PART 1 - GENERAL

1.01 SOILS REPORT

A. A geotechnical investigation of the site has been made for use in site grading and foundation design for this Project. This report has been bound herein for information purposes only. Boring logs and test data are for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. Architect and Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor and advise Contractor to make his own investigations as he deems necessary.

B. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's expense; however, no change in the Contract Sum will be authorized for such additional exploration.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF DOCUMENT

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

1580 East Stearns Street
Fayetteville, Arkansas 72703
Office (479) 443.2377
mce.us.com

January 21, 2022

WALTON ENTERPRISES
110 NW 2nd Street, Suite 300
Bentonville, Arkansas 72702

CERTIFICATE OF AUTHORIZATION
McCLELLAND CONSULTING ENGINEERS, INC.
No. 24
ARKANSAS-ENGINEER

ATTN: Mr. Jim Daniel
Senior Construction Manager

RE: Geotechnical Investigation
Whole Health School of Medicine & Health Sciences
Bentonville, Arkansas
MCE Project Number: 21-3942

Dear Mr. Daniel:

We are submitting herewith the report for the Geotechnical Investigation on the above-referenced project. We appreciate the opportunity to provide this service to you. If there are any questions regarding the Geotechnical Investigation, please contact us.

Sincerely yours,

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

Steven J. Head, PE
Principal | Geotechnical Department Head

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 16434
STEVEN J. HEAD
1/21/2022

Enclosure: Geotechnical Report

GEOTECHNICAL INVESTIGATION

Whole Health School of Medicine & Health Sciences

Bentonville, Arkansas
MCE Project Number
21-3942

Walton Enterprises, LLC
110 NW 2nd Street, Suite 300
Bentonville, Arkansas 72702

January, 2022

McCLELLAND CONSULTING ENGINEERS, INC.
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GEOTECHNICAL REPORT

Whole Health School of Medicine & Health Sciences

MCE Project Number: 21-3942

Bentonville, Arkansas

FOR

WALTON ENTERPRISES

110 NW 2nd Street, Suite 300
Bentonville, Arkansas 72702

Executive Summary

This is a report of the findings of the Geotechnical Investigation relevant to the proposed Whole Health School of Medicine & Health Sciences to be located in Bentonville, Arkansas. This report includes information on surface materials and subsurface conditions in addition to providing recommendations for site preparation, grading, structure foundations, and recommended minimum pavement sections. The significant findings listed below should not be used separately from the further discussion provided in the body of this report.

The following is a summary of significant findings:

- A total of 13 project borings were conducted across the project site as part of this investigation. These boring locations were predetermined and provided by the Client as "Exhibit B".
    - Eight (8) project borings (B-01 through B-05; B-11 through B-13) were conducted outside of the proposed structure footprint.
    - Five (5) project borings (B-06 through B-10) were conducted within the proposed structure footprint.
    - All 13 of the above-referenced project borings were planned to be conducted until encountering materials resulting in auger refusal. These refusal materials were encountered at depths ranging from 23.5 feet to 45 feet below the existing surface elevations. More information pertaining to these materials can be found in the Site Geology and the Rock Excavation sections of this report.
- The encountered surface materials (Stratum I) across the site include silty surface topsoil, coarse-aggregate base, and asphalt materials. The thickness of the encountered surface materials ranged from two (2) to six (6) inches.
- Fine-grained and coarse-grained soils were encountered prior to auger refusal materials.
    - Stratum II fine-grained soils included both low-plasticity and high-plasticity clays with varying amounts of sands and gravels.
    - Stratum III coarse-grained soils included multiple types of sands and gravel materials with varying gradations.
- Groundwater was not encountered by any project borings. However, the presence of perched groundwater is common in the project area; particularly above hard clays and in-situ rock materials.
- It is our recommendation based on the assumed structural loading and data collected during this investigation that either rammed aggregate piers (RAPs) or drilled piers should be considered for foundation support of the proposed structure. Further details regarding both options may be found in the body of this report.

- At the time of this report, lateral loading had not been finalized by the Design Team. We expect to issue an Addendum document between 70% Design Development (DD) and 100% DD submittals that provides LPile analysis and lateral loading recommendations, should drilled piers be the preferred foundation type. This analysis would be provided as a separate agreement beyond the current project scope covered by this Geotechnical Report.
- It is anticipated that light, standard, and heavy-duty pavement sections will be utilized throughout the project site, constructed of both rigid concrete and flexible asphalt materials. Recommendations for these sections can be found in Table 7 on page 14 of this report.

Table of Contents

Introduction

A geotechnical investigation of subsurface soil and rock conditions was conducted by McClelland Consulting Engineers, Inc. (MCE) for the proposed Whole Health School of Medicine & Health Sciences to be located in Bentonville, Arkansas. The investigation was requested and authorized by Mr. Jim Daniel, Senior Construction Manager with Walton Enterprises, to investigate subsurface conditions at the project site and to prepare recommendations for site preparation and grading operations, foundation and pavement recommendations, and excavation considerations for the planned development.

Site Description

The proposed project site is located on the west side of NE J Street in Bentonville, Arkansas. Specifically, the site is located west of the intersection of NE J Street and NE 10th Street. We understand that the proposed project site is comprised of three (3) individual parcels with the following Tax IDs: 01-00349-000, 01-05321-000, and 01-5320-000. All combined, the three (3) parcels are understood to encompass approximately 14.4 acres, more or less.

