reservation (ORR) which includes the project site. Figure 3, reproduced from the Hatcher report, shows the project site underlain by bedrock belonging to the Chickamauga Supergroup (Och), a sequence of formations highlighted within the red box in Figure 4.

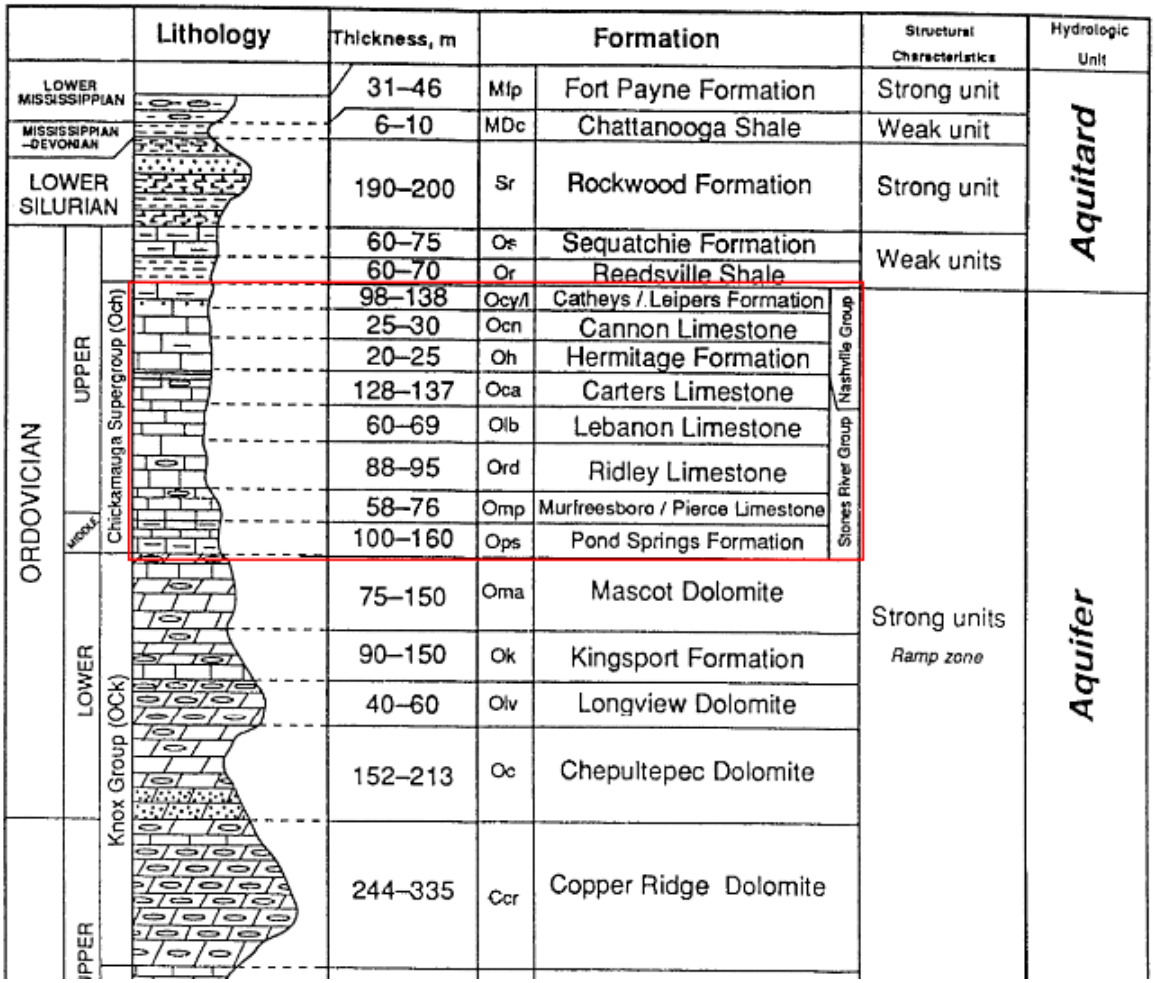


Figure 4. Lithology of Chickamauga Super Group

Lettis Consultants International (Lettis) developed a detailed geologic map titled Plate 2b (Northeast Quadrant) Clinch River Site Area Geologic Map, incorporating data from multiple sources. This reconnaissance mapping aligns with Hatcher's interpretation, indicating that the project site is underlain by the Chickamauga Supergroup except for the eastern margin which is underlain by the Rome Formation. The Lettis mapping with boring locations overlain is shown in Figure 5. The recovered rock cores from our geotechnical exploration confirmed the presence of formations of the Chickamauga Supergroup as mapped by Lettis and Hatcher. We also confirmed the presence of the Reedsville Shale in the north portion of the project site and bedrock of the Rome Formation along the east boundary of the project site. Both the Reedsville Shale and the Rome Formation are comprised of dark brown to red shale or siltstone.

The Reedsville Shale was observed in Boring A-12 confirming the Lettis mapping of that formation. The Rome Formation was encountered in Borings A-5 and A-10 indicating the Rome

Formation is located approximately 500 feet further northwest than the Lettis mapping. The Rome Formation was not encountered in Boring B-01.

The Chickamauga Supergroup is Upper Ordovician age rock while the Rome Formation is much older Lower Cambrian aged rock and normally occurs several hundred feet below the Chickamauga Supergroup in the stratigraphic section. The fault line is the interface between the older Rome Formation and the younger Chickamauga Supergroup. The revised location of the fault line is shown in Figure 5 by both a solid and dashed line. The solid line is where the fault location is confirmed by the borings. The dashed line is inferred and is based on the distance of the northwest offset of the mapped fault location as indicated by borings B-01 and A-5.

Within the Chickamauga Supergroup, Lettis identified the Catheys / Leipers Formation, Cannon Limestone, Hermitage Formation, Carters Limestone, Lebanon Limestone, and Ridley Limestone. Lettis also identified two formations within the project site that are directly above the Chickamauga Supergroup: the Sequatchie Formation and the Reedsville Shale.

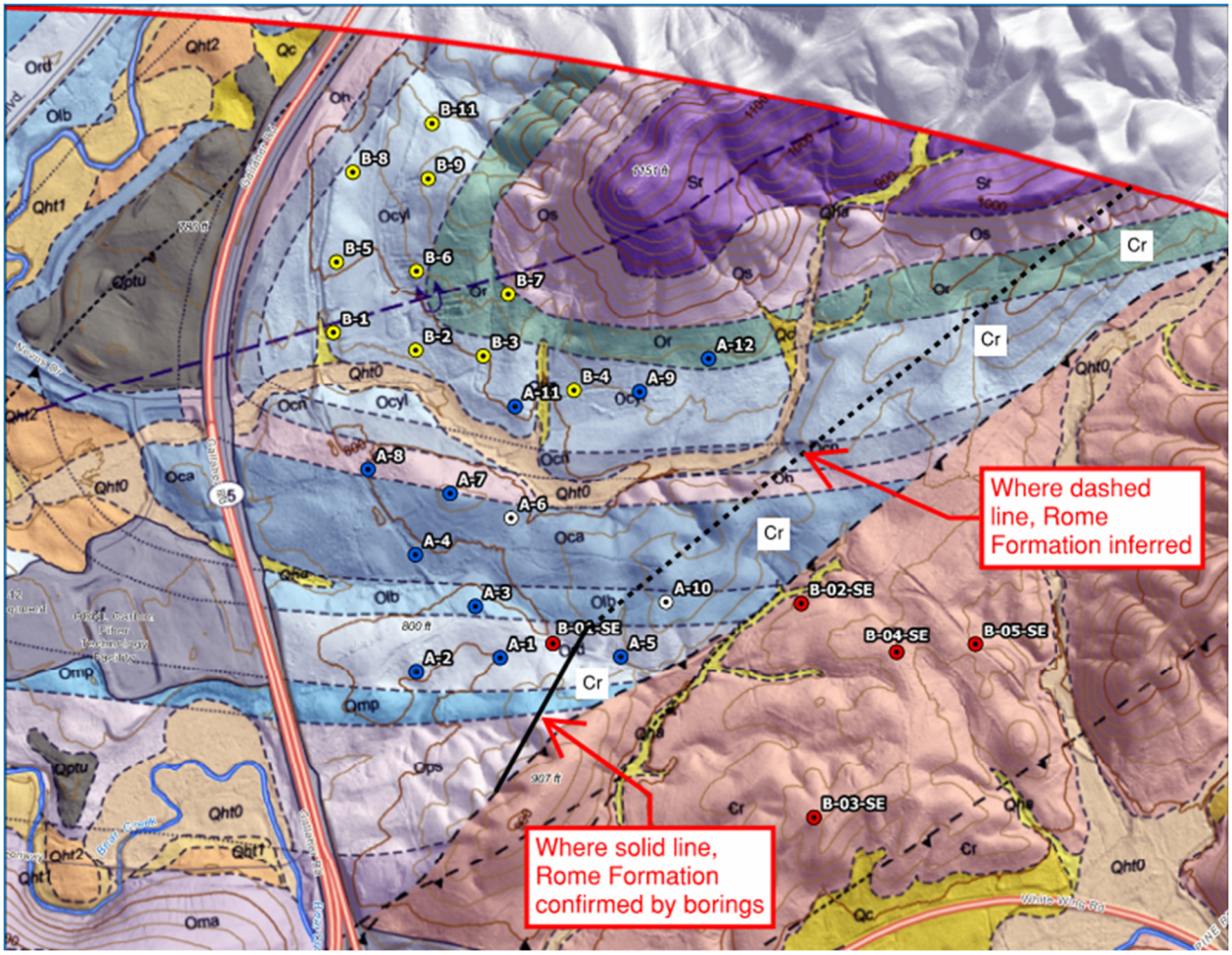


Figure 5a: Geologic Formations over the Project Parcel (Lettis)

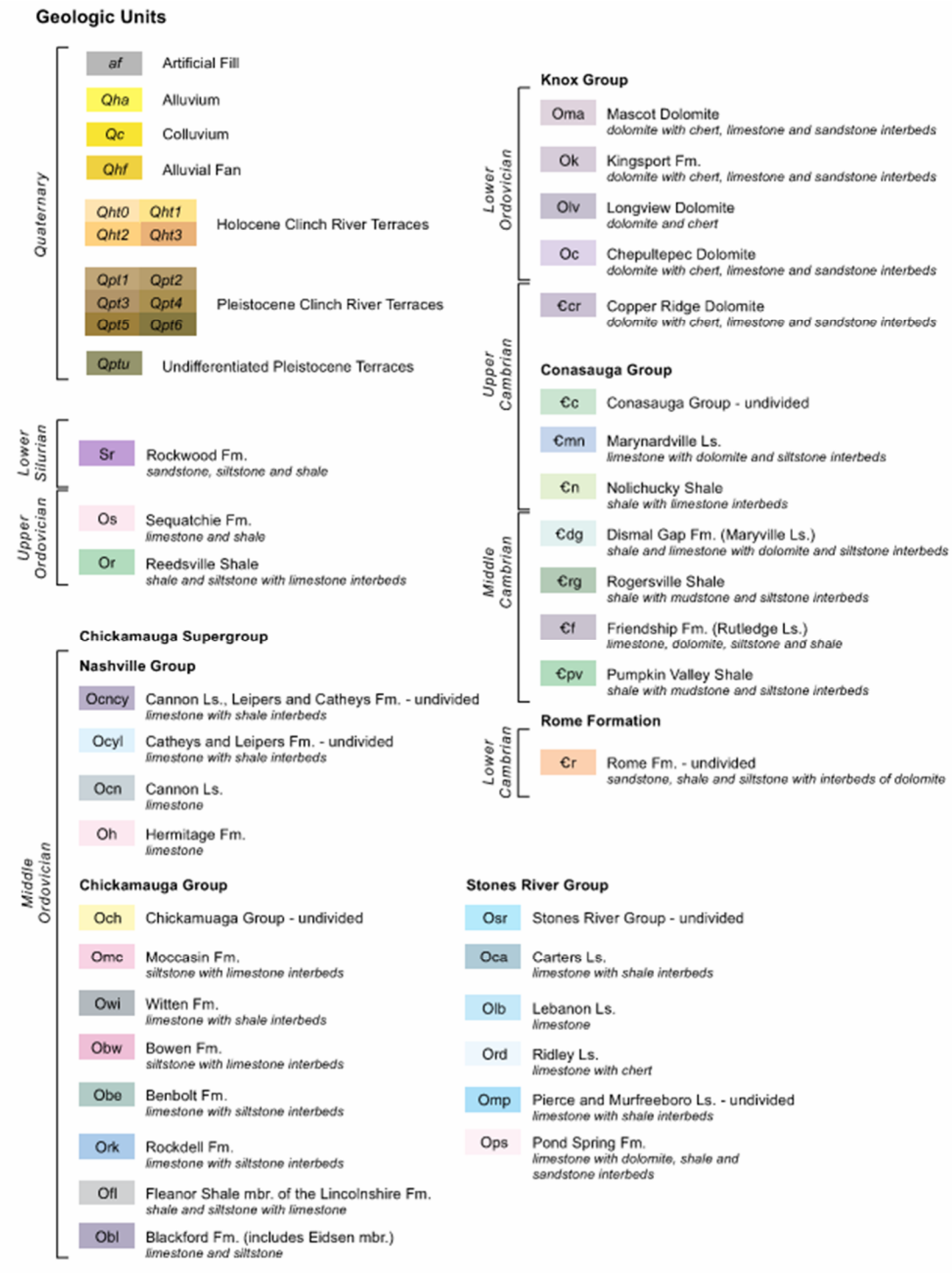


Figure 5b: Legend for Geologic Map

4.3 GEOLOGICAL HAZARDS

4.3.1 Regional Karst Features

In their October 2006 report titled *Oak Ridge Reservation Physical Characteristics and Natural Resources*, Patricia Dreyer Parr and Joan F. Hughes provide a comprehensive overview of the geology and natural features of the Oak Ridge Reservation (ORR). Figure 6 below is adapted from Figure 5 in the original report, which depicts the bedrock geology of the ORR along with prominent karst features. Notably, sinkholes—represented by red triangles—are almost exclusively concentrated within the Knox Group (highlighted in yellow). The project site, marked by the black box labeled “Site,” lies within the Chickamauga Group (shown in blue) and directly borders the Knox Group. The near absence of sinkholes within the Chickamauga Group, except where it adjoins the Knox Group, suggests that some of these transitional areas may actually be underlain by Knox Group formations rather than Chickamauga. However, detailed mapping by Lettis Consultants and analysis of recovered rock cores confirm that the project area is indeed underlain by the Chickamauga Supergroup, indicating that the risk of sinkhole development at the project site is low. An enlarged version of Figure 6 is provided in Attachment 4 for reference.

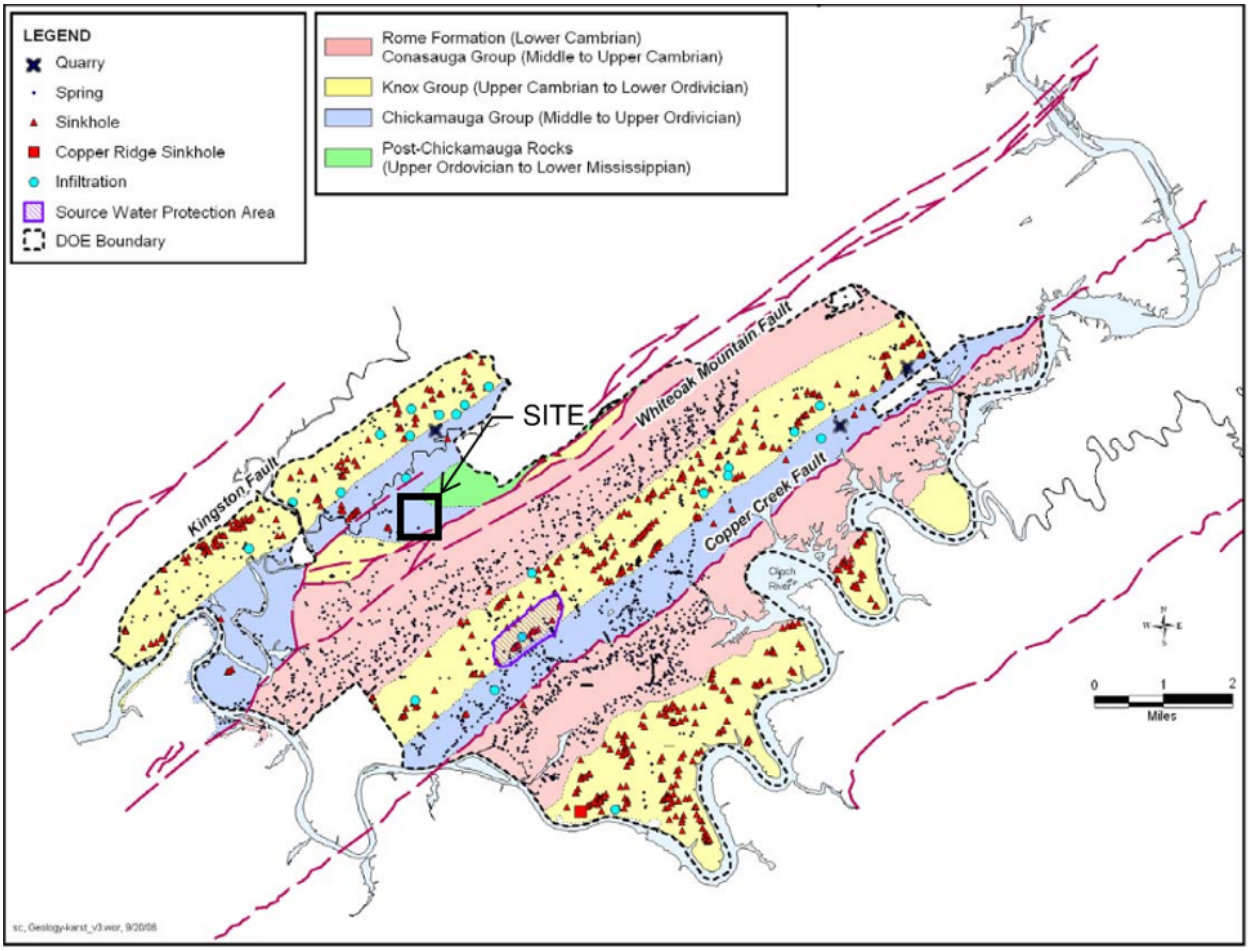


Figure 6: Regional Map of ORR with Karst Features

4.4 SUBSURFACE SOIL CONDITIONS

The subsurface investigation performed by S&ME included 27 soil test borings along with the laboratory testing on collected samples. Based on these borings, the generalized descriptions of the geologic units encountered are summarized below:

Stratum 1: Surface Materials – Topsoil ranging from 2 to 6 inches thick was encountered in the borings of Series A and SE. Topsoil was not present at the Series B borehole locations.

Stratum 2: Overburden – The soil overburden thickness ranged from 7 to 59 feet thick. The soil profile is stiff clay with high plasticity that transitions to soft or medium stiff near the top of bedrock. The soil overburden also includes some amounts of lean clay (CL), sandy-silt (ML), and elastic-silt (MH). Occasional thin layers of chert were encountered as shown in A-06 at a depth of 15 feet below ground surface. The soil overburden thickness (i.e. depth to bedrock) for all the borings are shown in Figure 7.

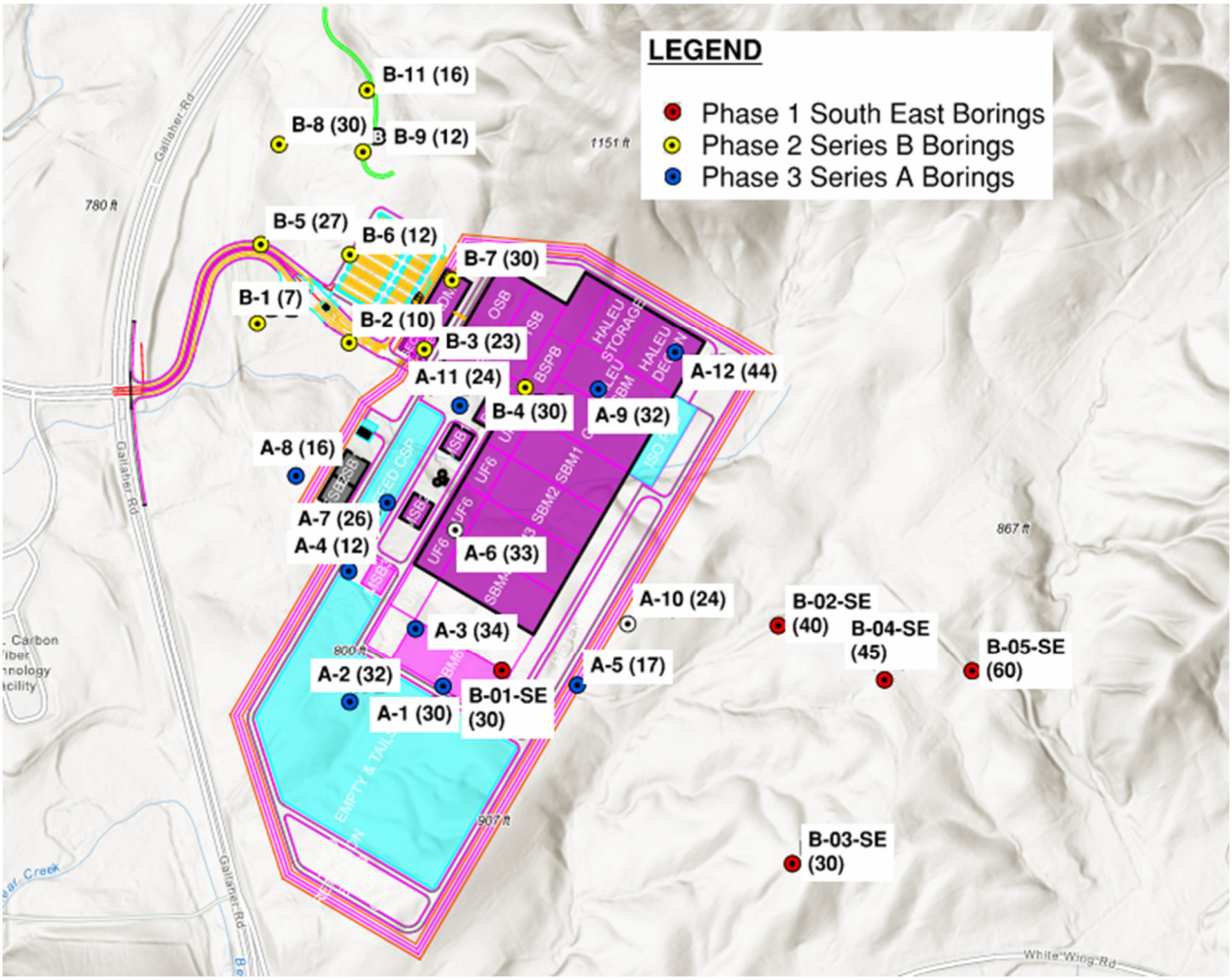


Figure 7: Soil Overburden Thickness by Boring Location

Stratum 3: Bedrock – The bedrock consists of light gray to dark gray limestone, light gray to dark gray limestone with calcareous shale interbeds, and calcareous shale with limestone seams.

The differential weathering of the Chickamauga Supergroup formations results in a variable or undulating top of rock profile. The top of rock profile does not mirror the ground surface topography, creating uncertainty in predicting top of rock elevations at any discrete location at the site.

Each of the rock formations across the project site have some unique characteristics. However, they can be separated into three generalized categories for the purpose of foundation support and material handling:

- limestone with few discontinuities such as clay seams
- limestone with numerous clay seams
- the Reedsville Shale and Rome Formation

The difference in the two limestone units is discerned using the Rock Quality Designation (RQD) and the Recovered Rock Core (percent recovery). RQD is the ratio of the sum of rock pieces longer than 4 inches relative to the length of the total core run. The RQD is an indicator of overall rock quality and whether the limestone is thinly bedded or massively bedded. The percent recovery is the ratio of the length of recovered material relative to the total length of the core run. Core loss is usually due to voids in the bedrock or clay seams that wash away during the coring process.

The "*limestone with few discontinuities*" typically has an RQD of 60 and Percent Recovery of 85 percent or more. The "*limestone with numerous clay seams*" typically has an RQD of 40 and Percent Recovery of 75 percent or less. The Reedsville Shale typically has an RQD of 25 and a Percent Recovery of 50 percent.

Refer to the boring logs for detailed descriptions of the soil and rock encountered at the boring locations. Based on the available borehole data, the subsurface strata of the overall project site can be divided into profiles depending on the bedrock characteristics and the thickness of overburden soil layers as shown in Tables 2a through 2d. The average Standard Penetration Test (SPT) Resistance N-value, Pocket Penetration Value (PPV) and Uniaxial Compression Test data of soil and rock. The respective areas associated with each of these profiles are shown in Figure 8.

Table 2a: Subsurface Profile 1

Depth to Top (ft)	Depth to Bottom (ft)	Deposition Type (Soil / Rock)	RQD	% REC	SPT-N	PPV (ksf)	Compressive Strength (psi)
0	15	Soil – CH / CL / MH	-	-	12	5.0	-
15	20	Soil – CH / CL / MH	-	-	9	3	-
20	30	Limestone (with numerous clay seams)	35-45	70-80	-	-	10000
30	50	Limestone (with few clay seams)	75-85	85-95	-	-	15000
50	70	Limestone (competent bedrock)	60-70	80-85	-	-	12000

Table 2b : Subsurface Profile 2

Depth to Top (ft)	Depth to Bottom (ft)	Deposition Type (Soil / Rock)	RQD	% REC	SPT-N	PPV (ksf)	Compressive Strength (psi)
0	20	Soil – CH / CL / MH	-	-	12	4	-
20	30	Soil – CH / CL / MH	-	-	9	2.4	-
30	50	Limestone (with numerous clay seams)	35-45	70-80	-	-	10000
50	60	Limestone (with few clay seams)	60-70	80-90	-	-	15000
60	70	Competent limestone rock (lightly weathered)	75-85	85-95	-	-	20000

Table 2c : Subsurface Profile 3a (Borings A-06 and A-10)

Depth to Top (ft)	Depth to Bottom (ft)	Deposition Type (Soil / Rock)	RQD	REC	SPT-N	PPV (ksf)	Compressive Strength (psi)
0	15	Soil – CH / CL / MH	-	-	24	6	-
15	30	Soil – SM with gravel	-	-	40	-	-
30	60	Reedsville Shale - moderately weathered	75	80-90	-	-	5000

Table 2d : Subsurface Profile 3b

Depth to Top (ft)	Depth to Bottom (ft)	Deposition Type (Soil / Rock)	RQD	% REC	SPT-N	PPV (ksf)	Compressive Strength (psi)
0	10	Soil – CH / CL / MH	-	-	24	6	-
10	45	Soil –SM with gravel	-	-	40	-	-
45	55	Reedsville Shale - highly weathered	10	50-60	-	-	2000
55	65	Reedsville Shale - moderately weathered	40	80-90	-	-	5000

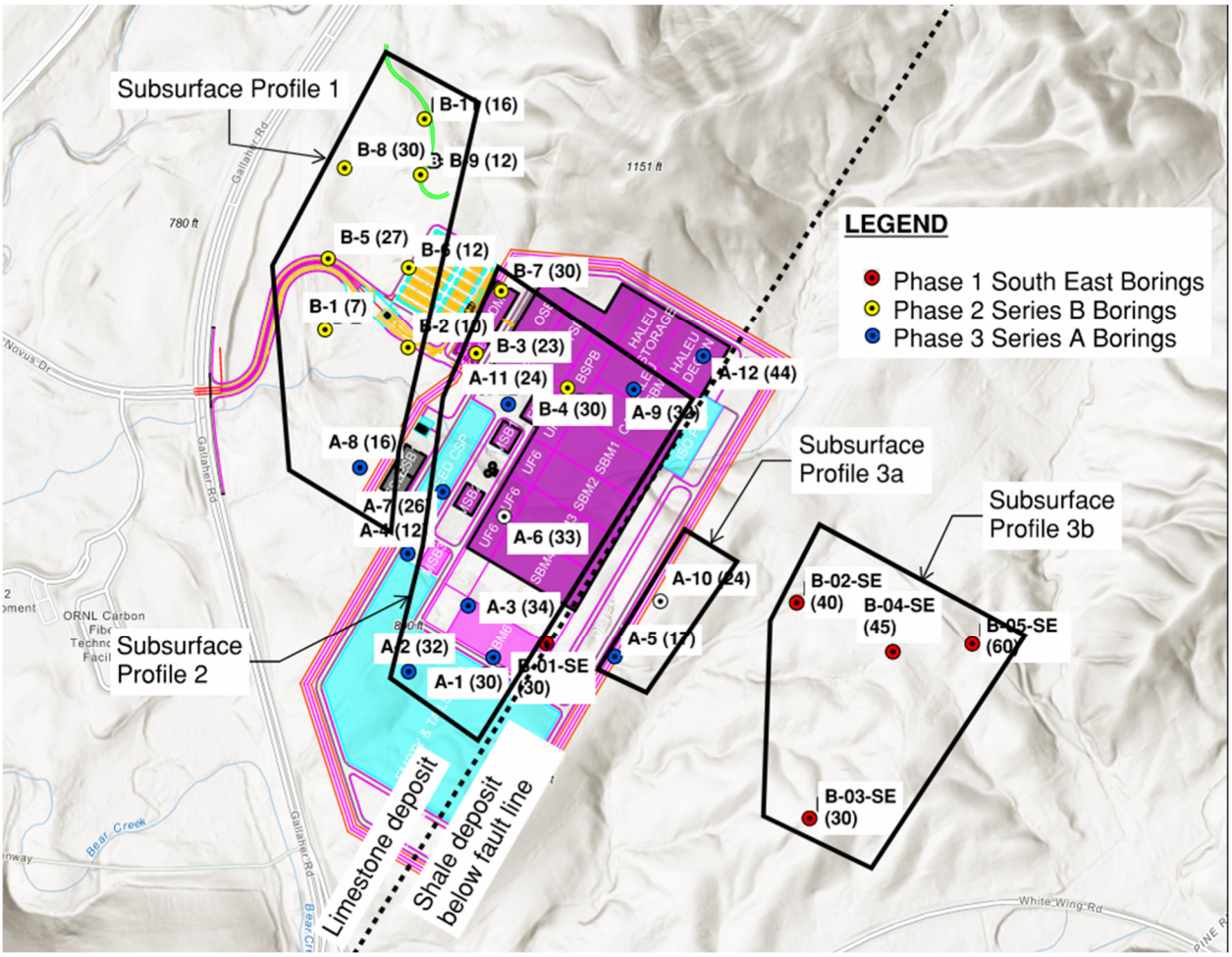


Figure 8: Subsurface Profile Areas

4.5 GROUNDWATER CONDITIONS

Groundwater was not encountered in Phase 3 A-Series or Phase 2 B-Series soil borings at the completion of soil auguring. Groundwater was encountered in Phase 1 Boring B-02-SE at a depth of 30 feet below ground surface (bgs) and the borehole caved on Boring B-03 at a depth of 20 feet bgs suggesting the presence of water at 20 feet.

In this region, perched groundwater is present along the top of rock after a period of precipitation. Over a few days, the perched water migrates down through the fractures in the bedrock to the stable groundwater table deep into the bedrock. The perched groundwater fluctuates with the seasonal precipitation, higher in the spring and lower in the summer. The movement of perched groundwater follows the dip of the bedrock. Upgradient recharge area(s) will affect the amount and duration of perched groundwater during construction.

It is anticipated that water during construction is perched water associated with rainfall events.

The stable groundwater table will not be encountered during grading. Excavations into bedrock will encounter water especially after rainfall events. Water will flow into the excavations through the fractures and bedding planes in the bedrock. The inflow will diminish over time until the next rainfall event where the recharge will generate a new volume of construction water.

We recommend installing piezometers to monitor groundwater levels over time during the supplemental exploration program. This is required in the cut area at the north of the site. Understanding the groundwater profile in the cut is critical to the design of the soil overburden portion of the cut slope.

4.6 SOIL CORROSION

Laboratory tests were conducted on select soil samples collected from the exploratory borings to evaluate the soil corrosion potential. Corrosion laboratory testing included in-situ electrical resistivity, chloride and sulfate content, and pH. Test results are summarized in Table 3 and the full laboratory test reports are provided in Attachment 7.

Table 3: Summary of Laboratory Soil Corrosivity Testing

Boring ID	Depth (Feet)	pH	Sulfate (mg/kg)	Chloride (mg/kg)	Electrical Resistivity (ohm-cm)
B-03	3-5	8.1	37.2	14.4	31,490
B-05	3-5	7.1	24.1	25.6	87,100
B-07	3-5	6.8	25.6	45.3	388,600

Water-soluble sulfate test results indicate exposure class S0 per ACI 318 should be applied for concrete in contact with native soils. Soil electrical resistivity measurements indicate the soil is non-corrosive for buried ferrous metals. Below grade metal pipes should be bedded and initially backfilled with granular materials to reduce potential corrosion. A corrosion engineer should be engaged to review the test results, recommend additional testing if appropriate, and determine if a corrosion protection systems is needed.

4.7 FROST

The frost depth at the project site is 10 inches, as specified in the City of Oak Ridge, Tennessee building code.

4.8 SEISMICITY AND K-25 FAULT INVESTIGATION

Kiewit retained Lettis Consultants International to perform a site-specific seismic hazard analysis for the project site. At the time of this report, the Lettis study is ongoing with expected results at

the end of August 2025. The purpose of the Lettis study is to develop design ground motions in accordance with ASCE7-22 *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* including risk-adjusted Maximum Considered Earthquake and Design Earthquake spectra. Lettis will perform a probabilistic seismic hazard analysis (PSHA), deterministic seismic hazard analysis (DSHA), and site response analysis (SRA). Lettis will evaluate the seismic potential of the K-25 fault through a fault investigation. The K-25 fault, mapped on the project site, is a mapped trace of the White Oak Mountain fault.

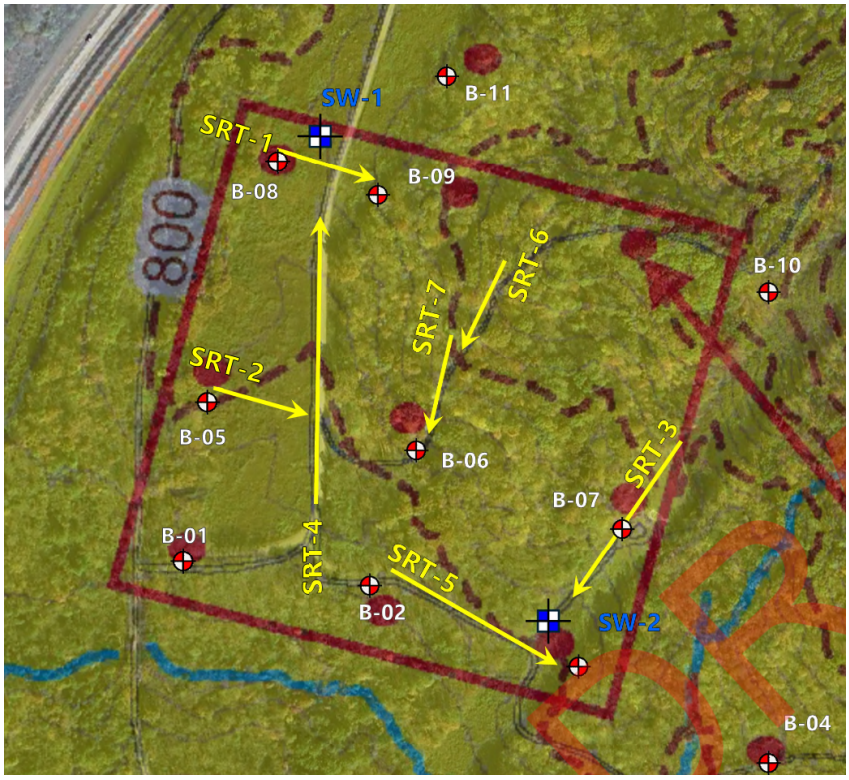
The PSHA, DSHA, SRA design spectra and K-25 fault investigation results will be submitted under separate cover once they are available.

S&ME performed seismic refraction (P-waves) and measured shear wave velocity (surface waves) at several locations across the site as shown in Figure 9. S&ME used a combination of active Multi-channel Analysis of Surface Waves (MASW) and passive Microtremor Array Measurements (MAM) methods to measure the shear wave velocity at four locations noted in Figure 9 (SW-1, SW-2, SW-3 and SW-4). Weighted average shear wave velocity values (V_{S100}) ranging from 1,696 to 2,079 ft/sec were calculated based on collected data, indicating a Seismic Site Class C. S&ME conducted a site-specific seismic site response analysis (SSRA) and developed a design acceleration response spectrum that accounts for local soil conditions. Based on the analysis, the Seismic Design Category (SDC) was determined as follows:

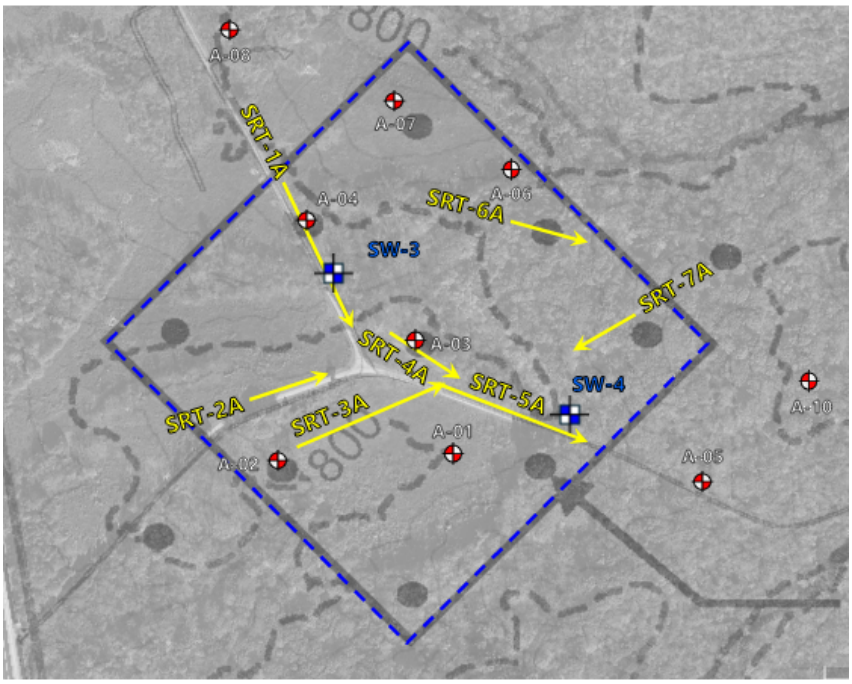
- SDC C for Risk Categories I–III
- SDC D for Risk Category IV

The resulting code-limited design response accelerations from the SSRA are presented in Table below, alongside the general procedure design parameters for comparison.

Code	Method	SDS (g)	SD1 (g)	PGAM (g)	SDC (RC I-III)	SDC (RC IV)
IBC 2018 / ASCE 7-16	SSRA	0.474	0.098	0.384	C	D
IBC 2018 / ASCE 7-16	General Procedure (Site Class C)	0.437	0.123	0.393	C	D



(a)



(b)

Figure 9: Locations of Seismic Refraction Tomography and Surface Wave Velocity Tests

5.0 PRELIMINARY DESIGN RECOMMENDATIONS

Specific loading and geometry information for the structures were not available at the time of this report. This report provides general design guidance for conventional shallow spread foundations, mat foundations and drilled shaft foundations. Final foundation design recommendations will be developed during final design.

5.1 FACTORS OF SAFETY

The proposed project is to be designed to the 2018 International Buildings (2018 IBC) and ASCE 7-22 standards. For the purpose of our preliminary design guidance Table 4 provides minimum recommended geotechnical factors of safety used for our preliminary design recommendations.

Table 4: Minimum ASD Factors of Safety for Foundations and Slope Stability Analysis

Description	Factor of Safety
Shallow Foundations (Footings and Mats)	
1. Bearing Capacity: Semi-empirical analysis using laboratory and in-situ test data	3.0
2. Sliding: Based on Friction (Cohesion = 0)	1.5
Deep Foundations (Drilled Shafts)	
1. Axial Compression: Semi-empirical analysis using laboratory and in-situ test data a. Side Resistance b. End Bearing Resistance	 2.5 3.0
2. Axial Tension: Semi-empirical analysis using laboratory and in-situ test data	2.5
Slope Stability	
1. Short Term – Limit Equilibrium Analysis. Temporary condition during construction	1.3
2. Long Term – Limit Equilibrium Analysis. Post construction condition	1.5

5.2 SHALLOW FOUNDATIONS

5.2.1 Spread, Continuous and Mat Foundations

Shallow foundations include isolated spread footings, continuous wall footings and mat foundations supported by structural fill or by residual soil with an SPT N-value greater than 9 blows per foot. For preliminary design, use an allowable bearing pressure of 4,000 pounds per square foot (psf) to size isolated, shallow spread footings (up to 10 feet x10 feet) and continuous footings. The spacing between the edge of the spread footings will be at least one-width of the footing size. Mat foundations larger than 10 feet x 10 feet but smaller than 30 feet x 30 feet should use an allowable pressure of 1500 psf. All the shallow foundations should have a minimum width of 24 inches and a minimum embedment of 24 inches.

Shallow foundations can bear directly on prepared subgrade and do not require an aggregate base. Across the project site, the weathered rock is overlain by approximately 20 feet to 40 feet

of overburden soil. The allowable bearing pressure was assigned considering the foundation is cast on the soil strata with an embedment depth of two feet. The allowable bearing pressure was calculated based on a minimum factor of safety of 3.0 and a maximum post construction settlement of one-inch total and ½-inch differential over a horizontal distance of 30 feet.

The allowable bearing pressure can be increased by 33 percent for transient loads such as wind and seismic loads. For sliding resistance, we recommend an ultimate coefficient of friction of 0.35 for cast-in-place concrete against subgrade soils or structural fill and an ultimate coefficient of friction of 0.55 for cast-in-place concrete against bedrock. We recommend a minimum factor of safety of 1.5 when utilizing sliding resistance alone. Passive soil resistance can be determined in accordance with Section 5.5.1.

5.2.2 Modulus of Subgrade Reaction

Recommended vertical modulus of subgrade reaction (MSR) values for a range of foundation sizes are summarized in Table 5. These values were calculated for the entire foundation and are applicable to foundations with a length to width ratios listed. Square foundations 10-foot by 10-foot or less should be treated as rigid.

Table 5: Shallow Foundations Net Allowable Bearing Pressure

Foundation Width, B (feet)	Foundation Length, L (feet)	Modulus of Subgrade Reaction (pci)
6	6	Rigid
8	8	Rigid
10	10	Rigid
4	20	83
6	30	83
20	20	40
30	30	28

Notes:
1. Assumes foundations are bearing a minimum 2 feet below finished grade.
2. Assumes adjacent foundations are spaced at a distance greater than the maximum B width of the two foundations.

Modulus of subgrade reaction values in Table 5 should not be used for warehouse racks and floor slabs. Due to variations in settlement across footings and variability in the Ks values, we recommend completing a sensitivity analysis by halving and doubling the Ks values provided for finite element modeling (FEM) of foundations during design. Modulus of subgrade reaction analysis is for structural design and the estimated structural deformation of the foundation yielded by the modeling may not be representative of the estimated geotechnical settlement of the foundation. Although soil is a non-linear material (stress vs. strain), the modulus of subgrade reaction idealizes soil as linear. This simplification can lead to unexpected results in FEM analysis.

5.2.3 Floor Slabs

Grade supported floor slabs may be used to support light area bearing pressures less than 300 psf or transient equipment loading. Grade supported slabs should be underlain by 6 inches of aggregate base or clean sand. Grade supported floor slabs should be designed with a modulus of subgrade reaction (k_s) of 150 lb/in^3. Slabs should be independent of all walls, columns, and grade beams except where the Structural Engineer has determined reinforcement requirements and construction joints.

A minimum 6-mil (0.006 inch) thick polyethylene vapor barrier should be installed below interior floor slabs in occupied buildings or other interior foundations that may be impacted by moisture. Vapor barrier joints should be overlapped a minimum of 12 inches. It is recommended the vapor barrier location beneath floor slabs beneath floor slabs be determined from ACI 302.1R-15 Guide to Concrete Floor and Slab Construction (2015).

5.3 DRILLED SHAFT FOUNDATIONS

5.3.1 Axial Resistance

Axial resistance for drilled shafts is by either side resistance or end bearing in bedrock depending on whether the shaft is in limestone or in shale. Drilled shafts located east of the fault line, in the Rome Formation (borings A-5 and A-10), will encounter soft shale that has highly variable conditions for end bearing. For drilled shafts in the Rome Formation (east of the fault line) design the shaft to resist axial compression using side resistance and not end-bearing. For the purposes of determining the estimate quantity for drilled shaft rock excavation, Figure 10 provides the minimum required socket length, by Area, to achieve the allowable end-bearing values.

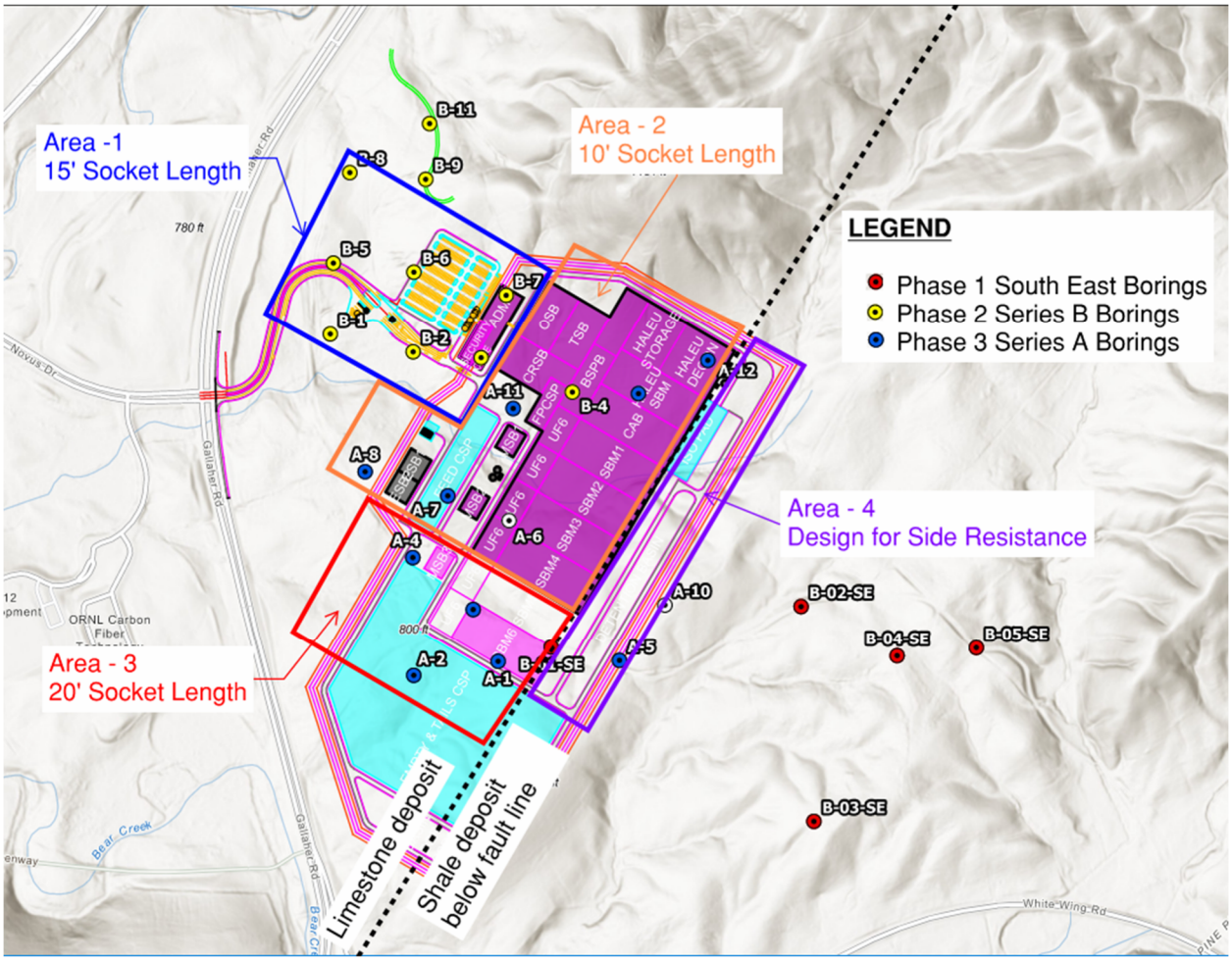


Figure 10: Minimum Rock Socket Length for End-Bearing by Area

Allowable unit side resistance and unit end bearing values for each Area are provided in Table 6. The area represented by the SE borings is not included in Table 6 as drilled shafts are not planned to be installed in that area.

An ASD factor of safety of 2.5 was applied to the ultimate unit side resistance and 3.0 to the ultimate unit end bearing values to estimate the allowable values in Table 6. Soil side resistance should be ignored for axial compression and tension capacity. For end bearing shafts, the minimum rock socket length was set such that the tip of the shaft was underlain by competent rock for at least a depth of two diameters (2D) below the bottom of the shaft. Settlement of drilled shafts embedded into or bearing on bedrock will be controlled by elastic shortening of the drilled shaft. The shafts designed for side resistance in shale should be spaced at a minimum of three diameters (3D) center to center to not have any group effect on the overall geotechnical capacity of the shaft foundation.

Table 6: Allowable Unit Side Resistance, End Bearing and Socket Length

Area No.	Rock Socket Material	Compressive Strength of Rock (psi)	Minimum Socket Length (ft)	Allowable Unit Side Resistance (ksf)	Allowable Unit End Bearing (ksf)
Area 1	Limestone	15000	15	8	200
Area 2	Limestone	20000	10	8	200
Area 3	Limestone	20000	20	8	200
Area 4	Shale	5000	Note 1	4	50

Note 1 – socket length to be determined based on actual structure load, unknown at this time

5.3.2 Lateral Resistance

Drilled shaft lateral resistance is typically governed by service limit states for deflection and rotation tolerances under service loads. The acceptable deflection and rotation tolerance should be determined by the Structural Engineer. LPILE parameters required to perform the lateral analysis are provided in Table 7a through 7d for Areas 1 through 4 shown in Figure 10. The subsurface profiles of Tables 2a-2d in section 4.5 were used to determine the LPILE parameters for soil and rock. The depth intervals in Tables 7a through 7d are measured from top of original ground. Where fill is required to achieve the final grade, that interval is added to the top of the profile in each table. The fill interval will change within each area based on the difference between finished grade and top of original ground. It is assumed that drilled shafts will be located at a spacing greater than six diameters (6D) center to center. Hence, no group effect has been considered. The lateral response should be evaluated with considerations for service axial loads. The Geotechnical Engineer should be engaged for additional analysis to evaluate shear force and lateral deflection once service loads are defined.

Table 7a: Area 1 – LPILE Parameters

Top Elev. (ft)	Bottom Elev. (ft)	Deposition Type Soil / Rock	Unit Weight, γ (pcf)	Cohesion, C (psf)	Uniaxial Compressive Strength, Q_u (psi)	Strain Factor, ε_{50}
		Fill - Stiff clay w/o free water (Reese)	125	3000	-	0.005
0	15	Stiff clay w/o free water (Reese)	120	2500	-	0.005
15	20	Stiff clay w/o free water (Reese)	118	1500	-	0.007

20	30	Strong Rock (Reese)	168	-	10000	-
30	50	Strong Rock (Reese)	168	-	15000	-
50	70	Strong Rock (Reese)	168	-	12000	-

Table 7b: Area 2 – LPILE Parameters

Depth to Top Elev. (ft)	Depth to Bottom Elev. (ft)	Deposition Type Soil / Rock	Unit Weight, γ (pcf)	Cohesion, C (psf)	Uniaxial Compressive Strength, Q_u (psi)	Strain Factor, ε_{50}
		Fill - Stiff clay w/o free water (Reese)	125	3000	-	0.005
0	20	Stiff clay w/o free water (Reese)	120	2000	-	0.005
20	30	Stiff clay w/o free water (Reese)	118	1200	-	0.007
30	40	Strong Rock (Reese)	168	-	10000	-
40	60	Strong Rock (Reese)	168	-	15000	-
60	70	Strong Rock (Reese)	168	-	12000	-

Table 7c: Area 3 – LPILE Parameters

Depth to Top Elev. (ft)	Depth to Bottom Elev. (ft)	Deposition Type Soil / Rock	Unit Weight, γ (pcf)	Cohesion, C (psf)	Uniaxial Compressive Strength, Q_u (psi)	Strain Factor, ε_{50}
		Stiff clay w/o free water (Reese)	125	3000	-	0.005
0	20	Stiff clay w/o free water (Reese)	120	2000	-	0.005
20	30	Stiff clay w/o free water (Reese)	118	1200	-	0.007
30	50	Strong Rock (Reese)	168	-	10000	-
50	60	Strong Rock (Reese)	168	-	15000	-
60	70	Strong Rock (Reese)	168	-	12000	-

Table 7d: Area 4 – LPILE Parameters

Depth to Top Elev. (ft)	Depth to Bottom Elev. (ft)	Deposition Type Soil / Rock	Unit Weight, γ (pcf)	Cohesion, C (psf)	Uniaxial Compressive Strength, Q_u (psi)	Strain Factor, ε_{50}
		Stiff clay w/o free water (Reese)	125	3000	-	0.005
0	15	Stiff clay w/o free water (Reese)	120	3000	-	0.005
15	30	Strong Rock (Reese)	150	-	2000	-
30	50	Strong Rock (Reese)	150	-	5000	-

5.3.3 Drilled Shaft Installation Considerations

Foundation Design Engineer and Contractor should consider the following for drilled shaft construction.

- Drilled shaft construction should be monitored on a full-time basis by a representative of the geotechnical engineer.
- Drilled shafts for the project site should be considered as unclassified excavations. Contractor should expect the shaft to be excavated with a combination of rock augers, core barrels, and cleanout buckets when excavating both weathered and intact bedrock.
- It is preferred to construct using the dry method by using temporary casing, if possible, to facilitate observation of the shaft sockets and bottoms.
- As the drilled shaft excavation is advanced, install temporary steel casing in the excavation. A properly designed casing is needed to prevent collapse of the excavation sidewalls and to reduce the inflow of mud and water into the excavation. Temporary casings are removed as concrete is placed. Casing should not be left in rock sockets that use side resistance to resist the structural loads as it would interfere with the concrete/rock side friction.
- The limestone bedrock west of the fault line is prone to solutioning and clay filled joints, and open voids were encountered in some of the borings. Anticipate that some shafts will have open voids that will enable concrete to flow into the surrounding bedrock through the void system. The estimate should consider concrete overage from voids and include an allowance in the project budget for additional drilled shaft concrete. Of the twenty rock core borings in limestone, three exhibited numerous voids and clay filled joints (A-3, A-7 and B-8).The remaining borings had limited, isolated clay seams.
- In case of dry construction, any water in the drilled shaft excavation should be pumped out prior to placing concrete. At the time of concrete placement, less than 2-inches of water should be present at the base of excavation. Flow into the shaft excavation should be less than 12-inches per hour. If water levels cannot be maintained, wet construction method should be used.
- Adjacent drilled shaft elements located within three (3) diameters, center-to-center, of each other may be installed if the adjacent element was installed 24 hours or more prior to beginning the adjacent element and initial concrete set in the adjacent element has occurred.
- Minimum drilled shaft clear cover for drilled shafts 4-feet and larger in diameter should follow FHWA GEC 10 in lieu of ACI 336 minimum clear cover of 3-inches. Contractor should use precautions during reinforcing steel and concrete placement to prevent loose soil and debris from falling into the excavation. Free-fall concrete placement should not be allowed to strike the reinforcing cage or the sides of the excavation.
- Cage centralizer and spacers should be installed per FHWA GEC 10.
- Concrete slump and placement conditions should follow FHWA GEC 10 for the proposed drilled shaft construction (dry open hole, temporary casing, or wet method) and concrete placement method.
- Drilled shafts extending above bottom of foundation elevation will need to either be

constructed from a higher elevation and cutoff to the proper elevation, or constructed using form work, a corrugated metal pipe, or sonotube to achieve the top of shaft elevation.

5.4 BELOW GRADE AND RETAINING WALLS

5.4.1 Lateral Earth Pressure

The SBM base slab is approximately 13 feet below grade and supports the isolation piers and operating floor slab for the SBM. The embedded slab requires below grade walls. The lateral earth pressure coefficients in Table 8 assume the below grade walls are backfilled with native clay. or dense graded aggregate. Open graded, free draining backfill is not recommended in this karst environment as it concentrates drainage into the soil that can create internal drainage paths in the soil that eventually lead to a dropout.

Yielding walls should be designed using the active earth pressure coefficient while non-yielding walls should be designed using the at-rest earth pressure coefficient. Table 9 provides static earth pressure coefficients for native soils and dense aggregate fill without any hydrostatic pressure as water is considered to be drained out quickly after construction through the attached drainage system. The values in the table are unfactored and do not include surcharge or seismic loading. The movement required to achieve full passive pressure should be considered when applying passive resistance.

Sliding resistance for below grade structures should be evaluated using an ultimate coefficient of friction of 0.35 for cast-in-place concrete bearing on native soils and 0.45 for cast-in-place concrete bearing on compacted dense graded aggregate (DGA) base or mud mat.

Table 8. Lateral Earth Pressure Design Parameters

Earth Pressure Condition	Earth Pressure Coefficient[1,2]		Unit Weight (pcf)	
	Silty Clay	DGA	Silty Clay	DGA
Active (K_a)	0.33	0.28	120	135
At-Rest (K_0)	0.5	0.44	120	135
Passive (K_p)	3.0	3.5	120	135

Notes:
(1) Uniform, horizontal backfill, compacted to 98% of the ASTM D 698 maximum dry density.
(2) Assumed an internal friction angle of 30 degrees for silty clay and 34 degrees for DGA.

5.4.2 Seismic Earth Pressure

Dynamic loads from earthquakes should be applied to below grade walls in accordance with the applicable International Building Code. Where applicable, the additional dynamic load per foot of wall should be calculated as:

$$P_E = K_{AE} \times \gamma \times H^2$$

Where:

- H is the height of the wall
- γ is the unit weight of retained soil
- K_{AE} is the seismic earth pressure coefficient

This load should be distributed as a triangle over the height of the wall, with the resultant at 1/3 from the base of wall. The unit weights and seismic earth pressure coefficients (K_{AE}) obtained by Mononobe-Okabe method for different soil types are shown below in table 9.

Table 9. Seismic Earth Pressure Coefficient Design Parameters

Type of Backfill	Seismic Earth Pressure CoefficientCoefficient	Unit Weight (pcf)
Structural Soil Fill	0.0728	125
DGA	0.0714	135
Silty Clay	0.0746	120

5.4.3 Surcharges

Below grade structures should be designed for a minimum lateral surcharge pressure of 100 psf for AASHTO HS-20 loads. Mat foundation surcharge loads located within horizontal distance equal to the wall depth should be applied as an area load equal to the mat foundation pressure multiplied by the active or at-rest earth pressure coefficient depending on wall deflection. Strip and spread footings located within a horizontal distance equal to the wall depth should be applied as Boussinesq strip loads or area loads respectively. Structures that will be exposed to crane loading should be designed considering track surcharges using Boussinesq strip loads or area loads depending on engaged track width and length.

5.4.4 Waterproofing, Moisture Barriers, and Drainage

Water is expected to accumulate behind below grade structures and basement walls with time. For purposes of moisture control, we recommend installing water stop at all cold joints where foundations and floor slabs intersect. Water proofing membranes should be installed on the exterior of all occupied below grade structures, structures housing critical utilities, and below grade structures that are not equipped with a permanent drainage system or sump. Water proofing should be designed and constructed in accordance with the 2018 International Building Code.

Where possible below grade wall should be drained with perforated pipes behind the wall and discharging with a solid pipe to a storm drain system or daylight into a drainage ditch, pond or swale. Perforated pipes should be backfilled by free-draining rock and wrapped with a geotextile separator fabric.

5.4.5 Wall Construction

Compaction used within 5 feet of the back of retaining walls should be done with a vibratory plate or tamper weighing less than 1,000 pounds. A roller compactor weighing up to 10 tons may be used at an offset distance greater than 5 feet from the back of the retaining wall. See Figure 11 for construction details.

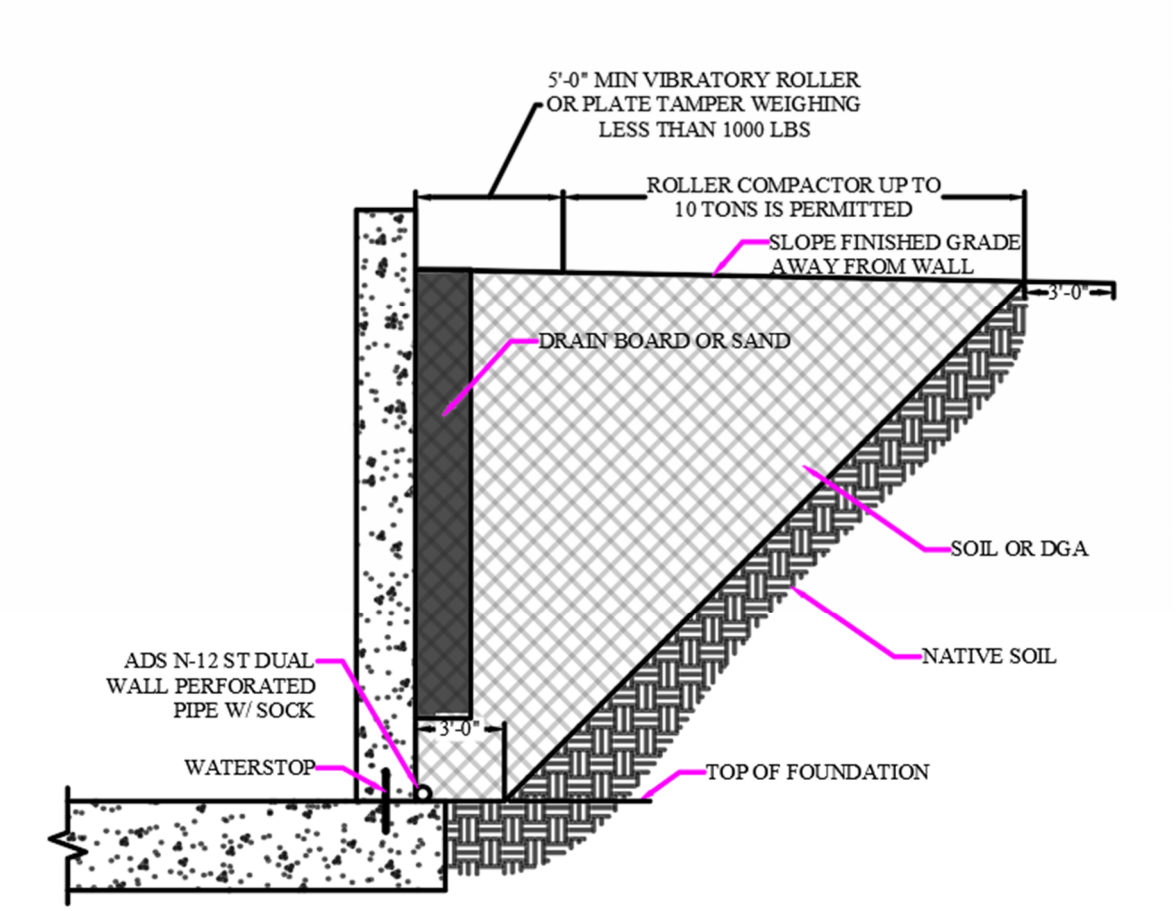


Figure 11: Above and Below Grade Wall Construction Diagram

5.5 DYNAMIC SOIL PROPERTIES

The dynamic soil properties for machine foundations can be evaluated from the results of fourteen Seismic Refraction Tomography (SRT) tests and four sets of surface wave velocity tests (combination of MASW and MAM) performed by S&ME at the project site. Locations of SRT and Surface Wave Velocity tests are shown in Figure 7(a) and 7(b). Details of estimated shear wave velocity profiles for each location are given in the geotechnical data report of S&ME. Based on these shear wave velocity profiles, average shear wave velocity and the corresponding dynamic parameters can be determined for soil and rock layers by using the following equations.

Maximum dynamic shear modulus is computed as: $G_{max} = \rho V_s^2$ where,

G_{max} = dynamic shear modulus (ksi),

V_s = Shear wave velocity (ft/sec),

$\rho = \gamma/g$, where γ = unit weight of soil (pcf); g = acceleration due to gravity = 32.2 ft/sec^2

The low strain elastic modulus, E may be computed using the following equation:

$E = 2G (\mu + 1)$ where μ is Poisson's ratio

5.6 EMBANKMENT SETTLEMENT

A preliminary finished grade of 825 feet was provided during the development of this report. The final grade was later revised to 830 feet, with potential for further changes. Embankment settlement recommendations are based on the 825-foot elevation, which differs from the 830 feet shown on the current conceptual grading plan. Approximately 50 feet of fill will be required at the southwest corner to reach elevation 825 feet. The amount of fill lessens as you move northeast up the valley. The weight of the new fill will cause the underlying soil to consolidate and settle. S&ME performed one-dimensional consolidation tests on samples of the fat clay and elastic silt to evaluate how the soil consolidates in response the added stress such as the weight from fill placed above it. We used borings A-1, A-2 and A-3 to develop a generalized soil profile model for the southwest portion of the site. We used that soil profile model and the S&ME consolidation test results to estimate both the amount of expected primary settlement and the time it takes for 95 percent of the expected primary settlement to occur. Table 10 summarizes the estimated settlement for fill thickness ranging from 10 feet to 50 feet.

Table 10: Estimated Primary Consolidation-Settlement

Thickness of New Fill (feet)	Total Estimated Settlement (inches)	Time for 95% of Primary Settlement to Occur[1]
50	3 to 4	One to two months
40	3 to 3.5	One to two months
30	2.5 to 3	One to two months
20	2 to 2.5	One to two months
10	1 to 2	One to two months

Notes:

1. **measured from completion of fill placement**

We recommend that drilled shaft installation in areas underlain by more than twenty (20) feet of new fill be delayed until 95 percent of the primary consolidation-settlement is complete. Table 11 provides the expected waiting period(s) after completion of fill placement. Delaying drilled shaft installation prevents drilled shafts from having to incorporate downdrag loads.

5.6.1 Monitoring of Consolidation-Settlement

Embankment fill settlement shall be monitored during and after fill placement is complete by using settlement platforms. A settlement platform is typically a 2-foot by 2-foot steel plate with an inner pipe attached to the plate. An outer casing isolates the inner pipe from the surrounding fill. Both the inner pipe and outer casing are extended up as the embankment fill is placed. Settlement is measured by establishing the beginning elevation

of the top of the inner pipe and periodically surveying the elevation as the fill progresses. Each time a pipe section is added (inner and outer), the top of inner pipe elevation is surveyed.. This settlement is plotted against time to generate a Time-Settlement curve that allows the geotechnical engineer to evaluate when primary consolidation has occurred. A typical settlement platform is shown below in Figure 12.

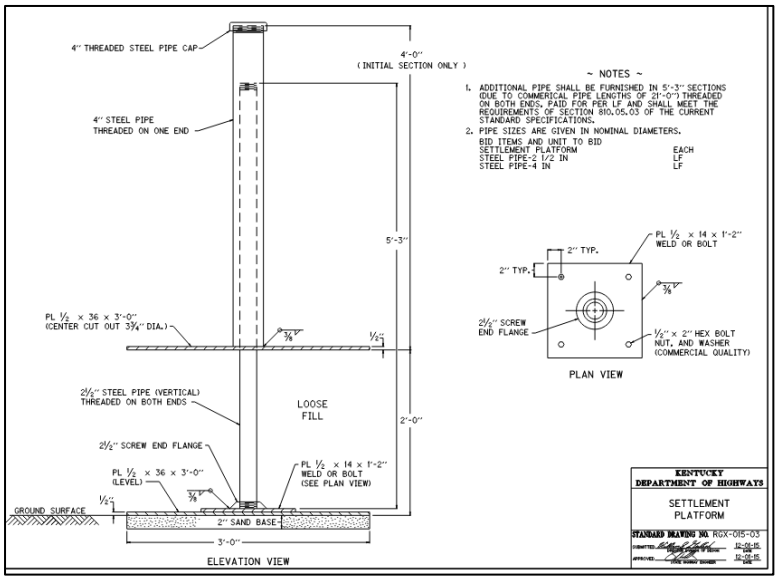


Figure 12: Typical Settlement Platform

5.7 SLOPE STABILITY DESIGN

5.7.1 Earth Slope Stability Analysis

Slope stability analyses were completed for approximately 50 feet tall, 3H:1V fill slope proposed on the south side of the project where the existing valley will be filled. Soil parameters for the slope stability analysis are summarized in Table 11. Based on the established correlation between friction angle and soil plasticity index, the friction angle for the onsite clay is estimated to range between 25 and 30 degrees. To maintain a conservative approach in the slope stability analysis, the lower bound values of the friction angle were adopted, as summarized in Table 11. Groundwater was assumed at the soil and bedrock interface Slope stability analysis results are provided in Attachment 6. The proposed embankment outslope of 3H:1V has a calculated factor of safety greater than 1.5. No other slope stability concerns were identified based on existing site conditions and proposed site grading.

Table 11: Slope Stability Analysis Parameters

Soil Stratum	Total Unit Weight (pcf)	Effective Stress Strength Parameters	
		Cohesion C' (psf)	Friction Angle (degrees)
Soft to Medium Stiff Clay	110	0	25
Medium Stiff to Stiff Clay	120	0	25
Compacted Fill	120	0	27

5.7.2 Earth Slope Design Recommendations

The following recommendations should be applied by the project civil engineer for embankment slope design based on our preliminary information.

- Embankment slopes constructed of compacted soil should be 3H:1V.
- Diversion berms or swales should be installed at the top of slopes to divert runoff water away from the slope faces. Loading conditions (vehicular, staged equipment, structures, etc.) should be kept at least 10 feet from the top of fill slopes. Temporary slope stability requirements will need to be established for project specific construction equipment to prevent fill slope instability during material placement and compaction.
- Fill slope construction should include subgrade evaluation and improvements as discussed in Section 6.2 under the observation of a representative of the Geotechnical Engineer. Unsuitable soils and unstable subgrade may require over-excavation and replacement.
- Drainage should be installed in all fill slopes where springs are encountered to intercept and direct water through the embankment without loss of embankment material. This could include hard piping through the embankment to discharge through a headwall or construction of a durable rock drainage blanket to prevent build-up of hydrostatic pressure within the embankment that could impact the stability of the embankment.
- Where fill is placed on existing slopes steeper than 5H:1V, the existing slope shall be benched with minimum 8 feet wide benches as the fill is placed to key the fill into the existing slope. See Figure 13.

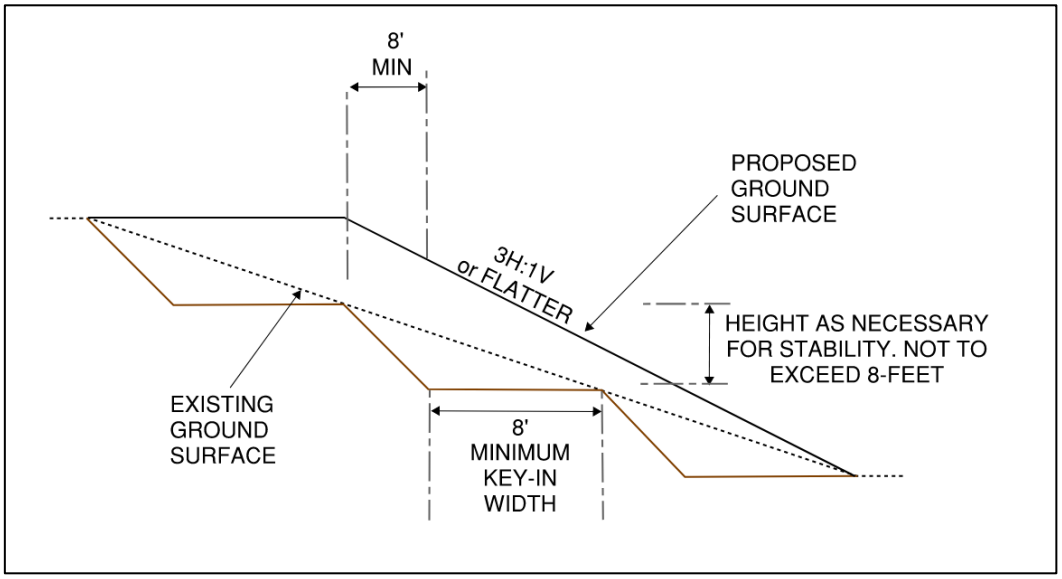


Figure 13: Key-In Details for Fill Slopes on Soil

5.7.3 Rock Cut Slope Design Recommendations

For the purposes of the estimate, rock cut slopes in limestone should be sloped to 0.25H:1V with a 15 feet wide intermediate bench every 40 feet vertically. Permanent rock cut slopes in the Reedsville Shale and Rome Formation shale should be sloped at 1H:1V with a 15 feet wide intermediate bench every 30 feet vertically. Use a 10-feet wide overburden bench at the top of all rock cuts. These slope configurations may change once a supplemental geotechnical exploration is performed that includes rock core borings in the planned cuts.

6.0 EARTHWORK RECOMMENDATIONS

6.1 SITE DEVELOPMENT AND GRADING

The site is heavily wooded. Site preparation should begin with clearing and grubbing, including the removal of all topsoil, underbrush, root mats, trees, and stumps. All subgrades should be proofrolled prior to fill placement. Areas that pump or rut excessively should be scarified and recompacted or undercut and replaced with the specified material.

Appendix B of the Tennessee Permanent Stormwater Management and Design Guidance Manual, which covers Stormwater Design Guidelines for Karst Terrain, mandates detailed investigation and drainage designs for sites underlain by carbonate rock (e.g., limestone, dolomite). Preliminary site investigations have confirmed the presence of carbonate rock and karst features, such as voids or soil filled cavities in rock. Consequently, additional detailed geotechnical investigation, as specified in the manual will be required. The detailed site investigation includes geotechnical borings, geophysics, and thorough site reconnaissance.

There are several drainage channels that cross the Orano site on their way to Bear Creek. Where located within a planned fill area, construct a rock drain in the bottom of the drainage channel(s) to allow water to migrate from the surrounding ground, into the rock filled channel and off-site.

These are typically composed of durable limestone shot-rock and wrapped in filter fabric (see Figure 9). Extend the rock drain through the toe of the fill and allow it to daylight. General or structural fill can be placed above the rock drain depending on the specified fill type.

Based on an assumed final working grade elevation of +825 feet earthwork operations will generate three types of material:

- durable limestone shot-rock
- soil (clay and shale)
- mixture of soil and shot-rock

Each of these will have a different placement method and acceptance criteria. The recommendations in Section 6.2 are preliminary as borings have not been advanced at the planned north excavation location. To provide guidance for project development, we assumed the rock type and quality we observed in the recovered rock cores from our preliminary borings is present in the north cut. Based on the geologic mapping, that assumption is reasonable. Section 6.2 recommendations may have some refinement when borings are performed in that cut area.

6.2 FILL PLACEMENT AND COMPACTION

6.2.1 Structural Soil Fill

Defined as all fill that will be subjected to structural loads such as those imposed by foundations, storage pads and roadways. These materials shall be free of organic and inorganic trash and debris, frost or frozen material, and shall not contain particles greater than three (3) inches in any dimension.

Clay fill shall also have a dry unit weight greater than 90 pounds per cubic foot (pcf).

- Place soil fill in horizontal layers not exceeding 8 inches loose lift thickness.
- Compact each lift to at least 98 percent of the standard Proctor maximum dry density (ASTM D698).
- Moisture control is dictated by the individual Proctor curves but for now assume plus or minus 3 percent of the standard Proctor optimum moisture content.

Where supporting slabs on grade, sidewalks, pavement and shallow foundations, the structural clay fill within five feet of the finished grade elevation shall have a Plasticity Index less than or equal to 35 ($PI \leq 35$), as determined by ASTM D4318 or be lime-treated to reduce the soil plasticity and swell potential. This requirement may be waived if additional testing during the supplemental geotechnical exploration determines the swell pressure of the compacted fat clay is less than the applied load of the slab on grade, sidewalk, pavement or shallow foundation.

The native clay overburden soils generally have a PI greater than 35, but less than 50 which makes it suitable for reuse as structural fill if placed greater than five feet below finished grade.

6.2.2 Structural Granular Fill

Defined as all non-degradable granular fill that will be subjected to structural loads such as those imposed by foundations and roadways. These materials shall be free of organic and inorganic trash and debris, frost or frozen material, and shall not contain particles greater than three (3) inches in any dimension and less than ten (10) percent fines passing the #200 sieve. This material

includes processed non-degradable (durable) limestone shot-rock and non-degradable limestone imported from a quarry. It does not include the degradable (non-durable) shales from the Reedsville Shale or the Rome Formation.

- Place clean non-degradable structural granular fill in loose lifts no thicker than 12-inches.
- Place in a manner that prevents nesting and results in voids being filled with smaller rock fragments to form a dense and compact mass.
- Rock materials shall not be dumped into its final position but shall be spread by blading and dozing in a manner that will minimize voids, pockets, and bridging.
- Each layer shall be leveled over the entire lift area and compacted with a CAT 815 or 825 or similar compactor with an operating weight of at least 45,000 pounds. The rubber-tired construction equipment should vary their haul path across the fill to promote compaction.
- Water may be needed to reduce dust during the compaction process.
- Tennessee DOT-approved materials, such as Type A aggregate, Grading D, may be used as structural granular fill to ensure compliance with local specifications.

6.2.3 General Soil Fill

Defined as fill placed over relatively large open areas to raise the overall grade and will not support structures or pavement. These materials shall be free of organic and inorganic trash and debris, and frost or frozen material. The material shall not contain particle sizes greater than three (3) inches. Fine-grained native soils not suitable for use as structural fill may be utilized as general fill. These soils may require additional moisture control during placement and compaction.

- Place soil fill in horizontal layers not exceeding eight inches loose lift thickness.
- Compact each lift to at least 98 percent of the standard Proctor maximum dry density (ASTM D698).
- Moisture control is dictated by the individual Proctor curves but for now assume plus or minus 3 percent of the standard Proctor optimum moisture content.

6.2.4 General Granular Fill

Defined as fill placed over relatively large open areas to raise the overall grade and will not support structures or pavement. These materials shall be free of organic and inorganic trash and debris, frost or frozen material, and shall not contain particles greater than eight (8) inches in any dimension and less than twenty (20) percent soil fines passing the #200 sieve. This material includes processed and unprocessed non-degradable (durable) limestone shot-rock and non-degradable limestone imported from the quarry. It does not include the degradable (non-durable) shales from the Reedsville Shale or the Rome Formation.

- Place clean non-degradable shot-rock fill in loose lifts no thicker than 24-inches.
- Place in a manner that prevents nesting and results in voids being filled with smaller rock fragments to form a dense and compact mass.
- Rock materials shall not be dumped into its final position but shall be spread by blading and dozing in a manner that will minimize voids, pockets, and bridging.
- Each layer shall be leveled over the entire lift area and compacted with a CAT 815/ 825 or similar compactor with an operating weight of at least 45,000 pounds. The rubber-tired construction equipment should vary their haul path across the fill to promote compaction.

6.2.5 General Shale Fill

Defined as fill placed over relatively large open areas to raise the overall grade and will not support structures or pavement. These materials shall be free of organic and inorganic trash and debris, frost or frozen material, and shall not contain particles greater than eight (8) inches in any dimension. The General Shall Fill is comprised of the degradable (non-durable) shales from the Reedsville Shale and/ or the Rome Formation. The shale shall be mechanically broken down by successive wetting, blading, and discing until it reaches the consistency of soil. Each layer shall be leveled over the entire lift area and compacted with a CAT 815 or similar compactor with an operating weight of at least 45,000 pounds.

6.2.6 Compaction Requirement, Maximum Lift Thicknesses, and Test Frequency

Compaction requirements are provided in Tables 12 and 13. The specified moisture content range may change once moisture-density relationship testing is completed in the final design phase. Maximum loose-lift thickness for each soil type and various equipment based on the estimated exerted compaction force are provided in Tables 14 and 15.

Table 12: Fill Material and Compaction Requirements

Location of Material	Minimum Density[1]	Moisture Content (% of Optimum)	Minimum Field Density Testing Frequency[2,3]
Structural fill areas	98% (ASTM D698)	-3 to +3 Percent	1 test every 2,500 ft^2; minimum 3 tests1 test/lift
General fill for embankment areas	98% (ASTM D698)	-3 to +3 Percent	1 test every 5,000 ft^2; minimum 3 tests1 test/lift
Granular fill and backfill in landscaped or yard areas outside the limits of pavement, pads, or structures	95% (ASTM D698)	-3 to +3 Percent	1 test every 5,000 ft^2; minimum 3tests1 test/lift
Aggregate base course	95% (ASTM D1557)	-3 to +3 Percent	1 test every 2,500 ft^2; minimum 3 tests1 test/lift
Aggregate surfacing material	No Requirement. Compact to Dense Mass		Not Required

Notes:

1. The minimum density requirement shown is a percentage of the maximum laboratory dry density determined by ASTM D698 or ASTM D1557.
2. Testing for in-place density of soils should be in accordance with ASTM D1556, ASTM D2167, ASTM D6938, or ASTM D2937.

Table 13: Fill Material and Compaction Requirements for Utility Trenches

Location of Utility Trench Backfill	Minimum Density[1]	Moisture Content (% of Optimum)	Minimum Field Density Testing Frequency[2,3]
Trench bottoms: ▪ **Where structural fill is used to replace unsuitable material** ▪ **Material placed underneath electrical duct banks**	98% (ASTM D698)	-3 to +3 Percent	1 test per every 100 linear feet of trench; minimum 1 test/lift
Granular bedding and initial backfill	98% (ASTM D698)	-3 to +3 Percent	
Under structures and pads: from the top of the initial backfill to the finished subgrade	98% (ASTM D698)	-3 to +3 Percent	
In landscaped or yard areas, from the top of the initial backfill to the top of the finished subgrade	98% (ASTM D698)	-3 to +3% Percent	

Notes:
1. The minimum density requirement shown is a percentage of the maximum laboratory dry density determined by ASTM D698.
2. Testing for in-place density of soils should be in accordance with ASTM D1556, ASTM D2167, ASTM D6938, or ASTM D2937. Density tests should be performed in each lift before the next lift is placed.

Table 14: Maximum Loose Lift Thicknesses for Coarse-Grained Soils

Compaction Equipment	Force Exerted (kip)	Maximum Loose Lift[1] Thickness (inches)
Hand/Small Plate Compactor	Less than 5.5	4
Small Smooth Drum Rollers, Large Plate Compactors	5.5 to 15	6
Large Smooth Drum Rollers / Heavy Equipment	More than 15	12 – Structural Fill 24 – General Fill12

Table 15: Maximum Loose Lift Thicknesses for Fine-Grained Soils

Compaction Equipment	Force Exerted (kip)	Maximum Loose Lift[1] Thickness (inches)
Trench Compactor	Minimum 8-kip Centrifugal Force	4
Self-Propelled Sheepsfoot Roller	Minimum 24-kip Operating Weight	6
CAT 815 or Large Sheepsfoot Roller	Minimum 45-kip Operating Weight	8
CAT 825 or Equivalent	Minimum 75-kip Operating Weight	12

Notes:

1. Twelve (12) inch lift thickness requires density testing of the entire compacted lift. An initial test at the top of the compacted lift is required to determine the in-place density of the upper portion of the lift. Subsequently, the soil will need to be excavated downward to perform additional tests to determine the density of the entire lift.

6.3 BULKING (SHRINK/SWELL) FACTORS

Table 16 provides the recommended preliminary bulking factors for use in estimating earthwork quantities. Shale values assume the material is excavated and mechanically broken down to soil when placed as fill.

Moisture-Density relationship testing has not been complete as of the date of this report. Bulking factors may change after the supplemental geotechnical exploration is performed.

Table 16. Preliminary Bulking Factors

Soil Stratum	Bulking Factor from Bank CY
Soft to Medium Stiff Clay	**Ten (10) percent shrink when compacted**
Stiff Clay	**Twenty (20) percent swell when excavated and placed as fill**
General and Structural Fill	**Five (5) percent swell when excavated and compacted as fill**

6.4 CONSTRUCTION CONSIDERATIONS

6.4.1 Seasonal Impacts

Ideal months for mass grading to allow for proper moisture conditioning of soil are between April and the middle of November. Weather effects on mass grading outside these months may lead to an increase in the effort required to complete mass grading. The cohesive soils at this site are slow to dry when saturated. Hydrated Lime or other drying agents may be required to achieve proper moisture contents for the clay during the wet months of the year (November through March). The Geotechnical Engineer should review plans for use of drying agents if the use of more than 4 percent by weight is planned or if Portland cement will be used. Fly ash should not be used without review and approval from the geotechnical engineer and Owner. Attempting site grading during or immediately after precipitation events is not recommended. Limestone shot-rock or other granular materials are acceptable for fill placement during wetter months.

6.4.2 Erosion and Sedimentation Control

The cohesive soils (clay and silt) at the site are susceptible to water erosion. Flowing water will quickly create drainage gullies if surface water is not properly controlled. Erosion control measures shall be implemented immediately once excavation and site grading commence. Erosion and sedimentation control measures should follow the authority having jurisdiction requirements.

6.4.3 Cold Weather Considerations

Placement of frozen material for fill is not permitted. Project team should not place fill on wet or

frozen ground. Soil that has frozen should be removed before resuming compaction operations. Limestone shot-rock (Structural and General Fill) and TDOT Type A aggregate, Grading D with less than six percent by weight passing the number 200 sieve (fines content) may be placed when weather is below 32 degrees.

7.0 CONSTRUCTION ENGINEERING

7.1 TEMPORARY EXCAVATIONS

Residual soils are generally classified as OSHA Type B and C soils depending on undrained shear strength of materials encountered. Bedrock excavation stability needs to be evaluated in the field by an experienced geotechnical engineer or geologist based on bedding and joint conditions observed in borings and site conditions. The contractor's competent person should observe site conditions and confirm OSHA soil type for determining benching and sloping requirements for excavation less than 20 feet deep. Bedrock excavations, excavations below the water table and/or in excess of 20 feet deep should be designed by a professional engineer licensed in the State of Tennessee.

7.2 DEWATERING

Dewatering using sumps and pump, and ditches is the most productive method to manage construction water. Dewatering using wellpoints or pumping wells is not an efficient method as these elements would have to intersect a fracture in the rock to be productive. Dewatering of cohesionless soils will need to be closely monitored to prevent fines migration and subsurface erosion. Frequent observation and maintenance will be required to operate these systems.

7.3 TEMPORARY EARTH RETAINING STRUCTURES

Temporary earth retaining structures (Sheet Piles, Soldier Pile and Lagging, Soil Nail Walls, etc.) should be designed by a professional engineer licensed in the State of Tennessee. Temporary earth retaining structures Engineer of Record needs to consider construction sequencing, equipment and structure surcharge loading, property right of way constraints, and live traffic where exposed to public right of way.

8.0 INSPECTIONS AND TESTING

8.1 SUMMARY

The Geotechnical Engineer of Record or designee should inspect the subgrade for all foundations on the project. Inspections should occur during excavation to subgrade elevation and immediately prior to placing rebar or mudmat. The Geotechnical Engineer should observe site grading activities including undercutting and replacement, subgrade preparation, proofrolling and fill placement. The Geotechnical Engineer shall have their representative onsite during deep foundation installation. Contractor should provide fill placement and deep foundation installation records to the Geotechnical Engineer of Record daily for his review.

8.2 BUILDING CODE SPECIAL INSPECTIONS AND TESTS

Tables 17 and 18 state the 2018 IBC Special Inspections and testing requirements for soils and cast-in-place deep foundation elements. Orano and contractor should use the project specifications, this Geotechnical Report and the project drawing to determine compliance.

Table 17. Required Verification and Inspection of Soils

Type	Continuous Special Inspection	Periodic Special Inspection	Performed By:
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.(1)	—	X	Geotechnical Engineer or Designee
2. Verify excavations are extended to proper depth and have reached proper material.(2)	—	X	Geotechnical Engineer or Designee
3. Perform classification and testing of compacted fill materials.(3)	—	X	Testing Agency
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	—	Testing Agency
5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.	—	X	Geotechnical Engineer or Designee

Notes:
1. Immediately prior to placement of the mudmat or reinforcing steel
2. Perform inspection immediately upon completion of excavation.
3. Perform material testing at the beginning of the project, at the interval required in the “Material Test Reports” section above, when the fill material source is changed, when changes in material properties and characteristics are observed, and when requested by the Geotechnical Engineer. Perform compaction testing whenever earthwork operations are in progress. See “Submittals” section above for requirements for tests and submitting test reports.

Table 18. Required Verification and Inspection of Cast-In-Place Deep Foundation Elements

Type	Continuous Special Inspection	Periodic Special Inspection	Performed By:
1. Observe drilling operations and maintain complete and accurate records for each element	X	—	Geotechnical Engineer or Designee

2. Verify placement locations and plumbness, confirm element diameter, lengths, embedment into bedrock (if applicable), and adequate end-bearing strata capacity. Record concrete or grout volumes.	X	—	Geotechnical Engineer or Designee
3. For concrete elements, perform additional special inspections in accordance with 2018 IBC.	—	X	Testing Agency

9.0 FUTURE STUDIES

This preliminary geotechnical report is based on Geotechnical Borings and Geophysical Surveys completed to date. Large portions of the planned Enrichment Facility were not available for exploration. A supplemental geotechnical exploration is required to characterize the remainder of the site, fill in gaps within the existing information and better define the subsurface conditions that can impact construction quantities and schedule. Supplemental exploration should include to the following:

- Geotechnical borings with rock coring at the north end of the site in the planned rock cut to characterize the and quality of the bedrock to finalize the design of the rock cut slope and the soil overburden cut slope.
- Soil test borings with rock core and geophysical surveys testing e.g. seismic refraction or MASW in the areas that were not previously accessible.
- Strength testing of embankment material including remolded samples to confirm the soil shear strength parameters for slope stability analyses.
- Moisture-density relationship and California Bearing Ratio testing of the onsite soil for pavement design.
- Infiltration testing for stormwater basins / swales for native and embankment conditions and pond liner recommendations.
- Swell testing of the fat clay to evaluate the expansive characteristics including the swell pressure.
- Additional rock core borings for refinement of drilled shaft quantities. The minimum socket lengths are based on the recovered rock cores and represent only a portion of the site. It is common practice in East Tennessee to core each drilled shaft location during the design phase geotechnical exploration to evaluate the actual rock conditions
- Additional soil corrosivity testing and electrical resistivity testing to assess the potential of the soil to attack the concrete, cement grout and buried steel.

10.0 REPORT LIMITATIONS

This report has been prepared for the exclusive use of Kiewit Engineering Group Inc., Kiewit Nuclear Solutions Co. and Orano USA for the stated purpose and should not be relied on by others. Report should only be transmitted in its entirety. The recommendations included in this report were developed using generally accepted standards of geotechnical engineering practice in the State of Tennessee at the time the report was prepared. Kiewit Engineering Group Inc. is not responsible for the conclusions, opinions, or recommendations of others based on the data presented herein. Our conclusions and recommendations are based on information furnished to us and obtained by us, the assumptions stated in this report, and our past experience. Final design plans, anticipated loads, and settlement criteria are subject to change. The Geotechnical Engineer should be notified of such changes.

The exploratory borings, test pit logs, and geotechnical cross sections contain an interpretation of the subsurface conditions at specific locations at the time of exploration. The stratification lines represent the approximate boundary between soil and rock units. The actual transition may be more or less gradual than implied.

11.0 REFERENCES

Geotechnical Data Report, Self Sufficiency Parcel 2 Site A and Site B, Oak Ridge, Tennessee, S&ME Project No. 24430185A, dated March 26, 2025.

Geotechnical Data Report – Self Sufficiency Parcel 2, Oak Ridge, Tennessee, S&ME Project No. 24430185, dated July 26, 2024.

Oak Ridge Reservation: Physical Characteristics and Natural Resources – Patricia Dreyer Parr and Joan F. Hughes, Prepared by UT-Battelle for the U.S. Department of Energy, October 2006.

Environmental Sciences Division: Status Report on the Geology of the Oak Ridge Reservation – Robert D. Hatcher, Jr. et. al., Oak Ridge National Laboratory, Oak Ridge, Tennessee, October 1992.

Tennessee Department of Environment and Conservation, Tennessee Permanent Stormwater Management and Design Guidance Manual, Appendix B: Stormwater Design Guidelines for Karst Terrain, December 2014.

2018 International Building Code

American Concrete Institute (ACI) Committee 318, Building Code Requirements for Structural Concrete, 2019 Edition.

American Concrete Institute (ACI). (2015). Guide to Concrete Floor Slab Construction (ACI 302.1R-15), Reported by ACI Committee 302, June, 2015.

Tang, Q. (1995). *Load transfer mechanisms of drilled shaft foundations in karstic limestone: behavior under working load*. The University of Tennessee.

FHWA-NHI-10-016. Drilled Shafts: Construction Procedures and LRFD Design Methods.

Bowles J. E., “foundation Analysis and Design. 5th Ed.”, New York: McGraw-Hill (1996).

ATTACHMENTS

ATTACHMENT 1
GENERAL ARRANGEMENT

N

PROPOSED EASEMENT

EXIST TRANSMISSION TOWER, APPROXIMATE LOCATION, TYP

EXISTING 161 KV TRANSMISSION LINE
OWNER: TVA

EXISTING EASEMENT

FAULT LINE

OAKRIDGE SUBSTATION

OAKRIDGE TURNPIKE

ADM
SECURITY
CAFE
OSB
TSB
CRSB
BSPB
FPCSP
HALEU STORAGE
HALEU DECON
HALEU SBM
CAB
ISO PAD
OO
UF6
ESB2
ESB1
FEED CSP
MSB1
MSB2
MSB3
SBM1
SBM2
SBM3
SBM4
SBM5
SBM6
STORMWATER
AREA FOR STORMWATER
EMPTY & TAILS CSP
LINED RETENTION BASIN FOR CSP1

FAULT LINE

TEMPORARY DEVELOPMENT LIMITS TO PARCEL

PARCEL BOUNDARY

FAULT LINES

HIGHWAY 95

LEGEND

- .....FENCE LINE
- .....WATERSHED LINE
- .....WATERSHED LINE
- .....WHITE WING SCRAP YARD
- .....FAULT LINE (APPROXIMATE LOCATION)
- .....OVERHEAD POWER LINE
- .....CEMETERY (SEE NOTE 3)

NOTES

1. SITE BOUNDARY BASED ON DOE\UCOR SELF SUFFICIENCY PARCEL 2.
2. EXISTING BACKGROUND INFORMATION IS BASED ON CAD FILE CREATED FROM PUBLICLY AVAILABLE GIS INFORMATION.
3. CEMETERY LOCATIONS ARE APPROXIMATE AND LIMITS TO BE DETERMINED.

CONCEPT LAYOUT - NOT FOR CONSTRUCTION

Kiewit orano

0 300 600
SCALE IN FEET

25' CONTOURS

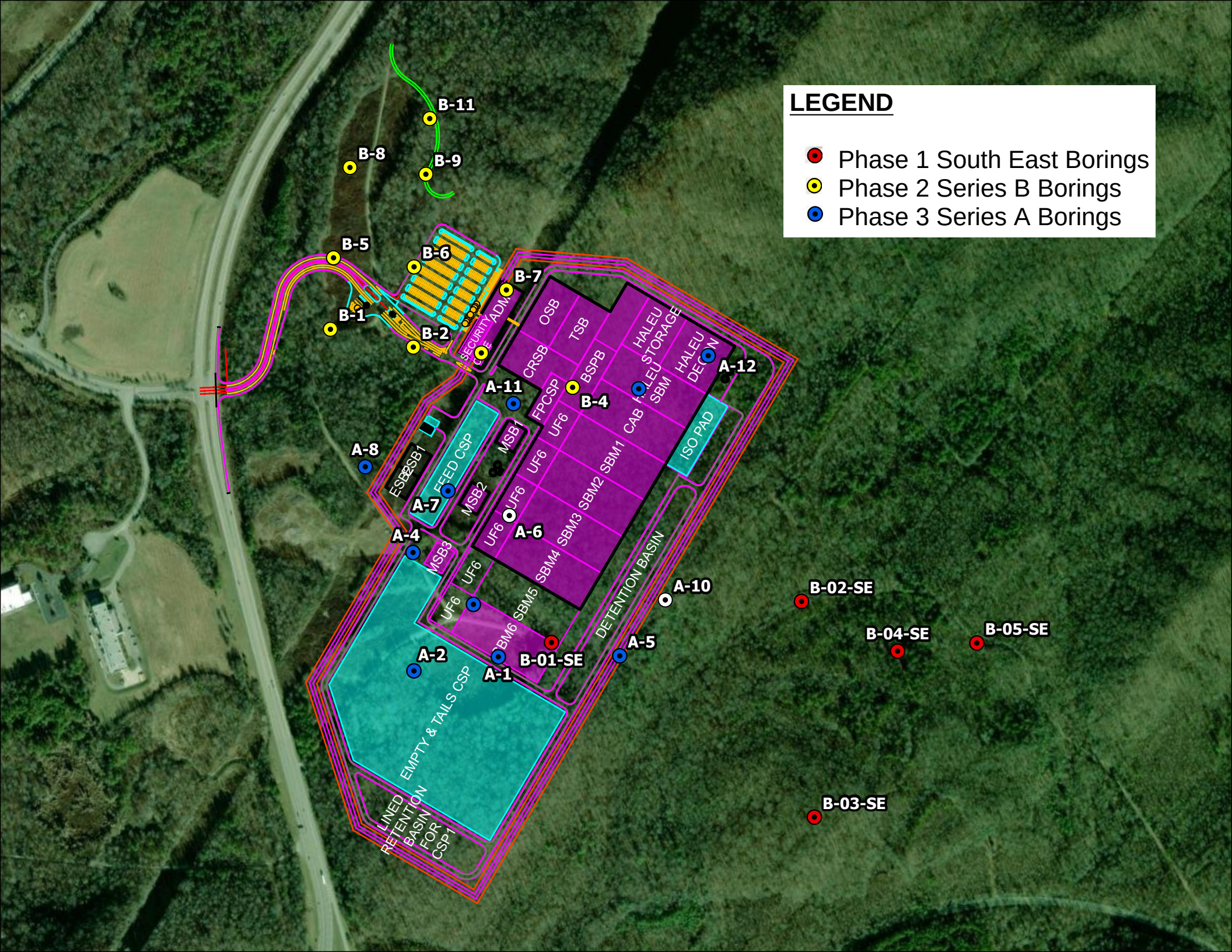
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OAK RIDGE, TN

TASK ORDER #1
SITE LAYOUT

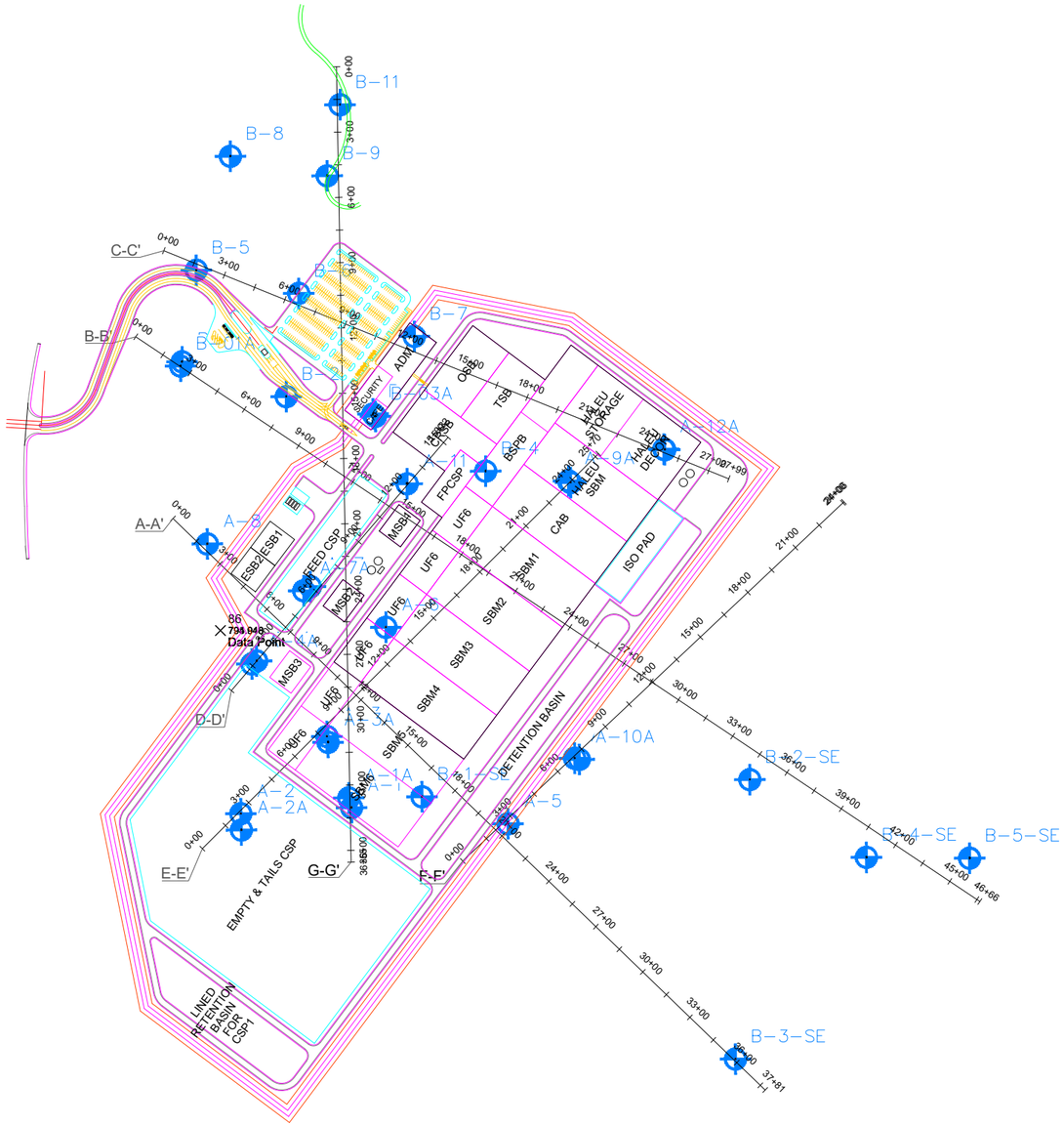
SHEET 1 OF 1

REV A: 06/02/2025

ATTACHMENT 2
BORING LOCATION PLAN


LEGEND
Phase 1 South East Borings
Phase 2 Series B Borings
Phase 3 Series A Borings
B-11
B-8
B-9
B-5
B-6
B-7
B-1
B-2
A-12
A-11
B-4
A-8
A-7
A-4
A-6
A-10
B-02-SE
B-04-SE
B-05-SE
A-5
A-2
A-1
B-01-SE
B-03-SE
ADMIN
SECURITY
OSB
TSB
CRSB
BSPB
HALEU STORAGE
HALEU DECON
LEU SBM
FPCSP
UF6
CAB
ISO PAD
MSB1
ESB1
ESB2
FEED CSP
MSB2
SBM1
SBM2
SBM3
SBM4
SBM5
SBM6
MSB3
DETENTION BASIN
EMPTY & TAILS CSP
LINED RETENTION BASIN FOR CSP1

ATTACHMENT 3
SUBSURFACE PROFILES



N

LOCATION PLAN
SCALE: NTS

SHEET INDEX	
ID	**TITLE**
GT-001	Alignment A-A'
GT-002	Alignment B-B
GT-003	Alignment C-C'
GT-004	Alignment D-D'
GT-005	Alignment E-E'
GT-006	Alignment F-F'
GT-007	Alignment G-G'

Legend

ASPHALT	Asphalt
Auger	Auger
PWR	Partially Weathered Rock
CH	Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
GP	Poorly Graded GRAVEL
LIMESTONE	Limestone
MH	Elastic SILT
ML	SILT
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
SP	Poorly Graded SAND
Topsoil	Topsoil
USGS 616	Siltstone and Shale
USGS 675	Calcareous Shale and Limestone and Calcareous Limestone and Shale
Void	Void

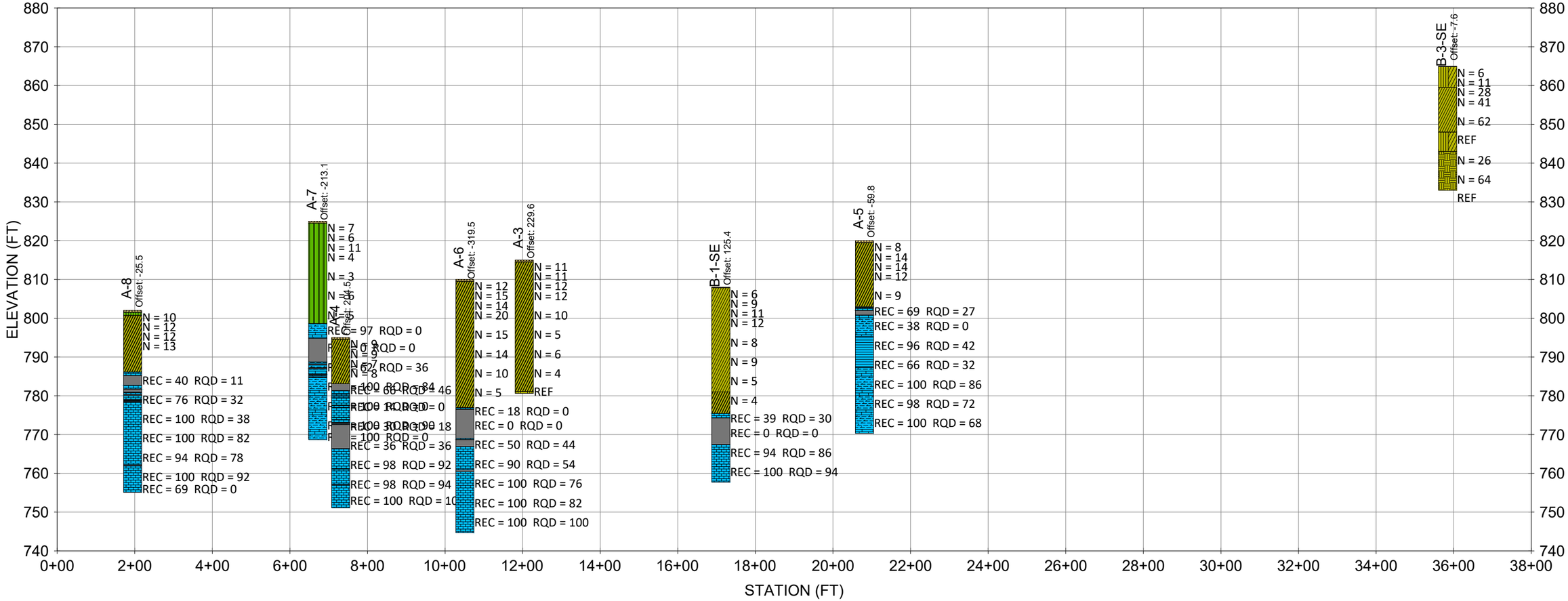
GENERAL NOTES:.

1. Estimated bedrock contacted developed in Leapfrog 2024.1 using borehole data and P-wave velocities from in the March 2025 S&ME Report

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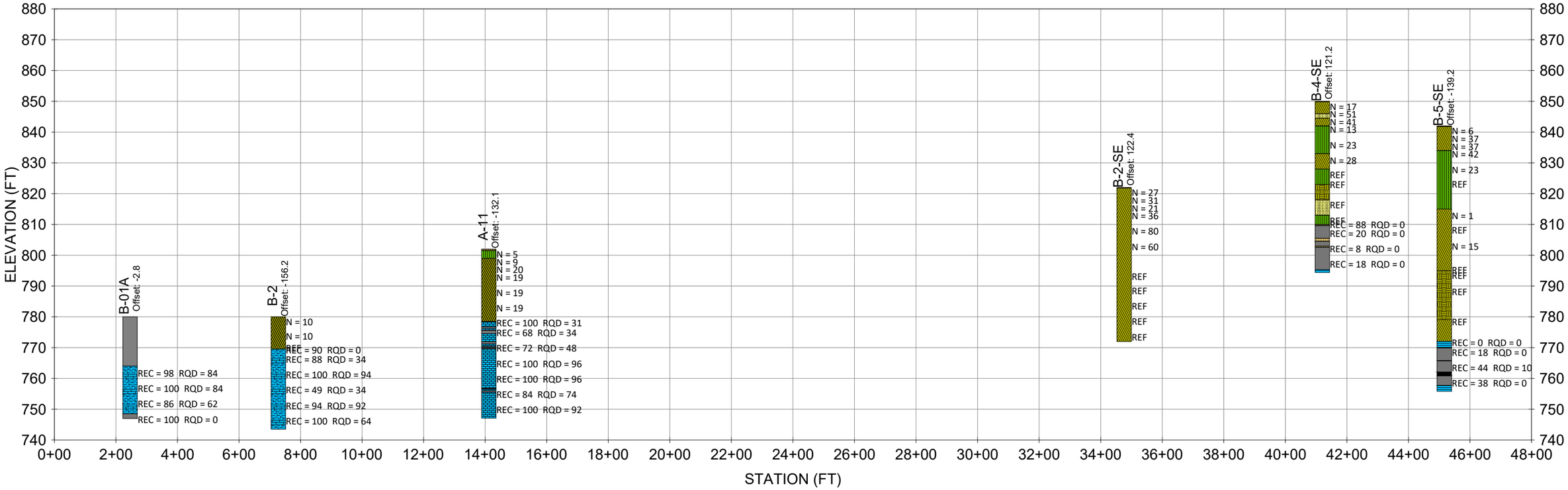
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PROJECT TASK: ORANO HALEU - PHASE 1		PROJECT NO.: 20055719
SHEET TITLE: ALIGNMENTS		SHEET ID: M-001



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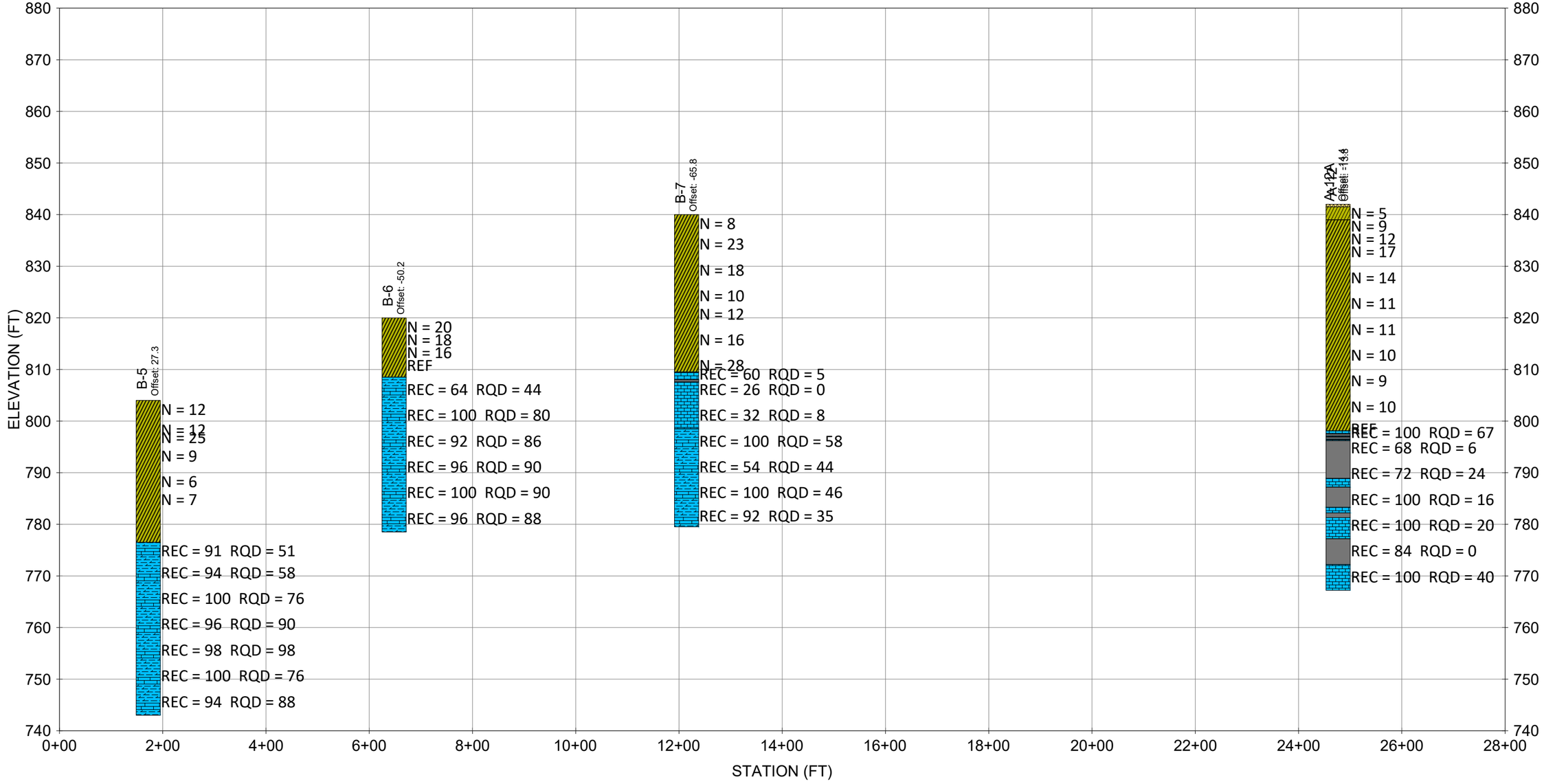
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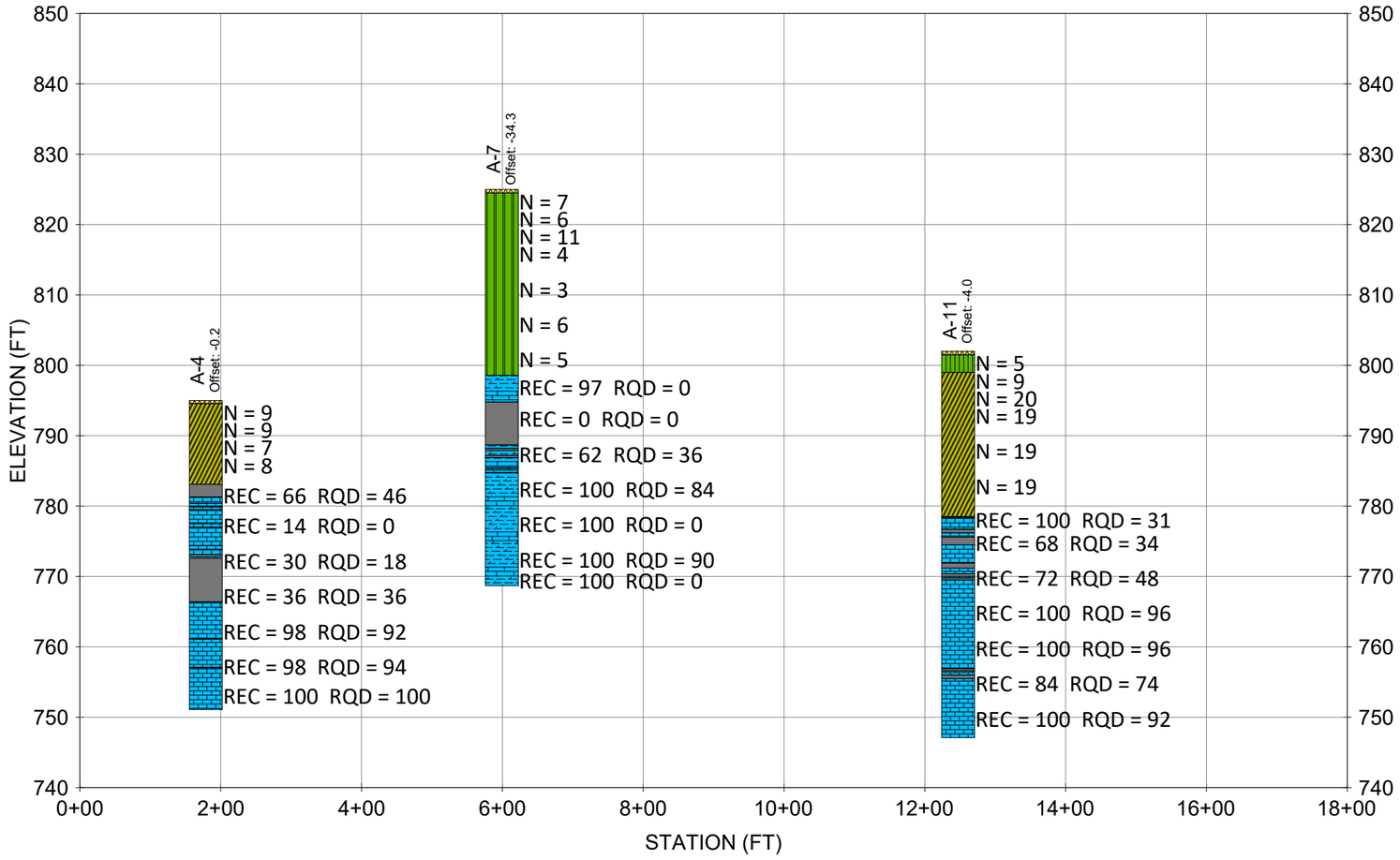
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PROJECT TASK		PROJECT NO.
ORANO HALEU - PHASE 1		20055719
SHEET TITLE		SHEET ID
ALIGNMENT B-B'		GT-002



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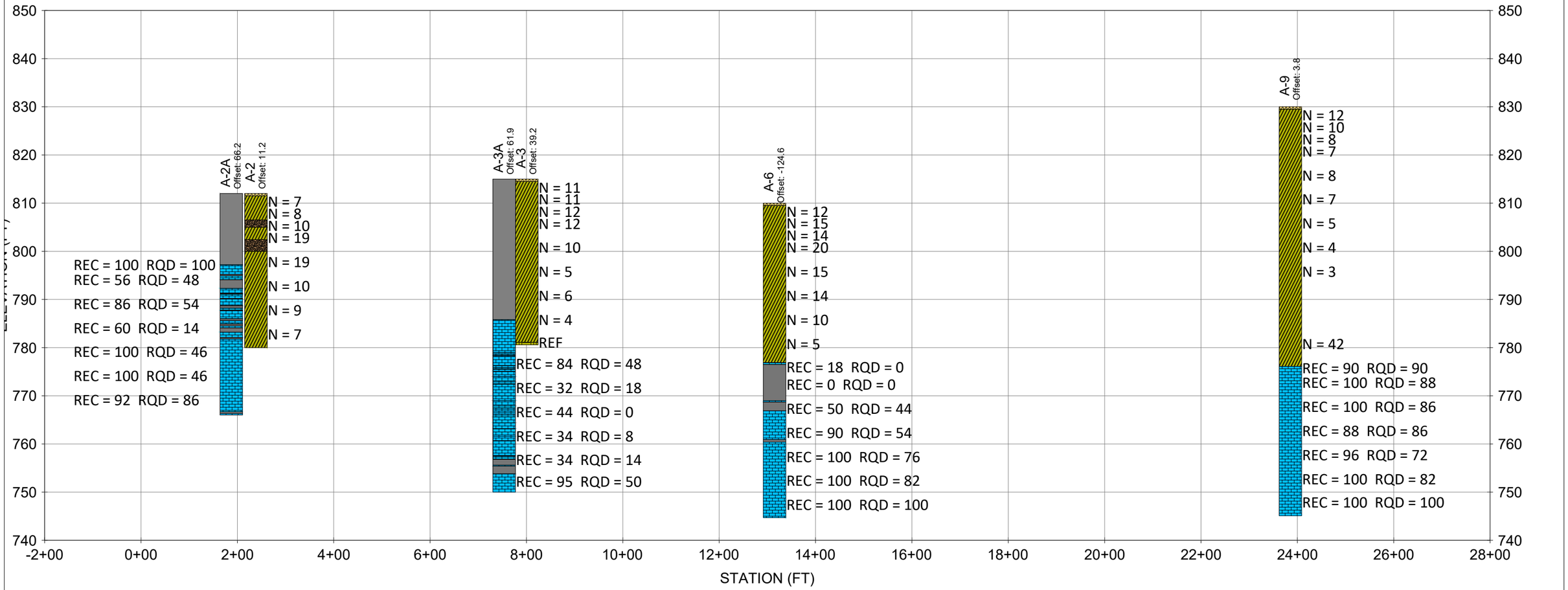
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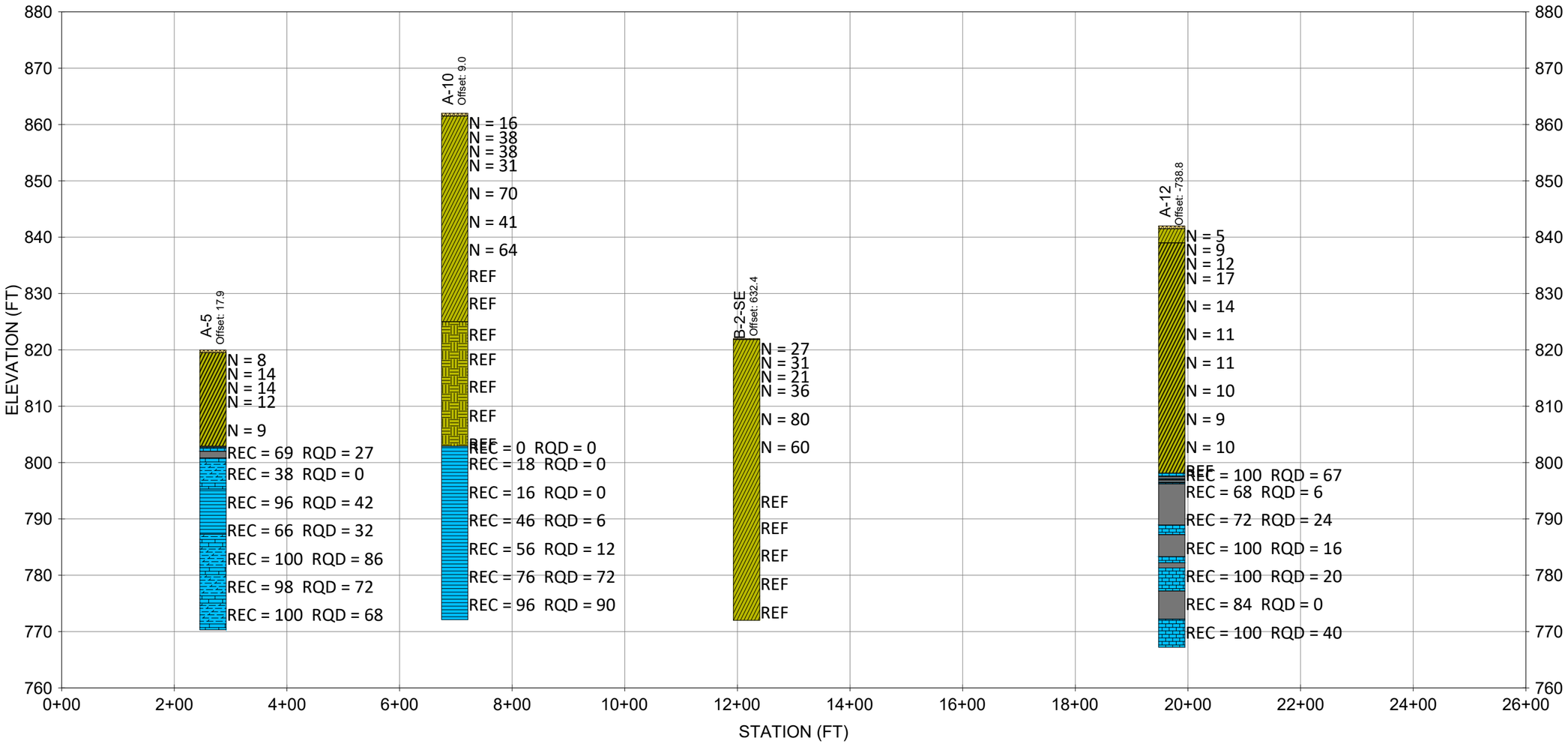


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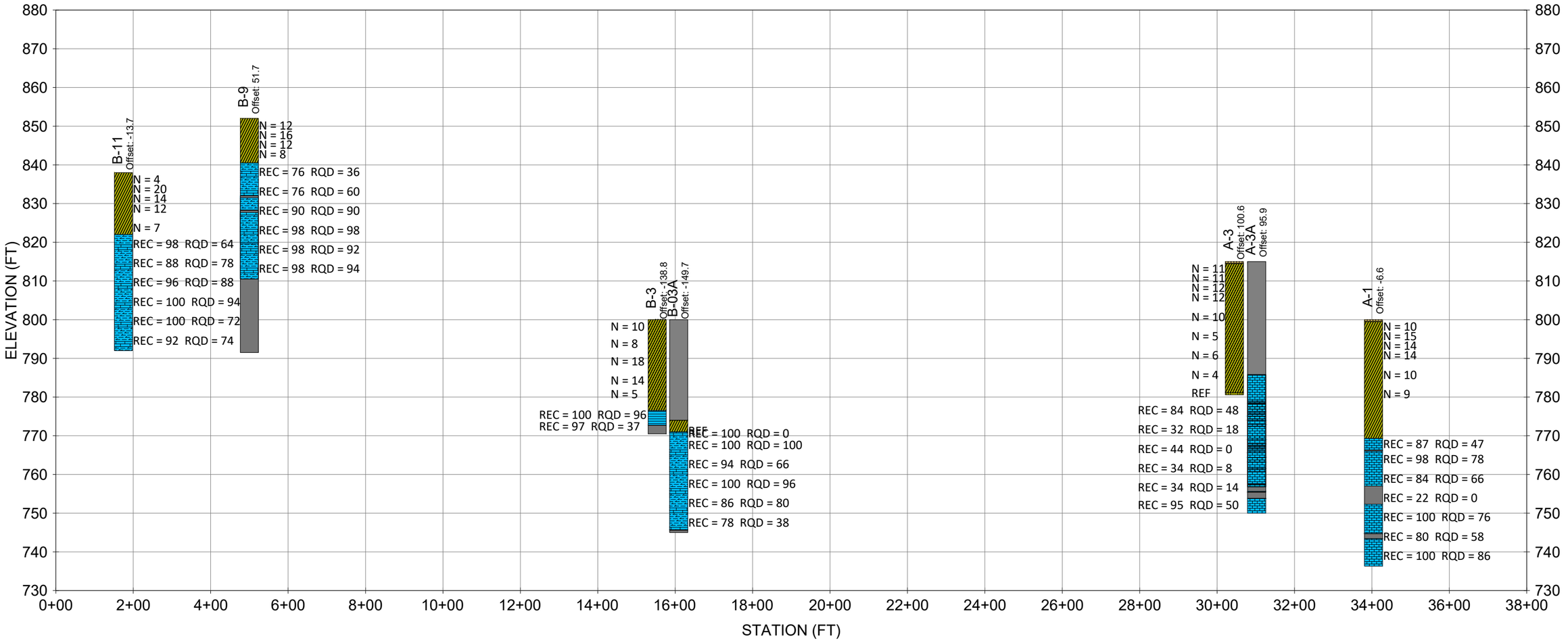
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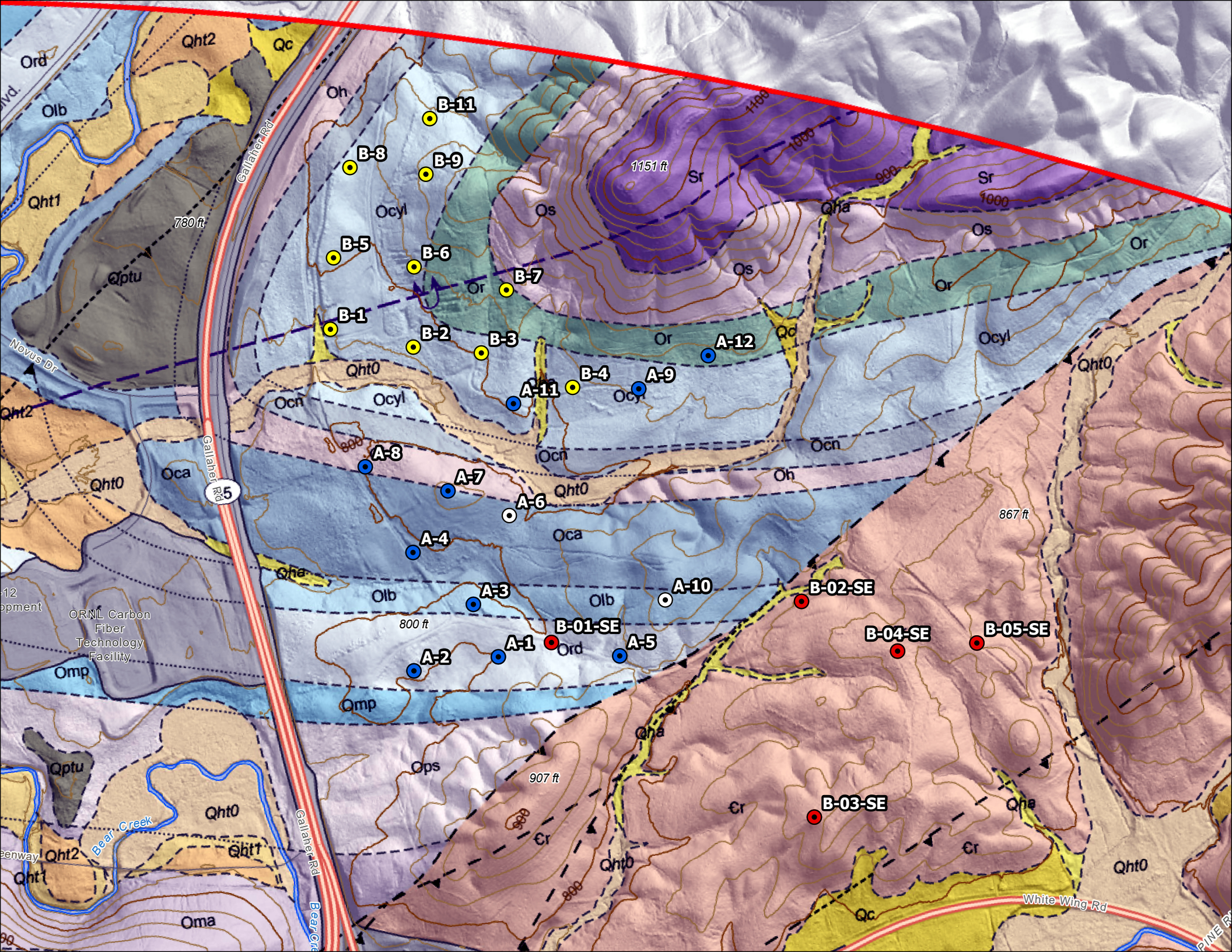


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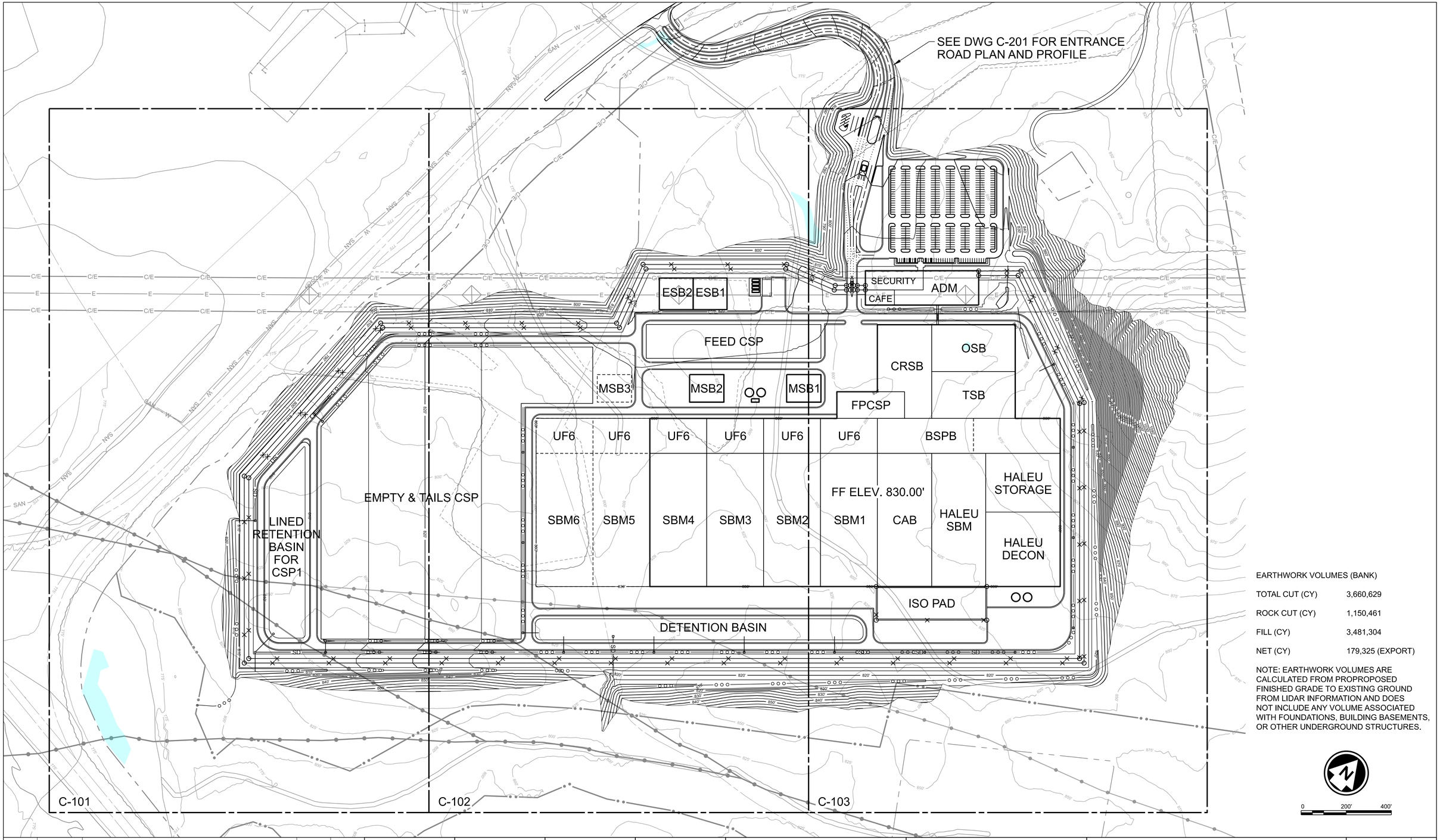
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ATTACHMENT 4
GEOLOGICAL MAPS


B-11
B-8
B-9
B-5
B-6
B-7
B-1
B-2
B-3
B-4
A-12
A-11
A-9
A-8
A-7
A-6
A-4
A-3
A-10
B-02-SE
B-01-SE
A-1
A-5
A-2
B-04-SE
B-05-SE
B-03-SE
Gallaher Rd
Novus Dr
Bear Creek
White Wing Rd
ORNL Carbon Fiber Technology Facility
1151 ft
867 ft
800 ft
907 ft
780 ft
Ord
Olb
Qht2
Qc
Qht1
Qptu
Oh
Ocyl
Os
Sr
Or
Qd
Qha
Ocn
Qht0
Oca
Olb
Omp
Qmp
Qps
Oma
Cr

ATTACHMENT 5
SITE GRADING PLAN



EARTHWORK VOLUMES (BANK)

TOTAL CUT (CY)	3,660,629
ROCK CUT (CY)	1,150,461
FILL (CY)	3,481,304
NET (CY)	179,325 (EXPORT)

NOTE: EARTHWORK VOLUMES ARE CALCULATED FROM PROPROPOSED FINISHED GRADE TO EXISTING GROUND FROM LIDAR INFORMATION AND DOES NOT INCLUDE ANY VOLUME ASSOCIATED WITH FOUNDATIONS, BUILDING BASEMENTS, OR OTHER UNDERGROUND STRUCTURES.

0 200' 400'

REV	DATE	DESCRIPTION	BY	APVD
A	06/20/2025	PRELIMINARY - TASK ORDER #2	RT	AM

ISSUE RECORD

DESIGNED BY: R. TOWNSEND	DATE: 06/20/25	
DRAWN BY: E. JONES	DATE: 06/20/25	
CHECKED BY: J. CREEL	DATE: 06/20/25	
APPROVED BY: A. MONCALEANO	DATE: 06/20/25	

PRELIMINARY - NOT FOR CONSTRUCTION

Kiewit

orano

PROJECT IKE ENRICHMENT
OAK RIDGE, TN

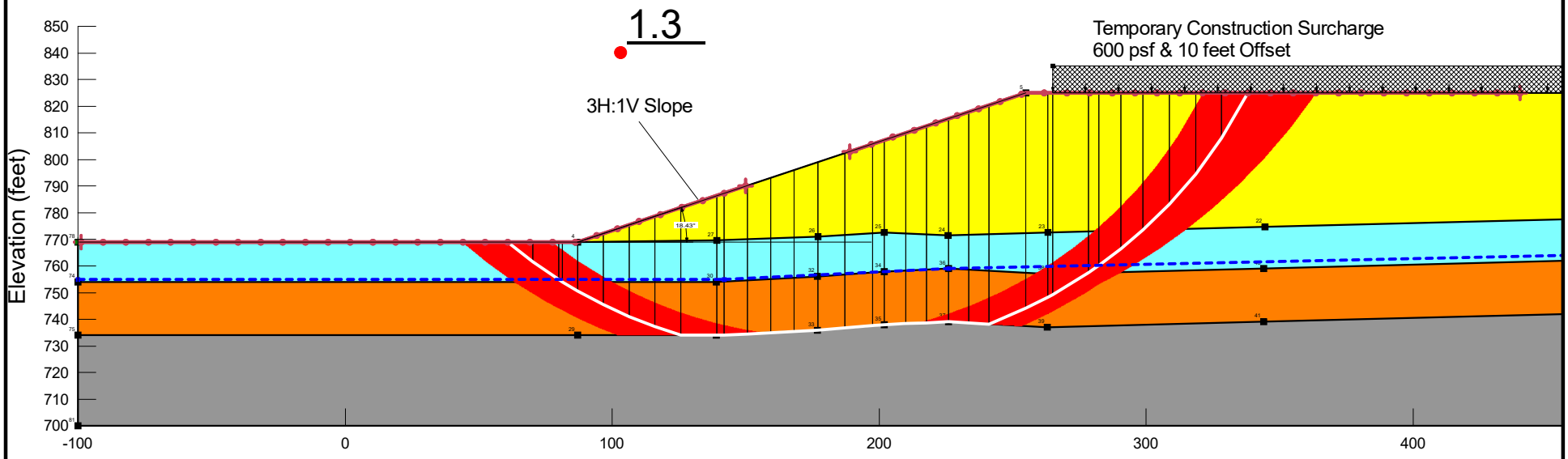
TASK ORDER 2
CIVIL
OVERALL GRADING PLAN AND KEY MAP

SCALE: 1" = 200'	SIZE: D
PROJECT NO:	
DOCUMENT NO:	
DRAWING NO: C-100	REV: A

ATTACHMENT 6
SLOPE STABILITY ANALYSIS RESULTS

Orano
Southwest Fill Slope
End of Construction
Analysis Type: Spencer

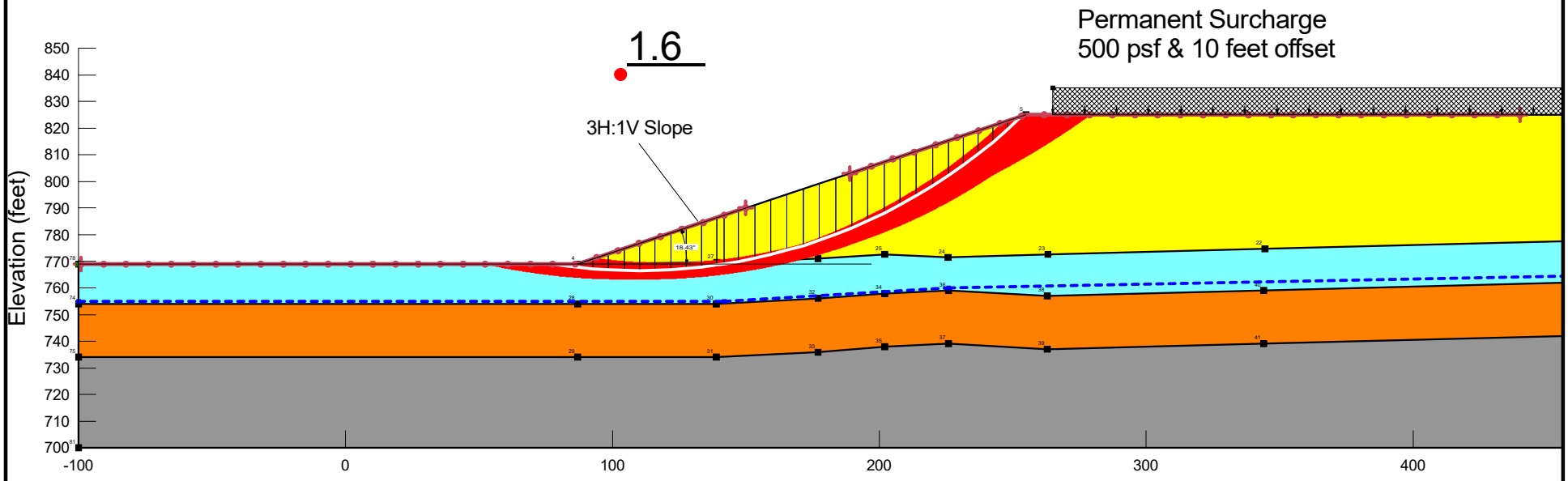
Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Bedrock			
	Compacted Fill (CL)	120	2,000	0
	Med. Stiff to Stiff Clay	120	2,000	0
	Soft to Med. Stiff Clay	110	1,000	0



Designed by: Yueru (Ruby) Chen	Project: The Orano LEU Enrichment Facility	KIEWIT PKS SINCE 1884 Kiewit
Checked by: Craig Lee	Client: Orano USA	
Date:05/23/2025 Scale:1:700	File Name: Slope Stability	

Orano
Southwest Fill Slope
Long Term Drained Condition
Analysis Type: Spencer

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Bedrock			
	Compacted Fill (CL)	120	0	27
	Med. Stiff to Stiff Clay	120	0	25
	Soft to Med. Stiff Clay	110	0	25



Designed by: Yueru (Ruby) Chen	Project: The Orano LEU Enrichment Facility	
Checked by: Craig Lee	Client: ORANO USA	
Date:05/23/2025 Scale:1:700	File Name: Slope Stability	

Kiewit

Section Cut for Slope Stability Analysis

NOTE: CONTOURS SHOWN REPRESENT ISOPACH LINES INDICATING CUT/FILL DEPTHS FROM EXISTING GRADE TO FINISHED GRADE. PORTIONS OF THE LAYOUT ARE BASED ON A PREVIOUS DESIGN; WHERE APPLICABLE AND STILL VALID, THE PRIOR LAYOUT HAS BEEN RETAINED.

ATTACHMENT 7
S&ME DATA REPORT

Geotechnical Data Report
Self Sufficiency Parcel 2 Site A and Site B
Oak Ridge, Tennessee
S&ME Project No. 24430185A

PREPARED FOR:

Kiewit Nuclear Solutions Co.
9701 Renner Blvd.
Lenexa, KS 66219

PREPARED BY:

S&ME, Inc.
5801 Middlebrook Pike, Suite A
Knoxville, TN 37921

March 26, 2025

March 26, 2025

Kiewit Nuclear Solutions Co.
9701 Renner Blvd.
Lenexa, KS 66219

Attention: Mr. Matt Hawley, P.E.

Reference: **Geotechnical Data Report**
Self Sufficiency Parcel 2 Site A and Site B
Oak Ridge, Tennessee
S&ME Project No. 24430185A

Dear Mr. Hawley:

S&ME, Inc. (S&ME) has completed our preliminary geotechnical exploration for the Self Sufficiency Parcel 2 project located at the northeast corner of the intersection of Oak Ridge Turnpike and Highway 95 in Oak Ridge, Tennessee in general accordance with S&ME Proposal No. 244301858 dated May 21, 2024. Our services were authorized by Kiewit Engineering Group Inc. through Task Assignment Order No. 7300017844 dated May 31, 2024. The purpose of this exploration was to obtain geotechnical data at the site to support the geotechnical analyses associated with the design and construction of the project.

This data report explains our understanding of the project, documents our field exploration procedures, provides the subsurface data obtained and presents the results of our laboratory testing program.

Sincerely,
S&ME, Inc.

JASON S. REEVES
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 123557
STATE OF TENNESSEE

3/26/2025

Joshua A. Baines, EI
Geotechnical Operations Manager

Jason S. Reeves, PE
Principal Engineer
TN Reg. No. 123557

Nadia Fantello
Geophysical Operations Manager

Mark J. Tilashalski, PE
Project Engineer

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Appendices

Appendix I – Figures

Appendix II – Tables

Appendix III – Test Boring Log Legend, Boring Logs and Core Photographs

Appendix IV – Laboratory Test Results

1.0 Introduction

S&ME, Inc. (S&ME) has completed our geotechnical exploration for the Self Sufficiency Parcel 2 project located at the northeast corner of the intersection of Oak Ridge Turnpike and Highway 95 in Oak Ridge, Tennessee in general accordance with S&ME Proposal No. 24430185 dated May 21, 2024. Our services were authorized by Kiewit Engineering Group Inc (Kiewit). through Change Order No. 02 dated May 31, 2024. The purpose of this exploration was to obtain geotechnical data at the site to support the geotechnical analyses associated with the design and construction of the project.

This data report explains our understanding of the project, documents our field exploration procedures, and presents the results of our laboratory testing program. Geotechnical engineering recommendations or analyses were beyond our authorized scope of services.

2.0 Project Information and Scope of Services

Project information provided to us pertaining to the site was proved via email from Mr. Matt Hawley, P.E. with Kiewit. We were provided the following documents:

- *Self Sufficiency Parcel 2 Geologic Formations & Topographic Contours Oak Ridge, Tennessee,* dated January 4, 2024 by United Cleanup Oak Ridge LLC (UCOR).
- *Self Sufficiency Parcel 2, Project Layout*, no date, no origin.
- *Self Sufficiency Parcel 2 (SSP-2) Oak Ridge, Tennessee*, dated February 20, 2024 by UCOR.
- *Orano Boring Location, no date, by Kiewit*

Based on the provided information, Kiewit requested a preliminary geotechnical exploration to aid in developing high level cost estimates for site grading and various project sturucture foundation construction for this potential project in Oak Ridge, Tennessee. The project location is shown on the Site Vicinity Plan (Figure 1) in Appendix I. The second geotechnical exploration program requested by Kiewit included:

- Establish the exploration locations in the field
- Perform twenty-two (22) soil test boringsCore refusal materials in all test borings
- Perform Multi-Channel Analysis of Surface Waves (MASW) and Microtremor Array Measurements (MAM)
- Perform P-Wave Seismic Refraction Tomography (SRT) profiles

- Field log recovered soil and bedrock samples
- Prepare boring logs
- Perform the assigned laboratory testing program
- Perform a Seismic Site Response Analysis (SSRA)
- Prepare a geotechnical data report

The following work items associated with this geotechnical exploration were provided by Kiewit personnel and were outside of our authorized scope of work:

- Development of the laboratory testing program and laboratory testing assignments
- Engineering analyses

3.0 Field Exploration

3.1 General

Subsurface conditions were explored for Site B from November 13 through November 23, 2024 and Site A from January 7 through February 6, 2025. The procedures used by S&ME for field and laboratory sampling and testing were in general accordance with ASTM procedures and established engineering practice. The final field exploration program performed, as requested by Kiewit, included:

- Performed 22 soil test borings
- Cored refusal materials in all borings
- Performed 3 Multi-Channel Analysis of Surface Waves (MASW) and Microtremor Array Measurements (MAM)
- Performed 7 P-Wave Seismic Refraction Tomography (SRT) profiles

The approximate exploration locations are shown on the *Exploration Location Plans, Figure 2 and 3* included in Appendix I. S&ME personnel marked the exploration locations in the field using a commercial grade, hand-held global positioning system (GPS) device with points established using Google Earth™. All depths in this report reference the ground surface at the time of this exploration.

Field logs of each boring were maintained in the field by the field professional. The field logs were reviewed, and the information was used to prepare the final boring logs in OpenGround by Bentley Systems, Inc. The final logs are included in the Appendix III.

The soil descriptions on the boring logs in the appendices are based on the field descriptions by the field professional in general accordance with ASTM D2488 *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures),* review by a senior geotechnical professional, and the laboratory test results

performed on selected samples using ASTM D2487 *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*.

Laboratory Atterberg Limits (Soil Plasticity) tests were performed on 18 split-spoon samples and 3 undisturbed samples from 10 borings from Site B and on 25 split spoon samples and 10 undisturbed samples from 12 borings from Site A as assigned by Kiewit personnel. The soil field descriptions were revised as needed based on the laboratory test results.

Rock descriptions on the boring logs are based on field descriptions by the field professional and review by a senior geotechnical professional. Rock Quality Designation (RQD) was determined in accordance with ASTM D6032 *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core*. The Boring Legends in the appendices provide a key for the terminology and graphic representations included on the boring logs.

The boring logs indicate approximate boundaries between different soil and rock classifications (lithology). Lithologic boundaries depicted on the boring logs represent a synthesis of data generated in the field and the laboratory. The data include observations of drill rig behavior, soil descriptions made in the field, and laboratory test results from index testing. The following sections discuss the various components of the subsurface exploration program.

3.2 Test Borings

3.2.1 Site A

S&ME performed 12 soil test borings designated Borings A-01 through A-12. The borings were augered to refusal while performing Standard Penetration Testing (SPT) to depths ranging from approximately 12 to 59 feet. The boring exploration is summarized in Table 1 in Appendix II. S&ME personnel logged and classified the soils and rock recovered from the borings as previously discussed, and photographed the split-spoon samples and recovered rock core samples. The boring logs and rock core photographs are provided in Appendix III.

The borings were advanced in the overburden soil using hollow stem augers with an inside-diameter of 3-¼ inches with a CME 550 or Diedrich D-50 drill rig. The drill crew worked in general accordance with the American Society for Testing and Materials International (ASTM) D6151, the *Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling.* Split-spoon sampling and Standard Penetration Tests (SPTs) were performed in general accordance with ASTM D1586, the *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. SPTs and split-barrel sampling were typically performed in the overburden soils at 2-½-foot intervals to depths of 10 feet and on 5-foot intervals thereafter. An automatic trip drop SPT hammer was used for the Standard Penetration Testing. The N-values reported on our boring logs are the field values without any adjustments or corrections.

The borings were extended below the auger refusal depths using rock coring techniques. The coring was performed in general accordance with ASTM D2113, *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration* using an NQ-size double tube core barrel equipped with diamond-tipped core bit. At the completion of drilling, the borings were backfilled with auger cuttings and a borehole closure appliance.

3.2.2 Site B

S&ME performed 10 soil test borings designated Borings B-01 through B-09 and B-11. The borings were augered to refusal while performing Standard Penetration Testing to depths ranging from approximately 7 to 33 feet. The boring exploration is summarized in Table 1 in Appendix II. S&ME personnel logged and classified the soils and rock samples recovered from the borings as previously discussed, and photographed the split-spoon samples and recovered rock core samples. The boring logs and rock core photographs are provided in Appendix III.

The borings were advanced in the overburden soil using hollow stem augers with an inside-diameter of 3-¼ inches with Mobile B-57 drill rig. The drill crew worked in general accordance with the American Society for Testing and Materials International (ASTM) D6151, the *Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling*. Split-spoon sampling and Standard Penetration Tests (SPTs) were performed in general accordance with ASTM D1586, the *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. SPTs and split-barrel sampling were typically performed in the overburden soils at 2½-foot intervals to depths of 10 feet and on 5-foot intervals thereafter. An automatic trip drop SPT hammer was used for the Standard Penetration Testing. The N-values reported on our boring logs are the field values without any adjustments or corrections.

The borings were extended below auger refusal using rock coring techniques. The coring was performed in general accordance with ASTM D2113, *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration*.

At the completion of drilling, the borings were backfilled with auger cuttings and a borehole closure appliance

3.3 Groundwater

3.3.1 Site A

Water level measurements were attempted in the borings at termination upon auger refusal and prior to coring. The borings were dry during drilling prior to coring. The offset borings were dry at end of drilling.

3.3.2 Site B

Water level measurements were attempted in the borings at termination upon auger refusal and prior to coring. The borings were dry during drilling prior to coring.

4.0 Laboratory Testing

4.1 Laboratory Testing Program and Procedures

Kiewit personnel selected disturbed (split-spoon), intact (thin-walled tube) and rock cores for laboratory testing. Laboratory testing was performed in accordance with ASTM standards or other standards, where applicable, as specified by Kiewit. The type, test standard and number of tests performed for the laboratory testing program are listed below:

- 132 - Moisture Contents (ASTM D2216)
- 55 - Atterberg Limits (ASTM D4318)
- 6 - Wash #200 (ASTM D1140)
- 10 – Grain-Size Analysis (ASTM D6913)
- 8 - One-Dimensional Consolidation Test (ASTM D2435)
- 13 - Unconfined Compressive Strength (soil, ASTM D2166)
- 11 - Unconfined Compressive Strength (rock core; ASTM D7012, Method C)

4.2 Laboratory Test Results

The geotechnical laboratory test reports with the individual test data and results for the soil natural moisture content and soil index are provided in Appendix IV. The test reports with the individual test data and results for the rock core testing are also provided in Appendix IV. The tables summarizing the geotechnical laboratory test results are listed below and may be found in Appendix II:

- Table 3 Summary of Soil Index Test Results Site A
- Table 4 Summary of Soil Index Test Results Site B
- Table 5 Summary of Rock Core Unconfined Compression Test Results Site A
- Table 6 Summary of Rock Core Unconfined Compression Test Results Site B

5.0 Geophysics

5.1.1 Geophysical Methodology, Field Efforts, and Data Processing

Between December 11, 2024, and January 17, 2025, S&ME completed Seismic Refraction Tomography (SRT) and surface waves seismic surveys at the requested locations (Site A and B, **Figure 4**) to support the geotechnical exploration program in identifying the approximate depths to bedrock and for Seismic Site Class determination.

5.1.1.1 Seismic Refraction Tomography (SRT)

The Seismic Refraction Tomograph (SRT) method measures travel times of seismic compression waves (P-waves) generated from an active energy source, such as a sledgehammer, at receivers (geophones) located along a linear array. The velocities at which the seismic waves propagate along the array can be determined from the slope of arrival times. Waves in soil (low-density) will travel slower than waves in competent bedrock (high-density). Where increases in elastic material properties occur, the seismic waves are refracted much like light in a prism. Depths to higher velocity strata such as rock can be determined from the location of a slope change in the first arrival vs. distance plots. P-wave velocities also provide an indication of density and of excavation characteristics based on empirical relationships (i.e., rippability).

A Geometrics seismic system equipped with twenty-four (24) 10 Hz vertical geophones was used in general accordance with ASTM D5777 *"Standard Guide for Using the Seismic Refraction Method for Subsurface Investigation"*. A total of fourteen (14) SRT profiles that ranged from about 230 feet to 690 feet in length were collected using a set geophone spacing of 10 feet (Lines SRT-1A through SRT-7A, Site A; Lines SRT-1B through SRT-7B, Site B; as shown in **Figures 5 and 10** in Appendix I, respectively).

Data from several shots (off-end, end, quarter, and mid-point) were acquired for each survey profile and a sledgehammer was used as the energy source. The SRT data was processed using Geogiga Technology Corp. Seismic Pro™ software and Golden Software's Surfer® program and were used to produce our final contoured 2D models. Elevations used for our SRT models were based on LiDAR data downloaded from the USGS website rather than actual field survey measurements performed by S&ME, and as such, should be considered estimate.

5.1.1.2 Surface Waves

The Seismic Site Class is based on the average shear wave velocity (Vs) to a depth of 100 feet (Vs100), and analysis of surface waves (Rayleigh waves) can be used to estimate shear wave velocities.

Surface waves generated from either an active or passive energy source (e.g., sledgehammer striking a metal plate or background noise, respectively) are recorded at the ground surface along a spread of low-frequency sensors (i.e., geophones). Active sources typically provide relatively higher frequencies (i.e., better resolution at shallower depths) while passive sources generally provide relatively lower frequencies (e.g., greater depth at lower resolution). Seismic measurements are transformed from time domain into frequency domain from which the phase characteristics of the surface waves can be calculated. A dispersion curve (i.e., phase velocity curve vs frequency) is developed and then transformed into a one-dimensional (1D) shear wave velocity profile through an inversion and iterative process in which Vs100 is calculated.

We used a combination of the active Multi-Channel Analysis of Surface Waves (MASW) and passive Microtremor Array Measurements (MAM) methods. A total of four (4) surveys were collected at the requested locations (SW-1 and SW-2, Site B; SW-3 and SW-4, Site A; as shown in **Figures 5 and 10** in Appendix I, respectively). The MASW surveys were conducted using a Geometrics seismograph equipped with twenty-four (24) 4.5 Hz vertical geophones at set spacings of 5 feet along a linear array and a 16-lb sledgehammer as the energy source.

The MAM surveys were conducted using a Geometrics seismograph equipped with twenty-four (24) 4.5 Hz vertical geophones at a set spacing of 5 feet along a linear array, as well as eleven (11) 4.5 Hz vertical geophones at a set spacing of 30 feet along a non-linear array. Background noise was used as an energy source. Data analysis was conducted using the Geogiga Technology Corp. Seismic ProTM software (SURFACE PLUS module).

5.1.2 Geophysical Results

The geophysical testing results are generally summarized as follows:

- The SRT profiles presented in **Figures 6 through 9 and 11 through 15** in Appendix I indicate P-wave velocities across the surveyed areas that generally range from about 700 feet per second (ft/s) to 20,000 ft/s.
- Based on correlations with the geotechnical borings performed relatively adjacent to the SRT profiles, the residuum overburden appears to have seismic P-wave velocities generally less than about 6,500 feet per second (ft/s) (dark blue to green). The PWR and competent bedrock appear to exhibit seismic P-wave velocities generally greater than about 6,500 ft/s (yellow, orange to red, and red to purple).
- The approximate locations of the relatively adjacent geotechnical borings are overlain on the SRT geophysical models for reference and comparison.
- In addition, approximate elevations/depths of our interpreted top of bedrock (~6,500 ft/s) were extracted from the SRT data sets at an average of 30-foot intervals, along with auger refusals from the boring logs, to

develop contoured elevation/depth plots (**Figures 13 through 17**). The contoured surface plots of our interpreted top of bedrock were also provided separately in a digital format, in the State Plane 1983 TN 4100 coordinate system.

- Shear wave velocity profiles are presented in **Figures 26 through 30.**
- Table 1 below summarizes the results of the geophysical seismic services. The calculated weighted average Vs100 values are based on Sections 20 and Equation 20.4.1 of ASCE 7-16.

Table 1: Surface Wave Seismic Results

Survey Location	Calculated Average Shear Wave Velocity, Vs100 (ft/s)	Approximate Depth of Measurement (ft)	Seismic Site Class Designation
SW-1 (Site B)	1,696	118	C
SW-2 (Site B)	2,079	105	C
SW-3 (Site A)	1,737	122	C
SW-4 (Site A)	1,963	113	C

5.1.3 Geophysical Limitations

Regardless of the thoroughness of a geophysical survey, there is always a possibility that actual conditions may not match the geophysical test interpretations. The contoured plots of top of weathered rock and top of competent mass bedrock are estimated and are based solely on the available geotechnical and geophysical data collected, and as such, the exact top of rock depths may vary from the depths shown. The results should be considered accurate only to the degree implied by the methods used and the method's limitations and data coverage. Accordingly, the possibility exists that not all features at a project site will be located due to either subsurface soil conditions or the occurrence of features outside the lateral limits and below the depth of penetration of the methods used.

The geophysical methods used for this survey also has inherent limitations. Site activity (e.g., generators, heavy equipment, traffic, etc.) can cause noise/interference in the data sets. Depth restrictions are also associated with seismic methods and energy sources. Obtaining P-wave velocities is limited to geologic conditions in which velocities increase with depth, and as such, a lower velocity layer beneath a high velocity layer would not be identified.

6.0 SSRA Analysis

This section presents the results of our seismic site response analysis (SSRA) and resulting seismic design parameters in accordance with IBC 2018 and ASCE 7-16.

6.1 Shear Wave Velocity Data and Soil Model

In our field exploration, shear-wave velocity (V_s) data was collected using the Multichannel Analysis of Surface Waves at four locations SW-1 through SW-4. The collected shear wave velocity data is shown in the attached Figure A-1. The calculated average shear wave velocities to a depth of 100 ft below the ground surface (i.e., V_{S100}) for these arrays ranged from 1,696 to 2,079 ft/sec. These values correspond to a Seismic Site Class C based on Table 20.3-1 of ASCE 7-16.

Based on the measured data, we developed a representative shear-wave velocity profile to use as our "base" model for input into DEEPSOIL, which is shown on **Figure A-1** in Appendix I. Required soil parameters for the SSRA were selected based on the results of our field exploration, and were based on published data and our experience.

6.2 Ground Motions

The B/C boundary Risk-Targeted Maximum Considered Earthquake (MCE_R) response spectrum for a 1% risk of structural collapse in 50 years was defined as the target spectrum using spectral accelerations values at 5 Hz (S_{MS}) and 1 Hz (S_{M1}) assuming a Site Class B in accordance with IBC 2021 and ASCE 7-16. The S_{MS} and S_{M1} parameters are 0.455 g and 0.098 g, respectively, based on the ASCE 7-16 hazard. These values were used to generate a Site Class B MCE_R response spectrum consistent with Figure 11.4-1 of ASCE 7-16, which served as our target acceleration response spectrum (ARS). The target spectrum is presented in the attached **Figure A-2**.

The earthquake hazard associated with the site was de-aggregated using the 2014 update (version 4.2.0) of the USGS Unified Hazard Tool website to estimate the modal magnitude and site-to-source distance of the earthquake contributing to the maximum spectral acceleration at various periods. For a 2-percent probability of exceedance (2% PE) in 50 years, the short period hazard (i.e., for periods of less than about 1-second) is controlled by a smaller earthquake (magnitude of about 4.5 to 6.0) occurring close to the site (distance of about 10 to 20 km). The longer period hazard (i.e., periods greater than about 1-second) is controlled by a larger earthquake (magnitude of 7.8) occurring at a distance of 550 km (i.e., the New Madrid fault zone). For purposes of this report, we refer to these controlling earthquakes as the "Small Earthquake" and "Large Earthquake" scenarios, respectively.

Two sets of five earthquake records were selected from the NGA-West2 database as seed motions for spectral matching. The first set was selected for having similar magnitude and distance as the "Small Earthquake" scenario and the second set was selected for having similar magnitude and distance as the "Large Earthquake" scenario. The selected motions generally possess a similar spectral shape as the B/C boundary target spectrum and were recorded on materials generally consistent with the B/C boundary. These selected records were then spectrally matched to the target ARS using the program SeismoMatch[1]. The "Small Earthquake" motions were spectrally matched to the target for periods from 0.01 to 1 seconds. The "Large Earthquake" motions were spectrally matched to the target for periods from 1 to 5 seconds. The spectrally matched motions and average matched spectrum are shown with the B/C boundary target spectrum in **Figure A-2** included in Appendix I.

[1] Seismosoft. (2021). SeismoMatch (2021 Version) - A computer program for spectral matching of earthquake records.

6.3 Methodology

The site-specific acceleration response spectrum (ARS) was developed using the one-dimensional site response analysis program DEEPSOIL v7.0[2]. The spectrally matched time-histories were applied as input rock-motions at the base of the model. To assess the sensitivity of ground surface response to uncertainty in the soil properties, we performed multiple analyses with variations of depth of the BC boundary, shear strength, and shear wave velocity profile. Each time history was applied to each of the model variations. A site-specific MCE_R response spectrum for a 1% risk of structural collapse in 50 years (with an equivalent viscous damping ratio of 5%) was generated for each of the model variations and then were averaged to compute the overall MCE_R spectrum. The site-specific design ARS at the ground surface is equal to two-thirds of the MCE_R ARS as defined in Section 21.3 of ASCE 7-16.

Per ASCE 7-16, the site-specific spectral response acceleration for the short period (S_{DS}) is 90 percent of the maximum spectral acceleration (S_a) from the site-specific spectrum, at any period between 0.2 and 0.5 seconds, inclusively. The site-specific spectral response acceleration for the 1.0 second period (S_{D1}) is the maximum value of the product, T x S_a, where T is period and S_a is the site-specific acceleration, for periods from 1.0 to 5.0 seconds. The site-specific PGA_M is taken as the MCE_R (before a two-thirds reduction) spectral acceleration at the 0.01-second period (0.01-second is the smallest period for which the output spectral acceleration is available from DEEPSOIL analysis).

The site-specific design ARS and design acceleration parameters (PGA_M, $S_{DS,}$ and S_{D1}) have been limited to a minimum value of 80 percent of the limit basis which is outlined in Section 21.3 of ASCE 7-16.

6.4 Results

The combined and code-limited site-specific design ARS is shown as the red line on the attached **Figure A-3** in Appendix I. The light blue line on Figure A-3 represents 80 percent of the code-prescribed limit basis for our SSRA spectra.

As illustrated in Figure A-3, the site-specific peak ground acceleration (PGA_M) and long-period design spectral acceleration parameter (S_{D1}) have all decreased compared to the general procedure for Site Class C. The short-period design spectral acceleration parameter (S_{DS}) has increased compared to the general procedure for Site Class C. The resulting code-limited, design response accelerations from the SSRA are presented in Table 2. The general procedure design acceleration parameters for Site Class C are also presented for reference.

The site-specific analyses indicate a Seismic Design Category (SDC) C should be considered for Risk Categories I-III and SDC D should be considered for Risk Category IV in accordance with Section 1613.2.5 of IBC 2018.

[2] DEEPSOIL v7.0 is a one-dimensional site response analysis program that can perform nonlinear and equivalent linear site response analyses with and without pore water pressure control. Hashash, Y.M.A., Musgrove, M.I., Harmon, J.A., Groholski, D.R., Phillips,C.A., and Park, D. (2019). *DEEPSOIL 7.0, User Manual.* University of Illinois at Urbana-Champaign, Urbana, IL.

Table 2 – Summary of Design Acceleration Parameters

Code	Method	S_{DS} (g)	S_{D1} (g)	PGA_M (g)	SDC (RC I-III)	SDC (RC IV)
IBC 2018 / ASCE 7-16	SSRA	0.474	0.098	0.384	C	D
IBC 2018 / ASCE 7-16	General Procedure (Site Class C)	0.437	0.123	0.393	C	D

7.0 Limitations of Data Report

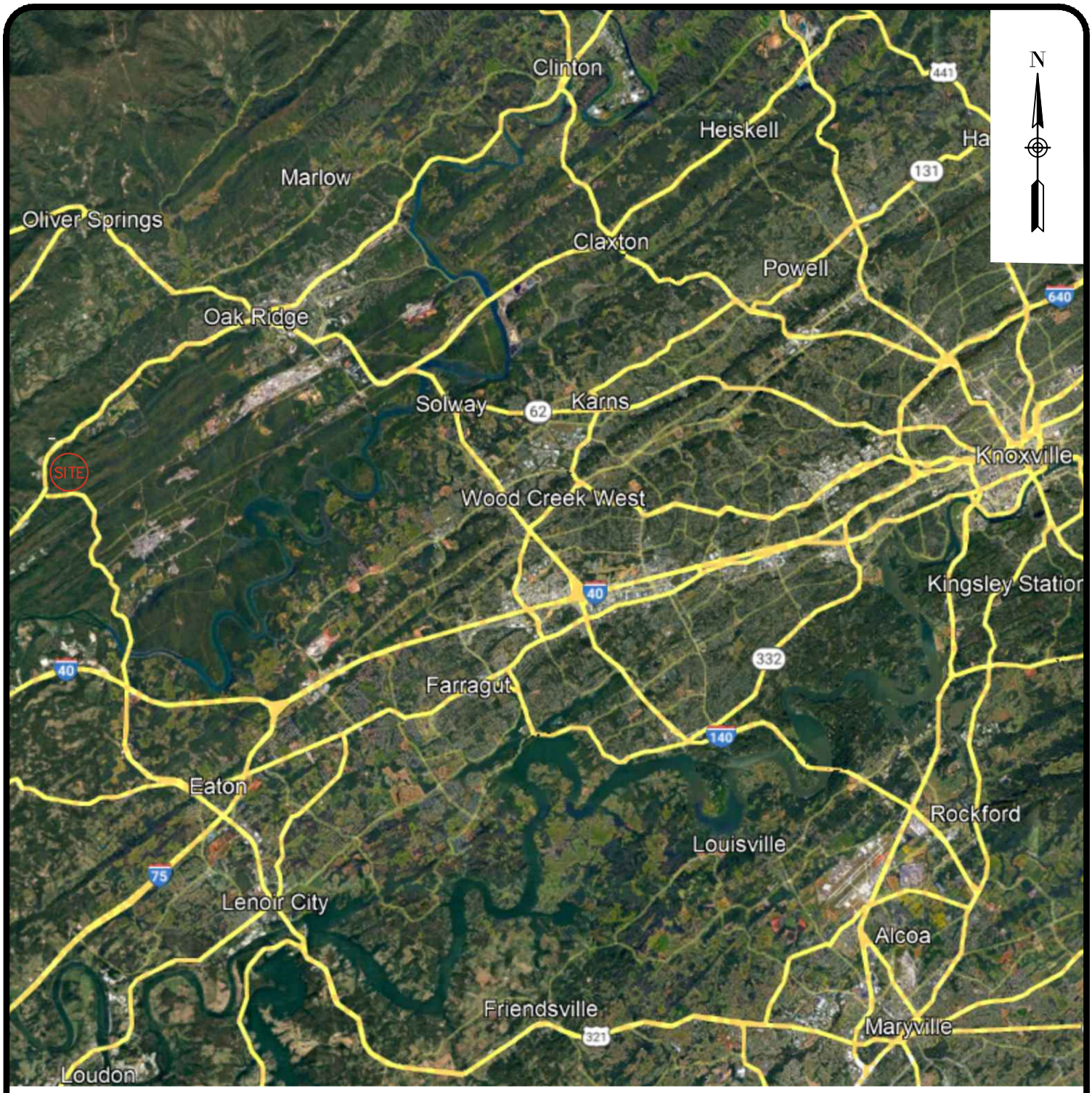
This geotechnical data report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The data contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared, and no geotechnical recommendations are provided other than seismic design parameters and recommendations. No other representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

The provided limited data from this field exploration program is preliminary and does not constitute data to be able to provide specific recommendations for geotechnical development at the site, and additional subsurface exploration should be performed prior to design and construction once the structure locations, geometry, and loading are determined. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services, if requested.

Appendix I – Figures

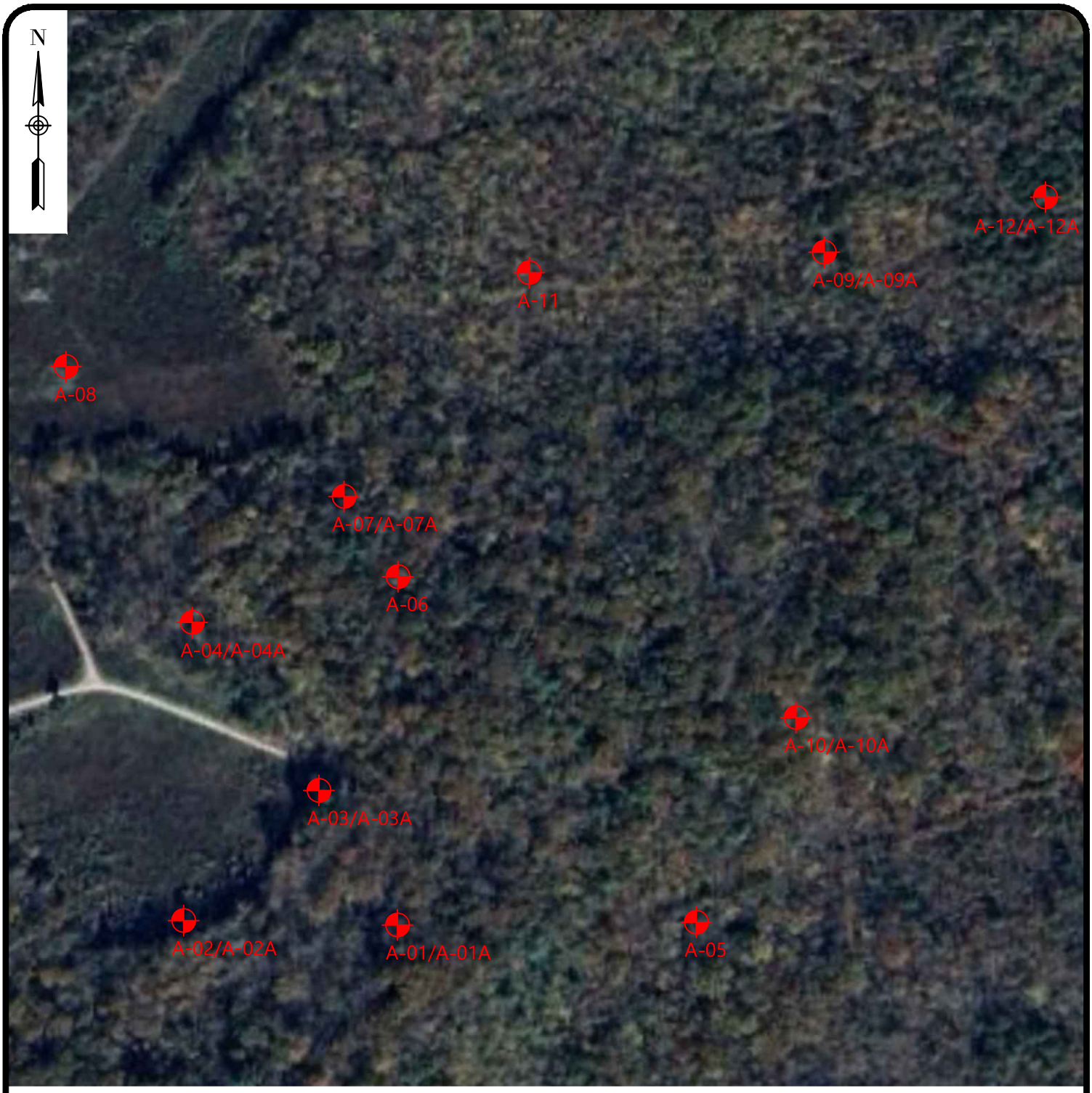


Notes:

1) Base map from Google Earth Pro accessed on March 24, 2025.

	Site Vicinity Map	SCALE: Not to Scale	FIGURE NO. 1
	Self Sufficiency Parcel 2 Kiewit Engineering Group, Inc. Oak Ridge, TN	DATE: 03/24/2025 PROJECT NUMBER 24430185A	

Drawing Path: Y:\Shared\SME\Ops\Knoxville-1430\Projects\2024\24430185A_Kiewit_Self Sufficiency Parcel 2_Oak Ridge TN\GEO\CAD\Record Drawings\Figure 1_SVM.dwg



Legend:

Approximate Location of Soil Test Borings

Notes:

1) Boring locations are shown in general arrangement only.
2) Do not use boring locations for determination of distances or quantities.
3) Base map from Google Earth Pro accessed on March 24, 2025.

Test Location Plan

Self Sufficiency Parcel 2 - Site A
Kiewit Engineering Group, Inc.
Oak Ridge, TN

SCALE:	FIGURE NO.
Not to Scale	2
DATE:	
03/24/2025	
PROJECT NUMBER	
24430185A	

Drawing Path: Y:\Shared\SME\Ops\Knoxville-1430\Projects\2024\24430185A_Kiewit_Self Sufficiency Parcel 2_Oak Ridge TN\GEO\CAD\Record Drawings\Figure 2_BLP.dwg



Legend:

Approximate Location of Soil Test Borings

Notes:

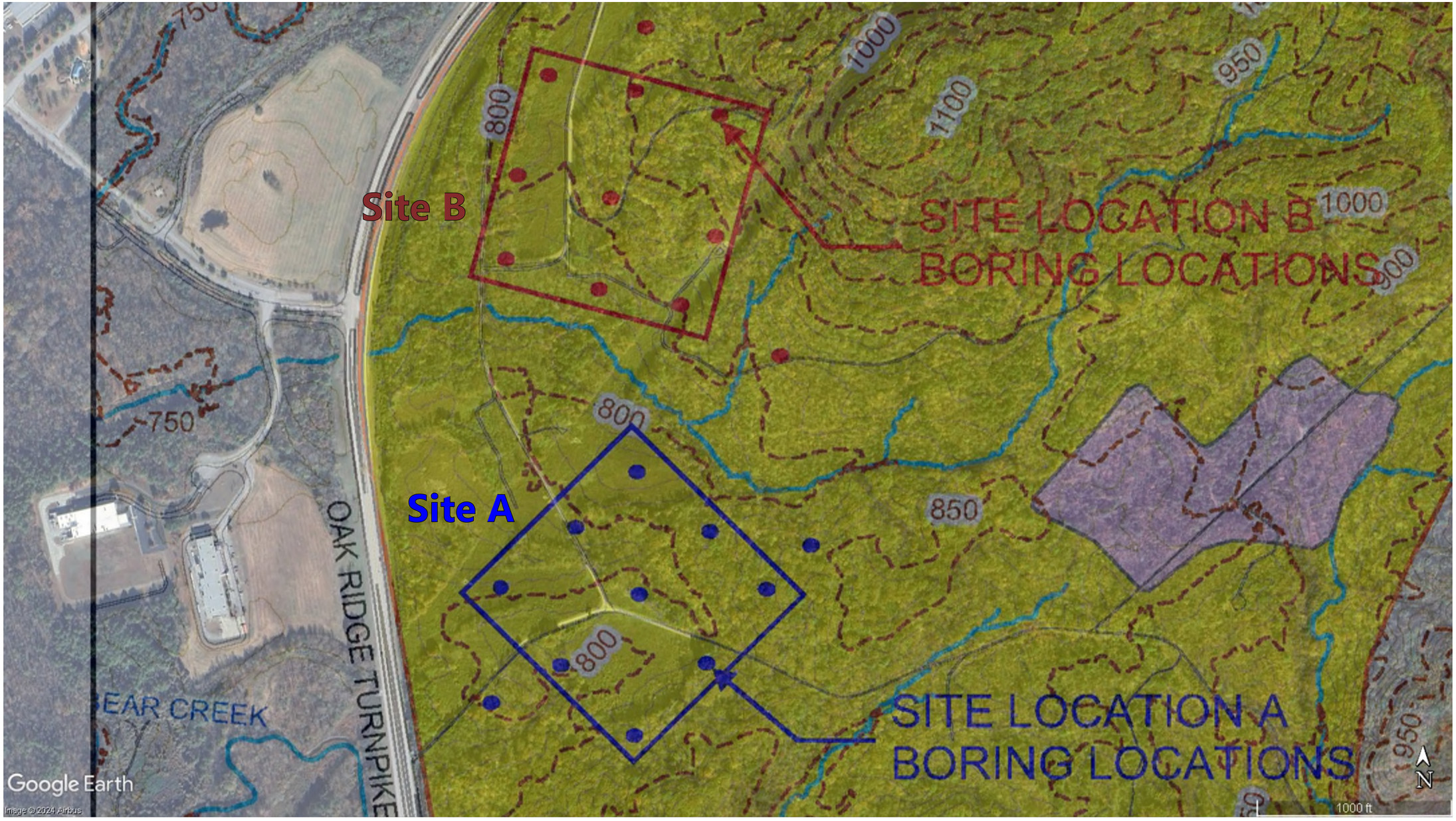
1) Boring locations are shown in general arrangement only.
2) Do not use boring locations for determination of distances or quantities.
3) Base map from Google Earth Pro accessed on March 24, 2025.

