ECS SOUTHEAST, LLC

Geotechnical Engineering Report

Valvoline – Florence, AL

Cox Creek Pkwy
Florence, Alabama 35630

ECS Project Number 30:2971

October 23, 2025

October 23, 2025

Ms. Kelsey Peterson
Valvoline Instant Oil Change
100 Valvoline Way
Lexington, Kentucky 40509

Reference: Report of Subsurface Exploration and Geotechnical Engineering Evaluation
Valvoline – Florence, AL
Cox Creek Pkwy
Florence, AL

ECS Project No. 30:2971

Dear Ms. Peterson:

As authorized by your acceptance of our Proposal No. 30-3933-P, dated September 12, 2025, ECS Southeast, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to you during the design phase of this project. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please do not hesitate to contact us.

Respectfully,
ECS Southeast, LLC

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EXECUTIVE SUMMARY

ECS Southeast, LLC (ECS) has completed the subsurface exploration for the proposed Valvoline Instant Oil Change located at Cox Creek Pkwy in Florence, Alabama. The project information summarized below is based exclusively on the information made available to us by the client at the time of this report. Our findings, conclusions and recommendations are summarized below. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

PROJECT INFORMATION:

- Site Location: Cox Creek Pkwy, Florence, AL
- Building Scope: Single-story with basement, approximately 1,500 square feet
- Building Type: Shallow foundations
- Structural Loads: Max. column loads = 12 kips, Max. wall loads = 3 klf, Max. floor loads = 60 psf
- Sitework: Parking lot, drive lanes, underground utilities

SUBSURFACE CONDITIONS:

- Field Exploration: 6 SPT borings in the proposed building footprint; 1 SPT borings in the proposed dumpster coral
- Natural Soils: Generally consisted of an orange sandy lean clay (CL)
- Groundwater: Not encountered at time of drilling

GEOTECHNICAL CONCERNS

- **Possible Existing Fill (Section 5.2)**
- **Moisture Sensitive Soils (Section 5.3)**

DESIGN & CONSTRUCTION RECOMMENDATIONS:

- Shallow Mat/slab foundations
- Max. Allow. Contact Pressure = 2,000 psf
- Modulus of Subgrade Reaction of 120 pci
- Seismic Design: IBC Site Class “D”

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design of the proposed development. The project will include construction of a 1,500 SF Valvoline store with basement. In addition, asphalt parking and drive lanes will be located around the structure. The recommendations developed for this report are based on project information supplied by our field observations.

Our services were provided in accordance with our proposal and Terms and Conditions of Service between ECS Southeast, LLC and Valvoline Instant Oil Change.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of surface topographical features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent physical properties.
- Final soil boring logs.
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills and identification of potentially inadequate soils and/or soils exhibiting excessive moisture at the time of sampling.
- Recommended foundation type.
- Evaluation and recommendations relative to groundwater control.
- Pavement design based on assumed CBR value.
- Recommendations for design and construction of drainage structures and stormwater management facilities.
- An evaluation of soil excavation issues.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The subject site is located at 404 Cox Creek Pkwy in Florence, Alabama. The site is bound by Cox Creek parkway to the southwest and commercial properties on all other sides. At the time of drilling, the site appears to have been recently cut, and a retaining wall installed at the northeast edge. Prior to grading the site consisted of maintained grass. The approximate site location is outlined in red in Figure 2.1.1 below.

Figure 2.1.1 - Site Location (Outlined in Red)

2.2 PROPOSED CONSTRUCTION

The following information explains our understanding of the planned development including proposed buildings and related infrastructure:

Table 2.2.1 – Proposed Construction Table

SUBJECT	DESIGN INFORMATION / UNDERSTANDINGS
Building Type	Single Story with basement supported by mat slab
Building Footprint	Approximately 1,500 square feet
Existing Grade Change	Site previously graded. Estimated minor grade changes.
Finished floor Elevations	10 to 12 feet below existing site grade
Foundation Type	12” mat slab and basement walls
Column Loads	10 to 60 kips
Wall Loads	1 to 3 kips per linear foot (klf)
Floor Loads	60 pounds per square foot (psf)
Pavement for parking	9 parking spaces
Access Driveway	Access drive from Crow Drive
Design Traffic Load	Not provided

We have not been provided with design grades. Based on existing site grades, the anticipated construction, and our experience with similar projects, we assume that cut and fill depths will be less than 3 feet for general site grading.

The design traffic counts were not available at the time of this report. However, based on previous Valvoline projects, ECS has determined that the concrete section will consist of 6 inches of reinforced Portland cement concrete on a compacted aggregate subbase course. Consistent with past projects, an ESAL (Equivalent Single Axle Load) value of less than 150,000 was estimated for this project's rigid and flexible pavement areas.

The Valvoline standard pavement sections for a 20-year design life include:

- **Asphalt Section**: 1½-inch asphalt surface course over a 2½-inch asphalt binder course on an 8-inch-thick compacted aggregate subbase course.

If our understanding of the proposed project is inaccurate or the design changes, please contact ECS immediately so we can review (and revise, if necessary) the recommendations provided herein.

2.3 REGIONAL/SITE GEOLOGY

Based on review of the *Geologic map of Lauderdale County,* Alabama (published by the Geological Survey of Alabama, dated 1962) the subject site is underlain by the Tuscumbia Limestone (Mt) formation. Tuscumbia Limestone consists of gray medium bedded limestone with nodules of gray to black chert. Figure 2.3.1 below illustrates the approximate location of the subject in reference to the geology at the site.

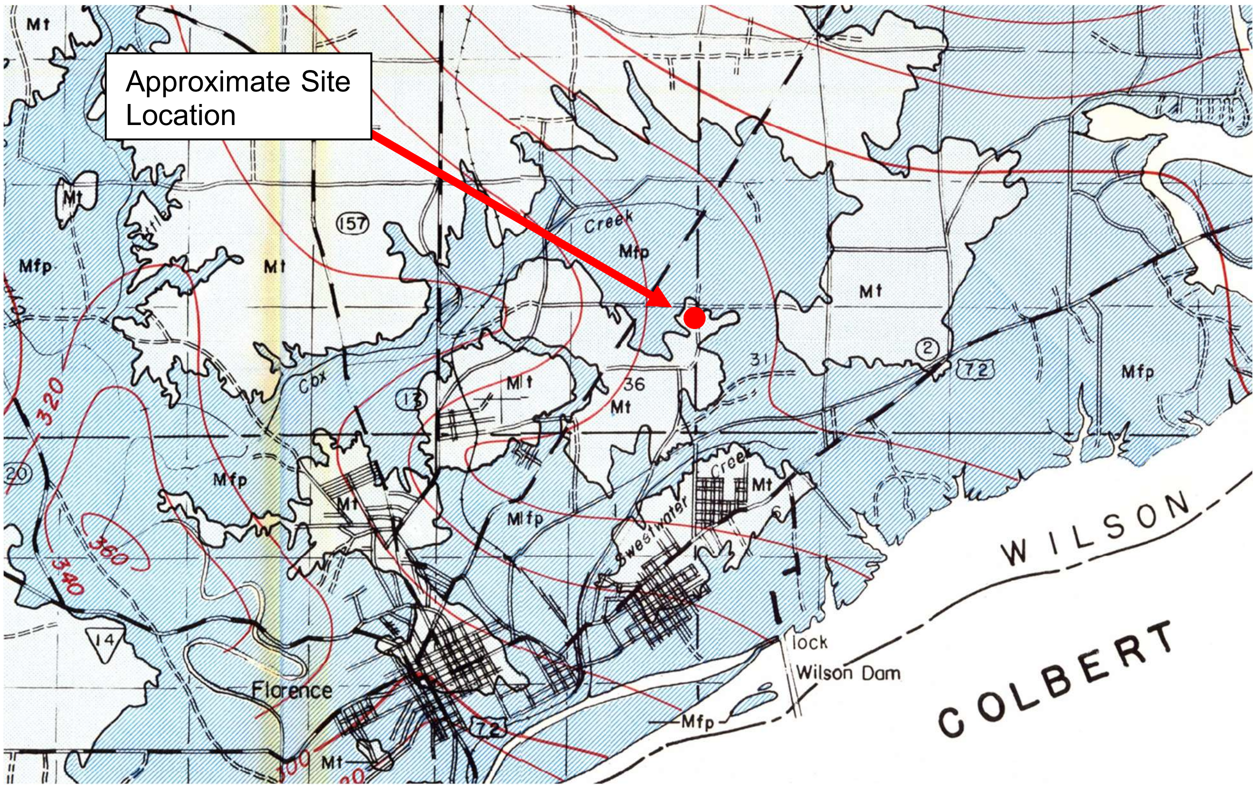


Figure 2.3.1 – Site Geology with Approximate Location of Site Highlighted

2.3.1 Karst Geology

Areas of Lauderdale County are known to have karst geology. Karst terrain is characterized by caves, caverns, voids, soil domes, soil raveling, interrupted drainage, disappearing streams, and topographical features such as sinkholes and closed depressions. These features are the result of the dissolution of soluble bedrock such as limestone, dolomite and rock like evaporates by groundwater and/or the infiltration of surface water.

As water enters fractures, bedding planes, and other bedrock discontinuities within soluble bedrock, it slowly dissolves the rock and enlarges the discontinuities. Over geologic time, this results in the formation of solution channels or underground passages and ravines which may develop into surficial manifestations such as sinkholes and closed depressions. The dissolution of bedrock is generally a very slow process. However, soil may be eroded or raveled into the enlarged bedrock fractures, creating soil domes. Eventually, soil in these features can be lost through groundwater movement, resulting in surface depressions and potential sudden ground subsidence.

The soils derived from and overlying the carbonate bedrock are typically a clayey and silty soil with varying amounts of sand and rock fragments. These soils may be well developed, and large, detached boulders may also be encountered in the soil profile as “float” boulders and when encountered during excavations, may be mistaken for competent bedrock.

The bedrock within the general geographic region is characterized by jointed and faulted soluble carbonate lithologies interbedded with non-carbonate lithologies. These carbonate formations are generally moderately to highly solution prone, highly calcareous and sometimes weather differentially to produce a pinnacled top of rock profile.

A pinnacled top of rock is characterized by areas of shallow bedrock with intervening areas of deeper soils.

The degree of weathering or solutioning is often controlled by lithological variations and structural orientations. Where structural discontinuities intersect or in areas which are highly fractured, solutioning is intensified creating low areas and seams that are typically filled with residual clayey soils. Conversely, more competent, high areas represent slightly- to non-fractured lithologies that are often coarser grained and only slightly solution prone.

The underlying carbonate formations of the project geographic area are susceptible to Karst-related sinkhole development. Contributing characteristics and factors controlling the development include subsurface structural deformation, joint sets, and thick carbonate bedding within the area.

While specific signs of incipient sinkhole development were not necessarily observed in the soil test borings, the possibility of a Karst-related sinkhole cannot be ruled out.

3.0 FIELD EXPLORATION

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our scope of work included drilling seven (7) SPT borings with six (6) located within the building footprint (designated B-1 through B-6), and one (1) in the proposed dumpster coral (designated T-1). The approximate boring locations are shown on the Boring Location Diagram in Appendix A.

3.1 EXPLORATION METHOD

3.1.1 Standard Penetration Test (SPT Borings)

An ATV-mounted drill rig was utilized to drill the soil test borings. Borings were advanced to the predetermined depths ranging from 10 to 20 feet below the present ground surface.

Boring locations were identified in the field by ECS personnel using GPS techniques prior to mobilization of our drilling equipment. Ground surface elevations noted on our boring logs were obtained from Google Earth and should be considered approximate.

Standard penetration tests (SPT) were conducted in the borings at regular intervals in general accordance with ASTM D 1586. Small representative samples were obtained during these tests and were used to classify the soils encountered. The standard penetration resistances obtained provide a general indication of soil shear strength and compressibility.

3.2 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil strata. Please refer to the boring logs in Appendix B.

3.2.1 Natural Soils

Natural soils typically consisted of an orange sandy lean clay (CL). SPT N-values ranged from 8 to 39 bpf with typical values between 16 and 25 indicating a medium-high consistency material.