Based on information gathered within the provided Exhibit B and observations made during the investigation, it was noted that all three (3) parcels contain existing developments. The existing developments appear to primarily be single-family residential structures as well as their associated outbuildings and pavement improvements.

In addition to the aforementioned existing developments, onsite vegetation was noted to include grass, shrubs, and mature trees. The majority of the mature trees are concentrated in the eastern and western portions of the project site.

From NE J Street, the site exhibits a gentle slope from the west down to the east. Topographical survey data was not provided as part of the RFP package; however, MCE anticipates that the maximum grade differentials across the site are on the order of 28 feet. Much less variance in topography exists within the planned structure footprint.

Project Description

We understand that the project scope includes the construction of a new three (3) – story medical school building, with an additional story of underground parking, surface parking, and additional pavement improvements.

New Medical School Building

The proposed new medical school structure is understood to encompass a structural footprint of 120,000 square feet and is anticipated to be constructed of structural steel with some concrete and/or mass timber elements. The new structure will include spaces for administration, education, a simulation clinic, and flex areas for meetings and seminars.

Pavement Improvements & Underground Parking

The project pavement improvement areas are anticipated to include access drives, surface parking, underground parking, dumpster pads, and pedestrian walkways.

We anticipate that the vehicular project pavements will be frequently subjected to light passenger vehicles and occasionally subjected to heavier truck traffic. As such, we assume that both flexible asphalt and rigid concrete pavements may be utilized. We anticipate that the design team may consider light-, standard-, and heavy-duty sections for both rigid and flexible pavements.

Pavement improvements for parking are understood to include both surface and underground parking areas. From the RFP document, we understand that the underground parking area will accommodate approximately 115 vehicles utilizing the structure footprint. Finalized project scope and details regarding the underground parking are still being developed at this time, including potential depth below the existing ground elevations. Surface parking areas are understood to accommodate approximately 50 vehicles.

Anticipated Structural Loading & Site Grading

Finalized structural documents and grading plans were not available at the time of preparing this proposal. Through discussion with the structural engineer, it was determined that the maximum column load will not exceed 1,000 kips though smaller loads on the order of 50 kips or less are expected as well. The building's main level is expected to be elevated 60 feet above the existing grade.

Field Investigation

The geotechnical investigation consisted of 13 total project borings. Eight (8) project borings (B-01 through B-05 and B-11 through B-13) were conducted outside of the proposed structure footprint. Five (5) project borings (B-06 through B-10) were conducted within the proposed structure footprint. The boring locations were predetermined and provided within Exhibit B of the RFP document. All project borings were conducted until materials resulting in auger refusal were encountered.

Utilizing water-based coring techniques, project borings B-06 and B-09 were advanced an additional 18 feet and 10 feet beyond the encountered auger refusal materials; respectively.

The majority of the main-structure borings (B-07, B-08, and B-10), and some of the external borings (B-03 and B-04), were conducted with a CME 45B truck-mounted drill rig utilizing four (4) inch solid stem augers. The rest of the borings (B-01, B-02, B-05, B-06, B-09, and B-11 through B-13) were conducted with a Diedrich D-50 Turbo track-mounted drill rig utilizing hollow stem augers. Soil samples were obtained at the depths indicated on the boring logs by the use of a two (2) inch diameter split-spoon sampler. The split-spoon sampler was driven by blows from a 140-pound automatic hammer dropped from a fixed height of 30 inches. The specific locations of the referenced borings are provided in Appendix A on Plate 1.

The number of blows required to drive the split-spoon sampler the final 12 inches of an 18-inch drive, or portion thereof, is referred to as the Standard Penetration value, N, and is recorded on the boring logs in units of blows-per-foot. Final drilled depths are shown as the depths achieved by the core barrel. The field tests performed outside of the Standard Penetration Test included visual soil classifications, groundwater observations, rock recovery (REC), and rock quality designation (RQD).

Groundwater was not encountered by any of the project borings. Long-term groundwater monitoring was not included as part of our scope of work. Table 1 below shows the surface material thickness, depths, and elevations that were achieved by the conducted project borings. A key to the terms and symbols used on the boring logs is also presented in Appendix B on Plate 15.

The visual soil and rock classifications are given on the boring logs. The boring logs may be referenced in Appendix B on Plates 2 through 14. Subsurface Diagrams featuring the elevations of each soil/rock stratum in relation to boring location may be referenced in Appendix D on Plates 19 through 24.