	Test Location Plan	SCALE: Not to Scale	FIGURE NO. 3
	Self Sufficiency Parcel 2 - Site B Kiewit Engineering Group, Inc. Oak Ridge, Tennessee	DATE: 03/24/2025 PROJECT NUMBER 24430185A	

Drawing Path: Y:\Shared\SME\Ops\Knoxville-1430\Projects\2024\24430185A_Kiewit_Self Sufficiency Parcel 2_Oak Ridge TN\GEO\CAD\Record Drawings\Figure 2_BLP.dwg

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

Overlay provided by Kiewit



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

SURVEY LOCATION PLAN

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

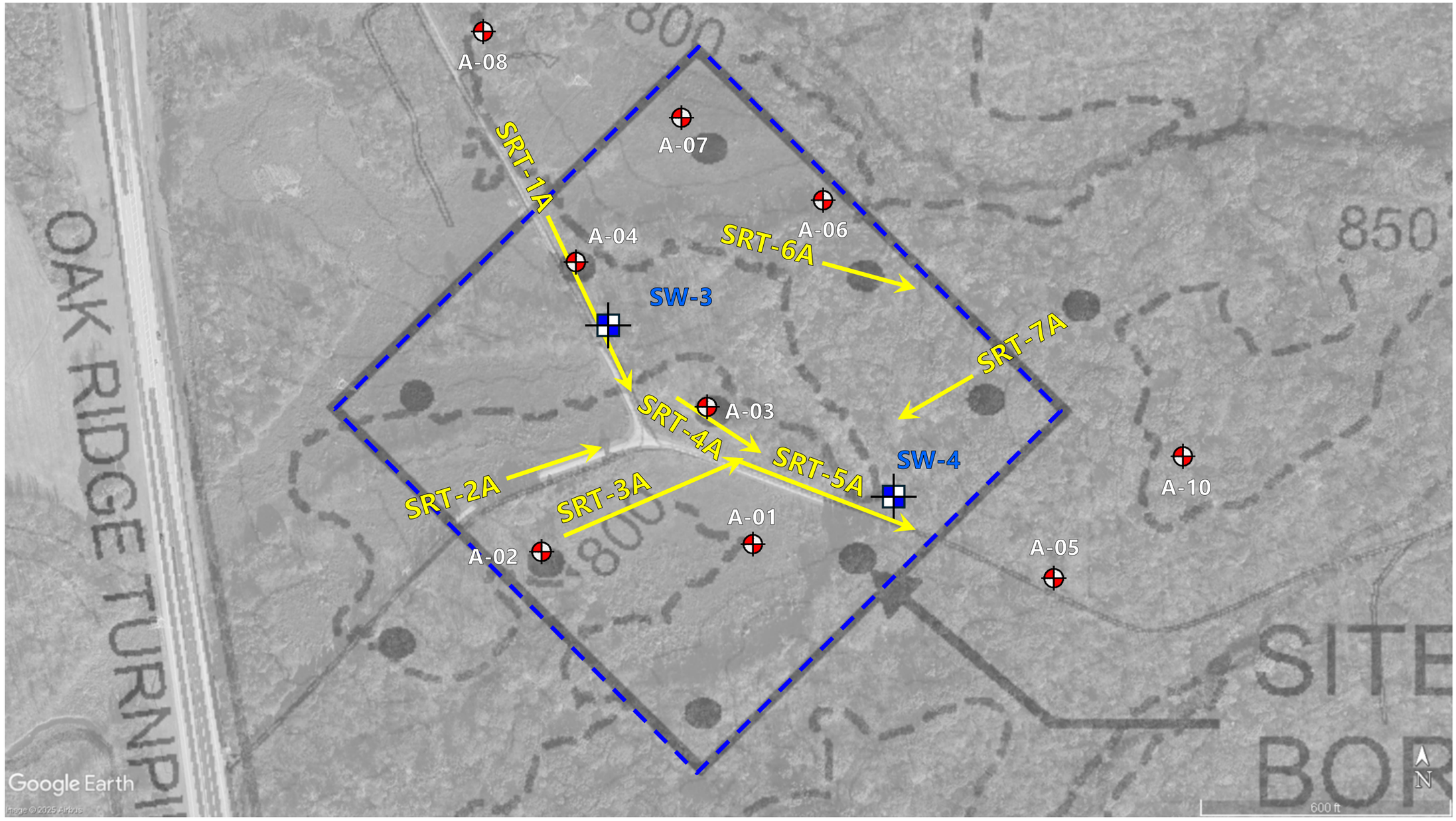
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
4

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Seismic Refraction Profile

Boring Location (S&ME; 2024)

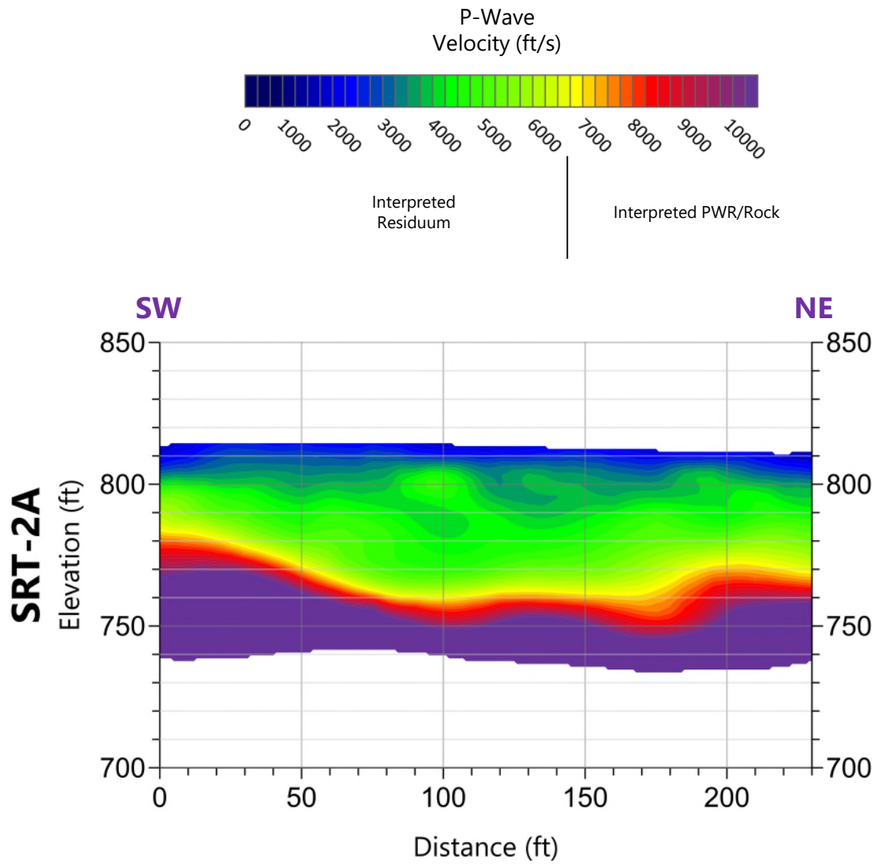
Surface Waves Seismic

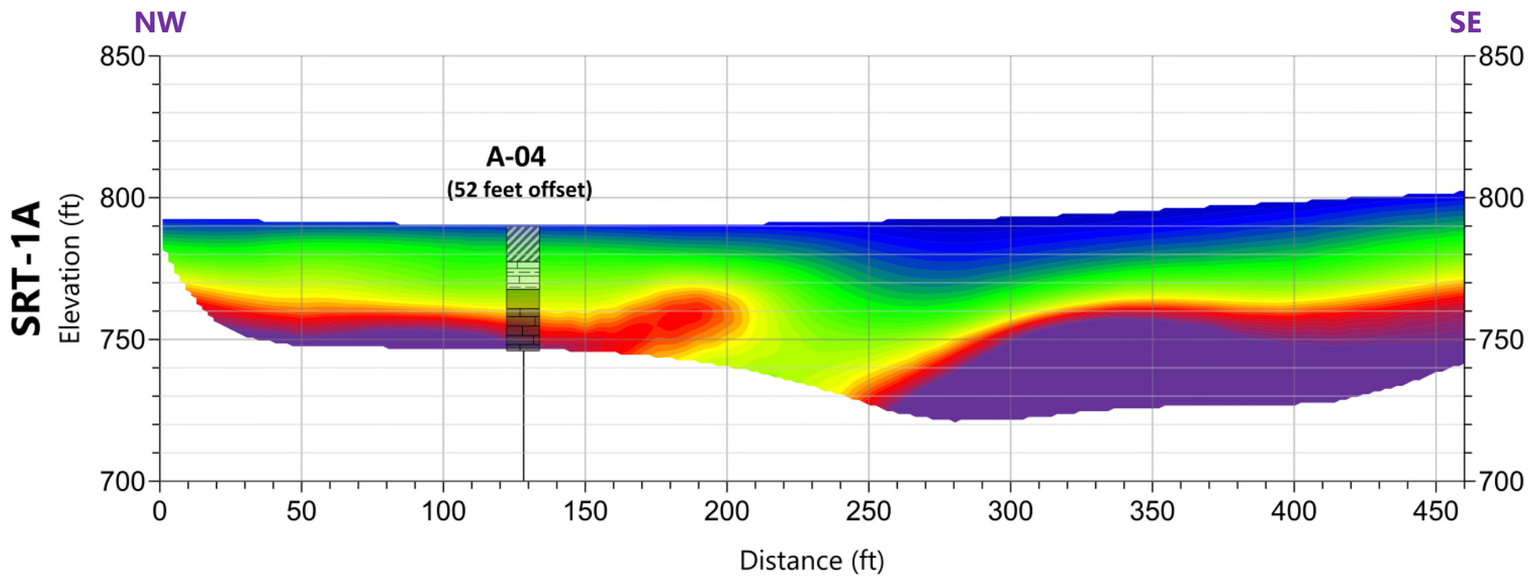
Requested Survey Area – Site A

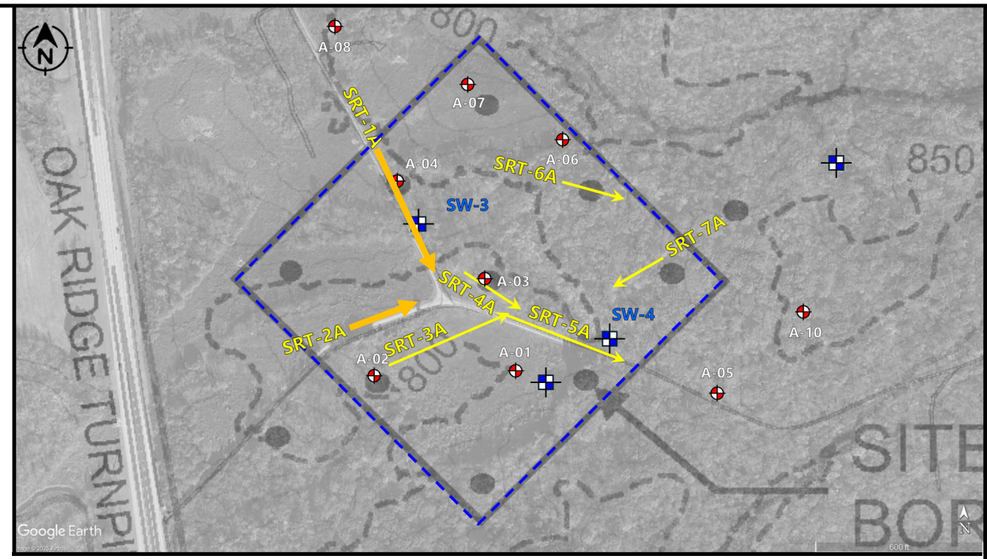
SEISMIC REFRACTION SURVEY LOCATION PLAN – SITE A

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:	AS SHOWN
DATE:	3/24/2025
PROJECT NUMBER	24430185A
FIGURE NO.	5







REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

LEGEND

- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

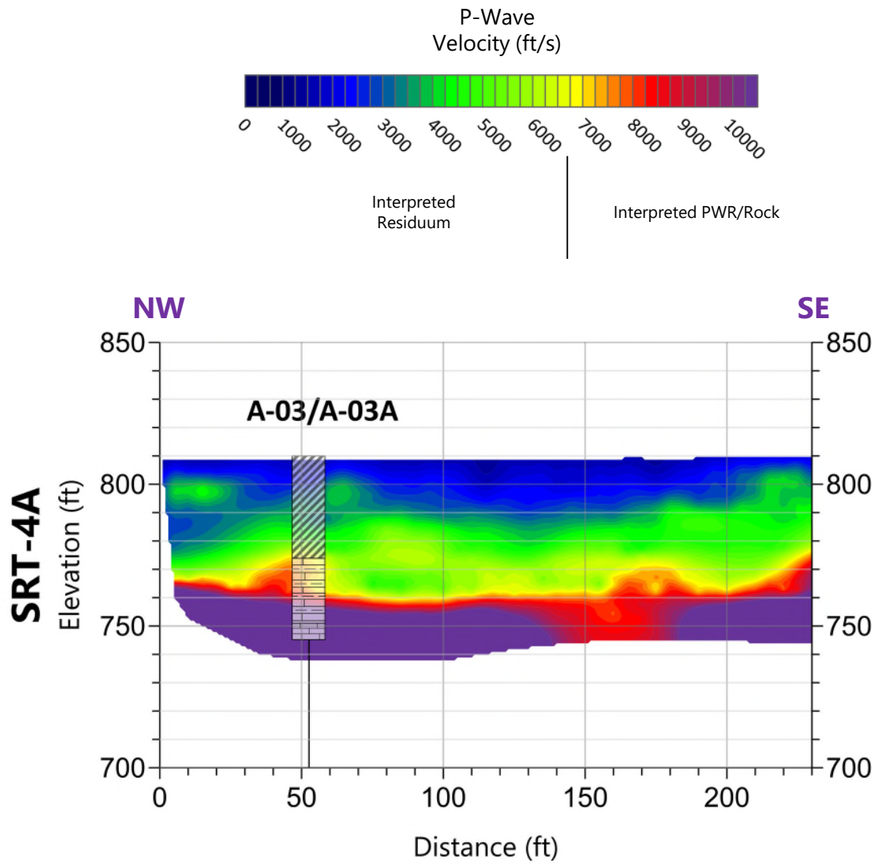
BORING LEGEND

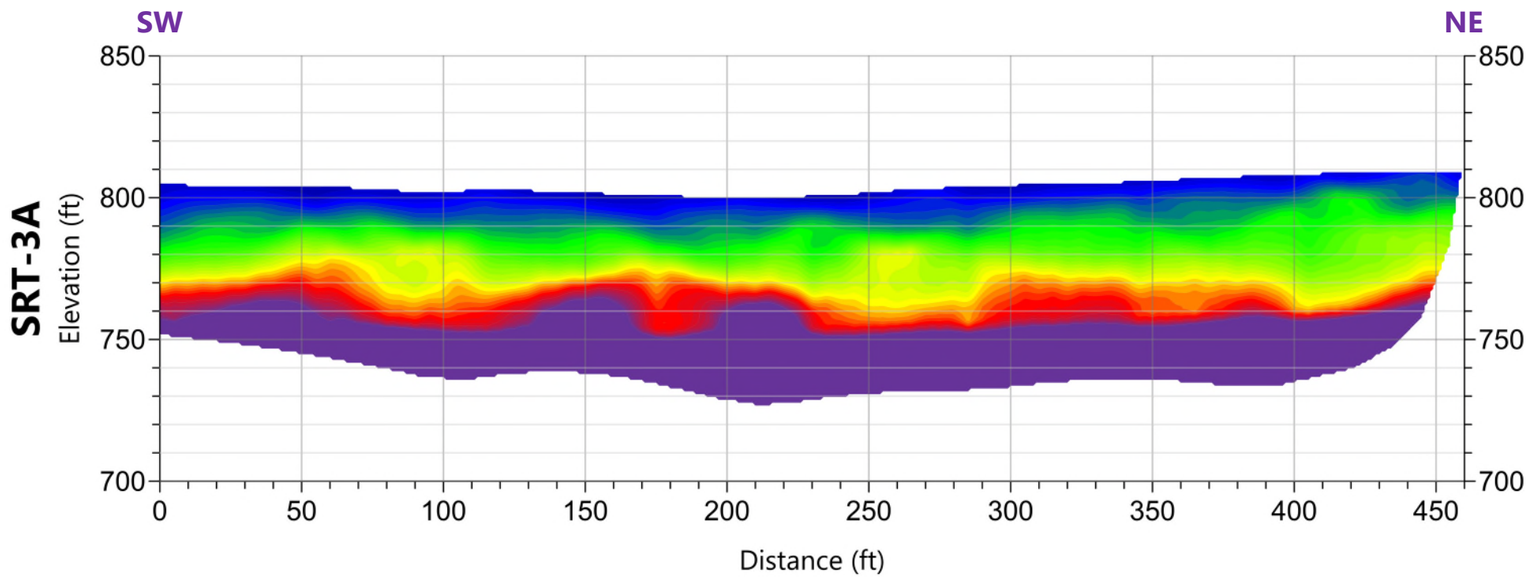
- Residuum: Fat Clay (CH)
- Interbedded Limestone – Weathered – very poor/poor quality
- Void
- Limestone – excellent quality

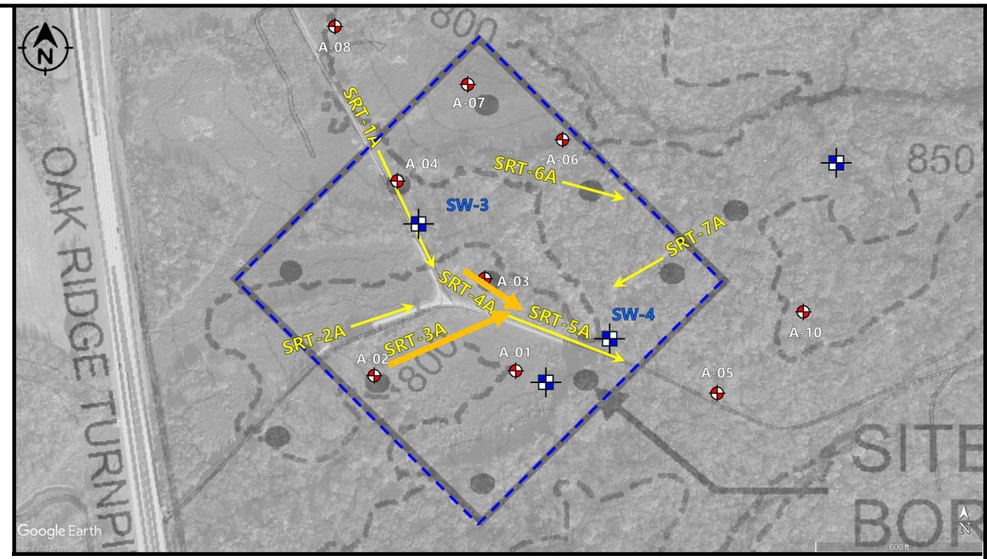
SEISMIC REFRACTION PROFILES – SITE A - LINES SRT-1 & SRT-2

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:	AS SHOWN
DATE:	3/24/2025
PROJECT NUMBER	24430185A
FIGURE NO.	6







REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

LEGEND

- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

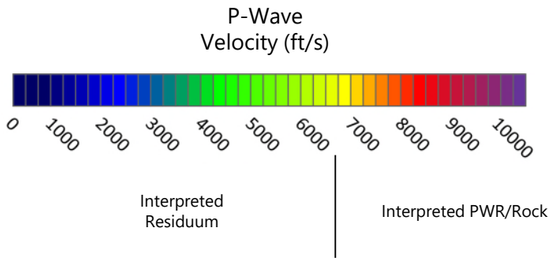
BORING LEGEND

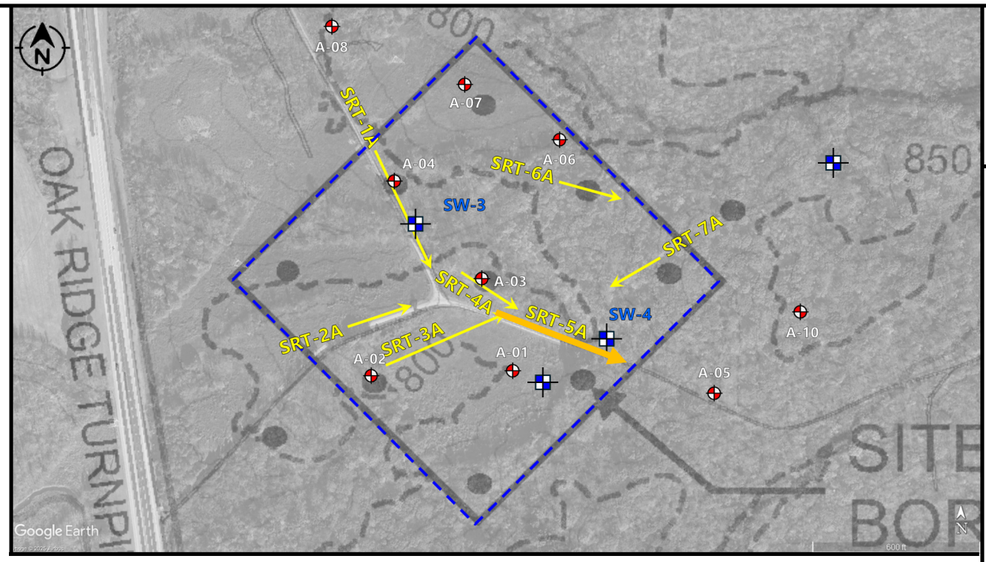
- Residuum: Fat Clay (CH)
- Interbedded Limestone – Weathered – very poor/poor quality
- Limestone – Weathered – fair quality

SEISMIC REFRACTION PROFILES – SITE A - LINES SRT-3 & SRT-4

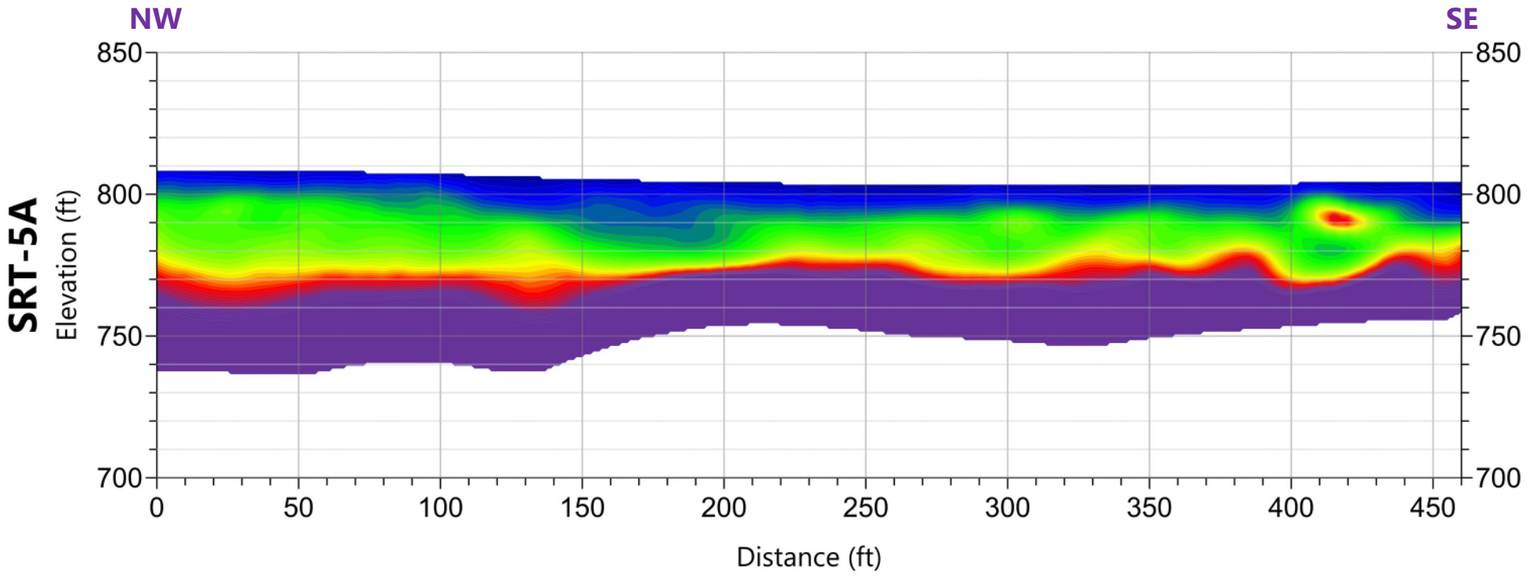
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN
DATE: 3/24/2025
PROJECT NUMBER: 24430185A
FIGURE NO.: 7





REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



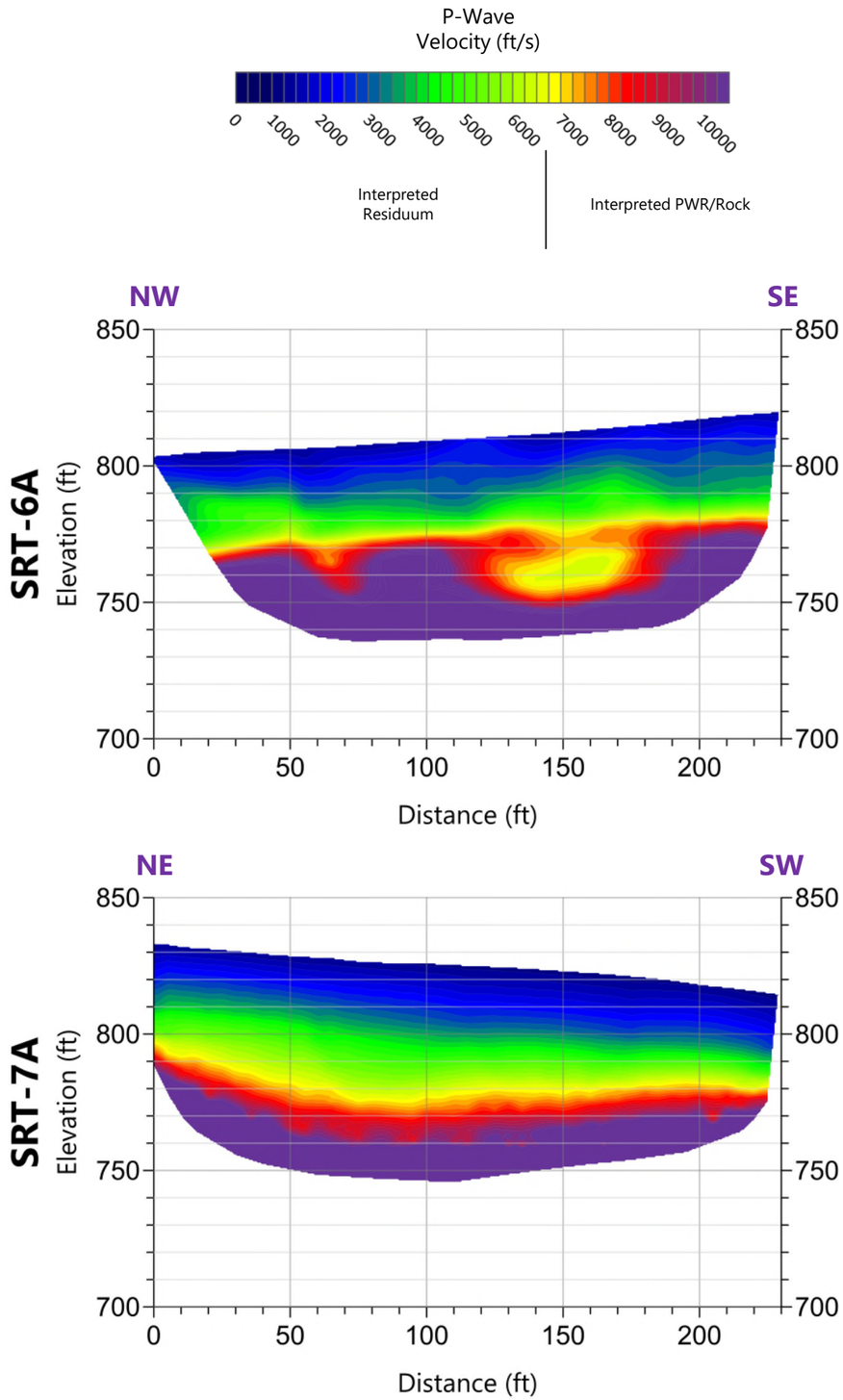
LEGEND

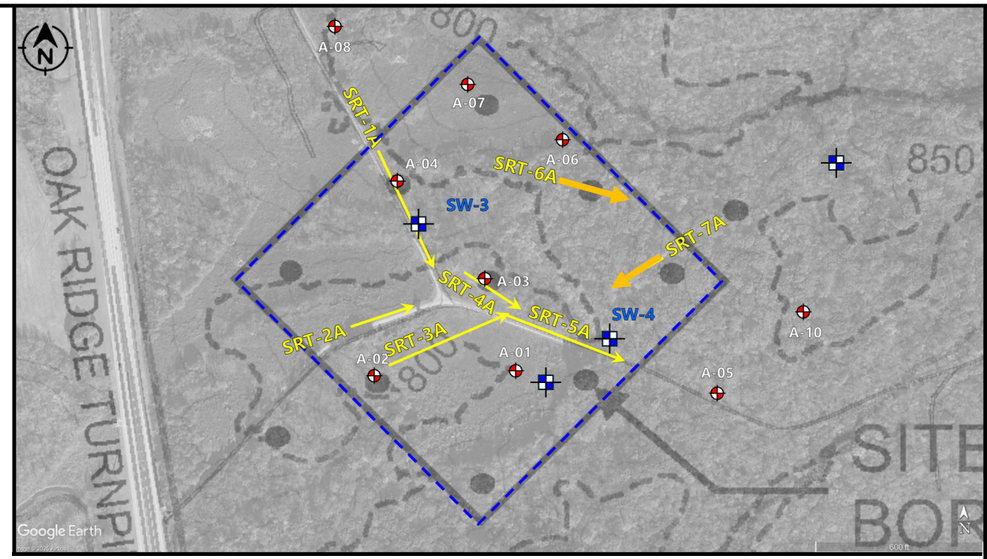
- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

SEISMIC REFRACTION PROFILES – SITE A - LINE SRT-5

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN
DATE: 3/24/2025
PROJECT NUMBER: 24430185A
FIGURE NO.: **8**





REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

LEGEND

- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

SEISMIC REFRACTION PROFILES – SITE A - LINES SRT-6 & SRT-7

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

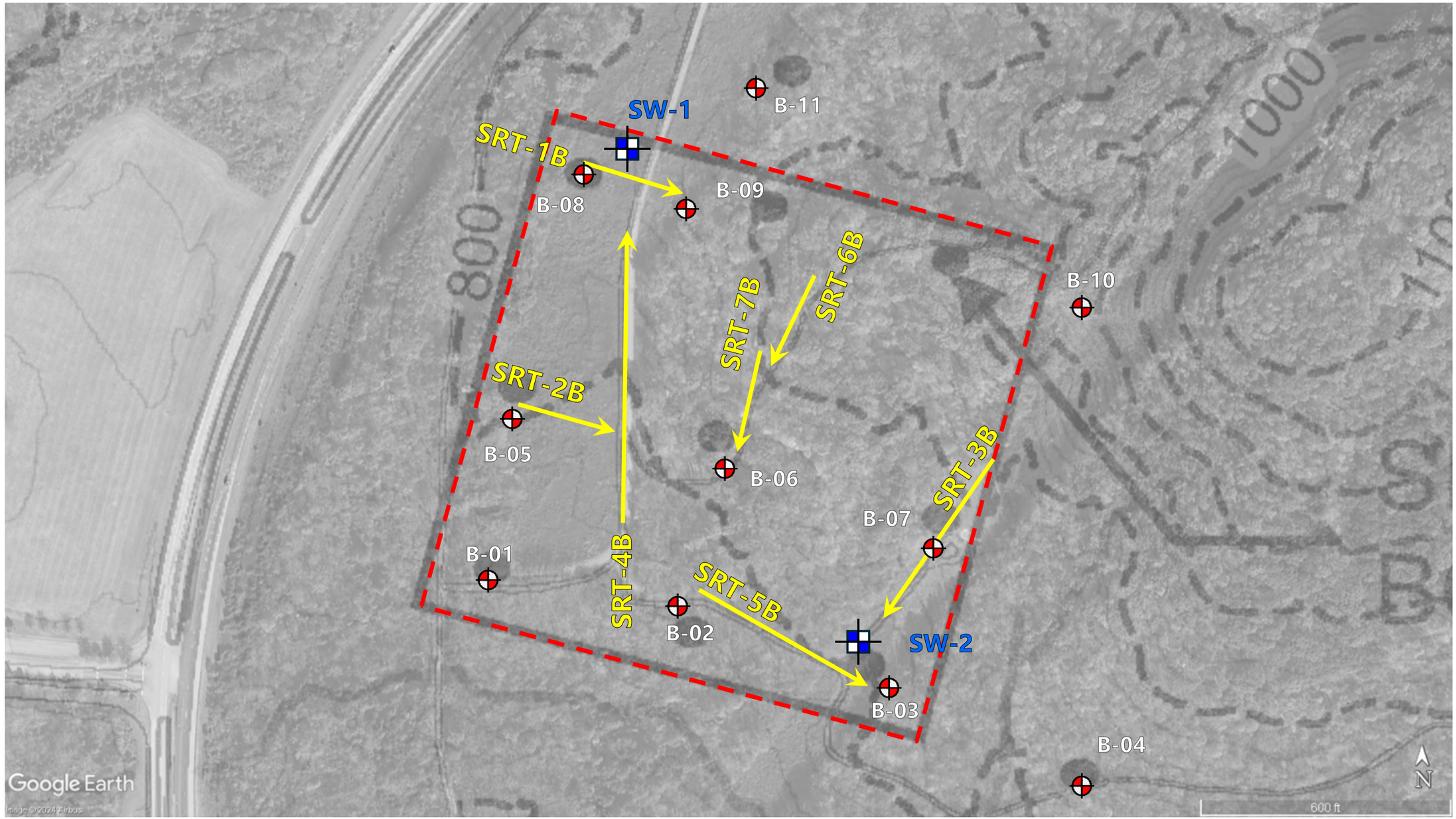
SCALE: AS SHOWN

DATE: 3/24/2025

PROJECT NUMBER 24430185A

FIGURE NO. 9

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Seismic Refraction Profile | Boring Location (S&ME; 2024) | Surface Waves Seismic | Requested Survey Area – Site B

SEISMIC REFRACTION SURVEY LOCATION PLAN – SITE B

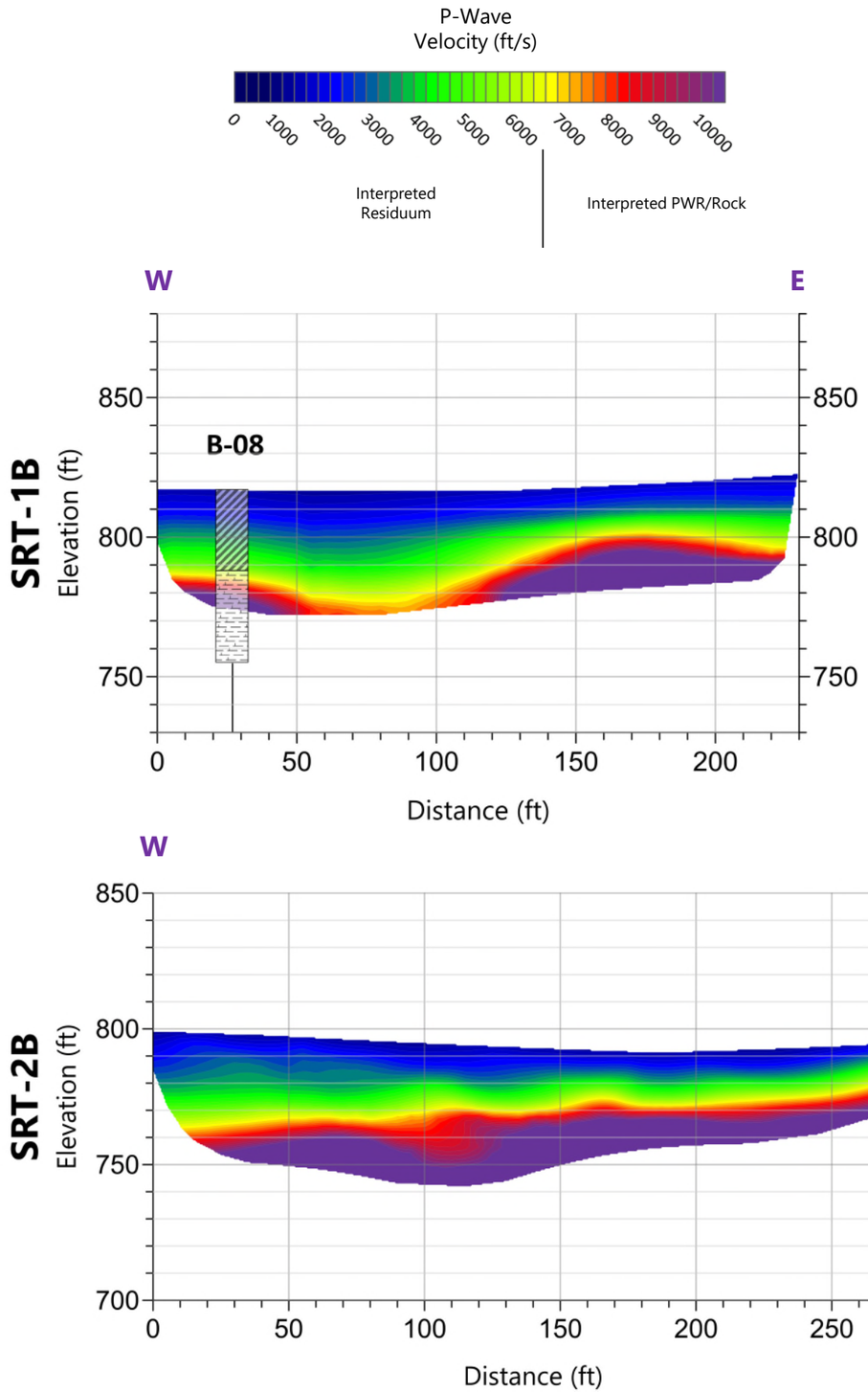
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

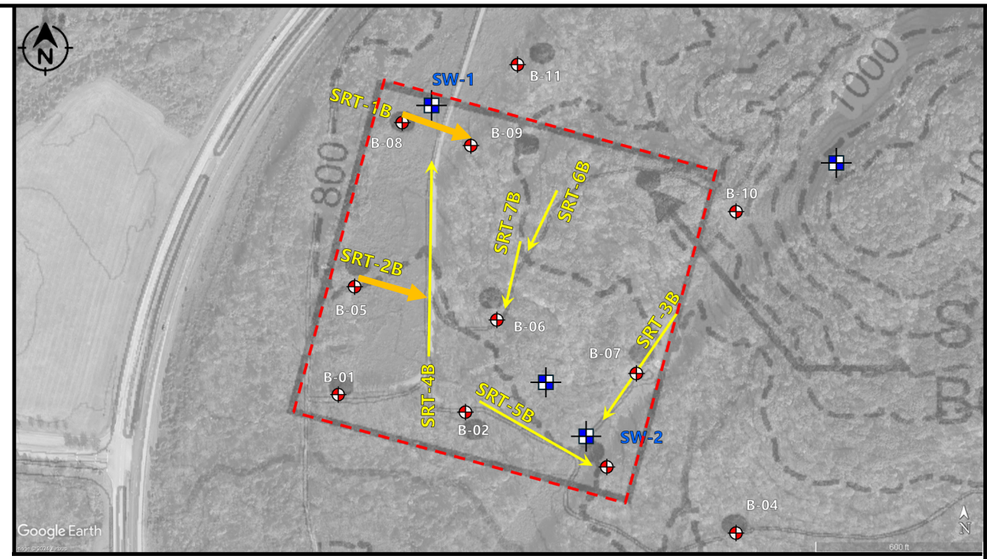
SCALE: AS SHOWN

DATE: 3/24/2025

PROJECT NUMBER: 24430185A

FIGURE NO.: **10**





REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

LEGEND

- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

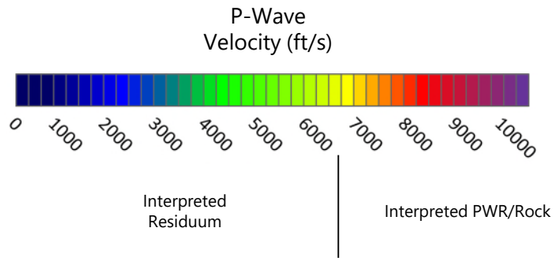
BORING LEGEND

- Residuum: Fat Clay /Fat Clay with Sand (CH)
- Calcareous Shale and Limestone – Weathered – poor to excellent quality

SEISMIC REFRACTION PROFILES – SITE B - LINES SRT-1 & SRT-2

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:	AS SHOWN
DATE:	3/24/2025
PROJECT NUMBER	24430185A
FIGURE NO.	11

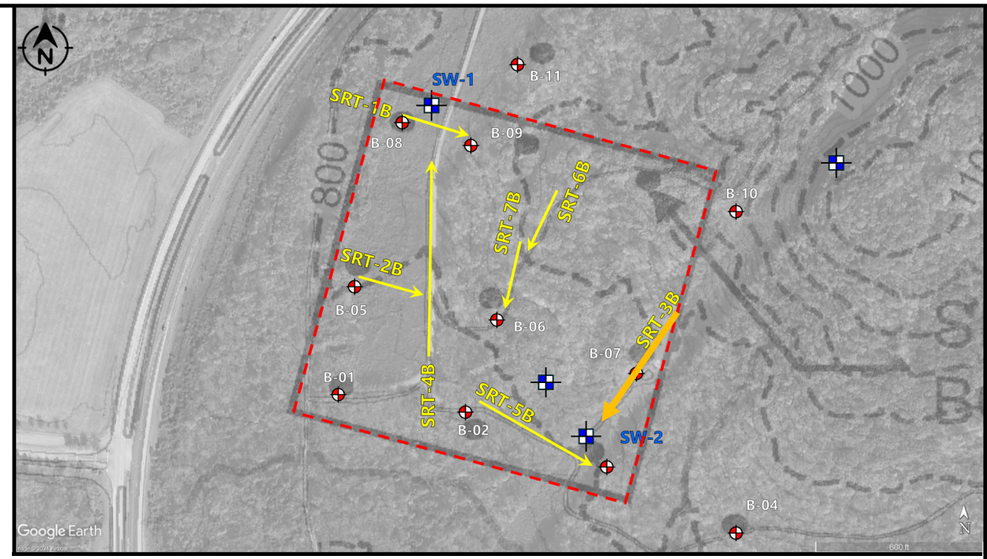


LEGEND

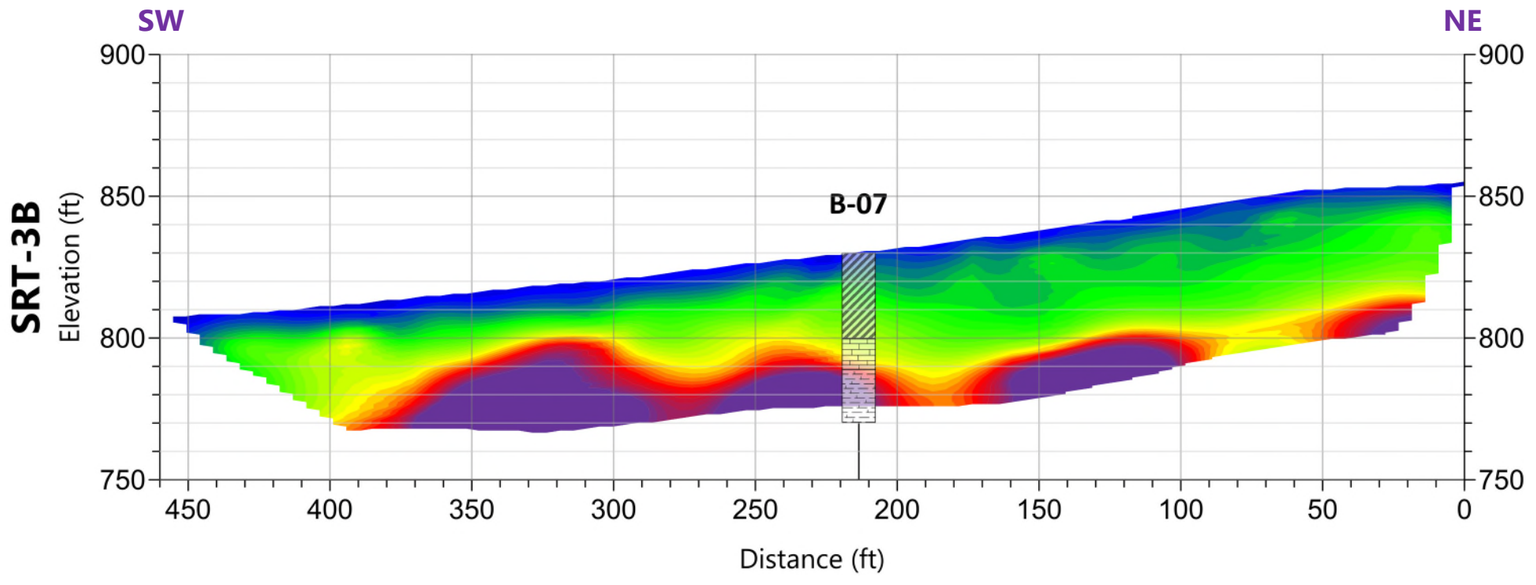
- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

BORING LEGEND

- Residuum: Fat Clay /Fat Clay with Sand (CH)
- Calcareous Shale and Limestone – Weathered – poor to fair quality
- Limestone – Weathered – very poor quality



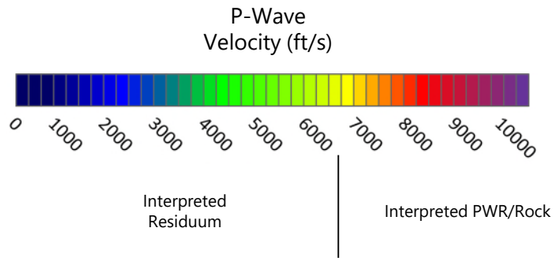
REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



SEISMIC REFRACTION PROFILES – SITE B - LINE SRT-3

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:	AS SHOWN
DATE:	3/24/2025
PROJECT NUMBER	24430185A
FIGURE NO.	12

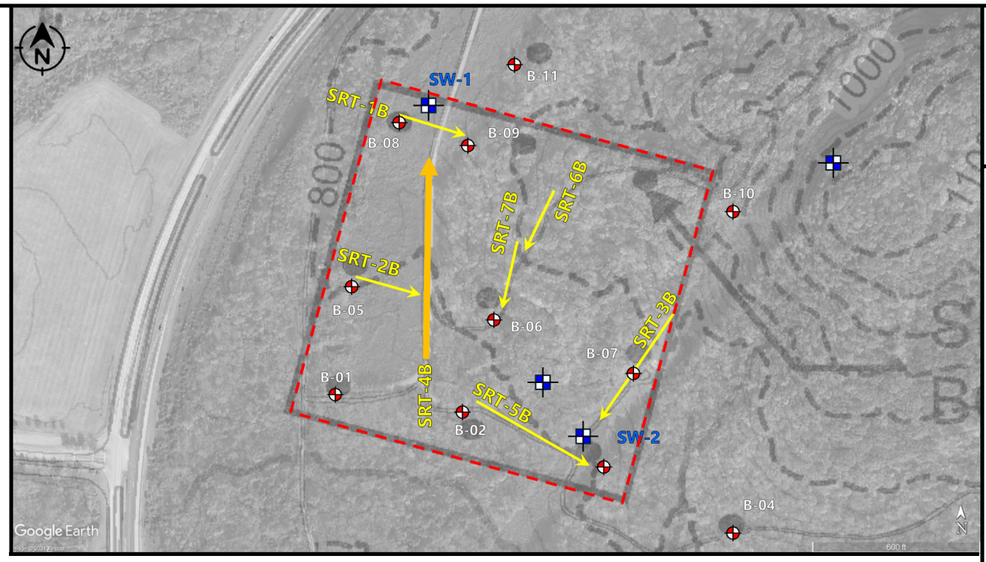


LEGEND

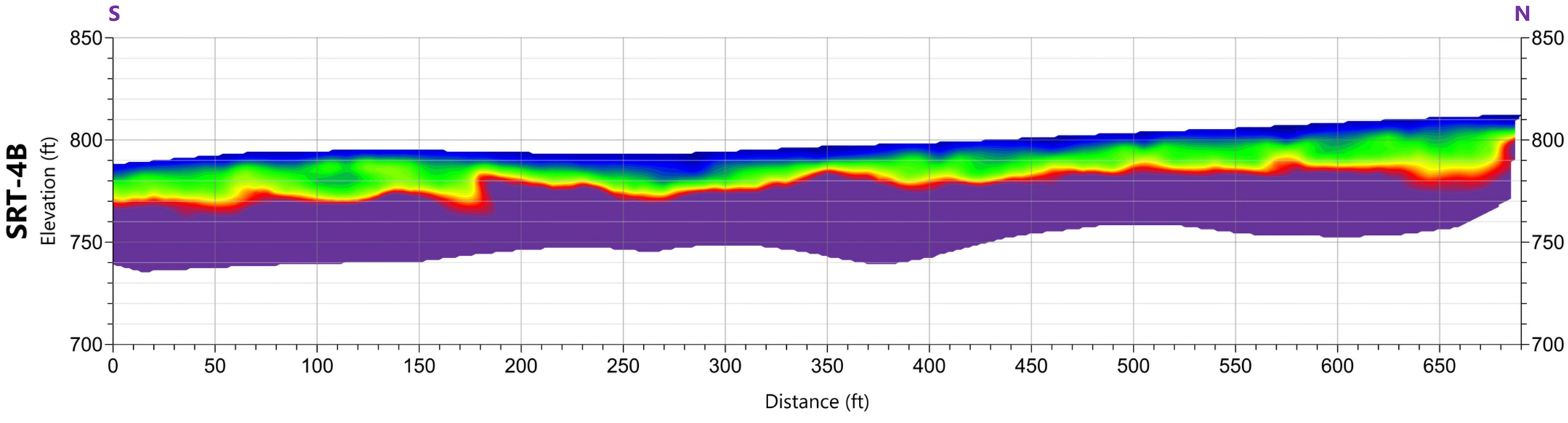
Seismic Refraction Profile

Boring Location (S&ME; 2024)

Surface Waves Seismic



REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



SEISMIC REFRACTION PROFILES – SITE B - LINE SRT-4

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

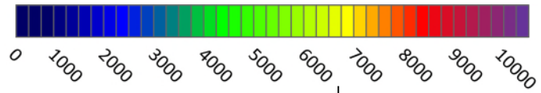
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
13

P-Wave
Velocity (ft/s)



Interpreted Residuum

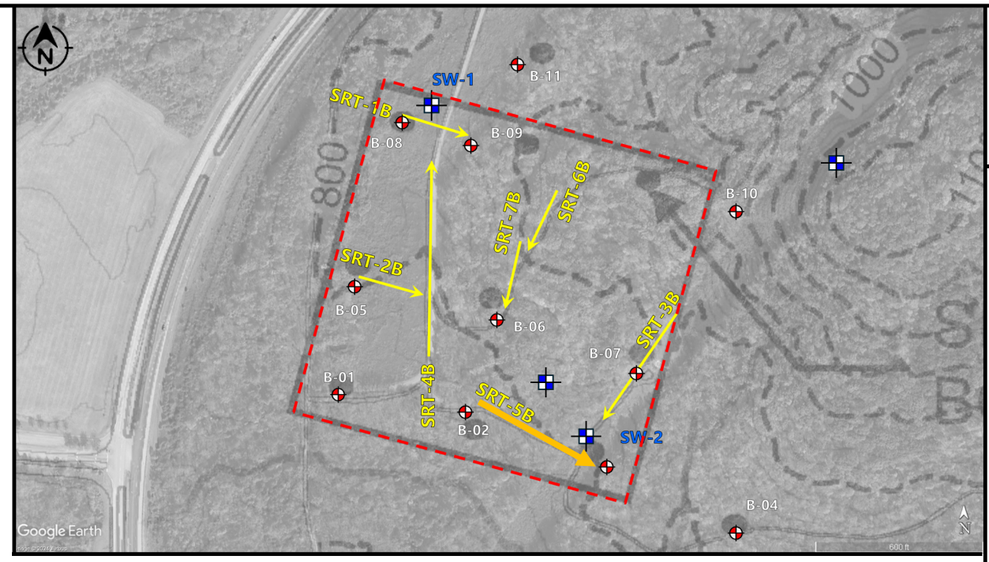
Interpreted PWR/Rock

LEGEND

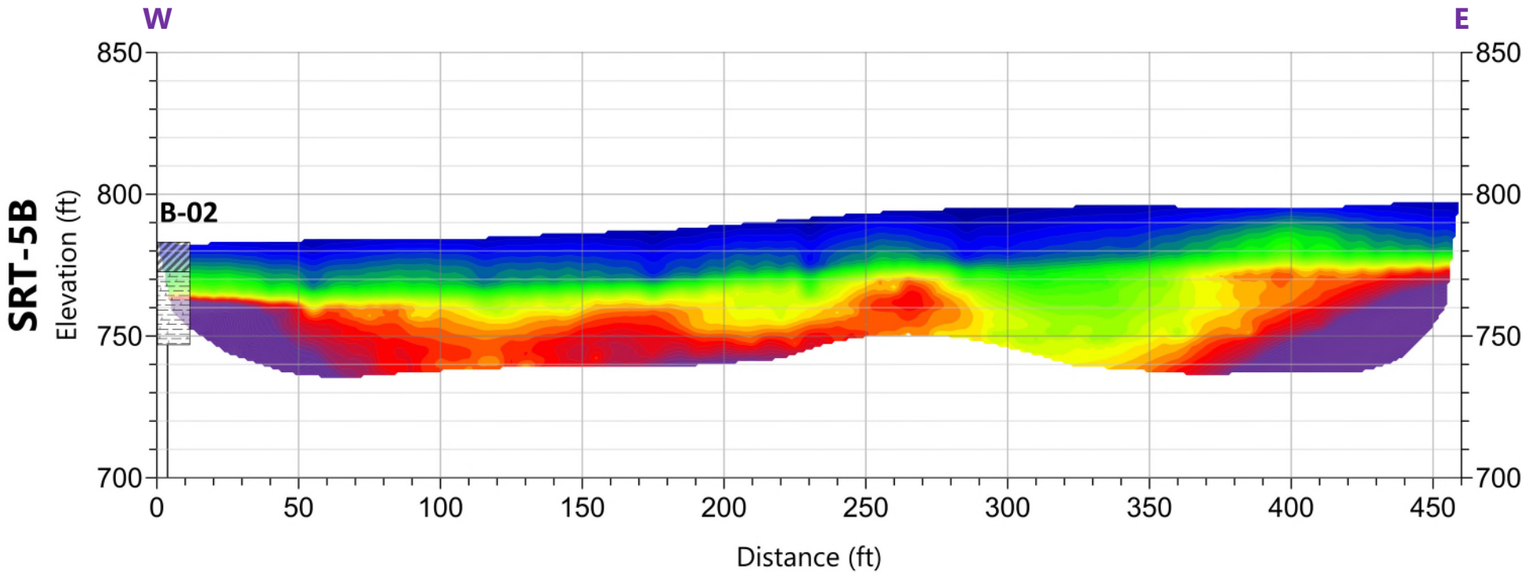
- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

BORING LEGEND

- Residuum: Fat Clay /Fat Clay with Sand (CH)
- Calcareous Shale and Limestone – Weathered – poor to excellent quality



REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

SEISMIC REFRACTION PROFILES – SITE B - LINE SRT-5

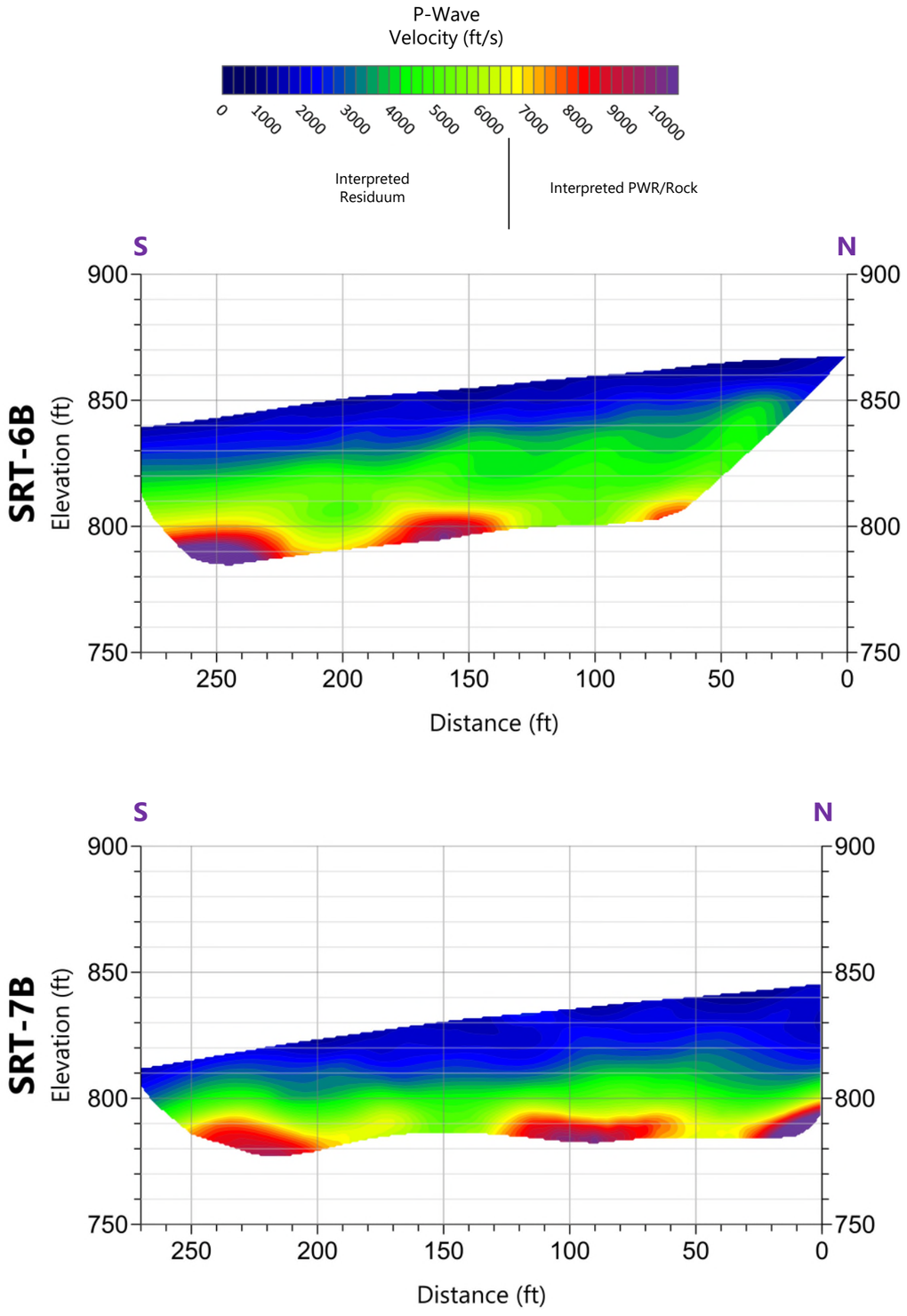
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

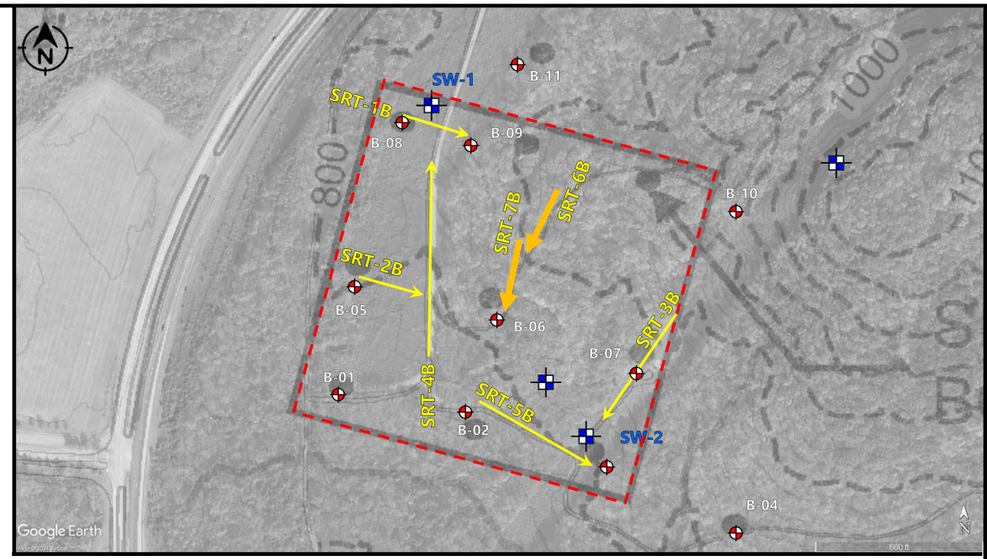
SCALE: AS SHOWN

DATE: 3/24/2025

PROJECT NUMBER: 24430185A

FIGURE NO.: 14





REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

LEGEND

- Seismic Refraction Profile
- Boring Location (S&ME; 2024)
- Surface Waves Seismic

SEISMIC REFRACTION PROFILES – SITE B - LINES SRT-6 & SRT-7

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN

DATE: 3/24/2025

PROJECT NUMBER 24430185A

FIGURE NO. 15

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

Boring Location (S&ME; 2024)

Seismic Refraction Profile

SURVEY LOCATION PLAN

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

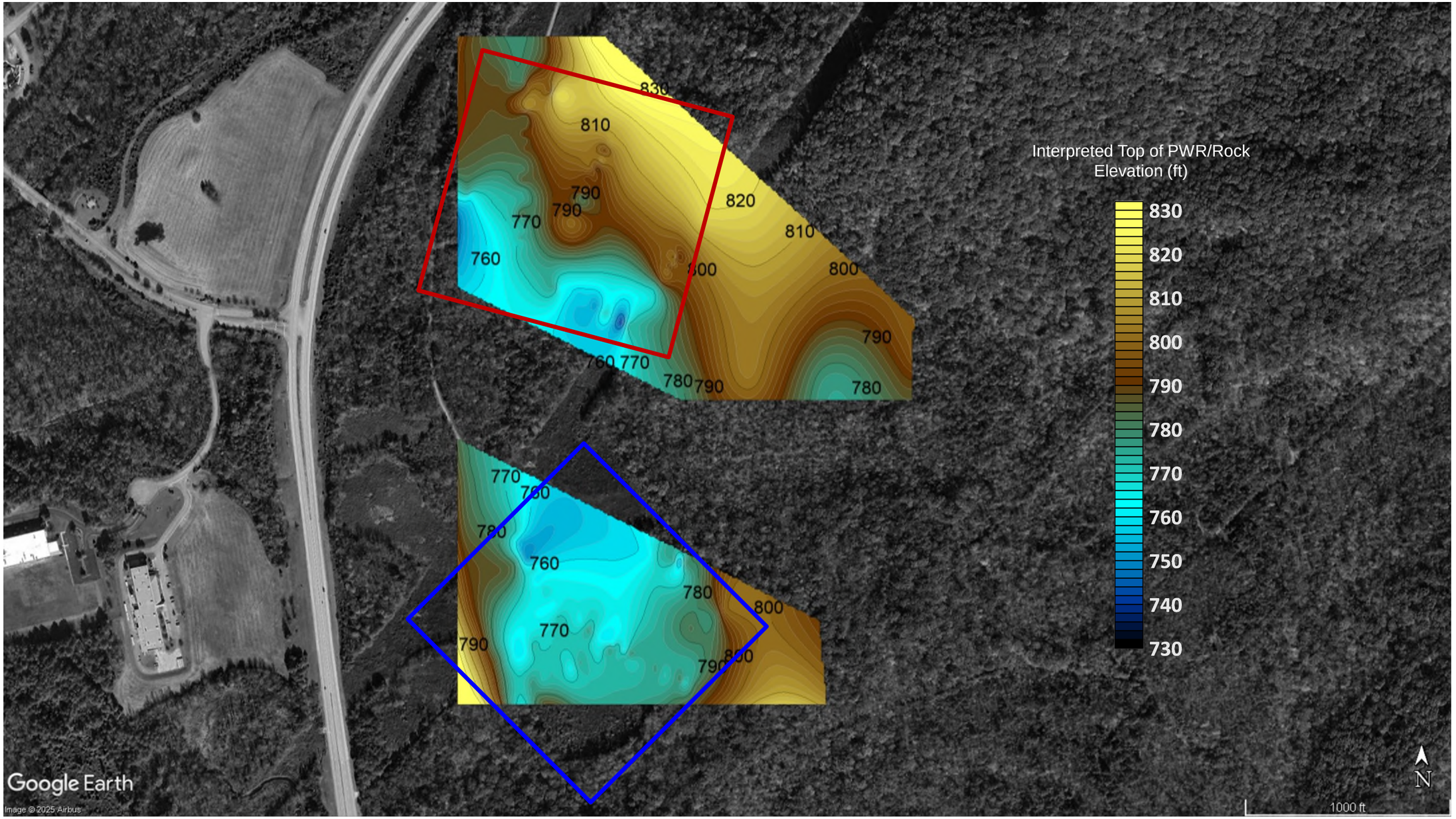
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
16

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

INTERPRETED TOP OF PWR/ROCK - ELEVATION

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

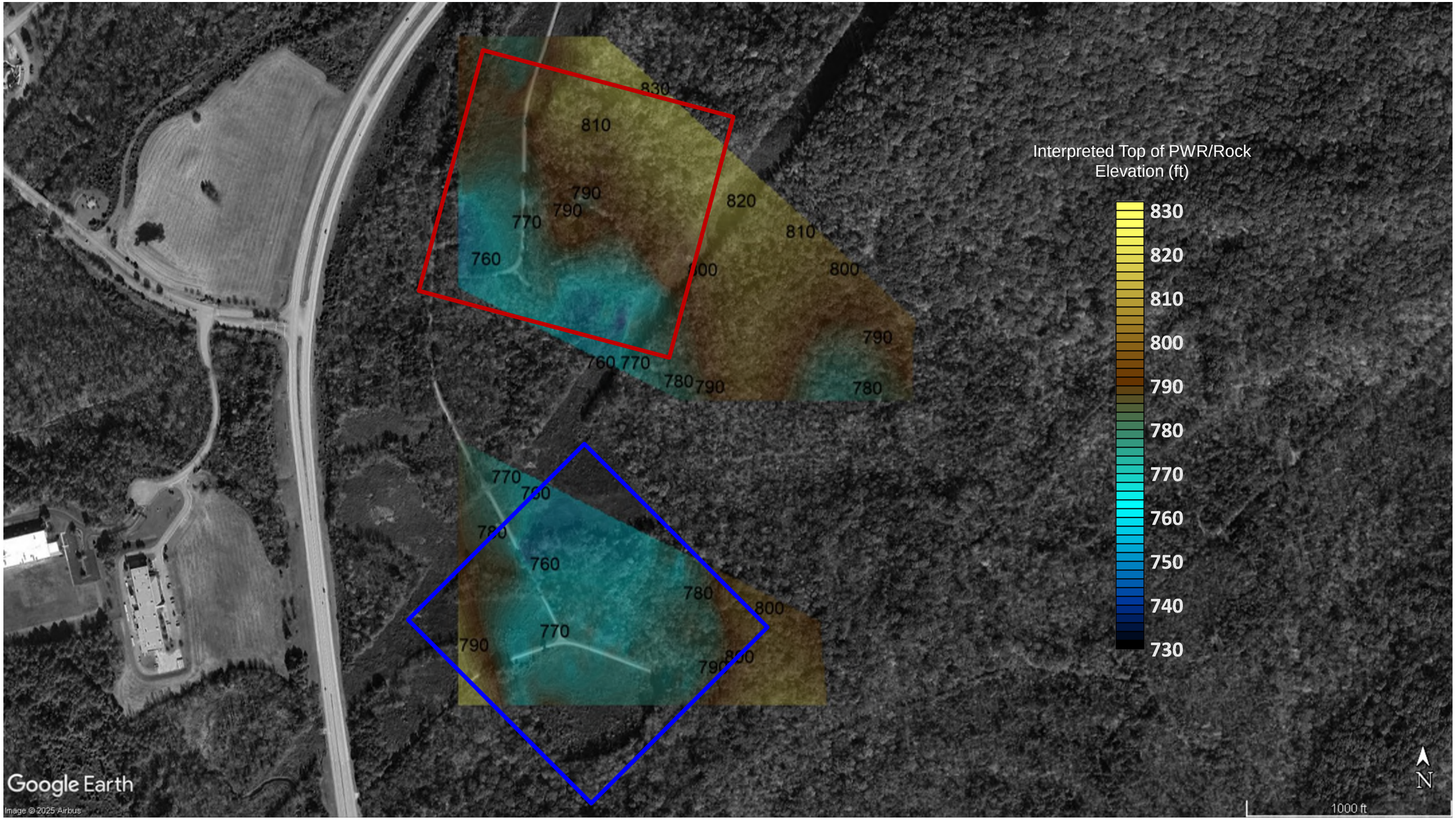
SCALE: AS SHOWN

DATE: 3/24/2025

PROJECT NUMBER 24430185A

FIGURE NO. 17

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

INTERPRETED TOP OF PWR/ROCK - ELEVATION

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

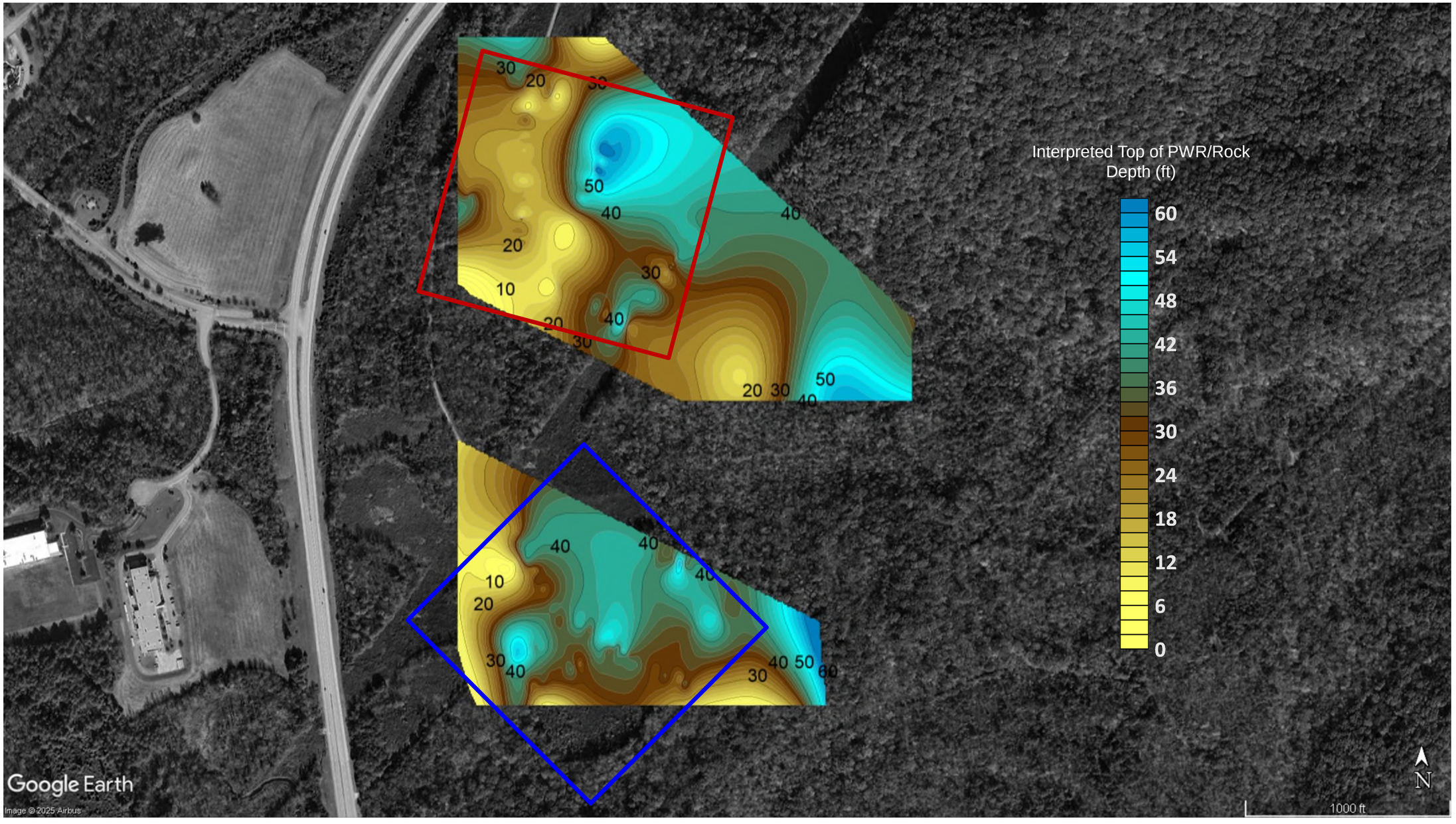
SCALE: AS SHOWN

DATE: 3/24/2025

PROJECT NUMBER 24430185A

FIGURE NO. **18**

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

INTERPRETED TOP OF PWR/ROCK - DEPTH

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

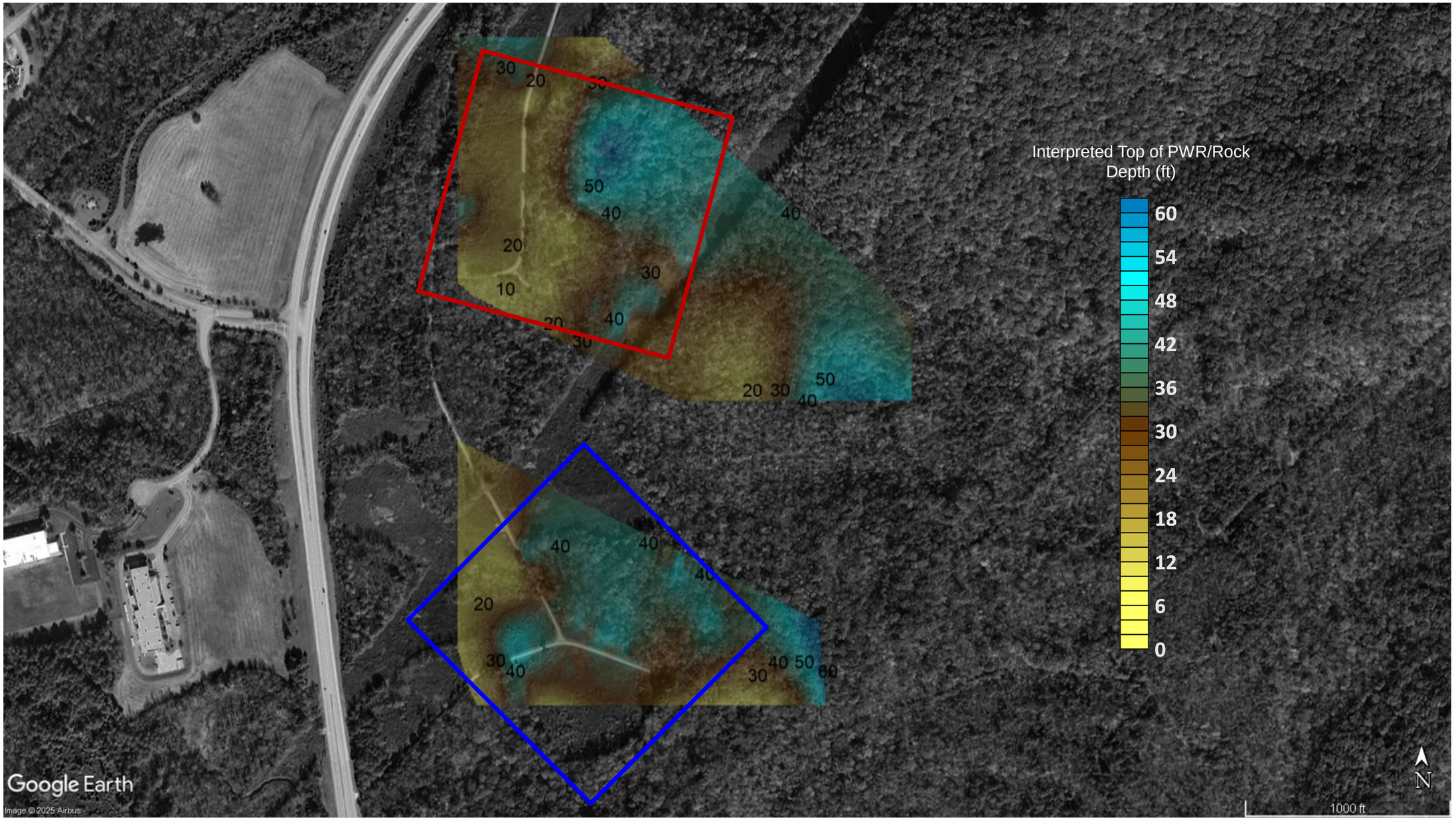
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
19

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

INTERPRETED TOP OF PWR/ROCK - DEPTH

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

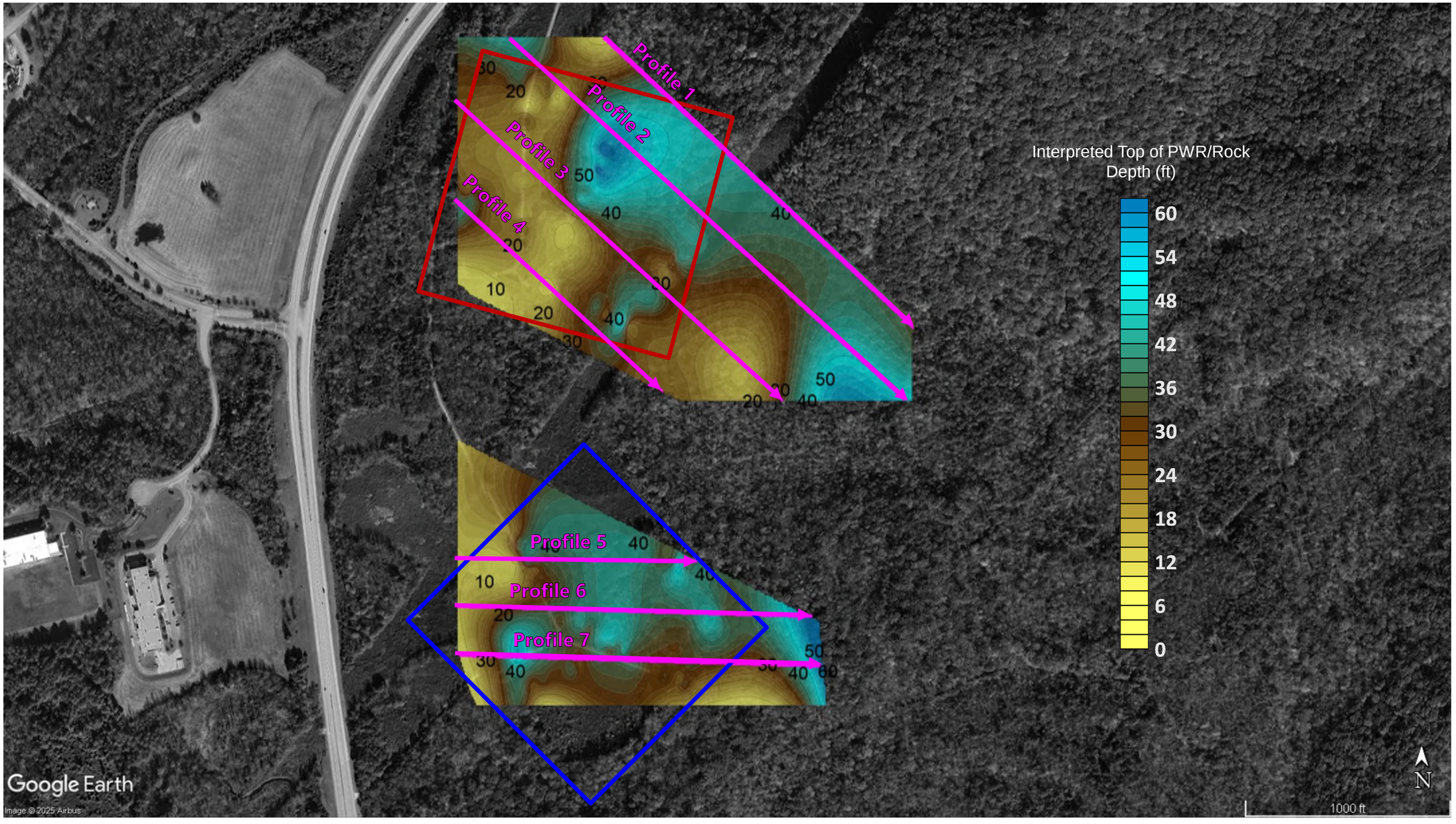
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
20

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Requested Survey Area – Site A

Requested Survey Area – Site B

Interpreted TOR Profile

INTERPRETED TOP OF PWR/ROCK - DEPTH

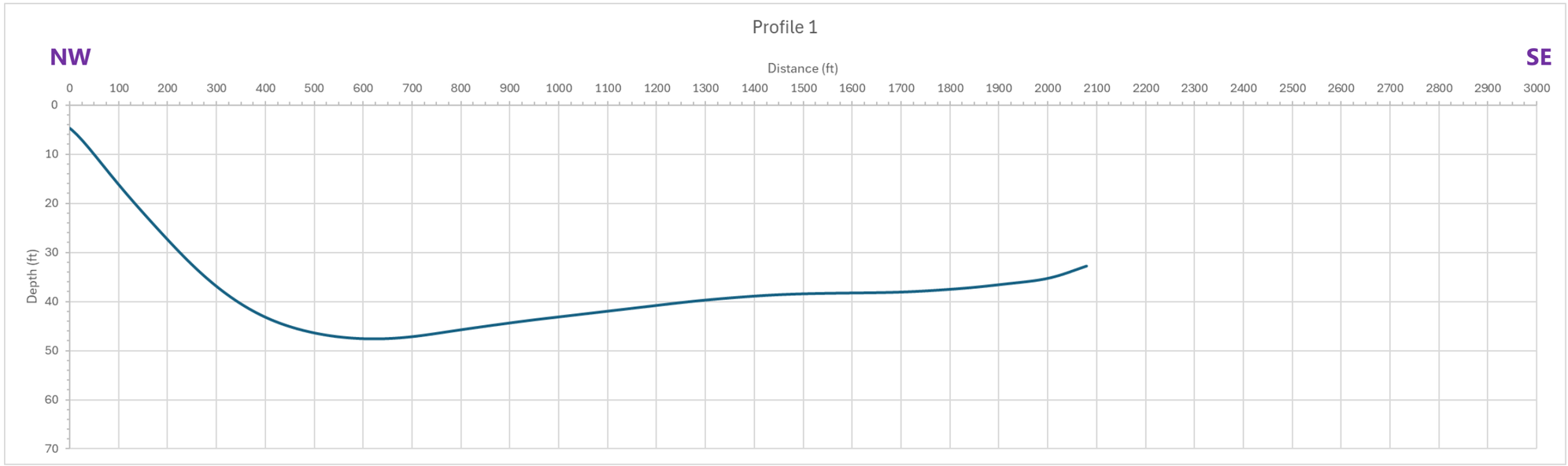
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

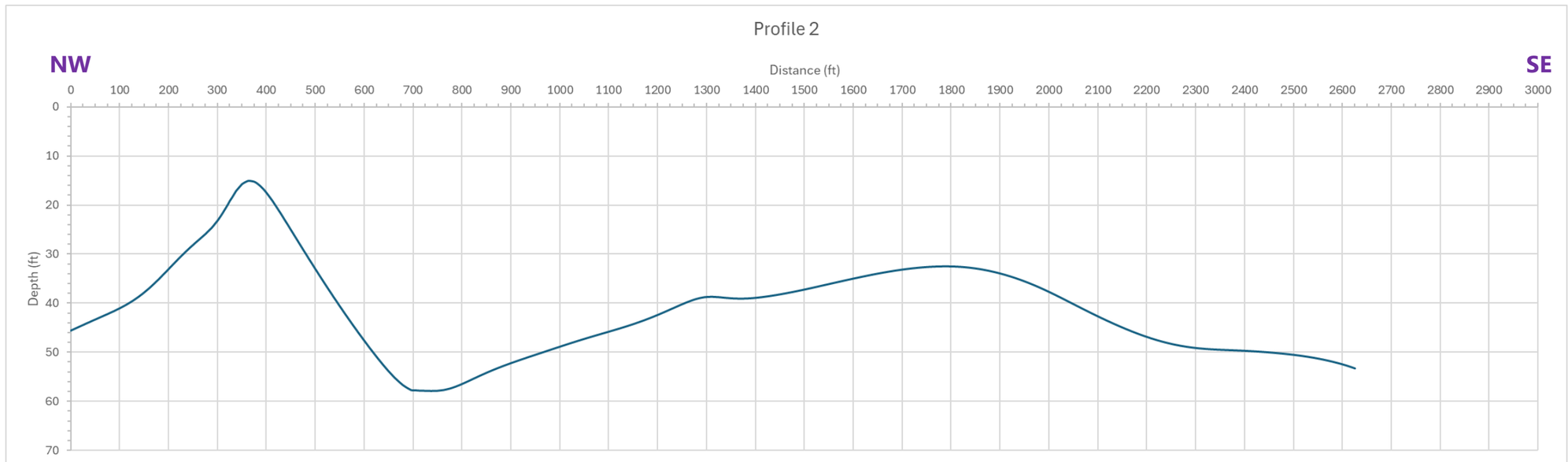
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
21





INTERPRETED TOP OF PWR/ROCK – DEPTH PROFILES 1 & 2

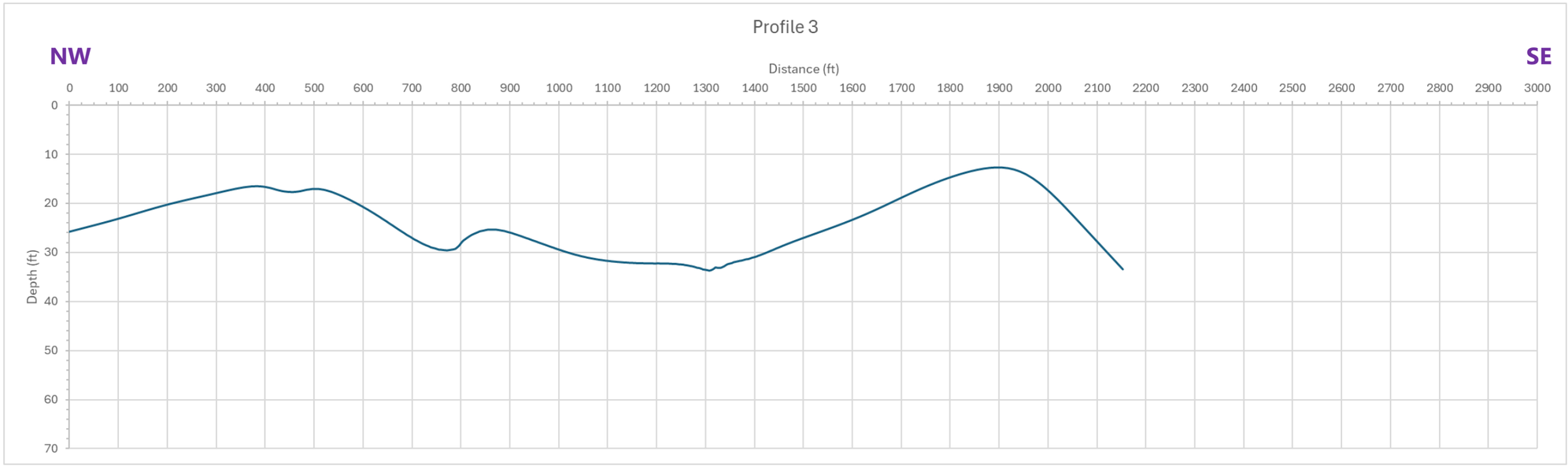
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

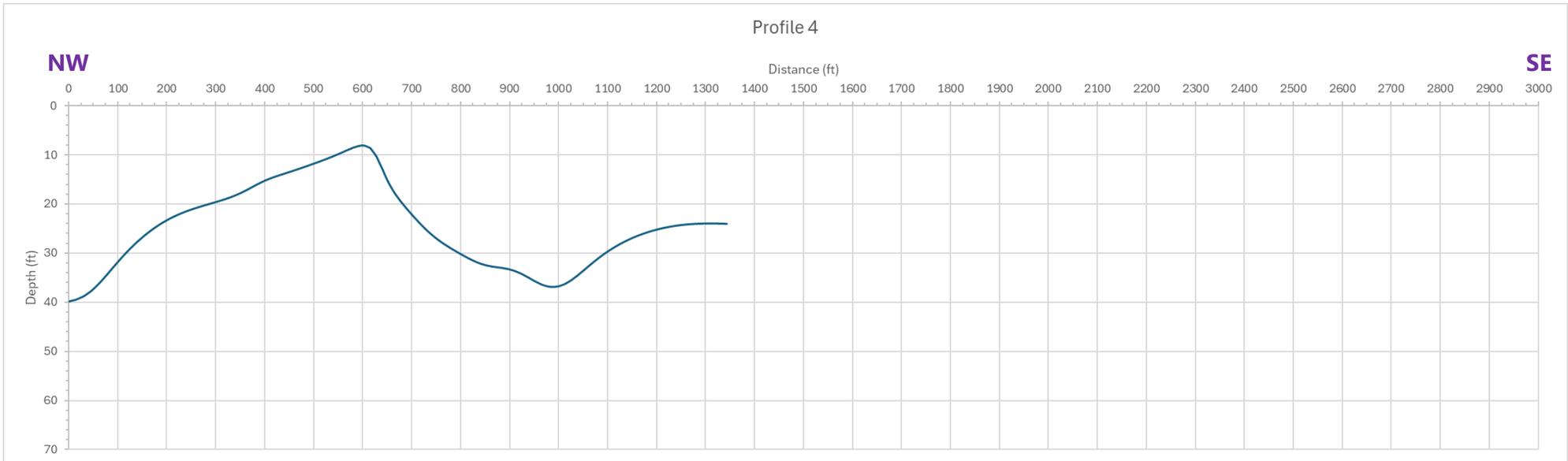
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
22





INTERPRETED TOP OF PWR/ROCK – DEPTH PROFILES 3 & 4

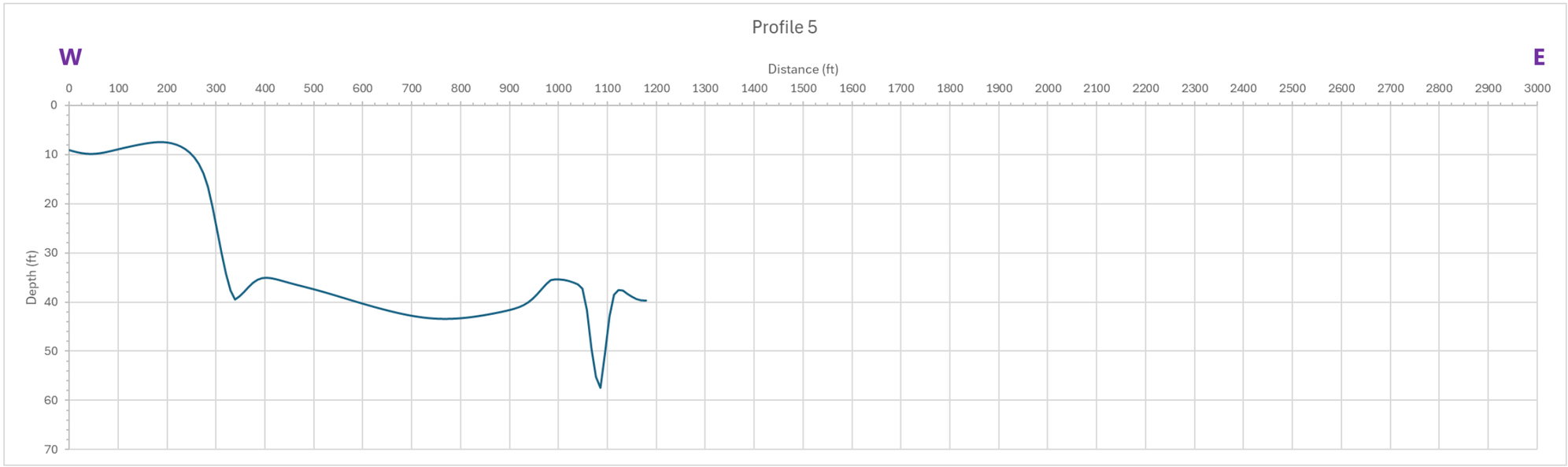
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

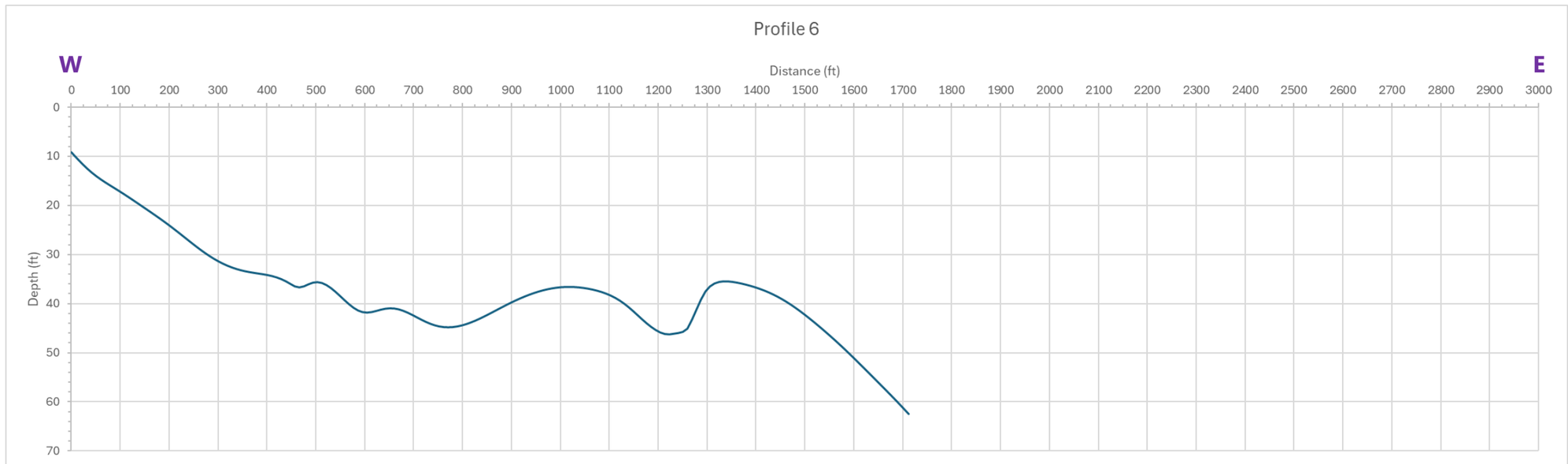
SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
23





INTERPRETED TOP OF PWR/ROCK – DEPTH PROFILES 5 & 6

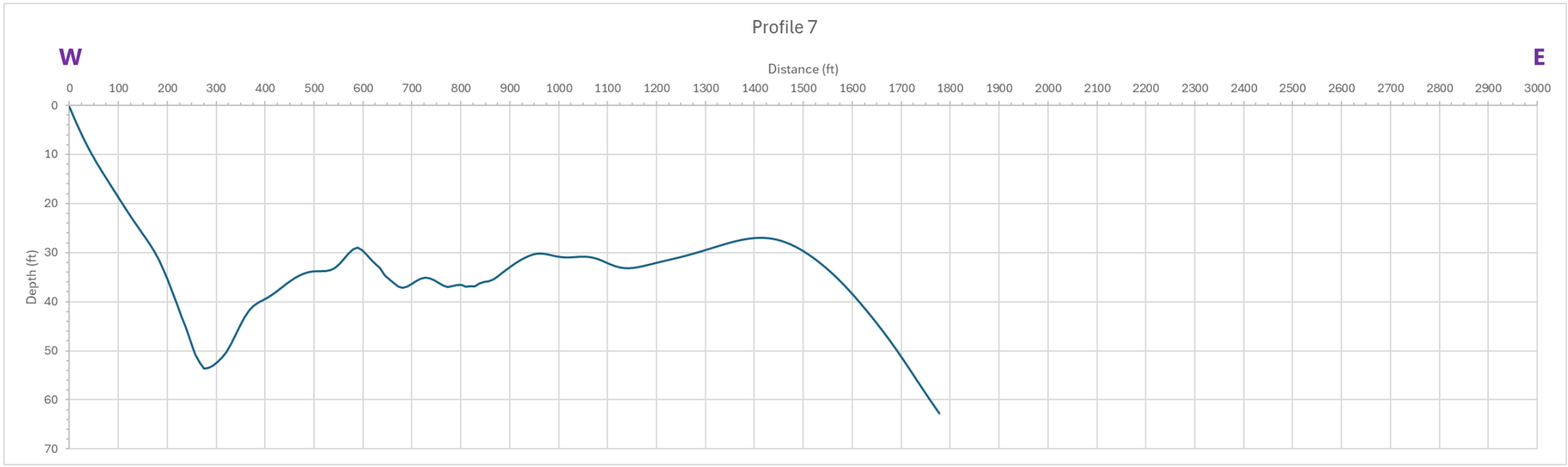
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
24



INTERPRETED TOP OF PWR/ROCK – DEPTH PROFILE 7

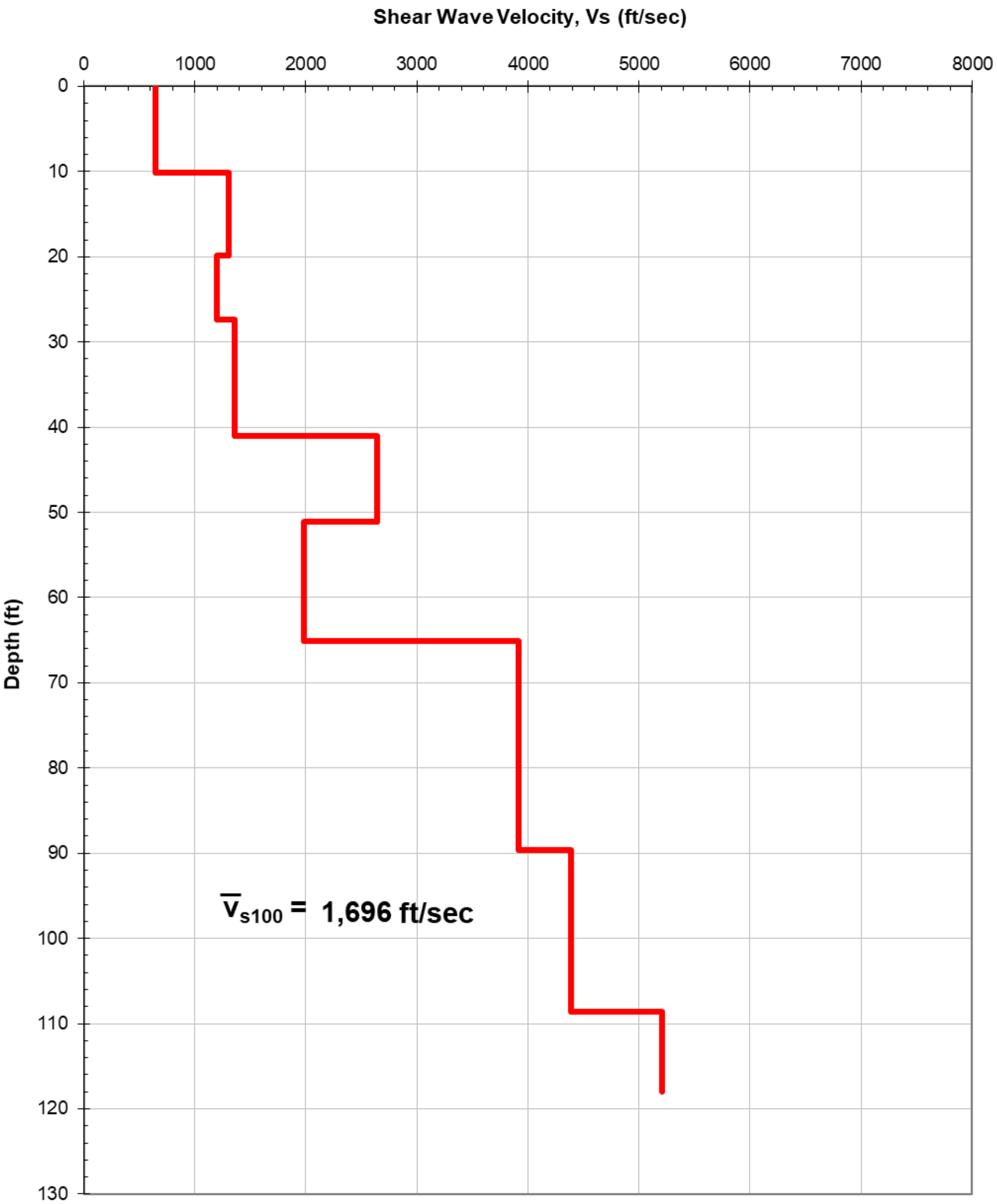
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:
AS SHOWN

DATE:
3/24/2025

PROJECT NUMBER
24430185A

FIGURE NO.
25

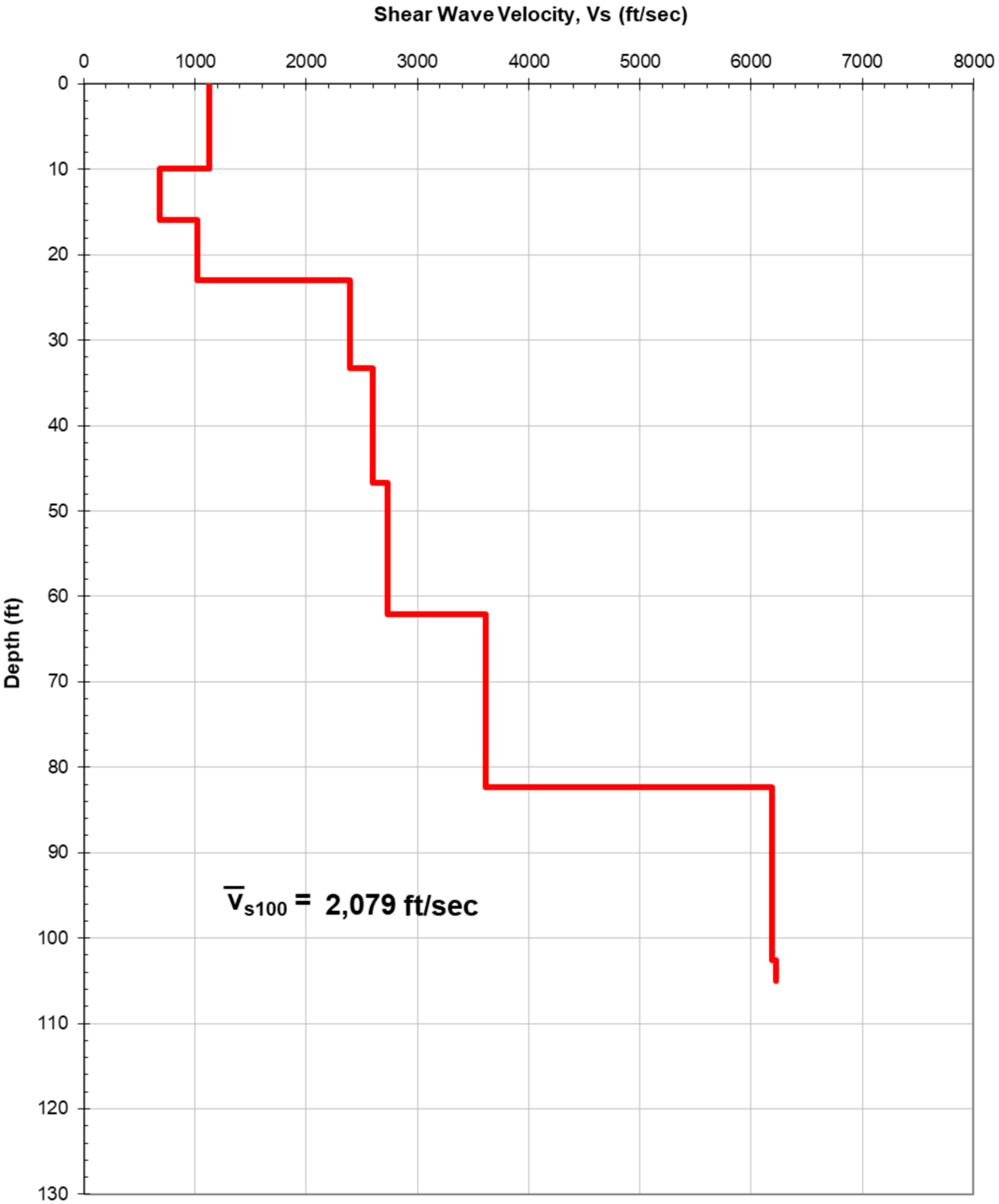


SHEAR WAVE VELOCITY PROFILE – SITE B - SW-1

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN
DATE: 3/24/2025
PROJECT NUMBER 24430185A

FIGURE NO. 26

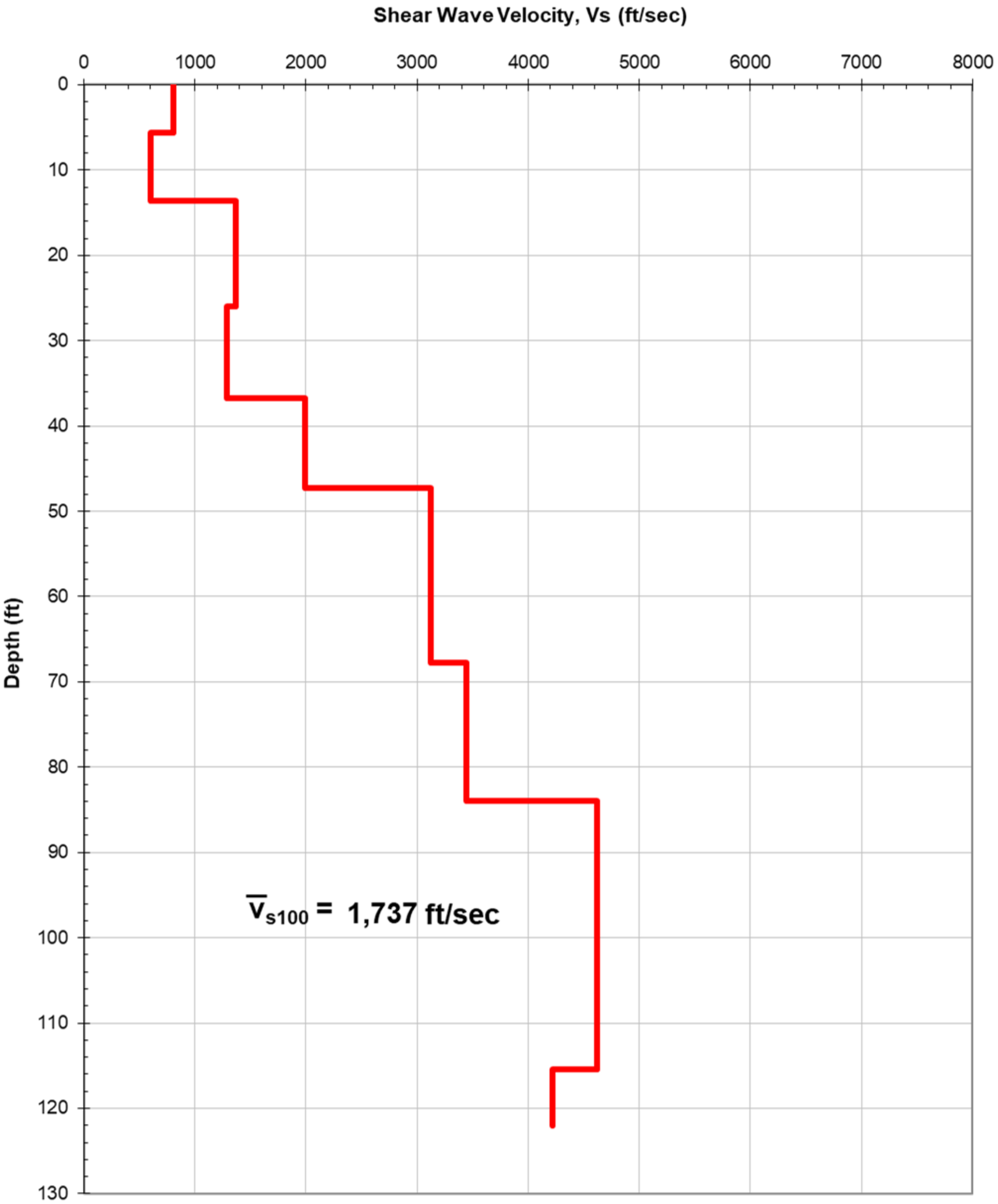


SHEAR WAVE VELOCITY PROFILE – SITE B - SW-2

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN
DATE: 3/24/2025
PROJECT NUMBER 24430185A

FIGURE NO. 27

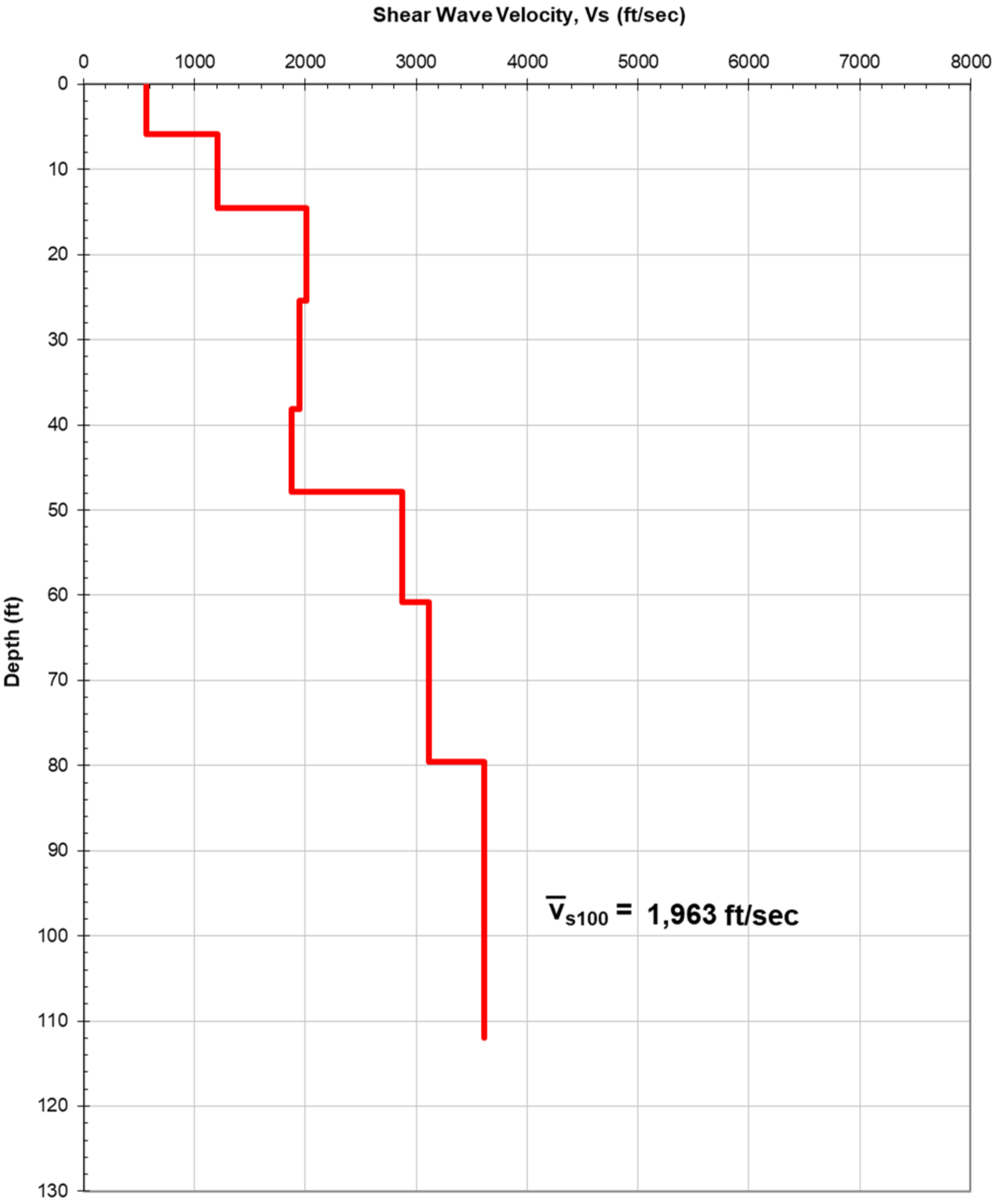


SHEAR WAVE VELOCITY PROFILE – SITE A - SW-3

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN
DATE: 3/24/2025
PROJECT NUMBER 24430185A

FIGURE NO. **28**

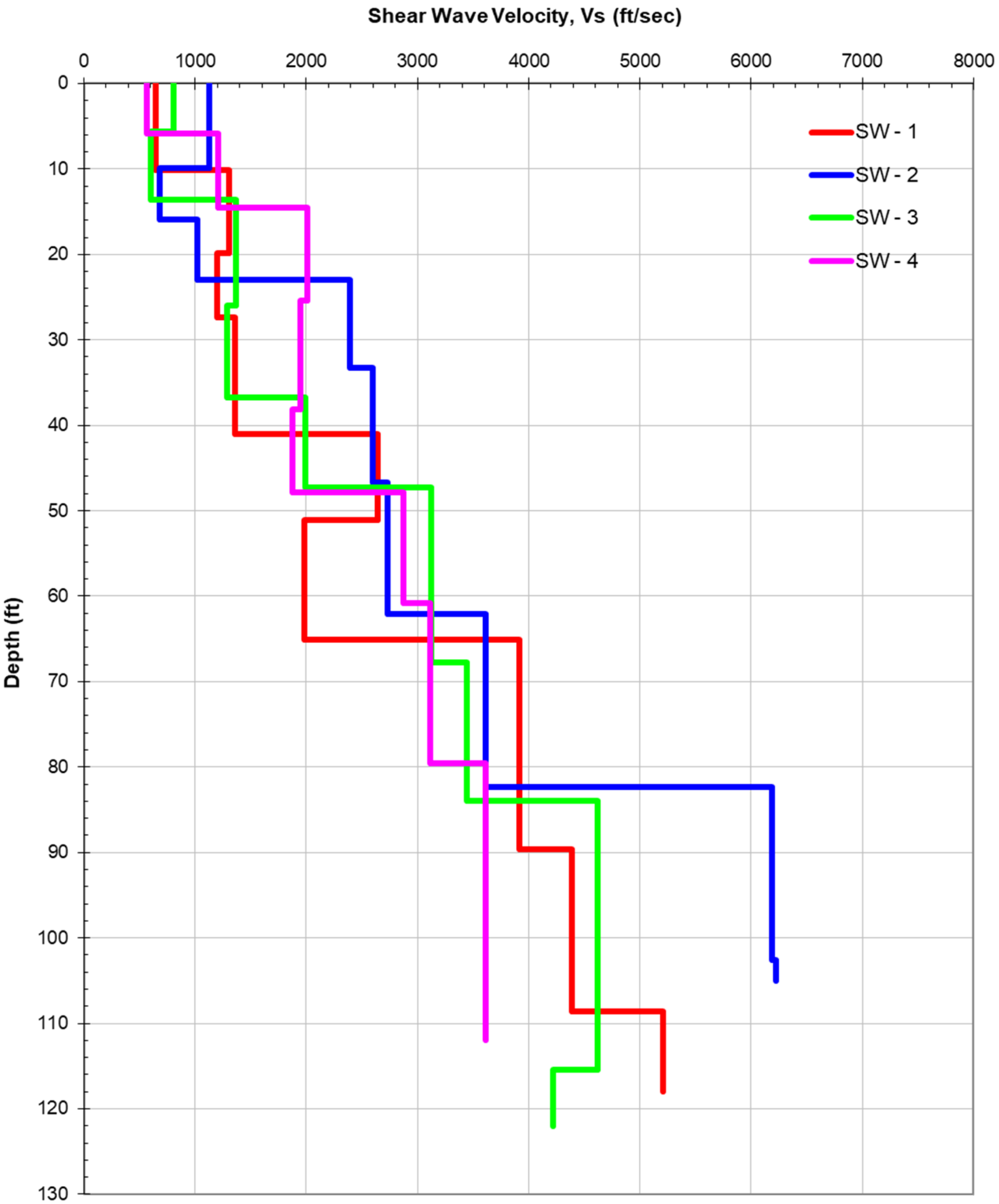


SHEAR WAVE VELOCITY PROFILE – SITE A - SW-4

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN
DATE: 3/24/2025
PROJECT NUMBER 24430185A

FIGURE NO. 29



COMBINED SHEAR WAVE VELOCITY PROFILES

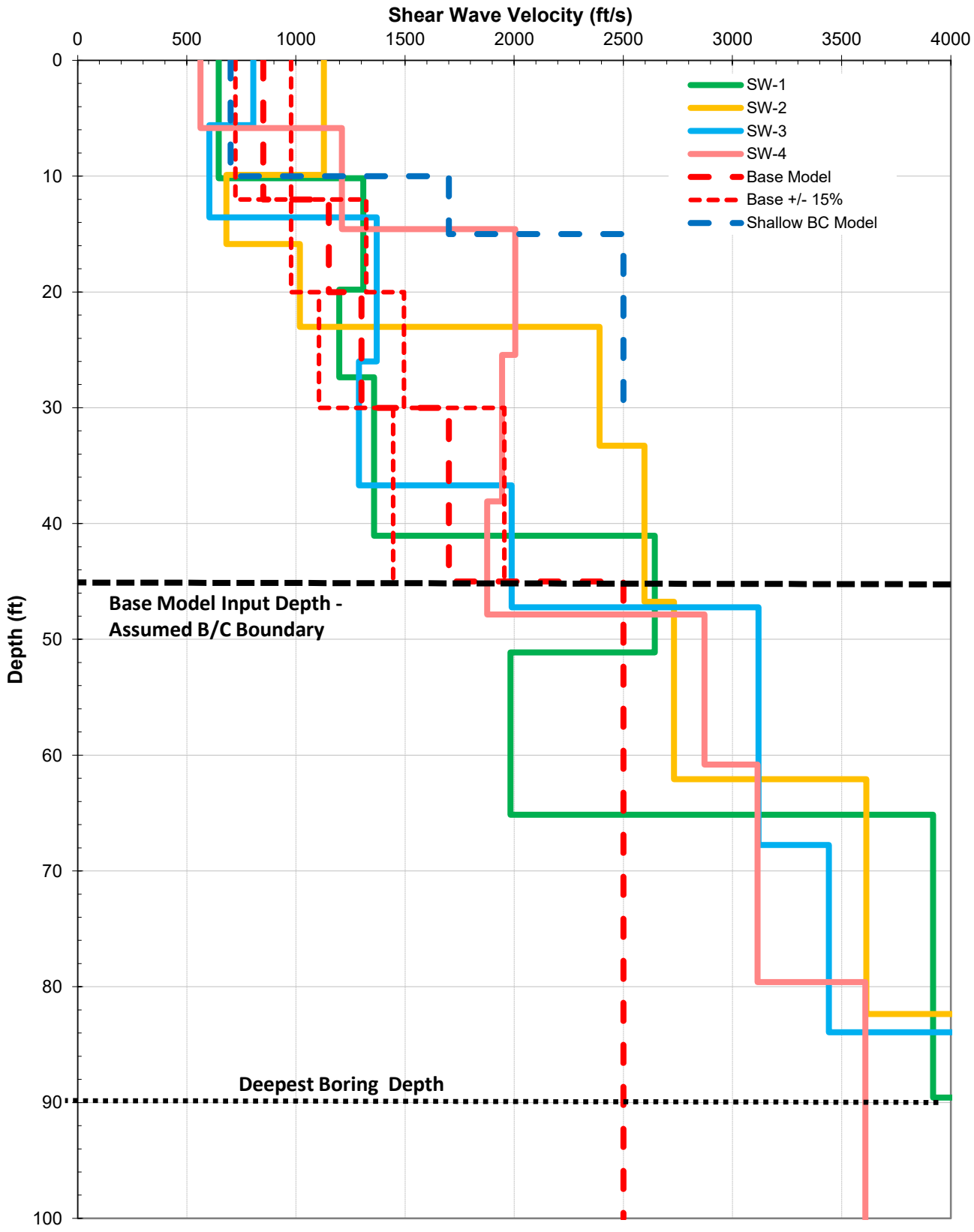
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE: AS SHOWN

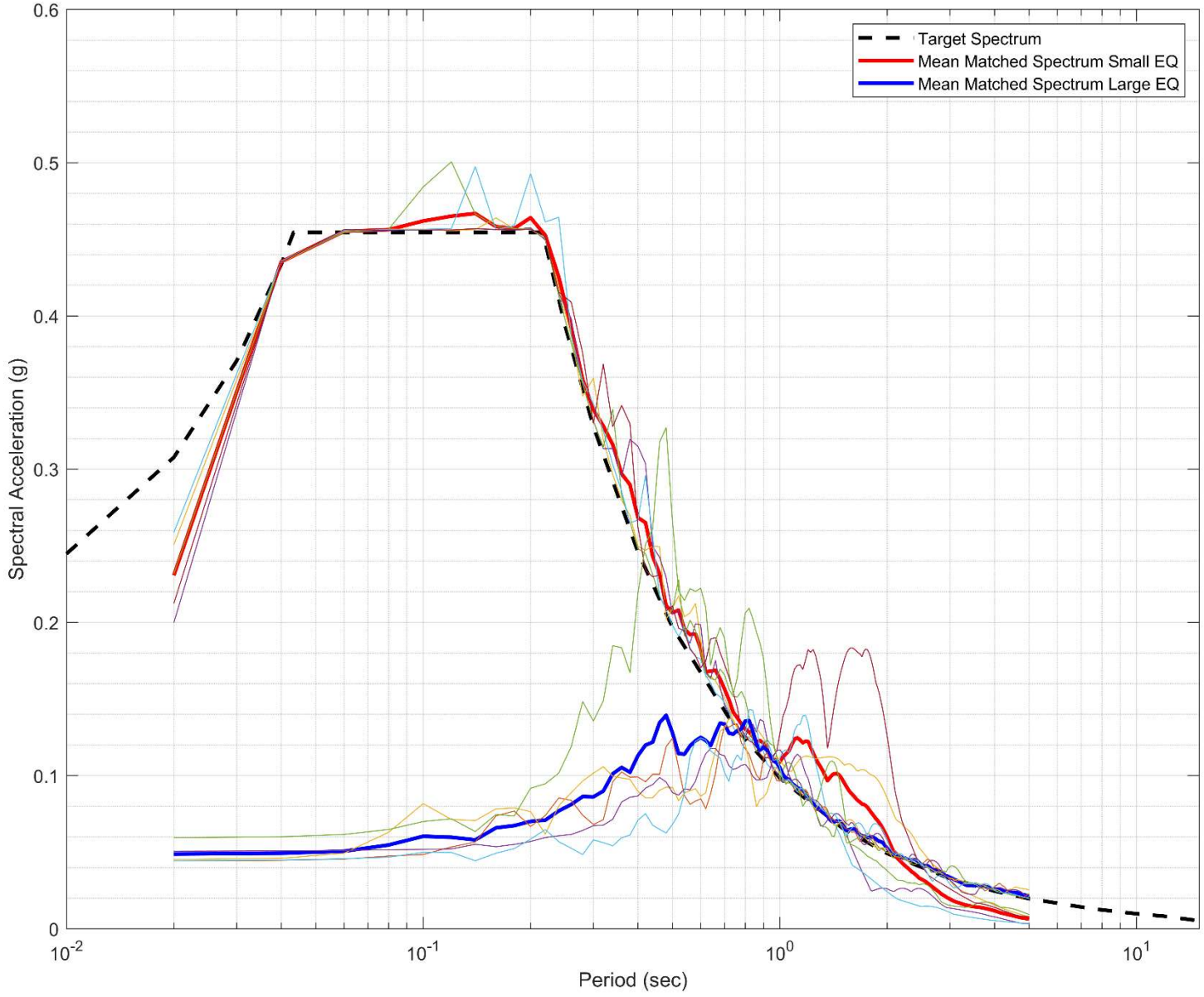
DATE: 3/24/2025

PROJECT NUMBER 24430185A

FIGURE NO. **30**



	SHEAR WAVE VELOCITY PROFILES	DATE: 3-4-2025	FIGURE NO. A-1
	SELF SUFFICIENCY PARCEL 2 OAK RIDGE, TENNESSEE	PROJECT NUMBER 24430185A	



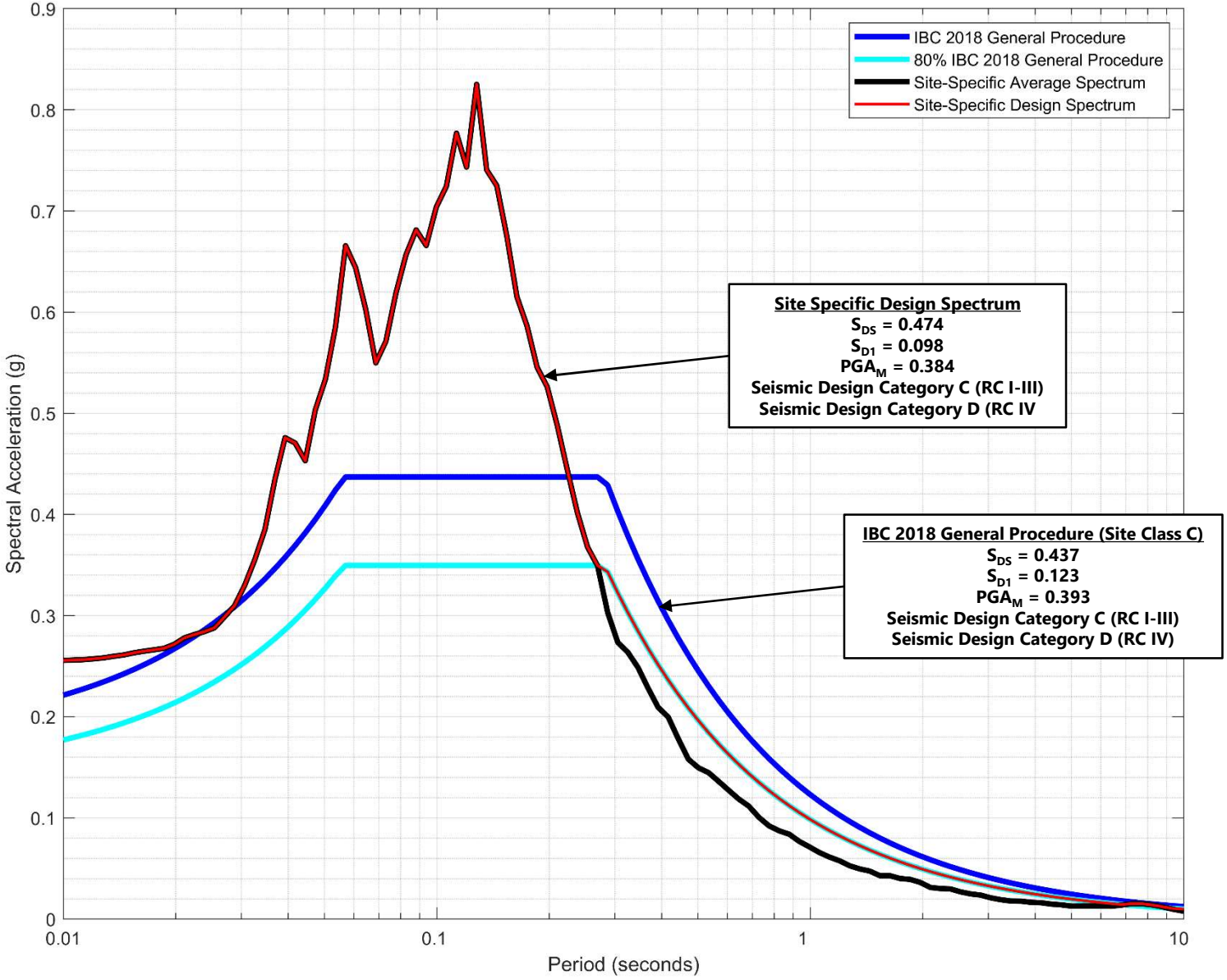
SPECTRALLY MATCHED RECORDED MOTIONS
B/C BOUNDARY

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

DATE: 3-4-2025

PROJECT NUMBER 24430185A

FIGURE NO. A-2



DESIGN ACCLERATION RESPONSE SPECTRA AT GROUND SURFACE
1% PROBABILTY OF STRUCTURAL COLLAPSE IN 50 YEARS, 5% DAMPING

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

DATE: 3-4-2025

PROJECT NUMBER 24430185A

FIGURE NO. A-3

Appendix II – Tables

Table 1 – Boring Summary Site A

Boring Number	Drill Rig Type	Hammer Type	Depth (ft)		As-Drilled Coordinates and Elevations [1]			Test/SampleType(s)		
			Proposed	Actual R=Refusal T=Terminate	Lattitude	Longitude	Ground Surface Elevation (ft)	SPT [2]	UD [3]	Rock Coring
A-01	Diedrich D-50	Automatic	Refusal+Core	30.7 R 63.7 T	35.949856	-84.358167	811	X		X
A-01A	Diedrich D-50	Automatic	Target	28.0 T	35.949956	-84.358214	811		X	
A-02	CME 550	Automatic	Refusal	32.2 R	35.949722	-84.360000	814	X		
A-02A	CME 550	Automatic	Refusal+Core	14.8 R 46.0 T	35.949722	-84.359720	793			X
A-03	CME 550	Automatic	Refusal	34.4 R	35.950792	84.358944	813	X		
A-03A	CME 550	Automatic	Refusal+Core	33.0 R 65.0 T	35.950781	-84.358925	810			X
A-04	CME 550	Automatic	Refusal+Core	11.9 R 43.9 T	35.951667	-84.360128	801	X		X
A-04A	CME 550	Automatic	Target	10.0 T	35.951111	-84.360114	801		X	
A-05	Diedrich D-50	Automatic	Refusal+Core	17.1 R 49.7 T	35.949933	-84.356008	805	X		X
A-06	Diedrich D-50	Automatic	Refusal+Core	33.1 R 65.3 T	35.951908	-84.358514	803	X		X
A-07	Diedrich D-50	Automatic	Refusal+Core	26.4 R 56.3 T	35.952569	-84.358719	830	X		X
A-07A	Diedrich D-50	Automatic	Target	20.2 T	35.952553	-84.358753	830		X	
A-08	Diedrich D-50	Automatic	Refusal+Core	15.9 R 46.9 T	35.953128	-84.360928	813	X		X
A-09	Diedrich D-50	Automatic	Refusal+Core	53.9 R 84.9 T	35.954056	-84.355011	860	X		X
A-09A	Diedrich D-50	Automatic	Target	32.0 T	35.954097	-84.355078	860		X	
A-10	Diedrich D-50	Automatic	Refusal+Core	59.1 R 89.9 T	35.950733	-84.355342	826	X		X
A-10A	Diedrich D-50	Automatic	Target	20.0 T	35.950775	-84.355303	826		X	
A-11	Diedrich D-50	Automatic	Refusal+Core	23.6 R 54.9 T	35.953986	-84.357439	832	X		X
A-12	Diedrich D-50	Automatic	Refusal+Core	43.9 R 74.8 T	35.954408	-84.353567	868	X		X
A-12A	Diedrich D-50	Automatic	Target	32.0 T	35.954456	-84.353597	870		X	

(1) Horizontal/Vertical Datum: Tennessee State Plane Coordinates NAD 1983 / NAVD 1988; located using hand held commercial grade GPS, submeter accuracy

(2) SPT - Standard Penetration Test

(3) UD - "Undisturbed" Thin-Walled (Shelby) Tube Sampling

Table 2 – Boring Summary Site B

Boring Number	Drill Rig Type	Hammer Type	Depth (ft)		As-Drilled Coordinates and Elevations [1]			Test/SampleType(s)		
			Proposed	Actual R=Refusal T=Terminate	Lattitude	Longitude	Ground Surface Elevation (ft)	SPT [2]	UD [3]	Rock Coring
B-01	Mobile B-57	Automatic	Refusal+Core	7.0 R 15.5 T	35.955488	-84.361137	772	X	X	X
B-01A	Mobile B-57	Automatic	Refusal+Core	16.0 R 33.0 T	35.955488	-84.361137	772			X
B-02	Mobile B-57	Automatic	Refusal+Core	10.5 R 36.5 T	35.955314	-84.359485	772	X	X	X
B-03	Mobile B-57	Automatic	Refusal+Core	23.5 R 29.5T	35.954818	-84.357890	804	X	X	X
B-03A	Mobile B-57	Automatic	Refusal+Core	29.0 R 55.0 T	35.954818	-84.357890	804			X
B-04	Mobile B-57	Automatic	Refusal+Core	32.0 R 65.5	35.954109	-84.356334	814	X		X
B-05	Mobile B-57	Automatic	Refusal+Core	27.5 R 61.0 T	35.956586	-84.360911	800	X	X	X
B-06	Mobile B-57	Automatic	Refusal+Core	11.5 R 41.5 T	35.956208	-84.359223	810	X		X
B-07	Mobile B-57	Automatic	Refusal+Core	30.5 R 60.5 T	35.955730	-84.357526	830	X	X	X
B-08	Mobile B-57	Automatic	Refusal+Core	29.5 R 61.5 T	35.958070	-84.360329	816	X		X
B-09	Mobile B-57	Automatic	Refusal+Core	11.5 R 41.5 T	35.957904	-84.359514	826	X		X
B-11	Mobile B-57	Automatic	Refusal+Core	16.0 R 46.0 T	35.958704	84.358953	831	X		X

(1) Horizontal/Vertical Datum: Tennessee State Plane Coordinates NAD 1983 / NAVD 1988; located using hand held commercial grade GPS, submeter accuracy

(2) SPT - Standard Penetration Test

(3) UD - "Undisturbed" Thin-Walled (Shelby) Tube Sampling

Table 3 – Summary of Soil Index and Chemical Analysis Test Results Site A									
Boring Location	Sample Type	Sample Number	Depth Interval [1] (ft)	LL	PL	PI	USCS Symbol [2]	Fines %	Natural Moisture[4] (%)
A-01	SPT	SS-02	3.5-5	50	24	26	CH		22.3
A-01	SPT	SS-04	8.5-10						35.7
A-01A	UD	UD-01	16-18	69	28	41	CH	86.3	33.8
A-01A	UD	UD-02	26-28	60	22	38	CH	89.5	51.6
A-02	SPT	SS-01	1-2.5	49	23	26	CL		22.1
A-02	SPT	SS-03	6-7.5						31.7
A-02	SPT	SS-04	8.5-10						18.6
A-02	SPT	SS-05	13.5-15	88	28	60	CH		33.7
A-02	SPT	SS-06	18.5-20						35.3
A-02	SPT	SS-07	23.5-25	78	29	49	CH		36.2
A-02	SPT	SS-08	28.5-30						23.1
A-03	SPT	SS-01	1-2.5						32.7
A-03	SPT	SS-02	3.5-5	90	39	51	MH		34.0
A-03	SPT	SS-03	6-7.5						37.8
A-03	SPT	SS-04	8.5-10						37.5
A-03	SPT	SS-05	13.5-15	79	30	49	CH		34.2
A-03	SPT	SS-06	18.5-20						40.0
A-03	SPT	SS-07	23.5-25	72	29	43	CH		45.9
A-03	SPT	SS-08	28.5-30						42.8
A-04	SPT	SS-01	1-2.5						27.3
A-04	SPT	SS-02	3.5-5						36.3
A-04A	UD	UD-01	6-8	84	30	54	CH	98.0	39.6
A-05	SPT	SS-01	1-2.5						18.4
A-05	SPT	SS-02	3.5-5	40	19	21	CL		21.5
A-05	SPT	SS-03	6-7.5						32.2
A-05	SPT	SS-04	8.5-10	68	28	40	CH		29.0
A-05	SPT	SS-05	13.5-15	66	27	39	CH		40.6
A-06	SPT	SS-01	1-2.5						24.9
A-06	SPT	SS-02	3.5-5	75	33	42	CH		26.8
A-06	SPT	SS-03	6-7.5						36.5
A-06	SPT	SS-04	8.5-10	90	39	51	MH		36.6
A-06	SPT	SS-05	13.5-15						41.4
A-06	SPT	SS-06	18.5-20	84	29	55	CH		27.8
A-06	SPT	SS-07	23.5-25						34.4
A-06	SPT	SS-08	28.5-30	81	27	54	CH		40.7
A-07	SPT	SS-01	1-2.5						47.3
A-07	SPT	SS-02	3.5-5	65	34	31	MH		48.0
A-07	SPT	SS-03	6-7.5						44.2

Table 3 – Summary of Soil Index and Chemical Analysis Test Results Site A									
Boring Location	Sample Type	Sample Number	Depth Interval [1] (ft)	LL	PL	PI	USCS Symbol [2]	Fines %	Natural Moisture[4] (%)
A-07	SPT	SS-04	8.5-10						55.1
A-07	SPT	SS-05	13.5-15						66.4
A-07	SPT	SS-07	23.5-25						53.1
A-07A	UD	UD-01	18-20	63	32	31	MH	83.8	46.8
A-08	SPT	SS-01	1-2.5						24.0
A-08	SPT	SS-02	3.5-5	50	19	31	CH		22.3
A-08	SPT	SS-03	6-7.5						21.8
A-08	SPT	SS-04	8.5-10	52	22	30	CH		27.2
A-08	SPT	SS-05	13.5-15						38.0
A-09	SPT	SS-01	1-2.5						32.8
A-09	SPT	SS-02	3.5-5	71	30	41	CH		38.3
A-09	SPT	SS-03	6-7.5						41.9
A-09	SPT	SS-04	8.5-10						45.1
A-09	SPT	SS-06	18.5-20						44.2
A-09	SPT	SS-07	23.5-25	67	28	39	CH		31.7
A-09	SPT	SS-09	33.5-35						62.8
A-09	SPT	SS-10	38.8-40	45	25	20	CL		33.7
A-09	SPT	SS-11	43.5-45						47.9
A-09	SPT	SS-12	48.5-50						24.7
A-09A	UD	UD-01	14-16	56	29	28	CH	81.9	42.0
A-09A	UD	UD-02	30-32	64	28	37	CH	78.4	50.0
A-10	SPT	SS-01	1-2.5						21.8
A-10	SPT	SS-02	3.5-5	34	23	11	CL		17.8
A-10	SPT	SS-05	13.5-15						15.5
A-10	SPT	SS-07	23.5-25						13.7
A-10	SPT	SS-08	28.5-30						12.2
A-10	SPT	SS-09	33.5-35						10.5
A-10	SPT	SS-11	43.5-45						5.6
A-10	SPT	SS-13	53.5-55						9.2
A-10A	UD	UD-01	8-10	33	26	7	SM	41.8	17.3
A-10A	UD	UD-02	18-20	31	23	8	SM	24.3	13.0
A-11	SPT	SS-01	1-2.5						27.2
A-11	SPT	SS-02	3.5-5	42	20	22	CL		21.4
A-11	SPT	SS-03	6-7.5						23.6
A-11	SPT	SS-04	8.5-10	88	36	52	CH		24.7
A-11	SPT	SS-05	13.5-15						33.5
A-11	SPT	SS-06	18.5-20	70	32	38	CH		30.2

Table 3 – Summary of Soil Index and Chemical Analysis Test Results Site A									
Boring Location	Sample Type	Sample Number	Depth Interval [1] (ft)	LL	PL	PI	USCS Symbol [2]	Fines %	Natural Moisture[4] (%)
A-12	SPT	SS-01	1-2.5						28.2
A-12	SPT	SS-02	3.5-5	45	22	23	CL		24.5
A-12	SPT	SS-03	6-7.5						23.1
A-12	SPT	SS-04	8.5-10						24.9
A-12	SPT	SS-05	13.5-15						25.9
A-12	SPT	SS-07	23.5-25						24.8
A-12	SPT	SS-09	33.5-35						29.5
A-12	SPT	SS-10	38.5-40						34.4
A-12A	UD	UD-01	18-20	50	26	24	CH	57.4	22.9
A-12A	UD	UD-02	30-32	56	24	32	CH	80.1	35..3

(1) Depth typically reported as length of drive for SPT.

(2) Classification estimated based on available test results and ASTM D2488-17^{e1} Visual Manual Procedure.

Table 4 – Summary of Soil Index and Chemical Analysis Test Results Site B									
Boring Location	Sample Type	Sample Number	Depth Interval [1] (ft)	LL	PL	PI	USCS Symbol [2]	Fines %	Natural Moisture[4] (%)
B-01	SPT	SS-01	2-3.5	42	24	18	CL		21.9
B-01	SPT	SS-02	5.5-7						20.0
B-02	SPT	SS-01	1-2.5						27.6
B-02	SPT	SS-02	5-6.5	73	31	42	CH		31.4
B-03	SPT	SS-01	1-2.5	45	24	21	CL		25.5
B-03	SPT	SS-02	5-6.5						24.2
B-03	UD	UD-02	8-10	45	25	20	CL	89.9	23.5
B-03	SPT	SS-04	15-16.5						30.9
B-03	SPT	SS-05	18.5-20	53	27	26	CH		34.7
B-04	SPT	SS-01	1-2.5						33.2
B-04	SPT	SS-03	6-7.5	54	29	25	CH	73.4	32.8
B-04	SPT	SS-05	13.5-15						43.5
B-04	SPT	SS-06	18.5-20						56.6
B-04	SPT	SS-07	23.5-25	43	27	16	ML	50.9	32.0
B-05	SPT	SS-01	1-2.5						38.0
B-05	SPT	SS-02	5-6.5	90	41	49	MH		36.9
B-05	SPT	SS-04	10-11.5						40.2
B-05	UD	UD-03	13-15	63	40	23	MH	74.1	43.9
B-05	SPT	SS-06	18.5-20						38.0
B-05	SPT	SS-07	23.5-25	62	33	29	MH		42.3
B-06	SPT	SS-01	1-2.5						29.2
B-06	SPT	SS-02	3.5-5	66	27	39	CH		23.0
B-06	SPT	SS-03	6-7.5						25.6
B-06	SPT	SS-04	8.5-10	64	26	38	CH		25.1
B-07	SPT	SS-01	1-2.5						20.0
B-07	SPT	SS-02	5-6.5	64	30	34	CH	94.1	25.5
B-07	SPT	SS-03	10-11.5						33.0
B-07	UD	UD-03	13-15	52	30	22	MH	56.7	29.1
B-07	SPT	SS-06	23.5-25						36.7
B-07	SPT	SS-07	28.5-30						32.2

Table 4 – Summary of Soil Index and Chemical Analysis Test Results Site B									
Boring Location	Sample Type	Sample Number	Depth Interval [1] (ft)	LL	PL	PI	USCS Symbol [2]	Fines %	Natural Moisture[4] (%)
B-08	SPT	SS-01	1-2.5						33.0
B-08	SPT	SS-02	3.5-5	72	36	36	MH		38.1
B-08	SPT	SS-03	6-7.5						43.9
B-08	SPT	SS-04	8.5-10	73	40	33	MH		45.2
B-08	SPT	SS-05	13.5-15						56.9
B-08	SPT	SS-06	18.5-20	48	27	21	CL		40.5
B-08	SPT	SS-07	23.5-25						38.4
B-08	SPT	SS-08	28.5-30						27.4
B-09	SPT	SS-01	1-2.5						40.5
B-09	SPT	SS-02	3.5-5	83	36	47	CH		30.7
B-09	SPT	SS-03	6-7.5						34.4
B-09	SPT	SS-04	8.5-10	79	32	47	CH		41.1
B-11	SPT	SS-01	1-2.5						25.5
B-11	SPT	SS-02	3.5-5	88	37	51	CH		24.9
B-11	SPT	SS-03	6-7.5						27.7
B-11	SPT	SS-04	8.5-10	83	30	53	CH		36.9
B-11	SPT	SS-05	13.5-15						45.7

(1) Depth typically reported as length of drive for SPT.

(2) Classification estimated based on available test results and ASTM D2488-17^{e1} Visual Manual Procedure.

Table 5 – Rock Core Unconfined Compressive Strength Testing Summary Site A				
Boring Number	**Rock Type**	**Sample Depth (feet)**	**Bulk Unit Weight (pcf)**	**Peak Compressive Stress (psi)**
A-01	Limestone	34.2-34.55	68.8	11,581
A-03A	Limestone	38.1-38.5	165.6	5,039
A-03A	Limestone	58.5-58.9	168.9	18,238
A-05	Calcareous Shale	25.55-25.9	149.7	3,522

Table 6 – Rock Core Unconfined Compressive Strength Testing Summary Site B				
Boring Number	**Rock Type**	**Sample Depth (feet)**	**Bulk Unit Weight (pcf)**	**Peak Compressive Stress (psi)**
B-03A	Limestone and Clacareous Shale Interbedded	36.1-36.5	167.8	10,782
B-04	Limestone and Clacareous Shale Interbedded	39.0-39.4	170.2	18,748
B-05	Limestone and Clacareous Shale Interbedded	31.3-31.7	167.9	6,715
B-09	Limestone and Clacareous Shale Interbedded	30.4-30.8	169.6	23,124

Appendix III – Test Boring Log Legend, Boring Logs and Core Photographs

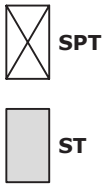
SOIL LOG LEGEND

SOIL PROPERTY SYMBOLS

N - Standard Penetration, bpf
LL - Liquid Limit, %
PPV - Pocket Penetrometer Value, tsf
NMC - Natural Moisture Content, %
PL - Plastic Limit, %
Qu - Unconfined Compressive Strength
F - Fines Content, %
PI - Plasticity Index, %
γd - Dry Unit Weight, pcf

The STANDARD PENETRATION TEST (SPT) as defined by ASTM D1586 (or AASHTO T206) is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer freely falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The SPT N Value is determined by adding the number of blows from the 2nd and 3rd 6-inch increments. A normalized blowcount (N_{60}) may be determined by the following equation: N_{60} = [Rig Energy Ratio (%) / 60] * N.

SHELBY TUBE (ST) samples are obtained by hydraulically pushing a thin-walled tube (typically 3-inches in diameter) to obtain a relatively undisturbed sample for testing of fine-grained soils to determine engineering properties such as strength, compressibility, permeability, and density. Shelby tubes are sampled in general accordance with ASTM D1587 (AASHTO T207).



Descriptive Order of Soil Strata: Geologic Disposition (i.e., Fill, Colluvium, Alluvium, etc.), ASTM Group Name (ASTM Group Symbol), quantified/qualified soil constituents, misc. constituents, consistency/density, color, organic description, moisture. ASTM group classifications is determined per ASTM D2487 where lab testing has been performed and ASTM D2488 where lab testing has not been performed.

ASTM GROUP NAME (SYMBOL) AND GRAPHIC

- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- WELL GRADED GRAVEL WITH SILT (GW-GM)
- WELL GRADED GRAVEL WITH CLAY (GW-GC)
- POORLY GRADED GRAVEL WITH SILT (GP-GM)
- POORLY GRADED GRAVEL WITH CLAY (GP-GC)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- CLAYEY GRAVEL WITH SILT (GC-GM)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- WELL GRADED SAND WITH SILT (SW-SM)
- WELL GRADED SAND WITH CLAY (SW-SC)
- POORLY GRADED SAND WITH SILT (SP-SM)
- POORLY GRADED SAND WITH CLAY (SP-SC)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- CLAYEY SAND WITH SILT (SC-SM)
- LEAN CLAY (CL)
- SILTY CLAY (CL-ML)
- SILT (ML)
- FAT CLAY (CH)
- ELASTIC SILT (MH)
- ORGANIC LOW PLASTICITY SILT OR CLAY (OL)
- ORGANIC HIGH PLASTICITY SILT OR CLAY (OH)
- PEAT (PT)
- TOPSOIL
- ASPHALT
- BASE - CEMENT MODIFIED
- BASE - CEMENT STABILIZED AGGREGATE
- BASE - GRAVEL
- CONCRETE
- VOID / NO RECOVERY
- IGM / PWR

FINE-GRAINED SOIL (Relative Consistency)

	N	PPV
Very Soft	< 2 bpf	< 0.25 tsf
Soft	2 - 4 bpf	> 0.25 - 0.5 tsf
Firm	5 - 8 bpf	> 0.5 - 1.0 tsf
Stiff	9 - 15 bpf	> 1.0 - 2.0 tsf
Very Stiff	16 - 30 bpf	> 2.0 - 4.0 tsf
Hard	> 30 bpf	> 4.0 tsf

COARSE-GRAINED SOIL (Relative Density)

	N
Very Loose	< 5 bpf
Loose	5 - 10 bpf
Medium Dense	11 - 30 bpf
Dense	31 - 50 bpf
Very Dense	> 50 bpf

MINOR CONSTITUENTS (% By Weight)

	Percentage
Trace	0% - 10%
Little	11% - 20%
Some	21% - 35%
"And"	≥ 36%

ORGANIC CONTENT OF SOIL (Determined by ASTM D2974 or AASHTO T267)

Classification	Percentage
With Organic Matter	4% - 15%
Organic Soil	16% - 30%
Peat	> 30%

MOISTURE CONDITION

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

At Time of Drilling (ATD) — Groundwater observation made anytime during the drilling process. Depending on time of reading and drilling methodologies, this value may be influenced by the drilling process.

End of Drilling — Groundwater measurement soon after the drilling processes are complete, and the borehole is at final depth. Drilling fluids, if introduced during drilling, may influence this measurement.

After Drilling — Groundwater measurements made in a borehole hours to days after drilling is complete. Depending on subsurface conditions, elapsed time, drilling process, etc. this observation may reflect a stabilized level.

REFERENCES:

FHWA NHI-16-072, Geotechnical Engineering Circular No. 5 "Geotechnical Site Characterization"
ASTM Specifications D2487 and D2488
DOT Specifications & Design Manuals from NC, SC, OH, MI, IN, PA, VA.

ROCK CORE LOG LEGEND

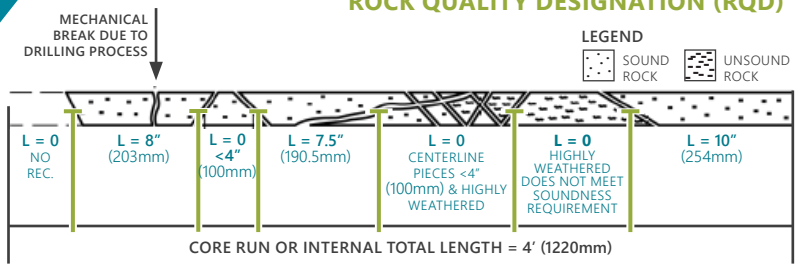
ROCK CORE RECOVERY

Core Diameter (I.D.)	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

Rock Core Sample

$$\text{REC (Recovery)} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

ROCK QUALITY DESIGNATION (RQD)



$$\text{RQD (Equation)} = \left(\frac{\sum \text{Sound Core with Length (L)} \geq 4\text{" (100mm)}}{\text{Core Run or Interval Total Length}}\right) \times 100$$

$$\text{RQD (Example)} = \left(\frac{8\text{"} + 7.5\text{"} + 10\text{"}}{48\text{"}}\right) \times 100 = 53\% \text{ (FAIR)}$$

ROCK QUALITY

Percent	Quality
>90–100	Excellent
>75–90	Good
>50–75	Fair
>25–50	Poor
0–25	Very Poor

(ASTM D6032)

GRAIN SIZE

Very Fine-Grained	<0.003 in. (<0.075 mm)
Fine-Grained	0.003 – 0.02 in. (0.075 – 0.425 mm)
Medium-Grained	0.02 – 0.8 in. (0.425 – 2 mm)
Coarse-Grained	0.8 – 2 in. (2 – 4.75 mm)
Very Coarse-Grained	>2 in. (>4.75 mm)

BEDDING

Very Thickly Bedded	>3 ft.
Thickly Bedded	3 ft. – 18 in.
Thinly Bedded	18 in. – 2 in.
Very Thinly Bedded	2 in. – 0.4 in.
Laminated	0.4 in. – 0.1 in.
Thinly Laminated	<0.1 in.

FRACTURE RATE / SPACING

Unfractured	>10 ft.
Intact	10 ft. – 3 ft.
Slightly Fractured	3 ft. – 1 ft.
Moderately Fractured	12 in. – 4 in.
Fractured	4 in. – 2 in.
Highly Fractured	< 2 in.

SURFACE ROUGHNESS

Very Rough	Near vertical steps and ridges occur on the discontinuity surface.
Slightly Rough	Asperities on the discontinuity surface are distinguishable and can be felt.
Smooth	Surface appears smooth and feels so to the touch.
Slickensided	Surface has a smooth, glassy finish with visual evidence of striation.

WEATHERING

Fresh	No visible sign of rock material weathering; slight discoloration on major discontinuity surfaces is possible.
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All rock material may be discolored by weathering and the external surface may be somewhat weaker than in its fresh condition.
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 in. diameter sample cannot be broken readily by hand.
Highly Weathered	More than half the rock is decomposed or disintegrated to soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 in. diameter sample can be broken readily by hand across the rock fabric.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely still intact. Material can by granulated by hand.
Residual Soil	All rock material is converted to soil. Material can be easily broken apart by hand.

STRENGTH

		APPROX. UNCONFINED COMPRESSIVE STRENGTH (PSI)
Extremely Strong Rock	Specimen can only be chipped with firm blows from the hammer end of a geological hammer.	> 36,250
Very Strong Rock	Specimen requires many firm blows from the hammer end of a geological hammer to fracture.	36,250 – 14,500
Strong Rock	Specimen requires more than one firm blow of the point of a geological hammer to fracture.	14,500 – 7,250
Medium Strong Rock	Specimen cannot be scraped or cut with a pocket knife. Specimen can be fractured with a single firm blow with a geological hammer point.	7,250 – 3,500
Weak Rock	Shallow cuts or scrapes can be made in a specimen with a pocket knife. A firm blow with a geological hammer creates shallow indents.	3,500 – 725
Very Weak Rock	Specimen crumbles under sharp blow with point of geological hammer and can be peeled with a pocket knife.	725 – 150
Extremely Weak Rock	Specimen can be indented by thumbnail.	150 – 35

HARDNESS

Very Hard	Cannot be scratched with a pocket knife; leaves knife steel marks on surface.
Hard	Can be scratched by a pocket knife with difficulty; scratch produces little powder and is only faintly visible; trace of knife's steel may be visible.
Moderately Hard	Can be readily scratched by a pocket knife; scratch leaves a heavy trace of dust and scratch is readily visible after the powder has been blown away.
Low Hardness	Can be gouged deeply or carved with a pocket knife.
Friable	Easily crumbled by hand, pulverized or reduced to powder sand is too soft to be cut by a pocket knife.
Soft	Very weak plastic material.

REFERENCES:

FHWA NHI-16-072, GEOTECHNICAL ENGINEERING CIRCULAR NO. 5 "GEOTECHNICAL SITE CHARACTERIZATION"
DOT SPECIFICATIONS & DESIGN MANUALS FROM NC, SC, OH, MI, IN, PA.

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-01 *Sheet 1 of 2*

DATE DRILLED: 01/30/2025	**ELEVATION:** 811 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 63.7 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.949856 **LONGITUDE:** -84.358167
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0								
	0.5				TOPSOIL, 6 inches FAT CLAY (CH), little chert, stiff, dark tan brown, moist	PPV= 1.8		
				SS-1 (14 in)		4-4-6 N = 10 PPV= 1.8		
5				SS-2 (16 in)				807
				SS-3 (18 in)		6-7-8 N = 15 PPV= 2.0		
	8.0				FAT CLAY (CH), little chert, trace sand, stiff, dark tan brown, moist	5-6-8 N = 14 PPV= 2.1		
10				SS-4 (18 in)				802
						4-6-8 N = 14		
		Residuum		SS-5 (18 in)		PPV= 1.0		
15						4-4-6 N = 10		797
				SS-6 (18 in)		PPV= 1.8		
20						3-4-5 N = 9		792
	22.0				FAT CLAY (CH), very soft, dark tan brown, wet			
				SS-7 (18 in)		PPV= 0.2		787
25						0-0-0 N = WOH		
								782
30	Auger refusal at 30.7 feet							
	30.7	Rock			LIMESTONE, dark gray, poor quality, 25° to 30° bedding, fresh to slightly weathered, hard			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/30/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-01 *Sheet 2 of 2*

DATE DRILLED: 01/30/2025	**ELEVATION:** 811 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 63.7 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.949856 **LONGITUDE:** -84.358167
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ├─┤ PL---LL 20 40 60 80 100	ELEVATION
				RUN-01 REC-87% RQD-47%	LIMESTONE, dark gray, poor quality, 25° to 30° bedding, fresh to slightly weathered, hard			
	33.7							
	34.0				Soil filled cavity			
35				RUN-02 REC-98% RQD-78%	LIMESTONE, dark gray, fair quality to good quality, 25° to 30° bedding, fresh to slightly weathered, hard			777
40				RUN-03 REC-84% RQD-66%				772
	43.0				Void			
45				RUN-04 REC-22% RQD-0%				767
	47.7	Rock			LIMESTONE, dark gray, very poor quality to good quality, 25° to 30° bedding, fresh to slightly weathered, hard			
50				RUN-05 REC-100% RQD-76%				762
55	55.3				Void			757
	56.6			RUN-06 REC-80% RQD-58%	LIMESTONE, dark gray, fair quality to good quality, 25° to 30° bedding, fresh to slightly weathered, hard			
60				RUN-07 REC-100% RQD-86%				752
	63.7				Borehole terminated at 63.7 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/30/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-01**
				Sheet 1 of 4	
Date:	01/30/2025	**Elevation:**	811 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.949856 Longitude: -84.358167		



A-01, Top Depth: 1.0 ft



A-01, Top Depth: 3.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-01 Sheet 2 of 4
Date:	01/30/2025	Elevation:	811 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.949856	Longitude: -84.358167	



A-01, Top Depth: 6.0 ft



A-01, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-01**
				Sheet 3 of 4	
Date:	01/30/2025	**Elevation:**	811 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949856	Longitude: -84.358167		



A-01, Top Depth: 13.5 ft



A-01, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-01**
				Sheet 4 of 4	
Date:	01/30/2025	**Elevation:**	811 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.949856 Longitude: -84.358167		



A-01, Top Depth: 23.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-01** Sheet 1 of 4
Date:	01/30/2025	**Elevation:** 811 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.949856 Longitude: -84.358167	



A-01 Depth: 30.7 - 33.7 ft
RUN-01
REC-87%
RQD-47%



A-01 Depth: 33.7 - 38.7 ft
RUN-02
REC-98%
RQD-78%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-01**
		Sheet 2 of 4	
Date:	01/30/2025 **Elevation:** 811 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949856 Longitude: -84.358167	



A-01 Depth: 38.7 - 43.7 ft
RUN-03
REC-84%
RQD-66%



A-01 Depth: 43.7 - 48.7 ft
RUN-04
REC-22%
RQD-0%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-01**
		Sheet 3 of 4	
Date: 01/30/2025	**Elevation:** 811 ft	Notes:	
Photographed by: Brandon Waddell	Latitude: 35.949856 Longitude: -84.358167		



A-01 Depth: 48.7 - 53.7 ft
RUN-05
REC-100%
RQD-76%



A-01 Depth: 53.7 - 58.7 ft
RUN-06
REC-80%
RQD-58%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	A-01
		Sheet 4 of 4	
Date:	01/30/2025	Elevation: 811 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.949856 Longitude: -84.358167	



A-01 Depth: 58.7 - 63.7 ft
RUN-07
REC-100%
RQD-86%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-01**
				Sheet 1 of 2	
Date:	01/30/2025	**Elevation:**	811 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949856	Longitude: -84.358167		



Box 1; 30.7 to 42.6



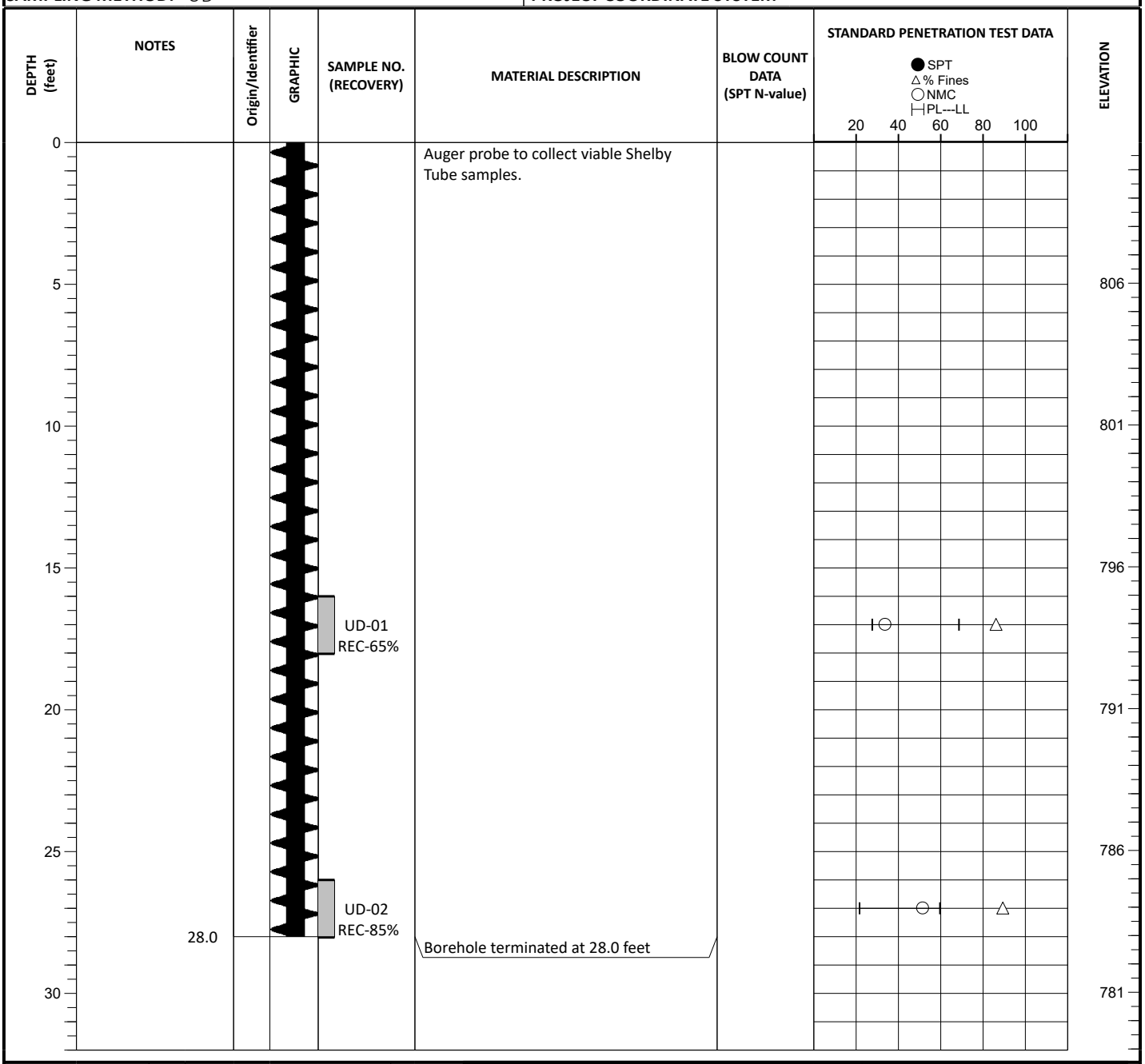
Box 2; 42.6 to 54.5

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Location Photographs:**	**A-01**
		Sheet 2 of 2	
Date:	01/30/2025 **Elevation:** 811 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949856 Longitude: -84.358167	



Box 3; 54.5 to 63.7

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-01A *Sheet 1 of 1*
DATE DRILLED: 01/30/2025	**ELEVATION:** 811 ft	**NOTES:** Offset boring to collect undisturbed Shelby Tube samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 28.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.949956 **LONGITUDE:** -84.358214
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	01/30/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-02 *Sheet 1 of 2*

DATE DRILLED: 01/07/2025	**ELEVATION:** 814 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 32.2 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.949722 **LONGITUDE:** -84.360000
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.5				TOPSOIL, 6 inches			
				SS-01 (17 in)	LEAN CLAY WITH SAND (CL), little silt, firm, tan and red brown, moist	3-3-4 N = 7 PPV= 1.9		
				SS-02 (12 in)		2-4-4 N = 8 PPV= 2.1		
5	5.5							809
	7.0			SS-03 (11 in)	POORLY GRADED GRAVEL (GP), loose, gray, dry			
				SS-04 (12 in)	FAT CLAY WITH SAND (CH), little silt, little gravel, stiff to very stiff, tan and red brown, moist	5-5-5 N = 10 4-7-12 N = 19		
10	9.6				POORLY GRADED GRAVEL (GP), little clay, little sand, medium dense, gray, dry			804
	12.0	Residuum			FAT CLAY (CH), little silt, trace sand, trace rock fragments, very stiff, tan brown, moist			
				SS-05 (18 in)		3-7-12 N = 19 PPV= 3.0		
15								799
	17.0				FAT CLAY (CH), little silt, trace chert, stiff, red brown with tan, moist			
				SS-06 (17 in)		4-4-6 N = 10 PPV= 2.8		
20								794
				SS-07 (18 in)		2-4-5 N = 9 PPV= 2.5		
25								789
	28.0				FAT CLAY (CH), little sand, little limestone fragments, firm, red brown, moist			
				SS-08 (1 in)		1-3-4 N = 7		
30								784

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/07/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-02 *Sheet 2 of 2*
DATE DRILLED: 01/07/2025	**ELEVATION:** 814 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 32.2 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.949722 **LONGITUDE:** -84.360000
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
	Auger refusal 32.2 at 32.2 feet				FAT CLAY (CH), little sand, little limestone fragments, firm, red brown, moist Borehole terminated at 32.2 feet			
35								779
40								774
45								769
50								764
55								759
60								754

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/07/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**SPT Photographs:**	**A-02**
				Sheet 1 of 4	
Date:	01/07/2025	**Elevation:**	814 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.949722 Longitude: -84.360000		



A-02, Top Depth: 1.0 ft



A-02, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-02**
				Sheet 2 of 4	
Date:	01/07/2025	**Elevation:**	814 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.949722 Longitude: -84.360000			



A-02, Top Depth: 6.0 ft



A-02, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-02**
				Sheet 3 of 4	
Date:	01/07/2025	**Elevation:**	814 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.949722 Longitude: -84.360000			



A-02, Top Depth: 13.5 ft



A-02, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-02**
				Sheet 4 of 4	
Date:	01/07/2025	**Elevation:**	814 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.949722 Longitude: -84.360000			



A-02, Top Depth: 23.5 ft



A-02, Top Depth: 28.5 ft

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-02A *Sheet 1 of 2*

DATE DRILLED: 01/07/2025	**ELEVATION:** 793 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of augers leading off.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 46.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.949722 **LONGITUDE:** -84.359720
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					Auger probe to top of rock at 14.8 feet			793
5								788
10								783
15	Auger refusal at 14.8 feet							778
20								773
25								768
30	Loss of circulation							763

Depth	Sample No. (Recovery)	Material Description
14.8	RUN-01 REC-100% RQD-100%	LIMESTONE, gray, excellent quality to poor quality, 30° to 40° bedding, fresh, hard
16.8		Soil filled cavity
17.1		LIMESTONE, gray, poor quality, slightly weathered to fresh, hard
17.9		Soil filled cavity
19.7	RUN-02 REC-56% RQD-48%	LIMESTONE, gray, poor quality, 30° to 40° bedding, slightly weathered to fresh, hard
20.8		Soil filled cavity
20.9		LIMESTONE, gray, poor quality to fair quality, 30° to 40° bedding, slightly weathered to fresh, hard
21.8		Soil filled cavity
21.9		LIMESTONE, gray, fair quality, 30° to 40° bedding, slightly weathered to fresh, hard
23.3	RUN-03 REC-86% RQD-54%	Soil filled cavity
23.8		LIMESTONE, gray, fair quality, 30° to 40° bedding, slightly weathered to fresh, hard
24.2		Soil filled cavity
24.3		LIMESTONE, gray, fair quality, 30° to 40° bedding, moderately weathered to fresh, hard
26.0		Soil filled cavity
26.4		LIMESTONE, gray, very poor quality, 30° to 40° bedding, slightly weathered to fresh, hard
27.1		Soil filled cavity
27.5	RUN-04 REC-60% RQD-14%	LIMESTONE, gray, very poor quality, 30° to 40° bedding, slightly weathered to fresh, hard
27.9		Soil filled cavity
28.8		LIMESTONE, gray, very poor quality, 30° to 40° bedding, slightly weathered to fresh, hard
29.9		Soil filled cavity
30.2		LIMESTONE, gray, very poor quality to good quality, 30° to 40° bedding, slightly weathered to fresh, hard

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-02A *Sheet 2 of 2*
DATE DRILLED: 01/07/2025	**ELEVATION:** 793 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of augers leading off.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 46.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.949722 **LONGITUDE:** -84.359720
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35	Mechanical fractures from 38.7 to 39.9 due to wedged rock core in core barrel.		RUN-05 REC-100% RQD-46%	LIMESTONE, gray, very poor quality to good quality, 30° to 40° bedding, slightly weathered to fresh, hard	758
40			RUN-06 REC-100% RQD-46%		753
45	45.3 45.7 46.0		RUN-07 REC-92% RQD-86%	Void LIMESTONE, gray, good quality, 30° to 40° bedding, slightly weathered, hard Borehole terminated at 46.0 feet	748
50					743
55					738
60					733

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**A-02A**
				Sheet 1 of 2	
Date:	01/07/2025	**Elevation:**	793 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.949722	Longitude:	-84.359720



Box 1: 14.8 to 23.5 feet

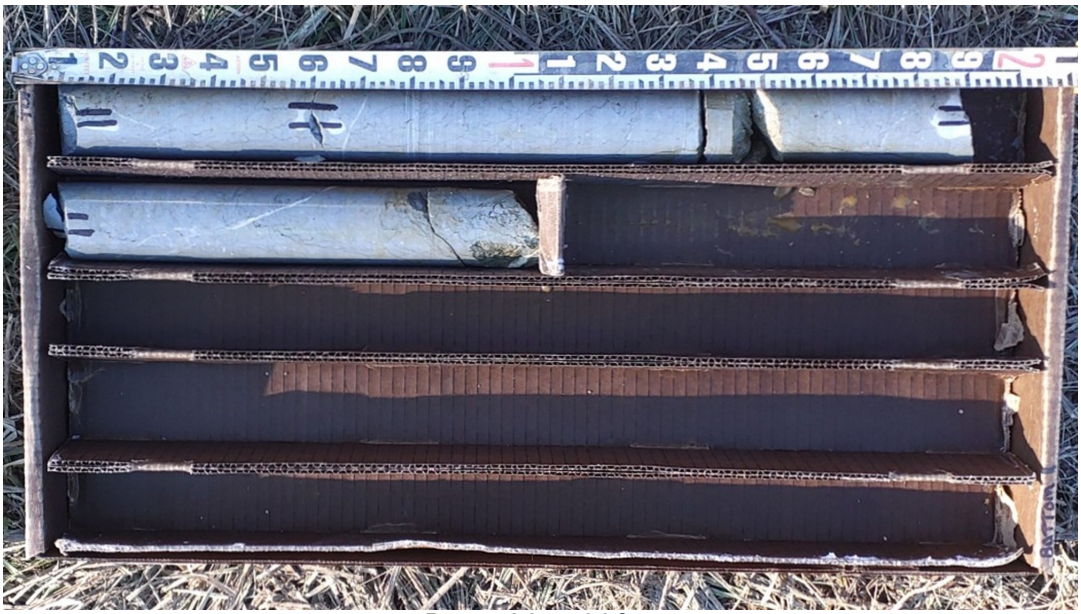


Box 2: 23.5 to 32.9 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-02A
				Sheet 2 of 2	
Date:	01/07/2025	Elevation:	793 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.949722	Longitude:	-84.359720



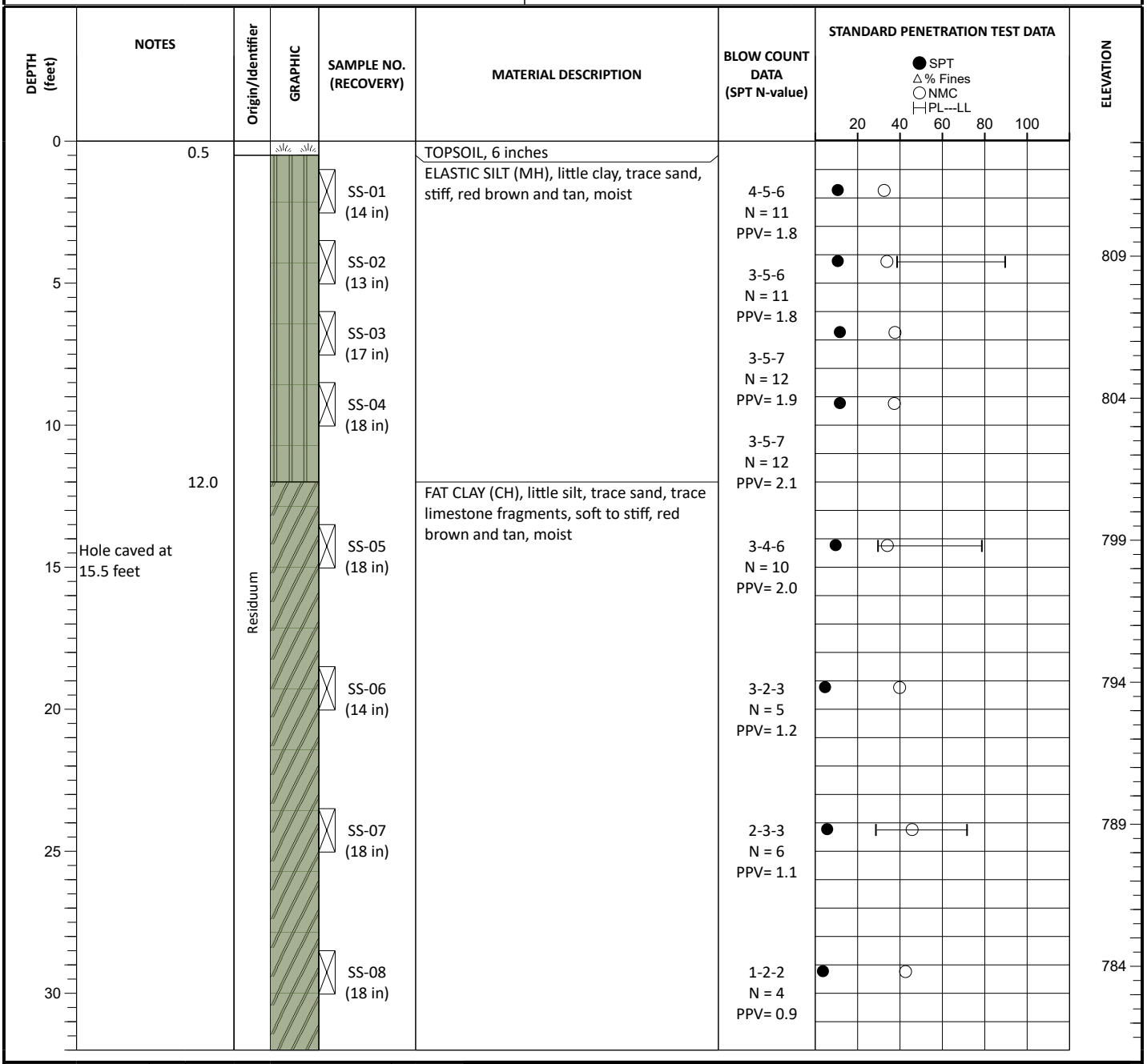
Box 3: 32.9 to 42.8 feet



Box 4: 42.8 to 46.0 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-03 *Sheet 1 of 2*

DATE DRILLED: 01/20/2025	**ELEVATION:** 813 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 34.4 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.950792 **LONGITUDE:** -84.358944
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/20/2025		Not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-03 *Sheet 2 of 2*

DATE DRILLED: 01/20/2025	**ELEVATION:** 813 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 34.4 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.950792 **LONGITUDE:** -84.358944
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
35	Auger refusal at 34.4 feet 33.9 Augers lead off 34.4	Residuum		SS-09 (11 in)	FAT CLAY (CH), little silt, trace sand, trace limestone fragments, soft to stiff, red brown and tan, moist Weathered rock, sampled as limestone fragments, little sand, very dense, gray, dry Borehole terminated at 34.4 feet	6-50/5" N = 50/5"	●	779
40								774
45								769
50								764
55								759
60								754

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/20/2025		Not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-03 Sheet 1 of 5
Date:	01/20/2025	Elevation:	813 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.950792 Longitude: -84.358944		



A-03, Top Depth: 1.0 ft



A-03, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-03**
				Sheet 2 of 5	
Date:	01/20/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.950792 Longitude: -84.358944		



A-03, Top Depth: 6.0 ft



A-03, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	SPT Photographs:	A-03
		Sheet 3 of 5	
Date:	01/20/2025	Elevation: 813 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.950792 Longitude: -84.358944	



A-03, Top Depth: 13.5 ft

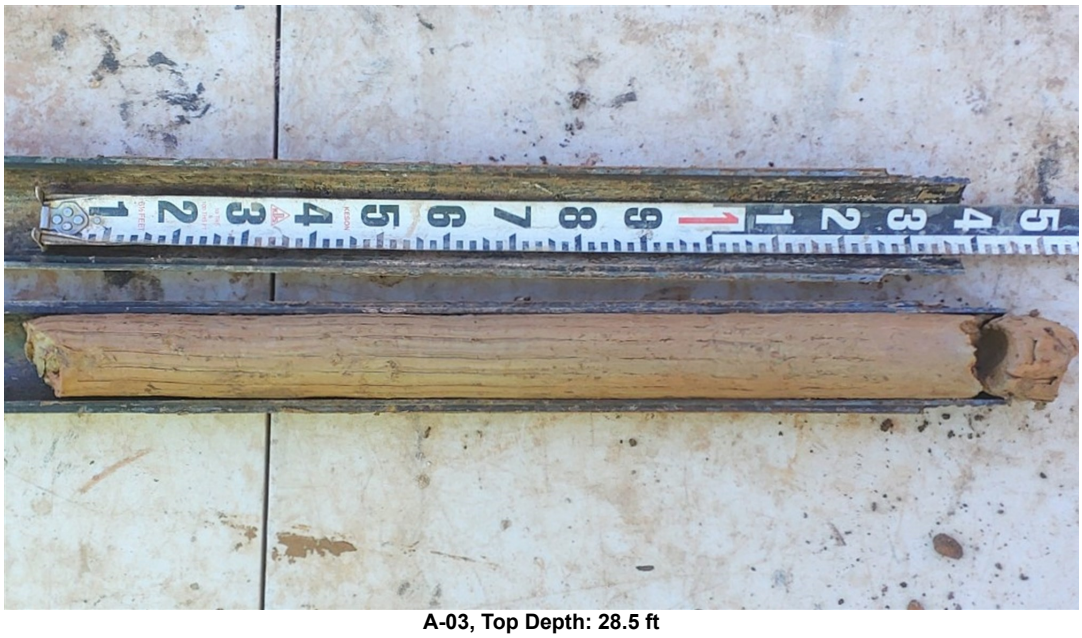


A-03, Top Depth: 18.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-03 Sheet 4 of 5
Date:	01/20/2025	Elevation:	813 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.950792 Longitude: -84.358944		



A-03, Top Depth: 23.5 ft



A-03, Top Depth: 28.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-03**
				Sheet 5 of 5	
Date:	01/20/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.950792 Longitude: -84.358944			



A-03, Top Depth: 33.5 ft

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-03A *Sheet 1 of 3*

DATE DRILLED: 01/22/2025	**ELEVATION:** 810 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of augers leading off.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 65.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: HQ CA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.950781 **LONGITUDE:** -84.358925
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
0					Casing advancement into bedrock to a depth of 36.0 feet.			810
5								805
10								800
15								795
20								790
25								785
30								780

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/22/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-03A *Sheet 2 of 3*

DATE DRILLED: 01/22/2025	**ELEVATION:** 810 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of augers leading off.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 65.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: HQ CA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.950781 **LONGITUDE:** -84.358925
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢PL---LL; 20 40 60 80 100)	ELEVATION
35	Top of rock encountered at approximately 33.0 feet.				Casing advancement into bedrock to a depth of 36.0 feet.			775
	Loss of circulation	36.0		RUN-01 REC-84% RQD-48%	LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh, hard			
		36.5			Soil filled cavity			
		36.7			LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh, hard			
		38.7			Soil filled cavity			
40		39.1			LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to slightly weathered, hard			770
		39.5			Void			
		39.9			LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to moderately weathered, hard			
		41.0			Soil filled cavity			
		42.1			LIMESTONE, gray, very poor quality, 30° to 40° bedding, fresh, hard			
		42.6		RUN-02 REC-32% RQD-18%	Void			
45		45.0			LIMESTONE, gray, very poor quality, 30° to 40° bedding, slightly weathered to fresh, hard			765
		46.0			Soil filled cavity			
		47.1			LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered to slightly weathered, hard			
		47.5			Soil filled cavity			
		47.8		RUN-03 REC-44% RQD-0%	LIMESTONE, gray, very poor quality, 30° to 40° bedding, slightly weathered, hard			
50		48.4			Void			760
		49.0			LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered, hard			
		49.4			Void			
		50.6			LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered to fresh, hard			
		51.8			Void			
		53.4		RUN-04 REC-34% RQD-8%	LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered to fresh, hard			
55		54.3			Void			755
		57.4			LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered, hard			
		57.7			Soil filled cavity			
		58.2		RUN-05 REC-34% RQD-14%	LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered to fresh, hard			
60		59.2			Soil filled cavity			750
		59.4			LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered, hard			
		59.6			Soil filled cavity			
		61.2			LIMESTONE, gray, fair quality, 30° to 40° bedding, moderately weathered to fresh, hard			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/22/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-03A *Sheet 3 of 3*
DATE DRILLED: 01/22/2025	**ELEVATION:** 810 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of augers leading off.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 65.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: HQ CA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.950781 **LONGITUDE:** -84.358925
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
65	65.0		RUN-06 REC-95% RQD-50%	LIMESTONE, gray, fair quality, 30° to 40° bedding, moderately weathered to fresh, hard Borehole terminated at 65.0 feet	745
70					740
75					735
80					730
85					725
90					720
95					715

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	01/22/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-03A** Sheet 1 of 3
Date:	01/22/2025	**Elevation:** 810 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.950781 Longitude: -84.358925	



A-03A Depth: 36.0 - 41.0 ft
RUN-01
REC-84%
RQD-48%



A-03A Depth: 41.0 - 46.0 ft
RUN-02
REC-32%
RQD-18%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-03A**
		Sheet 2 of 3	
Date: 01/22/2025	**Elevation:** 810 ft	Notes:	
Photographed by: Zane Robinson	Latitude: 35.950781 Longitude: -84.358925		



A-03A Depth: 46.0 - 51.0 ft
RUN-03
REC-44%
RQD-0%

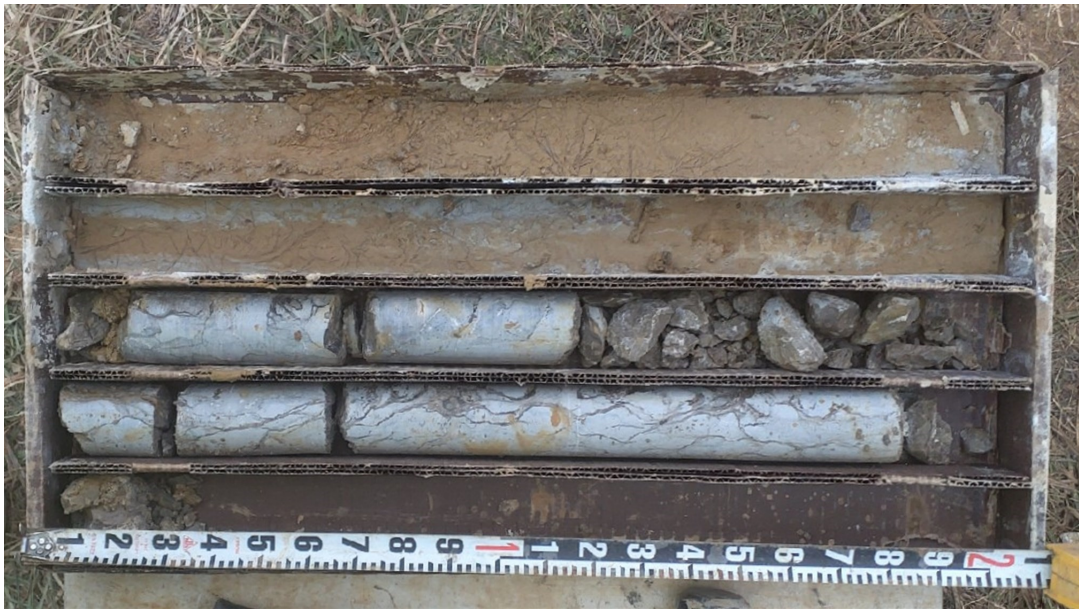


A-03A Depth: 51.0 - 56.0 ft
RUN-04
REC-34%
RQD-8%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**A-03A**
		Sheet 3 of 3	
Date:	01/22/2025 **Elevation:** 810 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.950781 Longitude: -84.358925	



A-03A Depth: 56.0 - 61.0 ft
RUN-05
REC-34%
RQD-14%



A-03A Depth: 61.0 - 65.0 ft
RUN-06
REC-95%
RQD-50%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-03A
				Sheet 1 of 2	
Date:	01/22/2025	Elevation:	810 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.950781	Longitude:	-84.358925

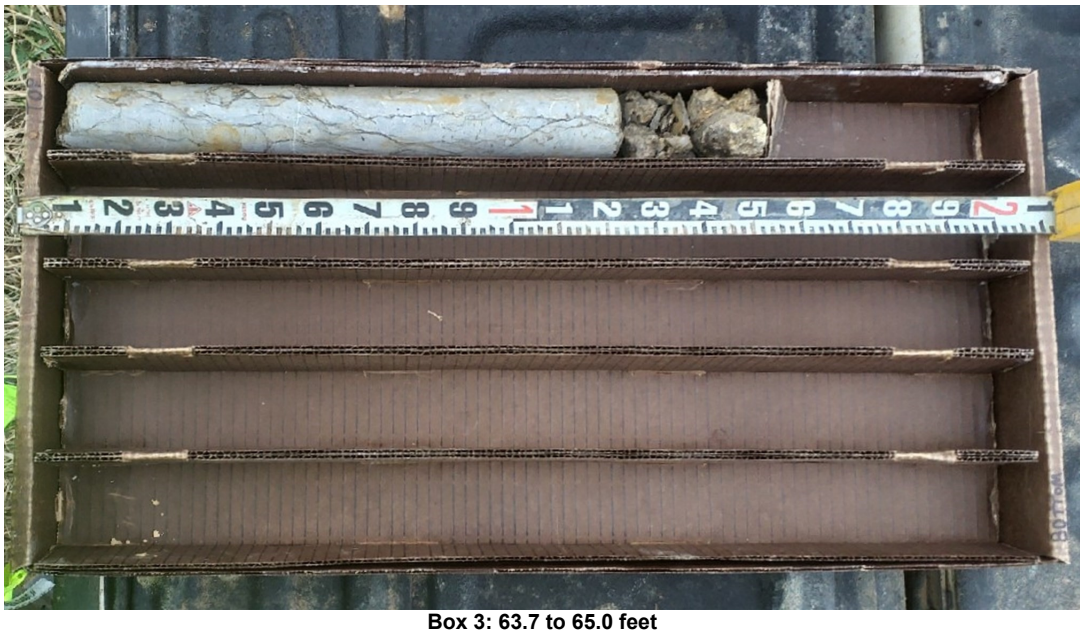


Box 1: 36.0 to 47.8 feet



Box 2: 47.8 to 63.7 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-03A
				Sheet 2 of 2	
Date:	01/22/2025	Elevation:	810 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.950781	Longitude: -84.358925	



Box 3: 63.7 to 65.0 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-04 *Sheet 1 of 2*

DATE DRILLED: 01/16/2025	**ELEVATION:** 801 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 43.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.951667 **LONGITUDE:** -84.360128
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.4				TOPSOIL, 5 inches			
				SS-01 (14 in)	FAT CLAY (CH), little silt, little sand, trace chert, stiff, tan brown, moist	4-4-5 N = 9 PPV= 2.1	● ○	
	3.0	Residuum		SS-02 (17 in)	FAT CLAY (CH), little silt, trace chert, stiff to firm, red brown and tan, moist	4-4-5 N = 9 PPV= 1.9	● ○	797
5				SS-03 (18 in)		2-3-4 N = 7 PPV= 1.8	●	
				SS-04 (18 in)		2-3-5 N = 8 PPV= 2.2	●	792
10	Auger refusal at 11.9 feet							
	Hole cave at 13.7 feet	11.9			Soil filled cavity			
		12.1			LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh, hard			
		13.7		RUN-01 REC-66% RQD-46%	Soil filled cavity			
15		14.6			LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to slightly weathered, hard			787
		15.0			Soil filled cavity			
		15.1			LIMESTONE, gray, poor quality to very poor quality, 30° to 40° bedding, moderately weathered to slightly weathered, hard			
		15.5			Soil filled cavity			
		17.4		RUN-02 REC-14% RQD-0%	LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered to slightly weathered, hard			
20		18.0			Soil filled cavity			782
		20.6			LIMESTONE, gray, very poor quality, 30° to 40° bedding, fresh to slightly weathered, hard			
	Loss of circulation	21.9			Soil filled cavity			
		22.2		RUN-03 REC-30% RQD-18%	LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered, hard			
		22.4			Void			
25								777
				RUN-04 REC-36% RQD-36%				
		28.6			LIMESTONE, gray, poor quality to excellent quality, 30° to 40° bedding, fresh, hard			
30								772

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/16/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-04 *Sheet 2 of 2*

DATE DRILLED: 01/16/2025	**ELEVATION:** 801 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 43.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.951667 **LONGITUDE:** -84.360128
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
			RUN-05 REC-98% RQD-92%	LIMESTONE, gray, poor quality to excellent quality, 30° to 40° bedding, fresh, hard	
33.8					
33.9				Soil filled cavity	767
35				LIMESTONE, gray, excellent quality, 30° to 40° bedding, fresh, hard	
37.9			RUN-06 REC-98% RQD-94%	Soil filled cavity	
38.0				LIMESTONE, gray, excellent quality, 30° to 40° bedding, fresh, hard	762
40					
			RUN-07 REC-100% RQD-100%		
43.9				Borehole terminated at 43.9 feet	757
45					
50					752
55					747
60					742

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	01/16/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

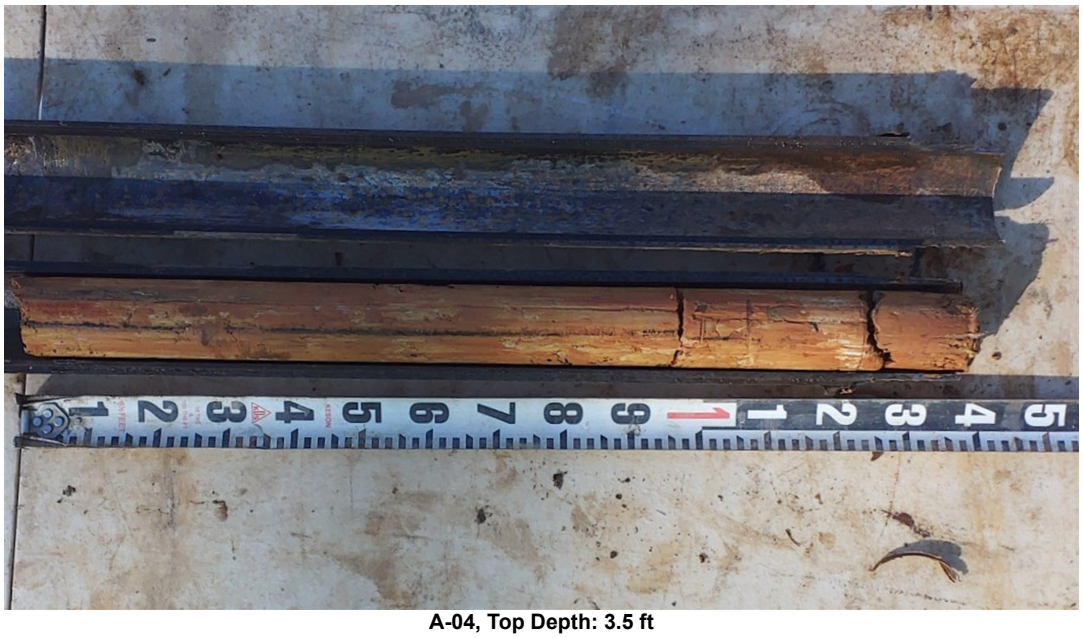
Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-04**
				Sheet 1 of 2	
Date:	01/16/2025	**Elevation:**	801 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.951667 Longitude: -84.360128			



A-04, Top Depth: 1.0 ft



A-04, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-04**
				Sheet 2 of 2	
Date:	01/16/2025	**Elevation:**	801 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951667 Longitude: -84.360128		



A-04, Top Depth: 6.0 ft



A-04, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-04** Sheet 1 of 4
Date:	01/16/2025	**Elevation:** 801 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.951667 Longitude: -84.360128	



A-04 Depth: 11.9 - 15.4 ft
RUN-01
REC-66%
RQD-46%

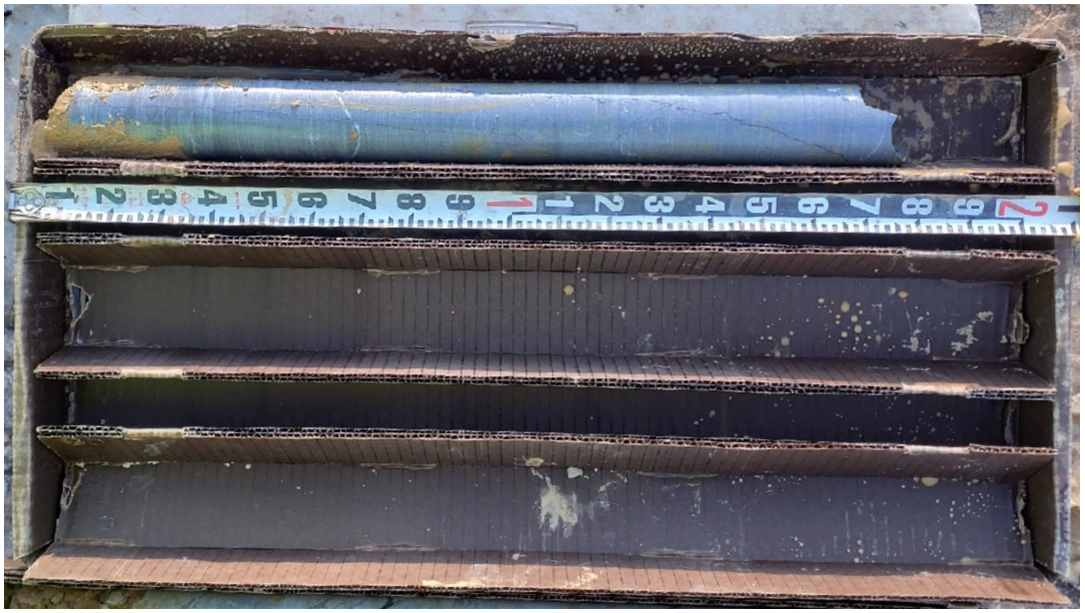


A-04 Depth: 15.4 - 20.4 ft
RUN-02
REC-14%
RQD-0%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Core Photographs:	A-04
				Sheet 2 of 4	
Date:	01/16/2025	Elevation:	801 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951667 Longitude: -84.360128		



A-04 Depth: 20.4 - 25.4 ft
RUN-03
REC-30%
RQD-18%

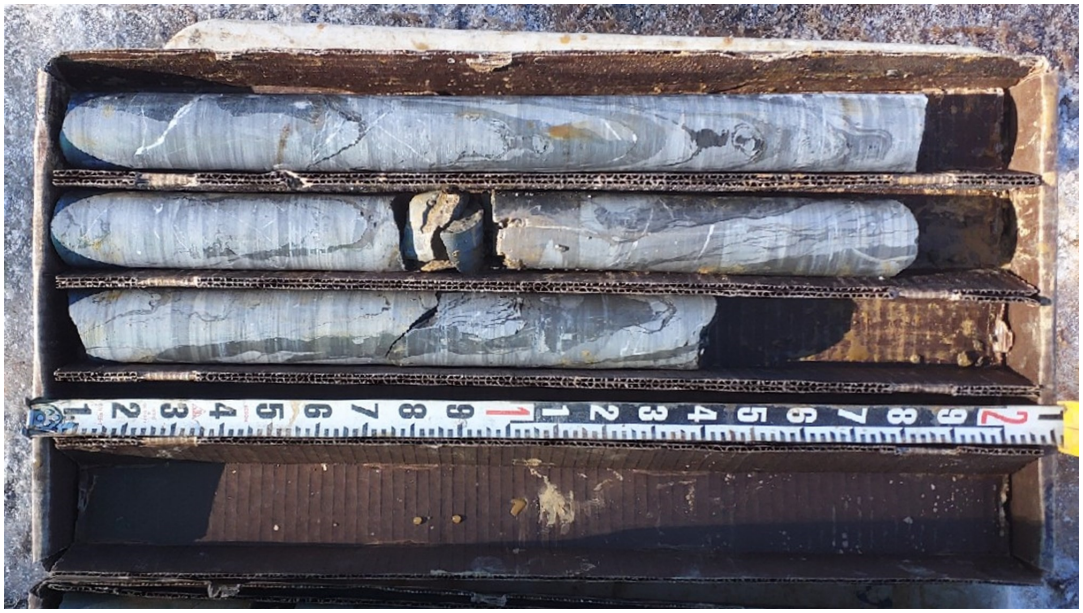


A-04 Depth: 25.4 - 30.4 ft
RUN-04
REC-36%
RQD-36%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-04** Sheet 3 of 4
Date:	01/16/2025	**Elevation:** 801 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.951667 Longitude: -84.360128	



A-04 Depth: 30.4 - 35.4 ft
RUN-05
REC-98%
RQD-92%



A-04 Depth: 35.4 - 40.4 ft
RUN-06
REC-98%
RQD-94%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Core Photographs:**	**A-04**
				Sheet 4 of 4	
Date:	01/16/2025	**Elevation:**	801 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951667 Longitude: -84.360128		



A-04 Depth: 40.4 - 43.9 ft
RUN-07
REC-100%
RQD-100%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-04**
				Sheet 1 of 2	
Date:	01/16/2025	**Elevation:**	801 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.951667	Longitude: -84.360128		



Box 1: 11.9 to 29.9 feet



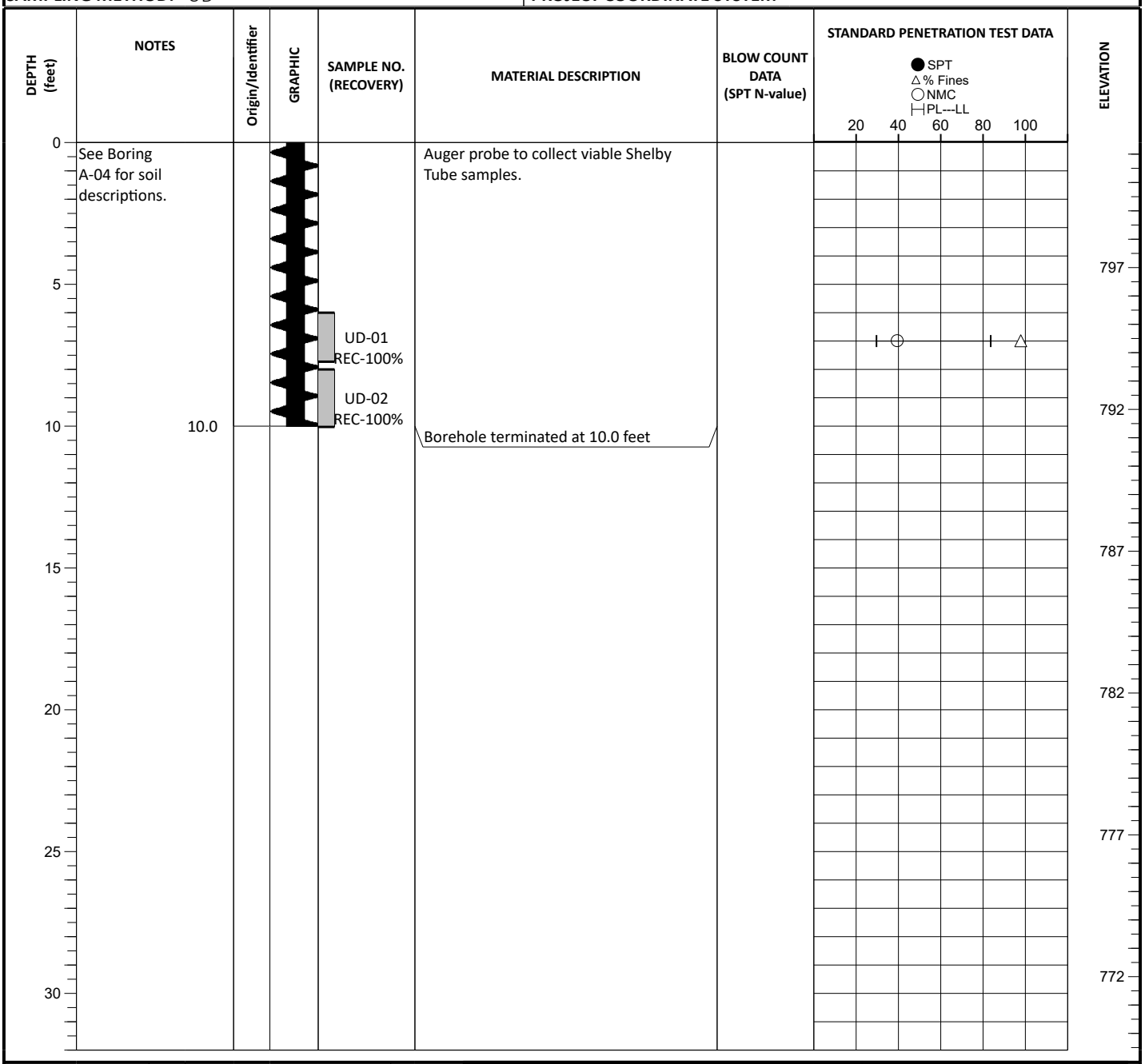
Box 2: 29.9 to 39.1 feet

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-04**
				Sheet 2 of 2	
Date:	01/16/2025	**Elevation:**	801 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951667 Longitude: -84.360128		



Box 3: 39.1 to 43.9 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-04A *Sheet 1 of 1*
DATE DRILLED: 01/17/2025	**ELEVATION:** 801 ft	**NOTES:** Offset boring to collect undisturbed Shelby Tube samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Travis Cardini	**BORING DEPTH:** 10.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.951111 **LONGITUDE:** -84.360114
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	01/17/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-05 *Sheet 1 of 2*

DATE DRILLED: 02/03/2025	**ELEVATION:** 805 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 49.7 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.949933 **LONGITUDE:** -84.356008
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0								
	0.5				TOPSOIL, 6 inches			
				SS-01 (18 in)	LEAN CLAY (CL), trace sand, trace silt, firm, dark tan, moist	PPV= 0.5		
	3.0					2-4-4 N = 8 PPV= 1.5		
5				SS-02 (18 in)	LEAN CLAY (CL), trace silt, stiff, dark brown, moist			801
				SS-03 (16 in)		4-6-8 N = 14 PPV= 1.8		
	8.0	Residuum						
				SS-04 (17 in)	FAT CLAY (CH), trace silt, trace sand, stiff, dark red brown, moist	4-6-8 N = 14 PPV= 2.0		796
10								
	12.0					4-5-7 N = 12		
				SS-05 (18 in)	FAT CLAY (CH), trace silt, stiff, dark red brown, moist	PPV= 1.5		791
15	Auger refusal at 17.1 feet					2-3-6 N = 9		
	17.1				Soil Filled Cavity			
	17.3			RUN-01 REC-69% RQD-27%	LIMESTONE, dark gray, poor quality, 25° to 30° bedding, fresh, very hard			
	18.0				Soil Filled Cavity			
20	19.2				CALCAREOUS SHALE AND LIMESTONE, dark red to dark gray, interbedded, very poor quality to poor quality, 25° to 30° bedding, fresh to slightly weathered, hard			786
				RUN-02 REC-38% RQD-0%				
	24.7							781
25					CALCAREOUS SHALE, dark red, poor quality, fresh, hard			
				RUN-03 REC-96% RQD-42%				
30								776

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/03/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-05 *Sheet 2 of 2*
DATE DRILLED: 02/03/2025	**ELEVATION:** 805 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 49.7 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.949933 **LONGITUDE:** -84.356008
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
				CALCAREOUS SHALE, dark red, poor quality, fresh, hard	
32.7			RUN-04 REC-66% RQD-32%	CALCAREOUS SHALE AND LIMESTONE, dark red to dark gray, interbedded, poor quality to good quality, 25° to 30° bedding, fresh to slightly weathered, hard	
35					771
			RUN-05 REC-100% RQD-86%		
40					766
			RUN-06 REC-98% RQD-72%		
45					761
			RUN-07 REC-100% RQD-68%		
49.7				Borehole terminated at 49.7 feet	756
50					
55					751
60					746

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	02/03/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-05 Sheet 1 of 3
Date:	02/03/2025	**Elevation:**	805 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.949933	Longitude: -84.356008	



A-05, Top Depth: 1.0 ft



A-05, Top Depth: 3.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-05 Sheet 2 of 3
Date:	02/03/2025	**Elevation:**	805 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.949933	Longitude: -84.356008	



A-05, Top Depth: 6.0 ft



A-05, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-05**
				Sheet 3 of 3	
Date:	02/03/2025	**Elevation:**	805 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949933	Longitude: -84.356008		



A-05, Top Depth: 13.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-05**
		Sheet 1 of 4	
Date:	02/03/2025 **Elevation:** 805 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949933 Longitude: -84.356008	



A-05 Depth: 17.1 - 19.7 ft
RUN-01
REC-69%
RQD-27%



A-05 Depth: 19.7 - 24.7 ft
RUN-02
REC-38%
RQD-0%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-05** Sheet 2 of 4
Date:	02/03/2025	**Elevation:** 805 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.949933 Longitude: -84.356008	



A-05 Depth: 24.7 - 29.7 ft
RUN-03
REC-96%
RQD-42%



A-05 Depth: 29.7 - 34.7 ft
RUN-04
REC-66%
RQD-32%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-05**
		Sheet 3 of 4	
Date:	02/03/2025 **Elevation:** 805 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949933 Longitude: -84.356008	



A-05 Depth: 34.7 - 39.7 ft
RUN-05
REC-100%
RQD-86%



A-05 Depth: 39.7 - 44.7 ft
RUN-06
REC-98%
RQD-72%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-05**
		Sheet 4 of 4	
Date:	02/03/2025 **Elevation:** 805 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949933 Longitude: -84.356008	



A-05 Depth: 44.7 - 49.7 ft
RUN-07
REC-100%
RQD-68%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-05
				Sheet 1 of 2	
Date:	02/03/2025	Elevation:	805 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.949933 Longitude: -84.356008		



Box 1; 17.1 to 31.7



Box 2; 31.7 to 41.5

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Location Photographs:**	**A-05**
		Sheet 2 of 2	
Date:	02/03/2025 **Elevation:** 805 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.949933 Longitude: -84.356008	



Box 3; 41.5 to 49.7

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-06 *Sheet 1 of 3*

DATE DRILLED: 01/29/2025	**ELEVATION:** 803 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 65.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.951908 **LONGITUDE:** -84.358514
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.5				TOPSOIL, 6 inches			
				SS-01 (16 in)	FAT CLAY (CH), little sand, trace chert, stiff, red brown with tan, moist	3-6-6 N = 12 PPV= 1.9		
				SS-02 (12 in)		4-6-9 N = 15 PPV= 2.8		799
5				SS-03 (16 in)		4-7-7 N = 14 PPV= 2.6		
	8.0			SS-04 (13 in)	ELASTIC SILT (MH), little sand, trace chert, stiff to very stiff, red brown with tan, moist	5-9-11 N = 20 PPV= 3.8		794
10								
		Residuum		SS-05 (18 in)	*Zone with chert from approximately 14.5 to 15.0 feet.*	3-6-9 N = 15 PPV= 3.3		789
15	17.0				FAT CLAY (CH), little sand, little chert, stiff to firm, red brown with black, moist			
				SS-06 (17 in)		5-6-8 N = 14 PPV= 3.2		784
20								
				SS-07 (18 in)		4-5-5 N = 10 PPV= 2.3		779
25	Hole caved at 25.9 feet							
				SS-08 (18 in)		2-2-3 N = 5 PPV= 1.6		774
30								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/29/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-06 *Sheet 2 of 3*