The subsurface conditions presented above are shown on the boring logs should be considered approximate, based on interpretation of the exploration data using normally accepted geotechnical engineering judgments. It should be noted that transitions between different soil strata are typically less distinct than what is shown on the exploration records. Subsurface conditions between the actual boring locations will vary.

3.3 GROUNDWATER OBSERVATIONS

Groundwater was not encountered in the soil borings at the time of the subsurface exploration. It should be noted that it is possible for perched water to exist within the depths explored at the borings during other times of the year depending upon climatic and rainfall conditions. Additionally, discontinuous zones of perched water may exist within the existing fill and at transitions between existing fill and residual materials. Variations in the location of the long-term water table may occur as a result of change in precipitation, evaporation, surface water runoff, and other factors not immediately apparent at the time of this exploration.

4.0 LABORATORY TESTING

The laboratory testing performed by ECS for this project consisted of selected tests performed on samples obtained during our field exploration operations. The following paragraphs briefly discuss the results of the completed laboratory testing program during the execution of the soil test borings.

4.1 VISUAL CLASSIFICATION

Each soil sample from the test borings was visually classified on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS) and ASTM D 2488 (Description and Identification of Soils-Visual/Manual Procedures). After classification, the various soil types were grouped into the major zones noted on the boring logs in the appendix. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in situ, the transitions may be gradual.

The soil samples from our current exploration will be retained in our laboratory for a period of six months after the subsurface exploration program is completed, after which they will be discarded unless other instructions are received as to their disposition.

4.2 INDEX TESTING

The index testing performed by ECS for this project consisted of selected tests performed on samples obtained during our field exploration operations. Index property tests were performed on representative soil samples obtained from the test borings in order to aid in classifying soils according to the Unified Soil Classification System (USCS) and to quantify and correlate engineering properties. The index testing program included the following:

- Natural Moisture Content Tests (ASTM D 2216),
- Percent of Soil Passing the No. 200 Sieve (ASTM D 1140), and
- Atterberg Limits Tests (ASTM D 4318)

Natural moisture contents ranged from 13.6 to 45.3 percent. The results of the laboratory testing results are included in the appendix of this report. Additionally, a summary of testing is provided in Table 4.2.1.

Table 4.2.1 – Summary of Laboratory Classification Testing

Boring Location	Sample Depth (ft)	Liquid Limit	Plastic Index	% Passing #200	Soil Type
B-2	1 – 2.5	45	19	70.4	Lean Clay with Sand
B-3	13.5 – 15	60	25	55.7	Sandy Elastic Silt
B-5	1 – 2.5	45	19	50.1	Sandy Lean Clay

5.0 DESIGN RECOMMENDATIONS

Recommendations are provided below for the earthwork operations, the building, and pavement structures. A grading plan was not available at the time of this report; however, in view of the existing grades at the subject site, it is anticipated that 10 to 12 feet of cut will be required for basement construction.

5.1 SIGNIFICANT GEOTECHNICAL CONSIDERATIONS

The primary purpose of this geotechnical exploration was to help identify and evaluate the general subsurface conditions relative to the proposed construction. The following design recommendations have been developed on the basis of the previously described project information and subsurface conditions identified during this study.

Possible Existing Fill Soils (Section 5.2): Due to the site being previously graded, there is potential for areas of undocumented fill. Contingencies should be included in the project budget for undercutting or other remedial subgrade improvement for isolated deficient areas.

Moisture Sensitive Soils (Section 5.3): It should be noted that moisture-sensitive clays and silts are present on the site. We caution that depending on the time of year and other climatic conditions, these soils may be difficult to moisture condition and compact.

Construction Monitoring: ECS should be on-site full-time during earthwork and foundation construction activities to document that our recommendations are strictly followed and to provide recommendations for remedial activities, where necessary. If we are not retained for this critical monitoring of the subgrade and foundation construction, ECS cannot be responsible for long-term performance of the respective grade-supported construction.

5.2 POSSIBLE EXISTING FILL SOILS

Based on the results of the soil borings, we do not anticipate the need for site-wide remediation; but due to previous grading of the site, isolated areas of low consistency existing fill may be encountered. Contingencies should be included in the project budget for undercutting or other remedial subgrade improvement, where needed, for deficient areas encountered during grading. We recommend that a proofroll with a loaded tri-axle dump truck having an axle weight of at least 20 tons be performed before site grading begins to identify localized deficient areas.

5.3 MOISTURE SENSITIVE SOILS

Clayey and silty soils are inherently moisture sensitive and can lose strength rapidly when wet. We caution that earthwork should be planned for dry seasons of the year.

In order to reduce unnecessary undercuts, we recommend sealing of surfaces with a smooth-drum roller prior to rain events and sloping the site to promote drainage. It is also important to divert surface water from the site away from the building pad area.

Additionally, we recommend the excavation and concrete placement of foundations occur in the same day to limit the chance for rainfall and degradation of the foundation bearing surface. We understand this may be impractical in some instances; we, therefore, recommend the placement of a lean concrete 'mud mat' or 'mud seal' when foundation excavations may remain open overnight.

Should the moisture-sensitive soils remain at the foundation bearing surface and be wetted, we recommend undercutting these soils to an appropriate depth in the foundation and slab areas. Typically, the depth of undercut may range from a couple inches to about 2 feet depending on recent rainfall. ECS representatives can provide recommendations on site, as needed, for undercutting of softened, wet soils.

Provisions should be included in the project documents for undercut of fat clay in the slab-on-grade and foundation bearing surface, if encountered. Each should be undercut on the order of 1 foot and backfilled with material meeting project requirements.

5.5 FOUNDATION RECOMMENDATIONS

5.5.1 Basement Foundation

Provided subgrades are prepared as discussed herein and based on the assumed design foundation load, the proposed building basement can be supported by a mat foundation. The design of the mat foundations should utilize the following parameters:

Table 5.5.1 – Basement Foundation Design Parameters

Design Parameters	
Allowable Contact Pressure	2,000 psf
Acceptable Bearing Soil Material (Underneath Base Layer)	Engineered fill or Approved Native Soils
Minimum Bottom of Foundation Embedment Below Finished Basement Grade (1)	Nominal Depth
Minimum Mat Base Layer Thickness (2)	6 inches gravel
Modulus of Subgrade Reaction (k_1) (Plate Load Test Basis)	120 pci
Estimated Total Settlement (3)	Less than 1 inch
Estimated Differential Settlement (4)	½ inch or less across the width of the foundation

Notes:
1. Embedment depths consider bearing capacity, frost penetration, and expansive soils considerations.
2. To distribute foundation loading into the subgrade soil more uniformly, the mat foundation should be directly supported by a minimum 6-inch-thick layer of gravel (Mat Base Layer).
3. Settlement is based on the assumed max. contact stress of 2,000 psf. It should be noted that contact stress should not exceed the allowable bearing capacity recommended herein. If final stress is different, ECS must be contacted to update foundation recommendations and settlement calculations.
4. Based on the variability in soil borings. Differential settlement can be re-evaluated once the foundation plans are more complete.

Based on the proposed basement level elevation, existing fills and/or possible fills will be penetrated during the excavation work. If soft or unsuitable soils are encountered at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with compacted, engineered fill or lean concrete (with a strength of f'c ≥ 1,000 psi at 28 days) up to the original design bottom of the mat base layer. The original footing shall then be constructed on top of the backfill material, with a gravel base layer.

For resistance to lateral loads, a coefficient of friction is recommended between the base of the foundation elements and underlying soils. In addition, for footings cast directly against excavation sidewalls, a passive resistance may be used to resist lateral forces for undisturbed soils. The passive resistance should be neglected in the upper 12 inches unless the ground immediately in front of the footing is covered with concrete or other impervious pavement. The recommended lateral resistance values are ultimate values, and a suitable factor of safety should be used in design.

Table 5.5.2 -Basement Side Wall Design Parameters

Depth (ft)	Sliding Friction Coefficient [Concrete on Soil] (μ)	Soil Angle of Internal Friction (ø)	Effective Unit Weight (γ' pcf)	Coefficient of Passive Earth Pressure (K_p)
To 8 feet	0.30	26°	115	2.56
+8 feet	0.35	30°	120	3.00

Where utility trenches or other excavations are located adjacent to foundations, the bottom of the footing should be located below an imaginary 1:1 (horizontal to vertical) plane upward from the nearest bottom edge of the utility trench. Footing excavations should have firm bottoms and be free from slough prior to mat base placement. The foundation excavations should be observed by a geotechnical engineer or their representative prior to placement of mat base to observe the exposed ground conditions.

5.5.2 Street Level Apron Slabs

Provided subgrades are prepared as discussed herein and based on the assumed design load, the proposed street level aprons can be supported as monolithic turn down slabs. The design of the turndown slab should utilize the following parameters:

Table 5.5.2 – Apron Slab Design Parameters

Design Parameters	
Net Allowable Bearing Pressure (1)	2,000 psf
Acceptable Bearing Soil Material	Engineered fill or Approved Native Soils
Minimum Turn Down Width	8 inches
Minimum Turn Down Embedment Depth (below finished exterior grades) (2)	30 inches
Climatic Rating (Cw)	30
Modulus of Subgrade Reaction (k_1)	100 pci

Design Parameters	
Estimated Total Settlement (3)	Less than 1 inch
Estimated Differential Settlement (3)	½ inch or less in 50 feet

Notes:
1. Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
2. For bearing capacity, frost penetration, and expansive soils considerations.
3. Based on assumed maximum wall load of 3 klf. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.

The turndown slab should be considered similar to foundations. This means that if existing fill, soft, or unsuitable soils are encountered at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with compacted, engineered fill or lean concrete (with a strength of f'c ≥ 1,000 psi at 28 days) up to the original design bottom of the footing elevation. The original footing shall then be constructed on top of the backfill material. At the time of construction, further evaluation of the possible fill soils is necessary to determine if undercutting of these materials is required. Where utility trenches or other excavations are located adjacent to foundations, the bottom of the footing should be located below an imaginary 1:1 (horizontal to vertical) plane upward from the nearest bottom edge of the utility trench.

Footing excavations should have firm bottoms and be free from slough prior to concrete or reinforcement placement. The foundation excavations should be observed by a geotechnical engineer or their representative prior to placement of concrete or reinforcing steel to observe the exposed ground conditions.

5.5.3 Dumpster Enclosure Foundation

Provided subgrades are prepared as discussed herein, and based on the assumed design foundation loads, the proposed dumpster enclosure can be supported by conventional shallow spread footing foundations. These include individual column footings or continuous wall footings. The design of the shallow foundations should utilize the following parameters:

Table 5.5.3 – Dumpster Enclosure Foundation Design Parameters

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure (1)	2,500 psf	2,500 psf
Acceptable Bearing Soil Material	Engineered fill or Approved Native Soils	
Minimum Width	24 inches	18 inches
Minimum Footing Embedment Depth (below slab or finished grade) [Interior/Exterior] (2)	18/30 inches	18/30 inches
Estimated Total Settlement (3)	Less than 1 inch	Less than 1 inch
Estimated Differential Settlement (4)	Less than 0.5 inches between columns	Less than 0.5 inches over 50 feet

Notes:

(1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
(2) For bearing, expansive soils, and frost penetration requirements.
(3) Based on assumed structural loads (60kips/3klf). If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
(4) Based on anticipated variability in borings. Differential settlement can be re-evaluated once the foundation plans are more complete.

If existing fill, soft, or unsuitable soils are encountered at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with compacted, engineered fill or lean concrete (with a strength of f'c ≥ 1,000 psi at 28 days) up to the original design bottom of the footing elevation. The original footing shall then be constructed on top of the backfill material. At the time of construction, further evaluation of the possible fill soils is necessary to determine if undercutting of these materials is required.

For resistance to lateral loads, a coefficient of friction of 0.31 is recommended between the base of the foundation elements and underlying soils. In addition, for footings cast directly against excavation sidewalls, a passive resistance equal to an equivalent fluid applying 200 pcf pressure may be used to resist lateral forces for undisturbed soils. The passive resistance should be neglected in the upper 12 inches unless the ground immediately in front of the footing is covered with concrete or other impervious pavement. The recommended lateral resistance values are ultimate values, and a suitable factor of safety should be used in design.