Table 1: Project Borings – Depths and Elevations

Boring Number	Surface Material	Surface Material Thickness (in)	Boring Elevation (ft)	Refusal Depth (ft)	Total Drilled Depth (ft)	End of Boring Elevation (ft)
B-01	Topsoil	4.0	1284.0	28.5	28.5	1255.5
B-02	Topsoil	2.0	1282.5	26.0	26.0	1256.5
B-03	Topsoil	3.0	1281.5	45.0	45.0	1236.5
B-04	Aggregate	6.0	1280.0	34.5	34.5	1245.5
B-05	Topsoil	4.0	1279.5	37.0	37.0	1242.5
B-06	Topsoil	3.0	1283.5	23.5	41.5	1242.0
B-07	Asphalt	2.0	1283.0	24.5	24.5	1258.5
B-08	Asphalt	5.0	1282.5	23.5	23.5	1259.0
B-09	Asphalt	7.0	1281.0	37.5	47.5	1233.5
B-10	Asphalt	6.0	1281.0	41.5	41.5	1239.5
B-11	Topsoil	5.0	1282.5	28.5	28.5	1254.0
B-12	Topsoil	4.0	1281.5	28.5	28.5	1253.0

Notes: Elevations shown in Table 1 are rounded to the nearest 0.5 feet, based on the *Boundary & Topographic* survey; provided by Bates & Associates, Inc.
Surface material thicknesses are rounded to the nearest 1 inch

Laboratory Testing

Laboratory testing was performed on all soil/rock samples recovered from the project borings. The laboratory testing was directed at determining the engineering properties of the project soil/rock strata. The laboratory testing was conducted in accordance with the American Society for Testing and Materials (ASTM) designations. The tests performed on samples from the borings included moisture content, Atterberg Limits, sieve analyses, and unconfined compressive strength.

The natural soil moisture content was determined for each of the soil samples to provide a moisture profile for each project boring. Atterberg Limits tests (liquid and plastic limits) and sieve analyses were performed on selected samples to determine the classification of the soils and to help evaluate the volume-change characteristics of each soil stratum. The unconfined compressive strength of selected rock core samples was recorded in an effort to determine the in-situ strength of the encountered rock strata. Results of laboratory testing are provided on the boring logs and the Laboratory Test Results Summary in Appendix C on Plates 16 through 18. A key to the terms and symbols used on the boring logs is also presented in Appendix B on Plate 15. Table 2 below shows the relevant test method designations performed on the soil samples.

Table 2: Laboratory Test Method Designations

Test Designation	Test Method
ASTM D2488	Standard Practice for Description and Identification of Soils (Visual)
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (USCS)
ASTM D2216	Standard Test Method for Lab Determination of Water Content of Soil
ASTM D6913	Standard Test Method for Particle-Size Distribution of Soils Using Sieve Analysis
ASTM D4318	Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D7263	Standard Test Method for Lab Determination of Density and Unit Weight
ASTM D2166	Standard Test Method for Unconfined Compressive Strength of Cohesive Soils
ASTM D7012	Standard Test Methods for Compressive Strength and Elastic Moduli of Intact Rock Core Speciments

USDA Soil Types & Map

The following soil types exist in the project area according to current United States Department of Agriculture (USDA) soil maps, with descriptions from the Natural Resources Conservation Service (NRCS). Figure 1 on the following page provides imagery of the approximate site location and how it relates to the existing soil types.

The project site is located in central Benton County in Northwest Arkansas. The following soil types exist in the project area according to current USDA soil maps:

- **Captina Silt Loam (CnB)** – majority of the project area.
  - The Captina series consists of moderately shallow, moderately well-drained, moderately permeable soils on summits and interfluves. These soils formed in reworked loess over pedisediment over residuum weathered from cherty limestone. Slopes range from 1.0 to 3.0 percent.
- **Nixa Very Gravelly Silt Loam (NfC)** – western portion of the project area.
  - The Nixa series consists of moderately shallow, moderately well-drained, lowly permeable soils on hillslopes. These soils formed in slope alluvium over pedisediment over residuum weathered from limestone. Slopes range from 3.0 to 8.0 percent.
- **Noark Very Gravelly Silt Loam (NoF)** – southwestern extents of the project area.
  - The Noark series consists of very deep, well-drained, moderately permeable soils on hillslopes. These soils formed in slope alluvium over residuum weathered from limestone. Slopes range from 20.0 to 40.0 percent.
- **Tonti Gravelly Silt Loam (TsC)** – north-central extents of the project area.
  - The Tonti series consists of moderately deep, moderately well-drained, lowly permeable soils on summits, hills, and interfluves. These soils formed in loamy residuum weathered from cherty limestone. Slopes range from 3.0 to 8.0 percent.

The above-referenced soils in the project area have moderate-to-high potentials for corrosion of concrete and steel materials used in construction. An aerial image of the project area produced by the USDA Soil Survey is presented in Figure 1 below.