DATE DRILLED: 01/29/2025	**ELEVATION:** 803 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 65.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.951908 **LONGITUDE:** -84.358514
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
	Auger refusal at 33.1 feet	Residuum			FAT CLAY (CH), little sand, little chert, stiff to firm, red brown with black, moist			
		33.1			LIMESTONE, gray brown, very poor quality, moderately weathered, hard			
		33.5		RUN-01 REC-18% RQD-0%	Soil filled cavity			769
35				RUN-02 REC-0% RQD-0%				
40								764
		41.0			LIMESTONE, gray brown, poor quality, moderately weathered, hard			
		41.3			Soil filled cavity			
		43.1		RUN-03 REC-50% RQD-44%	LIMESTONE, gray, poor quality to fair quality, 30° to 40° bedding, fresh to moderately weathered, hard			759
45				RUN-04 REC-90% RQD-54%				
		49.1			Soil filled cavity			754
50		49.6			LIMESTONE, gray, fair quality to excellent quality, 30° to 40° bedding, slightly weathered to fresh, hard			
				RUN-05 REC-100% RQD-76%				
55								749
				RUN-06 REC-100% RQD-82%				
60								744
				RUN-07				

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/29/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-06 *Sheet 3 of 3*

DATE DRILLED: 01/29/2025	**ELEVATION:** 803 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 65.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.951908 **LONGITUDE:** -84.358514
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
65	65.3		REC-100% RQD-100%	LIMESTONE, gray, fair quality to excellent quality, 30° to 40° bedding, slightly weathered to fresh, hard Borehole terminated at 65.3 feet	
70					734
75					729
80					724
85					719
90					714
95					709

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	01/29/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-06**
				Sheet 1 of 4	
Date:	01/29/2025	**Elevation:**	803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.951908	Longitude: -84.358514		

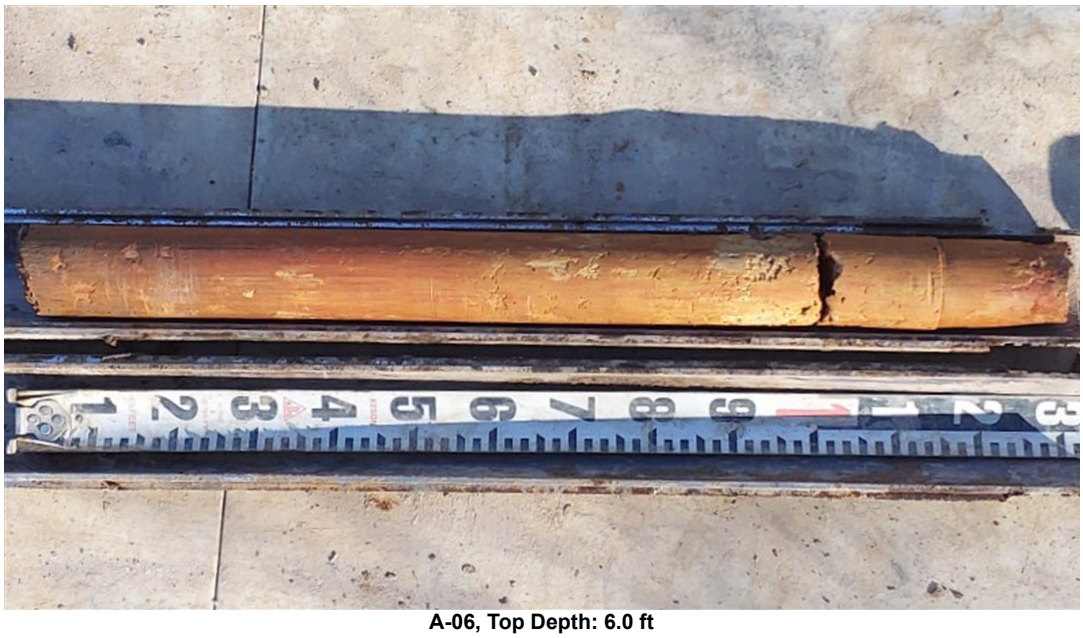


A-06, Top Depth: 1.0 ft



A-06, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-06**
				Sheet 2 of 4	
Date:	01/29/2025	**Elevation:**	803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951908 Longitude: -84.358514		

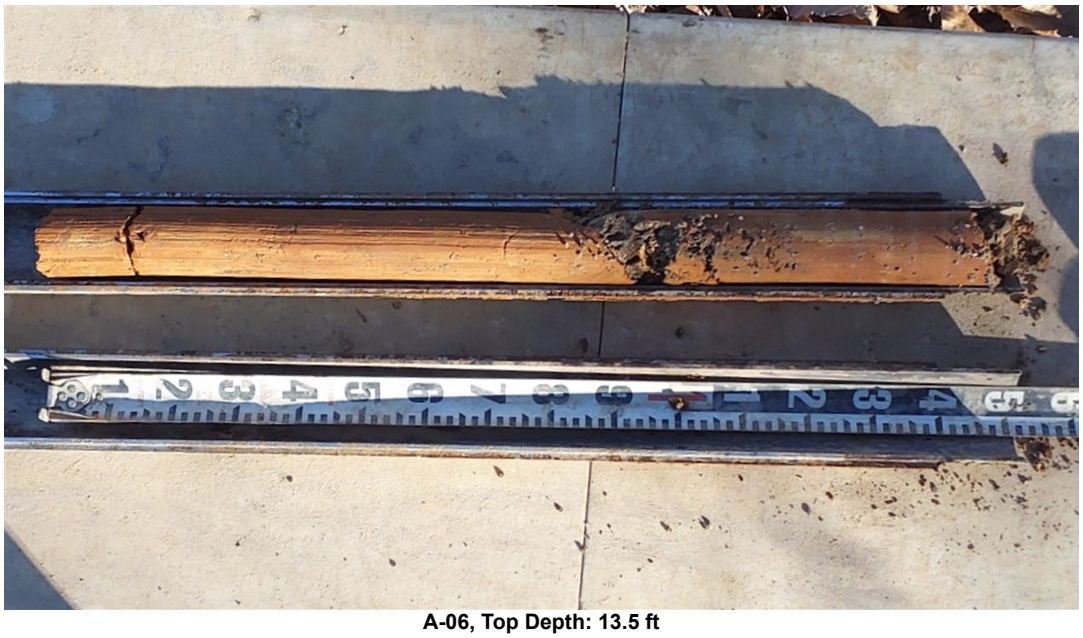


A-06, Top Depth: 6.0 ft



A-06, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-06**
				Sheet 3 of 4	
Date:	01/29/2025	**Elevation:**	803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951908 Longitude: -84.358514		



A-06, Top Depth: 13.5 ft



A-06, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-06**
				Sheet 4 of 4	
Date:	01/29/2025	**Elevation:**	803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951908 Longitude: -84.358514		

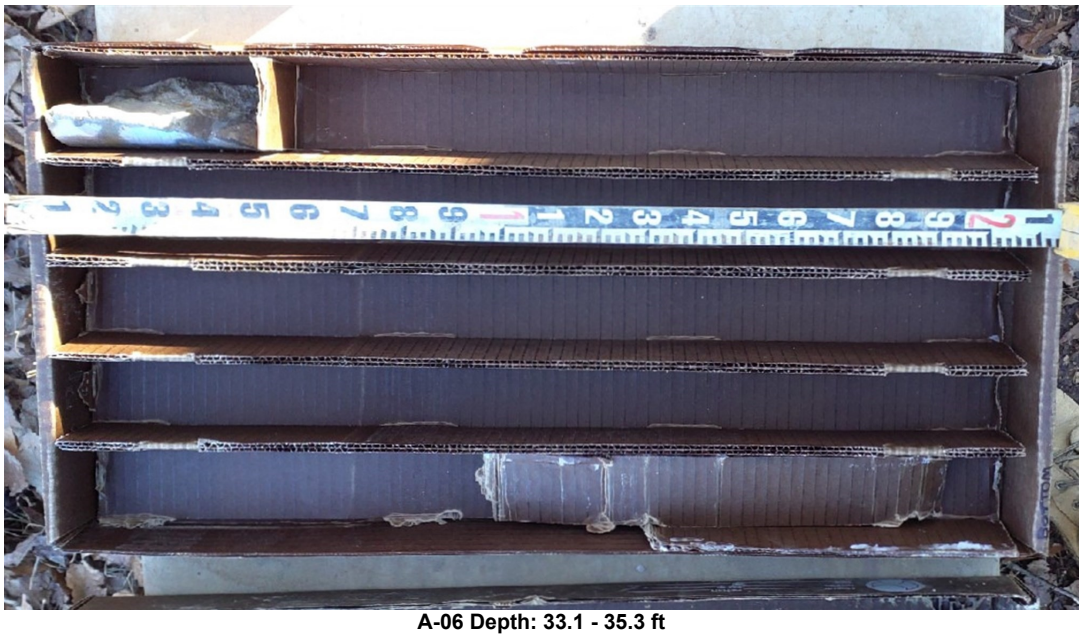


A-06, Top Depth: 23.5 ft

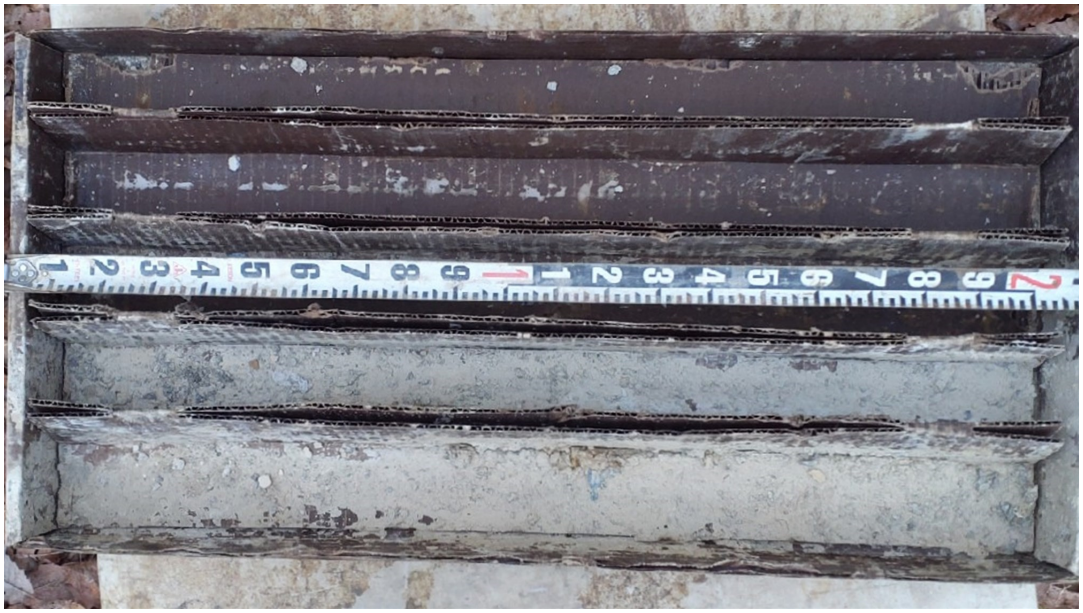


A-06, Top Depth: 28.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-06** Sheet 1 of 4
Date:	01/29/2025	**Elevation:** 803 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.951908 Longitude: -84.358514	



A-06 Depth: 33.1 - 35.3 ft
RUN-01
REC-18%
RQD-0%



A-06 Depth: 35.3 - 40.3 ft
RUN-02
REC-0%
RQD-0%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-06**
		Sheet 2 of 4	
Date:	01/29/2025 **Elevation:** 803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.951908 Longitude: -84.358514	



A-06 Depth: 40.3 - 45.3 ft
RUN-03
REC-50%
RQD-44%



A-06 Depth: 45.3 - 50.3 ft
RUN-04
REC-90%
RQD-54%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Core Photographs:**	**A-06**
				Sheet 3 of 4	
Date:	01/29/2025	**Elevation:**	803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951908 Longitude: -84.358514		

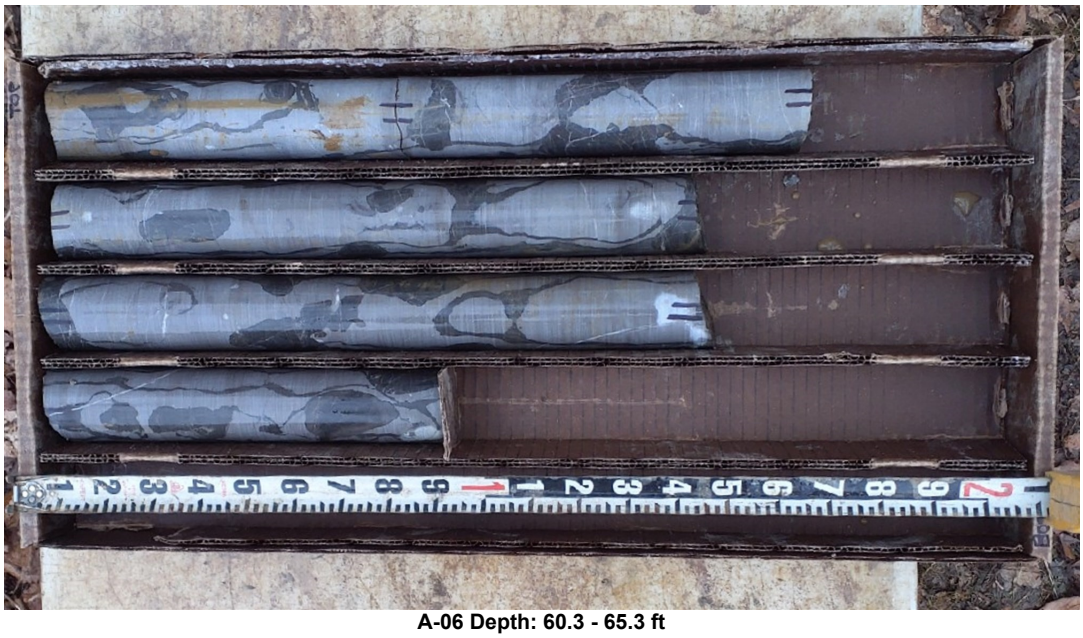


A-06 Depth: 50.3 - 55.3 ft
RUN-05
REC-100%
RQD-76%



A-06 Depth: 55.3 - 60.3 ft
RUN-06
REC-100%
RQD-82%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-06**
		Sheet 4 of 4	
Date:	01/29/2025 **Elevation:** 803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.951908 Longitude: -84.358514	



A-06 Depth: 60.3 - 65.3 ft
RUN-07
REC-100%
RQD-100%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-06
				Sheet 1 of 2	
Date:	01/29/2025	Elevation:	803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.951908 Longitude: -84.358514		

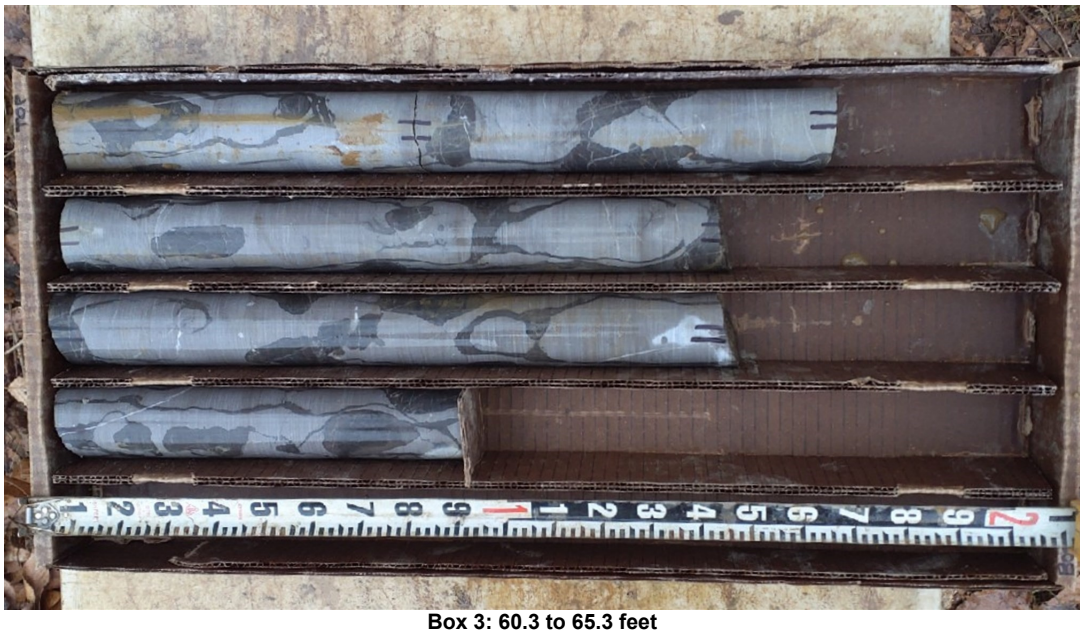


Box 1: 33.1 to 52.2 feet



Box 2: 52.2 to 60.3 feet

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Location Photographs:**	**A-06**
		Sheet 2 of 2	
Date:	01/29/2025 **Elevation:** 803 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.951908 Longitude: -84.358514	



Box 3: 60.3 to 65.3 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-07 *Sheet 1 of 2*

DATE DRILLED: 01/27/2025	**ELEVATION:** 830 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 56.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.952569 **LONGITUDE:** -84.358719
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0								
	0.5				TOPSOIL, 6 inches			
				SS-01 (18 in)	ELASTIC SILT (MH), some clay, little sand, soft to stiff, tan brown to brown, moist	2-4-3 N = 7 PPV= 2.3	● ○	
				SS-02 (18 in)		3-3-4 N = 7 PPV= 1.3	● ○	
5				SS-03 (18 in)		4-5-6 N = 11 PPV= 2.4	● ○	825
				SS-04 (18 in)		2-2-2 N = 4 PPV= 1.2	● ○	
10		Residuum						820
				SS-05 (18 in)		2-1-2 N = 3 PPV= 0.9	● ○	
15								815
	17.0				ELASTIC SILT WITH SAND (MH), some clay, firm, brown, moist			
				SS-06 (18 in)		2-2-4 N = 6 PPV= 0.8	● ○	
20	Hole caved at 22.1 feet							810
				SS-07 (18 in)		3-3-2 N = 5 PPV= 1.1	● ○	
25	Auger refusal at 26.4 feet							805
	26.4			RUN-01 REC-97% RQD-0%	LIMESTONE AND CALCAREOUS SHALE, gray brown, very poor quality, moderately weathered to slightly weathered, hard			
30	30.2				Soil filled cavity			800

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/27/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-07 *Sheet 2 of 2*
DATE DRILLED: 01/27/2025	**ELEVATION:** 830 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 56.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.952569 **LONGITUDE:** -84.358719
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-02 REC-0% RQD-0%	Soil filled cavity	795
	36.3			LIMESTONE AND CALCAREOUS SHALE, gray brown, poor quality, 60°, slightly weathered to fresh, hard	
	36.8			Soil filled cavity	
	37.1		RUN-03 REC-62% RQD-36%	LIMESTONE AND CALCAREOUS SHALE, gray brown, poor quality, moderately weathered, hard	
40	37.8 38.1 39.5			Soil filled cavity	790
	39.7			LIMESTONE AND CALCAREOUS SHALE, gray brown, poor quality, 30° to 40°, fresh, hard	
	40.2			Soil filled cavity	
	40.3		RUN-04 REC-100% RQD-84%	LIMESTONE AND CALCAREOUS SHALE, gray brown, poor quality, 30° to 40°, slightly weathered to fresh, hard	
45				Soil filled cavity	785
				LIMESTONE AND CALCAREOUS SHALE, gray brown and red brown, very poor quality to excellent quality, 30° to 40°, moderately weathered to fresh, moderately hard to hard	
			RUN-05 REC-72% RQD-0%		
50					780
			RUN-06 REC-100% RQD-90%		
55					775
			RUN-07 REC-100% RQD-0%		
	56.3			Borehole terminated at 56.3 feet	
60					770

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	01/27/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-07**
				Sheet 1 of 4	
Date:	01/27/2025	**Elevation:**	830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.952569 Longitude: -84.358719		

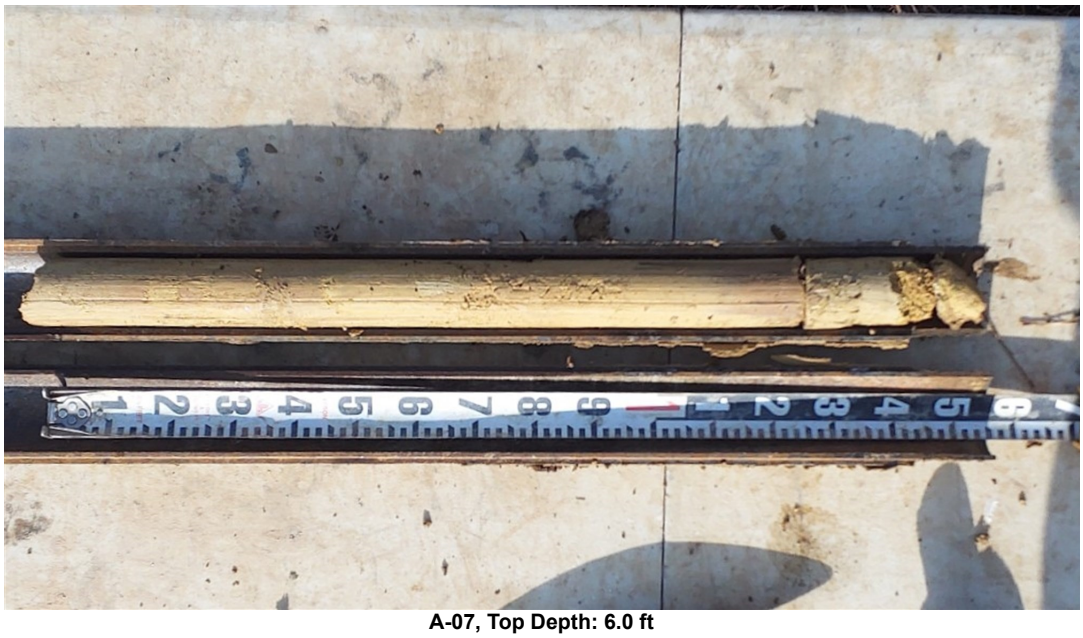


A-07, Top Depth: 1.0 ft



A-07, Top Depth: 3.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-07 Sheet 2 of 4
Date:	01/27/2025	**Elevation:**	830 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.952569	Longitude: -84.358719	



A-07, Top Depth: 6.0 ft



A-07, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-07**
				Sheet 3 of 4	
Date:	01/27/2025	**Elevation:**	830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.952569	Longitude: -84.358719		



A-07, Top Depth: 13.5 ft



A-07, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-07**
				Sheet 4 of 4	
Date:	01/27/2025	**Elevation:**	830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.952569	Longitude: -84.358719		

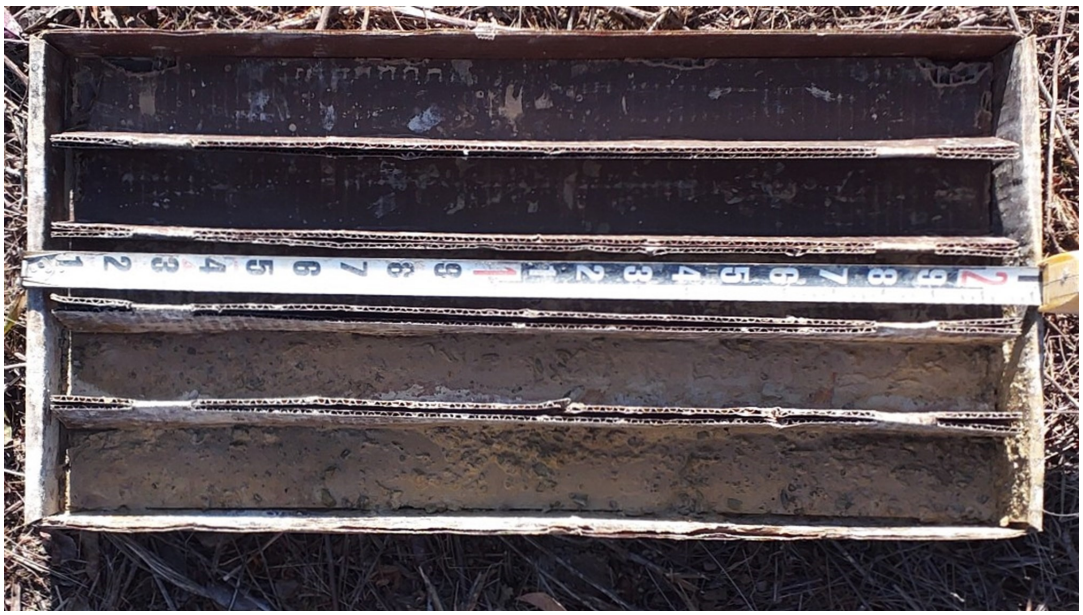


A-07, Top Depth: 23.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-07**
		Sheet 1 of 4	
Date:	01/27/2025 **Elevation:** 830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.952569 Longitude: -84.358719	



A-07 Depth: 26.4 - 30.3 ft
RUN-01
REC-97%
RQD-0%



A-07 Depth: 30.3 - 35.3 ft
RUN-02
REC-0%
RQD-0%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Core Photographs:**	**A-07**
				Sheet 2 of 4	
Date:	01/27/2025	**Elevation:**	830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.952569 Longitude: -84.358719		



A-07 Depth: 35.3 - 40.3 ft
RUN-03
REC-62%
RQD-36%



A-07 Depth: 40.3 - 45.3 ft
RUN-04
REC-100%
RQD-84%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**A-07**
		Sheet 3 of 4	
Date:	01/27/2025 **Elevation:** 830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.952569 Longitude: -84.358719	

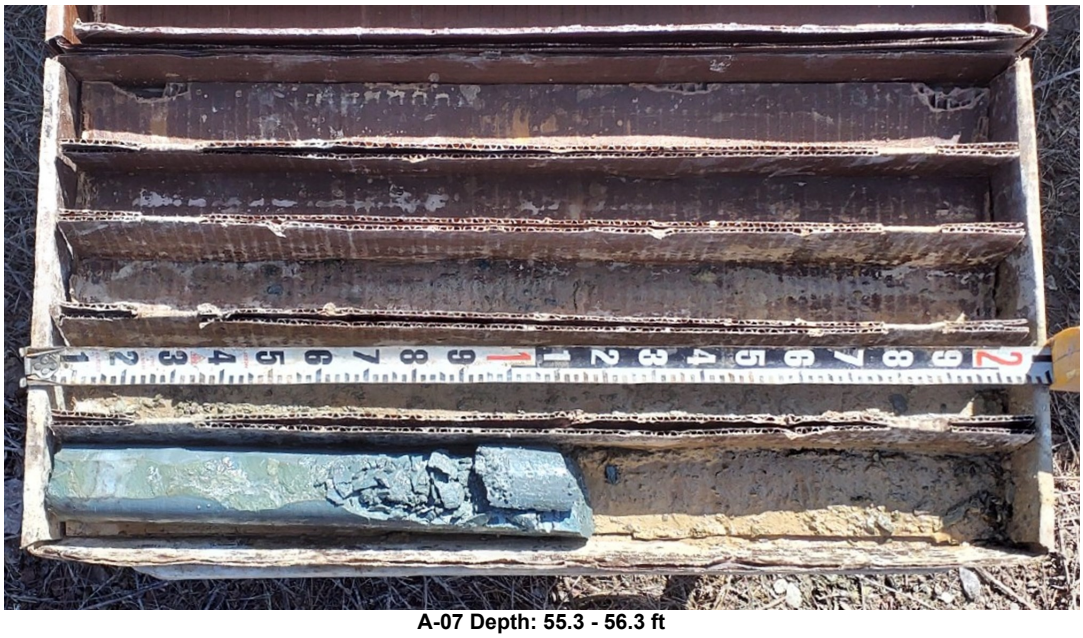


A-07 Depth: 45.3 - 50.3 ft
RUN-05
REC-72%
RQD-0%



A-07 Depth: 50.3 - 55.3 ft
RUN-06
REC-100%
RQD-90%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-07** Sheet 4 of 4
Date:	01/27/2025	**Elevation:** 830 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.952569 Longitude: -84.358719	



A-07 Depth: 55.3 - 56.3 ft
RUN-07
REC-100%
RQD-0%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-07
				Sheet 1 of 2	
Date:	01/27/2025	Elevation:	830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.952569 Longitude: -84.358719		



Box 1: 26.4 to 38.3 feet



Box 2: 38.3 to 52.1 feet

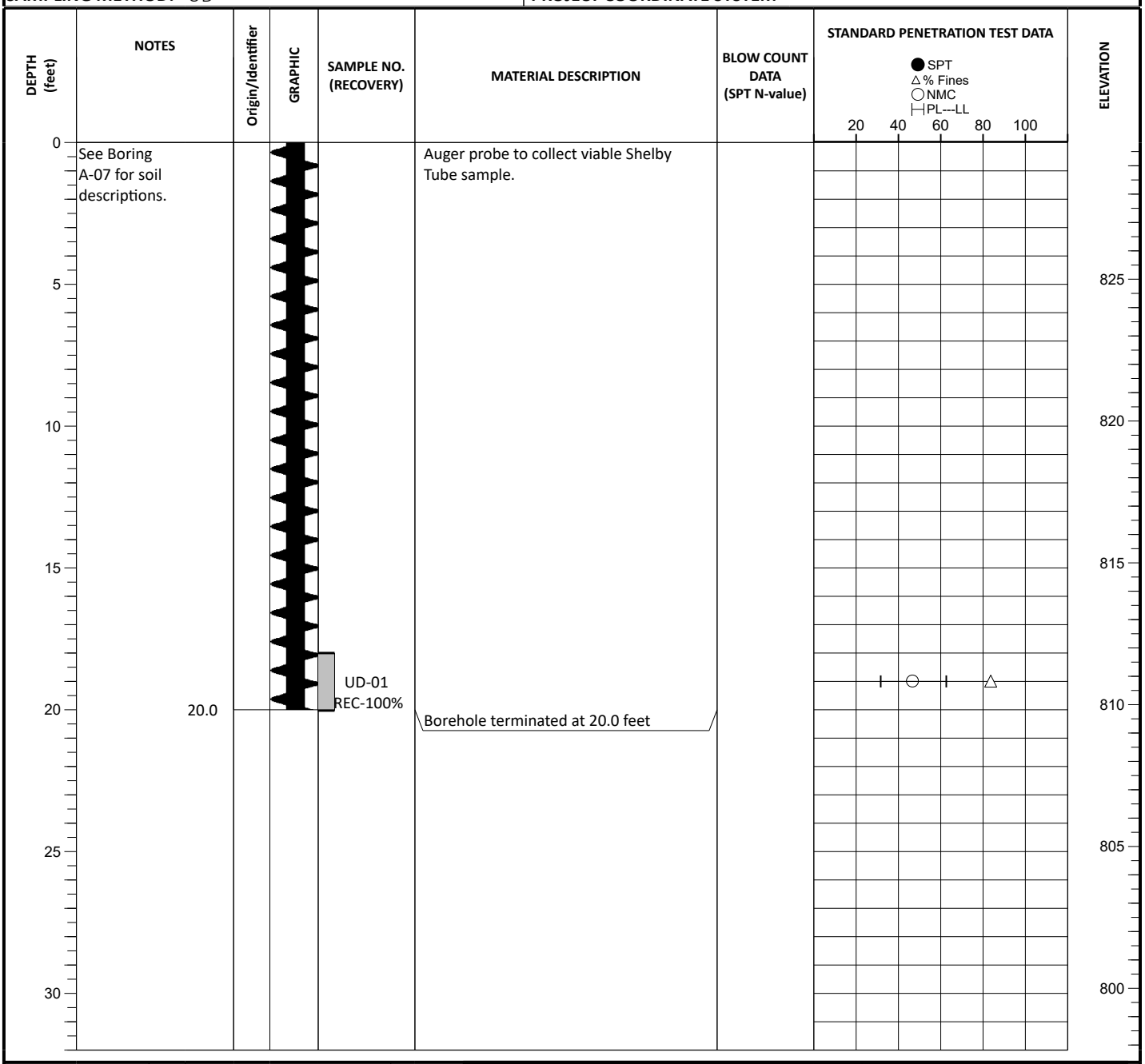
Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-07**
				Sheet 2 of 2	
Date:	01/27/2025	**Elevation:**	830 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.952569 Longitude: -84.358719		



Box 3: 52.1 to 56.3 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-07A *Sheet 1 of 1*

DATE DRILLED: 01/29/2025	**ELEVATION:** 830 ft	**NOTES:** Offset boring to collect undisturbed Shelby Tube samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.952553 **LONGITUDE:** -84.358753
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	01/29/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-08 *Sheet 1 of 2*

DATE DRILLED: 01/27/2025	**ELEVATION:** 813 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 46.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.953128 **LONGITUDE:** -84.360928
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					0.4 TOPSOIL, 5 inches, trace gravel			
	Hole caved at 2.5 feet			SS-01 (16 in)	1.3 SILT (ML), some clay, little sand, trace gravel, stiff, brown, moist	3-5-5 N = 10 PPV= 2.0		
				SS-02 (18 in)	FAT CLAY (CH), little silt, trace sand, trace chert, stiff, red brown with tan, moist	4-5-7 N = 12 PPV= 2.2		809
5		Residuum		SS-03 (16 in)		5-5-7 N = 12 PPV= 2.1		
				SS-04 (18 in)		4-6-7 N = 13 PPV= 1.9		804
10								
				SS-05 (13 in)	Weathered rock, sampled as limestone fragments, little sand, trace clay, very dense, gray with brown, dry	2-4-50/1" N = 50/1" PPV= 1.4		799
15	Auger refusal at 15.9 feet				14.5			
	Loss of circulation				15.9 LIMESTONE, gray, very poor quality, 30° to 40° bedding, fresh to slightly weathered, hard			
				RUN-01 REC-40% RQD-11%	16.8 Void			
					19.3 LIMESTONE, gray, very poor quality, 30° to 40° bedding, moderately weathered to fresh, hard			794
20					20.3 Void 20.7 Soil filled cavity 21.1 LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to slightly weathered, hard 21.7 Void			
				RUN-02 REC-76% RQD-32%	22.0 LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to moderately weathered, hard 23.0 Soil filled cavity 23.2 LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to slightly weathered, hard 23.4 Void			789
25					23.6 LIMESTONE, gray, poor quality to good quality, 30° to 40° bedding, moderately weathered to fresh, hard			
				RUN-03 REC-100% RQD-38%				784
30								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/27/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-08 *Sheet 2 of 2*

DATE DRILLED: 01/27/2025	**ELEVATION:** 813 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 46.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.953128 **LONGITUDE:** -84.360928
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-04 REC-100% RQD-82%	LIMESTONE, gray, poor quality to good quality, 30° to 40° bedding, moderately weathered to fresh, hard	779
			RUN-05 REC-94% RQD-78%		
40	39.8 40.1			Void LIMESTONE, gray, excellent quality to very poor quality, 30° to 40°, slightly weathered to fresh, hard	774
	Lifter did not retrieve remaining 4 inches; resulted in lower recovery and RQD.		RUN-06 REC-100% RQD-92%		
45					769
	46.9		RUN-07 REC-69% RQD-0%	Borehole terminated at 46.9 feet	
50					764
55					759
60					754

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	01/27/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

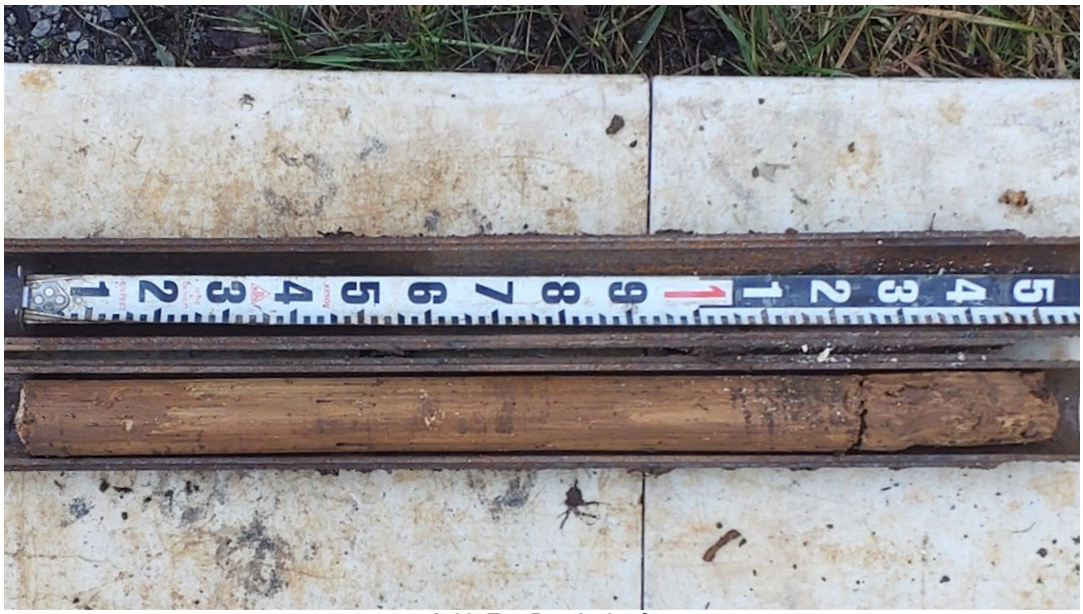
Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**SPT Photographs:**	**A-08**
				Sheet 1 of 3	
Date:	01/27/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953128	Longitude: -84.360928		



A-08, Top Depth: 1.0 ft



A-08, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-08**
				Sheet 2 of 3	
Date:	01/27/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.953128 Longitude: -84.360928		



A-08, Top Depth: 6.0 ft



A-08, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-08**
				Sheet 3 of 3	
Date:	01/27/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953128	Longitude: -84.360928		

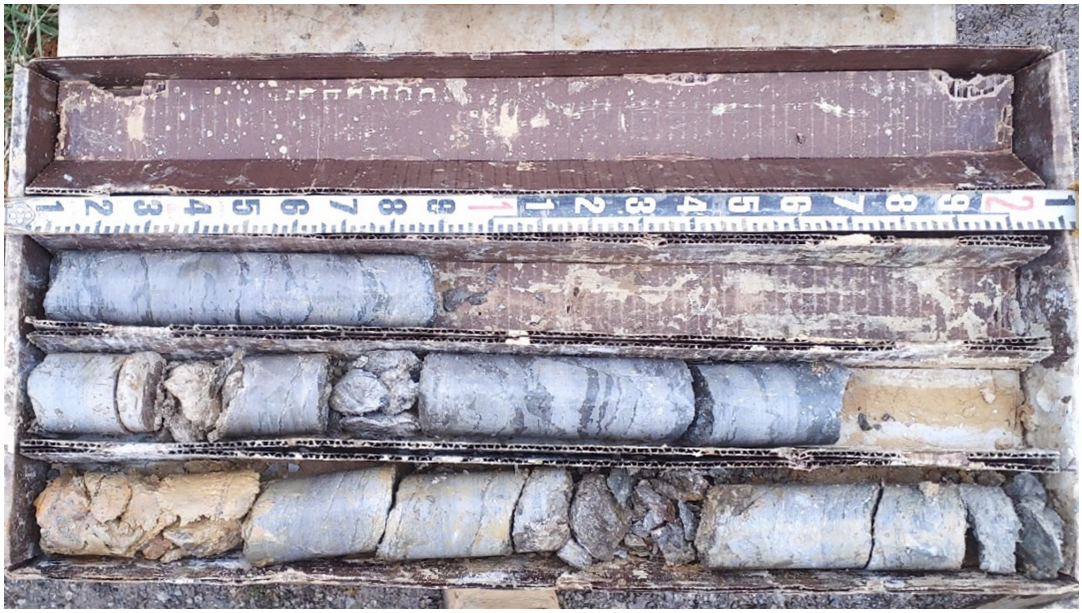


A-08, Top Depth: 13.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-08**
		Sheet 1 of 4	
Date:	01/27/2025 **Elevation:** 813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953128 Longitude: -84.360928	



A-08 Depth: 15.9 - 20.6 ft
RUN-01
REC-40%
RQD-11%

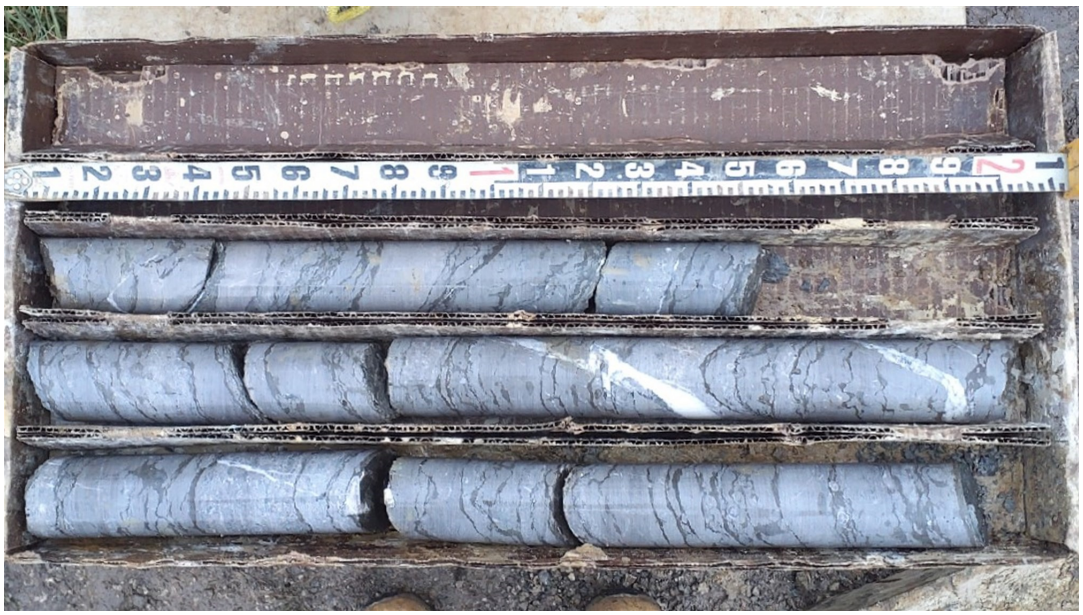


A-08 Depth: 20.6 - 25.6 ft
RUN-02
REC-76%
RQD-32%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-08** Sheet 2 of 4
Date:	01/27/2025	**Elevation:** 813 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953128 Longitude: -84.360928	

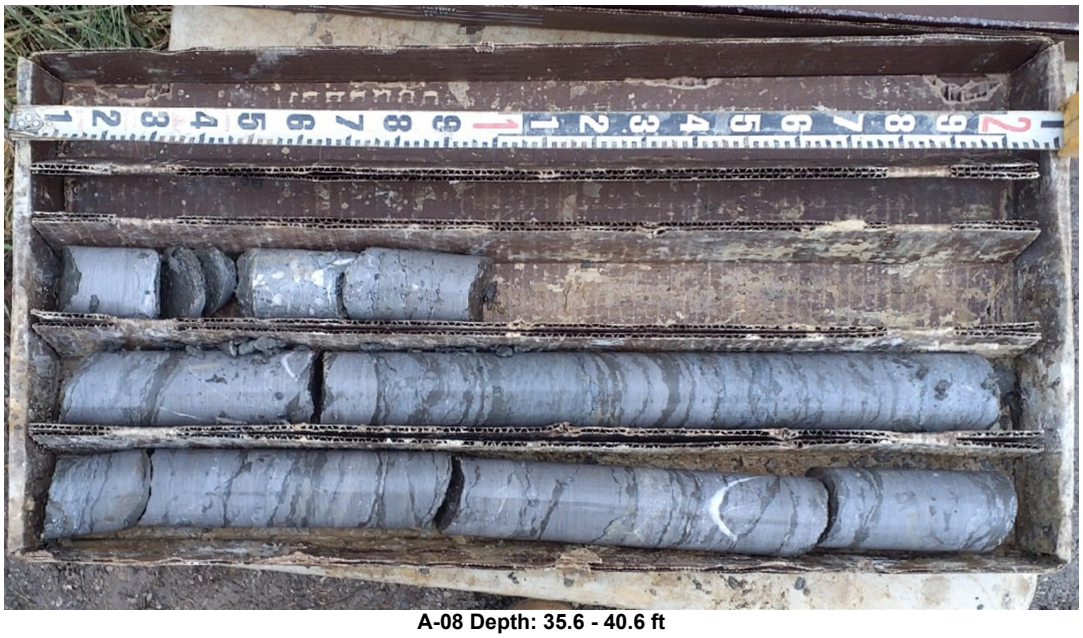


A-08 Depth: 25.6 - 30.6 ft
RUN-03
REC-100%
RQD-38%

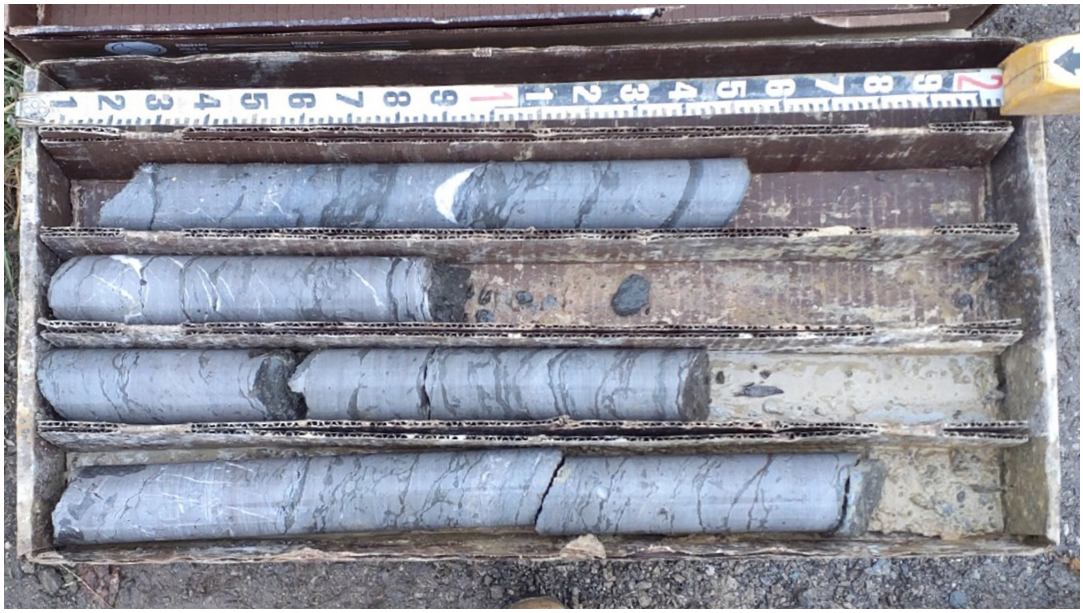


A-08 Depth: 30.6 - 35.6 ft
RUN-04
REC-100%
RQD-82%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**A-08**
		Sheet 3 of 4	
Date:	01/27/2025 **Elevation:** 813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953128 Longitude: -84.360928	



A-08 Depth: 35.6 - 40.6 ft
RUN-05
REC-94%
RQD-78%



A-08 Depth: 40.6 - 45.6 ft
RUN-06
REC-100%
RQD-92%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-08** Sheet 4 of 4
Date:	01/27/2025	**Elevation:** 813 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953128 Longitude: -84.360928	



A-08 Depth: 45.6 - 46.9 ft
RUN-07
REC-69%
RQD-0%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**A-08**
				Sheet 1 of 2	
Date:	01/27/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953128	Longitude: -84.360928		

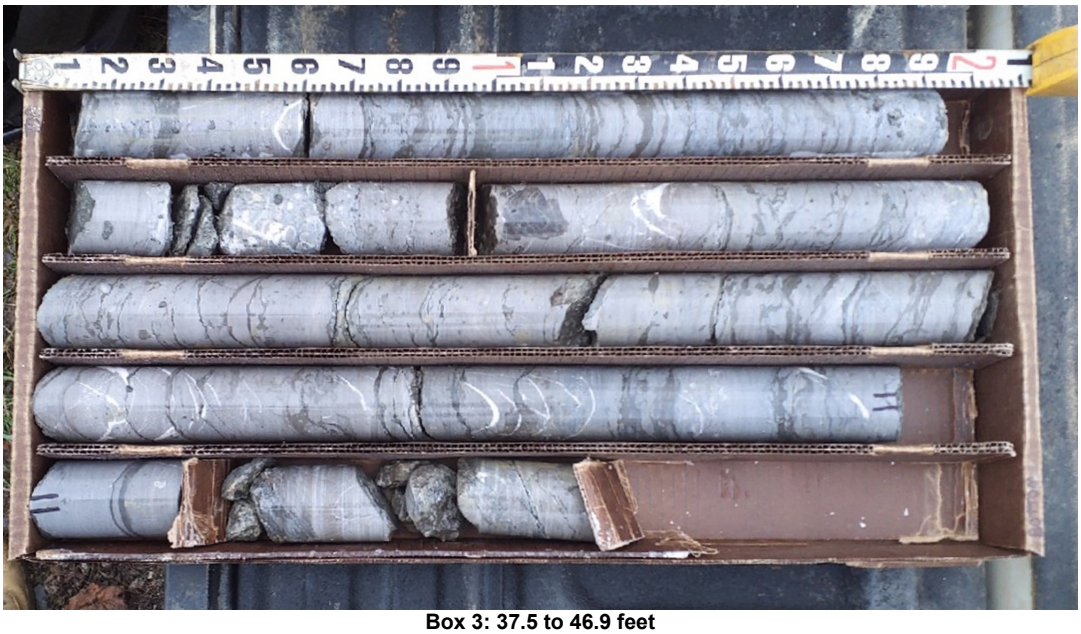


Box 1: 15.9 to 28.9 feet



Box 2: 28.9 to 37.5 feet

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-08**
				Sheet 2 of 2	
Date:	01/27/2025	**Elevation:**	813 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953128	Longitude: -84.360928		



Box 3: 37.5 to 46.9 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-09 *Sheet 1 of 3*

DATE DRILLED: 02/05/2025	**ELEVATION:** 860 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 84.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954056 **LONGITUDE:** -84.355011
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢PL---LL; 20 40 60 80 100)	ELEVATION
0	0.5				TOPSOIL, 6 inches			
				SS-01 (16 in)	FAT CLAY (CH), little organics, stiff, dark red brown, moist	PPV= 2.0 4-5-7 N = 12		
	3.0			SS-02 (16 in)	FAT CLAY (CH), little organics, trace sand, stiff, dark red brown, moist	PPV= 2.1 4-5-5 N = 10		
5	5.5			SS-03 (18 in)	FAT CLAY (CH), little organics, firm, dark red brown, moist	PPV= 0.6 3-3-5 N = 8		855
	8.0			SS-04 (18 in)	FAT CLAY WITH SAND (CH), little organics, trace chert, firm, dark red brown, moist	PPV= 0.8 3-3-4 N = 7		
10				SS-05 (18 in)		PPV= 1.0 4-3-5 N = 8		850
15		Residuum						845
	17.0			SS-06 (18 in)	FAT CLAY (CH), little organics, firm, dark red brown, wet to moist	PPV= 0.5 4-4-3 N = 7		
20								840
				SS-07 (18 in)		PPV= 0.6 2-2-3 N = 5		
25								835
	27.0			SS-08 (18 in)	FAT CLAY WITH SAND (CH), some organics, soft, dark red brown, wet to moist	PPV= 0.3 2-1-3 N = 4		
30								830
	32.0							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/05/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-09 *Sheet 2 of 3*
DATE DRILLED: 02/05/2025	**ELEVATION:** 860 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 84.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954056 **LONGITUDE:** -84.355011
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35				SS-09 (18 in)	FAT CLAY (CH), little organics, soft, dark red brown, wet to moist	PPV= 1.0 2-2-1 N = 3		825
	37.0	Residuum		SS-10 (13 in)	LEAN CLAY (CL), some organics, very soft, dark red brown, wet	PPV= 0.1 0-0-0 N = WOH		
40								820
				SS-11 (18 in)		PPV= 0.0 0-0-0 N = WOH		
45								815
	47.0			SS-12 (16 in)	FAT CLAY (CH), some weathered rock fragments, trace limestone fragments, hard, dark red brown, wet	PPV= 0.8 5-6-36 N = 42		
50	Auger refusal at 53.9 feet							810
	53.9			RUN-01 REC-90% RQD-90%	LIMESTONE, dark gray, good quality to excellent quality, 25° to 30° bedding, fresh, hard			
55				RUN-02 REC-100% RQD-88%				805
60				RUN-03 REC-100% RQD-86%				800

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/05/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-09 *Sheet 3 of 3*
DATE DRILLED: 02/05/2025	**ELEVATION:** 860 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 84.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954056 **LONGITUDE:** -84.355011
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
65			RUN-04 REC-88% RQD-86%	LIMESTONE, dark gray, good quality to excellent quality, 25° to 30° bedding, fresh, hard	795
70			RUN-05 REC-96% RQD-72%		790
75			RUN-06 REC-100% RQD-82%		785
80			RUN-07 REC-100% RQD-100%		780
85	84.9			Borehole terminated at 84.9 feet	775
90					770
95					765

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	02/05/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**SPT Photographs:** **A-09** Sheet 1 of 6
Date:	02/05/2025	**Elevation:** 860 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.954056 Longitude: -84.355011	



A-09, Top Depth: 1.0 ft



A-09, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-09**
				Sheet 2 of 6	
Date:	02/05/2025	**Elevation:**	860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.954056 Longitude: -84.355011		

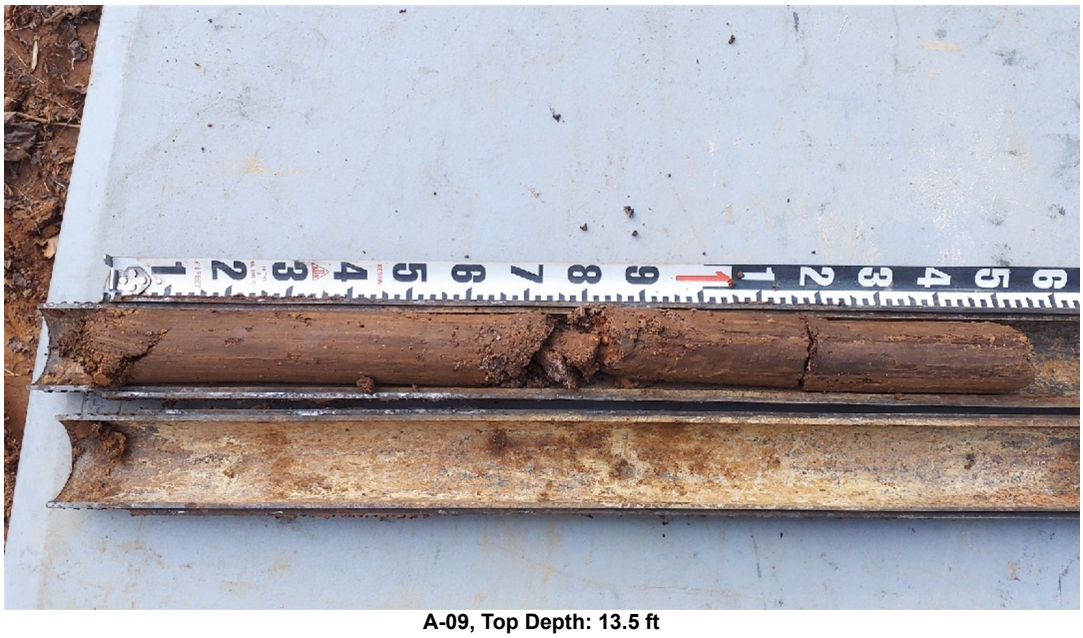


A-09, Top Depth: 6.0 ft



A-09, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-09 Sheet 3 of 6
Date:	02/05/2025	**Elevation:**	860 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.954056	Longitude: -84.355011	



A-09, Top Depth: 13.5 ft



A-09, Top Depth: 18.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	SPT Photographs:	A-09
		Sheet 4 of 6	
Date: 02/05/2025	Elevation: 860 ft	Notes:	
Photographed by: Brandon Waddell	Latitude: 35.954056 Longitude: -84.355011		



A-09, Top Depth: 23.5 ft



A-09, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**SPT Photographs:**	**A-09**
				Sheet 5 of 6	
Date:	02/05/2025	**Elevation:**	860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.954056 Longitude: -84.355011		



A-09, Top Depth: 33.5 ft



A-09, Top Depth: 38.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-09**
				Sheet 6 of 6	
Date:	02/05/2025	**Elevation:**	860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.954056 Longitude: -84.355011		

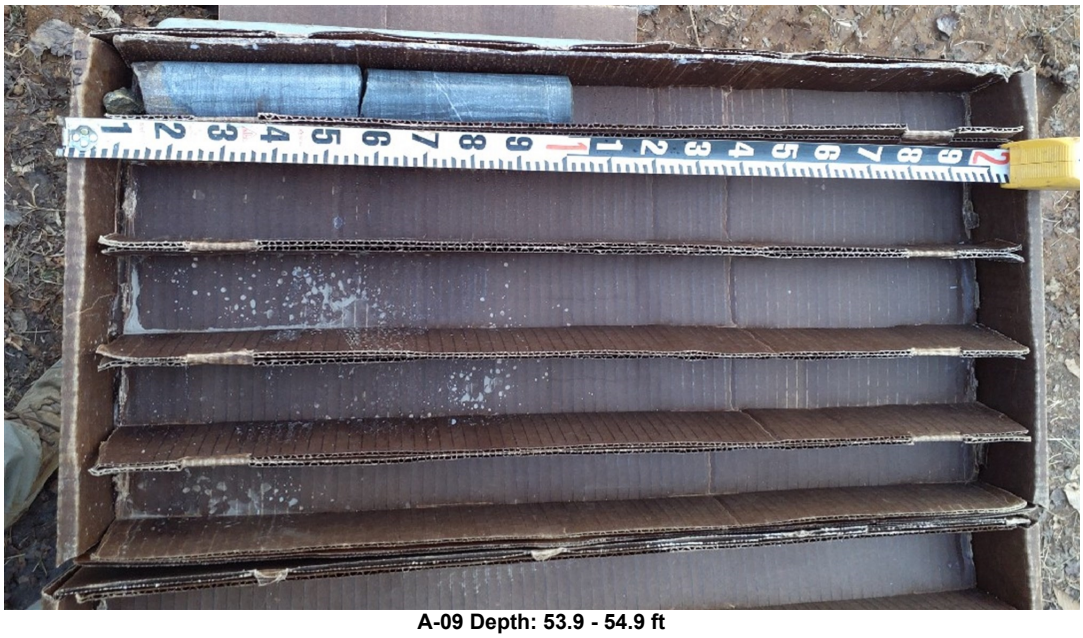


A-09, Top Depth: 43.5 ft



A-09, Top Depth: 48.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-09**
		Sheet 1 of 4	
Date:	02/05/2025 **Elevation:** 860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954056 Longitude: -84.355011	



A-09 Depth: 53.9 - 54.9 ft
RUN-01
REC-90%
RQD-90%



A-09 Depth: 54.9 - 59.9 ft
RUN-02
REC-100%
RQD-88%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**A-09**
		Sheet 2 of 4	
Date:	02/05/2025 **Elevation:** 860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954056 Longitude: -84.355011	



A-09 Depth: 59.9 - 64.9 ft
RUN-03
REC-100%
RQD-86%

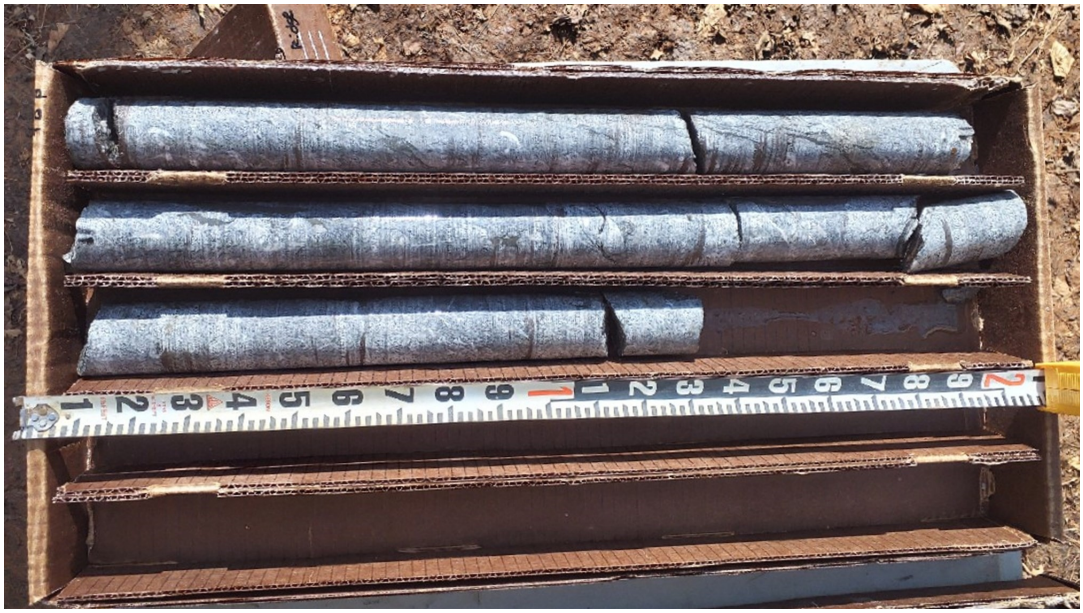


A-09 Depth: 64.9 - 69.9 ft
RUN-04
REC-88%
RQD-86%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-09**
		Sheet 3 of 4	
Date:	02/05/2025 **Elevation:** 860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954056 Longitude: -84.355011	



A-09 Depth: 69.9 - 74.9 ft
RUN-05
REC-96%
RQD-72%



A-09 Depth: 74.9 - 79.9 ft
RUN-06
REC-100%
RQD-82%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Core Photographs:	A-09
				Sheet 4 of 4	
Date:	02/05/2025	Elevation:	860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.954056 Longitude: -84.355011		



A-09 Depth: 79.9 - 84.9 ft
RUN-07
REC-100%
RQD-100%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-09
				Sheet 1 of 2	
Date:	02/05/2025	Elevation:	860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.954056 Longitude: -84.355011		



Box 1; 53.9 to 62.9



Box 2; 62.9 to 72.7

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	A-09
				Sheet 2 of 2	
Date:	02/05/2025	Elevation:	860 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.954056	Longitude: -84.355011	



Box 3; 72.7 to 81.9



Box 4; 81.9 to 84.9

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-09A *Sheet 1 of 2*

DATE DRILLED: 02/06/2025	**ELEVATION:** 860 ft	**NOTES:** Offset boring to collect undisturbed Shelby Tube samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 32.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954097 **LONGITUDE:** -84.355078
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
0					Auger probe to collect viable Shelby Tube samples.			
5								856
10								851
15				UD-01 REC-82%				846
20								841
25								836
30	32.0			UD-02 REC-92%				831

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	02/06/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-09A *Sheet 2 of 2*
DATE DRILLED: 02/06/2025	**ELEVATION:** 860 ft	**NOTES:** Offset boring to collect undisturbed Shelby Tube samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 32.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954097 **LONGITUDE:** -84.355078
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
					Borehole terminated at 32.0 feet			
35								826
40								821
45								816
50								811
55								806
60								801

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	02/06/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-10 *Sheet 1 of 3*

DATE DRILLED: 02/03/2025	**ELEVATION:** 826 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 89.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.950733 **LONGITUDE:** -84.355342
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
0	0.5				TOPSOIL, 6 inches			
				SS-01 (17 in)	LEAN CLAY (CL), trace gravel, very stiff, dark tan brown, moist	PPV= 1.2 4-8-8 N = 16		
	3.0			SS-02 (18 in)	LEAN CLAY (CL), trace sand, hard, dark tan brown, moist	PPV= 1.0 11-17-21 N = 38		822
5				SS-03 (14 in)		PPV= 1.0		
	8.0			SS-04 (18 in)	SILTY SAND WITH GRAVEL (SM), trace sand, dense to very dense, dark tan brown, moist	10-17-21 N = 38 PPV= 1.2		817
10		Residuum				8-10-21 N = 31		
				SS-05 (18 in)		PPV= 1.5 10-28-42 N = 70		812
15								
				SS-06 (18 in)		PPV= 1.2 12-18-23 N = 41		807
20								
				SS-07 (17 in)		PPV= 0.6 25-28-36 N = 64		802
25								
				SS-08 (13 in)		PPV= 1.0 27-50/2" N = 50/2"		797
30								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/03/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-10 *Sheet 2 of 3*

DATE DRILLED: 02/03/2025	**ELEVATION:** 826 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 89.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.950733 **LONGITUDE:** -84.355342
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35				SS-09 (11 in)	SILTY SAND WITH GRAVEL (SM), trace sand, dense to very dense, dark tan brown, moist	PPV= 1.2 44-50/1" N = 50/1"		792
	37.0				Weathered rock, sampled as shale fragments, very dense, dark gray, dry			
40				SS-10 (8 in)		48-50/1" N = 50/1"		787
		Residuum		SS-11 (7 in)		50/4" N = 50/4"		
45								782
				SS-12 (7 in)		50/1" N = 50/1"		
50								777
				SS-13 (7 in)		50/4" N = 50/4"		
55								772
	57.0 Auger refusal at 59.1 feet			SS-14 (2 in)	Weathered rock, sampled as shale fragments, trace chert, very dense, dark gray, dry	50/4" N = 50/4"		
60	59.1			RUN-01 REC-0% RQD-0% RUN-02 REC-18% RQD-0%	CALCAREOUS SHALE, dark gray brown, very poor quality, moderately weathered to highly weathered, moderately hard			767

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/03/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-10 *Sheet 3 of 3*

DATE DRILLED: 02/03/2025	**ELEVATION:** 826 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 89.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.950733 **LONGITUDE:** -84.355342
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
65			RUN-03 REC-16% RQD-0%	CALCAREOUS SHALE, dark gray brown, very poor quality, moderately weathered to highly weathered, moderately hard	762
70			RUN-04 REC-46% RQD-6%		757
75			RUN-05 REC-56% RQD-12%		752
80	79.9		RUN-06 REC-76% RQD-72%	CALCAREOUS SHALE, dark gray brown, fair quality to excellent quality, moderately weathered to fresh, moderately hard	747
85			RUN-07 REC-96% RQD-90%		742
90	89.9			Borehole terminated at 89.9 feet	737
95					732

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	02/03/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**SPT Photographs:**	**A-10**
				Sheet 1 of 7	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733	Longitude: -84.355342		



A-10, Top Depth: 1.0 ft



A-10, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-10**
				Sheet 2 of 7	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.950733 Longitude: -84.355342		



A-10, Top Depth: 6.0 ft



A-10, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-10**
				Sheet 3 of 7	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733	Longitude: -84.355342		



A-10, Top Depth: 13.5 ft



A-10, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-10**
				Sheet 4 of 7	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733	Longitude: -84.355342		



A-10, Top Depth: 23.5 ft



A-10, Top Depth: 28.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**SPT Photographs:**	**A-10**
			Sheet 5 of 7
Date:	02/03/2025 **Elevation:** 826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733 Longitude: -84.355342	



A-10, Top Depth: 33.5 ft



A-10, Top Depth: 38.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-10**
				Sheet 6 of 7	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.950733 Longitude: -84.355342		



A-10, Top Depth: 43.5 ft



A-10, Top Depth: 48.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**SPT Photographs:**	**A-10**
				Sheet 7 of 7	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude:	35.950733 Longitude: -84.355342		

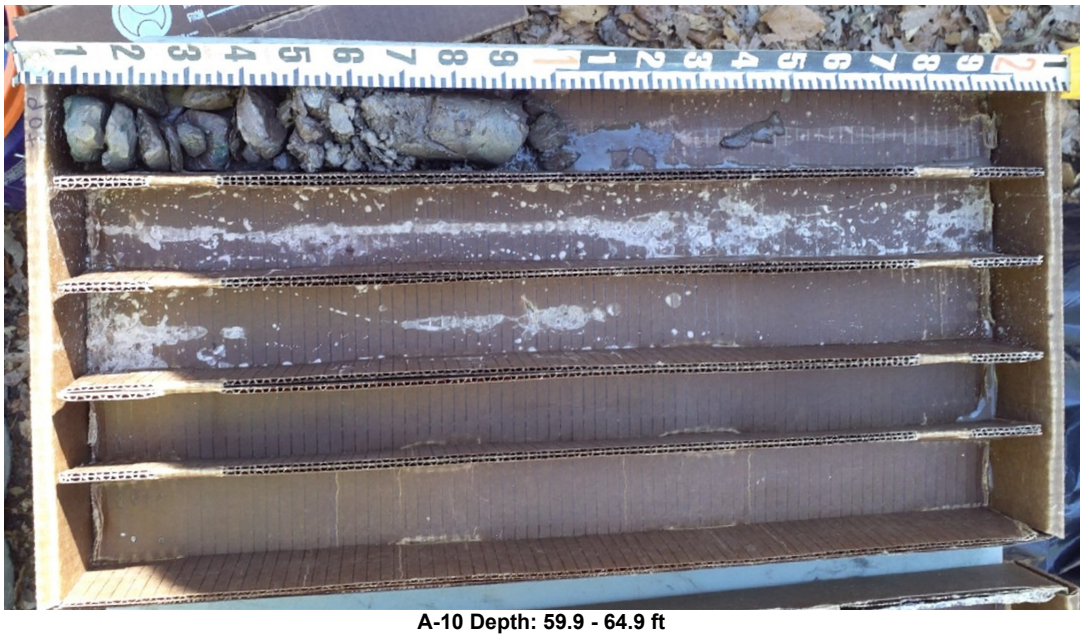


A-10, Top Depth: 53.5 ft



A-10, Top Depth: 58.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-10**
		Sheet 1 of 3	
Date:	02/03/2025 **Elevation:** 826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733 Longitude: -84.355342	



A-10 Depth: 59.9 - 64.9 ft
RUN-02
REC-18%
RQD-0%



A-10 Depth: 64.9 - 69.9 ft
RUN-03
REC-16%
RQD-0%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**A-10**
		Sheet 2 of 3	
Date:	02/03/2025	**Elevation:**	826 ft
Photographed by:	Brandon Waddell	Latitude: 35.950733 Longitude: -84.355342	



A-10 Depth: 69.9 - 74.9 ft
RUN-04
REC-46%
RQD-6%

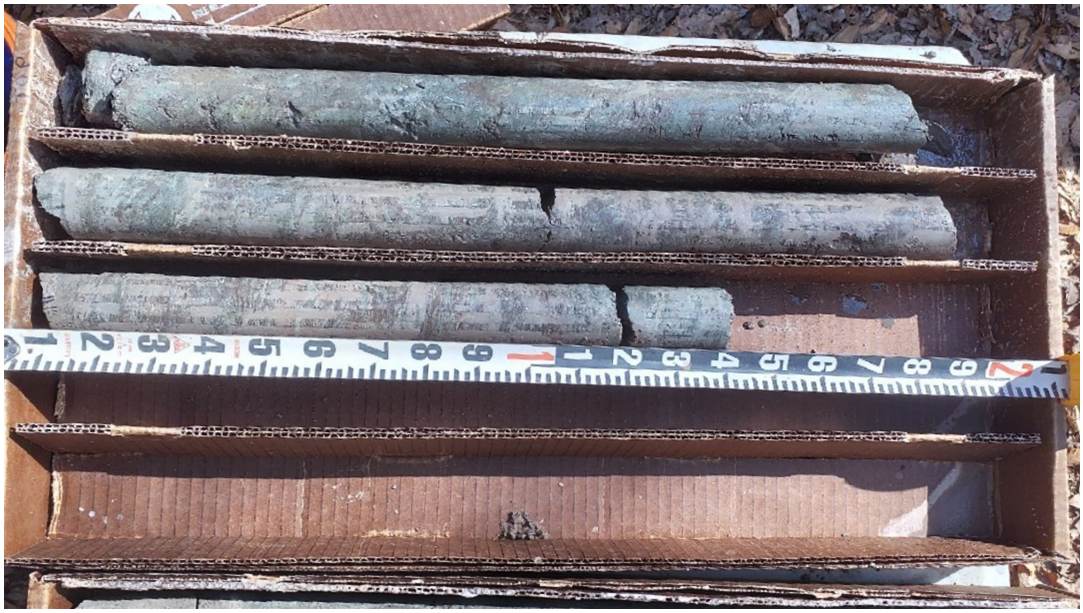


A-10 Depth: 74.9 - 79.9 ft
RUN-05
REC-56%
RQD-12%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-10**
		Sheet 3 of 3	
Date:	02/03/2025 **Elevation:** 826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733 Longitude: -84.355342	



A-10 Depth: 79.9 - 84.9 ft
RUN-06
REC-76%
RQD-72%



A-10 Depth: 84.9 - 89.9 ft
RUN-07
REC-96%
RQD-90%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**A-10**
				Sheet 1 of 1	
Date:	02/03/2025	**Elevation:**	826 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.950733	Longitude: -84.355342		



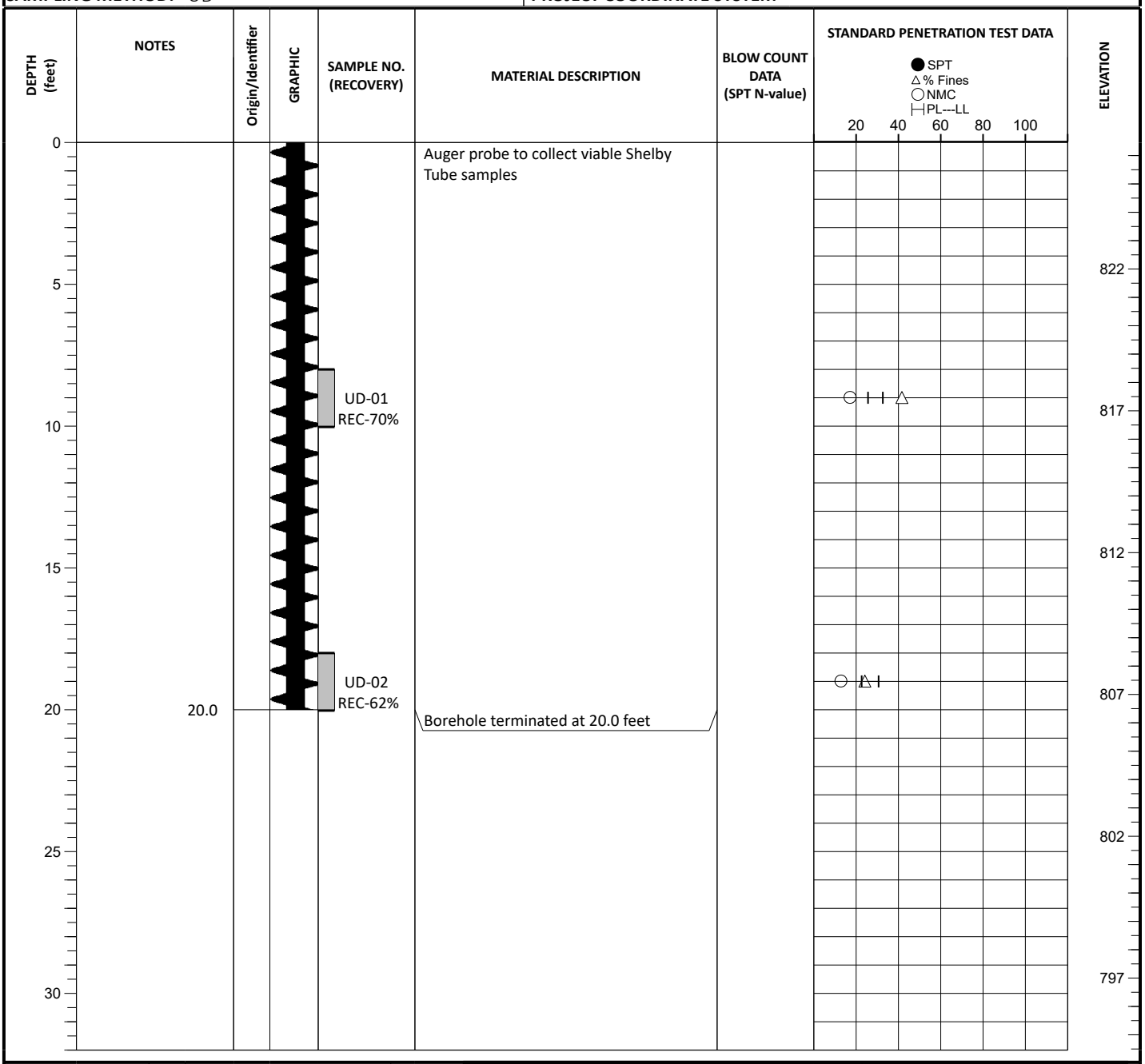
Box 1; 59.1 to 82.4



Box 2; 82.4 to 89.9

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-10A *Sheet 1 of 1*

DATE DRILLED: 02/04/2025	**ELEVATION:** 826 ft	**NOTES:** Offset boring to collect undisturbed Shelby Tube samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.950775 **LONGITUDE:** -84.355303
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	02/04/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-11 *Sheet 1 of 2*
DATE DRILLED: 01/30/2025	**ELEVATION:** 832 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 54.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.953986 **LONGITUDE:** -84.357439
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					TOPSOIL, 6 inches			
0.5				SS-01 (7 in)	LEAN CLAY (CL), some clay, little sand, firm to stiff, brown, moist	2-3-2 N = 5		
				SS-02 (18 in)		3-4-5 N = 9 PPV= 1.9		828
5								
5.5				SS-03 (18 in)	FAT CLAY WITH SAND (CH), little silt, trace chert, very stiff, tan brown, moist	5-8-12 N = 20 PPV= 3.1		
				SS-04 (17 in)		5-8-11 N = 19 PPV= 3.9		823
10		Residuum						
				SS-05 (14 in)		5-8-11 N = 19 PPV= 4.0		818
15								
17.0					FAT CLAY (CH), little sand, little chert, very stiff, red brown with black, moist			
	Hole caved at 19.2 feet			SS-06 (17 in)		4-8-11 N = 19 PPV= 4.0		813
20								
	Auger refusal at 23.6 feet			SS-07 (1 in)	Weathered rock, sampled as limestone fragments, very dense, gray, dry	50/1" N = 50/1"		
23.5				RUN-01 REC-100% RQD-31%	LIMESTONE, gray, poor quality, 30° to 40° bedding, slightly weathered to fresh, hard			808
23.6								
25								
25.3					Soil filled cavity			
25.8					LIMESTONE, gray, poor quality, 30° to 40° bedding, slightly weathered to fresh, hard			
26.4					Soil filled cavity			
27.5	Loss of circulation			RUN-02 REC-68% RQD-34%	LIMESTONE, gray, poor quality, 30° to 40° bedding, fresh to slightly weathered, hard			803
30								
30.1					Soil filled cavity			
30.8					LIMESTONE, gray, poor quality, moderately weathered, hard			
31.6					Soil filled cavity			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	01/30/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-11 *Sheet 2 of 2*
DATE DRILLED: 01/30/2025	**ELEVATION:** 832 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Thomas Chew	**BORING DEPTH:** 54.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Zane Robinson	**LATITUDE:** 35.953986 **LONGITUDE:** -84.357439
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
	32.0		RUN-03 REC-72% RQD-48%	LIMESTONE, gray, poor quality, moderately weathered, hard	
	32.2			Soil filled cavity	
	32.5			LIMESTONE, gray, poor quality to excellent quality, 30° to 40° bedding, fresh, hard	798
35					
			RUN-04 REC-100% RQD-96%		793
40					
			RUN-05 REC-100% RQD-96%		788
45	45.1			Soil filled cavity	
	45.4			LIMESTONE, gray, fair quality, 30° to 40° bedding, fresh, hard	
	46.0			Soil filled cavity	
	46.5		RUN-06 REC-84% RQD-74%	LIMESTONE, gray, fair quality to excellent quality, 30° to 40° bedding, moderately weathered to fresh, hard	783
50					
			RUN-07 REC-100% RQD-92%		778
55	54.9			Borehole terminated at 54.9 feet	
60					773

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	01/30/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

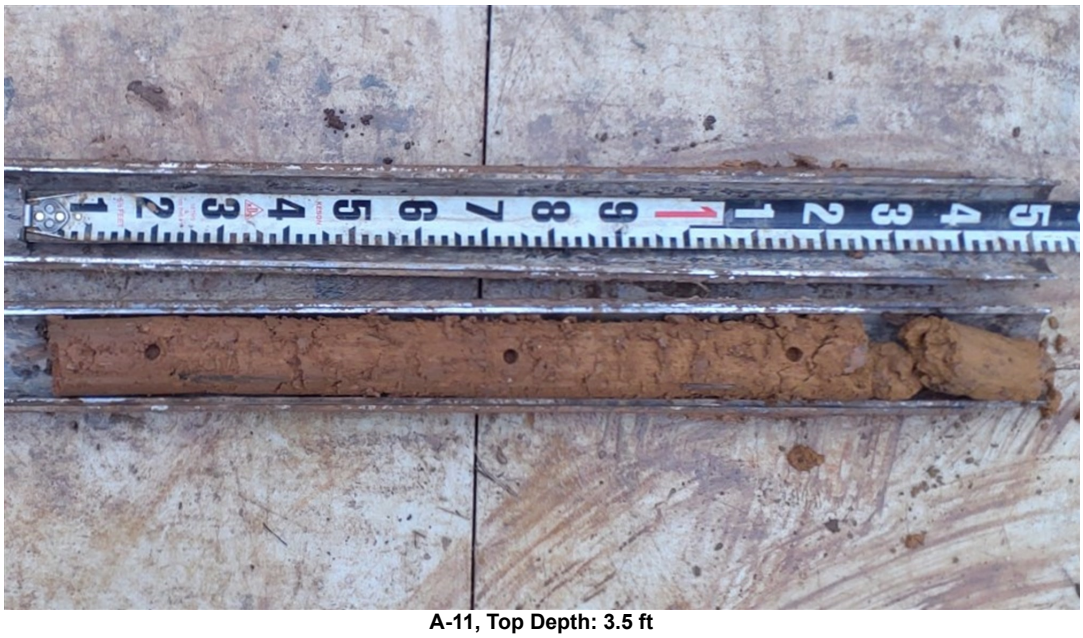
Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-11 Sheet 1 of 4
Date:	01/30/2025	**Elevation:**	832 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953986	Longitude: -84.357439	



A-11, Top Depth: 1.0 ft

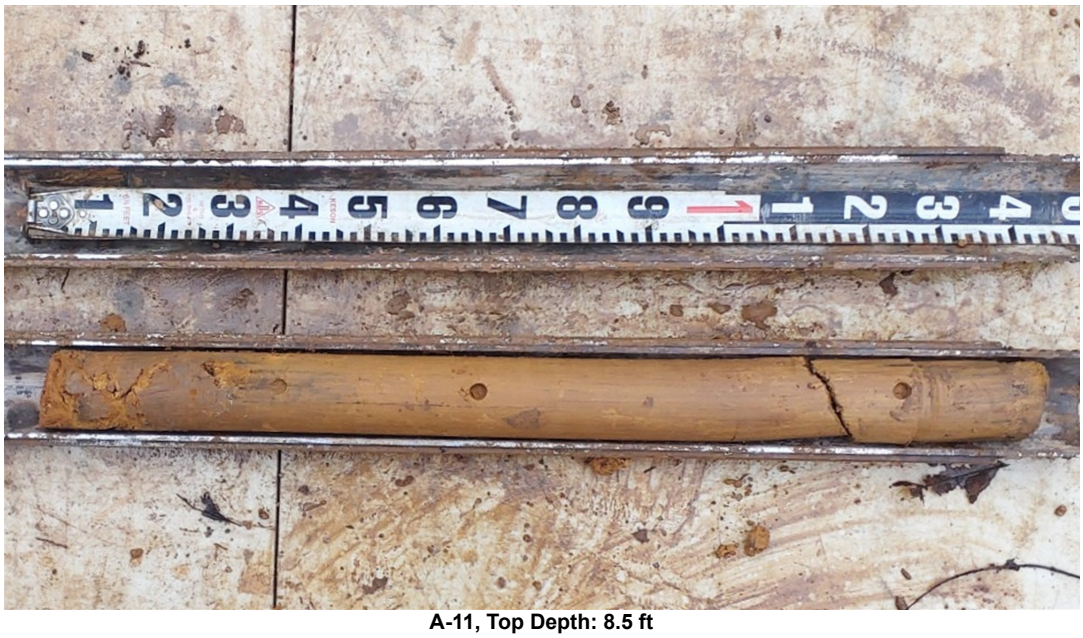


A-11, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**A-11**
				Sheet 2 of 4	
Date:	01/30/2025	**Elevation:**	832 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.953986 Longitude: -84.357439		



A-11, Top Depth: 6.0 ft



A-11, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-11 Sheet 3 of 4
Date:	01/30/2025	Elevation:	832 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953986	Longitude: -84.357439	



A-11, Top Depth: 13.5 ft



A-11, Top Depth: 18.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-11 Sheet 4 of 4
Date:	01/30/2025	**Elevation:**	832 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953986	Longitude: -84.357439	



A-11, Top Depth: 23.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-11** Sheet 1 of 4
Date:	01/30/2025	**Elevation:** 832 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953986 Longitude: -84.357439	



A-11 Depth: 23.6 - 24.9 ft
RUN-01
REC-100%
RQD-31%



A-11 Depth: 24.9 - 29.9 ft
RUN-02
REC-68%
RQD-34%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**A-11**
		Sheet 2 of 4	
Date:	01/30/2025 **Elevation:** 832 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953986 Longitude: -84.357439	



A-11 Depth: 29.9 - 34.9 ft
RUN-03
REC-72%
RQD-48%

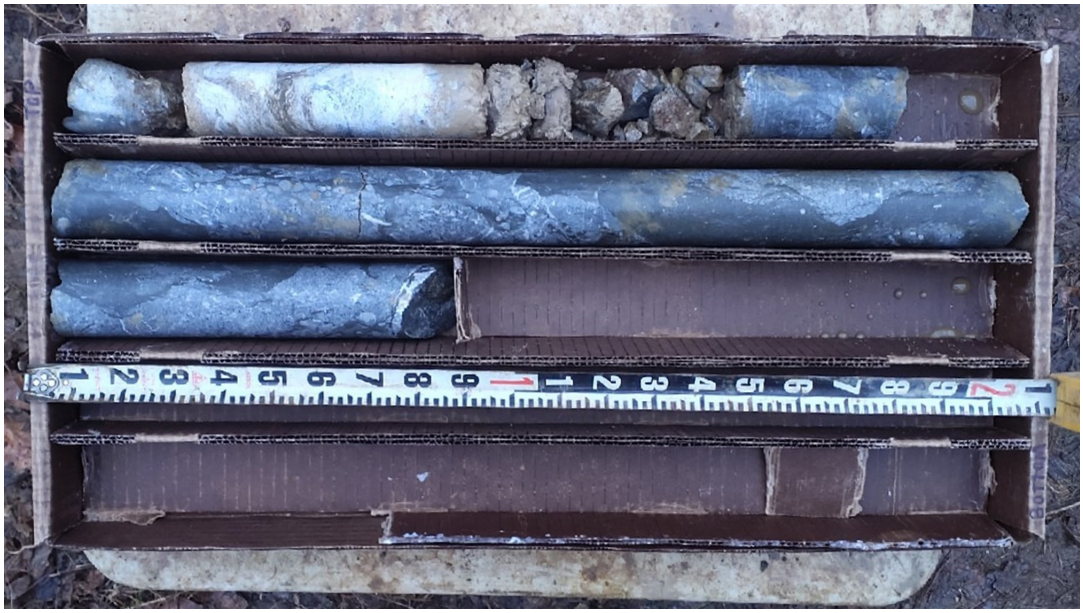


A-11 Depth: 34.9 - 39.9 ft
RUN-04
REC-100%
RQD-96%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-11**
		Sheet 3 of 4	
Date: 01/30/2025	**Elevation:** 832 ft	Notes:	
Photographed by: Zane Robinson	Latitude: 35.953986 Longitude: -84.357439		



A-11 Depth: 39.9 - 44.9 ft
RUN-05
REC-100%
RQD-96%



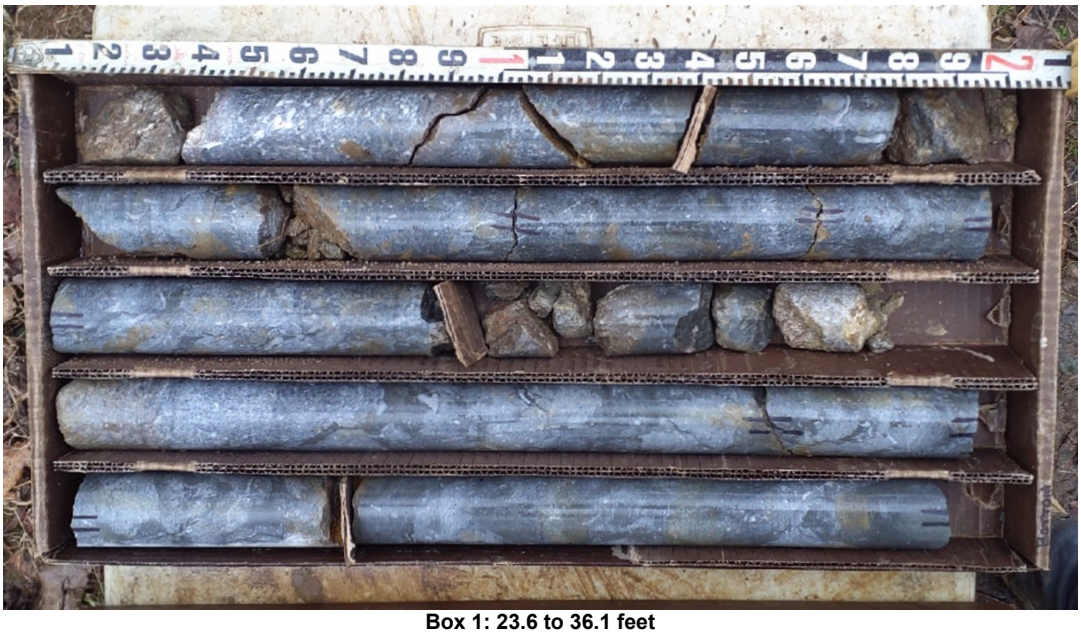
A-11 Depth: 44.9 - 49.9 ft
RUN-06
REC-84%
RQD-74%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **A-11** Sheet 4 of 4
Date:	01/30/2025	**Elevation:** 832 ft	Notes:
Photographed by:	Zane Robinson	Latitude: 35.953986 Longitude: -84.357439	

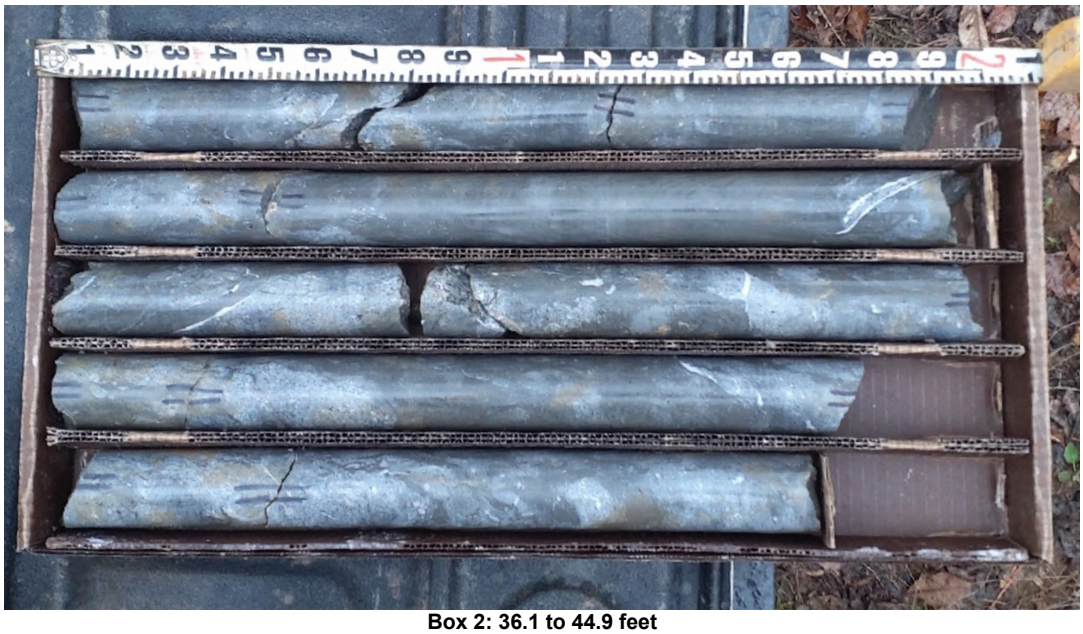


A-11 Depth: 49.9 - 54.9 ft
RUN-07
REC-100%
RQD-92%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-11**
				Sheet 1 of 2	
Date:	01/30/2025	**Elevation:**	832 ft	Notes:	
Photographed by:	Zane Robinson	Latitude: 35.953986	Longitude: -84.357439		



Box 1: 23.6 to 36.1 feet

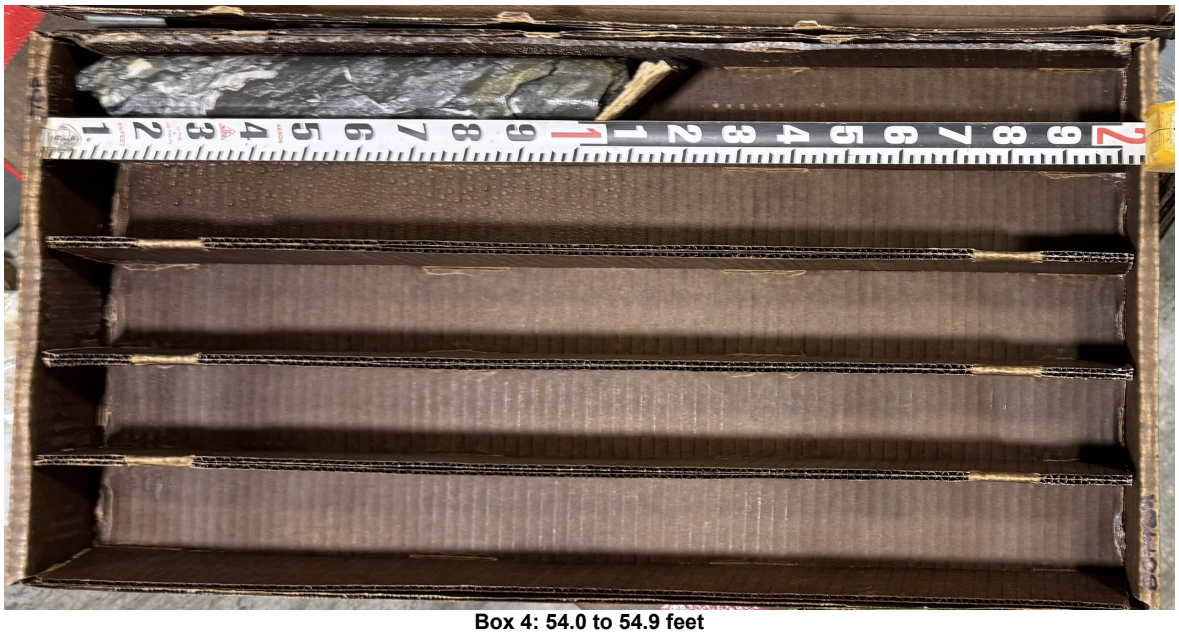


Box 2: 36.1 to 44.9 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**A-11**
				Sheet 2 of 2	
Date:	01/30/2025	**Elevation:**	832 ft	Notes:	
Photographed by:	Zane Robinson	Latitude:	35.953986 Longitude: -84.357439		



Box 3: 44.9 to 54.0 feet



Box 4: 54.0 to 54.9 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-12 *Sheet 1 of 3*

DATE DRILLED: 02/04/2025	**ELEVATION:** 868 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 74.8 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954408 **LONGITUDE:** -84.353567
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
0	0.5				TOPSOIL, 6 inches			
				SS-01 (11 in)	LEAN CLAY (CL), trace silt, firm, dark brown, moist	PPV= 1.0 1-2-3 N = 5		
	3.0			SS-02 (14 in)	LEAN CLAY (CL), trace sand, stiff, dark brown, moist	PPV= 1.6		
5	5.5			SS-03 (17 in)	FAT CLAY (CH), stiff, dark red brown, moist	4-4-5 N = 9 PPV= 1.6		863
	8.0			SS-04 (17 in)	FAT CLAY (CH), trace organics, very stiff, dark red brown, moist	4-5-7 N = 12 PPV= 2.0		
10	12.0	Residuum			SANDY FAT CLAY (CH), trace organics, stiff, dark red brown, moist	6-7-10 N = 17		858
				SS-05 (16 in)		PPV= 2.0 5-6-8 N = 14		
15								853
				SS-06 (16 in)		PPV= 2.0 3-4-7 N = 11		
20								848
				SS-07 (17 in)		PPV= 2.0 3-4-7 N = 11		
25								843
	27.0				FAT CLAY WITH SAND (CH), trace organics, little chert, stiff, dark red brown, moist			
				SS-08 (18 in)		PPV= 2.0 3-4-6 N = 10		
30								838

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/04/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-12 *Sheet 2 of 3*
DATE DRILLED: 02/04/2025	**ELEVATION:** 868 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 74.8 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954408 **LONGITUDE:** -84.353567
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35		Residuum		SS-09 (14 in)	FAT CLAY WITH SAND (CH), trace organics, little chert, stiff, dark red brown, moist	PPV= 1.0 3-4-5 N = 9		833
40				SS-10 (18 in)		PPV= 1.5 3-4-6 N = 10		828
	Auger refusal at 43.9 feet			SS-11 (0 in)		50/-1" N = 50/-1"		
45				RUN-01 REC-89% RQD-56%	LIMESTONE, dark gray, fair quality, 30° to 35° bedding, fresh, hard			823
					Soil cavity			
					LIMESTONE, dark gray, very poor quality, 30° to 35° bedding, fresh, hard			
					Soil cavity			
				RUN-02 REC-36% RQD-6%	LIMESTONE, dark gray, very poor quality, 30° to 35° bedding, fresh, hard			
50					Void			818
				RUN-03 REC-34% RQD-24%	LIMESTONE, dark gray, very poor quality, 30° to 35° bedding, fresh, hard			
55					Void			813
				RUN-04 REC-22% RQD-16%	LIMESTONE, dark gray, very poor quality, 30° to 35° bedding, fresh, hard			
					Soil cavity			
60					LIMESTONE, dark gray, very poor quality, 30° to 35° bedding, fresh, hard			808
				RUN-05 REC-50% RQD-20%				

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	02/04/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-12 *Sheet 3 of 3*

DATE DRILLED: 02/04/2025	**ELEVATION:** 868 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 74.8 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954408 **LONGITUDE:** -84.353567
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
65	64.8		RUN-06 REC-22% RQD-0%	LIMESTONE, dark gray, very poor quality, 30° to 35° bedding, fresh, hard Void	803
	68.7			Soil cavity	
70	69.8		RUN-07 REC-86% RQD-40%	LIMESTONE, dark gray, poor quality, 30° to 35° bedding, fresh, hard	798
75	74.8			Borehole terminated at 74.8 feet	793
80					788
85					783
90					778
95					773

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	02/04/2025		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-12 Sheet 1 of 5
Date:	02/04/2025	Elevation:	868 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.954408	Longitude: -84.353567	



A-12, Top Depth: 1.0 ft



A-12, Top Depth: 3.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	SPT Photographs:	A-12
		Sheet 2 of 5	
Date:	02/04/2025	Elevation: 868 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.954408 Longitude: -84.353567	



A-12, Top Depth: 6.0 ft



A-12, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-12 Sheet 3 of 5
Date:	02/04/2025	Elevation:	868 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.954408	Longitude: -84.353567	



A-12, Top Depth: 13.5 ft



A-12, Top Depth: 18.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: A-12 Sheet 4 of 5
Date:	02/04/2025	Elevation:	868 ft	Notes:
Photographed by:	Brandon Waddell	Latitude: 35.954408	Longitude: -84.353567	



A-12, Top Depth: 23.5 ft



A-12, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	SPT Photographs: A-12
		Sheet 5 of 5
Date: 02/04/2025	Elevation: 868 ft	Notes:
Photographed by: Brandon Waddell	Latitude: 35.954408 Longitude: -84.353567	

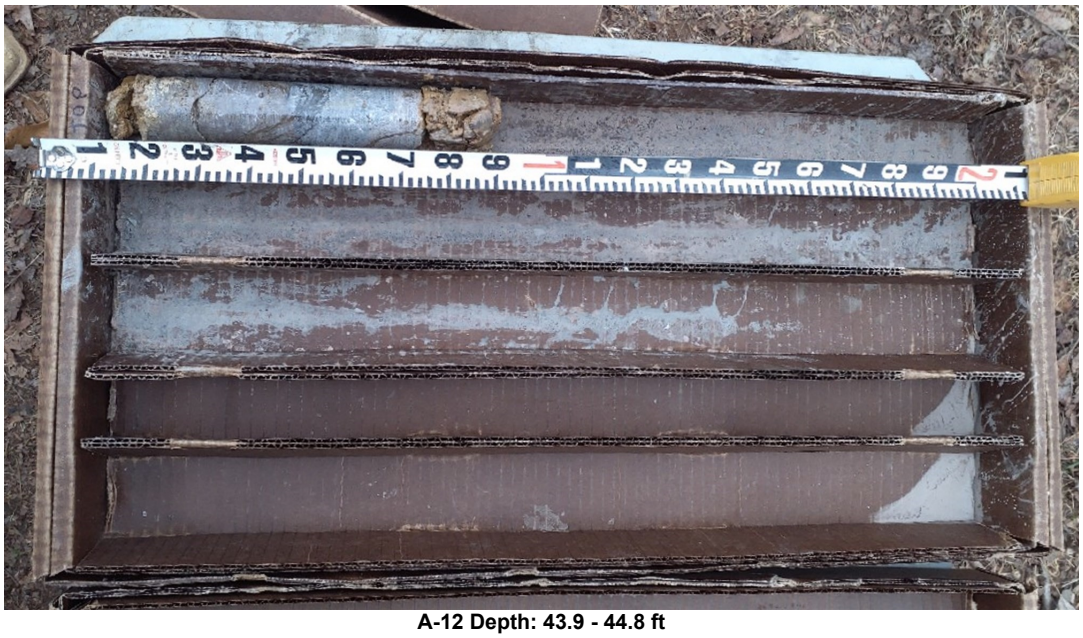


A-12, Top Depth: 33.5 ft



A-12, Top Depth: 38.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-12**
		Sheet 1 of 4	
Date:	02/04/2025 **Elevation:** 868 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954408 Longitude: -84.353567	



A-12 Depth: 43.9 - 44.8 ft
RUN-01
REC-89%
RQD-56%



A-12 Depth: 44.8 - 49.8 ft
RUN-02
REC-36%
RQD-6%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-12**
		Sheet 2 of 4	
Date:	02/04/2025 **Elevation:** 868 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954408 Longitude: -84.353567	



A-12 Depth: 49.8 - 54.8 ft
RUN-03
REC-34%
RQD-24%

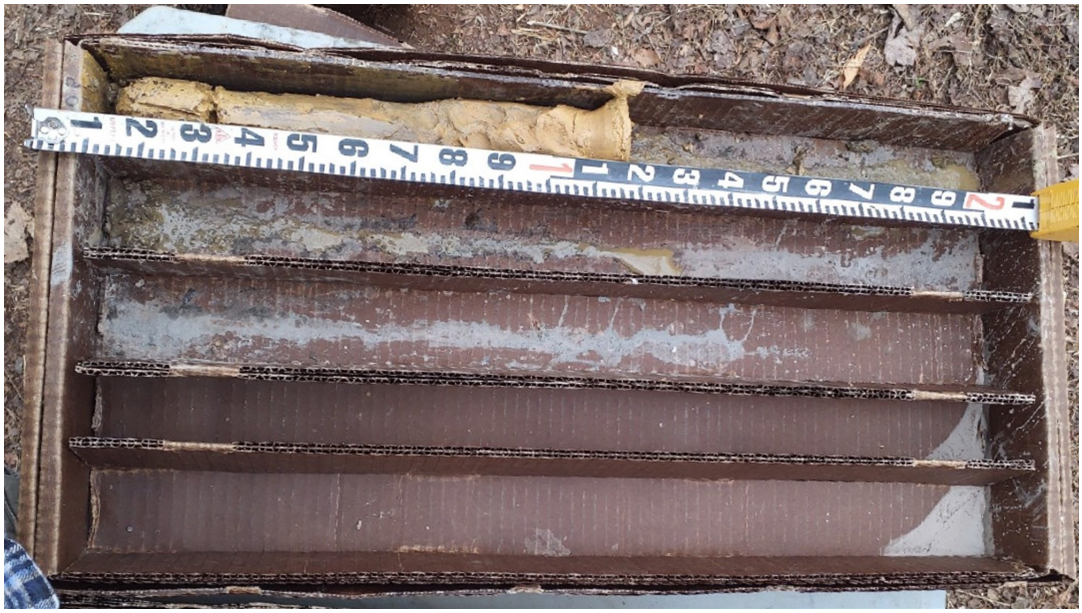


A-12 Depth: 54.8 - 59.8 ft
RUN-04
REC-22%
RQD-16%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-12**
		Sheet 3 of 4	
Date:	02/04/2025 **Elevation:** 868 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954408 Longitude: -84.353567	



A-12 Depth: 59.8 - 64.8 ft
RUN-05
REC-50%
RQD-20%



A-12 Depth: 64.8 - 69.8 ft
RUN-06
REC-22%
RQD-0%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**A-12**
		Sheet 4 of 4	
Date:	02/04/2025 **Elevation:** 868 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954408 Longitude: -84.353567	

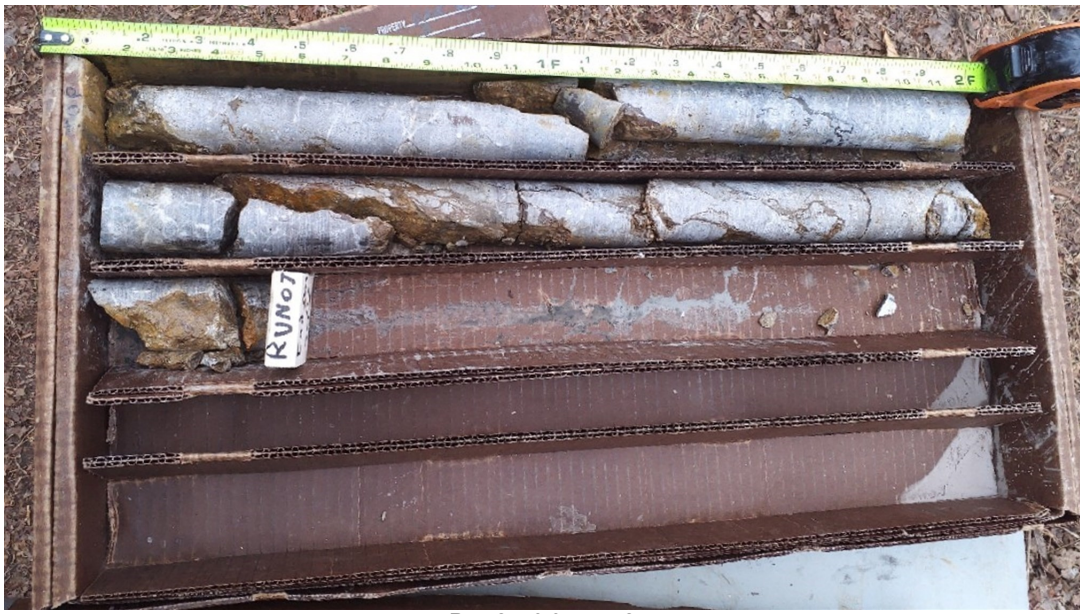


A-12 Depth: 69.8 - 74.8 ft
RUN-07
REC-86%
RQD-40%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**A-12**
				Sheet 1 of 1	
Date:	02/04/2025	**Elevation:**	868 ft	Notes:	
Photographed by:	Brandon Waddell	Latitude: 35.954408	Longitude: -84.353567		

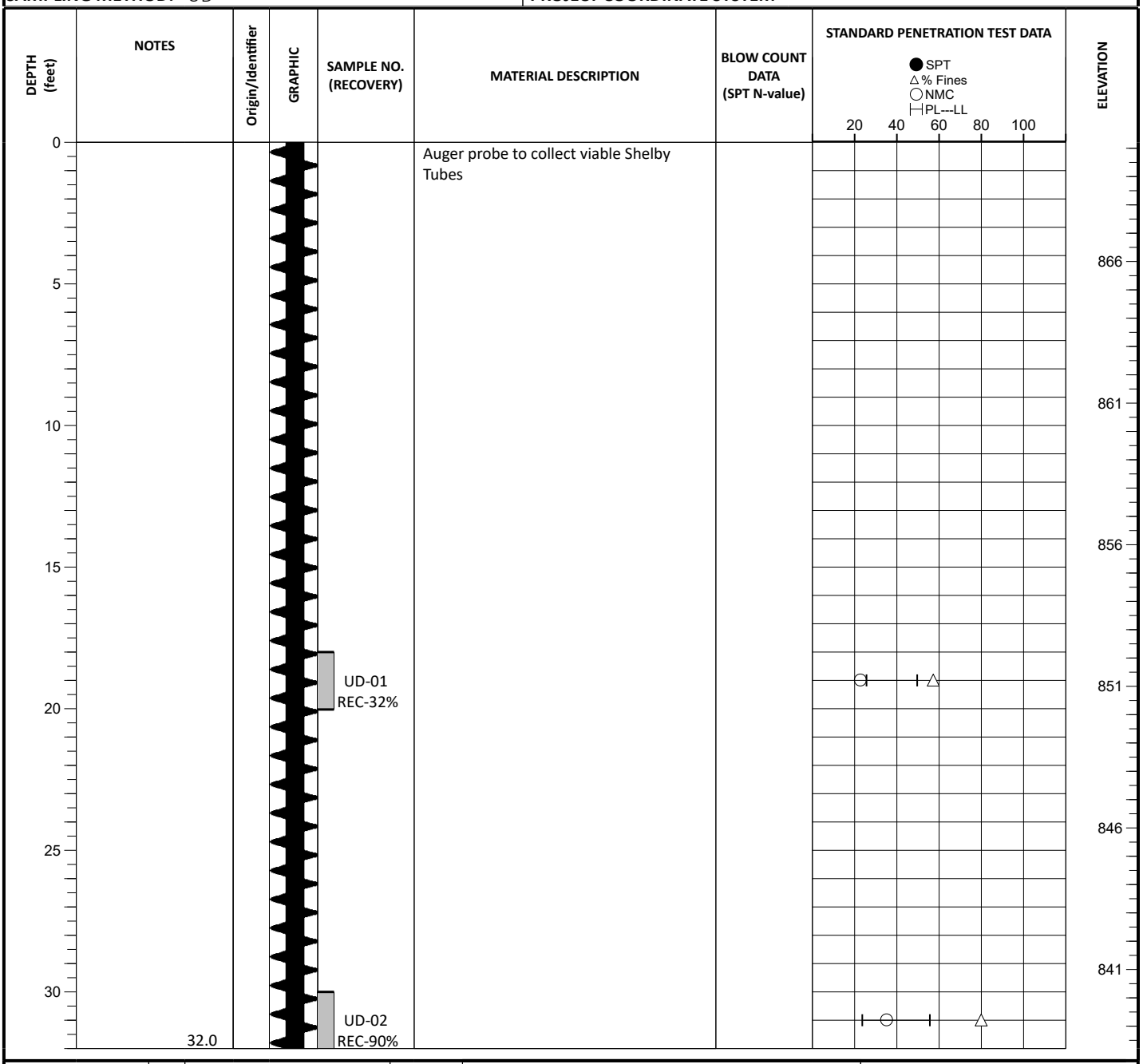


Box 1; 43.9 to 70.0



Box 2; 70.0 to 74.8

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-12A *Sheet 1 of 2*
DATE DRILLED: 02/05/2025	**ELEVATION:** 870 ft	**NOTES:** Offset boring to collect undisturbed samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 32.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954456 **LONGITUDE:** -84.353597
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	02/05/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: A-12A *Sheet 2 of 2*
DATE DRILLED: 02/05/2025	**ELEVATION:** 870 ft	**NOTES:** Offset boring to collect undisturbed samples.
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Brandon Blizzard	**BORING DEPTH:** 32.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Waddell	**LATITUDE:** 35.954456 **LONGITUDE:** -84.353597
SAMPLING METHOD: UD	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
					Borehole terminated at 32.0 feet			
35								836
40								831
45								826
50								821
55								816
60								811

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	02/05/2025		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-01 *Sheet 1 of 1*
DATE DRILLED: 11/18/2024	**ELEVATION:** 772 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 15.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955488 **LONGITUDE:** -84.361137
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					GRAVEL BASE, 12 inches			772
				SS-01 (13 in)	LEAN CLAY (CL), trace silt, trace organics, little gravel, firm to stiff, dark brown, moist	PPV= 2.2 2-5-5 N = 10	● ○	
5	Auger refusal at 7.0 feet	Residuum		UD-01 REC-85% SS-02 (16 in)		PPV= 2.5 2-2-3 N = 5	● ○	767
	Loss of return at 8.5 feet			RUN-01 REC-51% RQD-26%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, poor quality, 0° to 30° bedding, slightly weathered to fresh, moderately hard to hard			
10					Soil-filled Cavity			762
				RUN-02 REC-92% RQD-46%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, poor quality, 0° to 30° bedding, moderately weathered to fresh, moderately hard to hard			
15					Borehole terminated at 15.5 feet			757
20								752
25								747
30								742

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-01**
				Sheet 1 of 1	
Date:	11/18/2024	**Elevation:**	772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488	Longitude: -84.361137		



B-01, Top Depth: 2.0 ft



B-01, Top Depth: 5.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-01**
		Sheet 1 of 2	
Date:	11/18/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488 Longitude: -84.361137	



B-01 Depth: 7.0 - 10.5 ft
RUN-01
REC-51%
RQD-26%



B-01 Depth: 10.5 - 15.5 ft
RUN-02
REC-92%
RQD-46%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-01**
		Sheet 2 of 2	
Date:	11/18/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488 Longitude: -84.361137	



B-01 Depth: 3.5 - 5.5 ft
UD-01
REC-85%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**B-01**
				Sheet 1 of 1	
Date:	11/18/2024	**Elevation:**	772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488	Longitude: -84.361137		



BOX 01: 7.0 to 15.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-01A *Sheet 1 of 2*

DATE DRILLED: 11/19/2024	**ELEVATION:** 772 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of broken tooling.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 33.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955488 **LONGITUDE:** -84.361137
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA ● SPT △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80 100	ELEVATION
0					Advance boring to 16' to continue sampling. Refer to B-01 for sample descriptions.			772
5								767
10								762
15	Auger refusal at 16.0 feet							757
16.0				RUN-01 REC-98% RQD-84%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, good quality, 30° bedding, slightly weathered to fresh, moderately hard to hard, Hard chert at approx. 17.5 feet			
20								752
25				RUN-02 REC-100% RQD-84%				747
27.5					CALCAREOUS SHALE AND LIMESTONE, gray to blue gray, fair quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard			
30				RUN-03 REC-86% RQD-62%				742
31.5					Soil filled cavity			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-01A *Sheet 2 of 2*

DATE DRILLED: 11/19/2024	**ELEVATION:** 772 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of broken tooling.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 33.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955488 **LONGITUDE:** -84.361137
SAMPLING METHOD: CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
33.0			RUN-04 REC-15% RQD-0%	Soil filled cavity Borehole terminated at 33.0 feet	
35					737
40					732
45					727
50					722
55					717
60					712

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/19/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-01A**
		Sheet 1 of 2	
Date:	11/19/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488 Longitude: -84.361137	



B-01A Depth: 16.0 - 21.0 ft
RUN-01
REC-98%
RQD-84%



B-01A Depth: 21.0 - 26.0 ft
RUN-02
REC-100%
RQD-84%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-01A**
		Sheet 2 of 2	
Date:	11/19/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488 Longitude: -84.361137	



B-01A Depth: 26.0 - 31.0 ft
RUN-03
REC-86%
RQD-62%



B-01A Depth: 31.0 - 33.0 ft
RUN-04
REC-15%
RQD-0%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Location Photographs:**	**B-01A**
		Sheet 1 of 1	
Date:	11/19/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955488 Longitude: -84.361137	



BOX 01: 16.0 to 26.0 feet



BOX 02: 26.0 to 33.0 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-02 *Sheet 1 of 2*

DATE DRILLED: 11/19/2024	**ELEVATION:** 772 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 36.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955314 **LONGITUDE:** -84.359485
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0								
		Residuum		SS-01 (12 in)	FAT CLAY (CH), trace organics, little ferrous nodules, stiff, red brown with tan, moist	PPV= 4.2 5-5-5 N = 10	● ○	
				UD-01 REC-100%		PPV= 2.5		
5				SS-02 (11 in)		3-5-5 N = 10	● ⊢	768
				UD-02 REC-80%		PPV= 2.5		
10	Auger refusal at 10.5 feet			SS-03 (4 in)		50/5" N = 50/5"	●	763
				RUN-01 REC-90% RQD-0%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, poor quality to excellent quality, 0° to 30° bedding, moderately weathered to fresh, moderately hard to hard			
15				RUN-02 REC-88% RQD-34%				758
20				RUN-03 REC-100% RQD-94%				753
25				RUN-04 REC-49% RQD-34%				748
				RUN-05 REC-94% RQD-92%				
30								743

10.5

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-02 *Sheet 2 of 2*
DATE DRILLED: 11/19/2024	**ELEVATION:** 772 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 36.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955314 **LONGITUDE:** -84.359485
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-06 REC-100% RQD-64%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, poor quality to excellent quality, 0° to 30° bedding, moderately weathered to fresh, moderately hard to hard	738
36.5				Borehole terminated at 36.5 feet	
40					733
45					728
50					723
55					718
60					713

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/19/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

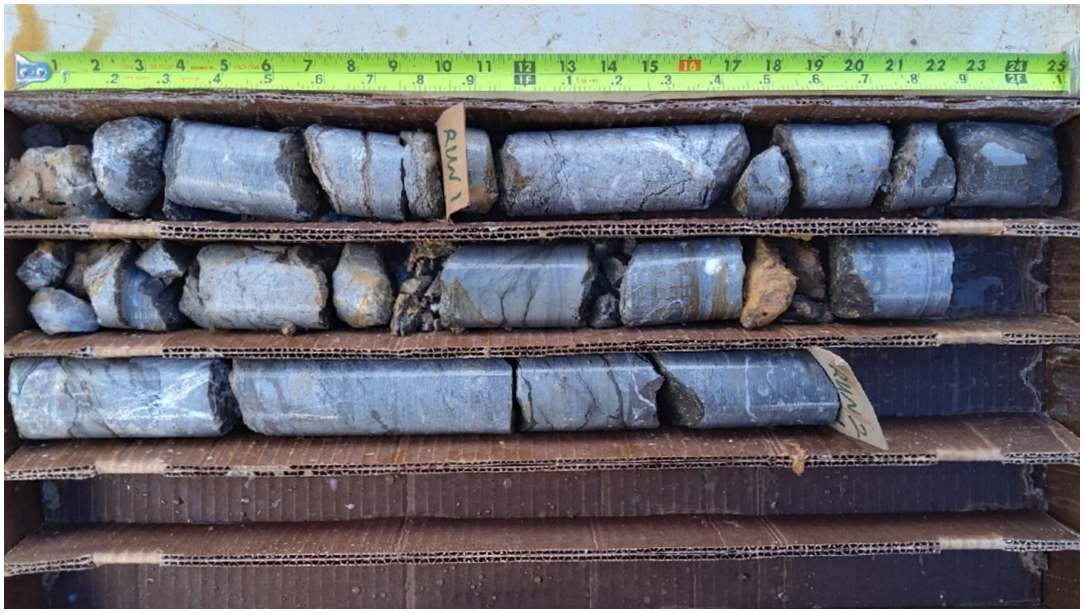
Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-02**
		Sheet 1 of 3	
Date:	11/19/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955314 Longitude: -84.359485	



B-02 Depth: 10.5 - 11.5 ft
RUN-01
REC-90%
RQD-0%

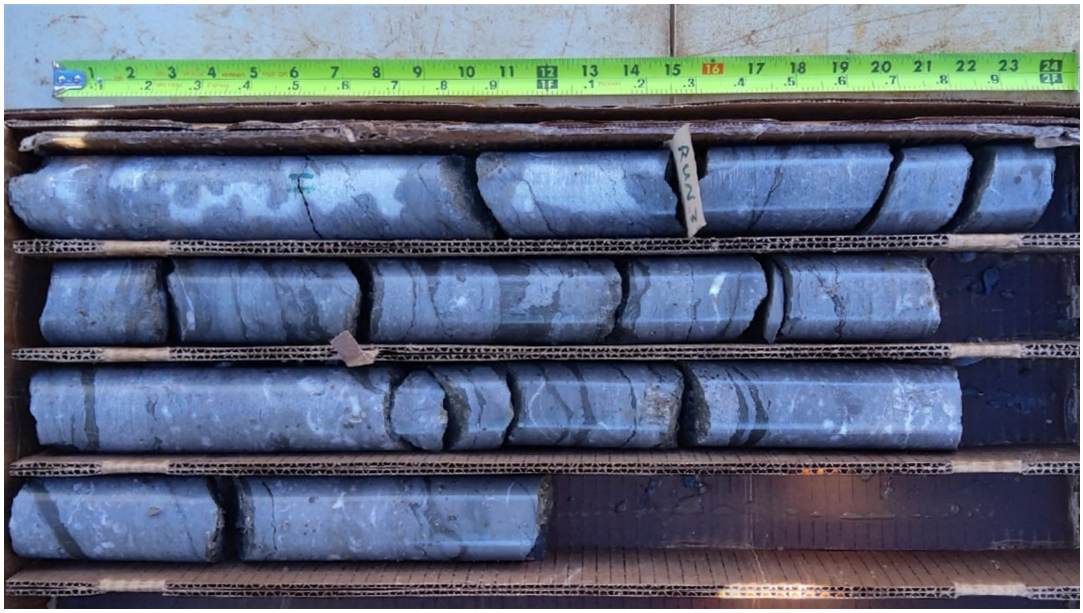


B-02 Depth: 11.5 - 16.5 ft
RUN-02
REC-88%
RQD-34%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-02**
		Sheet 2 of 3	
Date:	11/19/2024 **Elevation:** 772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955314 Longitude: -84.359485	

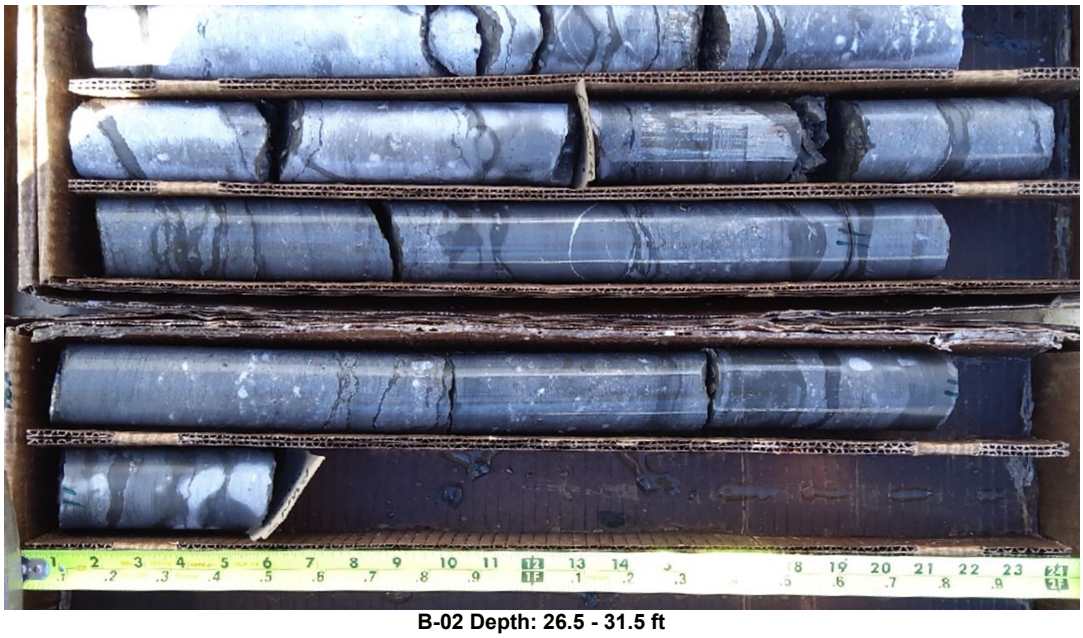


B-02 Depth: 16.5 - 21.5 ft
RUN-03
REC-100%
RQD-94%

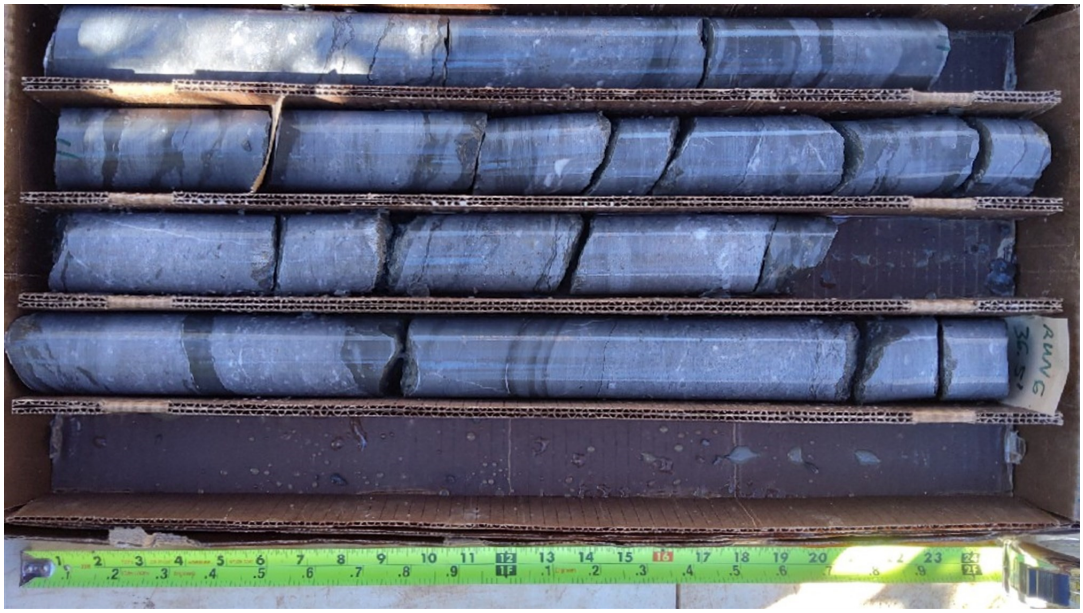


B-02 Depth: 21.5 - 31.5 ft
RUN-04
REC-49%
RQD-34%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-02
		Sheet 3 of 3	
Date:	11/19/2024	Elevation: 772 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.955314 Longitude: -84.359485	



B-02 Depth: 26.5 - 31.5 ft
RUN-05
REC-94%
RQD-92%



B-02 Depth: 31.5 - 36.5 ft
RUN-06
REC-100%
RQD-64%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-02
				Sheet 1 of 2	
Date:	11/19/2024	Elevation:	772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.955314	Longitude:	-84.359485

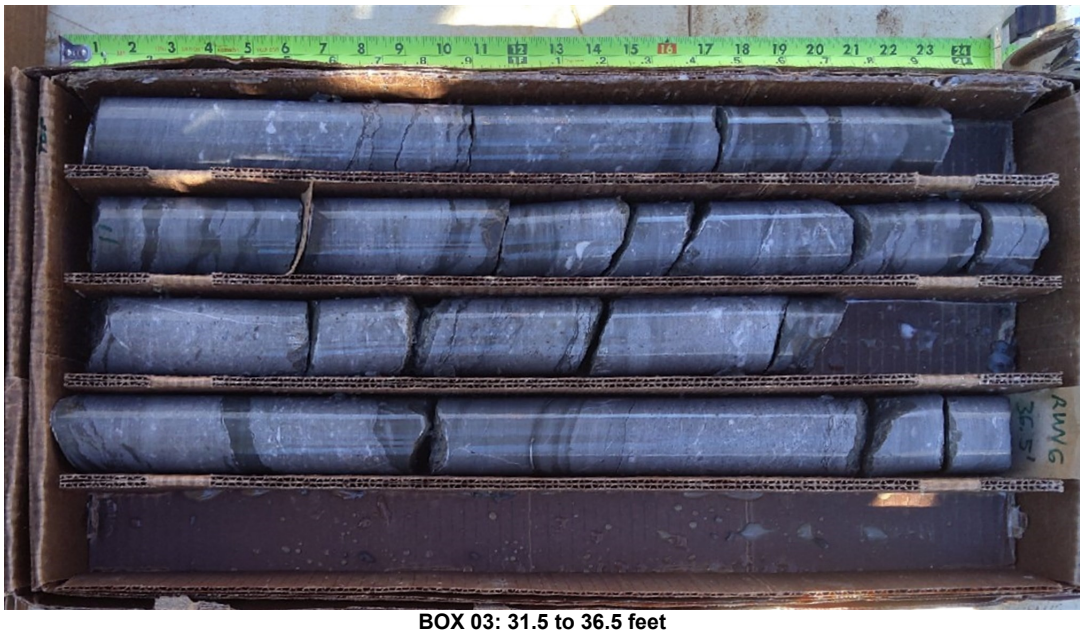


BOX 01: 10.5 to 21.5 feet



BOX 02: 21.5 to 31.5 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-02
				Sheet 2 of 2	
Date:	11/19/2024	Elevation:	772 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.955314 Longitude: -84.359485		



BOX 03: 31.5 to 36.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-03 *Sheet 1 of 1*

DATE DRILLED: 11/20/2024	**ELEVATION:** 804 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 29.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.954818 **LONGITUDE:** -84.357890
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					LEAN CLAY (CL), trace silt, trace roots, firm to very stiff, red brown to light brown, moist, black staining			
				SS-01 (16 in)		PPV= 2.2 3-4-6 N = 10		
				UD-01 REC-100%				
5				SS-02 (18 in)		PPV= 2.0 2-3-5 N = 8		799
				UD-02 REC-100%				
10		Residuum		SS-03 (18 in)		PPV= 4.0 4-7-11 N = 18		794
				UD-03 REC-100%				
15				SS-04 (18 in)		PPV= 4.0 4-6-8 N = 14		789
	17.0				FAT CLAY (CH), trace silt, firm, red brown, moist, black staining			
				SS-05 (18 in)		PPV= 2.0 2-3-2 N = 5		
20	Auger refusal at 23.5 feet							784
	23.5			RUN-01 REC-100% RQD-96%	CALCAREOUS SHALE, light gray and dark gray, poor quality to excellent quality, 50° to 60°, moderately weathered to fresh, moderately hard to hard, First rock at appx. 23.7 feet			779
25	27.3			RUN-02 REC-37% RQD-37%	Soil filled cavity			
30	29.5				Borehole terminated at 29.5 feet			774

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-03**
				Sheet 1 of 3	
Date:	11/20/2024	**Elevation:**	804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954818 Longitude: -84.357890		



B-03, Top Depth: 1.0 ft



B-03, Top Depth: 5.0 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-03**
				Sheet 2 of 3	
Date:	11/20/2024	**Elevation:**	804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.954818 Longitude: -84.357890			



B-03, Top Depth: 10.0 ft



B-03, Top Depth: 15.0 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:** **B-03** Sheet 3 of 3
Date:	11/20/2024	**Elevation:**	804 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.954818	Longitude: -84.357890	

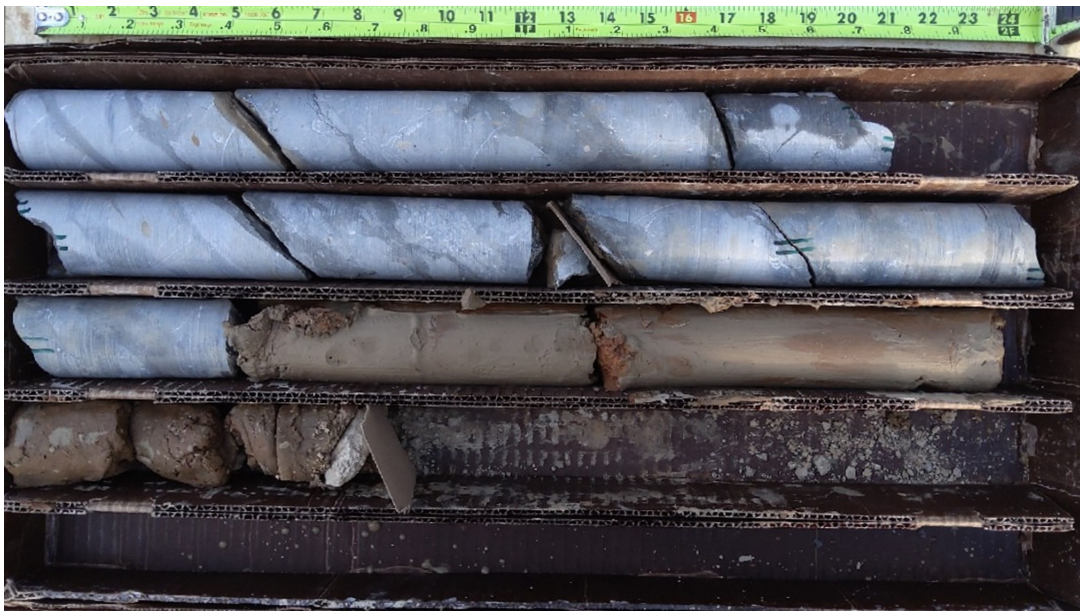


B-03, Top Depth: 18.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-03**
			Sheet 1 of 1
Date:	11/20/2024	**Elevation:** 804 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.954818 Longitude: -84.357890	

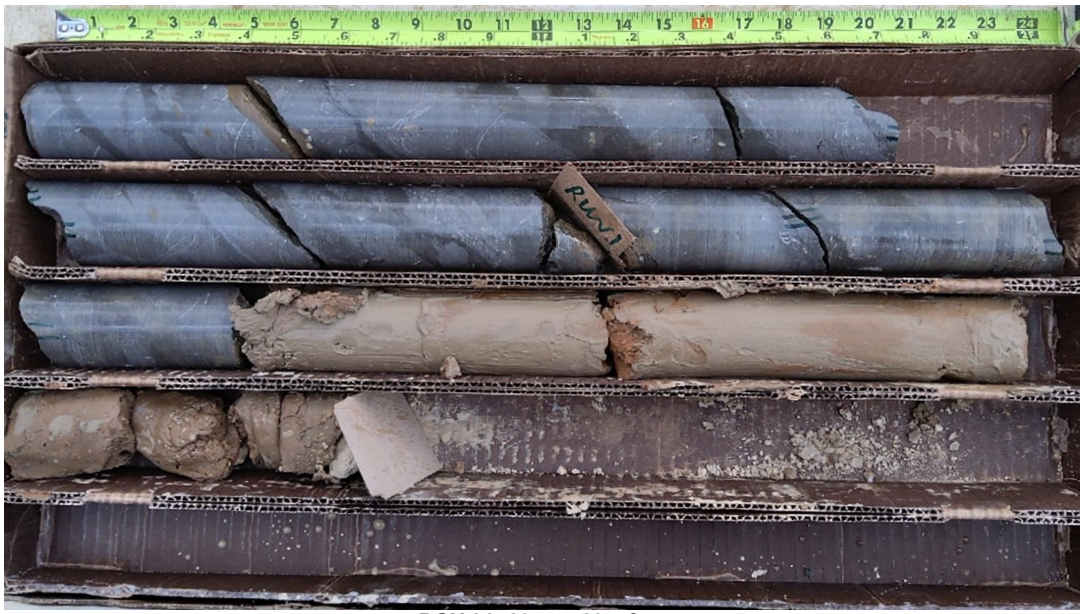


B-03 Depth: 23.5 - 26.0 ft
RUN-01
REC-100%
RQD-96%



B-03 Depth: 26.0 - 29.5 ft
RUN-02
REC-37%
RQD-37%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**B-03**
				Sheet 1 of 1	
Date:	11/20/2024	**Elevation:**	804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954818 Longitude: -84.357890		



BOX 01: 23.5 to 29.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-03A *Sheet 1 of 2*

DATE DRILLED: 11/20/2024	**ELEVATION:** 804 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of broken tooling.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 55.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.954818 **LONGITUDE:** -84.357890
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					Advanced boring to 26.0 feet to continue sampling. Refer to boring B-03 for sample descriptions.			
5								799
10								794
15								789
20								784
25								779
26.0	Auger refusal at 29.0 feet	Residuum		SS-01 (18 in)	FAT CLAY WITH SAND (CH), trace silt, some rock fragments, very soft to hard, red brown to light brown, moist, blow counts increased due to refusal material in last sample interval	PPV= 0.8 0-0-0 N = WOH 50/5" N = 50/5"	●	
				SS-02 (7 in)				
29.0				RUN-01 REC-100% RQD-0%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, very poor quality to excellent quality, 30° to 60° bedding, moderately weathered to fresh, moderately hard to hard			
30								774

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-03A *Sheet 2 of 2*
DATE DRILLED: 11/20/2024	**ELEVATION:** 804 ft	**NOTES:** Sample description based on visual observation of obtained samples. Offset boring to continue rock core sampling because of broken tooling.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 55.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.954818 **LONGITUDE:** -84.357890
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-02 REC-100% RQD-100%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, very poor quality to excellent quality, 30° to 60° bedding, moderately weathered to fresh, moderately hard to hard	769
40			RUN-03 REC-94% RQD-66%		764
45			RUN-04 REC-100% RQD-96%		759
50			RUN-05 REC-86% RQD-80%		754
55	54.4 55.0		RUN-06 REC-78% RQD-38%	Soil filled cavity Borehole terminated at 55.0 feet	749
60					744

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/20/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: B-03A Sheet 1 of 1
Date:	11/20/2024	**Elevation:**	804 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.954818	Longitude: -84.357890	



B-03A, Top Depth: 26.0 ft

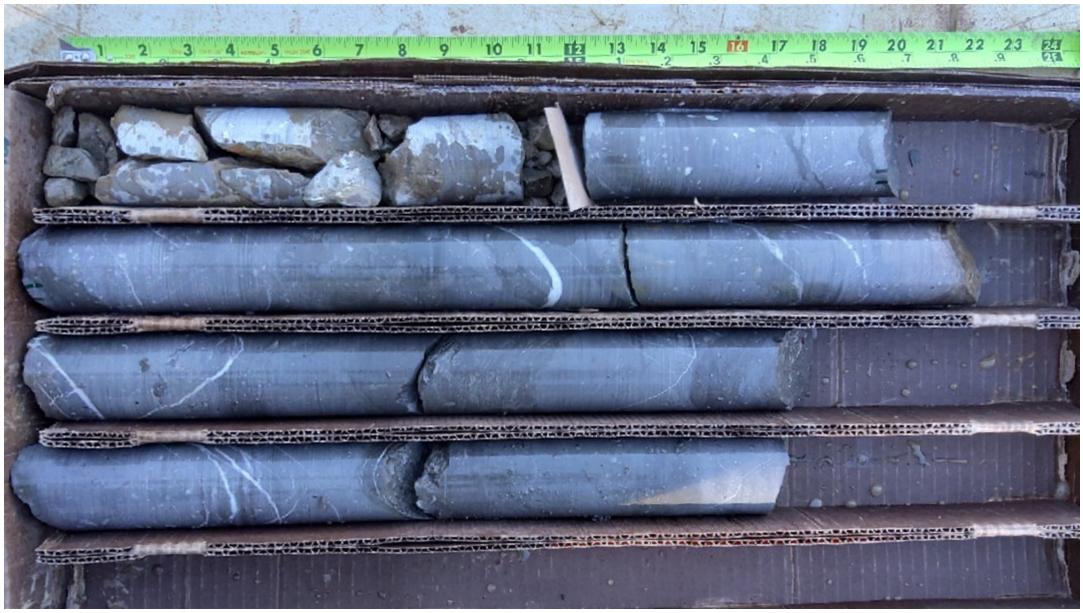


B-03A, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-03A**
		Sheet 1 of 3	
Date:	11/20/2024 **Elevation:** 804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.954818 Longitude: -84.357890	

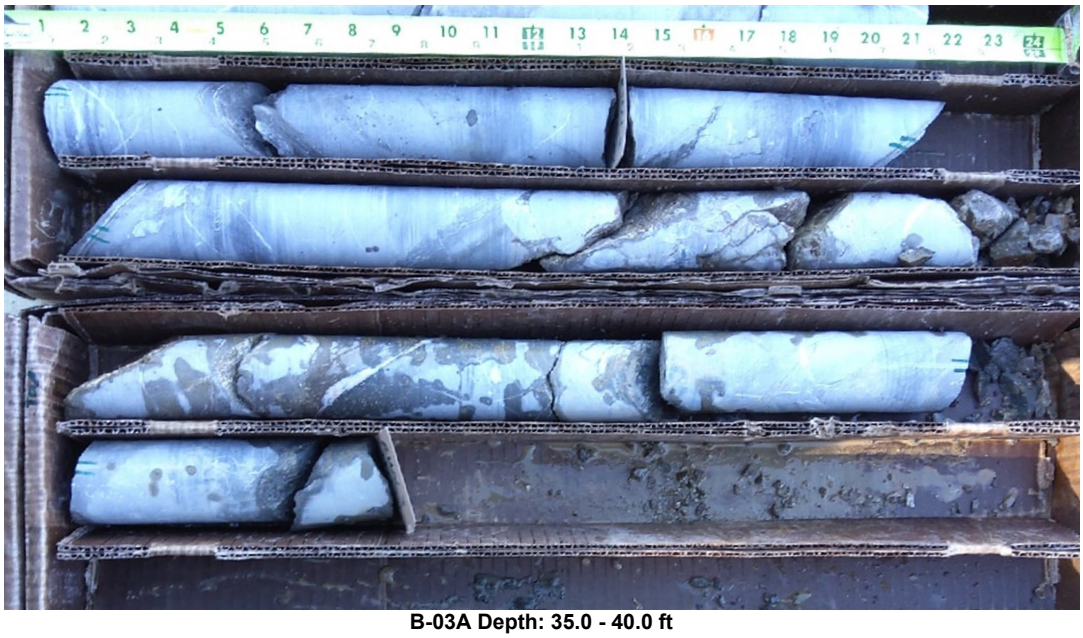


B-03A Depth: 29.0 - 30.0 ft
RUN-01
REC-100%
RQD-0%

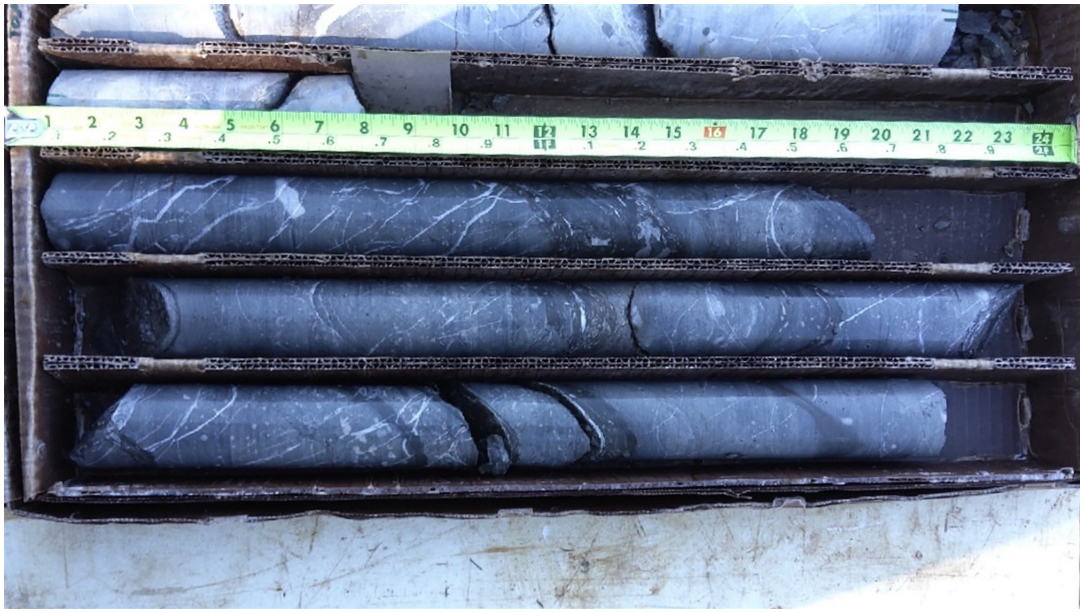


B-03A Depth: 30.0 - 35.0 ft
RUN-02
REC-100%
RQD-100%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-03A**
		Sheet 2 of 3	
Date:	11/20/2024 **Elevation:** 804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.954818 Longitude: -84.357890	



B-03A Depth: 35.0 - 40.0 ft
RUN-03
REC-94%
RQD-66%

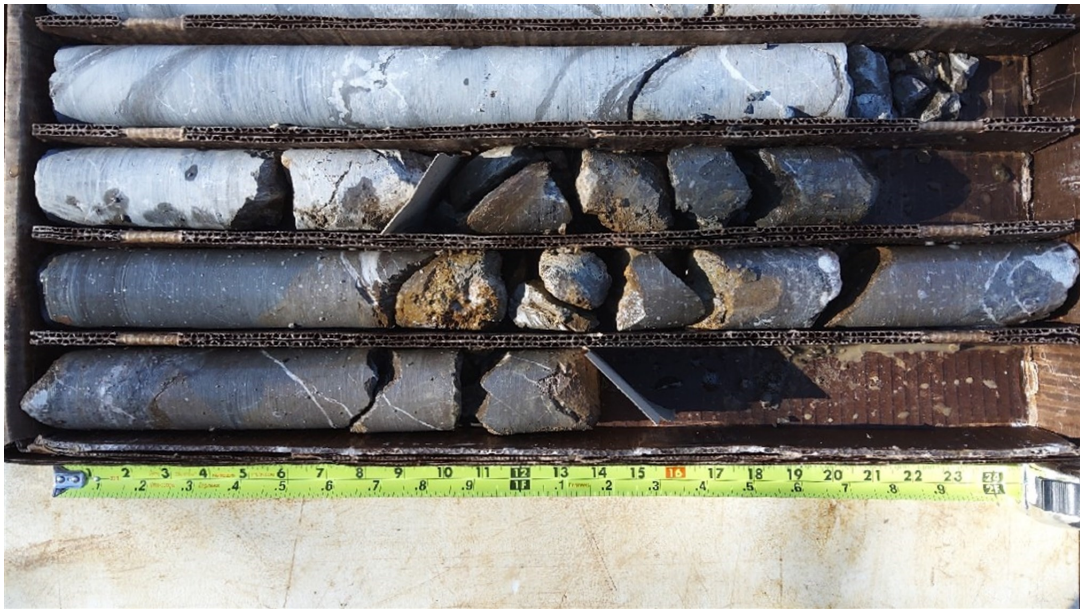


B-03A Depth: 40.0 - 45.0 ft
RUN-04
REC-100%
RQD-96%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Core Photographs:	B-03A
				Sheet 3 of 3	
Date:	11/20/2024	Elevation:	804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954818 Longitude: -84.357890		



B-03A Depth: 45.0 - 50.0 ft
RUN-05
REC-86%
RQD-80%



B-03A Depth: 50.0 - 55.0 ft
RUN-06
REC-78%
RQD-38%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-03A
				Sheet 1 of 2	
Date:	11/20/2024	Elevation:	804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954818	Longitude:	-84.357890



BOX 01: 29.0 to 35.0 feet



BOX 02: 35.0 to 45.0 feet

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**B-03A**
				Sheet 2 of 2	
Date:	11/20/2024	**Elevation:**	804 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954818 Longitude: -84.357890		



BOX 03: 45.0 to 55.0 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-04 *Sheet 1 of 3*

DATE DRILLED: 11/21/2024	**ELEVATION:** 814 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 65.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.954109 **LONGITUDE:** -84.356334
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢PL---LL, 20 40 60 80 100)	ELEVATION
0		Residuum		SS-01 (17 in)	FAT CLAY WITH SAND (CH), some silt, stiff to soft, red brown with tan, moist	PPV= 3.0		814
						3-4-7 N = 11		
				SS-02 (17 in)		PPV= 2.5		
5						3-4-7 N = 11		809
				SS-03 (14 in)		PPV= 2.8		
				SS-04 (16 in)		2-3-5 N = 8		
10						PPV= 1.5		804
						3-4-5 N = 9		
				SS-05 (18 in)		PPV= 1.8		
15						2-3-4 N = 7		799
				SS-06 (18 in)		PPV= 0.8		
20						3-2-2 N = 4		794
	22.0				SANDY SILT (ML), some clay, soft, tan to dark brown, moist			
				SS-07 (18 in)		PPV= 0.5		
25						2-1-2 N = 3		789
				SS-08 (8 in)		PPV= 0.5		
30						1-1-1 N = 2		784
	Auger refusal at 32.0 feet							
	32.0							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/21/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-04 *Sheet 2 of 3*

DATE DRILLED: 11/21/2024	**ELEVATION:** 814 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 65.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.954109 **LONGITUDE:** -84.356334
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35	34.8 35.3		RUN-01 REC-77% RQD-66%	LIMESTONE, gray and light brown, fair quality, 50° to 60° bedding, moderately weathered to fresh, moderately hard to hard Soil filled cavity LIMESTONE AND CALCAREOUS SHALE, gray brown and dark gray, interbedded, poor quality to good quality, 50° to 80° bedding, moderately weathered to fresh, moderately hard to hard	779
40			RUN-02 REC-74% RQD-48%		774
45			RUN-03 REC-100% RQD-50%		769
50			RUN-04 REC-92% RQD-84%		764
55			RUN-05 REC-86% RQD-66%		759
60			RUN-06 REC-94% RQD-56%		754

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/21/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-04 *Sheet 3 of 3*

DATE DRILLED: 11/21/2024	**ELEVATION:** 814 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 65.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.954109 **LONGITUDE:** -84.356334
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
65	65.5		RUN-07 REC-100% RQD-80%	LIMESTONE AND CALCAREOUS SHALE, gray brown and dark gray, interbedded, poor quality to good quality, 50° to 80° bedding, moderately weathered to fresh, moderately hard to hard	749
				Borehole terminated at 65.5 feet	
70					744
75					739
80					734
85					729
90					724
95					719

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/21/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-04**
				Sheet 1 of 4	
Date:	11/21/2024	**Elevation:**	814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954109 Longitude: -84.356334		



B-04, Top Depth: 1.0 ft



B-04, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-04**
				Sheet 2 of 4	
Date:	11/21/2024	**Elevation:**	814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954109 Longitude: -84.356334		



B-04, Top Depth: 6.0 ft



B-04, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs:	B-04
				Sheet 3 of 4	
Date:	11/21/2024	Elevation:	814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954109 Longitude: -84.356334		



B-04, Top Depth: 13.5 ft



B-04, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-04**
				Sheet 4 of 4	
Date:	11/21/2024	**Elevation:**	814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954109 Longitude: -84.356334		



B-04, Top Depth: 23.5 ft



B-04, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-04
		Sheet 1 of 4	
Date:	11/21/2024	Elevation: 814 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.954109 Longitude: -84.356334	



B-04 Depth: 32.0 - 35.5 ft
RUN-01
REC-77%
RQD-66%



B-04 Depth: 35.5 - 40.5 ft
RUN-02
REC-74%
RQD-48%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-04
		Sheet 2 of 4	
Date:	11/21/2024	Elevation: 814 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.954109 Longitude: -84.356334	



B-04 Depth: 40.5 - 45.5 ft
RUN-03
REC-100%
RQD-50%



B-04 Depth: 45.5 - 50.5 ft
RUN-04
REC-92%
RQD-84%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-04**
		Sheet 3 of 4	
Date:	11/21/2024	**Elevation:**	814 ft
Photographed by:	Ken Wolf	Latitude: 35.954109 Longitude: -84.356334	



B-04 Depth: 50.5 - 55.5 ft
RUN-05
REC-86%
RQD-66%



B-04 Depth: 55.5 - 60.5 ft
RUN-06
REC-94%
RQD-56%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-04**
		Sheet 4 of 4	
Date:	11/21/2024 **Elevation:** 814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.954109 Longitude: -84.356334	



B-04 Depth: 60.5 - 65.5 ft
RUN-07
REC-100%
RQD-80%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**B-04**
				Sheet 1 of 2	
Date:	11/21/2024	**Elevation:**	814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954109 Longitude: -84.356334		

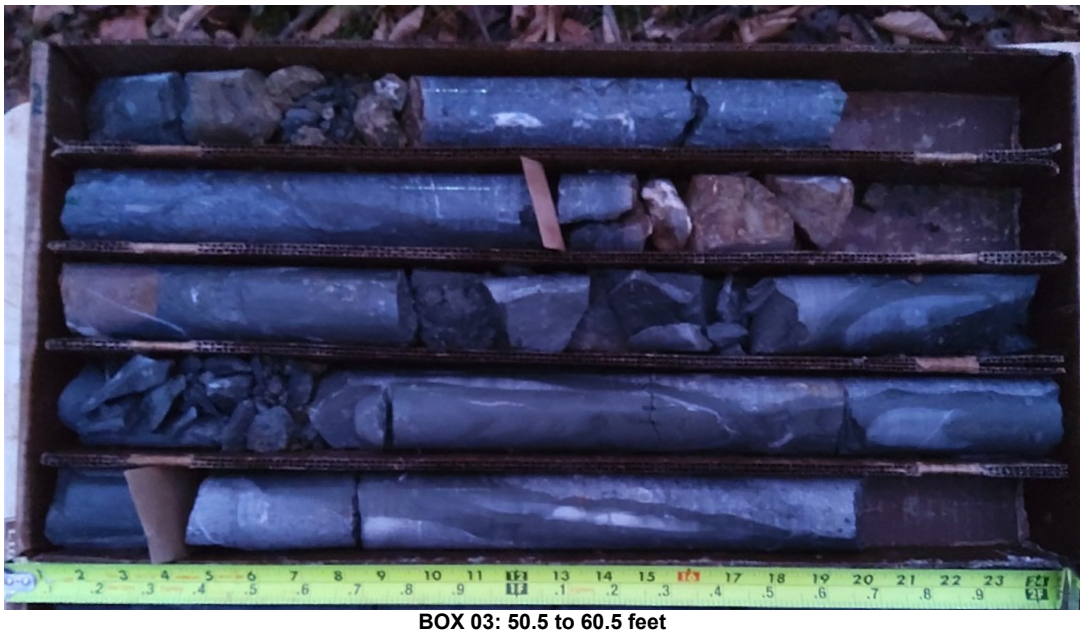


BOX 01: 32.0 to 40.5 feet

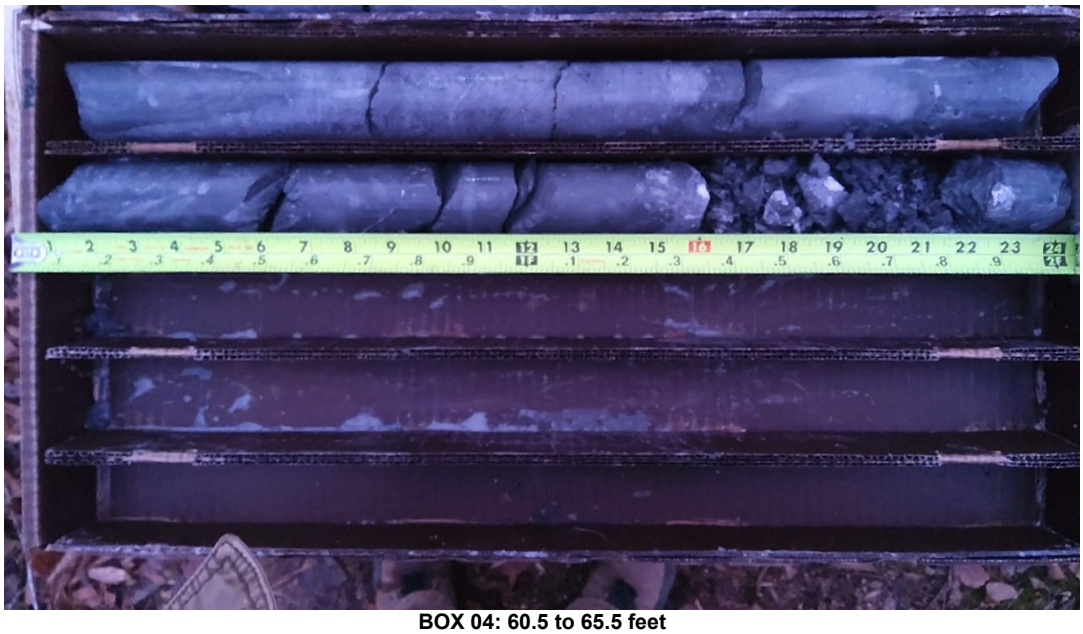


BOX 02: 40.5 to 50.5 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**B-04**
				Sheet 2 of 2	
Date:	11/21/2024	**Elevation:**	814 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.954109 Longitude: -84.356334		



BOX 03: 50.5 to 60.5 feet



BOX 04: 60.5 to 65.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-05 *Sheet 1 of 2*

DATE DRILLED: 11/15/2024	**ELEVATION:** 800 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 61.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.956586 **LONGITUDE:** -84.360911
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0		Residuum		SS-01 (13 in)	ELASTIC SILT WITH SAND (MH), little clay, little organics, firm to very stiff, red brown to dark brown, moist, black staining	PPV= 4.5 3-5-7 N = 12		
				UD-01 REC-100%				
5				SS-02 (14 in)		PPV= 4.2		796
				SS-03 (17 in)		3-5-7 N = 12 PPV= 4.0		
				UD-02 REC-75%				
10				SS-04 (18 in)		8-11-14 N = 25 PPV= 3.5		791
				UD-03		3-4-5 N = 9		
15				SS-05 (18 in)		PPV= 2.0		786
						2-3-3 N = 6		
				SS-06 (18 in)		PPV= 3.0		
20						2-3-4 N = 7		781
					No blow counts recorded for SS-07	PPV= 0.8		
25				SS-07 (6 in)				776
	Auger refusal at 27.5 feet							
	27.5			RUN-01 REC-91% RQD-51%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, fair quality to excellent quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard			
30								771

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/15/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-05 *Sheet 2 of 2*
DATE DRILLED: 11/15/2024	**ELEVATION:** 800 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 61.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.956586 **LONGITUDE:** -84.360911
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-02 REC-94% RQD-58%	LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, fair quality to excellent quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard	766
40			RUN-03 REC-100% RQD-76%		761
45			RUN-04 REC-96% RQD-90%		756
50			RUN-05 REC-98% RQD-98%		751
55			RUN-06 REC-100% RQD-76%		746
60			RUN-07 REC-94% RQD-88%		741
61.0				Borehole terminated at 61.0 feet	

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/15/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-05**
				Sheet 1 of 4	
Date:	11/15/2024	**Elevation:**	800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956586 Longitude: -84.360911		



B-05, Top Depth: 1.0 ft



B-05, Top Depth: 5.0 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-05**
				Sheet 2 of 4	
Date:	11/15/2024	**Elevation:**	800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956586 Longitude: -84.360911		



B-05, Top Depth: 6.5 ft



B-05, Top Depth: 10.0 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-05**
				Sheet 3 of 4	
Date:	11/15/2024	**Elevation:**	800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956586 Longitude: -84.360911		

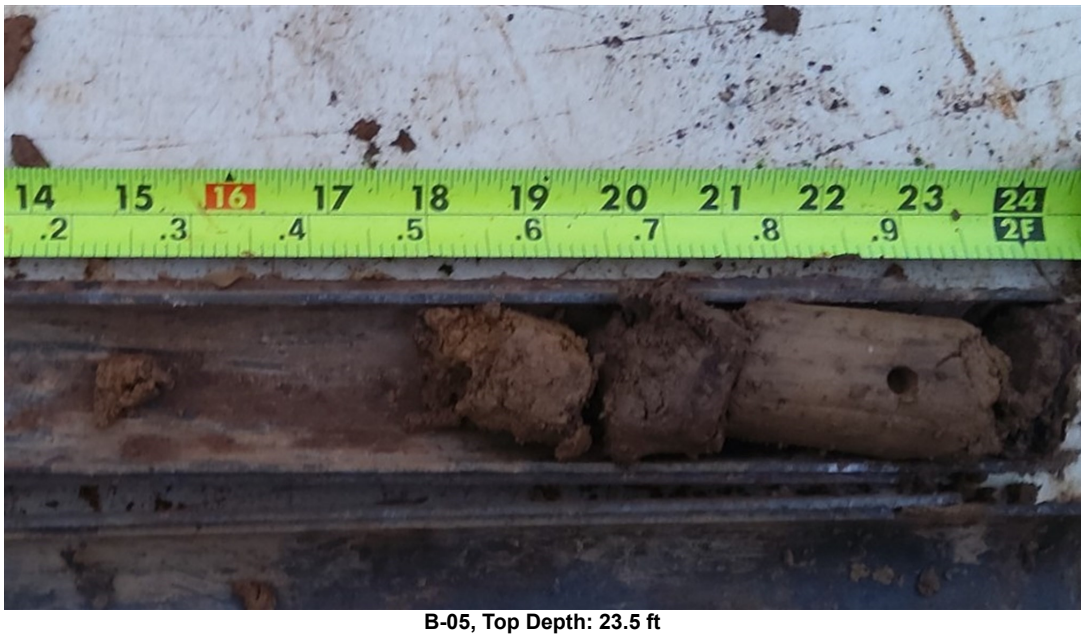


B-05, Top Depth: 15.0 ft



B-05, Top Depth: 18.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:** **B-05** Sheet 4 of 4
Date:	11/15/2024	**Elevation:**	800 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.956586	Longitude: -84.360911	

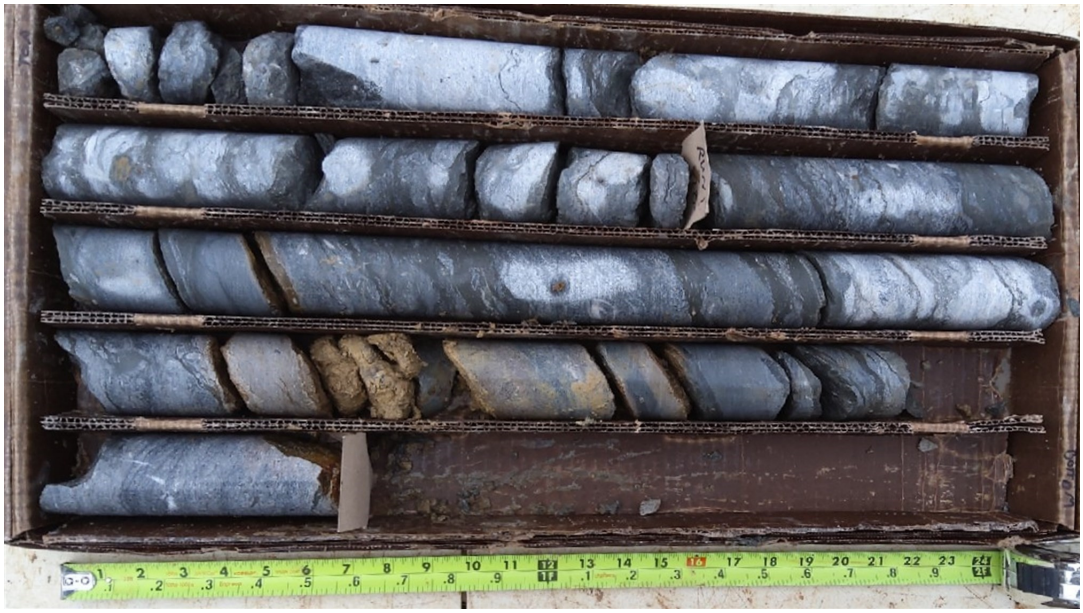


B-05, Top Depth: 23.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-05**
		Sheet 1 of 4	
Date:	11/15/2024	**Elevation:**	800 ft
Photographed by:	Ken Wolf	Latitude: 35.956586 Longitude: -84.360911	



B-05 Depth: 27.5 - 31.0 ft
RUN-01
REC-91%
RQD-51%



B-05 Depth: 31.0 - 36.0 ft
RUN-02
REC-94%
RQD-58%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-05**
		Sheet 2 of 4	
Date:	11/15/2024 **Elevation:** 800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.956586 Longitude: -84.360911	



B-05 Depth: 36.0 - 41.0 ft
RUN-03
REC-100%
RQD-76%



B-05 Depth: 41.0 - 46.0 ft
RUN-04
REC-96%
RQD-90%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-05
		Sheet 3 of 4	
Date:	11/15/2024	Elevation: 800 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.956586 Longitude: -84.360911	

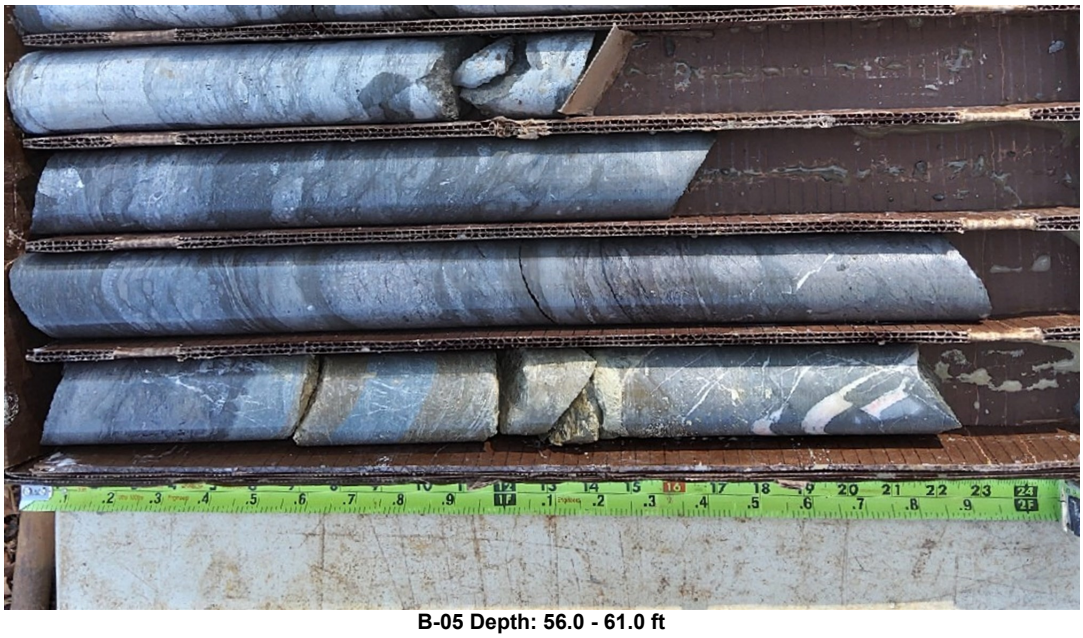


B-05 Depth: 46.0 - 51.0 ft
RUN-05
REC-98%
RQD-98%



B-05 Depth: 51.0 - 56.0 ft
RUN-06
REC-100%
RQD-76%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-05**
		Sheet 4 of 4	
Date:	11/15/2024 **Elevation:** 800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.956586 Longitude: -84.360911	



B-05 Depth: 56.0 - 61.0 ft
RUN-07
REC-94%
RQD-88%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-05
				Sheet 1 of 2	
Date:	11/15/2024	Elevation:	800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956586 Longitude: -84.360911		



BOX 01: 27.5 to 36.0 feet



BOX 02: 36.0 to 46.0 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-05
				Sheet 2 of 2	
Date:	11/15/2024	Elevation:	800 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956586 Longitude: -84.360911		



BOX 03: 46.0 to 56.0 feet



BOX 04: 56.0 to 61.0 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-06 *Sheet 1 of 2*

DATE DRILLED: 11/14/2024	**ELEVATION:** 810 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 41.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.956208 **LONGITUDE:** -84.359223
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0								
				SS-01 (16 in)	FAT CLAY WITH SAND (CH), trace silt, little ferrous nodules, trace chert, very stiff, red brown, moist	PPV= 4.5 7-10-10 N = 20 PPV= 4.5		
5		Residuum		SS-02 (16 in)		5-7-11 N = 18 PPV= 4.5		806
				SS-03 (16 in)		5-7-9 N = 16 PPV= 4.5		
10	Auger refusal at 11.5 feet			SS-04 (14 in)		8-8-50/2" N = 50/2"		801
	Loss of return at 13.0 feet	11.5			Soil filled cavity			
		11.9			LIMESTONE AND CALCAREOUS SHALE, light gray and gray, interbedded, poor quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard			
		12.5			Soil filled cavity			
15		13.1		RUN-01 REC-64% RQD-44%	LIMESTONE AND CALCAREOUS SHALE, light gray and gray, interbedded, poor quality to excellent quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard			796
20				RUN-02 REC-100% RQD-80%				791
25				RUN-03 REC-92% RQD-86%				786
30				RUN-04 REC-96% RQD-90%				781
		31.5			CALCAREOUS SHALE AND LIMESTONE, dark gray and light gray, interbedded, good quality to excellent quality, 40° bedding, slightly weathered to fresh, moderately hard to hard			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/14/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-06 *Sheet 2 of 2*
DATE DRILLED: 11/14/2024	**ELEVATION:** 810 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 41.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.956208 **LONGITUDE:** -84.359223
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-05 REC-100% RQD-90%	CALCAREOUS SHALE AND LIMESTONE, dark gray and light gray, interbedded, good quality to excellent quality, 40° bedding, slightly weathered to fresh, moderately hard to hard	776
40			RUN-06 REC-96% RQD-88%		771
41.5				Borehole terminated at 41.5 feet	
45					766
50					761
55					756
60					751

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/14/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs:	B-06
				Sheet 1 of 2	
Date:	11/14/2024	Elevation:	810 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956208 Longitude: -84.359223		



B-06, Top Depth: 1.0 ft



B-06, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-06**
				Sheet 2 of 2	
Date:	11/14/2024	**Elevation:**	810 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956208 Longitude: -84.359223		



B-06, Top Depth: 6.0 ft

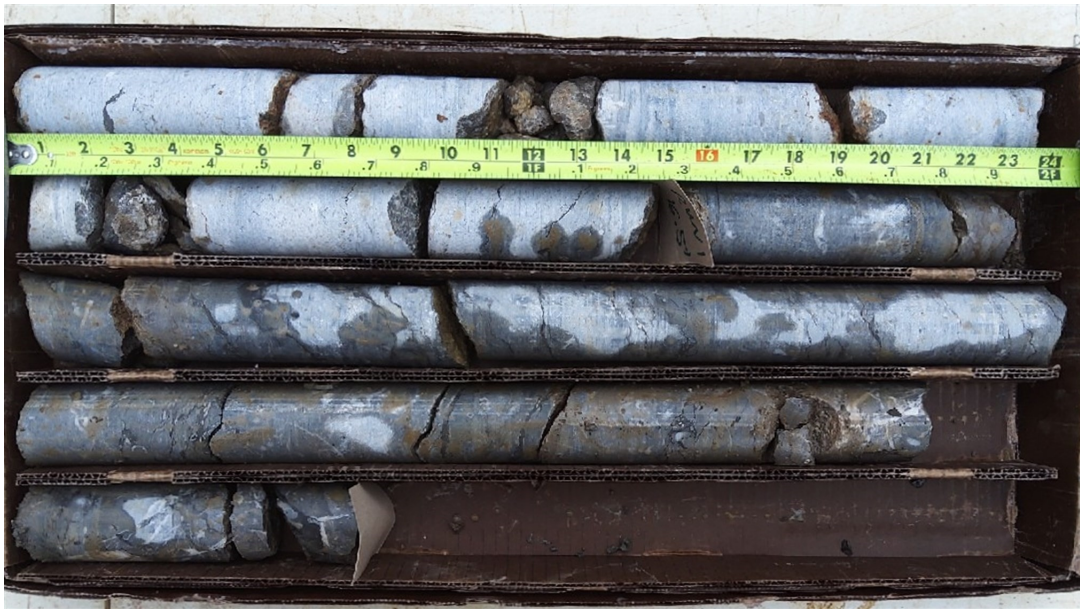


B-06, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-06**
		Sheet 1 of 3	
Date:	11/14/2024 **Elevation:** 810 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.956208 Longitude: -84.359223	



B-06 Depth: 11.5 - 16.5 ft
RUN-01
REC-64%
RQD-44%

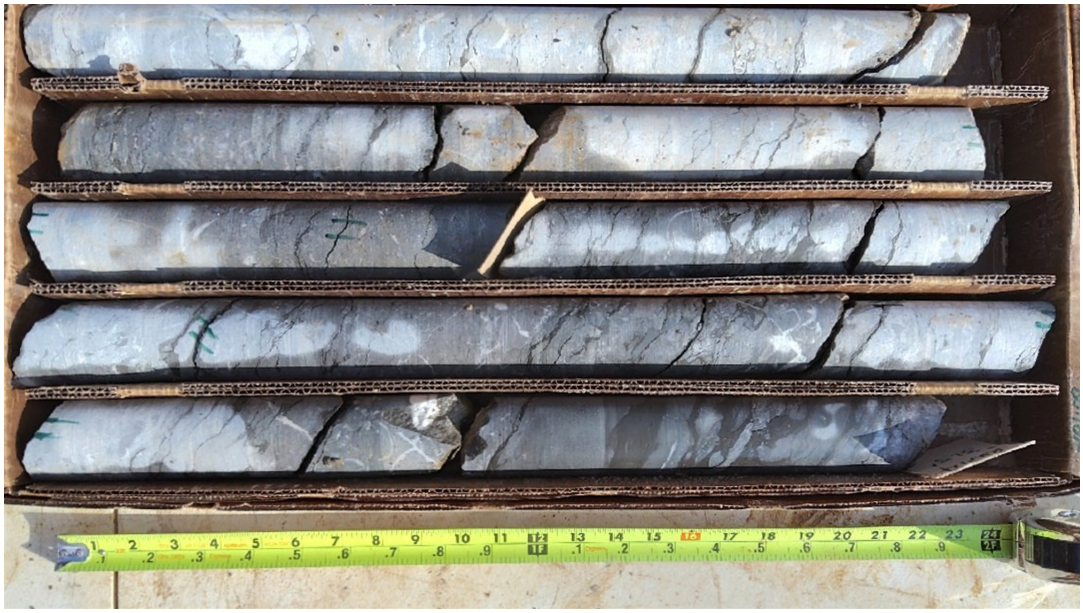


B-06 Depth: 16.5 - 21.5 ft
RUN-02
REC-100%
RQD-80%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Core Photographs:	B-06
				Sheet 2 of 3	
Date:	11/14/2024	Elevation:	810 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956208	Longitude: -84.359223	



B-06 Depth: 21.5 - 26.5 ft
RUN-03
REC-92%
RQD-86%

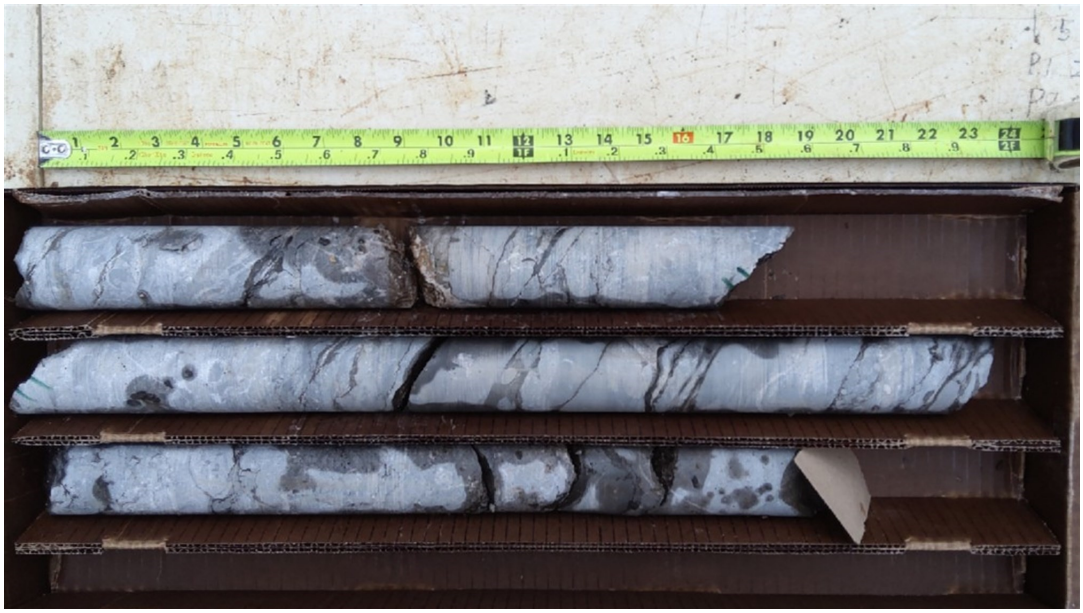


B-06 Depth: 26.5 - 31.5 ft
RUN-04
REC-96%
RQD-90%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-06
		Sheet 3 of 3	
Date:	11/14/2024	Elevation: 810 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.956208 Longitude: -84.359223	

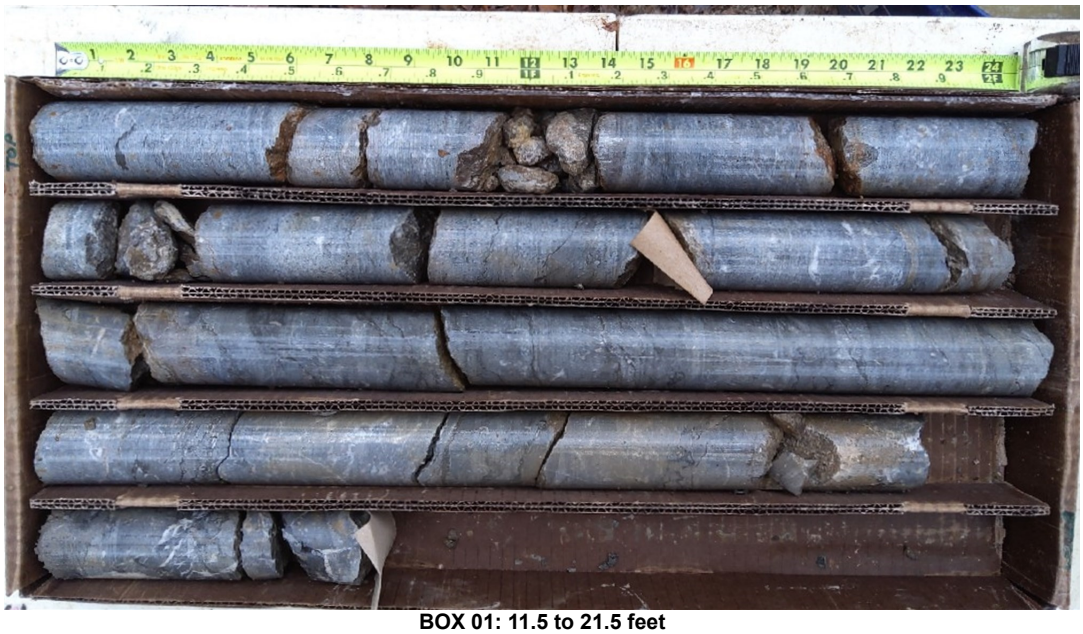


B-06 Depth: 31.5 - 36.5 ft
RUN-05
REC-100%
RQD-90%



B-06 Depth: 36.5 - 41.5 ft
RUN-06
REC-96%
RQD-88%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**Location Photographs:**	**B-06**
				Sheet 1 of 2	
Date:	11/14/2024	**Elevation:**	810 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.956208	Longitude: -84.359223		



BOX 01: 11.5 to 21.5 feet

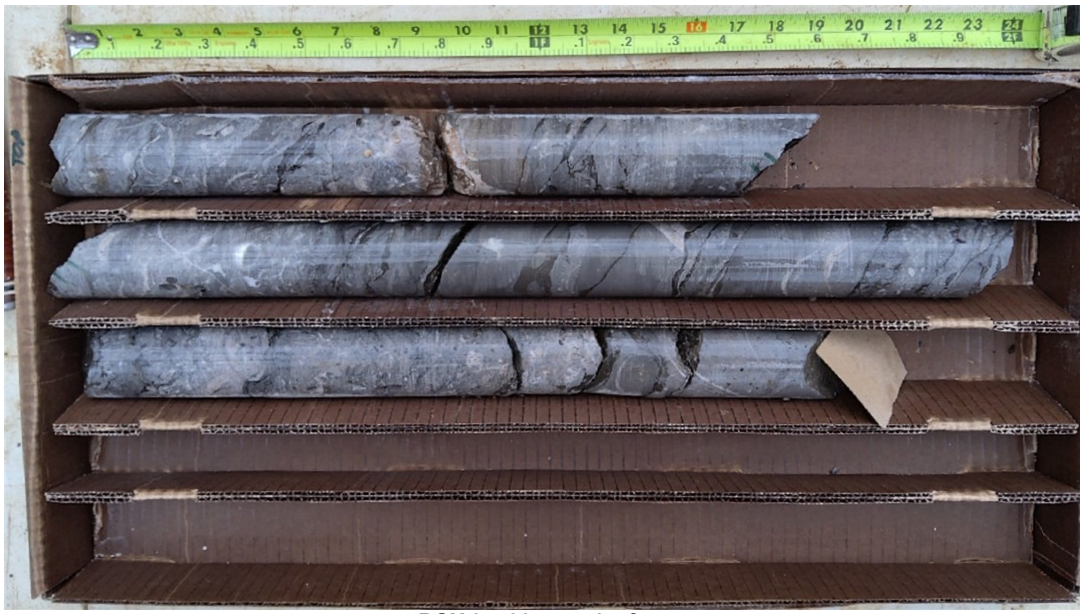


BOX 02: 21.5 to 31.5 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-06
				Sheet 2 of 2	
Date:	11/14/2024	Elevation:	810 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.956208 Longitude: -84.359223		



BOX 03: 31.5 to 36.5 feet



BOX 04: 36.5 to 41.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-07 *Sheet 1 of 2*

DATE DRILLED: 11/22/2024	**ELEVATION:** 830 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 60.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955730 **LONGITUDE:** -84.357526
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0		Residuum		SS-01 (13 in)	FAT CLAY (CH), little silt, little sand, stiff to very stiff, red brown to tan, moist	PPV= 3.0 3-5-5 N = 10		830
				UD-01 REC-100%				
5				SS-02 (18 in)		PPV= 4.5 6-9-14 N = 23		825
				UD-02 REC-100%				
10				SS-03 (18 in)		PPV= 3.0 6-9-9 N = 18		820
	12.0				ELASTIC SILT WITH SAND (MH), little clay, stiff to very stiff, tan, moist			
				UD-03 REC-100%				
15				SS-04 (18 in)		PPV= 2.5 3-5-5 N = 10		815
				SS-05 (18 in)		PPV= 1.2 5-5-7 N = 12		
20								810
				SS-06 (18 in)		PPV= 2.0 3-6-10 N = 16		
25								805
				SS-07 (18 in)		PPV= 0.5 2-2-26 N = 28		
30	Auger refusal at 30.5 feet							800
		30.5		RUN-01	LIMESTONE, light gray and dark gray, very poor quality, 30° bedding, moderately weathered to fresh, moderately hard to hard			
		32.0						

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/22/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-07 *Sheet 2 of 2*
DATE DRILLED: 11/22/2024	**ELEVATION:** 830 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 60.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.955730 **LONGITUDE:** -84.357526
SAMPLING METHOD: UD, SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
				Soil filled cavity	
32.4			REC-60% RQD-5%	LIMESTONE, light gray and dark gray, very poor quality, 30° bedding, moderately weathered to fresh, moderately hard to hard, Approx. 0.1 to 0.25 foot long soil-filled cavities throughout	
35			RUN-02 REC-26% RQD-0%		795
40			RUN-03 REC-32% RQD-8%		790
41.5				LIMESTONE AND CALCAREOUS SHALE, light gray and dark gray, interbedded, poor quality to fair quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard	
45			RUN-04 REC-100% RQD-58%		785
50			RUN-05 REC-54% RQD-44%		780
55			RUN-06 REC-100% RQD-46%		775
60			RUN-07 REC-92% RQD-35%		770
60.5				Borehole terminated at 60.5 feet	

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/22/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-07**
				Sheet 1 of 4	
Date:	11/22/2024	**Elevation:**	830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.955730 Longitude: -84.357526		



B-07, Top Depth: 1.0 ft



B-07, Top Depth: 5.0 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs:	B-07
				Sheet 2 of 4	
Date:	11/22/2024	Elevation:	830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.955730 Longitude: -84.357526		



B-07, Top Depth: 10.0 ft



B-07, Top Depth: 15.0 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: B-07 Sheet 3 of 4
Date:	11/22/2024	**Elevation:**	830 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.955730	Longitude: -84.357526	



B-07, Top Depth: 18.5 ft



B-07, Top Depth: 23.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-07**
				Sheet 4 of 4	
Date:	11/22/2024	**Elevation:**	830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.955730 Longitude: -84.357526		



B-07, Top Depth: 28.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A		**Core Photographs:** **B-07** Sheet 1 of 4
Date:	11/22/2024	**Elevation:** 830 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.955730 Longitude: -84.357526	



B-07 Depth: 30.5 - 31.5 ft
RUN-01
REC-60%
RQD-5%



B-07 Depth: 31.5 - 36.5 ft
RUN-02
REC-26%
RQD-0%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-07
		Sheet 2 of 4	
Date:	11/22/2024	Elevation: 830 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.955730 Longitude: -84.357526	



B-07 Depth: 36.5 - 41.5 ft
RUN-03
REC-32%
RQD-8%

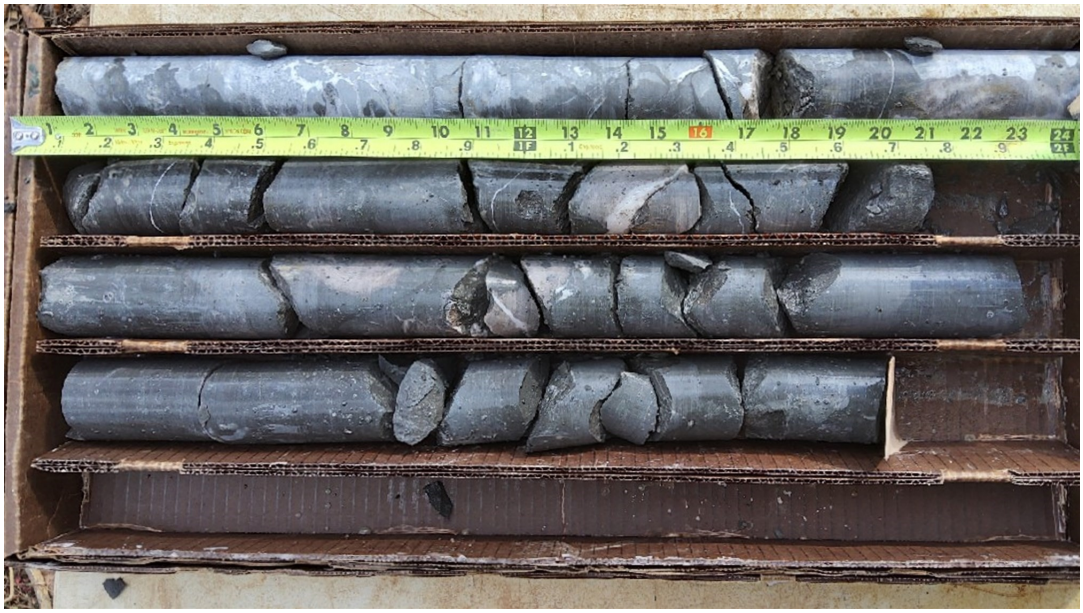


B-07 Depth: 41.5 - 46.5 ft
RUN-04
REC-100%
RQD-58%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-07**
		Sheet 3 of 4	
Date:	11/22/2024 **Elevation:** 830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955730 Longitude: -84.357526	



B-07 Depth: 46.5 - 51.5 ft
RUN-05
REC-54%
RQD-44%



B-07 Depth: 51.5 - 56.5 ft
RUN-06
REC-100%
RQD-46%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Core Photographs:**	**B-07**
				Sheet 4 of 4	
Date:	11/22/2024	**Elevation:**	830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.955730 Longitude: -84.357526		



B-07 Depth: 56.5 - 60.5 ft
RUN-07
REC-92%
RQD-35%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**B-07**
				Sheet 1 of 2	
Date:	11/22/2024	**Elevation:**	830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955730	Longitude: -84.357526		



BOX 01: 30.5 to 46.5 feet



BOX 02: 46.5 to 56.5 feet

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Location Photographs:**	**B-07**
		Sheet 2 of 2	
Date:	11/22/2024 **Elevation:** 830 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.955730 Longitude: -84.357526	



BOX 03: 56.5 to 60.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-08 *Sheet 1 of 2*

DATE DRILLED: 11/13/2024	**ELEVATION:** 816 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 61.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.958070 **LONGITUDE:** -84.360329
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (SPT ● / % Fines △ / NMC ○ / PL---LL ⊢)	ELEVATION
0		Residuum		SS-01 (14 in)	ELASTIC SILT WITH SAND (MH), some clay, trace gravel, stiff to very soft, brown to dark brown, moist	PPV= 4.5	20 40 60 80 100	
						4-6-6 N = 12 PPV= 4.0		
5				SS-02 (17 in)				812
				SS-03 (22 in)		3-5-4 N = 9 PPV= 2.2		
				SS-04 (17 in)		3-5-4 N = 9 PPV= 0.8		
10								807
						2-2-2 N = 4 PPV= 0.2		
				SS-5 (20 in)		0-0-0 N = WOH		
15								802
	17.0				LEAN CLAY WITH SAND (CL), some silt, trace gravel, firm to hard, brown to dark brown, moist	PPV= 0.2		
				SS-06 (24 in)		1-2-2 N = 4		
20								797
						PPV= 1.0		
				SS-07 (20 in)		2-2-3 N = 5		
25								792
						PPV= 0.5		
	Auger refusal at 29.5 feet			SS-08 (10 in)		25-50/4" N = 50/4"		
30								787
	29.5			RUN-01 REC-70% RQD-35%	CALCAREOUS SHALE AND LIMESTONE, light gray to red brown, very poor quality to excellent quality, 30° to 40° bedding, highly weathered to fresh, moderately hard to hard			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/13/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-08 *Sheet 2 of 2*
DATE DRILLED: 11/13/2024	**ELEVATION:** 816 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 61.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.958070 **LONGITUDE:** -84.360329
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-02 REC-60% RQD-10%	CALCAREOUS SHALE AND LIMESTONE, light gray to red brown, very poor quality to excellent quality, 30° to 40° bedding, highly weathered to fresh, moderately hard to hard	782
40			RUN-03 REC-98% RQD-94%		777
45			RUN-04 REC-100% RQD-54%		772
50			RUN-05 REC-100% RQD-88%		767
51.5				LIMESTONE AND CALCAREOUS SHALE, light gray and light blue green, interbedded, fair quality to excellent quality, 60° bedding, moderately weathered to fresh, moderately hard to hard	
55			RUN-06 REC-100% RQD-96%		762
60			RUN-07 REC-84% RQD-74%		757
61.5				Borehole terminated at 61.5 feet	

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/13/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-08**
				Sheet 1 of 4	
Date:	11/13/2024	**Elevation:**	816 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.958070 Longitude: -84.360329		



B-08, Top Depth: 1.0 ft



B-08, Top Depth: 3.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: B-08 Sheet 2 of 4
Date:	11/13/2024	**Elevation:**	816 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329		



B-08, Top Depth: 6.0 ft



B-08, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs:	B-08
				Sheet 3 of 4	
Date:	11/13/2024	Elevation:	816 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.958070 Longitude: -84.360329		



B-08, Top Depth: 13.5 ft

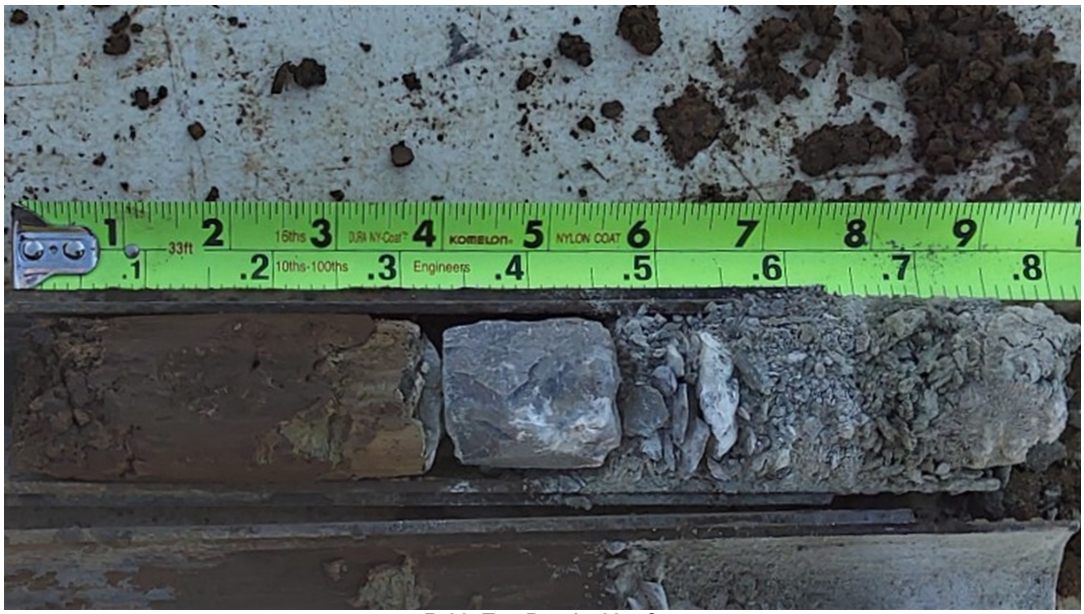


B-08, Top Depth: 18.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	SPT Photographs:	B-08
		Sheet 4 of 4	
Date:	11/13/2024	Elevation: 816 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329	



B-08, Top Depth: 23.5 ft



B-08, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-08
		Sheet 1 of 4	
Date:	11/13/2024	Elevation: 816 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329	



B-08 Depth: 29.5 - 31.5 ft
RUN-01
REC-70%
RQD-35%



B-08 Depth: 31.5 - 36.5 ft
RUN-02
REC-60%
RQD-10%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-08
		Sheet 2 of 4	
Date:	11/13/2024	Elevation: 816 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329	



B-08 Depth: 36.5 - 41.5 ft
RUN-03
REC-98%
RQD-94%



B-08 Depth: 41.5 - 46.5 ft
RUN-04
REC-100%
RQD-54%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-08
		Sheet 3 of 4	
Date:	11/13/2024	Elevation: 816 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329	



B-08 Depth: 46.5 - 51.5 ft
RUN-05
REC-100%
RQD-88%



B-08 Depth: 51.5 - 56.5 ft
RUN-06
REC-100%
RQD-96%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-08**
		Sheet 4 of 4	
Date:	11/13/2024 **Elevation:** 816 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329	



B-08 Depth: 56.5 - 61.5 ft
RUN-07
REC-84%
RQD-74%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-08
				Sheet 1 of 2	
Date:	11/13/2024	Elevation:	816 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.958070 Longitude: -84.360329		



BOX 01: 29.5 to 41.5 feet



Box 02: 41.5 to 51.5 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Location Photographs:	B-08
		Sheet 2 of 2	
Date:	11/13/2024	Elevation: 816 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958070 Longitude: -84.360329	



Box 03: 51.5 to 61.5 feet



Box 04: 56.5 to 61.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-09 *Sheet 1 of 2*