Where utility trenches or other excavations are located adjacent to foundations, the bottom of the footing should be located below an imaginary 1:1 (horizontal to vertical) plane upward from the nearest bottom edge of the utility trench.

Footing excavations should have firm bottoms and be free from slough prior to concrete or reinforcing steel placement. The foundation excavations should be observed by a geotechnical engineer or their representative prior to placement of reinforcing steel or concrete to observe the exposed ground conditions.

5.5.5 Below Grade Retaining Walls

As the proposed building includes a basement, the below grade walls should be designed and constructed in accordance with the following recommendations.

Lateral Earth Pressures: Retaining walls should be designed to withstand the lateral earth pressures exerted by the backfill. The pressure diagram is triangular. It is anticipated that retaining walls associated with the building structure, such as for below-grade basement walls, will be rigid walls restrained from rotation by the floor slab. For rigid walls, the "At Rest" (K_o) soil condition should be used in the wall design and evaluation. For cantilever walls that are free to rotate, the "Active" (K_a) soil condition should be used.

In the design of these retaining wall structures, the following soil parameters can be utilized. The critical zone is defined as the area between the back of the retaining wall structure and an imaginary line projected upward and rearward from the bottom back edge of the wall footing at a 45-degree angle. The structural engineer should use the following recommended soil properties for wall design.

Table 5.5.5 - Retaining Wall Backfill in the Critical Zone – Granular Engineered Fill

Soil Parameter	Recommended Value
Soil Classification	SILTY SAND (SM), CLAYEY SAND (SC), or more granular
Fines Content	Max. 20%<#200 Sieve
Retained Soil Moist Unit Weight (γ)	120 pcf
Cohesion (C)	0 psf
Angle of Internal Friction (ϕ)	32°
Coefficient of At-Rest Earth Pressure (K_o)	0.47
Coefficient of Active Earth Pressure (K_a)	0.30

We recommend that all permanent below grade walls be designed to also withstand lateral earth pressures from surcharge loads due to adjacent pavements, buildings, structures, slopes, equipment, or materials.

Retaining Wall Backfill: The backfill should be placed and compacted in accordance with the recommendations for engineered fill given in this report. Samples of proposed retaining wall backfill should be submitted by the contractor and tested by ECS prior to beginning construction activities to verify that the soils proposed meet or exceed those specified in the geotechnical report and retaining wall design. Tests should include classification, Standard/Modified Proctor compaction, and shear strength (remolded direct shear and/or remolded triaxial shear). The use of proper retaining wall backfill material, placement, and compaction, should be observed and tested by ECS at the time of construction.

Wall Drains: All below-grade building retaining walls should be properly drained so that hydrostatic pressures do not build up behind the walls and the backfill soils do not become saturated and soften. (Proper drainage and backfill compaction are required to prevent excessive mat slab settlement near the walls.) Wall drains can consist of a 12-inch-wide zone of free draining gravel, such as No. 57 Stone, employed directly behind the wall and separated from the soils beyond with a non-woven filter fabric. Alternatively, the wall drain can consist of a suitable geocomposite drainage board material. The wall drain should be hydraulically connected to the foundation drain. The wall foundation drains should be connected to the stormwater system. Below grade retaining walls should be waterproofed.

5.6 SEISMIC DESIGN CONSIDERATIONS

Seismic Site Classification: The International Building Code (IBC) 2018/2021 requires site classification for seismic design based on the upper 100 feet of a soil profile. At least two methods are utilized in classifying sites, namely the shear wave velocity (v_s) method and the Standard Penetration Resistance (N-value) method. The second method (Standard Penetration Resistance) was used in classifying this site.

Table 5.6.1 – Seismic Site Classification

SEISMIC SITE CLASSIFICATION			
Site Class	**Soil Profile Name**	**Shear Wave Velocity, Vs, (ft./s)**	**N value (bpf)**
A	Hard Rock	Vs > 5,000 fps	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	>50
D	**Stiff Soil Profile**	**600 ≤ Vs ≤ 1,200 fps**	**15 to 50**
E	Soft Soil Profile	Vs < 600 fps	<15

Based upon our interpretation of the subsurface conditions, the appropriate Seismic Site Classification is "D" as shown in the preceding table.

Ground Motion Parameters: The Mapped Structural Response Acceleration at Short Periods and 1-second periods, S_S and S_1, respectively, were considered for the project site located at approximate Latitude 34.8426 and an approximate Longitude of -87.6402. The approximate S_{DS} and S_{D1} values, as shown below for a Seismic Site Class D and Risk Category II, are calculated using the United States Geological Survey's (USGS) Seismic Hazard Curves and Uniform Hazard Response Spectra according to ASCE 7-22.

$$S_{DS} = 0.37 \text{ g}$$
$$S_{D1} = 0.23 \text{ g}$$

The Site Class definition should not be confused with the Seismic Design Category designation which the Structural Engineer typically assesses. If a higher site classification is beneficial to the project, we can provide additional testing methods that may yield more favorable results.

5.7 PAVEMENT DESIGN CONSIDERATIONS

For the design and construction of exterior pavements, we recommend preparation of the site as outlined in Sections 5.2 and 6.0 of this report. The stripped surfaces should be proofrolled and carefully observed at the time of construction to identify localized soft or unusable materials which should be removed. An ECS representative should be present at the time of proofrolling and subgrade inspections.

Once parking areas and drive lanes have been established to subgrade elevations, it is important to proceed with the placement of roadway design elements in a timely manner. Good drainage should reduce the possibility of the subgrade materials becoming saturated during the normal service period of the pavement.

Our scope of services did not include sampling and California Bearing Ratio (CBR) testing of existing subgrade for the specific purpose of a detailed pavement analysis. Based on the laboratory testing, the final pavement subgrade soils should be sufficient to achieve a minimum CBR of 3.

Based on our experience with similar Valvoline projects, ECS estimated a design ESAL (Equivalent Single Axle Load) value of less than 150,000 for both rigid and flexible pavements. These design EASL values, along with the CBR (California Bearing Ratio) design parameter referenced above, were used to calculate the necessary asphalt and concrete pavement sections to support the anticipated traffic loads. The recommended pavement section thicknesses are as follows:

Table 5.6.1 - Recommended Pavement Sections

Pavement Materials	Flexible Pavement	Rigid Pavement
Non-Reinforced Concrete Pavement	-	6
Surface Course (ALDOT 424)	1½	-
Asphalt Concrete Base (ALDOT 420)	2½	-
Aggregate Base (ALDOT 825B)	8	6
Total Pavement Section Thickness	12	12

Water should not be allowed to pond behind curbs and saturate the pavement base stone. In down-grade areas, base stone should extend through the slope face to allow water entering the base stone a path to exit. It should be noted that representative samples should be collected from the upper 2 feet of the final roadway soil subgrade to evaluate the CBR values of the pavement subgrade as construction progresses.

5.8 PAVEMENT MAINTENANCE

Regular maintenance and occasional repairs should be implemented to keep pavements in a serviceable condition. In addition, to help minimize water infiltration to the pavement section and within the base course layer resulting in softening of the subgrade and deterioration of the pavement, we recommend the timely sealing of joints and cracks using proper sealants. We recommend exterior pavements be reviewed for distress/cracks twice a year, once in the spring and once in the fall.

Sound maintenance programs should help maintain and enhance the performance of pavements and attain the design service life. A preventative maintenance program should be implemented early in the pavement life to be effective. The “standard in the industry” supported by research indicates that preventative maintenance should begin within 2 to 5 years of the pavement construction. Failure to perform preventative maintenance will reduce the service life of the pavement and increase the costs for both corrective maintenance and full pavement rehabilitation.

6.0 SITE CONSTRUCTION RECOMMENDATIONS

6.1 SUBGRADE PREPARATION

6.1.1 Stripping and Subgrade Preparation

The subgrade preparation should consist of stripping vegetation, rootmat, topsoil, and other soft or unusable materials from the 10-feet expanded building limits and 5-feet expanded pavement limits.

The amount and frequency of precipitation will affect the surficial soil conditions following stripping and initial site preparation. The contractor should make provisions to keep excavations dry during construction to maintain the integrity of the exposed soils and help reduce the potential for otherwise unnecessary remedial work.

Erosion and sedimentation shall be controlled in accordance with Best Management Practices and current state, local, and NPDES requirements. At the appropriate time, we would be pleased to provide a proposal for construction materials testing and NPDES related services.

6.1.2 Proofrolling

Following the stripping operations and prior to the placement of structural fills or structural elements, the exposed subgrade soils should be observed by the ECS geotechnical engineer or his approved representative. Proofrolling using a loaded tri-axle dump truck, having an axle weight of at least 10 tons, may be used at this time to aid in identifying localized soft or unusable materials that should be removed. Soft or unusable material encountered during proofrolling should be removed to a stable subgrade and replaced with an approved backfill compacted to the criteria given below.

6.2 EARTHWORK OPERATIONS

6.2.1 Structural Fill Materials

After subgrade preparation and observation has been completed and a firm and unyielding subgrade exists, fill placement may begin. Structural fill materials should not be placed on frozen soils or frost-heaved soils and/or soils which have been recently subjected to precipitation. Borrow fill materials, if necessary, should not contain wet or frozen materials at the time of placement. Wet or frost-heaved soils should be removed prior to the placement of engineered fill, granular sub-base materials, foundation/slab concrete, or paving materials.

Materials used as structural fill for the upper layer of soil subgrade should consist of approved material classified as CL, SP, SP-SM, SM, SC or more granular, which are free of debris, particles no larger than 6 inches in diameter (4-inches for trench/utility backfill), organic inclusions, cinders, ash, frozen material, or excess moisture. In addition, the materials must meet the following criteria:

- Liquid Limit (LL) ≤ 45 and Plasticity Index (PI) ≤ 25
- Maximum particle size = 6 inches (4 inches for trench/utility backfill)
- Maximum dry density ≥ 105 pounds per cubic foot (Standard Proctor Method)

We highly recommend mass grading proceed during drier portions of the year to limit moisture conditioning of the soils and/or remedial work.

Prior to placement of structural fill, representative bulk samples (about 50 pounds) of on-site and off-site borrow should be submitted to ECS for laboratory testing, which will include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Engineered fill in the building and other built-over areas should be compacted to at least 98 percent of the Standard Proctor maximum dry density (ASTM D 698). The structural fill, consisting of adequate on-site soils or off-site granular borrow material, or a mixture thereof, should be placed in essentially horizontal lifts with a maximum loose thickness of 8 inches and **moisture conditioned to within -1 to +3 percentage points of the optimum moisture content** per the Standard Proctor method (ASTM D 698).

Each lift of compacted engineered fill should be tested by a representative of the geotechnical engineer prior to placement of subsequent lifts. Compaction testing should be performed at the rate of at least 1 test per 2,500 square feet for each lift of fill within the building pad and at the rate of at least 1 test per 5,000 square feet for each lift of fill outside of the building pad, with a minimum of 3 tests per lift of fill within the building footprint. The elevation and location of the tests should be accurately identified at the time of fill placement. Areas which fail to achieve the required degree of compaction should be recompacted and retested until minimum compaction is achieved. Failing test areas may require adjustments in moisture content or other adequate remedial activities in order to achieve the required compaction.

The expanded limits of the proposed construction areas should be well defined, including the limits of the fill zones for buildings, pavements, and slopes, etc., at the time of fill placement. Grade controls should be maintained throughout the filling operations.

Compaction equipment adequate to the soil type being compacted should be used to compact the subgrades and fill materials. Sheepsfoot compaction equipment should be adequate for the fine-grained soils (Clays and Silts). A vibratory steel drum roller should be used for compaction of coarse-grained soils (Sands) as well as for sealing compacted surfaces. In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 to 4 inches may be required to achieve specified degrees of compaction.

At the end of each workday, fill areas should be graded to facilitate drainage of precipitation and the surface should be sealed by use of a smooth-drum roller. During placement and compaction of new fill at the beginning of each workday, the contractor may need to scarify existing subgrades to a depth on the order of 4 inches so that a weak plane will not be formed between the new fill and the existing subgrade soils.

6.3 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally adequate for support of utility pipes. The pipe subgrade, especially where existing fill was encountered, should be observed and probed for stability by the testing agency to evaluate the suitability of the materials encountered. Loose or unusable materials encountered at the utility pipe subgrade elevation should be removed and replaced with adequate compacted Structural Fill or pipe bedding material.