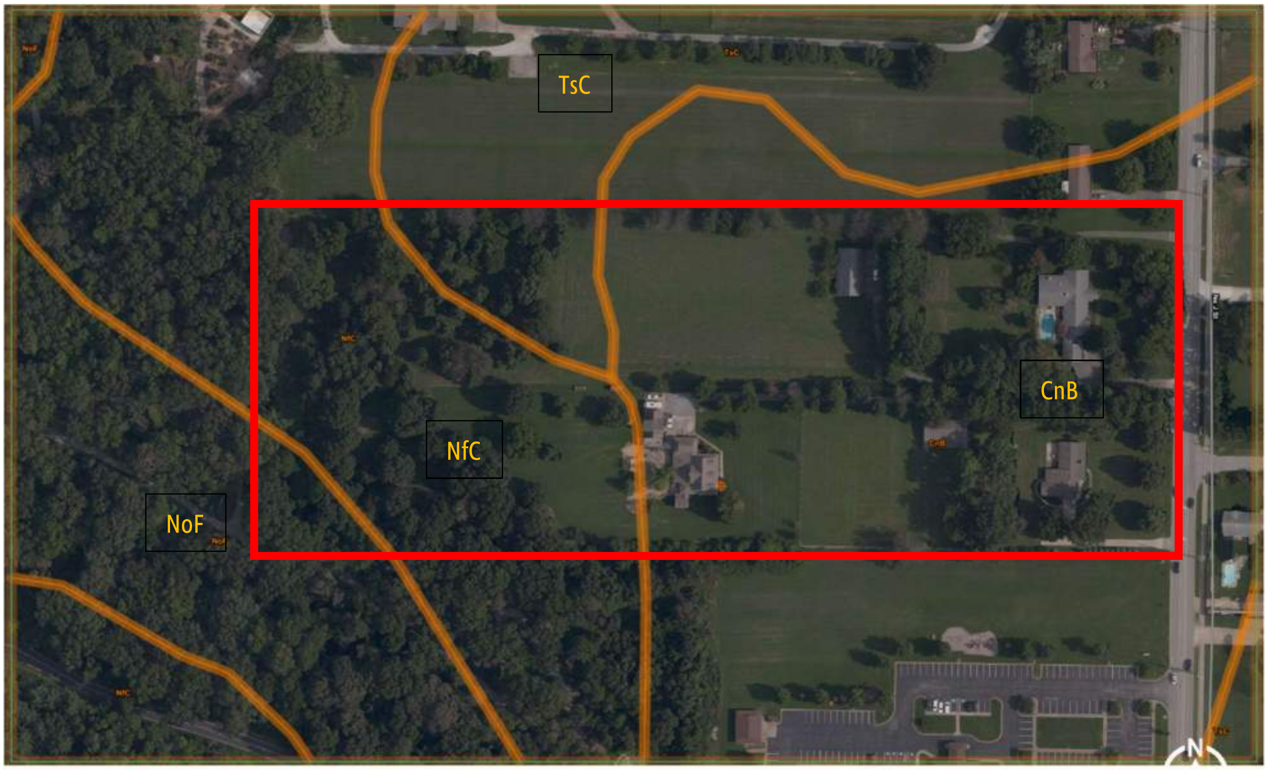


Figure 1: USDA Soil Survey Report Image.
The image was produced by the United States Department of Agriculture.
The red outline is the approximate project extent.

Site Geology

According to maps and literature published by the United States Geological Survey and the Arkansas Geological Survey, the project area is underlain by the Mississippian Age Boone Formation. The Boone Formation commonly consists of light gray to gray, fine-to-coarse-grained fossiliferous limestone interbedded with chert. Some sections may be predominantly limestone or chert. The chert in the Boone Formation tends to be dark in color in the lower part of the sequence and light in the upper part. The quantity and quality of the chert is known to vary considerably both vertically and horizontally with the formation.

Residual soils weathered from the Boone Formation are commonly referred to as "Hillside Material" within the region. The encountered subgrade materials beneath the project site are indicative of residual Boone Soils. The rock recovered from the coring operations of this investigation are also indicative of the Boone Formation. The thickness of the Boone Formation is typically reported at 300 to 350 feet.

The Boone Formation is well known for dissolutional features such as sinkholes, caves, and enlarged fissures according to Information Circular 36 produced by the Arkansas Geological Survey. The USGS imagery and formation key are presented in Figure 2 on the following page.