DATE DRILLED: 11/13/2024	**ELEVATION:** 826 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 41.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.957904 **LONGITUDE:** -84.359514
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0								826
		Residuum		SS-01 (24 in)	FAT CLAY WITH SAND (CH), trace silt, little organics, firm to very stiff, red brown to dark brown, moist, black staining	PPV= 4.0 5-6-6 N = 12		
				SS-02 (12 in)		PPV= 4.5 5-8-8 N = 16		
5				SS-03 (14 in)		PPV= 3.8 5-6-6 N = 12		821
				SS-04 (22 in)		PPV= 3.0 2-2-6 N = 8		
10	Auger refusal at 11.5 feet							816
		11.5		RUN-01 REC-76% RQD-36%	LIMESTONE AND CALCAREOUS SHALE, light gray and light brown, interbedded, poor quality to fair quality, 10° to 30° bedding, moderately weathered to fresh, moderately hard to hard			
15	Loss of return at 14 feet							811
				RUN-02 REC-76% RQD-60%				
20		20.0 20.5			Soil filled cavity LIMESTONE AND CALCAREOUS SHALE, gray and light gray, interbedded, fair quality to excellent quality, 30° bedding, moderately weathered to fresh, moderately hard to hard			806
		23.8 24.3		RUN-03 REC-90% RQD-90%	Soil filled cavity LIMESTONE AND CALCAREOUS SHALE, gray and light gray, interbedded, excellent quality, 30° bedding, slightly weathered to fresh, moderately hard to hard			
25								801
				RUN-04 REC-98% RQD-98%				
30								796

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/13/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-09 *Sheet 2 of 2*
DATE DRILLED: 11/13/2024	**ELEVATION:** 826 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 41.5 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.957904 **LONGITUDE:** -84.359514
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-05 REC-98% RQD-92%	LIMESTONE AND CALCAREOUS SHALE, gray and light gray, interbedded, excellent quality, 30° bedding, slightly weathered to fresh, moderately hard to hard	791
40			RUN-06 REC-98% RQD-94%		786
41.5				Borehole terminated at 41.5 feet	
45					781
50					776
55					771
60					766

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/13/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			**SPT Photographs:**	**B-09**
				Sheet 1 of 2	
Date:	11/13/2024	**Elevation:**	826 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.957904 Longitude: -84.359514		



B-09, Top Depth: 1.0 ft



B-09, Top Depth: 3.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-09**
				Sheet 2 of 2	
Date:	11/13/2024	**Elevation:**	826 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.957904	Longitude: -84.359514		



B-09, Top Depth: 6.0 ft



B-09, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-09**
		Sheet 1 of 3	
Date:	11/13/2024 **Elevation:** 826 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.957904 Longitude: -84.359514	



B-09 Depth: 11.5 - 16.5 ft
RUN-01
REC-76%
RQD-36%



B-09 Depth: 16.5 - 21.5 ft
RUN-02
REC-76%
RQD-60%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-09**
		Sheet 2 of 3	
Date:	11/13/2024 **Elevation:** 826 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.957904 Longitude: -84.359514	



B-09 Depth: 21.5 - 26.5 ft
RUN-03
REC-90%
RQD-90%

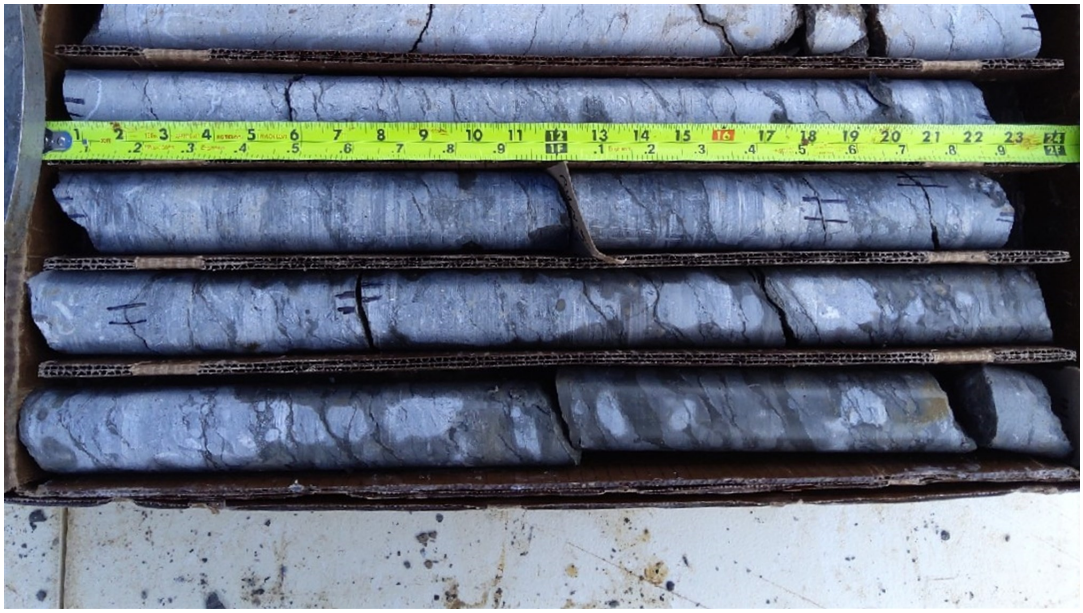


B-09 Depth: 26.5 - 31.5 ft
RUN-04
REC-98%
RQD-98%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-09
		Sheet 3 of 3	
Date:	11/13/2024	Elevation: 826 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.957904 Longitude: -84.359514	



B-09 Depth: 31.5 - 36.5 ft
RUN-05
REC-98%
RQD-92%

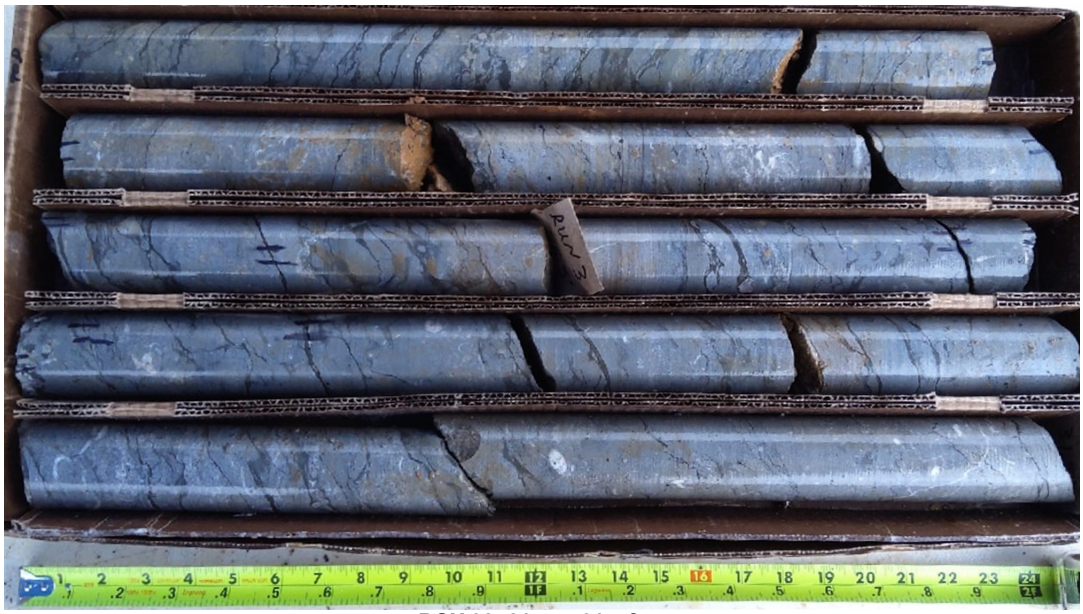


B-09 Depth: 36.5 - 41.5 ft
RUN-06
REC-98%
RQD-94%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Location Photographs:	B-09
		Sheet 1 of 2	
Date:	11/13/2024	Elevation: 826 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.957904 Longitude: -84.359514	



BOX 01: 11.5 to 21.5 feet



BOX 02: 21.5 to 31.5 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-09
				Sheet 2 of 2	
Date:	11/13/2024	Elevation:	826 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.957904 Longitude: -84.359514		



BOX 03: 31.5 to 41.5 feet

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-11 *Sheet 1 of 2*

DATE DRILLED: 11/22/2024	**ELEVATION:** 831 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 46.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.958704 **LONGITUDE:** -84.358953
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (● SPT, △ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0		Residuum		SS-01 (8 in)	FAT CLAY WITH SAND (CH), trace silt, trace ferrous nodules, soft to very stiff, red brown to dark brown, moist	PPV= 1.0		
				SS-02 (14 in)		2-2-2 N = 4 PPV= 4.5		827
5				SS-03 (14 in)		6-9-11 N = 20 PPV= 4.5		
				SS-04 (18 in)		5-6-8 N = 14 PPV= 2.5		822
10						2-5-7 N = 12		
				SS-05 (18 in)		PPV= 2.0		817
15	Auger refusal at 16.0 feet					1-2-5 N = 7		
	16.0			RUN-01 REC-98% RQD-64%	LIMESTONE AND CALCAREOUS SHALE, light gray and light brown, interbedded, fair quality to excellent quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard			812
20								
25				RUN-02 REC-88% RQD-78%				807
30				RUN-03 REC-96% RQD-88%				802

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/22/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee S&ME Project No. 24430185A	BORING LOG: B-11 *Sheet 2 of 2*

DATE DRILLED: 11/22/2024	**ELEVATION:** 831 ft	**NOTES:** Sample description based on visual observation of obtained samples.
DRILL RIG: Mobile B-57	**DATUM:** NAVD88	
DRILLER: Christopher Brummage	**BORING DEPTH:** 46.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Ken Wolf	**LATITUDE:** 35.958704 **LONGITUDE:** -84.358953
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
35			RUN-04 REC-100% RQD-94%	LIMESTONE AND CALCAREOUS SHALE, light gray and light brown, interbedded, fair quality to excellent quality, 30° to 40° bedding, moderately weathered to fresh, moderately hard to hard	797
40			RUN-05 REC-100% RQD-72%		792
45			RUN-06 REC-92% RQD-74%		787
	46.0			Borehole terminated at 46.0 feet	
50					782
55					777
60					772

GROUND WATER		DATE/TIME	DEPTH (FT)	REMARKS
ATD	▽	11/22/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Estimated from topo map (Rounded 1 ft), Horizontal Accuracy: Handheld GPS (1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs:	B-11
				Sheet 1 of 3	
Date:	11/22/2024	Elevation:	831 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.958704 Longitude: -84.358953		



B-11, Top Depth: 1.0 ft



B-11, Top Depth: 3.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			SPT Photographs: B-11 Sheet 2 of 3
Date:	11/22/2024	**Elevation:**	831 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958704	Longitude: -84.358953	



B-11, Top Depth: 6.0 ft



B-11, Top Depth: 8.5 ft

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**SPT Photographs:**	**B-11**
				Sheet 3 of 3	
Date:	11/22/2024	**Elevation:**	831 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.958704 Longitude: -84.358953			



B-11, Top Depth: 13.5 ft

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	Core Photographs:	B-11
		Sheet 1 of 3	
Date:	11/22/2024	Elevation: 831 ft	Notes:
Photographed by:	Ken Wolf	Latitude: 35.958704 Longitude: -84.358953	



B-11 Depth: 16.0 - 21.0 ft
RUN-01
REC-98%
RQD-64%

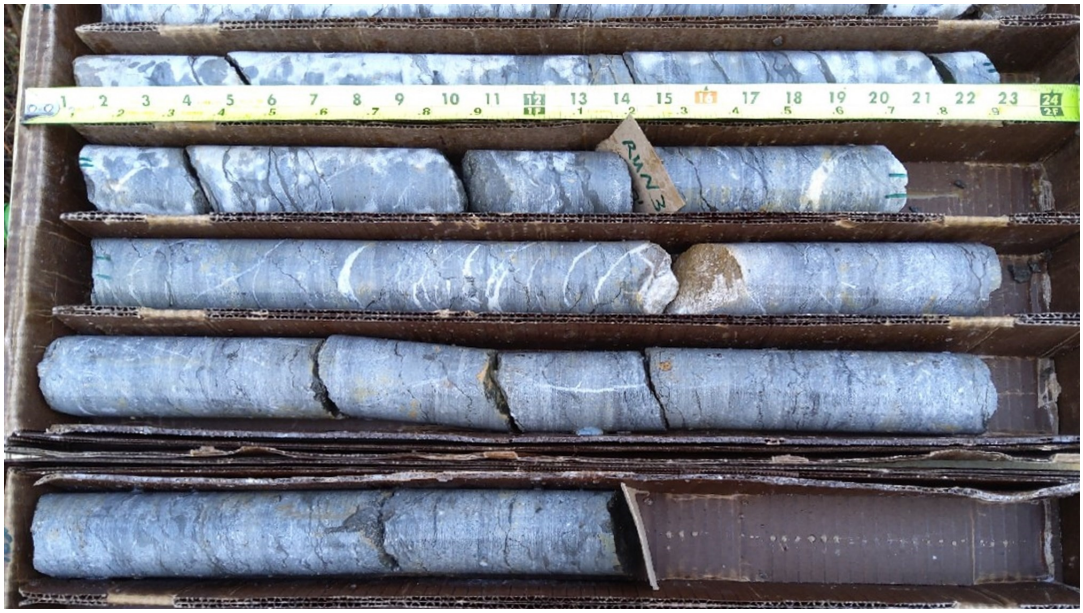


B-11 Depth: 21.0 - 26.0 ft
RUN-02
REC-88%
RQD-78%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A	**Core Photographs:**	**B-11**
		Sheet 2 of 3	
Date:	11/22/2024 **Elevation:** 831 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.958704 Longitude: -84.358953	



B-11 Depth: 26.0 - 31.0 ft
RUN-03
REC-96%
RQD-88%



B-11 Depth: 31.0 - 36.0 ft
RUN-04
REC-100%
RQD-94%

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A	**Core Photographs:**	**B-11**
		Sheet 3 of 3	
Date:	11/22/2024 **Elevation:** 831 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.958704 Longitude: -84.358953	

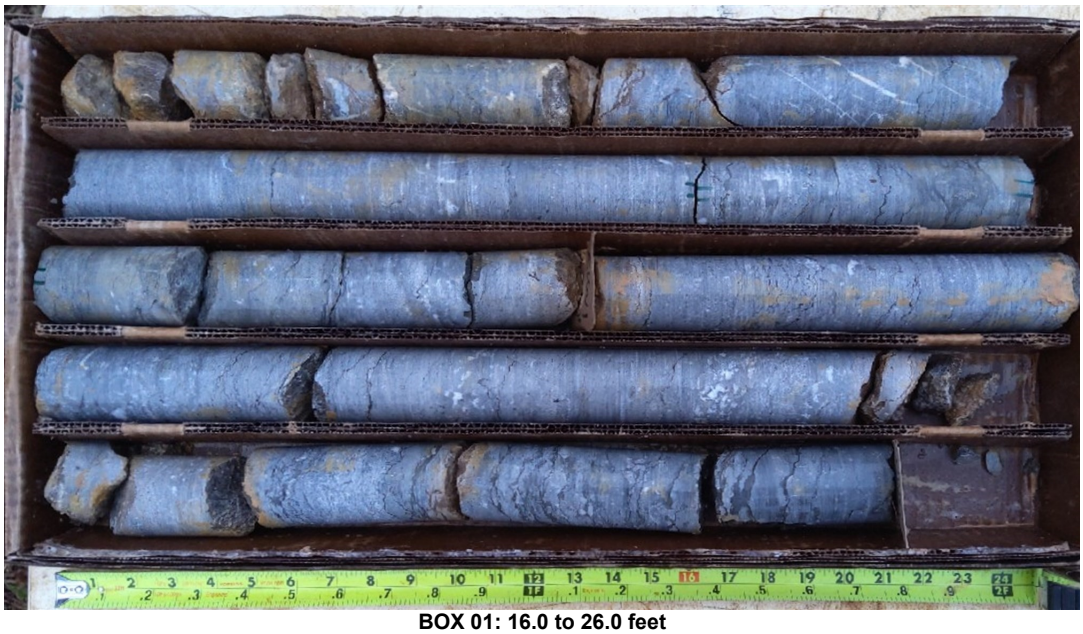


B-11 Depth: 36.0 - 41.0 ft
RUN-05
REC-100%
RQD-72%



B-11 Depth: 41.0 - 46.0 ft
RUN-06
REC-92%
RQD-74%

Project:	**Self Sufficiency Parcel 2 Additional Exploration** **Oak Ridge, Tennessee** 24430185A			**Location Photographs:**	**B-11**
				Sheet 1 of 2	
Date:	11/22/2024	**Elevation:**	831 ft	Notes:	
Photographed by:	Ken Wolf	Latitude: 35.958704	Longitude: -84.358953		



BOX 01: 16.0 to 26.0 feet

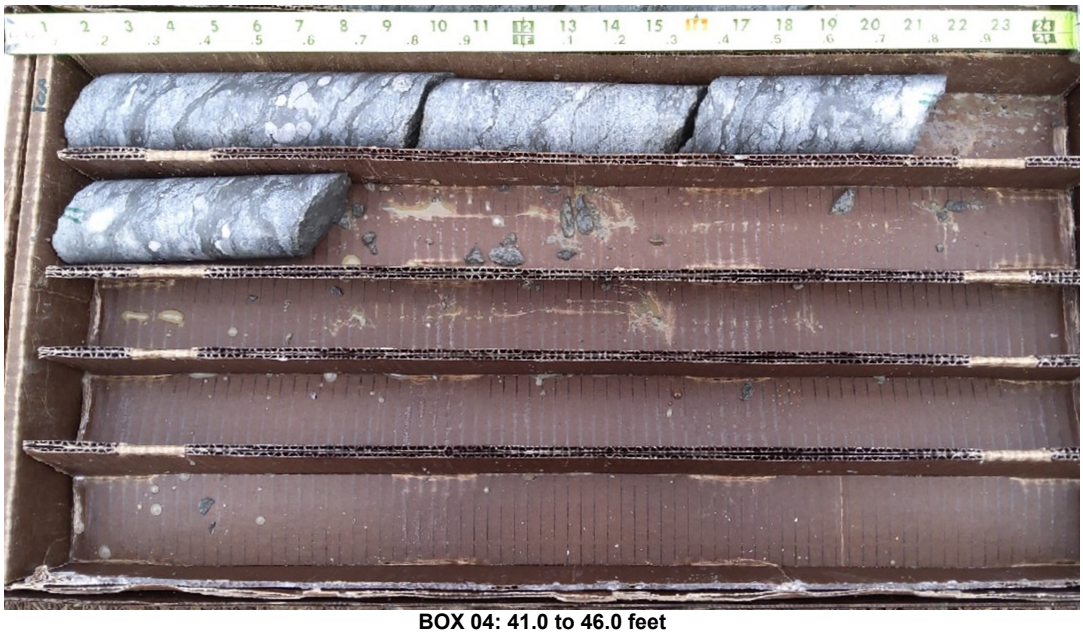


BOX 02: 26.0 to 36.0 feet

Project:	Self Sufficiency Parcel 2 Additional Exploration Oak Ridge, Tennessee 24430185A			Location Photographs:	B-11
				Sheet 2 of 2	
Date:	11/22/2024	Elevation:	831 ft	Notes:	
Photographed by:	Ken Wolf	Latitude:	35.958704 Longitude: -84.358953		

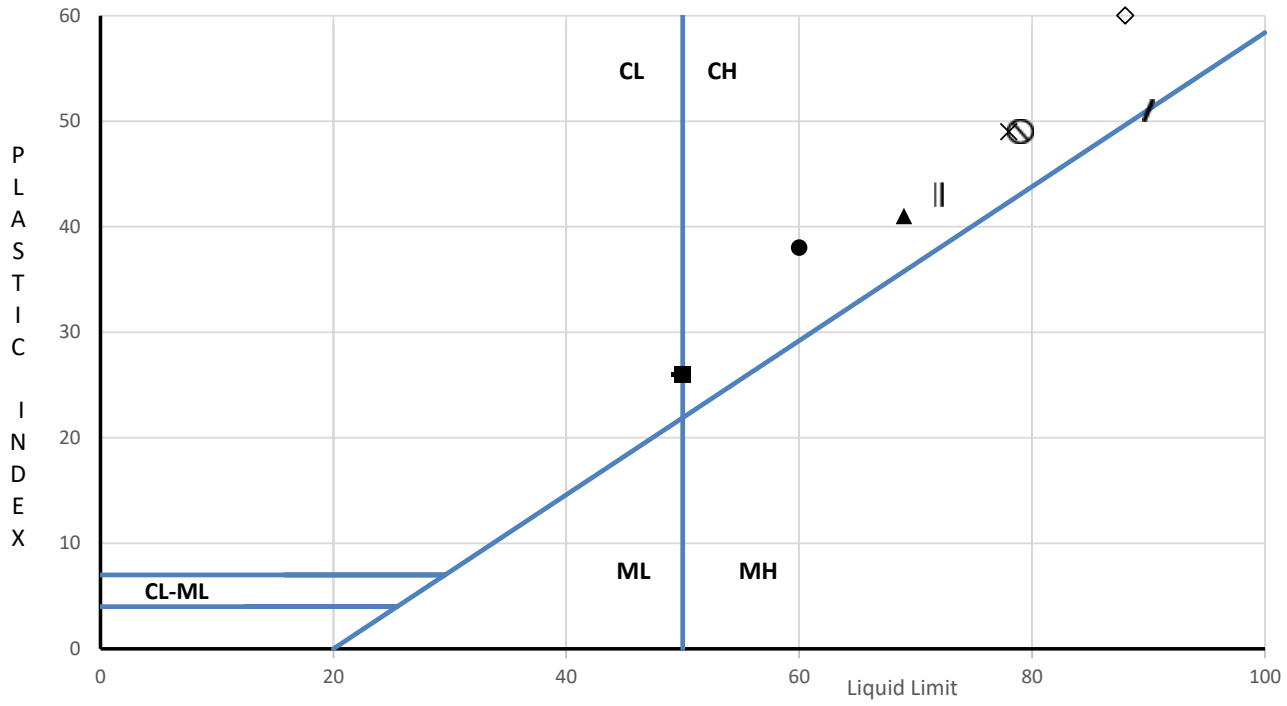


BOX 03: 36.0 to 41.0 feet



BOX 04: 41.0 to 46.0 feet

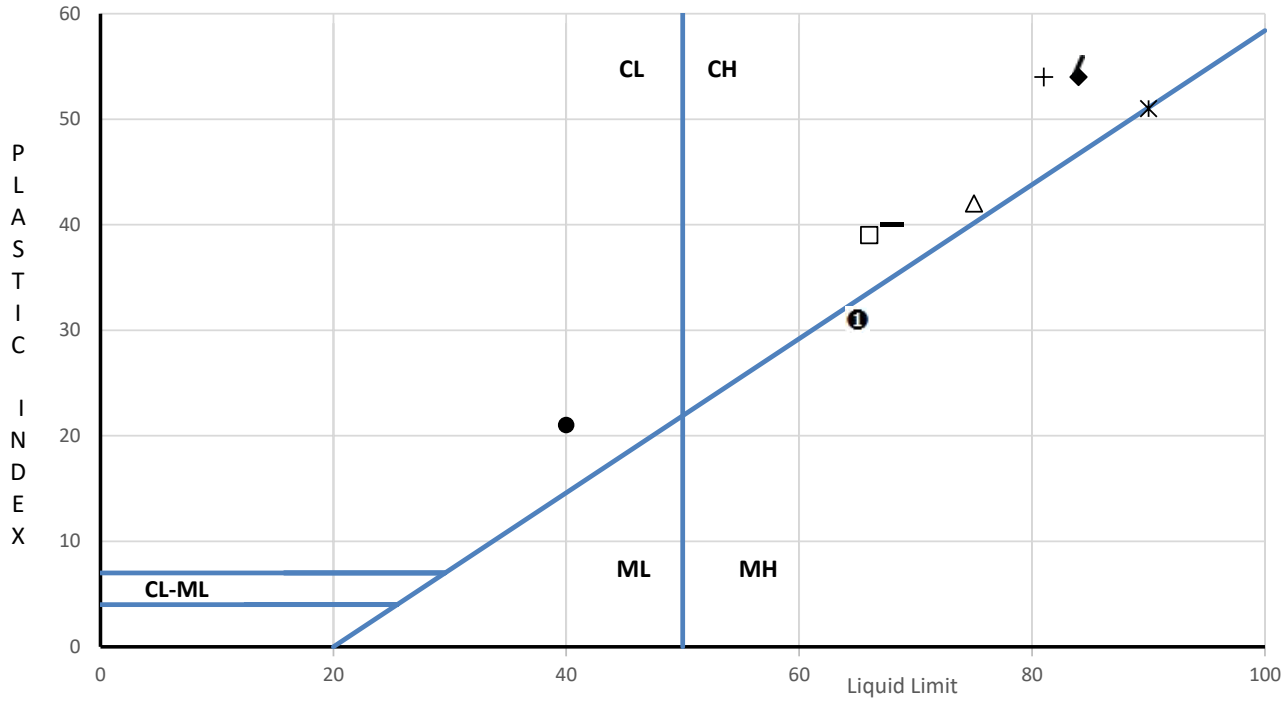
Appendix IV – Laboratory Test Results



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
■	A-01	SS-2	3.5	22.3	50	24	26		CH	
	A-01	SS-4	8.5	35.7						
▲	A-01A	UD-1	16	33.8	69	28	41	86.3	CH	FAT CLAY
●	A-01A	UD-02	26	51.6	60	22	38	89.5	CH	FAT CLAY
▬	A-02	SS-01	1	22.1	49	23	26		CL	
	A-02	SS-03	6	31.7						
	A-02	SS-04	8.5	18.6						
◇	A-02	SS-05	13.5	33.7	88	28	60		CH	
	A-02	SS-06	18.5	35.3						
✕	A-02	SS-07	23.5	36.2	78	29	49		CH	
	A-02	SS-08	28.5	23.1						
	A-03	SS-01	1	32.7						
/	A-03	SS-02	3.5	34.0	90	39	51		MH	
	A-03	SS-03	6	37.8						
	A-03	SS-04	8.5	37.5						
⊘	A-03	SS-05	13.5	34.2	79	30	49		CH	
	A-03	SS-06	18.5	40.0						
‖	A-03	SS-07	23.5	45.9	72	29	43		CH	
	A-03	SS-08	28.5	42.8						
	A-04	SS-01	1	27.3						

INDEX TEST RESULTS

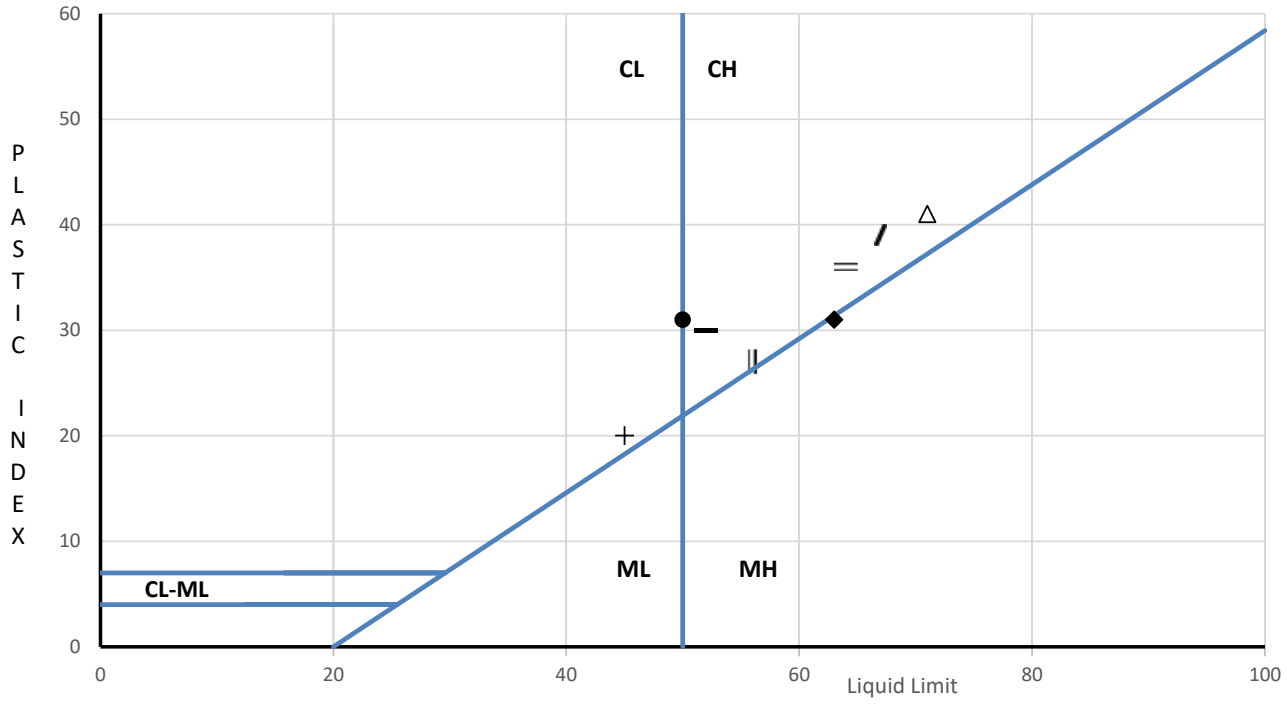
Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site A
Approved by	Date
Tyler Cole	3/18/2025 9:18



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	A-04	SS-02	3.5	36.3						
◆	A-04A	UD-01	6	39.6	84	30	54	98.0	CH	FAT CLAY
	A-05	SS-01	1	18.4						
●	A-05	SS-02	3.5	21.5	40	19	21		CL	
	A-05	SS-03	6	32.2						
▬	A-05	SS-04	8.5	29.0	68	28	40		CH	
□	A-05	SS-05	13.5	40.6	66	27	39		CH	
	A-06	SS-01	1	24.9						
△	A-06	SS-02	3.5	26.8	75	33	42		CH	
	A-06	SS-03	6	36.5						
✳	A-06	SS-04	8.5	36.6	90	39	51		MH	
	A-06	SS-05	13.5	41.4						
/	A-06	SS-06	18.5	27.8	84	29	55		CH	
	A-06	SS-07	23.5	34.4						
+	A-06	SS-08	28.5	40.7	81	27	54		CH	
	A-07	SS-01	1	47.3						
❶	A-07	SS-02	3.5	48.0	65	34	31		MH	
	A-07	SS-03	6	44.2						
	A-07	SS-04	8.5	55.1						
	A-07	SS-05	13.5	66.4						

INDEX TEST RESULTS

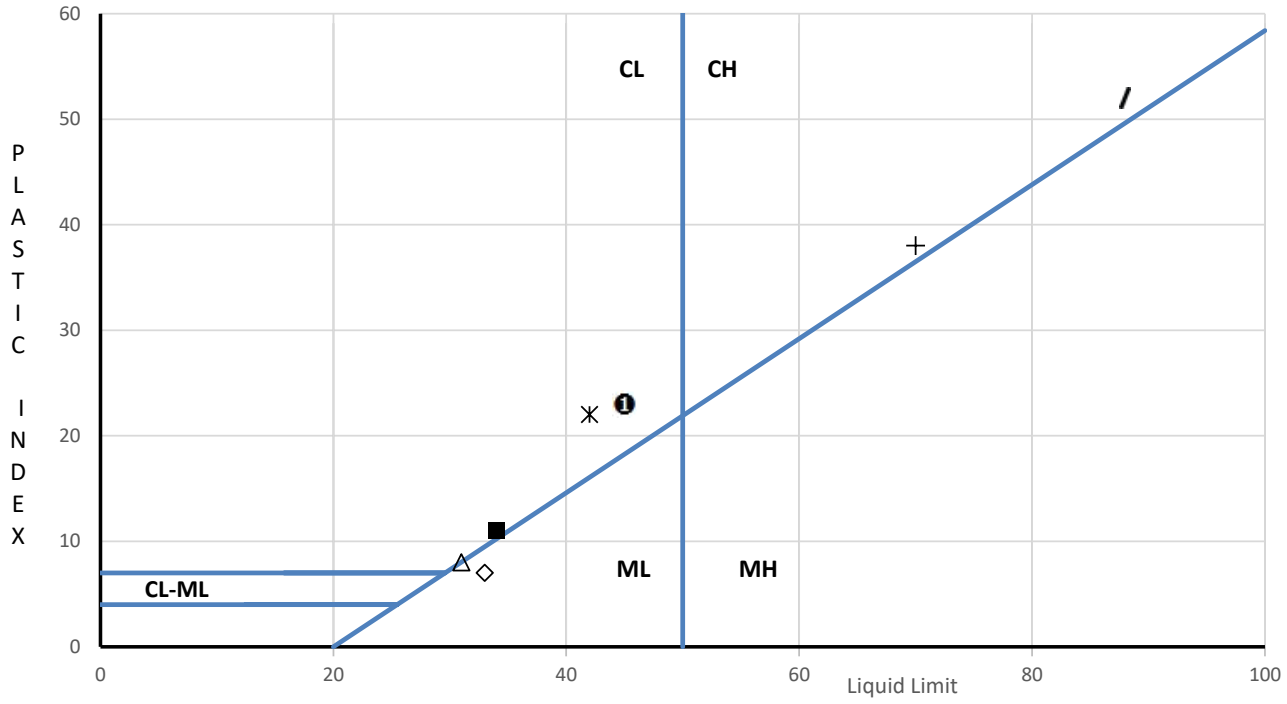
Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site A
Approved by	Date
Tyler Cole	3/18/2025 9:18



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	A-07	SS-07	23.5	53.1						
◆	A-07A	UD-01	18	46.8	63	32	31	83.8	MH	ELASTIC SILT WITH SAND
	A-08	SS-01	1	24.0						
●	A-08	SS-02	3.5	22.3	50	19	31		CH	
	A-08	SS-03	6	21.8						
▬	A-08	SS-04	8.5	27.2	52	22	30		CH	
	A-08	SS-05	13.5	38.0						
	A-09	SS-01	1	32.8						
△	A-09	SS-02	3.5	38.3	71	30	41		CH	
	A-09	SS-03	6	41.9						
	A-09	SS-04	8.5	45.1						
	A-09	SS-06	18.5	44.2						
/	A-09	SS-07	23.5	31.7	67	28	39		CH	
	A-09	SS-09	33.5	62.8						
+	A-09	SS-10	38.5	33.7	45	25	20		CL	
	A-09	SS-11	43.5	47.9						
	A-09	SS-12	48.5	24.7						
‖	A-09A	UD-01	14	42.0	56	29	27	81.9	CH	FAT CLAY WITH SAND
=	A-09A	UD-02	30	50.0	64	28	36	78.4	CH	FAT CLAY WITH SAND
	A-10	SS-01	1	21.8						

INDEX TEST RESULTS

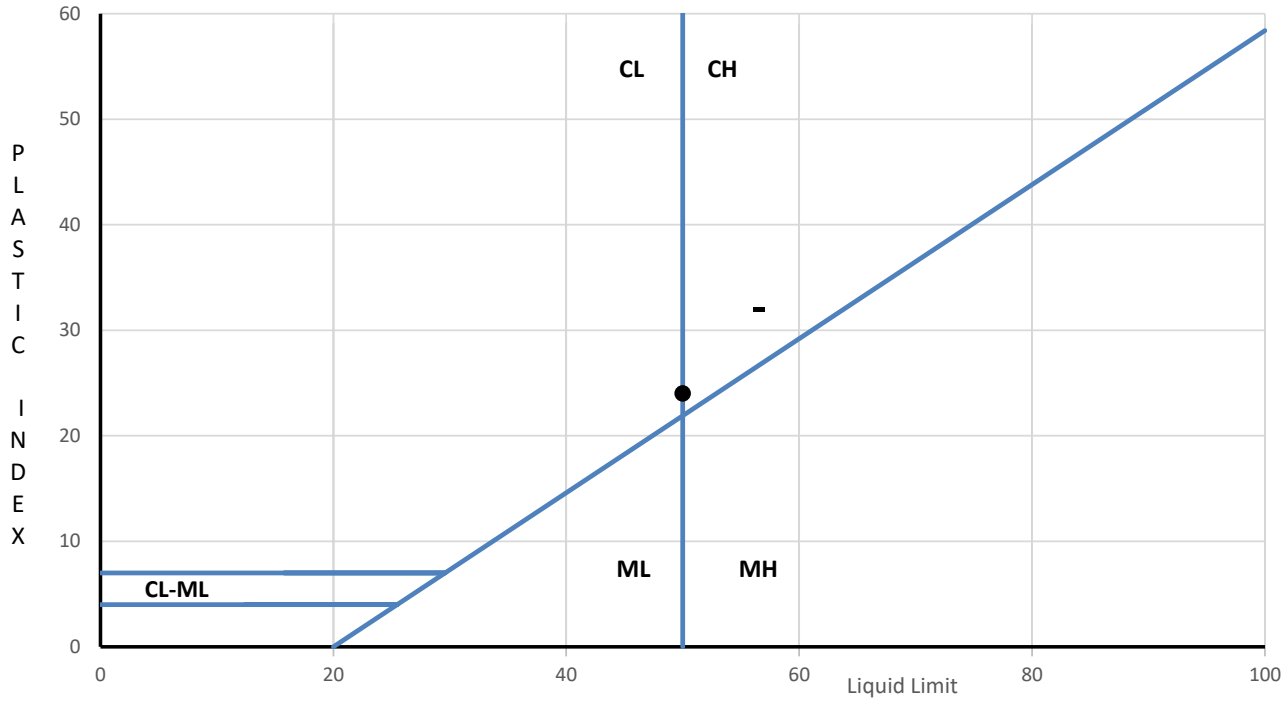
Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site A
Approved by	Date
Tyler Cobb	3/18/2025 9:18



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
■	A-10	SS-02	3.5	17.8	34	23	11		CL	
	A-10	SS-05	13.5	16.5						
	A-10	SS-07	23.5	13.7						
	A-10	SS-08	28.5	12.2						
	A-10	SS-09	33.5	10.5						
	A-10	SS-11	43.5	5.6						
	A-10	SS-13	53.5	9.2						
◇	A-10A	UD-01	8	17.3	33	26	7	41.8	SM	SILTY SAND WITH GRAVEL
△	A-10A	UD-02	18	13.0	31	23	8	24.3	SM	SILTY SAND WITH GRAVEL
	A-11	SS-01	1	27.2						
✳	A-11	SS-02	3.5	21.4	42	20	22		CL	
	A-11	SS-03	6	23.6						
/	A-11	SS-04	8.5	24.7	88	36	52		CH	
	A-11	SS-05	13.5	33.5						
+	A-11	SS-06	18.5	30.2	70	32	38		CH	
	A-12	SS-01	1	28.2						
❶	A-12	SS-02	3.5	24.5	45	22	23		CL	
	A-12	SS-03	6	23.1						
	A-12	SS-04	8.5	24.9						
	A-12	SS-05	13.5	25.9						

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site A
Approved by	Date
Tyler Cole	3/18/2025 9:18



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	A-12	**SS-07**	**23.5**	**24.8**						
	A-12	**SS-09**	**33.5**	**29.5**						
	A-12	**SS-10**	**38.5**	**34.4**						
●	**A-12A**	**UD-01**	**18**	**22.9**	**50**	**26**	**24**	**57.4**	**CH**	**SANDY FAT CLAY**
▬	**A-12A**	**UD-02**	**30**	**35.3**	**56**	**24**	**32**	**80.1**	**CH**	**FAT CLAY WITH SAND**

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site A
Approved by	Date
Tyler Cole	3/18/2025 9:18

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	2/14-2/17/25
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sampled by:	S&ME	Sample Date(s):	1/7-2/5/25
Sampling Method:	Split Spoon, Shelby Tube	Log # :	43-25-007

Method: **A (1%)** ☐ **B (0.1%)** ☑ Balance ID. 9398 Calibration Date: 1/20/2025 Oven ID. 12872 Calibration Date: 1/20/2025

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
A-01	SS-02	3.5-5	RR	36.55	169.50	145.24	24.26	22.3%	
A-01	SS-04	8.5-10	OX	33.02	164.13	129.61	34.52	35.7%	
A-01A	UD-1	16-18	PK116	114.04	1250.26	963.12	287.14	33.8%	
A-01A	UD-02	26-28	CB2	181.66	1221.17	867.53	353.64	51.6%	
A-02	SS-01	1-2.5	H2O	21.57	156.80	132.30	24.50	22.1%	
A-02	SS-03	6-7.5	103	22.85	150.34	119.63	30.71	31.7%	
A-02	SS-04	8.5-10	101	32.59	177.29	154.60	22.69	18.6%	
A-02	SS-05	13.5-15	102	31.56	146.77	117.75	29.02	33.7%	
A-02	SS-06	18.5-20	27	31.63	154.57	122.47	32.10	35.3%	
A-02	SS-07	23.5-25	CONS2	21.67	150.05	115.91	34.14	36.2%	
A-02	SS-08	28.5-30	C-7	21.26	66.84	58.29	8.55	23.1%	
A-03	SS-01	1-2.5	3B	41.93	264.53	209.63	54.90	32.7%	
A-03	SS-02	3.5-5	D	42.76	171.99	139.21	32.78	34.0%	
A-03	SS-03	6-7.5	CONS8	21.41	145.71	111.61	34.10	37.8%	

Notes / Deviations / References

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

Tyler Cope
Signature

Lab Services Manager
Position

3/18/2025
Date

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #: 24430185A Report Date: 3/18/2025

Project Name: Self Sufficiency Parcel 2 Additional Exploration

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
A-03	SS-04	8.5-10	K17	46.08	205.30	161.85	43.45	37.5%	
A-03	SS-05	13.5-15	3.00	20.31	144.72	113.01	31.71	34.2%	
A-03	SS-06	18.5-20	D1	41.70	221.01	169.74	51.27	40.0%	
A-03	SS-07	23.5-25	C-69	30.81	140.11	105.71	34.40	45.9%	
A-03	SS-08	28.5-30	D3	41.36	257.61	192.79	64.82	42.8%	
A-04	SS-01	1-2.5	LeeC	32.74	219.59	179.51	40.08	27.3%	
A-04	SS-02	3.5-5	4	63.02	192.52	158.04	34.48	36.3%	
A-04A	UD-01	6-8	21	103.36	313.20	253.68	59.52	39.6%	
A-05	SS-01	1-2.5	6	42.32	199.10	174.77	24.33	18.4%	
A-05	SS-02	3.5-5	2B	40.14	241.80	206.18	35.62	21.5%	
A-05	SS-03	6-7.5	5	21.57	149.88	118.64	31.24	32.2%	
A-05	SS-04	8.5-10	CONS6	23.24	148.95	120.68	28.27	29.0%	
A-05	SS-05	13.5-15	4	63.02	215.82	171.69	44.13	40.6%	
A-06	SS-01	1-2.5	LEE-C	32.74	204.39	170.20	34.19	24.9%	
A-06	SS-02	3.5-5	D-3	41.38	180.40	151.02	29.38	26.8%	
A-06	SS-03	6-7.5	6	42.32	249.06	193.73	55.33	36.5%	
A-06	SS-04	8.5-10	2B	40.15	242.31	188.13	54.18	36.6%	
A-06	SS-05	13.5-15	#5	21.57	152.17	113.91	38.26	41.4%	
A-06	SS-06	18.5-20	CONS6	23.24	149.77	122.27	27.50	27.8%	
A-06	SS-07	23.5-25	d-4	21.75	148.58	116.11	32.47	34.4%	
A-06	SS-08	28.5-30	D	42.75	203.81	157.24	46.57	40.7%	
A-07	SS-01	1-2.5	3B	41.92	225.34	166.46	58.88	47.3%	

Notes / Deviations / References

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #: 24430185A Report Date:

Project Name: Self Sufficiency Parcel 2 Additional Exploration

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
A-07	SS-02	3.5-5	CONS8	21.42	146.19	105.73	40.46	48.0%	
A-07	SS-03	6-7.5	K17	46.08	225.78	170.72	55.06	44.2%	
A-07	SS-04	8.5-10	D1	41.69	194.51	140.19	54.32	55.1%	
A-07	SS-05	13.5-15	E	41.44	206.96	140.90	66.06	66.4%	
A-07	SS-07	23.5-25	27	31.63	154.91	112.15	42.76	53.1%	
A-07A	UD-01	18-20	222	176.56	394.38	324.95	69.43	46.8%	
A-08	SS-01	1-2.5	D3	41.38	216.00	182.17	33.83	24.0%	
A-08	SS-02	3.5-5	Lee-C	32.74	204.57	173.23	31.34	22.3%	
A-08	SS-03	6-7.5	4	63.03	221.60	193.23	28.37	21.8%	
A-08	SS-04	8.5-10	2B	40.15	211.29	174.66	36.63	27.2%	
A-08	SS-05	13.5-14.6	6	42.32	226.65	175.91	50.74	38.0%	
A-09	SS-01	1-2.5	CONS-6	23.24	174.71	137.33	37.38	32.8%	
A-09	SS-02	3.5-5	d-4	21.74	165.22	125.52	39.70	38.3%	
A-09	SS-03	6-7.5	CONS-2	21.68	145.01	108.60	36.41	41.9%	
A-09	SS-04	8.5-10	#5	21.57	144.96	106.62	38.34	45.1%	
A-09	SS-05	18.5-20	102	31.55	162.33	122.24	40.09	44.2%	
A-09	SS-06	23.5-25	101	32.58	174.71	140.54	34.17	31.7%	
A-09	SS-07	33.5-35	103	22.85	176.80	117.44	59.36	62.8%	
A-09	SS-08	38.5-40	H2O	21.56	156.29	122.35	33.94	33.7%	
A-09	SS-09	43.5-45	OX	33.01	215.08	156.10	58.98	47.9%	
A-09	SS-10	48.5-50	RR	36.60	160.46	135.91	24.55	24.7%	
A-09A	UD-01	14-6	PK112	108.86	313.76	253.19	60.57	42.0%	
A-09A	UD-02	30-32	195	96.02	301.64	233.14	68.50	50.0%	
A-10	SS-01	1-2.5	EFF	41.60	204.39	175.29	29.10	21.8%	

Notes / Deviations / References

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #: 24430185A Report Date:

Project Name: Self Sufficiency Parcel 2 Additional Exploration

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
A-10	SS-02	3.5-5	Y2	41.10	210.26	184.65	25.61	17.8%	
A-10	SS-05	13.5-15	A42	39.65	222.48	196.52	25.96	16.5%	
A-10	SS-07	23.5-25	5	42.23	262.93	236.41	26.52	13.7%	
A-10	SS-08	28.5-29.2	1B	58.78	266.30	243.72	22.58	12.2%	
A-10	SS-09	33.5-34.1	D-19	41.68	238.53	219.83	18.70	10.5%	
A-10	SS-11	43.5-43.8	R-21	31.83	160.82	153.97	6.85	5.6%	
A-10	SS-13	53.5-53.8	D1	41.69	201.36	187.95	13.41	9.2%	
A-10A	UD-01	8-10	33	105.30	333.50	299.80	33.70	17.3%	
A-10A	UD-02	18-20	1980	98.14	297.61	274.63	22.98	13.0%	
A-11	SS-01	1-2.5	3.00	20.31	129.74	106.31	23.43	27.2%	
A-11	SS-02	3.5-5	E	41.45	215.60	184.91	30.69	21.4%	
A-11	SS-03	6-7.5	K17	46.11	210.68	179.23	31.45	23.6%	
A-11	SS-04	8.5-10	D	42.74	234.57	196.62	37.95	24.7%	
A-11	SS-05	13.5-15	3	41.93	274.61	216.26	58.35	33.5%	
A-11	SS-06	18.5-20	Lee-B	33.19	235.94	188.93	47.01	30.2%	
A-12	SS-01	1-2.5	407	25.16	220.57	177.60	42.97	28.2%	
A-12	SS-02	3.5-5	410	25.18	180.02	149.54	30.48	24.5%	
A-12	SS-03	6-7.5	445	25.22	167.75	140.97	26.78	23.1%	
A-12	SS-04	8.5-10	412	25.10	166.46	138.32	28.14	24.9%	
A-12	SS-05	13.5-15	421	25.19	153.84	127.39	26.45	25.9%	
A-12	SS-07	23.5-25	413	25.15	162.90	135.53	27.37	24.8%	
A-12	SS-09	33.5-35	400	24.81	172.62	138.99	33.63	29.5%	
A-12	SS-10	38.5-40	423	24.68	166.49	130.16	36.33	34.4%	
A-12A	UD-01	18-20	A2	11.58	1217.13	992.57	224.56	22.9%	
A-12A	UD-02	30-32	10003	11.26	1151.81	854.44	297.37	35.3%	

Notes / Deviations / References

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☐ AASHTO T 89 ☐ AASHTO T 90 ☐

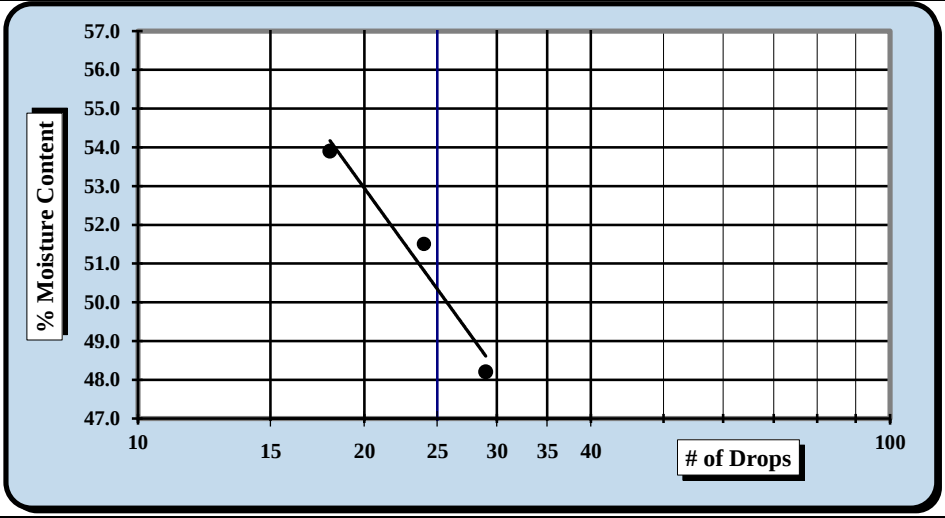
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/10/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	2/20/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-01	Sample #: SS-02	Sample Date: 1/30/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	yellowish Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B1	B5	A3				23	3	
A	Tare Weight	15.85	15.93	15.91				15.42	15.45	
B	Wet Soil Weight + A	30.15	32.96	33.24				24.85	25.11	
C	Dry Soil Weight + A	25.50	27.17	27.17				23.05	23.26	
D	Water Weight (B-C)	4.65	5.79	6.07				1.80	1.85	
E	Dry Soil Weight (C-A)	9.65	11.24	11.26				7.63	7.81	
F	% Moisture (D/E)*100	48.2%	51.5%	53.9%				23.6%	23.7%	
N	# OF DROPS	29	24	18						
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**50**
Plastic Limit	**24**
Plastic Index	**26**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/10/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

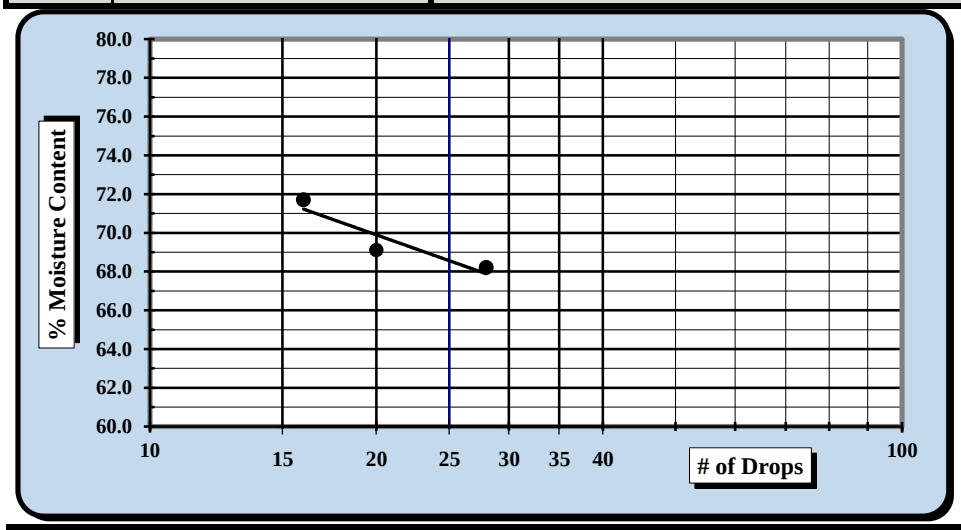
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/11/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-01A	Sample #: UD-01	Sample Date: 1/30/2025
Log #:	43-25-007		Depth: 16-18 ft
Description:	Light brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B12	17	A1				B1	21	
A	Tare Weight	15.90	15.48	15.64				15.88	15.51	
B	Wet Soil Weight + A	25.62	24.29	25.58				25.05	24.32	
C	Dry Soil Weight + A	21.68	20.69	21.43				23.04	22.40	
D	Water Weight (B-C)	3.94	3.60	4.15				2.01	1.92	
E	Dry Soil Weight (C-A)	5.78	5.21	5.79				7.16	6.89	
F	% Moisture (D/E)*100	68.2%	69.1%	71.7%				28.1%	27.9%	
N	# OF DROPS	28	20	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**69**
Plastic Limit	**28**
Plastic Index	**41**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

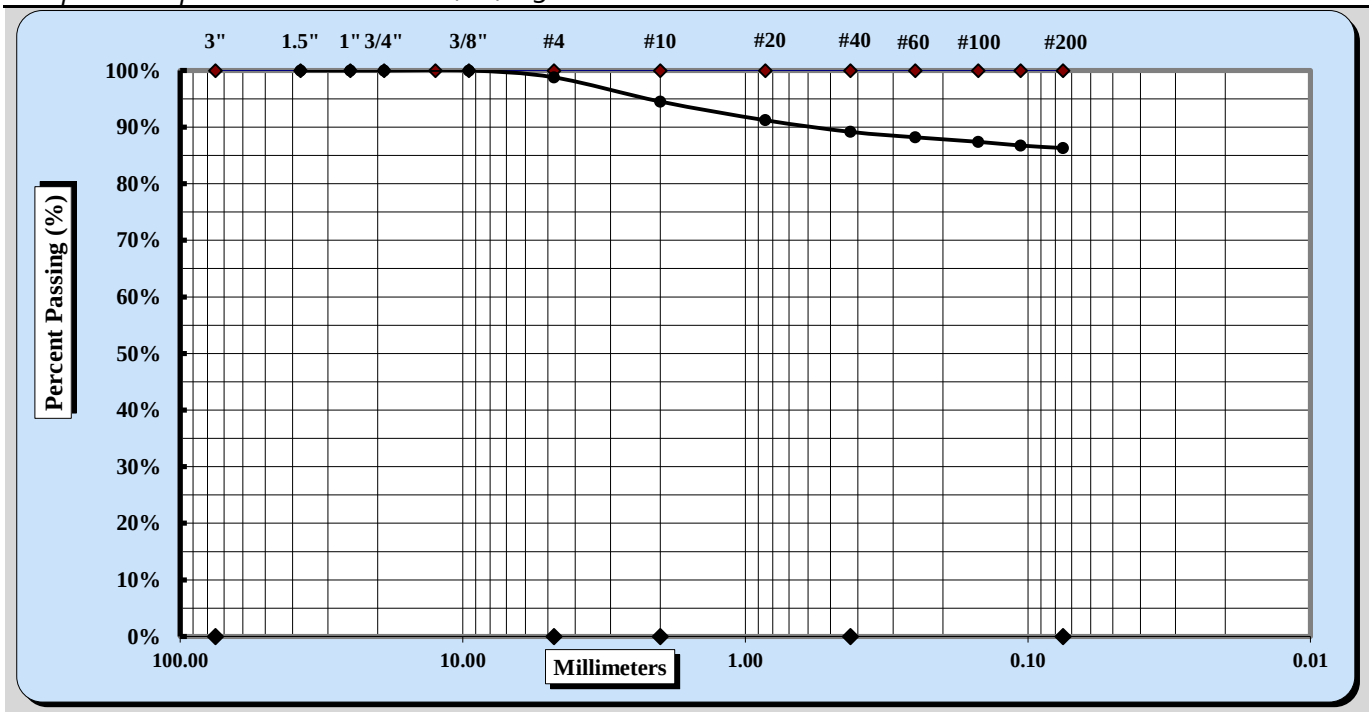
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Sieve Analysis of Soils

Quality Assurance *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/17/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-01A	Type: UD	Sample Date:	1/30/2025
Sample Log No.: 43-25-007	Sample: UD-01	Depth:	16-18 ft
Sample Description:	FAT CLAY (CH), light brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	3/8"	Coarse Sand	4%	Fine Sand	3%
Gravel	1%	Medium Sand	5%	Silt & Clay	86%
Liquid Limit:	69	Plastic Limit:	28	Plastic Index:	41

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Tyler Copeman		Lab Services Manager	3/17/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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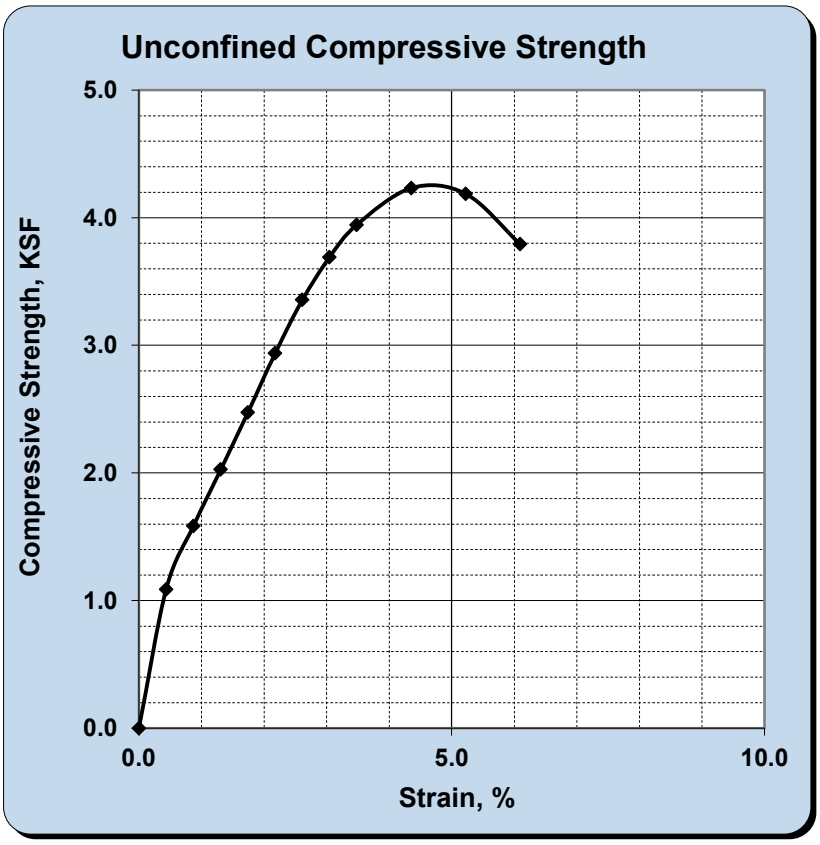
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/17/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	2/19/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-01A Sample No. UD-01	Sample Date:	1/30/2025
		Depth:	16-18 ft
Sample Description:	FAT CLAY (CH), brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 87.3 pcf
Initial Water Content: 33.8%
Unconfined Compressive Strength, q_u: **4.232** KSF
Undrained Shear Strength, s_u: **2.116** KSF

Liquid Limit: 69
Plasticity Index: 41
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.85
Strain at Failure: 5.6

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/17/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

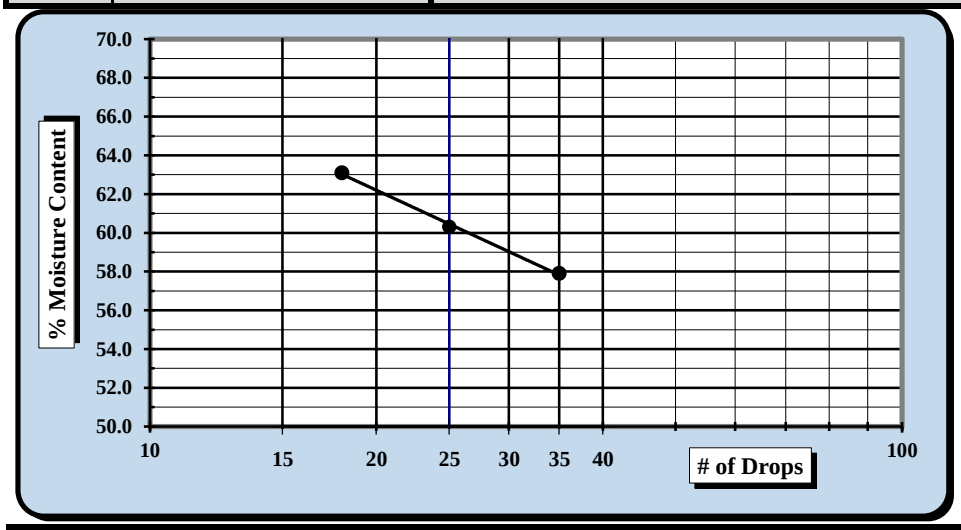
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-01A	Sample #: UD-02	Sample Date: 1/30/2025
Log #:	43-25-007		Depth: 26-28 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

	Pan #	Liquid Limit						Plastic Limit		
	Tare #:	A5	24	A1				19	22	
A	Tare Weight	15.82	15.43	15.64				15.37	15.38	
B	Wet Soil Weight + A	26.48	24.89	25.28				23.81	24.68	
C	Dry Soil Weight + A	22.57	21.33	21.55				22.29	22.97	
D	Water Weight (B-C)	3.91	3.56	3.73				1.52	1.71	
E	Dry Soil Weight (C-A)	6.75	5.90	5.91				6.92	7.59	
F	% Moisture (D/E)*100	57.9%	60.3%	63.1%				22.0%	22.5%	
N	# OF DROPS	35	25	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.3%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**60**
Plastic Limit	**22**
Plastic Index	**38**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

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CONSOLIDATION TEST DATA

3/24/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: A-01A
Depth: 16-18 ft **Sample Number:** UD-01
Material Description: FAT CLAY (CH), light brown
Liquid Limit: 69 **Plasticity Index:** 41
USCS: CH
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1325. ASTM D2435.
Tested by: Lindsey Deskins **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE			VOID RATIO			AFTER TEST		
Wet w+t =	265.58	g.	Spec. Gr. =	2.774		Wet w+t =	684.15	g.
Dry w+t =	209.76	g.	Est. Ht. Solids =	0.494	in.	Dry w+t =	647.84	g.
Tare Wt. =	43.76	g.	Init. V.R. =	1.024		Tare Wt. =	539.75	g.
Moisture =	33.6	%	Init. Sat. =	91.1	%	Moisture =	33.6	%

UNIT WEIGHT			TEST START					
Height =	1.000	in.	Height =	1.000	in.			
Diameter =	2.500	in.	Diameter =	2.500	in.			
Weight =	147.41	g.				Dry Wt. =	108.09	g.
Dry Dens. =	85.6	pcf						

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00000		0.00000			1.024	
0.25	0.00240	0.00020	0.00220			1.019	0.2 Comprs.
0.50	0.00470	0.00070	0.00400			1.015	0.4 Comprs.
1.00	0.00790	0.00120	0.00670	1.991		1.010	0.7 Comprs.
2.00	0.01590	0.00160	0.01430	1.992		0.995	1.4 Comprs.
4.00	0.02990	0.00230	0.02760	1.781		0.968	2.8 Comprs.
8.00	0.05330	0.00320	0.05010	1.488		0.922	5.0 Comprs.
4.00	0.05000	0.00270	0.04730			0.928	4.7 Comprs.
2.00	0.04500	0.00230	0.04270			0.937	4.3 Comprs.
1.00	0.03940	0.00180	0.03760			0.948	3.8 Comprs.
2.00	0.04130	0.00210	0.03920			0.944	3.9 Comprs.
4.00	0.04630	0.00260	0.04370			0.935	4.4 Comprs.
8.00	0.05590	0.00330	0.05260			0.917	5.3 Comprs.
16.00	0.09050	0.00450	0.08600	0.768		0.850	8.6 Comprs.
32.00	0.14720	0.00640	0.14080	0.602		0.739	14.1 Comprs.
16.00	0.14160	0.00500	0.13660			0.747	13.7 Comprs.
4.00	0.12390	0.00330	0.12060			0.780	12.1 Comprs.
1.00	0.10370	0.00220	0.10150			0.818	10.1 Comprs.

TEST RESULTS SUMMARY

Compression index (C_c), ksf = 0.37 **Preconsolidation pressure (P_p), ksf =** 8.1 **Void ratio at P_p (e_m) =** 0.921

Recompression index (C_r) = 0.04

Pressure: 0.25 ksf — **TEST READINGS** — **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	0.0000
2	0.1000	0.0026
3	0.2500	0.0026
4	0.5000	0.0026
5	1.0000	0.0026
6	2.0167	0.0025
7	3.0167	0.0024

Void Ratio = 1.019 **Compression =** 0.2%

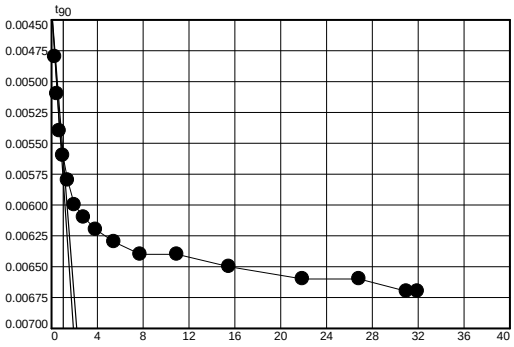
Pressure: 0.50 ksf — **TEST READINGS** — **Load No. 2**

No.	Elapsed Time	Dial Reading
1	0.0000	0.0024
2	0.1000	0.0047
3	0.2500	0.0047
4	0.5000	0.0047
5	1.0000	0.0047
6	2.0000	0.0047
7	4.0000	0.0047
8	8.0000	0.0047
9	15.0167	0.0047
10	17.5333	0.0047

Void Ratio = 1.015 **Compression =** 0.4%

Pressure: 1.00 ksf — **TEST READINGS** — **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0047	11	60.0667	0.0076
2	0.1000	0.0060	12	120.1500	0.0076
3	0.2500	0.0063	13	240.3000	0.0077
4	0.5000	0.0066	14	480.6167	0.0078
5	1.0000	0.0068	15	720.9167	0.0078
6	2.0000	0.0070	16	961.2333	0.0079
7	4.0000	0.0072	17	1020.9167	0.0079
8	8.0000	0.0073			
9	15.0167	0.0074			
10	30.0333	0.0075			

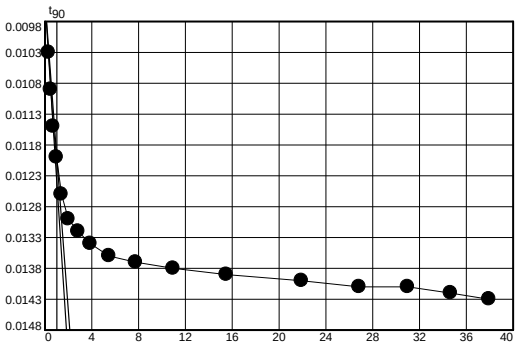


Void Ratio = 1.010 **Compression =** 0.7%

D_0 = 0.0044 **D_{90} =** 0.0056 **D_{100} =** 0.0057 **C_v at 1.05 min. =** 1.991 ft.^{2}/day

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0079	11	60.0667	0.0153
2	0.1000	0.0119	12	120.1500	0.0154
3	0.2500	0.0125	13	240.3167	0.0155
4	0.5000	0.0131	14	480.6167	0.0156
5	1.0000	0.0136	15	720.9333	0.0157
6	2.0000	0.0142	16	961.2500	0.0157
7	4.0000	0.0146	17	1201.5667	0.0158
8	8.0167	0.0148	18	1439.1500	0.0159
9	15.0167	0.0150			
10	30.0333	0.0152			

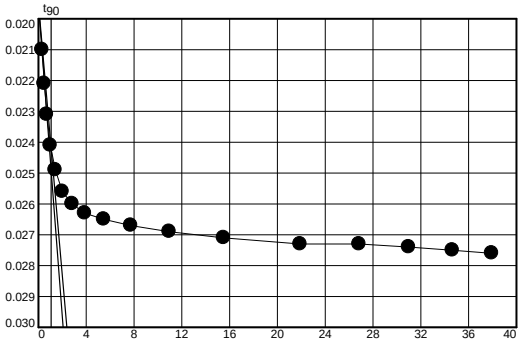


Void Ratio = 0.995 **Compression =** 1.4%

D_0 = 0.0095 **D_{90} =** 0.0120 **D_{100} =** 0.0123 **C_v at 1.04 min. =** 1.992 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0159	11	60.0833	0.0290
2	0.1000	0.0233	12	120.1667	0.0292
3	0.2500	0.0244	13	240.3167	0.0294
4	0.5000	0.0254	14	480.5500	0.0296
5	1.0000	0.0264	15	720.6667	0.0296
6	2.0167	0.0272	16	960.9833	0.0297
7	4.0167	0.0279	17	1201.3000	0.0298
8	8.0167	0.0283	18	1440.1667	0.0299
9	15.0333	0.0286			
10	30.0500	0.0288			

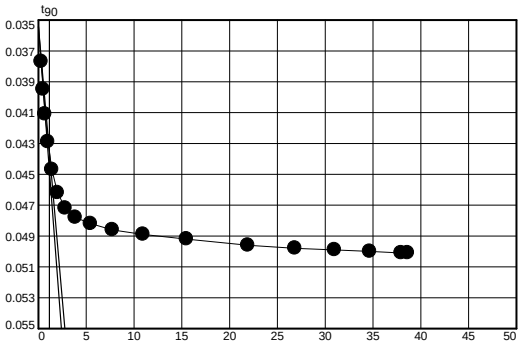


Void Ratio = 0.968 **Compression =** 2.8%

D_0 = 0.0195 **D_{90} =** 0.0242 **D_{100} =** 0.0248 **C_v at 1.14 min. =** 1.781 ft.^{2}/day

Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0299	11	60.0833	0.0518
2	0.1000	0.0409	12	120.1500	0.0521
3	0.2500	0.0427	13	240.3167	0.0524
4	0.5000	0.0443	14	480.6167	0.0528
5	1.0000	0.0461	15	720.9333	0.0530
6	2.0000	0.0479	16	961.2500	0.0531
7	4.0000	0.0494	17	1201.5667	0.0532
8	8.0000	0.0504	18	1441.8833	0.0533
9	15.0167	0.0510	19	1492.6667	0.0533
10	30.0333	0.0514			



Void Ratio = 0.922 **Compression =** 5.0%

D_0 = 0.0354 **D_{90} =** 0.0435 **D_{100} =** 0.0444 **C_v at 1.32 min. =** 1.488 ft.^{2}/day

Pressure: 4.00 ksf	TEST READINGS	Load No. 7

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0533	11	60.0833	0.0503
2	0.1000	0.0516	12	120.1500	0.0502
3	0.2500	0.0514	13	240.3167	0.0501
4	0.5000	0.0511	14	480.6167	0.0500
5	1.0000	0.0509	15	720.9333	0.0500
6	2.0000	0.0507	16	961.2500	0.0500
7	4.0000	0.0505	17	1201.5667	0.0500
8	8.0000	0.0504	18	1316.2000	0.0500
9	15.0167	0.0504			
10	30.0333	0.0503			

Void Ratio = 0.928 **Compression =** 4.7%

Pressure: 2.00 ksf	TEST READINGS	Load No. 8

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0500	11	60.0667	0.0456
2	0.0833	0.0485	12	120.1500	0.0453
3	0.2500	0.0481	13	240.3000	0.0453
4	0.5000	0.0477	14	480.6167	0.0451
5	1.0000	0.0472	15	720.9167	0.0450
6	2.0000	0.0468	16	961.2333	0.0450
7	4.0000	0.0463	17	1201.5333	0.0450
8	8.0000	0.0460	18	1416.7000	0.0450
9	15.0167	0.0458			
10	30.0333	0.0457			

Void Ratio = 0.937 **Compression =** 4.3%

Pressure: 1.00 ksf	TEST READINGS	Load No. 9

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0450	11	60.0833	0.0403
2	0.1000	0.0439	12	120.1500	0.0401
3	0.2500	0.0437	13	240.3167	0.0400
4	0.5000	0.0433	14	480.6333	0.0397
5	1.0000	0.0429	15	720.9333	0.0396
6	2.0000	0.0424	16	961.2500	0.0395
7	4.0000	0.0417	17	1201.5667	0.0395
8	8.0000	0.0412	18	1440.1667	0.0394
9	15.0167	0.0408			
10	30.0333	0.0405			

Void Ratio = 0.948 **Compression =** 3.8%

Pressure: 2.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0394	11	60.0833	0.0411
2	0.1000	0.0401	12	120.1500	0.0411
3	0.2500	0.0403	13	240.3167	0.0411
4	0.5000	0.0404	14	480.6333	0.0411
5	1.0000	0.0406	15	720.9500	0.0411
6	2.0000	0.0407	16	961.2500	0.0411
7	4.0000	0.0408	17	1201.5667	0.0412
8	8.0000	0.0409	18	1440.2667	0.0413
9	15.0167	0.0409			
10	30.0333	0.0411			

Void Ratio = 0.944 **Compression =** 3.9%

Pressure: 4.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0413	11	60.0667	0.0459
2	0.1000	0.0432	12	120.1500	0.0459
3	0.2500	0.0438	13	240.3000	0.0460
4	0.5000	0.0442	14	480.6167	0.0460
5	1.0000	0.0448	15	720.9167	0.0461
6	2.0000	0.0452	16	961.2333	0.0461
7	4.0000	0.0455	17	1201.5500	0.0462
8	8.0000	0.0456	18	1440.1667	0.0463
9	15.0167	0.0457			
10	30.0333	0.0459			

Void Ratio = 0.935 **Compression =** 4.4%

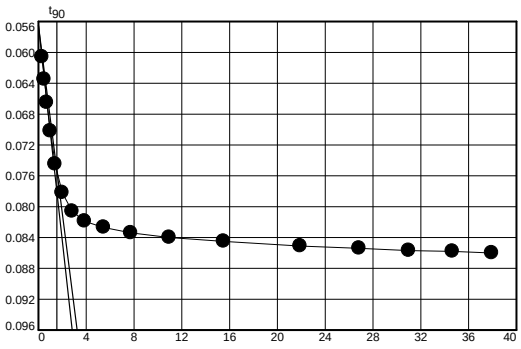
Pressure: 8.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0463	11	60.0833	0.0552
2	0.1000	0.0501	12	120.1667	0.0553
3	0.2500	0.0511	13	240.3167	0.0555
4	0.5000	0.0520	14	480.6333	0.0556
5	1.0167	0.0529	15	720.9500	0.0557
6	2.0167	0.0537	16	961.2667	0.0558
7	4.0167	0.0543	17	1201.5833	0.0559
8	8.0167	0.0547	18	1441.9000	0.0559
9	15.0333	0.0549	19	1462.2500	0.0559
10	30.0500	0.0549			

Void Ratio = 0.917 **Compression =** 5.3%

Pressure: 16.00 ksf **TEST READINGS** **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0559	11	60.0833	0.0879
2	0.1000	0.0651	12	120.1500	0.0885
3	0.2500	0.0680	13	240.3167	0.0890
4	0.5000	0.0710	14	480.6333	0.0896
5	1.0000	0.0747	15	720.9500	0.0899
6	2.0000	0.0790	16	961.2667	0.0902
7	4.0000	0.0827	17	1201.5833	0.0903
8	8.0000	0.0851	18	1440.1667	0.0905
9	15.0167	0.0864			
10	30.0333	0.0872			

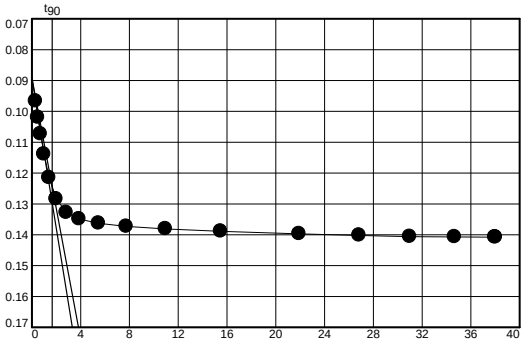


Void Ratio = 0.850 **Compression =** 8.6%

D_0 = 0.0565 **D_{90} =** 0.0753 **D_{100} =** 0.0774 **C_v at 2.39 min. =** 0.768 ft.^{2}/day

Pressure: 32.00 ksf **TEST READINGS** **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0905	11	60.0833	0.1437
2	0.1000	0.1031	12	120.1667	0.1445
3	0.2500	0.1084	13	240.3167	0.1453
4	0.5000	0.1137	14	480.6333	0.1461
5	1.0000	0.1203	15	720.9500	0.1466
6	2.0000	0.1279	16	961.2667	0.1470
7	4.0000	0.1348	17	1201.6000	0.1471
8	8.0167	0.1392	18	1441.9167	0.1472
9	15.0167	0.1413	19	1446.7333	0.1472
10	30.0500	0.1427			



Void Ratio = 0.739 **Compression =** 14.1%

D_0 = 0.0892 **D_{90} =** 0.1245 **D_{100} =** 0.1284 **C_v at 2.77 min. =** 0.602 ft.^{2}/day

Pressure: 16.00 ksf **TEST READINGS** **Load No. 15**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1472	11	60.0667	0.1420
2	0.1000	0.1444	12	120.1500	0.1419
3	0.2500	0.1439	13	240.2833	0.1418
4	0.5000	0.1433	14	480.5500	0.1417
5	1.0000	0.1429	15	720.8333	0.1416
6	2.0000	0.1425	16	961.1000	0.1416
7	4.0000	0.1423	17	1201.3833	0.1416
8	8.0167	0.1421	18	1441.6667	0.1416
9	15.0167	0.1421	19	1462.0167	0.1416
10	30.0333	0.1420			

Void Ratio = 0.747 **Compression =** 13.7%

Pressure: 4.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1416	11	60.0667	0.1248
2	0.1000	0.1375	12	120.1500	0.1246
3	0.2500	0.1361	13	240.2833	0.1243
4	0.5000	0.1347	14	480.5833	0.1240
5	1.0000	0.1328	15	720.9167	0.1239
6	2.0000	0.1305	16	961.2500	0.1239
7	4.0000	0.1283	17	1201.5833	0.1239
8	8.0167	0.1266	18	1345.1333	0.1239
9	15.0167	0.1257			
10	30.0333	0.1252			

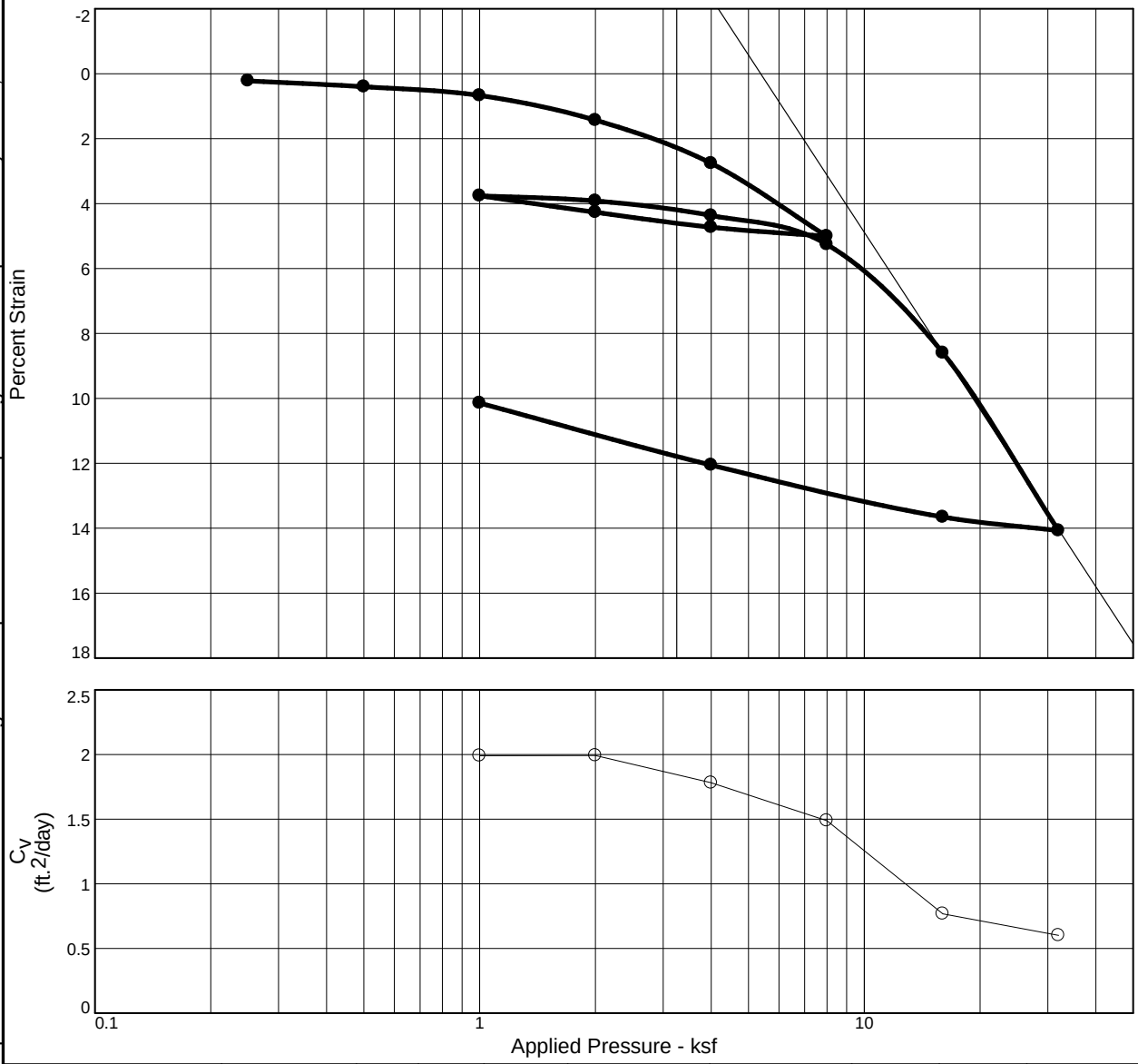
Void Ratio = 0.780 **Compression =** 12.1%

Pressure: 1.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1239	11	60.0833	0.1060
2	0.1000	0.1220	12	120.1667	0.1052
3	0.2500	0.1212	13	240.3333	0.1047
4	0.5000	0.1203	14	480.6667	0.1041
5	1.0000	0.1190	15	720.9833	0.1039
6	2.0000	0.1171	16	961.3000	0.1039
7	4.0000	0.1147	17	1201.6333	0.1038
8	8.0167	0.1118	18	1440.9000	0.1037
9	15.0167	0.1092			
10	30.0333	0.1071			

Void Ratio = 0.818 **Compression =** 10.1%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
91.1 %	33.6 %	85.6	69	41	2.774		8.1	0.37	0.04	1.024

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY (CH), light brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A **Depth:** 16-18 ft **Sample Number:** UD-01

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1325. ASTM D2435.

Figure 1

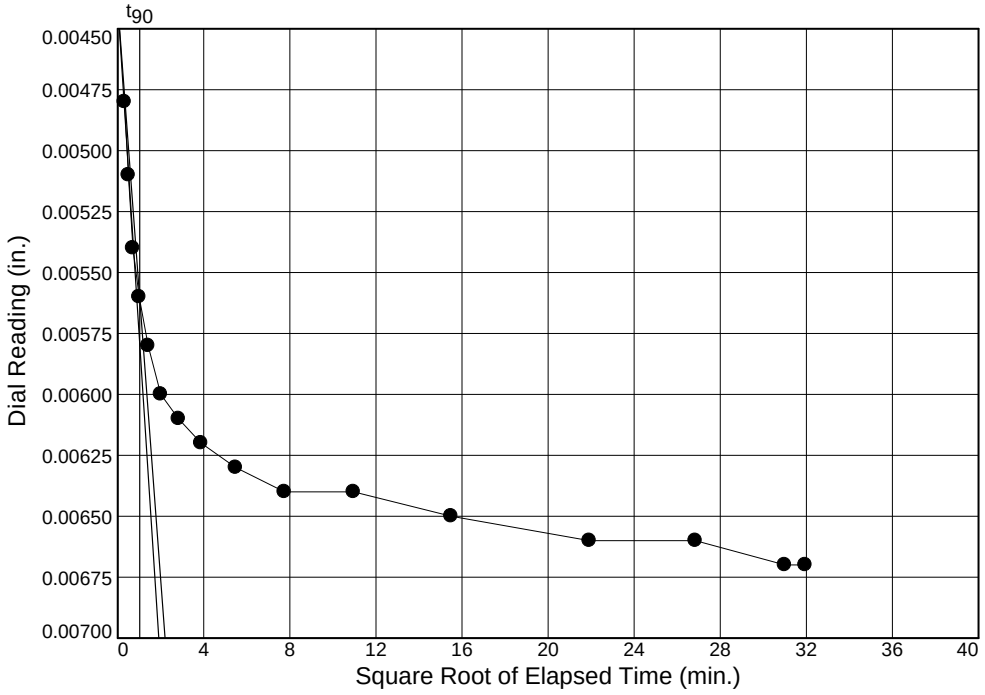
Tested By: Lindsey Deskins **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

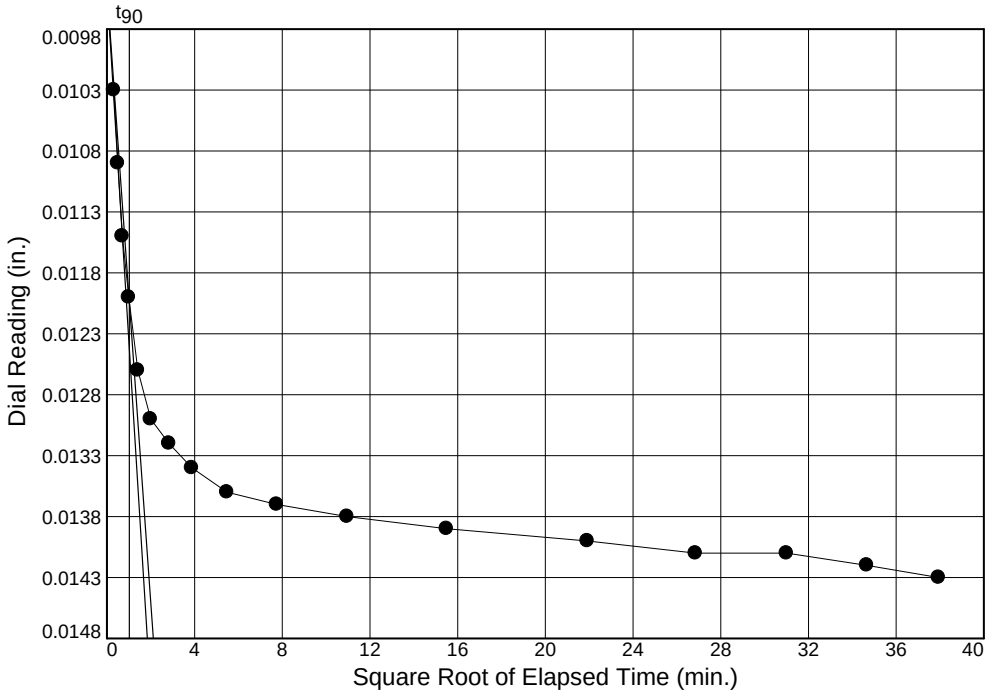
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 16-18 ft Sample Number: UD-01



Load No.= 3
Load= 1.00 ksf
D_0 = 0.0044
D_{90} = 0.0056
D_{100} = 0.0057
T_{90} = 1.05 min.

C_v @ T_{90}
1.991 ft.^{2}/day



Load No.= 4
Load= 2.00 ksf
D_0 = 0.0095
D_{90} = 0.0120
D_{100} = 0.0123
T_{90} = 1.04 min.

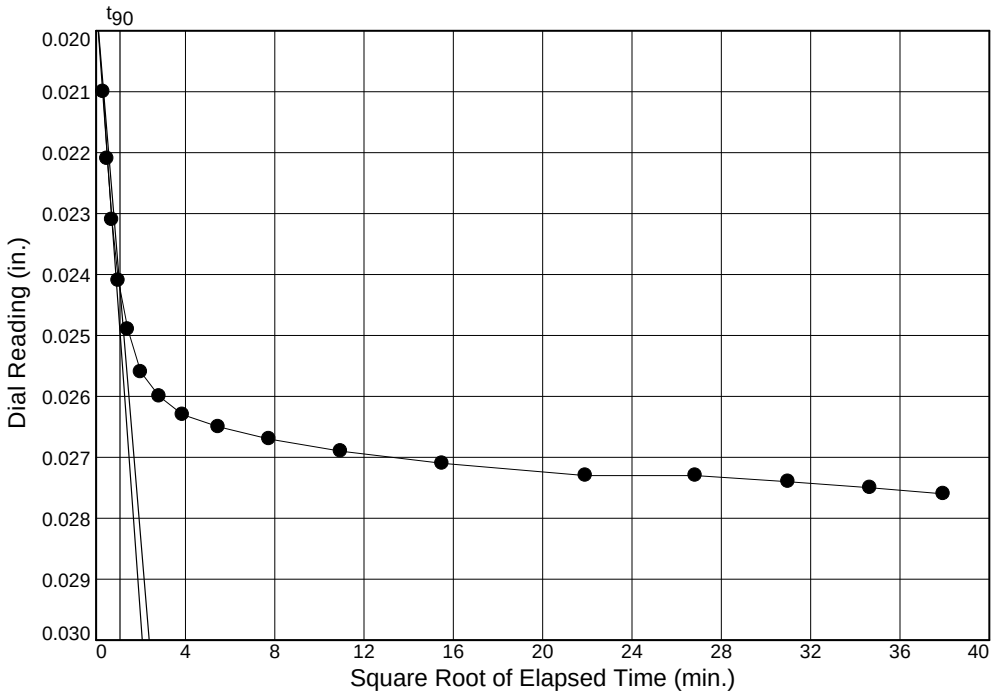
C_v @ T_{90}
1.992 ft.^{2}/day

Figure 2

Dial Reading vs. Time

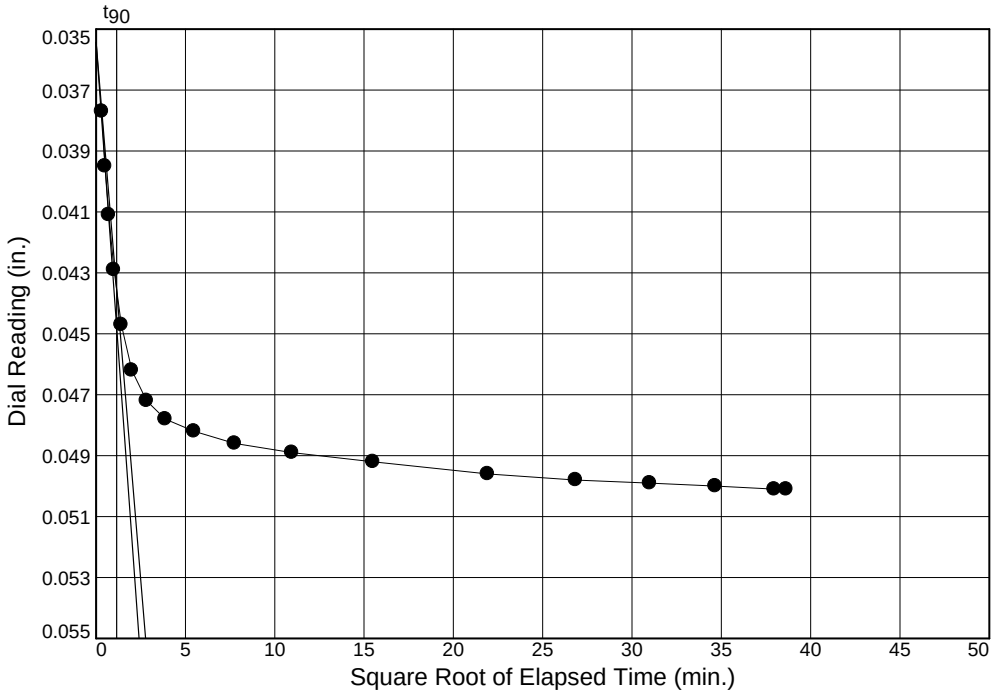
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 16-18 ft Sample Number: UD-01



Load No.= 5
Load= 4.00 ksf
D_0 = 0.0195
D_{90} = 0.0242
D_{100} = 0.0248
T_{90} = 1.14 min.

C_v @ T_{90}
1.781 ft.^{2}/day



Load No.= 6
Load= 8.00 ksf
D_0 = 0.0354
D_{90} = 0.0435
D_{100} = 0.0444
T_{90} = 1.32 min.

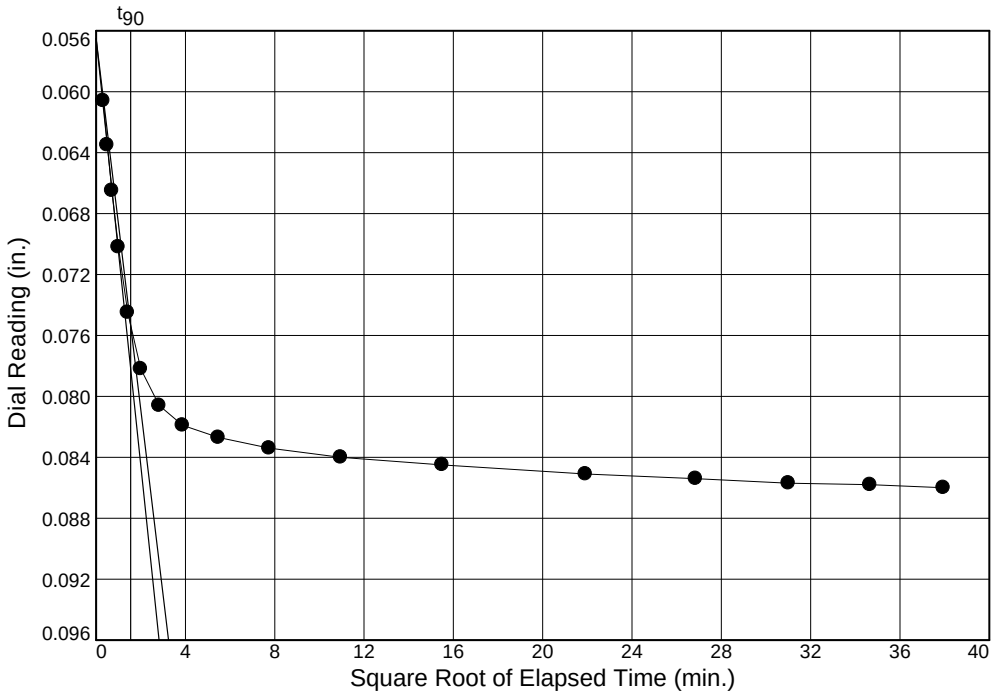
C_v @ T_{90}
1.488 ft.^{2}/day

Figure 3

Dial Reading vs. Time

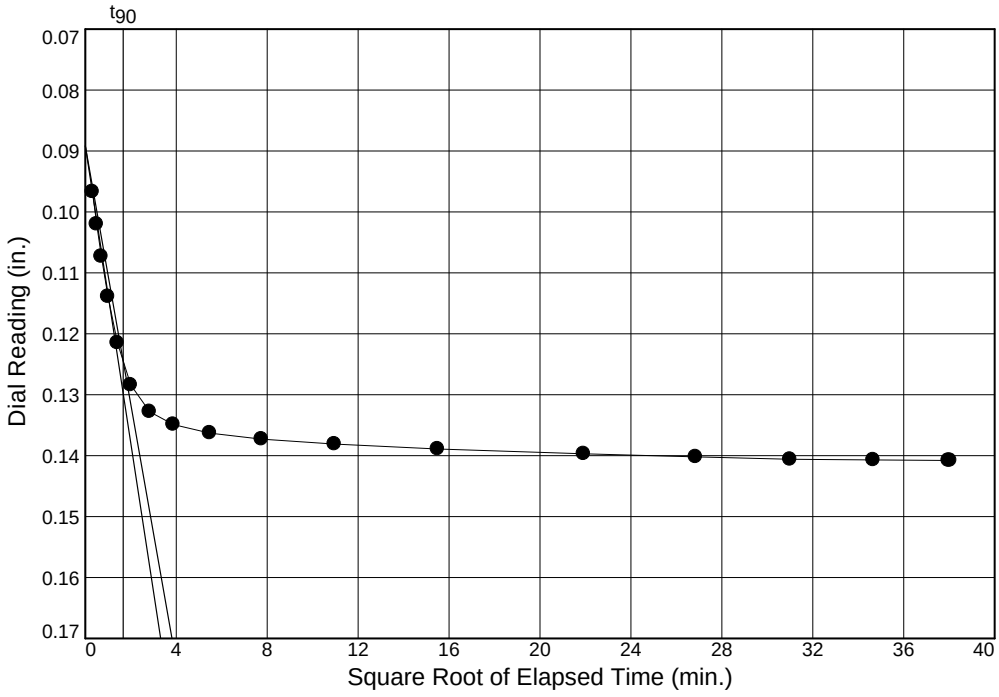
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 16-18 ft Sample Number: UD-01



Load No.= 13
Load= 16.00 ksf
D_0 = 0.0565
D_{90} = 0.0753
D_{100} = 0.0774
T_{90} = 2.39 min.

C_v @ T_{90}
0.768 ft.^{2}/day



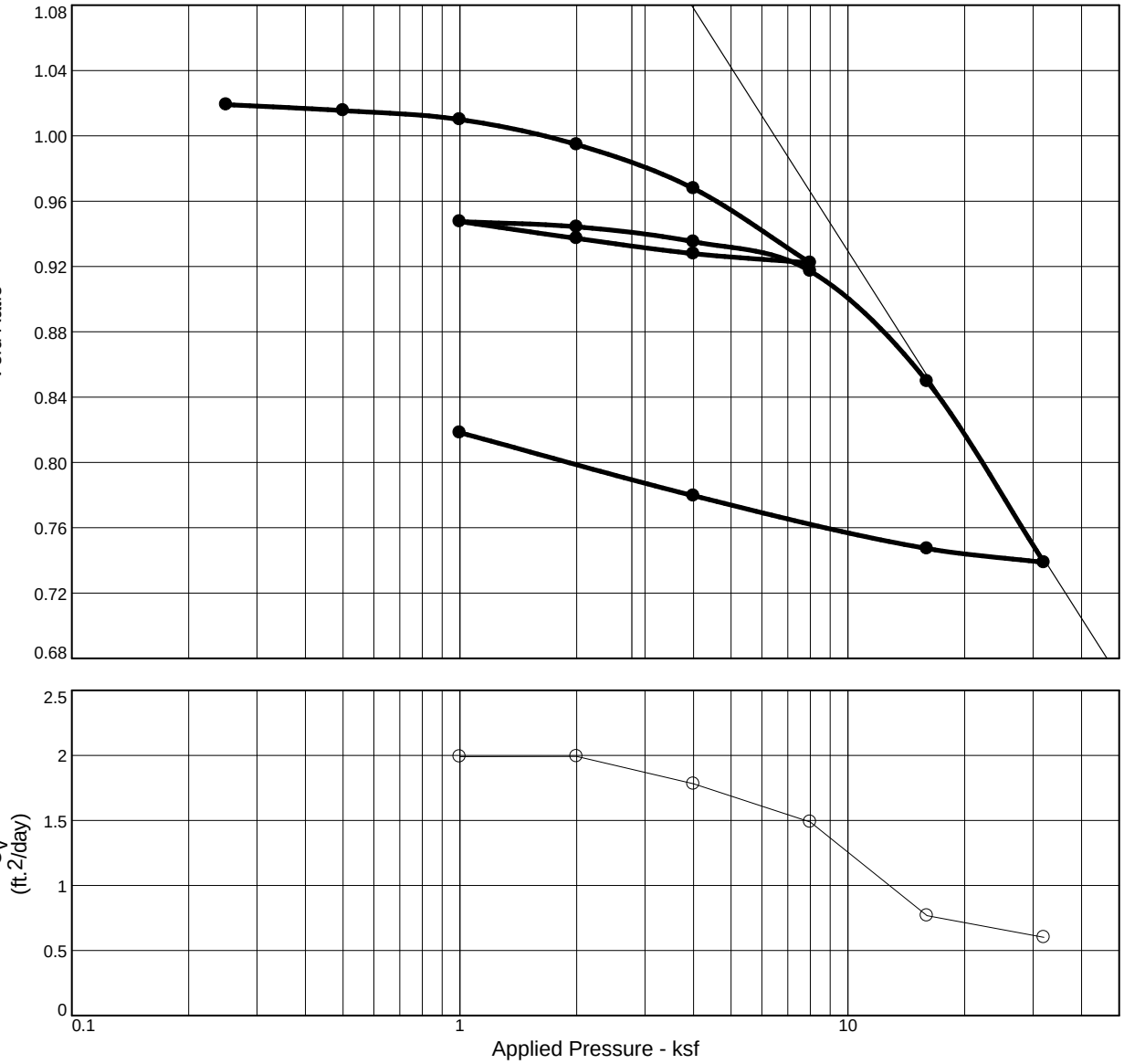
Load No.= 14
Load= 32.00 ksf
D_0 = 0.0892
D_{90} = 0.1245
D_{100} = 0.1284
T_{90} = 2.77 min.

C_v @ T_{90}
0.602 ft.^{2}/day

Figure 4

S & ME, Inc.

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
91.1 %	33.6 %	85.6	69	41	2.774		8.1	0.37	0.04	1.024

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY (CH), light brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A **Depth:** 16-18 ft **Sample Number:** UD-01

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1325. ASTM D2435.

Figure 1

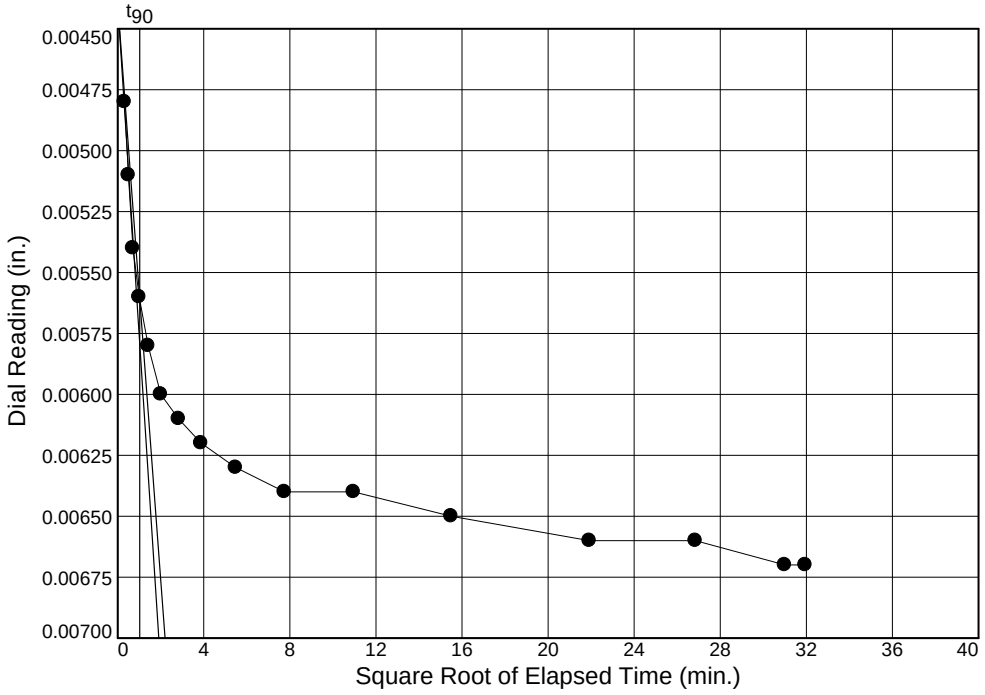
Tested By: Lindsey Deskins **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

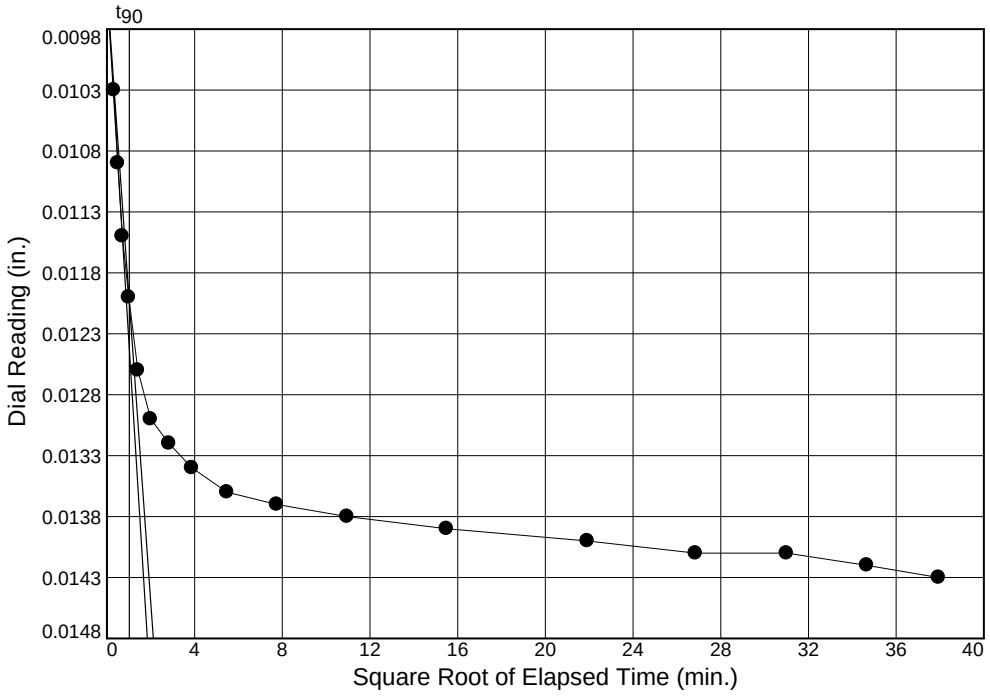
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 16-18 ft Sample Number: UD-01



Load No.= 3
Load= 1.00 ksf
D_0 = 0.0044
D_{90} = 0.0056
D_{100} = 0.0057
T_{90} = 1.05 min.

C_v @ T_{90}
1.991 ft.^{2}/day



Load No.= 4
Load= 2.00 ksf
D_0 = 0.0095
D_{90} = 0.0120
D_{100} = 0.0123
T_{90} = 1.04 min.

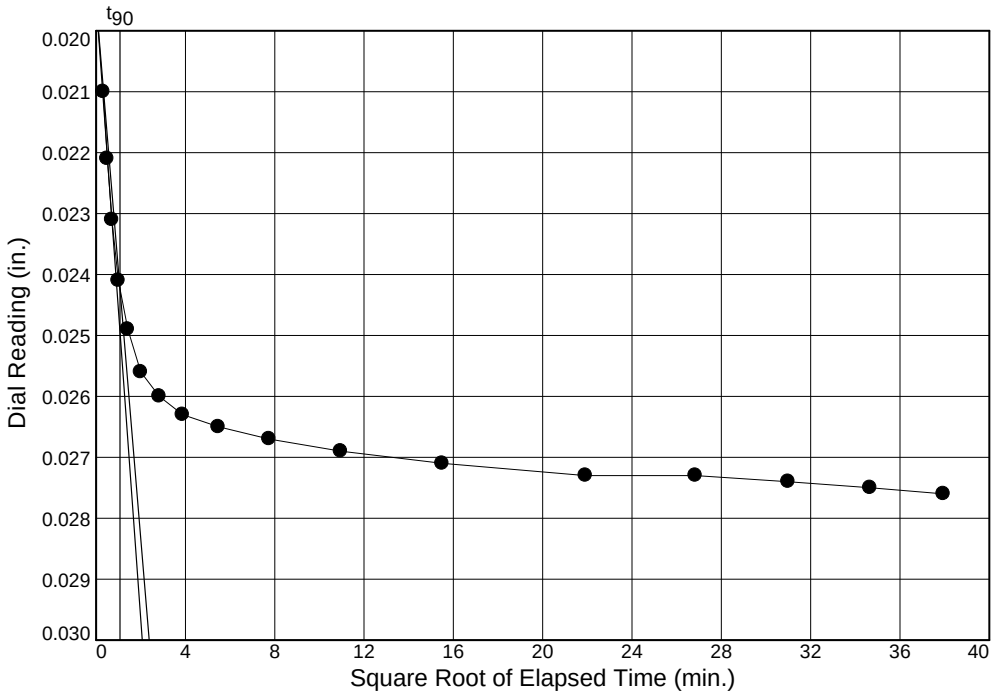
C_v @ T_{90}
1.992 ft.^{2}/day

Figure 2

Dial Reading vs. Time

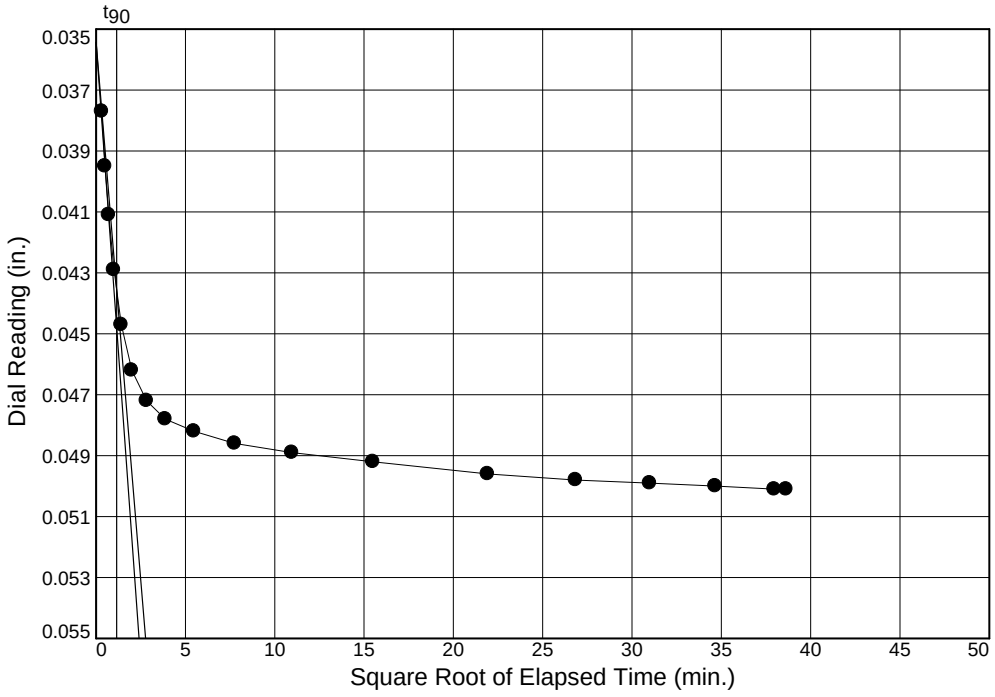
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 16-18 ft Sample Number: UD-01



Load No.= 5
Load= 4.00 ksf
D_0 = 0.0195
D_{90} = 0.0242
D_{100} = 0.0248
T_{90} = 1.14 min.

C_v @ T_{90}
1.781 ft.^{2}/day



Load No.= 6
Load= 8.00 ksf
D_0 = 0.0354
D_{90} = 0.0435
D_{100} = 0.0444
T_{90} = 1.32 min.

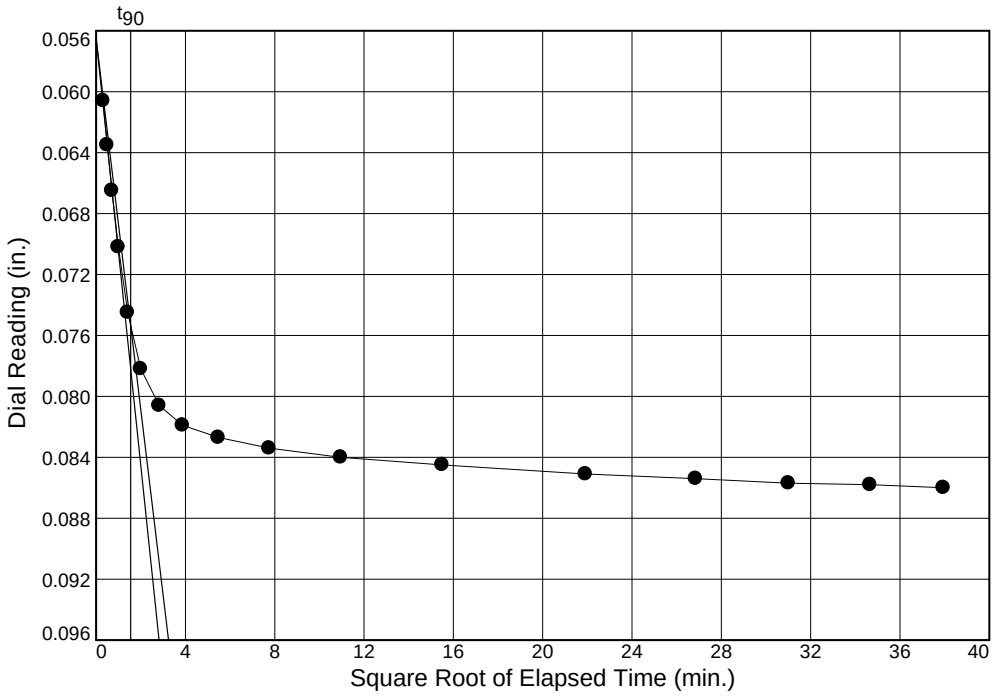
C_v @ T_{90}
1.488 ft.^{2}/day

Figure 3

Dial Reading vs. Time

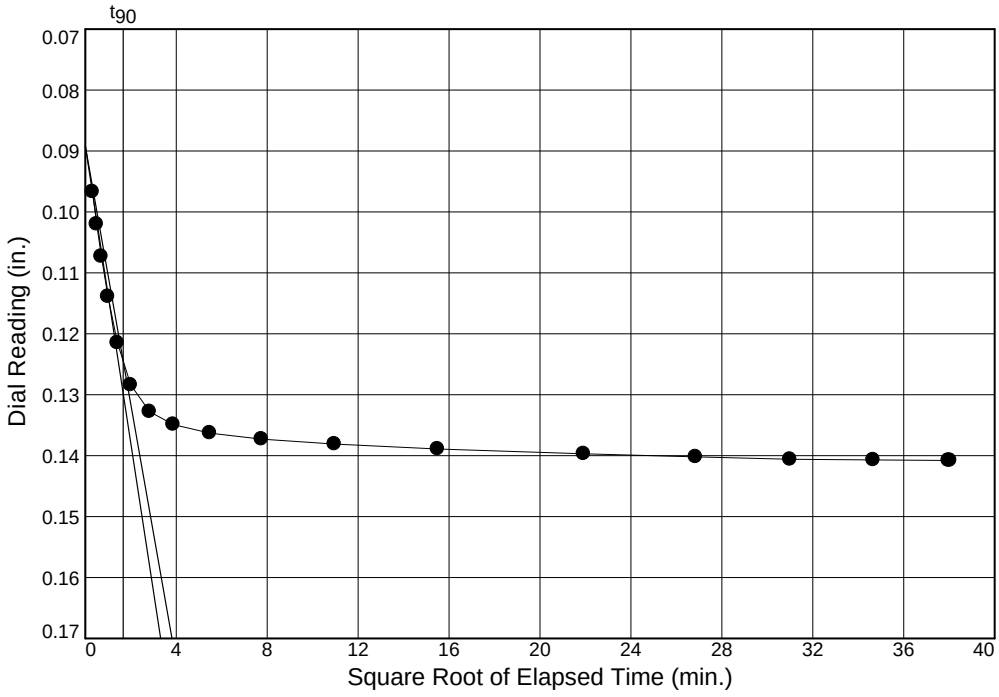
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 16-18 ft Sample Number: UD-01



Load No.= 13
Load= 16.00 ksf
D_0 = 0.0565
D_{90} = 0.0753
D_{100} = 0.0774
T_{90} = 2.39 min.

C_v @ T_{90}
0.768 ft.^{2}/day



Load No.= 14
Load= 32.00 ksf
D_0 = 0.0892
D_{90} = 0.1245
D_{100} = 0.1284
T_{90} = 2.77 min.

C_v @ T_{90}
0.602 ft.^{2}/day

Figure 4

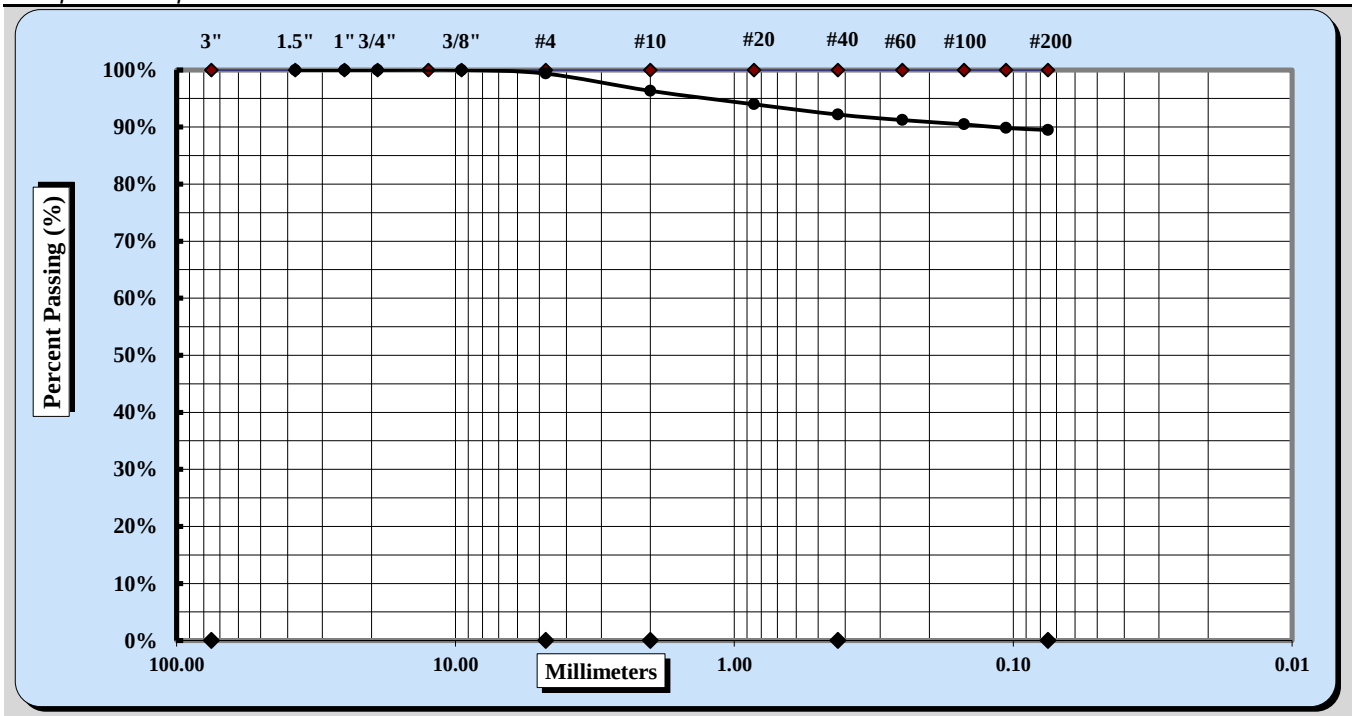
S & ME, Inc.

Sieve Analysis of Soils

Quality Assurance *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/17/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/10/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-01A	Type: UD	Sample Date:	1/30/2025
Sample Log No.: 43-25-007	Sample: UD-02	Depth:	26-28 ft
Sample Description:	FAT CLAY (CH), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	#4	Coarse Sand	3%	Fine Sand	3%
Gravel	1%	Medium Sand	4%	Silt & Clay	89%
Liquid Limit:	60	Plastic Limit:	22	Plastic Index:	38

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Tyler Copeman — *Technical Responsibility*
Tyler Cope — *Signature*
Lab Services Manager — *Position*
3/17/2025 — *Date*

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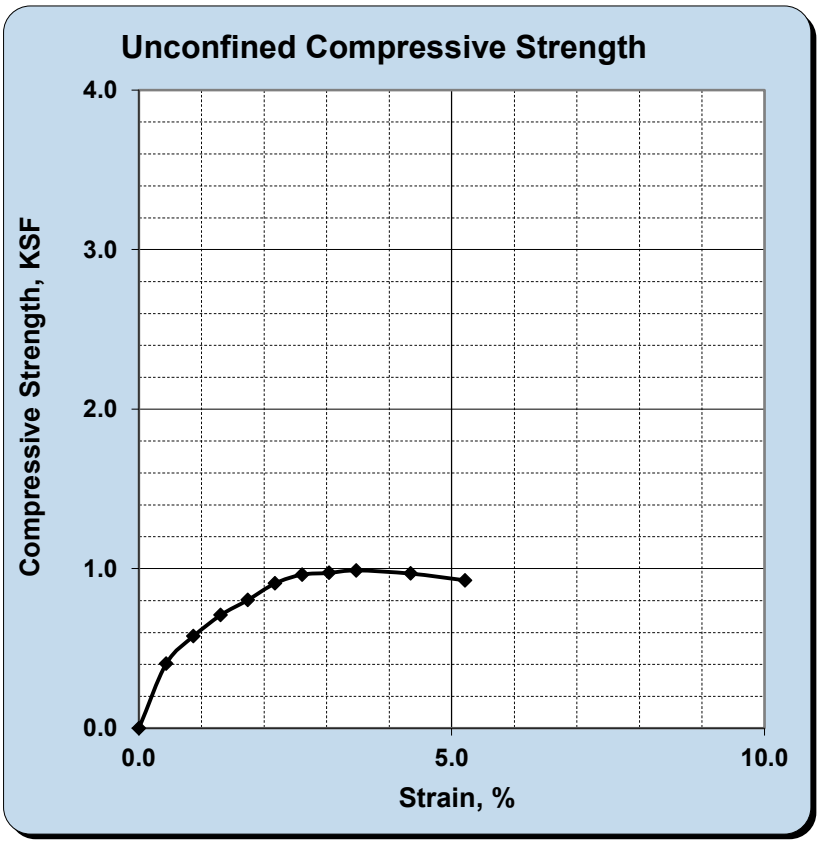
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	2/19/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-01A Sample No. UD-02	Sample Date:	1/30/2025
		Depth:	26-28 ft
Sample Description:	FAT CLAY (CH), brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 71.2 pcf
Initial Water Content: 51.6%
Unconfined Compressive Strength, q_u: **0.989** KSF
Undrained Shear Strength, s_u: **0.495** KSF

Liquid Limit: 60
Plasticity Index: 38
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.85
Strain at Failure: 3.5

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

3/24/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: A-01A
Depth: 26-28 ft **Sample Number:** UD-02
Material Description: FAT CLAY (CH), brown
Liquid Limit: 60 **Plasticity Index:** 38
USCS: CH
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #33755. ASTM D2435.
Tested by: Lindsey Deskins **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	264.56 g.	Spec. Gr. =	2.704	Wet w+t =	358.78 g.
Dry w+t =	201.18 g.	Est. Ht. Solids =	0.452 in.	Dry w+t =	323.92 g.
Tare Wt. =	53.74 g.	Init. V.R. =	1.213	Tare Wt. =	228.89 g.
Moisture =	43.0 %	Init. Sat. =	95.8 %	Moisture =	36.7 %
UNIT WEIGHT		**TEST START**		Dry Wt. =	95.03 g.
Height =	1.000 in.	Height =	1.000 in.		
Diameter =	2.500 in.	Diameter =	2.500 in.		
Weight =	140.57 g.				
Dry Dens. =	76.3 pcf				

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Deformation (in.)	C_v ($ft.^2$/day)	C_α	Void Ratio	% Strain
start	1.95584	0.00000			1.213	
0.25	1.95745	0.00161	3.260		1.209	0.2 Comprs.
0.50	1.96120	0.00536	3.806		1.201	0.5 Comprs.
1.00	1.97146	0.01562	0.318		1.178	1.6 Comprs.
2.00	1.98699	0.03115	0.333		1.144	3.1 Comprs.
4.00	2.01403	0.05819	0.247		1.084	5.8 Comprs.
8.00	2.05512	0.09928	0.122		0.993	9.9 Comprs.
4.00	2.05118	0.09534			1.002	9.5 Comprs.
2.00	2.04521	0.08937			1.015	8.9 Comprs.
1.00	2.03809	0.08225			1.031	8.2 Comprs.
2.00	2.04225	0.08641			1.022	8.6 Comprs.
4.00	2.04738	0.09154			1.010	9.2 Comprs.
8.00	2.06299	0.10715			0.976	10.7 Comprs.
16.00	2.11157	0.15573	0.123		0.868	15.6 Comprs.
32.00	2.17051	0.21467	0.105		0.738	21.5 Comprs.
16.00	2.16639	0.21055			0.747	21.1 Comprs.
4.00	2.14567	0.18983			0.793	19.0 Comprs.
1.00	2.11871	0.16287			0.852	16.3 Comprs.

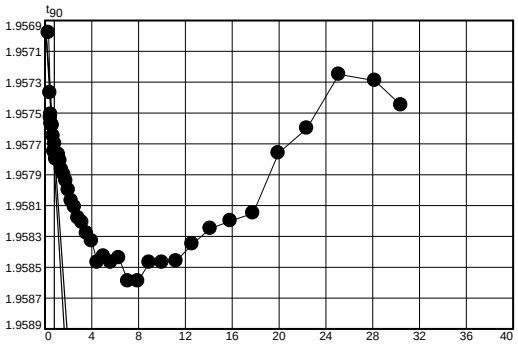
TEST RESULTS SUMMARY

Compression index (C_c), ksf = 0.43 **Preconsolidation pressure (P_p), ksf =** 4.3 **Void ratio at P_p (e_m) =** 1.077

Recompression index (C_r) = 0.06

Pressure: 0.25 ksf **TEST READINGS** **Load No. 1**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.95584	23	10.1333	1.95821
2	0.1000	1.95698	24	12.7333	1.95828
3	0.2000	1.95737	25	15.9833	1.95833
4	0.2333	1.95753	26	20.1000	1.95847
5	0.2667	1.95751	27	25.2667	1.95843
6	0.3000	1.95757	28	31.7667	1.95847
7	0.3667	1.95758	29	39.9667	1.95844
8	0.4333	1.95758	30	50.2667	1.95859
9	0.5167	1.95765	31	63.2500	1.95859
10	0.6167	1.95775	32	79.5833	1.95847
11	0.7500	1.95770	33	100.1500	1.95847
12	0.9167	1.95780	34	126.0500	1.95846
13	1.1167	1.95779	35	158.6500	1.95835
14	1.3833	1.95777	36	199.6833	1.95825
15	1.7167	1.95781	37	251.3500	1.95820
16	2.1167	1.95787	38	316.3833	1.95815
17	2.6333	1.95790	39	398.2667	1.95776
18	3.3000	1.95794	40	501.3500	1.95760
19	4.1167	1.95800	41	631.1167	1.95725
20	5.1500	1.95807	42	794.5000	1.95729
21	6.4500	1.95811	43	925.7500	1.95745
22	8.0833	1.95818			

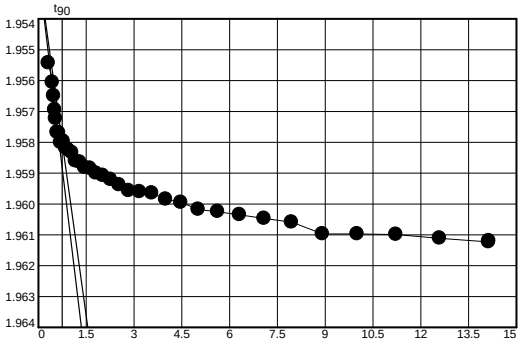


Void Ratio = 1.209 **Compression =** 0.2%

D_0 = 1.9569 **D_{90} =** 1.9577 **D_{100} =** 1.9578 **C_v at 0.65 min. =** 3.260 ft.^{2}/day

Pressure: 0.50 ksf **TEST READINGS** **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.95549	12	0.9000	1.95825
2	0.1000	1.95543	13	1.1167	1.95834
3	0.2000	1.95606	14	1.3667	1.95861
4	0.2333	1.95650	15	1.7000	1.95865
5	0.2667	1.95695	16	2.1167	1.95882
6	0.3000	1.95723	17	2.6333	1.95885
7	0.3500	1.95768	18	3.2833	1.95900
8	0.4167	1.95770	19	4.1000	1.95908
9	0.5000	1.95801	20	5.1333	1.95921
10	0.6167	1.95797	21	6.4333	1.95938
11	0.7333	1.95817	22	8.0667	1.95957



Pressure: 0.50 ksf | **TEST READINGS (continued)** | **Load No. 2**

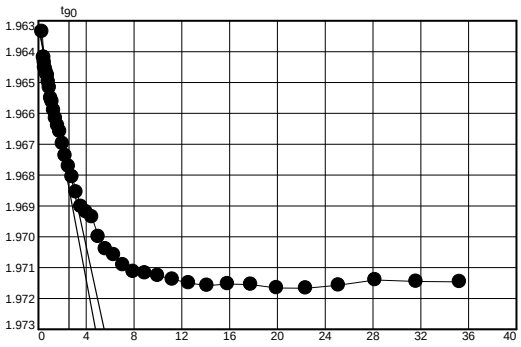
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
23	10.1333	1.95961	33	100.1500	1.96097
24	12.7167	1.95965	34	126.0333	1.96099
25	15.9833	1.95985	35	158.6333	1.96111
26	20.0833	1.95995	36	199.6833	1.96123
27	25.2500	1.96018	37	200.0167	1.96120
28	31.7500	1.96025			
29	39.9500	1.96035			
30	50.2500	1.96047			
31	63.2333	1.96059			
32	79.5833	1.96097			

Void Ratio = 1.201 **Compression =** 0.5%

D_0 = 1.9524 **D_{90} =** 1.9580 **D_{100} =** 1.9586 **C_v at 0.55 min. =** 3.806 ft.^{2}/day

Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.95956	23	10.1167	1.96856
2	0.1000	1.96335	24	12.7167	1.96902
3	0.2000	1.96419	25	15.9667	1.96920
4	0.2333	1.96419	26	20.0833	1.96936
5	0.2667	1.96435	27	25.2500	1.97000
6	0.3000	1.96451	28	31.7500	1.97040
7	0.3500	1.96453	29	39.9500	1.97059
8	0.4167	1.96463	30	50.2500	1.97092
9	0.5000	1.96473	31	63.2333	1.97113
10	0.6000	1.96477	32	79.5667	1.97118
11	0.7333	1.96498	33	100.1333	1.97126
12	0.9000	1.96517	34	126.0333	1.97138
13	1.1167	1.96551	35	158.6333	1.97150
14	1.3667	1.96563	36	199.6667	1.97158
15	1.7000	1.96590	37	251.3333	1.97153
16	2.1167	1.96616	38	316.3833	1.97155
17	2.6333	1.96640	39	398.2500	1.97166
18	3.2833	1.96659	40	501.3500	1.97167
19	4.1000	1.96698	41	631.1167	1.97157
20	5.1333	1.96737	42	794.4833	1.97140
21	6.4333	1.96772	43	1000.1667	1.97145
22	8.0667	1.96806	44	1243.1167	1.97146

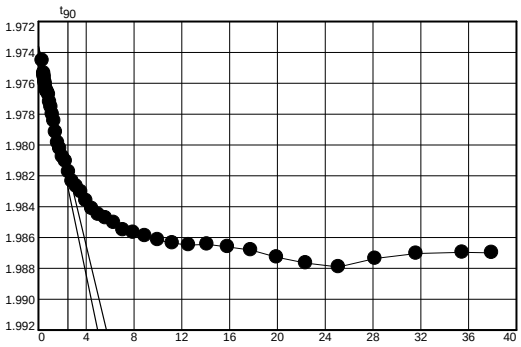


Void Ratio = 1.178 **Compression =** 1.6%

D_0 = 1.9632 **D_{90} =** 1.9677 **D_{100} =** 1.9683 **C_v at 6.54 min. =** 0.318 ft.^{2}/day

Pressure: 2.00 ksf **TEST READINGS** **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.97027	24	12.7333	1.98304
2	0.1167	1.97453	25	16.0000	1.98361
3	0.2167	1.97535	26	20.1000	1.98413
4	0.2333	1.97549	27	25.2667	1.98451
5	0.2667	1.97561	28	31.7667	1.98474
6	0.3167	1.97591	29	39.9667	1.98504
7	0.3667	1.97605	30	50.2667	1.98552
8	0.4333	1.97636	31	63.2500	1.98568
9	0.5167	1.97652	32	79.5833	1.98589
10	0.6167	1.97658	33	100.1500	1.98616
11	0.7500	1.97674	34	126.0500	1.98636
12	0.9167	1.97721	35	158.6500	1.98649
13	1.1333	1.97754	36	199.6833	1.98644
14	1.3833	1.97801	37	251.3500	1.98661
15	1.7167	1.97844	38	316.3833	1.98681
16	2.1333	1.97917	39	398.2667	1.98728
17	2.6500	1.97986	40	501.3500	1.98766
18	3.3000	1.98024	41	631.1167	1.98791
19	4.1167	1.98077	42	794.5000	1.98736
20	5.1500	1.98106	43	1000.1667	1.98704
21	6.4500	1.98175	44	1259.1000	1.98696
22	8.0833	1.98236	45	1440.1333	1.98699
23	10.1333	1.98268			

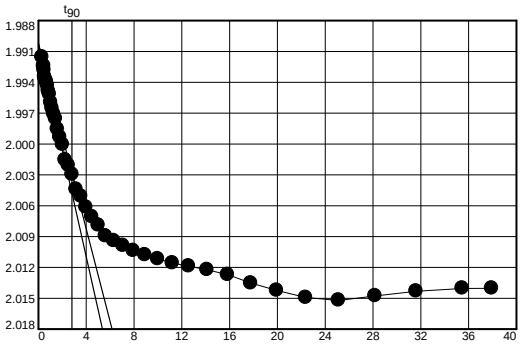


Void Ratio = 1.144 **Compression =** 3.1%

D_0 = 1.9736 **D_{90} =** 1.9816 **D_{100} =** 1.9824 **C_V at 6.08 min. =** 0.333 ft.^{2}/day

Pressure: 4.00 ksf **TEST READINGS** **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.98505	14	1.3667	1.99653
2	0.1000	1.99155	15	1.7000	1.99707
3	0.2000	1.99242	16	2.1000	1.99755
4	0.2167	1.99241	17	2.6167	1.99856
5	0.2500	1.99281	18	3.2833	1.99932
6	0.3000	1.99343	19	4.1000	2.00006
7	0.3500	1.99368	20	5.1333	2.00156
8	0.4167	1.99381	21	6.4167	2.00207
9	0.5000	1.99399	22	8.0667	2.00297
10	0.6000	1.99431	23	10.1167	2.00441
11	0.7333	1.99481	24	12.7000	2.00508
12	0.9000	1.99516	25	15.9667	2.00614
13	1.1000	1.99595	26	20.0667	2.00709



Pressure: 4.00 ksf	TEST READINGS (continued)	Load No. 5

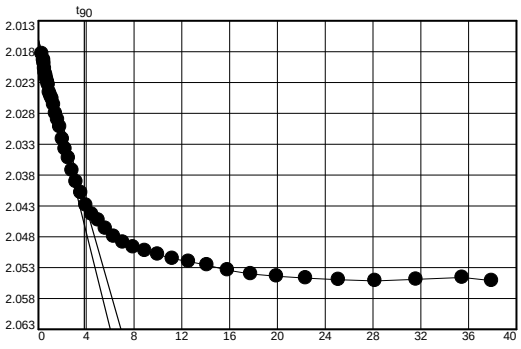
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
27	25.2333	2.00790	37	251.3333	2.01271
28	31.7500	2.00896	38	316.3667	2.01353
29	39.9333	2.00942	39	398.2500	2.01424
30	50.2500	2.00988	40	501.3333	2.01493
31	63.2167	2.01037	41	631.1000	2.01521
32	79.5500	2.01079	42	794.4833	2.01477
33	100.1333	2.01118	43	1000.1500	2.01432
34	126.0167	2.01158	44	1259.0833	2.01404
35	158.6167	2.01188	45	1440.1667	2.01403
36	199.6667	2.01223			

Void Ratio = 1.084 **Compression =** 5.8%

D_0 = 1.9902 D_{90} = 2.0029 D_{100} = 2.0043 C_v **at 7.85 min. =** 0.247 ft.^{2}/day

Pressure: 8.00 ksf	TEST READINGS	Load No. 6

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.01147	24	12.7167	2.04088
2	0.1000	2.01835	25	15.9833	2.04289
3	0.2000	2.01939	26	20.0833	2.04436
4	0.2167	2.01938	27	25.2500	2.04534
5	0.2500	2.01993	28	31.7500	2.04668
6	0.3000	2.02075	29	39.9500	2.04795
7	0.3500	2.02145	30	50.2500	2.04889
8	0.4167	2.02186	31	63.2333	2.04969
9	0.5000	2.02238	32	79.5667	2.05027
10	0.6000	2.02290	33	100.1333	2.05087
11	0.7333	2.02336	34	126.0333	2.05155
12	0.9000	2.02461	35	158.6333	2.05203
13	1.1167	2.02520	36	199.6667	2.05260
14	1.3667	2.02564	37	251.3333	2.05342
15	1.7000	2.02660	38	316.3667	2.05403
16	2.1167	2.02803	39	398.2500	2.05440
17	2.6333	2.02903	40	501.3333	2.05469
18	3.2833	2.03020	41	631.1167	2.05495
19	4.1000	2.03218	42	794.4833	2.05515
20	5.1333	2.03377	43	1000.1500	2.05490
21	6.4333	2.03525	44	1259.0833	2.05460
22	8.0667	2.03726	45	1440.1167	2.05512
23	10.1167	2.03908			



Void Ratio = 0.993 **Compression =** 9.9%

D_0 = 2.0161 D_{90} = 2.0422 D_{100} = 2.0450 C_v **at 14.74 min. =** 0.122 ft.^{2}/day

Pressure: 4.00 ksf	TEST READINGS	Load No. 7

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.05614	16	2.1167	2.05183	31	63.2333	2.05112
2	0.1000	2.05308	17	2.6333	2.05175	32	79.5667	2.05117
3	0.2000	2.05282	18	3.2833	2.05153	33	100.1333	2.05117
4	0.2167	2.05287	19	4.1000	2.05141	34	126.0333	2.05136
5	0.2500	2.05288	20	5.1333	2.05137	35	158.6333	2.05149
6	0.3000	2.05285	21	6.4333	2.05131	36	199.6667	2.05170
7	0.3500	2.05280	22	8.0667	2.05124	37	251.3333	2.05192
8	0.4167	2.05274	23	10.1167	2.05119	38	316.3667	2.05241
9	0.5000	2.05267	24	12.7167	2.05117	39	398.2500	2.05276
10	0.6000	2.05258	25	15.9667	2.05116	40	501.3333	2.05283
11	0.7333	2.05257	26	20.0833	2.05107	41	631.1000	2.05275
12	0.9000	2.05242	27	25.2500	2.05103	42	794.4833	2.05217
13	1.1167	2.05230	28	31.7500	2.05103	43	1000.1500	2.05173
14	1.3667	2.05213	29	39.9333	2.05103	44	1259.0833	2.05128
15	1.7000	2.05208	30	50.2500	2.05105	45	1438.6667	2.05118

Void Ratio = 1.002 **Compression =** 9.5%

Pressure: 2.00 ksf	TEST READINGS	Load No. 8

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.05235	16	2.1167	2.04842	31	63.2500	2.04604
2	0.1000	2.05076	17	2.6333	2.04804	32	79.5833	2.04604
3	0.2000	2.05061	18	3.3000	2.04780	33	100.1500	2.04609
4	0.2333	2.05032	19	4.1167	2.04748	34	126.0500	2.04616
5	0.2667	2.05037	20	5.1500	2.04727	35	158.6500	2.04636
6	0.3167	2.05035	21	6.4500	2.04712	36	199.6833	2.04659
7	0.3667	2.05019	22	8.0833	2.04704	37	251.3500	2.04682
8	0.4333	2.05016	23	10.1500	2.04688	38	316.3833	2.04695
9	0.5167	2.04999	24	12.7333	2.04667	39	398.2667	2.04717
10	0.6167	2.04982	25	16.0000	2.04653	40	501.3500	2.04739
11	0.7500	2.04953	26	20.1000	2.04636	41	631.1333	2.04726
12	0.9167	2.04937	27	25.2667	2.04627	42	794.5000	2.04646
13	1.1167	2.04920	28	31.7667	2.04613	43	1000.1833	2.04590
14	1.3833	2.04885	29	39.9667	2.04612	44	1259.1000	2.04557
15	1.7167	2.04867	30	50.2667	2.04598	45	1440.2000	2.04521

Void Ratio = 1.015 **Compression =** 8.9%

Pressure: 1.00 ksf	TEST READINGS	Load No. 9

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.04671	16	2.1167	2.04409	31	63.2500	2.03962
2	0.1000	2.04536	17	2.6333	2.04382	32	79.5833	2.03966
3	0.2000	2.04523	18	3.2833	2.04361	33	100.1500	2.03970
4	0.2333	2.04513	19	4.1000	2.04328	34	126.0500	2.03965
5	0.2667	2.04523	20	5.1333	2.04311	35	158.6500	2.03985
6	0.3000	2.04516	21	6.4333	2.04289	36	199.6833	2.03994
7	0.3500	2.04514	22	8.0667	2.04254	37	251.3500	2.04011
8	0.4167	2.04503	23	10.1333	2.04215	38	316.3833	2.04024
9	0.5000	2.04494	24	12.7167	2.04184	39	398.2667	2.04039
10	0.6167	2.04481	25	15.9833	2.04159	40	501.3500	2.04044
11	0.7333	2.04467	26	20.0833	2.04102	41	631.1333	2.04015
12	0.9000	2.04451	27	25.2500	2.04055	42	794.5000	2.03948
13	1.1167	2.04445	28	31.7667	2.04013	43	1000.1667	2.03904
14	1.3667	2.04434	29	39.9500	2.03986	44	1259.1000	2.03853
15	1.7000	2.04432	30	50.2667	2.03983	45	1440.1500	2.03809

Void Ratio = 1.031 **Compression =** 8.2%

Pressure: 2.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.03763	16	2.1167	2.03907	31	63.2500	2.04045
2	0.1000	2.03853	17	2.6333	2.03917	32	79.5833	2.04065
3	0.2000	2.03856	18	3.2833	2.03925	33	100.1500	2.04092
4	0.2333	2.03853	19	4.1167	2.03935	34	126.0500	2.04120
5	0.2667	2.03855	20	5.1500	2.03942	35	158.6500	2.04145
6	0.3000	2.03858	21	6.4500	2.03962	36	199.6833	2.04178
7	0.3500	2.03858	22	8.0833	2.03969	37	251.3500	2.04200
8	0.4167	2.03870	23	10.1333	2.03973	38	316.3833	2.04235
9	0.5000	2.03870	24	12.7333	2.03985	39	398.2667	2.04264
10	0.6000	2.03880	25	15.9833	2.03992	40	501.3500	2.04281
11	0.7333	2.03873	26	20.1000	2.03995	41	631.1167	2.04298
12	0.9000	2.03880	27	25.2667	2.04010	42	794.4833	2.04274
13	1.1167	2.03886	28	31.7667	2.04005	43	1000.1667	2.04231
14	1.3667	2.03892	29	39.9500	2.04007	44	1259.0833	2.04225
15	1.7000	2.03899	30	50.2667	2.04020	45	1440.0833	2.04225

Void Ratio = 1.022 **Compression =** 8.6%

Pressure: 4.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.04054	16	2.1000	2.04565	31	63.2333	2.04772
2	0.0833	2.04290	17	2.6167	2.04607	32	79.5667	2.04774
3	0.2000	2.04320	18	3.2833	2.04636	33	100.1333	2.04776
4	0.2167	2.04323	19	4.1000	2.04663	34	126.0333	2.04781
5	0.2500	2.04328	20	5.1333	2.04684	35	158.6333	2.04784
6	0.3000	2.04345	21	6.4333	2.04702	36	199.6667	2.04797
7	0.3500	2.04345	22	8.0667	2.04721	37	251.3333	2.04787
8	0.4167	2.04369	23	10.1167	2.04733	38	316.3667	2.04819
9	0.5000	2.04383	24	12.7167	2.04736	39	398.2500	2.04839
10	0.6000	2.04403	25	15.9667	2.04748	40	501.3333	2.04846
11	0.7333	2.04420	26	20.0833	2.04750	41	631.1167	2.04886
12	0.9000	2.04441	27	25.2500	2.04756	42	794.4833	2.04856
13	1.1000	2.04474	28	31.7500	2.04756	43	1000.1500	2.04824
14	1.3667	2.04499	29	39.9500	2.04761	44	1259.0833	2.04784
15	1.7000	2.04541	30	50.2500	2.04770	45	1440.0500	2.04738

Void Ratio = 1.010 **Compression =** 9.2%

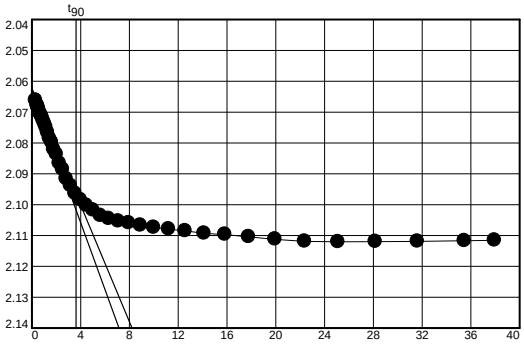
Pressure: 8.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.04580	16	2.1167	2.05408	31	63.2333	2.06024
2	0.1000	2.04955	17	2.6333	2.05468	32	79.5833	2.06037
3	0.2000	2.05045	18	3.2833	2.05537	33	100.1500	2.06067
4	0.2333	2.05052	19	4.1167	2.05593	34	126.0333	2.06097
5	0.2667	2.05065	20	5.1500	2.05636	35	158.6333	2.06127
6	0.3000	2.05090	21	6.4500	2.05692	36	199.6833	2.06182
7	0.3500	2.05100	22	8.0833	2.05761	37	251.3500	2.06213
8	0.4167	2.05119	23	10.1333	2.05824	38	316.3833	2.06245
9	0.5000	2.05144	24	12.7333	2.05877	39	398.2667	2.06293
10	0.6167	2.05176	25	15.9833	2.05905	40	501.3500	2.06349
11	0.7333	2.05214	26	20.1000	2.05939	41	631.1167	2.06346
12	0.9000	2.05236	27	25.2667	2.05958	42	794.5000	2.06332
13	1.1167	2.05263	28	31.7667	2.05967	43	1000.1667	2.06316
14	1.3833	2.05324	29	39.9500	2.05985	44	1259.1000	2.06313
15	1.7000	2.05365	30	50.2667	2.06000	45	1440.2500	2.06299

Void Ratio = 0.976 **Compression =** 10.7%

Pressure: 16.00 ksf	TEST READINGS	Load No. 13

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.05886	24	12.7167	2.09631
2	0.1000	2.06619	25	15.9833	2.09839
3	0.2000	2.06765	26	20.0833	2.10026
4	0.2333	2.06791	27	25.2500	2.10179
5	0.2667	2.06831	28	31.7667	2.10356
6	0.3000	2.06865	29	39.9500	2.10459
7	0.3500	2.06924	30	50.2667	2.10537
8	0.4167	2.07019	31	63.2333	2.10590
9	0.5000	2.07054	32	79.5833	2.10669
10	0.6167	2.07106	33	100.1500	2.10738
11	0.7333	2.07174	34	126.0333	2.10792
12	0.9000	2.07272	35	158.6333	2.10850
13	1.1167	2.07379	36	199.6833	2.10930
14	1.3667	2.07489	37	251.3500	2.10968
15	1.7000	2.07653	38	316.3833	2.11041
16	2.1167	2.07846	39	398.2667	2.11123
17	2.6333	2.07972	40	501.3500	2.11188
18	3.2833	2.08208	41	631.1167	2.11205
19	4.1000	2.08365	42	794.4833	2.11199
20	5.1333	2.08660	43	1000.1667	2.11190
21	6.4500	2.08858	44	1259.0833	2.11170
22	8.0833	2.09158	45	1440.2833	2.11157
23	10.1333	2.09387			

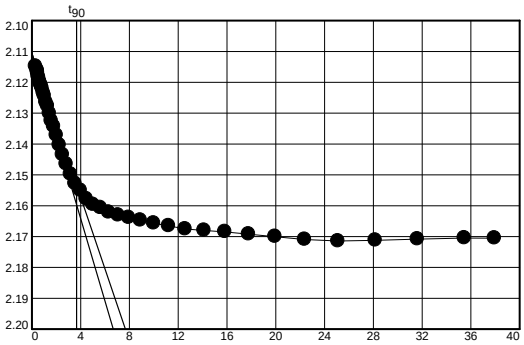


Void Ratio = 0.868 **Compression =** 15.6%

D_0 = 2.0624 **D_{90} =** 2.0966 **D_{100} =** 2.1004 **C_V at 13.09 min. =** 0.123 ft.^{2}/day

Pressure: 32.00 ksf	TEST READINGS	Load No. 14

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.10597	14	1.3667	2.12645
2	0.1000	2.11481	15	1.7000	2.12766
3	0.2000	2.11598	16	2.1000	2.13006
4	0.2167	2.11637	17	2.6167	2.13248
5	0.2500	2.11697	18	3.2833	2.13434
6	0.3000	2.11804	19	4.1000	2.13718
7	0.3500	2.11858	20	5.1333	2.14037
8	0.4167	2.11961	21	6.4333	2.14343
9	0.5000	2.12039	22	8.0667	2.14648
10	0.6000	2.12104	23	10.1167	2.14979
11	0.7333	2.12190	24	12.7167	2.15280
12	0.9000	2.12329	25	15.9667	2.15503
13	1.1000	2.12440	26	20.0833	2.15777



Pressure: 32.00 ksf	TEST READINGS (continued)	Load No. 14

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
27	25.2500	2.15962	37	251.3333	2.16847
28	31.7500	2.16066	38	316.3667	2.16921
29	39.9333	2.16212	39	398.2500	2.17003
30	50.2500	2.16305	40	501.3333	2.17096
31	63.2333	2.16384	41	631.1000	2.17145
32	79.5667	2.16475	42	794.4667	2.17123
33	100.1333	2.16566	43	1000.1500	2.17082
34	126.0333	2.16654	44	1259.0667	2.17048
35	158.6333	2.16755	45	1440.4333	2.17051
36	199.6667	2.16803			

Void Ratio = 0.738 **Compression =** 21.5%

D_0 = 2.1106 **D_{90} =** 2.1533 **D_{100} =** 2.1581 **C_v at 13.45 min. =** 0.105 ft.^{2}/day

Pressure: 16.00 ksf	TEST READINGS	Load No. 15

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.17450	16	2.1000	2.16753	31	63.2333	2.16632
2	0.1000	2.17121	17	2.6333	2.16726	32	79.5667	2.16646
3	0.2000	2.17027	18	3.2833	2.16718	33	100.1333	2.16656
4	0.2167	2.16978	19	4.1000	2.16707	34	126.0333	2.16673
5	0.2500	2.17001	20	5.1333	2.16705	35	158.6333	2.16646
6	0.3000	2.16978	21	6.4333	2.16693	36	199.6667	2.16690
7	0.3500	2.16973	22	8.0667	2.16685	37	251.3333	2.16694
8	0.4167	2.16938	23	10.1333	2.16678	38	316.3667	2.16760
9	0.5000	2.16916	24	12.7167	2.16660	39	398.2500	2.16793
10	0.6000	2.16886	25	15.9833	2.16655	40	501.3333	2.16816
11	0.7333	2.16883	26	20.0833	2.16652	41	631.1000	2.16798
12	0.9000	2.16863	27	25.2500	2.16642	42	794.4833	2.16711
13	1.1167	2.16843	28	31.7500	2.16642	43	1000.1500	2.16670
14	1.3667	2.16782	29	39.9500	2.16640	44	1259.0833	2.16620
15	1.7000	2.16780	30	50.2500	2.16636	45	1440.3500	2.16639

Void Ratio = 0.747 **Compression =** 21.1%

Pressure: 4.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.17130	16	2.1167	2.15950	31	63.2333	2.14716
2	0.1000	2.16590	17	2.6333	2.15862	32	79.5833	2.14715
3	0.2000	2.16476	18	3.2833	2.15745	33	100.1500	2.14702
4	0.2333	2.16433	19	4.1000	2.15627	34	126.0333	2.14697
5	0.2667	2.16421	20	5.1333	2.15566	35	158.6333	2.14695
6	0.3000	2.16396	21	6.4333	2.15435	36	199.6667	2.14708
7	0.3500	2.16368	22	8.0667	2.15352	37	251.3333	2.14706
8	0.4167	2.16332	23	10.1333	2.15259	38	316.3833	2.14734
9	0.5000	2.16270	24	12.7167	2.15153	39	398.2667	2.14662
10	0.6167	2.16234	25	15.9833	2.15038	40	501.3333	2.14670
11	0.7333	2.16213	26	20.0833	2.14970	41	631.1167	2.14640
12	0.9000	2.16201	27	25.2500	2.14921	42	794.4833	2.14619
13	1.1167	2.16169	28	31.7500	2.14877	43	1000.1500	2.14610
14	1.3667	2.16112	29	39.9500	2.14829	44	1259.0833	2.14594
15	1.7000	2.16021	30	50.2500	2.14783	45	1440.1667	2.14567

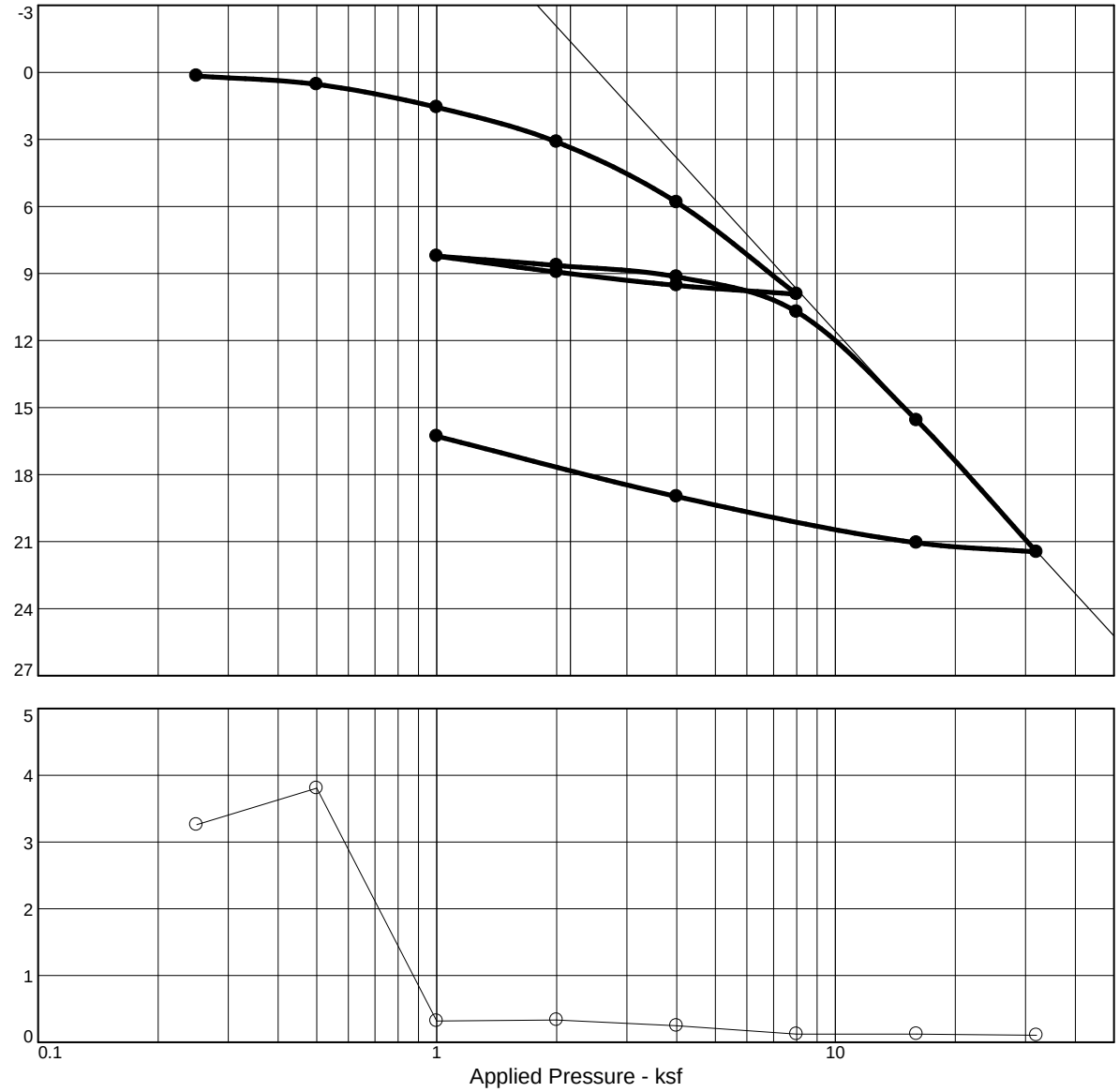
Void Ratio = 0.793 **Compression =** 19.0%

Pressure: 1.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.14794	16	2.1167	2.14201	31	63.2333	2.12446
2	0.1000	2.14555	17	2.6333	2.14141	32	79.5833	2.12343
3	0.2000	2.14528	18	3.2833	2.14054	33	100.1500	2.12247
4	0.2333	2.14525	19	4.1167	2.13968	34	126.0500	2.12151
5	0.2667	2.14518	20	5.1500	2.13892	35	158.6333	2.12116
6	0.3000	2.14516	21	6.4500	2.13825	36	199.6833	2.12084
7	0.3667	2.14500	22	8.0833	2.13745	37	251.3500	2.12100
8	0.4333	2.14474	23	10.1333	2.13595	38	316.3833	2.12066
9	0.5167	2.14458	24	12.7333	2.13506	39	398.2667	2.12044
10	0.6167	2.14435	25	15.9833	2.13349	40	501.3500	2.12028
11	0.7500	2.14409	26	20.0833	2.13244	41	631.1167	2.12002
12	0.9167	2.14389	27	25.2667	2.13077	42	794.4833	2.11960
13	1.1167	2.14356	28	31.7667	2.12909	43	1000.1667	2.11917
14	1.3833	2.14307	29	39.9500	2.12733	44	1259.0833	2.11900
15	1.7000	2.14251	30	50.2667	2.12664	45	1440.1500	2.11871

Void Ratio = 0.852 **Compression =** 16.3%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
95.8 %	43.0 %	76.3	60	38	2.704		4.3	0.43	0.06	1.213

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY (CH), brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A **Depth:** 26-28 ft **Sample Number:** UD-02

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #33755. ASTM D2435.

Figure 1

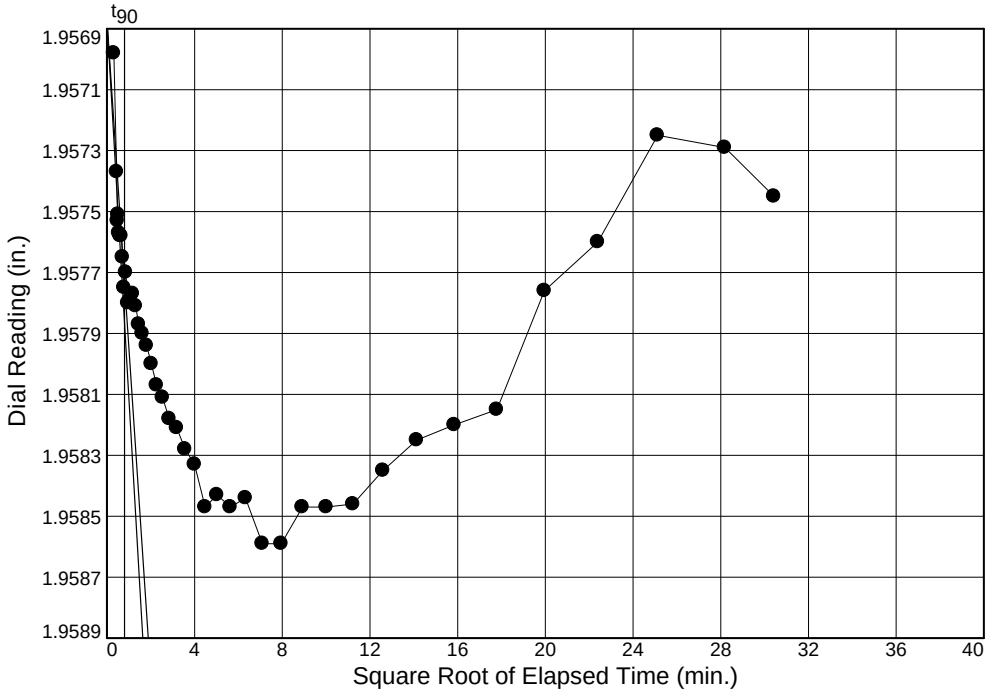
Tested By: Lindsey Deskins **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

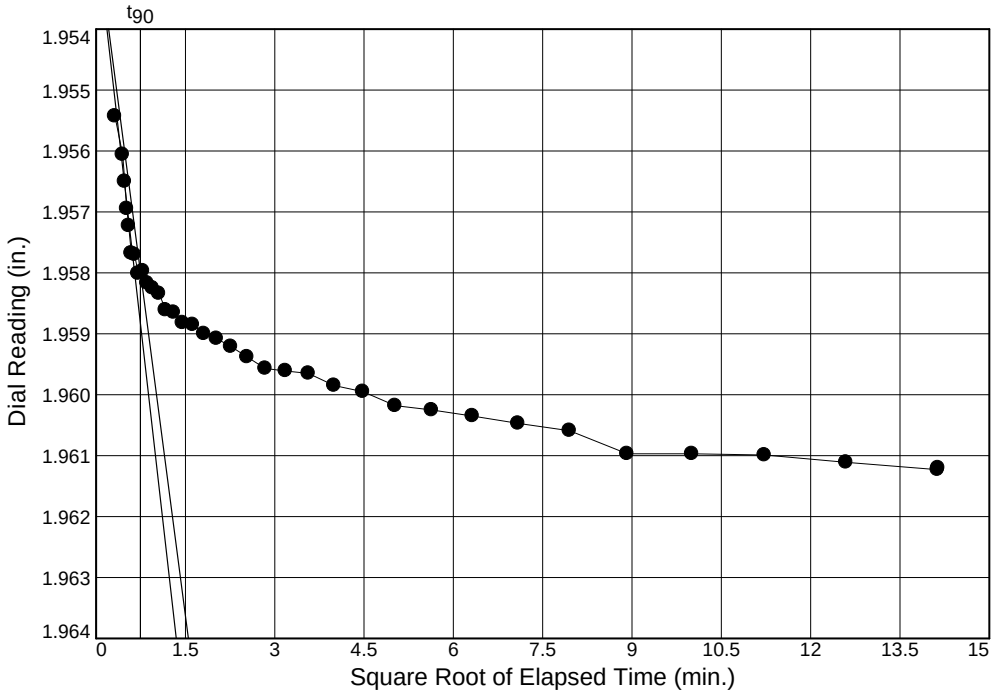
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 1
Load= 0.25 ksf
D_0 = 1.9569
D_{90} = 1.9577
D_{100} = 1.9578
T_{90} = 0.65 min.

C_v @ T_{90}
3.260 ft.^{2}/day



Load No.= 2
Load= 0.50 ksf
D_0 = 1.9524
D_{90} = 1.9580
D_{100} = 1.9586
T_{90} = 0.55 min.

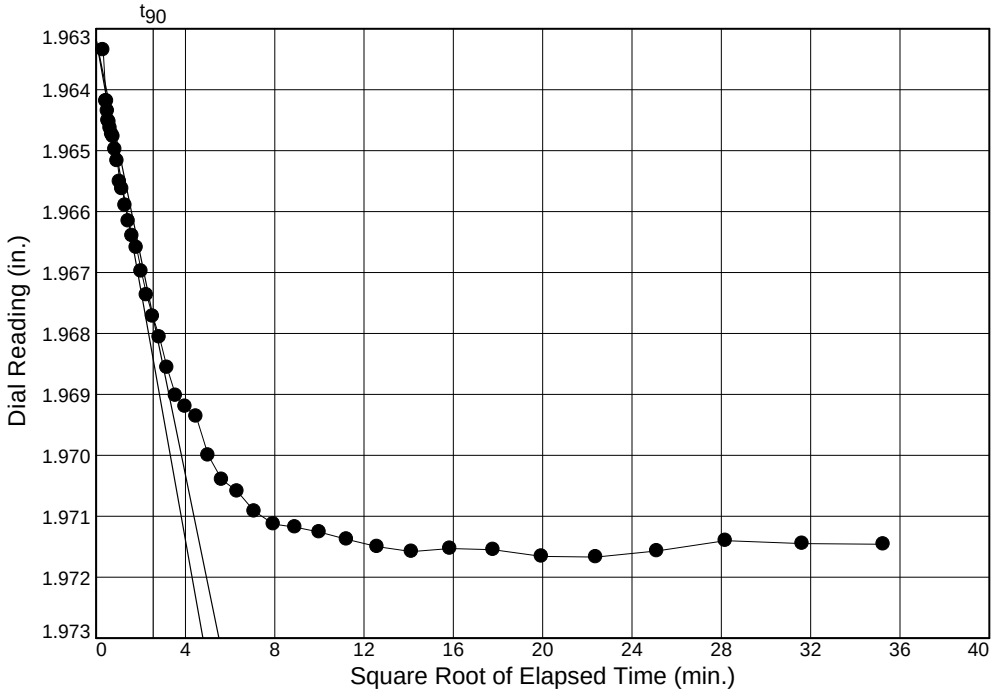
C_v @ T_{90}
3.806 ft.^{2}/day

Figure 2

Dial Reading vs. Time

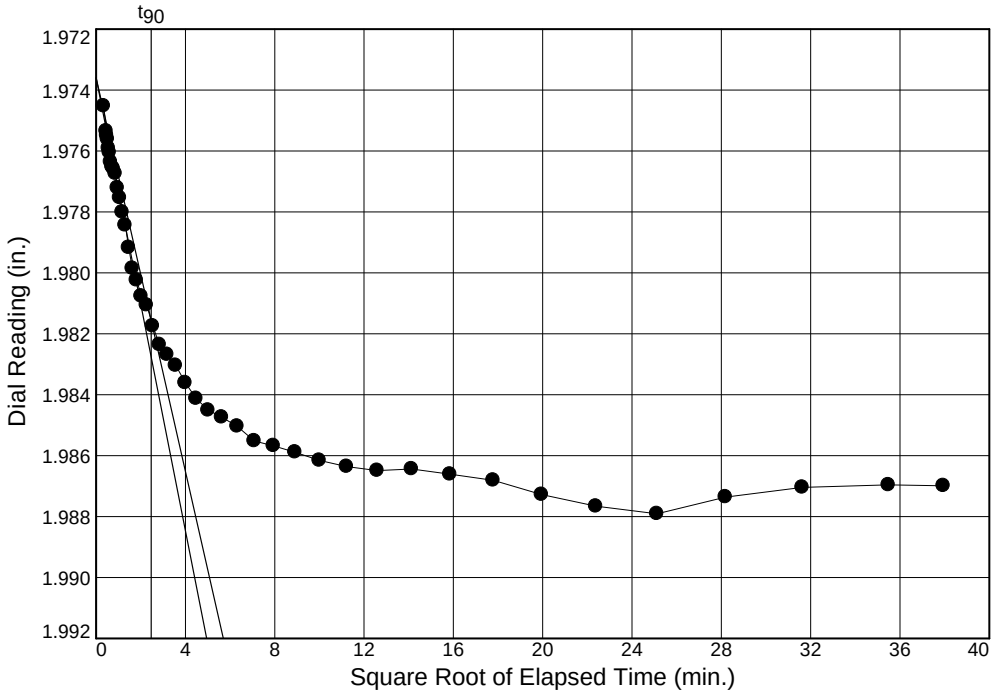
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 3
Load= 1.00 ksf
D_0 = 1.9632
D_{90} = 1.9677
D_{100} = 1.9683
T_{90} = 6.54 min.

C_v @ T_{90}
0.318 ft.^{2}/day



Load No.= 4
Load= 2.00 ksf
D_0 = 1.9736
D_{90} = 1.9816
D_{100} = 1.9824
T_{90} = 6.08 min.

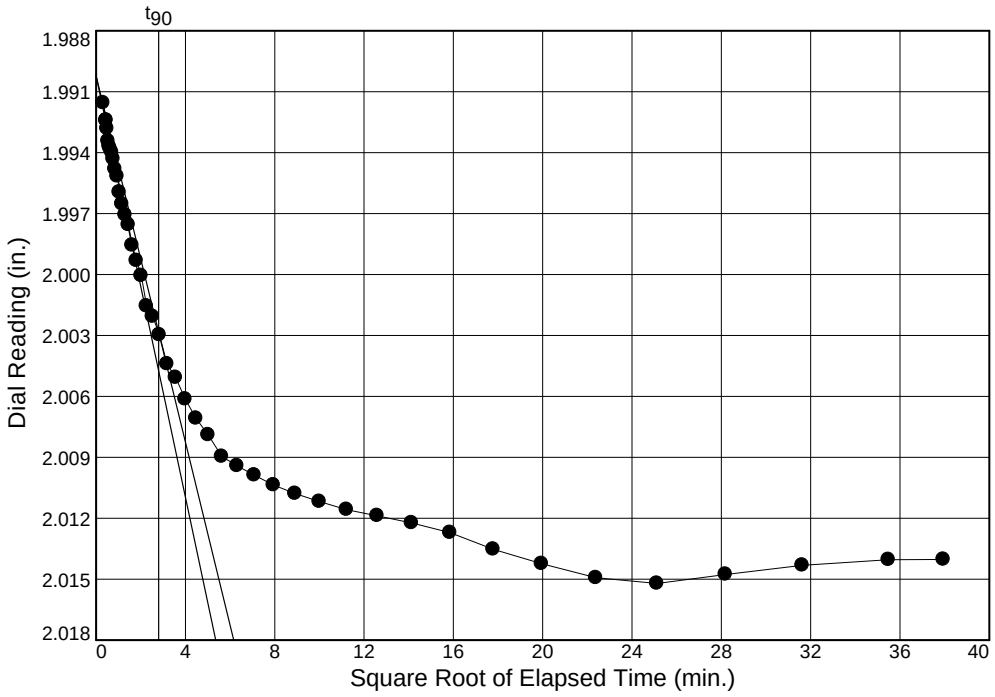
C_v @ T_{90}
0.333 ft.^{2}/day

Figure 3

Dial Reading vs. Time

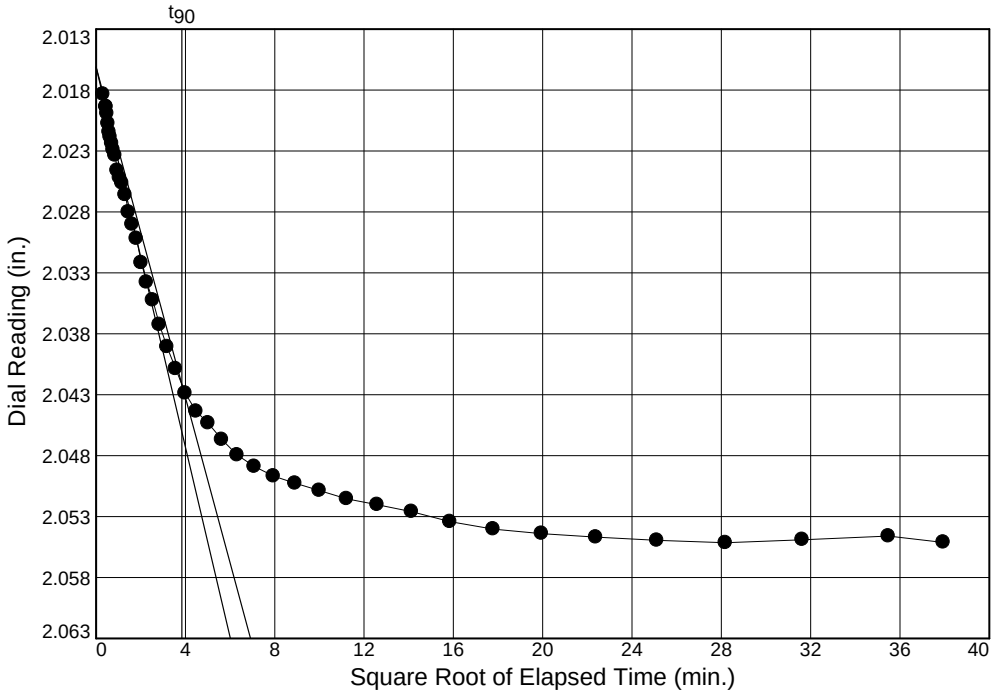
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 5
Load= 4.00 ksf
D_0 = 1.9902
D_{90} = 2.0029
D_{100} = 2.0043
T_{90} = 7.85 min.

C_v @ T_{90}
0.247 ft.^{2}/day



Load No.= 6
Load= 8.00 ksf
D_0 = 2.0161
D_{90} = 2.0422
D_{100} = 2.0450
T_{90} = 14.74 min.

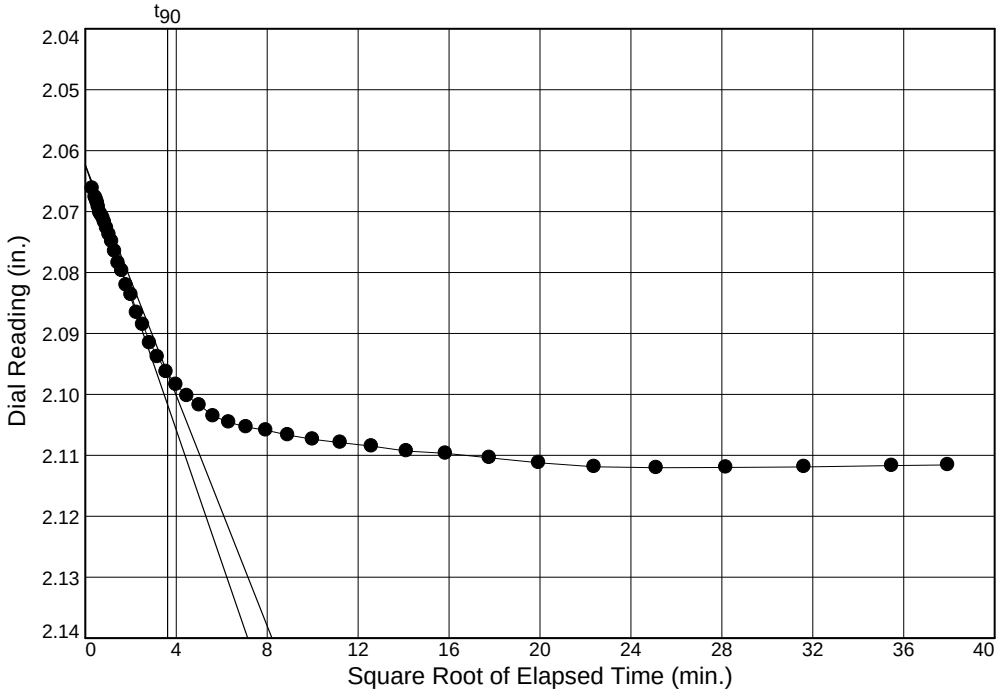
C_v @ T_{90}
0.122 ft.^{2}/day

Figure 4

Dial Reading vs. Time

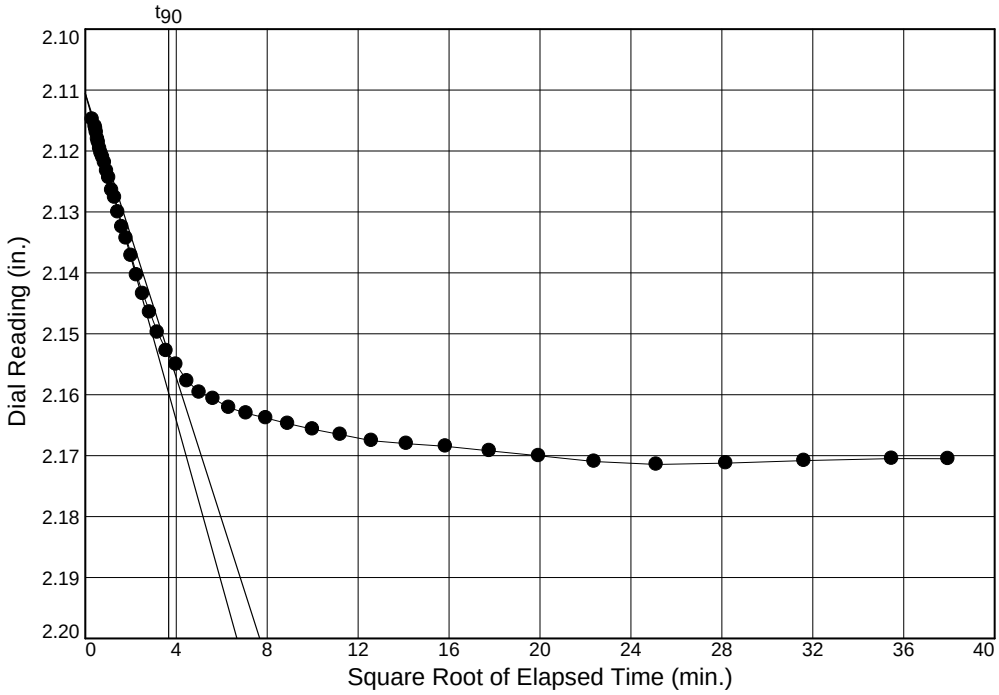
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 13
Load= 16.00 ksf
D_0 = 2.0624
D_{90} = 2.0966
D_{100} = 2.1004
T_{90} = 13.09 min.

C_v @ T_{90}
0.123 $ft.^2/day$

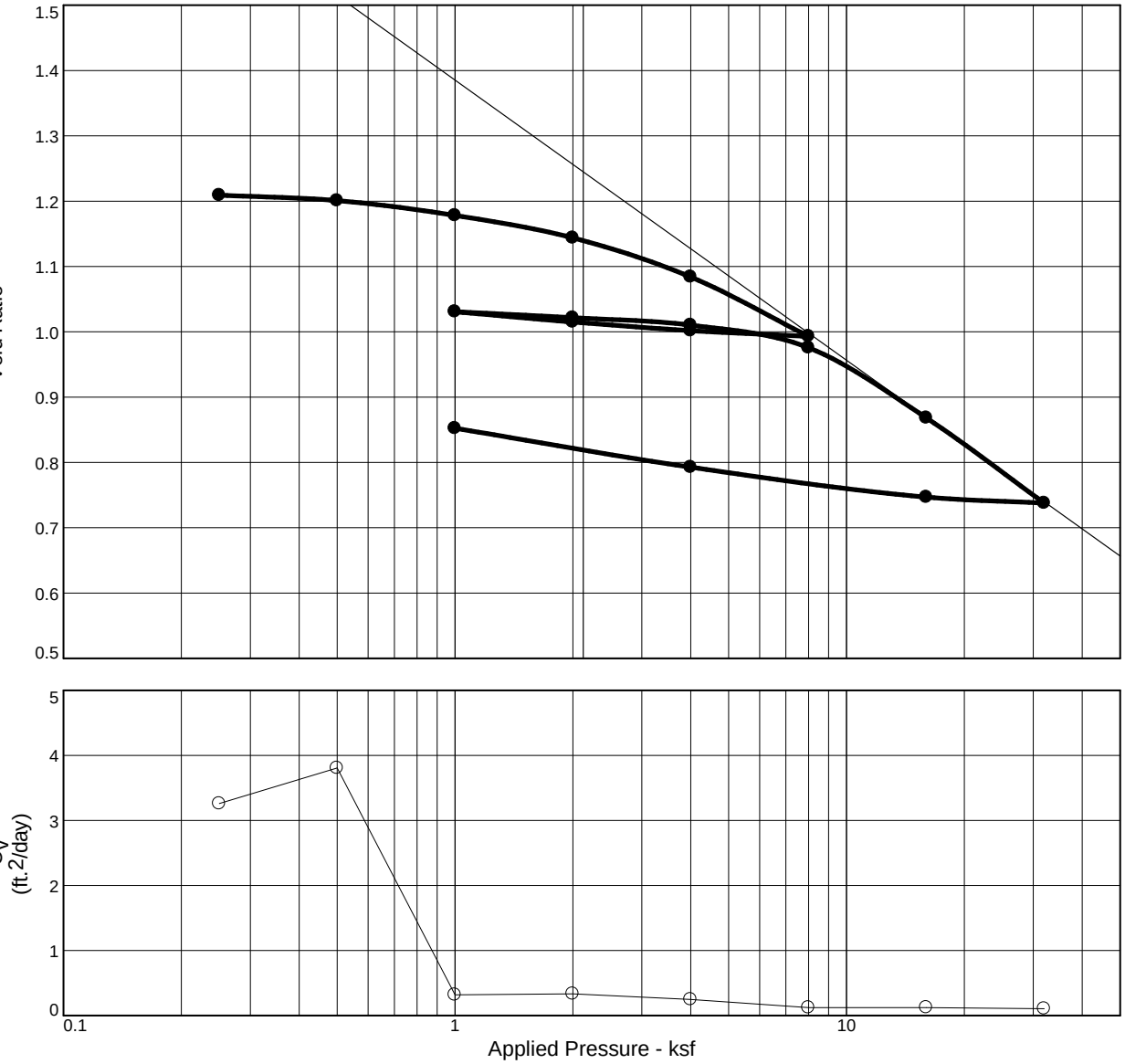


Load No.= 14
Load= 32.00 ksf
D_0 = 2.1106
D_{90} = 2.1533
D_{100} = 2.1581
T_{90} = 13.45 min.

C_v @ T_{90}
0.105 $ft.^2/day$

Figure 5

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
95.8 %	43.0 %	76.3	60	38	2.704		4.3	0.43	0.06	1.213

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY (CH), brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A **Depth:** 26-28 ft **Sample Number:** UD-02

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #33755. ASTM D2435.

Figure 1

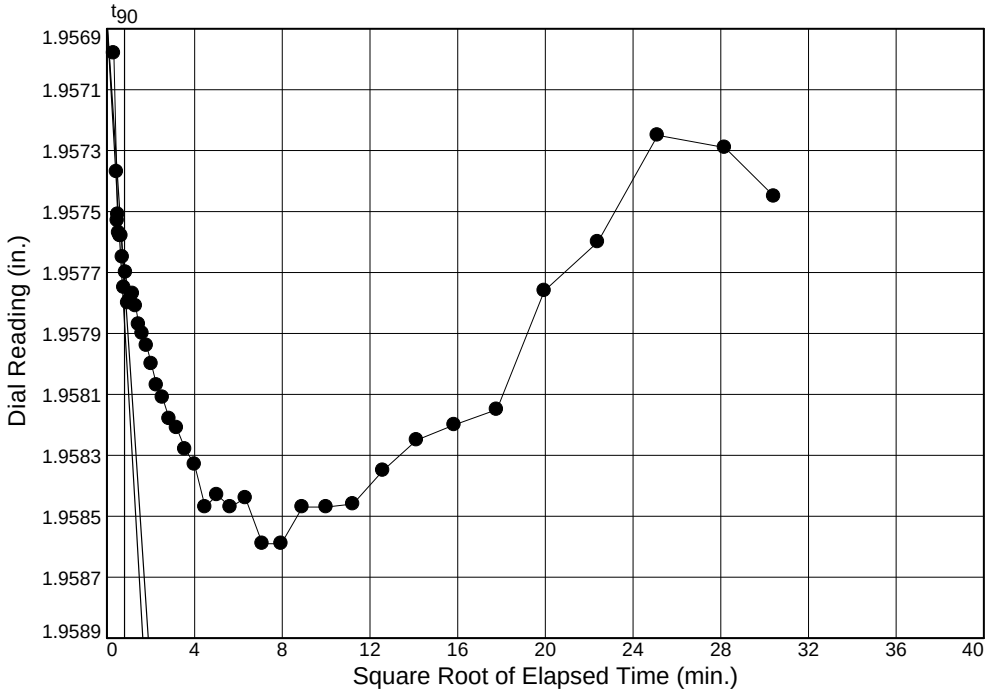
Tested By: Lindsey Deskins **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

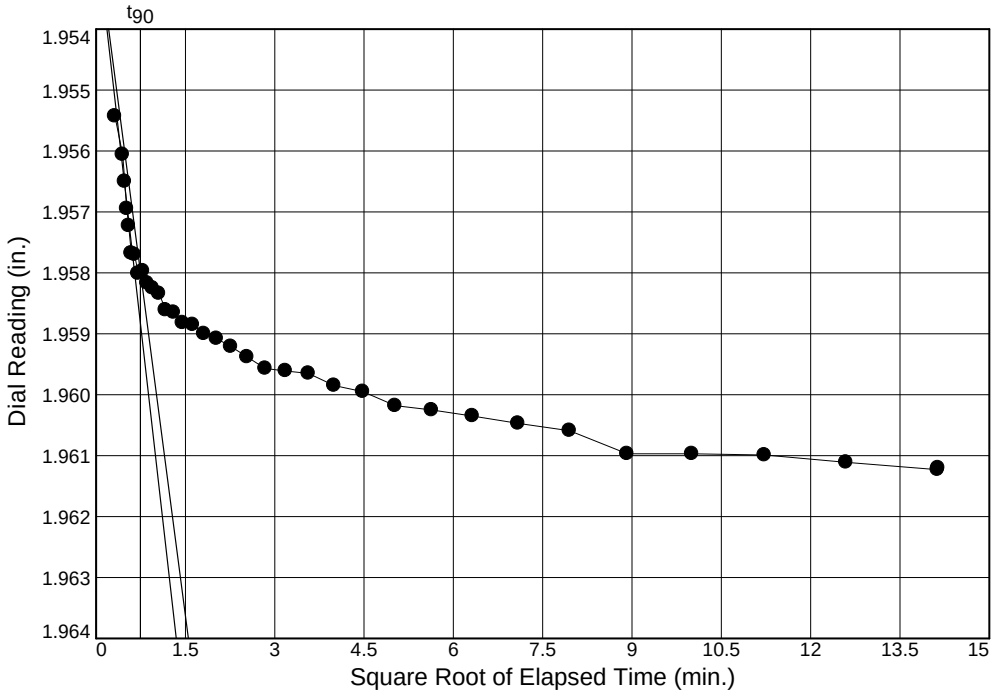
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 1
Load= 0.25 ksf
D_0 = 1.9569
D_{90} = 1.9577
D_{100} = 1.9578
T_{90} = 0.65 min.

C_v @ T_{90}
3.260 ft.^{2}/day



Load No.= 2
Load= 0.50 ksf
D_0 = 1.9524
D_{90} = 1.9580
D_{100} = 1.9586
T_{90} = 0.55 min.

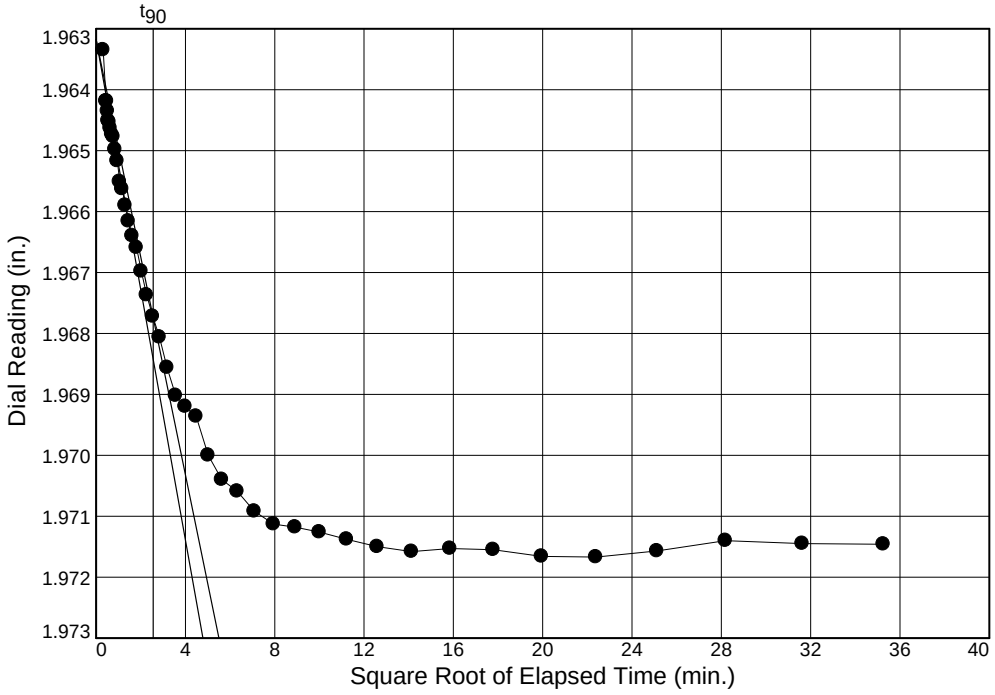
C_v @ T_{90}
3.806 ft.^{2}/day

Figure 2

Dial Reading vs. Time

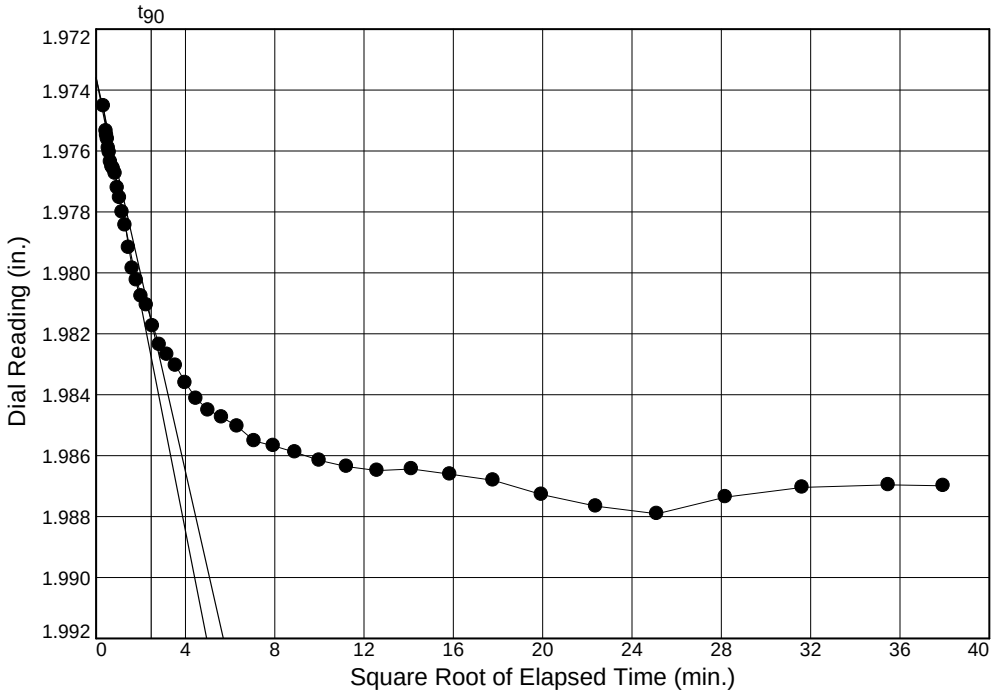
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 3
Load= 1.00 ksf
D_0 = 1.9632
D_{90} = 1.9677
D_{100} = 1.9683
T_{90} = 6.54 min.

C_v @ T_{90}
0.318 ft.^{2}/day



Load No.= 4
Load= 2.00 ksf
D_0 = 1.9736
D_{90} = 1.9816
D_{100} = 1.9824
T_{90} = 6.08 min.

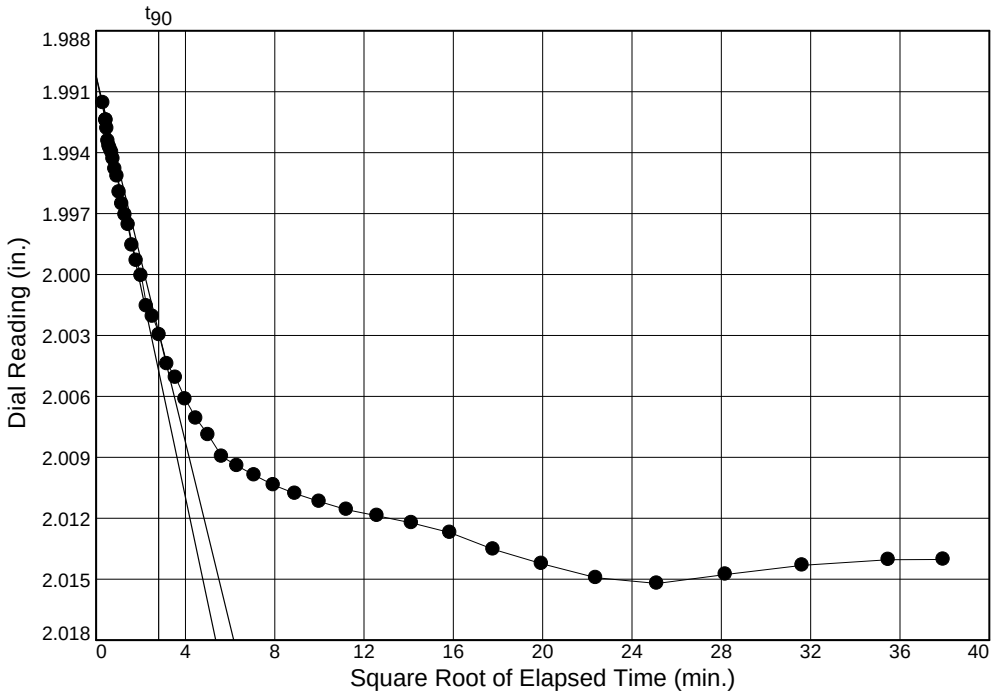
C_v @ T_{90}
0.333 ft.^{2}/day

Figure 3

Dial Reading vs. Time

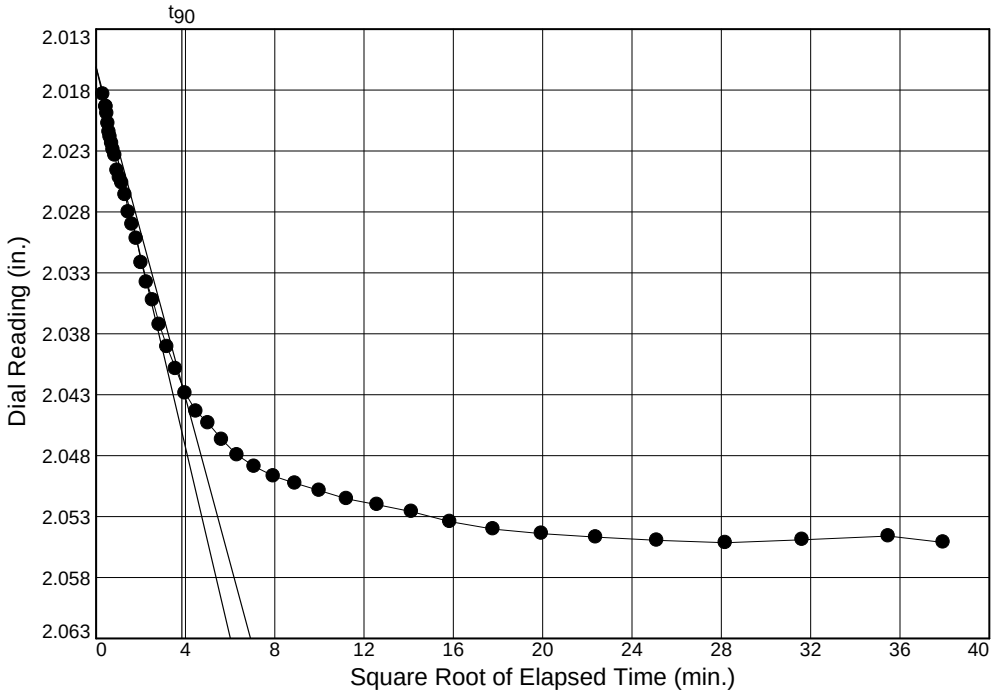
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 5
Load= 4.00 ksf
D_0 = 1.9902
D_{90} = 2.0029
D_{100} = 2.0043
T_{90} = 7.85 min.