Utility Backfilling: The granular bedding material should be at least 4 inches thick, but not less than that specified by the project drawings and specifications. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for structural fill given in this report. Compacted backfill should be free of topsoil, roots, ice, or other material designated as inadequate. The backfill should be moisture conditioned, placed, and compacted in accordance with the recommendations of this report.

Utility Excavation Dewatering: Depending upon time of year of construction and the resulting potential shallow groundwater, the contractor should be prepared for temporary dewatering in utility excavations. While we did not encounter water in our borings, the possibility exists for water to be present in deeper excavations in wetter portions of the year.

6.4 TEMPORARY EXCAVATIONS

During foundation excavation and utility installation, the existing on-site soils should be observed by a geotechnical engineer and should be benched or sloped back at appropriate gradients, in accordance with OSHA 29 CFR 1926. It should be understood that, during wet weather and cold weather conditions, seepage and freeze/thaw conditions may decrease the stability of cuts.

During construction, temporary slopes should be regularly evaluated for signs of movement, seepage, or an unsafe condition. Soil slopes should be covered for protection from rain and surface runoff conditions. Stormwater runoff shall not be permitted to overtop the crests of slopes, and therefore must be diverted away from the slopes.

6.5 GENERAL CONSTRUCTION CONSIDERATIONS

Subgrade Protection: Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development areas, including structural and pavement areas. It would be advisable to designate a haul road and construction staging area to limit the areas of disturbance and to prevent construction traffic from excessively degrading subgrade soils.

Excavation Safety: Cuts or excavations associated with utility excavations may require forming or bracing, slope flattening, or other physical measures to control sloughing and/or prevent slope failures. Contractors should be familiar with applicable OSHA codes to ensure that adequate protection of the excavations and trench walls is provided.

Erosion Control: Install soil erosion and sedimentation control devices, as well as temporary stormwater management facilities, as specified by Site/Civil Engineer. Maintain positive drainage conditions throughout construction, avoiding unnecessary ponding of stormwater in excavations or low areas of the site. Seal-roll exposed soil or subgrade surfaces prior to rain or snow events, and promptly remove standing water immediately afterwards.

6.6 CONSTRUCTION OBSERVATION AND TESTING

Regardless of the thoroughness of a geotechnical engineering study, there is always a possibility that subsurface conditions between test borings may be different from those encountered at the test boring locations, that conditions are not as anticipated by the designers, or that the demolition or construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the supervision of ECS, since we are familiar with the intent of the recommendations presented in this report. Such observation services are recommended to evaluate whether the conditions anticipated in the design actually exist, or whether the recommendations presented in the report should be modified where necessary.

7.0 CLOSING

This report has been prepared for the exclusive use of Valvoline Instant Oil Change and their design team. ECS has prepared this report of findings, evaluations, and recommendations to guide geotechnical-related design and construction aspects of the project.

The description of the proposed project is based on information provided to ECS during design team meetings over the course of the project development. If any of this information is inaccurate, either due to our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted immediately in order that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed construction.

We recommend that ECS be allowed to review the project's plans and specifications pertaining to our work so that we may ascertain consistency of those plans/specifications with the intent of the geotechnical report.

Field observations, monitoring, and quality assurance testing during earthwork and foundation installation are an extension of and integral to the geotechnical design recommendation. We recommend that the owner retain these quality assurance services and that ECS be allowed to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

The scope of this investigation was limited to the evaluation of the load-carrying capabilities and load stability of the soils and bedrock. Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied, inferred or suggested by this report or results of this study.

Appendix A - Drawings and Reports

Site Location Diagram
Boring Location Diagram(s)

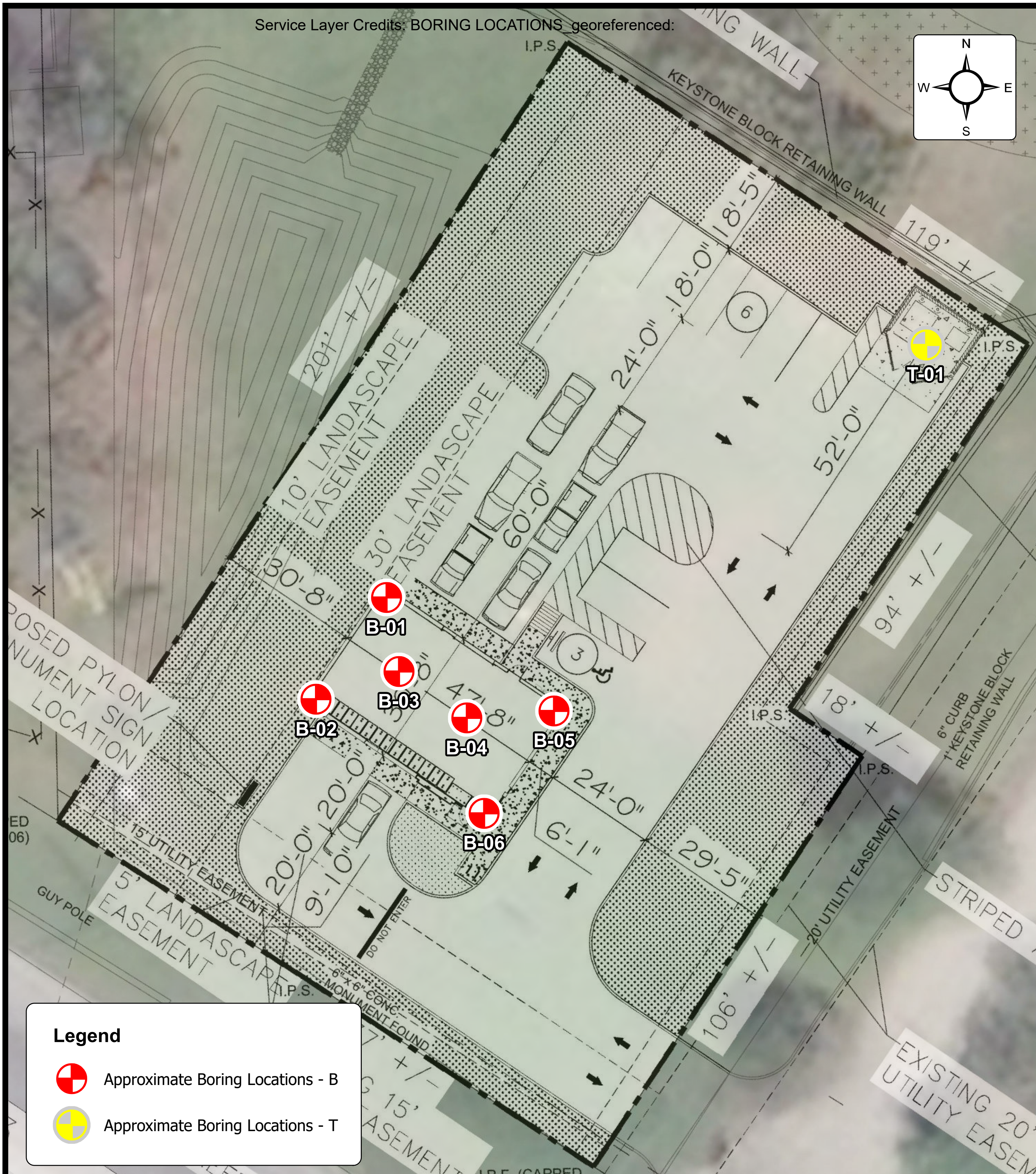
SITE LOCATION DIAGRAM

Valvoline - Florence

404 Cox Creek Pkwy, Florence, Alabama

Valvoline Instant Oil Change

ENGINEER	JTH3
SCALE	1" = 300'
PROJECT NO.	30:2971
SHEET	
DATE	10/9/2025



BORING LOCATION DIAGRAM
Valvoline - Florence

404 Cox Creek Pkwy, Florence, Alabama

Valvoline Instant Oil Change

ENGINEER	JTH3
SCALE	1" = 30'
PROJECT NO.	30:2971
SHEET	
DATE	10/9/2025

Appendix B – Field Operations

- Reference Notes
- Exploration Procedures
- Boring Logs
- Cross Section
- Other Field Operations

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]		
	ASPHALT	
	CONCRETE	
	GRAVEL	
	TOPSOIL	
	VOID	
	BRICK	
	AGGREGATE BASE COURSE	
GW	WELL-GRADED GRAVEL	gravel-sand mixtures, little or no fines
GP	POORLY-GRADED GRAVEL	gravel-sand mixtures, little or no fines
GM	SILTY GRAVEL	gravel-sand-silt mixtures
GC	CLAYEY GRAVEL	gravel-sand-clay mixtures
SW	WELL-GRADED SAND	gravelly sand, little or no fines
SP	POORLY-GRADED SAND	gravelly sand, little or no fines
SM	SILTY SAND	sand-silt mixtures
SC	CLAYEY SAND	sand-clay mixtures
ML	SILT	non-plastic to medium plasticity
MH	ELASTIC SILT	high plasticity
CL	LEAN CLAY	low to medium plasticity
CH	FAT CLAY	high plasticity
OL	ORGANIC SILT or CLAY	non-plastic to low plasticity
OH	ORGANIC SILT or CLAY	high plasticity
PT	PEAT	highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, QP[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS[6]

- WL (First Encountered)
- WL (Completion)
- WL (Seasonal High Water)
- WL (Stabilized)

FILL AND ROCK

FILL | POSSIBLE FILL | PROBABLE FILL | ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)

- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.

**Drilling Methods May Vary—* The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

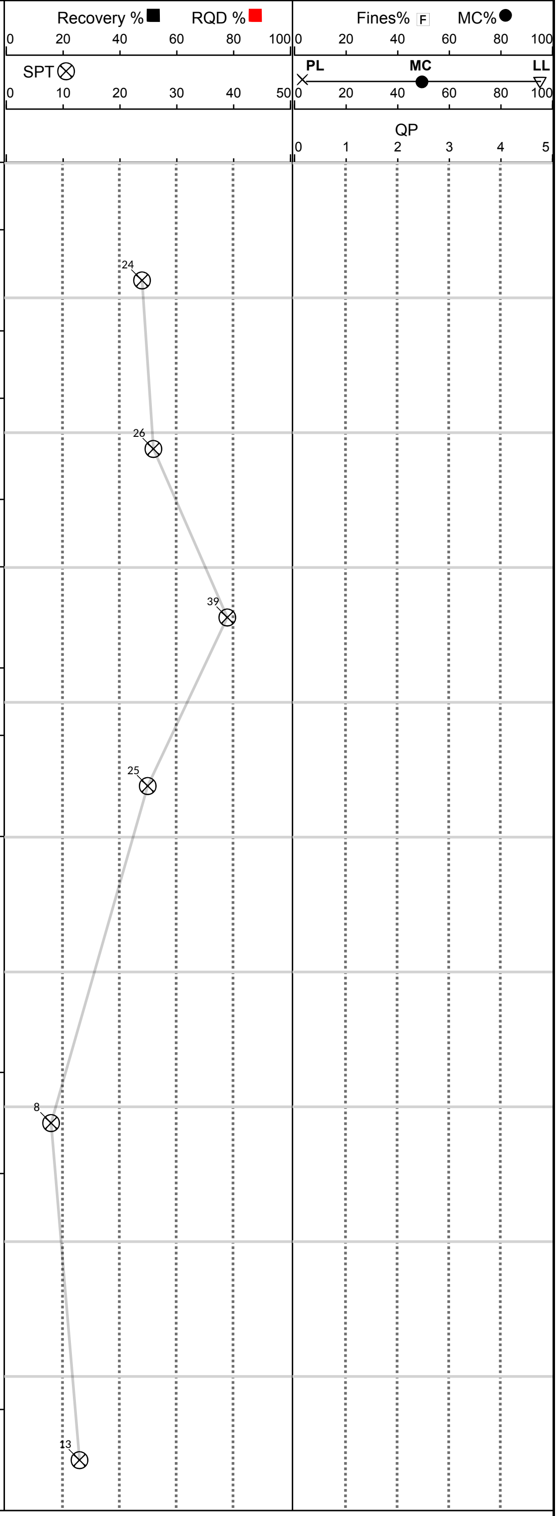
CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Valvoline Instant Oil Change	**30:2971**	**B-01**	**1 OF 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Valvoline - Florence	**South Bros Drilling, Inc.**