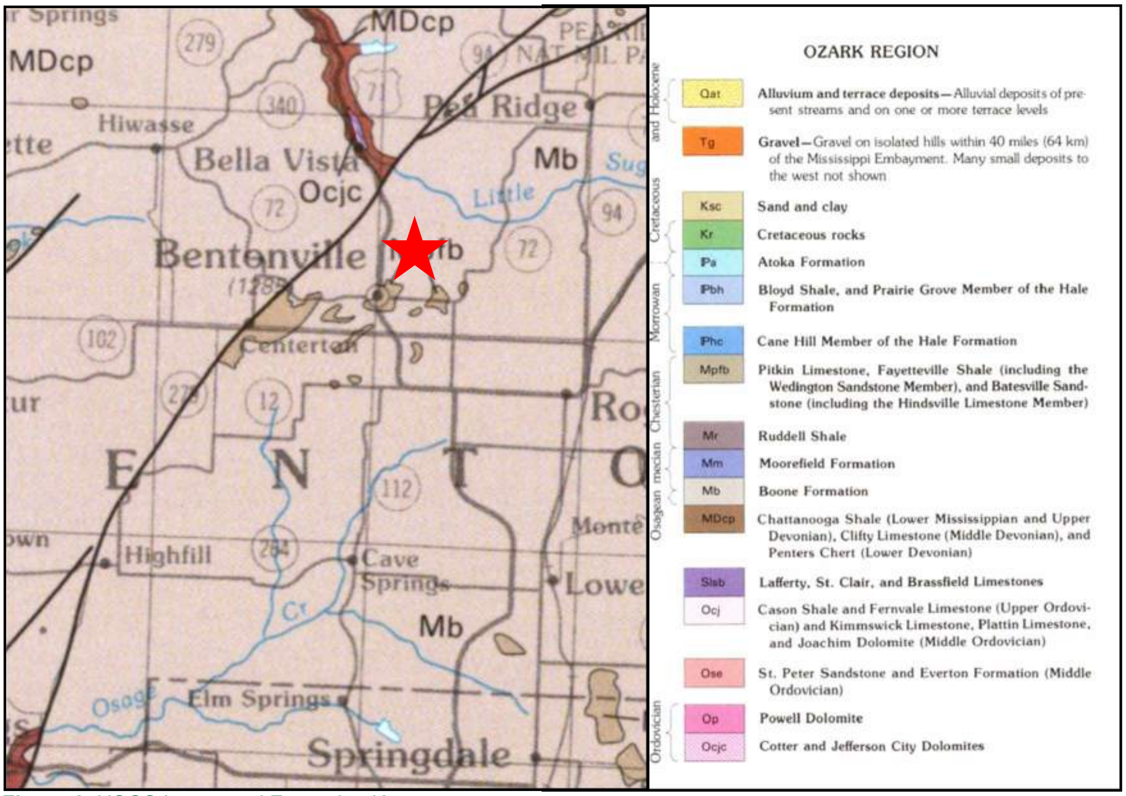


Figure 2: USGS Image and Formation Key.
This information was produced by the Arkansas Geological Survey and the United States Geological Survey.
The red star is the approximate project location.

IBC Site Classification

The proposed development area is recommended to be assigned as a Risk Category III according to Table 1604.5 of the 2021 International Building Code (IBC). The site seismic classification determination may utilize spectral response accelerations S_{DS} and S_{D1} of **0.133g** and **0.089g** respectively, with reference to Section 1613 of the 2021 IBC, and current Applied Technology Council (ATC) information based on Site Class C for the soil profile within the proposed Whole Health School of Medicine & Health Sciences campus.

On-Site Soil Stratum Summary

The subsurface soil conditions at the site are described as below:

Stratum I – Surface Materials

The encountered surface materials across the site include silty surface topsoil, coarse-aggregate base, and asphalt materials. The thickness of the encountered topsoil material ranged from three (3) to five (5) inches. The coarse-aggregate base material was encountered at a thickness of six (6) inches. The thickness of the encountered asphalt material ranged from two (2) to three (3) inches with project borings B-08 through B-10 having an underlying coarse-aggregate base ranging from two (2) to four (4) inches in thickness. Reported thicknesses are only valid for the actual boring location and may vary in unexplored portions of the project area.

Observations made while onsite indicated the existence of additional surface materials including landscaped rock features and rigid concrete pavements around existing developments to the southwest, north, and east of the proposed building location. Based on the findings and onsite observations, the Contractor should anticipate an average stripping depth of one (1) foot across the project site. Additional excavation will likely be required to remove all foundation elements from existing structures and organic material from the densely vegetated areas of the project site. All deleterious materials including roots and organics, foundation elements, building materials, etc. should be removed full-depth from the project site prior to construction.

Stratum II – Fine-Grained Subgrade Materials

The fine-grained subgrade materials that make up Stratum II exhibited low to high plasticity characteristics. The fine-grained subgrade materials include Lean Clay (CL), Sandy Lean Clay (CL), Lean Clay with Sand (CL), Sandy Lean Clay with Gravel (CL), Sandy Fat Clay (CH), and Fat Clay with Sand (CH). The Stratum II materials contained varying amounts and gradations of sand and gravel.

The CL materials were encountered as light brown to brown, reddish-brown, reddish-brown to brown, dark reddish-brown, and dark brown in color. Consistency values ranged from medium-stiff to hard with corresponding N-Values from 4 to greater than 50. Soil moisture content for the CL materials ranged from 7.9 to 24.0 percent based on ASTM D2216. The CL soils are considered moisture-sensitive and may lose significant strength upon saturation and/or disturbance.

The CH materials were encountered as light reddish-brown and dark reddish-brown in color. Consistency values ranged from stiff to very stiff with corresponding N-Values ranging from 9 to 27. Soil moisture content for the CH materials was found to range from 11.9 to 24.2 percent. The CH soils are considered moisture-sensitive and may lose significant strength upon saturation and/or disturbance.

Stratum III – Coarse-Grained Subgrade Materials

The coarse-grained subgrade materials that make up Stratum III exhibited negligible to high plasticity characteristics. The coarse-grained subgrade materials include Clayey Sand (SC), Clayey Sand with Gravel (SC), Clayey Gravel with Sand (GC), and Silty Gravel with Sand (GM). The Stratum III materials contained varying amounts and gradations of sand and gravel.

The SC materials were encountered as reddish-brown, reddish-gray, reddish-orange to reddish-brown in color. Consistency values ranged from medium-dense to very dense with corresponding N-Values ranging from 19 to greater than 50. Soil moisture content for the SC materials was found to range from 3.7 to 26.7 percent.

The GC materials were encountered as reddish-brown, light reddish-brown, and dark reddish-brown in color. Consistency values ranged from loose to very dense with corresponding N-values ranging from 4 to greater than 50. Soil moisture content for the GC materials ranged from 7.9 to 35.1 percent.

The GM materials were encountered as light reddish-brown in color. Consistency values ranged from very loose to medium-dense with corresponding N-Values ranging from 3 to 16. Soil moisture content for the GM materials ranged from 11.8 to 19.4 percent. The GM soils are considered moisture-sensitive and may lose significant strength upon saturation and/or disturbance.