C_v @ T_{90}
0.247 ft.^{2}/day



Load No.= 6
Load= 8.00 ksf
D_0 = 2.0161
D_{90} = 2.0422
D_{100} = 2.0450
T_{90} = 14.74 min.

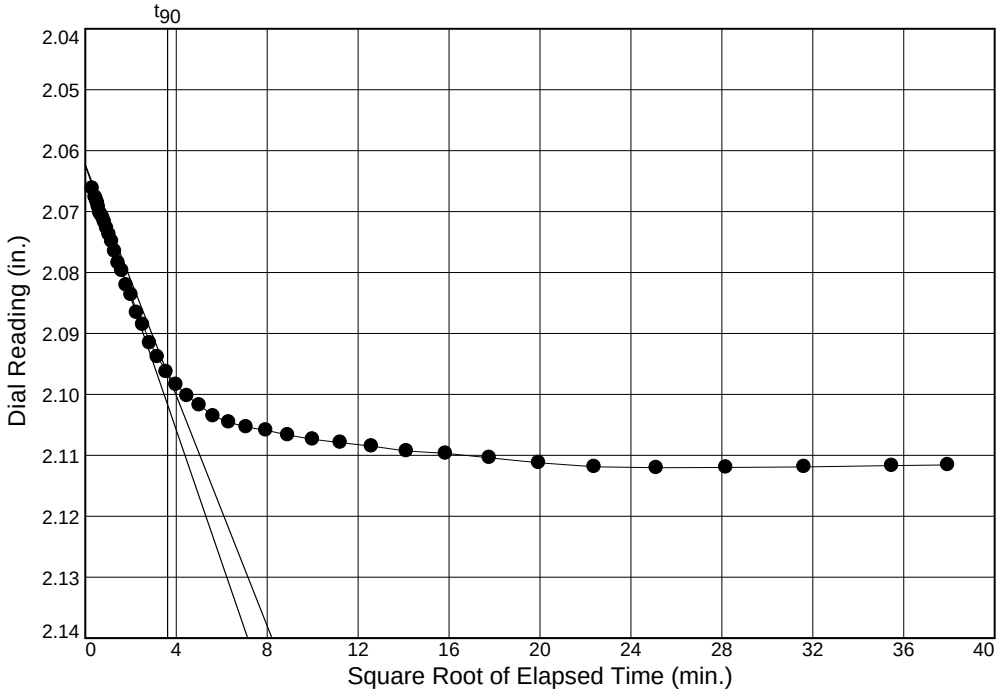
C_v @ T_{90}
0.122 ft.^{2}/day

Figure 4

Dial Reading vs. Time

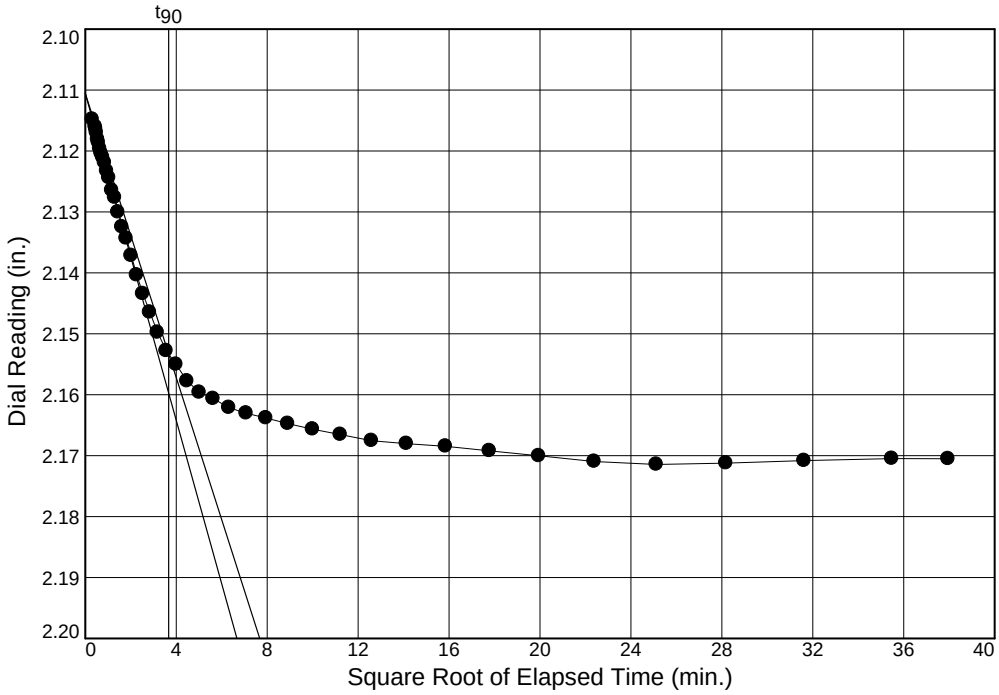
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-01A Depth: 26-28 ft Sample Number: UD-02



Load No.= 13
Load= 16.00 ksf
D_0 = 2.0624
D_{90} = 2.0966
D_{100} = 2.1004
T_{90} = 13.09 min.

C_v @ T_{90}
0.123 $ft.^2$/day



Load No.= 14
Load= 32.00 ksf
D_0 = 2.1106
D_{90} = 2.1533
D_{100} = 2.1581
T_{90} = 13.45 min.

C_v @ T_{90}
0.105 $ft.^2$/day

Figure 5

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☐ AASHTO T 89 ☐ AASHTO T 90 ☐

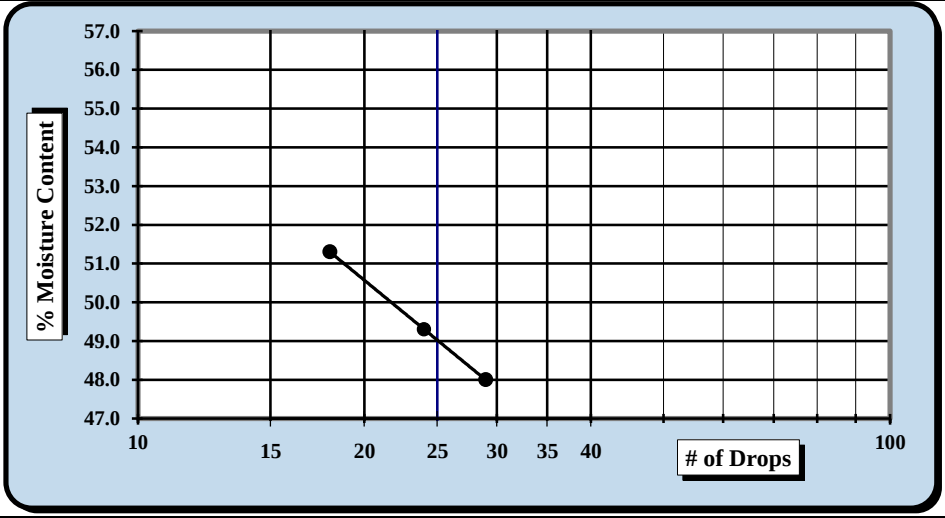
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/10/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	2/20/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-02	Sample #: SS-01	Sample Date: 1/7/2025
Log #:	43-25-007		Depth: 1-2.5 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B2	5	B3				14	12	
A	Tare Weight	15.91	15.38	15.89				15.44	15.57	
B	Wet Soil Weight + A	29.94	31.82	33.47				24.97	24.84	
C	Dry Soil Weight + A	25.39	26.39	27.51				23.21	23.11	
D	Water Weight (B-C)	4.55	5.43	5.96				1.76	1.73	
E	Dry Soil Weight (C-A)	9.48	11.01	11.62				7.77	7.54	
F	% Moisture (D/E)*100	48.0%	49.3%	51.3%				22.7%	22.9%	
N	# OF DROPS	29	24	18						
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.8%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**49**
Plastic Limit	**23**
Plastic Index	**26**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/10/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

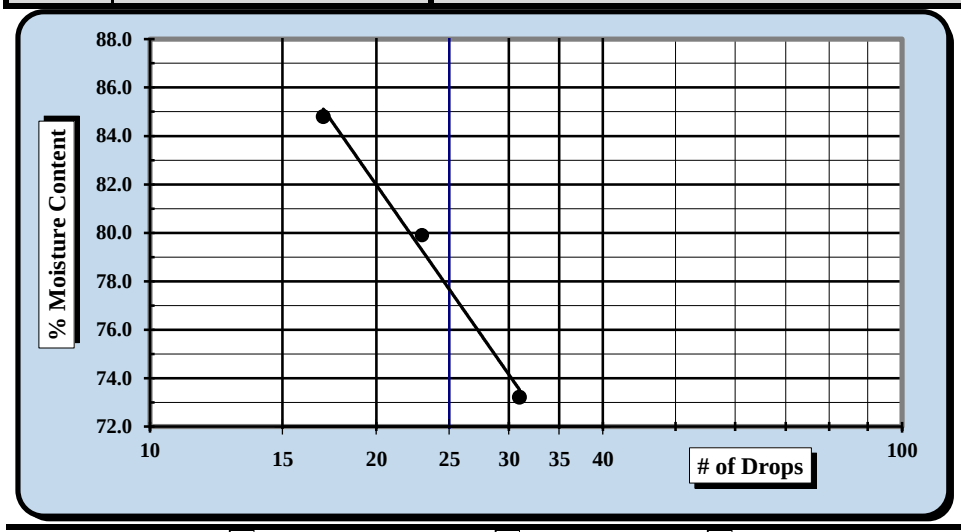
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/10/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	2/20/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-02	Sample #: SS-07	Sample Date: 1/7/2025
Log #:	43-25-007		Depth: 23.5-25 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	A4	13				A2	10	
A	Tare Weight	15.42	15.91	15.39				15.90	15.39	
B	Wet Soil Weight + A	30.28	33.40	34.42				24.50	24.07	
C	Dry Soil Weight + A	24.00	25.63	25.69				22.58	22.15	
D	Water Weight (B-C)	6.28	7.77	8.73				1.92	1.92	
E	Dry Soil Weight (C-A)	8.58	9.72	10.30				6.68	6.76	
F	% Moisture (D/E)*100	73.2%	79.9%	84.8%				28.7%	28.4%	
N	# OF DROPS	31	23	17				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.6%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**78**
Plastic Limit	**29**
Plastic Index	**49**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/10/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☐ AASHTO T 89 ☐ AASHTO T 90 ☐

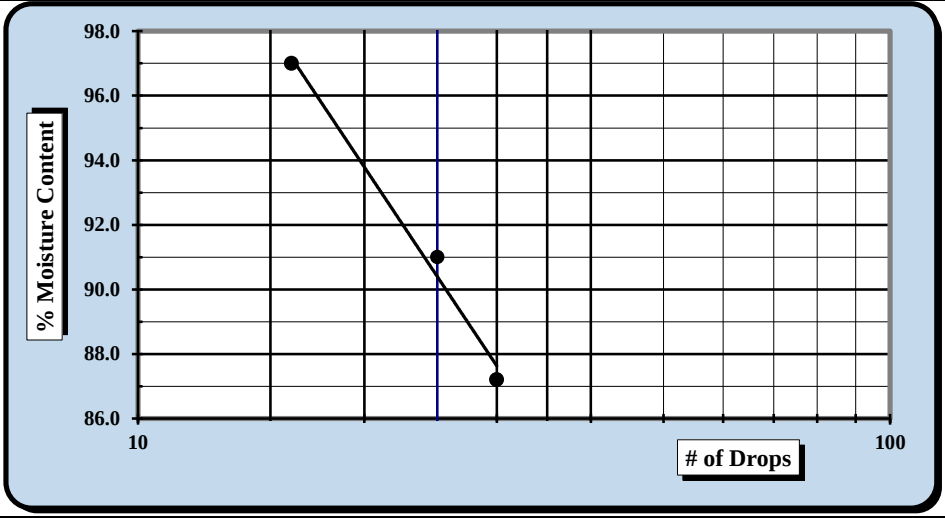
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/10/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	2/21/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-03	Sample #: SS-02	Sample Date: 1/20/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	6	B5	9				3	7	
A	Tare Weight	15.40	15.95	15.42				15.44	15.43	
B	Wet Soil Weight + A	29.98	31.61	34.10				24.45	24.92	
C	Dry Soil Weight + A	23.19	24.15	24.90				21.95	22.27	
D	Water Weight (B-C)	6.79	7.46	9.20				2.50	2.65	
E	Dry Soil Weight (C-A)	7.79	8.20	9.48				6.51	6.84	
F	% Moisture (D/E)*100	87.2%	91.0%	97.0%				38.4%	38.7%	
N	# OF DROPS	30	25	16						
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.6%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**90**
Plastic Limit	**39**
Plastic Index	**51**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/10/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

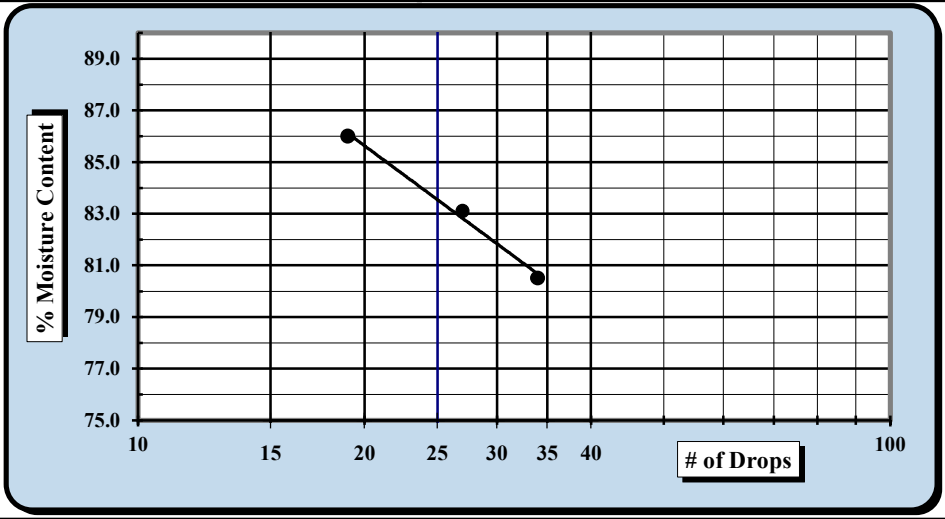
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/11/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-04A	Sample #: UD-01	Sample Date: 1/17/2025
Log #:	43-25-007		Depth: 6-7.7 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B6	2	A5				15	3	
A	Tare Weight	15.95	15.61	15.80				15.28	15.46	
B	Wet Soil Weight + A	27.14	22.20	24.67				22.73	23.24	
C	Dry Soil Weight + A	22.15	19.21	20.57				21.00	21.43	
D	Water Weight (B-C)	4.99	2.99	4.10				1.73	1.81	
E	Dry Soil Weight (C-A)	6.20	3.60	4.77				5.72	5.97	
F	% Moisture (D/E)*100	80.5%	83.1%	86.0%				30.2%	30.3%	
N	# OF DROPS	34	27	19				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.3%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**84**
Plastic Limit	**30**
Plastic Index	**54**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe
Technician Name

Lindsey Deskins
Technical Responsibility

3/18/2025
Date

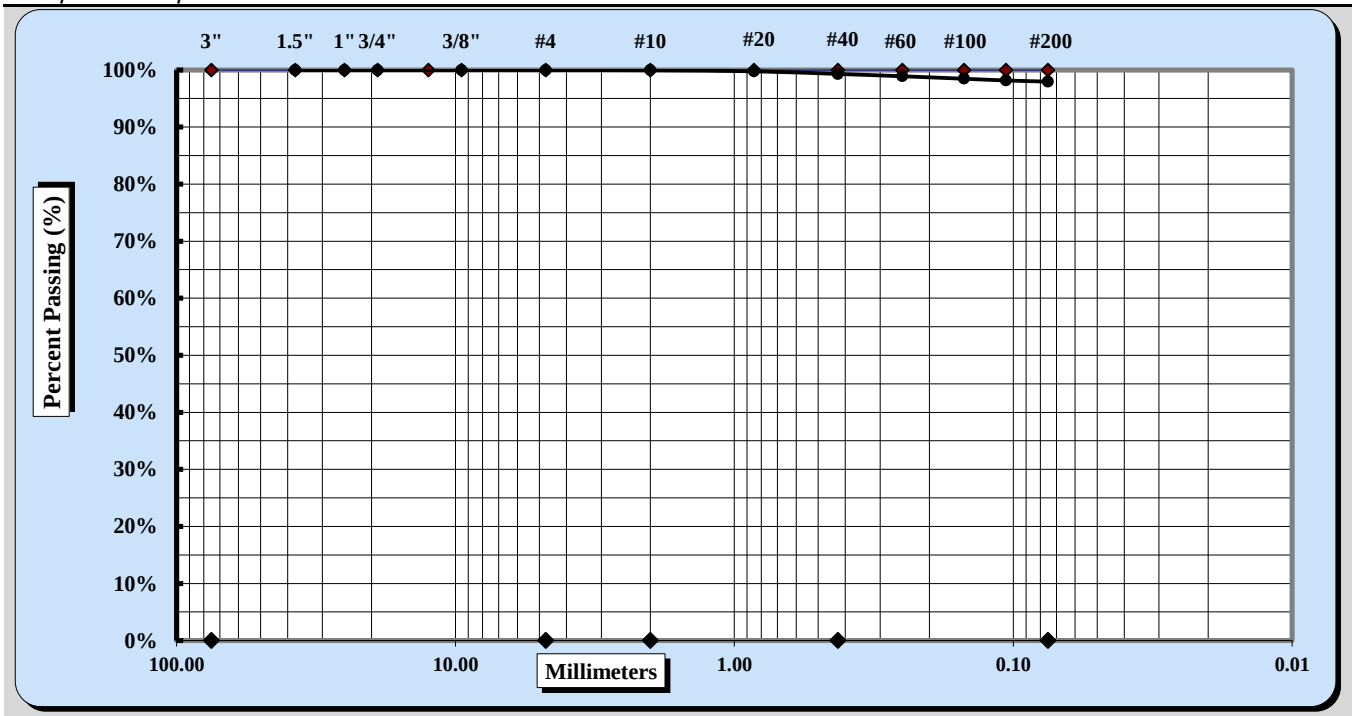
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Sieve Analysis of Soils

Quality Assurance *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/17/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/10/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-04A	Type: UD	Sample Date:	1/17/2025
Sample Log No.: 43-25-007	Sample: UD-01	Depth:	6-7.7 ft
Sample Description:	FAT CLAY (CH), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	#40	Coarse Sand	0%	Fine Sand	1%
Gravel	0%	Medium Sand	1%	Silt & Clay	98%
Liquid Limit:	84	Plastic Limit:	30	Plastic Index:	54

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Tyler Copeman — *Technical Responsibility*
Tyler Cope — *Signature*
Lab Services Manager — *Position*
3/17/2025 — *Date*

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Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

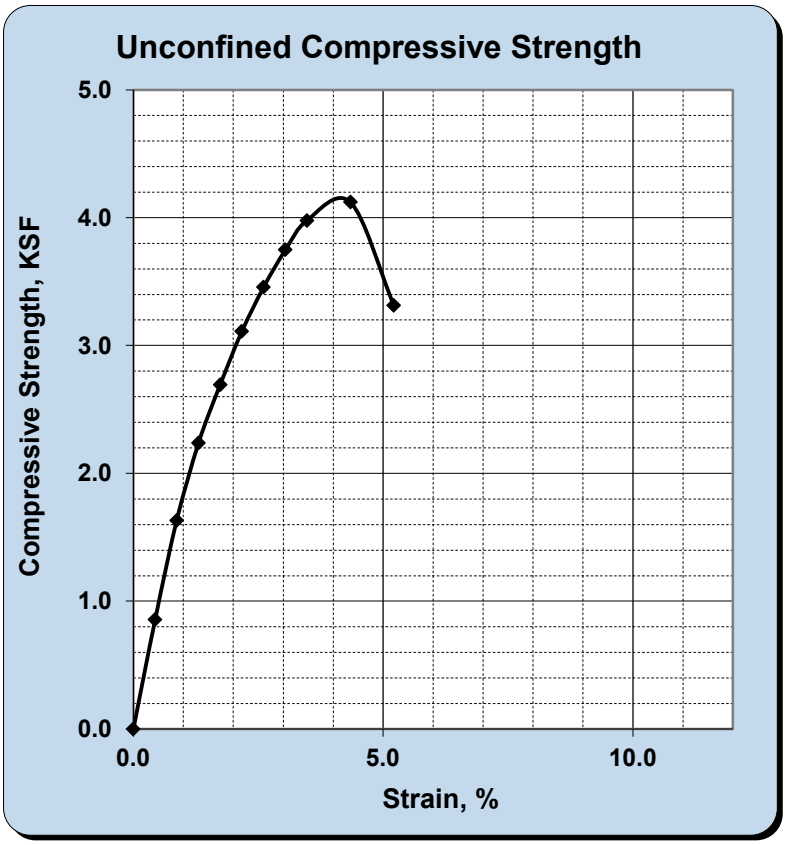
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/8/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-04A Sample No. UD-01	Sample Date:	1/17/2025
		Depth:	6-7.7 ft

Sample Description: FAT CLAY (CH), brown



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 85.6 pcf Initial Water Content: 35.1%
Unconfined Compressive Strength, q_u: **4.121** KSF
Undrained Shear Strength, s_u: **2.061** KSF

Liquid Limit: 84
Plasticity Index: 54
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.85
Strain at Failure: 3.1

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

3/25/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: A-04A
Depth: 6-7.7 ft **Sample Number:** UD-01
Material Description: FAT CLAY (CH), brown
Liquid Limit: 84 **Plasticity Index:** 54
USCS: CH
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1323. ATM D2435.
Tested by: Victoria Igoe **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	138.59 g.	Spec. Gr.	= 2.843	Wet w+t =	654.59 g.
Dry w+t =	101.52 g.	Est. Ht. Solids	= 0.440 in.	Dry w+t =	616.54 g.
Tare Wt. =	7.12 g.	Init. V.R.	= 1.124	Tare Wt. =	515.70 g.
Moisture =	39.3 %	Init. Sat.	= 99.4 %	Moisture =	37.7 %

UNIT WEIGHT		TEST START			
Height =	0.935 in.	Height	= 0.935 in.		
Diameter =	2.500 in.	Diameter	= 2.500 in.	Dry Wt. =	100.84 g.
Weight =	140.25 g.				
Dry Dens. =	83.6 pcf				

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00030		0.00000			1.124	
0.13	0.00250	0.00240	-0.00020			1.124	0.0 Swell
0.25	0.00200	0.00010	0.00160	0.455		1.120	0.2 Comprs.
0.50	0.00520	0.00050	0.00440	0.596		1.114	0.5 Comprs.
1.00	0.00860	0.00080	0.00750	0.602		1.107	0.8 Comprs.
2.00	0.01510	0.00130	0.01350	0.635		1.093	1.4 Comprs.
4.00	0.02480	0.00190	0.02260	0.635		1.073	2.4 Comprs.
8.00	0.03940	0.00280	0.03630	0.632		1.041	3.9 Comprs.
4.00	0.03640	0.00230	0.03380			1.047	3.6 Comprs.
2.00	0.03260	0.00170	0.03060			1.054	3.3 Comprs.
1.00	0.02920	0.00140	0.02750			1.061	2.9 Comprs.
2.00	0.03030	0.00170	0.02830			1.060	3.0 Comprs.
4.00	0.03370	0.00220	0.03120			1.053	3.3 Comprs.
8.00	0.04090	0.00290	0.03770			1.038	4.0 Comprs.
16.00	0.05980	0.00390	0.05560	0.628		0.998	5.9 Comprs.
32.00	0.09130	0.00550	0.08550	0.595		0.930	9.1 Comprs.
16.00	0.08550	0.00430	0.08090			0.940	8.7 Comprs.
4.00	0.06840	0.00260	0.06550			0.975	7.0 Comprs.
1.00	0.05420	0.00170	0.05220			1.005	5.6 Comprs.

TEST RESULTS SUMMARY

Compression index (C_c), ksf = 0.23 **Preconsolidation pressure (P_p), ksf =** 8.2 **Void ratio at P_p (e_m) =** 1.040

Recompression index (C_r) = 0.03

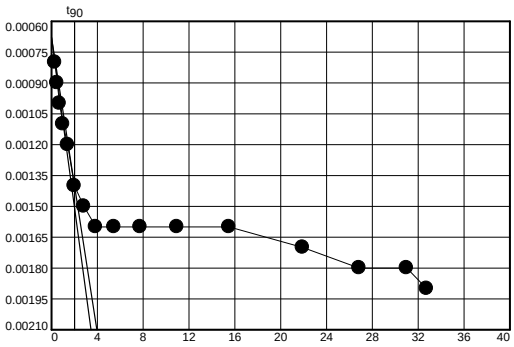
Pressure: 0.13 ksf — **TEST READINGS** — **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	0.0003
2	0.1000	0.0018
3	0.2500	0.0020
4	0.5000	0.0020
5	1.0000	0.0025
6	2.0000	0.0025
7	2.8000	0.0025

Void Ratio = 1.124 **Swell =** 0.0%

Pressure: 0.25 ksf — **TEST READINGS** — **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.00000	11	60.0833	0.0017
2	0.1000	0.0009	12	120.1667	0.0017
3	0.2500	0.0010	13	240.3333	0.0017
4	0.5000	0.0011	14	480.6667	0.0018
5	1.0000	0.0012	15	721.0000	0.0019
6	2.0000	0.0013	16	961.3333	0.0019
7	4.0167	0.0015	17	1071.9167	0.0020
8	8.0167	0.0016			
9	15.0167	0.0017			
10	30.0500	0.0017			

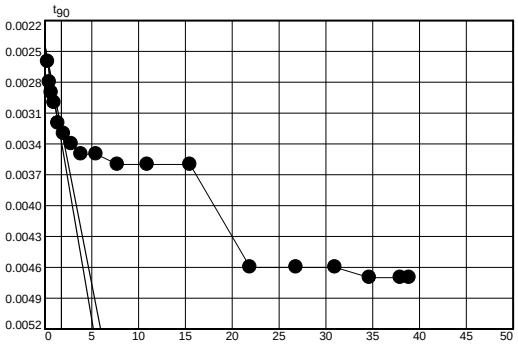


Void Ratio = 1.120 **Compression =** 0.2%

D_0 = 0.0007 **D_{90} =** 0.0014 **D_{100} =** 0.0015 **C_v at 4.07 min. =** 0.455 ft.^{2}/day

Pressure: 0.50 ksf — **TEST READINGS** — **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0020	11	60.0833	0.0041
2	0.1000	0.0031	12	120.1667	0.0041
3	0.2500	0.0033	13	240.3333	0.0041
4	0.5000	0.0034	14	480.6667	0.0051
5	1.0000	0.0035	15	720.9833	0.0051
6	2.0000	0.0037	16	961.3000	0.0051
7	4.0167	0.0038	17	1201.6333	0.0052
8	8.0167	0.0039	18	1441.9500	0.0052
9	15.0333	0.0040	19	1514.0667	0.0052
10	30.0500	0.0040			

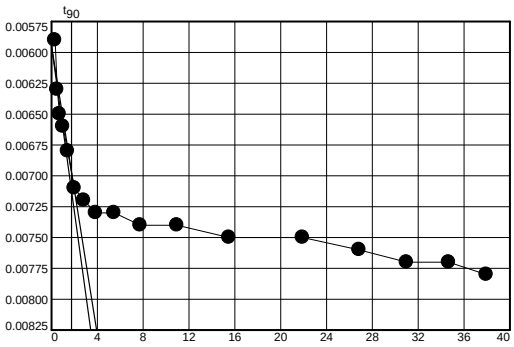


Void Ratio = 1.114 **Compression =** 0.5%

D_0 = 0.0024 **D_{90} =** 0.0033 **D_{100} =** 0.0033 **C_v at 3.09 min. =** 0.596 ft.^{2}/day

Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0052	11	60.0833	0.0082
2	0.1000	0.0067	12	120.1500	0.0082
3	0.2500	0.0071	13	240.3167	0.0083
4	0.5000	0.0073	14	480.6333	0.0083
5	1.0000	0.0074	15	720.9667	0.0084
6	2.0000	0.0076	16	961.2833	0.0085
7	4.0000	0.0079	17	1201.6000	0.0085
8	8.0167	0.0080	18	1440.1667	0.0086
9	15.0167	0.0081			
10	30.0333	0.0081			

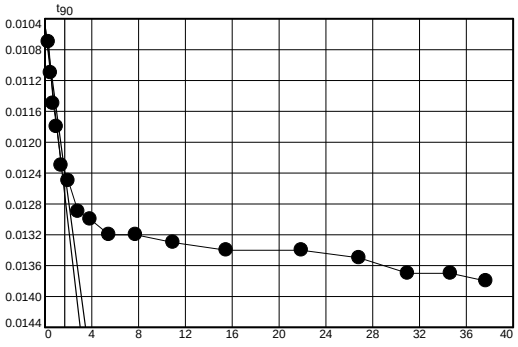


Void Ratio = 1.107 **Compression =** 0.8%

D_0 = 0.0059 **D_{90} =** 0.0070 **D_{100} =** 0.0071 **C_v at 3.04 min. =** 0.602 ft.^{2}/day

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0086	11	60.0833	0.0145
2	0.1000	0.0120	12	120.1667	0.0146
3	0.2500	0.0124	13	240.3167	0.0147
4	0.5000	0.0128	14	480.6333	0.0147
5	1.0000	0.0131	15	720.9500	0.0148
6	2.0000	0.0136	16	961.2667	0.0150
7	4.0000	0.0138	17	1201.6000	0.0150
8	8.0167	0.0142	18	1420.3667	0.0151
9	15.0167	0.0143			
10	30.0333	0.0145			

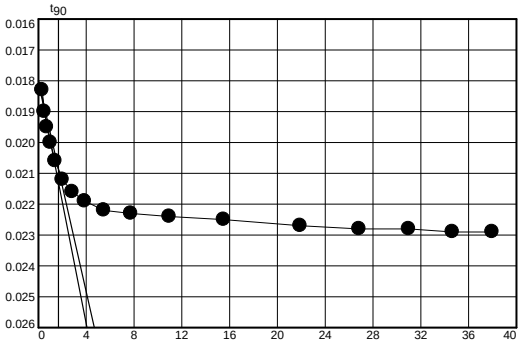


Void Ratio = 1.093 **Compression =** 1.4%

D_0 = 0.0105 **D_{90} =** 0.0124 **D_{100} =** 0.0126 **C_v at 2.85 min. =** 0.635 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0151	11	60.0833	0.0242
2	0.1000	0.0202	12	120.1667	0.0243
3	0.2500	0.0209	13	240.3167	0.0244
4	0.5000	0.0214	14	480.6333	0.0246
5	1.0000	0.0219	15	720.9667	0.0247
6	2.0000	0.0225	16	961.2833	0.0247
7	4.0167	0.0231	17	1201.6000	0.0248
8	8.0167	0.0235	18	1441.9333	0.0248
9	15.0167	0.0238			
10	30.0500	0.0241			

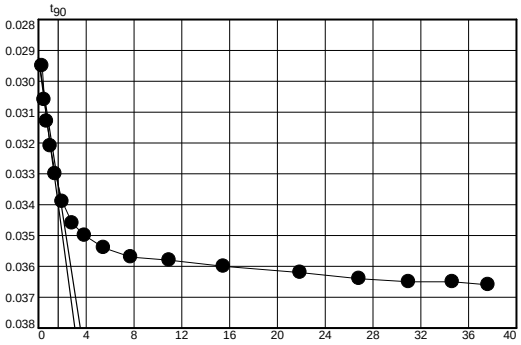


Void Ratio = 1.073 **Compression =** 2.4%

D_0 = 0.0180 **D_{90} =** 0.0209 **D_{100} =** 0.0212 **C_v at 2.81 min. =** 0.635 ft.^{2}/day

Pressure: 8.00 ksf	TEST READINGS	Load No. 7

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0248	11	60.0667	0.0385
2	0.1000	0.0323	12	120.1333	0.0386
3	0.2500	0.0334	13	240.3000	0.0388
4	0.5000	0.0341	14	480.6167	0.0390
5	1.0000	0.0349	15	720.9333	0.0392
6	2.0000	0.0358	16	961.2500	0.0393
7	4.0000	0.0367	17	1201.5667	0.0393
8	8.0000	0.0374	18	1417.3333	0.0394
9	15.0167	0.0378			
10	30.0333	0.0382			



Void Ratio = 1.041 **Compression =** 3.9%

D_0 = 0.0292 **D_{90} =** 0.0334 **D_{100} =** 0.0338 **C_v at 2.75 min. =** 0.632 ft.^{2}/day

Pressure: 4.00 ksf	TEST READINGS	Load No. 8

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0394	11	60.0667	0.0367
2	0.1000	0.0379	12	120.1500	0.0366
3	0.2500	0.0378	13	240.3167	0.0365
4	0.5000	0.0377	14	480.6333	0.0364
5	1.0000	0.0375	15	720.9500	0.0364
6	2.0000	0.0373	16	961.2667	0.0364
7	4.0000	0.0371	17	1201.5833	0.0364
8	8.0000	0.0370	18	1320.7333	0.0364
9	15.0167	0.0369			
10	30.0333	0.0368			

Void Ratio = 1.047 **Compression =** 3.6%

Pressure: 2.00 ksf	TEST READINGS	Load No. 9

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0364	11	60.0833	0.0331
2	0.1000	0.0353	12	120.1667	0.0330
3	0.2500	0.0351	13	240.3333	0.0329
4	0.5000	0.0348	14	480.6500	0.0327
5	1.0000	0.0346	15	720.9833	0.0326
6	2.0000	0.0344	16	961.3000	0.0326
7	4.0167	0.0340	17	1201.6167	0.0326
8	8.0167	0.0337	18	1440.1833	0.0326
9	15.0333	0.0335			
10	30.0500	0.0333			

Void Ratio = 1.054 **Compression =** 3.3%

Pressure: 1.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0326	11	60.0833	0.0298
2	0.1000	0.0318	12	120.1667	0.0297
3	0.2500	0.0316	13	240.3167	0.0295
4	0.5000	0.0315	14	480.6333	0.0292
5	1.0000	0.0314	15	720.9667	0.0292
6	2.0000	0.0312	16	961.2833	0.0292
7	4.0000	0.0308	17	1201.6167	0.0292
8	8.0167	0.0305	18	1441.9500	0.0292
9	15.0167	0.0303	19	1449.0500	0.0292
10	30.0333	0.0300			

Void Ratio = 1.061 **Compression =** 2.9%

Pressure: 2.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0292	11	60.0833	0.0302
2	0.1000	0.0297	12	120.1667	0.0302
3	0.2500	0.0298	13	240.3333	0.0302
4	0.5000	0.0298	14	480.6500	0.0302
5	1.0000	0.0299	15	720.9833	0.0303
6	2.0167	0.0299	16	961.3000	0.0303
7	4.0167	0.0300	17	1201.6167	0.0303
8	8.0167	0.0300	18	1432.8167	0.0303
9	15.0333	0.0301			
10	30.0500	0.0301			

Void Ratio = 1.060 **Compression =** 3.0%

Pressure: 4.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0303	11	60.0833	0.0334
2	0.1000	0.0319	12	120.1667	0.0335
3	0.2500	0.0322	13	240.3167	0.0336
4	0.5000	0.0323	14	480.6500	0.0336
5	1.0000	0.0326	15	720.9667	0.0336
6	2.0000	0.0328	16	961.2833	0.0337
7	4.0000	0.0330	17	1201.6167	0.0337
8	8.0000	0.0331	18	1441.9333	0.0337
9	15.0167	0.0332	19	1448.4000	0.0337
10	30.0333	0.0333			

Void Ratio = 1.053 **Compression =** 3.3%

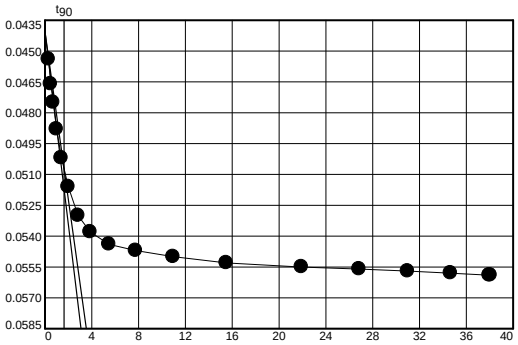
Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0337	11	60.0667	0.0402
2	0.0833	0.0369	12	120.1500	0.0403
3	0.2500	0.0374	13	240.3167	0.0404
4	0.5000	0.0378	14	480.6333	0.0406
5	1.0000	0.0383	15	720.9500	0.0407
6	2.0000	0.0388	16	961.2667	0.0408
7	4.0000	0.0393	17	1201.5833	0.0409
8	8.0000	0.0397	18	1435.0333	0.0409
9	15.0167	0.0400			
10	30.0333	0.0401			

Void Ratio = 1.038 **Compression =** 4.0%

Pressure: 16.00 ksf | **TEST READINGS** | **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0409	11	60.0833	0.0586
2	0.1000	0.0493	12	120.1667	0.0589
3	0.2500	0.0505	13	240.3167	0.0592
4	0.5000	0.0514	14	480.6333	0.0594
5	1.0000	0.0527	15	720.9333	0.0595
6	2.0000	0.0541	16	961.2500	0.0596
7	4.0000	0.0555	17	1201.5500	0.0597
8	8.0167	0.0569	18	1441.8667	0.0598
9	15.0167	0.0577	19	1448.6000	0.0598
10	30.0333	0.0583			

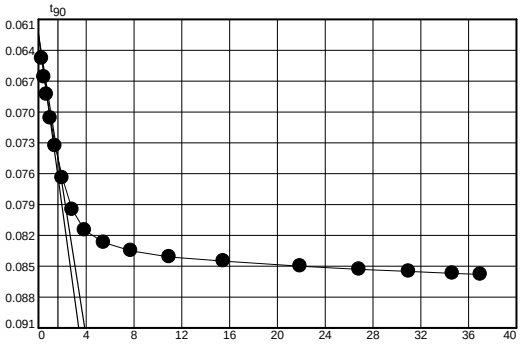


Void Ratio = 0.998 **Compression =** 5.9%

D_0 = 0.0441 **D_{90} =** 0.0507 **D_{100} =** 0.0515 **C_V at 2.67 min. =** 0.628 ft.^{2}/day

Pressure: 32.00 ksf | **TEST READINGS** | **Load No. 15**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0598	11	60.0667	0.0890
2	0.0833	0.0703	12	120.1500	0.0896
3	0.2333	0.0721	13	240.2167	0.0900
4	0.4833	0.0738	14	480.5167	0.0905
5	1.0000	0.0761	15	720.8333	0.0908
6	2.0000	0.0788	16	961.1333	0.0910
7	4.0000	0.0819	17	1201.4500	0.0912
8	8.0000	0.0850	18	1368.9833	0.0913
9	15.0167	0.0870			
10	30.0333	0.0882			



Void Ratio = 0.930 **Compression =** 9.1%

D_0 = 0.0624 **D_{90} =** 0.0745 **D_{100} =** 0.0758 **C_V at 2.66 min. =** 0.595 ft.^{2}/day

Pressure: 16.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0913	11	60.0833	0.0858
2	0.1000	0.0890	12	120.1500	0.0858
3	0.2500	0.0887	13	240.3167	0.0857
4	0.5000	0.0883	14	480.6167	0.0855
5	1.0000	0.0880	15	720.9333	0.0855
6	2.0000	0.0874	16	961.2333	0.0855
7	4.0000	0.0868	17	1201.5500	0.0855
8	8.0167	0.0864	18	1441.8667	0.0855
9	15.0167	0.0861	19	1470.7500	0.0855
10	30.0333	0.0859			

Void Ratio = 0.940 **Compression =** 8.7%

Pressure: 4.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0855	11	60.0833	0.0698
2	0.1000	0.0827	12	120.1667	0.0694
3	0.2500	0.0819	13	240.3167	0.0690
4	0.5000	0.0811	14	480.5833	0.0687
5	1.0000	0.0802	15	720.8833	0.0684
6	2.0167	0.0788	16	961.2000	0.0684
7	4.0167	0.0770	17	1201.5167	0.0684
8	8.0167	0.0747	18	1427.1333	0.0684
9	15.0333	0.0727			
10	30.0500	0.0708			

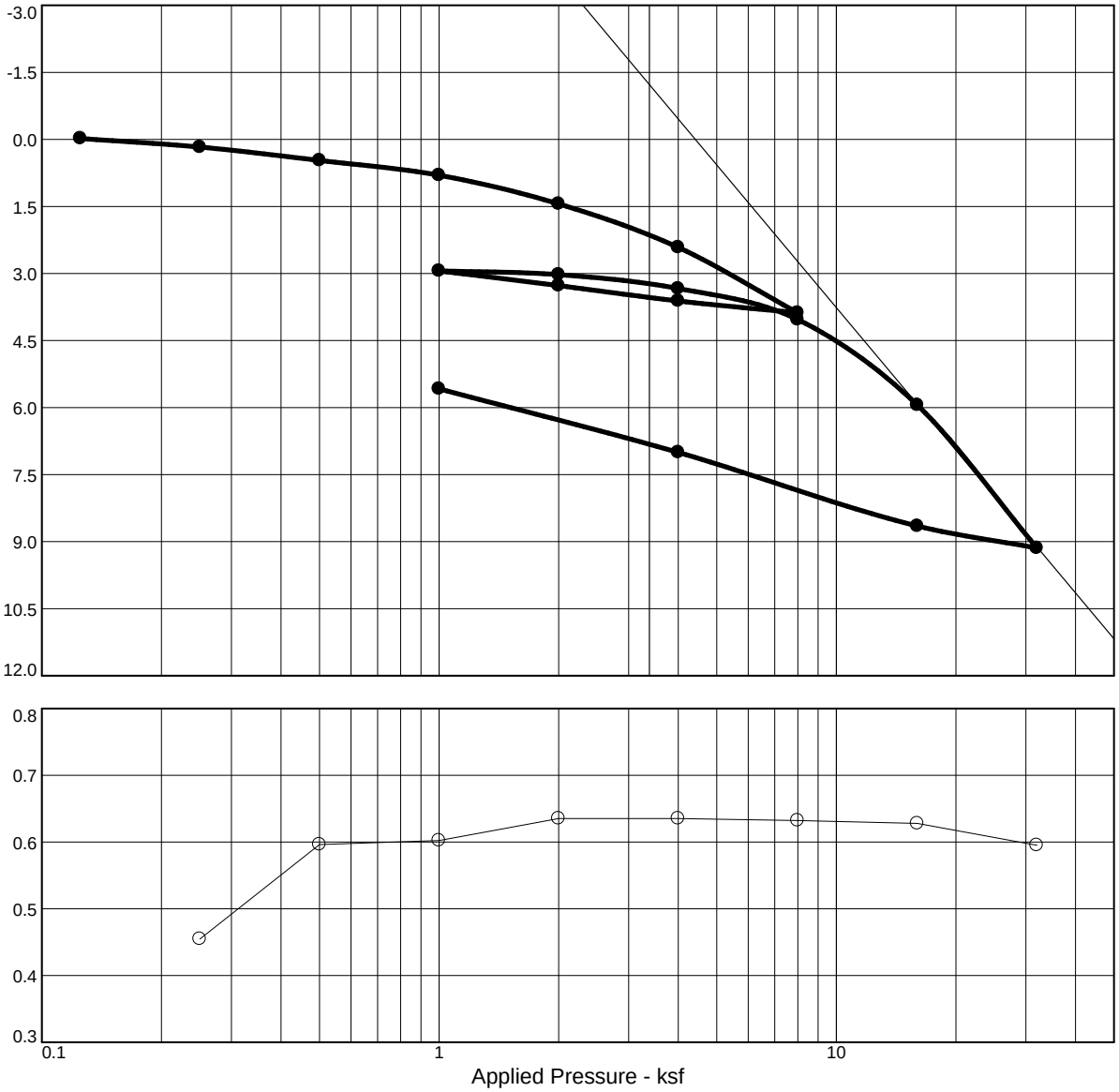
Void Ratio = 0.975 **Compression =** 7.0%

Pressure: 1.00 ksf	TEST READINGS	Load No. 18

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0684	11	59.9833	0.0567
2	0.1000	0.0670	12	119.9833	0.0556
3	0.2500	0.0666	13	239.9667	0.0550
4	0.5000	0.0662	14	479.9667	0.0546
5	1.0000	0.0657	15	719.9667	0.0544
6	2.0000	0.0649	16	959.9667	0.0543
7	4.0000	0.0638	17	1199.9667	0.0542
8	8.0000	0.0624	18	1439.9500	0.0542
9	15.0000	0.0606			
10	30.0000	0.0585			

Void Ratio = 1.005 **Compression =** 5.6%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
99.4 %	39.3 %	83.6	84	54	2.843		8.2	0.23	0.03	1.124

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY (CH), brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A **Depth:** 6-7.7 ft **Sample Number:** UD-01

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1323. ATM D2435.

Figure 1

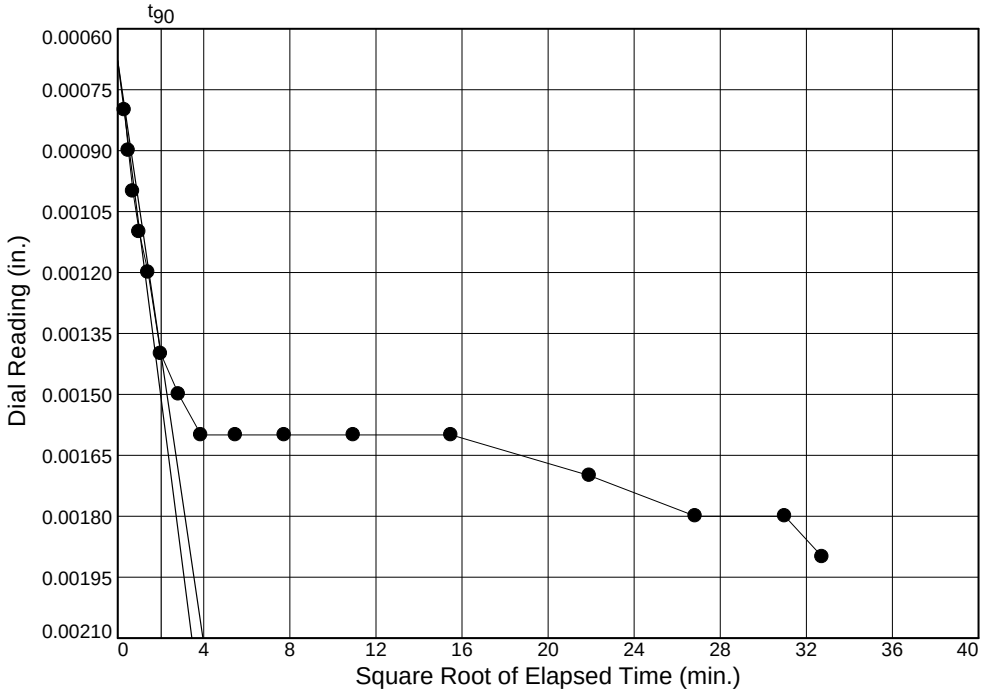
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

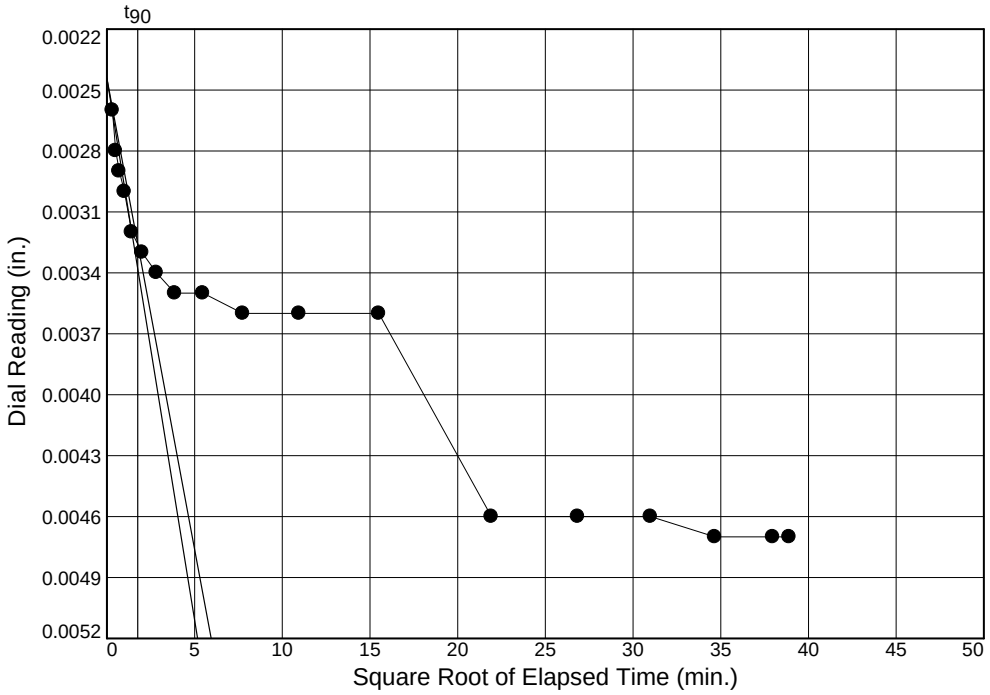
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



Load No.= 2
Load= 0.25 ksf
D_0 = 0.0007
D_{90} = 0.0014
D_{100} = 0.0015
T_{90} = 4.07 min.

C_v @ T_{90}
0.455 ft.^{2}/day



Load No.= 3
Load= 0.50 ksf
D_0 = 0.0024
D_{90} = 0.0033
D_{100} = 0.0033
T_{90} = 3.09 min.

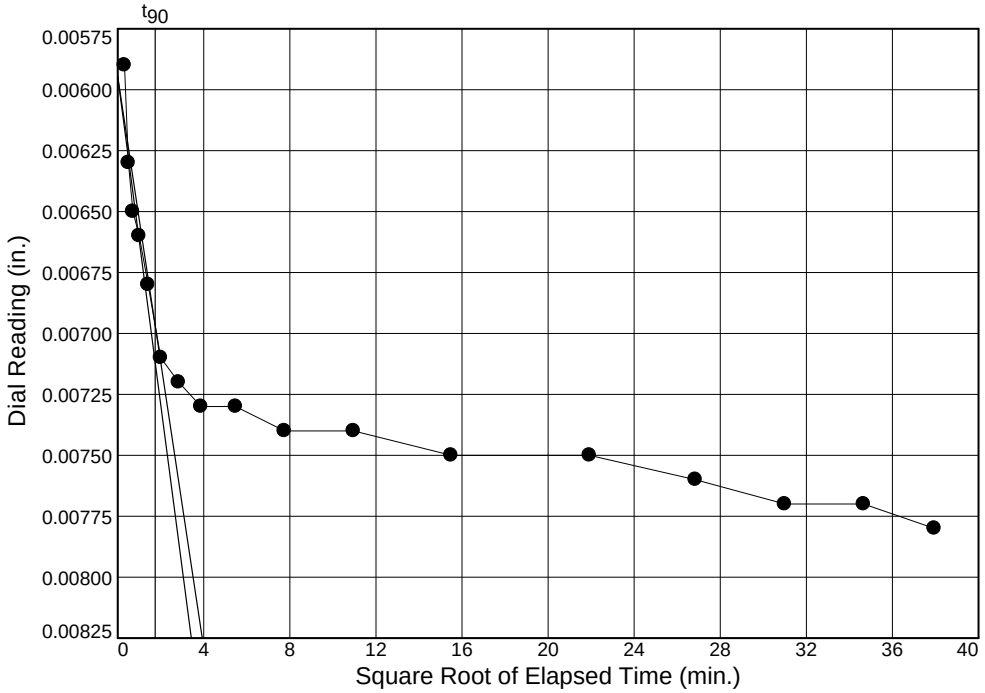
C_v @ T_{90}
0.596 ft.^{2}/day

Figure 2

Dial Reading vs. Time

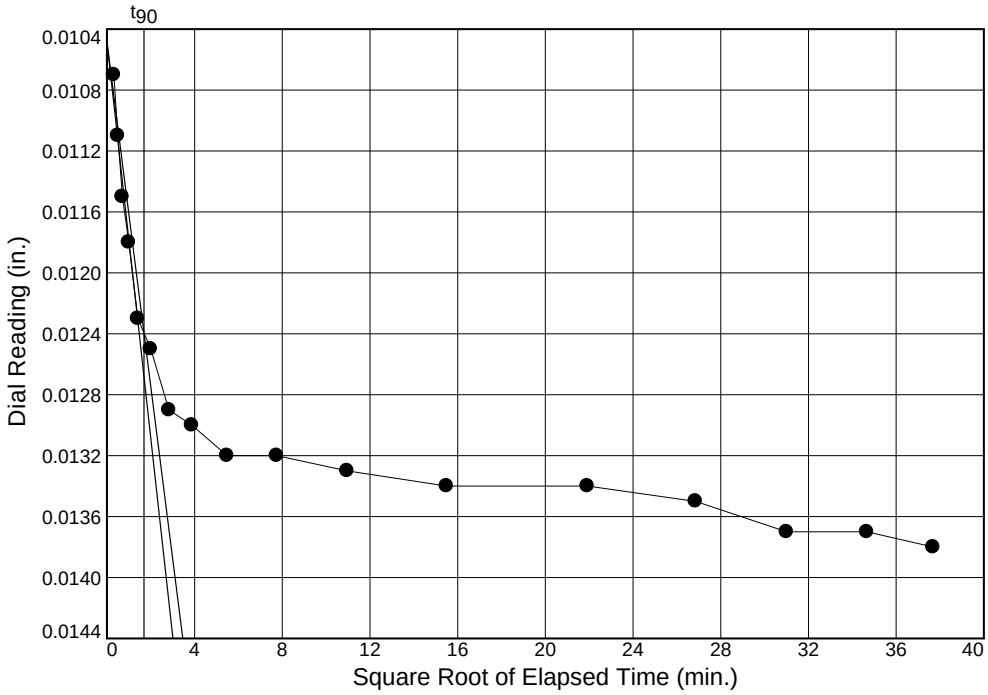
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0059
D_{90} = 0.0070
D_{100} = 0.0071
T_{90} = 3.04 min.

C_v @ T_{90}
0.602 ft.^{2}/day



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0105
D_{90} = 0.0124
D_{100} = 0.0126
T_{90} = 2.85 min.

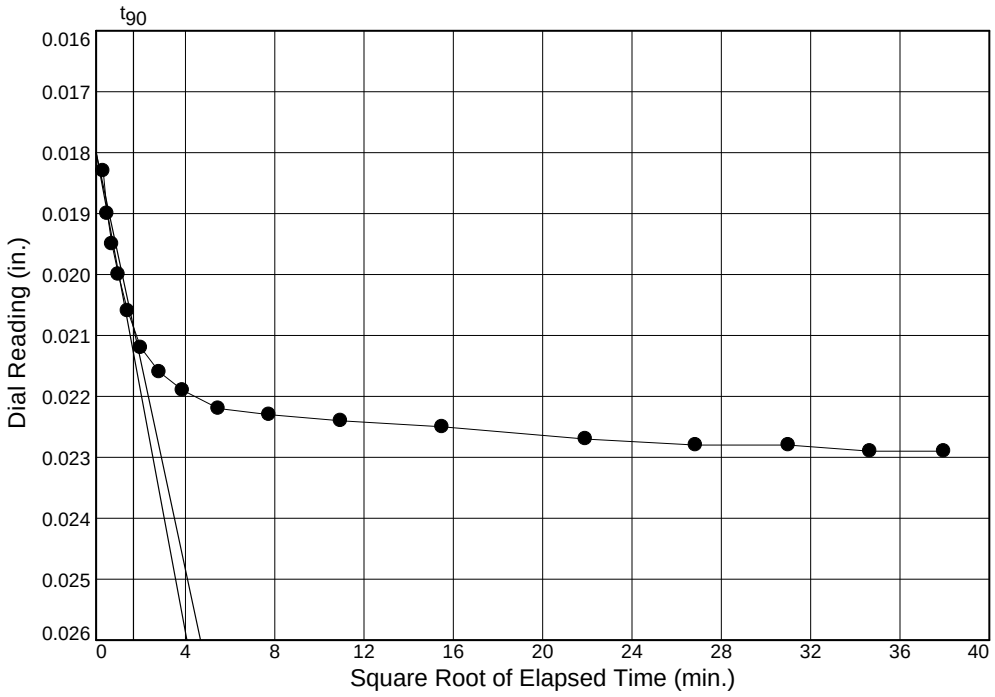
C_v @ T_{90}
0.635 ft.^{2}/day

Figure 3

Dial Reading vs. Time

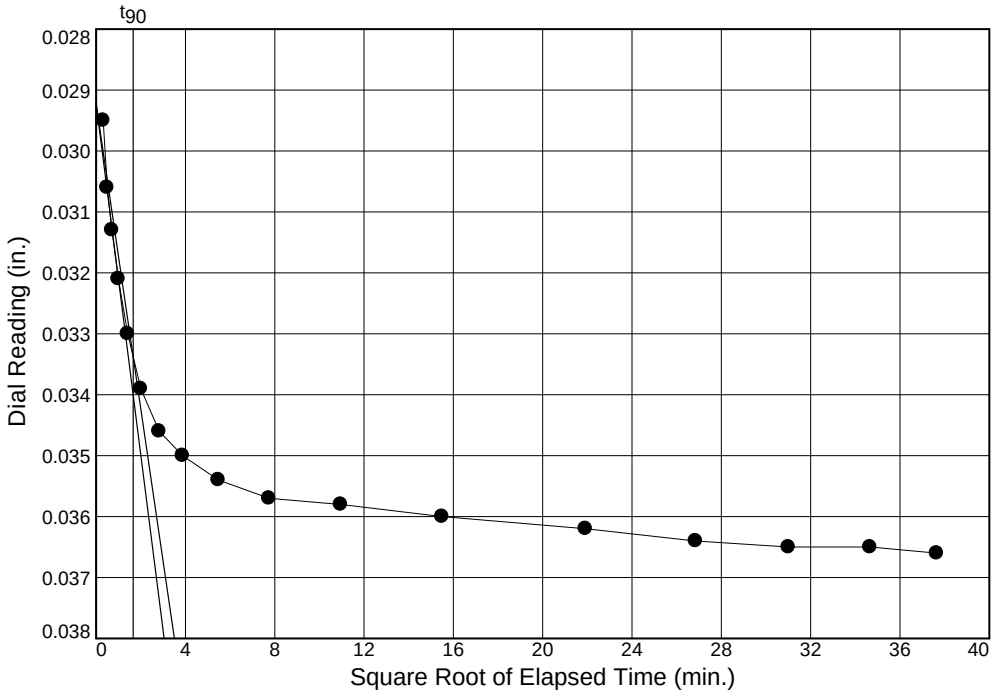
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0180
D_{90} = 0.0209
D_{100} = 0.0212
T_{90} = 2.81 min.

C_v @ T_{90}
0.635 ft.^{2}/day



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0292
D_{90} = 0.0334
D_{100} = 0.0338
T_{90} = 2.75 min.

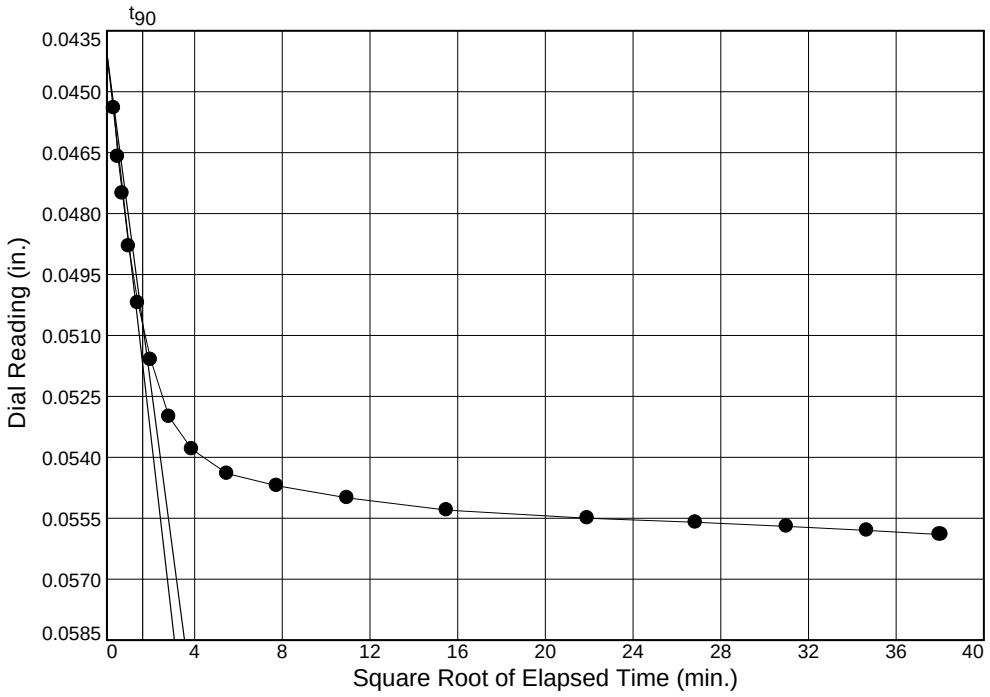
C_v @ T_{90}
0.632 ft.^{2}/day

Figure 4

Dial Reading vs. Time

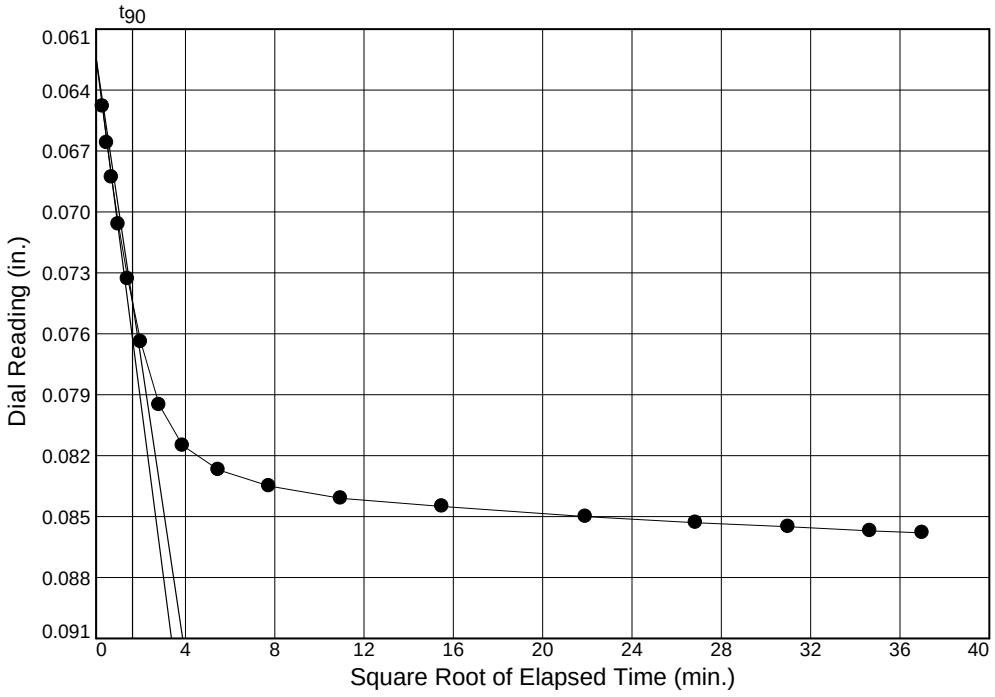
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0441
D_{90} = 0.0507
D_{100} = 0.0515
T_{90} = 2.67 min.

C_v @ T_{90}
0.628 ft.^{2}/day

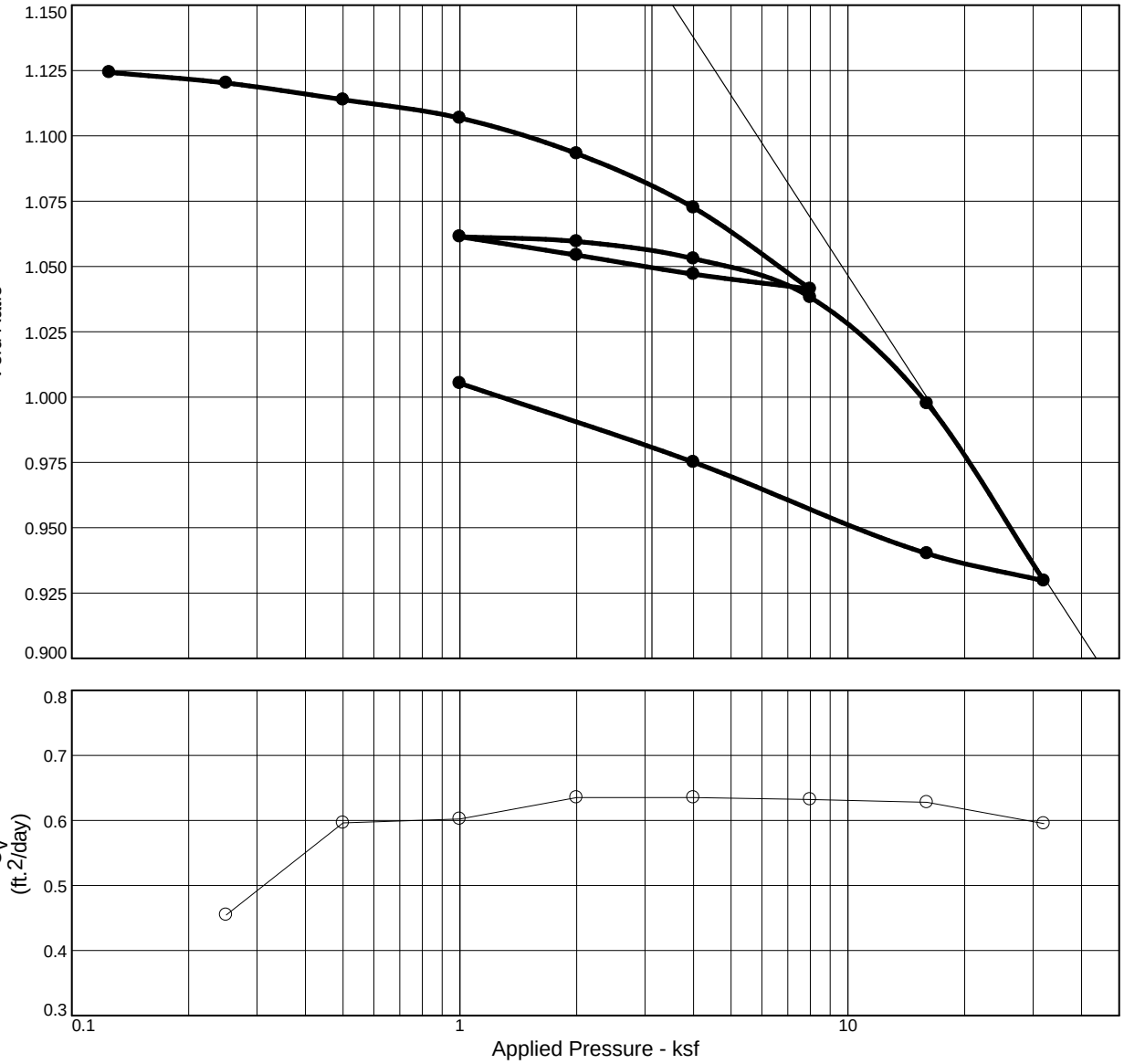


Load No.= 15
Load= 32.00 ksf
D_0 = 0.0624
D_{90} = 0.0745
D_{100} = 0.0758
T_{90} = 2.66 min.

C_v @ T_{90}
0.595 ft.^{2}/day

Figure 5

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
99.4 %	39.3 %	83.6	84	54	2.843		8.2	0.23	0.03	1.124

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY (CH), brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A **Depth:** 6-7.7 ft **Sample Number:** UD-01

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1323. ATM D2435.

Figure 1

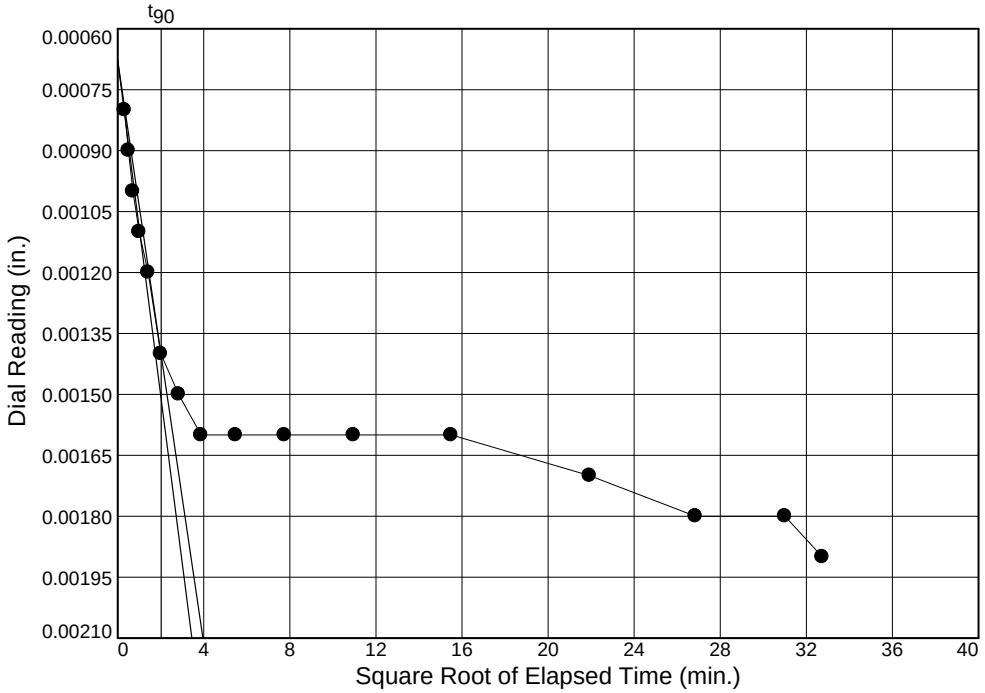
Tested By: Victoria Igoe **Checked By:** Jason Reeves

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Dial Reading vs. Time

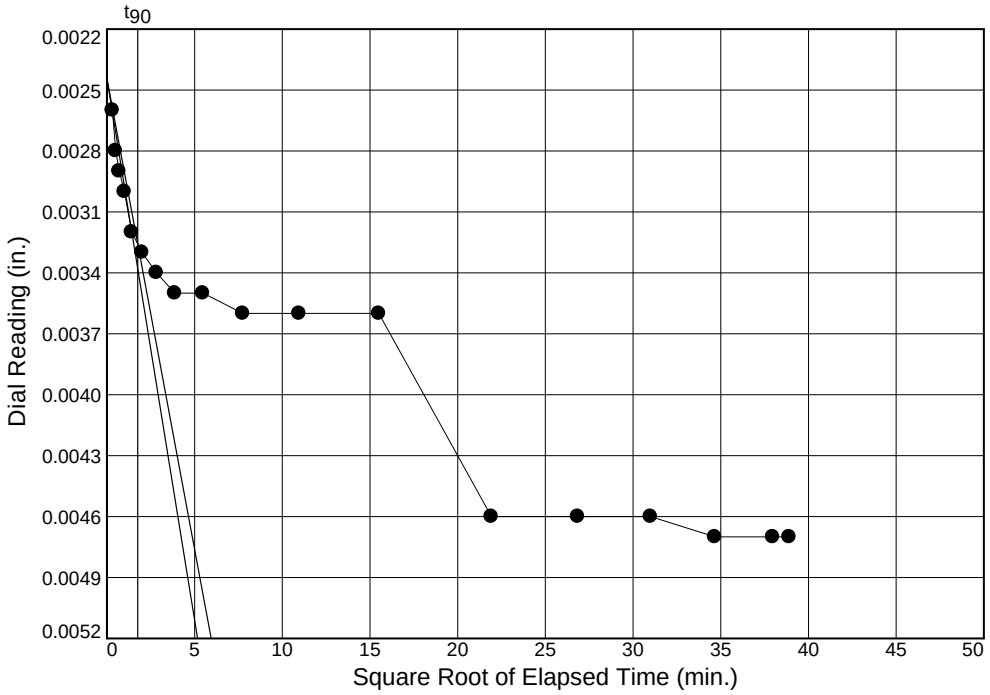
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



Load No.= 2
Load= 0.25 ksf
D_0 = 0.0007
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0.455 ft.^{2}/day



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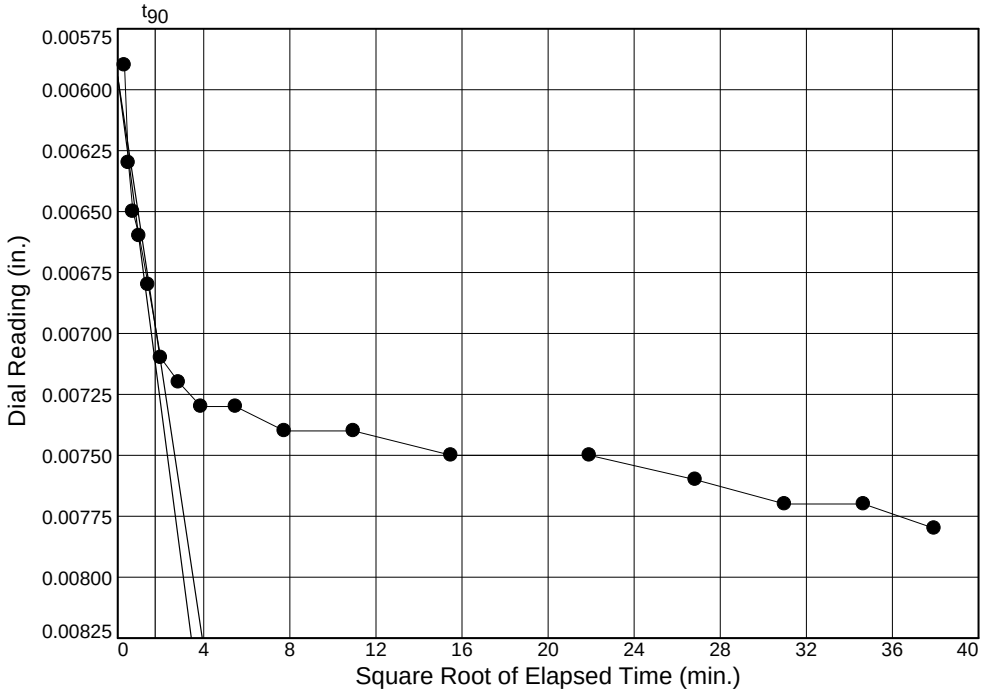
C_v @ T_{90}
0.596 ft.^{2}/day

Figure 2

Dial Reading vs. Time

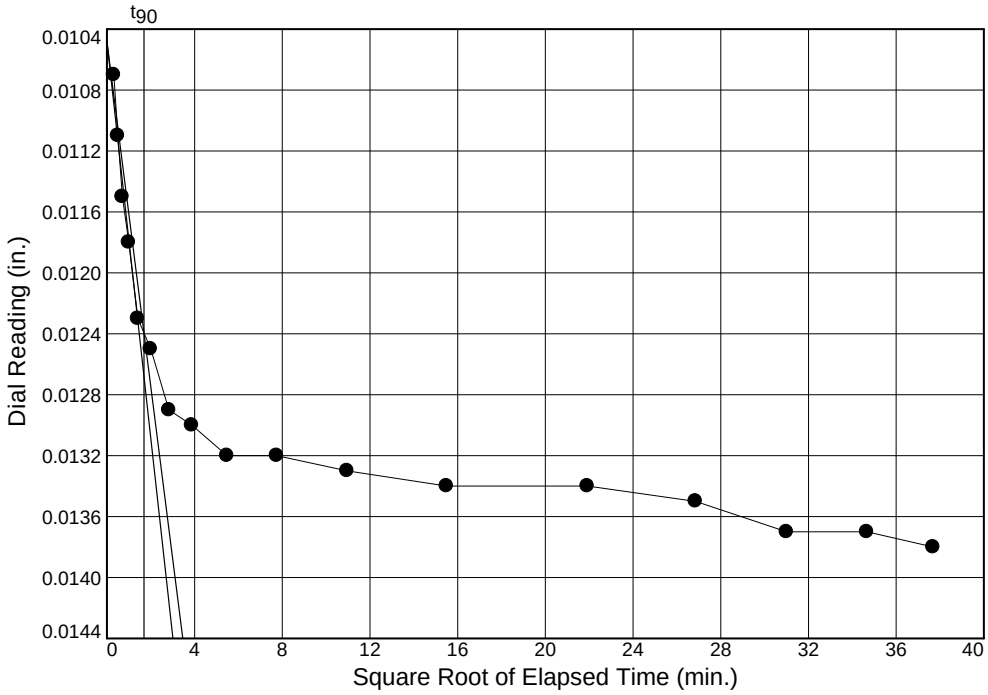
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



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D_{100} = 0.0071
T_{90} = 3.04 min.

C_v @ T_{90}
0.602 ft.^{2}/day



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Load= 2.00 ksf
D_0 = 0.0105
D_{90} = 0.0124
D_{100} = 0.0126
T_{90} = 2.85 min.

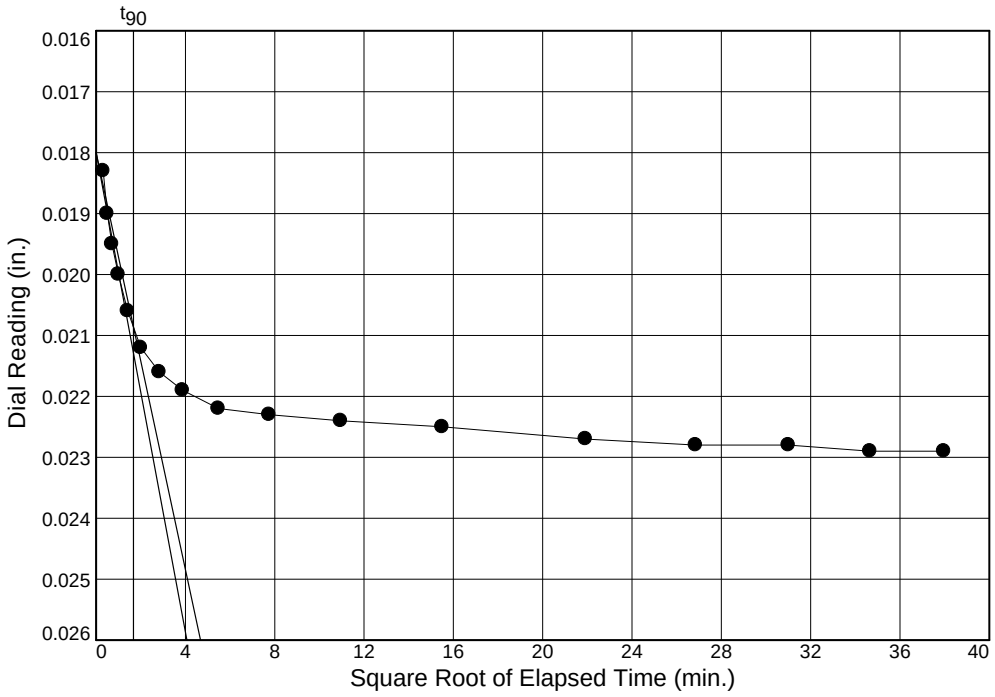
C_v @ T_{90}
0.635 ft.^{2}/day

Figure 3

Dial Reading vs. Time

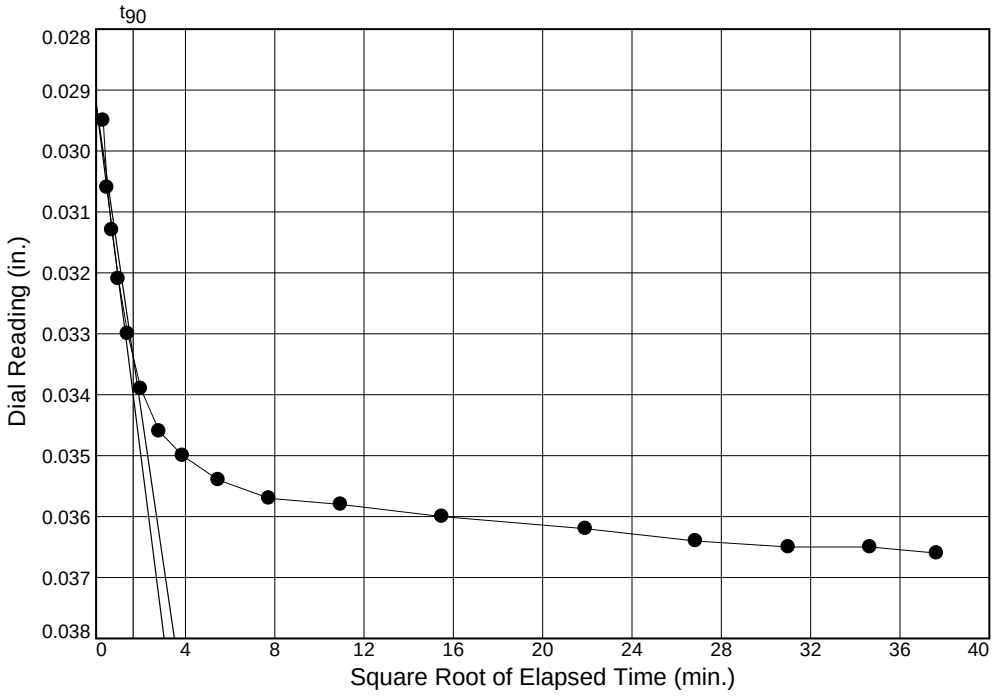
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



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0.635 ft.^{2}/day



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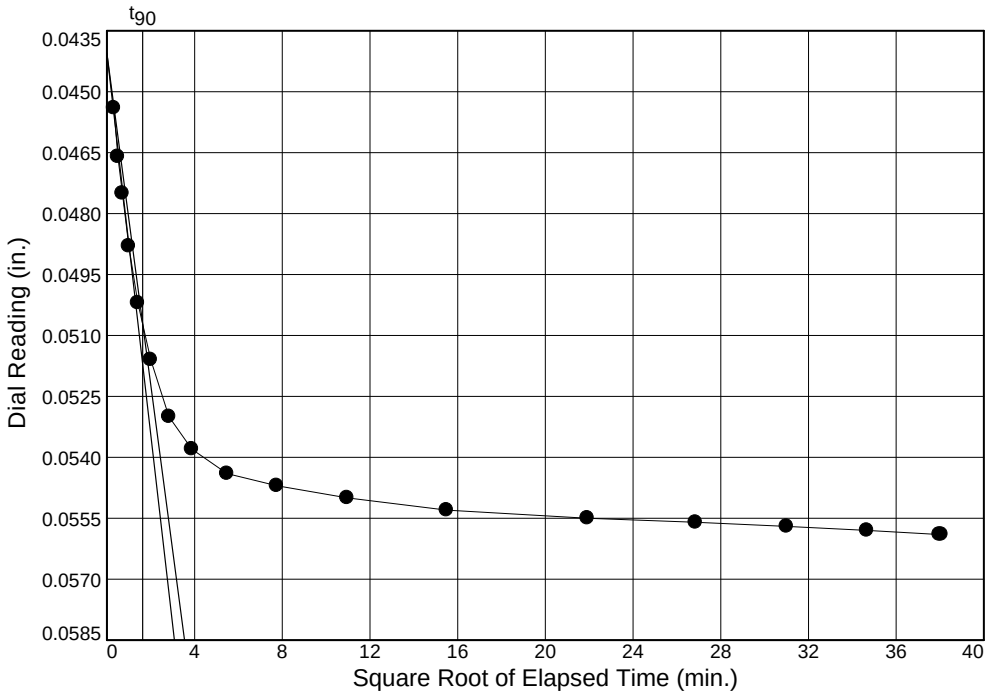
C_v @ T_{90}
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Figure 4

Dial Reading vs. Time

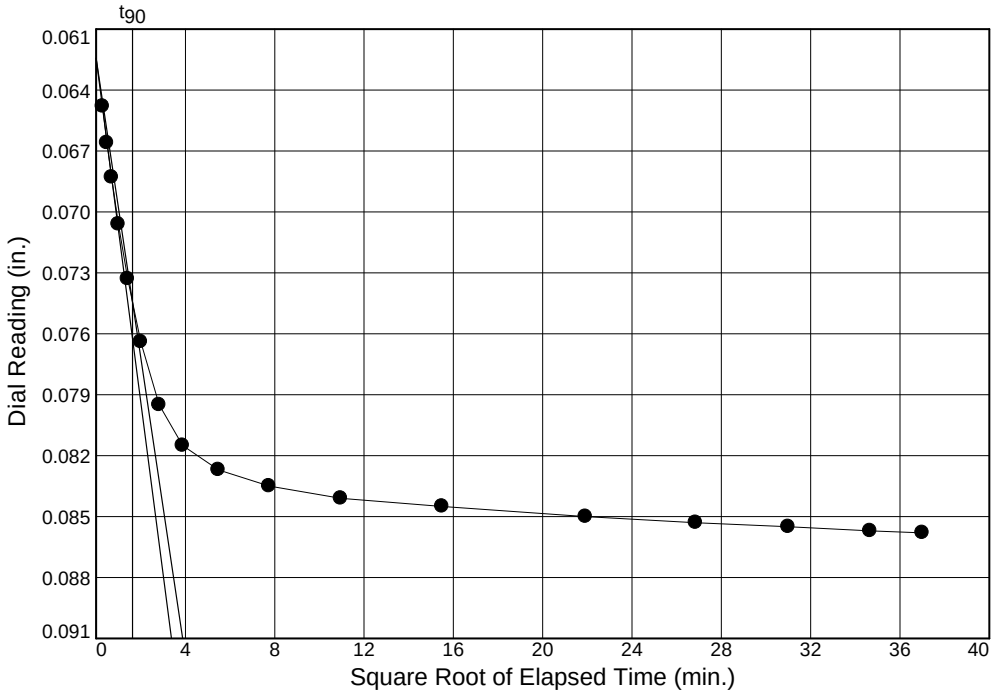
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-04A Depth: 6-7.7 ft Sample Number: UD-01



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D_{100} = 0.0515
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C_v @ T_{90}
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Load No.= 15
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T_{90} = 2.66 min.

C_v @ T_{90}
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Figure 5

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

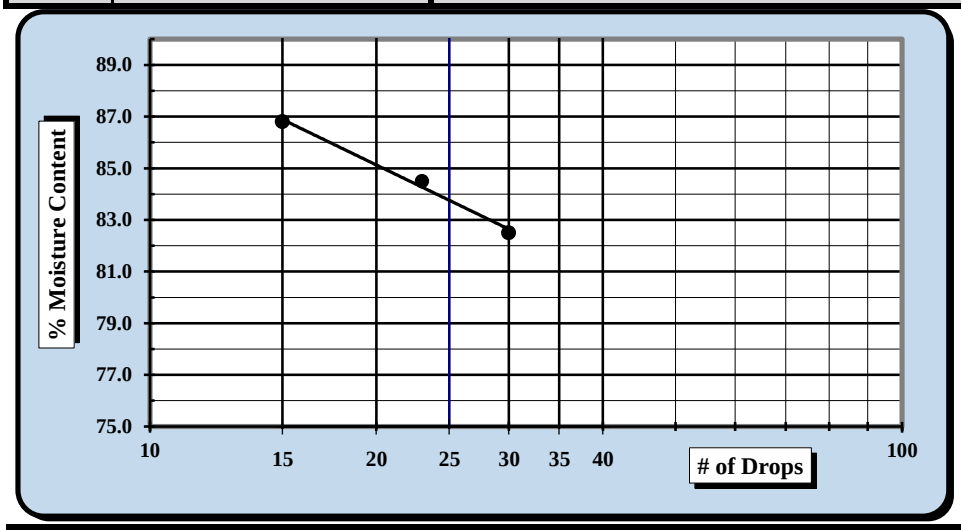
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/11/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-06	Sample #: SS-06	Sample Date: 1/29/2025
Log #:	43-25-007		Depth: 18.5-20 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	16	14	12				B5	8	
A	Tare Weight	15.62	15.47	15.56				15.93	15.48	
B	Wet Soil Weight + A	24.27	23.46	24.73				23.81	24.14	
C	Dry Soil Weight + A	20.36	19.80	20.47				22.05	22.19	
D	Water Weight (B-C)	3.91	3.66	4.26				1.76	1.95	
E	Dry Soil Weight (C-A)	4.74	4.33	4.91				6.12	6.71	
F	% Moisture (D/E)*100	82.5%	84.5%	86.8%				28.8%	29.1%	
N	# OF DROPS	30	23	15				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.0%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**84**
Plastic Limit	**29**
Plastic Index	**55**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe	3/12/2025	Tyler Copeman	3/18/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-07A	Sample #: UD-01	Sample Date: 1/29/2025
Log #:	43-25-007		Depth: 18-20 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B4	A3	A6				B2	21	
A	Tare Weight	15.72	15.91	15.73				15.90	15.53	
B	Wet Soil Weight + A	29.04	31.52	32.68				24.88	24.48	
C	Dry Soil Weight + A	24.01	25.40	25.84				22.69	22.28	
D	Water Weight (B-C)	5.03	6.12	6.84				2.19	2.20	
E	Dry Soil Weight (C-A)	8.29	9.49	10.11				6.79	6.75	
F	% Moisture (D/E)*100	60.7%	64.5%	67.7%				32.3%	32.6%	
N	# OF DROPS	30	21	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**63**
Plastic Limit	**32**
Plastic Index	**31**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

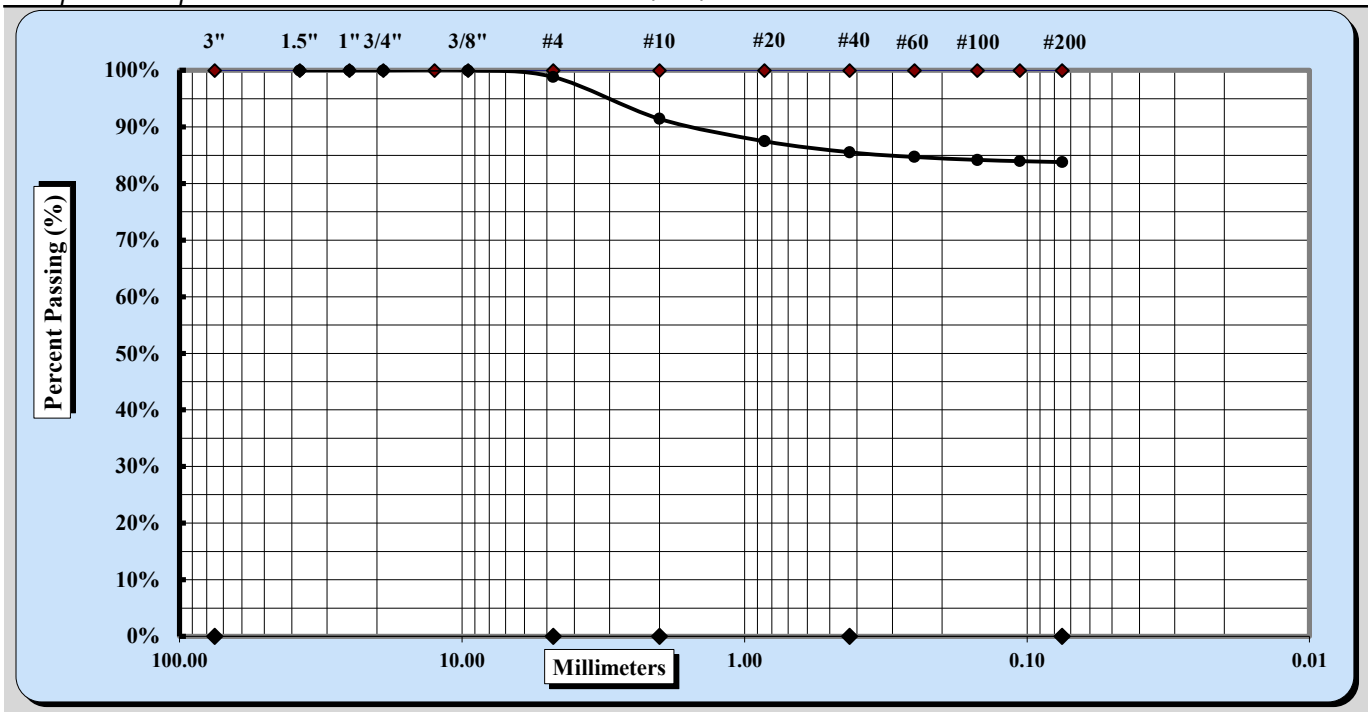
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Sieve Analysis of Soils

Quality Assurance | *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-07A	Type: UD	Sample Date:	1/29/2025
Sample Log No.: 43-25-007	Sample: UD-01	Depth:	18-20 ft
Sample Description:	ELASTIC SILT WITH SAND (MH), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	3/8"	Coarse Sand	7%	Fine Sand	2%
Gravel	1%	Medium Sand	6%	Silt & Clay	84%
Liquid Limit:	63	Plastic Limit:	32	Plastic Index:	31

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☐ Soft ☐ Weathered & Friable ☒

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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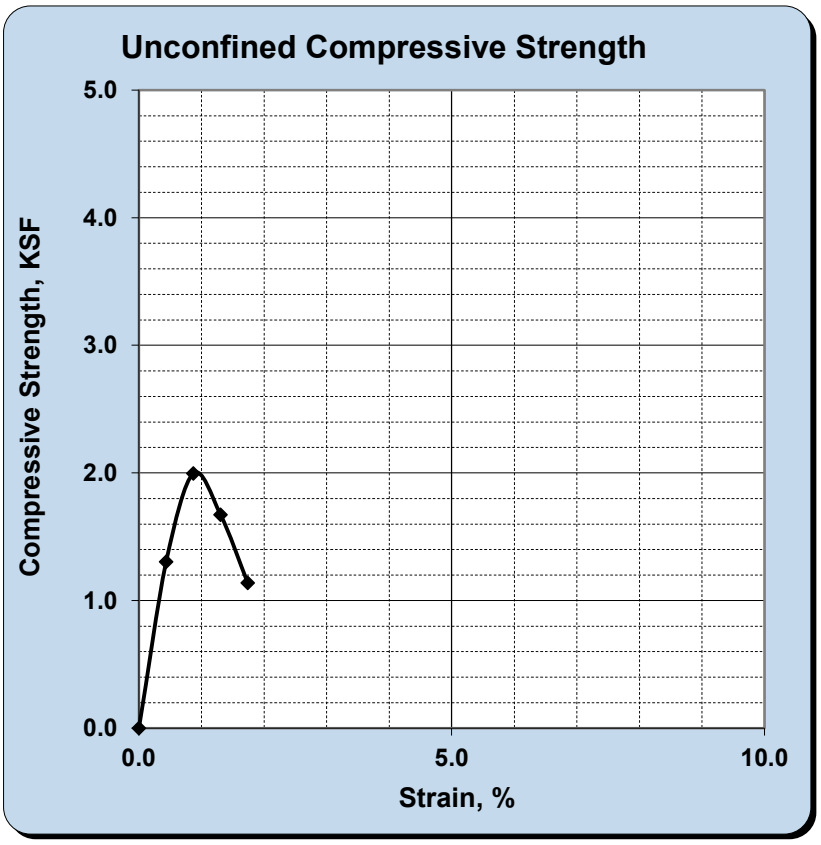
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/8/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-07A Sample No. UD-01	Sample Date:	1/29/2025
		Depth:	18-20 ft
Sample Description:	ELASTIC SILT WITH SAND (MH), brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 74.9 pcf
Initial Water Content: 44.9%
Unconfined Compressive Strength, q_u: **1.995** KSF
Undrained Shear Strength, s_u: **0.998** KSF

Liquid Limit: 63
Plasticity Index: 31
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.84
Strain at Failure: 0.9

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

3/25/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: A-07A
Depth: 18-20 ft **Sample Number:** UD-01
Material Description: ELASTIC SILT WITH SAND (MH), brown
Liquid Limit: 63 **Plasticity Index:** 31
USCS: MH
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1322. ASTM D2435.
Tested by: Victoria Igoe **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	203.56 g.	Spec. Gr. =	2.799	Wet w+t =	612.31 g.
Dry w+t =	136.82 g.	Est. Ht. Solids =	0.370 in.	Dry w+t =	577.23 g.
Tare Wt. =	8.22 g.	Init. V.R. =	1.513	Tare Wt. =	494.36 g.
Moisture =	51.9 %	Init. Sat. =	96.0 %	Moisture =	42.3 %
UNIT WEIGHT		**TEST START**		Dry Wt. =	82.87 g.
Height =	0.930 in.	Height =	0.930 in.		
Diameter =	2.501 in.	Diameter =	2.501 in.		
Weight =	126.67 g.				
Dry Dens. =	69.5 pcf				

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00000		0.00000			1.513	
0.13	0.00650	0.00360	0.00290			1.505	0.3 Comprs.
0.25	0.00290	0.00090	0.00200	1.371		1.508	0.2 Comprs.
0.50	0.00480	0.00190	0.00290	1.361		1.505	0.3 Comprs.
1.00	0.00950	0.00290	0.00660	2.765		1.495	0.7 Comprs.
2.00	0.01530	0.00410	0.01120	2.153		1.483	1.2 Comprs.
4.00	0.02530	0.00510	0.02020	1.959		1.459	2.2 Comprs.
8.00	0.04410	0.00600	0.03810	1.742		1.410	4.1 Comprs.
4.00	0.04290	0.00580	0.03710			1.413	4.0 Comprs.
2.00	0.04140	0.00520	0.03620			1.416	3.9 Comprs.
1.00	0.03950	0.00510	0.03440			1.420	3.7 Comprs.
2.00	0.04010	0.00530	0.03480			1.419	3.7 Comprs.
4.00	0.04190	0.00550	0.03640			1.415	3.9 Comprs.
8.00	0.04640	0.00590	0.04050			1.404	4.4 Comprs.
16.00	0.09260	0.00720	0.08540	1.580		1.283	9.2 Comprs.
32.00	0.19110	0.00920	0.18190	0.991		1.022	19.5 Comprs.
16.00	0.18790	0.00850	0.17940			1.029	19.3 Comprs.
4.00	0.17620	0.00590	0.17030			1.053	18.3 Comprs.
1.00	0.16570	0.00500	0.16070			1.079	17.3 Comprs.

TEST RESULTS SUMMARY

Compression index (C_c), ksf = 0.86 **Preconsolidation pressure (P_p), ksf =** 12.3 **Void ratio at P_p (e_m) =** 1.347

Recompression index (C_r) = 0.02

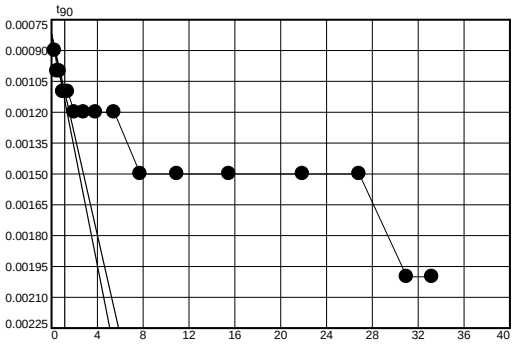
Pressure: 0.13 ksf — **TEST READINGS** — **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	0.00000
2	0.1000	0.0062
3	0.2500	0.0063
4	0.5000	0.0063
5	1.0000	0.0065
6	2.0167	0.0065

Void Ratio = 1.505 **Compression =** 0.3%

Pressure: 0.25 ksf — **TEST READINGS** — **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.00000	11	60.0667	0.0024
2	0.0833	0.0018	12	120.1500	0.0024
3	0.2500	0.0019	13	240.3167	0.0024
4	0.5000	0.0019	14	480.6333	0.0024
5	1.0000	0.0020	15	720.9500	0.0024
6	2.0000	0.0020	16	961.2833	0.0029
7	4.0000	0.0021	17	1102.1667	0.0029
8	8.0000	0.0021			
9	15.0167	0.0021			
10	30.0333	0.0021			

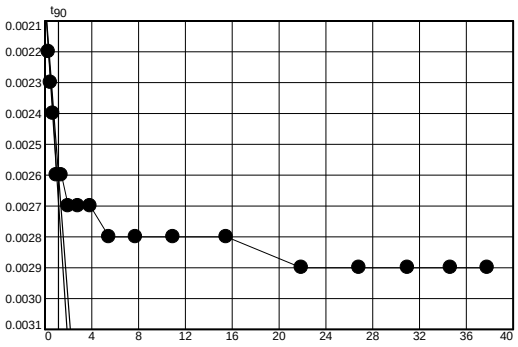


Void Ratio = 1.508 **Compression =** 0.2%

D_0 = 0.0008 **D_{90} =** 0.0011 **D_{100} =** 0.0011 **C_v at 1.34 min. =** 1.371 ft.^{2}/day

Pressure: 0.50 ksf — **TEST READINGS** — **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0029	11	60.0833	0.0047
2	0.1000	0.0041	12	120.1667	0.0047
3	0.2500	0.0042	13	240.3167	0.0047
4	0.5000	0.0043	14	480.6333	0.0048
5	1.0000	0.0045	15	720.9667	0.0048
6	2.0000	0.0045	16	961.2833	0.0048
7	4.0000	0.0046	17	1201.6000	0.0048
8	8.0167	0.0046	18	1429.4167	0.0048
9	15.0167	0.0046			
10	30.0500	0.0047			

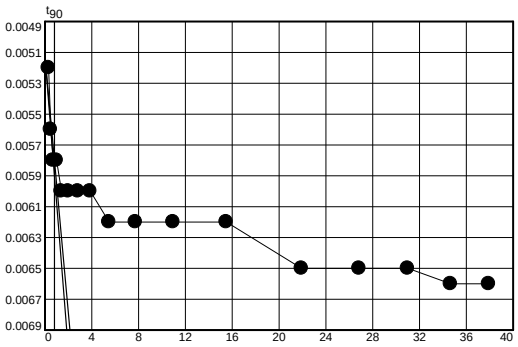


Void Ratio = 1.505 **Compression =** 0.3%

D_0 = 0.0020 **D_{90} =** 0.0026 **D_{100} =** 0.0027 **C_v at 1.34 min. =** 1.361 ft.^{2}/day

Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0048	11	60.0500	0.0091
2	0.1000	0.0081	12	120.1333	0.0091
3	0.2500	0.0085	13	240.2833	0.0091
4	0.5000	0.0087	14	480.6000	0.0094
5	1.0000	0.0087	15	720.9333	0.0094
6	2.0000	0.0089	16	961.2500	0.0094
7	4.0000	0.0089	17	1201.5667	0.0095
8	8.0000	0.0089	18	1438.2500	0.0095
9	15.0000	0.0089			
10	30.0000	0.0091			

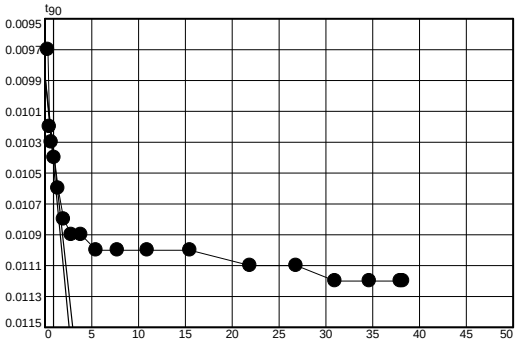


Void Ratio = 1.495 **Compression =** 0.7%

D_0 = 0.0051 **D_{90} =** 0.0058 **D_{100} =** 0.0059 **C_v at 0.66 min. =** 2.765 ft.^{2}/day

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0095	11	60.0833	0.0151
2	0.1000	0.0138	12	120.1667	0.0151
3	0.2500	0.0143	13	240.3167	0.0151
4	0.5000	0.0144	14	480.6333	0.0152
5	1.0000	0.0145	15	720.9667	0.0152
6	2.0000	0.0147	16	961.2833	0.0153
7	4.0167	0.0149	17	1201.6000	0.0153
8	8.0167	0.0150	18	1441.9333	0.0153
9	15.0167	0.0150	19	1461.7333	0.0153
10	30.0500	0.0151			

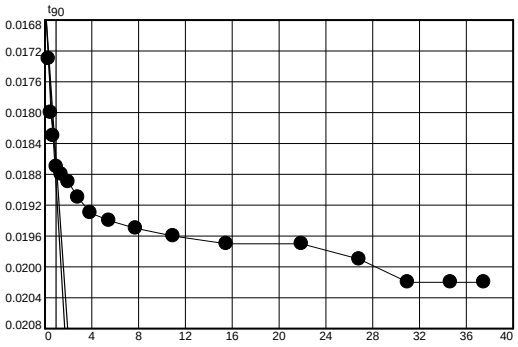


Void Ratio = 1.483 **Compression =** 1.2%

D_0 = 0.0099 **D_{90} =** 0.0104 **D_{100} =** 0.0104 **C_v at 0.84 min. =** 2.153 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0153	11	60.0667	0.0246
2	0.1000	0.0224	12	120.1333	0.0247
3	0.2500	0.0231	13	240.3000	0.0248
4	0.5000	0.0234	14	480.6167	0.0248
5	1.0000	0.0238	15	720.9333	0.0250
6	2.0000	0.0239	16	961.2500	0.0253
7	4.0000	0.0240	17	1201.5667	0.0253
8	8.0000	0.0242	18	1406.5167	0.0253
9	15.0167	0.0244			
10	30.0333	0.0245			

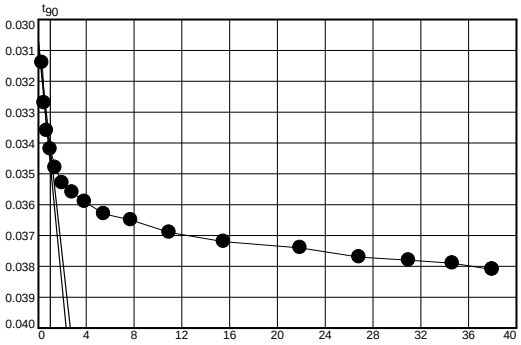


Void Ratio = 1.459 **Compression =** 2.2%

D_0 = 0.0165 **D_{90} =** 0.0186 **D_{100} =** 0.0189 **C_v at 0.91 min. =** 1.959 ft.^{2}/day

Pressure: 8.00 ksf **TEST READINGS** **Load No. 7**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0253	11	60.0833	0.0425
2	0.1000	0.0374	12	120.1667	0.0429
3	0.2500	0.0387	13	240.3167	0.0432
4	0.5000	0.0396	14	480.6333	0.0434
5	1.0000	0.0402	15	720.9500	0.0437
6	2.0000	0.0408	16	961.2667	0.0438
7	4.0000	0.0413	17	1201.6000	0.0439
8	8.0167	0.0416	18	1441.9167	0.0441
9	15.0167	0.0419	19	1444.5667	0.0441
10	30.0500	0.0423			



Void Ratio = 1.410 **Compression =** 4.1%

D_0 = 0.0307 **D_{90} =** 0.0342 **D_{100} =** 0.0346 **C_v at 0.99 min. =** 1.742 ft.^{2}/day

Pressure: 4.00 ksf **TEST READINGS** **Load No. 8**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0441	11	60.0833	0.0431
2	0.1000	0.0431	12	120.1667	0.0431
3	0.2500	0.0431	13	240.3333	0.0431
4	0.5000	0.0431	14	480.6500	0.0429
5	1.0000	0.0431	15	720.9667	0.0429
6	2.0000	0.0431	16	961.3000	0.0429
7	4.0000	0.0431	17	1201.6167	0.0429
8	8.0167	0.0431	18	1340.1167	0.0429
9	15.0167	0.0431			
10	30.0500	0.0431			

Void Ratio = 1.413 **Compression =** 4.0%

Pressure: 2.00 ksf **TEST READINGS** **Load No. 9**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0429	11	60.0833	0.0415
2	0.1000	0.0416	12	120.1667	0.0414
3	0.2500	0.0416	13	240.3167	0.0414
4	0.5000	0.0416	14	480.6333	0.0414
5	1.0000	0.0416	15	720.9667	0.0414
6	2.0000	0.0416	16	961.2833	0.0414
7	4.0000	0.0416	17	1201.6167	0.0414
8	8.0000	0.0415	18	1439.6167	0.0414
9	15.0167	0.0415			
10	30.0333	0.0415			

Void Ratio = 1.416 **Compression =** 3.9%

Pressure: 1.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0414	11	60.0833	0.0400
2	0.1000	0.0405	12	120.1667	0.0399
3	0.2500	0.0403	13	240.3333	0.0398
4	0.5000	0.0402	14	480.6500	0.0398
5	1.0000	0.0401	15	720.9667	0.0395
6	2.0000	0.0401	16	961.2833	0.0395
7	4.0000	0.0400	17	1201.6167	0.0395
8	8.0167	0.0400	18	1423.1500	0.0395
9	15.0167	0.0400			
10	30.0333	0.0400			

Void Ratio = 1.420 **Compression =** 3.7%

Pressure: 2.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0395	11	60.0667	0.0400
2	0.1000	0.0400	12	120.1500	0.0400
3	0.2500	0.0400	13	240.3167	0.0401
4	0.5000	0.0400	14	480.6333	0.0401
5	1.0000	0.0400	15	720.9667	0.0401
6	2.0000	0.0400	16	961.2833	0.0401
7	4.0000	0.0400	17	1201.6000	0.0401
8	8.0000	0.0400	18	1441.9333	0.0401
9	15.0167	0.0400	19	1449.3500	0.0401
10	30.0333	0.0400			

Void Ratio = 1.419 **Compression =** 3.7%

Pressure: 4.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0401	11	60.0667	0.0419
2	0.1000	0.0416	12	120.1500	0.0419
3	0.2500	0.0417	13	240.3167	0.0419
4	0.5000	0.0417	14	480.6333	0.0419
5	1.0000	0.0417	15	720.9500	0.0419
6	2.0000	0.0419	16	961.2667	0.0419
7	4.0000	0.0419	17	1201.5833	0.0419
8	8.0000	0.0419	18	1429.6500	0.0419
9	15.0167	0.0419			
10	30.0333	0.0419			

Void Ratio = 1.415 **Compression =** 3.9%

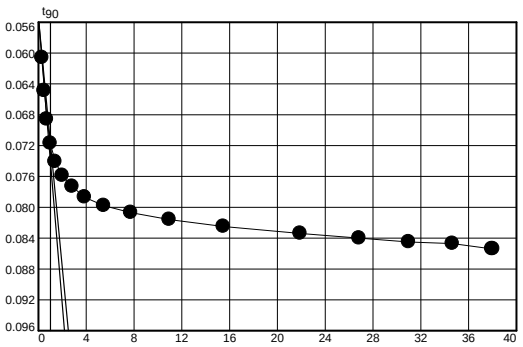
Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0419	11	60.0833	0.0456
2	0.1000	0.0445	12	120.1667	0.0457
3	0.2500	0.0447	13	240.3167	0.0459
4	0.5000	0.0448	14	480.6333	0.0459
5	1.0000	0.0449	15	720.9333	0.0461
6	2.0000	0.0450	16	961.2500	0.0461
7	4.0167	0.0453	17	1201.5667	0.0461
8	8.0167	0.0454	18	1441.8667	0.0464
9	15.0167	0.0456	19	1450.9500	0.0464
10	30.0500	0.0456			

Void Ratio = 1.404 **Compression =** 4.4%

Pressure: 16.00 ksf | **TEST READINGS** | **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0464	11	60.0833	0.0879
2	0.1000	0.0678	12	120.1667	0.0888
3	0.2500	0.0721	13	240.2167	0.0897
4	0.5000	0.0758	14	480.5333	0.0906
5	1.0000	0.0789	15	720.8500	0.0912
6	2.0000	0.0813	16	961.1500	0.0917
7	4.0167	0.0831	17	1201.4667	0.0919
8	8.0167	0.0845	18	1441.6000	0.0926
9	15.0167	0.0859	19	1448.1500	0.0926
10	30.0500	0.0870			

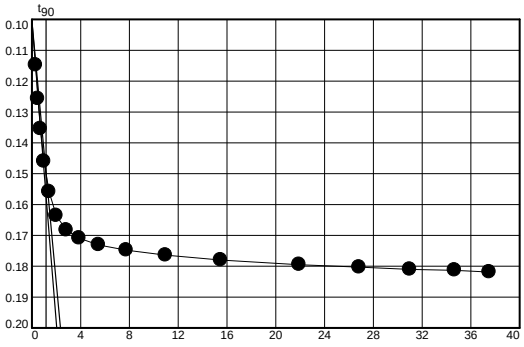


Void Ratio = 1.283 **Compression =** 9.2%

D_0 = 0.0554 **D_{90} =** 0.0717 **D_{100} =** 0.0735 **C_V at 1.01 min. =** 1.580 ft.^{2}/day

Pressure: 32.00 ksf | **TEST READINGS** | **Load No. 15**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0926	11	60.0667	0.1840
2	0.1000	0.1240	12	120.1500	0.1856
3	0.2500	0.1349	13	240.3000	0.1872
4	0.5000	0.1447	14	480.6167	0.1887
5	1.0000	0.1552	15	720.9167	0.1895
6	2.0000	0.1651	16	961.2333	0.1902
7	4.0000	0.1728	17	1201.5500	0.1905
8	8.0000	0.1775	18	1407.3167	0.1911
9	15.0167	0.1801			
10	30.0333	0.1823			



Void Ratio = 1.022 **Compression =** 19.5%

D_0 = 0.1005 **D_{90} =** 0.1500 **D_{100} =** 0.1554 **C_V at 1.36 min. =** 0.991 ft.^{2}/day

Pressure: 16.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1911	11	60.0667	0.1880
2	0.1000	0.1882	12	120.1500	0.1880
3	0.2500	0.1888	13	240.3167	0.1879
4	0.5000	0.1886	14	247.2833	0.1879
5	1.0000	0.1885			
6	2.0000	0.1882			
7	4.0000	0.1882			
8	8.0000	0.1882			
9	15.0167	0.1881			
10	30.0333	0.1881			

Void Ratio = 1.029 **Compression =** 19.3%

Pressure: 4.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1879	11	60.0333	0.1768
2	0.1000	0.1832	12	120.1000	0.1767
3	0.2500	0.1817	13	240.2500	0.1765
4	0.5000	0.1806	14	480.5667	0.1762
5	1.0000	0.1793	15	720.8667	0.1762
6	2.0000	0.1784	16	961.1833	0.1762
7	4.0000	0.1777	17	1179.2667	0.1762
8	8.0000	0.1774			
9	15.0167	0.1771			
10	30.0333	0.1769			

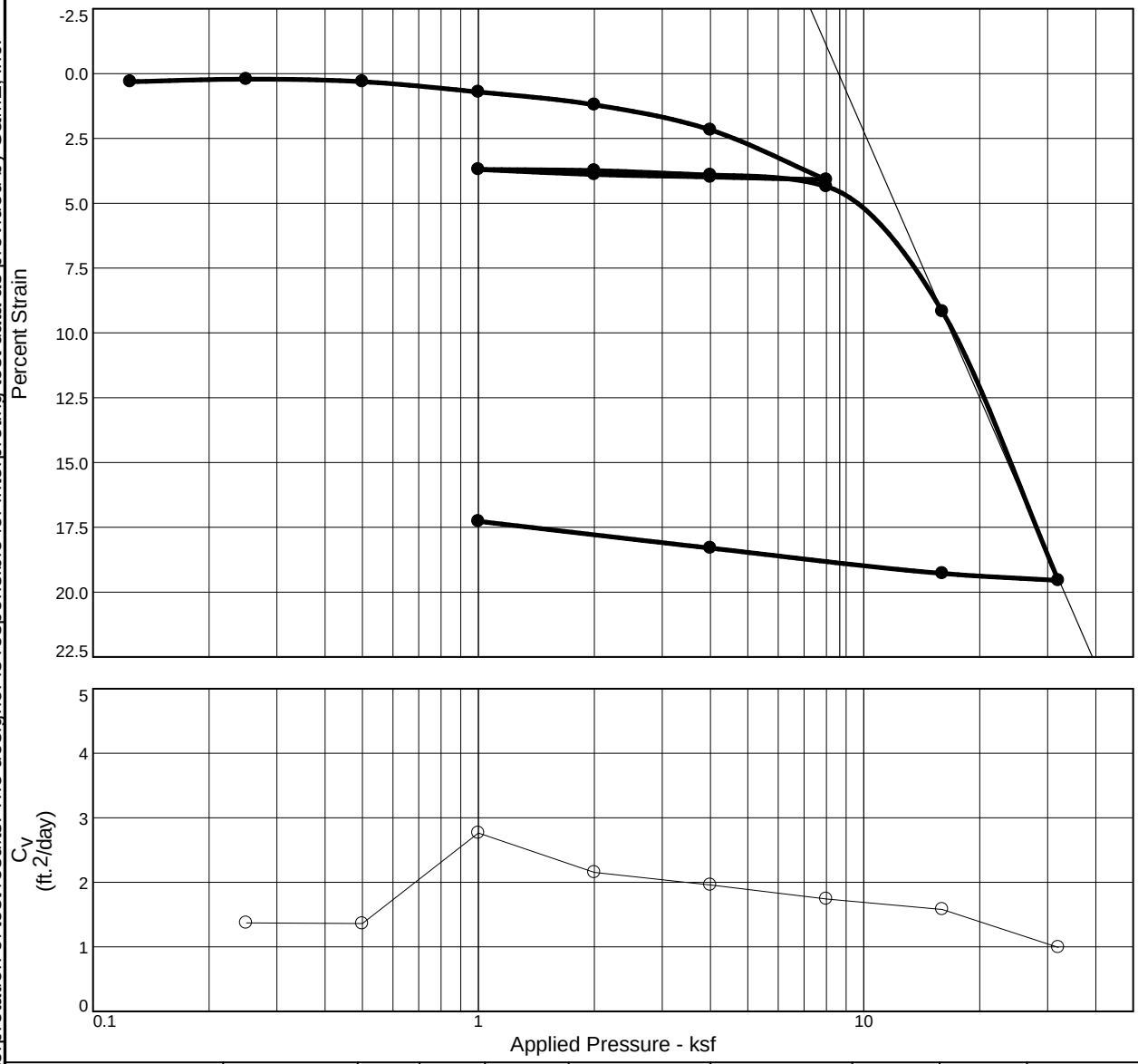
Void Ratio = 1.053 **Compression =** 18.3%

Pressure: 1.00 ksf	TEST READINGS	Load No. 18

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1762	11	60.0000	0.1671
2	0.1000	0.1744	12	120.0000	0.1667
3	0.2500	0.1736	13	239.9833	0.1664
4	0.5000	0.1727	14	479.9833	0.1662
5	1.0000	0.1717	15	719.9833	0.1659
6	2.0000	0.1704	16	959.9833	0.1659
7	4.0000	0.1693	17	1199.9667	0.1657
8	8.0000	0.1683	18	1439.9667	0.1657
9	15.0000	0.1678			
10	30.0000	0.1673			

Void Ratio = 1.079 **Compression =** 17.3%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
96.0 %	51.9 %	69.5	63	31	2.799		12.3	0.86	0.02	1.513

MATERIAL DESCRIPTION	USCS	AASHTO
ELASTIC SILT WITH SAND (MH), brown	MH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A **Depth:** 18-20 ft **Sample Number:** UD-01

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1322. ASTM D2435.

Figure 1

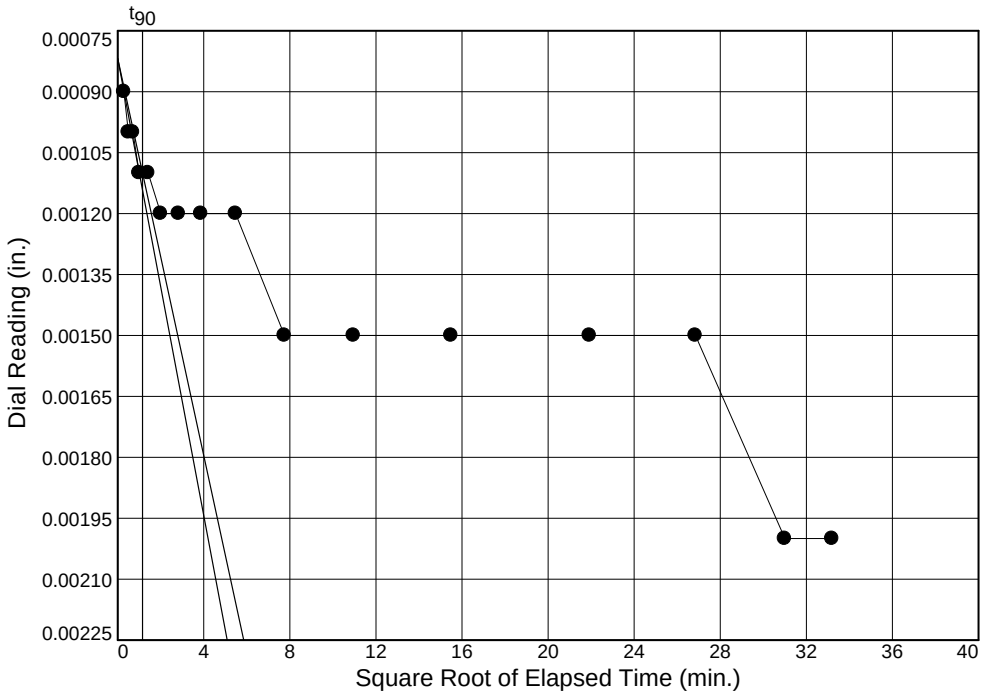
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

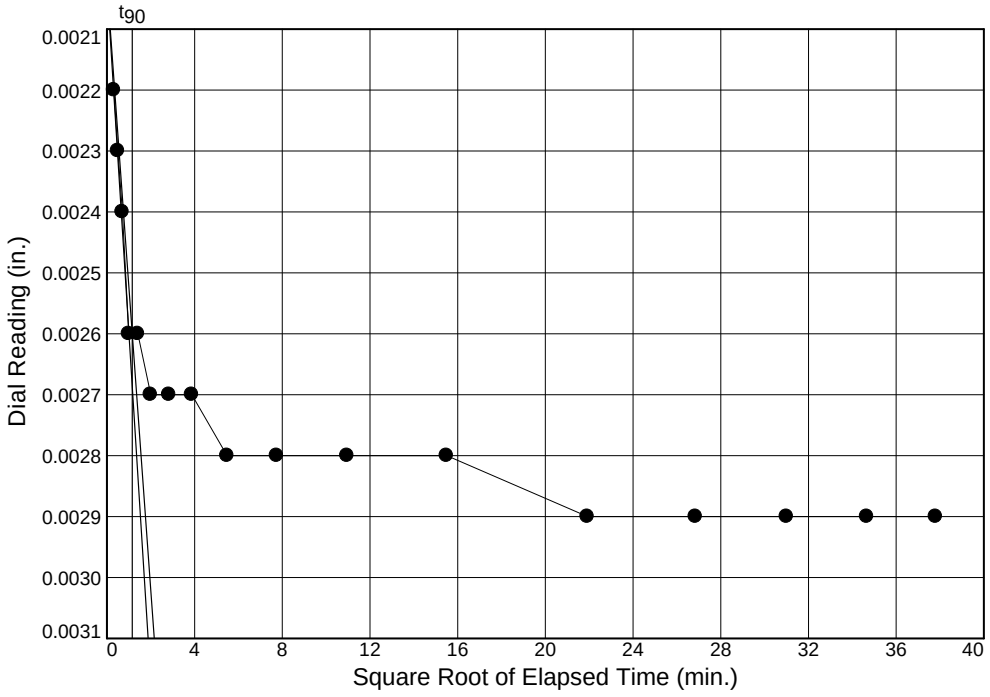
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 2
Load= 0.25 ksf
D_0 = 0.0008
D_{90} = 0.0011
D_{100} = 0.0011
T_{90} = 1.34 min.

C_v @ T_{90}
1.371 ft.^{2}/day



Load No.= 3
Load= 0.50 ksf
D_0 = 0.0020
D_{90} = 0.0026
D_{100} = 0.0027
T_{90} = 1.34 min.

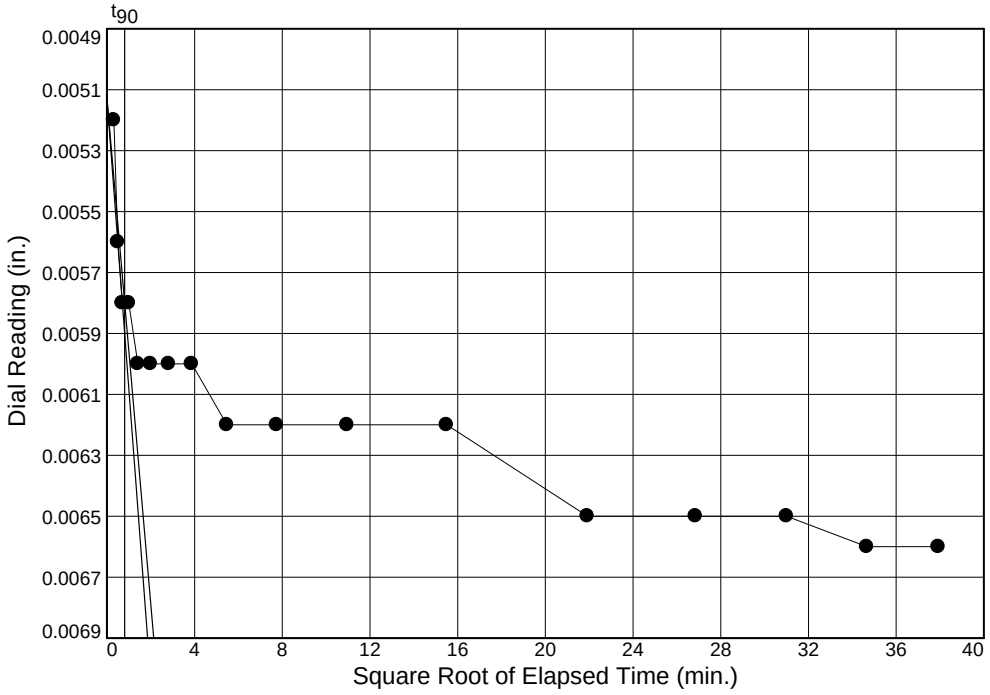
C_v @ T_{90}
1.361 ft.^{2}/day

Figure 2

Dial Reading vs. Time

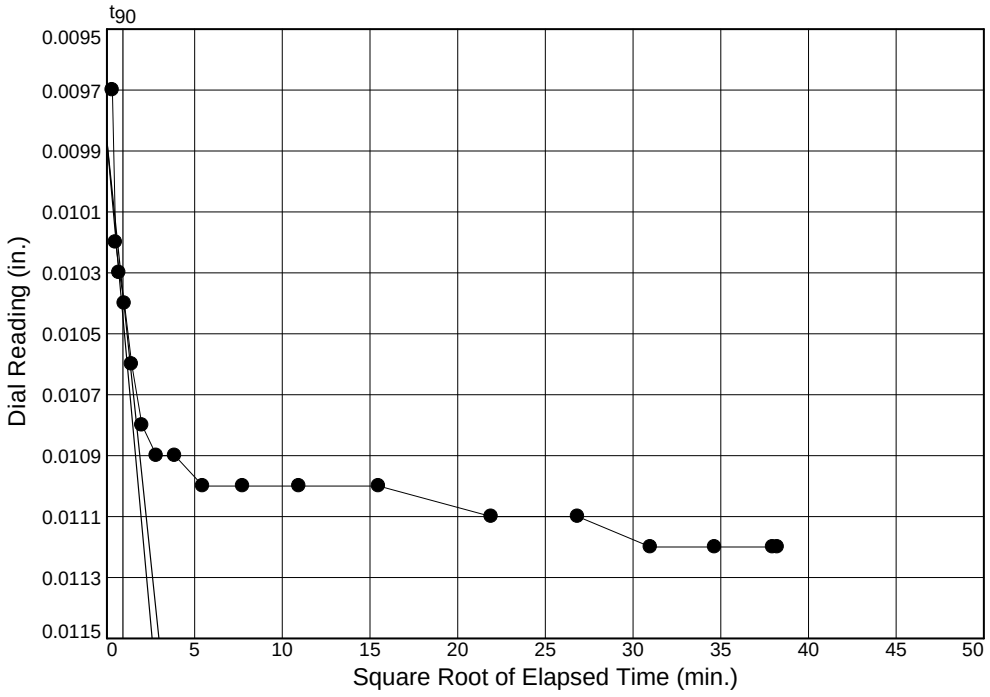
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0051
D_{90} = 0.0058
D_{100} = 0.0059
T_{90} = 0.66 min.

C_v @ T_{90}
2.765 ft.^{2}/day



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0099
D_{90} = 0.0104
D_{100} = 0.0104
T_{90} = 0.84 min.

C_v @ T_{90}
2.153 ft.^{2}/day

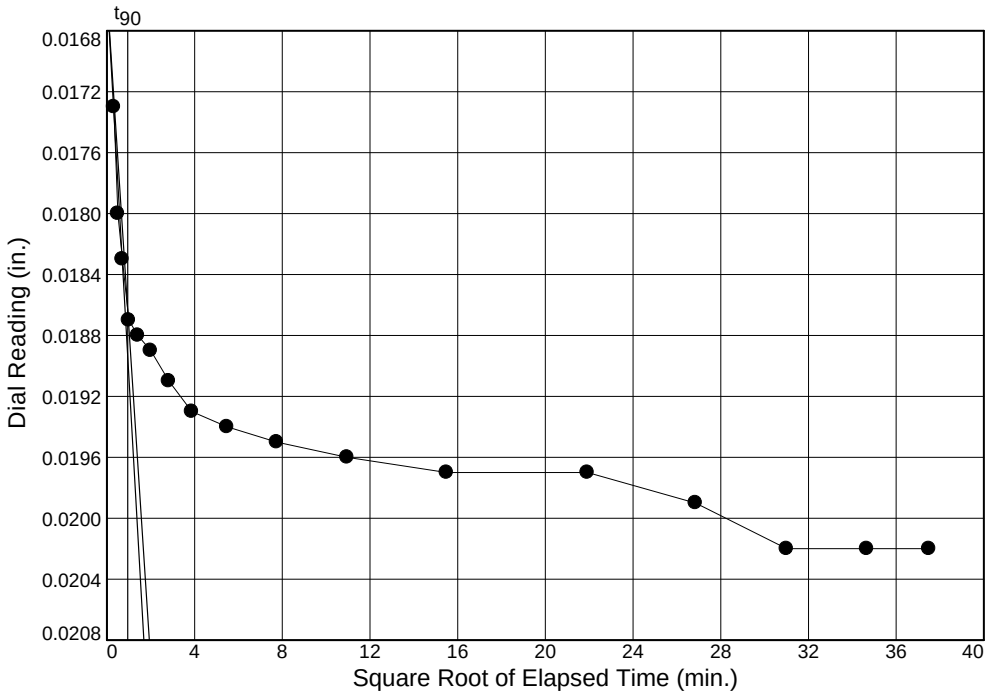
Figure 3

S & ME, Inc.

Dial Reading vs. Time

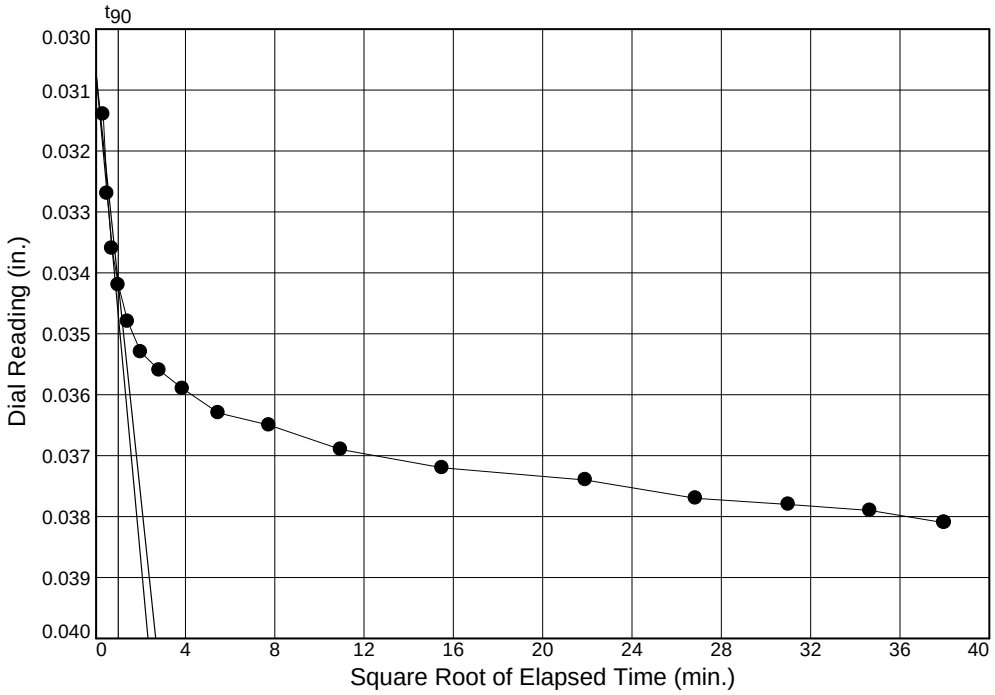
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0165
D_{90} = 0.0186
D_{100} = 0.0189
T_{90} = 0.91 min.

C_v @ T_{90}
1.959 ft.^{2}/day



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0307
D_{90} = 0.0342
D_{100} = 0.0346
T_{90} = 0.99 min.

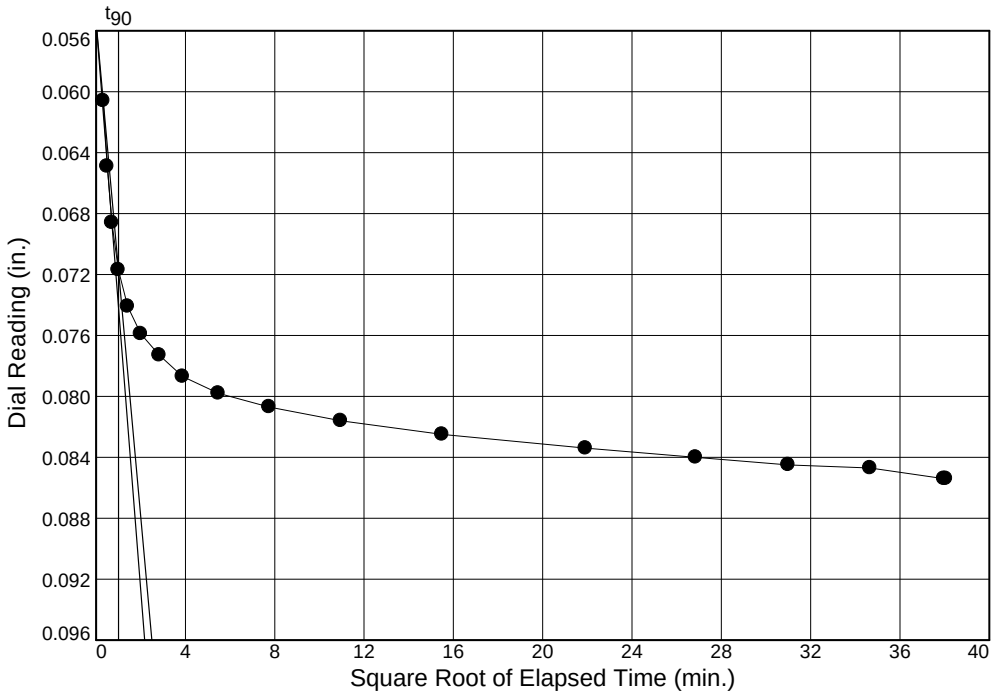
C_v @ T_{90}
1.742 ft.^{2}/day

Figure 4

Dial Reading vs. Time

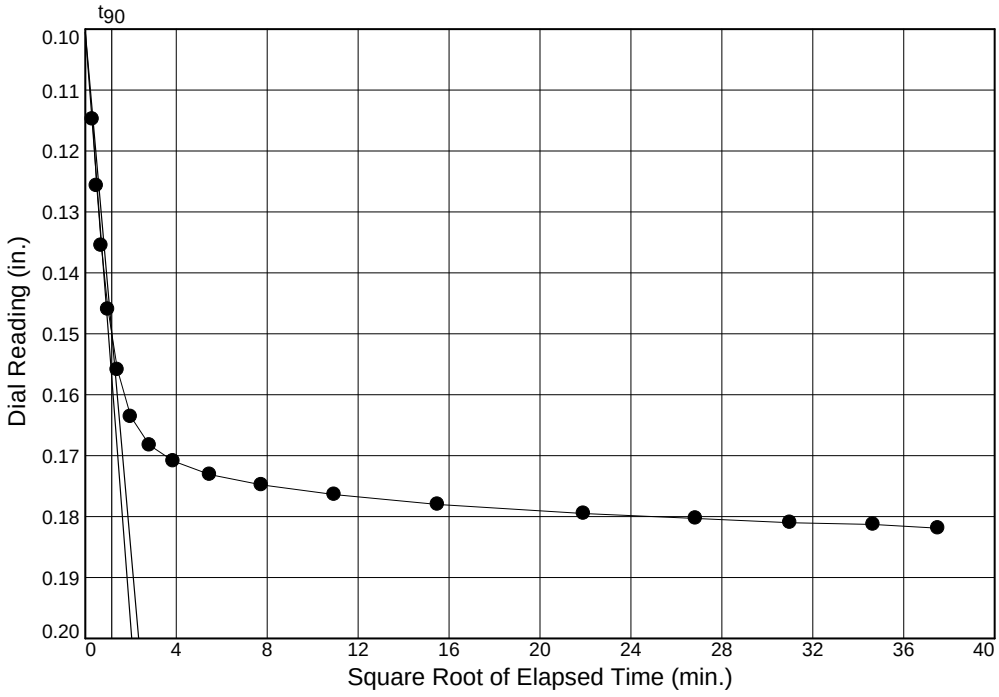
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0554
D_{90} = 0.0717
D_{100} = 0.0735
T_{90} = 1.01 min.

C_v @ T_{90}
1.580 ft.^{2}/day

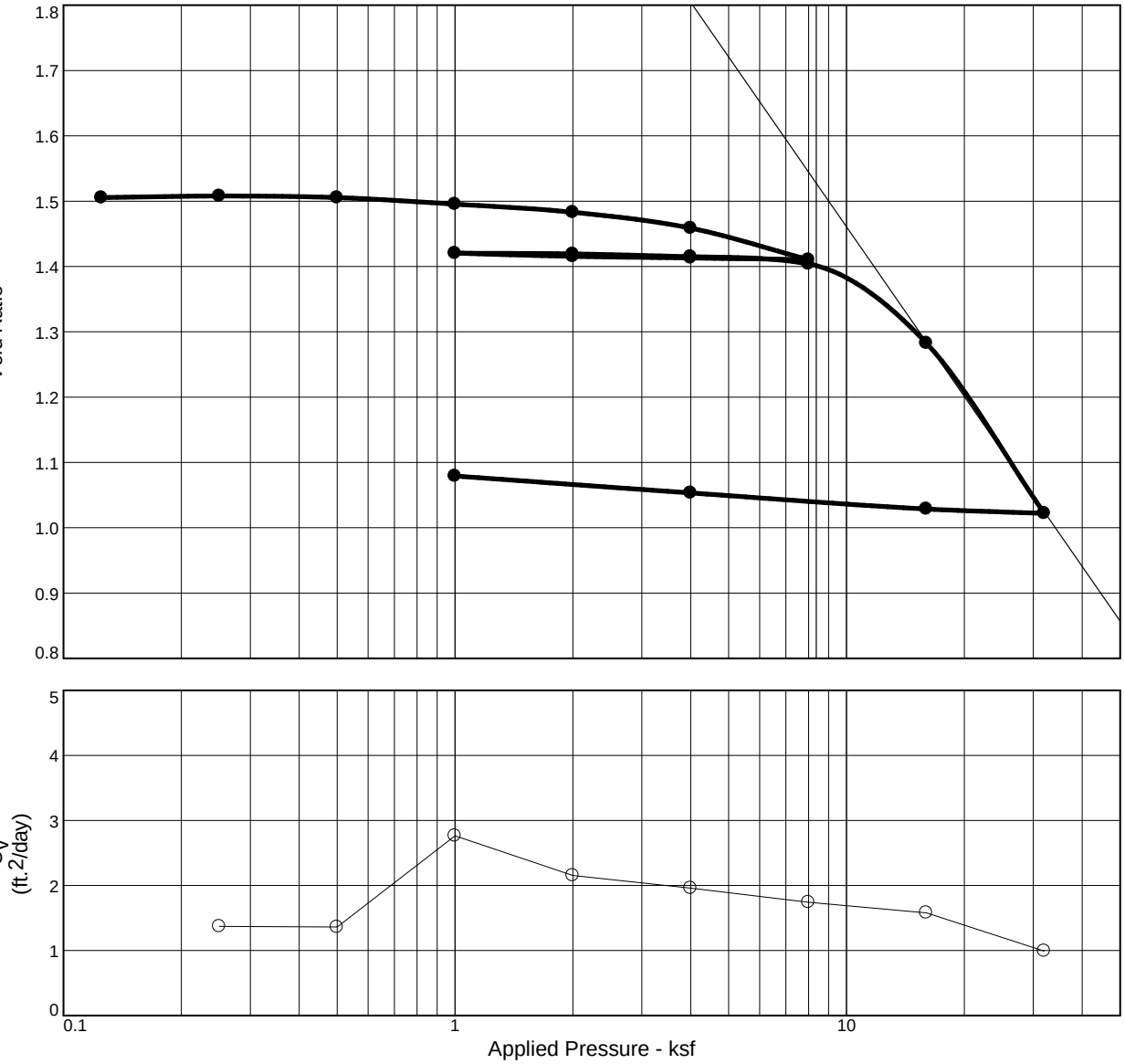


Load No.= 15
Load= 32.00 ksf
D_0 = 0.1005
D_{90} = 0.1500
D_{100} = 0.1554
T_{90} = 1.36 min.

C_v @ T_{90}
0.991 ft.^{2}/day

Figure 5

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
96.0 %	51.9 %	69.5	63	31	2.799		12.3	0.86	0.02	1.513

MATERIAL DESCRIPTION	USCS	AASHTO
ELASTIC SILT WITH SAND (MH), brown	MH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A **Depth:** 18-20 ft **Sample Number:** UD-01

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1322. ASTM D2435.

Figure 1

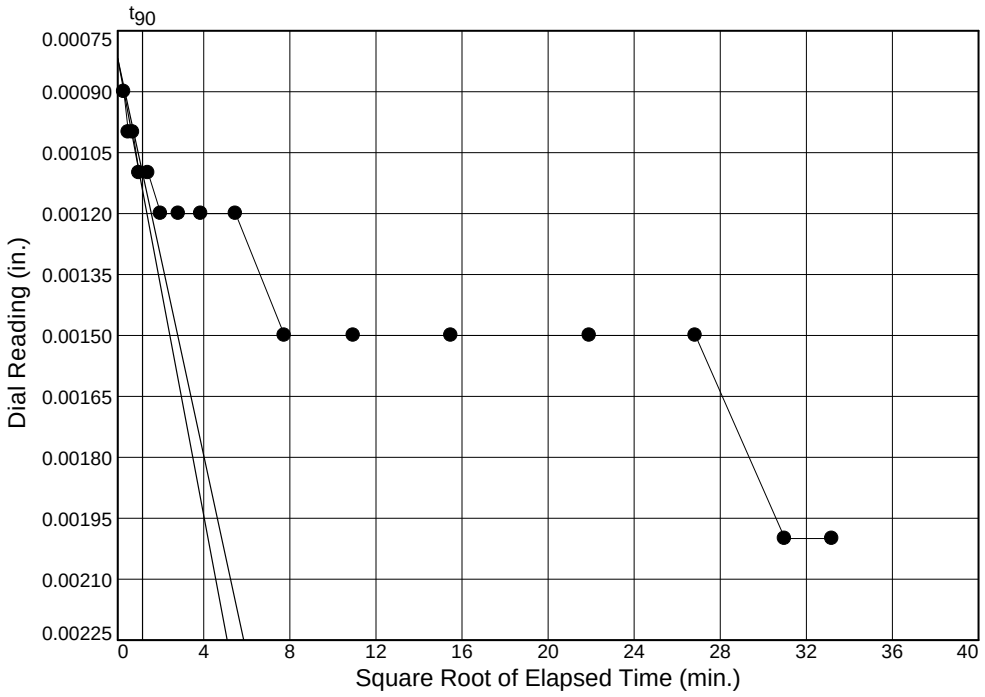
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

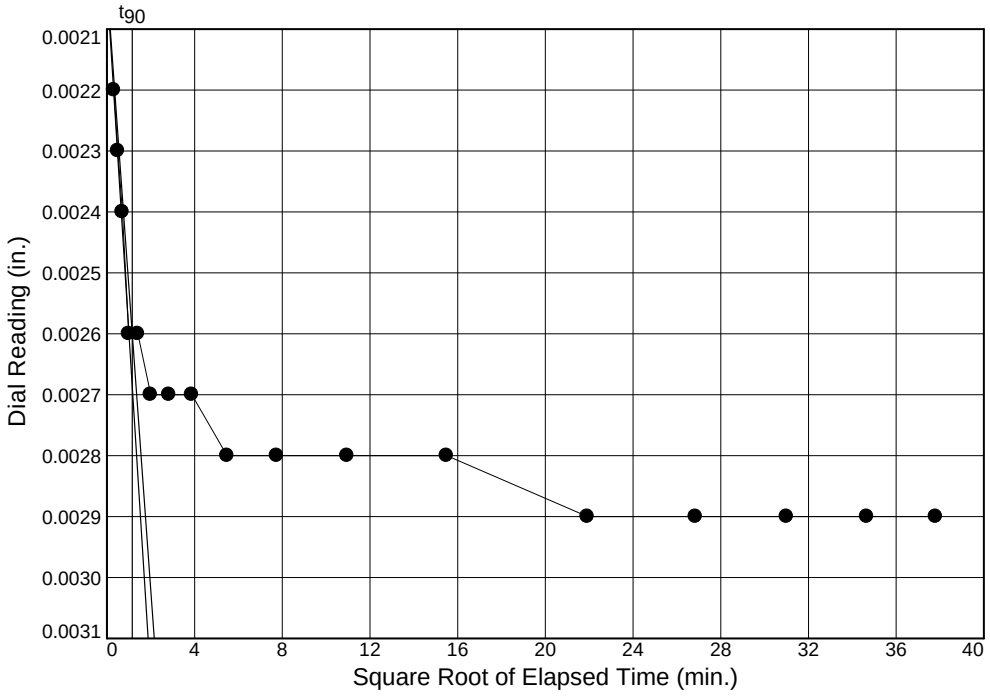
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 2
Load= 0.25 ksf
D_0 = 0.0008
D_{90} = 0.0011
D_{100} = 0.0011
T_{90} = 1.34 min.

C_v @ T_{90}
1.371 ft.^{2}/day



Load No.= 3
Load= 0.50 ksf
D_0 = 0.0020
D_{90} = 0.0026
D_{100} = 0.0027
T_{90} = 1.34 min.

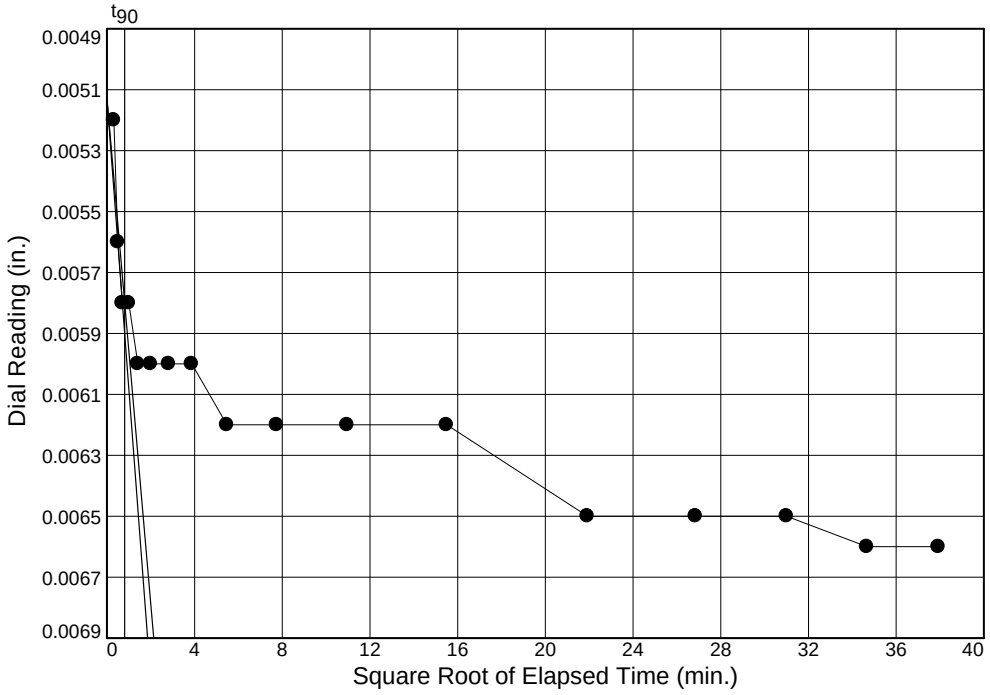
C_v @ T_{90}
1.361 ft.^{2}/day

Figure 2

Dial Reading vs. Time

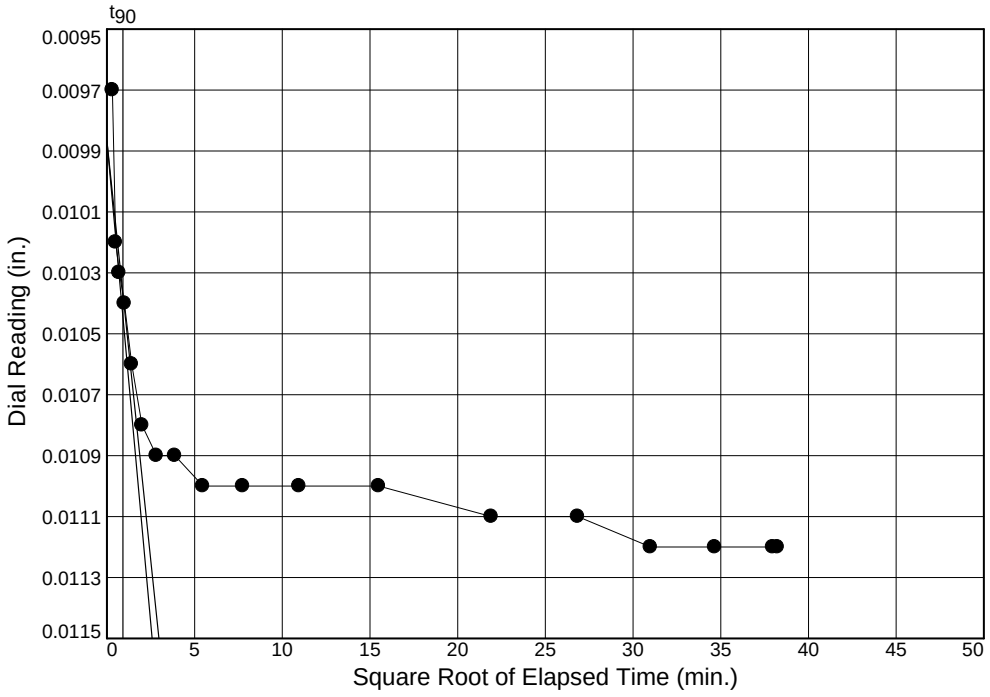
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0051
D_{90} = 0.0058
D_{100} = 0.0059
T_{90} = 0.66 min.

C_v @ T_{90}
2.765 ft.^{2}/day



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0099
D_{90} = 0.0104
D_{100} = 0.0104
T_{90} = 0.84 min.

C_v @ T_{90}
2.153 ft.^{2}/day

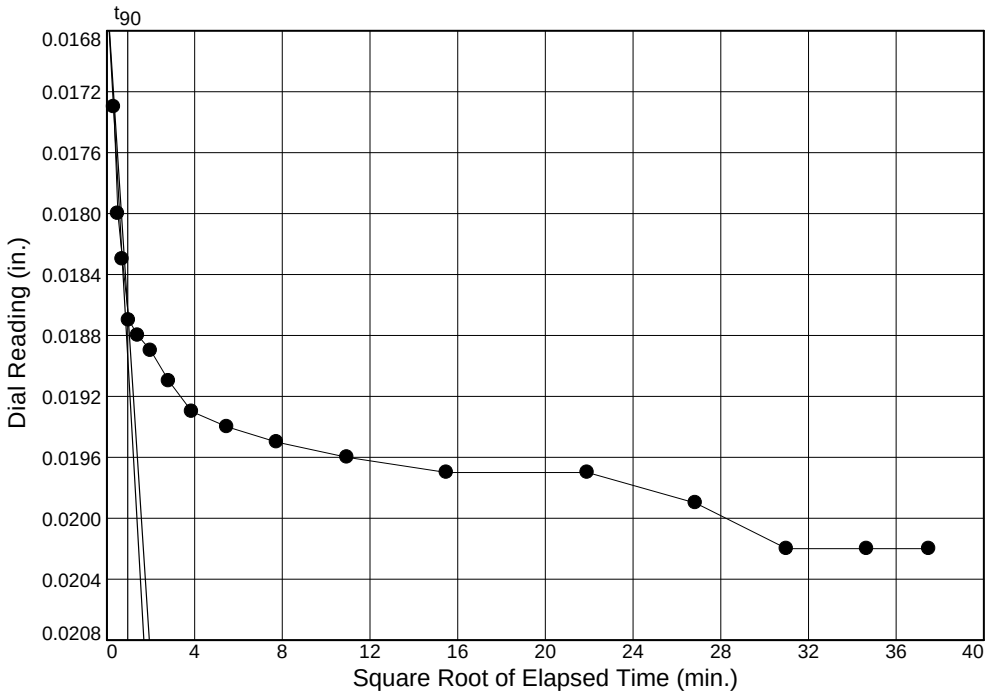
Figure 3

S & ME, Inc.

Dial Reading vs. Time

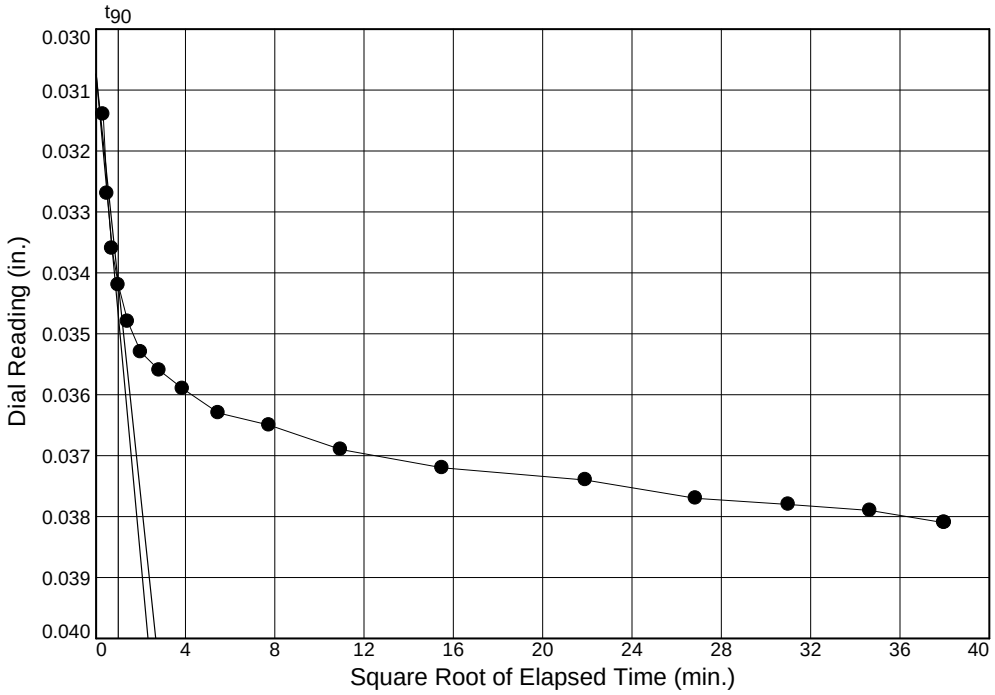
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0165
D_{90} = 0.0186
D_{100} = 0.0189
T_{90} = 0.91 min.

C_v @ T_{90}
1.959 ft.^{2}/day



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0307
D_{90} = 0.0342
D_{100} = 0.0346
T_{90} = 0.99 min.

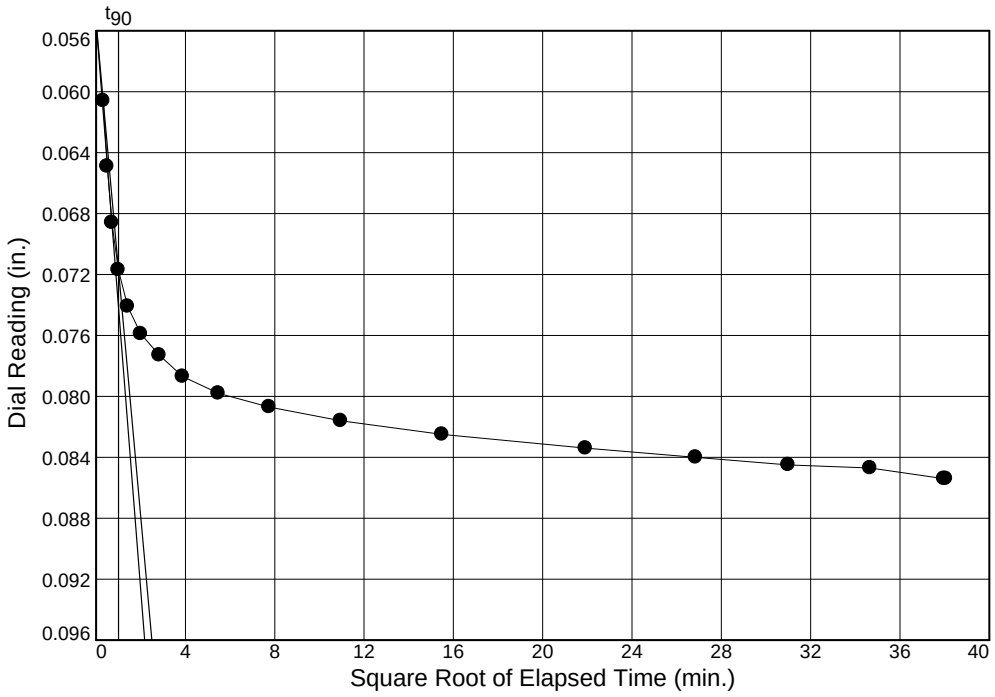
C_v @ T_{90}
1.742 ft.^{2}/day

Figure 4

Dial Reading vs. Time

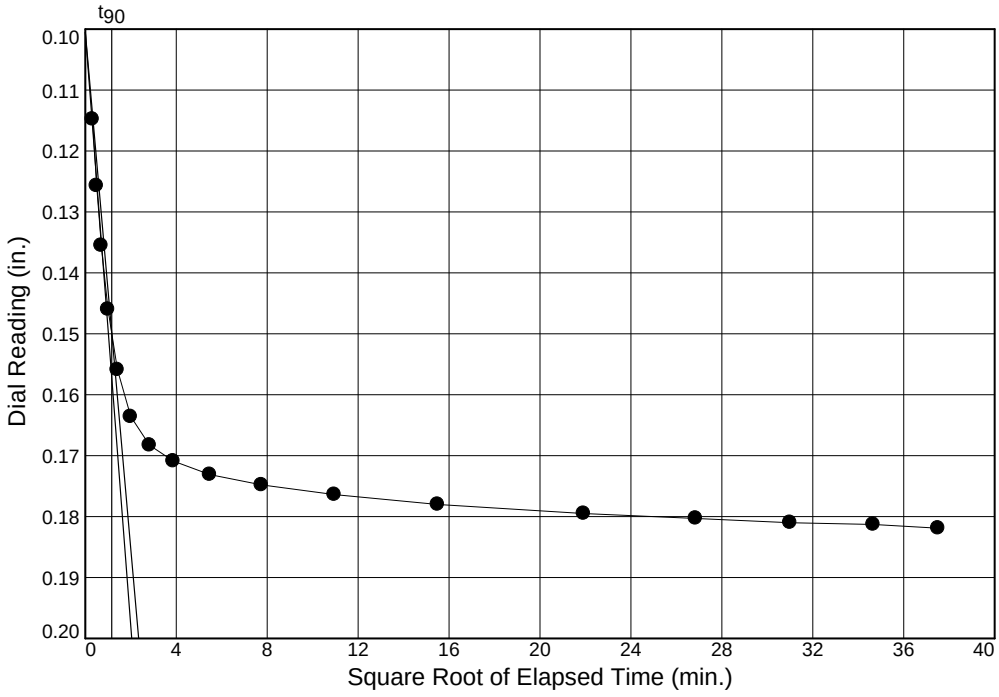
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-07A Depth: 18-20 ft Sample Number: UD-01



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0554
D_{90} = 0.0717
D_{100} = 0.0735
T_{90} = 1.01 min.

C_v @ T_{90}
1.580 ft.^{2}/day



Load No.= 15
Load= 32.00 ksf
D_0 = 0.1005
D_{90} = 0.1500
D_{100} = 0.1554
T_{90} = 1.36 min.

C_v @ T_{90}
0.991 ft.^{2}/day

Figure 5

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-08	Sample #: SS-02	Sample Date: 1/27/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	21	B4	14				24	B5	
A	Tare Weight	15.52	15.70	15.47				15.42	15.94	
B	Wet Soil Weight + A	31.65	32.27	34.71				25.11	25.11	
C	Dry Soil Weight + A	26.57	26.66	27.98				23.56	23.65	
D	Water Weight (B-C)	5.08	5.61	6.73				1.55	1.46	
E	Dry Soil Weight (C-A)	11.05	10.96	12.51				8.14	7.71	
F	% Moisture (D/E)*100	46.0%	51.2%	53.8%				19.0%	18.9%	
N	# OF DROPS	33	23	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**19.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**50**
Plastic Limit	**19**
Plastic Index	**31**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-08	Sample #: SS-04	Sample Date: 1/27/2025
Log #:	43-25-007		Depth: 8.5-10 ft
Description:	Brownish yellow		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	7	B3	4				B6	23	
A	Tare Weight	15.41	15.94	15.44				15.93	15.41	
B	Wet Soil Weight + A	29.59	31.64	33.16				25.24	25.23	
C	Dry Soil Weight + A	24.91	26.26	26.71				23.57	23.46	
D	Water Weight (B-C)	4.68	5.38	6.45				1.67	1.77	
E	Dry Soil Weight (C-A)	9.50	10.32	11.27				7.64	8.05	
F	% Moisture (D/E)*100	49.3%	52.1%	57.2%				21.9%	22.0%	
N	# OF DROPS	35	24	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.0%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**52**
Plastic Limit	**22**
Plastic Index	**30**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

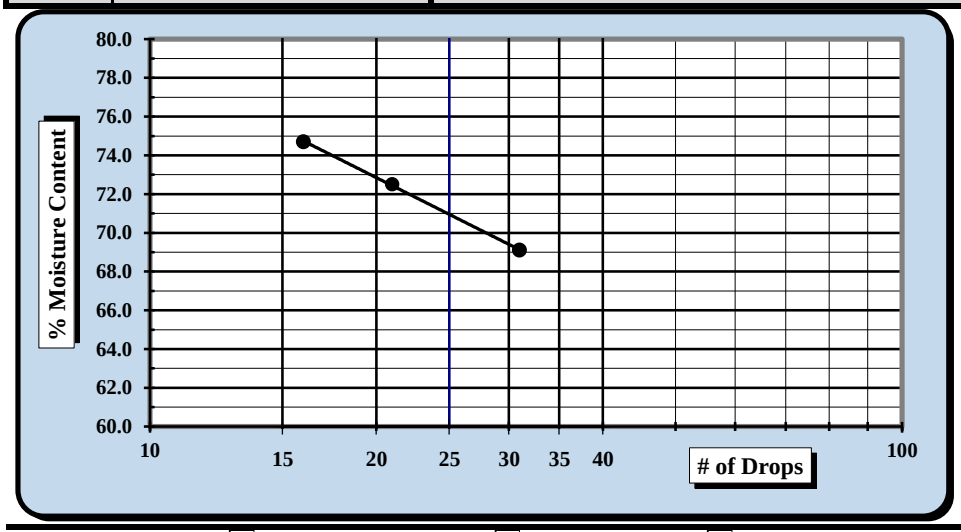
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-09	Sample #: SS-02	Sample Date: 2/5/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	Strong Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	10	2	B1				A2	17	
A	Tare Weight	15.39	15.61	15.86				15.94	15.48	
B	Wet Soil Weight + A	26.99	27.55	26.41				24.38	25.61	
C	Dry Soil Weight + A	22.25	22.53	21.90				22.41	23.25	
D	Water Weight (B-C)	4.74	5.02	4.51				1.97	2.36	
E	Dry Soil Weight (C-A)	6.86	6.92	6.04				6.47	7.77	
F	% Moisture (D/E)*100	69.1%	72.5%	74.7%				30.4%	30.4%	
N	# OF DROPS	31	21	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**71**
Plastic Limit	**30**
Plastic Index	**41**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

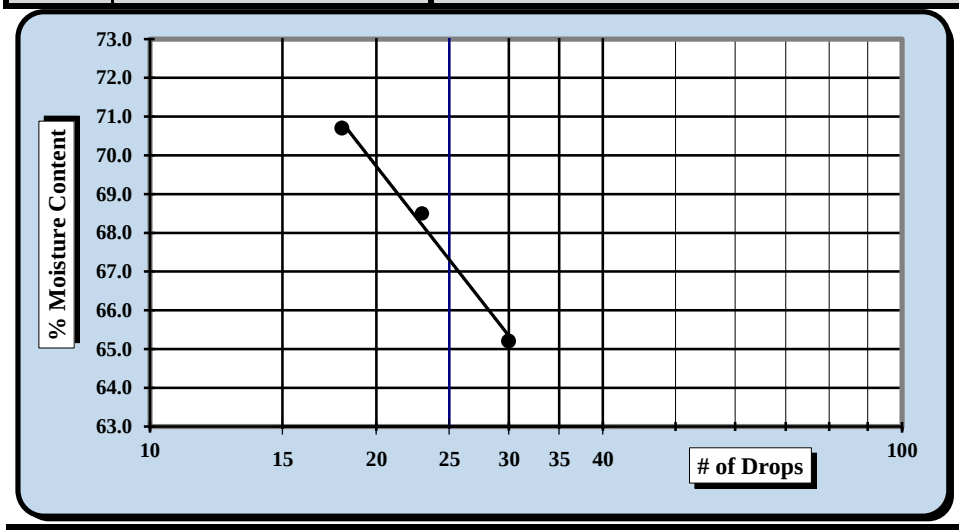
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-09	Sample #: SS-07	Sample Date: 2/5/2025
Log #:	43-25-007		Depth: 23.5-25 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	8	B2	A6				17	22	
A	Tare Weight	15.48	15.90	15.74				15.47	15.38	
B	Wet Soil Weight + A	29.80	31.20	33.19				24.87	24.72	
C	Dry Soil Weight + A	24.15	24.98	25.96				22.83	22.71	
D	Water Weight (B-C)	5.65	6.22	7.23				2.04	2.01	
E	Dry Soil Weight (C-A)	8.67	9.08	10.22				7.36	7.33	
F	% Moisture (D/E)*100	65.2%	68.5%	70.7%				27.7%	27.4%	
N	# OF DROPS	30	23	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**67**
Plastic Limit	**28**
Plastic Index	**39**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

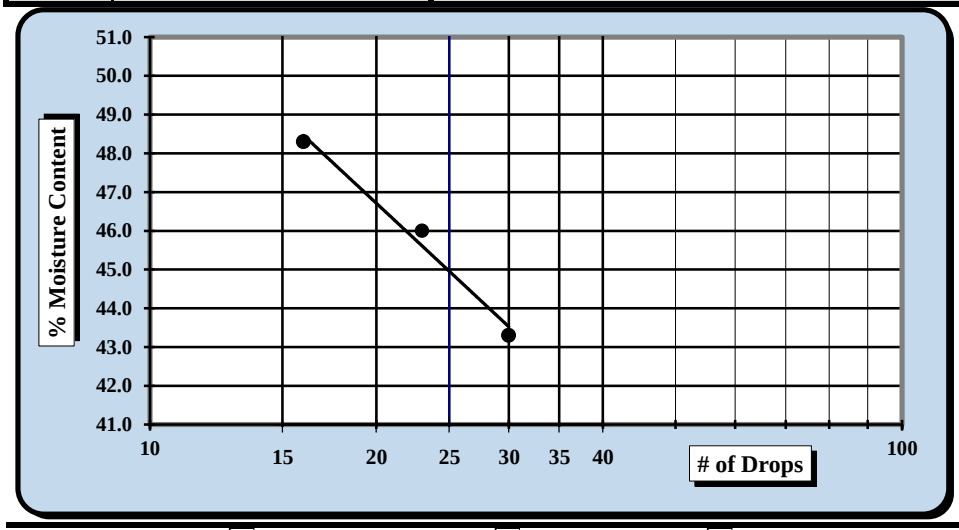
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-09	Sample #: SS-10	Sample Date: 2/5/2025
Log #:	43-25-007		Depth: 38.5-40
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	6	18	A4				A3	3	
A	Tare Weight	15.41	11.19	15.91				15.91	15.45	
B	Wet Soil Weight + A	29.96	31.02	31.69				25.02	25.29	
C	Dry Soil Weight + A	25.56	24.77	26.55				23.22	23.34	
D	Water Weight (B-C)	4.40	6.25	5.14				1.80	1.95	
E	Dry Soil Weight (C-A)	10.15	13.58	10.64				7.31	7.89	
F	% Moisture (D/E)*100	43.3%	46.0%	48.3%				24.6%	24.7%	
N	# OF DROPS	30	23	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.7%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**45**
Plastic Limit	**25**
Plastic Index	**20**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

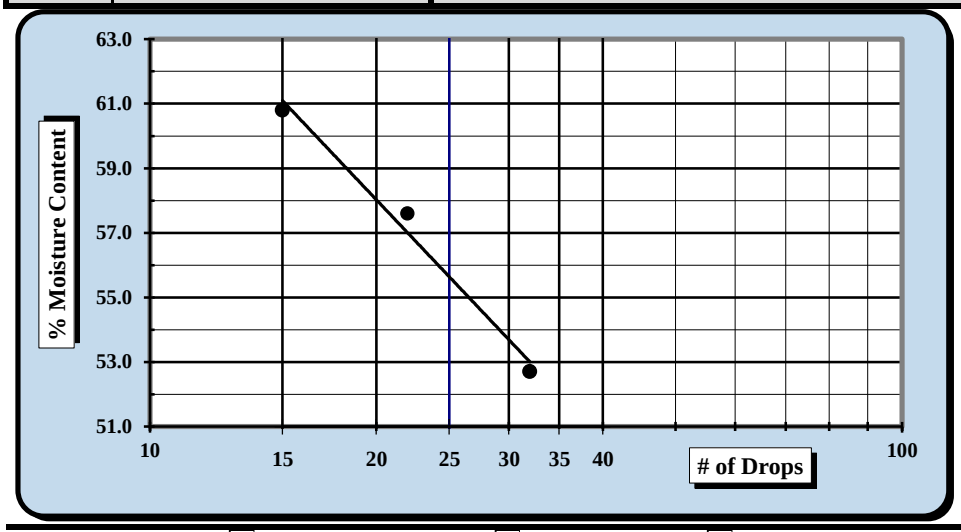
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/14/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-09A	Sample #: UD-01		Sample Date: 2/6/2025	
Log #:	43-25-007			Depth: 14-16 ft	
Description:	Brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B6	7	12				2	B1	
A	Tare Weight	15.92	15.43	15.56				15.60	15.85	
B	Wet Soil Weight + A	29.16	32.73	35.69				24.97	25.02	
C	Dry Soil Weight + A	24.59	26.41	28.08				22.86	22.97	
D	Water Weight (B-C)	4.57	6.32	7.61				2.11	2.05	
E	Dry Soil Weight (C-A)	8.67	10.98	12.52				7.26	7.12	
F	% Moisture (D/E)*100	52.7%	57.6%	60.8%				29.1%	28.8%	
N	# OF DROPS	32	22	15				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.0%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**56**
Plastic Limit	**29**
Plastic Index	**27**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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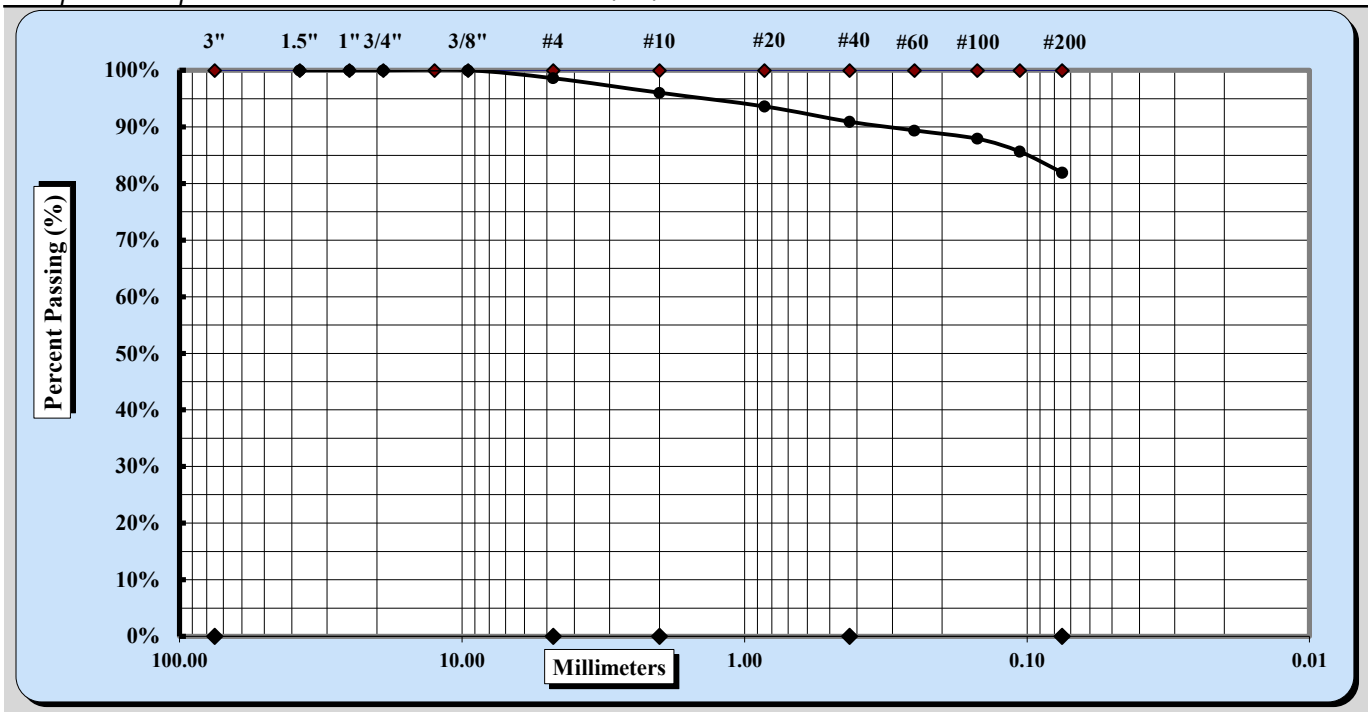
Sieve Analysis of Soils

Quality Assurance *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-09A	Type: UD	Sample Date:	2/6/2025
Sample Log No.: 43-25-007	Sample: UD-1	Depth:	14-16 ft

Sample Description: FAT CLAY WITH SAND (CH), brown



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	3/8"	Coarse Sand	3%	Fine Sand	9%
Gravel	1%	Medium Sand	5%	Silt & Clay	82%
Liquid Limit:	56	Plastic Limit:	29	Plastic Index:	27

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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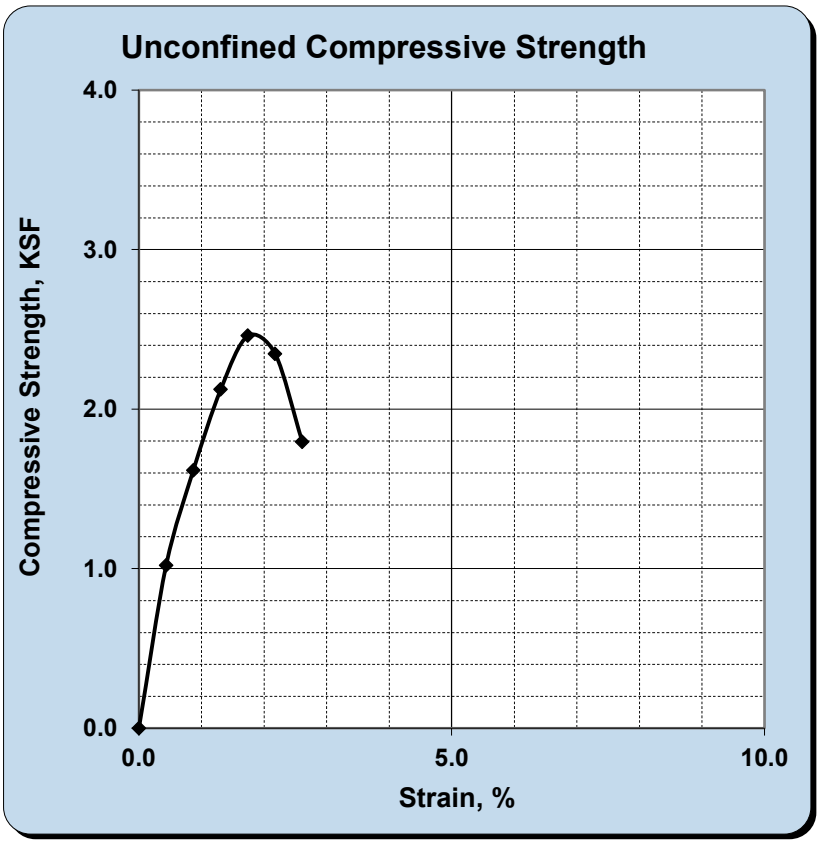
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	2/19/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-09A Sample No. UD-01	Sample Date:	2/6/2025
		Depth:	14-16 ft
Sample Description:	FAT CLAY WITH SAND (CH), brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 81.0 pcf
Initial Water Content: 40.6%
Unconfined Compressive Strength, q_u: **2.461** KSF
Undrained Shear Strength, s_u: **1.230** KSF

Liquid Limit: 56
Plasticity Index: 27
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.80
Strain at Failure: 1.8

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

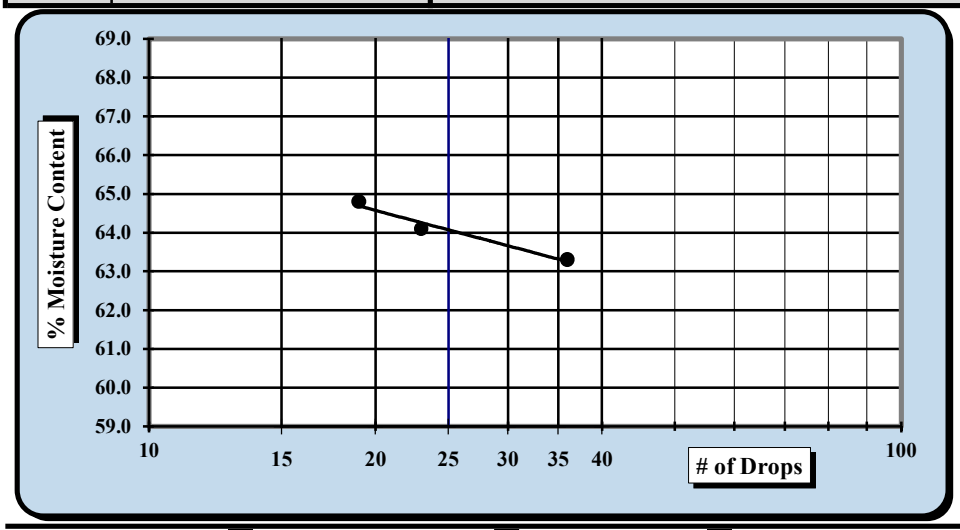
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/11/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-09A	Sample #: UD-02	Sample Date: 2/6/2025
Log #:	43-25-007		Depth: 30-32 ft
Description:	Dark brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B1	A4	10				7	19	
A	Tare Weight	15.84	15.89	15.40				15.42	15.38	
B	Wet Soil Weight + A	26.44	25.36	24.25				22.38	22.48	
C	Dry Soil Weight + A	22.33	21.66	20.77				20.84	20.93	
D	Water Weight (B-C)	4.11	3.70	3.48				1.54	1.55	
E	Dry Soil Weight (C-A)	6.49	5.77	5.37				5.42	5.55	
F	% Moisture (D/E)*100	63.3%	64.1%	64.8%				28.4%	27.9%	
N	# OF DROPS	36	23	19				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**64**
Plastic Limit	**28**
Plastic Index	**36**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe
Technician Name

Lindsey Deskins
Technical Responsibility

3/18/2025
Date

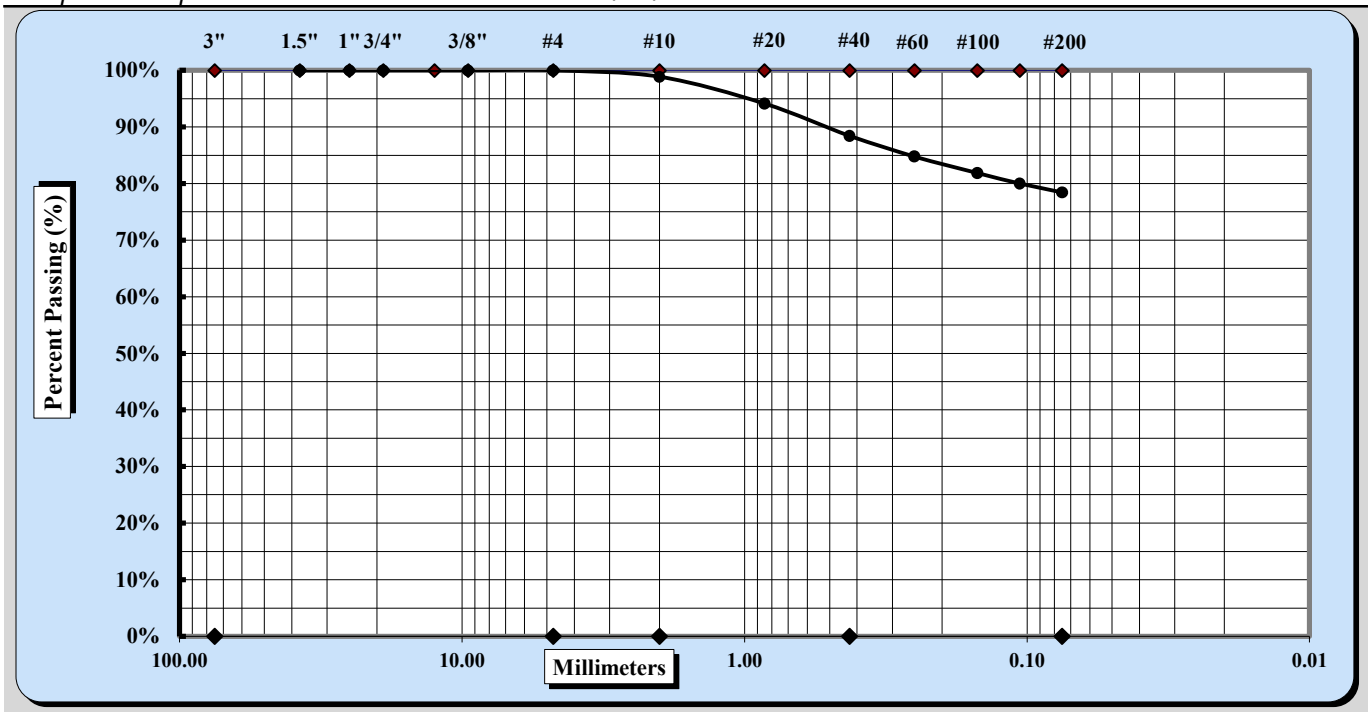
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Sieve Analysis of Soils

Quality Assurance | *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-09A	Type: UD	Sample Date:	2/6/2025
Sample Log No.: 43-25-007	Sample: UD-02	Depth:	30-32 ft
Sample Description:	FAT CLAY WITH SAND (CH), dark brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	#4	Coarse Sand	1%	Fine Sand	10%
Gravel	0%	Medium Sand	10%	Silt & Clay	78%
Liquid Limit:	64	Plastic Limit:	28	Plastic Index:	36

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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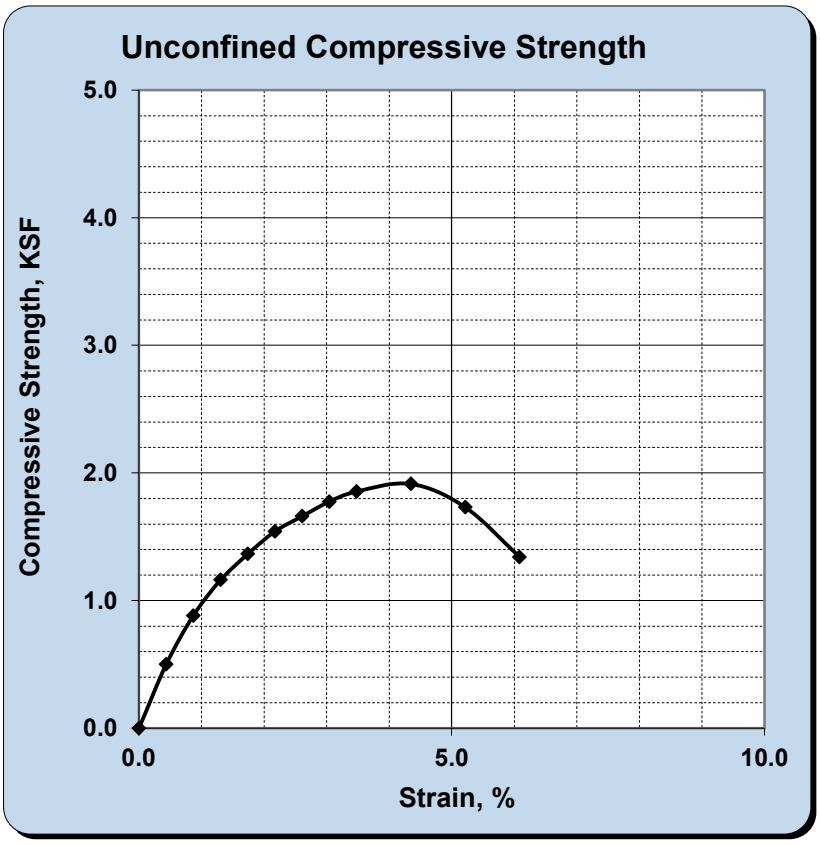
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/8/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-09A Sample No. UD-02	Sample Date:	2/6/2025
		Depth:	30-32 ft
Sample Description:	FAT CLAY WITH SAND (CH), dark brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 79.5 pcf
Initial Water Content: 40.5%
Unconfined Compressive Strength, q_u: **1.915** KSF
Undrained Shear Strength, s_u: **0.957** KSF

Liquid Limit: 64
Plasticity Index: 36
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.85
Strain at Failure: 4.3

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

3/25/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: A-09A
Depth: 30-32 ft **Sample Number:** UD-02
Material Description: FAT CLAY WITH SAND (CH), dark brown
Liquid Limit: 64 **Plasticity Index:** 36
USCS: CH
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #20983. ASTM D2435.
Tested by: Victoria Igoe

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	108.47 g.	Spec. Gr. =	2.795	Wet w+t =	303.28 g.
Dry w+t =	85.44 g.	Est. Ht. Solids =	0.480 in.	Dry w+t =	267.21 g.
Tare Wt. =	21.89 g.	Init. V.R. =	1.083	Tare Wt. =	161.03 g.
Moisture =	36.3 %	Init. Sat. =	93.5 %	Moisture =	34.0 %
UNIT WEIGHT		**TEST START**		Dry Wt. =	106.18 g.
Height =	1.000 in.	Height =	1.000 in.		
Diameter =	2.500 in.	Diameter =	2.500 in.		
Weight =	146.97 g.				
Dry Dens. =	83.7 pcf				

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00020		0.00000			1.083	
0.13	0.00020	0.00010	-0.00010			1.084	0.0 Swell
0.25	0.00120	0.00020	0.00080	3.253		1.082	0.1 Comprs.
0.50	0.00340	0.00040	0.00280	3.678		1.078	0.3 Comprs.
1.00	0.00690	0.00100	0.00570	3.712		1.072	0.6 Comprs.
2.00	0.01310	0.00170	0.01120	3.163		1.060	1.1 Comprs.
4.00	0.02280	0.00270	0.01990	3.254		1.042	2.0 Comprs.
8.00	0.04220	0.00410	0.03790	2.717		1.004	3.8 Comprs.
4.00	0.04040	0.00330	0.03690			1.007	3.7 Comprs.
2.00	0.03860	0.00250	0.03590			1.009	3.6 Comprs.
1.00	0.03560	0.00180	0.03360			1.013	3.4 Comprs.
2.00	0.03660	0.00210	0.03430			1.012	3.4 Comprs.
4.00	0.03890	0.00310	0.03560			1.009	3.6 Comprs.
8.00	0.04450	0.00410	0.04020			1.000	4.0 Comprs.
16.00	0.07870	0.00530	0.07320	1.994		0.931	7.3 Comprs.
32.00	0.13470	0.00690	0.12760	1.540		0.817	12.8 Comprs.
16.00	0.13220	0.00590	0.12610			0.821	12.6 Comprs.
4.00	0.12340	0.00370	0.11950			0.834	12.0 Comprs.
1.00	0.11460	0.00210	0.11230			0.849	11.2 Comprs.