SITE LOCATION:	LOSS OF CIRCULATION
404 Cox Creek Pkwy, Florence, Alabama, 35630	BOTTOM OF CASING

LATITUDE:	LONGITUDE:	STRUCTURE:	SURFACE ELEVATION:
34.842712	**-87.64016**		**625**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) SANDY LEAN CLAY - orange, very stiff, with chert fragments.				
	S-1	SS	18	18					17-12-12 (24)
	S-2	SS	18	18					17-13-13 (26)
5.0								620	
	S-3	SS	18	18					30-19-20 (39)
	S-4	SS	18	18					11-12-13 (25)
10.0								615	
	S-5	SS	18	18	(MH) SANDY ELASTIC SILT - orangish tan, stiff, With chert fragments.				5-3-5 (8)
15.0								610	
	S-6	SS	18	18	END OF BORING AT 20 Ft				5-5-8 (13)



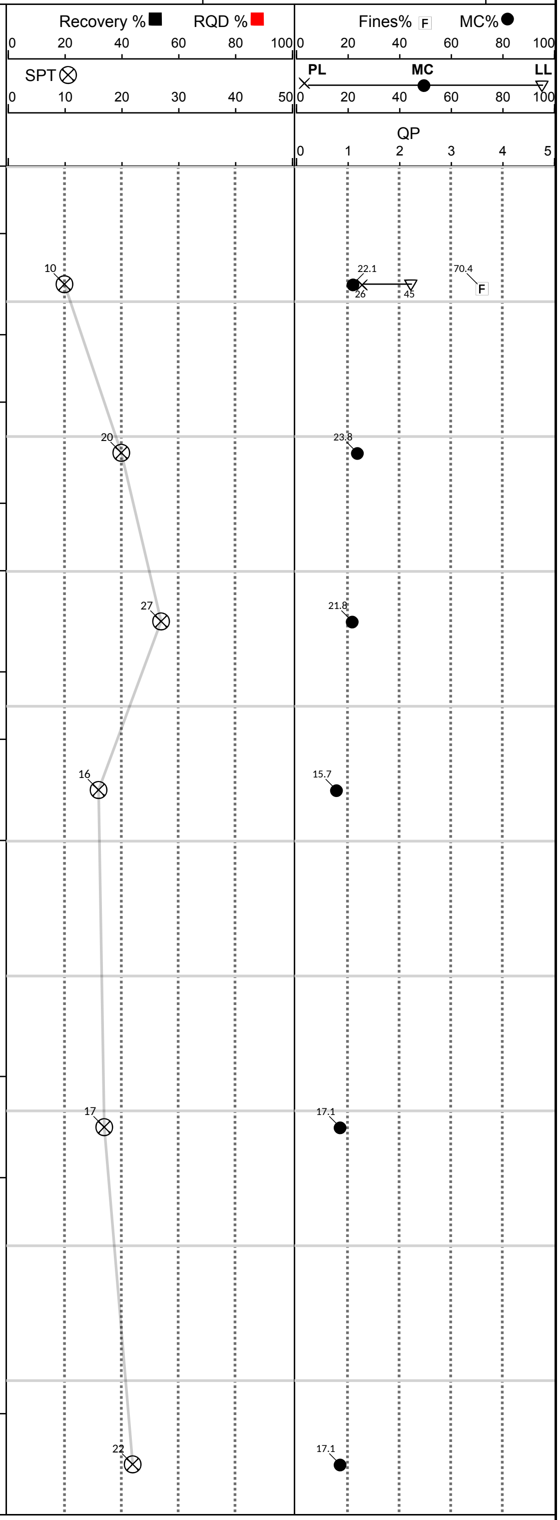
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 10/07/2025	**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 10/07/2025	**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:** ATV / **LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):		

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Valvoline Instant Oil Change**	PROJECT NO.: **30:2971**	BORING NO.: **B-02**	SHEET: **1 OF 1**
PROJECT NAME: **Valvoline - Florence**	DRILLER/CONTRACTOR: **South Bros Drilling, Inc.**		
SITE LOCATION: **404 Cox Creek Pkwy, Florence, Alabama, 35630**		LOSS OF CIRCULATION	
LATITUDE: **34.842651**	LONGITUDE: **-87.64021**	STRUCTURE:	SURFACE ELEVATION: **625**
		BOTTOM OF CASING	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) LEAN CLAY WITH SAND - orange, stiff, with chert fragments.		
	S-1	SS	18	18			3-4-6 (10)
	S-2	SS	18	18	(CL) SANDY LEAN CLAY - orange, very stiff, With chert fragments.		6-9-11 (20)
5.0						620	
	S-3	SS	18	18			13-13-14 (27)
	S-4	SS	18	18			9-7-9 (16)
10.0						615	
	S-5	SS	18	18			6-7-10 (17)
15.0						610	
	S-6	SS	18	18	END OF BORING AT 20 Ft		11-11-11 (22)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 10/07/2025	**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 10/07/2025	**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:** ATV / **LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):		

GEOTECHNICAL BOREHOLE LOG

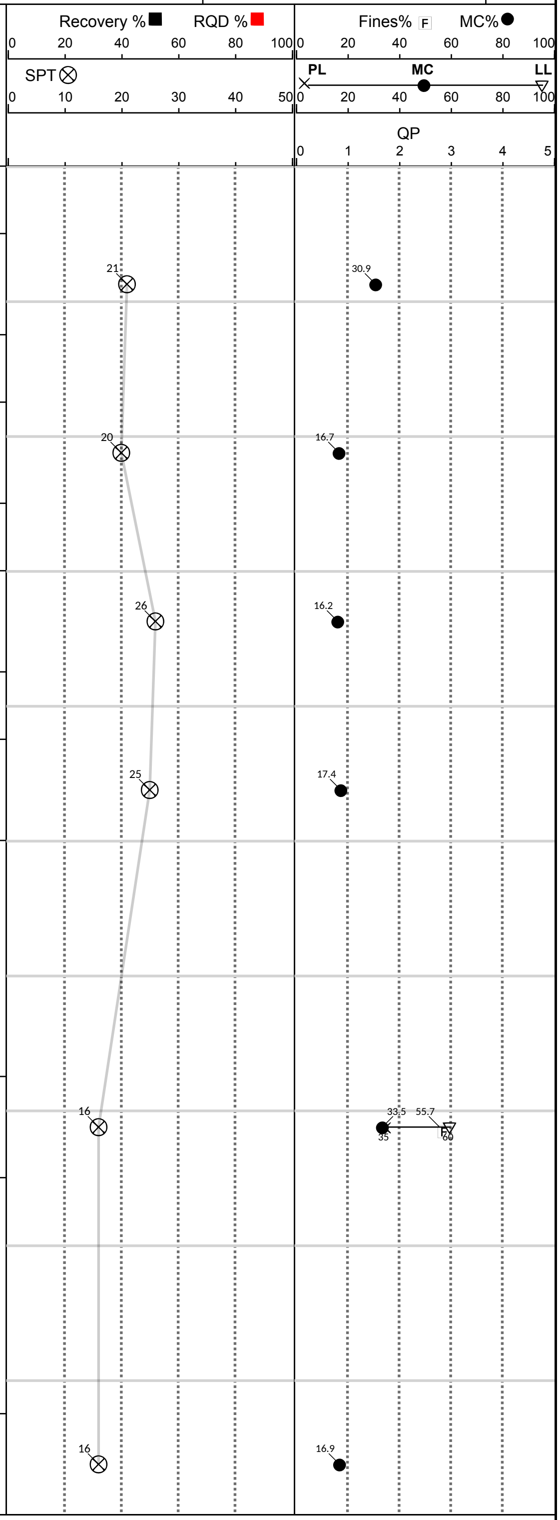
CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Valvoline Instant Oil Change	**30:2971**	**B-03**	**1 OF 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Valvoline - Florence	**South Bros Drilling, Inc.**

SITE LOCATION:	LOSS OF CIRCULATION
404 Cox Creek Pkwy, Florence, Alabama, 35630	BOTTOM OF CASING

LATITUDE:	LONGITUDE:	STRUCTURE:	SURFACE ELEVATION:
34.842668	**-87.64015**		**625**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) SANDY LEAN CLAY - orange, very stiff, with chert fragments.				
	S-1	SS	18	18					8-10-11 (21)
	S-2	SS	18	18					11-10-10 (20)
5.0								620	
	S-3	SS	18	18					18-14-12 (26)
	S-4	SS	18	18					10-12-13 (25)
10.0								615	
	S-5	SS	18	18	(MH) SANDY ELASTIC SILT - orangish tan, very stiff.				9-4-12 (16)
15.0								610	
	S-6	SS	18	18	END OF BORING AT 20 Ft				7-9-7 (16)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	BORING STARTED: 10/07/2025		CAVE IN DEPTH: Not Observed	
WL (Completion):	BORING COMPLETED: 10/07/2025		HAMMER TYPE: Automatic	
WL (Seasonal High Water):	EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
WL (Stabilized):	ATV			

GEOTECHNICAL BOREHOLE LOG

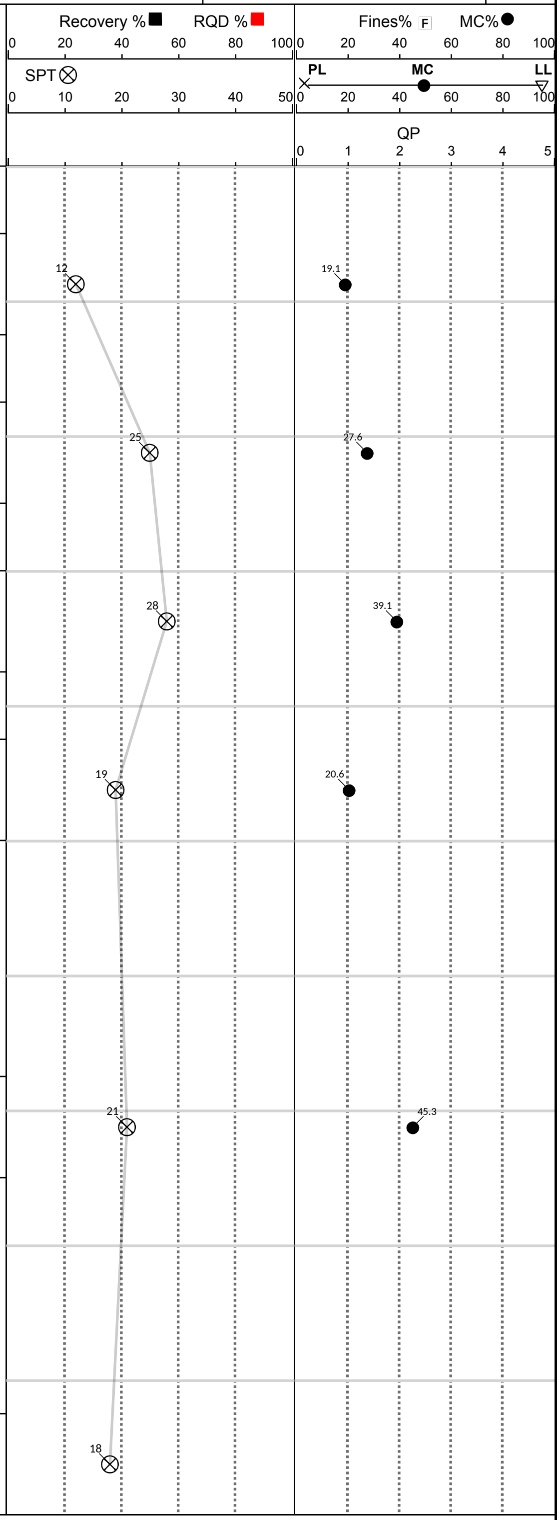
CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Valvoline Instant Oil Change	**30:2971**	**B-04**	**1 OF 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Valvoline - Florence	**South Bros Drilling, Inc.**