Stratum IV – Cherty Limestone Shelf (Boone Formation)

Stratum IV materials were encountered by project boring B-06 at an approximate depth of 28.5 feet below the existing surface elevation and include light gray limestone with interbedded chert. Approximately five (5) feet of Stratum IV materials were encountered prior to exposing a layer of low-consistency residual materials that resulted in low Rock-Quality Designation (RQD) and low recovery (REC). The low-consistency materials encountered beneath the Stratum IV limestone shelf are referenced as a “void” on the boring log for B-06 due to the relatively low consistency compared to the overlying rock materials. Although a “void” was not present in boring B-09, the recorded RQD, REC, and compressive strength of the sampled rock material is indicative of Stratum IV material as described by this section.

If drilled piers are the preferred foundation type, the presence of non-rock layers beneath the bottom-of-pier elevations may create inadequate conditions from which to support the drilled piers if a sufficient thickness of Stratum IV materials is not left intact. This recommendation is based on the assumed maximum loading conditions. The recorded compressive strength of the Stratum IV material is comparable to that of the Stratum V samples with an average compressive strength of 1,530 kips per square foot (ksf). However, the distinction between Stratum IV and Stratum V is due to the dissolution features (residual soils) encountered at a depth of 31.5 feet and the resulting low RQD of Core Run #2 in boring B-06. Based on the continued coring operations conducted at project boring B-06, consistent rock material was encountered at an approximate depth of 36.5 feet below the existing surface elevation; directly beneath the encountered void. This may be referenced in the below *Stratum V – Consistent Cherty Limestone (Boone Formation)* description.

Stratum V – Consistent Cherty Limestone (Boone Formation)

Stratum V materials include light gray limestone with interbedded chert and high recovery and RQD values. These materials were determined to have an average unconfined compressive strength of 2,426 ksf. The competent, consistent limestone material was encountered between 36.5 and 37.5 feet below the existing surface elevations of the relevant project borings.

As discussed in later sections of this report, probing operations are highly recommended to be utilized during the installation of drilled piers (if relevant) to confirm the consistency of the intended end-bearing material.

Engineer's Analysis and Recommendations

At the time of preparing this report, it is our understanding that the planned Whole Health School of Medicine & Health Sciences will include the construction of an approximately 120,000 sf, three (3) - story medical school building above an underground parking area with an approximate 115-vehicle capacity. Additional pavement improvements are anticipated to include a surface parking area with an approximate 50-vehicle capacity, pedestrian walkways, access drives, and dumpster pads. It is our current understanding that maximum column loads for the planned building will not exceed 1,000 kips. However, smaller loads up to 50 kips are expected as well.

Due to the anticipated loading conditions, two (2) potential foundation recommendations have been provided within this report: a rammed aggregate pier (RAP) subgrade improvement system with shallow foundations, and a deep foundation recommendation consisting of drilled piers. It is our initial recommendation that RAPs would be preferred due to the higher cost of drilled piers associated with the depths to consistent rock encountered across the project site. Should the elevation of the below-grade parking area substantially reduce the depth to competent, consistent rock, the drilled-pier system may become more financially beneficial.

Site Preparation and Grading

The existing surface materials encountered during our investigation consisted of grass, roots, and organics, coarse-aggregate, and flexible asphalt materials with an underlying coarse-aggregate layer in the upper two (2) to six (6) inches below the existing surface elevations. Rigid concrete materials and landscaped rock features were observed within the project area, around existing residential developments.

It is our recommendation that all surface materials including vegetation (grass, roots, etc.), asphalt, concrete, and other materials that may exist in the project area be removed full-depth from beneath all building and site improvement/pavement area dimensions. This includes existing foundations and site developments. An average stripping depth of two (2) feet should be anticipated by the Contractor for initial site grading, with additional undercut required in isolated areas, particularly in areas around project borings B-01 and B-02 and within the footprints of existing onsite developments. These undercuts may be on the order of three (3) feet or more.

Three (3) parcels within the proposed project site contain existing developments. The existing developments are primarily single-family residential structures along with their associated outbuildings and pavement improvements. ***Although not encountered by the terminal depths of any project borings, it is imperative that all remnants of the previous structure(s) be removed full-depth prior to the placement of select fill, new concrete, and structural elements.***

Additional care should be taken by the Contractor to prevent excessive saturation and exposed Stratum II and/or Stratum III subgrade soils, as these materials may potentially lose significant strength upon saturation. This can be achieved by providing positive drainage during construction and covering with select fill material soon after excavation, where applicable. The onsite subgrade soils will be especially susceptible to reduced shear strengths if construction occurs during historically wet portions of the calendar year.

Excavated slopes during construction should be benched or sloped to provide a minimum two-to-one horizontal-to-vertical (2H:1V) ratio. Construction slopes steeper than recommended may be unstable, particularly when introduced to moisture increases during precipitation events. Temporary shoring measures should be anticipated to stabilize construction slopes that are steeper than 2H:1V.