TEST RESULTS SUMMARY

Compression index (C_c), ksf = 0.37 **Preconsolidation pressure (P_p), ksf =** 8.9 **Void ratio at P_p (e_m) =** 0.996

Recompression index (C_r) = 0.01

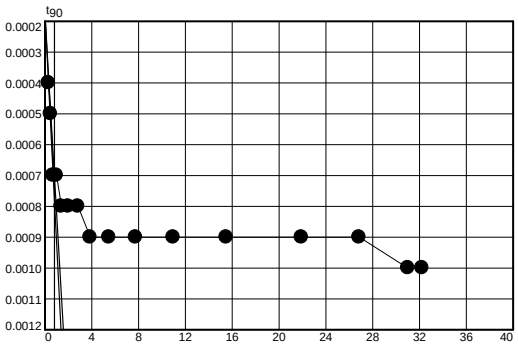
Pressure: 0.13 ksf — **TEST READINGS** — **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	0.0002
2	0.1000	0.0002
3	0.2500	0.0002
4	0.5000	0.0002
5	1.0000	0.0002
6	2.0000	0.0002
7	2.2500	0.0002

Void Ratio = 1.084 **Swell =** 0.0%

Pressure: 0.25 ksf — **TEST READINGS** — **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.00000	11	60.1000	0.0011
2	0.1000	0.0006	12	120.2167	0.0011
3	0.2500	0.0007	13	240.4333	0.0011
4	0.5000	0.0009	14	480.8833	0.0011
5	1.0000	0.0009	15	721.3167	0.0011
6	2.0000	0.0010	16	961.7333	0.0012
7	4.0000	0.0010	17	1038.0333	0.0012
8	8.0000	0.0010			
9	15.0167	0.0011			
10	30.0500	0.0011			

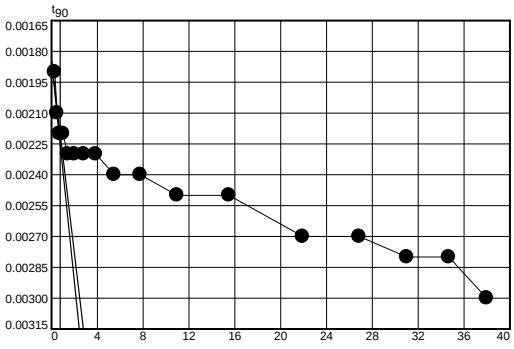


Void Ratio = 1.082 **Compression =** 0.1%

D_0 = 0.0002 **D_{90} =** 0.0007 **D_{100} =** 0.0008 **C_V at 0.65 min. =** 3.253 ft.^{2}/day

Pressure: 0.50 ksf — **TEST READINGS** — **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0012	11	60.1000	0.0028
2	0.0833	0.0023	12	120.2167	0.0029
3	0.2333	0.0025	13	240.4333	0.0029
4	0.5000	0.0026	14	480.8667	0.0031
5	1.0000	0.0026	15	721.3167	0.0031
6	2.0000	0.0027	16	961.7500	0.0032
7	4.0000	0.0027	17	1202.1833	0.0032
8	8.0000	0.0027	18	1442.6167	0.0034
9	15.0167	0.0027			
10	30.0500	0.0028			

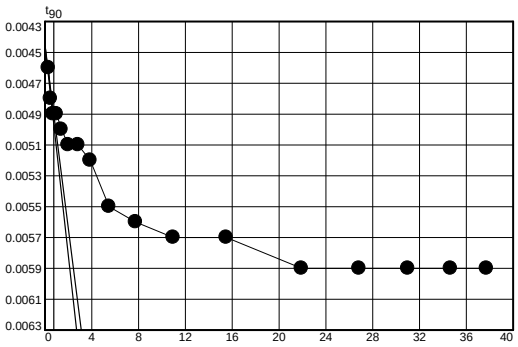


Void Ratio = 1.078 **Compression =** 0.3%

D_0 = 0.0018 **D_{90} =** 0.0022 **D_{100} =** 0.0022 **C_V at 0.57 min. =** 3.678 ft.^{2}/day

Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0034	11	60.1000	0.0066
2	0.1000	0.0056	12	120.2167	0.0067
3	0.2500	0.0058	13	240.4333	0.0067
4	0.5000	0.0059	14	480.8833	0.0069
5	1.0000	0.0059	15	721.3167	0.0069
6	2.0000	0.0060	16	961.7500	0.0069
7	4.0000	0.0061	17	1202.1833	0.0069
8	8.0167	0.0061	18	1423.8000	0.0069
9	15.0167	0.0062			
10	30.0500	0.0065			

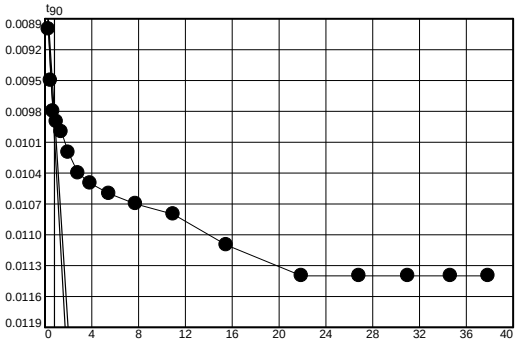


Void Ratio = 1.072 **Compression =** 0.6%

D_0 = 0.0045 **D_{90} =** 0.0049 **D_{100} =** 0.0049 **C_v at 0.57 min. =** 3.712 ft.^{2}/day

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0069	11	60.1000	0.0124
2	0.1000	0.0107	12	120.2167	0.0125
3	0.2500	0.0112	13	240.4333	0.0128
4	0.5000	0.0115	14	480.8833	0.0131
5	1.0000	0.0116	15	721.3167	0.0131
6	2.0000	0.0117	16	961.7500	0.0131
7	4.0000	0.0119	17	1202.2000	0.0131
8	8.0167	0.0121	18	1435.2500	0.0131
9	15.0167	0.0122			
10	30.0500	0.0123			

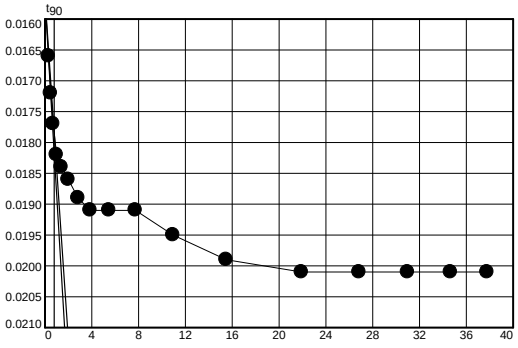


Void Ratio = 1.060 **Compression =** 1.1%

D_0 = 0.0084 **D_{90} =** 0.0098 **D_{100} =** 0.0100 **C_v at 0.66 min. =** 3.163 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0131	11	59.9167	0.0218
2	0.1000	0.0193	12	119.8667	0.0222
3	0.2500	0.0199	13	240.0833	0.0226
4	0.5000	0.0204	14	480.5167	0.0228
5	1.0000	0.0209	15	720.9500	0.0228
6	2.0000	0.0211	16	961.4000	0.0228
7	4.0000	0.0213	17	1201.8333	0.0228
8	8.0167	0.0216	18	1428.4500	0.0228
9	15.0167	0.0218			
10	29.9833	0.0218			

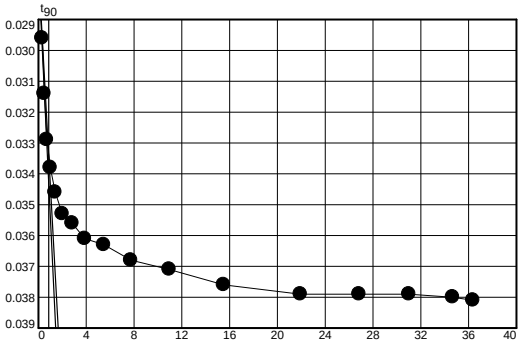


Void Ratio = 1.042 **Compression =** 2.0%

D_0 = 0.0157 **D_{90} =** 0.0178 **D_{100} =** 0.0181 **C_v at 0.63 min. =** 3.254 ft.^{2}/day

Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 7**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0228	11	60.1167	0.0409
2	0.1000	0.0337	12	120.2167	0.0412
3	0.2500	0.0355	13	240.4500	0.0417
4	0.5000	0.0370	14	480.8833	0.0420
5	1.0000	0.0379	15	721.3167	0.0420
6	2.0000	0.0387	16	961.7667	0.0420
7	4.0167	0.0394	17	1202.2000	0.0421
8	8.0167	0.0397	18	1322.8000	0.0422
9	15.0333	0.0402			
10	30.0500	0.0404			



Void Ratio = 1.004 **Compression =** 3.8%

D_0 = 0.0273 **D_{90} =** 0.0334 **D_{100} =** 0.0340 **C_v at 0.74 min. =** 2.717 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 8**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0422	11	60.1000	0.0405
2	0.1000	0.0409	12	120.2167	0.0404
3	0.2500	0.0409	13	240.4500	0.0404
4	0.5000	0.0409	14	480.9000	0.0405
5	1.0000	0.0409	15	721.3333	0.0406
6	2.0000	0.0405	16	961.7667	0.0406
7	4.0000	0.0405	17	1202.2167	0.0405
8	8.0167	0.0405	18	1441.0167	0.0404
9	15.0167	0.0405			
10	30.0500	0.0405			

Void Ratio = 1.007 **Compression =** 3.7%

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 9**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0404	11	60.1000	0.0386
2	0.1000	0.0389	12	120.2167	0.0386
3	0.2500	0.0388	13	240.4333	0.0386
4	0.5000	0.0388	14	240.7500	0.0386
5	1.0000	0.0388			
6	2.0000	0.0388			
7	4.0000	0.0387			
8	8.0167	0.0386			
9	15.0167	0.0386			
10	30.0500	0.0386			

Void Ratio = 1.009 **Compression =** 3.6%

Pressure: 1.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0386	11	60.1000	0.0363
2	0.1000	0.0385	12	120.2167	0.0363
3	0.2500	0.0375	13	240.4333	0.0362
4	0.5000	0.0370	14	480.8833	0.0358
5	1.0000	0.0366	15	721.3500	0.0357
6	2.0000	0.0364	16	961.7833	0.0357
7	4.0000	0.0364	17	1202.2000	0.0357
8	8.0167	0.0363	18	1213.3167	0.0356
9	15.0167	0.0363			
10	30.0500	0.0363			

Void Ratio = 1.013 **Compression =** 3.4%

Pressure: 2.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0356	11	60.1167	0.0364
2	0.1000	0.0363	12	120.2167	0.0364
3	0.2500	0.0363	13	240.4333	0.0365
4	0.5000	0.0363	14	480.8833	0.0365
5	1.0000	0.0363	15	721.3333	0.0367
6	2.0000	0.0364	16	961.7833	0.0367
7	4.0167	0.0364	17	1202.2167	0.0367
8	8.0167	0.0364	18	1427.0833	0.0366
9	15.0333	0.0364			
10	30.0500	0.0364			

Void Ratio = 1.012 **Compression =** 3.4%

Pressure: 4.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0366	11	60.1167	0.0387
2	0.1000	0.0383	12	120.2333	0.0387
3	0.2500	0.0385	13	240.4500	0.0388
4	0.5000	0.0386	14	480.8833	0.0389
5	1.0000	0.0386	15	721.3333	0.0389
6	2.0000	0.0387	16	961.7667	0.0389
7	4.0167	0.0387	17	1202.2000	0.0389
8	8.0167	0.0387	18	1442.6333	0.0389
9	15.0333	0.0387			
10	30.0667	0.0387			

Void Ratio = 1.009 **Compression =** 3.6%

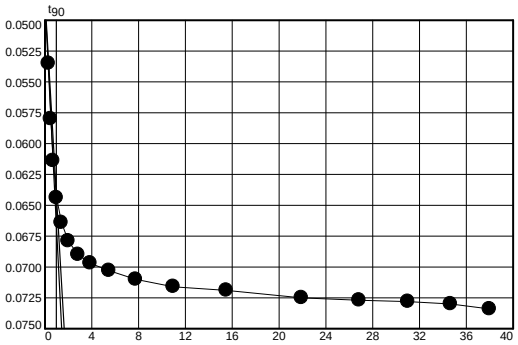
Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0389	11	60.1167	0.0436
2	0.1000	0.0420	12	120.2167	0.0437
3	0.2500	0.0426	13	240.4333	0.0441
4	0.5000	0.0427	14	480.8667	0.0444
5	1.0000	0.0428	15	721.2833	0.0444
6	2.0000	0.0429	16	961.7333	0.0445
7	4.0167	0.0432	17	1202.1667	0.0445
8	8.0167	0.0434	18	1439.7333	0.0445
9	15.0333	0.0435			
10	30.0500	0.0435			

Void Ratio = 1.000 **Compression =** 4.0%

Pressure: 16.00 ksf | **TEST READINGS** | **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0445	11	60.1167	0.0763
2	0.1000	0.0588	12	120.2167	0.0769
3	0.2500	0.0633	13	240.4333	0.0772
4	0.5000	0.0667	14	480.8833	0.0778
5	1.0000	0.0697	15	721.3333	0.0780
6	2.0000	0.0717	16	961.7667	0.0781
7	4.0000	0.0732	17	1202.2167	0.0783
8	8.0167	0.0743	18	1442.6500	0.0787
9	15.0333	0.0750			
10	30.0500	0.0756			

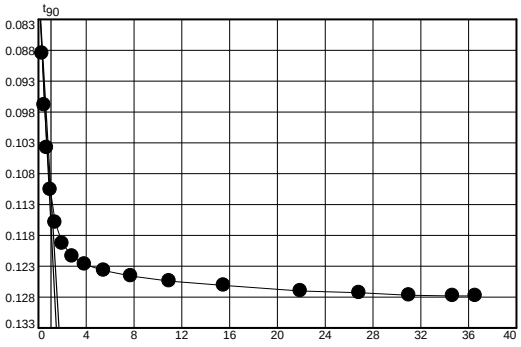


Void Ratio = 0.931 **Compression =** 7.3%

D_0 = 0.0484 **D_{90} =** 0.0641 **D_{100} =** 0.0659 **C_V at 0.95 min. =** 1.994 ft.^{2}/day

Pressure: 32.00 ksf | **TEST READINGS** | **Load No. 15**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0787	11	60.1000	0.1315
2	0.1000	0.0954	12	120.2167	0.1323
3	0.2500	0.1038	13	240.4333	0.1330
4	0.5000	0.1107	14	480.8667	0.1339
5	1.0000	0.1175	15	721.3000	0.1342
6	2.0000	0.1228	16	961.7500	0.1346
7	4.0000	0.1262	17	1202.2000	0.1347
8	8.0167	0.1283	18	1337.7667	0.1347
9	15.0167	0.1296			
10	30.0500	0.1306			



Void Ratio = 0.817 **Compression =** 12.8%

D_0 = 0.0770 **D_{90} =** 0.1113 **D_{100} =** 0.1151 **C_V at 1.11 min. =** 1.540 ft.^{2}/day

Pressure: 16.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1347	11	60.1167	0.1323
2	0.1000	0.1329	12	120.2167	0.1322
3	0.2500	0.1327	13	240.4333	0.1322
4	0.5000	0.1326	14	480.8833	0.1322
5	1.0000	0.1326	15	721.3167	0.1322
6	2.0000	0.1324	16	961.7500	0.1322
7	4.0167	0.1324	17	1202.2000	0.1322
8	8.0167	0.1324	18	1442.6333	0.1322
9	15.0333	0.1324			
10	30.0500	0.1323			

Void Ratio = 0.821 **Compression =** 12.6%

Pressure: 4.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1322	11	60.1167	0.1237
2	0.1000	0.1276	12	120.2333	0.1237
3	0.2500	0.1266	13	240.4500	0.1236
4	0.5000	0.1258	14	480.8833	0.1235
5	1.0167	0.1251	15	721.3167	0.1235
6	2.0167	0.1246	16	961.7333	0.1235
7	4.0167	0.1244	17	1202.1833	0.1235
8	8.0167	0.1242	18	1440.7167	0.1234
9	15.0333	0.1241			
10	30.0667	0.1238			

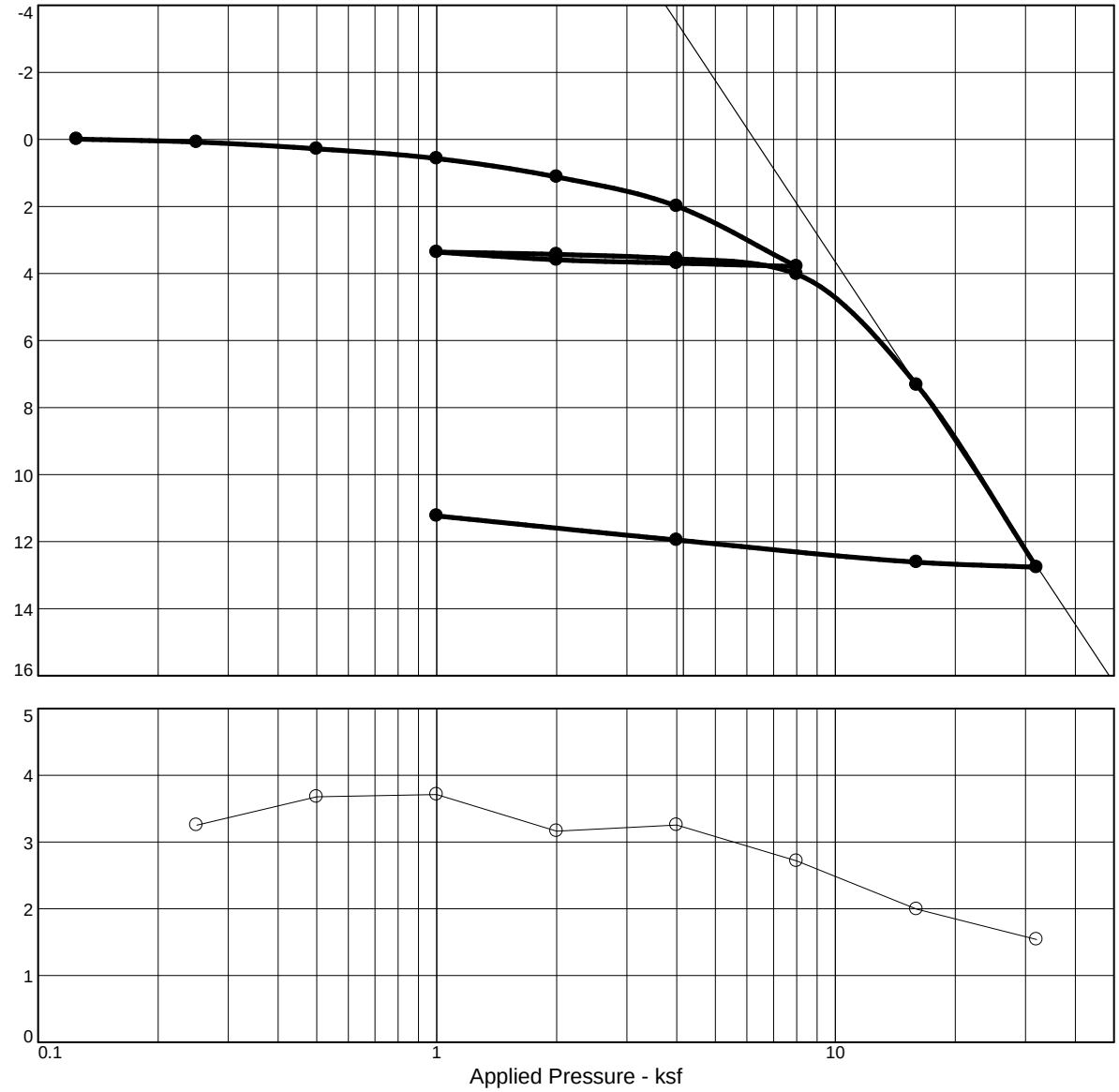
Void Ratio = 0.834 **Compression =** 12.0%

Pressure: 1.00 ksf	TEST READINGS	Load No. 18

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.1234	11	60.1000	0.1155
2	0.1000	0.1220	12	120.2167	0.1152
3	0.2500	0.1203	13	240.4333	0.1150
4	0.5000	0.1194	14	480.8833	0.1148
5	1.0000	0.1184	15	721.3000	0.1148
6	2.0000	0.1173	16	961.7333	0.1147
7	4.0000	0.1166	17	1202.1667	0.1147
8	8.0167	0.1162	18	1442.6000	0.1146
9	15.0167	0.1158			
10	30.0500	0.1156			

Void Ratio = 0.849 **Compression =** 11.2%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
93.5 %	36.3 %	83.7	64	36	2.795		8.9	0.37	0.01	1.083

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY WITH SAND (CH), dark brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A **Depth:** 30-32 ft **Sample Number:** UD-02

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #20983. ASTM D2435.

Figure 1

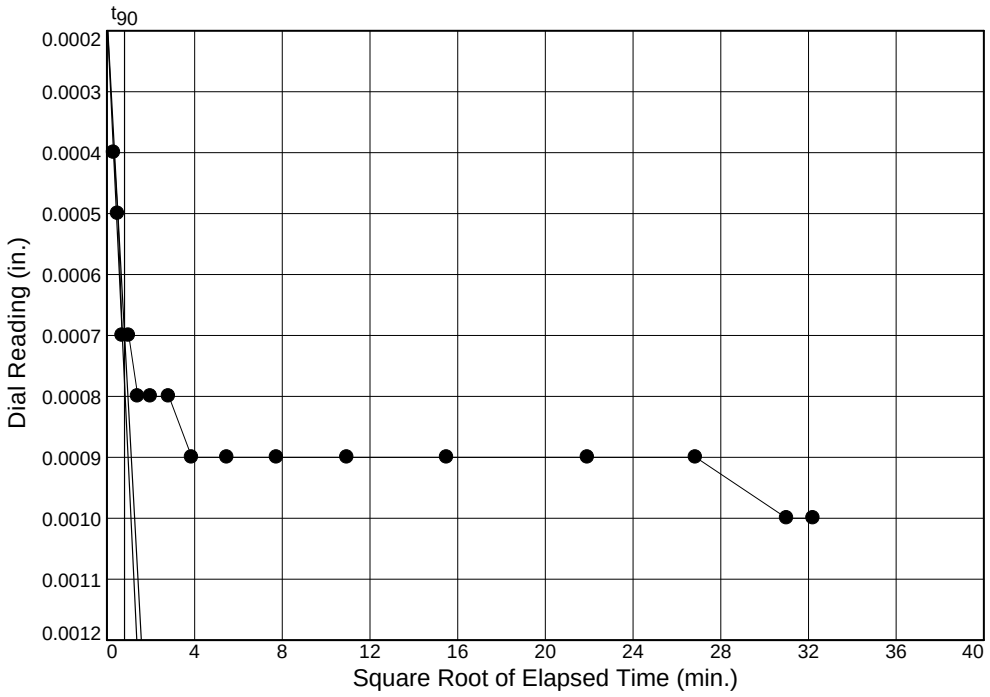
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

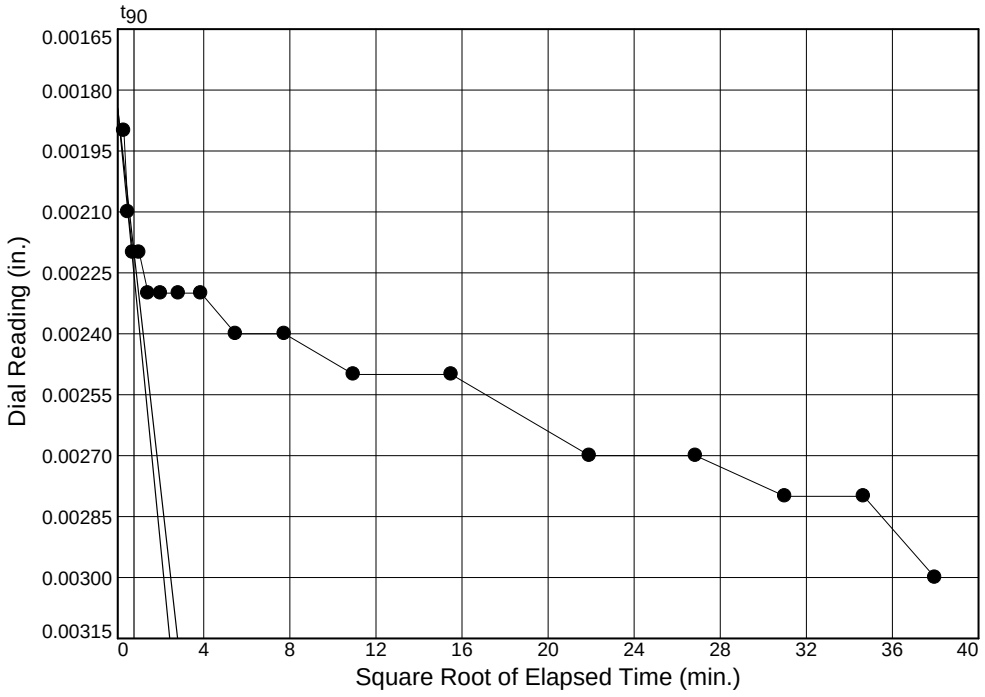
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 2
Load= 0.25 ksf
D_0 = 0.0002
D_{90} = 0.0007
D_{100} = 0.0008
T_{90} = 0.65 min.

C_v @ T_{90}
3.253 ft.^{2}/day



Load No.= 3
Load= 0.50 ksf
D_0 = 0.0018
D_{90} = 0.0022
D_{100} = 0.0022
T_{90} = 0.57 min.

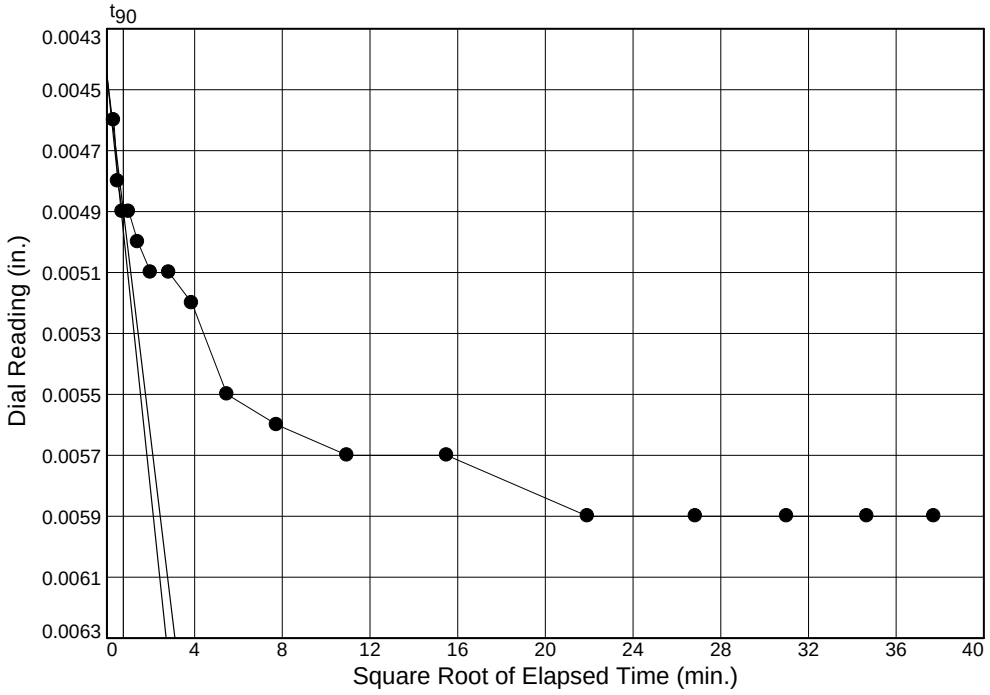
C_v @ T_{90}
3.678 ft.^{2}/day

Figure 2

Dial Reading vs. Time

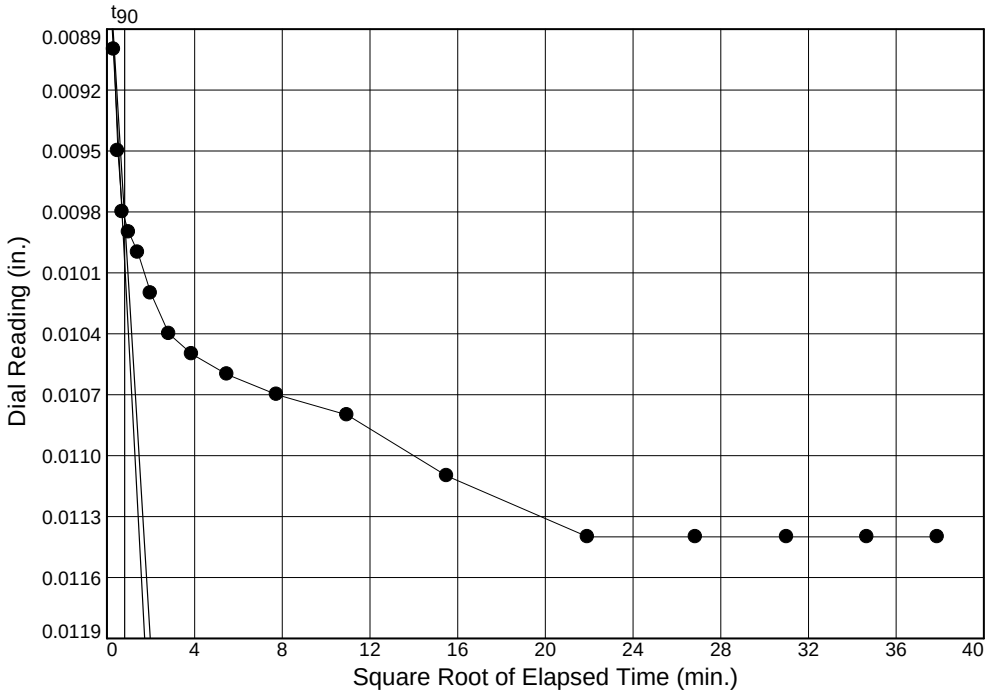
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0045
D_{90} = 0.0049
D_{100} = 0.0049
T_{90} = 0.57 min.

C_v @ T_{90}
3.712 ft.^{2}/day



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0084
D_{90} = 0.0098
D_{100} = 0.0100
T_{90} = 0.66 min.

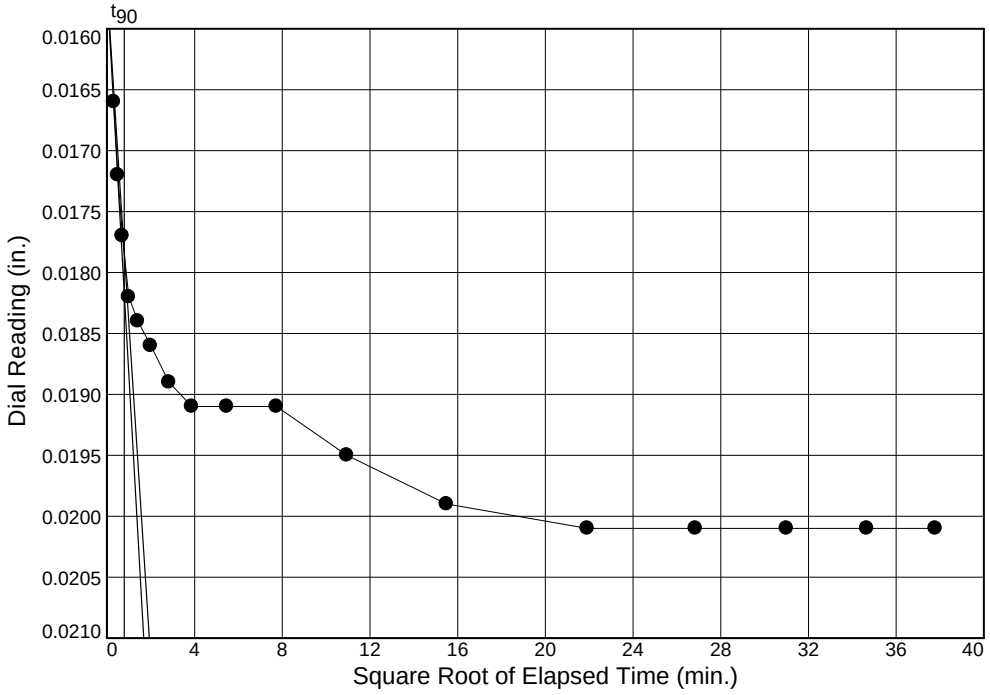
C_v @ T_{90}
3.163 ft.^{2}/day

Figure 3

Dial Reading vs. Time

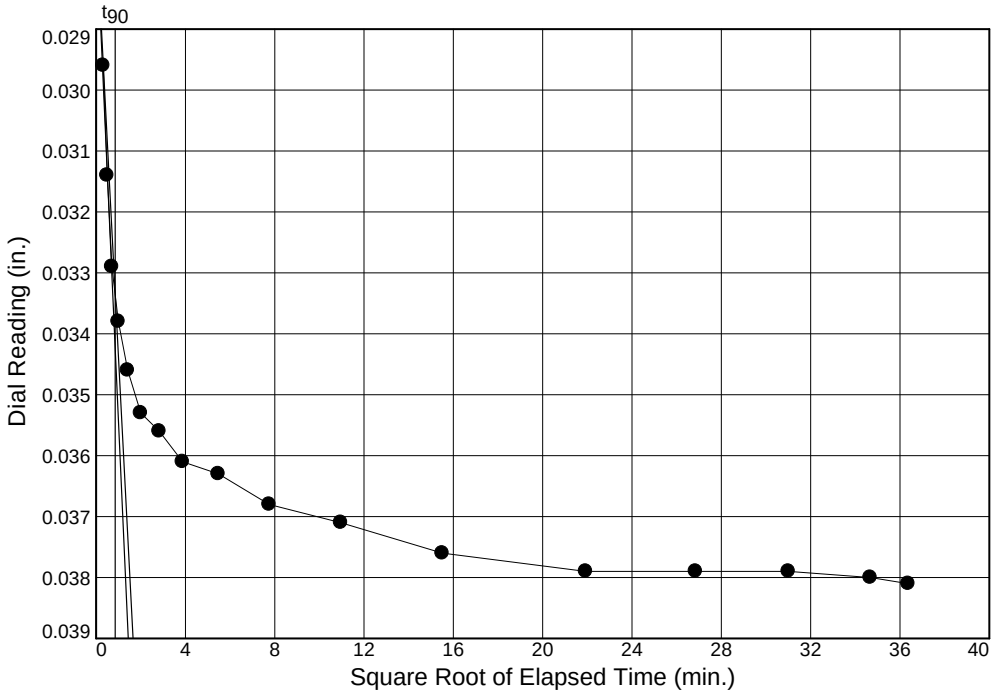
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0157
D_{90} = 0.0178
D_{100} = 0.0181
T_{90} = 0.63 min.

C_v @ T_{90}
3.254 ft.^{2}/day



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0273
D_{90} = 0.0334
D_{100} = 0.0340
T_{90} = 0.74 min.

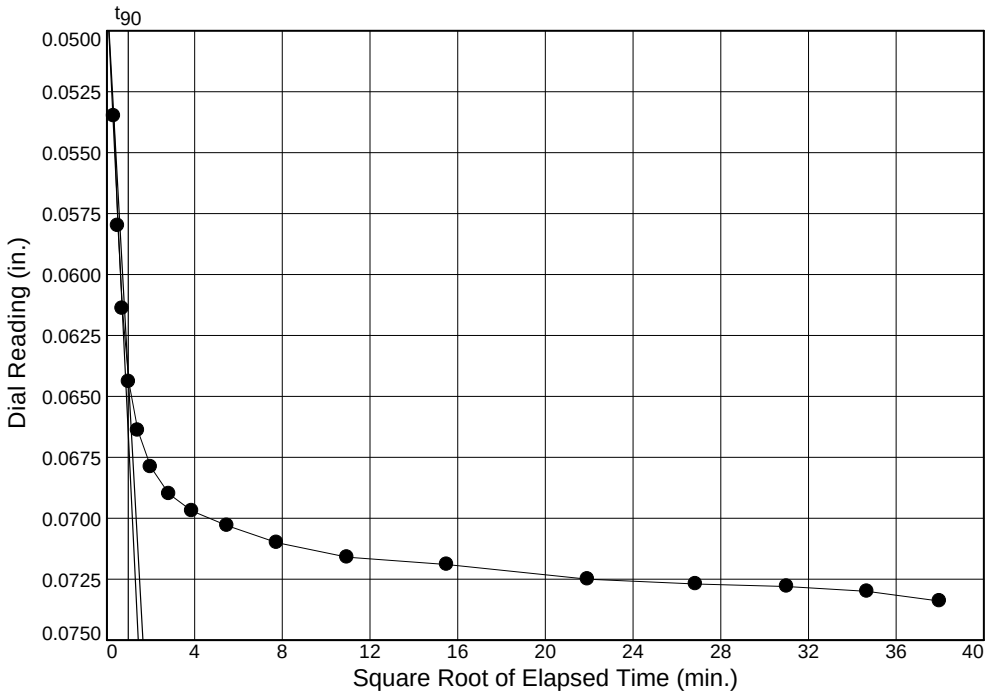
C_v @ T_{90}
2.717 ft.^{2}/day

Figure 4

Dial Reading vs. Time

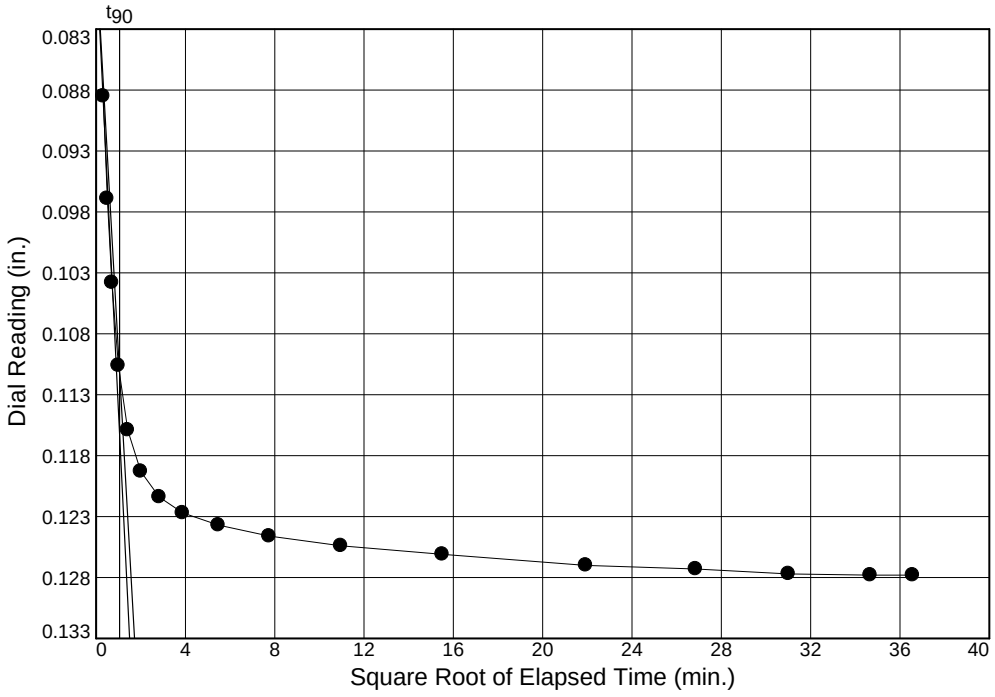
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0484
D_{90} = 0.0641
D_{100} = 0.0659
T_{90} = 0.95 min.

C_v @ T_{90}
1.994 ft.^{2}/day

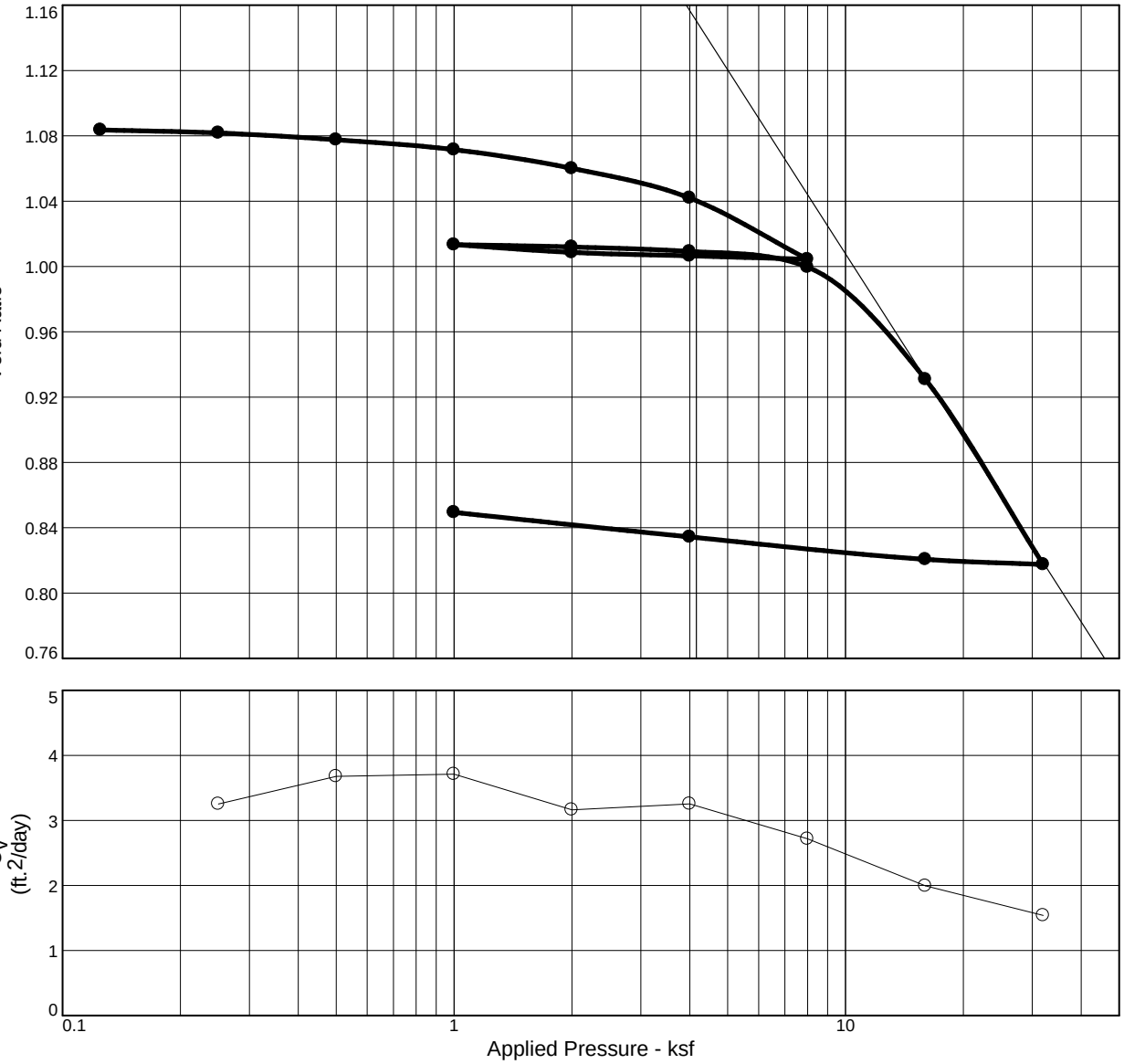


Load No.= 15
Load= 32.00 ksf
D_0 = 0.0770
D_{90} = 0.1113
D_{100} = 0.1151
T_{90} = 1.11 min.

C_v @ T_{90}
1.540 ft.^{2}/day

Figure 5

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
93.5 %	36.3 %	83.7	64	36	2.795		8.9	0.37	0.01	1.083

MATERIAL DESCRIPTION	USCS	AASHTO
FAT CLAY WITH SAND (CH), dark brown	CH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A **Depth:** 30-32 ft **Sample Number:** UD-02

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #20983. ASTM D2435.

Figure 1

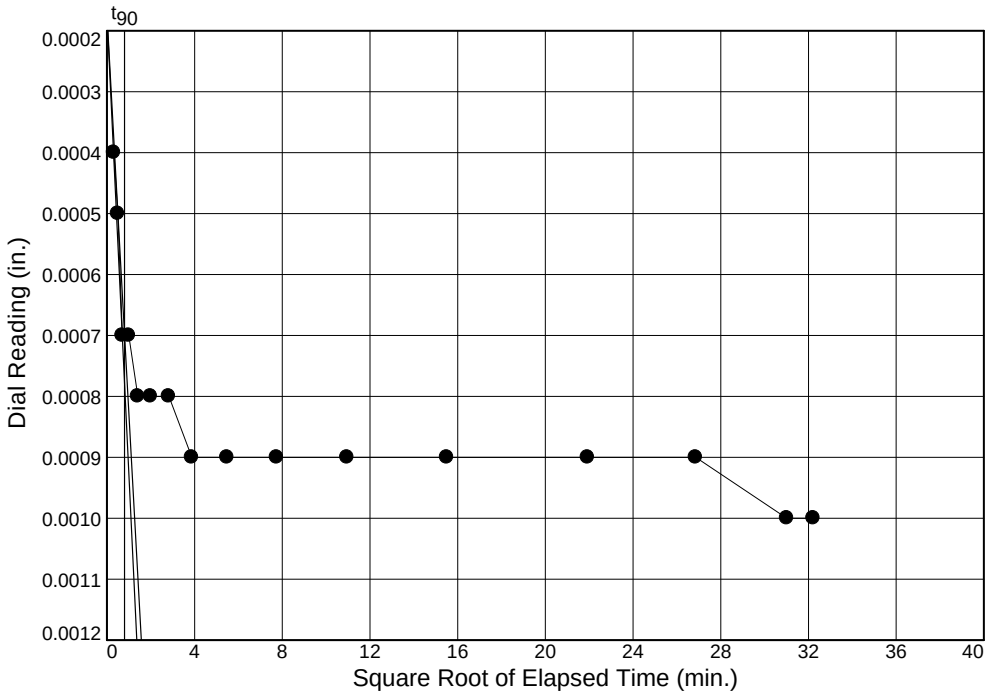
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

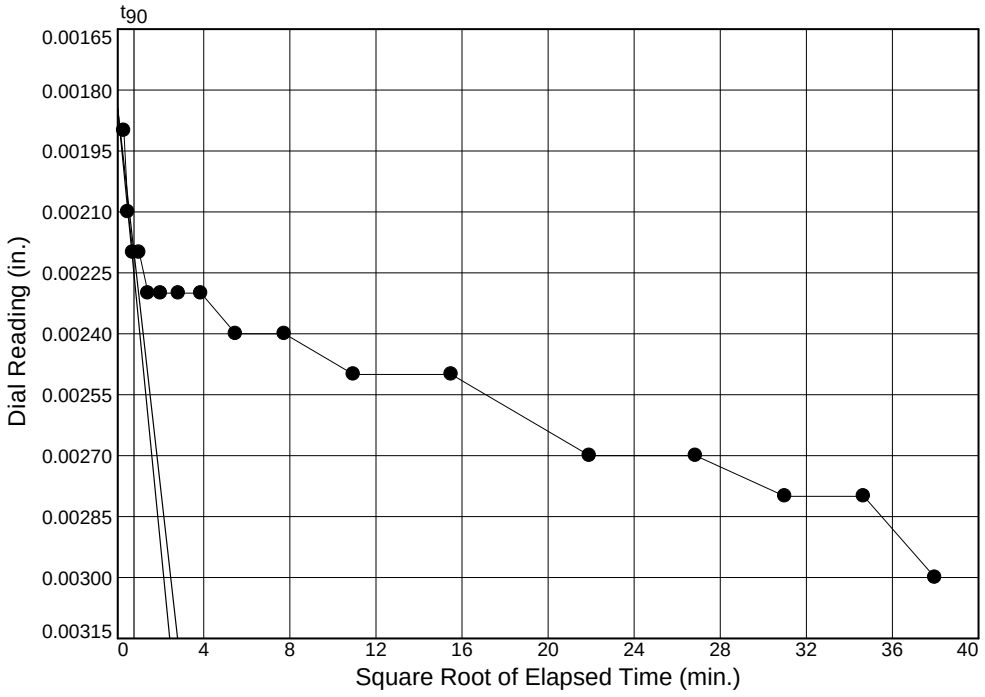
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 2
Load= 0.25 ksf
D_0 = 0.0002
D_{90} = 0.0007
D_{100} = 0.0008
T_{90} = 0.65 min.

C_v @ T_{90}
3.253 ft.^{2}/day



Load No.= 3
Load= 0.50 ksf
D_0 = 0.0018
D_{90} = 0.0022
D_{100} = 0.0022
T_{90} = 0.57 min.

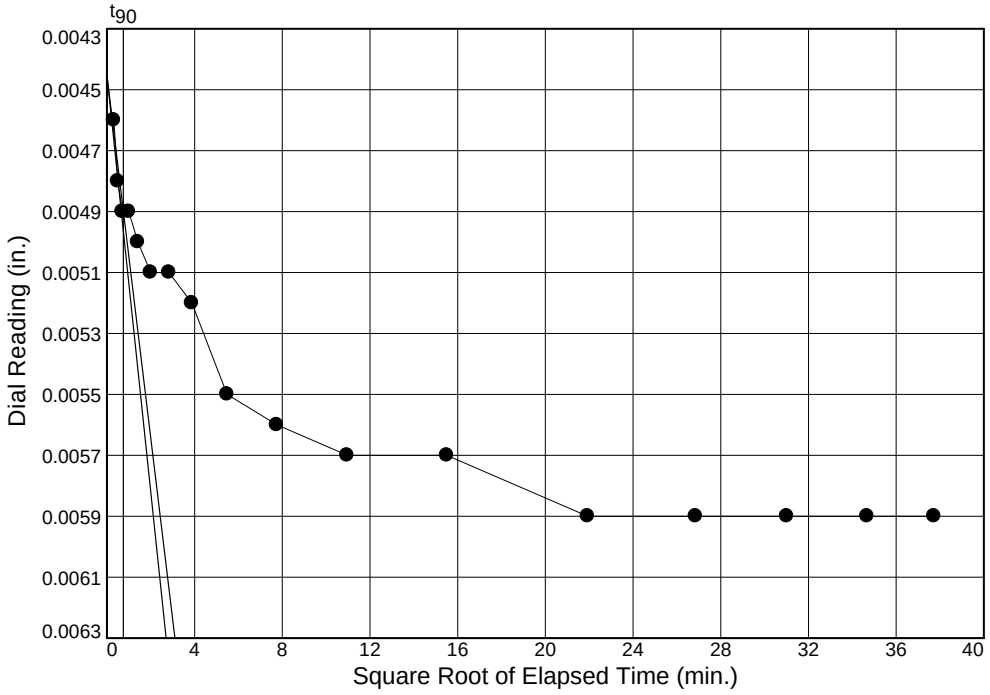
C_v @ T_{90}
3.678 ft.^{2}/day

Figure 2

Dial Reading vs. Time

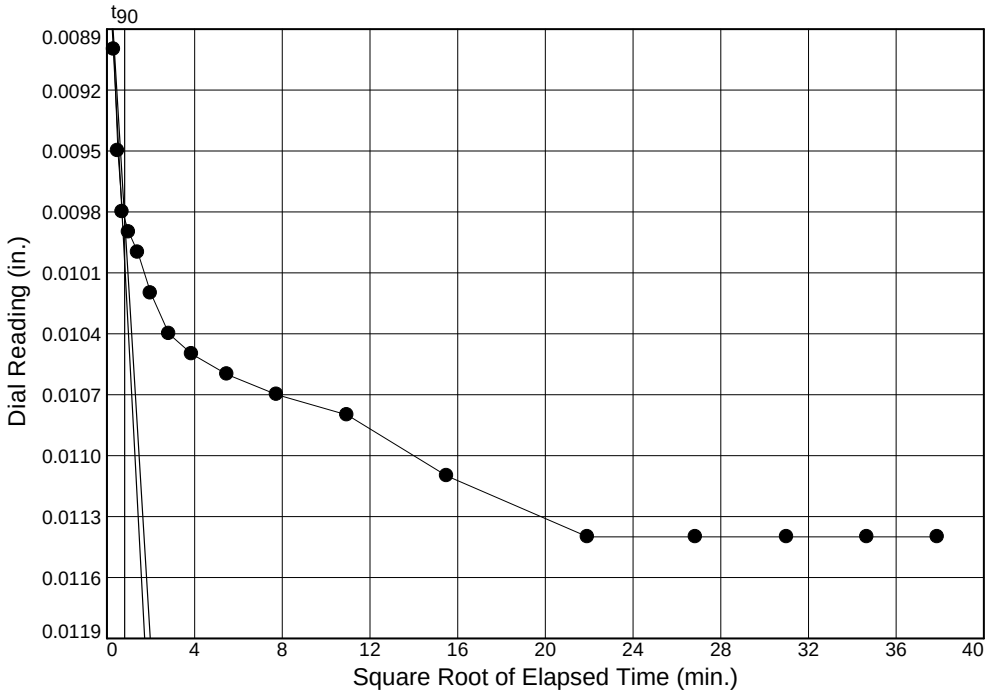
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0045
D_{90} = 0.0049
D_{100} = 0.0049
T_{90} = 0.57 min.

C_v @ T_{90}
3.712 ft.^{2}/day



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0084
D_{90} = 0.0098
D_{100} = 0.0100
T_{90} = 0.66 min.

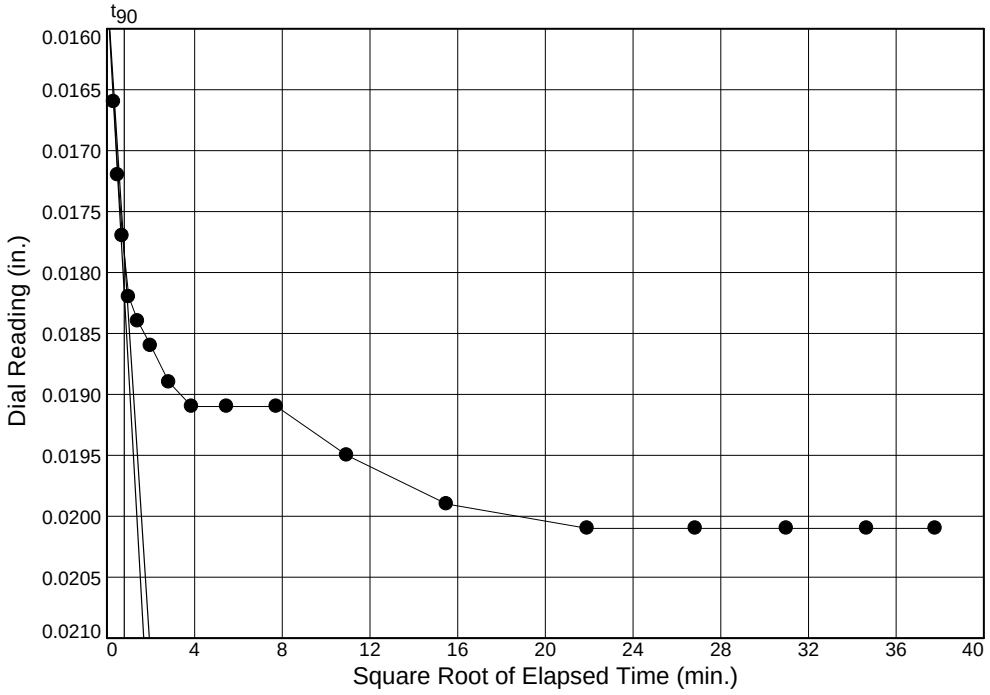
C_v @ T_{90}
3.163 ft.^{2}/day

Figure 3

Dial Reading vs. Time

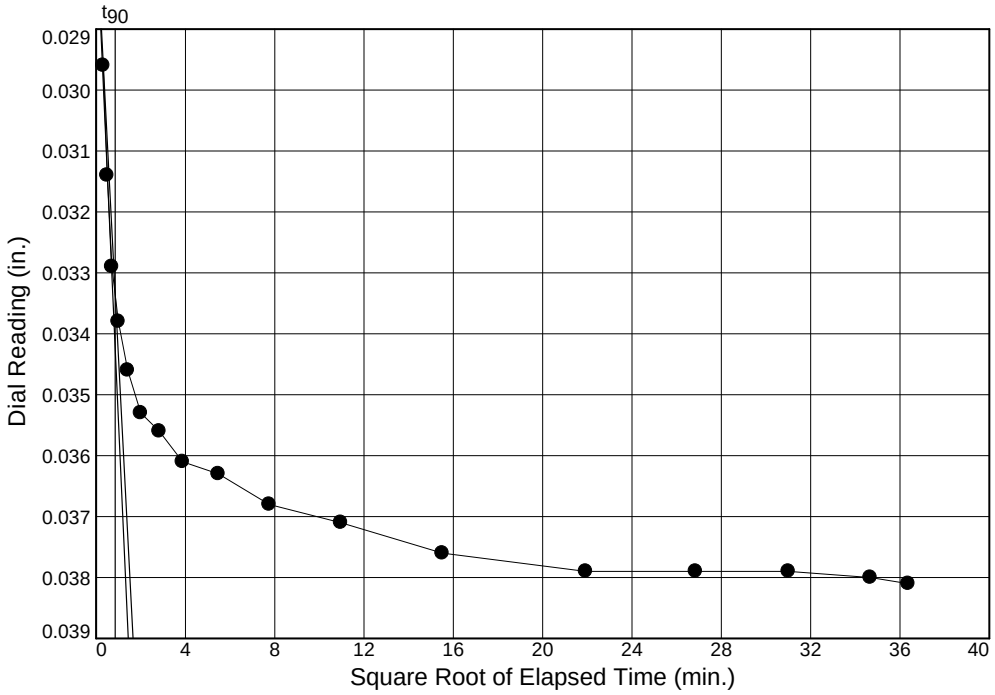
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0157
D_{90} = 0.0178
D_{100} = 0.0181
T_{90} = 0.63 min.

C_v @ T_{90}
3.254 ft.^{2}/day



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0273
D_{90} = 0.0334
D_{100} = 0.0340
T_{90} = 0.74 min.

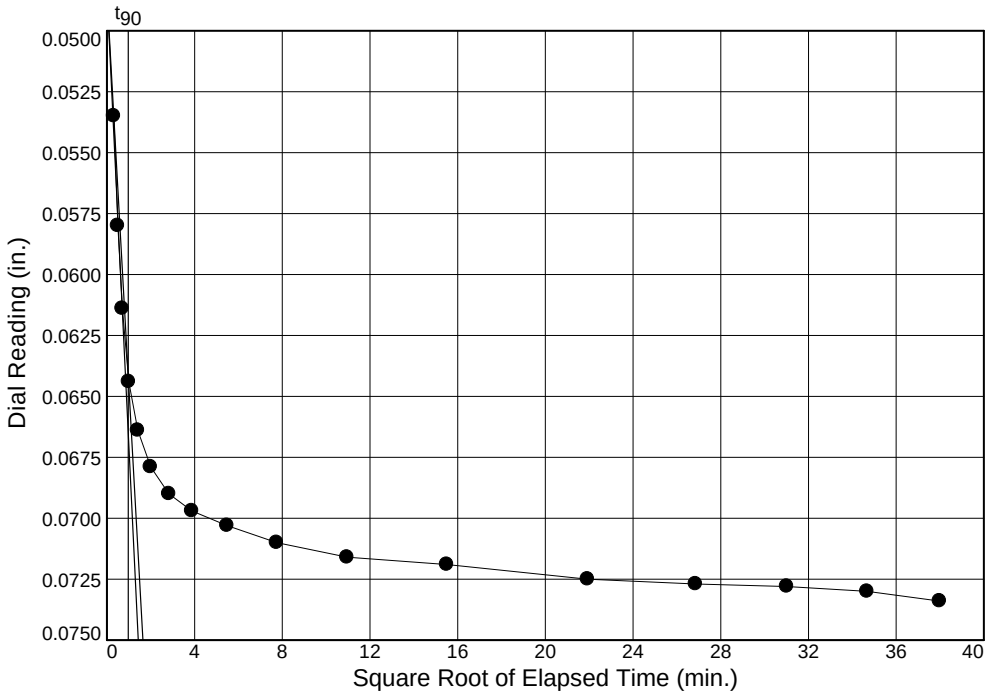
C_v @ T_{90}
2.717 ft.^{2}/day

Figure 4

Dial Reading vs. Time

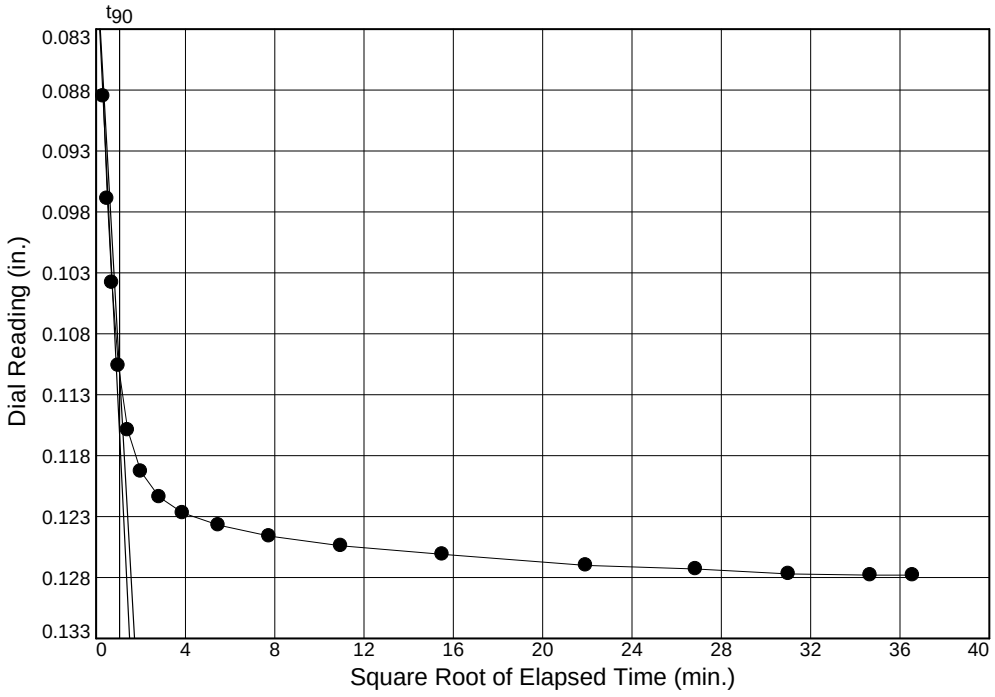
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: A-09A Depth: 30-32 ft Sample Number: UD-02



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0484
D_{90} = 0.0641
D_{100} = 0.0659
T_{90} = 0.95 min.

C_v @ T_{90}
1.994 ft.^{2}/day



Load No.= 15
Load= 32.00 ksf
D_0 = 0.0770
D_{90} = 0.1113
D_{100} = 0.1151
T_{90} = 1.11 min.

C_v @ T_{90}
1.540 ft.^{2}/day

Figure 5

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

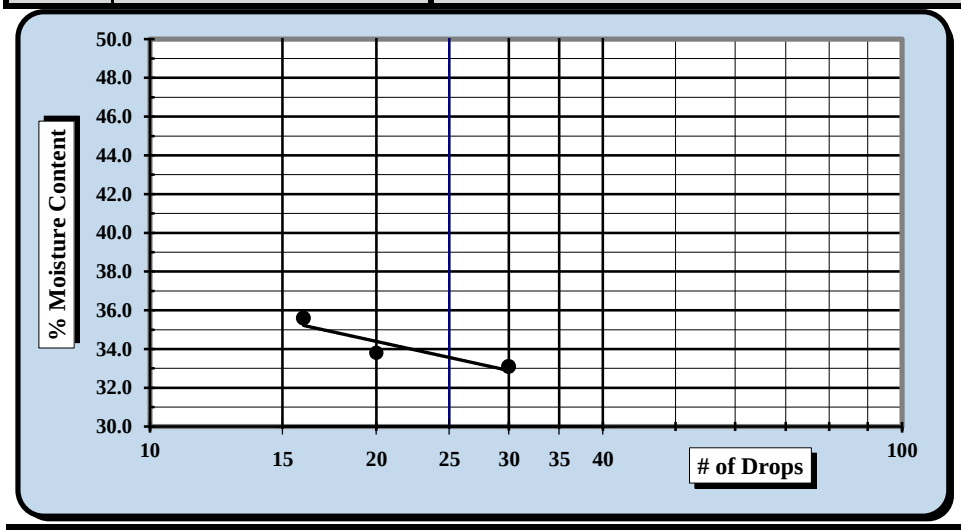
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-10	Sample #: SS-02	Sample Date: 2/3/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	Yellowish brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	8	12	23				13	4	
A	Tare Weight	15.48	15.56	15.42				15.36	15.47	
B	Wet Soil Weight + A	28.83	30.04	30.35				23.43	24.93	
C	Dry Soil Weight + A	25.51	26.38	26.43				21.94	23.18	
D	Water Weight (B-C)	3.32	3.66	3.92				1.49	1.75	
E	Dry Soil Weight (C-A)	10.03	10.82	11.01				6.58	7.71	
F	% Moisture (D/E)*100	33.1%	33.8%	35.6%				22.6%	22.7%	
N	# OF DROPS	30	20	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**34**
Plastic Limit	**23**
Plastic Index	**11**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

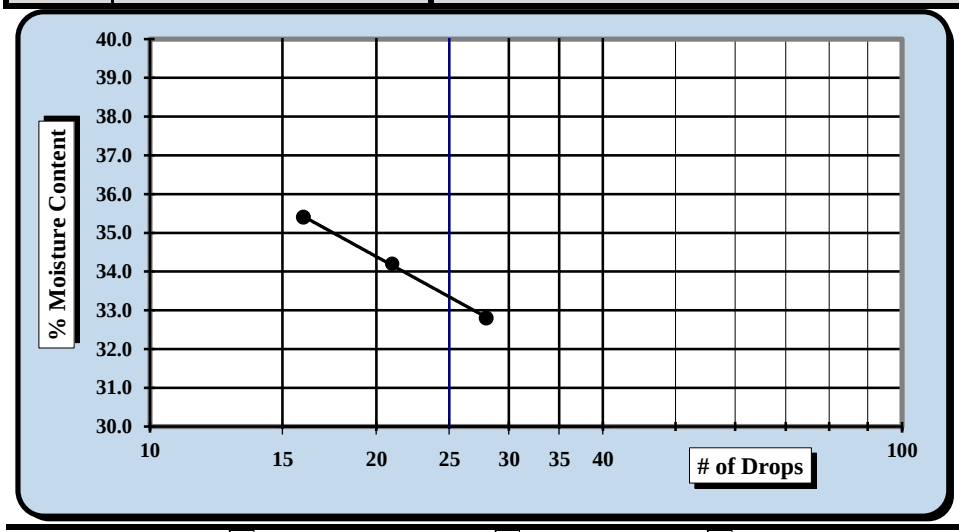
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-10A	Sample #: UD-01	Sample Date: 2/4/2025
Log #:	43-25-007		Depth: 8-10 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	3	18	16				17	20	
A	Tare Weight	15.46	11.15	15.62				15.47	15.42	
B	Wet Soil Weight + A	29.32	30.58	31.64				24.68	24.81	
C	Dry Soil Weight + A	25.90	25.63	27.45				22.79	22.88	
D	Water Weight (B-C)	3.42	4.95	4.19				1.89	1.93	
E	Dry Soil Weight (C-A)	10.44	14.48	11.83				7.32	7.46	
F	% Moisture (D/E)*100	32.8%	34.2%	35.4%				25.8%	25.9%	
N	# OF DROPS	28	21	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.9%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**33**
Plastic Limit	**26**
Plastic Index	**7**
Group Symbol	**ML**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

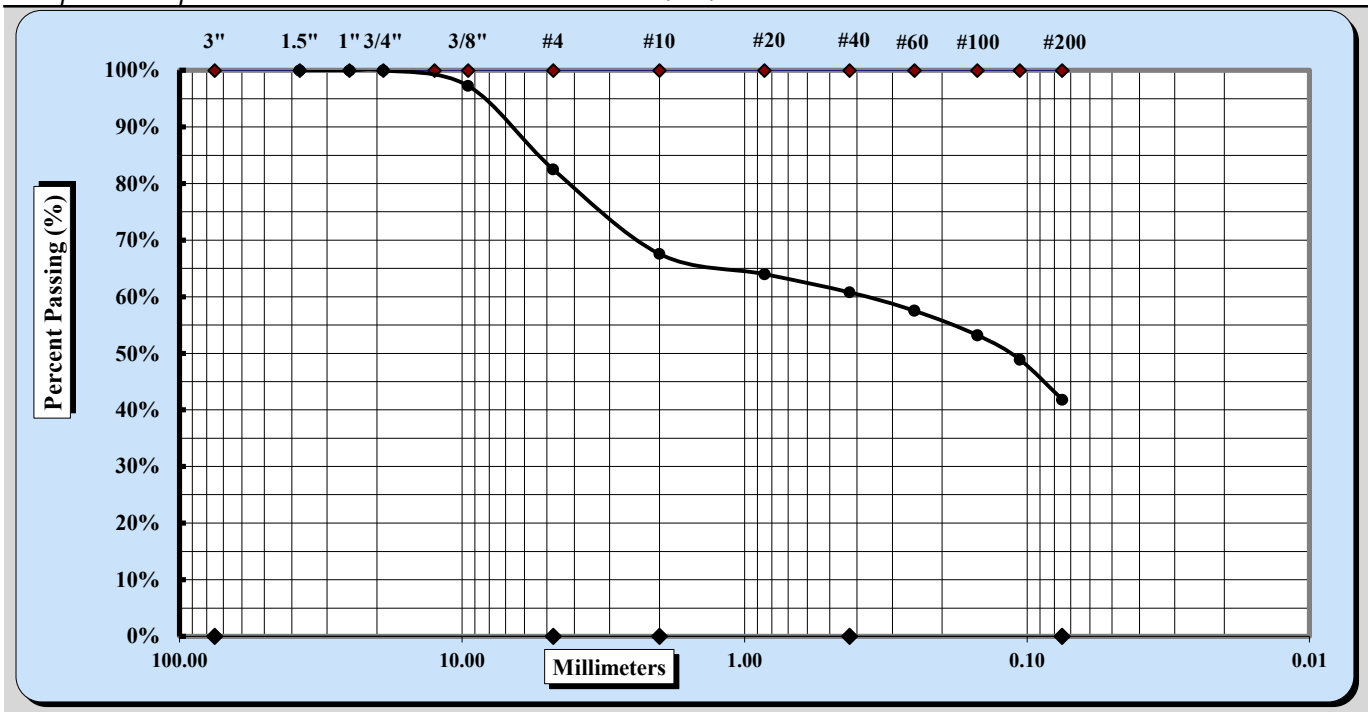
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Sieve Analysis of Soils

Quality Assurance *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-10A	Type: UD	Sample Date:	2/4/2025
Sample Log No.: 43-25-007	Sample: UD-01	Depth:	8-10 ft
Sample Description:	SILTY SAND WITH GRAVEL (SM), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	3/4"	Coarse Sand	15%	Fine Sand	19%
Gravel	17%	Medium Sand	7%	Silt & Clay	42%
Liquid Limit:	33	Plastic Limit:	26	Plastic Index:	7

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☐ Soft ☐ Weathered & Friable ☒

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

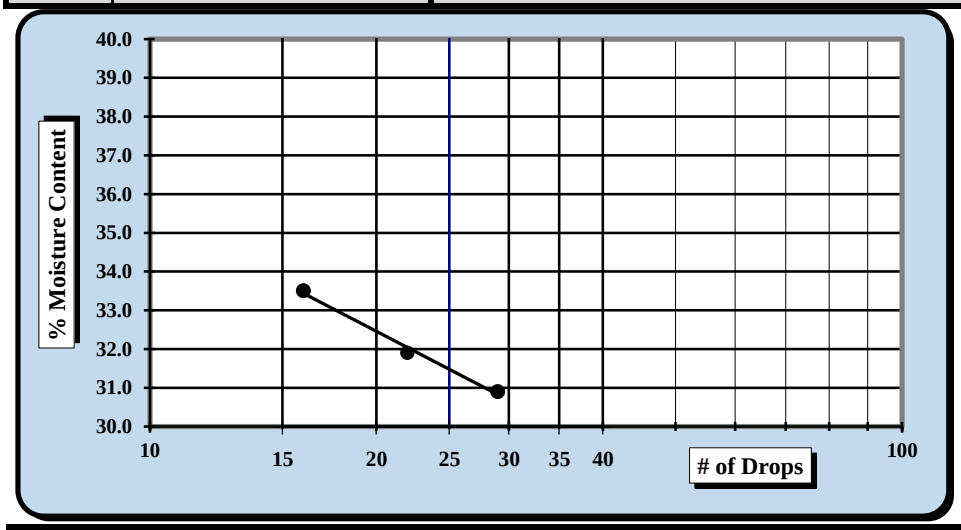
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/14/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-10A	Sample #: UD-02	Sample Date: 2/4/2025
Log #:	43-25-007		Depth: 18-20 ft
Description:	Strong Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	24	A1	14				B3	A4	
A	Tare Weight	15.42	15.63	15.47				15.94	15.92	
B	Wet Soil Weight + A	29.70	31.77	32.90				25.13	25.75	
C	Dry Soil Weight + A	26.33	27.87	28.53				23.42	23.93	
D	Water Weight (B-C)	3.37	3.90	4.37				1.71	1.82	
E	Dry Soil Weight (C-A)	10.91	12.24	13.06				7.48	8.01	
F	% Moisture (D/E)*100	30.9%	31.9%	33.5%				22.9%	22.7%	
N	# OF DROPS	29	22	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.8%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**31**
Plastic Limit	**23**
Plastic Index	**8**
Group Symbol	**ML**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

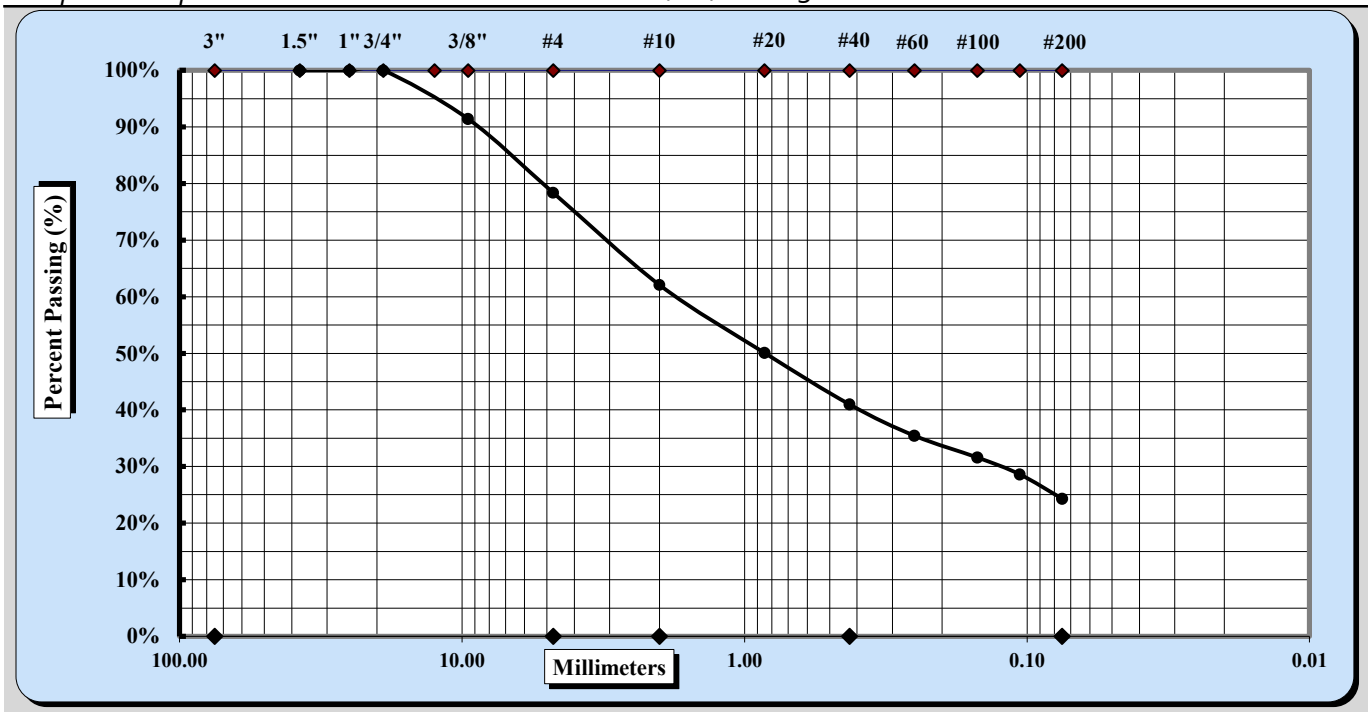
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Sieve Analysis of Soils

Quality Assurance | *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-10A	Type: UD	Sample Date:	2/4/2025
Sample Log No.: 43-25-007	Sample: UD-02	Depth:	18-20 ft
Sample Description:	SILTY SAND WITH GRAVEL (SM), strong brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	3/4"	Coarse Sand	16%	Fine Sand	17%
Gravel	22%	Medium Sand	21%	Silt & Clay	24%
Liquid Limit:	31	Plastic Limit:	23	Plastic Index:	8

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☐ Soft ☐ Weathered & Friable ☒

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

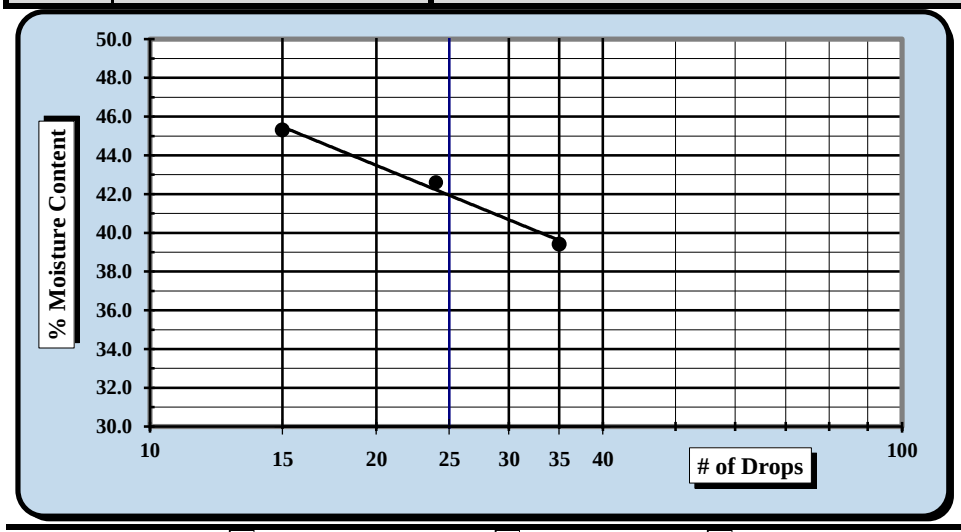
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-11	Sample #: SS-02	Sample Date: 1/30/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	Strong Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

	Pan #	Liquid Limit						Plastic Limit		
	Tare #:	14	B5	9				B2	3	
A	Tare Weight	15.46	15.94	15.42				15.90	15.46	
B	Wet Soil Weight + A	25.50	26.85	27.74				23.80	24.63	
C	Dry Soil Weight + A	22.66	23.59	23.90				22.49	23.10	
D	Water Weight (B-C)	2.84	3.26	3.84				1.31	1.53	
E	Dry Soil Weight (C-A)	7.20	7.65	8.48				6.59	7.64	
F	% Moisture (D/E)*100	39.4%	42.6%	45.3%				19.9%	20.0%	
N	# OF DROPS	35	24	15				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**42**
Plastic Limit	**20**
Plastic Index	**22**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

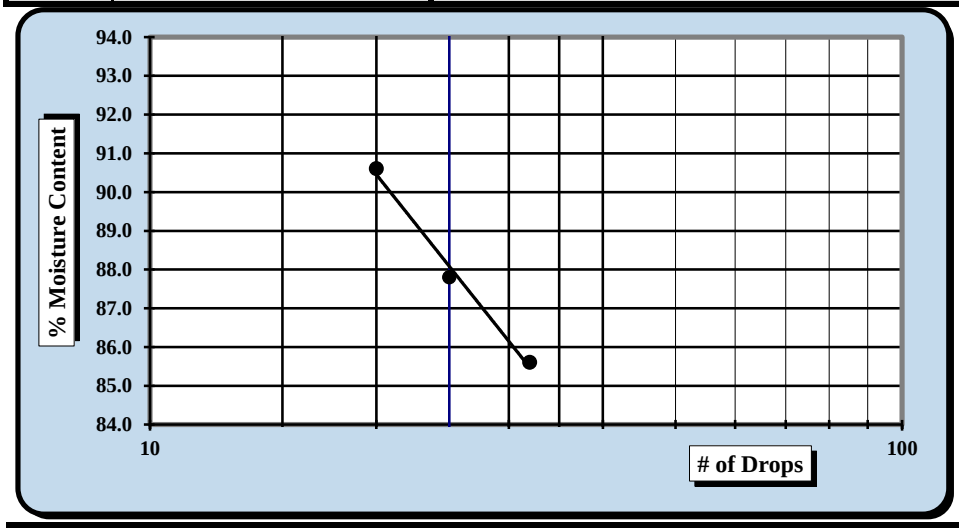
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-11	Sample #: SS-04	Sample Date: 1/30/2025
Log #:	43-25-007		Depth: 8.5-10 ft
Description:	yellowish brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	2	A1	19				B1	5	
A	Tare Weight	15.61	15.63	15.38				15.85	15.39	
B	Wet Soil Weight + A	29.88	31.46	32.46				25.09	25.09	
C	Dry Soil Weight + A	23.30	24.06	24.34				22.65	22.54	
D	Water Weight (B-C)	6.58	7.40	8.12				2.44	2.55	
E	Dry Soil Weight (C-A)	7.69	8.43	8.96				6.80	7.15	
F	% Moisture (D/E)*100	85.6%	87.8%	90.6%				35.9%	35.7%	
N	# OF DROPS	32	25	20				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**88**
Plastic Limit	**36**
Plastic Index	**52**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

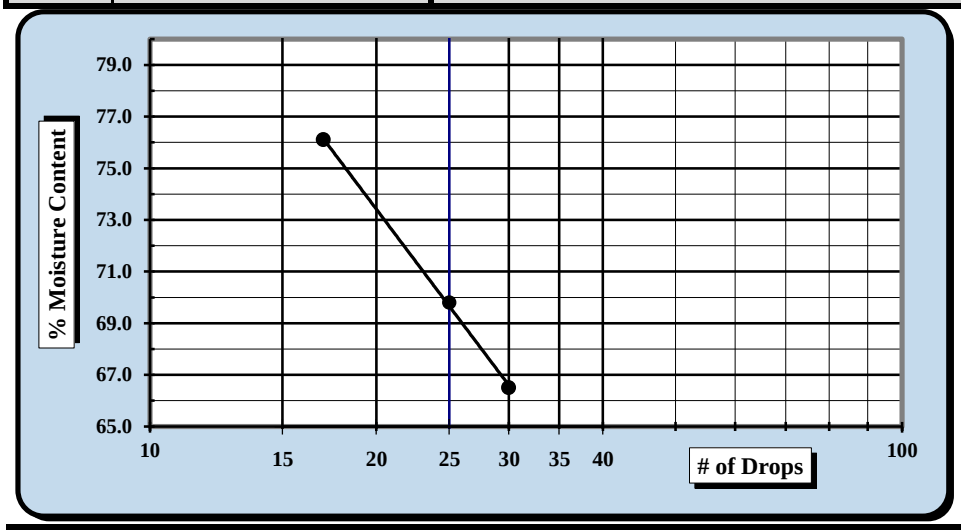
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-11	Sample #: SS-06	Sample Date: 2/4/2025
Log #:	43-25-007		Depth: 18.5-20 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	15	A5	A2				10	16	
A	Tare Weight	15.28	15.81	15.94				15.40	15.65	
B	Wet Soil Weight + A	29.80	31.06	32.35				25.03	24.99	
C	Dry Soil Weight + A	24.00	24.79	25.26				22.68	22.70	
D	Water Weight (B-C)	5.80	6.27	7.09				2.35	2.29	
E	Dry Soil Weight (C-A)	8.72	8.98	9.32				7.28	7.05	
F	% Moisture (D/E)*100	66.5%	69.8%	76.1%				32.3%	32.5%	
N	# OF DROPS	30	25	17				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.4%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**70**
Plastic Limit	**32**
Plastic Index	**38**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

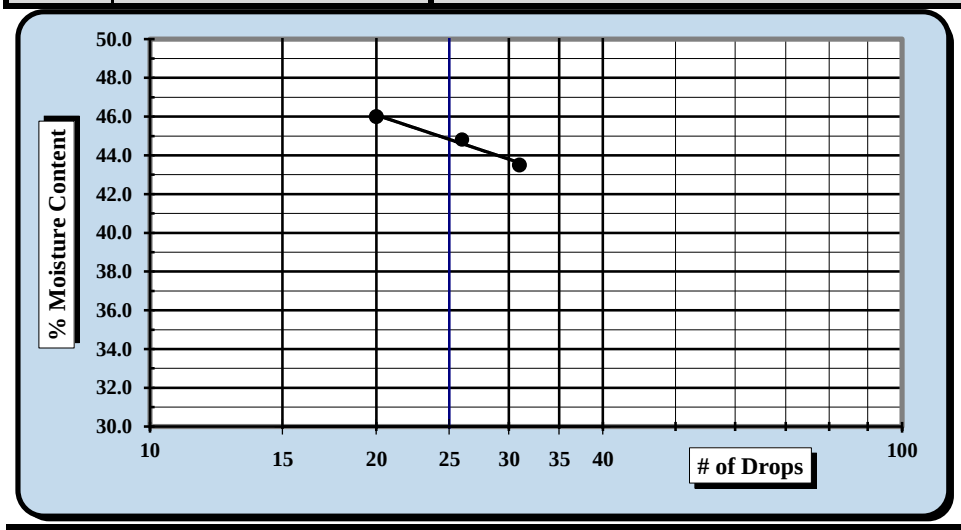
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/12/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-12	Sample #: SS-02	Sample Date: 2/4/2025
Log #:	43-25-007		Depth: 3.5-5 ft
Description:	Strong brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	16	5	21				9	B6	
A	Tare Weight	15.61	15.38	15.49				15.43	15.93	
B	Wet Soil Weight + A	26.72	27.18	27.07				23.55	26.15	
C	Dry Soil Weight + A	23.35	23.53	23.42				22.08	24.29	
D	Water Weight (B-C)	3.37	3.65	3.65				1.47	1.86	
E	Dry Soil Weight (C-A)	7.74	8.15	7.93				6.65	8.36	
F	% Moisture (D/E)*100	43.5%	44.8%	46.0%				22.1%	22.2%	
N	# OF DROPS	31	26	20				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.2%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**45**
Plastic Limit	**22**
Plastic Index	**23**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Victoria Igoe
Technician Name

Tyler Copeman
Technical Responsibility

3/18/2025
Date

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

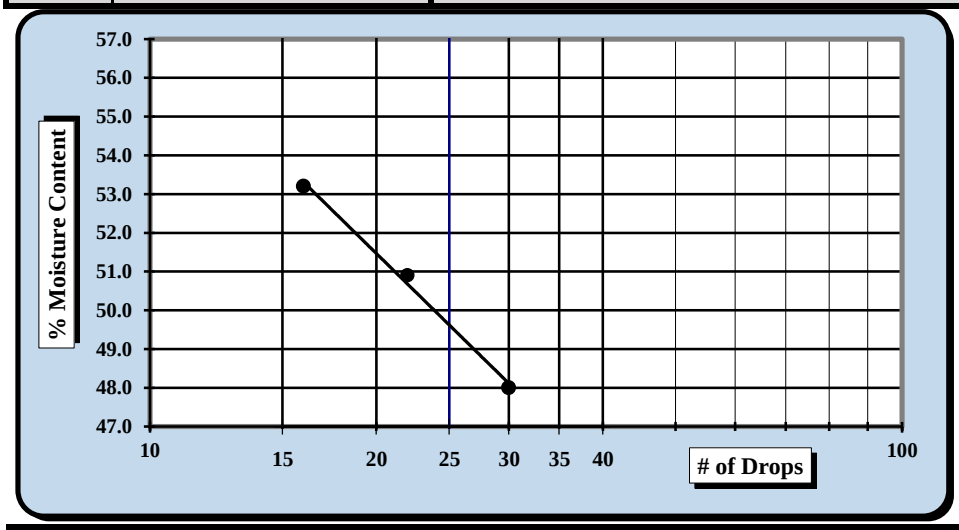
S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/13/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-12A	Sample #: UD-01	Sample Date: 2/5/2025
Log #:	43-25-007		Depth: 18-20 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B5	19	8				23	13	
A	Tare Weight	15.93	15.40	15.50				15.40	15.36	
B	Wet Soil Weight + A	31.16	32.90	33.66				24.95	24.95	
C	Dry Soil Weight + A	26.22	27.00	27.35				22.97	22.96	
D	Water Weight (B-C)	4.94	5.90	6.31				1.98	1.99	
E	Dry Soil Weight (C-A)	10.29	11.60	11.85				7.57	7.60	
F	% Moisture (D/E)*100	48.0%	50.9%	53.2%				26.2%	26.2%	
N	# OF DROPS	30	22	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**50**
Plastic Limit	**26**
Plastic Index	**24**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

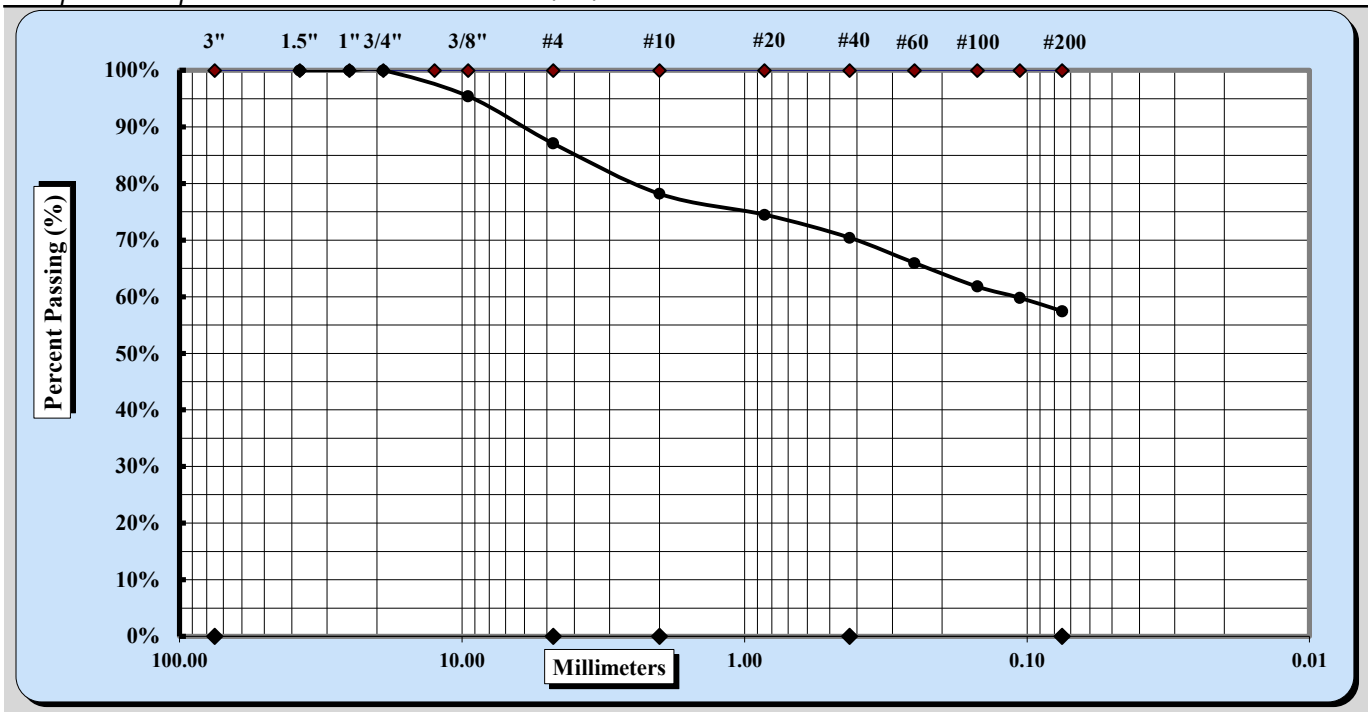
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Sieve Analysis of Soils

Quality Assurance | *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-12A	Type: UD	Sample Date:	2/5/2025
Sample Log No.: 43-25-007	Sample: UD-01	Depth:	18-20 ft
Sample Description:	SANDY FAT CLAY (CH), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	3/4"	Coarse Sand	9%	Fine Sand	13%
Gravel	13%	Medium Sand	8%	Silt & Clay	57%
Liquid Limit:	50	Plastic Limit:	26	Plastic Index:	24

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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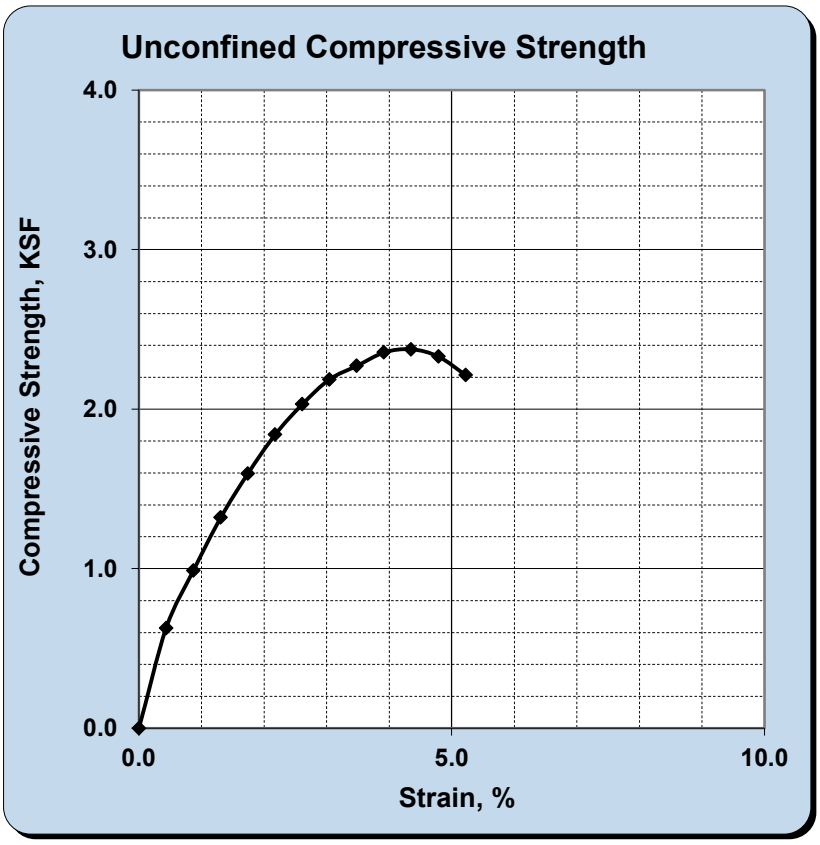
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	2/19/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-12A Sample No. UD-01	Sample Date:	2/5/2025
		Depth:	18-20 ft
Sample Description:	SANDY FAT CLAY (CH), brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 101.6 pcf
Initial Water Content: 22.9%
Unconfined Compressive Strength, q_u: **2.375** KSF
Undrained Shear Strength, s_u: **1.187** KSF

Liquid Limit: 50
Plasticity Index: 24
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.43
Strain at Failure: 4.4

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc.- Knoxville; 8501 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	3/14/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	A-12A	Sample #: UD-02	Sample Date: 2/5/2025
Log #:	43-25-007		Depth: 30-32 ft
Description:	Brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	1/20/2025	Grooving tool	32576	12/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	1/20/2025			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	22	10	5				A2	A5	
A	Tare Weight	15.39	15.39	15.39				15.92	15.80	
B	Wet Soil Weight + A	29.07	30.49	33.75				24.36	24.81	
C	Dry Soil Weight + A	24.28	25.01	26.80				22.73	23.07	
D	Water Weight (B-C)	4.79	5.48	6.95				1.63	1.74	
E	Dry Soil Weight (C-A)	8.89	9.62	11.41				6.81	7.27	
F	% Moisture (D/E)*100	53.9%	57.0%	60.9%				23.9%	23.9%	
N	# OF DROPS	30	24	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.9%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**56**
Plastic Limit	**24**
Plastic Index	**32**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez — *Technician Name*
Tyler Copeman — *Technical Responsibility*
3/18/2025 — *Date*

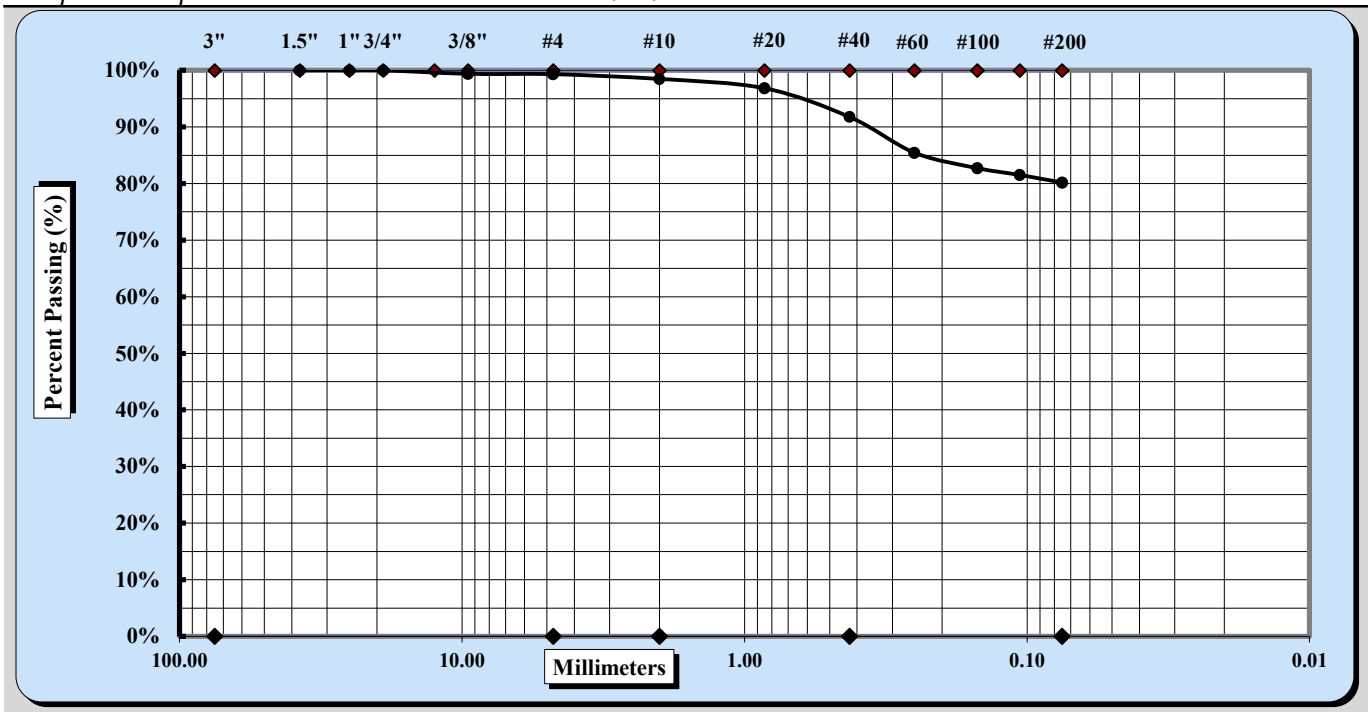
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Sieve Analysis of Soils

Quality Assurance | *ASTM D6913 Method A*

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	**24430185A**	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	3/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample ID: A-12A	Type: UD	Sample Date:	2/5/2025
Sample Log No.: 43-25-007	Sample: UD-02	Depth:	30-32 ft
Sample Description:	FAT CLAY WITH SAND (CH), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt and Clay	< 0.075 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)		
Medium Sand	< 2.00 mm and > 0.425 mm (#40)		

Maximum Particle Size	#4	Coarse Sand	1%	Fine Sand	12%
Gravel	1%	Medium Sand	7%	Silt & Clay	80%
Liquid Limit:	56	Plastic Limit:	24	Plastic Index:	32

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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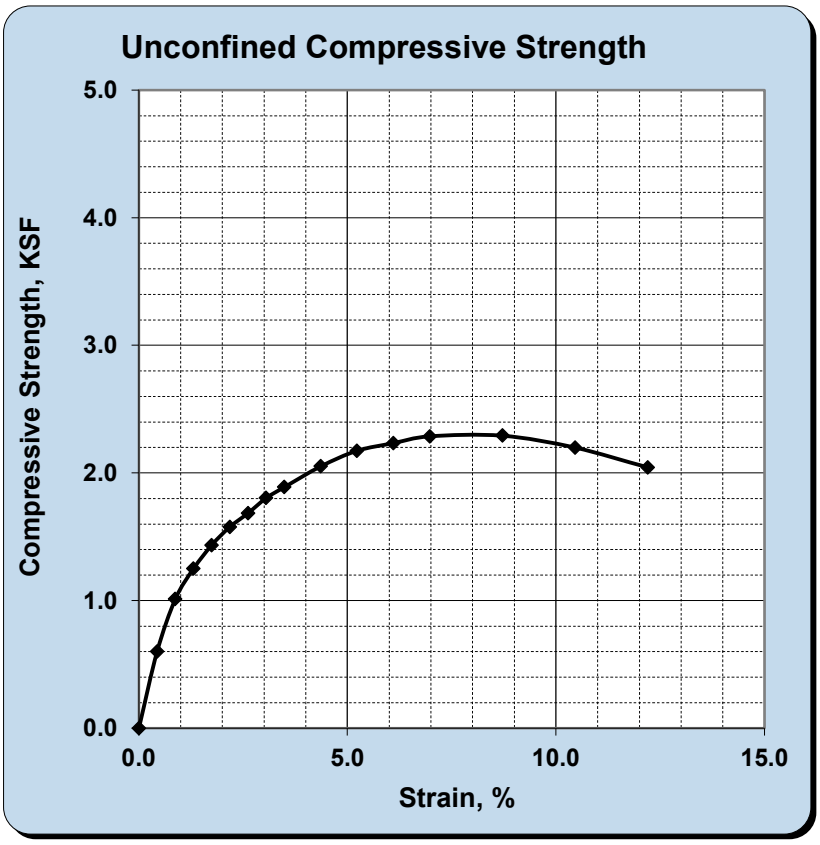
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project No.:	24430185A	Report Date:	3/18/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	2/20/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	A-12A Sample No. UD-02	Sample Date:	2/5/2025
		Depth:	30-32 ft
Sample Description:	FAT CLAY WITH SAND (CH), brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 87.5 pcf
Initial Water Content: 35.3%
Unconfined Compressive Strength, q_u: **2.293** KSF
Undrained Shear Strength, s_u: **1.146** KSF

Liquid Limit: 56
Plasticity Index: 32
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.87
Strain at Failure: 8.0

References / Comments / Deviations:

Lindsey Deskins	Lindsey Deskins	Staff Professional	3/18/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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UNCONFINED COMPRESSION
(ASTM D7012 Method C)

S&ME, Inc. - Knoxville 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project Name: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A

Report Date: 3/24/2025
Reviewed By: Tyler Copeman

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
A-01	Run-02	34.2 - 34.55	3.91	1.76	A	2.43	168.8	79	28,141	11,581	0.1
A-03A	Run-01	38.1 - 38.5	4.23	1.99	A	3.11	165.6	66	15,672	5,039	0.2
A-03A	Run-05	58.5 - 58.9	4.29	1.97	A	3.05	168.9	83	55,625	18,238	0.1
A-05	Run-03	25.55 - 25.9	4.03	1.75	A	2.41	149.7	54	8,489	3,522	1.3
A-06	Run-04	46.4 - 46.8	4.38	1.99	A	3.11	168.7	90	63,759	20,501	0.0

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.

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UNCONFINED COMPRESSION (ASTM D7012 Method C)

S&ME, Inc. - Knoxville 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project Name: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A

Report Date: 3/24/2025
Reviewed By: Tyler Copeman

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
A-11	Run-02	28.3 - 28.7	4.31	1.98	A	3.08	170.0	86	49,323	16,014	0.1
A-12	Run-03	53.8 - 54.15	3.85	1.75	A	2.41	168.5	88	46,757	19,401	0.1

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.

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PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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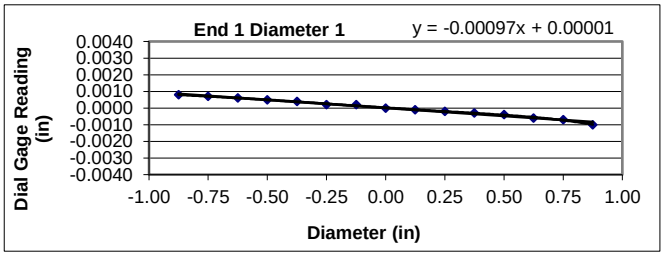
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.76	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	3.91	**Tested by:**	Victoria Igoe
Boring Id:	A-01	**Unit Weight (pcf):**	168.8	**Reviewed by:**	3/24/2025
Sample No.:	Run-02	**Moisture Content (%):**	0.1		
Depth (ft):	34.2 - 34.55				

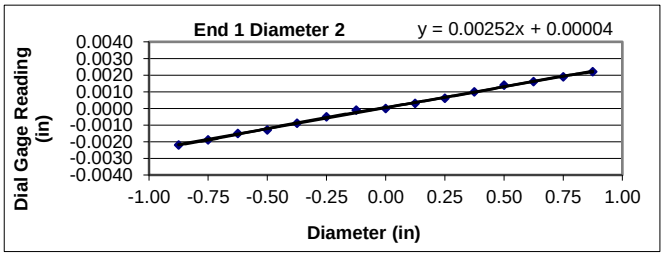
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

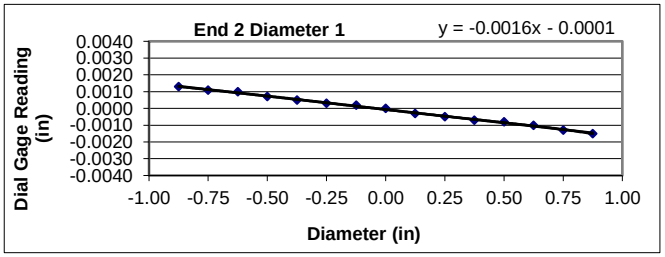
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	0.0008	-0.0022	0.0013	-0.0027
- 6/8	0.0007	-0.0019	0.0011	-0.0023
- 5/8	0.0006	-0.0015	0.0010	-0.0020
- 4/8	0.0005	-0.0013	0.0007	-0.0017
- 3/8	0.0004	-0.0009	0.0005	-0.0014
- 2/8	0.0002	-0.0005	0.0003	-0.0009
- 1/8	0.0002	-0.0001	0.0002	-0.0005
0	0.0000	0.0000	0.0000	0.0000
1/8	-0.0001	0.0003	-0.0003	0.0005
2/8	-0.0002	0.0006	-0.0005	0.0007
3/8	-0.0003	0.0010	-0.0007	0.0012
4/8	-0.0004	0.0014	-0.0008	0.0015
5/8	-0.0006	0.0016	-0.0010	0.0018
6/8	-0.0007	0.0019	-0.0013	0.0022
7/8	-0.0010	0.0022	-0.0015	0.0026

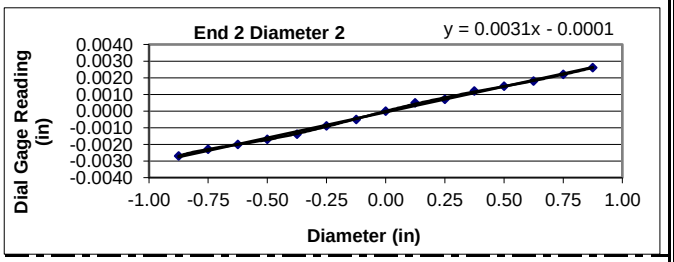




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	-0.00097
	Angle of Best Fit Line:	-0.05533
End 2:	Slope of Best Fit Line:	-0.00159
	Angle of Best Fit Line:	-0.09118
	Max Angular Difference:	**0.04**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00252
	Angle of Best Fit Line:	0.14439
End 2:	Slope of Best Fit Line:	0.00308
	Angle of Best Fit Line:	0.17663
	Max Angular Difference:	**-0.03**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0018	0.0010	**YES**
End 1 Diam 2	0.0044	0.0025	**YES**
End 2 Diam 1	0.0028	0.0016	**YES**
End 2 Diam 2	0.0053	0.0030	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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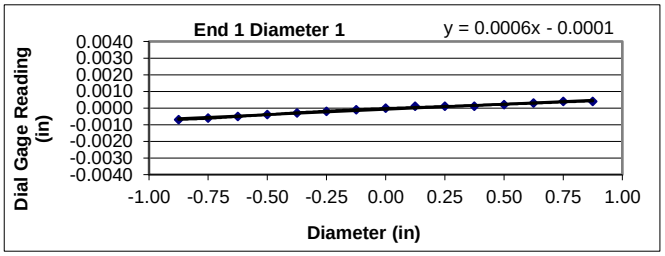
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.99	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	4.23	**Tested by:**	Victoria Igoe
Boring Id:	A-03A	**Unit Weight (pcf):**	165.6	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-01	**Moisture Content (%):**	0.2		
Depth (ft):	38.1 - 38.5				

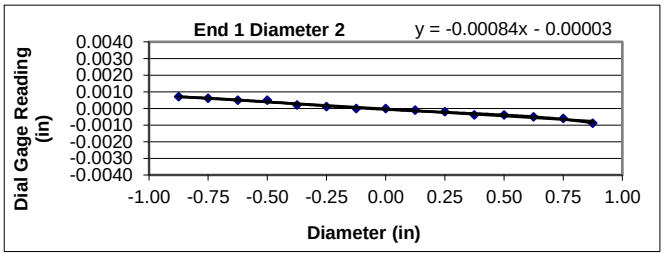
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

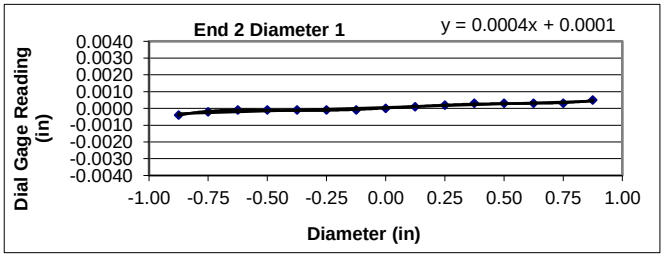
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0007	0.0007	-0.0004	0.0006
- 6/8	-0.0006	0.0006	-0.0002	0.0005
- 5/8	-0.0005	0.0005	-0.0001	0.0005
- 4/8	-0.0004	0.0005	-0.0001	0.0005
- 3/8	-0.0003	0.0002	-0.0001	0.0004
- 2/8	-0.0002	0.0001	-0.0001	0.0003
- 1/8	-0.0001	0.0000	-0.0001	0.0002
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0001	-0.0001	0.0001	0.0000
2/8	0.0001	-0.0002	0.0002	0.0000
3/8	0.0001	-0.0004	0.0003	-0.0001
4/8	0.0002	-0.0004	0.0003	-0.0002
5/8	0.0003	-0.0005	0.0003	-0.0005
6/8	0.0004	-0.0006	0.0003	-0.0007
7/8	0.0004	-0.0009	0.0005	-0.0009

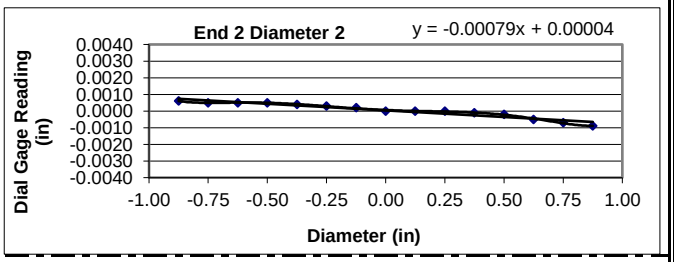




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00063
	Angle of Best Fit Line:	0.03618
End 2:	Slope of Best Fit Line:	0.00043
	Angle of Best Fit Line:	0.02439
	Max Angular Difference:	**0.01**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	-0.00084
	Angle of Best Fit Line:	-0.04829
End 2:	Slope of Best Fit Line:	-0.00079
	Angle of Best Fit Line:	-0.04551
	Max Angular Difference:	**0.00**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0011	0.0006	**YES**
End 1 Diam 2	0.0016	0.0008	**YES**
End 2 Diam 1	0.0009	0.0005	**YES**
End 2 Diam 2	0.0015	0.0008	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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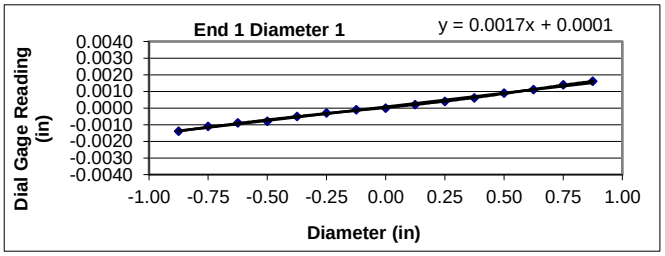
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.97	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	4.29	**Tested by:**	Victoria Igoe
Boring Id:	A-03A	**Unit Weight (pcf):**	168.9	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-05	**Moisture Content (%):**	0.1		
Depth (ft):	58.5 - 58.9				

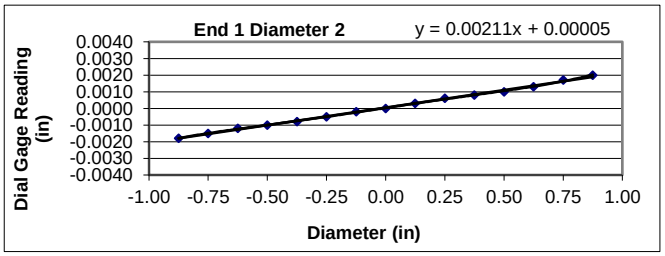
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

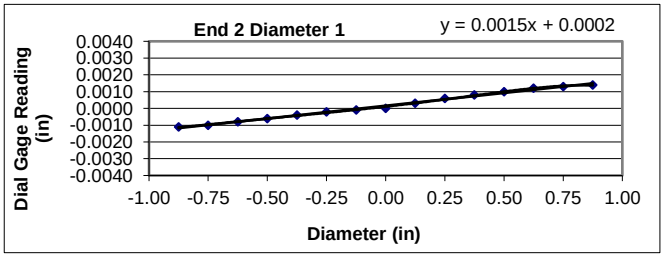
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0014	-0.0018	-0.0011	-0.0021
- 6/8	-0.0011	-0.0015	-0.0010	-0.0018
- 5/8	-0.0009	-0.0012	-0.0008	-0.0015
- 4/8	-0.0008	-0.0010	-0.0006	-0.0012
- 3/8	-0.0005	-0.0008	-0.0004	-0.0008
- 2/8	-0.0003	-0.0005	-0.0002	-0.0006
- 1/8	-0.0001	-0.0002	-0.0001	-0.0003
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0002	0.0003	0.0003	0.0003
2/8	0.0004	0.0006	0.0006	0.0006
3/8	0.0006	0.0008	0.0008	0.0010
4/8	0.0009	0.0010	0.0010	0.0013
5/8	0.0011	0.0013	0.0012	0.0016
6/8	0.0014	0.0017	0.0013	0.0019
7/8	0.0016	0.0020	0.0014	0.0022

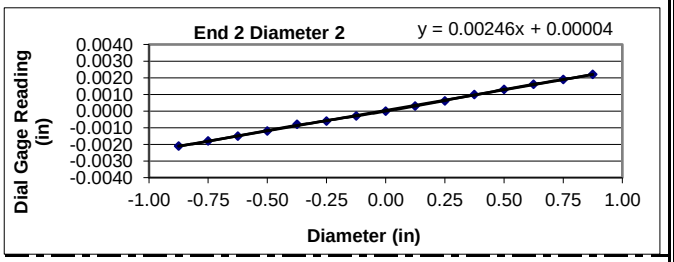




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00165
	Angle of Best Fit Line:	0.09462
End 2:	Slope of Best Fit Line:	0.00152
	Angle of Best Fit Line:	0.08725
	Max Angular Difference:	**0.01**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00211
	Angle of Best Fit Line:	0.12081
End 2:	Slope of Best Fit Line:	0.00246
	Angle of Best Fit Line:	0.14111
	Max Angular Difference:	**-0.02**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0030	0.0015	**YES**
End 1 Diam 2	0.0038	0.0019	**YES**
End 2 Diam 1	0.0025	0.0013	**YES**
End 2 Diam 2	0.0043	0.0022	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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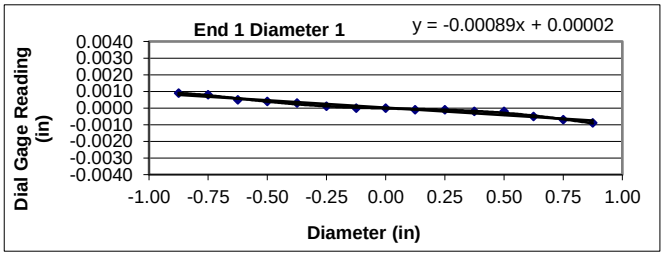
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	4.03	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	1.75	**Tested by:**	Victoria Igoe
Boring Id:	A-05	**Unit Weight (pcf):**	149.7	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-03	**Moisture Content (%):**	1.3		
Depth (ft):	25.55 - 25.9				

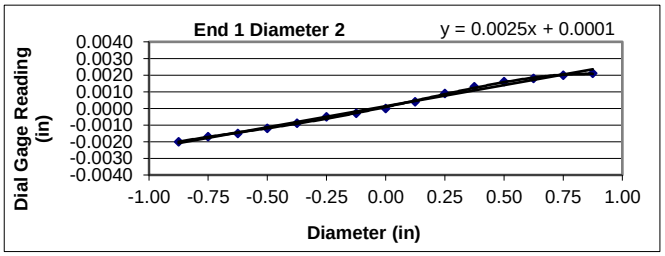
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

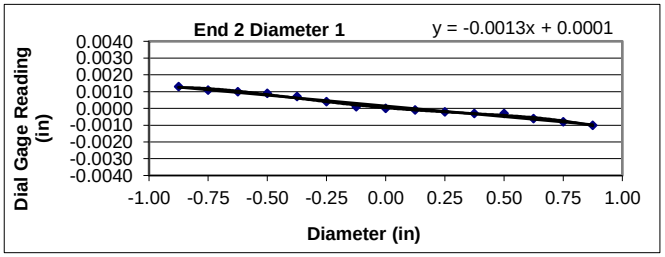
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	0.0009	-0.0020	0.0013	-0.0019
- 6/8	0.0008	-0.0017	0.0011	-0.0016
- 5/8	0.0005	-0.0015	0.0010	-0.0012
- 4/8	0.0004	-0.0012	0.0009	-0.0010
- 3/8	0.0003	-0.0009	0.0007	-0.0007
- 2/8	0.0001	-0.0005	0.0004	-0.0005
- 1/8	0.0000	-0.0003	0.0001	-0.0002
0	0.0000	0.0000	0.0000	0.0000
1/8	-0.0001	0.0004	-0.0001	0.0003
2/8	-0.0001	0.0009	-0.0002	0.0006
3/8	-0.0002	0.0013	-0.0003	0.0009
4/8	-0.0002	0.0016	-0.0003	0.0011
5/8	-0.0005	0.0018	-0.0006	0.0015
6/8	-0.0007	0.0020	-0.0008	0.0018
7/8	-0.0009	0.0021	-0.0010	0.0021

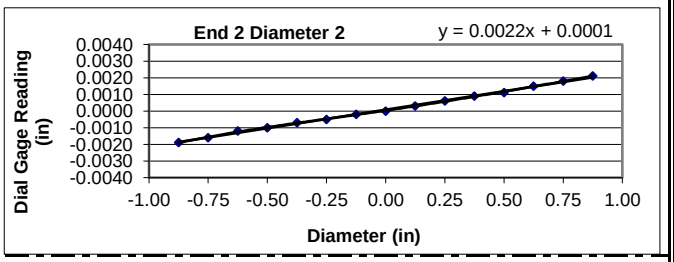




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	-0.00089
	Angle of Best Fit Line:	-0.05075
End 2:	Slope of Best Fit Line:	-0.00128
	Angle of Best Fit Line:	-0.07317
	Max Angular Difference:	**0.02**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00253
	Angle of Best Fit Line:	0.14520
End 2:	Slope of Best Fit Line:	0.00222
	Angle of Best Fit Line:	0.12736
	Max Angular Difference:	**0.02**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0018	0.0004	**YES**
End 1 Diam 2	0.0041	0.0010	**YES**
End 2 Diam 1	0.0023	0.0006	**YES**
End 2 Diam 2	0.0040	0.0010	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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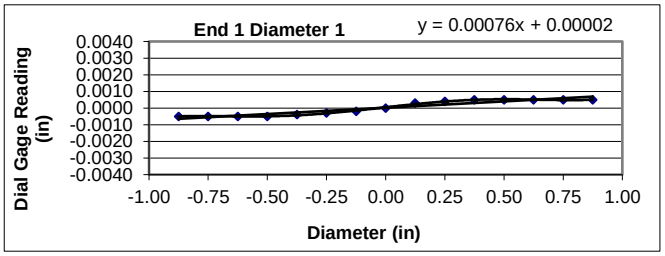
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.99	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	4.38	**Tested by:**	Victoria Igoe
Boring Id:	A-06	**Unit Weight (pcf):**	168.7	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-04	**Moisture Content (%):**	0.0		
Depth (ft):	46.4 - 46.8				

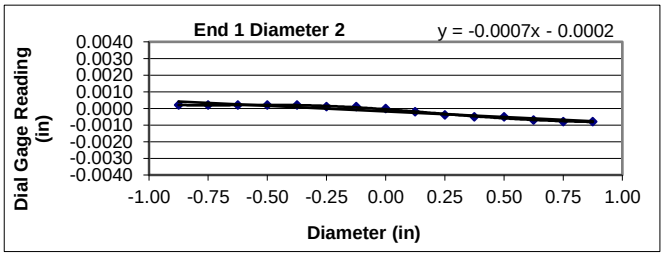
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

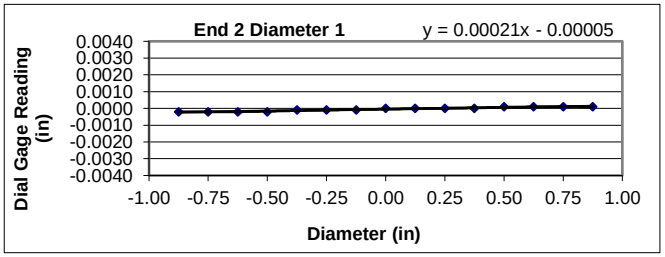
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0005	0.0002	-0.0002	0.0007
- 6/8	-0.0005	0.0002	-0.0002	0.0006
- 5/8	-0.0005	0.0002	-0.0002	0.0005
- 4/8	-0.0005	0.0002	-0.0002	0.0004
- 3/8	-0.0004	0.0002	-0.0001	0.0003
- 2/8	-0.0003	0.0001	-0.0001	0.0002
- 1/8	-0.0002	0.0001	-0.0001	0.0001
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0003	-0.0002	0.0000	-0.0001
2/8	0.0004	-0.0004	0.0000	-0.0001
3/8	0.0005	-0.0005	0.0000	-0.0002
4/8	0.0005	-0.0005	0.0001	-0.0002
5/8	0.0005	-0.0007	0.0001	-0.0002
6/8	0.0005	-0.0008	0.0001	-0.0003
7/8	0.0005	-0.0008	0.0001	-0.0005

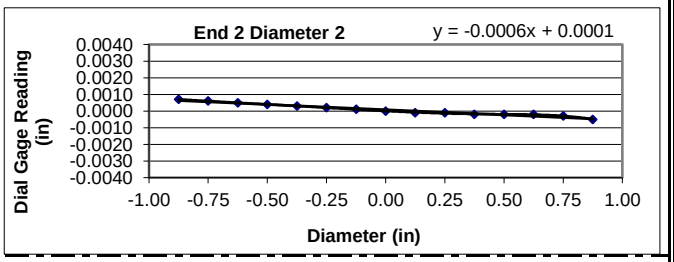




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00076
	Angle of Best Fit Line:	0.04354
End 2:	Slope of Best Fit Line:	0.00021
	Angle of Best Fit Line:	0.01179
	Max Angular Difference:	**0.03**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	-0.00068
	Angle of Best Fit Line:	-0.03880
End 2:	Slope of Best Fit Line:	-0.00063
	Angle of Best Fit Line:	-0.03601
	Max Angular Difference:	**0.00**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0010	0.0005	**YES**
End 1 Diam 2	0.0010	0.0005	**YES**
End 2 Diam 1	0.0003	0.0002	**YES**
End 2 Diam 2	0.0012	0.0006	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

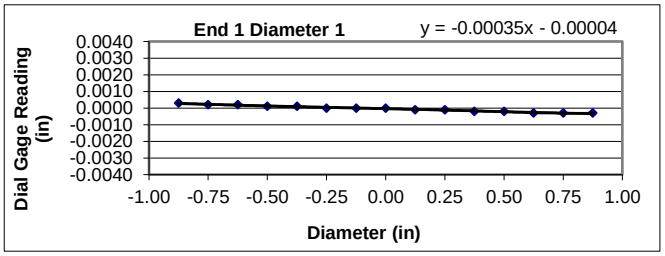
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.98	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	4.31	**Tested by:**	Victoria Igoe
Boring Id:	A-11	**Unit Weight (pcf):**	170.0	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-02	**Moisture Content (%):**	0.1		
Depth (ft):	28.3 - 28.7				

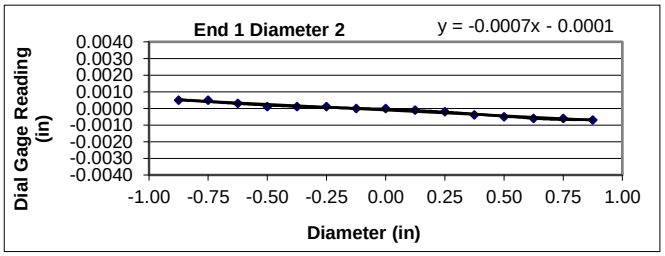
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

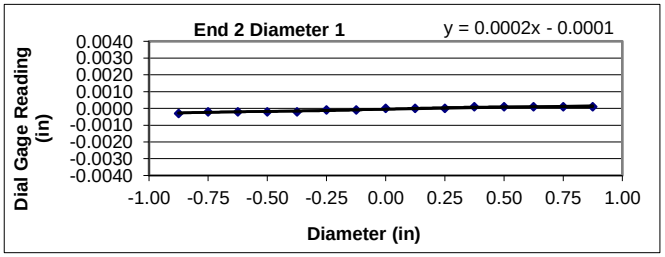
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	0.0003	0.0005	-0.0003	0.0007
- 6/8	0.0002	0.0005	-0.0002	0.0006
- 5/8	0.0002	0.0003	-0.0002	0.0005
- 4/8	0.0001	0.0001	-0.0002	0.0003
- 3/8	0.0001	0.0001	-0.0002	0.0003
- 2/8	0.0000	0.0001	-0.0001	0.0002
- 1/8	0.0000	0.0000	-0.0001	0.0001
0	0.0000	0.0000	0.0000	0.0000
1/8	-0.0001	-0.0001	0.0000	0.0000
2/8	-0.0001	-0.0002	0.0000	0.0000
3/8	-0.0002	-0.0004	0.0001	-0.0001
4/8	-0.0002	-0.0005	0.0001	-0.0001
5/8	-0.0003	-0.0006	0.0001	-0.0002
6/8	-0.0003	-0.0006	0.0001	-0.0003
7/8	-0.0003	-0.0007	0.0001	-0.0004

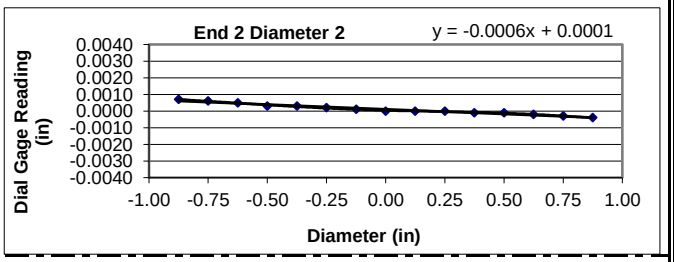




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	-0.00035
	Angle of Best Fit Line:	-0.01981
End 2:	Slope of Best Fit Line:	0.00024
	Angle of Best Fit Line:	0.01391
	Max Angular Difference:	**-0.03**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	-0.00069
	Angle of Best Fit Line:	-0.03945
End 2:	Slope of Best Fit Line:	-0.00057
	Angle of Best Fit Line:	-0.03258
	Max Angular Difference:	**-0.01**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0006	0.0003	**YES**
End 1 Diam 2	0.0012	0.0006	**YES**
End 2 Diam 1	0.0004	0.0002	**YES**
End 2 Diam 2	0.0011	0.0006	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

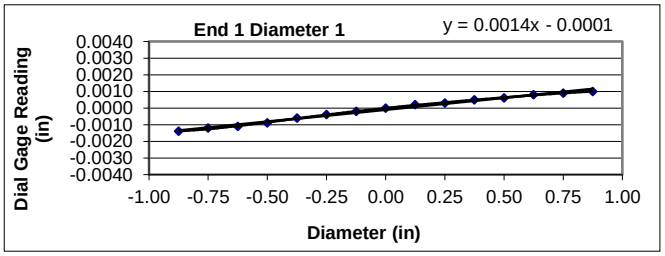
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.75	**Date:**	3/4/2025
Project No.:	24430185A	**Length (in):**	3.85	**Tested by:**	Victoria Igoe
Boring Id:	A-12	**Unit Weight (pcf):**	168.5	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-03	**Moisture Content (%):**	0.1		
Depth (ft):	53.8 - 54.15				

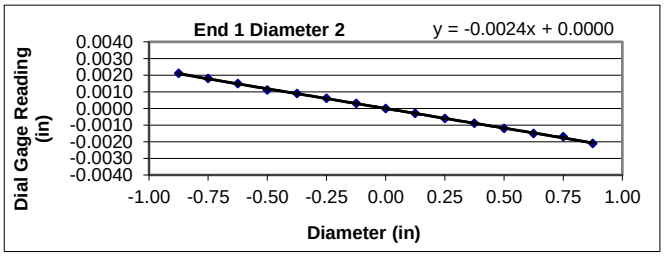
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

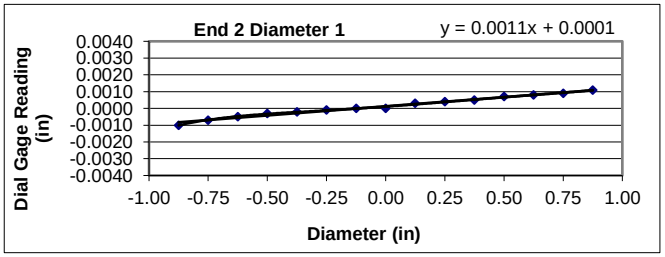
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0014	0.0021	-0.0010	0.0021
- 6/8	-0.0012	0.0018	-0.0007	0.0019
- 5/8	-0.0011	0.0015	-0.0005	0.0016
- 4/8	-0.0009	0.0011	-0.0003	0.0013
- 3/8	-0.0006	0.0009	-0.0002	0.0009
- 2/8	-0.0004	0.0006	-0.0001	0.0007
- 1/8	-0.0002	0.0003	0.0000	0.0005
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0002	-0.0003	0.0003	-0.0003
2/8	0.0003	-0.0006	0.0004	-0.0006
3/8	0.0005	-0.0009	0.0005	-0.0008
4/8	0.0006	-0.0012	0.0007	-0.0012
5/8	0.0008	-0.0015	0.0008	-0.0016
6/8	0.0009	-0.0017	0.0009	-0.0018
7/8	0.0010	-0.0021	0.0011	-0.0021

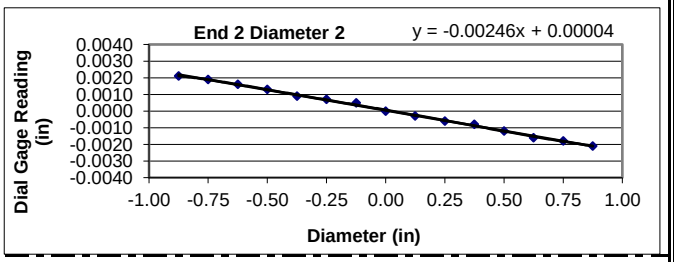




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00143
	Angle of Best Fit Line:	0.08185
End 2:	Slope of Best Fit Line:	0.00109
	Angle of Best Fit Line:	0.06253
	Max Angular Difference:	**0.02**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	-0.00237
	Angle of Best Fit Line:	-0.13587
End 2:	Slope of Best Fit Line:	-0.00246
	Angle of Best Fit Line:	-0.14095
	Max Angular Difference:	**0.01**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0024	0.0014	**YES**
End 1 Diam 2	0.0042	0.0024	**YES**
End 2 Diam 1	0.0021	0.0012	**YES**
End 2 Diam 2	0.0042	0.0024	**YES**

Perpendicularity Tolerance Met? **YES**





Date: 03/05/2025

Photographer: Victoria Igoe

1	**Location / Orientation**	A-01, Run-02 (34.2' – 34.55')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

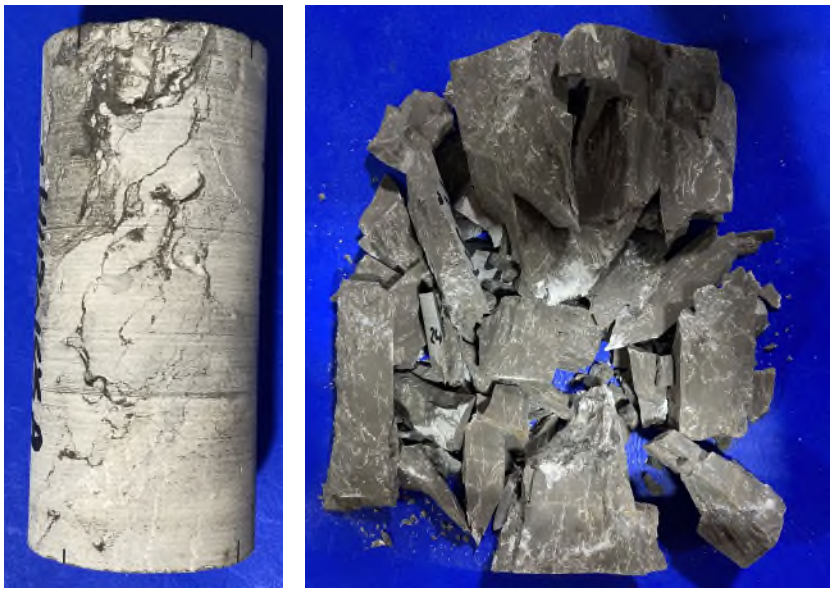




Date: 03/05/2025

Photographer: Victoria Igoe

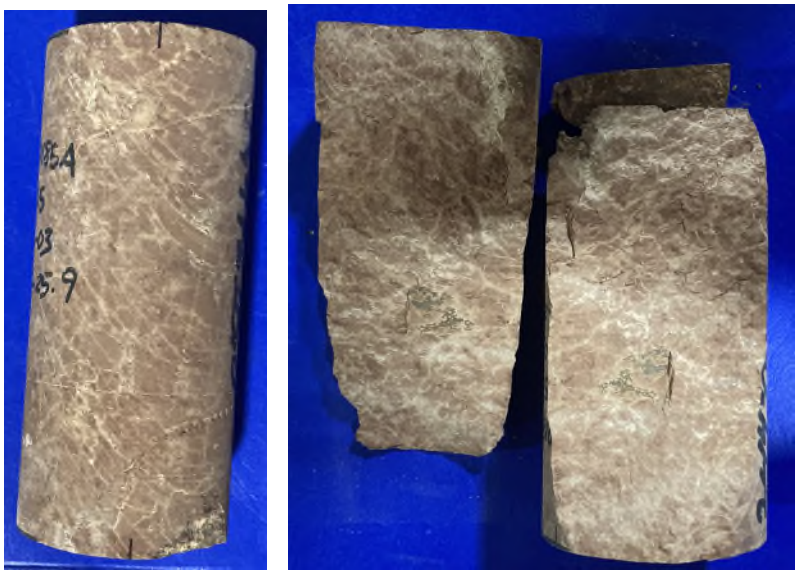
2	**Location / Orientation**	A-03A, Run-01 (38.1' – 38.5')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



Date: 03/05/2025

Photographer: Victoria Igoe

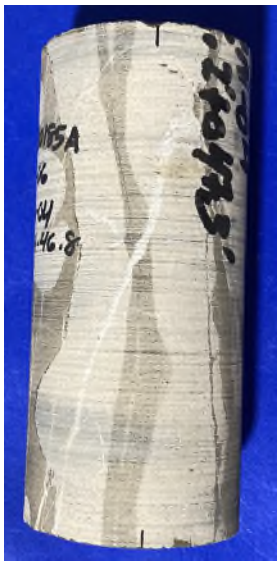
3	**Location / Orientation**	A-03A, Run-05 (58.5' – 58.9')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



Date: 03/05/2025

Photographer: Victoria Igoe

4	**Location / Orientation**	A-05, Run-03 (25.5' – 25.9')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)





Date: 03/05/2025

Photographer: Victoria Igoe

5	**Location / Orientation**	A-06, Run-04 (46.4' – 46.8')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)





Date: 03/05/2025

Photographer: Victoria Igoe

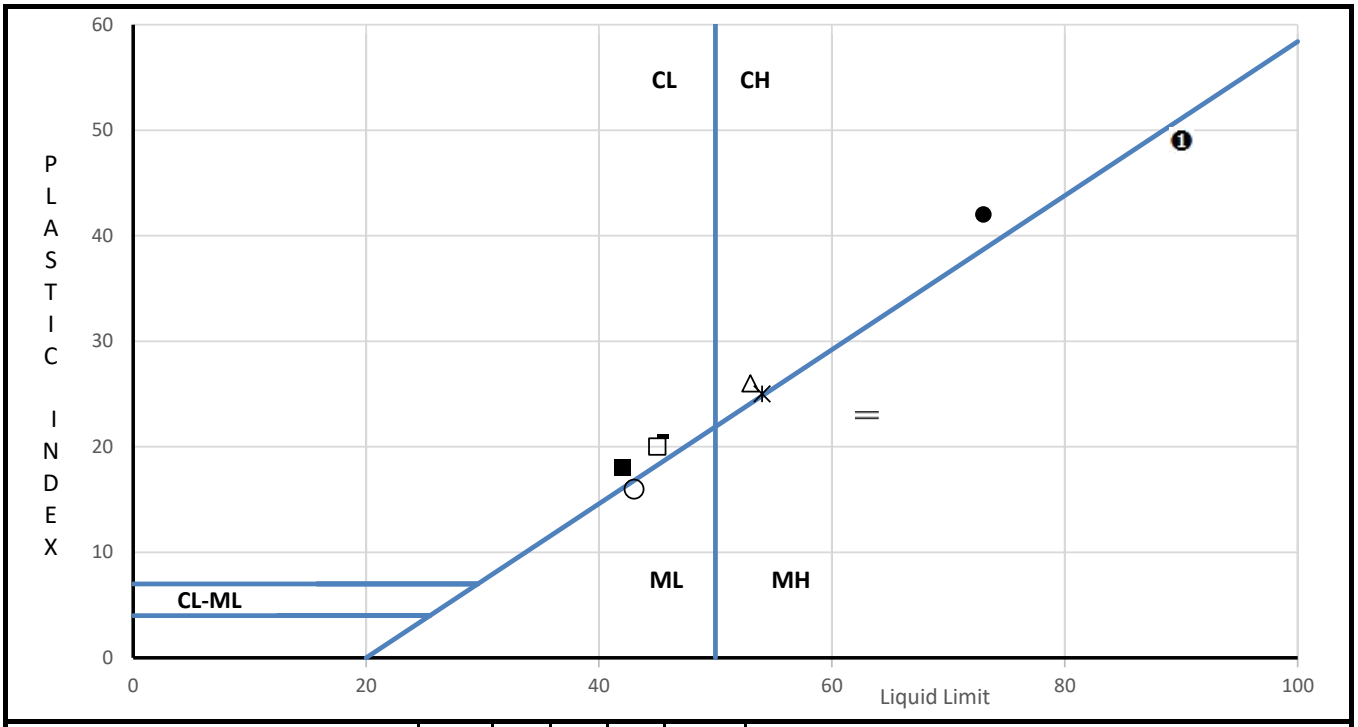
6	**Location / Orientation**	A-11, Run-02 (28.3' – 28.7')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



Date: 03/05/2025

Photographer: Victoria Igoe

7	**Location / Orientation**	A-12, Run-03 (53.8' – 54.15')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



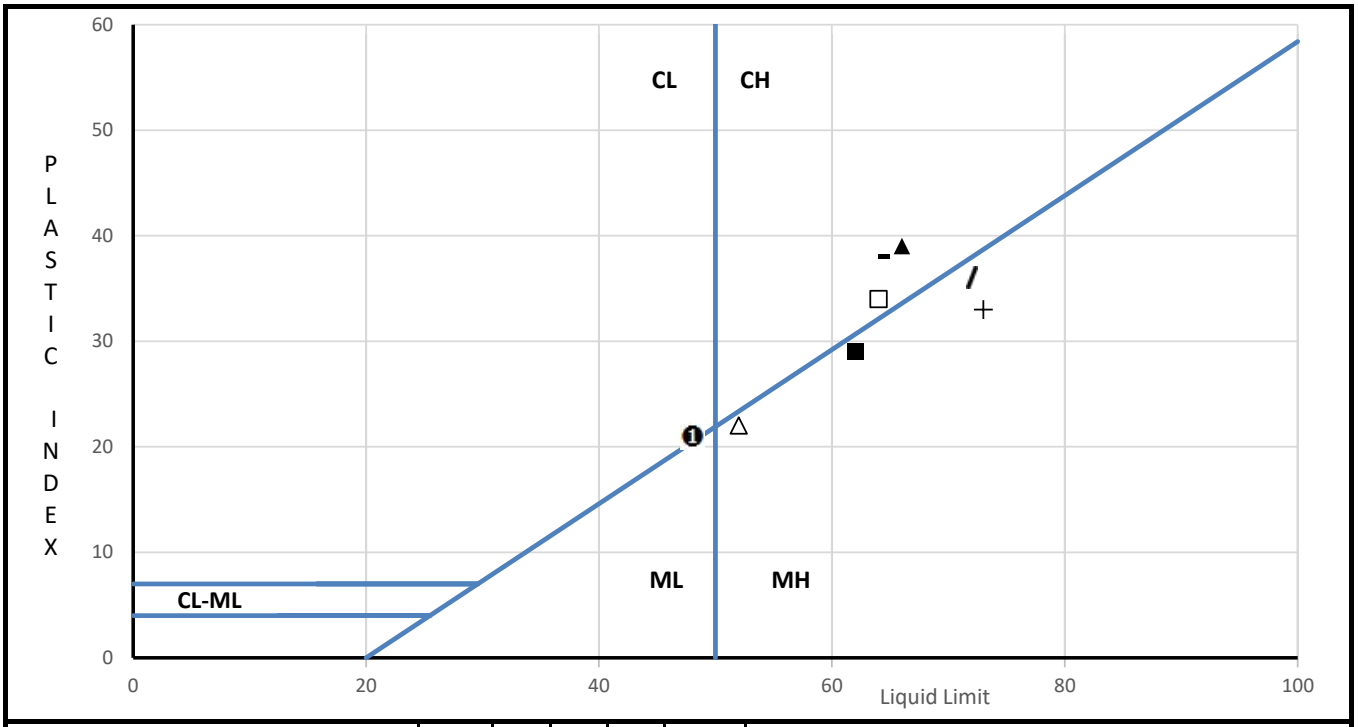
Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
■	B-01		2	21.9	42	24	18		CL	
	B-01		5.5	20.0						
	B-02		1	27.6						
●	B-02		5	31.4	73	31	42		CH	
▬	B-03		1	25.5	45	24	21		CL	
	B-03		5	24.2						
□	B-03	UD-02	8	23.5	45	25	20	89.9	CL	
	B-03		15	30.9						
△	B-03		18.5	34.7	53	27	26		CH	
	B-04		1	33.2						
✳	B-04		6	32.8	54	29	25	73.4	CH	
	B-04		13.5	43.5						
	B-04		18.5	46.6						
○	B-04		23.5	32.0	43	27	16	50.9	ML	
	B-04		28.5	28.8						
	B-05		1	38.0						
❶	B-05		5	36.9	90	41	49		MH	
	B-05		10	40.2						
═	B-05	UD-03	13	43.9	63	40	23	74.1	MH	
	B-05		18.5	38.0						

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A

Approved by	Date
Tyler Cobb	1/31/2025 7:45

Report No. KNOX_25001580
Report Date 1/31/2025



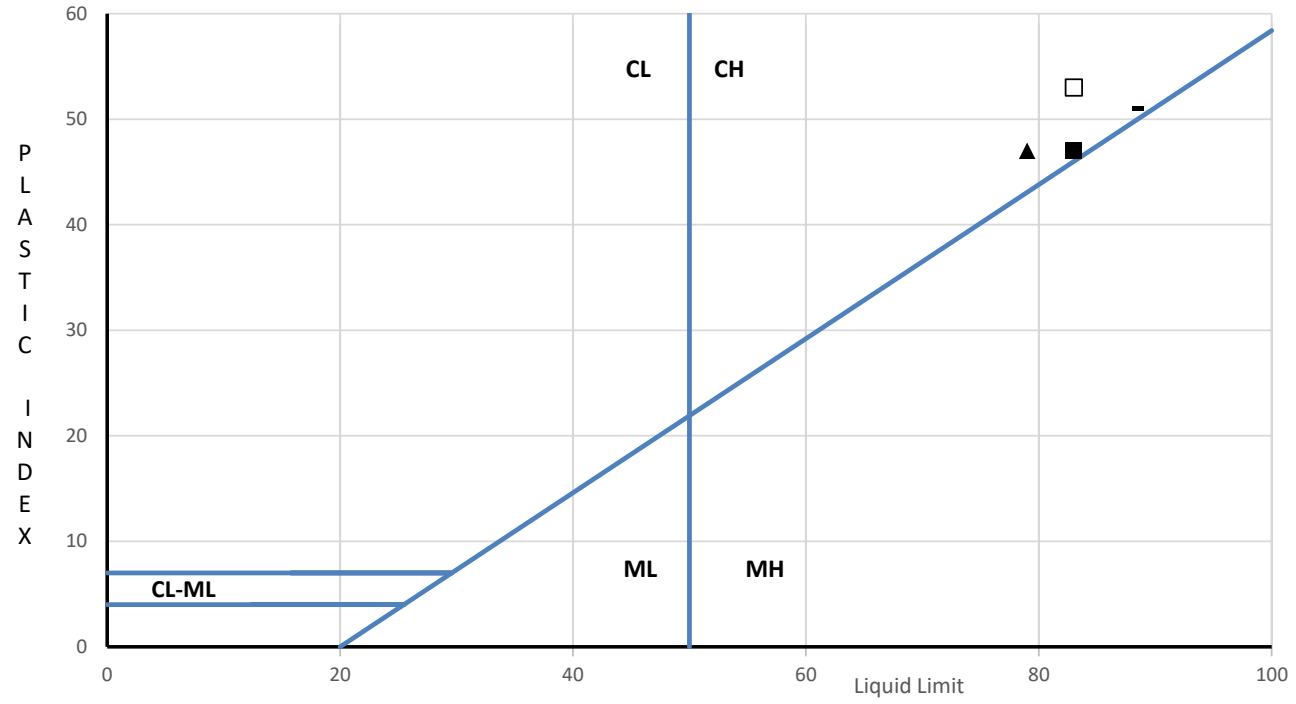
Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
■	B-05		23.5	42.3	62	33	29		MH	
	B-06		1	29.2						
▲	B-06		3.5	23.0	66	27	39		CH	
	B-06		6	25.6						
▬	B-06		8.5	25.1	64	26	38		CH	
	B-07		1	20.0						
□	B-07		5	25.5	64	30	34	94.1	CH	
	B-07		10	33.0						
△	B-07	UD-03	13	29.1	52	30	22	56.7	MH	
	B-07		23.5	36.7						
	B-07		28.5	32.2						
	B-08		1	33.0						
/	B-08		3.5	38.1	72	36	36		MH	
	B-08		6	43.9						
+	B-08		8.5	45.2	73	40	33		MH	
	B-08		13.5	56.9						
❶	B-08		18.5	40.5	48	27	21		CL	
	B-08		23.5	38.4						
	B-08		28.5	27.4						
	B-09		1	33.8						

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site B

Approved by	Date
Tyler Cole	1/31/2025 8:07

Report No.
Report Date



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
■	B-09		3.5	30.7	83	36	47		CH	
	B-09		6	34.4						
▲	B-09		8.5	41.1	79	32	47		CH	
	B-11		1	25.5						
▬	B-11		3.5	24.9	88	37	51		CH	
	B-11		6	27.7						
□	B-11		8.5	36.9	83	30	53		CH	
	B-11		13.5	45.7						

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2 Additional Exploration
Project Number	24430185A - Site B
Approved by	Date
Tyler Cole	1/31/2025 9:10

Report No.
Report Date

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/29/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	12/19-20/2024, 1/24/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sampled by:	S&ME	Sample Date(s):	11/13-22/2024
Sampling Method:	Split Spoon, Shelby Tube	Log # :	43-4192

Method: **A (1%)** ☐ **B (0.1%)** ☑ Balance ID. 2001-016 Calibration Date: 2/15/2024 Oven ID. 12872 Calibration Date: 6/14/2024

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
B-01	SS-01	2-3.5	423	24.63	204.67	172.38	32.29	21.9%	
B-01	SS-02	5.5-7	C64	22.82	140.61	120.94	19.67	20.0%	
B-02	SS-01	1-2.5	400	24.79	147.65	121.11	26.54	27.6%	
B-02	SS-02	5-6.5	145	22.93	123.29	99.31	23.98	31.4%	
B-03	SS-01	1-2.5	407	25.16	173.15	143.04	30.11	25.5%	
B-03	SS-02	5-6.5	C-37	31.58	145.94	123.63	22.31	24.2%	
B-03	UD-02	8-10	145	71.82	249.39	215.60	33.79	23.5%	
B-03	SS-04	15-16.5	150	21.19	141.70	113.27	28.43	30.9%	
B-03	SS-05	18.5-20	413	25.13	169.90	132.64	37.26	34.7%	
B-04	SS-01	1-2.5	421	25.16	162.33	128.15	34.18	33.2%	
B-04	SS-03	6-7.5	176	97.14	228.01	195.67	32.34	32.8%	
B-04	SS-05	13.5-15	406	25.15	168.33	124.94	43.39	43.5%	
B-04	SS-06	18.5-20	445	25.24	164.38	120.14	44.24	46.6%	
B-04	SS-07	23.5-25	69	96.72	285.44	239.71	45.73	32.0%	
B-04	SS-08	28.5-30	412	25.12	151.40	123.19	28.21	28.8%	

Notes / Deviations / References

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

Kim Gonzalez — *Technician Name* — 1/29/2025 — *Date*

Lindsey Deskins — *Technical Responsibility* — Lindsey Deskins — *Signature* — Staff Professional — *Position* — 1/29/2025 — *Date*

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Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #: 24430185A Report Date: 1/29/2025

Project Name: Self Sufficiency Parcel 2 Additional Exploration

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
B-05	SS-01	1-2.5	157	21.30	112.43	87.32	25.11	38.0%	
B-05	SS-02	5-6.5	C-66	22.47	133.89	103.83	30.06	36.9%	
B-05	SS-04	10-11.5	D1	41.70	206.94	159.57	47.37	40.2%	
B-05	UD-03	13-15	151	93.47	289.76	229.88	59.88	43.9%	
B-05	SS-06	18.5-20	C-41	22.02	148.55	113.70	34.85	38.0%	
B-05	SS-07	23.5-25	C-42	21.75	66.59	53.26	13.33	42.3%	
B-06	SS-01	1-2.5	C-37	31.54	144.48	118.89	25.59	29.3%	
B-06	SS-02	3.5-5	C-64	22.76	127.75	108.11	19.64	23.0%	
B-06	SS-03	6-7.5	145	22.92	134.24	111.54	22.70	25.6%	
B-06	SS-04	8.5-9	5	42.22	211.92	177.86	34.06	25.1%	
B-07	SS-01	1-2.5	C-6	30.58	140.67	122.33	18.34	20.0%	
B-07	SS-02	5-6.5	129	68.21	286.52	242.19	44.33	25.5%	
B-07	SS-03	10-11.5	EFF	41.59	215.81	172.62	43.19	33.0%	
B-07	UD-03	13-15	147	66.13	260.21	216.43	43.78	29.1%	
B-07	SS-06	23.5-25	A42	39.60	268.79	207.26	61.53	36.7%	
B-07	SS-07	28.5-30	406	25.16	233.10	182.45	50.65	32.2%	
B-08	SS-01	1-2.5	150	21.18	128.21	101.63	26.58	33.0%	
B-08	SS-02	3.5-5	410	25.17	196.86	149.52	47.34	38.1%	
B-08	SS-03	6-7.5	400	24.77	153.11	113.93	39.18	43.9%	
B-08	SS-04	8.5-10	423	24.63	175.56	128.58	46.98	45.2%	
B-08	SS-05	13.5-15	407	25.15	192.14	131.58	60.56	56.9%	
B-08	SS-06	18.5-20	418	25.03	191.90	143.84	48.06	40.5%	
B-08	SS-07	23.5-25	413	25.13	201.53	152.56	48.97	38.4%	
B-08	SS-08	28.5-29.5	LEE-B	33.19	220.73	180.40	40.33	27.4%	

Notes / Deviations / References

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

Quality Assurance *ASTM D 2216* ☑ *AASHTO T 265* ☐

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #: 24430185A Report Date: 1/29/2025

Project Name: Self Sufficiency Parcel 2 Additional Exploration

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
B-09	SS-01	1-2.5	421	25.15	161.65	127.20	34.45	33.8%	
B-09	SS-02	3.5-5	412	25.13	132.25	107.12	25.13	30.7%	
B-09	SS-03	6.7.5	434	25.14	156.62	122.98	33.64	34.4%	
B-09	SS-04	8.5-10	445	25.25	147.28	111.74	35.54	41.1%	
B-11	SS-01	1-2.5	400	24.77	180.33	148.77	31.56	25.5%	
B-11	SS-02	3.5-5	445	25.24	164.00	136.32	27.68	24.9%	
B-11	SS-03	6-7.5	412	25.11	152.17	124.57	27.60	27.7%	
B-11	SS-04	8.5-10	418	25.04	160.50	124.00	36.50	36.9%	
B-11	SS-05	13.5-15	434	25.13	169.06	123.90	45.16	45.7%	

Notes / Deviations / References

Form No: TR-D1140-1
Revision No. 1
Revision Date: 8/2/17

MATERIAL FINER THAN THE #200 SIEVE

ASTM D1140

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/29/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	12/18/2024, 1/24/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Sample by:	S&ME	Sample Date(s):	11/13-22/2024
Sampling Method:	Split Spoon, Shelby Tube	Log #:	43-4192

Method; A ☐ **B** ☑ Soaked ☑ Soak Time 24 hrs

Boring #	Sample #	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Tare Wt. + Dry Wt. after Wash	% Passing #200
		ft		grams	grams	grams	grams	%
B-03	UD-02	8-10	145	71.82	249.39	215.60	86.40	**89.9%**
B-04	SS-03	6-7.5	176	97.14	228.01	195.67	123.37	**73.4%**
B-04	SS-07	23.5-25	69	96.72	285.44	239.71	166.87	**50.9%**
B-05	UD-03	13-15	151	93.47	289.76	229.88	128.75	**74.1%**
B-07	SS-02	5-6.5	129	68.21	286.52	242.19	78.41	**94.1%**
B-07	UD-03	13-15	147	66.13	260.21	216.43	131.18	**56.7%**

Balance ID. *2001-016* *Calibration Date:* *2/15/24* *#200 Sieve* *32574* *Calibration Date:* *2/27/24*

Notes / Deviations / References: ASTM D1140: Amount of Material in Soil Finer Than the No. 200 (75-um)) Sieve

Kim Gonzalez — *Technician Name* — 1/29/2025 — *Date*

Lindsey Deskins — *Technical Responsibility* — Lindsey Deskins — *Signature* — Staff Professional — *Position* — 1/29/2025 — *Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

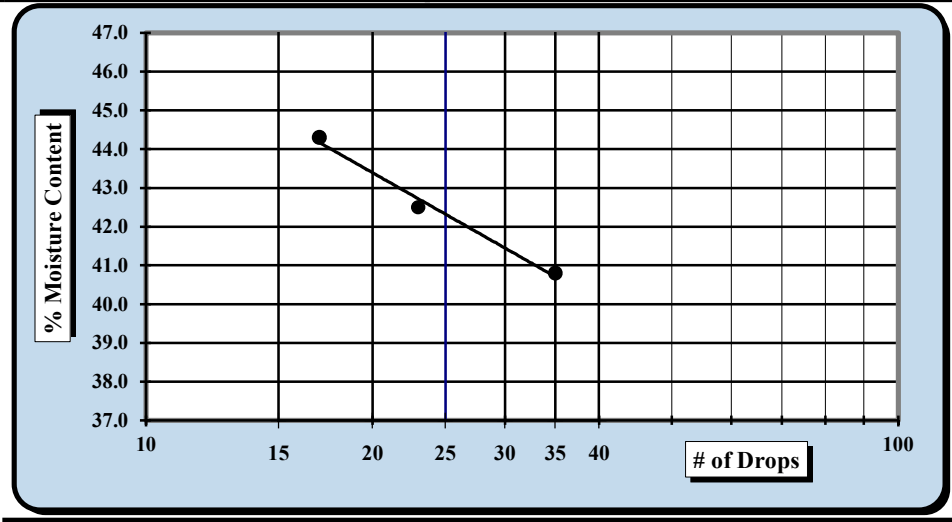
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	12/31/2024
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-01	Sample #: SS-01		Sample Date:	11/18/2024
Log #:	43-4192			Depth: 2-3.5 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	10	A1	21				B4	5	
A	Tare Weight	15.39	15.63	15.52				15.68	15.39	
B	Wet Soil Weight + A	29.54	32.86	35.22				25.26	25.14	
C	Dry Soil Weight + A	25.44	27.72	29.17				23.43	23.27	
D	Water Weight (B-C)	4.10	5.14	6.05				1.83	1.87	
E	Dry Soil Weight (C-A)	10.05	12.09	13.65				7.75	7.88	
F	% Moisture (D/E)*100	40.8%	42.5%	44.3%				23.6%	23.7%	
N	# OF DROPS	35	23	17				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**42**
Plastic Limit	**24**
Plastic Index	**18**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/2/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

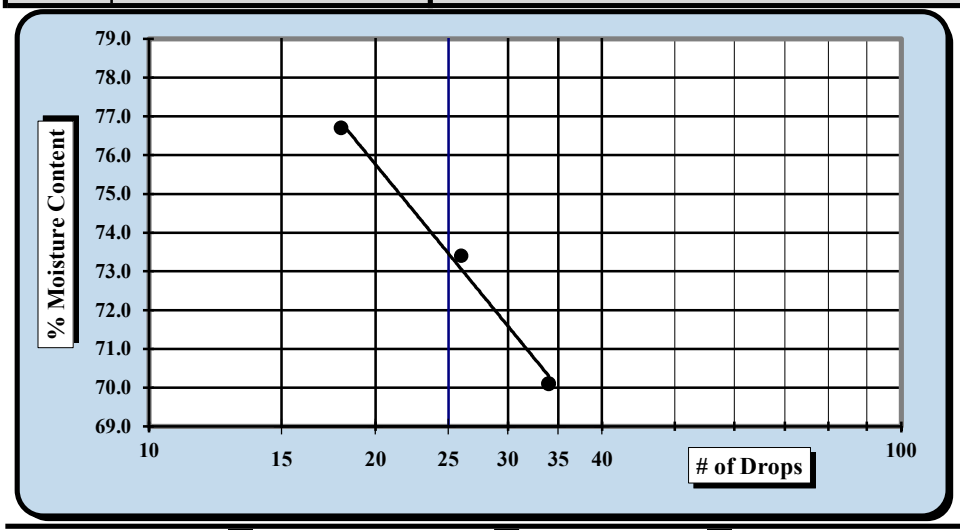
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/8/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-02	Sample #: SS-02		Sample Date:	11/19/2024
Log #:	43-4192			Depth: 5-6.5 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	A1	B1	14				B2	9	
A	Tare Weight	15.66	15.91	15.46				15.89	15.42	
B	Wet Soil Weight + A	29.52	30.25	33.89				24.24	24.46	
C	Dry Soil Weight + A	23.81	24.18	25.89				22.26	22.30	
D	Water Weight (B-C)	5.71	6.07	8.00				1.98	2.16	
E	Dry Soil Weight (C-A)	8.15	8.27	10.43				6.37	6.88	
F	% Moisture (D/E)*100	70.1%	73.4%	76.7%				31.1%	31.4%	
N	# OF DROPS	34	26	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**73**
Plastic Limit	**31**
Plastic Index	**42**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/8/2025	Lindsey Deskins	1/8/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

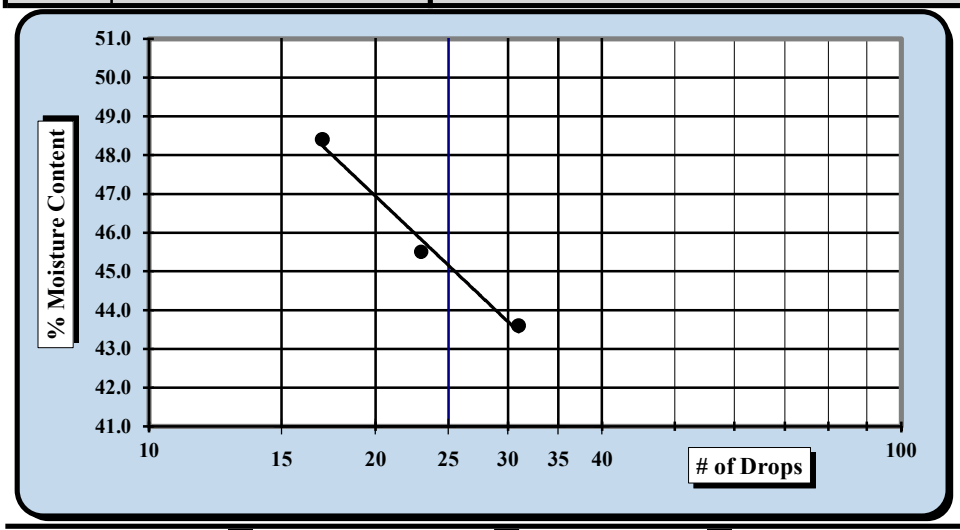
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/8/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-03	Sample #: SS-01		Sample Date:	11/20/2024
Log #:	43-4192			Depth: 1-2.5 ft	
Description:	yellowish brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	A4	7	A3				22	A5	
A	Tare Weight	15.91	15.38	15.91				15.37	15.79	
B	Wet Soil Weight + A	29.70	32.03	33.78				24.66	24.39	
C	Dry Soil Weight + A	25.51	26.82	27.95				22.85	22.73	
D	Water Weight (B-C)	4.19	5.21	5.83				1.81	1.66	
E	Dry Soil Weight (C-A)	9.60	11.44	12.04				7.48	6.94	
F	% Moisture (D/E)*100	43.6%	45.5%	48.4%				24.2%	23.9%	
N	# OF DROPS	31	23	17				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**45**
Plastic Limit	**24**
Plastic Index	**21**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/8/2025	Lindsey Deskins	1/8/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

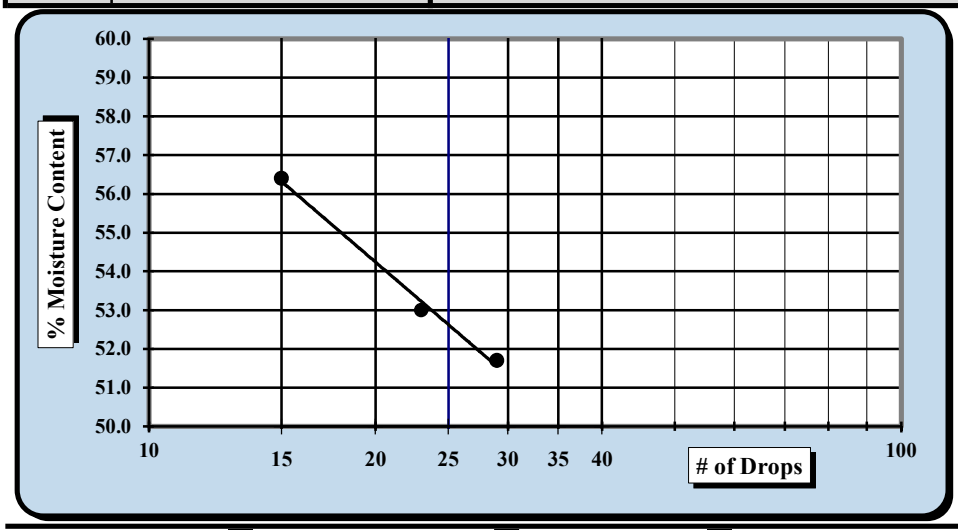
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/3/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-03	Sample #: SS-05		Sample Date:	11/20/2024
Log #:	43-4192			Depth: 18.5-20 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B1	A3	10				21	9	
A	Tare Weight	15.83	15.90	15.40				15.57	15.43	
B	Wet Soil Weight + A	32.50	33.77	35.51				24.74	24.73	
C	Dry Soil Weight + A	26.82	27.58	28.26				22.80	22.75	
D	Water Weight (B-C)	5.68	6.19	7.25				1.94	1.98	
E	Dry Soil Weight (C-A)	10.99	11.68	12.86				7.23	7.32	
F	% Moisture (D/E)*100	51.7%	53.0%	56.4%				26.8%	27.0%	
N	# OF DROPS	29	23	15				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**53**
Plastic Limit	**27**
Plastic Index	**26**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/6/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

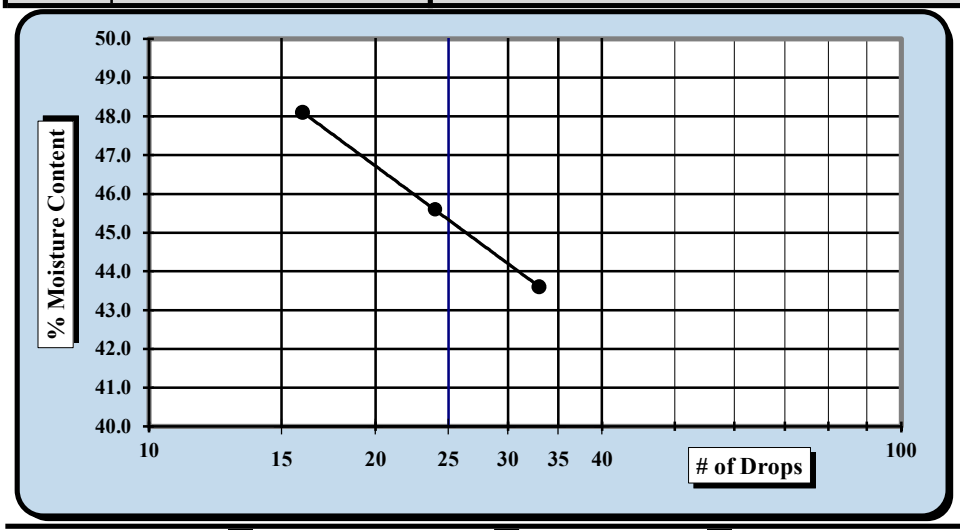
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/31/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/31/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-03	Sample #: UD-02		Sample Date:	11/20/2024
Log #:	43-4192			Depth: 8-10 ft	
Description:	reddish brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	18	13	A2				14	6	
A	Tare Weight	11.14	15.40	15.94				15.46	15.38	
B	Wet Soil Weight + A	29.73	32.14	33.47				25.21	25.03	
C	Dry Soil Weight + A	24.09	26.90	27.78				23.29	23.13	
D	Water Weight (B-C)	5.64	5.24	5.69				1.92	1.90	
E	Dry Soil Weight (C-A)	12.95	11.50	11.84				7.83	7.75	
F	% Moisture (D/E)*100	43.6%	45.6%	48.1%				24.5%	24.5%	
N	# OF DROPS	33	24	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**45**
Plastic Limit	**25**
Plastic Index	**20**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/31/2025	Lindsey Deskins	1/31/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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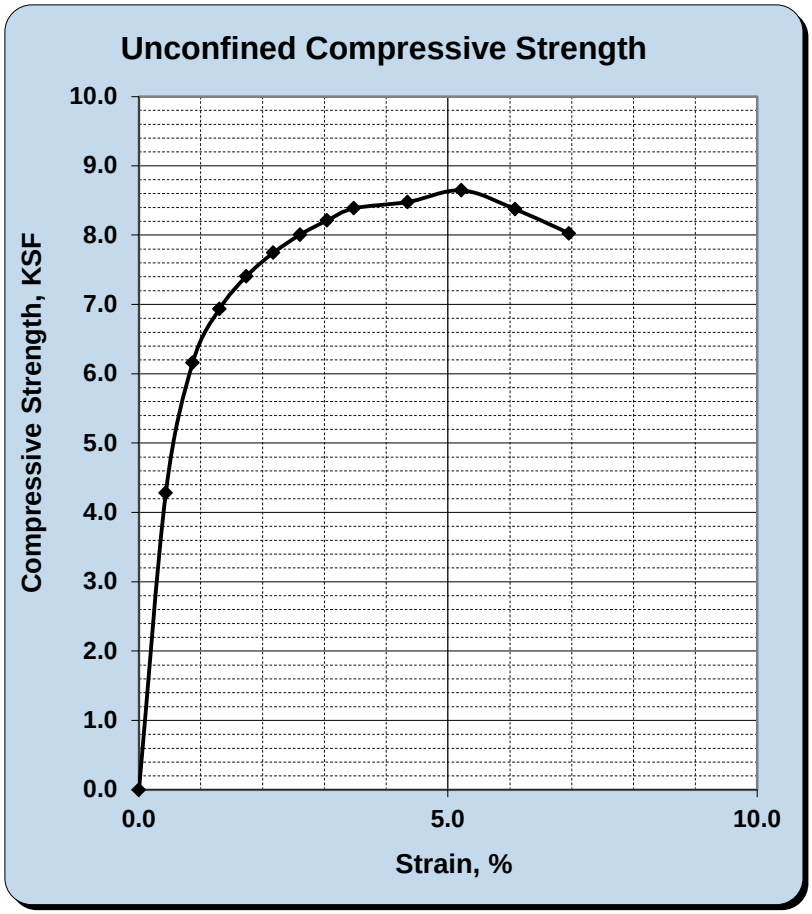
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project No.:	24430185A	Report Date:	2/3/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	1/28/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	B-03 Sample No.: UD-02	Sample Date:	11/20/2024
		Depth:	8-10 ft
Sample Description:	LEAN CLAY (CL), reddish brown		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 90.0 pcf
Initial Water Content: 32.7%
Unconfined Compressive Strength, q_u: **8.647** KSF
Undrained Shear Strength, s_u: **4.324** KSF

Liquid Limit: 45
Plasticity Index: 20
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.9
Strain at Failure: 5.2

References / Comments / Deviations:

Victoria Igoe	Victoria Igoe	Engineering Technician	2/3/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

3/4/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: B-03
Depth: 8-10 ft **Sample Number:** UD-02
Material Description: LEAN CLAY (CL), reddish brown
Liquid Limit: 45 **Plasticity Index:** 20
USCS: CL
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1323. ASTM D2435.
Tested by: Lindsey Deskins **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	263.55 g.	Spec. Gr. =	2.741	Wet w+t =	673.86 g.
Dry w+t =	226.20 g.	Est. Ht. Solids =	0.590 in.	Dry w+t =	643.35 g.
Tare Wt. =	53.74 g.	Init. V.R. =	0.685	Tare Wt. =	515.63 g.
Moisture =	21.7 %	Init. Sat. =	86.6 %	Moisture =	23.9 %

UNIT WEIGHT		TEST START			
Height =	0.995 in.	Height =	0.995 in.		
Diameter =	2.498 in.	Diameter =	2.498 in.		
Weight =	158.05 g.				
Dry Dens. =	101.5 pcf			Dry Wt. =	127.72 g.

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00000		0.00000			0.685	
0.25	0.00090	0.00010	0.00080			0.684	0.1 Comprs.
0.50	0.00240	0.00050	0.00190	1.874		0.682	0.2 Comprs.
1.00	0.00490	0.00080	0.00410	1.868		0.678	0.4 Comprs.
2.00	0.00940	0.00130	0.00810	1.656		0.671	0.8 Comprs.
4.00	0.01510	0.00190	0.01320	1.507		0.663	1.3 Comprs.
8.00	0.02390	0.00280	0.02110	1.400		0.649	2.1 Comprs.
4.00	0.02250	0.00230	0.02020			0.651	2.0 Comprs.
2.00	0.02110	0.00170	0.01940			0.652	2.0 Comprs.
1.00	0.01960	0.00140	0.01820			0.654	1.8 Comprs.
2.00	0.02030	0.00170	0.01860			0.654	1.9 Comprs.
4.00	0.02170	0.00220	0.01950			0.652	2.0 Comprs.
8.00	0.02480	0.00290	0.02190			0.648	2.2 Comprs.
16.00	0.03980	0.00390	0.03590	1.318		0.624	3.6 Comprs.
32.00	0.06720	0.00550	0.06170	1.131		0.581	6.2 Comprs.
16.00	0.06460	0.00430	0.06030			0.583	6.1 Comprs.
4.00	0.05810	0.00260	0.05550			0.591	5.6 Comprs.
1.00	0.05260	0.00170	0.05090			0.599	5.1 Comprs.

TEST RESULTS SUMMARY

Compression index (C_c), ksf = 0.15 **Preconsolidation pressure (P_p), ksf =** 12.4 **Void ratio at P_p (e_m) =** 0.636

Recompression index (C_r) = 0.01

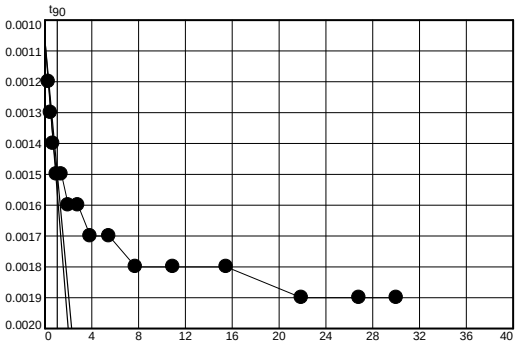
Pressure: 0.25 ksf **TEST READINGS** **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	0.00000
2	0.1000	0.0008
3	0.2500	0.0008
4	0.5000	0.0008
5	1.0000	0.0009
6	2.0000	0.0009
7	4.0000	0.0009
8	8.0167	0.0009
9	15.0167	0.0009
10	18.6333	0.0009

Void Ratio = 0.684 **Compression =** 0.1%

Pressure: 0.50 ksf **TEST READINGS** **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0009	11	60.0500	0.0023
2	0.1000	0.0017	12	120.1167	0.0023
3	0.2500	0.0018	13	240.2500	0.0023
4	0.5000	0.0019	14	480.5167	0.0024
5	1.0000	0.0020	15	720.7667	0.0024
6	2.0000	0.0020	16	902.8833	0.0024
7	4.0000	0.0021			
8	8.0000	0.0021			
9	15.0167	0.0022			
10	30.0333	0.0022			

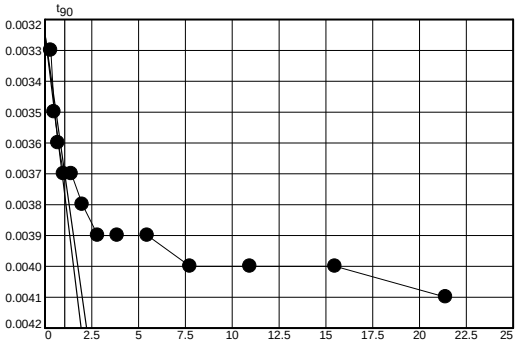


Void Ratio = 0.682 **Compression =** 0.2%

D_0 = 0.0011 **D_{90} =** 0.0015 **D_{100} =** 0.0015 **C_v at 1.12 min. =** 1.874 ft.^{2}/day

Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0024	11	60.0667	0.0048
2	0.1000	0.0041	12	120.1333	0.0048
3	0.2500	0.0043	13	240.2667	0.0048
4	0.5000	0.0044	14	458.6333	0.0049
5	1.0000	0.0045			
6	2.0000	0.0045			
7	4.0000	0.0046			
8	8.0167	0.0047			
9	15.0167	0.0047			
10	30.0333	0.0047			

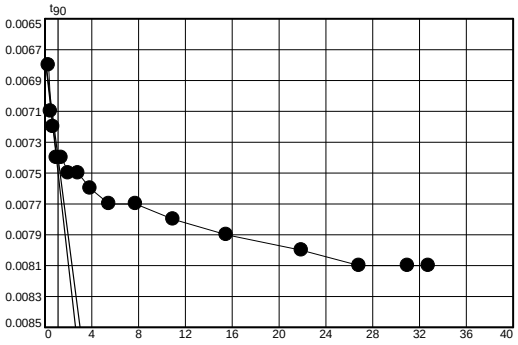


Void Ratio = 0.678 **Compression =** 0.4%

D_0 = 0.0032 **D_{90} =** 0.0037 **D_{100} =** 0.0038 **C_v at 1.12 min. =** 1.868 ft.^{2}/day

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0049	11	60.0667	0.0090
2	0.1000	0.0081	12	120.1333	0.0091
3	0.2500	0.0084	13	240.2667	0.0092
4	0.5000	0.0085	14	480.5333	0.0093
5	1.0000	0.0087	15	720.7833	0.0094
6	2.0000	0.0087	16	961.0500	0.0094
7	4.0167	0.0088	17	1073.8667	0.0094
8	8.0167	0.0088			
9	15.0167	0.0089			
10	30.0333	0.0090			

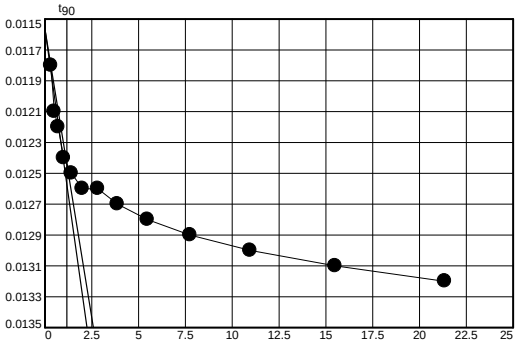


Void Ratio = 0.671 **Compression =** 0.8%

D_0 = 0.0067 **D_{90} =** 0.0074 **D_{100} =** 0.0075 **C_v at 1.25 min. =** 1.656 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0094	11	60.0667	0.0148
2	0.1000	0.0137	12	120.1333	0.0149
3	0.2500	0.0140	13	240.2667	0.0150
4	0.5000	0.0141	14	456.0667	0.0151
5	1.0000	0.0143			
6	2.0167	0.0144			
7	4.0167	0.0145			
8	8.0167	0.0145			
9	15.0167	0.0146			
10	30.0333	0.0147			

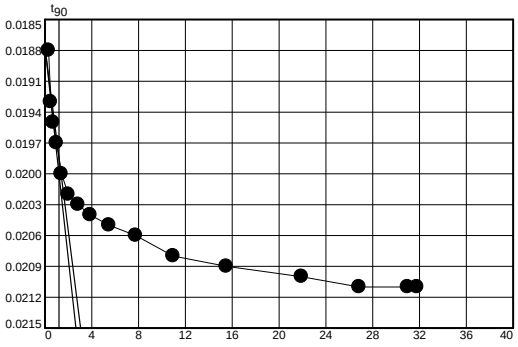


Void Ratio = 0.663 **Compression =** 1.3%

D_0 = 0.0116 **D_{90} =** 0.0124 **D_{100} =** 0.0125 **C_v at 1.36 min. =** 1.507 ft.^{2}/day

Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0151	11	60.0667	0.0234
2	0.1000	0.0216	12	120.1333	0.0236
3	0.2500	0.0221	13	240.2667	0.0237
4	0.5000	0.0223	14	480.5167	0.0238
5	1.0000	0.0225	15	720.7833	0.0239
6	2.0000	0.0228	16	961.0500	0.0239
7	4.0000	0.0230	17	1010.7500	0.0239
8	8.0167	0.0231			
9	15.0167	0.0232			
10	30.0333	0.0233			



Void Ratio = 0.649 **Compression =** 2.1%

D_0 = 0.0188 **D_{90} =** 0.0198 **D_{100} =** 0.0200 **C_v at 1.45 min. =** 1.400 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 7**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0239	11	60.0667	0.0228
2	0.1000	0.0230	12	120.1167	0.0227
3	0.2500	0.0229	13	240.2500	0.0226
4	0.5000	0.0229	14	440.7167	0.0225
5	1.0000	0.0229			
6	2.0000	0.0229			
7	4.0000	0.0229			
8	8.0000	0.0228			
9	15.0167	0.0228			
10	30.0333	0.0228			

Void Ratio = 0.651 **Compression =** 2.0%

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 8**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0225	11	60.0667	0.0213
2	0.0833	0.0217	12	120.1500	0.0212
3	0.2333	0.0216	13	240.3000	0.0211
4	0.4833	0.0216	14	480.6000	0.0211
5	1.0000	0.0216	15	720.9167	0.0211
6	2.0000	0.0215	16	891.4000	0.0211
7	4.0000	0.0215			
8	8.0000	0.0214			
9	15.0167	0.0214			
10	30.0333	0.0213			

Void Ratio = 0.652 **Compression =** 2.0%

Pressure: 1.00 ksf	TEST READINGS	Load No. 9

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0211	11	60.0667	0.0200
2	0.1000	0.0205	12	120.1500	0.0199
3	0.2500	0.0204	13	240.3000	0.0198
4	0.5000	0.0204	14	480.6167	0.0197
5	1.0000	0.0203	15	510.0000	0.0196
6	2.0000	0.0202			
7	4.0000	0.0202			
8	8.0000	0.0201			
9	15.0167	0.0201			
10	30.0333	0.0200			

Void Ratio = 0.654 **Compression =** 1.8%

Pressure: 2.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0196	11	60.0833	0.0201
2	0.1000	0.0200	12	120.1667	0.0201
3	0.2500	0.0200	13	240.3167	0.0201
4	0.5000	0.0200	14	480.6167	0.0202
5	1.0000	0.0200	15	720.9333	0.0202
6	2.0000	0.0200	16	961.2500	0.0203
7	4.0167	0.0200	17	1200.2833	0.0203
8	8.0167	0.0201			
9	15.0167	0.0201			
10	30.0500	0.0201			

Void Ratio = 0.654 **Compression =** 1.9%

Pressure: 4.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0203	11	60.0833	0.0215
2	0.1000	0.0213	12	120.1667	0.0215
3	0.2500	0.0213	13	240.3167	0.0216
4	0.5000	0.0213	14	480.6333	0.0216
5	1.0000	0.0214	15	720.9500	0.0216
6	2.0167	0.0214	16	961.2500	0.0216
7	4.0167	0.0214	17	1201.5667	0.0216
8	8.0167	0.0215	18	1393.3167	0.0217
9	15.0333	0.0215			
10	30.0500	0.0215			

Void Ratio = 0.652 **Compression =** 2.0%

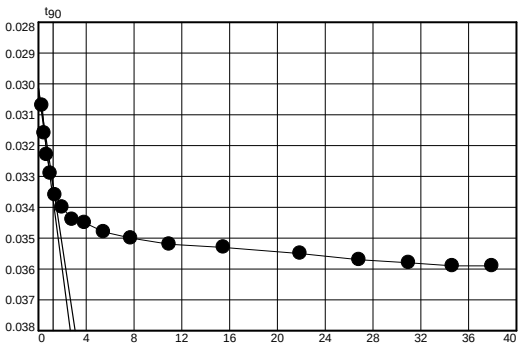
Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 12**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0217	11	60.0667	0.0244
2	0.1000	0.0237	12	120.1500	0.0245
3	0.2500	0.0238	13	240.3000	0.0245
4	0.5000	0.0239	14	480.3500	0.0245
5	1.0000	0.0240	15	720.6667	0.0247
6	2.0000	0.0240	16	960.9833	0.0247
7	4.0000	0.0241	17	1201.2833	0.0247
8	8.0000	0.0241	18	1336.8167	0.0248
9	15.0167	0.0242			
10	30.0333	0.0243			

Void Ratio = 0.648 **Compression =** 2.2%

Pressure: 16.00 ksf | **TEST READINGS** | **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0248	11	60.0667	0.0389
2	0.1000	0.0346	12	120.1500	0.0391
3	0.2500	0.0355	13	240.3000	0.0392
4	0.5000	0.0362	14	480.6167	0.0394
5	1.0000	0.0368	15	720.9333	0.0396
6	2.0000	0.0375	16	961.2500	0.0397
7	4.0000	0.0379	17	1201.5667	0.0398
8	8.0000	0.0383	18	1441.8833	0.0398
9	15.0167	0.0384			
10	30.0333	0.0387			

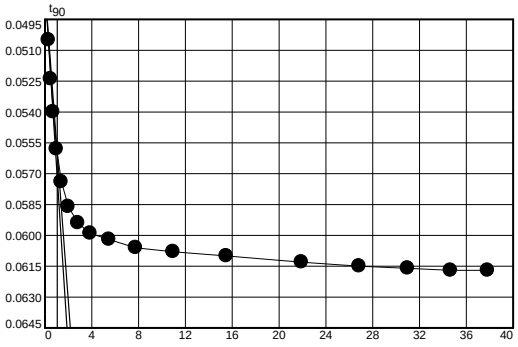


Void Ratio = 0.624 **Compression =** 3.6%

D_0 = 0.0301 **D_{90} =** 0.0333 **D_{100} =** 0.0336 **C_V at 1.50 min. =** 1.318 ft.^{2}/day

Pressure: 32.00 ksf | **TEST READINGS** | **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.39800	11	60.0667	0.0661
2	0.1000	0.0560	12	120.1500	0.0663
3	0.2500	0.0579	13	240.3000	0.0665
4	0.5000	0.0595	14	480.6167	0.0668
5	1.0000	0.0613	15	720.9333	0.0670
6	2.0000	0.0629	16	961.2500	0.0671
7	4.0000	0.0641	17	1201.5500	0.0672
8	8.0000	0.0649	18	1431.3333	0.0672
9	15.0167	0.0654			
10	30.0333	0.0657			



Void Ratio = 0.581 **Compression =** 6.2%

D_0 = 0.0480 **D_{90} =** 0.0560 **D_{100} =** 0.0569 **C_V at 1.10 min. =** 1.131 ft.^{2}/day

Pressure: 16.00 ksf		TEST READINGS			Load No. 15
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0672	11	60.0833	0.0648
2	0.1000	0.0652	12	120.1500	0.0648
3	0.2500	0.0651	13	240.3167	0.0647
4	0.5000	0.0651	14	480.6167	0.0646
5	1.0000	0.0650	15	720.9333	0.0645
6	2.0000	0.0649	16	961.2333	0.0645
7	4.0000	0.0649	17	1201.5500	0.0645
8	8.0167	0.0649	18	1441.8667	0.0646
9	15.0167	0.0648			
10	30.0333	0.0648			

Void Ratio = 0.583 **Compression =** 6.1%

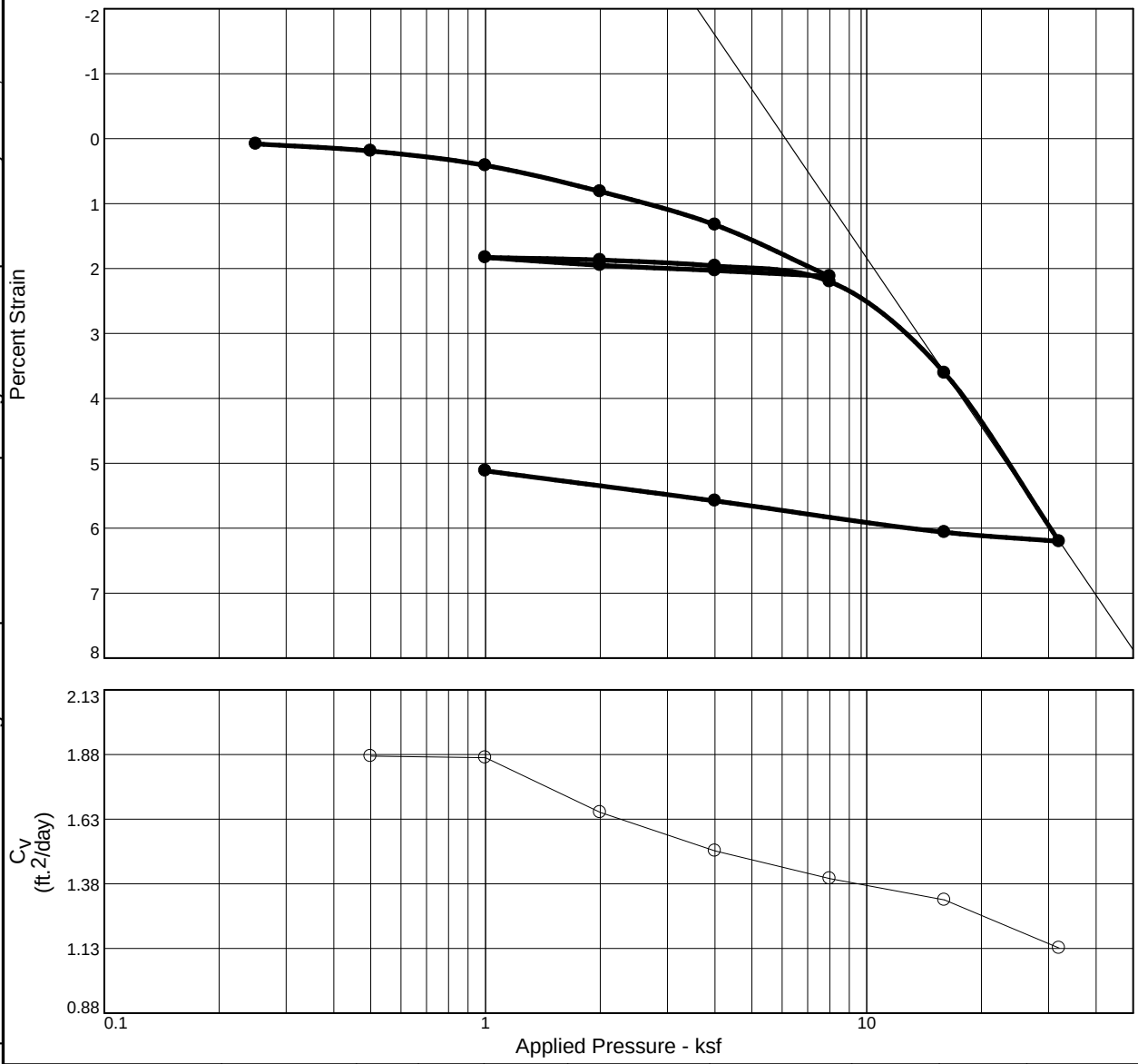
Pressure: 4.00 ksf		TEST READINGS			Load No. 16
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.06460	11	60.0833	0.0588
2	0.1000	0.0613	12	120.1667	0.0586
3	0.2500	0.0608	13	240.3167	0.0584
4	0.5000	0.0605	14	480.6333	0.0583
5	1.0000	0.0601	15	720.9500	0.0583
6	2.0000	0.0597	16	961.2667	0.0582
7	4.0167	0.0594	17	1201.5833	0.0582
8	8.0167	0.0592	18	1440.1833	0.0581
9	15.0167	0.0591			
10	30.0500	0.0589			

Void Ratio = 0.591 **Compression =** 5.6%

Pressure: 1.00 ksf		TEST READINGS			Load No. 17
No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0581	11	60.0833	0.0536
2	0.1000	0.0566	12	120.1667	0.0533
3	0.2500	0.0564	13	240.3167	0.0530
4	0.5000	0.0561	14	480.6333	0.0527
5	1.0000	0.0558	15	720.9500	0.0527
6	2.0000	0.0553	16	961.2500	0.0526
7	4.0000	0.0549	17	1201.5667	0.0526
8	8.0167	0.0544	18	1441.9000	0.0526
9	15.0167	0.0541			
10	30.0333	0.0538			

Void Ratio = 0.599 **Compression =** 5.1%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
86.6 %	21.7 %	101.5	45	20	2.741		12.4	0.15	0.01	0.685

MATERIAL DESCRIPTION	USCS	AASHTO
LEAN CLAY (CL), reddish brown	CL	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 **Depth:** 8-10 ft **Sample Number:** UD-02

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1323. ASTM D2435.

Figure 1

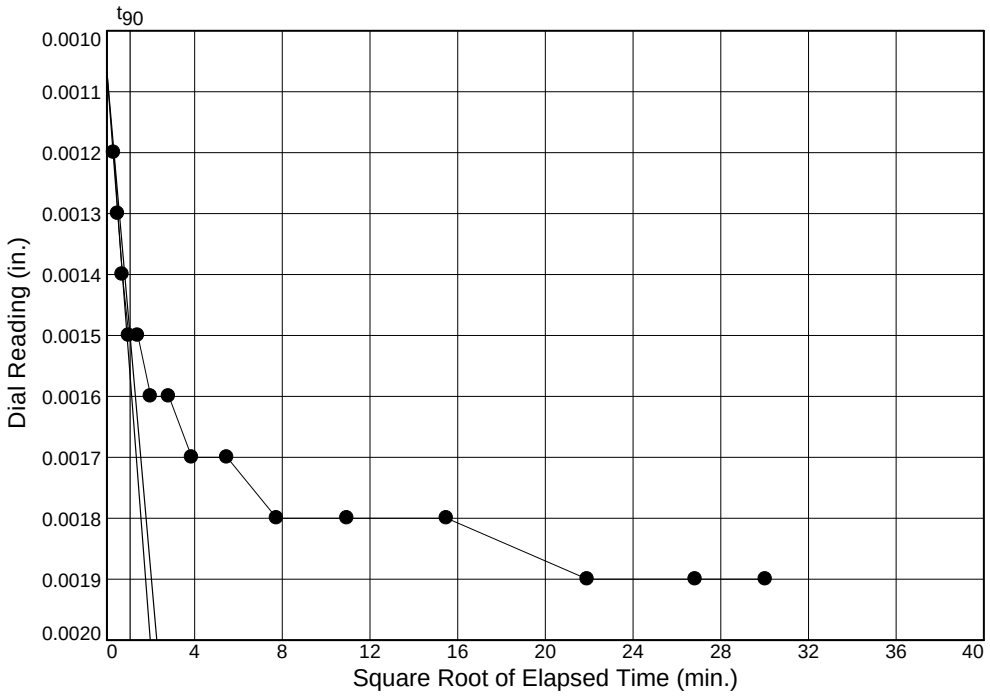
Tested By: Lindsey Deskins **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

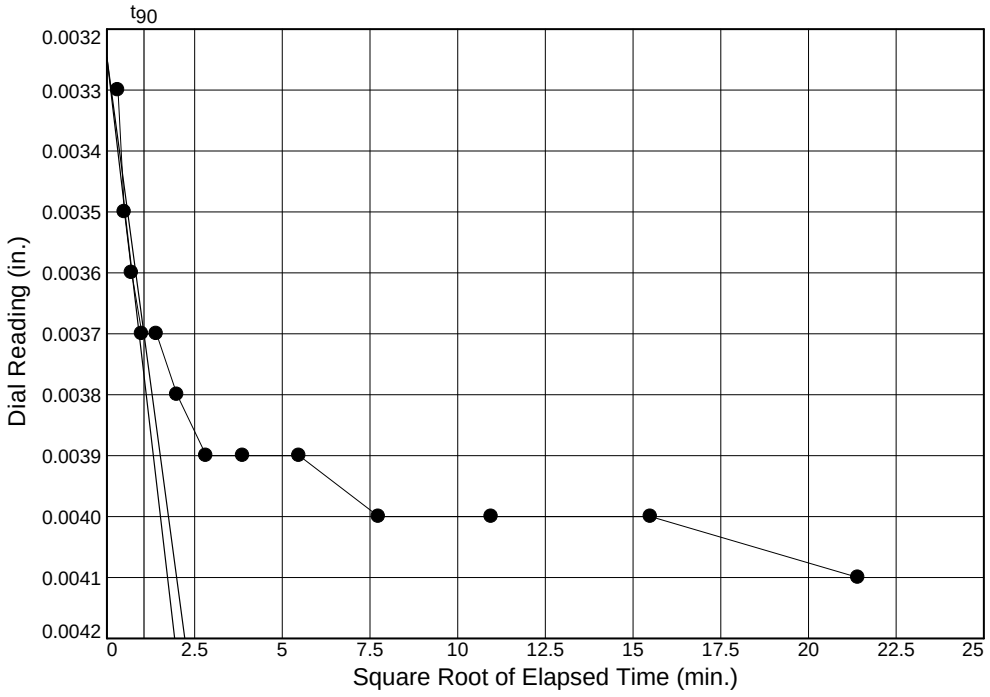
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 2
Load= 0.50 ksf
D_0 = 0.0011
D_{90} = 0.0015
D_{100} = 0.0015
T_{90} = 1.12 min.

C_v @ T_{90}
1.874 ft.^{2}/day



Load No.= 3
Load= 1.00 ksf
D_0 = 0.0032
D_{90} = 0.0037
D_{100} = 0.0038
T_{90} = 1.12 min.