SITE LOCATION:	LOSS OF CIRCULATION
404 Cox Creek Pkwy, Florence, Alabama, 35630	

LATITUDE:	LONGITUDE:	STRUCTURE:	SURFACE ELEVATION:	BOTTOM OF CASING
34.84264	**-87.640102**		**625**	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) LEAN CLAY WITH SAND - orange, stiff, With chert fragments.				
	S-1	SS	18	18					4-5-7 (12)
	S-2	SS	18	18	(CL) SANDY LEAN CLAY - orange, very stiff, With chert fragments.				9-10-15 (25)
5.0								620	
	S-3	SS	18	18					9-11-17 (28)
	S-4	SS	18	18					12-9-10 (19)
10.0								615	
	S-5	SS	18	18					5-9-12 (21)
15.0								610	
				18	(MH) SANDY ELASTIC SILT - orangish tan, very stiff.				3-9-9 (18)
					END OF BORING AT 20 Ft				



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 10/07/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 10/07/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV		

GEOTECHNICAL BOREHOLE LOG

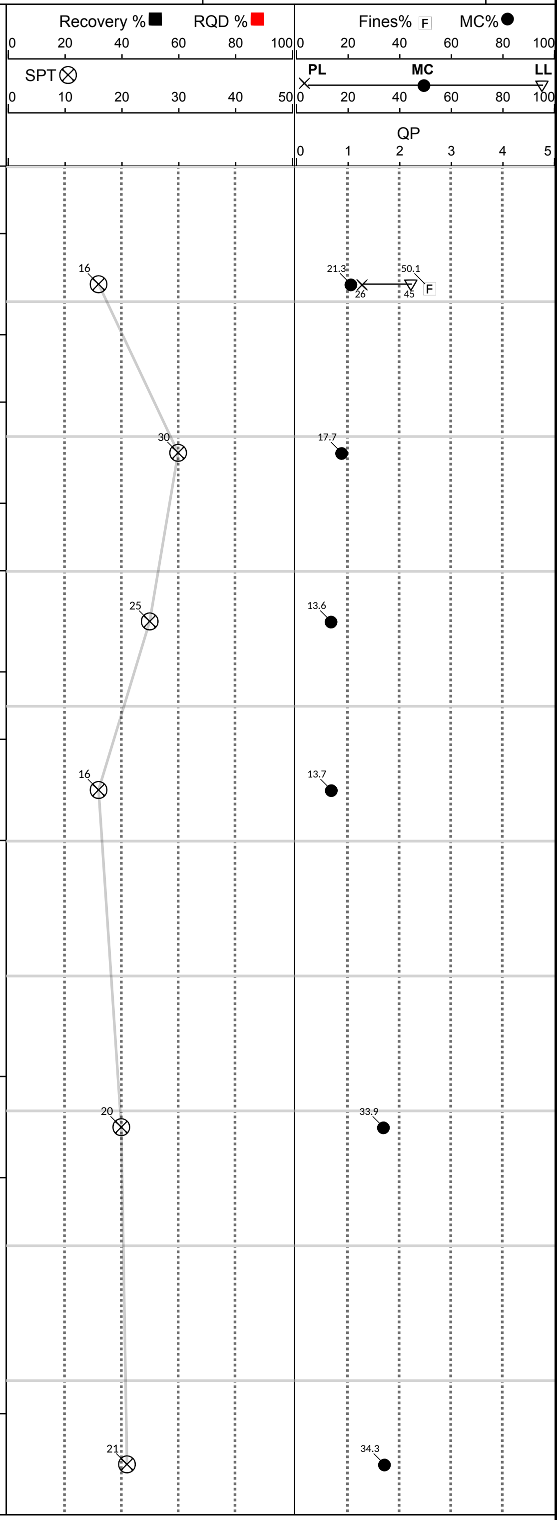
CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Valvoline Instant Oil Change	**30:2971**	**B-05**	**1 OF 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Valvoline - Florence	**South Bros Drilling, Inc.**

SITE LOCATION:	
404 Cox Creek Pkwy, Florence, Alabama, 35630	LOSS OF CIRCULATION

LATITUDE:	LONGITUDE:	STRUCTURE:	SURFACE ELEVATION:	
34.842644	**-87.640038**		**625**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) SANDY LEAN CLAY - orange, very stiff, With chert fragments.				
	S-1	SS	18	18					8-9-7 (16)
	S-2	SS	18	18					13-13-17 (30)
5.0								620	
	S-3	SS	18	18					17-13-12 (25)
	S-4	SS	18	18					7-7-9 (16)
10.0								615	
	S-5	SS	18	18					9-10-10 (20)
15.0								610	
	S-6	SS	18	18	END OF BORING AT 20 Ft				12-7-14 (21)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:**	10/07/2025	**CAVE IN DEPTH:**	Not Observed
WL (Completion):	**BORING COMPLETED:**	10/07/2025	**HAMMER TYPE:**	Automatic
WL (Seasonal High Water):	**EQUIPMENT:** ATV	**LOGGED BY:**	**DRILLING METHOD:**	
WL (Stabilized):				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Valvoline Instant Oil Change	**30:2971**	**B-06**	**1 OF 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Valvoline - Florence	**South Bros Drilling, Inc.**

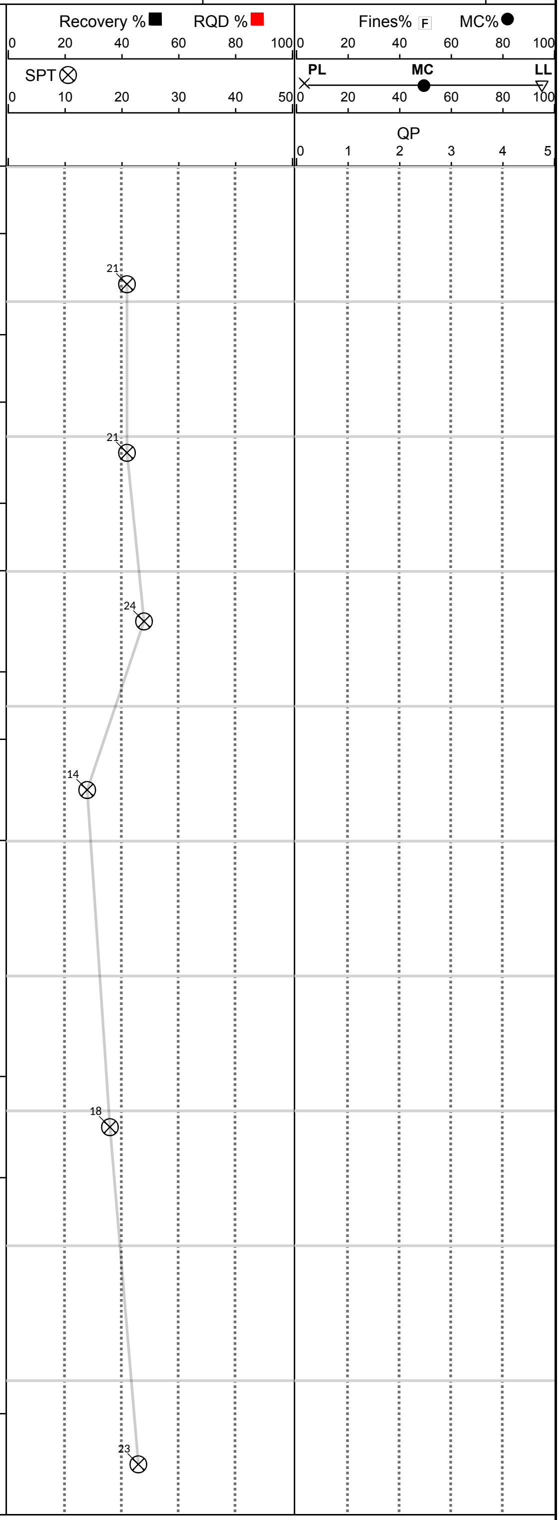
SITE LOCATION:
404 Cox Creek Pkwy, Florence, Alabama, 35630

LOSS OF CIRCULATION

BOTTOM OF CASING

LATITUDE:	LONGITUDE:	STRUCTURE:	SURFACE ELEVATION:
34.842583	**-87.640089**		**625**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) SANDY LEAN CLAY - orange, very stiff, with chert fragments.				
	S-1	SS	18	18					6-9-12 (21)
	S-2	SS	18	18					8-9-12 (21)
5.0								620	
	S-3	SS	18	18					9-12-12 (24)
	S-4	SS	18	18					7-6-8 (14)
10.0								615	
	S-5	SS	18	18					7-9-9 (18)
15.0								610	
	S-6	SS	18	18	END OF BORING AT 20 Ft				11-11-12 (23)



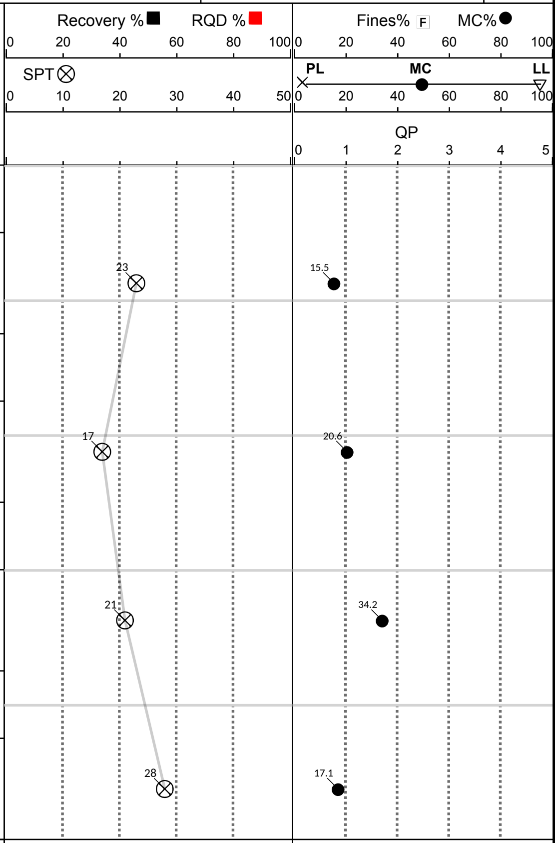
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 10/07/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 10/07/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:** ATV	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):			

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Valvoline Instant Oil Change**	PROJECT NO.: **30:2971**	BORING NO.: **T-01**	SHEET: **1 OF 1**
PROJECT NAME: **Valvoline - Florence**	DRILLER/CONTRACTOR: **South Bros Drilling, Inc.**		
SITE LOCATION: **404 Cox Creek Pkwy, Florence, Alabama, 35630**		LOSS OF CIRCULATION	
LATITUDE: **34.842863**	LONGITUDE: **-87.63977**	STRUCTURE:	SURFACE ELEVATION: **625**
		BOTTOM OF CASING	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*
					(CL) SANDY LEAN CLAY - orange, very stiff, with chert fragments.				
	S-1	SS	18	18					7-11-12 (23)
	S-2	SS	18	18					9-7-10 (17)
5.0								620	
	S-3	SS	18	18					7-9-12 (21)
	S-4	SS	18	18					10-10-18 (28)
					END OF BORING AT 10 Ft			615	