Subgrade Verification

Following stripping and initial grading and prior to the placement of select fill, all improvement areas should be proof-rolled with a fully-loaded tandem-axle dump truck weighing approximately 60,000 pounds, or equivalent construction equipment. The proof-rolling should be observed by the Geotechnical Engineer or his/her representative to verify stable subgrade conditions. Any soft and/or yielding subgrade areas encountered should be repaired by undercutting and backfilling with select fill material.

It is highly recommended that proof-rolling occur after topsoil stripping/initial grading and before fill placement. Based on the data in the boring logs, it is our anticipation that the soils beneath the proposed structure and associated parking areas will be moderately stable at approximately two (2) feet below the existing surface elevations.

Isolated areas may require additional undercutting on the order of 12 to 18 inches depending on site conditions at the time of construction.

The frequency of these areas and the total depth of required undercut may increase based on site conditions at the time of earthwork operations, particularly if construction occurs during a wet weather pattern. MCE recommends that the Contractor anticipates a minimum of 24 inches of select fill material to provide a stable and weather-resistant building pad in both the main structure and parking garage areas, from which to conduct construction activities during the foundation and slab-on-grade project sequences.

General Foundation Recommendations

The building foundations relevant to the planned Whole Health School of Medicine & Health Sciences structure and associated parking features should be sized to meet three (3) conditions. First, the maximum stresses imposed on the foundation strata should not exceed the allowable bearing pressures as determined from the shear strength properties of the bearing strata. Secondly, foundations should be designed to limit the maximum anticipated total and differential settlement to magnitudes that will neither damage nor impair the use of the structures. Finally, the foundation systems must also be designed to resist the anticipated lateral or overturning forces during the most critical loading conditions, including earthquake loadings.

All foundation excavations should be cleaned of loose soil, debris, and water prior to the placement of reinforcing elements and concrete. Foundation excavations should be observed by the Geotechnical Engineer or his/her representative to verify the stability of exposed soils/rock, prior to the placement of fill material, reinforcing elements, or concrete. These factors, as well as additional construction considerations related to the existing soil and ground conditions, were influential in the preparation of the recommendations presented hereinafter.

Subgrade Improvement – Rammed Aggregate Piers (RAPs)

Based on the provided information and assumed loading conditions, the first option to support the new Whole Health School of Medicine & Health Sciences structure and associated parking underground parking structure may be supported by shallow foundations placed on soils improved by a rammed aggregate pier (RAP) system. It is our opinion that RAPs would provide adequate foundation support (based on the current assumed structure loading) and could offer potential cost savings when compared to alternative deep foundation systems such as drilled piers. The recommendation for the RAP system would be aimed at improving the subgrade capacity and conditions within the structure footprint by their installation. The implementation of the RAP system can improve the bearing capacity of otherwise unsuitable subgrade materials so that conventional shallow foundations may be utilized and also reduce the settlement potential for the subgrade soils. The piers are typically constructed by drilling 24 to 30-inch diameter holes to planned terminal depths and backfilling the holes with compacted aggregate. Compaction consolidates the aggregate column and increases lateral stress in the soil matrix.

The system serves to reduce settlement by replacing and reinforcing the relatively loose (compressible) soils in the shallow subgrade material below the planned structure location. The rammed aggregate pier system would provide an additional benefit over drilled pier foundation system in that it would not require temporary or permanent casing elements. The RAP system would provide an advantage over drilled piers in that they would not require additional equipment, such as concrete pump trucks and cranes. The installation of an RAP system is typically more economical and efficient than other deep foundation options, which require achieving a more competent bearing stratum at deeper elevations, with added material costs. It is anticipated that the RAP installation would occur after pad construction (generally two (2) feet of moisture-conditioned and properly compacted select fill material) within the relevant building areas. RAP's may also be required for stabilization beneath any additional site retaining structures, if applicable.

A number of companies capable of the work exist within the region, although Geopier© is the closest provider geographically that is known to design and install the recommended system. The design and performance criteria for these systems are typically provided by the installation contractor. The rammed aggregate piers should be installed to depths and spacing frequencies that improve the proposed structure subgrade areas to provide a minimum net allowable bearing capacity that is sufficient for the project loading. Precise bearing capacity values should be directed by the RAP designer, but a minimum capacity on the order of 6,000 pounds per square foot (psf) can be obtained at the site with an expected settlement range on the order of one (1) inch total long-term and one-half (1/2) inch differential settlement after loading. It is likely that a bearing capacity on the order of 7,000 psf can be achieved, but this should be confirmed with the RAP designer once more finalized structure loading information is available. For rammed aggregate piers that may be in an uplift condition, the initial project design constraints may utilize a maximum uplift capacity of 30 kips per pier. Confirmation of this value should be obtained through the RAP designer. It is likely that the final design uplift value will be in excess of 20 kips per pier. A short-term increase in allowable loadings during seismic and wind events is not recommended at this time.

By providing proper compaction energy, the aggregate piers increase the shear strength of the immediately surrounding soil matrix, which in turn improves the subgrade for an area larger than the actual pier dimensions. Methods of installation that do not provide adequate compaction energy result in placing end-bearing stone columns that extend a vertical load onto deeper bearing strata but do not improve the structure subgrade as intended by the recommendations for this foundation system. A vertically-loaded stone column is not the recommended foundation type and does not provide the same soil improvements as the referenced RAP system.