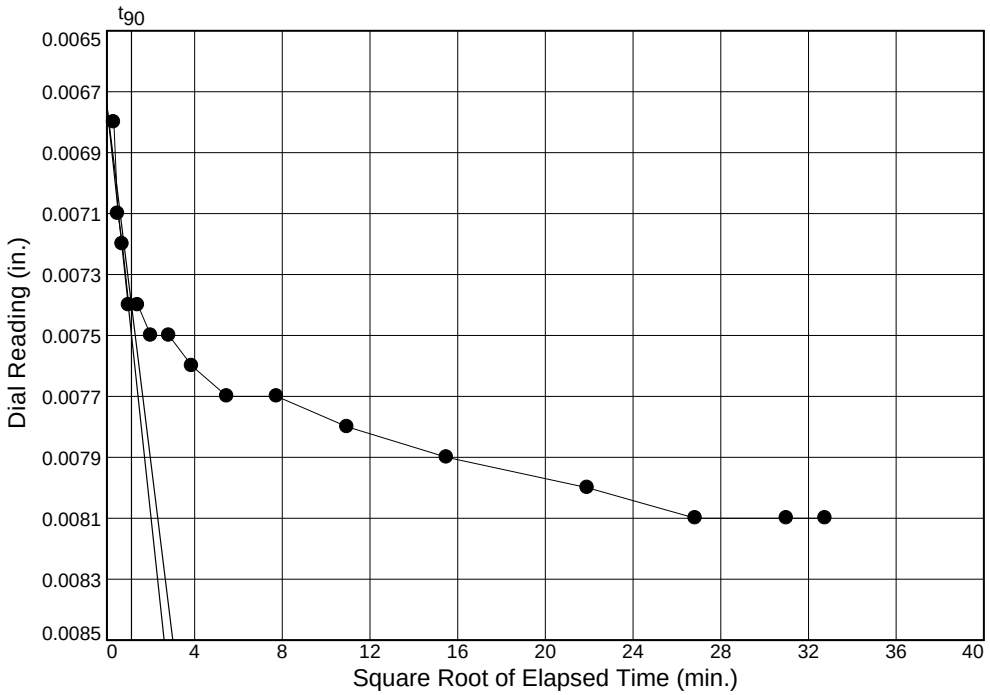
C_v @ T_{90}
1.868 ft.^{2}/day

Figure 2

Dial Reading vs. Time

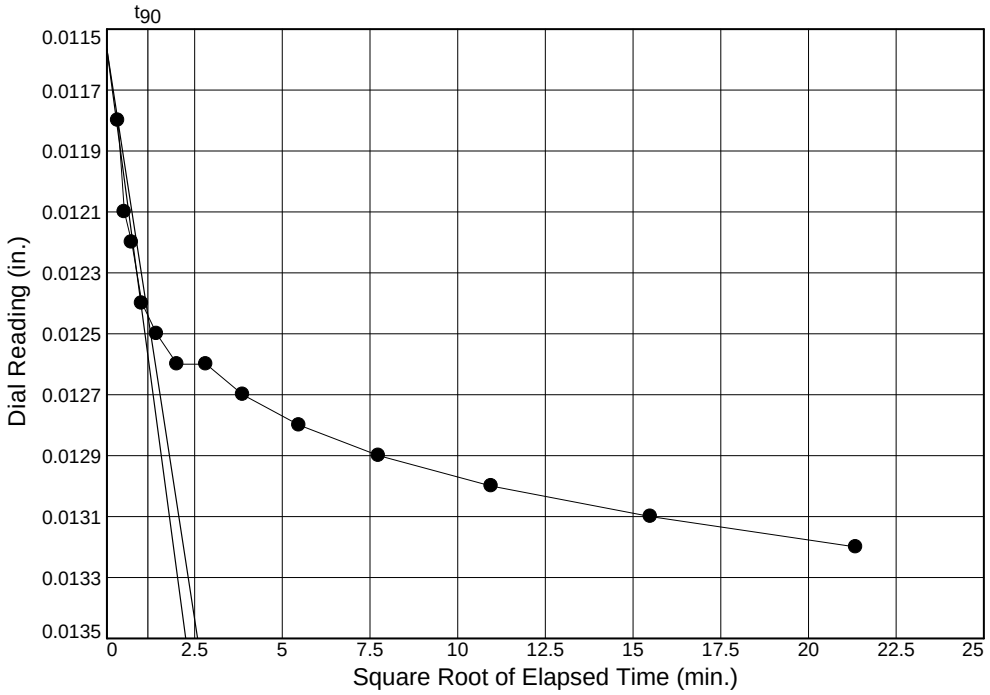
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 4
Load= 2.00 ksf
D_0 = 0.0067
D_{90} = 0.0074
D_{100} = 0.0075
T_{90} = 1.25 min.

C_v @ T_{90}
1.656 ft.^{2}/day



Load No.= 5
Load= 4.00 ksf
D_0 = 0.0116
D_{90} = 0.0124
D_{100} = 0.0125
T_{90} = 1.36 min.

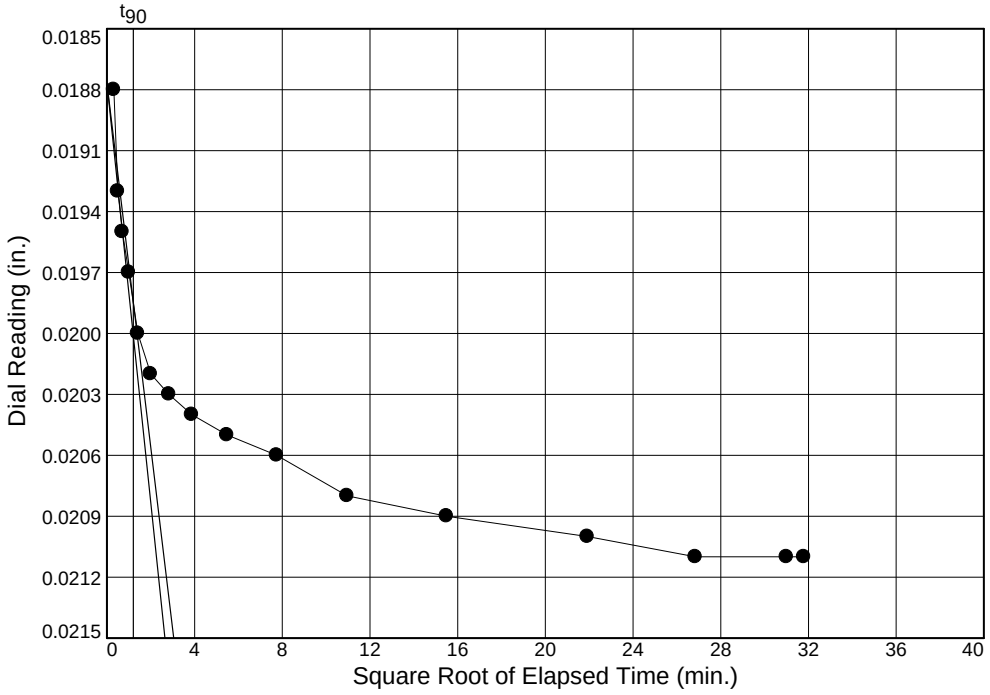
C_v @ T_{90}
1.507 ft.^{2}/day

Figure 3

Dial Reading vs. Time

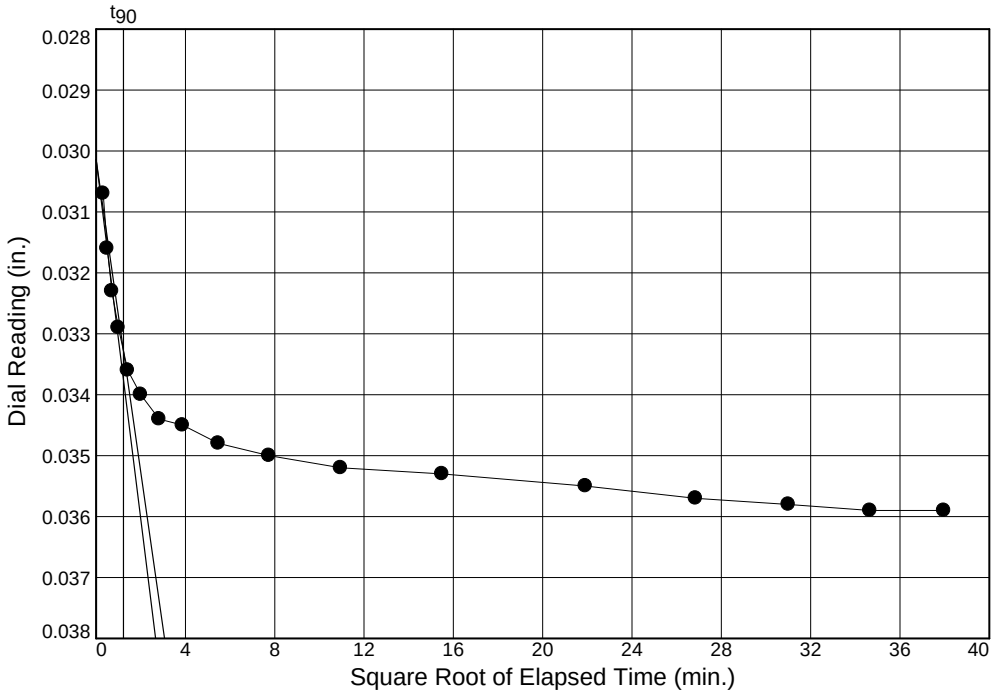
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 6
Load= 8.00 ksf
D_0 = 0.0188
D_{90} = 0.0198
D_{100} = 0.0200
T_{90} = 1.45 min.

C_v @ T_{90}
1.400 ft.^{2}/day



Load No.= 13
Load= 16.00 ksf
D_0 = 0.0301
D_{90} = 0.0333
D_{100} = 0.0336
T_{90} = 1.50 min.

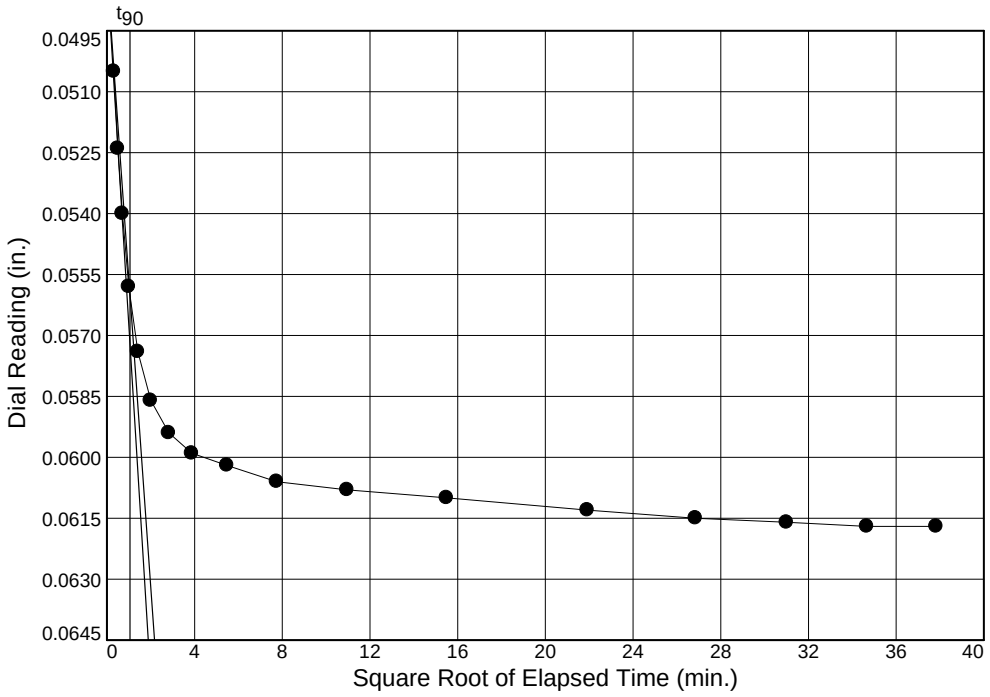
C_v @ T_{90}
1.318 ft.^{2}/day

Figure 4

Dial Reading vs. Time

Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



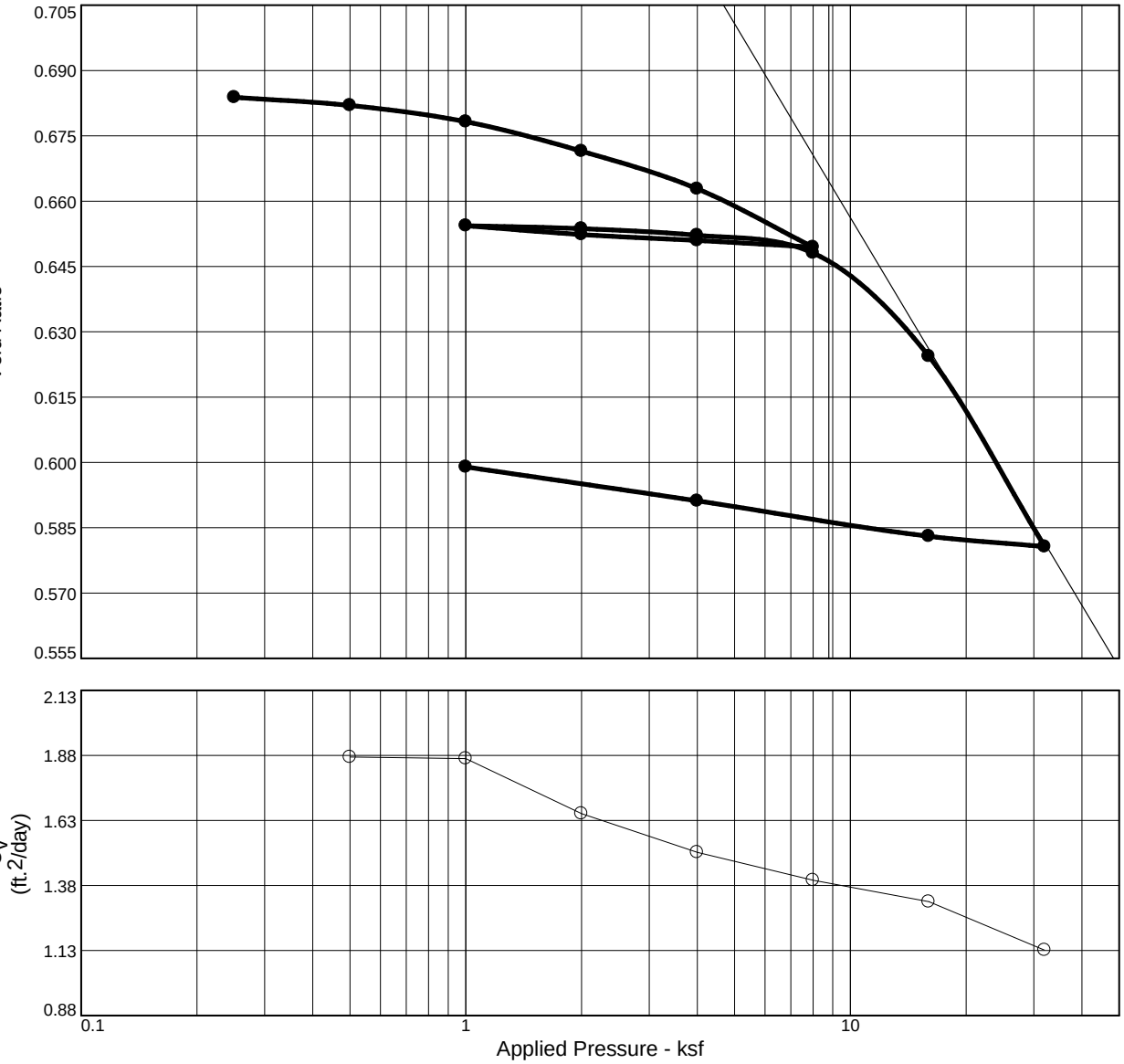
Load No.= 14
Load= 32.00 ksf
D_0 = 0.0480
D_{90} = 0.0560
D_{100} = 0.0569
T_{90} = 1.10 min.

C_v @ T_{90}
1.131 ft.^{2}/day

Figure 5

S & ME, Inc.

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
86.6 %	21.7 %	101.5	45	20	2.741		12.4	0.15	0.01	0.685

MATERIAL DESCRIPTION	USCS	AASHTO
LEAN CLAY (CL), reddish brown	CL	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 **Depth:** 8-10 ft **Sample Number:** UD-02

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1323. ASTM D2435.

Figure 1

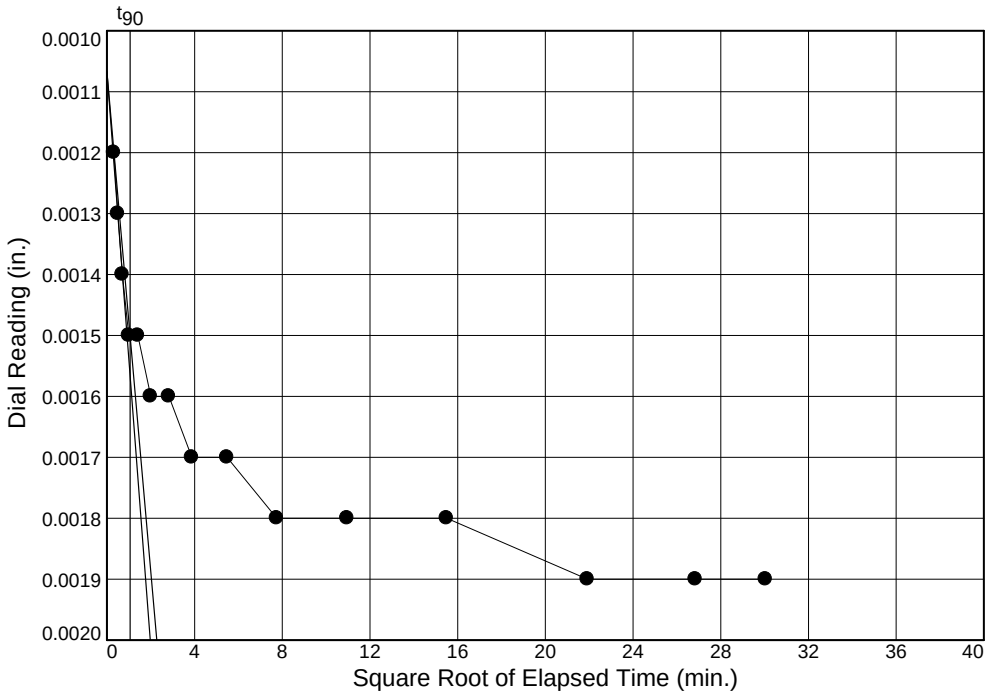
Tested By: Lindsey Deskins **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

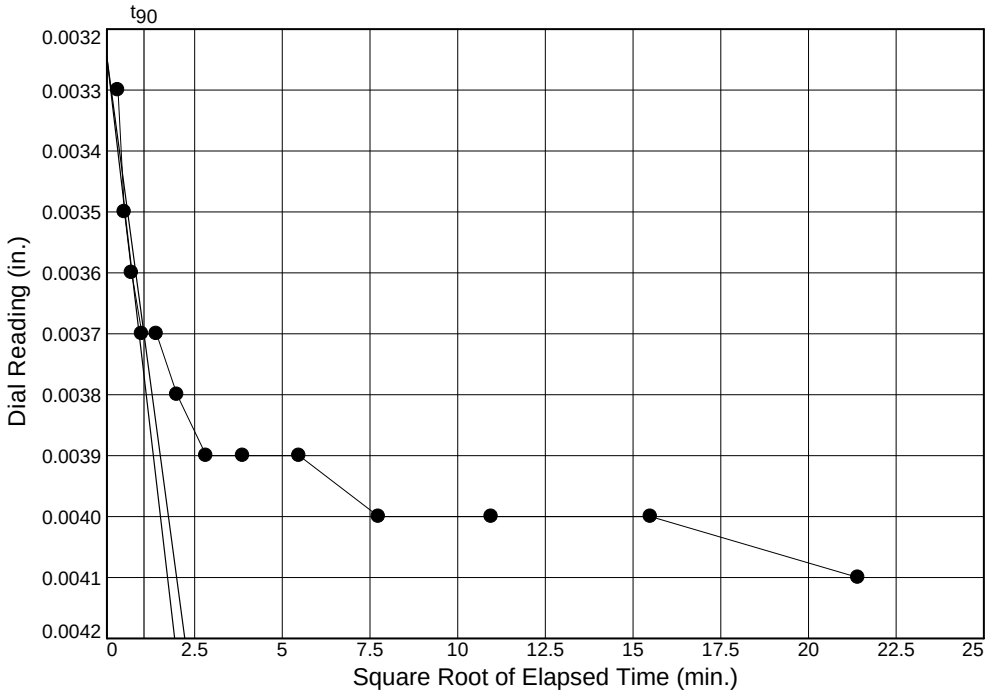
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 2
Load= 0.50 ksf
D_0 = 0.0011
D_{90} = 0.0015
D_{100} = 0.0015
T_{90} = 1.12 min.

C_v @ T_{90}
1.874 ft.^{2}/day



Load No.= 3
Load= 1.00 ksf
D_0 = 0.0032
D_{90} = 0.0037
D_{100} = 0.0038
T_{90} = 1.12 min.

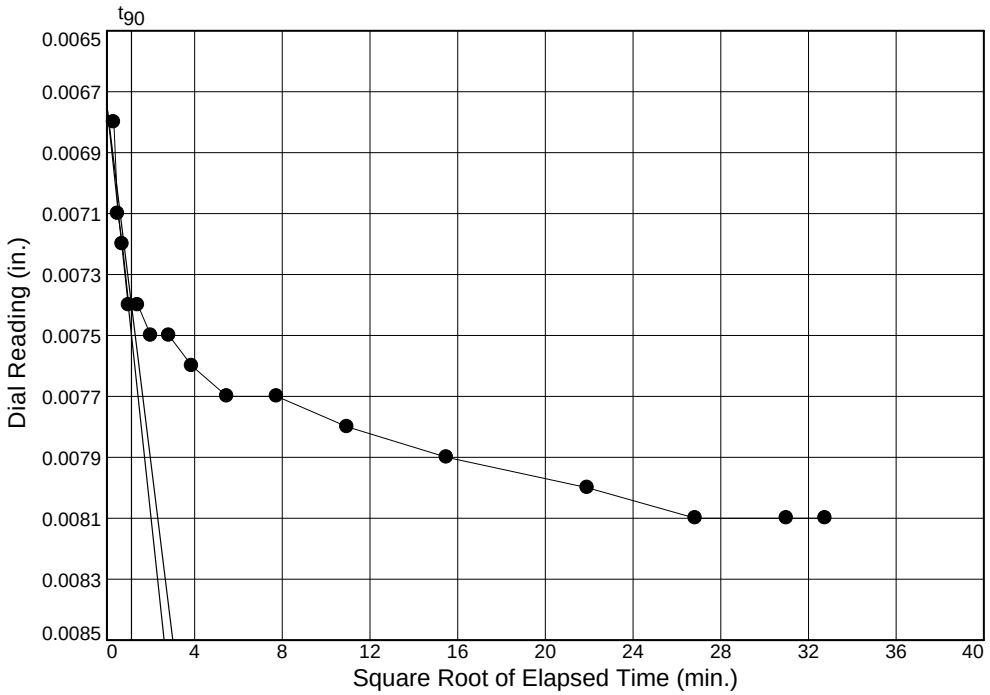
C_v @ T_{90}
1.868 ft.^{2}/day

Figure 2

Dial Reading vs. Time

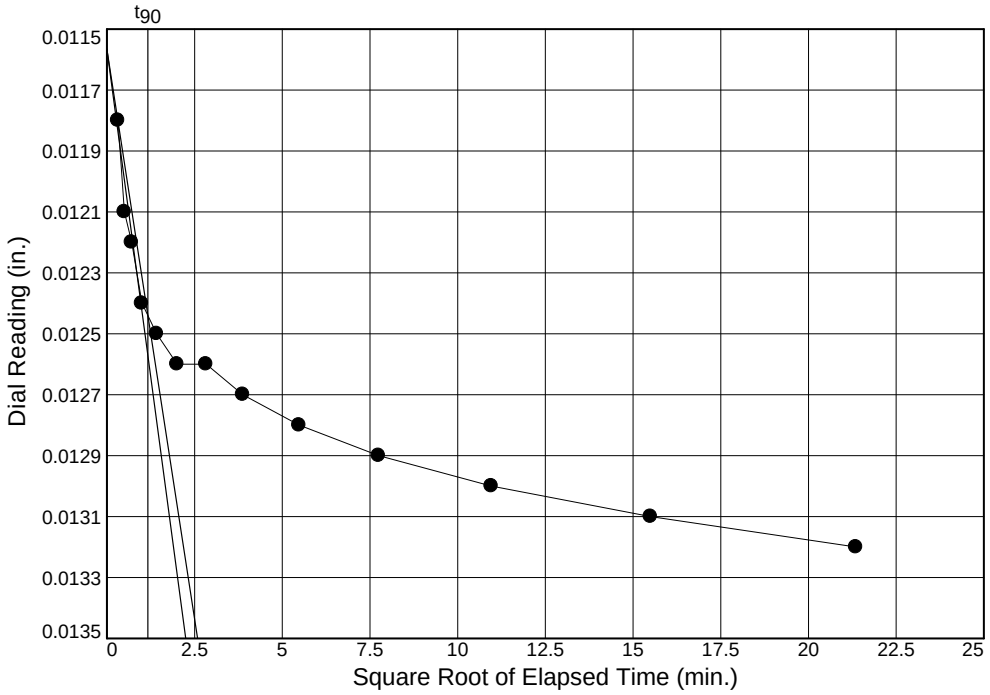
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 4
Load= 2.00 ksf
D_0 = 0.0067
D_{90} = 0.0074
D_{100} = 0.0075
T_{90} = 1.25 min.

C_v @ T_{90}
1.656 ft.^{2}/day



Load No.= 5
Load= 4.00 ksf
D_0 = 0.0116
D_{90} = 0.0124
D_{100} = 0.0125
T_{90} = 1.36 min.

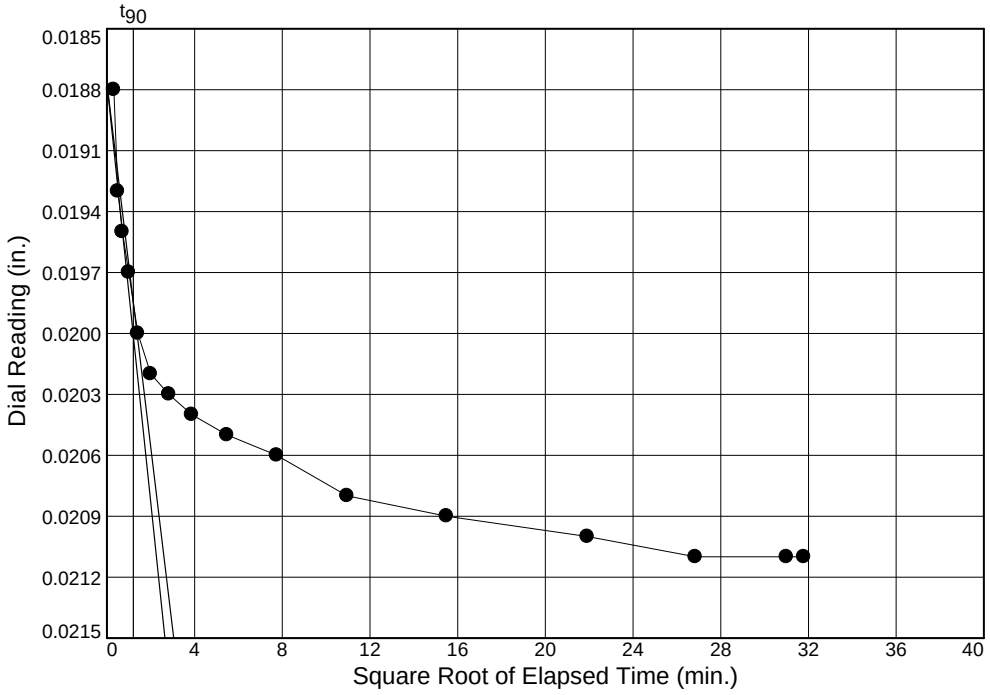
C_v @ T_{90}
1.507 ft.^{2}/day

Figure 3

Dial Reading vs. Time

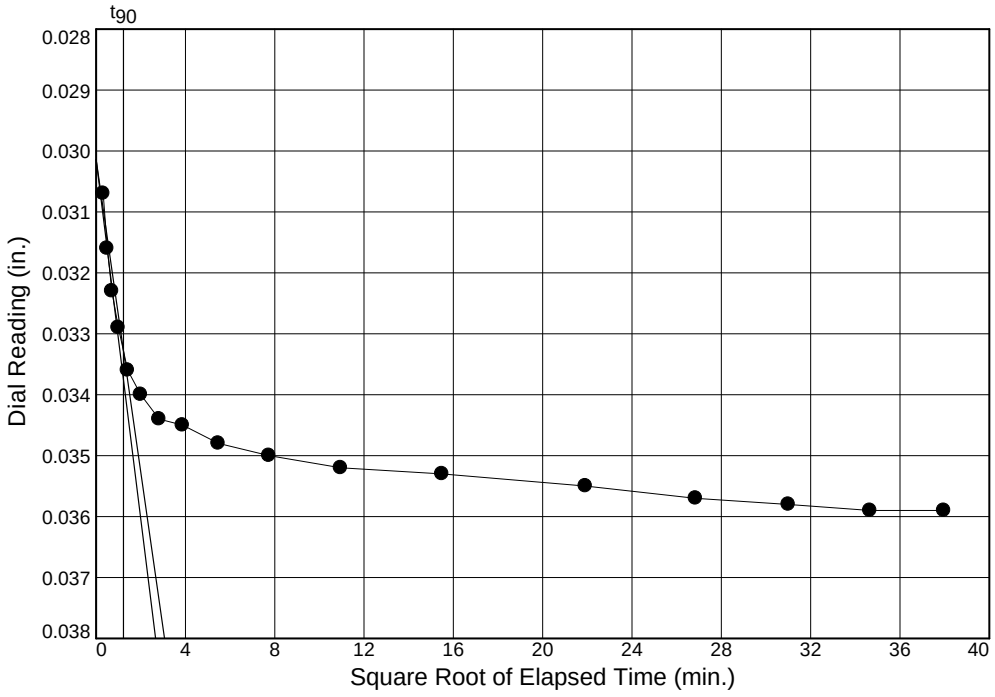
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 6
Load= 8.00 ksf
D_0 = 0.0188
D_{90} = 0.0198
D_{100} = 0.0200
T_{90} = 1.45 min.

C_v @ T_{90}
1.400 ft.^{2}/day



Load No.= 13
Load= 16.00 ksf
D_0 = 0.0301
D_{90} = 0.0333
D_{100} = 0.0336
T_{90} = 1.50 min.

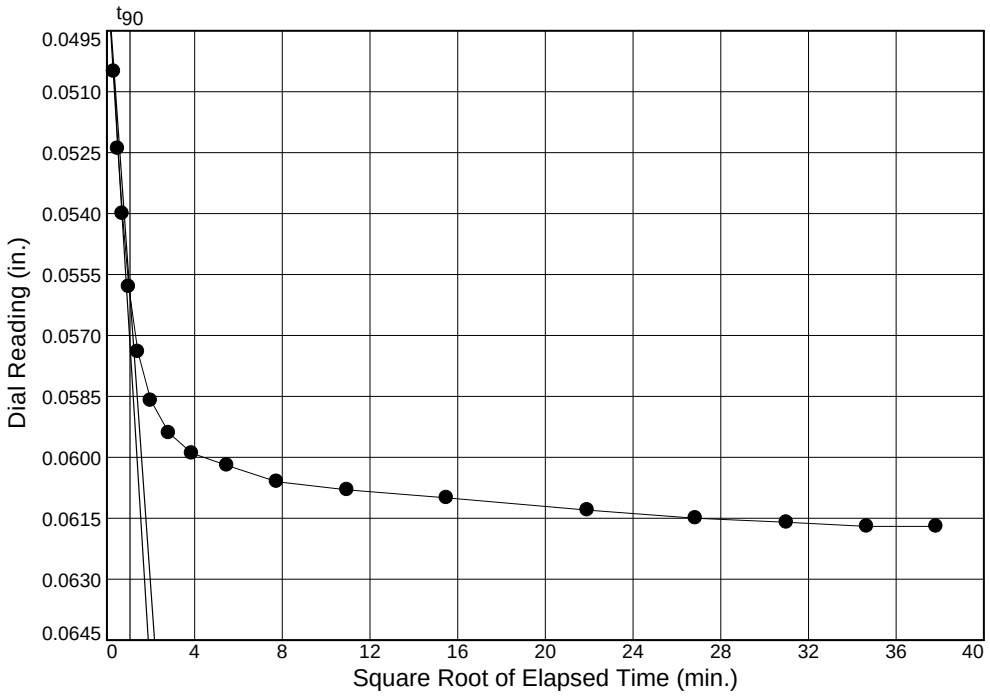
C_v @ T_{90}
1.318 ft.^{2}/day

Figure 4

Dial Reading vs. Time

Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-03 Depth: 8-10 ft Sample Number: UD-02



Load No.= 14
Load= 32.00 ksf
D_0 = 0.0480
D_{90} = 0.0560
D_{100} = 0.0569
T_{90} = 1.10 min.

C_v @ T_{90}
1.131 ft.^{2}/day

Figure 5

S & ME, Inc.

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

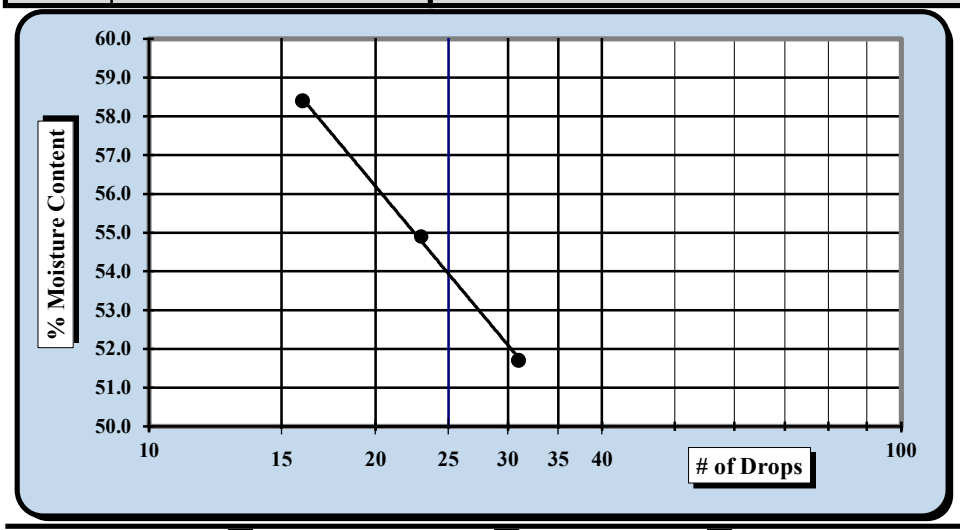
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/3/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-04	Sample #: SS-03		Sample Date:	11/21/2024
Log #:	43-4192			Depth: 6-7.5 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	16	8	B3				2	12	
A	Tare Weight	15.61	15.49	15.90				15.60	15.55	
B	Wet Soil Weight + A	29.69	30.24	31.99				25.06	25.03	
C	Dry Soil Weight + A	24.89	25.01	26.06				22.94	22.90	
D	Water Weight (B-C)	4.80	5.23	5.93				2.12	2.13	
E	Dry Soil Weight (C-A)	9.28	9.52	10.16				7.34	7.35	
F	% Moisture (D/E)*100	51.7%	54.9%	58.4%				28.9%	29.0%	
N	# OF DROPS	31	23	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**54**
Plastic Limit	**29**
Plastic Index	**25**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/4/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

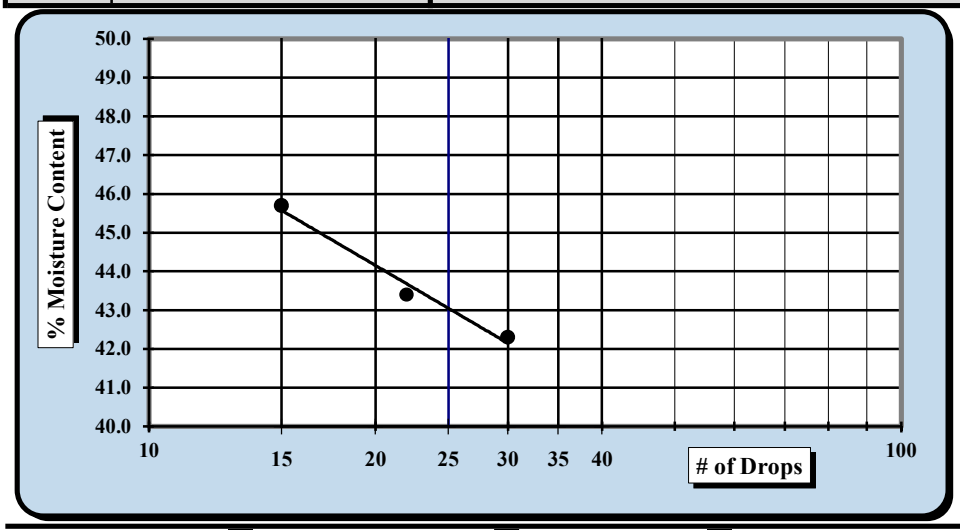
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/4/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-04	Sample #: SS-07		Sample Date:	11/21/2024
Log #:	43-4192			Depth: 23.5-25 ft	
Description:	dark brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B6	21	B5				B2	5	
A	Tare Weight	15.90	15.54	15.91				15.90	15.38	
B	Wet Soil Weight + A	29.90	32.72	34.05				25.95	25.32	
C	Dry Soil Weight + A	25.74	27.52	28.36				23.85	23.24	
D	Water Weight (B-C)	4.16	5.20	5.69				2.10	2.08	
E	Dry Soil Weight (C-A)	9.84	11.98	12.45				7.95	7.86	
F	% Moisture (D/E)*100	42.3%	43.4%	45.7%				26.4%	26.5%	
N	# OF DROPS	30	22	15				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**43**
Plastic Limit	**27**
Plastic Index	**16**
Group Symbol	**ML**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/6/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

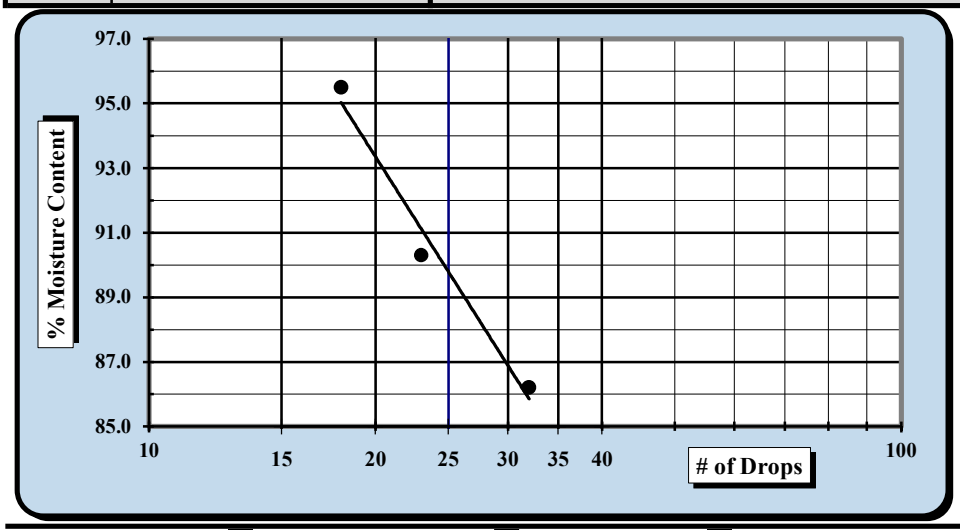
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/8/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-05	Sample #: SS-02		Sample Date:	11/15/2024
Log #:	43-4192			Depth: 5-6.5 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	3	B6	23				8	B3	
A	Tare Weight	15.47	15.90	15.39				15.48	15.90	
B	Wet Soil Weight + A	30.96	31.60	33.96				24.83	25.48	
C	Dry Soil Weight + A	23.79	24.15	24.89				22.12	22.71	
D	Water Weight (B-C)	7.17	7.45	9.07				2.71	2.77	
E	Dry Soil Weight (C-A)	8.32	8.25	9.50				6.64	6.81	
F	% Moisture (D/E)*100	86.2%	90.3%	95.5%				40.8%	40.7%	
N	# OF DROPS	32	23	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.8%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**90**
Plastic Limit	**41**
Plastic Index	**49**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/8/2025	Lindsey Deskins	1/8/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

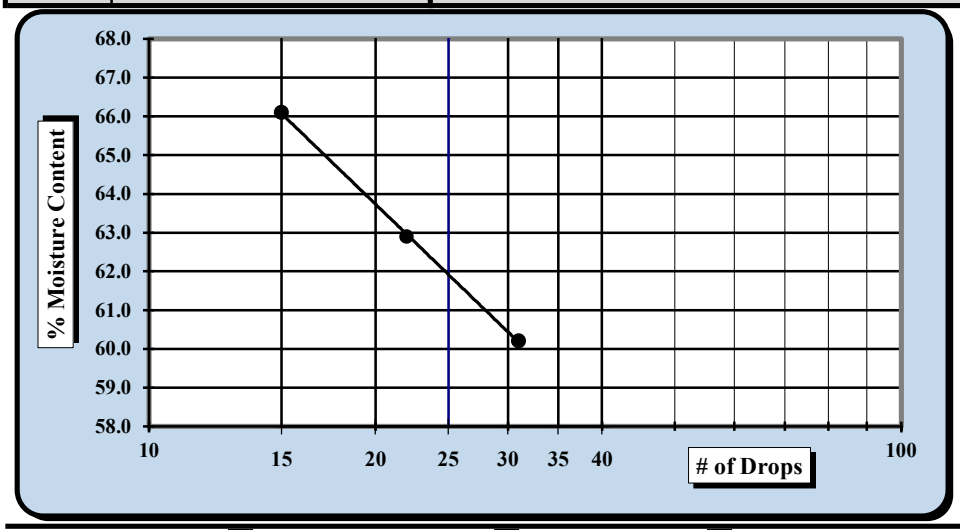
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	12/31/2024
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-05	Sample #: SS-07		Sample Date:	11/15/2024
Log #:	43-4192			Depth: 23.5-25 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B1	A6	9				B3	16	
A	Tare Weight	15.81	15.68	15.38				15.90	15.61	
B	Wet Soil Weight + A	29.57	30.52	32.82				25.18	25.23	
C	Dry Soil Weight + A	24.40	24.79	25.88				22.90	22.86	
D	Water Weight (B-C)	5.17	5.73	6.94				2.28	2.37	
E	Dry Soil Weight (C-A)	8.59	9.11	10.50				7.00	7.25	
F	% Moisture (D/E)*100	60.2%	62.9%	66.1%				32.6%	32.7%	
N	# OF DROPS	31	22	15				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**62**
Plastic Limit	**33**
Plastic Index	**29**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/2/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

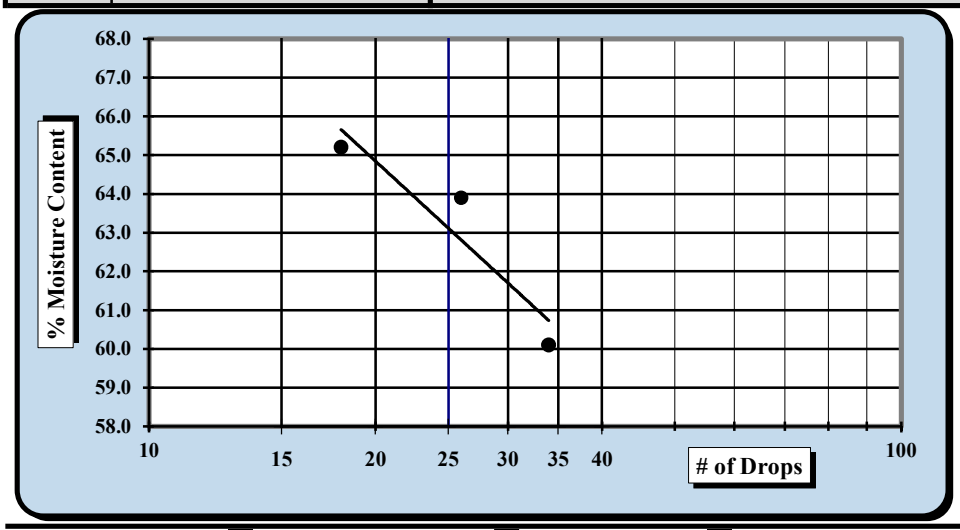
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/31/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/31/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-05	Sample #: UD-03		Sample Date:	11/15/2024
Log #:	43-4192			Depth: 13-15 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B2	16	10				A1	23	
A	Tare Weight	15.91	15.64	15.39				15.64	15.42	
B	Wet Soil Weight + A	29.31	31.18	33.40				24.71	24.79	
C	Dry Soil Weight + A	24.28	25.12	26.29				22.11	22.13	
D	Water Weight (B-C)	5.03	6.06	7.11				2.60	2.66	
E	Dry Soil Weight (C-A)	8.37	9.48	10.90				6.47	6.71	
F	% Moisture (D/E)*100	60.1%	63.9%	65.2%				40.2%	39.6%	
N	# OF DROPS	34	26	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**39.9%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**63**
Plastic Limit	**40**
Plastic Index	**23**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/31/2025	Lindsey Deskins	1/31/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-D854-1A
Revision No. 1
Revision Date: 08/03/17

SPECIFIC GRAVITY OF SOIL

Moist Specimens ASTM D 854 Method A

S&ME,Inc, - Knoxville; 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	1-29-24/
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.	B-05	Sample No. UD-03	Sample Date:
Location:	Sampled by:		Depth (ft): 13-15 ft
Sample Description:	Brown Elastic Silt with Sand (MH), brown (Visual)		
Material Excluded:			% Passing #4 Sieve: 100%

Balance ID.	*0.1 gram*	*ID#:*	*9398*	*Cal. Date:*	*1/20/25*	*Cal. Due:*	*1/20/26*
Pycnometer ID No.	*32*	*Cal. Date:*	*3/6/24*	*Balance Verification*	Check Mass:		

Pycnometer Volume (V_p)	499.61	ml.	Mass Determination:	grams
Pycnometer Mass (PM)	172.11	grams	*If [PM-M_p] is greater than .06 grams,*	
Ave. Pycnometer Mass (M_p)	172.12	grams	*recalibrate the dry mass of the pycnometer.*	

	Initial Moisture Content	***Tare #:***		Soaking Time: ASTM C127: 24 ± 4 hrs. ☑
A	Tare Weight		25.15	Aggregate not initially dried ☐
B	Wet Wt + Tare Wt		118.98	
C	Dry Wt. + Tare Wt.		90.85	
D	Water Weight	***B-C***	28.13	
E	Dry Weight	***C-A***	65.70	
F	**Moisture Content**	***100*D/E***	**42.8%**	

(See Table 2 ASTM D 854)	Low Limit	High Limit
Target Dry Mass	*40.00*	*60.00*
Target Wet Mass	**57.12**	**85.68**
Wet Mass of test specimen	**66.56**	grams

$M_{psw;t}$ = *Mass of the Pycnometer, soil, and water =* **700.66** *grams*

Mass of Dry Soil (grams)		Tare #	HY-10
A	Tare Weight		394.53
C	Dry Wt. + Tare Wt.		441.13
M_s	Dry Weight	**C-A**	46.60

T_t =	Test Temperature T_t	21.0 °C
K =	Temperature Coefficient at T_t	0.99979
K =	Temperature Coefficient at 23°C	0.99933
$p_{w;t}$ =	Density of Water at T_t	0.99799 g./ml.

$M_{pw;t}$ =	Mass of the Pycnometer and water at T_t	$M_{pw;t} = M_p + (V_p \times p_{w;t})$	670.73	grams
G_t =	Specific Gravity of Soil Solids at the T_t	$G_t = M_s / (M_{pw;t} - (M_{psw;t}-M_s))$	2.795	
G =	Specific Gravity of Soil Solids at the 20°C	$G = K \times G_t$	2.794	

Soils containing plus #4 material tested per **ASTM C 127**

R =	*% of Soil retained on the #4 sieve*	0.0%
P =	*% of Soil passing the #4 sieve*	100.0%

G_{+4} Apparent Specific Gravity of plus #4 material at the 23°C per ASTM C127
Apparent Specific Gravity of plus #4 material corrected to 20°C

G_{total} *Total Sample Specific Gravity*

$$G_{total} = \frac{1}{\frac{R}{100 \times G_{+4}} + \frac{P}{100 \times G}} = 2.794$$

Notes / Deviations / References: ASTM D854: Specific Gravity of Soil Solids by Water Pycnometer

Kim Gonzalez	Jason Reeves	Technical Manager	2/16/2025
Technician Name	*Technical Responsibility*	*Position*	Date

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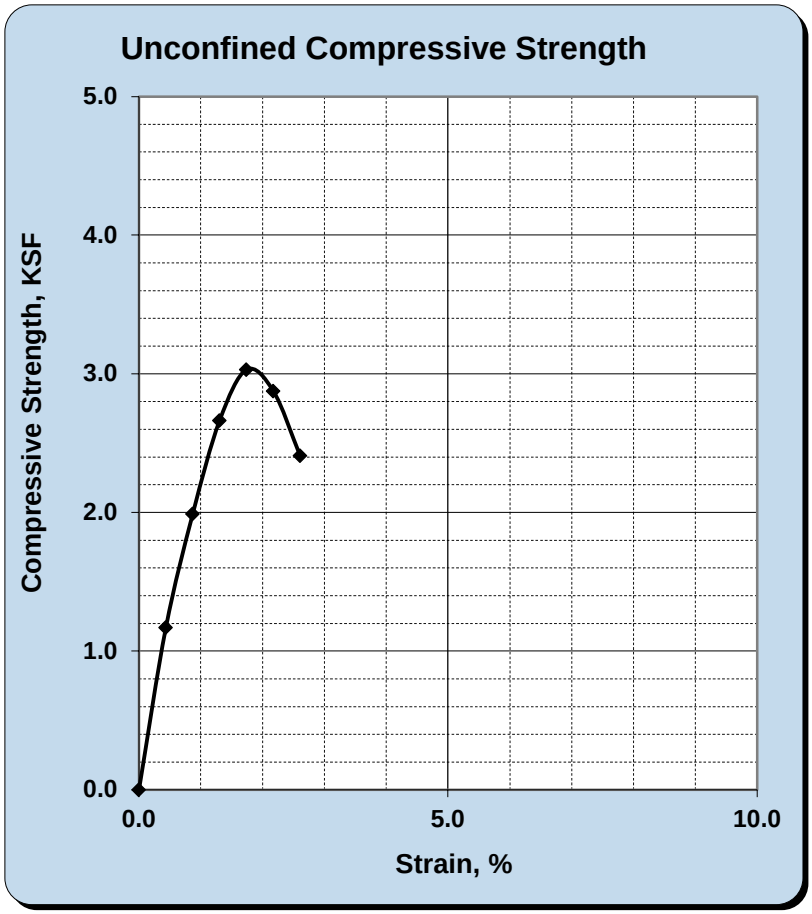
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project No.:	24430185A	Report Date:	2/3/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	1/28/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	B-05 Sample No. UD-03	Sample Date:	11/15/2024
		Depth:	13-15 ft
Sample Description:	ELASTIC SILT WITH SAND (MH), brown (VISUAL)		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 74.1 pcf
Initial Water Content: 44.8%
Unconfined Compressive Strength, q_u: **3.030** KSF
Undrained Shear Strength, s_u: **1.515** KSF

Liquid Limit: 63
Plasticity Index: 23
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.84
Strain at Failure: 1.8

References / Comments / Deviations:

Victoria Igoe	Victoria Igoe	Engineering Technician	2/3/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

2/16/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: B-05
Depth: 13-15 ft **Sample Number:** UD-03
Material Description: Elastic Silt with Sand (MH), brown (VISUAL)
Tested by: Victoria Igoe **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	110.90 g.	Spec. Gr. =	2.794	Wet w+t =	364.06 g.
Dry w+t =	75.35 g.	Est. Ht. Solids =	0.408 in.	Dry w+t =	324.53 g.
Tare Wt. =	7.06 g.	Init. V.R. =	1.454	Tare Wt. =	228.53 g.
Moisture =	52.1 %	Init. Sat. =	100.0 %	Moisture =	41.2 %

UNIT WEIGHT		TEST START			
Height =	1.001 in.	Height =	1.001 in.	Dry Wt. =	96.00 g.
Diameter =	2.500 in.	Diameter =	2.500 in.		
Weight =	139.33 g.				
Dry Dens. =	71.1 pcf				

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Deformation (in.)	C_v ($ft.^2$/day)	C_α	Void Ratio	% Strain
start	1.97764	0.00000			1.454	
0.13	1.97765	0.00001			1.454	0.0 Comprs.
0.25	1.97762	-0.00002			1.454	0.0 Swell
0.50	1.97791	0.00027			1.454	0.0 Comprs.
1.00	1.97826	0.00062			1.453	0.1 Comprs.
2.00	1.98199	0.00435	0.803		1.444	0.4 Comprs.
4.00	1.98891	0.01127	0.897		1.427	1.1 Comprs.
8.00	2.00337	0.02573	0.792		1.391	2.6 Comprs.
4.00	2.00191	0.02427			1.395	2.4 Comprs.
2.00	1.99735	0.01971			1.406	2.0 Comprs.
1.00	1.99380	0.01616			1.415	1.6 Comprs.
2.00	1.99586	0.01822			1.410	1.8 Comprs.
4.00	1.99951	0.02187			1.401	2.2 Comprs.
8.00	2.00627	0.02863			1.384	2.9 Comprs.
16.00	2.04423	0.06659	0.596		1.291	6.7 Comprs.
32.00	2.10996	0.13232	0.413		1.130	13.2 Comprs.
16.00	2.10575	0.12811			1.140	12.8 Comprs.
4.00	2.09026	0.11262			1.178	11.3 Comprs.
1.00	2.07215	0.09451			1.222	9.4 Comprs.

Compression index (C_c), ksf = 0.53 **Preconsolidation pressure (P_p), ksf =** 10.7 **Void ratio at P_p (e_m) =** 1.358
Recompression index (C_r) = 0.04

Pressure: 0.13 ksf | **TEST READINGS** | **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	1.97764
2	0.1667	1.97771
3	0.3167	1.97763
4	0.5667	1.97760
5	1.0667	1.97763
6	2.0667	1.97771
7	2.2833	1.97765

Void Ratio = 1.454 **Compression =** 0.0%

Pressure: 0.25 ksf | **TEST READINGS** | **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.97637	11	30.1167	1.97789
2	0.1000	1.97632	12	60.1167	1.97814
3	0.2000	1.97709	13	120.1167	1.97801
4	0.3500	1.97726	14	240.1333	1.97787
5	0.6000	1.97732	15	480.1333	1.97764
6	1.1000	1.97766	16	720.1333	1.97755
7	2.1000	1.97765	17	855.2333	1.97762
8	4.1000	1.97763			
9	8.1167	1.97769			
10	15.1167	1.97772			

Void Ratio = 1.454 **Swell =** 0.0%

Pressure: 0.50 ksf | **TEST READINGS** | **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.97562	11	30.1333	1.97728
2	0.1167	1.97715	12	60.1333	1.97727
3	0.2167	1.97718	13	120.1333	1.97723
4	0.3667	1.97725	14	240.1333	1.97785
5	0.6167	1.97719	15	480.1333	1.97829
6	1.1167	1.97725	16	720.1333	1.97843
7	2.1167	1.97719	17	960.1333	1.97787
8	4.1167	1.97727	18	1200.1333	1.97783
9	8.1167	1.97724	19	1440.1333	1.97781
10	15.1167	1.97727	20	1440.8333	1.97791

Void Ratio = 1.454 **Compression =** 0.0%

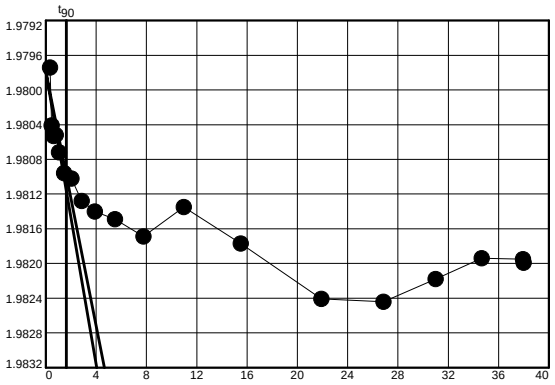
Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.97625	11	30.1167	1.97836
2	0.1000	1.97818	12	60.1167	1.97843
3	0.2000	1.97810	13	120.1167	1.97840
4	0.3500	1.97801	14	240.1167	1.97839
5	0.6000	1.97770	15	480.1167	1.97883
6	1.1000	1.97831	16	720.1167	1.97880
7	2.1000	1.97832	17	960.1167	1.97829
8	4.1000	1.97827	18	1200.1167	1.97811
9	8.1167	1.97830	19	1440.1167	1.97826
10	15.1167	1.97837			

Void Ratio = 1.453 **Compression =** 0.1%

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.97832	11	30.1167	1.98149
2	0.1167	1.97974	12	60.1167	1.98169
3	0.2167	1.98041	13	120.1167	1.98135
4	0.3667	1.98053	14	240.1333	1.98177
5	0.6167	1.98052	15	480.1333	1.98241
6	1.1167	1.98072	16	720.1333	1.98244
7	2.1167	1.98096	17	960.1333	1.98218
8	4.1167	1.98102	18	1200.1333	1.98194
9	8.1167	1.98128	19	1440.1333	1.98195
10	15.1167	1.98140	20	1442.3167	1.98199

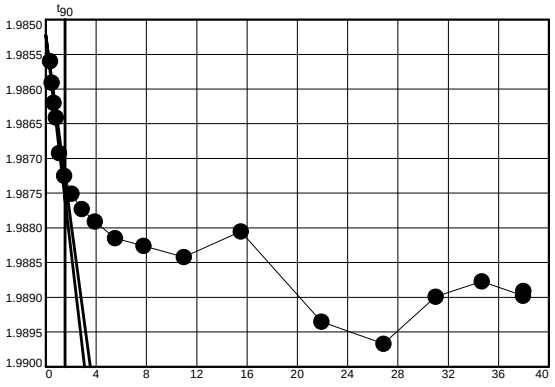


Void Ratio = 1.444 **Compression =** 0.4%

D_0 = 1.9798 **D_{90} =** 1.9810 **D_{100} =** 1.9811 **C_V at 2.63 min. =** 0.803 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.98009	11	30.1333	1.98815
2	0.1167	1.98560	12	60.1333	1.98826
3	0.2167	1.98591	13	120.1333	1.98842
4	0.3667	1.98620	14	240.1333	1.98805
5	0.6167	1.98641	15	480.1333	1.98935
6	1.1167	1.98692	16	720.1333	1.98967
7	2.1167	1.98725	17	960.1333	1.98899
8	4.1167	1.98751	18	1200.1333	1.98877
9	8.1333	1.98773	19	1440.1333	1.98898
10	15.1333	1.98791	20	1441.9000	1.98891

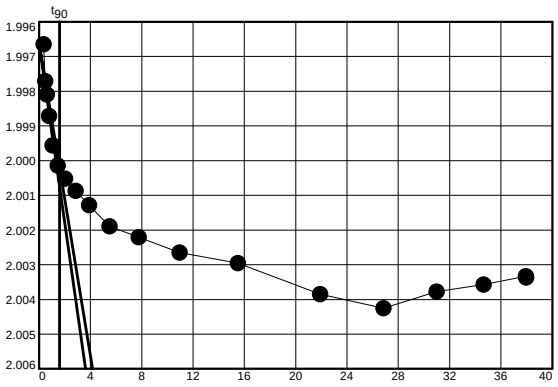


Void Ratio = 1.427 **Compression =** 1.1%

D_0 = 1.9852 **D_{90} =** 1.9873 **D_{100} =** 1.9875 **C_V at 2.33 min. =** 0.897 ft.^{2}/day

Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 7**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.98645	11	30.1333	2.00189
2	0.1167	1.99665	12	60.1333	2.00221
3	0.2167	1.99771	13	120.1333	2.00265
4	0.3667	1.99809	14	240.1333	2.00295
5	0.6167	1.99871	15	480.1333	2.00385
6	1.1167	1.99956	16	720.1333	2.00425
7	2.1167	2.00014	17	960.1333	2.00377
8	4.1333	2.00052	18	1200.1333	2.00357
9	8.1333	2.00087	19	1440.1333	2.00333
10	15.1333	2.00128	20	1442.2000	2.00337



Void Ratio = 1.391 **Compression =** 2.6%

D_0 = 1.9966 **D_{90} =** 2.0002 **D_{100} =** 2.0006 **C_v at 2.59 min. =** 0.792 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 8**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.00448	11	30.1167	2.00133
2	0.1167	2.00164	12	60.1167	2.00129
3	0.2167	2.00162	13	120.1167	2.00134
4	0.3667	2.00168	14	240.1167	2.00139
5	0.6167	2.00162	15	480.1167	2.00171
6	1.1167	2.00149	16	720.1167	2.00191
7	2.1167	2.00149	17	960.1167	2.00186
8	4.1167	2.00147	18	1200.1167	2.00180
9	8.1167	2.00143	19	1440.1167	2.00185
10	15.1167	2.00134	20	1442.9000	2.00191

Void Ratio = 1.395 **Compression =** 2.4%

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 9**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.00317	11	30.1167	1.99857
2	0.1000	2.00042	12	60.1167	1.99850
3	0.2000	2.00028	13	120.1167	1.99845
4	0.3500	2.00024	14	240.1167	1.99835
5	0.6167	2.00006	15	480.1167	1.99836
6	1.1167	1.99975	16	720.1167	1.99830
7	2.1167	1.99961	17	960.1167	1.99796
8	4.1167	1.99925	18	1200.1167	1.99777
9	8.1167	1.99905	19	1422.3167	1.99735
10	15.1167	1.99881			

Void Ratio = 1.406 **Compression =** 2.0%

Pressure: 1.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.99872	11	30.1167	1.99491
2	0.1000	1.99666	12	60.1167	1.99456
3	0.2000	1.99656	13	120.1167	1.99421
4	0.3500	1.99642	14	240.1167	1.99430
5	0.6000	1.99636	15	480.1167	1.99470
6	1.1000	1.99628	16	720.1167	1.99481
7	2.1000	1.99624	17	960.1167	1.99443
8	4.1000	1.99612	18	1200.1333	1.99385
9	8.1167	1.99585	19	1440.1333	1.99380
10	15.1167	1.99542	20	1441.9500	1.99380

Void Ratio = 1.415 **Compression =** 1.6%

Pressure: 2.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.99324	11	30.1333	1.99514
2	0.1000	1.99512	12	60.1333	1.99509
3	0.2167	1.99515	13	120.1333	1.99528
4	0.3667	1.99515	14	240.1333	1.99533
5	0.6167	1.99517	15	480.1333	1.99623
6	1.1167	1.99512	16	720.1333	1.99651
7	2.1167	1.99519	17	960.1333	1.99621
8	4.1167	1.99518	18	1200.1333	1.99602
9	8.1333	1.99524	19	1422.6000	1.99586
10	15.1333	1.99526			

Void Ratio = 1.410 **Compression =** 1.8%

Pressure: 4.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.99414	11	30.1167	1.99790
2	0.1000	1.99742	12	60.1167	1.99788
3	0.2000	1.99746	13	120.1167	1.99797
4	0.3500	1.99743	14	240.1167	1.99811
5	0.6000	1.99751	15	480.1167	1.99977
6	1.1000	1.99758	16	720.1167	2.00012
7	2.1000	1.99758	17	960.1167	1.99989
8	4.1167	1.99770	18	1200.1167	1.99966
9	8.1167	1.99773	19	1440.1333	1.99954
10	15.1167	1.99776	20	1447.9000	1.99951

Void Ratio = 1.401 **Compression =** 2.2%

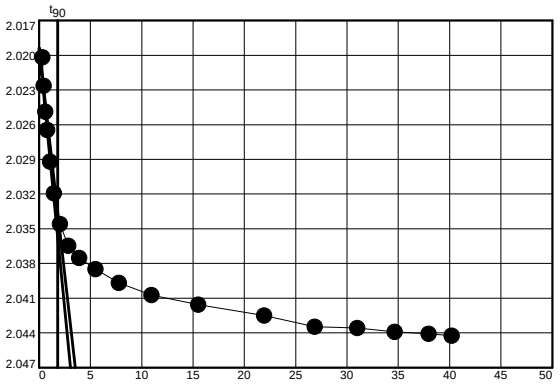
Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	1.99792	11	30.1167	2.00506
2	0.1000	2.00366	12	60.1167	2.00515
3	0.2000	2.00372	13	120.1167	2.00538
4	0.3500	2.00386	14	240.1167	2.00566
5	0.6000	2.00391	15	480.1167	2.00693
6	1.1000	2.00407	16	720.1167	2.00738
7	2.1000	2.00420	17	960.1167	2.00692
8	4.1167	2.00433	18	1200.1167	2.00659
9	8.1167	2.00458	19	1440.1167	2.00628
10	15.1167	2.00485	20	1524.4833	2.00627

Void Ratio = 1.384 **Compression =** 2.9%

Pressure: 16.00 ksf | **TEST READINGS** | **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.00215	11	30.1167	2.03848
2	0.1000	2.02018	12	60.1167	2.03969
3	0.2000	2.02265	13	120.1167	2.04074
4	0.3500	2.02487	14	240.1167	2.04155
5	0.6000	2.02647	15	480.1167	2.04251
6	1.1000	2.02919	16	720.1333	2.04348
7	2.1000	2.03193	17	960.1333	2.04359
8	4.1167	2.03458	18	1200.1333	2.04390
9	8.1167	2.03648	19	1440.1333	2.04408
10	15.1167	2.03753	20	1616.5833	2.04423

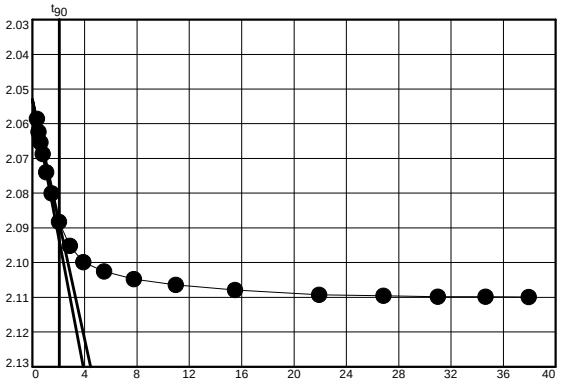


Void Ratio = 1.291 **Compression =** 6.7%

D_0 = 2.0194 **D_{90} =** 2.0335 **D_{100} =** 2.0351 **C_V at 3.24 min. =** 0.596 ft.^{2}/day

Pressure: 32.00 ksf | **TEST READINGS** | **Load No. 15**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.03866	11	30.1333	2.10252
2	0.1167	2.05859	12	60.1333	2.10474
3	0.2167	2.06236	13	120.1333	2.10643
4	0.3667	2.06544	14	240.1333	2.10790
5	0.6167	2.06875	15	480.1333	2.10928
6	1.1167	2.07397	16	720.1333	2.10957
7	2.1333	2.08003	17	960.1333	2.10981
8	4.1333	2.08823	18	1200.1333	2.10983
9	8.1333	2.09518	19	1439.7000	2.10996
10	15.1333	2.09985			



Void Ratio = 1.130 **Compression =** 13.2%

D_0 = 2.0530 **D_{90} =** 2.0884 **D_{100} =** 2.0923 **C_V at 4.19 min. =** 0.413 ft.^{2}/day

Pressure: 16.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.11398	11	30.1167	2.10701
2	0.1000	2.10875	12	60.1167	2.10680
3	0.2000	2.10845	13	120.1167	2.10683
4	0.3500	2.10846	14	240.1167	2.10702
5	0.6167	2.10833	15	480.1167	2.10691
6	1.1167	2.10812	16	720.1167	2.10628
7	2.1167	2.10783	17	960.1167	2.10610
8	4.1167	2.10760	18	1200.1167	2.10558
9	8.1167	2.10723	19	1440.1167	2.10568
10	15.1167	2.10714	20	1440.1667	2.10575

Void Ratio = 1.140 **Compression =** 12.8%

Pressure: 4.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.11067	11	30.1167	2.09223
2	0.1000	2.10381	12	60.1167	2.09169
3	0.2000	2.10328	13	120.1167	2.09173
4	0.3500	2.10257	14	240.1167	2.09165
5	0.6000	2.10157	15	480.1167	2.09129
6	1.1000	2.10051	16	720.1333	2.09108
7	2.1000	2.09846	17	960.1333	2.09093
8	4.1167	2.09690	18	1200.1333	2.09060
9	8.1167	2.09544	19	1440.1333	2.09024
10	15.1167	2.09338	20	1441.2500	2.09026

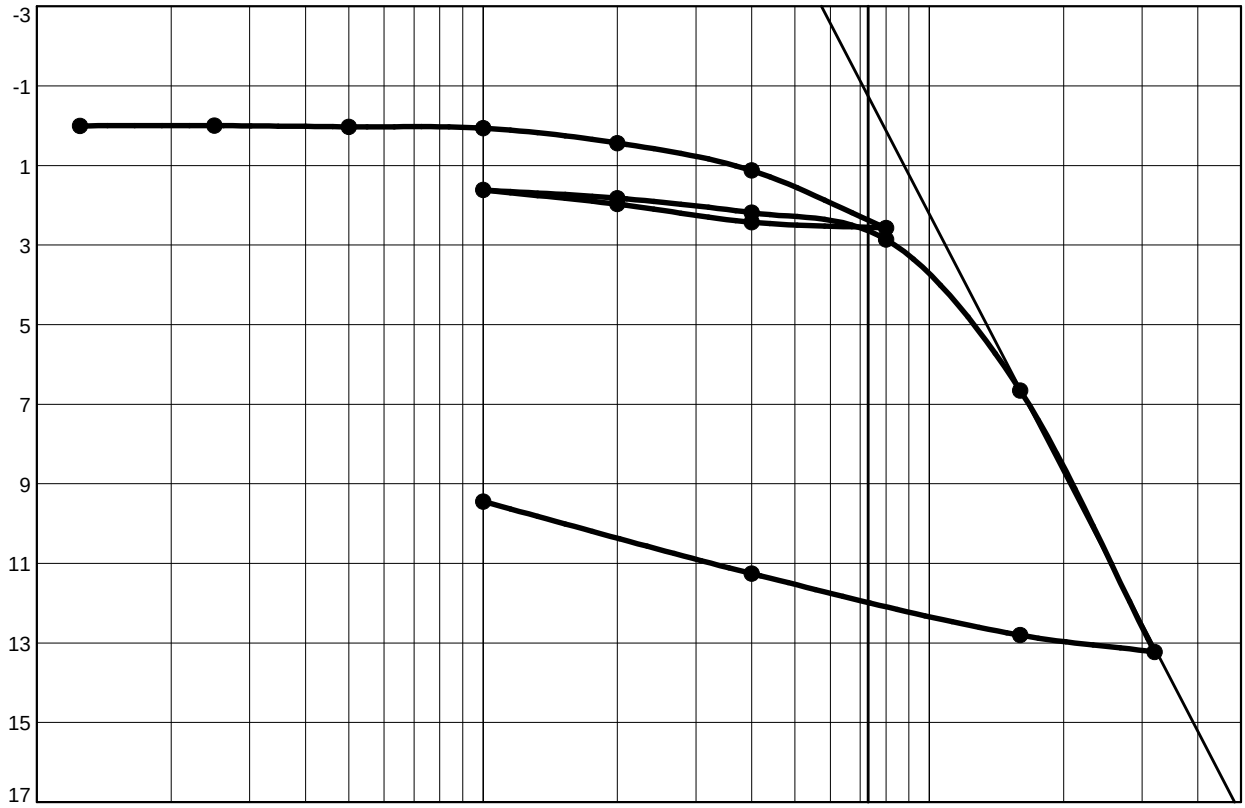
Void Ratio = 1.178 **Compression =** 11.3%

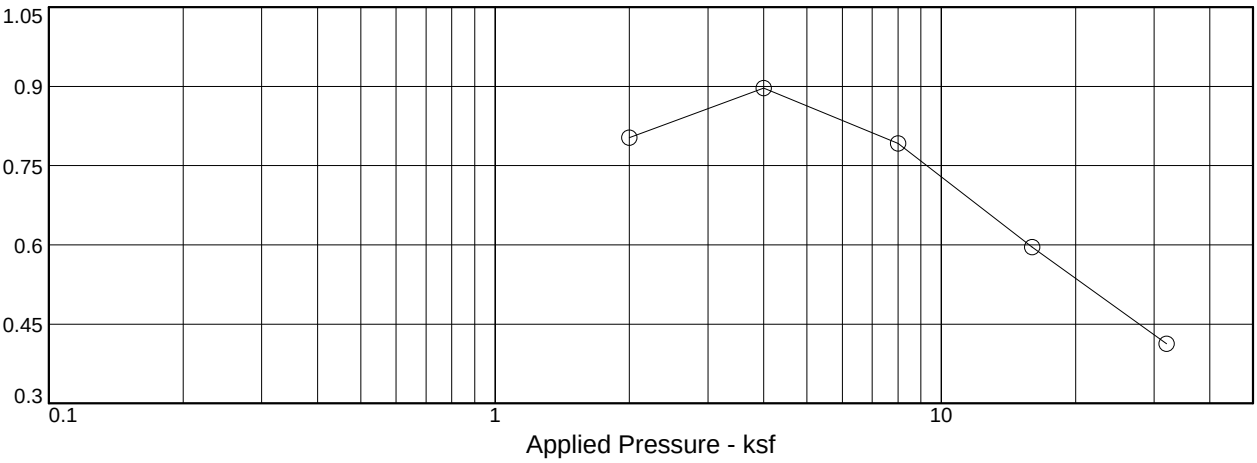
Pressure: 1.00 ksf	TEST READINGS	Load No. 18

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	2.09246	11	30.1333	2.07866
2	0.1167	2.08868	12	60.1333	2.07719
3	0.2167	2.08852	13	120.1333	2.07641
4	0.3667	2.08808	14	240.1333	2.07583
5	0.6167	2.08734	15	480.1333	2.07464
6	1.1167	2.08669	16	720.1333	2.07356
7	2.1167	2.08570	17	960.1333	2.07296
8	4.1167	2.08472	18	1200.1333	2.07233
9	8.1167	2.08282	19	1440.1500	2.07215
10	15.1333	2.08054			

Void Ratio = 1.222 **Compression =** 9.4%

ASTM D2435 CONSOLIDATION TEST REPORT





Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
100.0 %	52.1 %	71.1			2.794		10.7	0.53	0.04	1.454

MATERIAL DESCRIPTION	USCS	AASHTO
Elastic Silt with Sand (MH), brown (VISUAL)		

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 **Depth:** 13-15 ft **Sample Number:** UD-03

S & ME, INC.

Louisville, TN

Remarks:

Figure

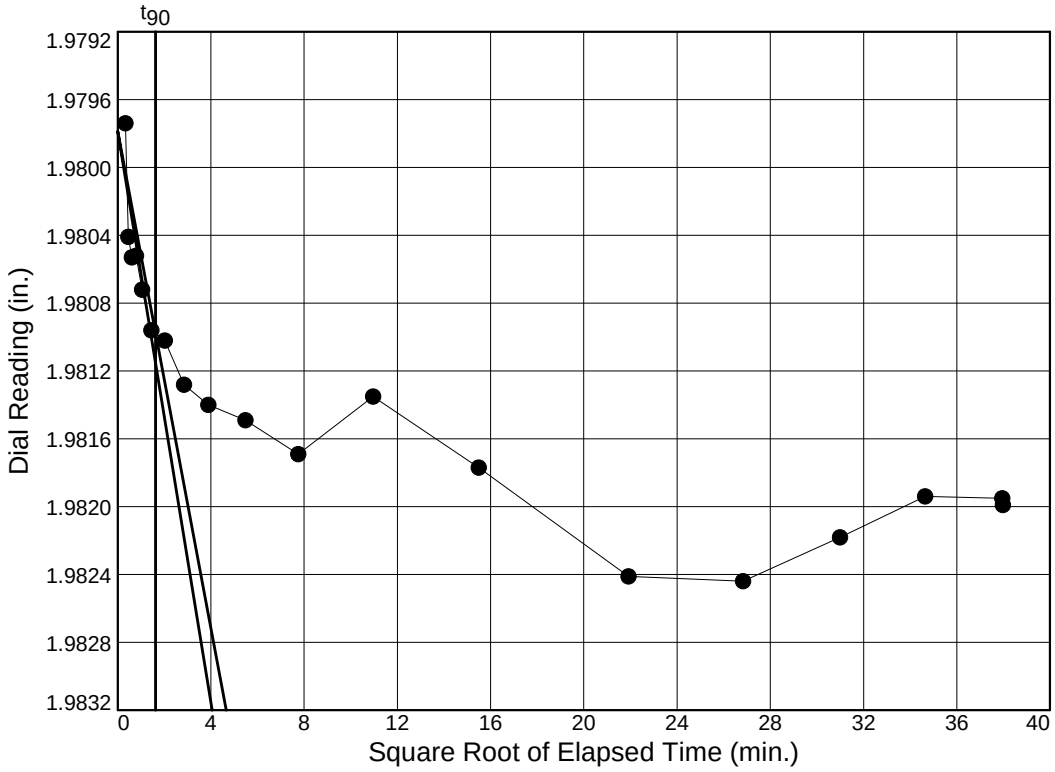
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

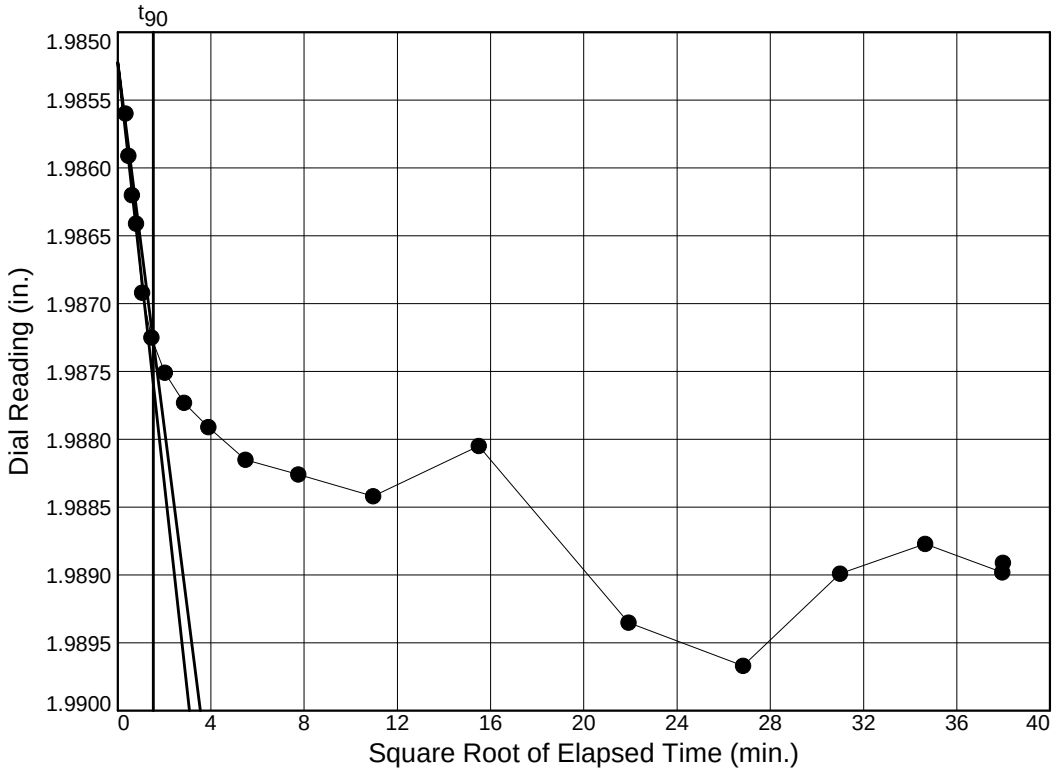
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 Depth: 13-15 ft Sample Number: UD-03



Load No.= 5
Load= 2.00 ksf
D_0 = 1.9798
D_{90} = 1.9810
D_{100} = 1.9811
T_{90} = 2.63 min.

C_v @ T_{90}
0.803 ft.^{2}/day



Load No.= 6
Load= 4.00 ksf
D_0 = 1.9852
D_{90} = 1.9873
D_{100} = 1.9875
T_{90} = 2.33 min.

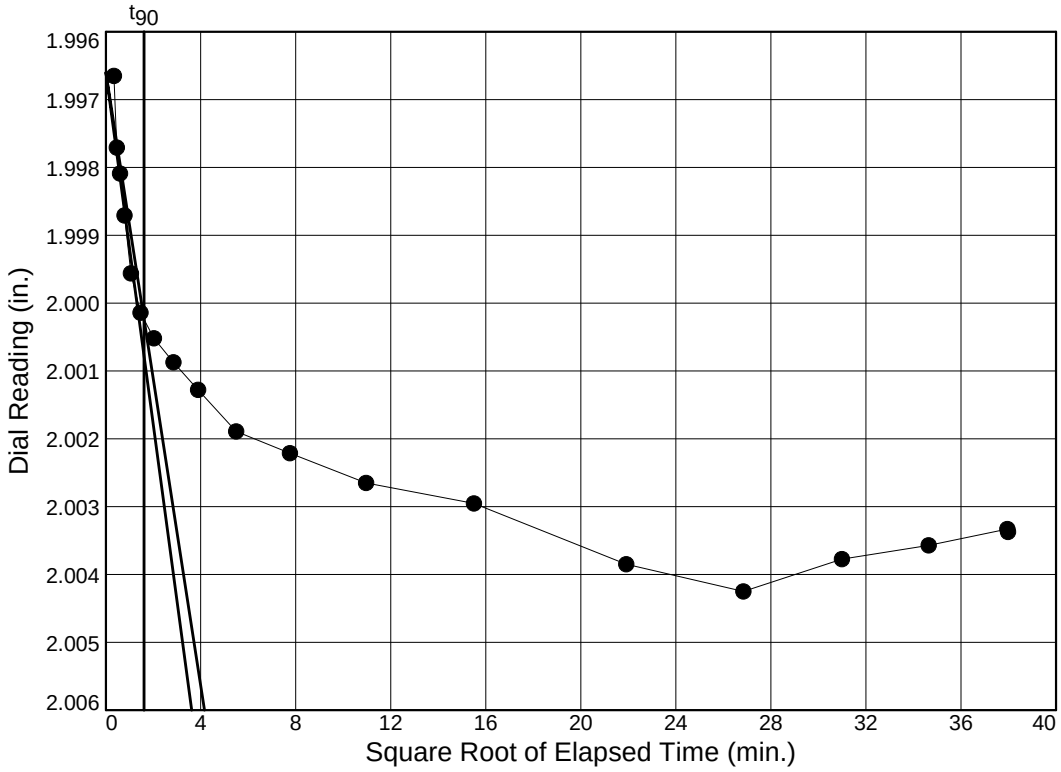
C_v @ T_{90}
0.897 ft.^{2}/day

Figure

Dial Reading vs. Time

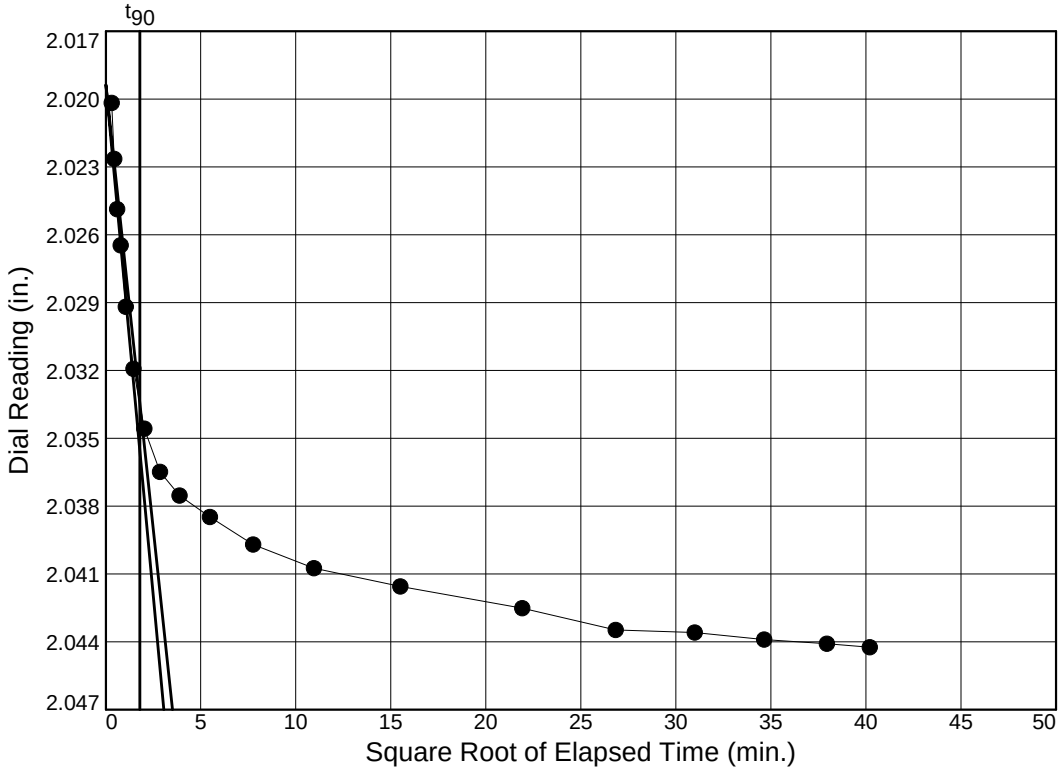
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 Depth: 13-15 ft Sample Number: UD-03



Load No.= 7
Load= 8.00 ksf
D_0 = 1.9966
D_{90} = 2.0002
D_{100} = 2.0006
T_{90} = 2.59 min.

C_v @ T_{90}
0.792 ft.^{2}/day



Load No.= 14
Load= 16.00 ksf
D_0 = 2.0194
D_{90} = 2.0335
D_{100} = 2.0351
T_{90} = 3.24 min.

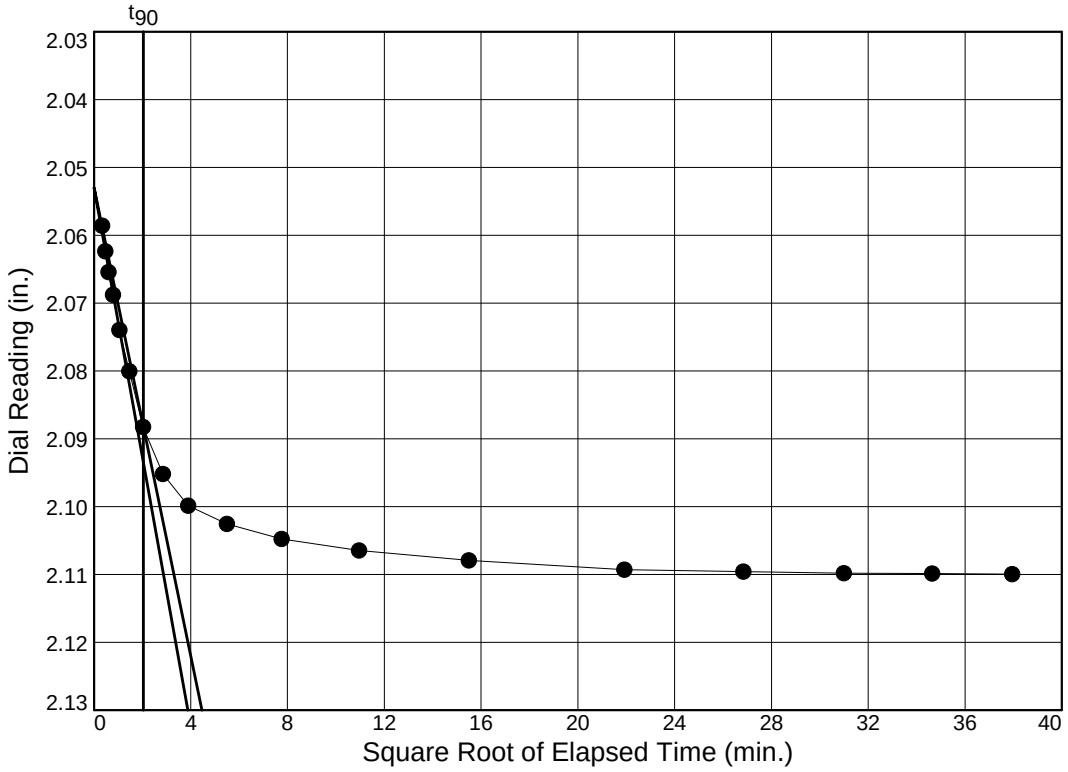
C_v @ T_{90}
0.596 ft.^{2}/day

Figure

Dial Reading vs. Time

Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 Depth: 13-15 ft Sample Number: UD-03



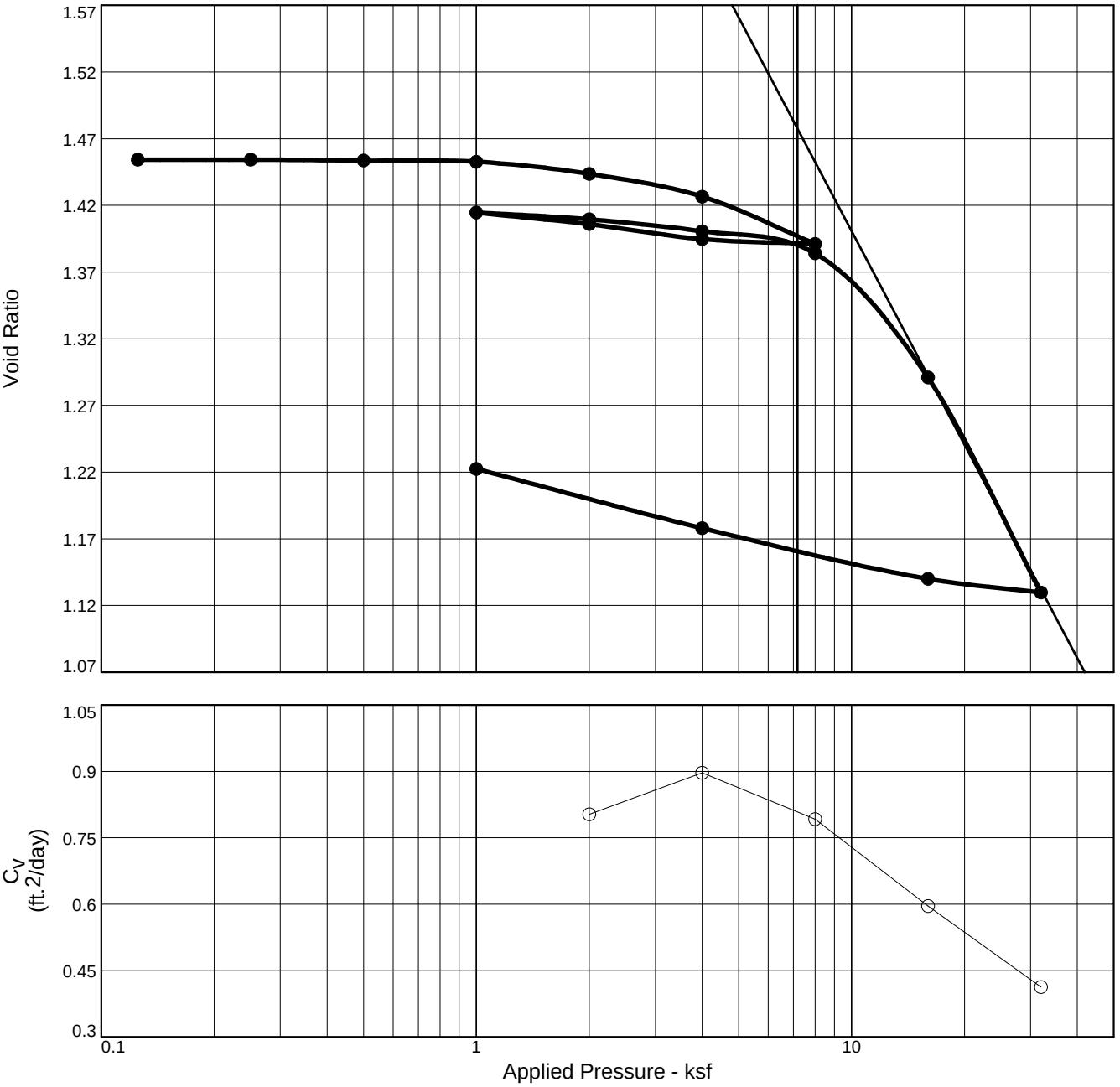
Load No.= 15
Load= 32.00 ksf
D_0 = 2.0530
D_{90} = 2.0884
D_{100} = 2.0923
T_{90} = 4.19 min.

C_v @ T_{90}
0.413 ft.^{2}/day

Figure

S & ME, Inc.

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
100.0 %	52.1 %	71.1			2.794		10.7	0.53	0.04	1.454

MATERIAL DESCRIPTION	USCS	AASHTO
Elastic Silt with Sand (MH), brown (VISUAL)		

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 **Depth:** 13-15 ft **Sample Number:** UD-03

S & ME, INC.

Louisville, TN

Remarks:

Figure

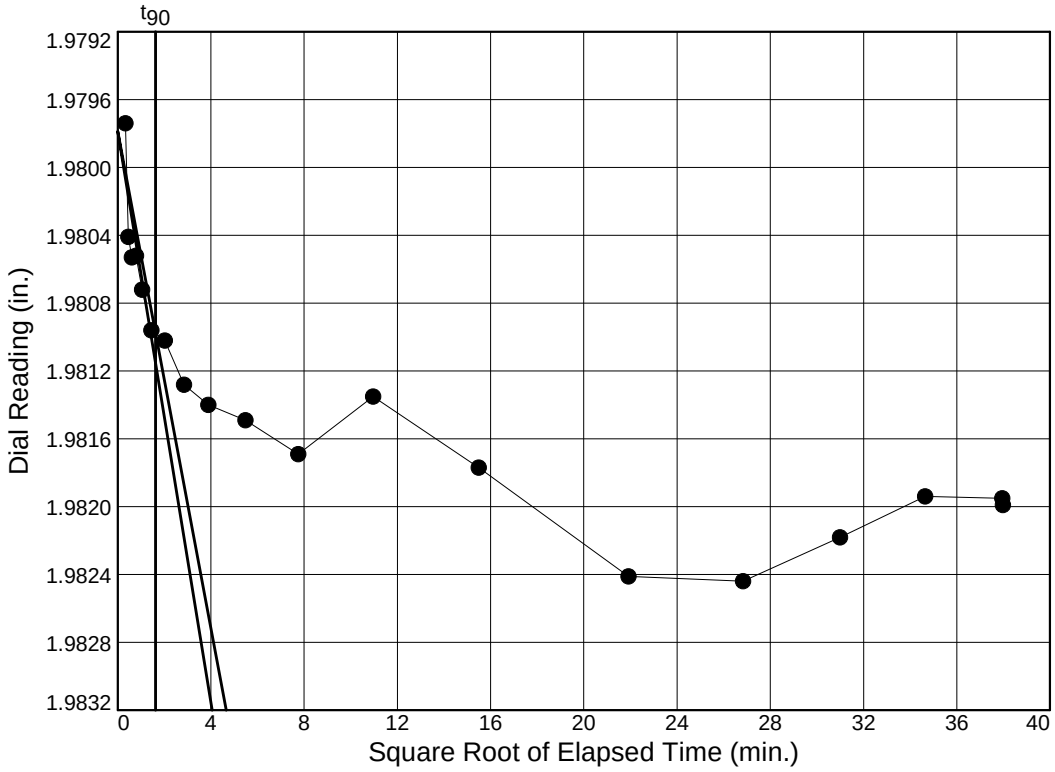
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

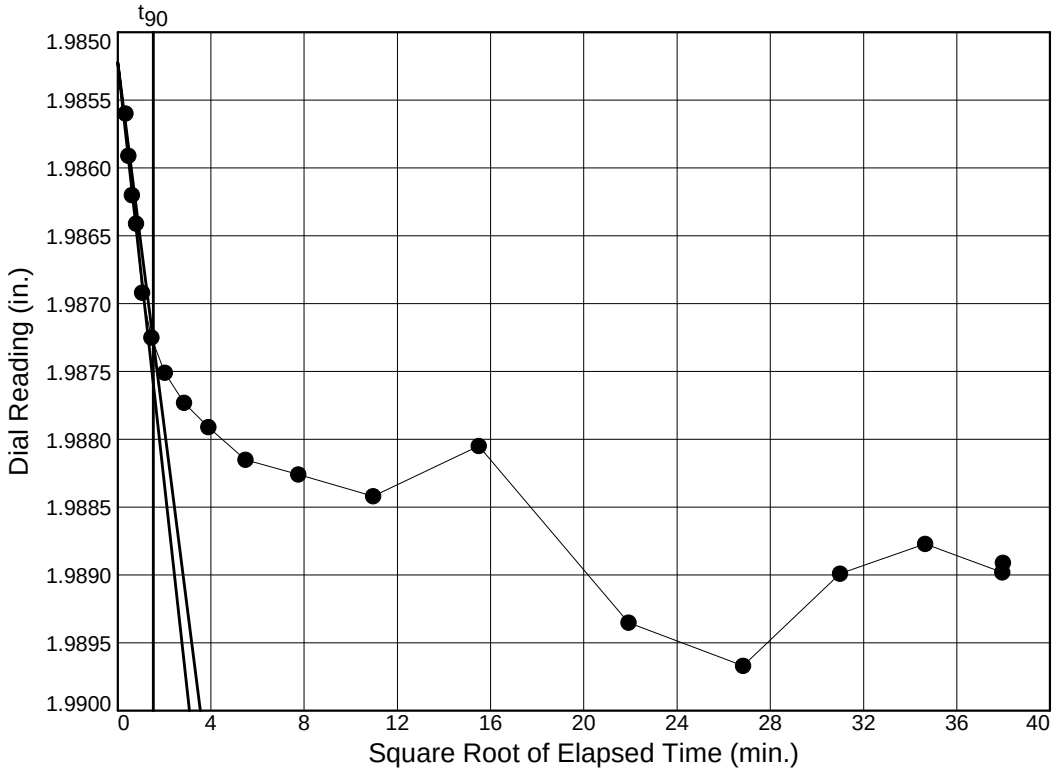
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 Depth: 13-15 ft Sample Number: UD-03



Load No.= 5
Load= 2.00 ksf
D_0 = 1.9798
D_{90} = 1.9810
D_{100} = 1.9811
T_{90} = 2.63 min.

C_v @ T_{90}
0.803 ft.^{2}/day



Load No.= 6
Load= 4.00 ksf
D_0 = 1.9852
D_{90} = 1.9873
D_{100} = 1.9875
T_{90} = 2.33 min.

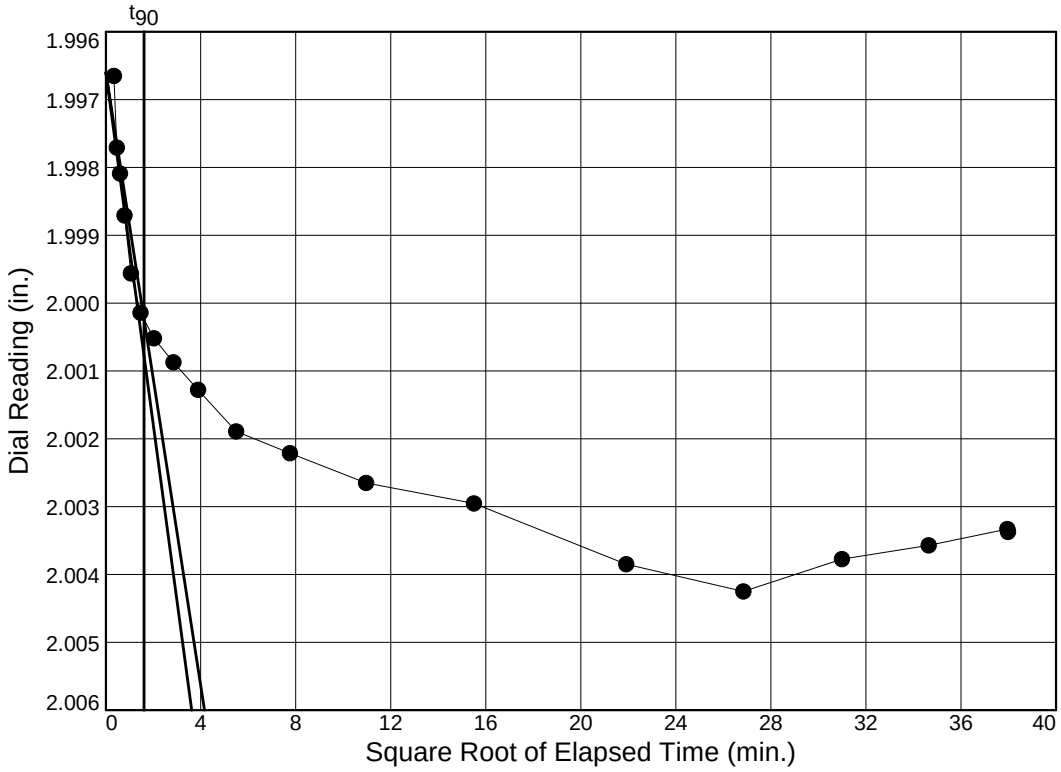
C_v @ T_{90}
0.897 ft.^{2}/day

Figure

Dial Reading vs. Time

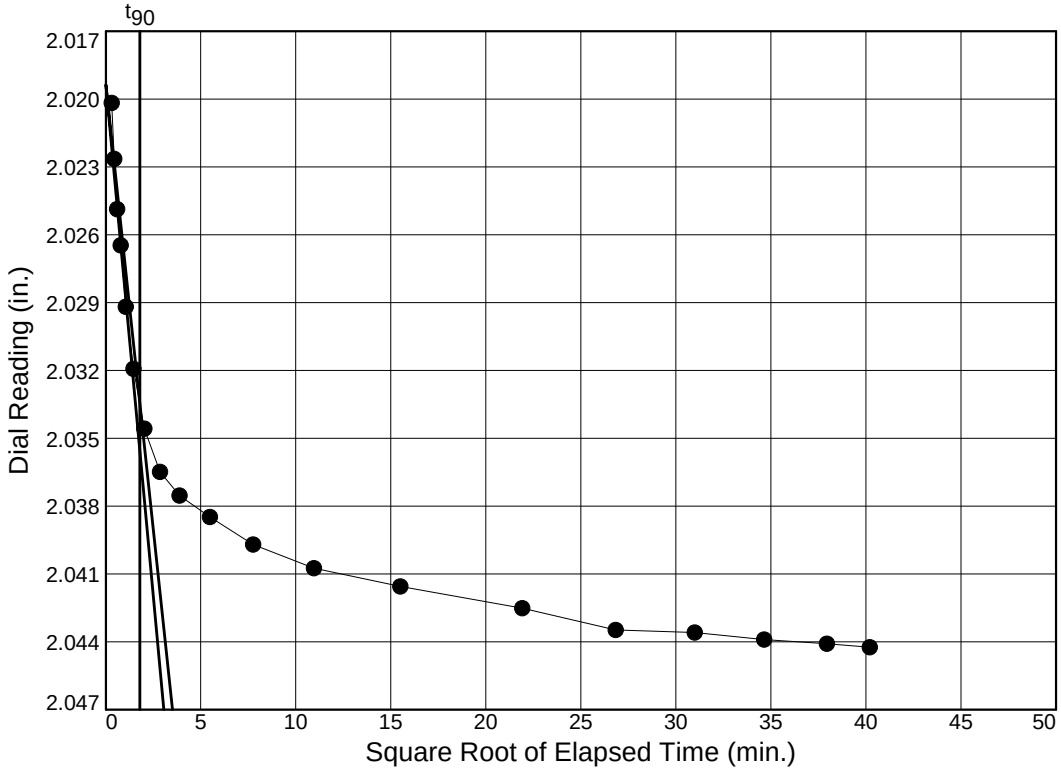
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 Depth: 13-15 ft Sample Number: UD-03



Load No.= 7
Load= 8.00 ksf
D_0 = 1.9966
D_{90} = 2.0002
D_{100} = 2.0006
T_{90} = 2.59 min.

C_v @ T_{90}
0.792 ft.^{2}/day



Load No.= 14
Load= 16.00 ksf
D_0 = 2.0194
D_{90} = 2.0335
D_{100} = 2.0351
T_{90} = 3.24 min.

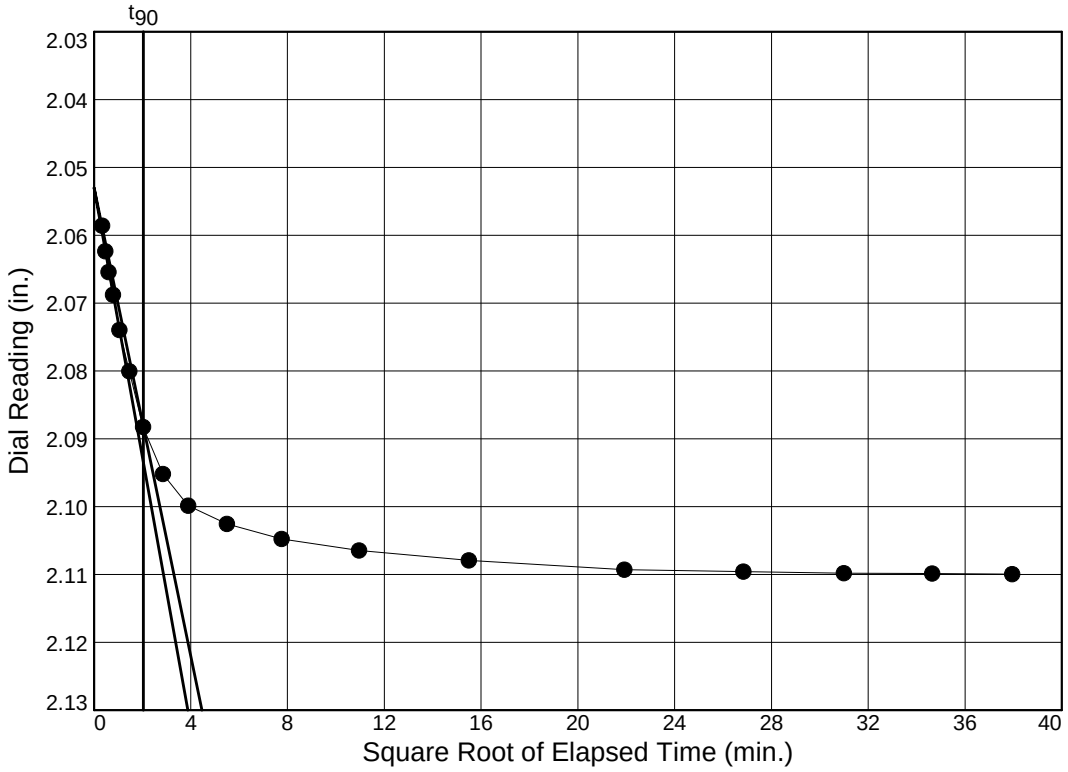
C_v @ T_{90}
0.596 ft.^{2}/day

Figure

Dial Reading vs. Time

Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-05 Depth: 13-15 ft Sample Number: UD-03



Load No.= 15
Load= 32.00 ksf
D_0 = 2.0530
D_{90} = 2.0884
D_{100} = 2.0923
T_{90} = 4.19 min.

C_v @ T_{90}
0.413 ft.^{2}/day

Figure

S & ME, Inc.

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

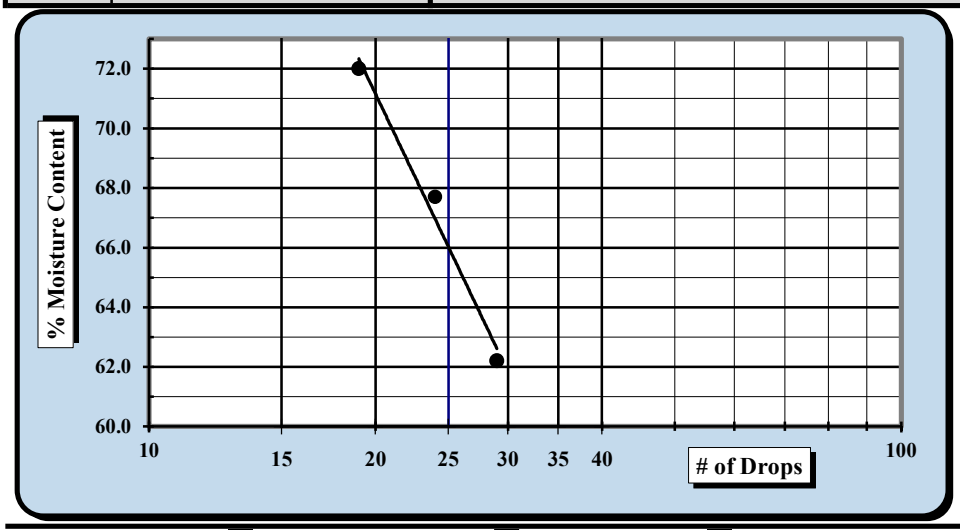
Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/3/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring #:	B-06	Sample #: SS-02	Sample Date: 11/14/2024
Log #:	43-4192		Depth: 3.5-5 ft
Description:	yellowish brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B5	7	18				13	A6	
A	Tare Weight	15.91	15.39	15.37				15.33	15.67	
B	Wet Soil Weight + A	29.26	30.23	33.00				24.74	25.07	
C	Dry Soil Weight + A	24.14	24.24	25.62				22.75	23.07	
D	Water Weight (B-C)	5.12	5.99	7.38				1.99	2.00	
E	Dry Soil Weight (C-A)	8.23	8.85	10.25				7.42	7.40	
F	% Moisture (D/E)*100	62.2%	67.7%	72.0%				26.8%	27.0%	
N	# OF DROPS	29	24	19				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**66**
Plastic Limit	**27**
Plastic Index	**39**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/4/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

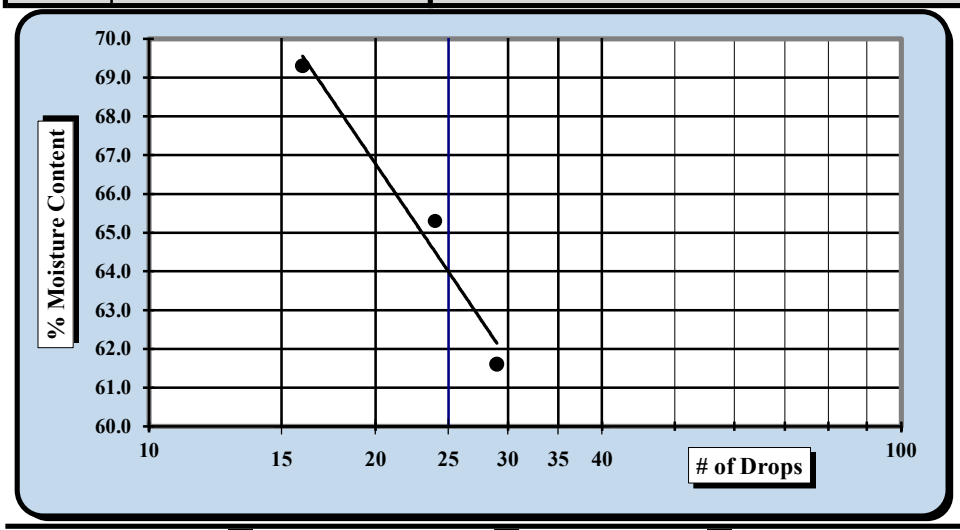
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/8/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/7/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-06	Sample #: SS-04		Sample Date:	11/14/2024
Log #:	43-4192			Depth: 8.5-9 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	21	B5	B4				18	A2	
A	Tare Weight	15.53	15.92	15.70				11.14	15.93	
B	Wet Soil Weight + A	29.72	32.20	33.17				19.10	25.40	
C	Dry Soil Weight + A	24.31	25.77	26.02				17.49	23.47	
D	Water Weight (B-C)	5.41	6.43	7.15				1.61	1.93	
E	Dry Soil Weight (C-A)	8.78	9.85	10.32				6.35	7.54	
F	% Moisture (D/E)*100	61.6%	65.3%	69.3%				25.4%	25.6%	
N	# OF DROPS	29	24	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**64**
Plastic Limit	**26**
Plastic Index	**38**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/8/2025	Lindsey Deskins	1/8/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

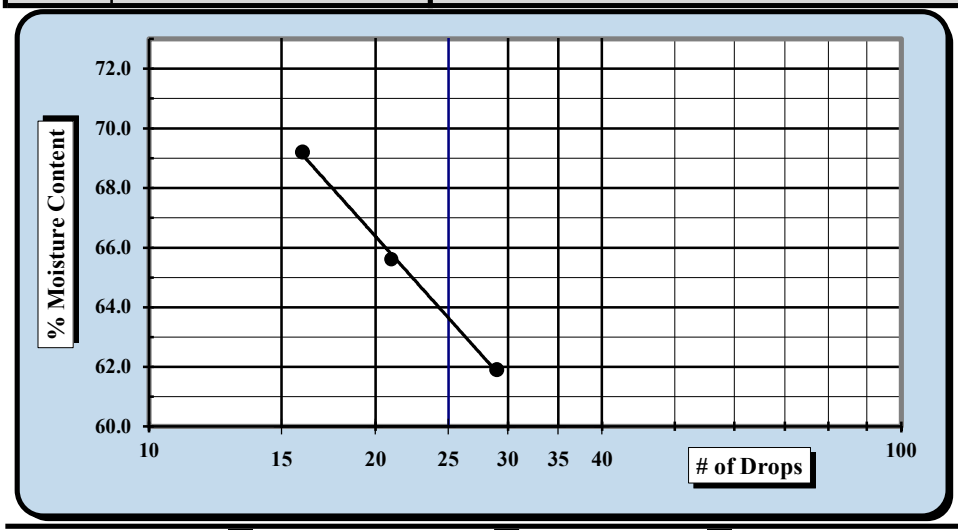
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/3/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-07	Sample #: SS-02		Sample Date:	11/22/2024
Log #:	43-4192			Depth: 5-6.5 ft	
Description:	yellowish orange				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	3	B6	23				A4	B2	
A	Tare Weight	15.47	15.37	15.39				15.90	15.90	
B	Wet Soil Weight + A	32.58	34.66	36.69				25.48	25.31	
C	Dry Soil Weight + A	26.04	27.02	27.98				23.28	23.15	
D	Water Weight (B-C)	6.54	7.64	8.71				2.20	2.16	
E	Dry Soil Weight (C-A)	10.57	11.65	12.59				7.38	7.25	
F	% Moisture (D/E)*100	61.9%	65.6%	69.2%				29.8%	29.8%	
N	# OF DROPS	29	21	16				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**64**
Plastic Limit	**30**
Plastic Index	**34**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/4/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

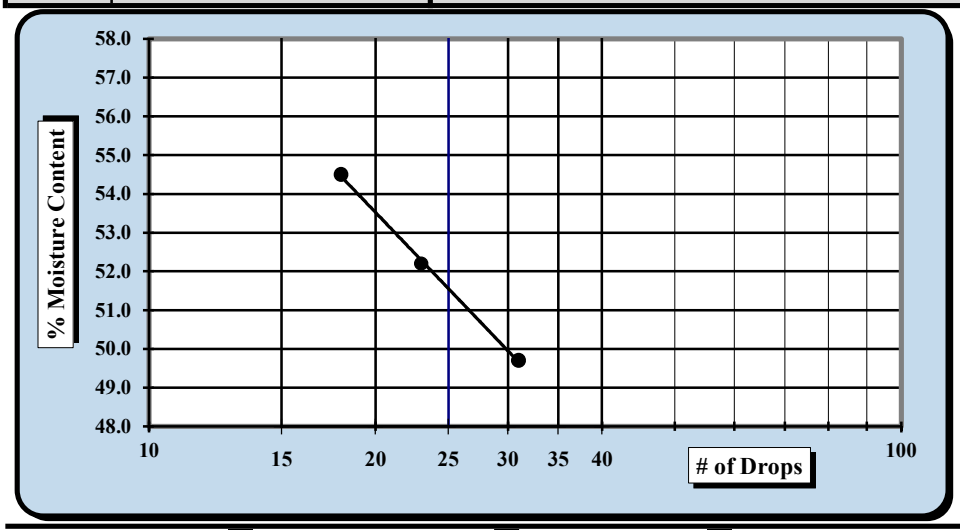
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/31/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/31/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-07	Sample #: UD-03		Sample Date:	11/22/2024
Log #:	43-4192			Depth: 13-15 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	A6	7				3	4	
A	Tare Weight	15.42	15.69	15.43				15.46	15.47	
B	Wet Soil Weight + A	29.36	31.32	33.92				25.00	24.99	
C	Dry Soil Weight + A	24.73	25.96	27.40				22.83	22.81	
D	Water Weight (B-C)	4.63	5.36	6.52				2.17	2.18	
E	Dry Soil Weight (C-A)	9.31	10.27	11.97				7.37	7.34	
F	% Moisture (D/E)*100	49.7%	52.2%	54.5%				29.4%	29.7%	
N	# OF DROPS	31	23	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**52**
Plastic Limit	**30**
Plastic Index	**22**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/31/2025	Lindsey Deskins	1/31/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-D854-1A
Revision No. 1
Revision Date: 08/03/17

SPECIFIC GRAVITY OF SOIL

Moist Specimens ASTM D 854 Method A

S&ME,Inc, - Knoxville; 5801 Middlebrook Pike, Suite A, Knoxville, TN 37921

Project #:	24430185A	Report Date:	2/16/25
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	1-29-24/2/5/25
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.	B-07	Sample No. UD-03	Sample Date:
Location:	Sampled by:		Depth (ft): 13-15 ft
Sample Description:	Sandy Elastic Silt (MH), brown (Visual)		
Material Excluded:			% Passing #4 Sieve: 100%

Balance ID.	*0.1 gram*	*ID#:*	*9398*	*Cal. Date:*	*1/20/25*	*Cal. Due:*	*1/20/26*
Pycnometer ID No.	*20*	*Cal. Date:*	*3/6/24*	*Balance Verification*	Check Mass:		

Pycnometer Volume (V_p)	499.52	ml.	Mass Determination:	grams
Pycnometer Mass (PM)	169.39	grams	*If [PM-M_p] is greater than .06 grams,*	
Ave. Pycnometer Mass (M_p)	169.40	grams	*recalibrate the dry mass of the pycnometer.*	

	Initial Moisture Content	***Tare #:***		Soaking Time:	ASTM C127: 24 ± 4 hrs. ☐	
A	Tare Weight		25.24		Aggregate not initially dried ☐	
B	Wet Wt + Tare Wt		127.52			
C	Dry Wt. + Tare Wt.		103.70	*(See Table 2 ASTM D 854)*	Low Limit	High Limit
D	Water Weight	***B-C***	23.82	Target Dry Mass	*40.00*	*60.00*
E	Dry Weight	***C-A***	78.46	Target Wet Mass	**52.16**	**78.24**
F	**Moisture Content**	***100*D/E***	**30.4%**	Wet Mass of test specimen	**67.28**	grams

$M_{psw;t}$ = *Mass of the Pycnometer, soil, and water =* **701.38** *grams*

	Mass of Dry Soil (grams)	Tare #	HY-11				
A	Tare Weight		394.77	**T_t =**	Test Temperature T_t	22.0	°C
C	Dry Wt. + Tare Wt.		446.91	**K =**	Temperature Coefficient at T_t	0.99957	
M_s	Dry Weight	**C-A**	52.14	**K =**	Temperature Coefficient at 23°C	0.99933	
				$p_{w;t}$ =	Density of Water at T_t	0.99777	g./ml.

$M_{pw;t}$ =	Mass of the Pycnometer and water at T_t	$M_{pw;t} = M_p + (V_p \times p_{w;t})$	667.81	grams
G_t =	Specific Gravity of Soil Solids at the T_t	$G_t = M_s / (M_{pw;t} - (M_{psw;t}-M_s))$	2.808	
G =	Specific Gravity of Soil Solids at the 20°C	$G = K \times G_t$	2.807	

Soils containing plus #4 material tested per **ASTM C 127**

R = *% of Soil retained on the #4 sieve* 0.0%
P = *% of Soil passing the #4 sieve* 100.0%

G_{+4} Apparent Specific Gravity of plus #4 material at the 23°C per ASTM C127
Apparent Specific Gravity of plus #4 material corrected to 20°C

G_{total} *Total Sample Specific Gravity* **G_{total}** = $\dfrac{1}{\dfrac{R}{100 \times G_{+4}} + \dfrac{P}{100 \times G}}$ = **2.807**

Notes / Deviations / References: ASTM D854: Specific Gravity of Soil Solids by Water Pycnometer

Kim Gonzalez	Jason Reeves	Technical Manager	2/16/2025
Technician Name	*Technical Responsibility*	*Position*	Date

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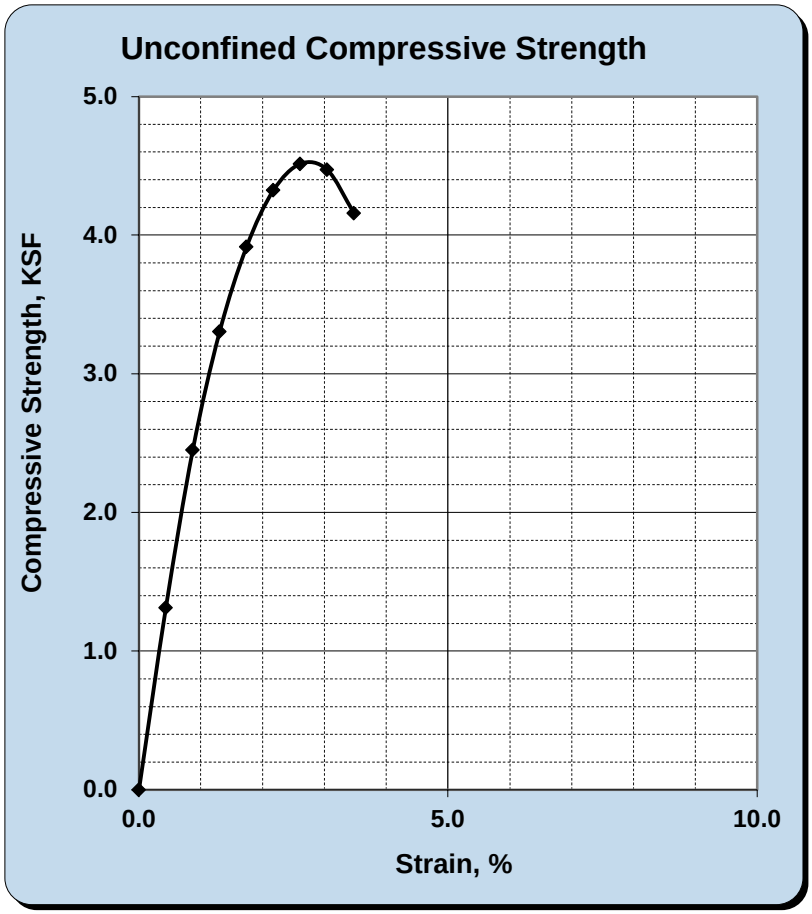
Form No. TR-D2166-01
Revision No. : 1
Revision Date: 08/16/17

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS

ASTM D2166

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project No.:	24430185A	Report Date:	2/3/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s):	1/28/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring No.:	B-07 Sample No. UD-03	Sample Date:	11/22/2024
		Depth:	13-15 ft
Sample Description:	SANDY ELASTIC SILT (MH), brown (VISUAL)		



Failed Specimen



Type of Sample: Intact
Source of Moisture Sample: Test Specimen

Initial Dry Unit Weight: 97.0 pcf
Initial Water Content: 27.5%
Unconfined Compressive Strength, q_u: **4.514** KSF
Undrained Shear Strength, s_u: **2.257** KSF

Liquid Limit: 52
Plasticity Index: 22
Height to Diameter Ratio: 2.0
Rate of Strain (%/min.): 0.83
Strain at Failure: 2.7

References / Comments / Deviations:

Victoria Igoe		Engineering Technician	2/3/2025
Technical Responsibility	*Signature*	*Position*	*Date*

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CONSOLIDATION TEST DATA

2/16/2025

Client: Kiewit Engineering Group, Inc.
Project: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A
Location: B-07
Depth: 13-15 ft **Sample Number:** UD-03
Material Description: Sandy Elastic Silt (MH), brown (VISUAL)
Liquid Limit: 52 **Plasticity Index:** 22
USCS: MH
Figure No.: 1
Testing Remarks: Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1322. ASTM D2435.
Tested by: Victoria Igoe **Checked by:** Jason Reeves

Test Specimen Data

NATURAL MOISTURE

Wet w+t	= 113.72	g.
Dry w+t	= 88.13	g.
Tare Wt.	= 7.20	g.
Moisture	= 31.6	%

VOID RATIO

Spec. Gr.	= 2.807	
Est. Ht. Solids	= 0.490	in.
Init. V.R.	= 0.907	
Init. Sat.	= 97.9	%

AFTER TEST

Wet w+t	= 638.35	g.
Dry w+t	= 603.56	g.
Tare Wt.	= 494.62	g.
Moisture	= 31.9	%

UNIT WEIGHT

Height	= 0.934	in.
Diameter	= 2.502	in.
Weight	= 145.84	g.
Dry Dens.	= 91.9	pcf

TEST START

Height	= 0.934	in.
Diameter	= 2.502	in.

Dry Wt. = 108.94 g.

End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Machine Defl. (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00020		0.00000			0.907	
0.13	0.00070	0.00360	-0.00310			0.913	0.3 Swell
0.25	0.00120	0.00090	0.00010			0.907	0.0 Comprs.
0.50	0.00310	0.00190	0.00100	0.585		0.905	0.1 Comprs.
1.00	0.00710	0.00290	0.00400	0.318		0.899	0.4 Comprs.
2.00	0.01360	0.00410	0.00930	0.365		0.888	1.0 Comprs.
4.00	0.02280	0.00510	0.01750	0.359		0.871	1.9 Comprs.
8.00	0.03630	0.00600	0.03010	0.385		0.845	3.2 Comprs.
4.00	0.03340	0.00580	0.02740			0.851	2.9 Comprs.
2.00	0.02930	0.00520	0.02390			0.858	2.6 Comprs.
1.00	0.02460	0.00510	0.01930			0.867	2.1 Comprs.
2.00	0.02620	0.00530	0.02070			0.864	2.2 Comprs.
4.00	0.03070	0.00550	0.02500			0.856	2.7 Comprs.
8.00	0.03780	0.00590	0.03170			0.842	3.4 Comprs.
16.00	0.05760	0.00720	0.05020	0.365		0.804	5.4 Comprs.
32.00	0.09210	0.00920	0.08270	0.388		0.738	8.8 Comprs.
16.00	0.08770	0.00850	0.07900			0.746	8.5 Comprs.
4.00	0.07010	0.00590	0.06400			0.776	6.8 Comprs.
1.00	0.05330	0.00500	0.04810			0.809	5.1 Comprs.

Compression index (C_c), ksf = 0.22 **Preconsolidation pressure (P_p), ksf =** 9.2 **Void ratio at P_p (e_m) =** 0.839
Recompression index (C_r) = 0.03

Pressure: 0.13 ksf | **TEST READINGS** | **Load No. 1**

No.	Elapsed Time	Dial Reading
1	0.0000	0.0002
2	0.1000	0.0006
3	0.2500	0.0006
4	0.5000	0.0006
5	1.0000	0.0007
6	2.0000	0.0007
7	2.4667	0.0007

Void Ratio = 0.913 **Swell =** 0.3%

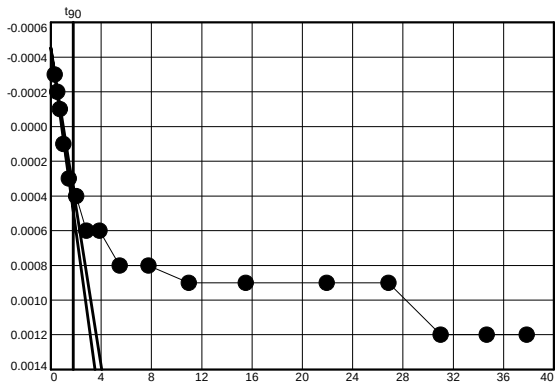
Pressure: 0.25 ksf | **TEST READINGS** | **Load No. 2**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0007	11	60.0667	0.0010
2	0.1000	0.0004	12	120.1333	0.0010
3	0.2500	0.0005	13	240.2667	0.0010
4	0.5000	0.0006	14	480.5500	0.0010
5	1.0000	0.0006	15	720.8167	0.0010
6	2.0000	0.0007	16	867.5167	0.0012
7	4.0000	0.0007			
8	8.0000	0.0010			
9	15.0167	0.0010			
10	30.0333	0.0010			

Void Ratio = 0.907 **Compression =** 0.0%

Pressure: 0.50 ksf | **TEST READINGS** | **Load No. 3**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0012	11	60.0667	0.0027
2	0.1000	0.0016	12	120.1333	0.0028
3	0.2500	0.0017	13	240.2667	0.0028
4	0.5000	0.0018	14	480.5500	0.0028
5	1.0000	0.0020	15	720.8167	0.0028
6	2.0000	0.0022	16	961.1000	0.0031
7	4.0000	0.0023	17	1201.3667	0.0031
8	8.0000	0.0025	18	1431.6000	0.0031
9	15.0167	0.0025			
10	30.0333	0.0027			

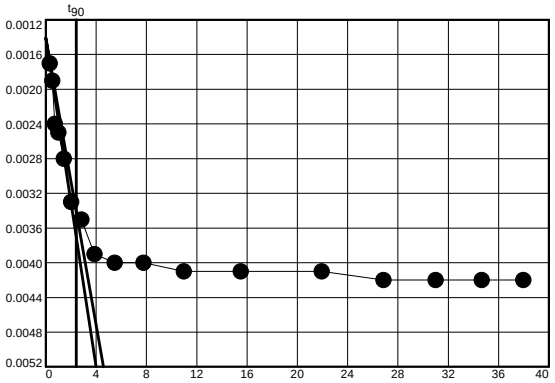


Void Ratio = 0.905 **Compression =** 0.1%

D_0 = -0.0005 **D_{90} =** 0.0004 **D_{100} =** 0.0005 **C_V at 3.16 min. =** 0.585 ft.^{2}/day

Pressure: 1.00 ksf | **TEST READINGS** | **Load No. 4**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0031	11	60.0667	0.0069
2	0.1000	0.0046	12	120.1333	0.0070
3	0.2500	0.0048	13	240.2667	0.0070
4	0.5000	0.0053	14	480.5333	0.0070
5	1.0000	0.0054	15	720.8167	0.0071
6	2.0000	0.0057	16	961.0833	0.0071
7	4.0000	0.0062	17	1201.3500	0.0071
8	8.0000	0.0064	18	1441.1167	0.0071
9	15.0167	0.0068			
10	30.0333	0.0069			

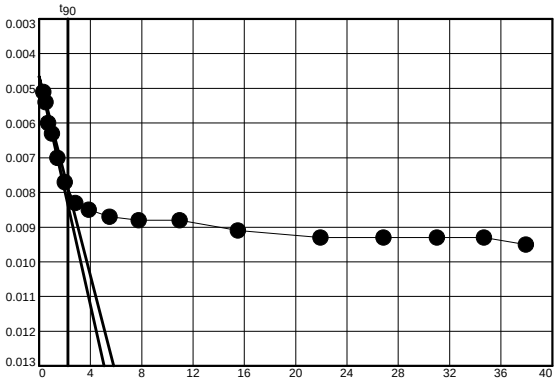


Void Ratio = 0.899 **Compression =** 0.4%

D_0 = 0.0014 **D_{90} =** 0.0034 **D_{100} =** 0.0036 **C_v at 5.79 min. =** 0.318 ft.^{2}/day

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 5**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0071	11	60.0667	0.0129
2	0.1000	0.0092	12	120.1333	0.0129
3	0.2500	0.0095	13	240.2833	0.0132
4	0.5000	0.0101	14	480.5500	0.0134
5	1.0000	0.0104	15	720.8167	0.0134
6	2.0000	0.0111	16	961.1000	0.0134
7	4.0167	0.0118	17	1201.3667	0.0134
8	8.0167	0.0124	18	1440.1667	0.0136
9	15.0167	0.0126			
10	30.0333	0.0128			

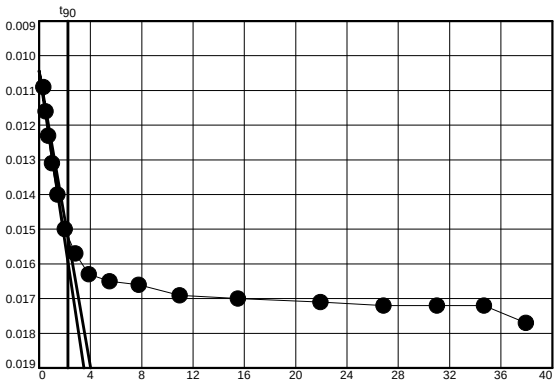


Void Ratio = 0.888 **Compression =** 1.0%

D_0 = 0.0047 **D_{90} =** 0.0079 **D_{100} =** 0.0082 **C_v at 5.00 min. =** 0.365 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 6**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0136	11	60.0667	0.0217
2	0.1000	0.0160	12	120.1333	0.0220
3	0.2500	0.0167	13	240.2667	0.0221
4	0.5000	0.0174	14	480.5500	0.0222
5	1.0000	0.0182	15	720.8167	0.0223
6	2.0000	0.0191	16	961.0833	0.0223
7	4.0000	0.0201	17	1201.3667	0.0223
8	8.0000	0.0208	18	1440.1667	0.0228
9	15.0167	0.0214			
10	30.0333	0.0216			

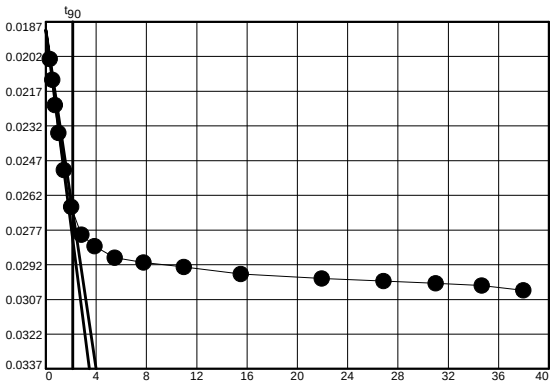


Void Ratio = 0.871 **Compression =** 1.9%

D_0 = 0.0104 **D_{90} =** 0.0152 **D_{100} =** 0.0157 **C_v at 5.00 min. =** 0.359 ft.^{2}/day

Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 7**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0228	11	60.0667	0.0351
2	0.1000	0.0263	12	120.1500	0.0353
3	0.2500	0.0272	13	240.2833	0.0356
4	0.5000	0.0283	14	480.5500	0.0358
5	1.0000	0.0295	15	720.8167	0.0359
6	2.0000	0.0311	16	961.1000	0.0360
7	4.0167	0.0327	17	1201.3833	0.0361
8	8.0167	0.0339	18	1440.1833	0.0363
9	15.0167	0.0344			
10	30.0333	0.0349			



Void Ratio = 0.845 **Compression =** 3.2%

D_0 = 0.0191 **D_{90} =** 0.0269 **D_{100} =** 0.0278 **C_v at 4.57 min. =** 0.385 ft.^{2}/day

Pressure: 4.00 ksf | **TEST READINGS** | **Load No. 8**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0363	11	60.0667	0.0335
2	0.1000	0.0351	12	120.1333	0.0335
3	0.2500	0.0348	13	240.2667	0.0334
4	0.5000	0.0345	14	480.5500	0.0334
5	1.0000	0.0342	15	720.8167	0.0334
6	2.0000	0.0340	16	961.1000	0.0334
7	4.0000	0.0337	17	1201.3833	0.0334
8	8.0000	0.0335	18	1432.7167	0.0334
9	15.0167	0.0335			
10	30.0333	0.0335			

Void Ratio = 0.851 **Compression =** 2.9%

Pressure: 2.00 ksf | **TEST READINGS** | **Load No. 9**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0334	11	60.0667	0.0295
2	0.1000	0.0319	12	120.1333	0.0294
3	0.2500	0.0318	13	240.2833	0.0293
4	0.5000	0.0316	14	480.5500	0.0293
5	1.0000	0.0311	15	720.8167	0.0293
6	2.0000	0.0306	16	961.1000	0.0293
7	4.0000	0.0302	17	1201.3667	0.0293
8	8.0167	0.0298	18	1430.9167	0.0293
9	15.0167	0.0297			
10	30.0333	0.0295			

Void Ratio = 0.858 **Compression =** 2.6%

Pressure: 1.00 ksf	TEST READINGS	Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0293	11	60.0833	0.0253
2	0.1000	0.0280	12	120.1500	0.0252
3	0.2500	0.0279	13	240.2833	0.0250
4	0.5000	0.0278	14	480.5500	0.0248
5	1.0000	0.0273	15	720.8167	0.0248
6	2.0167	0.0270	16	961.0833	0.0247
7	4.0167	0.0263	17	1201.3500	0.0246
8	8.0167	0.0261	18	1440.1833	0.0246
9	15.0167	0.0255			
10	30.0500	0.0254			

Void Ratio = 0.867 **Compression =** 2.1%

Pressure: 2.00 ksf	TEST READINGS	Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0246	11	60.0667	0.0262
2	0.1000	0.0253	12	120.1333	0.0262
3	0.2500	0.0254	13	240.2667	0.0262
4	0.5000	0.0255	14	480.5333	0.0262
5	1.0000	0.0256	15	720.8000	0.0262
6	2.0000	0.0260	16	961.0667	0.0262
7	4.0000	0.0260	17	1201.3333	0.0262
8	8.0000	0.0261	18	1419.8333	0.0262
9	15.0167	0.0262			
10	30.0333	0.0262			

Void Ratio = 0.864 **Compression =** 2.2%

Pressure: 4.00 ksf	TEST READINGS	Load No. 12

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0262	11	60.0667	0.0303
2	0.1000	0.0278	12	120.1333	0.0303
3	0.2500	0.0280	13	240.2667	0.0304
4	0.5000	0.0285	14	480.5333	0.0307
5	1.0000	0.0289	15	720.8000	0.0307
6	2.0000	0.0295	16	961.0667	0.0307
7	4.0167	0.0299	17	1201.3333	0.0307
8	8.0167	0.0302	18	1441.6000	0.0307
9	15.0167	0.0302	19	1448.3167	0.0307
10	30.0333	0.0303			

Void Ratio = 0.856 **Compression =** 2.7%

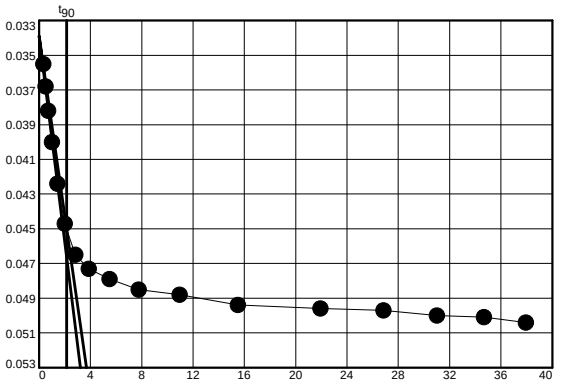
Pressure: 8.00 ksf | **TEST READINGS** | **Load No. 13**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0307	11	60.0667	0.0372
2	0.1000	0.0327	12	120.1333	0.0374
3	0.2500	0.0334	13	240.2667	0.0375
4	0.5000	0.0340	14	480.5333	0.0375
5	1.0000	0.0348	15	720.8000	0.0376
6	2.0000	0.0357	16	961.0667	0.0376
7	4.0000	0.0364	17	1201.3333	0.0377
8	8.0167	0.0367	18	1441.6000	0.0378
9	15.0167	0.0368			
10	30.0333	0.0370			

Void Ratio = 0.842 **Compression =** 3.4%

Pressure: 16.00 ksf | **TEST READINGS** | **Load No. 14**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.0378	11	60.0667	0.0557
2	0.1000	0.0427	12	120.1333	0.0560
3	0.2500	0.0440	13	240.2667	0.0566
4	0.5000	0.0454	14	480.5333	0.0568
5	1.0000	0.0472	15	720.8000	0.0569
6	2.0000	0.0496	16	961.0667	0.0572
7	4.0000	0.0519	17	1201.3333	0.0573
8	8.0000	0.0537	18	1440.1833	0.0576
9	15.0167	0.0545			
10	30.0333	0.0551			

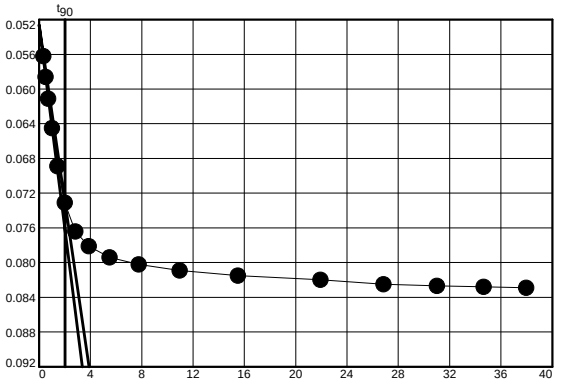


Void Ratio = 0.804 **Compression =** 5.4%

D_0 = 0.0339 **D_{90} =** 0.0450 **D_{100} =** 0.0463 **C_V at 4.64 min. =** 0.365 ft.^{2}/day

Pressure: 32.00 ksf | **TEST READINGS** | **Load No. 15**

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.05800	11	60.0667	0.08940
2	0.1000	0.06540	12	120.1333	0.09010
3	0.25	0.06780	13	240.2500	0.09070
4	0.5000	0.07030	14	480.5167	0.09120
5	1.0000	0.07370	15	720.00	0.09170
6	2.0000	0.07810	16	961.0333	0.09190
7	4.0000	0.08230	17	1201.3000	0.09200
8	8.00	0.08560	18	1441.3000	0.09210
9	15.0167	0.08730			
10	30.0333	0.08860			



Void Ratio = 0.738 **Compression =** 8.8%

D_0 = 0.0526 **D_{90} =** 0.0732 **D_{100} =** 0.0755 **C_V at 4.12 min. =** 0.388 ft.^{2}/day

Pressure: 16.00 ksf	TEST READINGS	Load No. 16

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.09210	11	60.0667	0.08790
2	0.1	0.09040	12	120.1333	0.08780
3	0.2500	0.08990	13	240.2500	0.08780
4	0.5000	0.08950	14	480.5167	0.08770
5	1.0000	0.08890	15	720.7833	0.08770
6	2.0000	0.08860	16	961.0500	0.08770
7	4.0000	0.08820	17	1200	0.08770
8	8.0000	0.08790	18	1421.2000	0.08770
9	15.0167	0.08790			
10	30	0.08790			

Void Ratio = 0.746 **Compression =** 8.5%

Pressure: 4.00 ksf	TEST READINGS	Load No. 17

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.08770	11	60.0667	0.07100
2	0.1000	0.08290	12	120.1333	0.07080
3	0.2500	0.08230	13	240.2667	0.07040
4	0.5000	0.08120	14	480.5167	0.07030
5	1.0000	0.07960	15	720.7833	0.07010
6	2.0000	0.07750	16	961.0500	0.07010
7	4.0000	0.07520	17	1201.3000	0.07010
8	8.0000	0.07330	18	1440.1500	0.07010
9	15.0167	0.07190			
10	30.0333	0.07120			

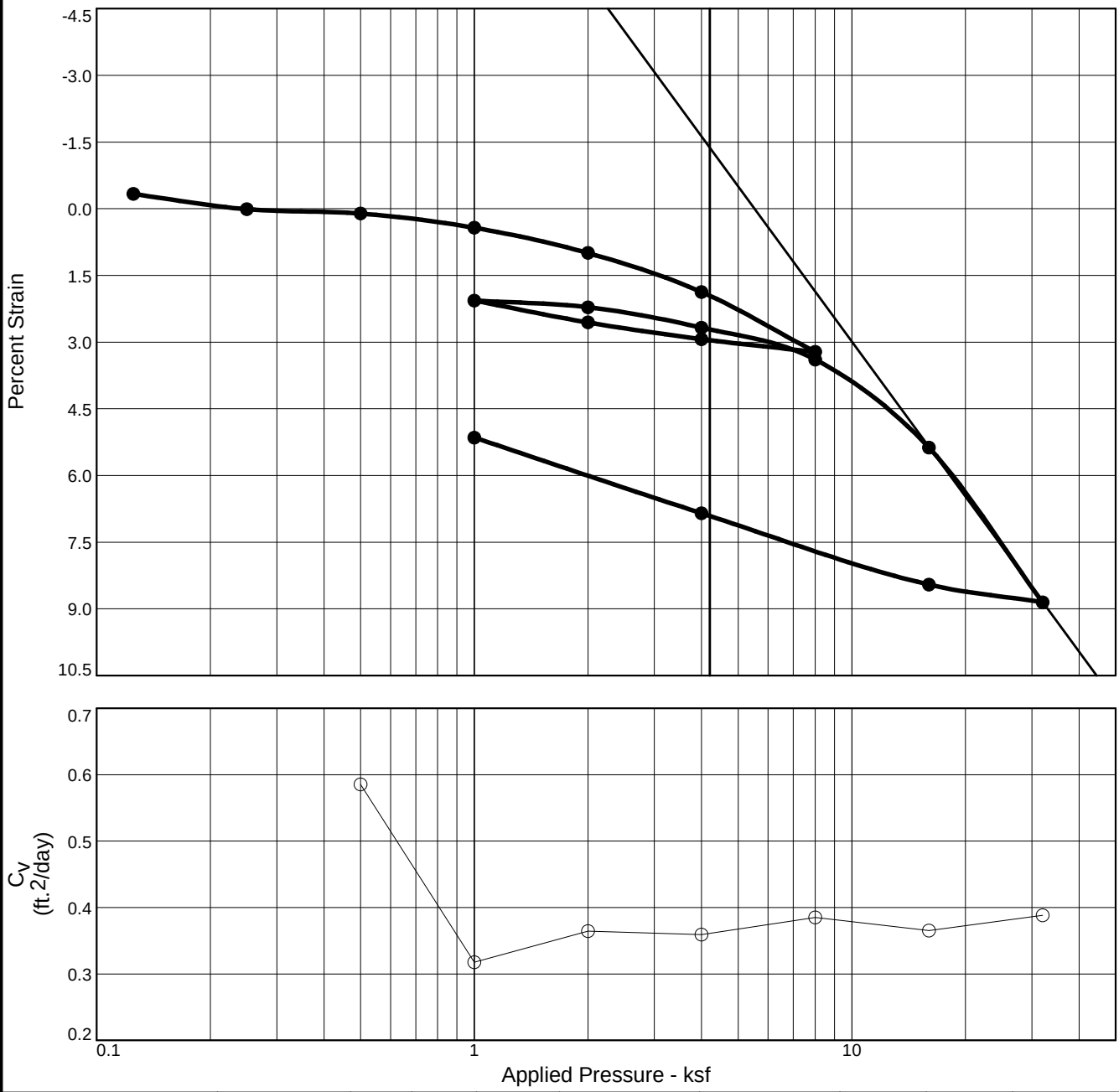
Void Ratio = 0.776 **Compression =** 6.8%

Pressure: 1.00 ksf	TEST READINGS	Load No. 18

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.0000	0.07010	11	60.0667	0.05420
2	0.1000	0.06780	12	120.1333	0.05370
3	0.2500	0.06720	13	240.2500	0.05340
4	0.5000	0.06650	14	480.5167	0.05330
5	1.0000	0.06550	15	720.7833	0.05330
6	2.0000	0.06410	16	961.0333	0.05330
7	4.0000	0.06230	17	1201.3000	0.05330
8	8.0000	0.05990	18	1202.2167	0.05330
9	15.0167	0.05760			
10	30.0333	0.05590			

Void Ratio = 0.809 **Compression =** 5.1%

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
97.9 %	31.6 %	91.9	52	22	2.807		9.2	0.22	0.03	0.907

MATERIAL DESCRIPTION	USCS	AASHTO
Sandy Elastic Silt (MH), brown (VISUAL)	MH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 **Depth:** 13-15 ft **Sample Number:** UD-03

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1322. ASTM D2435.

Figure 1

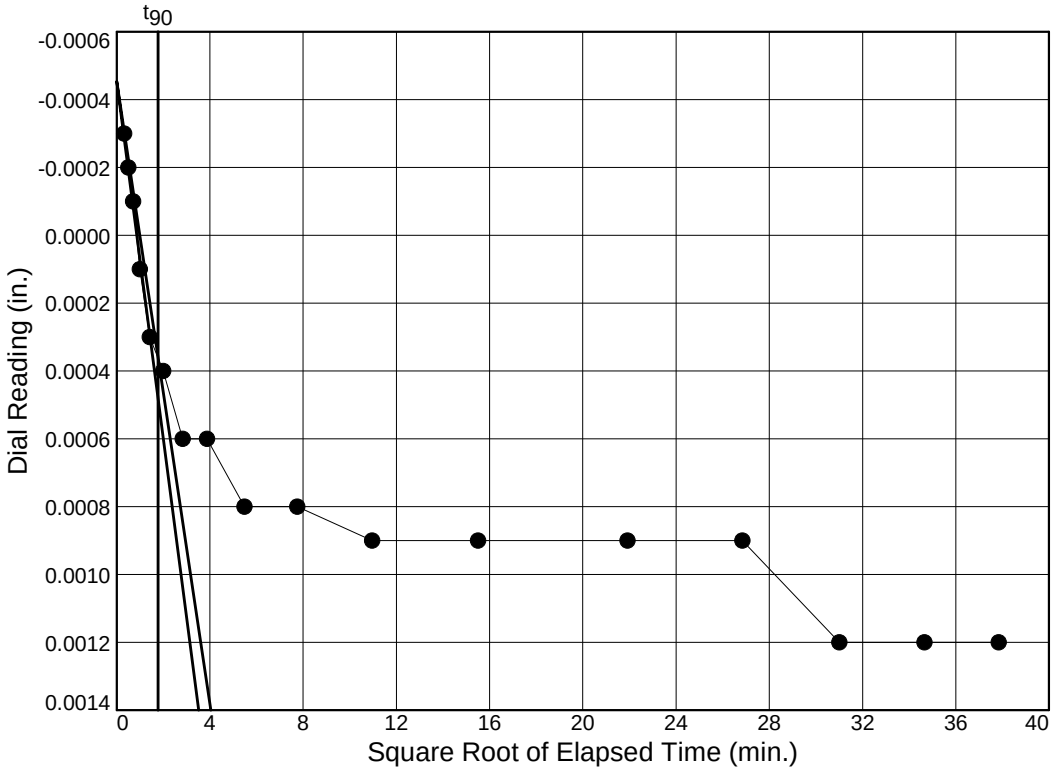
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

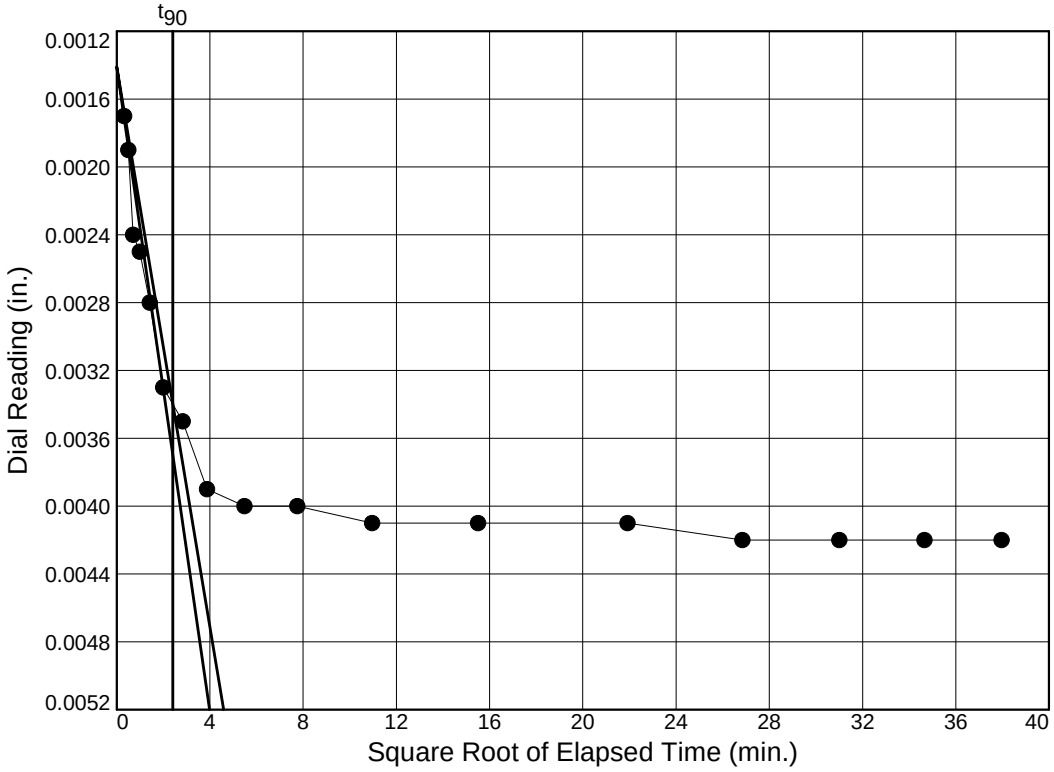
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 3
Load= 0.50 ksf
D_0 = -0.0005
D_{90} = 0.0004
D_{100} = 0.0005
T_{90} = 3.16 min.

C_v @ T_{90}
0.585 ft.^{2}/day



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0014
D_{90} = 0.0034
D_{100} = 0.0036
T_{90} = 5.79 min.

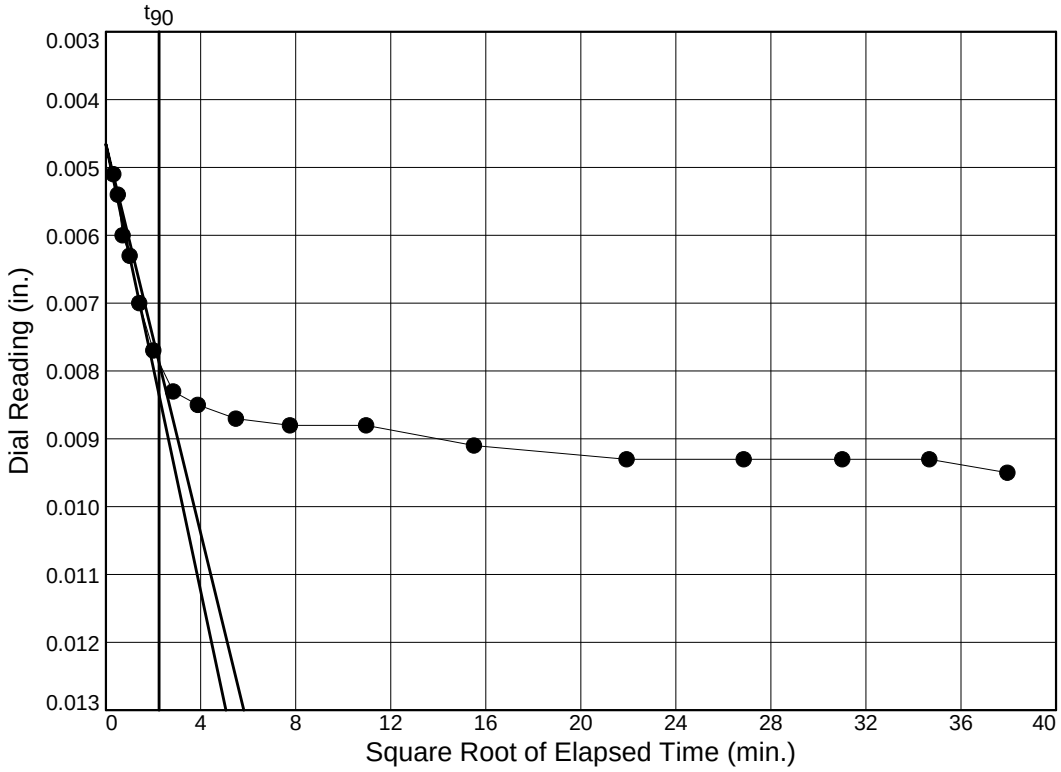
C_v @ T_{90}
0.318 ft.^{2}/day

Figure 2

Dial Reading vs. Time

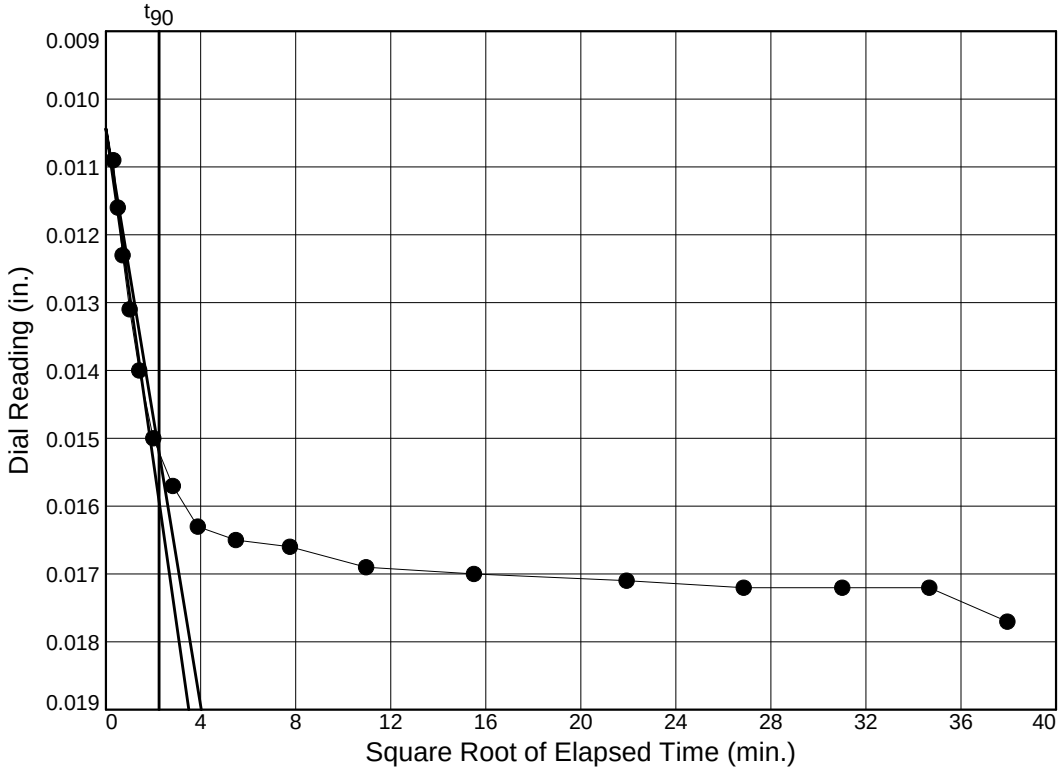
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0047
D_{90} = 0.0079
D_{100} = 0.0082
T_{90} = 5.00 min.

C_v @ T_{90}
0.365 ft.^{2}/day



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0104
D_{90} = 0.0152
D_{100} = 0.0157
T_{90} = 5.00 min.

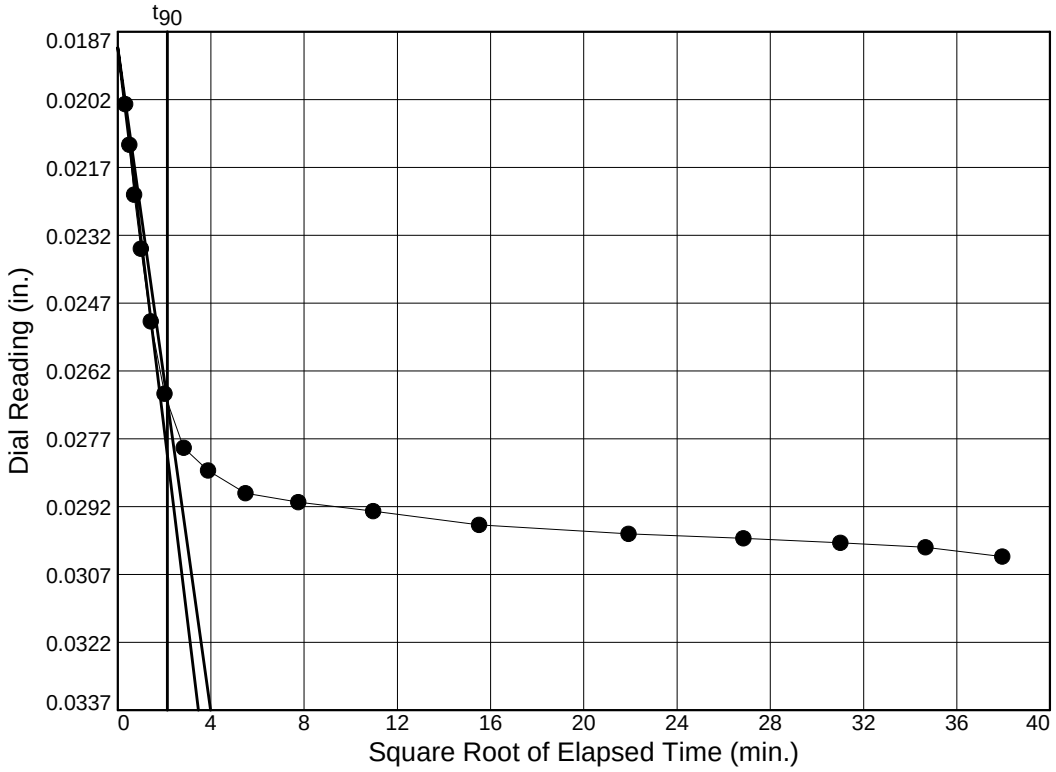
C_v @ T_{90}
0.359 ft.^{2}/day

Figure 3

Dial Reading vs. Time

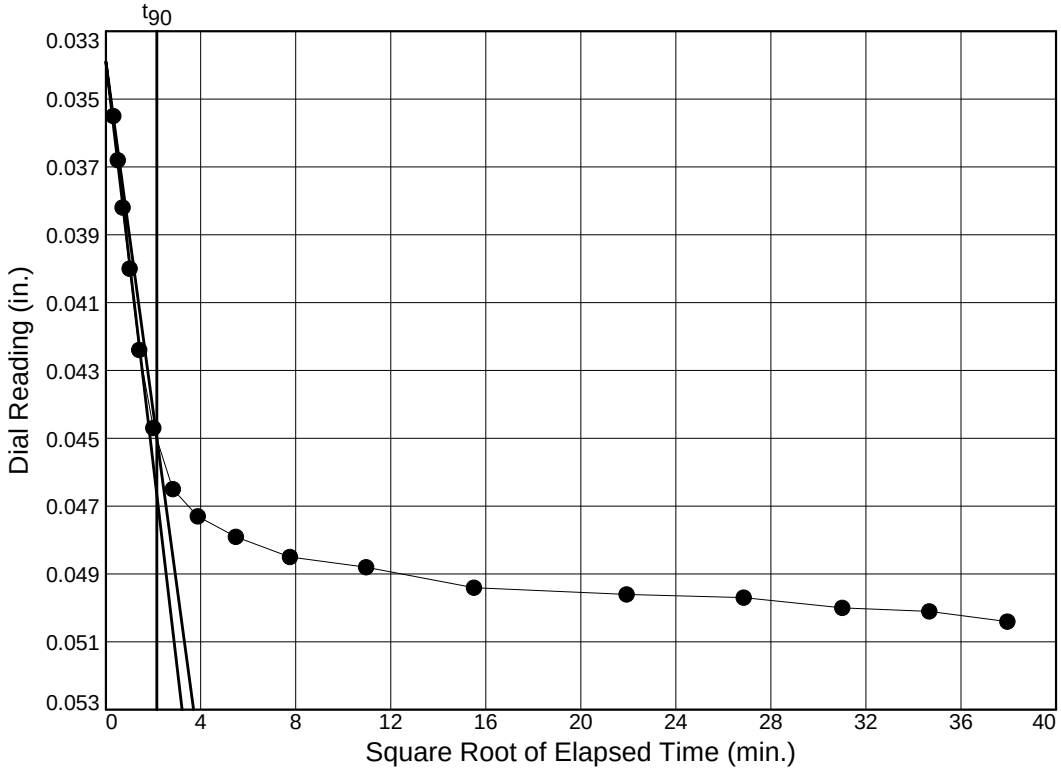
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0191
D_{90} = 0.0269
D_{100} = 0.0278
T_{90} = 4.57 min.

C_v @ T_{90}
0.385 ft.^{2}/day



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0339
D_{90} = 0.0450
D_{100} = 0.0463
T_{90} = 4.64 min.

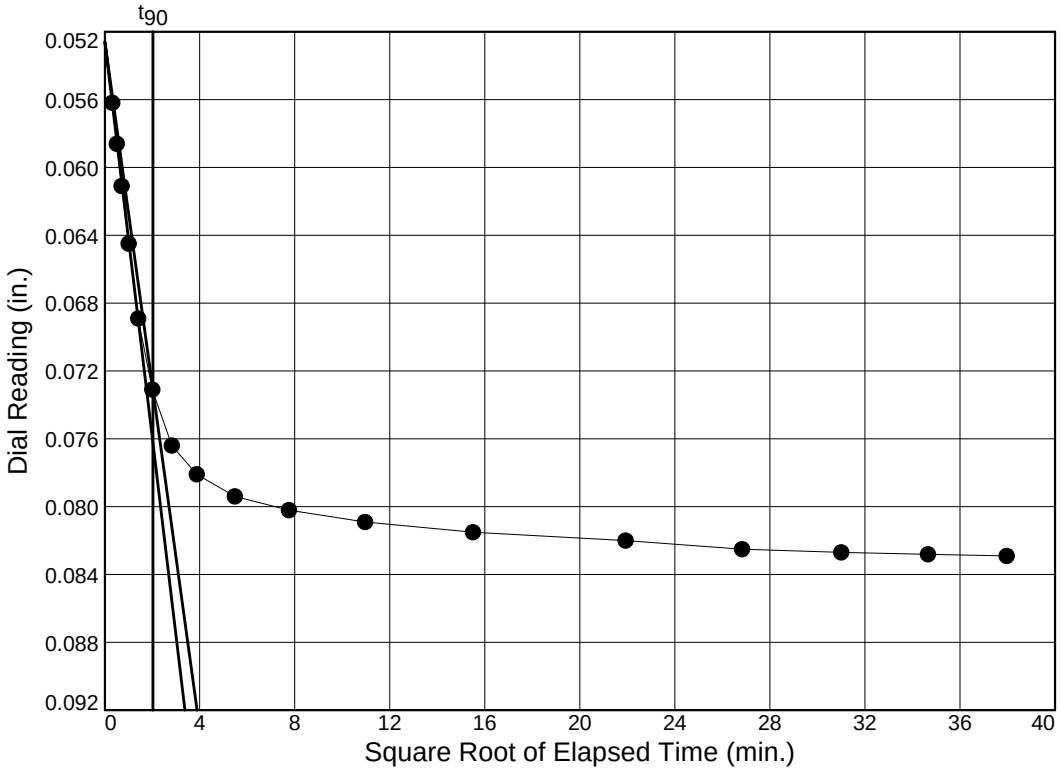
C_v @ T_{90}
0.365 ft.^{2}/day

Figure 4

Dial Reading vs. Time

Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03

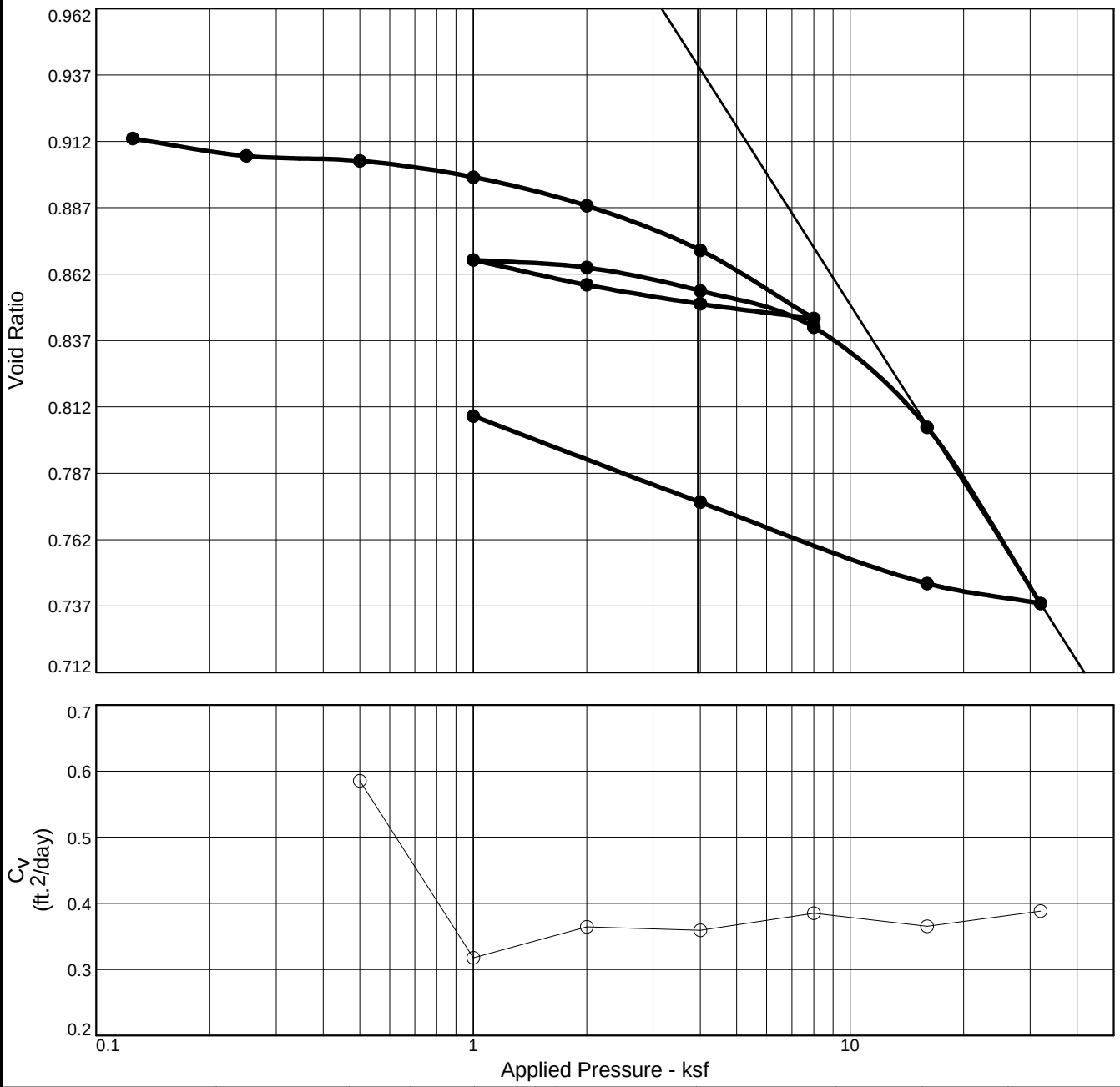


Load No.= 15
Load= 32.00 ksf
D_0 = 0.0526
D_{90} = 0.0732
D_{100} = 0.0755
T_{90} = 4.12 min.

C_v @ T_{90}
0.388 $ft.^2$/day

Figure 5

ASTM D2435 CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
97.9 %	31.6 %	91.9	52	22	2.807		9.2	0.22	0.03	0.907

MATERIAL DESCRIPTION	USCS	AASHTO
Sandy Elastic Silt (MH), brown (VISUAL)	MH	

Project No. 24430185A **Client:** Kiewit Engineering Group, Inc.

Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 **Depth:** 13-15 ft **Sample Number:** UD-03

S & ME, INC.

Louisville, TN

Remarks:

Specimen trimmed with cutting ring. Inundated in seat load. Consolidometer #1322. ASTM D2435.

Figure 1

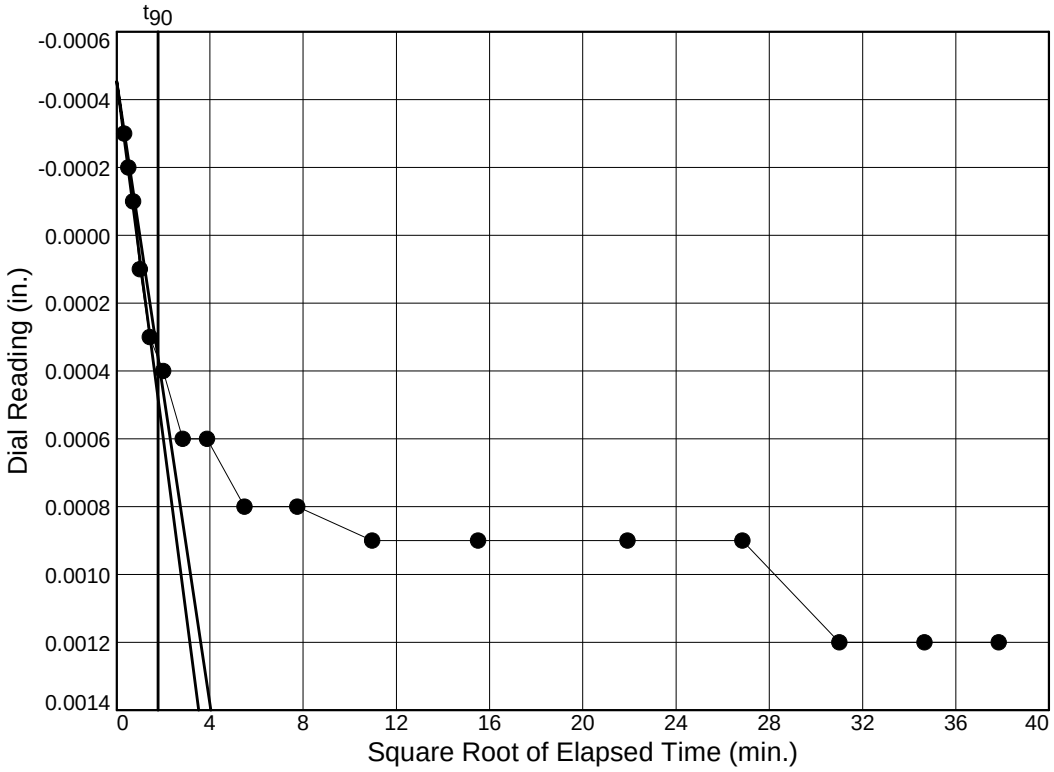
Tested By: Victoria Igoe **Checked By:** Jason Reeves

Cc, Pc, etc are not test results but an interpretation of test results. The designer is responsible for interpreting test data as provided by S&ME, Inc.

Dial Reading vs. Time

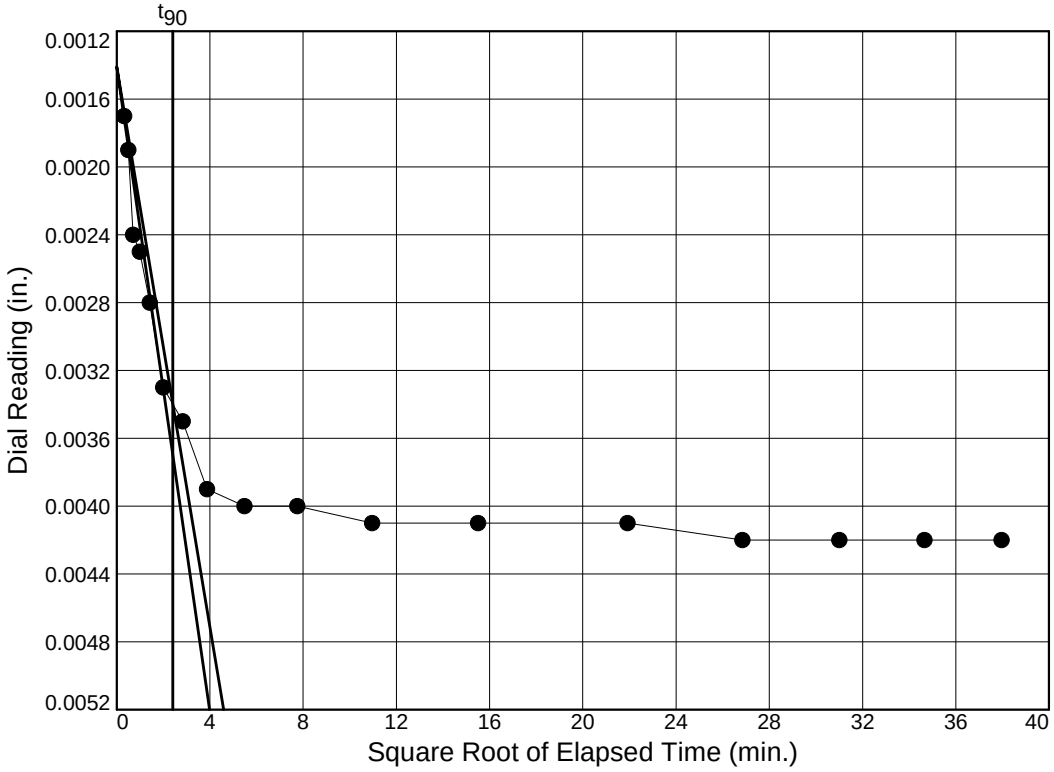
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 3
Load= 0.50 ksf
D_0 = -0.0005
D_{90} = 0.0004
D_{100} = 0.0005
T_{90} = 3.16 min.

C_v @ T_{90}
0.585 ft.^{2}/day



Load No.= 4
Load= 1.00 ksf
D_0 = 0.0014
D_{90} = 0.0034
D_{100} = 0.0036
T_{90} = 5.79 min.

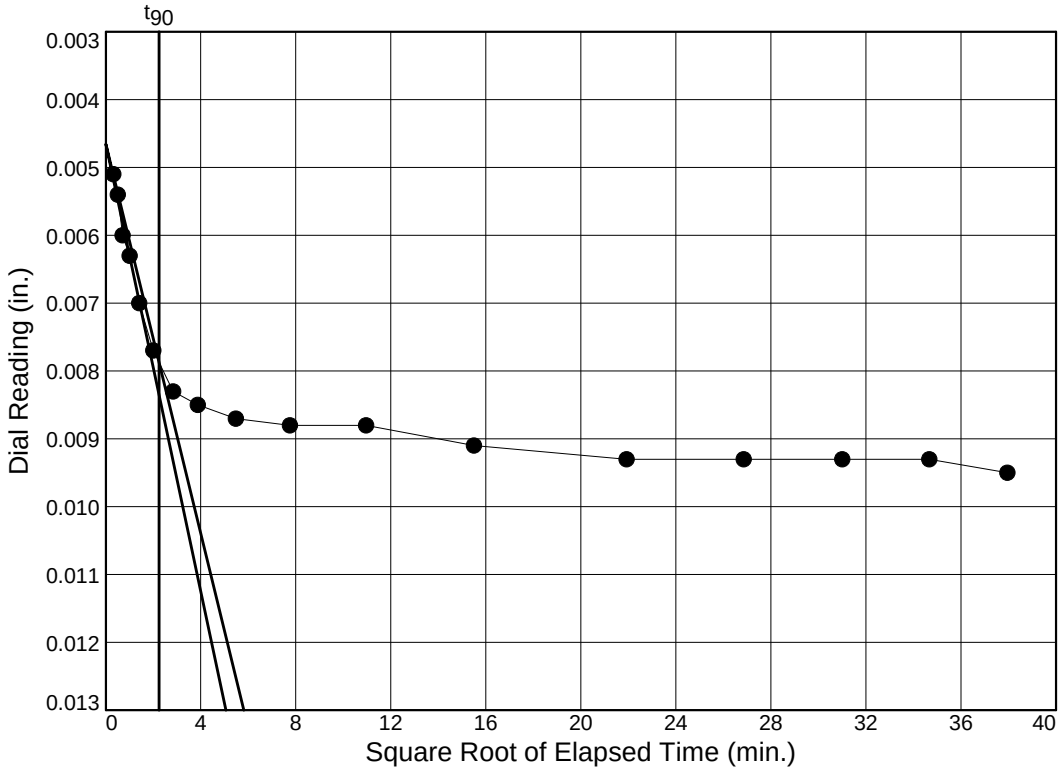
C_v @ T_{90}
0.318 ft.^{2}/day

Figure 2

Dial Reading vs. Time

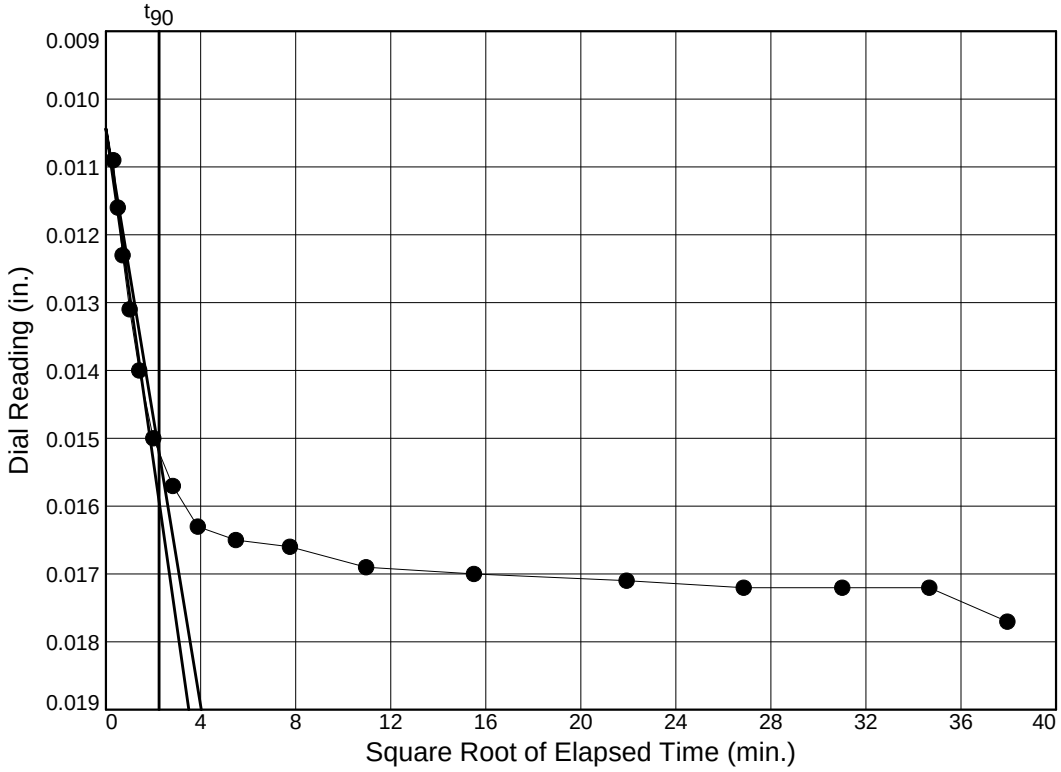
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 5
Load= 2.00 ksf
D_0 = 0.0047
D_{90} = 0.0079
D_{100} = 0.0082
T_{90} = 5.00 min.

C_v @ T_{90}
0.365 ft.^{2}/day



Load No.= 6
Load= 4.00 ksf
D_0 = 0.0104
D_{90} = 0.0152
D_{100} = 0.0157
T_{90} = 5.00 min.

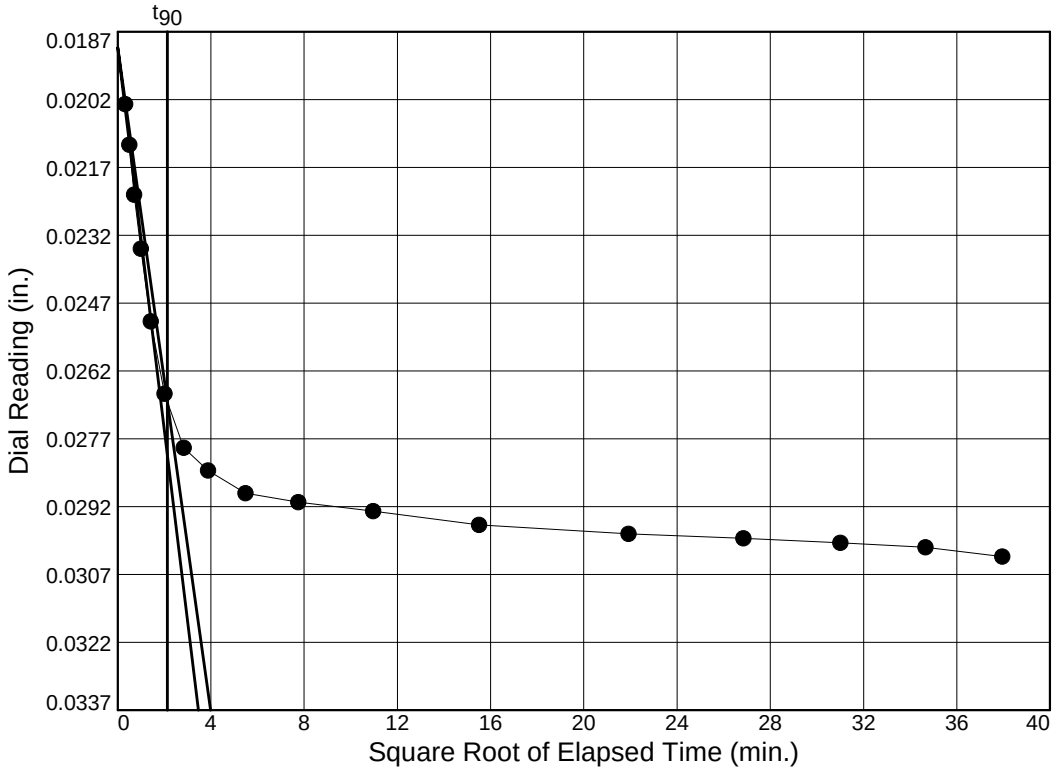
C_v @ T_{90}
0.359 ft.^{2}/day

Figure 3

Dial Reading vs. Time

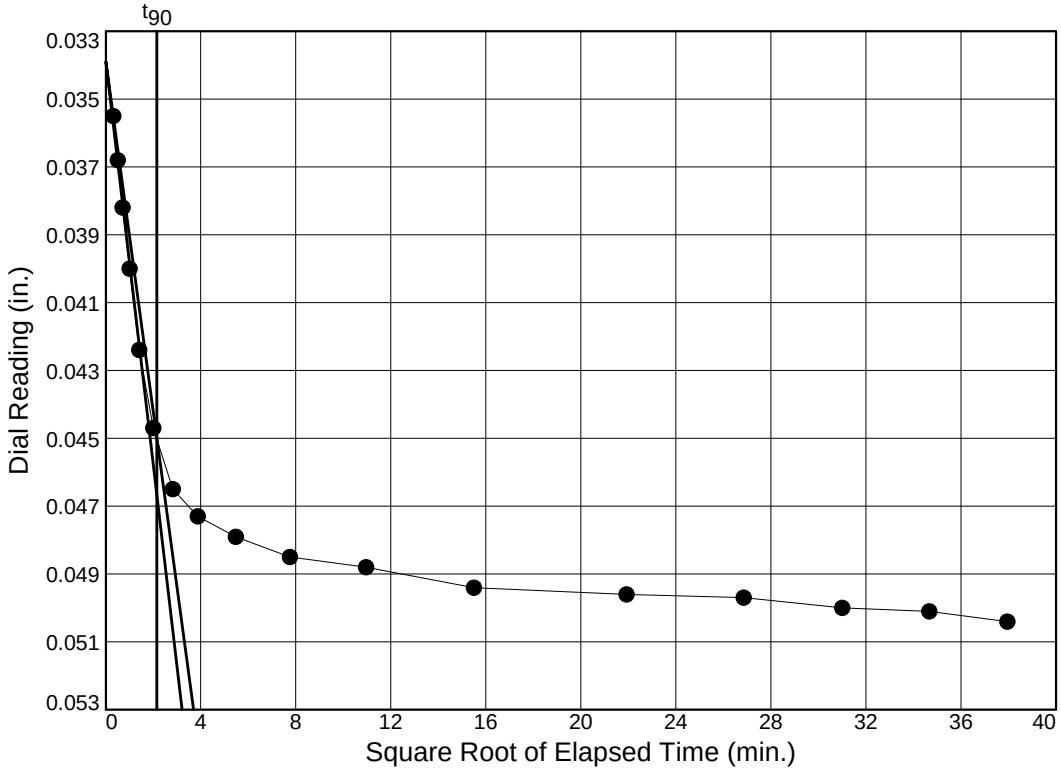
Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 7
Load= 8.00 ksf
D_0 = 0.0191
D_{90} = 0.0269
D_{100} = 0.0278
T_{90} = 4.57 min.

C_v @ T_{90}
0.385 ft.^{2}/day



Load No.= 14
Load= 16.00 ksf
D_0 = 0.0339
D_{90} = 0.0450
D_{100} = 0.0463
T_{90} = 4.64 min.

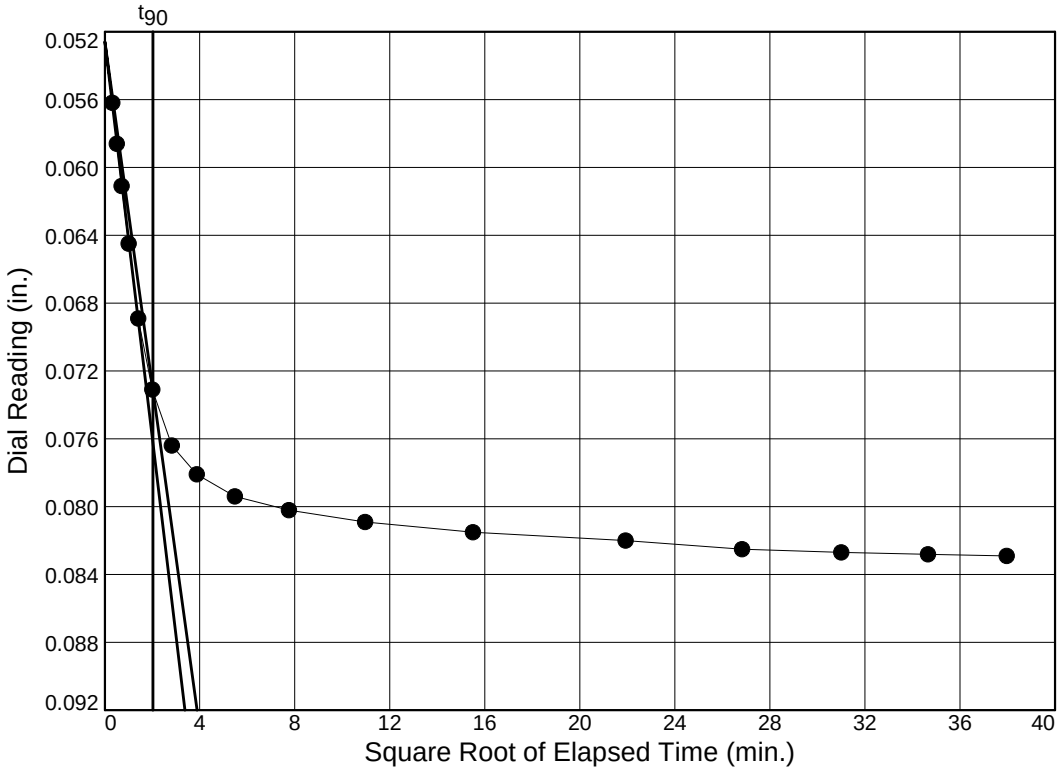
C_v @ T_{90}
0.365 ft.^{2}/day

Figure 4

Dial Reading vs. Time

Project No.: 24430185A
Project: Self Sufficiency Parcel 2 Additional Exploration

Location: B-07 Depth: 13-15 ft Sample Number: UD-03



Load No.= 15
Load= 32.00 ksf
D_0 = 0.0526
D_{90} = 0.0732
D_{100} = 0.0755
T_{90} = 4.12 min.