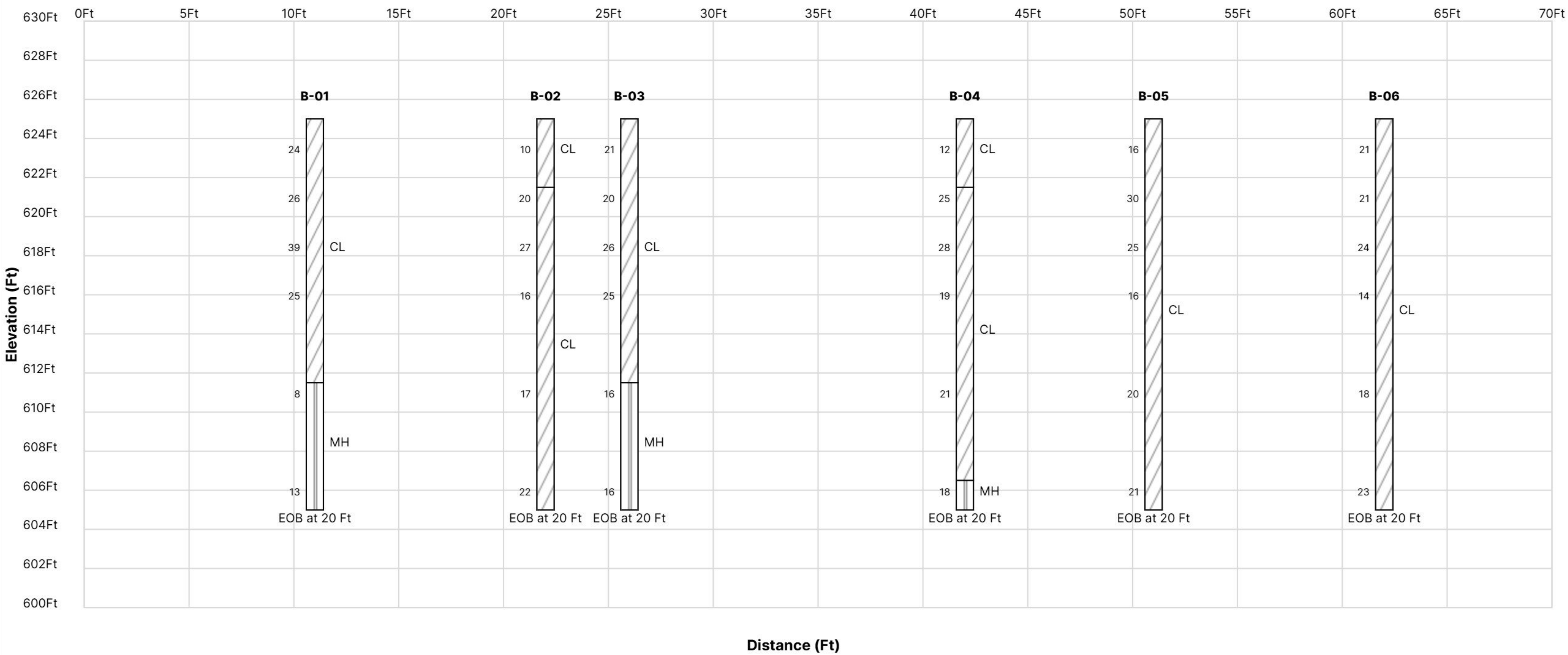


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 10/07/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 10/07/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV		

GEOTECHNICAL BOREHOLE LOG

Generalized Subsurface Cross Section



CLIENT:	Valvoline Instant Oil Change	PROJECT:	Valvoline - Florence
DRAWN DATE:	10/1/2025	PROJECT NO.:	30:2971
CHECKED DATE:	10/1/2025	SCALE:	AS SHOWN

Notes:
1-EOB: END OF BORING AR: AUGER REFUSALSR: SAMPLER REFUSAL
2-SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
3-STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).
4- TOPOGRAPHIC INFORMATION IS BASED ON PUBLICLY AVAILABLE DATA (GOOGLE OR CESIUM).THE TOPOGRAPHIC LINE SHOWN BETWEEN BORINGS IS FOR VISUAL REFERENCE ONLY.PLEASE REFER TO THE REFERENCE NOTES FOR BORING LOGS FOR SYMBOLOGY MEANING AND ADDITIONAL

Plastic Limit Water Content Liquid Limit	WL (First Encountered)	Fill
[FINES CONTENT %]	WL (Completion)	Possible Fill
BOTTOM OF CASING	WL (Estimated Seasonal High Water)	Probable Fill
LOSS OF CIRCULATION	WL (Stabilized)	WR/Rock
CALIBRATED PENETROMETER		

Photoionization Detector Test Results

Hole No.	Sample				PID reading (ppm)
	Ref	Top	Base	Soil Type	
B-1	S-1	1	2.5	CL	1.1
B-1	S-2	3.5	5	CL	1.2
B-1	S-3	6	7.5	CL	0.8
B-1	S-4	8.5	10	CL	1.7
B-1	S-5	13.5	15	MH	0.5
B-1	S-6	18.5	20	MH	0.1
B-2	S-1	1	2.5	CL	1.0
B-2	S-2	3.5	5	CL	1.1
B-2	S-3	6	7.5	CL	1.5
B-2	S-4	8.5	10	CL	1.3
B-2	S-5	13.5	15	CL	1.7
B-2	S-6	18.5	20	CL	1.5
B-3	S-1	1	2.5	CL	1.0
B-3	S-2	3.5	5	CL	0.8
B-3	S-3	6	7.5	CL	0.7
B-3	S-4	8.5	10	CL	1.3
B-3	S-5	13.5	15	MH	0.3
B-3	S-6	18.5	20	MH	0.4
B-4	S-1	1	2.5	CL	1.4
B-4	S-2	3.5	5	CL	1.7
B-4	S-3	6	7.5	CL	1.7
B-4	S-4	8.5	10	CL	0.5
B-4	S-5	13.5	15	CL	0.5
B-4	S-6	18.5	20	MH	0.2
B-5	S-1	1	2.5	CL	1.3
B-5	S-2	3.5	5	CL	1.5
B-5	S-3	6	7.5	CL	1.7
B-5	S-4	8.5	10	CL	1.0
B-5	S-5	13.5	15	CL	1.1
B-5	S-6	18.5	20	CL	1.6
B-6	S-1	1	2.5	CL	2.1
B-6	S-2	3.5	5	CL	1.7
B-6	S-3	6	7.5	CL	0.7
B-6	S-4	8.5	10	CL	0.6
B-6	S-5	13.5	15	CL	1.6
B-6	S-6	18.5	20	CL	1.2
T-1	S-1	1	2.5	CL	0.7
T-1	S-2	3.5	5	CL	1.6
T-1	S-3	6	7.5	CL	1.4
T-1	S-4	8.5	10	CL	1.7

Project: Valvoline - Calera, AL
Client: Valvoline Instant Oil Change

Project No. 30:2971

Appendix C – Laboratory Testing

Laboratory Testing Summary
Grain Size Analysis/Analyses
Plasticity Chart(s)

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-02	S-1	1.0-2.5	22.1	CL	45	26	19	70.4					
B-02	S-2	3.5-5.0	23.8										
B-02	S-3	6.0-7.5	21.8										
B-02	S-4	8.5-10.0	15.7										
B-02	S-5	13.5-15.0	17.1										
B-02	S-6	18.5-20.0	17.1										
B-03	S-1	1.0-2.5	30.9										
B-03	S-2	3.5-5.0	16.7										
B-03	S-3	6.0-7.5	16.2										
B-03	S-4	8.5-10.0	17.4										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Valvoline - Florence
Client:

Project No.: 30:2971
Date Reported: 10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received
Cole Cameron		JHooper	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-03	S-5	13.5-15.0	33.5	MH	60	35	25	55.7					
B-03	S-6	18.5-20.0	16.9										
B-04	S-1	1.0-2.5	19.1										
B-04	S-2	3.5-5.0	27.6										
B-04	S-3	6.0-7.5	39.1										
B-04	S-4	8.5-10.0	20.6										
B-04	S-6	13.5-15.0	45.3										
B-04	S-5	13.5-15.0	39.7										
B-05	S-1	1.0-2.5	21.3	CL	45	26	19	50.1					
B-05	S-2	3.5-5.0	17.7										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Valvoline - Florence
Client:

Project No.: 30:2971
Date Reported: 10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received
Cole Cameron		JHooper	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-05	S-3	6.0-7.5	13.6										
B-05	S-4	8.5-10.0	13.7										
B-05	S-5	13.5-15.0	33.9										
B-05	S-6	18.5-20.0	34.3										
T-01	S-1	1.0-2.5	15.5										
T-01	S-2	3.5-5.0	20.6										
T-01	S-3	6.0-7.5	34.2										
T-01	S-4	8.5-10.0	17.1										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

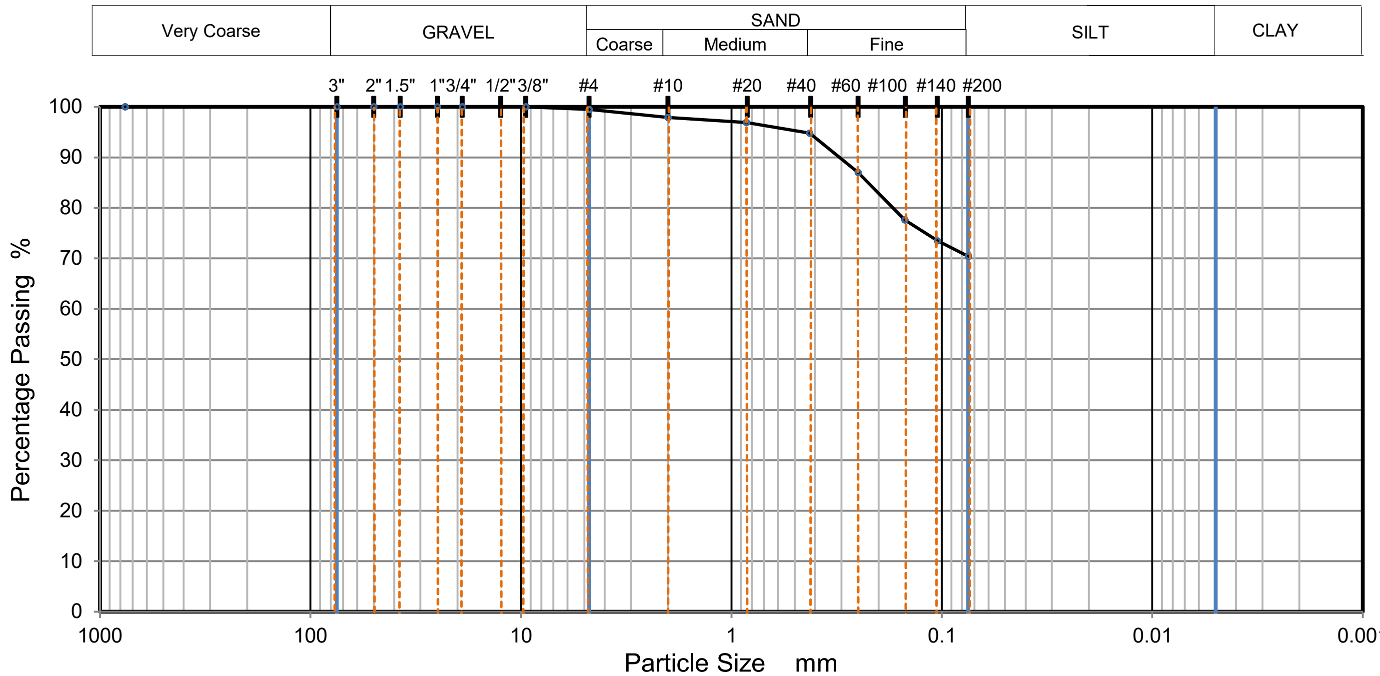
Project: Valvoline - Florence
Client:

Project No.: 30:2971
Date Reported: 10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received
Cole Cameron		JHooper	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS ()

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	100.0		
#4	99.5		
#10	97.9		
#20	96.9		
#40	94.8		
#60	87.0		
#100	77.6		
#140	73.5		
#200	70.4		

Dry Mass of sample, g	192.3

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.5
Coarse Sand, #4 to #10 sieve	1.6
Medium Sand, #10 to #40	3.1
Fine Sand, #40 to #200	24.4
Fines <#200	70.4

USCS	CL	Liquid Limit	45	D90	0.307	D50		D10	
AASHTO	A-7-6	Plastic Limit	26	D85	0.224	D30		Cu	
USCS Group Name	Lean clay with sand	Plasticity Index	19	D60		D15		Cc	

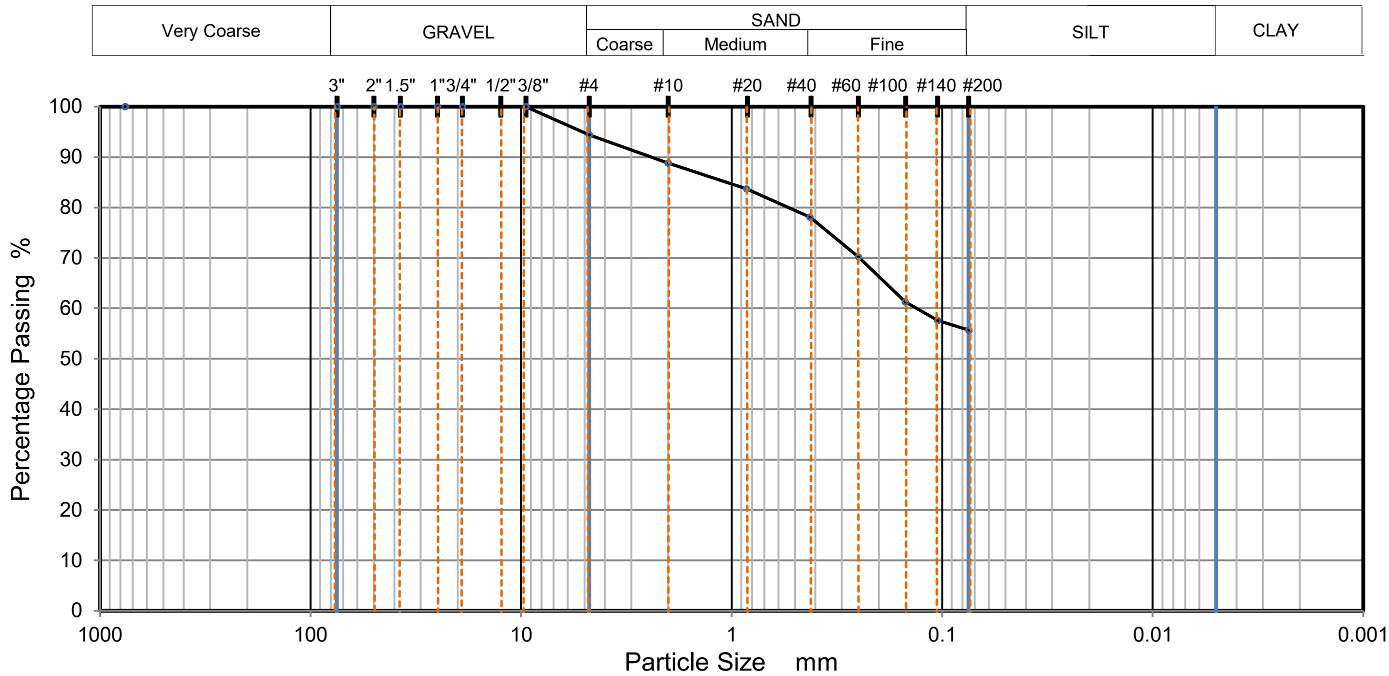
Project: Valvoline - Florence
Client:
Sample Description: Lean Clay with Sand
Sample Source: B-02

Project No.: 30:2971
Depth (ft): 1.0 - 2.5
Sample No.: S-1
Date Reported: 10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received	Remarks
Cole Cameron		JHooper		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS ()

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	100.0		
#4	94.4		
#10	88.8		
#20	83.7		
#40	78.1		
#60	70.2		
#100	61.3		
#140	57.6		
#200	55.7		

Dry Mass of sample, g	214.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	5.6
Coarse Sand, #4 to #10 sieve	5.6
Medium Sand, #10 to #40	10.7
Fine Sand, #40 to #200	22.4
Fines <#200	55.7

USCS	MH	Liquid Limit	60	D90	2.407	D50		D10	
AASHTO	A-7-5	Plastic Limit	35	D85	1.057	D30		Cu	
USCS Group Name	Sandy elastic silt	Plasticity Index	25	D60	0.132	D15		Cc	

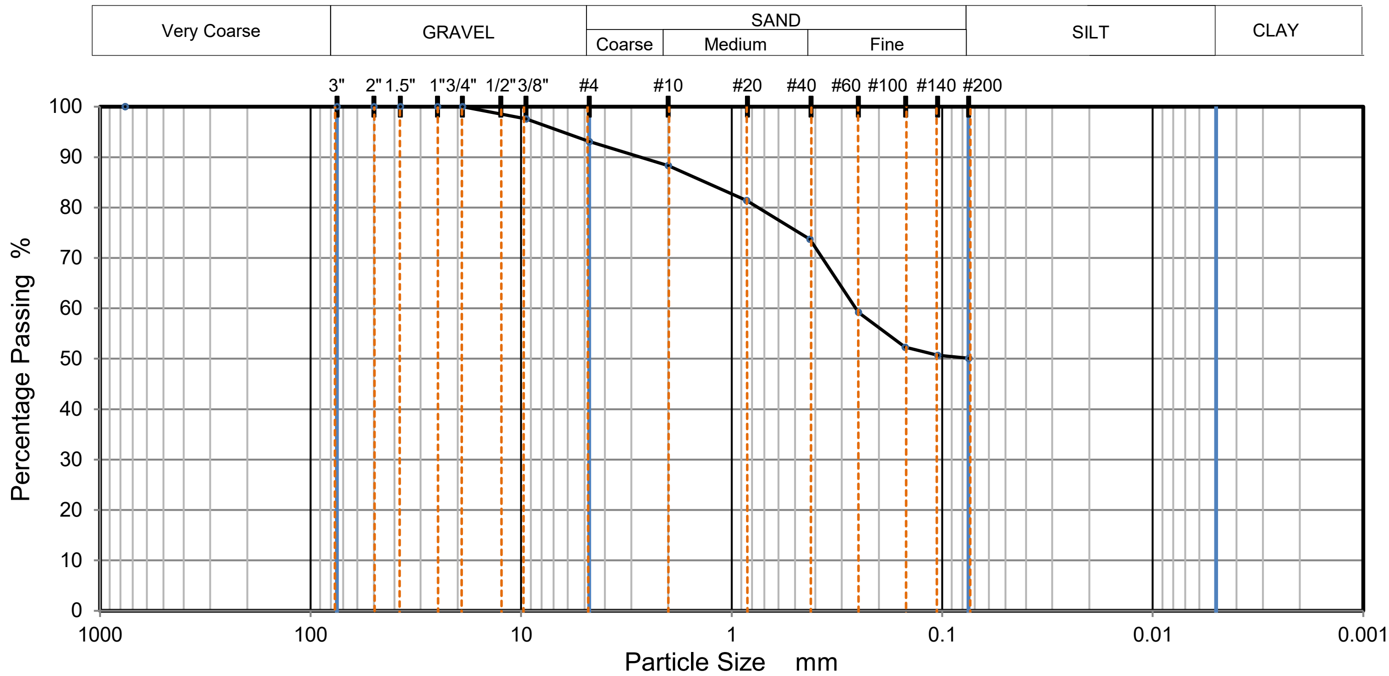
Project: Valvoline - Florence
Client:
Sample Description: Sandy Elastic Silt
Sample Source: B-03

Project No.: 30:2971
Depth (ft): 13.5 - 15.0
Sample No.: S-5
Date Reported: 10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received	Remarks
Cole Cameron		JHooper		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS ()

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	97.6		
#4	93.1		
#10	88.3		
#20	81.4		
#40	73.7		
#60	59.2		
#100	52.3		
#140	50.7		
#200	50.1		

Dry Mass of sample, g	247.4

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	6.9
Coarse Sand, #4 to #10 sieve	4.8
Medium Sand, #10 to #40	14.6
Fine Sand, #40 to #200	23.6
Fines <#200	50.1

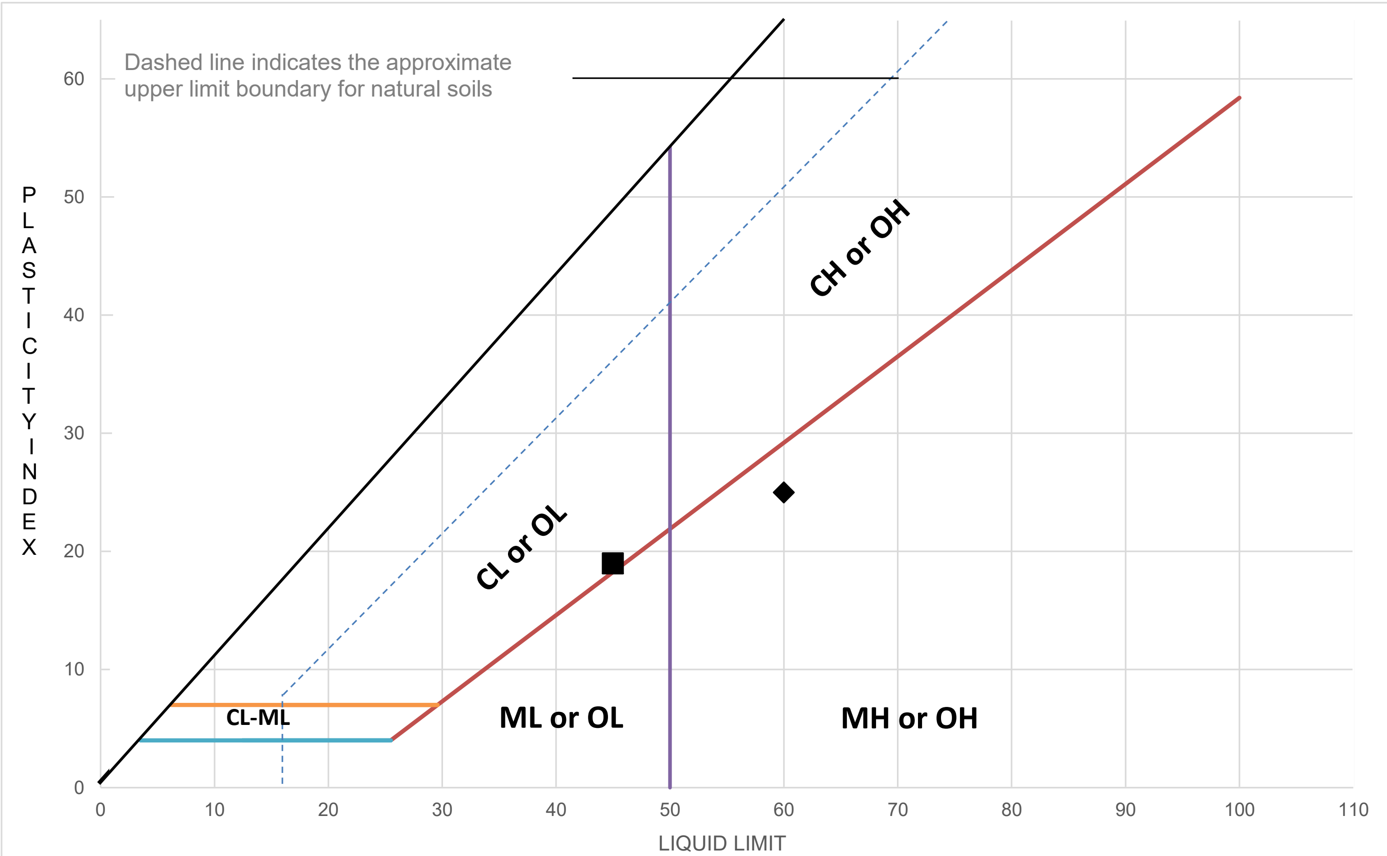
USCS	CL	Liquid Limit	45	D90	2.717	D50		D10	
AASHTO	A-7-6	Plastic Limit	26	D85	1.328	D30		Cu	
USCS Group Name	Sandy lean clay	Plasticity Index	19	D60	0.257	D15		Cc	

Project:	Valvoline - Florence	Project No.:	30:2971
Client:		Depth (ft):	1.0 - 2.5
Sample Description:	Sandy Lean Clay	Sample No.:	S-1
Sample Source:	B-05	Date Reported:	10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received	Remarks
		JHooper		

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-02	S-1	1.00-2.50	45	26	19	94.8	70.4	A-7-6	CL	Lean Clay with Sand
◆	B-03	S-5	13.50-15.00	60	35	25	78.1	55.7	A-7-5	MH	Sandy Elastic Silt
▲	B-05	S-1	1.00-2.50	45	26	19	73.7	50.1	A-7-6	CL	Sandy Lean Clay

Project: Valvoline - Florence
Client:

Project No.: 30:2971
Date Reported: 10/16/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Birmingham	133 West Oxmoor Road Suite 205 Birmingham, AL 35209	(205)588-5099 (678)546-8056

Tested by	Checked by	Approved by	Date Received
Cole Cameron		JHooper	

Appendix D – Other Information

GBA - Geotechnical Engineering Report Information Sheet

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

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