C_v @ T_{90}
0.388 $ft.^2$/day

Figure 5

Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

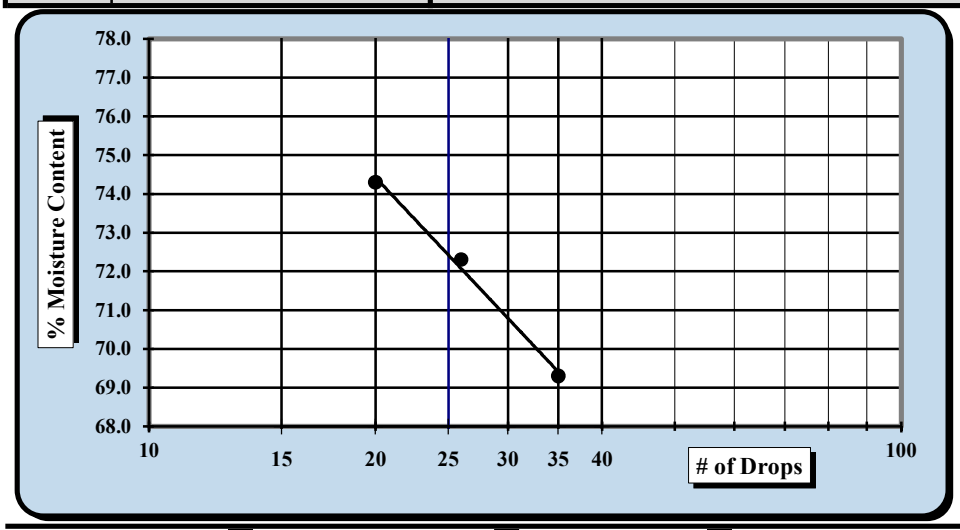
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/4/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-08	Sample #: SS-02		Sample Date:	11/13/2024
Log #:	43-4192			Depth: 3.5-5 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	23	10	B3				A5	6	
A	Tare Weight	15.43	15.40	15.93				15.79	15.38	
B	Wet Soil Weight + A	29.79	31.23	33.27				24.80	24.42	
C	Dry Soil Weight + A	23.91	24.59	25.88				22.42	22.04	
D	Water Weight (B-C)	5.88	6.64	7.39				2.38	2.38	
E	Dry Soil Weight (C-A)	8.48	9.19	9.95				6.63	6.66	
F	% Moisture (D/E)*100	69.3%	72.3%	74.3%				35.9%	35.7%	
N	# OF DROPS	35	26	20				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.8%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**72**
Plastic Limit	**36**
Plastic Index	**36**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/6/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

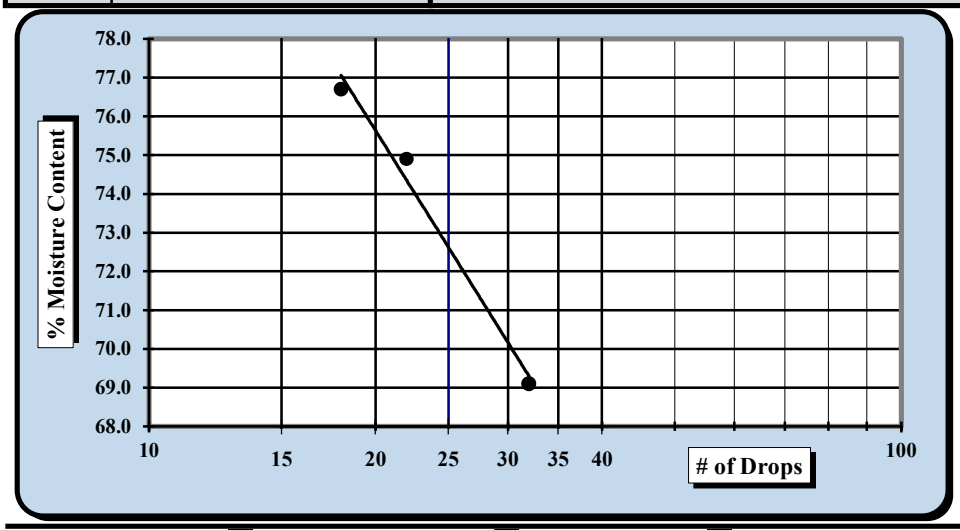
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	12/31/2024
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-08	Sample #: SS-04		Sample Date:	11/13/2024
Log #:	43-4192			Depth: 8.5-10 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	2	B6	B5				A5	A3	
A	Tare Weight	15.59	15.90	15.91				15.78	15.90	
B	Wet Soil Weight + A	29.44	30.00	33.17				24.99	25.08	
C	Dry Soil Weight + A	23.78	23.96	25.68				22.35	22.44	
D	Water Weight (B-C)	5.66	6.04	7.49				2.64	2.64	
E	Dry Soil Weight (C-A)	8.19	8.06	9.77				6.57	6.54	
F	% Moisture (D/E)*100	69.1%	74.9%	76.7%				40.2%	40.4%	
N	# OF DROPS	32	22	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**73**
Plastic Limit	**40**
Plastic Index	**33**
Group Symbol	**MH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/2/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

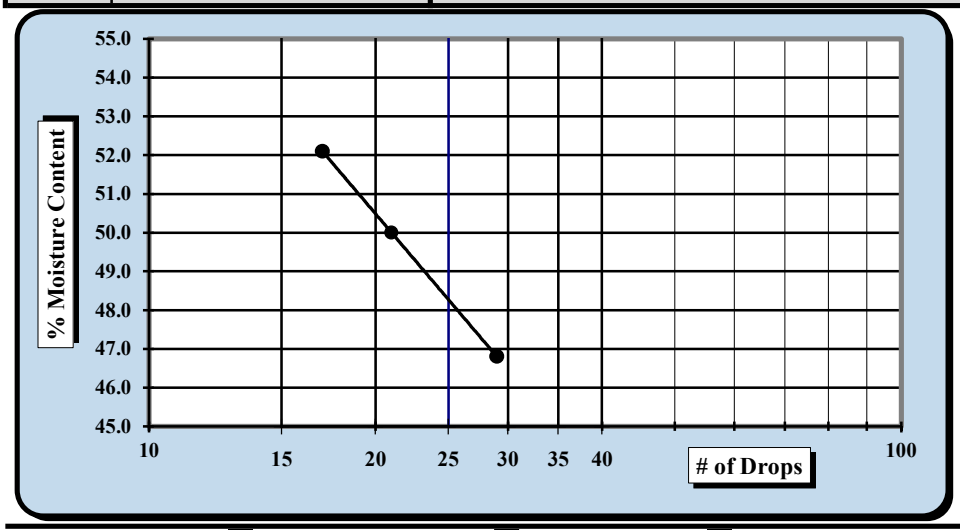
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/4/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-08	Sample #: SS-06		Sample Date:	11/13/2024
Log #:	43-4192			Depth: 18.5-20 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	15	B1	A3				3	2	
A	Tare Weight	15.27	15.83	15.88				15.47	15.58	
B	Wet Soil Weight + A	30.64	33.62	35.20				25.24	25.11	
C	Dry Soil Weight + A	25.74	27.69	28.58				23.20	23.11	
D	Water Weight (B-C)	4.90	5.93	6.62				2.04	2.00	
E	Dry Soil Weight (C-A)	10.47	11.86	12.70				7.73	7.53	
F	% Moisture (D/E)*100	46.8%	50.0%	52.1%				26.4%	26.6%	
N	# OF DROPS	29	21	17				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**48**
Plastic Limit	**27**
Plastic Index	**21**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/6/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

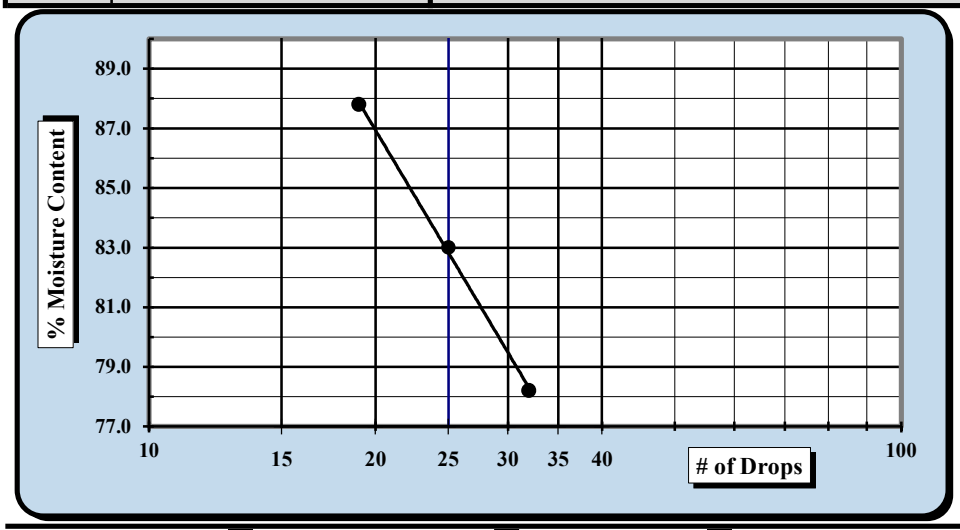
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/4/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-09	Sample #: SS-02		Sample Date:	11/14/2024
Log #:	43-4192			Depth: 3.5-5 ft	
Description:	yellowish brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	19	B4	A1				17	14	
A	Tare Weight	15.38	15.68	15.69				15.47	15.48	
B	Wet Soil Weight + A	29.60	30.54	32.01				25.08	24.99	
C	Dry Soil Weight + A	23.36	23.80	24.38				22.55	22.49	
D	Water Weight (B-C)	6.24	6.74	7.63				2.53	2.50	
E	Dry Soil Weight (C-A)	7.98	8.12	8.69				7.08	7.01	
F	% Moisture (D/E)*100	78.2%	83.0%	87.8%				35.7%	35.7%	
N	# OF DROPS	32	25	19				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.7%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**83**
Plastic Limit	**36**
Plastic Index	**47**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/6/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

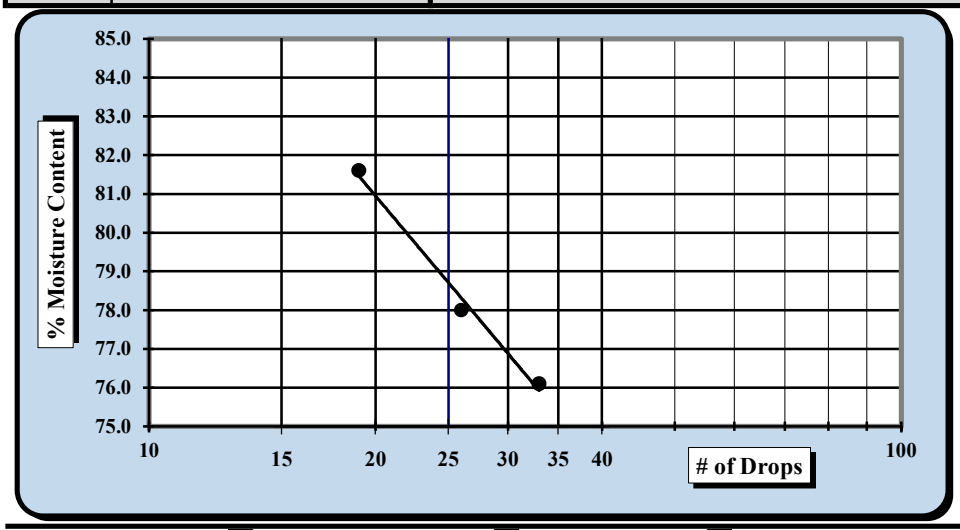
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/6/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/3/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-09	Sample #: SS-04		Sample Date:	11/14/2024
Log #:	43-4192			Depth: 8.5-10 ft	
Description:	brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	A2	6	A5				5	B6	
A	Tare Weight	15.98	15.39	15.79				15.38	15.91	
B	Wet Soil Weight + A	29.86	30.00	31.23				24.89	24.67	
C	Dry Soil Weight + A	23.86	23.60	24.29				22.58	22.56	
D	Water Weight (B-C)	6.00	6.40	6.94				2.31	2.11	
E	Dry Soil Weight (C-A)	7.88	8.21	8.50				7.20	6.65	
F	% Moisture (D/E)*100	76.1%	78.0%	81.6%				32.1%	31.7%	
N	# OF DROPS	33	26	19				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**79**
Plastic Limit	**32**
Plastic Index	**47**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/6/2025	Lindsey Deskins	1/6/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

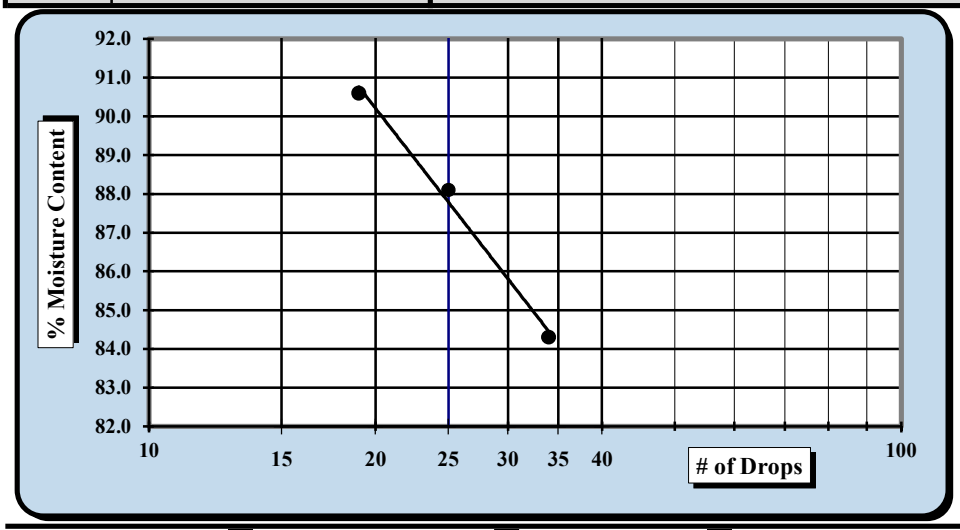
S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/29/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/28/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		

Boring #:	B-11	Sample #: SS-02		Sample Date:	11/22/2024
Log #:	43-4192			Depth: 3.5-5 ft	
Description:	light brown				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	B1	16	17				B6	5	
A	Tare Weight	15.86	15.61	15.46				15.91	15.36	
B	Wet Soil Weight + A	32.74	33.69	34.02				25.20	25.30	
C	Dry Soil Weight + A	25.02	25.22	25.20				22.67	22.60	
D	Water Weight (B-C)	7.72	8.47	8.82				2.53	2.70	
E	Dry Soil Weight (C-A)	9.16	9.61	9.74				6.76	7.24	
F	% Moisture (D/E)*100	84.3%	88.1%	90.6%				37.4%	37.3%	
N	# OF DROPS	34	25	19				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**88**
Plastic Limit	**37**
Plastic Index	**51**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/29/2025	Lindsey Deskins	1/29/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

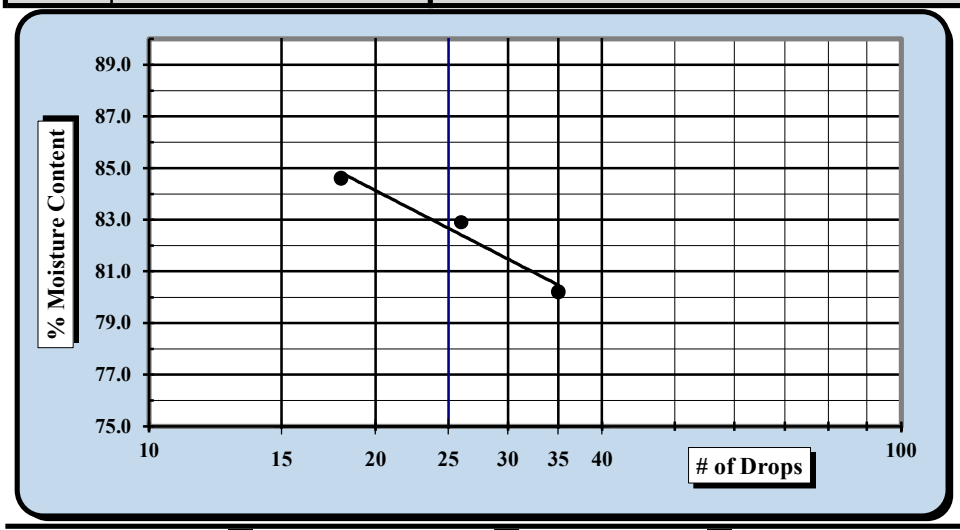
Quality Assurance ASTM D4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc. - Knoxville: 1413 Topside Road, Louisville, TN 37777

Project #:	24430185A	Report Date:	1/29/2025
Project Name:	Self Sufficiency Parcel 2 Additional Exploration	Test Date(s)	1/28/2025
Client Name:	Kiewit Engineering Group, Inc.		
Client Address:	8880 Penrose Lane, Lenexa, KS 66219		
Boring #:	B-11	Sample #: SS-04	Sample Date: 11/22/2024
Log #:	43-4192		Depth: 8.5-10 ft
Description:	light brown		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	32576	8/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/7/2024
Oven	12872	6/14/2024			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	8	B4	A3				B3	10	
A	Tare Weight	15.47	15.70	15.93				15.90	15.38	
B	Wet Soil Weight + A	30.64	32.98	34.26				25.08	25.10	
C	Dry Soil Weight + A	23.89	25.15	25.86				22.94	22.85	
D	Water Weight (B-C)	6.75	7.83	8.40				2.14	2.25	
E	Dry Soil Weight (C-A)	8.42	9.45	9.93				7.04	7.47	
F	% Moisture (D/E)*100	80.2%	82.9%	84.6%				30.4%	30.1%	
N	# OF DROPS	35	26	18				*Moisture Contents determined by ASTM D2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.3%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**83**
Plastic Limit	**30**
Plastic Index	**53**
Group Symbol	**CH**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☑

Notes / Deviations / References: **Group symbol is for minus No. 40 portion only.**

ASTM D4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Kim Gonzalez	1/29/2025	Lindsey Deskins	1/29/2025
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Results Only Soil Testing for Self Sufficiency Parcel 2 Additonal Exploration

December 30, 2024

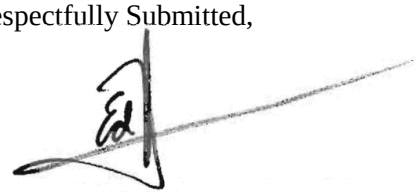
Prepared for:

Tyler Copeman
S&ME
1413 Topside Road
Louisville, TN 37777
tylercopeman@smeinc.com

Project X Job#: S241226I
Client Job or PO#: 24430185A

Prepared by:
D. Bobrova

Respectfully Submitted,





Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

Soil Analysis Lab Results

Client: S&ME
Job Name: Self Sufficiency Parcel 2 Additonal Exploration
Client Job Number: 24430185A
Project X Job Number: S241226I
December 30, 2024

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**
	(ft)	**(mg/kg)**	**(wt%)**	**(mg/kg)**	**(wt%)**	**(Ω-cm)**	**(Ω-cm)**	
B-03, UD-01	3-5	37.2	0.0037	14.4	0.0014	31,490	28,810	8.1
B-05, UD-01	3-5	24.1	0.0024	25.6	0.0026	87,100	37,520	7.1
B-07, UD-01	3-5	25.6	0.0026	45.3	0.0045	388,600	113,900	6.8

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops. This is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

If one sample pops up much more corrosive than all others, we would recommend collecting more samples surrounding the problem sample location to determine if the peak is isolated to it. This allows us to conclude it was a contaminated sample and able to declare it an outlier.

Try out our new online forms: SOIL CORROSIVITY & THERMAL RESISTIVITY LAB REQUEST FORM & IN-SITU WENNER 4 PIN QUOTE REQUEST FORM

UNCONFINED COMPRESSION
(ASTM D7012 Method C)

S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project Name: Self Sufficiency Parcel 2 Additional Exploration
Project Number: 24430185A

Report Date: December 30, 2024
Reviewed By: Tyler Copeman

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
B-03A	Run-03	36.1 - 36.5	4.28	1.99	A	3.11	167.8	78	33,533	10,782	0.5
B-04	Run-02	39.0 - 39.4	4.27	1.99	B	3.11	170.2	80	58,305	18,748	0.1
B-05	Run-02	31.3 - 31.7	4.43	1.99	B	3.11	167.9	56	20,883	6,715	0.3
B-09	Run-04	30.4 - 30.8	4.47	1.98	A	3.08	169.6	87	71,222	23,124	0.0

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.

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PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

1413 Topside Road, Louisville, TN 37777

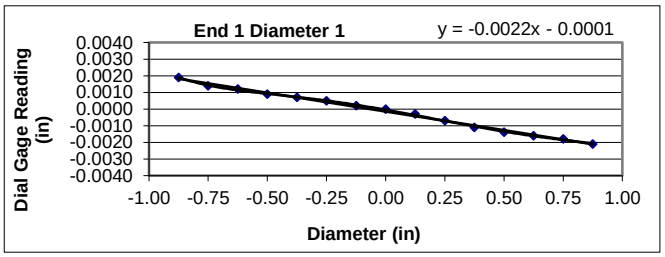
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.99	**Date:**	12/30/2024
Project No.:	24430185A	**Length (in):**	4.28	**Tested by:**	Victoria Igoe
Boring Id:	B-03A	**Unit Weight (pcf):**	167.8	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-03	**Moisture Content (%):**	0.5		
Depth (ft):	36.1 - 36.5				

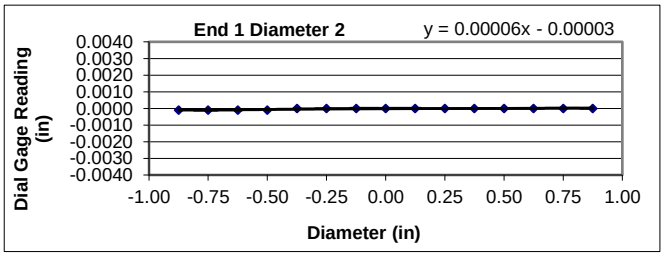
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

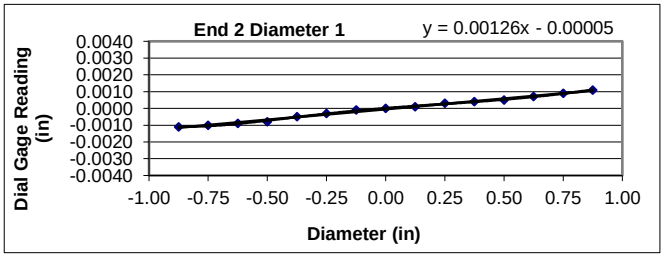
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	0.0019	-0.0001	-0.0011	-0.0002
- 6/8	0.0014	-0.0001	-0.0010	-0.0002
- 5/8	0.0012	-0.0001	-0.0009	-0.0002
- 4/8	0.0009	-0.0001	-0.0008	-0.0002
- 3/8	0.0007	0.0000	-0.0005	-0.0002
- 2/8	0.0005	0.0000	-0.0003	-0.0002
- 1/8	0.0002	0.0000	-0.0001	-0.0001
0	0.0000	0.0000	0.0000	0.0000
1/8	-0.0003	0.0000	0.0001	0.0000
2/8	-0.0007	0.0000	0.0003	0.0000
3/8	-0.0011	0.0000	0.0004	0.0000
4/8	-0.0014	0.0000	0.0005	0.0000
5/8	-0.0016	0.0000	0.0007	0.0000
6/8	-0.0018	0.0000	0.0009	0.0000
7/8	-0.0021	0.0000	0.0011	0.0001

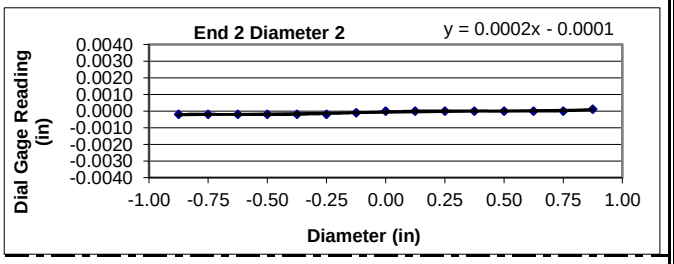




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	-0.00225
	Angle of Best Fit Line:	-0.12883
End 2:	Slope of Best Fit Line:	0.00126
	Angle of Best Fit Line:	0.07219
	Max Angular Difference:	**-0.20**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00006
	Angle of Best Fit Line:	0.00360
End 2:	Slope of Best Fit Line:	0.00018
	Angle of Best Fit Line:	0.01015
	Max Angular Difference:	**-0.01**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0040	0.0020	**YES**
End 1 Diam 2	0.0001	0.0001	**YES**
End 2 Diam 1	0.0022	0.0011	**YES**
End 2 Diam 2	0.0003	0.0002	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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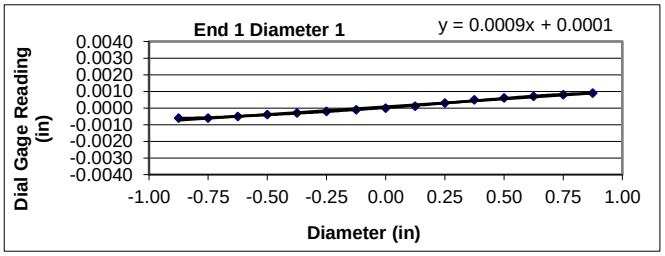
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.99	**Date:**	12/30/2024
Project No.:	24430185A	**Length (in):**	4.27	**Tested by:**	Victoria Igoe
Boring Id:	B-04	**Unit Weight (pcf):**	170.2	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-02	**Moisture Content (%):**	0.1		
Depth (ft):	39.0 - 39.4				

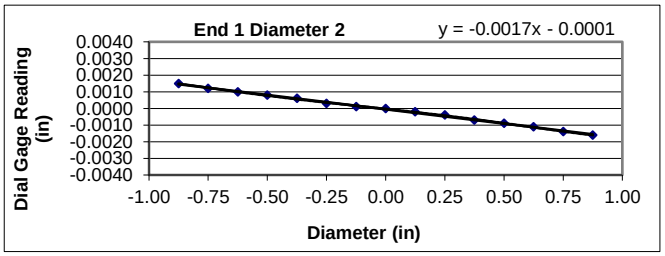
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **NO** Straightness Tolerance Met? **NO**

End Flatness and Parallelism Readings (Procedure FP1)

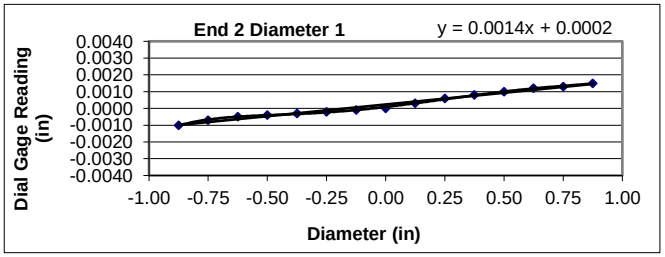
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0006	0.0015	-0.0010	0.0022
- 6/8	-0.0006	0.0012	-0.0007	0.0020
- 5/8	-0.0005	0.0010	-0.0005	0.0017
- 4/8	-0.0004	0.0008	-0.0004	0.0013
- 3/8	-0.0003	0.0006	-0.0003	0.0011
- 2/8	-0.0002	0.0003	-0.0002	0.0007
- 1/8	-0.0001	0.0001	-0.0001	0.0003
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0001	-0.0002	0.0003	-0.0002
2/8	0.0003	-0.0004	0.0006	-0.0004
3/8	0.0005	-0.0007	0.0008	-0.0007
4/8	0.0006	-0.0009	0.0010	-0.0010
5/8	0.0007	-0.0011	0.0012	-0.0012
6/8	0.0008	-0.0014	0.0013	-0.0014
7/8	0.0009	-0.0016	0.0015	-0.0017

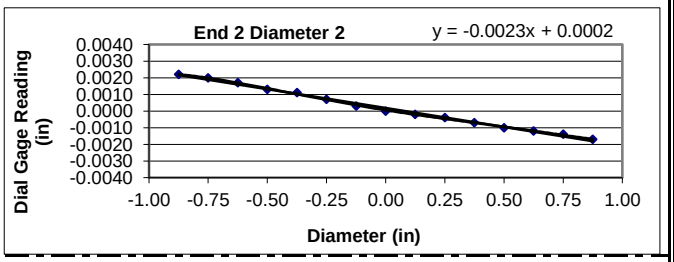




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00093
	Angle of Best Fit Line:	0.05320
End 2:	Slope of Best Fit Line:	0.00140
	Angle of Best Fit Line:	0.08005
	Max Angular Difference:	**-0.03**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	-0.00172
	Angle of Best Fit Line:	-0.09855
End 2:	Slope of Best Fit Line:	-0.00227
	Angle of Best Fit Line:	-0.13014
	Max Angular Difference:	**0.03**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0015	0.0008	**YES**
End 1 Diam 2	0.0031	0.0016	**YES**
End 2 Diam 1	0.0025	0.0013	**YES**
End 2 Diam 2	0.0039	0.0020	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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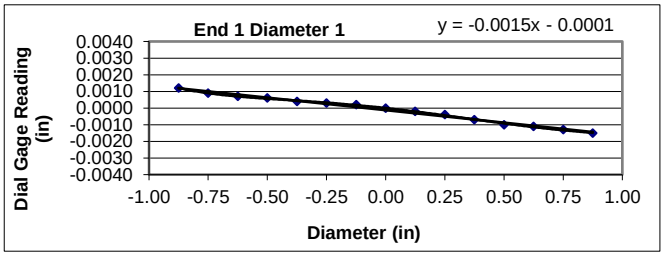
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.99	**Date:**	12/30/2024
Project No.:	24430185A	**Length (in):**	4.43	**Tested by:**	Victoria Igoe
Boring Id:	B-05	**Unit Weight (pcf):**	167.9	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-02	**Moisture Content (%):**	0.3		
Depth (ft):	31.3 - 31.7				

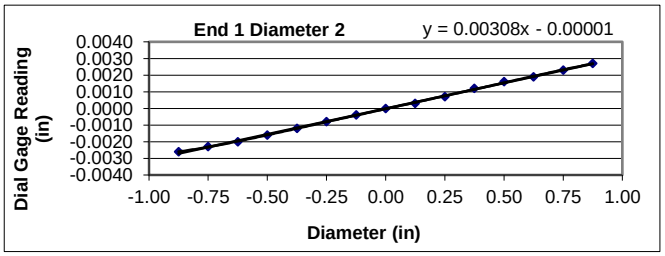
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **NO** Straightness Tolerance Met? **NO**

End Flatness and Parallelism Readings (Procedure FP1)

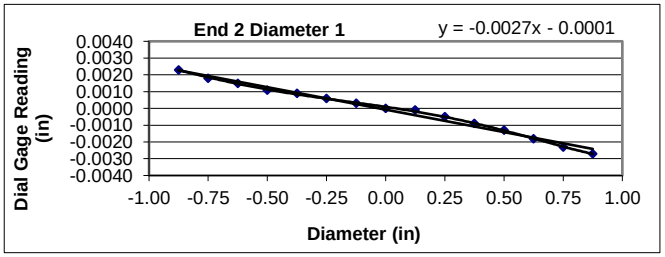
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	0.0012	-0.0026	0.0023	-0.0023
- 6/8	0.0009	-0.0023	0.0018	-0.0018
- 5/8	0.0007	-0.0020	0.0015	-0.0014
- 4/8	0.0006	-0.0016	0.0011	-0.0011
- 3/8	0.0004	-0.0012	0.0009	-0.0008
- 2/8	0.0003	-0.0008	0.0006	-0.0005
- 1/8	0.0002	-0.0004	0.0003	-0.0001
0	0.0000	0.0000	0.0000	0.0000
1/8	-0.0002	0.0003	-0.0001	0.0003
2/8	-0.0004	0.0007	-0.0005	0.0008
3/8	-0.0007	0.0012	-0.0009	0.0012
4/8	-0.0010	0.0016	-0.0013	0.0015
5/8	-0.0011	0.0019	-0.0018	0.0018
6/8	-0.0013	0.0023	-0.0023	0.0022
7/8	-0.0015	0.0027	-0.0027	0.0027

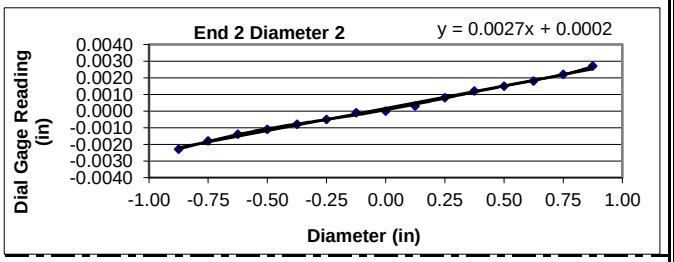




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	-0.00150
	Angle of Best Fit Line:	-0.08611
End 2:	Slope of Best Fit Line:	-0.00268
	Angle of Best Fit Line:	-0.15339
	Max Angular Difference:	**0.07**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00308
	Angle of Best Fit Line:	0.17663
End 2:	Slope of Best Fit Line:	0.00270
	Angle of Best Fit Line:	0.15453
	Max Angular Difference:	**0.02**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0027	0.0014	**YES**
End 1 Diam 2	0.0053	0.0027	**YES**
End 2 Diam 1	0.0050	0.0025	**YES**
End 2 Diam 2	0.0050	0.0025	**YES**

Perpendicularity Tolerance Met? **YES**

PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

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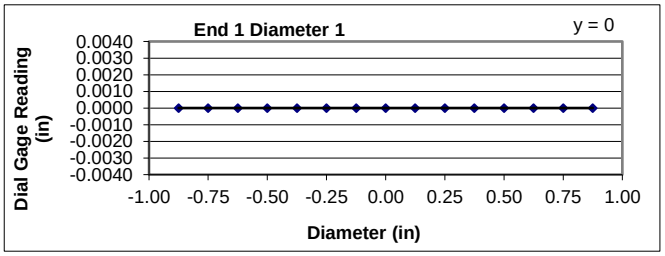
Project:	Self Sufficiency Parcel 2 Additional Exploration	**Diameter (in):**	1.98	**Date:**	12/30/2024
Project No.:	24430185A	**Length (in):**	4.47	**Tested by:**	Victoria Igoe
Boring Id:	B-09	**Unit Weight (pcf):**	169.6	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-04	**Moisture Content (%):**	0.0		
Depth (ft):	30.4 - 30.8				

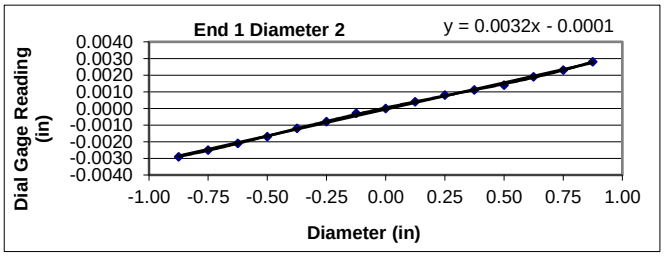
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

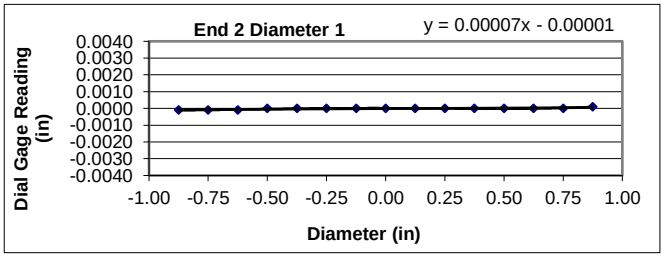
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	0.0000	-0.0029	-0.0001	-0.0023
- 6/8	0.0000	-0.0025	-0.0001	-0.0020
- 5/8	0.0000	-0.0021	-0.0001	-0.0016
- 4/8	0.0000	-0.0017	0.0000	-0.0011
- 3/8	0.0000	-0.0012	0.0000	-0.0009
- 2/8	0.0000	-0.0008	0.0000	-0.0006
- 1/8	0.0000	-0.0003	0.0000	-0.0003
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0000	0.0004	0.0000	0.0003
2/8	0.0000	0.0008	0.0000	0.0007
3/8	0.0000	0.0011	0.0000	0.0010
4/8	0.0000	0.0014	0.0000	0.0014
5/8	0.0000	0.0019	0.0000	0.0019
6/8	0.0000	0.0023	0.0000	0.0023
7/8	0.0000	0.0028	0.0001	0.0027

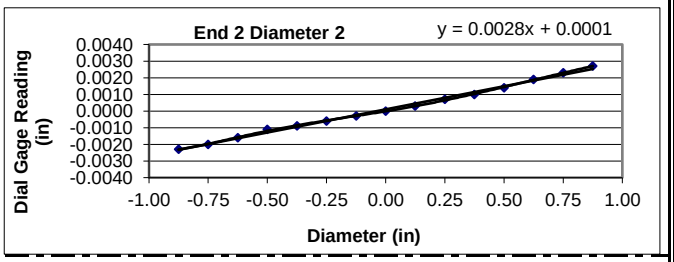




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00000
	Angle of Best Fit Line:	0.00000
End 2:	Slope of Best Fit Line:	0.00007
	Angle of Best Fit Line:	0.00409
	Max Angular Difference:	**0.00**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00320
	Angle of Best Fit Line:	0.18318
End 2:	Slope of Best Fit Line:	0.00278
	Angle of Best Fit Line:	0.15912
	Max Angular Difference:	**0.02**

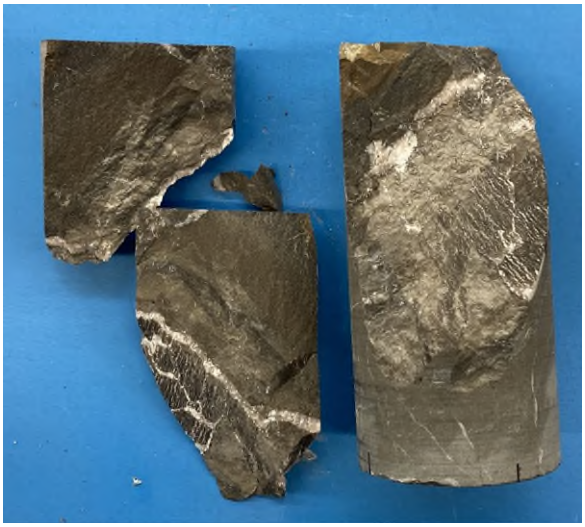
Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0000	0.0000	**YES**
End 1 Diam 2	0.0057	0.0029	**YES**
End 2 Diam 1	0.0002	0.0001	**YES**
End 2 Diam 2	0.0050	0.0025	**YES**

Perpendicularity Tolerance Met? **YES**



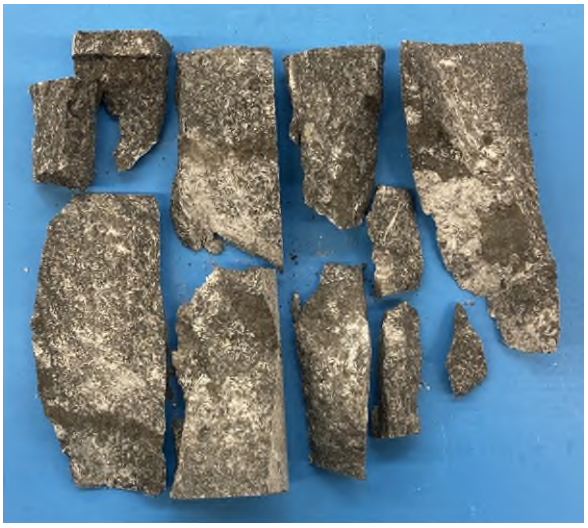


Date: 12/30/2024

Photographer: Victoria Igoe

1	**Location / Orientation**	B-03A, Run-03 (36.1′ – 36.5′)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

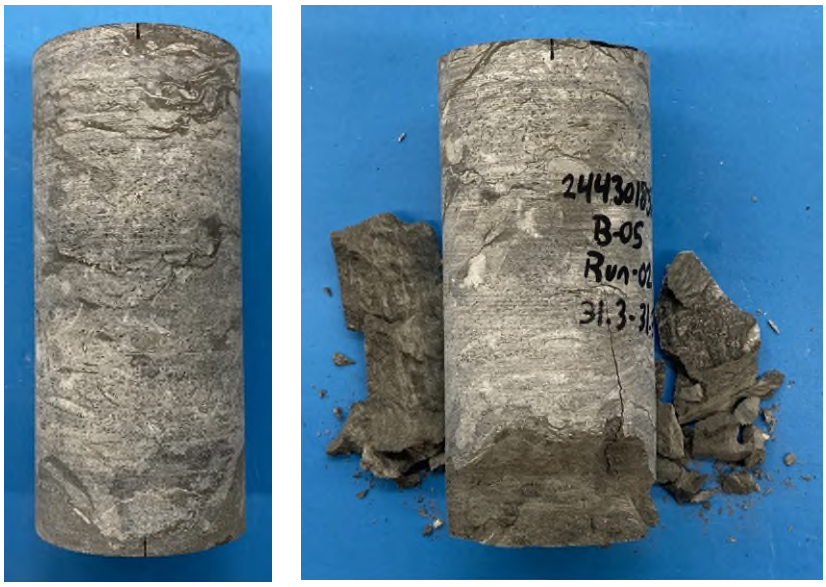




Date: 12/30/2024

Photographer: Victoria Igoe

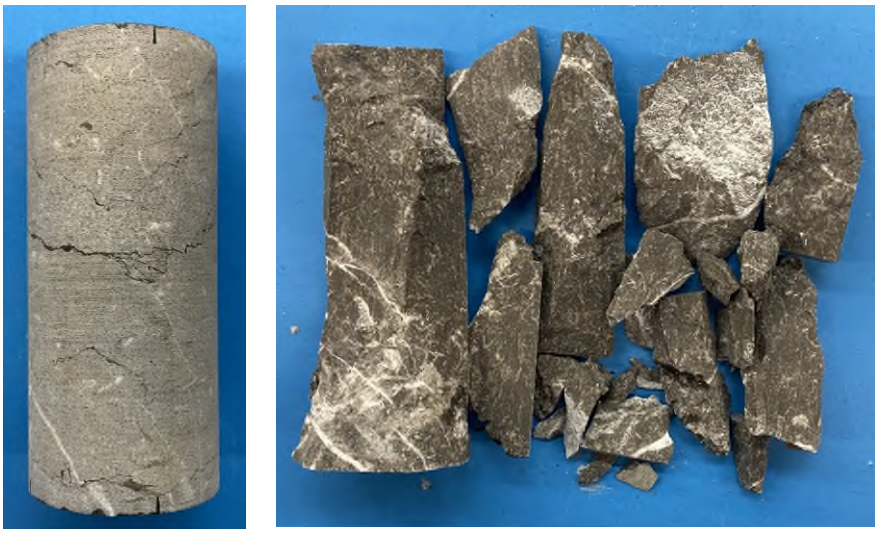
2	**Location / Orientation**	B-04, Run-02 (39.0′ – 39.4′)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



Date: 12/30/2024

Photographer: Victoria Igoe

3	**Location / Orientation**	B-05, Run-02 (31.3’ – 31.7’)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



Date: 12/30/2024

Photographer: Victoria Igoe

4	**Location / Orientation**	B-09, Run-04 (30.4’ – 30.8’)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

Geotechnical Data Report
Self Sufficiency Parcel 2
Oak Ridge, Tennessee
S&ME Project No. 24430185

PREPARED FOR:

Kiewit Nuclear Solutions Co.
9701 Renner Blvd.
Lenexa, KS 66219

PREPARED BY:

S&ME, Inc.
1413 Topside Road
Louisville, TN 37777

July 26, 2024

July 26, 2024

Kiewit Nuclear Solutions Co.
9701 Renner Blvd.
Lenexa, KS 66219

Attention: Mr. Matt Hawley, P.E.

Reference: **Geotechnical Data Report**
Self Sufficiency Parcel 2
Oak Ridge, Tennessee
S&ME Project No. 24430185

Dear Mr. Hawley:

S&ME, Inc. (S&ME) has completed our preliminary geotechnical exploration for the Self Sufficiency Parcel 2 project located at the northeast corner of the intersection of Oak Ridge Turnpike and Highway 95 in Oak Ridge, Tennessee in general accordance with S&ME Proposal No. 244301858 dated May 21, 2024. Our services were authorized by Kiewit Engineering Group Inc. through Task Assignment Order No. 7300017844 dated May 31, 2024. The purpose of this exploration was to obtain geotechnical data at the site to support the geotechnical analyses associated with the design and construction of the project.

This data report explains our understanding of the project, documents our field exploration procedures, provides the subsurface data obtained and presents the results of our laboratory testing program.

Sincerely,
S&ME, Inc.

Joshua A. Baines, EI
Geotechnical Operations Manager

Daniel R. Boles, PE
Principal Geotechnical Engineer
TN Reg. No. 103726

Nadia Fantello
Geophysical Operations Manager

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Appendices

Appendix I – Figures

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Appendix III – Test Boring Log Legend, Boring Logs and Core Photographs

Appendix IV – Laboratory Test Results

1.0 Introduction

S&ME, Inc. (S&ME) has completed our geotechnical exploration for the Self Sufficiency Parcel 2 project located at the northeast corner of the intersection of Oak Ridge Turnpike and Highway 95 in Oak Ridge, Tennessee in general accordance with S&ME Proposal No. 24430185 dated May 21, 2024. Our services were authorized by Kiewit Engineering Group Inc (Kiewit). through Task Assignment Order No. 7300017844 dated May 31, 2024. The purpose of this exploration was to obtain geotechnical data at the site to support the geotechnical analyses associated with the design and construction of the project.

This data report explains our understanding of the project, documents our field exploration procedures, and presents the results of our laboratory testing program. Geotechnical engineering recommendations or analyses were beyond our authorized scope of services.

2.0 Project Information and Scope of Services

Project information provided to us pertaining to the site was proved via email from Mr. Matt Hawley, P.E. with Kiewit. We were provided the following documents:

- *Self Sufficiency Parcel 2 Geologic Formations & Topographic Contours Oak Ridge, Tennessee,* dated January 4, 2024 by United Cleanup Oak Ridge LLC (UCOR).
- *Self Sufficiency Parcel 2, Project Layout*, no date, no origin.
- *Self Sufficiency Parcel 2 (SSP-2) Oak Ridge, Tennessee*, dated February 20, 2024 by UCOR.

Based on the provided information, Kiewit requested a preliminary geotechnical exploration to provide high level cost estimates for site grading and various project structure's foundations for this potential project in Oak Ridge, Tennessee. The project location is shown on the Site Vicinity Plan (Figure 1) in Appendix I. The initial geotechnical exploration program requested by Kiewit included:

- Establish the exploration locations in the field
- Perform five (5) soil test borings
- Core refusal materials in three (3) test borings
- Perform three (3) Multi-Channel Analysis of Surface Waves (MASW) and Microtremor Array Measurements (MAM)
- Perform seven (7) P-Wave Seismic Refraction Tomography (SRT) profiles
- Field log recovered soil and bedrock samples
- Prepare boring logs
- Perform the assigned laboratory testing program
- Prepare a geotechnical data report

The following work items associated with this geotechnical exploration were provided by Kiewit personnel and were outside of our authorized scope of work:

- Development of the laboratory testing program and laboratory testing assignments
- Engineering analyses

3.0 Field Exploration

3.1 General

Subsurface conditions were explored June 18 through June 20, 2024. The procedures used by S&ME for field and laboratory sampling and testing were in general accordance with ASTM procedures and established engineering practice. The final field exploration program performed, as requested by Kiewit, included:

- Performed 5 soil test borings
- Cored refusal materials in 3 borings
- Performed 3 Multi-Channel Analysis of Surface Waves (MASW) and Microtremor Array Measurements (MAM)
- Performed 7 P-Wave Seismic Refraction Tomography (SRT) profiles

Refer to the *Exploration Location Plans, Figure 2 and 3,* in Appendix I for the approximate exploration locations. S&ME personnel marked the exploration locations in the field using a commercial grade, hand-held global positioning system (GPS) device with points established using Google Earth™. All depths in this report reference the ground surface at the time of this exploration.

Field logs of each boring were maintained in the field by the field professional. The field logs were reviewed, and the information was used to prepare the final boring logs in OpenGround by Bentley Systems, Inc. The final logs are included in the Appendix III.

The soil descriptions on the boring logs in the appendices are based on the field descriptions by the field professional using ASTM D2488, review by a senior geotechnical professional, and the laboratory test results on selected samples using ASTM D2487. Laboratory Atterberg Limits tests were performed on 6 split spoon samples from 3 borings as assigned by Kiewit personnel. The soil field descriptions were revised as needed based on the laboratory test results. Rock descriptions on the boring logs are based on field descriptions by the field professional and review by a senior geotechnical professional. Rock Quality Designation (RQD) was determined in accordance with ASTM D6032 *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core*. The Boring Legends in the appendices provide a key for the terminology and graphic representations included on the boring logs. The boring logs indicate approximate boundaries between different soil and rock classifications (lithology). Lithologic boundaries depicted on the boring logs represent a synthesis of data generated in the field and the laboratory. The data include observations of drill rig behavior, soil descriptions made in the field, and laboratory test results from index testing. The following sections discuss the various components of the subsurface exploration program.

3.2 Test Borings

S&ME performed 5 soil test borings designated B-01 through B-05. Three borings (B-01, B-04 and B-05) were extended approximately 16 to 17 feet below auger refusal using rock coring techniques to obtain information on the bedrock underlying the site. The borings were typically augered to refusal while performing Standard Penetration Testing to depths ranging from approximately 33 to 70 feet. The boring exploration is summarized in Table 1 in Appendix II. S&ME personnel logged and classified the soils and rock recovered from the borings as previously discussed and photographed the split spoon samples and recovered rock core. The boring logs and rock core photographs are provided in Appendix III.

The borings were advanced in the overburden soil using hollow stem augers with an inside-diameter of 3¼ inches with CME 550 drill rig. The drill crew worked in general accordance with the American Society for Testing and Materials International (ASTM) D6151, the *Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling.* Split-spoon sampling and standard penetration tests (SPTs) were performed in general accordance with ASTM D1586, the *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. SPTs and split-barrel sampling were typically performed in the overburden soils at 2½-foot intervals to depths of 10 feet and on 5-foot intervals thereafter. An automatic trip drop hammer was used for the standard penetration resistance testing. The N values reported on our boring logs are the field values without any adjustments or corrections.

As indicated previously, borings B-01, B-04, and B-05 were extended below auger refusal using rock coring techniques. The coring was performed in general accordance with ASTM D2113, *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration*.

At the completion of drilling the borings were backfilled with auger cuttings and a borehole closure appliance.

3.3 Groundwater

The borings were typically dry during drilling operations with the exception of B-02. Groundwater was encountered at the time of drilling at a depth of about 30.2 feet below the ground surface (Elevation 816.8 feet).

3.4 Geophysics

3.4.1 Geophysical Methodology, Field Services, and Data Processing

Between June 17, and June 19, 2024, S&ME completed a Seismic Refraction Tomography (SRT) and surface wave seismic surveys at the requested locations to support the geotechnical exploration program to help identify the approximate depth to bedrock and shear wave analysis, respectively.

3.4.1.1 Seismic Refraction Tomography (SRT)

The SRT method measures travel times of seismic compression waves (P-waves) generated from an active energy source, such as a sledgehammer, at receivers (geophones) located along a linear array. The velocity at which the seismic waves propagate along the array can be determined from the slope of arrival times. Waves in soil (low-density) will travel slower than waves in competent bedrock (high-density). Where increases in elastic material properties occur, the seismic waves are refracted much like light in a prism. Depths to higher velocity strata such

as rock can be determined from the location of a slope change in the first arrival vs. distance plots. P-wave velocity also provides an indication of density and of excavation characteristics based on empirical relationships (i.e., rippability).

A Geometrics seismic system equipped with twenty-four (24) 10 Hz vertical geophones was used in general accordance with ASTM D5777 *Standard Guide for Using the Seismic Refraction Method for Subsurface Investigation*. A total of nine (9) SRT profiles that ranged from about 180 feet to 400 feet in length were collected using a set geophone spacing of 10 feet (Lines SRT-1 through SRT-9; Figure 3). Data from several shots (off-end, end, quarter, and mid-point) were acquired for each survey profile and a sledgehammer was used as the energy source. The SRT data was processed using the Geogiga Technology Corp. Seismic Pro™ software and Golden Software's Surfer® program was used to produce our final contoured 2D models. Elevations used for our SRT models were based on LiDAR data downloaded from the USGS website rather than actual field survey measurements performed by S&ME, and as such, should be considered estimated.

3.4.1.2 Surface Waves

The Seismic Site Class is based on the average shear wave velocity (Vs) to a depth of 100 feet (Vs100) and analysis of surface waves (Rayleigh waves) can be used to determine shear wave velocities.

Surface waves generated from either an active or passive energy source (e.g., sledgehammer striking a metal plate or background noise, respectively) are recorded at the ground surface along a spread of low-frequency sensors (i.e., geophones). Active sources typically provide relatively higher frequencies (i.e., better resolution at shallower depths) while passive sources generally provide relatively lower frequencies (e.g., greater depth at lower resolution). Seismic measurements are transformed from time domain into frequency domain from which the phase characteristics of the surface waves can be calculated. A dispersion curve (i.e., phase velocity curve vs frequency) is developed and then transformed into a one-dimensional (1D) shear wave velocity profile through an inversion and iterative process in which Vs100 is calculated.

We used a combination of the active Multi-Channel Analysis of Surface Waves (MASW) and passive Microtremor Array Measurements (MAM) methods. A total of three (3) surveys were collected at the requested locations (SW-1, SW-2, and SW-3; Figure 3). The MASW surveys were conducted using a Geometrics seismograph equipped with twenty-four (24) 4.5 Hz vertical geophones at set spacings of 5 feet along a linear array and a 16-lb sledgehammer as the energy source. The MAM surveys were conducted using a Geometrics seismograph equipped with twenty-four (24) 4.5 Hz vertical geophones at a set spacing of 5 feet along a linear array using background noise as the energy source. Data analysis was conducted using the Geogiga Technology Corp. Seismic ProTM software (SURFACE PLUS module).

3.4.2 Geophysical Results

- The SRT profiles presented in Figures 4 through 7 indicate P-wave velocities across the surveyed areas that generally range from about 1,000 feet per second (ft/s) to 11,000 ft/s.
- Based on correlation with the geotechnical borings performed relatively adjacent to the SRT profiles, the residual overburden appears to have seismic velocities generally less than about 6,500 feet per second (ft/s) (dark blue to green). Competent mass bedrock (auger refusal) appears to consist of seismic velocities generally greater than about 6,500 ft/s (yellow, orange to red, and red to purple).

- The approximate locations of the relatively adjacent geotechnical borings are overlain on the SRT geophysical models for reference.
- Surface wave measurements were obtained to a depth of approximately 118, 103, and 130 feet for SW-1, SW-2, and SW-3, respectively.
- Based on Sections 20 and Equation 20.4.1 of ASCE 7-16, the calculated weighted average Vs100 values are 2,363 feet per second (ft/s), 2,147 ft/s, and 1,899 ft/s for SW-1, SW-2, and SW-3, respectively.
- Based on these results, potential structures built at the survey locations can be designed using a Seismic Site Class C.
- Shear wave velocity profiles are presented in Figures 8 through 11.

3.4.3 Geophysical Limitations

Regardless of the thoroughness of a geophysical survey, there is always a possibility that actual conditions may not match the interpretations. The contoured plots of top of weathered rock and top of competent mass bedrock are estimated and are based solely on the available geotechnical and geophysical data collected, and as such, the exact top of rock depths may vary from what is shown. The results should be considered accurate only to the degree implied by the methods used and the method's limitations and data coverage. Accordingly, the possibility exists that not all features at a project site will be located due to either subsurface soil conditions or the occurrence of features outside the lateral limits and below the depth of penetration of the methods used. The geophysical method used for this survey also has inherent limitations. Site activity (e.g., generators, heavy equipment, traffic, etc.) can cause noise/interference in the data sets. Depth restrictions are also associated with seismic methods and the energy source. Obtaining P-wave velocities is limited to geologic conditions in which velocities increase with depth, and as such, a lower velocity layer beneath a high velocity layer would not be identified.

4.0 Laboratory Testing

4.1 Laboratory Testing Program and Procedures

Kiewit personnel selected disturbed (split-spoon), intact (thin-walled tube) and bulk soil samples, as well as rock cores for laboratory testing. Laboratory testing was performed in accordance with ASTM standards or other standards, where applicable as specified by Kiewit. The type, test standard and number of tests performed for the laboratory testing program are listed following:

- 23 Moisture Contents (ASTM D2216)
- 7 Atterberg Limits (ASTM D4318)
- 2 Unconfined Compressive Strength (rock core; ASTM D7012, Method C)

4.2 Laboratory Test Results

The geotechnical laboratory test reports with the individual test data and results for the soil natural moisture content and soil index are provided in Appendix IV. The test reports with the individual test data and results for the rock core testing are also provided in Appendix IV. The tables summarizing the geotechnical laboratory test results are listed below and may be found in Appendix II:

- Table 2 Summary of Soil Index Test Results
- Table 3 Summary of Rock Core Unconfined Compression Test Results

5.0 Limitations of Data Report

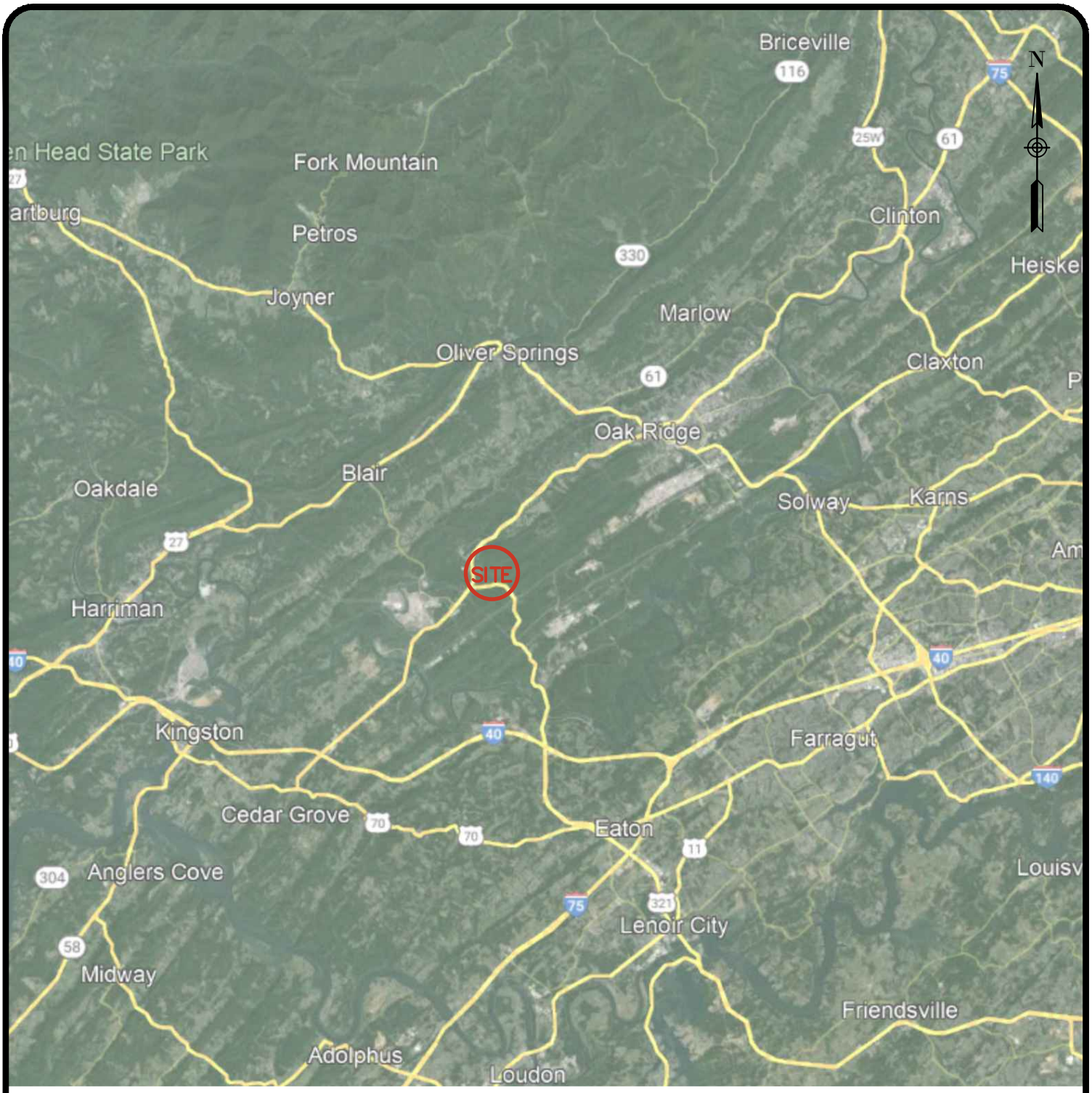
This geotechnical data report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The data contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared and no geotechnical recommendations are provided. No other representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

The provided limited data from this field exploration program is preliminary and does not constitute data to be able to provide specific recommendations for geotechnical develop at the site and additional subsurface exploration should be performed prior to design and construction. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

Appendix I – Figures

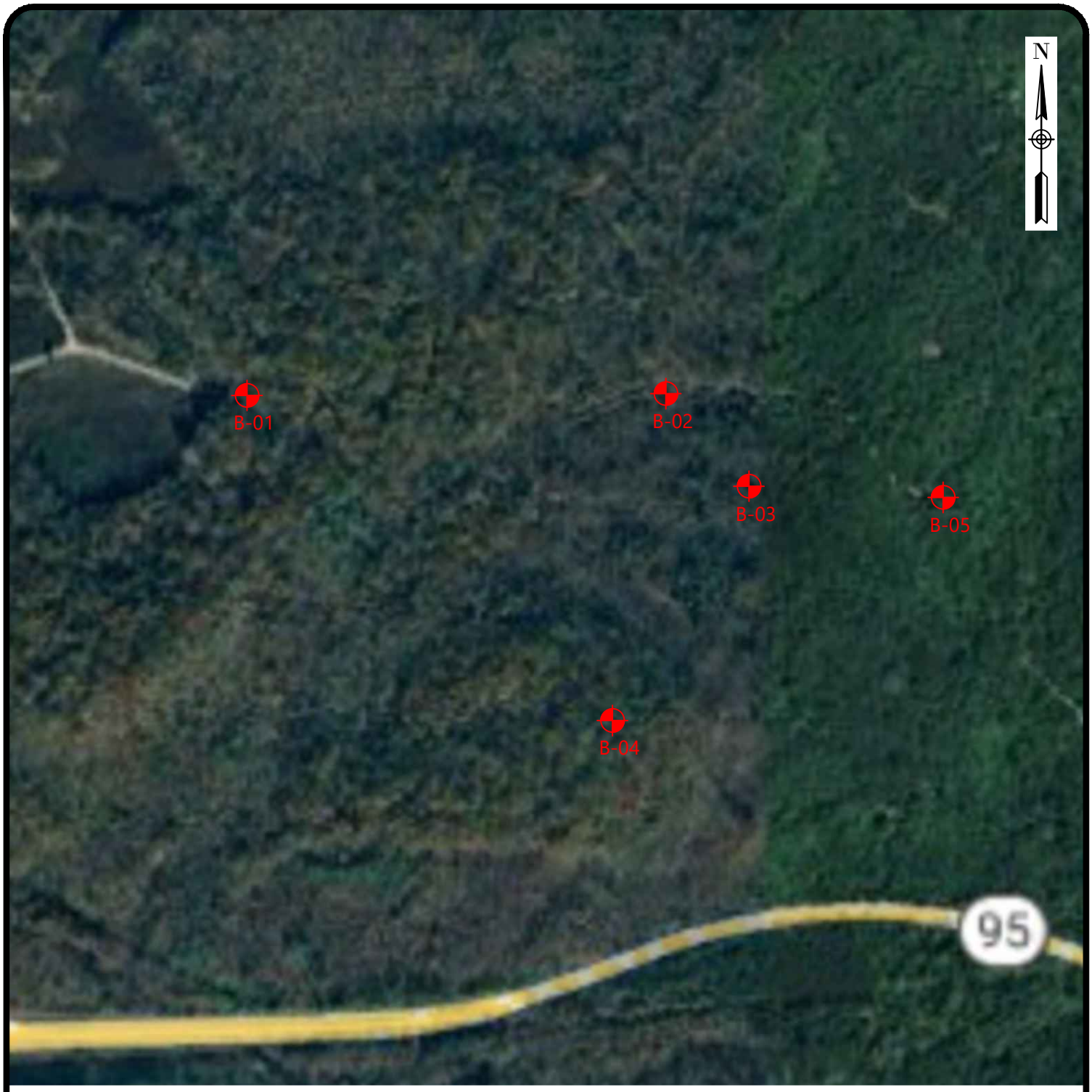


Notes:

1) Base map from Google Earth Pro accessed on July 25, 2024.

	Site Vicinity Plan	SCALE: Not to Scale	FIGURE NO. 1
	Self Sufficiency Parcel 2 Old County Road Oak Ridge, Tennessee	DATE: 07/25/2024 PROJECT NUMBER 24430185	

Drawing Path: T:\Knoxville-1430\Projects\2024\24430185_Kiewit_Self Sufficiency Parcel 2_Oak Ridge TN\GEO\CAD\Sketch\Figure 1_SVM.dwg



Legend:

Approximate Location of Soil Test Borings

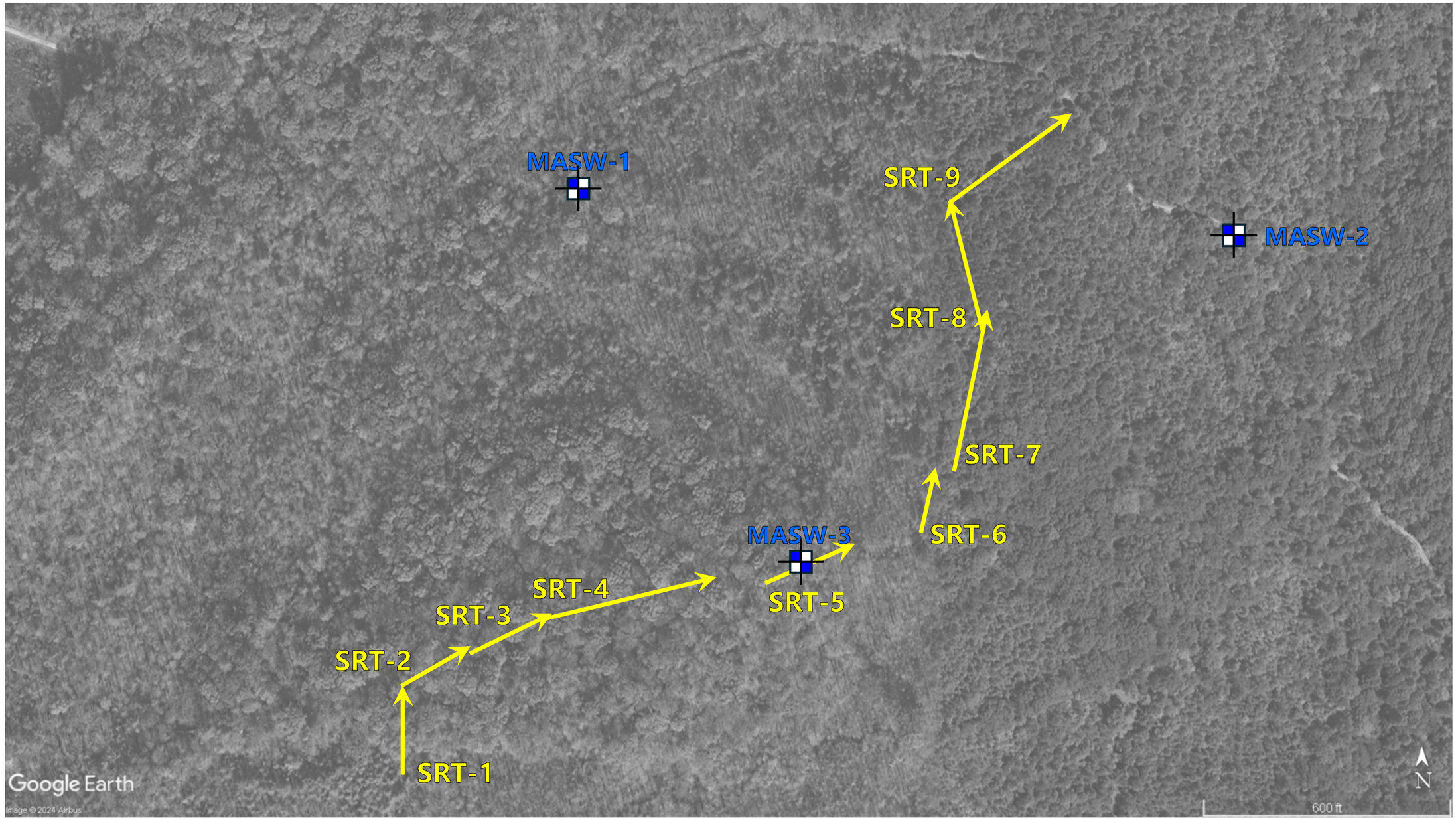
Notes:

1) Boring locations are shown in general arrangement only.
2) Do not use boring locations for determination of distances or quantities.
3) Base map from Google Earth Pro accessed on July 25, 2024.

	Test Location Plan	SCALE: Not to Scale	FIGURE NO. 2
	Self Sufficiency Parcel 2 Old County Road Oak Ridge, Tennessee	DATE: 07/25/2024 PROJECT NUMBER 24430185	

Drawing Path: T:\Knoxville-1430\Projects\2024\24430185_Kiewit_Self Sufficiency Parcel 2_Oak Ridge TN\GEO\CAD\Sketch\Figure 2_BLP.dwg

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



LEGEND

Seismic Refraction Profile

MASW

SEISMIC REFRACTION SURVEY LOCATION PLAN

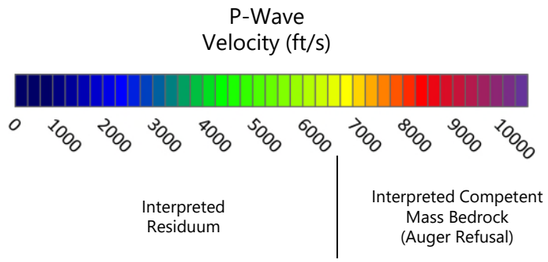
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:
AS SHOWN

DATE:
7/26/2024

PROJECT NUMBER
24430185

FIGURE NO.
3

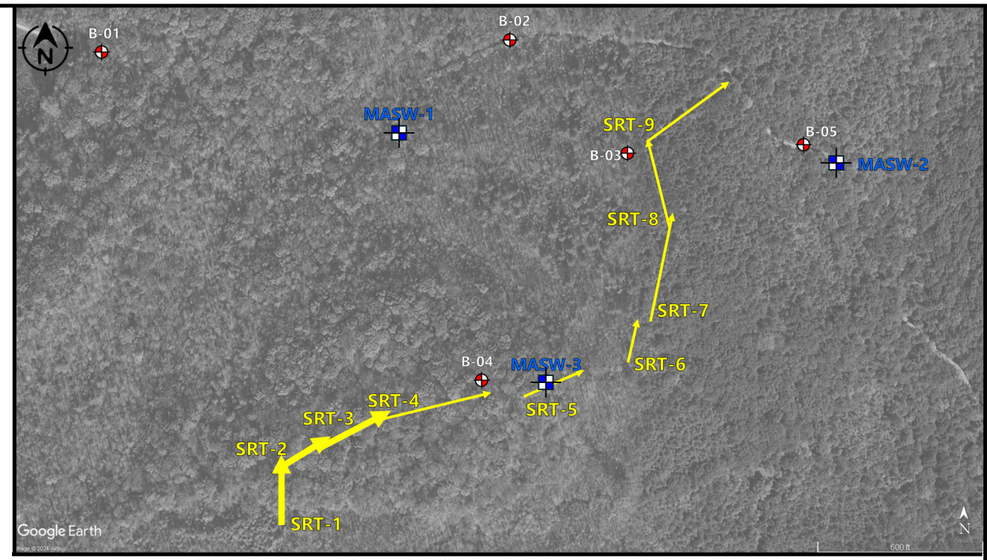


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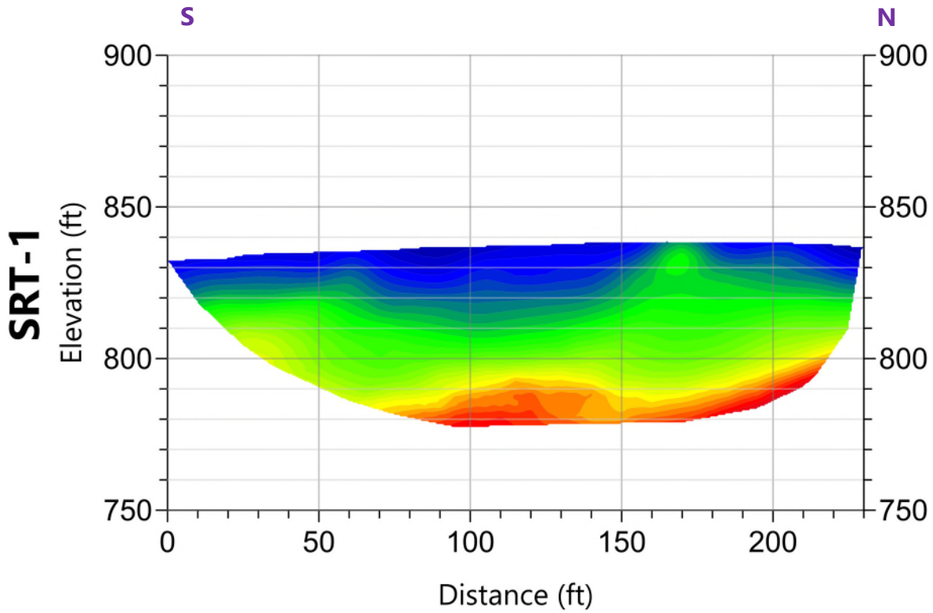
Seismic Refraction Profile

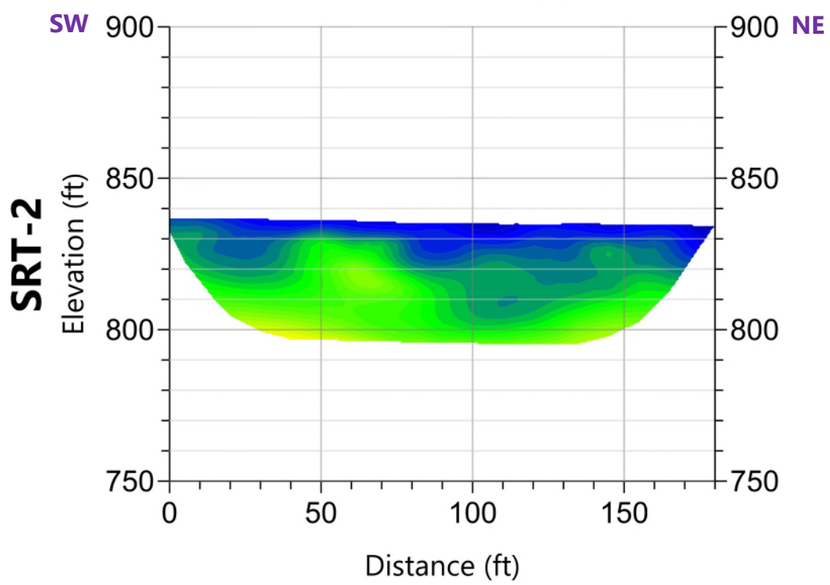
Boring Location (S&ME; 2024)

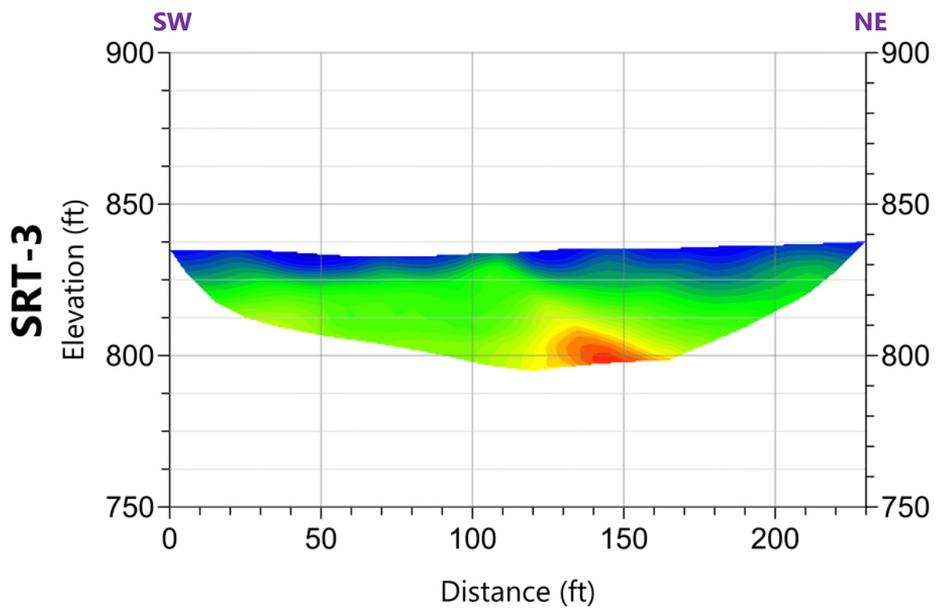
MASW



REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.







SEISMIC REFRACTION PROFILES – LINES SRT-1 THROUGH SRT-3

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

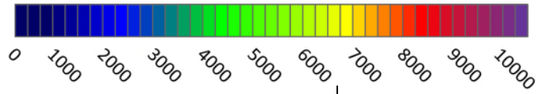
SCALE:
AS SHOWN

DATE:
7/26/2024

PROJECT NUMBER
24430185

FIGURE NO.
4

P-Wave
Velocity (ft/s)



Interpreted Residuum

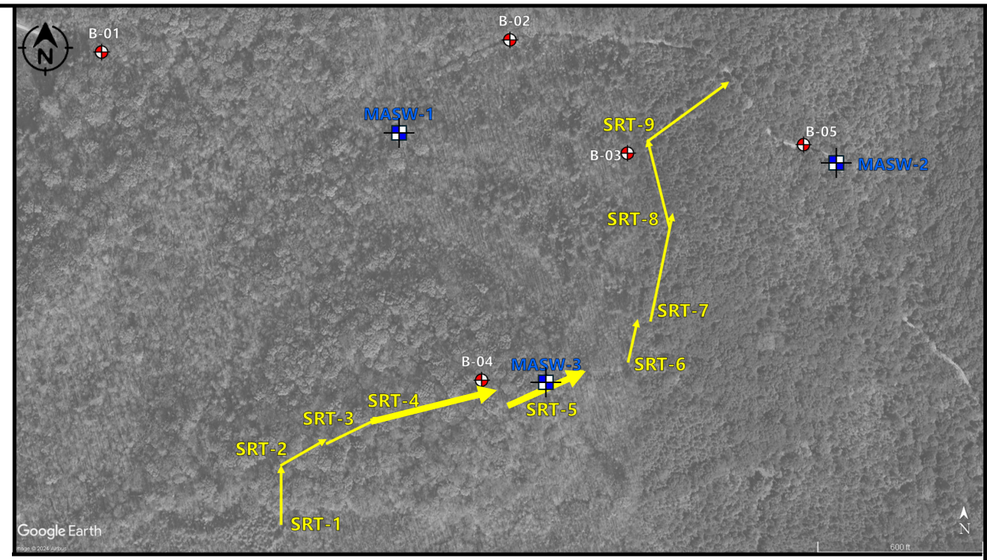
Interpreted Competent Mass Bedrock (Auger Refusal)

LEGEND

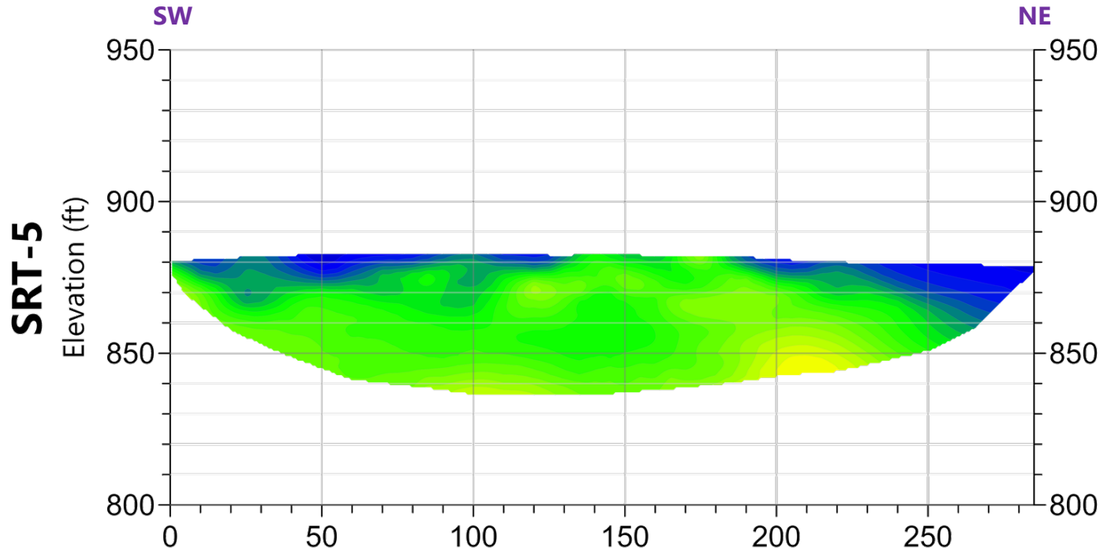
Seismic Refraction Profile

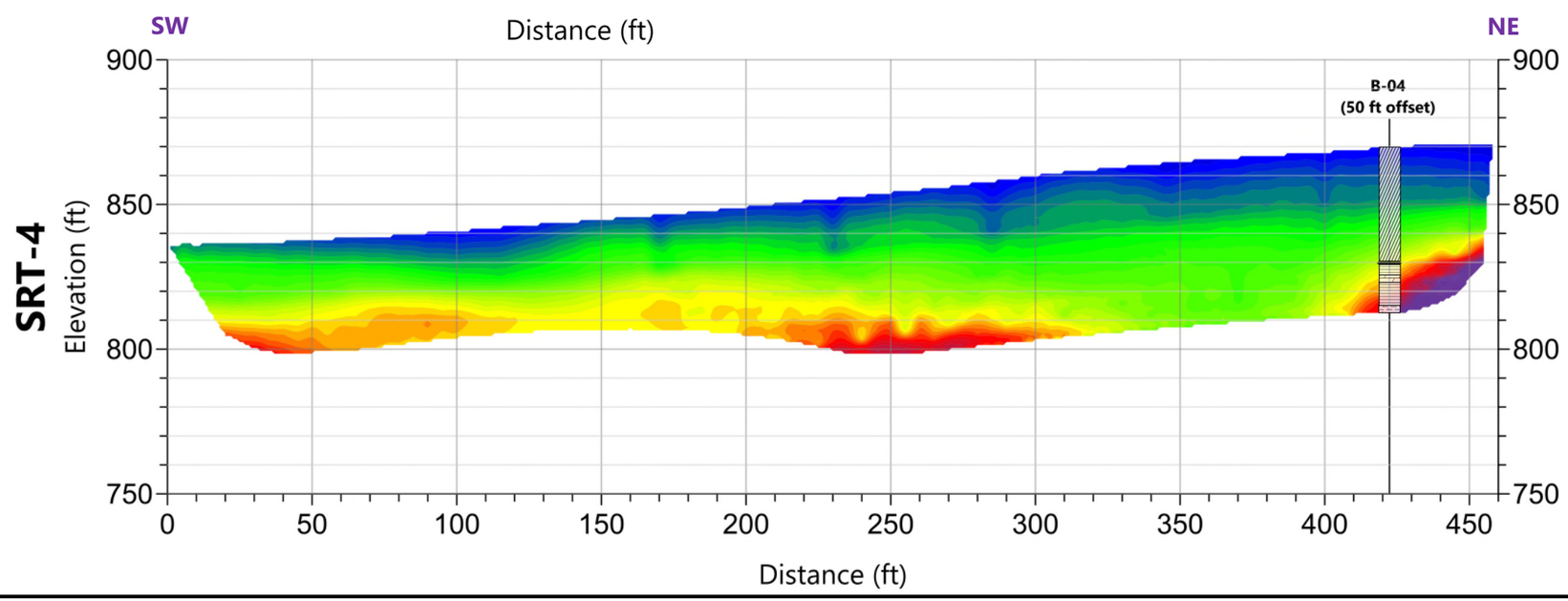
Boring Location (S&ME; 2024)

MASW



REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.





Approximate
Boring Location

XX

Indicates Auger refusal

BORING LEGEN

Residuum: Sandy Fat Clay (CH)

Soil Filled Cavity

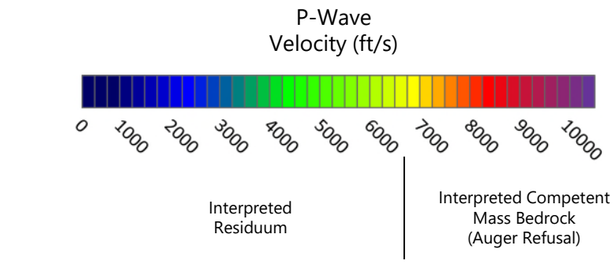
Siltstone

Shale

SEISMIC REFRACTION PROFILES – LINES SRT-4 AND SRT-5

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:	AS SHOWN
DATE:	7/26/2024
PROJECT NUMBER	24430185
FIGURE NO.	5

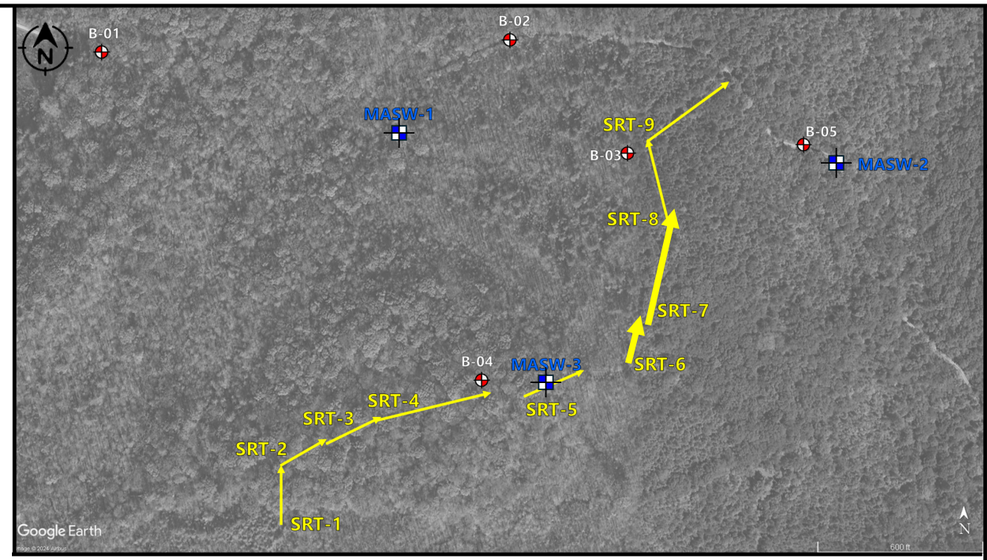


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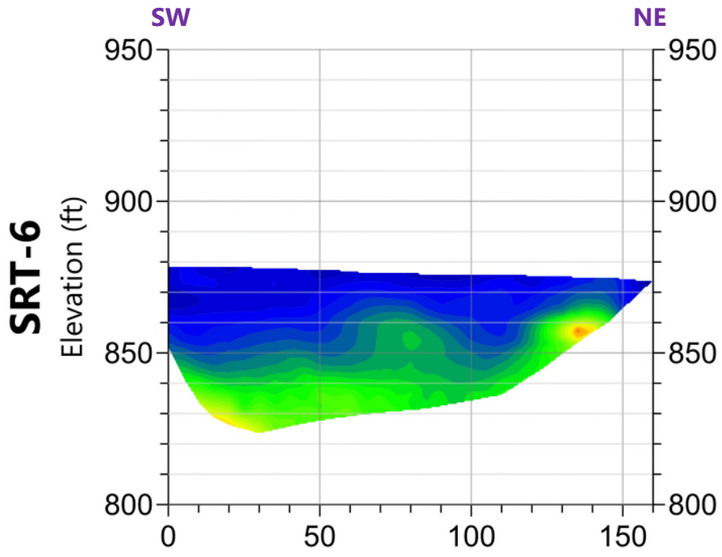
Seismic Refraction Profile

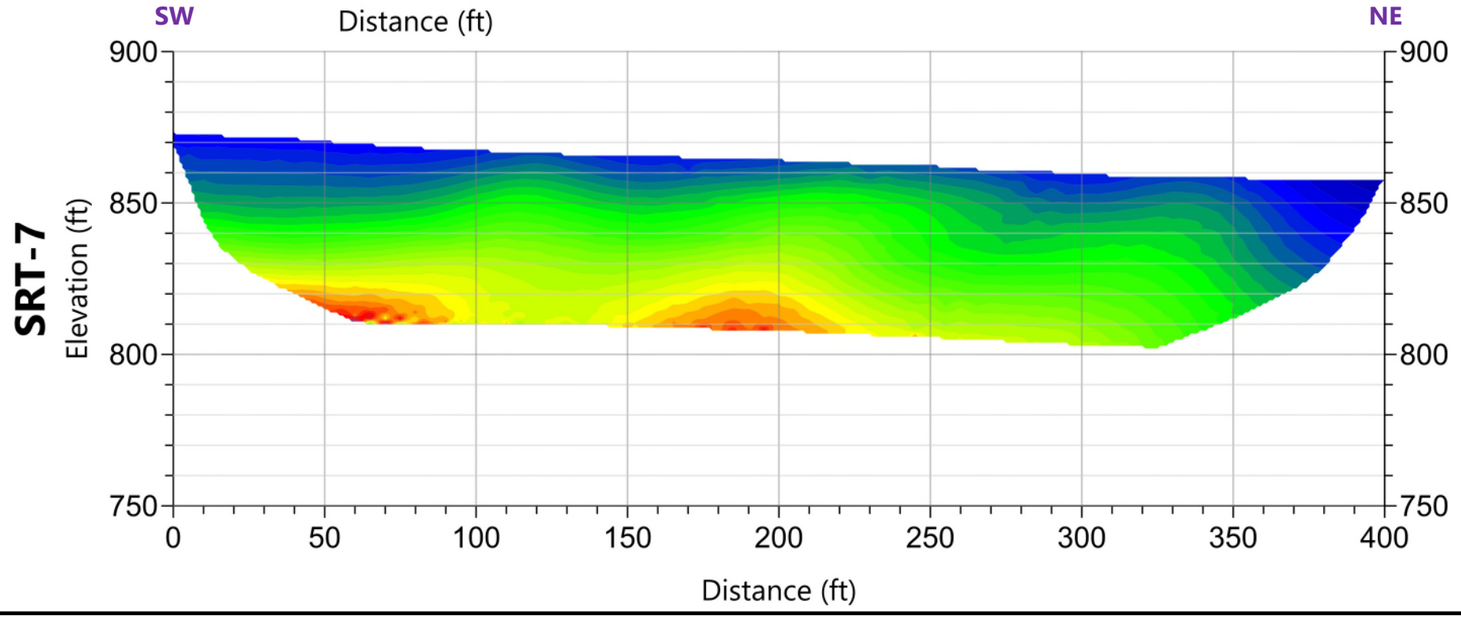
Boring Location (S&ME; 2024)

MASW



REFERENCE:
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SEISMIC REFRACTION PROFILES – LINES SRT-6 AND SRT-7

SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

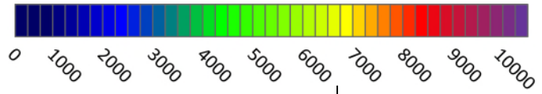
SCALE:
AS SHOWN

DATE:
7/26/2024

PROJECT NUMBER
24430185

FIGURE NO.
6

P-Wave
Velocity (ft/s)



Interpreted Residuum

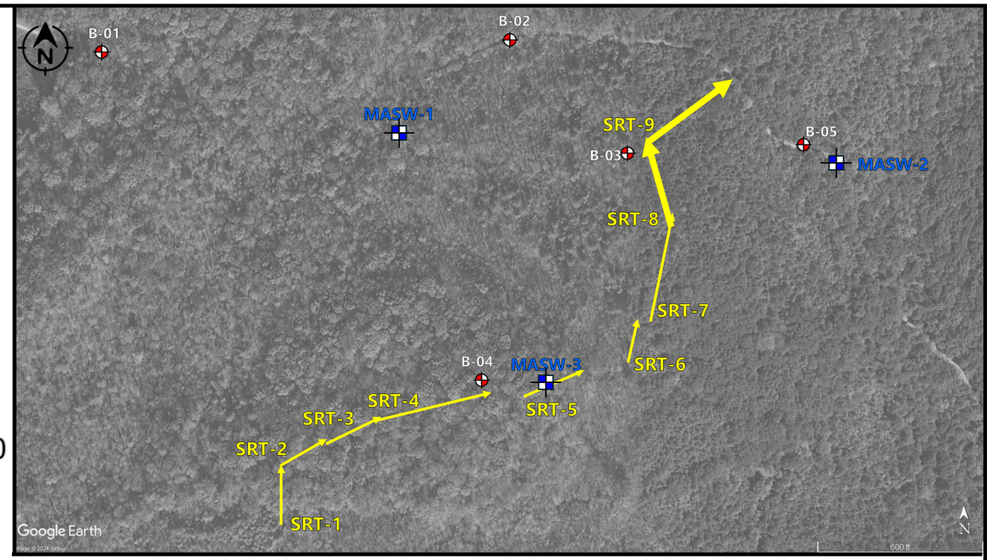
Interpreted Competent Mass Bedrock (Auger Refusal)

LEGEND

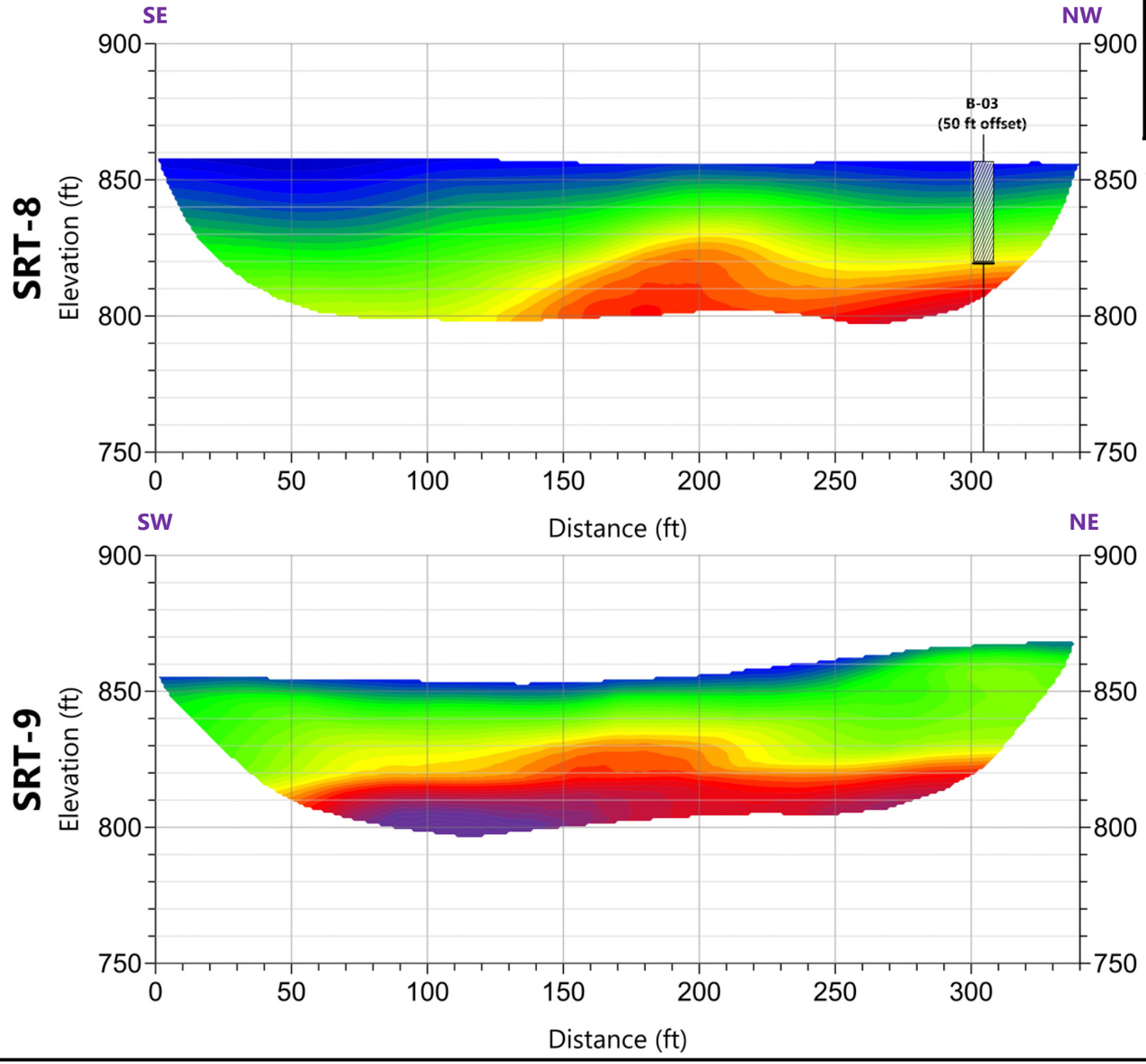
Seismic Refraction Profile

Boring Location (S&ME; 2024)

MASW



REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH (DATED NOVEMBER 5, 2023). THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED AND NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



Approximate
Boring Location

XX

Indicates Auger refusal

BORING LEGEND

Residuum: Sandy Fat Clay (CH)

Soil Filled Cavity

Siltstone

Shale

SEISMIC REFRACTION PROFILES – LINES SRT-8 AND SRT-9

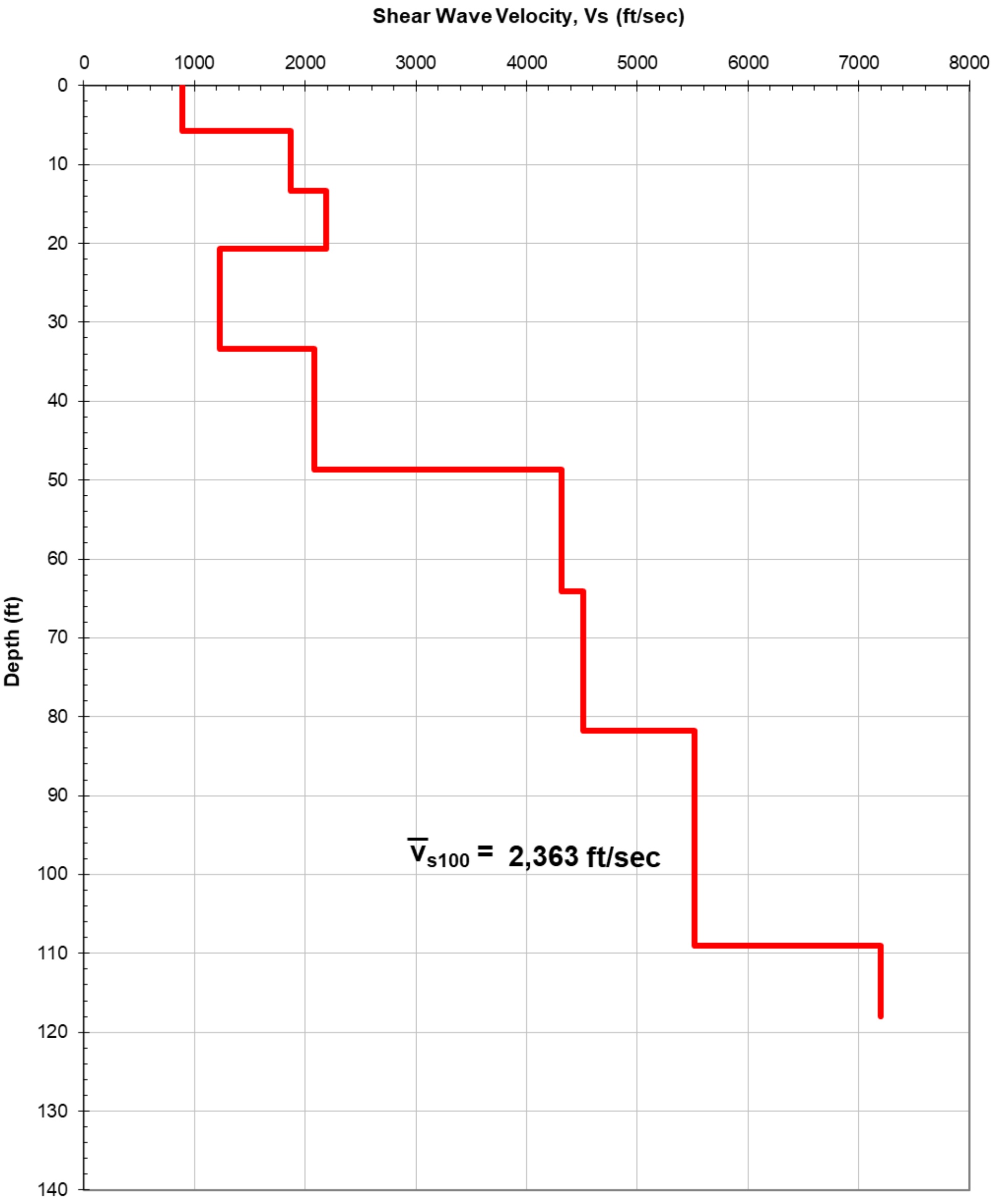
SELF SUFFICIENCY PARCEL 2
OAK RIDGE, TENNESSEE

SCALE:
AS SHOWN

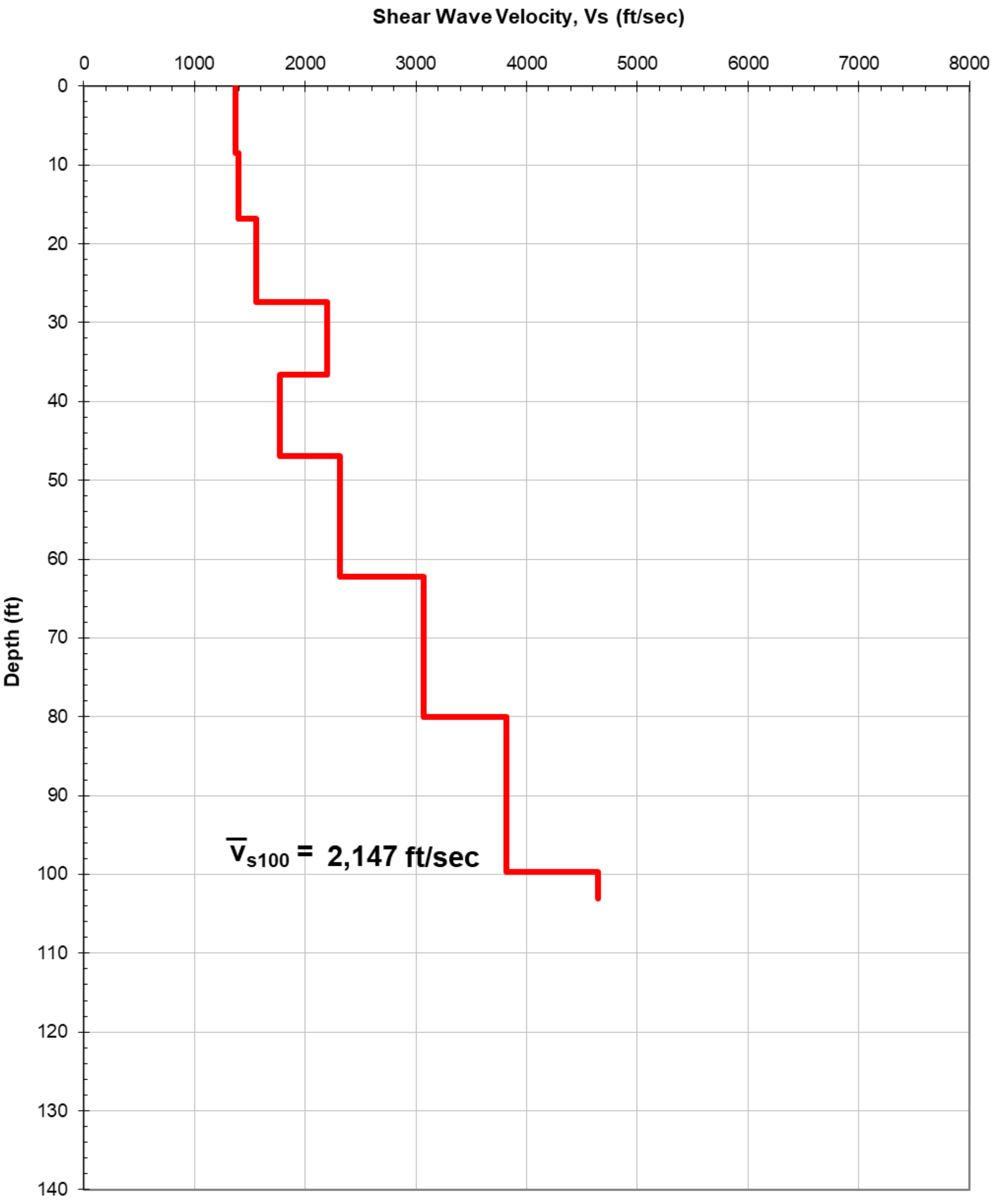
DATE:
7/26/2024

PROJECT NUMBER
24430185

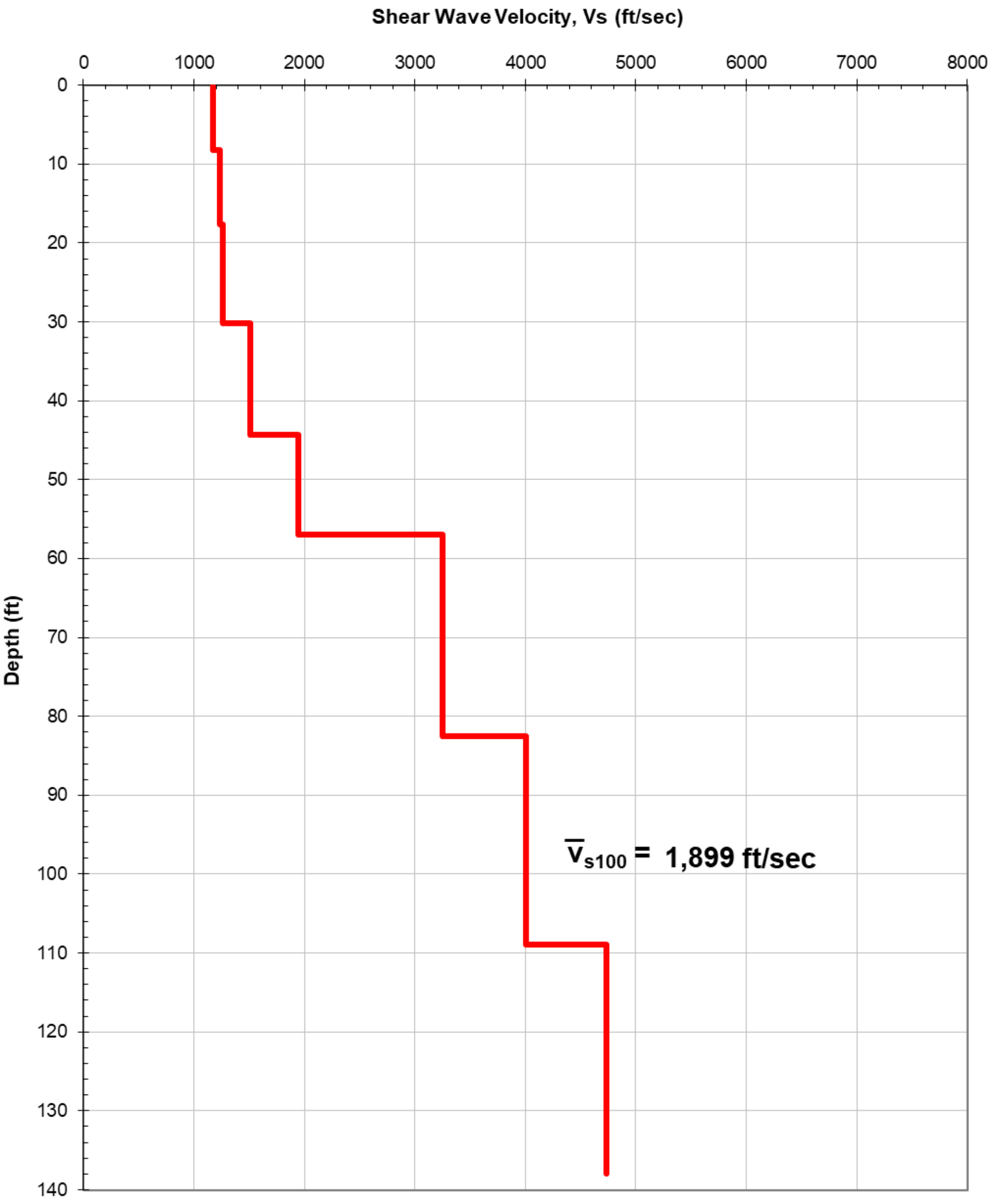
FIGURE NO.
7



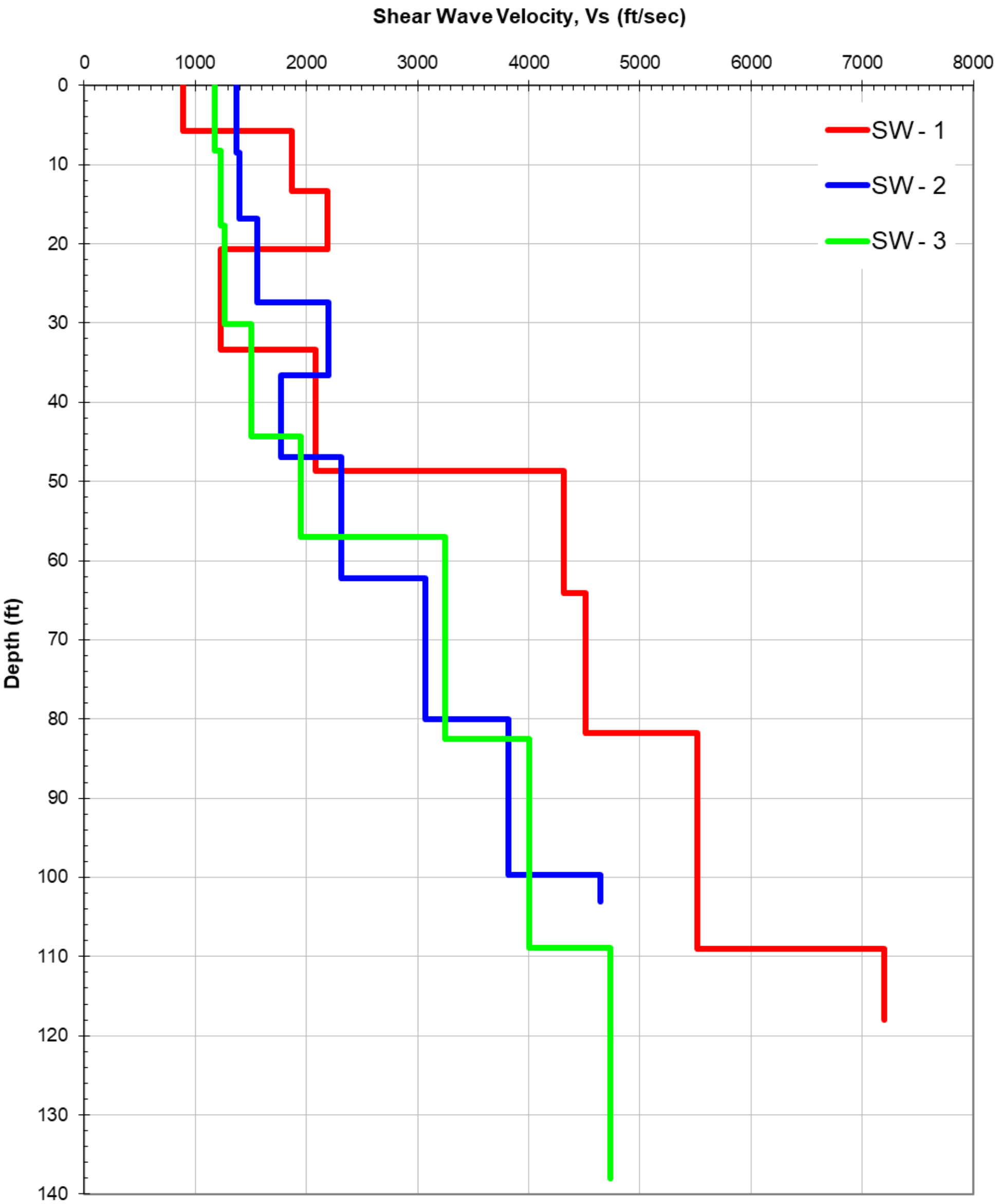
	SHEAR WAVE VELOCITY PROFILE – SW-1	SCALE: AS SHOWN	FIGURE NO.
	SELF SUFFICIENCY PARCEL 2 OAK RIDGE, TENNESSEE	DATE: 7/25/2024 PROJECT NUMBER 24430185	**8**



	SHEAR WAVE VELOCITY PROFILE – SW-2	SCALE: AS SHOWN	FIGURE NO.
	SELF SUFFICIENCY PARCEL 2 OAK RIDGE, TENNESSEE	DATE: 7/25/2024 PROJECT NUMBER 24430185	**9**



	SHEAR WAVE VELOCITY PROFILE – SW-3	SCALE: AS SHOWN	FIGURE NO.
	SELF SUFFICIENCY PARCEL 2 OAK RIDGE, TENNESSEE	DATE: 7/25/2024 PROJECT NUMBER 24430185	**10**



	COMBINED SHEAR WAVE VELOCITY PROFILES	SCALE: AS SHOWN	FIGURE NO.
	SELF SUFFICIENCY PARCEL 2 OAK RIDGE, TENNESSEE	DATE: 7/25/2024 PROJECT NUMBER 24430185	**11**

Appendix II – Tables

Table 1 – Boring Summary											
Boring Number	Drill Rig Type	Hammer Type	Depth (ft)		As-Drilled Coordinates and Elevations [1]			Test/SampleType(s)		
			Proposed	Actual R=Refusal T=Terminate	Northing (US ft)	Easting (US ft)	Ground Surface Elevation (ft)	SPT [2]	UD [3]	Rock Coring
B-01	CME 550	Automatic	Refusal+Core	32.6 R 50.3 T	592567.9	2454660.1	816	X		X
B-02	CME 550	Automatic	Refusal	50.0 R	592646.4	2456166.2	847	X		
B-03	CME 550	Automatic	Refusal	38.0 R	591362.8	2456100.6	862	X		
B-04	CME 550	Automatic	Refusal+Core	39.8 R 55.6 T	592289.4	2456702.1	880	X		X
B-05	CME 550	Automatic	Refusal+Core	67.5 R 87.5 T	592285.5	2457176.3	853	X		X

(1) Horizontal/Vertical Datum: Tennessee State Plane Coordinates NAD 1983 / NAVD 1988; located using hand held commercial grade GPS, submeter accuracy

(2) SPT - Standard Penetration Test

(3) UD - "Undisturbed" Thin-Walled (Shelby) Tube Sampling

Table 2 – Summary of Soil Index and Chemical Analysis Test Results

Boring Location	Sample Type	Sample Number	Depth Interval [1] (ft)	LL	PL	PI	USCS Symbol [2]	Natural Moisture[4] (%)
B-01	SPT	SS-02	3.5-5					19.2
B-01	SPT	SS-07	23.5-25	49	20	29	CL	36.4
B-02	SPT	SS-02	3.5-5					15.5
B-02	SPT	SS-04	8.5-10					15.4
B-02	SPT	SS-05	13.5-15					10.1
B-03	SPT	SS-02	3.5-5	NP	NP	NP		31.5
B-03	SPT	SS-03	6-7.5					26.1
B-03	SPT	SS-05	13.5-15	38	22	16	CL	14.4
B-03	SPT	SS-06	18.5-19.5					11.8
B-03	SPT	SS-08	28.5-30	37	25	12	ML	13.1
B-04	SPT	SS-01	1-2.5	39	24	15	CL	22.3
B-04	SPT	SS-02	3.5-5					8.4
B-04	SPT	SS-04	8.5-10	48	34	14	ML	33.3
B-04	SPT	SS-05	13.5-15					22.8
B-04	SPT	SS-06	18.5-20	40	30	10	ML	21.1
B-04	SPT	SS-07	23.5-24.33					10.3
B-04	SPT	SS-10	38.5-39.25					11.1
B-05	SPT	SS-01	1-2.5					23.9
B-05	SPT	SS-02	3.5-5					22.6
B-05	SPT	SS-03	6-7.5					22.5
B-05	SPT	SS-04	8.5-10					14.0
B-05	SPT	SS-08	28.5-30					84.0
B-05	SPT	SS-10	38.5-40					42.0

(1) Depth typically reported as length of drive for SPT.

(2) Classification estimated based on available test results and ASTM D2488-17^{e1} Visual Manual Procedure.

Table 3 – Rock Core Unconfined Compressive Strength Testing Summary				
Boring Number	**Rock Type**	**Sample Depth (feet)**	**Bulk Unit Weight (pcf)**	**Peak Compressive Stress (psi)**
B-01	Limestone	41.5-41.9	169.4	17,280
B-05	Siiltstone and Shale	80.2-80.6	169.0	10,603

Appendix III – Test Boring Log Legend, Boring Logs and Core Photographs

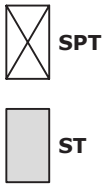
SOIL LOG LEGEND

SOIL PROPERTY SYMBOLS

N - Standard Penetration, bpf
LL - Liquid Limit, %
PPV - Pocket Penetrometer Value, tsf
NMC - Natural Moisture Content, %
PL - Plastic Limit, %
Qu - Unconfined Compressive Strength
F - Fines Content, %
PI - Plasticity Index, %
γd - Dry Unit Weight, pcf

The STANDARD PENETRATION TEST (SPT) as defined by ASTM D1586 (or AASHTO T206) is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer freely falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The SPT N Value is determined by adding the number of blows from the 2nd and 3rd 6-inch increments. A normalized blowcount (N_{60}) may be determined by the following equation: N_{60} = [Rig Energy Ratio (%) / 60] * N.

SHELBY TUBE (ST) samples are obtained by hydraulically pushing a thin-walled tube (typically 3-inches in diameter) to obtain a relatively undisturbed sample for testing of fine-grained soils to determine engineering properties such as strength, compressibility, permeability, and density. Shelby tubes are sampled in general accordance with ASTM D1587 (AASHTO T207).



Descriptive Order of Soil Strata: Geologic Disposition (i.e., Fill, Colluvium, Alluvium, etc.), ASTM Group Name (ASTM Group Symbol), quantified/qualified soil constituents, misc. constituents, consistency/density, color, organic description, moisture. ASTM group classifications is determined per ASTM D2487 where lab testing has been performed and ASTM D2488 where lab testing has not been performed.

ASTM GROUP NAME (SYMBOL) AND GRAPHIC

- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- WELL GRADED GRAVEL WITH SILT (GW-GM)
- WELL GRADED GRAVEL WITH CLAY (GW-GC)
- POORLY GRADED GRAVEL WITH SILT (GP-GM)
- POORLY GRADED GRAVEL WITH CLAY (GP-GC)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- CLAYEY GRAVEL WITH SILT (GC-GM)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- WELL GRADED SAND WITH SILT (SW-SM)
- WELL GRADED SAND WITH CLAY (SW-SC)
- POORLY GRADED SAND WITH SILT (SP-SM)
- POORLY GRADED SAND WITH CLAY (SP-SC)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- CLAYEY SAND WITH SILT (SC-SM)
- LEAN CLAY (CL)
- SILTY CLAY (CL-ML)
- SILT (ML)
- FAT CLAY (CH)
- ELASTIC SILT (MH)
- ORGANIC LOW PLASTICITY SILT OR CLAY (OL)
- ORGANIC HIGH PLASTICITY SILT OR CLAY (OH)
- PEAT (PT)
- TOPSOIL
- ASPHALT
- BASE - CEMENT MODIFIED
- BASE - CEMENT STABILIZED AGGREGATE
- BASE - GRAVEL
- CONCRETE
- VOID / NO RECOVERY
- IGM / PWR

FINE-GRAINED SOIL (Relative Consistency)

	N	PPV
Very Soft	< 2 bpf	< 0.25 tsf
Soft	2 - 4 bpf	> 0.25 - 0.5 tsf
Firm	5 - 8 bpf	> 0.5 - 1.0 tsf
Stiff	9 - 15 bpf	> 1.0 - 2.0 tsf
Very Stiff	16 - 30 bpf	> 2.0 - 4.0 tsf
Hard	> 30 bpf	> 4.0 tsf

COARSE-GRAINED SOIL (Relative Density)

	N
Very Loose	< 5 bpf
Loose	5 - 10 bpf
Medium Dense	11 - 30 bpf
Dense	31 - 50 bpf
Very Dense	> 50 bpf

MINOR CONSTITUENTS (% By Weight)

	Percentage
Trace	0% - 10%
Little	11% - 20%
Some	21% - 35%
"And"	≥ 36%

ORGANIC CONTENT OF SOIL (Determined by ASTM D2974 or AASHTO T267)

Classification	Percentage
With Organic Matter	4% - 15%
Organic Soil	16% - 30%
Peat	> 30%

MOISTURE CONDITION

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

At Time of Drilling (ATD) — Groundwater observation made anytime during the drilling process. Depending on time of reading and drilling methodologies, this value may be influenced by the drilling process.

End of Drilling — Groundwater measurement soon after the drilling processes are complete, and the borehole is at final depth. Drilling fluids, if introduced during drilling, may influence this measurement.

After Drilling — Groundwater measurements made in a borehole hours to days after drilling is complete. Depending on subsurface conditions, elapsed time, drilling process, etc. this observation may reflect a stabilized level.

REFERENCES:

FHWA NHI-16-072, Geotechnical Engineering Circular No. 5 "Geotechnical Site Characterization"
ASTM Specifications D2487 and D2488
DOT Specifications & Design Manuals from NC, SC, OH, MI, IN, PA, VA.

ROCK CORE LOG LEGEND

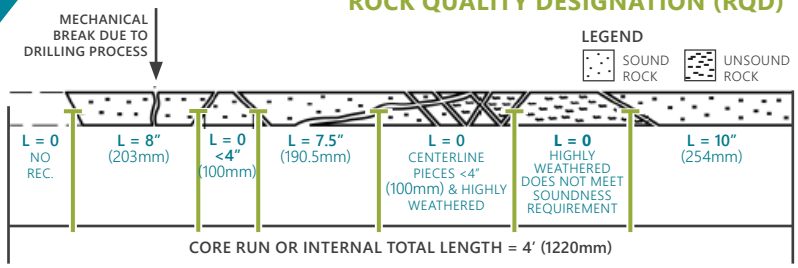
ROCK CORE RECOVERY

Core Diameter (I.D.)	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

Rock Core Sample

$$\text{REC (Recovery)} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

ROCK QUALITY DESIGNATION (RQD)



$$\text{RQD (Equation)} = \left(\frac{\sum \text{Sound Core with Length (L)} \geq 4\text{" (100mm)}}{\text{Core Run or Interval Total Length}}\right) \times 100$$

$$\text{RQD (Example)} = \left(\frac{8\text{"} + 7.5\text{"} + 10\text{"}}{48\text{"}}\right) \times 100 = 53\% \text{ (FAIR)}$$

ROCK QUALITY

Percent	Quality
>90–100	Excellent
>75–90	Good
>50–75	Fair
>25–50	Poor
0–25	Very Poor

(ASTM D6032)

GRAIN SIZE

Very Fine-Grained	<0.003 in. (<0.075 mm)
Fine-Grained	0.003 – 0.02 in. (0.075 – 0.425 mm)
Medium-Grained	0.02 – 0.8 in. (0.425 – 2 mm)
Coarse-Grained	0.8 – 2 in. (2 – 4.75 mm)
Very Coarse-Grained	>2 in. (>4.75 mm)

BEDDING

Very Thickly Bedded	>3 ft.
Thickly Bedded	3 ft. – 18 in.
Thinly Bedded	18 in. – 2 in.
Very Thinly Bedded	2 in. – 0.4 in.
Laminated	0.4 in. – 0.1 in.
Thinly Laminated	<0.1 in.

FRACTURE RATE / SPACING

Unfractured	>10 ft.
Intact	10 ft. – 3 ft.
Slightly Fractured	3 ft. – 1 ft.
Moderately Fractured	12 in. – 4 in.
Fractured	4 in. – 2 in.
Highly Fractured	< 2 in.

SURFACE ROUGHNESS

Very Rough	Near vertical steps and ridges occur on the discontinuity surface.
Slightly Rough	Asperities on the discontinuity surface are distinguishable and can be felt.
Smooth	Surface appears smooth and feels so to the touch.
Slickensided	Surface has a smooth, glassy finish with visual evidence of striation.

WEATHERING

Fresh	No visible sign of rock material weathering; slight discoloration on major discontinuity surfaces is possible.
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All rock material may be discolored by weathering and the external surface may be somewhat weaker than in its fresh condition.
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 in. diameter sample cannot be broken readily by hand.
Highly Weathered	More than half the rock is decomposed or disintegrated to soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 in. diameter sample can be broken readily by hand across the rock fabric.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely still intact. Material can by granulated by hand.
Residual Soil	All rock material is converted to soil. Material can be easily broken apart by hand.

STRENGTH

		APPROX. UNCONFINED COMPRESSIVE STRENGTH (PSI)
Extremely Strong Rock	Specimen can only be chipped with firm blows from the hammer end of a geological hammer.	> 36,250
Very Strong Rock	Specimen requires many firm blows from the hammer end of a geological hammer to fracture.	36,250 – 14,500
Strong Rock	Specimen requires more than one firm blow of the point of a geological hammer to fracture.	14,500 – 7,250
Medium Strong Rock	Specimen cannot be scraped or cut with a pocket knife. Specimen can be fractured with a single firm blow with a geological hammer point.	7,250 – 3,500
Weak Rock	Shallow cuts or scrapes can be made in a specimen with a pocket knife. A firm blow with a geological hammer creates shallow indents.	3,500 – 725
Very Weak Rock	Specimen crumbles under sharp blow with point of geological hammer and can be peeled with a pocket knife.	725 – 150
Extremely Weak Rock	Specimen can be indented by thumbnail.	150 – 35

HARDNESS

Very Hard	Cannot be scratched with a pocket knife; leaves knife steel marks on surface.
Hard	Can be scratched by a pocket knife with difficulty; scratch produces little powder and is only faintly visible; trace of knife's steel may be visible.
Moderately Hard	Can be readily scratched by a pocket knife; scratch leaves a heavy trace of dust and scratch is readily visible after the powder has been blown away.
Low Hardness	Can be gouged deeply or carved with a pocket knife.
Friable	Easily crumbled by hand, pulverized or reduced to powder sand is too soft to be cut by a pocket knife.
Soft	Very weak plastic material.

REFERENCES:

FHWA NHI-16-072, GEOTECHNICAL ENGINEERING CIRCULAR NO. 5 "GEOTECHNICAL SITE CHARACTERIZATION"
DOT SPECIFICATIONS & DESIGN MANUALS FROM NC, SC, OH, MI, IN, PA.

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-01 *Sheet 1 of 2*

DATE DRILLED: 06/17/2024	**ELEVATION:** 816 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 50.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592567.9 **EASTING:** 2454660.1
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.2	Residuum		SS-01 (13 in)	TOPSOIL, 2 inches LEAN CLAY (CL), little rock fragments, firm to stiff, brown to tan, moist	2-3-3 N = 6		
				SS-02 (18 in)		3-4-5 N = 9		812
5	5.5			SS-03 (18 in)	LEAN CLAY (CL), trace chert, little sand, firm to stiff, brown to tan, moist, black staining	4-5-6 N = 11		
				SS-04 (1 in)		3-4-8 N = 12		807
10								
				SS-05 (0 in)		4-3-5 N = 8		802
15	17.0				FAT CLAY (CH), trace chert, firm to stiff, orange brown with light gray, moist, black staining			
				SS-06 (18 in)		3-4-5 N = 9		797
20	22.0				LEAN CLAY (CL), trace chert, firm, orange brown with light gray, moist			
				SS-07 (18 in)		1-2-3 N = 5		792
25	27.0				FAT CLAY (CH), little rock fragments, soft, orange brown, moist			
				SS-08 (16 in)		0-2-2 N = 4		787
30								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/18/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-01 *Sheet 2 of 2*
DATE DRILLED: 06/17/2024	**ELEVATION:** 816 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 50.3 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592567.9 **EASTING:** 2454660.1
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
	Auger refusal at 32.6 feet	Residuum						
					FAT CLAY (CH), little rock fragments, soft, orange brown, moist			
					LIMESTONE, gray, poor quality, 5°, slightly weathered to fresh, hard			
					Void			
35				RUN-01 REC-39% RQD-30%				782
				RUN-02 REC-0% RQD-0%				
40								777
					LIMESTONE, gray, good quality to excellent quality, 5°, slightly weathered to fresh, hard			
				RUN-03 REC-94% RQD-86%				
45								772
				RUN-04 REC-100% RQD-94%				
50								767
					Borehole terminated at 50.3 feet			
55								762
60								757

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/18/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-01 Sheet 1 of 2
Date:	06/17/2024	Elevation:	816 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592567.9	Easting: 2454660.1	



B-01, Top Depth: 1.0 ft



B-01, Top Depth: 3.5 ft



B-01, Top Depth: 6.0 ft



B-01, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			**SPT Photographs:**	**B-01**
				Sheet 2 of 2	
Date:	06/17/2024	**Elevation:**	816 ft	Notes:	
Photographed by:	Abby Knauer	Northing:	592567.9	Easting:	2454660.1



B-01, Top Depth: 18.5 ft



B-01, Top Depth: 23.5 ft



B-01, Top Depth: 28.5 ft

Project:	**Self Sufficiency Parcel 2** **Oak Ridge, Tennessee** 24430185	**Core Photographs:**	**B-01**
		Sheet 1 of 2	
Date:	06/17/2024 **Elevation:** 816 ft	Notes:	
Photographed by:	Abby Knauer Northing: 592567.9 Easting: 2454660.1		

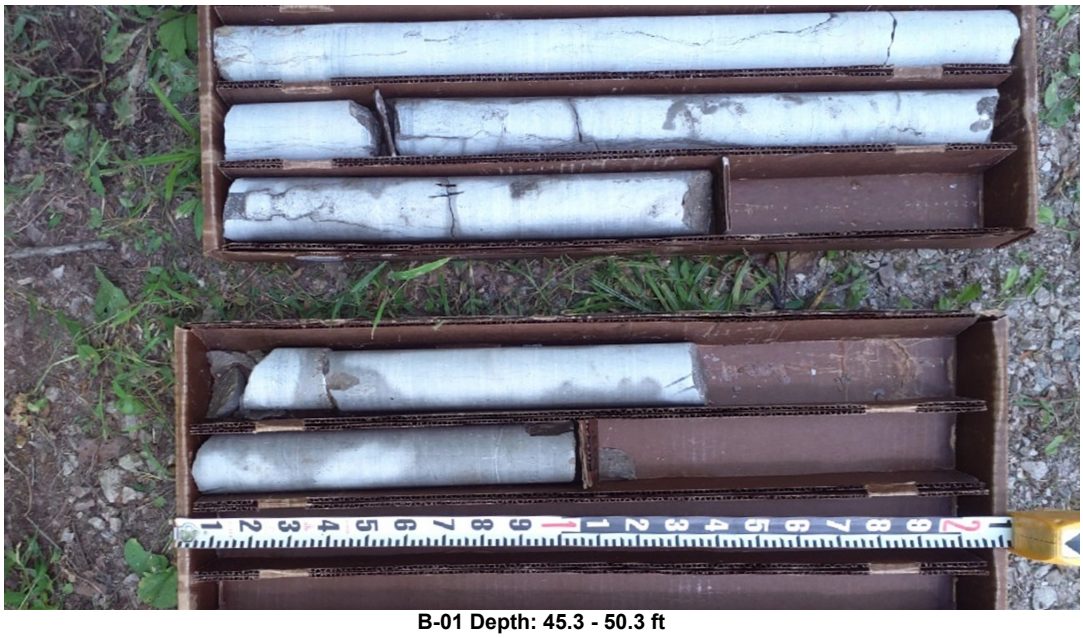


B-01 Depth: 32.6 - 35.3 ft
RUN-01
REC-39%
RQD-30%



B-01 Depth: 40.3 - 45.3 ft
RUN-03
REC-94%
RQD-86%

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			Core Photographs: B-01 Sheet 2 of 2
Date:	06/17/2024	**Elevation:**	816 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592567.9	Easting: 2454660.1	



B-01 Depth: 45.3 - 50.3 ft
RUN-04
REC-100%
RQD-94%

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-02 *Sheet 1 of 2*
DATE DRILLED: 06/18/2024	**ELEVATION:** 847 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 50.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Abby Knauer	**NORTHING:** 592646.4 **EASTING:** 2456166.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.2				TOPSOIL, 2 inches			
				SS-01 (14 in)	LEAN CLAY WITH SAND (CL), trace rock fragments, very stiff to hard, tan and gray, relict structure, moist	6-11-16 N = 27		
				SS-02 (17 in)		7-12-19 N = 31		
5				SS-03 (18 in)		4-8-13 N = 21		842
	8.0			SS-04 (18 in)	LEAN CLAY WITH SAND (CL), little rock fragments, hard, gray and dark brown, moist	12-16-20 N = 36		
10								837
	13.7			SS-05 (18 in)	LEAN CLAY WITH SAND (CL), trace chert, dark red brown, moist	18-30-50 N = 80		
15		Residuum						832
	17.0			SS-06 (18 in)	LEAN CLAY WITH SAND (CL), with weathered rock fragments, hard, dark gray to gray, relict structure, moist	20-30-30 N = 60		
20								827
	22.0			SS-07 (18 in)	SILT WITH SAND (CL), hard, gray with dark brown, moist	44-41-50/5" N = 50/5"		
25								822
	27.0				LEAN CLAY WITH SAND (CL), hard, dark red brown and gray			
	29.2 ▽			SS-08 (11 in)	LEAN CLAY WITH SAND (CL), with rock fragments, hard, gray tan, moist	19-50/5" N = 50/5"		
30								817

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	06/18/2024	30.2	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-02 *Sheet 2 of 2*
DATE DRILLED: 06/18/2024	**ELEVATION:** 847 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 50.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Abby Knauer	**NORTHING:** 592646.4 **EASTING:** 2456166.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35		Residuum		SS-09 (4 in)	LEAN CLAY WITH SAND (CL), with rock fragments, hard, gray tan, moist	50/4" N = 50/4"		812
40				SS-10 (1 in)		50/1" N = 50/1"		807
	42.0				LEAN CLAY WITH SAND (CL), hard, gray, wet			
45				SS-11 (2 in)		50/2" N = 50/2"		802
	47.0				LEAN CLAY WITH SAND (CL), trace rock fragments, hard, dark gray, moist			
	Auger refusal at 50.0 feet			SS-12 (4 in)		50/4" N = 50/4"		
50	50.0				Borehole terminated at 50.0 feet			797
55								792
60								787

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	06/18/2024	30.2	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-02 Sheet 1 of 3
Date:	06/18/2024	Elevation:	847 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592646.4	Easting: 2456166.2	



B-02, Top Depth: 1.0 ft



B-02, Top Depth: 3.5 ft



B-02, Top Depth: 6.0 ft



B-02, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-02 Sheet 2 of 3
Date:	06/18/2024	Elevation:	847 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592646.4	Easting: 2456166.2	



B-02, Top Depth: 13.5 ft



B-02, Top Depth: 18.5 ft



B-02, Top Depth: 23.5 ft



B-02, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			**SPT Photographs:**	**B-02**
				Sheet 3 of 3	
Date:	06/18/2024	**Elevation:**	847 ft	Notes:	
Photographed by:	Abby Knauer	Northing:	592646.4	Easting:	2456166.2



B-02, Top Depth: 33.5 ft



B-02, Top Depth: 38.5 ft



B-02, Top Depth: 43.5 ft



B-02, Top Depth: 48.5 ft

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-03 *Sheet 1 of 2*

DATE DRILLED: 06/20/2024	**ELEVATION:** 862 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 38.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Abby Knauer	**NORTHING:** 591362.8 **EASTING:** 2456100.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0					TOPSOIL, 2 inches			
0.2				SS-01 (14 in)	SILTY CLAY (CL-ML), firm, red brown and tan, moist	3-3-3 N = 6		
3.0				SS-02 (18 in)	SILTY CLAY (CL-ML), stiff, tan, moist	3-5-6 N = 11		858
5								
5.5				SS-03 (18 in)	LEAN CLAY (CL), very stiff, dark red brown, moist	6-11-17 N = 28		
8.0				SS-04 (18 in)	LEAN CLAY WITH SAND (CL), hard, dark red brown, relict structure, moist	8-17-24 N = 41		853
10								
14.4		Residuum		SS-05 (16 in)	LEAN CLAY WITH SAND (CL), hard, light gray, moist	14-24-38 N = 62		848
15								
17.0				SS-06 (12 in)	SILTY CLAY (CL-ML), hard, light green gray, dry	20-50 N = 50		843
20								
22.0	Hole Caved at 23.0 feet			SS-07 (18 in)	SILT WITH SAND (ML), trace rock fragments, very stiff, dark red brown tan, moist, black staining	9-11-15 N = 26		838
25								
27.0				SS-08 (18 in)	SILT (ML), with rock fragments, hard, dark red brown, moist, black staining	30-31-33 N = 64		833
30								
32.0								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	06/20/2024		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-03 *Sheet 2 of 2*
DATE DRILLED: 06/20/2024	**ELEVATION:** 862 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 38.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Abby Knauer	**NORTHING:** 591362.8 **EASTING:** 2456100.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35		Residuum		SS-09 (10 in)	PWR, sampled as silt, with sand, hard, brown to tan, moist	11-50/4" N = 50/4"		828
	Auger refusal at 38.0 feet							
38.0					Borehole terminated at 38.0 feet			823
40								
45								818
50								813
55								808
60								803

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼	06/20/2024		Not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-03 Sheet 1 of 3
Date:	06/20/2024	**Elevation:**	862 ft	Notes:
Photographed by:	Abby Knauer	Northing: 591362.8	Easting: 2456100.6	



B-03, Top Depth: 1.0 ft



B-03, Top Depth: 3.5 ft



B-03, Top Depth: 6.0 ft



B-03, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-03 Sheet 2 of 3
Date:	06/20/2024	Elevation:	862 ft	Notes:
Photographed by:	Abby Knauer	Northing: 591362.8	Easting: 2456100.6	



B-03, Top Depth: 13.5 ft



B-03, Top Depth: 18.5 ft

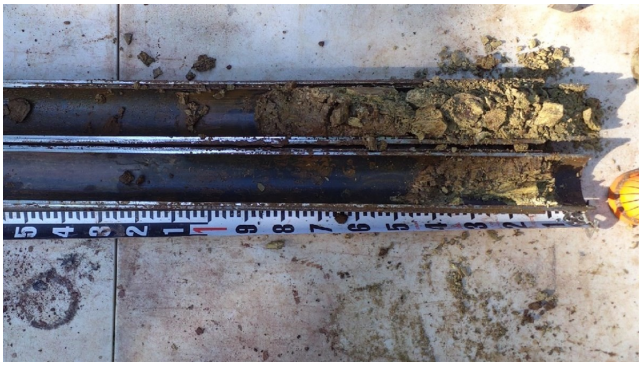


B-03, Top Depth: 23.5 ft



B-03, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-03 Sheet 3 of 3
Date:	06/20/2024	Elevation:	862 ft	Notes:
Photographed by:	Abby Knauer	Northing: 591362.8	Easting: 2456100.6	



B-03, Top Depth: 33.5 ft

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-04 *Sheet 1 of 2*

DATE DRILLED: 06/19/2024	**ELEVATION:** 880 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 55.6 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592289.4 **EASTING:** 2456702.1
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.2	Residuum		SS-01 (18 in)	TOPSOIL, 2 inches LEAN CLAY WITH SAND (CL), very stiff, light orange tan with red, moist	4-6-11 N = 17		
	3.0							
	4.0			SS-02 (18 in)	LEAN CLAY WITH SAND (CL), hard, light orange tan with brown, moist	10-30-21 N = 51		876
5	5.5			SS-03 (18 in)	POORLY GRADED SAND WITH GRAVEL (SP), trace clay, hard, brown gray and white, moist, black staining LEAN CLAY WITH SAND (CL), hard, red brown, relict structure, moist	9-17-24 N = 41		
	8.0			SS-04 (15 in)	SILT WITH SAND (ML), stiff, orange tan and light gray, relict structure, moist	5-5-8 N = 13		871
10	12.0			SS-05 (18 in)	SILT WITH SAND (ML), very stiff, gray tan, moist	9-12-11 N = 23		866
15	17.0			SS-06 (16 in)	LEAN CLAY (CL), very stiff, dark red brown, moist	7-11-17 N = 28		861
20	19.5				LEAN CLAY WITH SAND (CL), very stiff, light gray with dark red, relict structure, moist			
	22.0			SS-07 (10 in)	SILT WITH SAND (ML), hard, gray tan, relict structure, moist	23-50/4" N = 50/4"		856
25	27.0			SS-08 (5 in)	PWR, sampled as shale fragments, with sand, very dense, gray and tan, moist	50/5" N = 50/5"		851
30	32.0							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/19/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-04 *Sheet 2 of 2*
DATE DRILLED: 06/19/2024	**ELEVATION:** 880 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 55.6 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592289.4 **EASTING:** 2456702.1
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35		Residuum		SS-09 (4 in)	POORLY GRADED SAND (SP), with silt and clay, little rock fragments, very dense, tan, moist	50/4" N = 50/4"		846
	37.0				SANDY SILT (ML), with rock fragments, hard, dark red brown with tan, moist			
	Auger refusal at 39.8 feet			SS-10 (9 in)		47-50/3" N = 50/3"		841
40				RUN-01 REC-88% RQD-0%	40.0 SILTSTONE, dark red brown, very poor quality, 45°, moderately weathered, moderately hard 40.4 Soil filled cavity			
				RUN-02 REC-20% RQD-0%	44.5 SILTSTONE, dark red brown and dark gray, very poor quality, 45°, moderately weathered			836
45					45.5 Soil filled cavity 47.0 SILTSTONE, dark gray, very poor quality, 45°, moderately weathered			
				RUN-03 REC-8% RQD-0%	47.4 Soil filled cavity			831
50								
				RUN-04 REC-18% RQD-0%	54.7 SHALE, tan and green gray, very poor quality, moderately weathered, soft to moderately hard			826
55					55.6 Borehole terminated at 55.6 feet			
60								821

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/19/2024		Not encountered prior to coring
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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Project:	**Self Sufficiency Parcel 2** **Oak Ridge, Tennessee** 24430185			**SPT Photographs:**	**B-04**
				Sheet 1 of 3	
Date:	06/19/2024	**Elevation:**	880 ft	Notes:	
Photographed by:	Abby Knauer	Northing:	592289.4	Easting:	2456702.1



B-04, Top Depth: 1.0 ft



B-04, Top Depth: 3.5 ft



B-04, Top Depth: 6.0 ft



B-04, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-04 Sheet 2 of 3
Date:	06/19/2024	Elevation:	880 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592289.4	Easting: 2456702.1	



B-04, Top Depth: 13.5 ft



B-04, Top Depth: 18.5 ft



B-04, Top Depth: 23.5 ft



B-04, Top Depth: 28.5 ft

Project:	**Self Sufficiency Parcel 2** **Oak Ridge, Tennessee** 24430185			**SPT Photographs:**	**B-04**
				Sheet 3 of 3	
Date:	06/19/2024	**Elevation:**	880 ft	Notes:	
Photographed by:	Abby Knauer	Northing: 592289.4	Easting: 2456702.1		



B-04, Top Depth: 33.5 ft

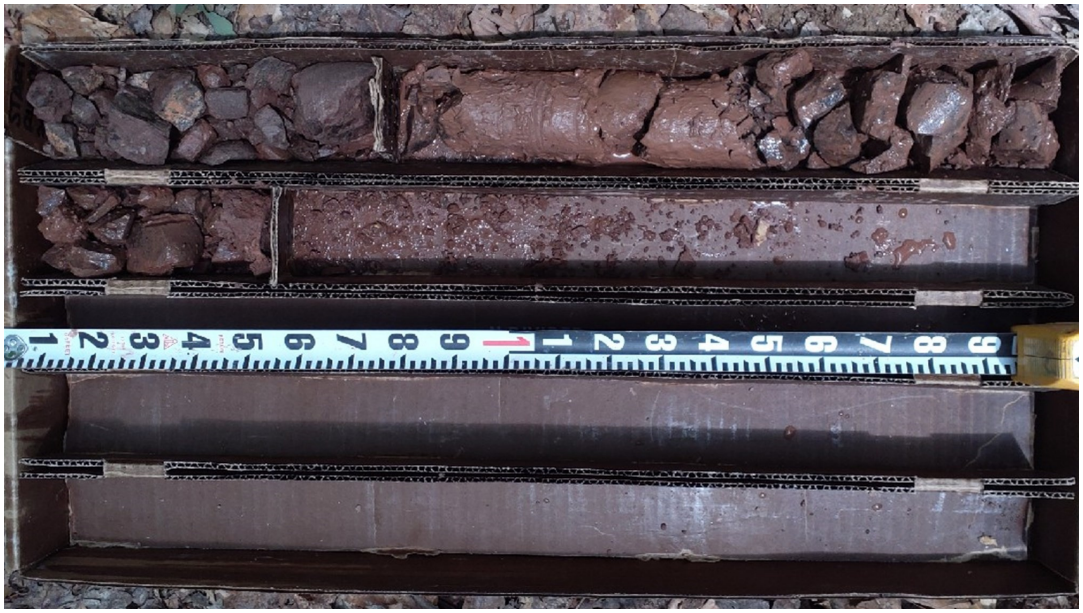


B-04, Top Depth: 38.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			Core Photographs: B-04 Sheet 1 of 2
Date:	06/19/2024	Elevation:	880 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592289.4	Easting: 2456702.1	



B-04 Depth: 39.8 - 40.6 ft
RUN-01
REC-88%
RQD-0%



B-04 Depth: 40.6 - 45.6 ft
RUN-02
REC-20%
RQD-0%

Project:	**Self Sufficiency Parcel 2** **Oak Ridge, Tennessee** 24430185	**Core Photographs:**	**B-04**
		Sheet 2 of 2	
Date:	06/19/2024 **Elevation:** 880 ft	Notes:	
Photographed by:	Abby Knauer Northing: 592289.4 Easting: 2456702.1		



B-04 Depth: 45.6 - 50.6 ft
RUN-03
REC-8%
RQD-0%



B-04 Depth: 50.6 - 55.6 ft
RUN-04
REC-18%
RQD-0%

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-05 *Sheet 1 of 3*
DATE DRILLED: 06/18/2024	**ELEVATION:** 853 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 86.2 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592285.5 **EASTING:** 2457176.3
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
0	0.2				TOPSOIL, 2 inches			
				SS-01 (13 in)	LEAN CLAY WITH SAND (CL), with rock fragments, firm, red brown and tan gray, relict structure, moist	2-2-4 N = 6		
				SS-02 (18 in)		7-16-21 N = 37		
5				SS-03 (18 in)		6-15-22 N = 37		848
	8.0				SILT WITH SAND (ML), trace rock fragments, hard, dark red brown, moist			
				SS-04 (13 in)		13-22-20 N = 42		
10	12.0				SILT WITH SAND (ML), trace rock fragments, very stiff to hard, orange tan, moist			843
		Residuum		SS-05 (18 in)		4-8-15 N = 23		
15								838
				SS-06 (12 in)		31-50/6" N = 50/6"		
20								833
				SS-07 (17 in)		27-28-50/5" N = 50/5"		
25								828
	27.0				SANDY LEAN CLAY (CL), very soft, dark brown with orange tan, wet			
				SS-08 (14 in)		0-0-1 N = 1		
30								823
	32.0							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/19/2024		Not encountered prior to coring.
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-05 *Sheet 2 of 3*
DATE DRILLED: 06/18/2024	**ELEVATION:** 853 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 86.2 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592285.5 **EASTING:** 2457176.3
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
35		Residuum		SS-09 (11 in)	SILTY CLAY WITH SAND (CL), trace rock fragments, hard, orange tan and brown, moist	28-50/5" N = 50/5"		818
37.0								
40				SS-10 (18 in)	LEAN CLAY (CL), stiff, brown, relict structure, moist	6-7-8 N = 15		813
42.0								
45				SS-11 (8 in)	SILTY CLAY WITH SAND (CL), hard, brown to tan, moist	37-50/2" N = 50/2"		808
47.0								
50				SS-12 (2 in)	Weathered rock, sampled as shale fragments, few sand, very dense, tan to dark red brown, moist	50/2" N = 50/2"		803
55				SS-13 (11 in)		50-50/5" N = 50/5"		798
60				SS-14 (0 in)		50/0" N = 50/0"		793
62.0					LEAN CLAY (CL), trace chert, hard, dark red brown, relict structure, moist			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/19/2024		Not encountered prior to coring.
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee S&ME Project No. 24430185	BORING LOG: B-05 *Sheet 3 of 3*
DATE DRILLED: 06/18/2024	**ELEVATION:** 853 ft	**NOTES:** Sample descriptions based on visual observations of obtained samples.
DRILL RIG: CME 550	**DATUM:** NAVD88	
DRILLER: Anthony Hooks	**BORING DEPTH:** 86.2 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Abby Knauer	**NORTHING:** 592285.5 **EASTING:** 2457176.3
SAMPLING METHOD: SS, CORE	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Tennessee FIPS 4100 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80 100)	ELEVATION
65		Residuum		SS-15 (5 in)	LEAN CLAY (CL), trace chert, hard, dark red brown, relict structure, moist	50/5" N = 50/5"		788
	Auger refusal at 70.0 feet			SS-16 (0 in)		50/0" N = 50/0"		
70								783
				RUN-01 REC-0% RQD-0%	SHALE, dark red brown, very poor quality, 10°, moderately weathered, moderately hard			
	70.0							
	72.1				Soil filled cavity			
75				RUN-02 REC-18% RQD-0%				778
	76.2				SHALE, dark red brown and gray, very poor quality, moderately weathered, moderately hard			
	76.3				Soil filled cavity			
80				RUN-03 REC-44% RQD-10%				773
	79.9				SILTSTONE AND SHALE, gray green and tan, interbedded, very poor quality, moderately weathered to fresh, moderately hard to hard			
	81.2				Soil filled cavity			
85				RUN-04 REC-38% RQD-0%				768
	84.3				SHALE, dark brown, very poor quality, highly weathered to fresh, moderately hard			
	86.2				Borehole terminated at 86.2 feet			
90								763
95								758

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	06/19/2024		Not encountered prior to coring.
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal, IGM = Intermediate Geomaterial

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			**SPT Photographs:**	**B-05**
				Sheet 1 of 4	
Date:	06/18/2024	**Elevation:**	853 ft	Notes:	
Photographed by:	Abby Knauer	Northing:	592285.5	Easting:	2457176.3



B-05, Top Depth: 1.0 ft



B-05, Top Depth: 3.5 ft



B-05, Top Depth: 6.0 ft



B-05, Top Depth: 8.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-05 Sheet 2 of 4
Date:	06/18/2024	Elevation:	853 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592285.5	Easting: 2457176.3	



B-05, Top Depth: 13.5 ft



B-05, Top Depth: 18.5 ft



B-05, Top Depth: 23.5 ft



B-05, Top Depth: 28.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			SPT Photographs: B-05 Sheet 3 of 4
Date:	06/18/2024	Elevation:	853 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592285.5	Easting: 2457176.3	



B-05, Top Depth: 33.5 ft



B-05, Top Depth: 38.5 ft



B-05, Top Depth: 43.5 ft



B-05, Top Depth: 48.5 ft

Project:	**Self Sufficiency Parcel 2** **Oak Ridge, Tennessee** 24430185			**SPT Photographs:**	**B-05**
				Sheet 4 of 4	
Date:	06/18/2024	**Elevation:**	853 ft	Notes:	
Photographed by:	Abby Knauer	Northing:	592285.5	Easting:	2457176.3



B-05, Top Depth: 53.5 ft



B-05, Top Depth: 63.5 ft

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185	**Core Photographs:**	**B-05**
		Sheet 1 of 2	
Date:	06/18/2024	**Elevation:**	853 ft
Photographed by:	Abby Knauer	Northing: 592285.5	Easting: 2457176.3



B-05 Depth: 71.2 - 76.2 ft
RUN-02
REC-18%
RQD-0%



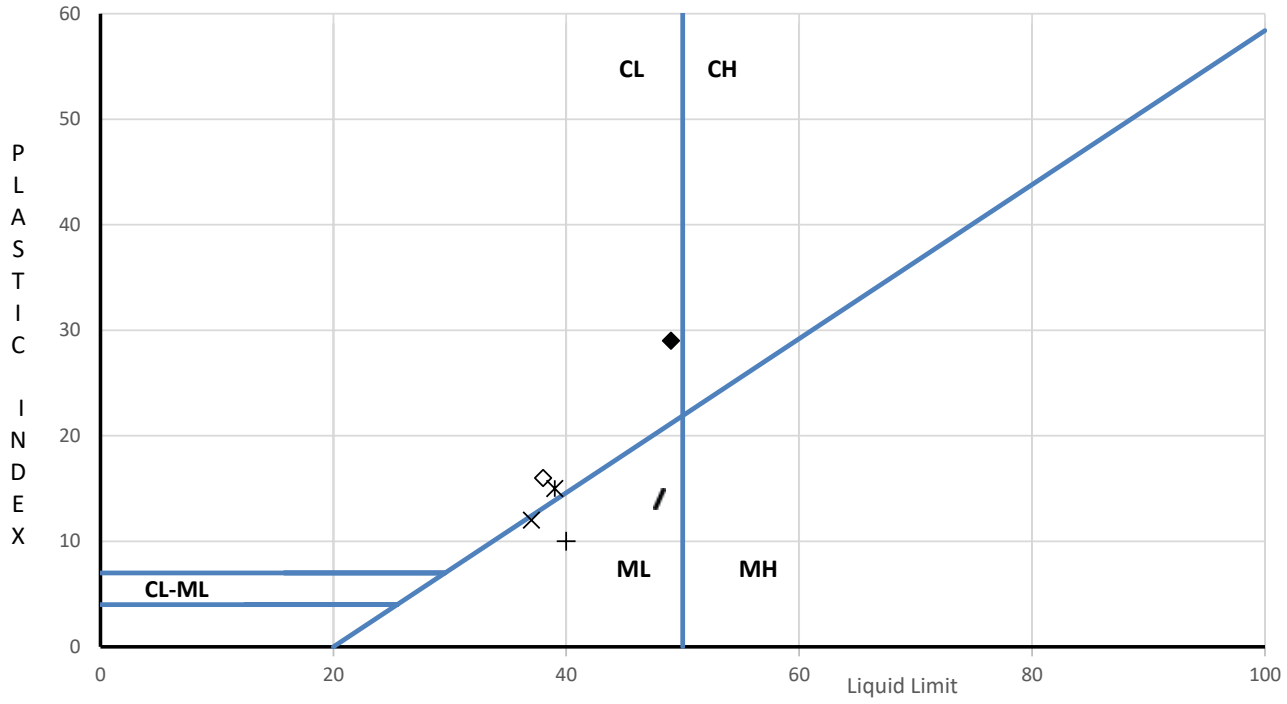
B-05 Depth: 76.2 - 81.2 ft
RUN-03
REC-44%
RQD-10%

Project:	Self Sufficiency Parcel 2 Oak Ridge, Tennessee 24430185			Core Photographs: B-05 Sheet 2 of 2
Date:	06/18/2024	**Elevation:**	853 ft	Notes:
Photographed by:	Abby Knauer	Northing: 592285.5	Easting: 2457176.3	



B-05 Depth: 81.2 - 86.2 ft
RUN-04
REC-38%
RQD-0%

Appendix IV – Laboratory Test Results

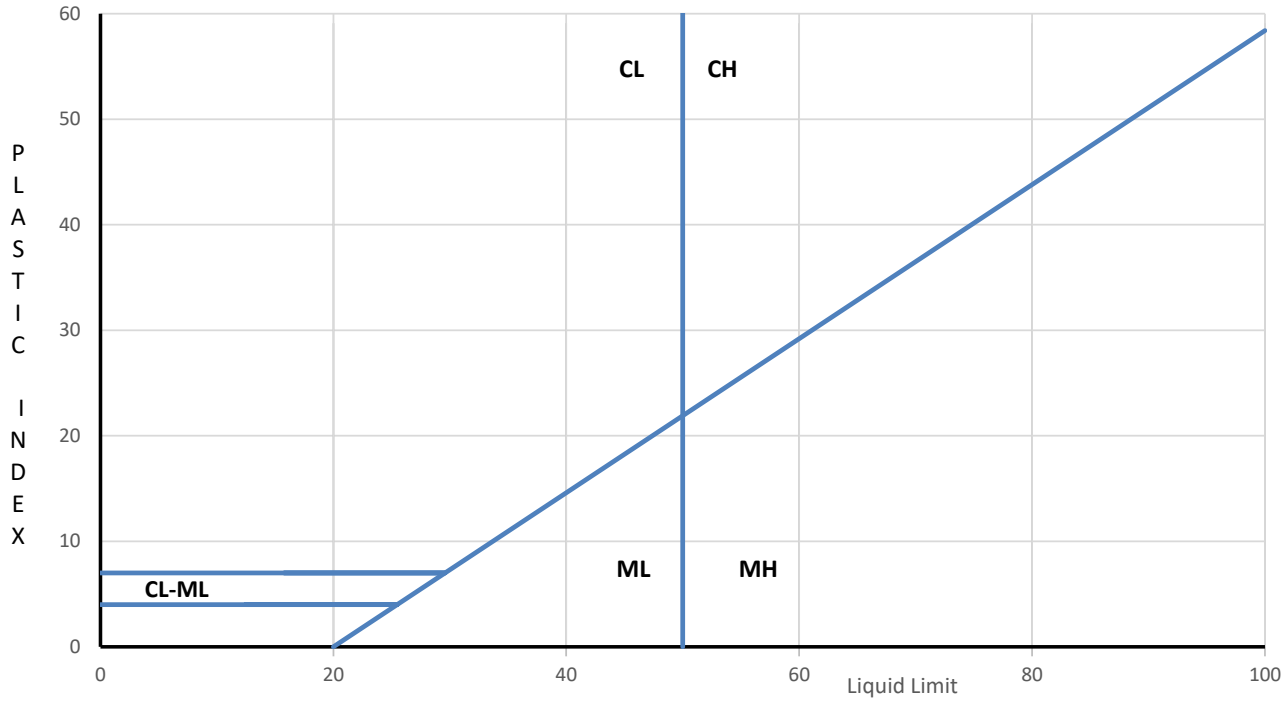


Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-01	SS-02	3.5	19.2						
◆	B-01	SS-07	23.5	36.4	49	20	29		CL	LEAN CLAY
	B-02	SS-02	3.5	15.5						
	B-02	SS-04	8.5	15.4						
	B-02	SS-05	13.5	10.1						
	B-03	SS-02	3.5	31.5	NP	NP	NP			
	B-03	SS-03	6	26.1						
◇	B-03	SS-05	13.5	14.4	38	22	16		CL	LEAN CLAY
	B-03	SS-06	18.5	11.8						
×	B-03	SS-08	28.5	13.1	37	25	12		ML	SILT
✳	B-04	SS-01	1	22.3	39	24	15		CL	LEAN CLAY
	B-04	SS-02	4	8.4						
/	B-04	SS-04	8.5	33.3	48	34	14		ML	SILT
	B-04	SS-05	13.5	22.8						
+	B-04	SS-06	18.5	21.1	40	30	10		ML	SILT
	B-04	SS-07	23.5	10.3						
	B-04	SS-10	38.5	11.1						
	B-05	SS-01	1	23.9						
	B-05	SS-02	3.5	22.6						
	B-05	SS-03	6	22.5						

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2
Project Number	24430185
Approved by	Date
Tyler Cole	7/11/2024 14:52

Report No.
Report Date



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-05	**SS-04**	**8.5**	**14.0**						
	B-05	**SS-08**	**28.5**	**84.0**						
	B-05	**SS-10**	**38.5**	**42.0**						

INDEX TEST RESULTS

Project Name	Self Sufficiency Parcel 2
Project Number	24430185

Approved by	Date
Tyler Cole	7/11/2024 14:52

Report No.
Report Date

	ASTM D2216: Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass	Form Number	KL-D2216-19
		Form Revision	1
		Test Date	
		Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

Method: **A (1%)** ☐ **B (0.1%)** ☒ Balance ID. Calibration Date:
Oven ID. Calibration Date:

Boring No.	Sample ID	Top Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
B-01	SS-02	3.50	C-2	30.34	143.53	125.28	18.25	19.2	
B-01	SS-07	23.50	C-59	22.23	139.96	108.57	31.39	36.4	
B-02	SS-02	3.50	C-64	22.54	130.59	116.06	14.53	15.5	
B-02	SS-04	8.50	C-6	30.59	140.59	125.88	14.71	15.4	
B-02	SS-05	13.50	C-57	21.17	117.32	108.50	8.82	10.1	
B-03	SS-02	3.50	129	21.10	114.94	92.45	22.49	31.5	
B-03	SS-03	6.00	157	21.28	133.54	110.30	23.24	26.1	
B-03	SS-05	13.50	157	21.35	72.99	66.49	6.50	14.4	
B-03	SS-06	18.50	150	21.19	136.30	124.13	12.17	11.8	
B-03	SS-08	28.50	C-41	21.91	123.05	111.35	11.70	13.1	
B-04	SS-01	1.00	C-30	22.29	132.32	112.27	20.05	22.3	
B-04	SS-02	4.00	C-33	21.46	126.90	118.76	8.14	8.4	
B-04	SS-04	8.50	126	22.50	125.99	100.13	25.86	33.3	
B-04	SS-05	13.50	N#3	21.89	126.07	106.73	19.34	22.8	
B-04	SS-06	18.50	144	21.68	132.83	113.48	19.35	21.1	
B-04	SS-07	23.50	C-28	21.76	141.14	129.99	11.15	10.3	
B-04	SS-10	38.50	C-46	22.24	130.79	119.94	10.85	11.1	
B-05	SS-01	1.00	C-21	21.30	138.44	115.88	22.56	23.9	
B-05	SS-02	3.50	C-7	21.23	136.85	115.51	21.34	22.6	
B-05	SS-03	6.00	C-62	22.39	136.05	115.16	20.89	22.5	

References / Comments / Deviations:

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	ASTM D2216: Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass	Form Number	KL-D2216-19
		Form Revision	1
		Test Date	
		Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

Method: **A (1%)** ☐ **B (0.1%)** ☒ Balance ID. Calibration Date:
Oven ID. Calibration Date:

Boring No.	Sample ID	Top Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft		grams	grams	grams	grams	%	
B-05	SS-04	8.50	C-24	30.52	133.14	120.50	12.64	14.0	
B-05	SS-08	28.50	C-29	41.94	164.20	108.37	55.83	84.0	
B-05	SS-10	38.50	11AA	22.56	163.89	122.08	41.81	42.0	

References / Comments / Deviations:

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ASTM D4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil

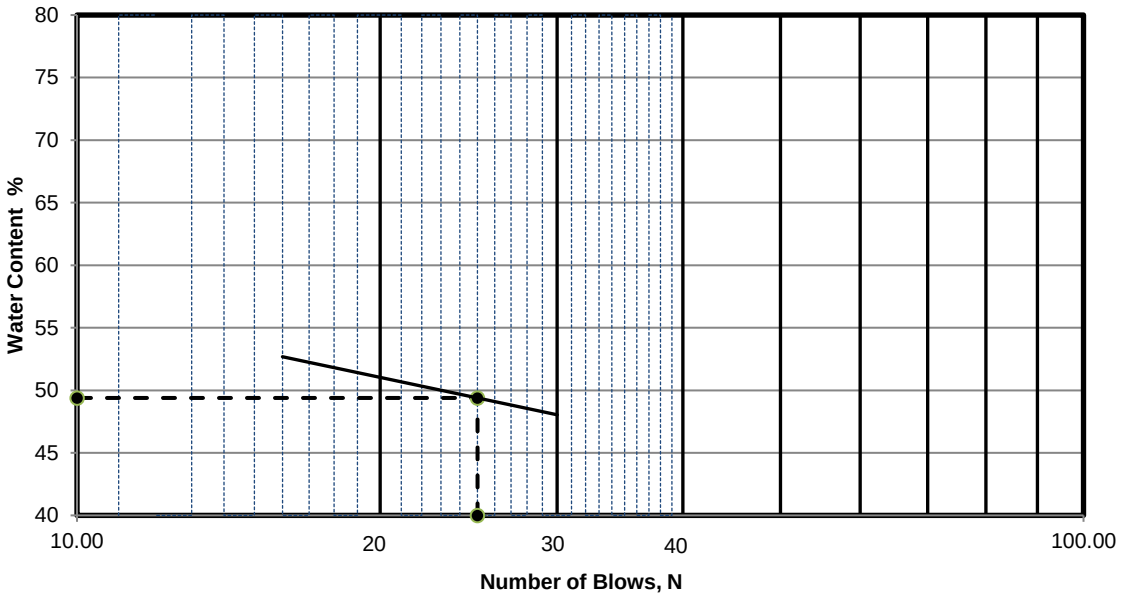
Form Number	KL-D4318-17
Form Revision	1
Test Date	7/9/2024
Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

KeyLAB ID	KNOX202407031	Sample Type	SS
Location ID	B-01	Sample Top Depth	23.5
Sample Reference	SS-07	Sample Base Depth	25
Description	Light brown	Test Method	

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:	8	A3	14				22	B3	
A	Tare Weight	15.52	15.92	15.52				15.41	15.89	
B	Wet Soil Weight + A	29.81	32.35	34.41				24.98	24.10	
C	Dry Soil Weight + A	25.19	26.78	27.92				23.37	22.72	
D	Water Weight (B-C)	4.62	5.57	6.49				1.61	1.38	
E	Dry Soil Weight (C-A)	9.67	10.86	12.40				7.96	6.83	
F	% Moisture (D/E)*100	47.8	51.3	52.3				20.2	20.2	
N	# OF DROPS	30	21	16				**20.2**		



Sample Preparation:

- ○ in natural condition
- ◉ dry prep
- ○ wet prep

Nonplastic?	0
Total Mass (g):	150
Mass Retained (g):	0
% Retained:	0.0
% Passing:	100.0

Liquid Limit	**49**
Plastic Limit	**20**
Plastic Index	**29**
ASTM	**CL**

References / Comments / Deviations:

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ASTM D4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil

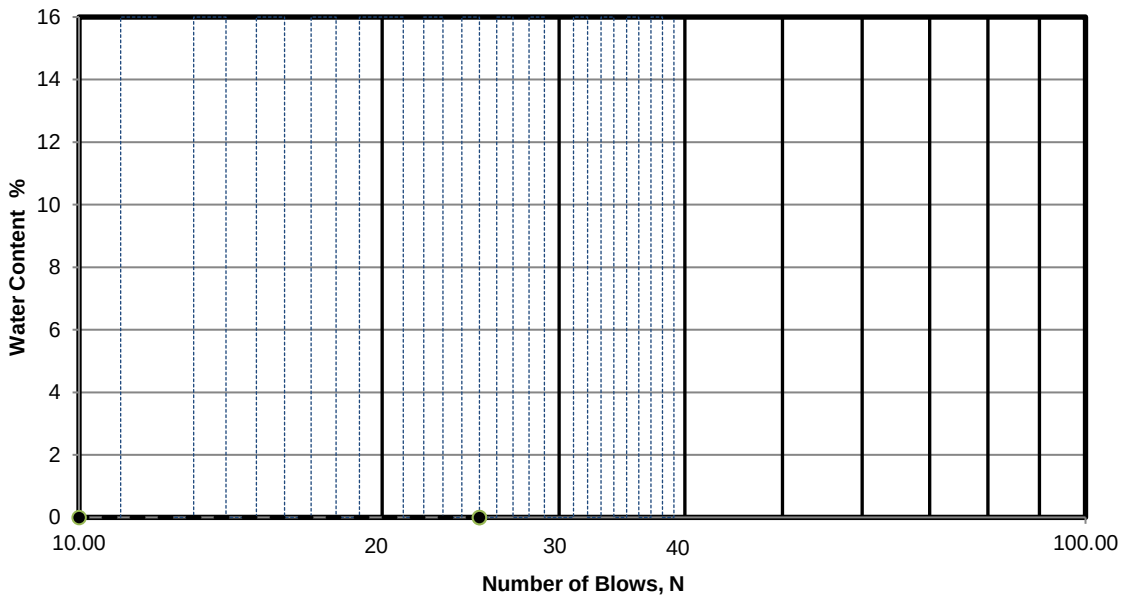
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Form Revision	1
Test Date	7/9/2024
Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

KeyLAB ID	KNOX202407035	Sample Type	SS
Location ID	B-03	Sample Top Depth	3.5
Sample Reference		Sample Base Depth	5
Description	yellowish brown	Test Method	

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS									



Sample Preparation:

- ◯ in natural condition
- ◯ dry prep
- ◯ wet prep

Nonplastic?	1
Total Mass (g):	
Mass Retained (g):	
% Retained:	
% Passing:	

Liquid Limit	
Plastic Limit	**NP**
Plastic Index	
ASTM	**ML**

References / Comments / Deviations:

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ASTM D4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil

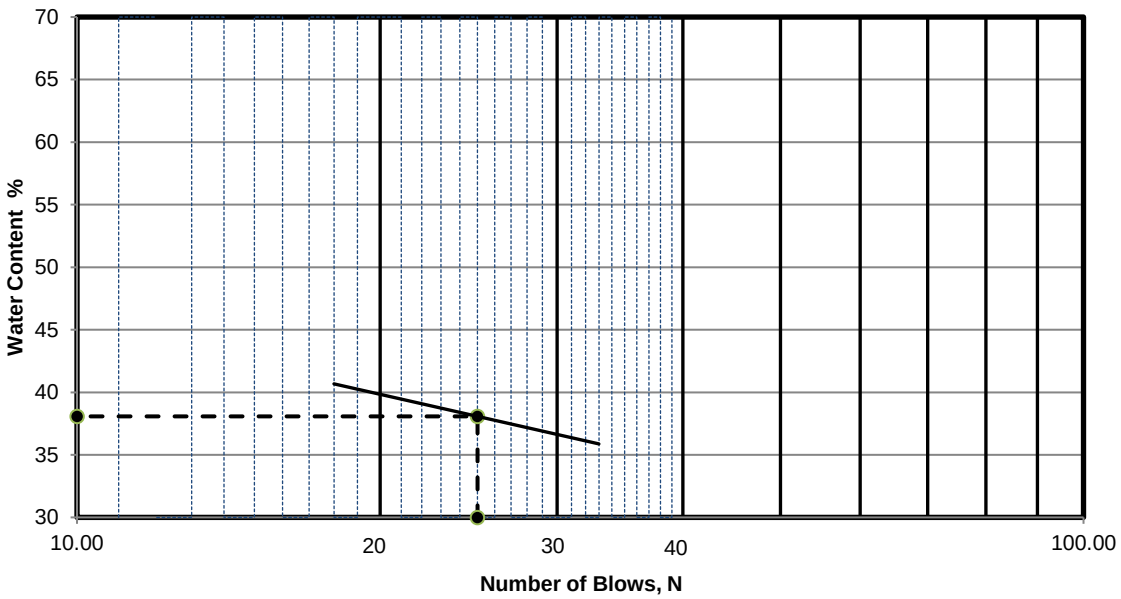
Form Number	KL-D4318-17
Form Revision	1
Test Date	7/16/2024
Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

KeyLAB ID	KNOX202407037	Sample Type	SS
Location ID	B-03	Sample Top Depth	13.5
Sample Reference		Sample Base Depth	15
Description		Test Method	ASTM D4318

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:	21	A2	20				A3	A6	
A	Tare Weight	15.47	15.87	15.40				15.91	15.72	
B	Wet Soil Weight + A	29.28	33.28	35.40				24.62	24.66	
C	Dry Soil Weight + A	25.62	28.46	29.59				23.02	23.02	
D	Water Weight (B-C)	3.66	4.82	5.81				1.60	1.64	
E	Dry Soil Weight (C-A)	10.15	12.59	14.19				7.11	7.30	
F	% Moisture (D/E)*100	36.1	38.3	40.9				22.5	22.5	
N	# OF DROPS	33	23	18				**22.5**		



Sample Preparation:

- ○ in natural condition
- ◉ dry prep
- ○ wet prep

Nonplastic?	0
Total Mass (g):	150
Mass Retained (g):	0
% Retained:	0.0
% Passing:	100.0

Liquid Limit	**38**
Plastic Limit	**22**
Plastic Index	**16**
ASTM	**CL**

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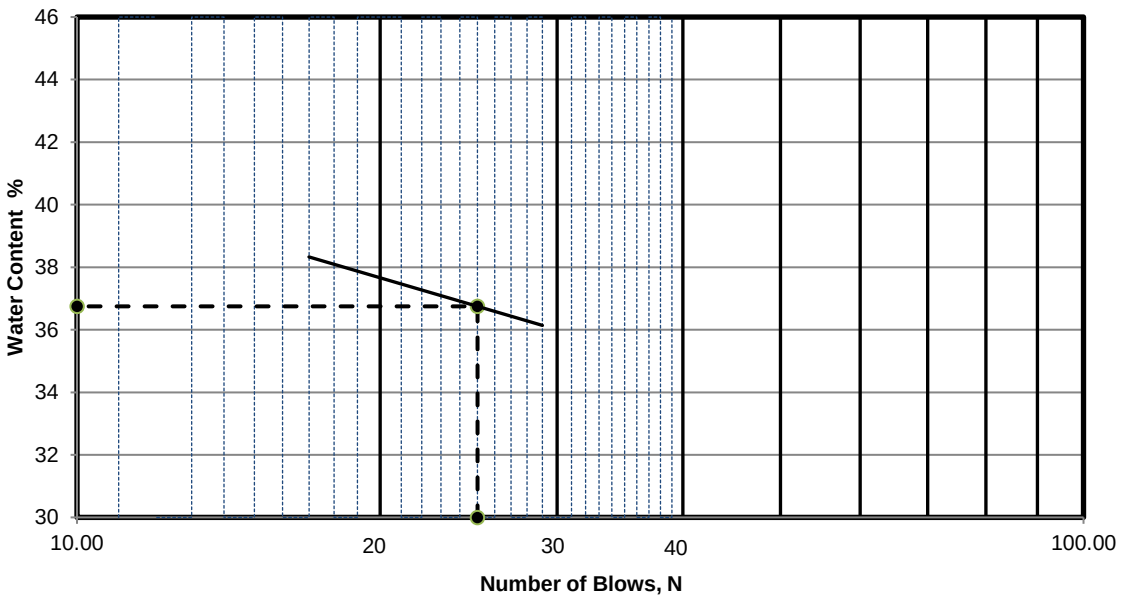
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Form Revision	1
Test Date	7/9/2024
Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

KeyLAB ID	KNOX202407039	Sample Type	SS
Location ID	B-03	Sample Top Depth	28.5
Sample Reference		Sample Base Depth	30
Description	Purple brown	Test Method	

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:	13	B1	2				12	A5	
A	Tare Weight	15.37	15.79	15.58				15.52	15.81	
B	Wet Soil Weight + A	30.67	32.27	33.35				25.11	25.52	
C	Dry Soil Weight + A	26.62	27.77	28.44				23.18	23.56	
D	Water Weight (B-C)	4.05	4.50	4.91				1.93	1.96	
E	Dry Soil Weight (C-A)	11.25	11.98	12.86				7.66	7.75	
F	% Moisture (D/E)*100	36.0	37.6	38.2				25.2	25.3	
N	# OF DROPS	29	22	17				**25.2**		



Sample Preparation:

- ○ in natural condition
- ◉ dry prep
- ○ wet prep

Nonplastic?	0
Total Mass (g):	150
Mass Retained (g):	0
% Retained:	0.0
% Passing:	100.0

Liquid Limit	**37**
Plastic Limit	**25**
Plastic Index	**12**
ASTM	**ML**

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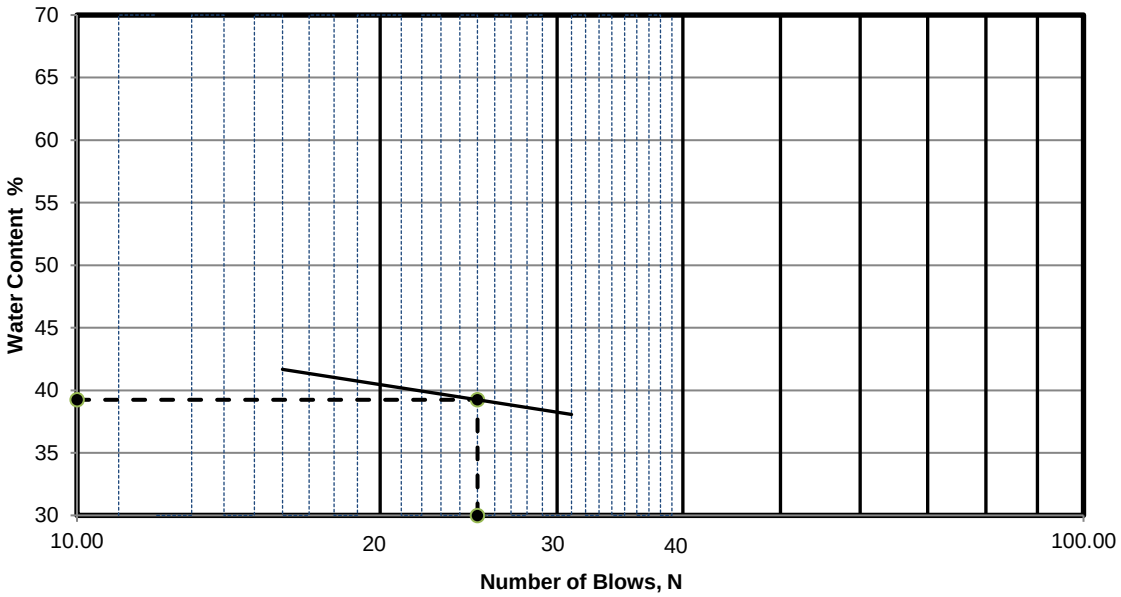
ASTM D4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Form Number	KL-D4318-17
Form Revision	1
Test Date	7/9/2024
Sample Date	

Project Number	24430185		
Project Name	Self Sufficiency Parcel 2		
Client Name	Kiewit		
Client Address			
KeyLAB ID	KNOX2024070310	Sample Type	SS
Location ID	B-04	Sample Top Depth	1
Sample Reference		Sample Base Depth	2.5
Description	Reddish brown	Test Method	

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:	A4	B4	A2				A1	7	
A	Tare Weight	15.94	15.83	15.85				15.61	15.37	
B	Wet Soil Weight + A	31.74	32.26	33.27				25.16	25.68	
C	Dry Soil Weight + A	27.39	27.60	28.15				23.30	23.69	
D	Water Weight (B-C)	4.35	4.66	5.12				1.86	1.99	
E	Dry Soil Weight (C-A)	11.45	11.77	12.30				7.69	8.32	
F	% Moisture (D/E)*100	38.0	39.6	41.6				24.2	23.9	
N	# OF DROPS	31	24	16				**24.1**		



Sample Preparation:

- ○ in natural condition
- ◉ dry prep
- ○ wet prep

Nonplastic?	0
Total Mass (g):	150
Mass Retained (g):	0
% Retained:	0.0
% Passing:	100.0

Liquid Limit	**39**
Plastic Limit	**24**
Plastic Index	**15**
ASTM	**CL**

References / Comments / Deviations:

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ASTM D4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil

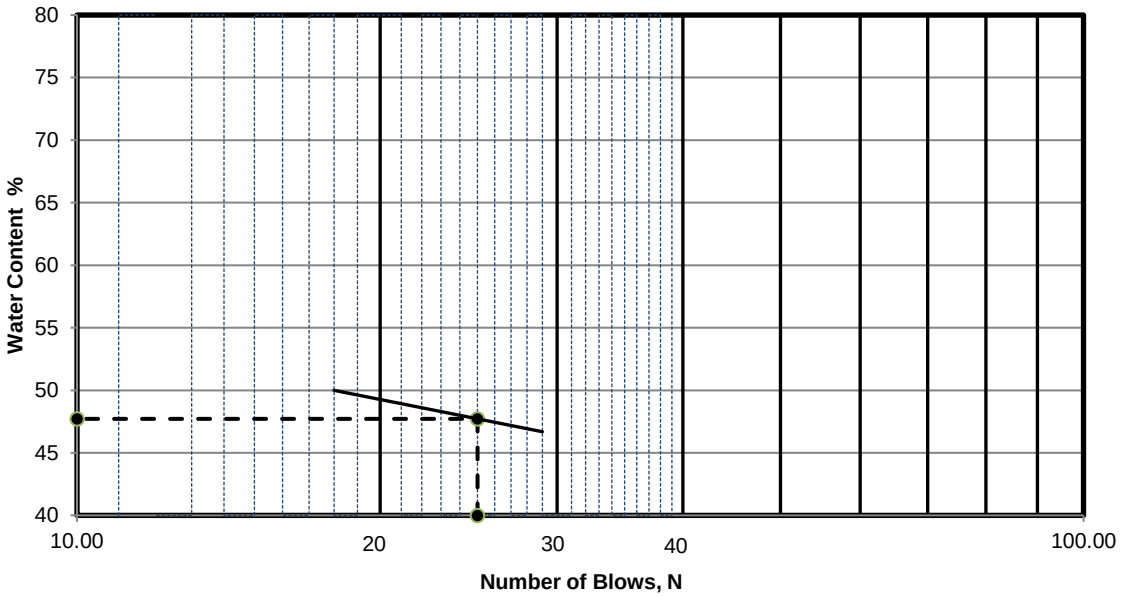
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Form Revision	1
Test Date	7/9/2024
Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

KeyLAB ID	KNOX2024070312	Sample Type	SS
Location ID	B-04	Sample Top Depth	8.5
Sample Reference		Sample Base Depth	10
Description	Olive	Test Method	

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:	21	4	B5				A6	6	
A	Tare Weight	15.44	15.42	15.96				15.75	15.47	
B	Wet Soil Weight + A	29.68	30.72	32.17				25.80	25.18	
C	Dry Soil Weight + A	25.13	25.76	26.74				23.24	22.69	
D	Water Weight (B-C)	4.55	4.96	5.43				2.56	2.49	
E	Dry Soil Weight (C-A)	9.69	10.34	10.78				7.49	7.22	
F	% Moisture (D/E)*100	47.0	48.0	50.4				34.2	34.5	
N	# OF DROPS	29	22	18				**34.3**		



Sample Preparation:

- ○ in natural condition
- ◉ dry prep
- ○ wet prep

Nonplastic?	0
Total Mass (g):	150
Mass Retained (g):	0
% Retained:	0.0
% Passing:	100.0

Liquid Limit	**48**
Plastic Limit	**34**
Plastic Index	**14**
ASTM	**ML**

References / Comments / Deviations:

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KGonzalez
Tested by

TCopeman
Approved by

Signature

Knoxville

1413 Topside Road, Louisville, TN 37777

ASTM D4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil

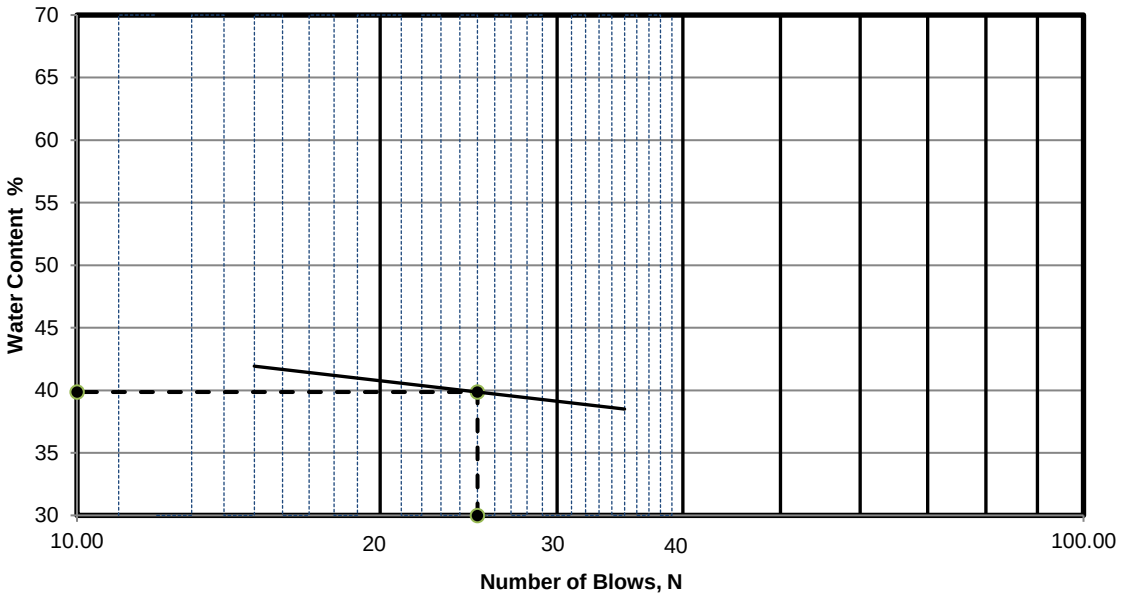
Form Number	KL-D4318-17
Form Revision	1
Test Date	7/9/2024
Sample Date	

Project Number	24430185
Project Name	Self Sufficiency Parcel 2
Client Name	Kiewit
Client Address	

KeyLAB ID	KNOX2024070314	Sample Type	SS
Location ID	B-04	Sample Top Depth	18.5
Sample Reference		Sample Base Depth	19.5
Description	Purplish brown	Test Method	

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	9398	2/14/2024	Grooving tool	14555	4/1/2024
LL Apparatus	18414	4/20/2024	No. 40 Sieve	31715	10/6/2023
Oven	12872	6/14/2024			

		Liquid Limit						Plastic Limit		
	Tare #:	9	15	3				16	19	
A	Tare Weight	15.40	15.41	15.55				15.56	15.37	
B	Wet Soil Weight + A	29.95	31.86	33.11				25.28	25.32	
C	Dry Soil Weight + A	25.93	27.09	27.95				23.04	23.02	
D	Water Weight (B-C)	4.02	4.77	5.16				2.24	2.30	
E	Dry Soil Weight (C-A)	10.53	11.68	12.40				7.48	7.65	
F	% Moisture (D/E)*100	38.2	40.8	41.6				29.9	30.1	
N	# OF DROPS	35	23	15				**30.0**		



Sample Preparation:

- ○ in natural condition
- ◉ dry prep
- ○ wet prep

Nonplastic?	0
Total Mass (g):	150
Mass Retained (g):	0
% Retained:	0.0
% Passing:	100.0

Liquid Limit	**40**
Plastic Limit	**30**
Plastic Index	**10**
ASTM	**ML**

References / Comments / Deviations:

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KGonzalez
Tested by

Knoxville

TCopeman
Approved by

Signature

1413 Topside Road, Louisville, TN 37777

Form No. TR-43-D7012C-02
Revision No. : 0
Revision Date: 08/22/18

UNCONFINED COMPRESSION (ASTM D7012 Method C)

S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project Name: Self Sufficiency Parcel 2
Project Number: 24430185

Report Date: July 10, 2024
Reviewed By: Tyler Copeman

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
B-01	Run-03	41.5 - 41.9	4.65	1.99	A	3.11	169.4	89	53,740	17,280	0.1

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.

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PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

1413 Topside Road, Louisville, TN 37777

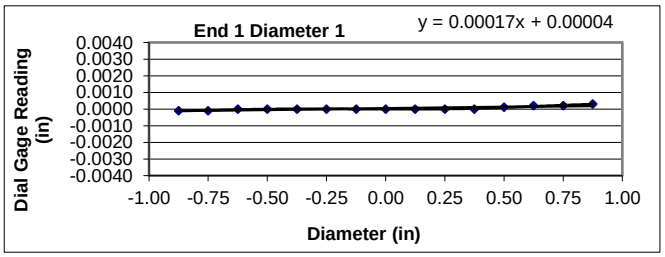
Project:	Self Sufficiency Parcel 2	**Diameter (in):**	1.99	**Date:**	7/10/2024
Project No.:	24430185	**Length (in):**	4.65	**Tested by:**	Ryan Skinner
Boring Id:	B-01	**Unit Weight (pcf):**	169.4	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-03	**Moisture Content (%):**	0.1		
Depth (ft):	41.5 - 41.9				

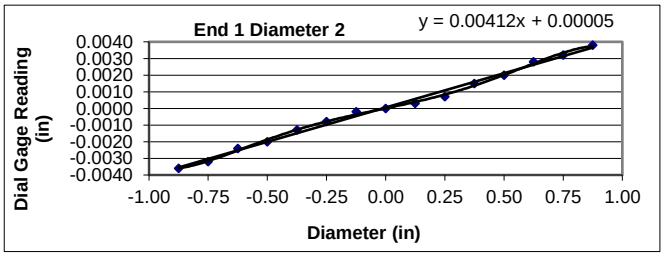
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

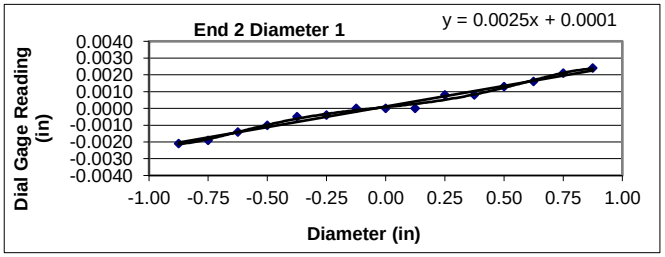
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0001	-0.0036	-0.0021	-0.0010
- 6/8	-0.0001	-0.0032	-0.0019	-0.0006
- 5/8	0.0000	-0.0024	-0.0014	-0.0005
- 4/8	0.0000	-0.0020	-0.0010	-0.0005
- 3/8	0.0000	-0.0013	-0.0005	-0.0003
- 2/8	0.0000	-0.0008	-0.0004	-0.0002
- 1/8	0.0000	-0.0002	0.0000	0.0000
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0000	0.0003	0.0000	0.0001
2/8	0.0000	0.0007	0.0008	0.0002
3/8	0.0000	0.0015	0.0008	0.0004
4/8	0.0001	0.0020	0.0013	0.0007
5/8	0.0002	0.0028	0.0016	0.0010
6/8	0.0002	0.0032	0.0021	0.0010
7/8	0.0003	0.0038	0.0024	0.0011

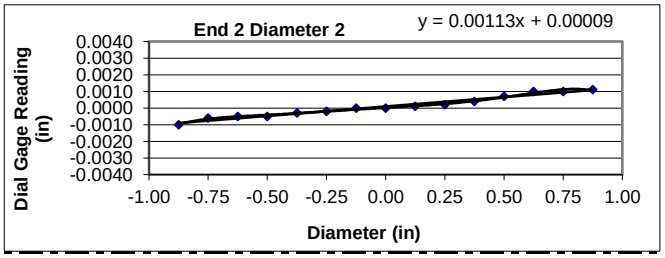




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00017
	Angle of Best Fit Line:	0.00982
End 2:	Slope of Best Fit Line:	0.00246
	Angle of Best Fit Line:	0.14078
	Max Angular Difference:	**-0.13**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00412
	Angle of Best Fit Line:	0.23589
End 2:	Slope of Best Fit Line:	0.00113
	Angle of Best Fit Line:	0.06483
	Max Angular Difference:	**0.17**

Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0004	0.0002	**YES**
End 1 Diam 2	0.0074	0.0037	**YES**
End 2 Diam 1	0.0045	0.0023	**YES**
End 2 Diam 2	0.0021	0.0011	**YES**

Perpendicularity Tolerance Met? **YES**





Date: 07/09/2024

Photographer: Ryan Skinner

1	**Location / Orientation**	B-01, Run-03 (41.5' – 41.9')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

UNCONFINED COMPRESSION
(ASTM D7012 Method C)

S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project Name: Self Sufficiency Parcel 2
Project Number: 24430185

Report Date: July 22, 2024
Reviewed By: Tyler Copeman

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
B-05	Run-03	80.2-80.6	4.24	1.97	A	3.05	169.0	75	32,339	10,603	0.6

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.

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PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

1413 Topside Road, Louisville, TN 37777

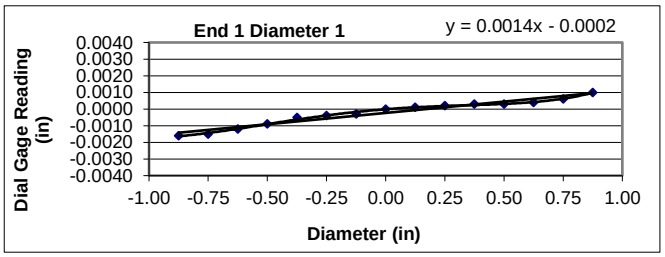
Project:	Self Sufficiency Parcel 2	**Diameter (in):**	1.97	**Date:**	7/16/2024
Project No.:	24430185	**Length (in):**	4.24	**Tested by:**	Victoria Igoe
Boring Id:	B-05	**Unit Weight (pcf):**	169.0	**Reviewed by:**	Tyler Copeman
Sample No.:	Run-03	**Moisture Content (%):**	0.6		
Depth (ft):	80.2-80.6				

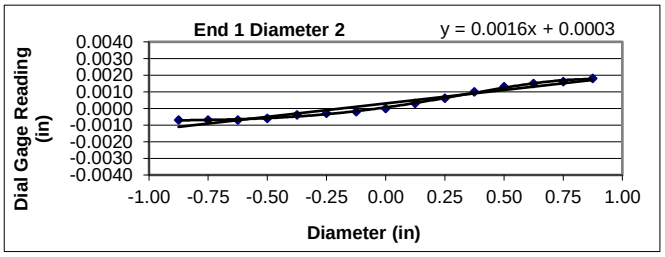
Deviation From Straightness (Procedure S1)

Is the maximum gap ≤ 0.02 in.? **YES** Straightness Tolerance Met? **YES**

End Flatness and Parallelism Readings (Procedure FP1)

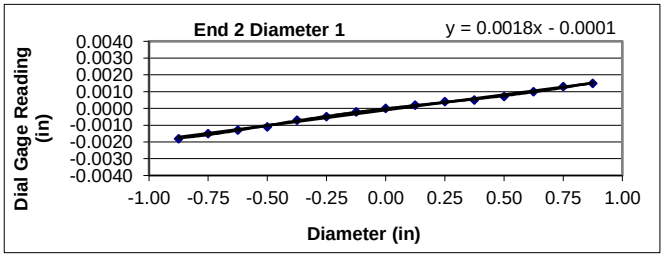
Position	End 1	End 1(90)	End 2	End 2(90)
- 7/8	-0.0016	-0.0007	-0.0018	-0.0008
- 6/8	-0.0015	-0.0007	-0.0015	-0.0007
- 5/8	-0.0012	-0.0007	-0.0013	-0.0006
- 4/8	-0.0009	-0.0006	-0.0011	-0.0004
- 3/8	-0.0005	-0.0004	-0.0007	-0.0001
- 2/8	-0.0004	-0.0003	-0.0005	-0.0001
- 1/8	-0.0003	-0.0002	-0.0002	0.0000
0	0.0000	0.0000	0.0000	0.0000
1/8	0.0001	0.0003	0.0002	0.0001
2/8	0.0002	0.0006	0.0004	0.0004
3/8	0.0003	0.0010	0.0005	0.0007
4/8	0.0003	0.0013	0.0007	0.0011
5/8	0.0004	0.0015	0.0010	0.0013
6/8	0.0006	0.0016	0.0013	0.0015
7/8	0.0010	0.0018	0.0015	0.0019

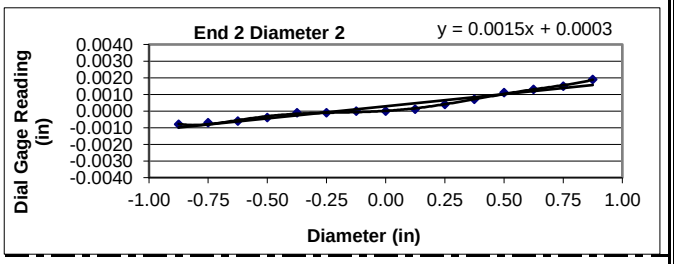




Flatness is met when the difference at any point between a smooth curve drawn through points and a visual best fit line is ≤ 0.001 in.

Flatness Tolerance Met? **YES**





Parallelism is met when the angular difference between best fit lines on opposing ends is ≤ 0.25°.

Parrallelism Diameter 1

End 1:	Slope of Best Fit Line:	0.00136
	Angle of Best Fit Line:	0.07792
End 2:	Slope of Best Fit Line:	0.00184
	Angle of Best Fit Line:	0.10542
	Max Angular Difference:	**-0.03**

Parrallelism Diameter 2

End 1:	Slope of Best Fit Line:	0.00161
	Angle of Best Fit Line:	0.09233
End 2:	Slope of Best Fit Line:	0.00146
	Angle of Best Fit Line:	0.08365
	Max Angular Difference:	**0.01**

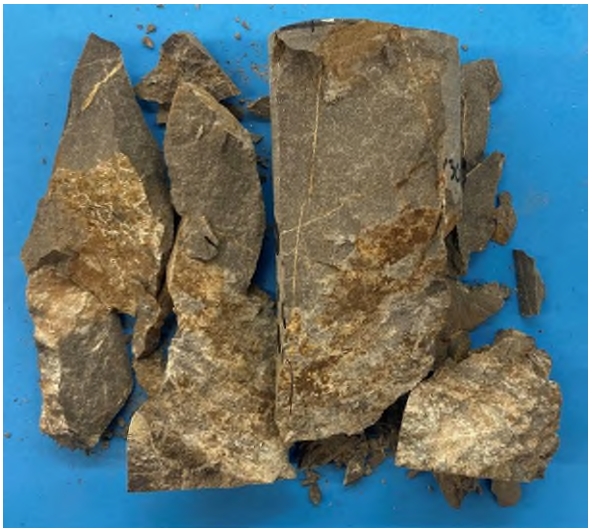
Parallelism Tolerance Met? **YES**

Perpendicularity (Procedure P1) is met when the difference between max and min readings along each line divided by the diameter is ≤ 0.0043.

	Difference b/w max & min	Divide by Diameter	Meets Tolerance
End 1 Diam 1	0.0026	0.0013	**YES**
End 1 Diam 2	0.0025	0.0013	**YES**
End 2 Diam 1	0.0033	0.0017	**YES**
End 2 Diam 2	0.0027	0.0014	**YES**

Perpendicularity Tolerance Met? **YES**





Date: 7/18/2024

Photographer: Victoria Igoe

1	**Location / Orientation**	B-05, Run-03 (80.2' – 80.6')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)