The RAP installation should be observed continuously by the Geotechnical Engineer or his/her representative. After installation of the rammed aggregate piers and relevant site grading, the structural elements may then be placed on shallow continuous and/or spread foundations that bear on the improved subgrade soils. The shallow foundations should be placed a minimum of two (2) feet below finished exterior ground elevations to protect against frost heave. All foundation excavations should be cleaned of loose soil, debris, and water prior to the placement of reinforcing elements and concrete. Foundation excavation should be observed by the Geotechnical Engineer or his/her representative to verify the stability of exposed soils, prior to placement of fill materials, reinforcing elements, or concrete. Concrete should not be placed on frozen soil.

It is imperative that the Design Team and the RAP designer coordinate regarding planned utility or other excavations that may influence the installed piers or that may be near their zone of influence. Excavations are often possible near the RAP dimensions but should be carefully planned and communicated. Often, cement is added to specific RAPs to prevent loss of aggregate and subgrade competency after excavation. Sometimes the depths of certain RAPs need to be increased, depending on the extent and proximity of the planned excavation.

It is recommended that MCE be present onsite during the installation of the RAP system to ensure compliance with the recommendations above and the intent of the foundation system design.

As previously noted, it is anticipated that a minimum of two (2) feet of select fill material will be required to be placed within the structure footprint to provide a stable working platform and under-slab area.

Shallow Foundation Recommendations

Based on our current understanding of the project scope, anticipated structural loads, and encountered subgrade materials, it is our recommendation that the proposed structure be supported on a conventional shallow foundation system consisting of continuous and individual (spread) footings bearing on the improved subgrade (provided by RAP installation).

The project footings should be excavated so that they may bear on stable subgrade material and placed a minimum of two (2) feet below the finished surface elevations in order to extend below the local frost line. In the unlikely event that soft and/or yielding subgrade areas are discovered within the structure footprint as a result of subgrade verification operations following the RAP installation, those areas should be undercut to stable subgrade materials and backfilled with select fill.

Deep Foundation Recommendations – Drilled Piers

Based on the provided information and assumed loading conditions, we have provided an alternative option to support the new Whole Health School of Medicine & Health Sciences structure and associated underground parking structure including a deep foundation system consisting of grade beams supported on drilled piers. The installation of drilled piers would likely be a tedious process due to the strength and depth of the in-situ rock, as well as the inconsistencies with the upper limestone materials at the project site.

The drilled piers should be founded a minimum of two (2) feet into the Stratum IV or Stratum V Limestone materials (rock socket) to provide the net allowable end bearing capacity referenced below. This recommendation is with the expectation that a minimum pier diameter of 36 inches and a maximum pier diameter of 60 inches will be utilized based on our experience with projects of similar scope in the project area. Drilling operations should expect hard rock drilling to be required to complete the recommended rock sockets. The use of drilling slurries is not recommended at this time. The use of shear rings is not currently anticipated.

At the time of this report, it is our understanding that lateral loadings have not been finalized by the design team. Should lateral loads be present within the project scope and drilled piers are determined to be the desirable foundation type, we will expect to issue an Addendum #1 document between 70% DD and 100% DD submittals that provide LPile analysis and lateral loading recommendations. This analysis would be provided as a separate agreement beyond the current project scope covered by this Geotechnical Report. As such, some socket lengths may be extended by the Addendum document to provide the required lateral support. If the information preceding the Addendum determines that extended rock sockets are not a feasible option for providing adequate lateral support and uplift resistance, the Design Team may elect to utilize rock anchors at the bottom of relevant drilled piers. Should they be implemented, the rock anchors may be designed for ultimate grout-to-ground bond strength of 200 pounds per square inch (psi) when utilizing grout with a design strength of at least 5,000 psi.

The anticipated bottom-of-pier elevations and recommended bearing strata may be referenced in Table 3 on the following page. The drilled piers should be designed for end-bearing support. The final drilled pier design may utilize a net allowable end bearing capacity of 100 ksf for the Stratum IV or Stratum V limestone material, based on the data recorded during this investigation and known characteristics of the rock formation in the project area. The provided allowable bearing pressure provides a minimum factor of safety of 3.0 with regard to the encountered rock material. Factors resulting in the allowable capacity included percent recovery, RQD, and ultimate compressive strength. Drilled piers should have a minimum length-to-diameter ratio of 3L:1D. A short-term increase in allowable loadings during seismic and wind events is not recommended at this time.

The recommended bearing stratum should be verified by the inspection of probe holes drilled beyond bottom-of-pier elevations. Current project budgeting and scheduling should expect that probe holes will be drilled for each pier location to determine the presence of weathered or fractured zones and verify the competency of the intended end-bearing material. The probe holes should be drilled beyond the bottom of the foundations (rock socket) to an additional depth of twice the individual drilled pier diameter (2L:1D) or an additional five (5) feet into competent rock, whichever is greater. The ultimate foundation depth should be a minimum of two (2) feet (rock socket) below any encountered fractured, weathered, or dissolution zones. The actual number of probe holes conducted may vary at the discretion of MCE based on the onsite results of probing operations.

Prior to the placement of concrete at each pier location, the Contractor should make a reasonable effort to remove all water and other deleterious material from the drilled pier excavation. While standing water will not reduce the provided bearing capacities of the referenced limestone material, the increased water-to-cement ratio (W/C) may reduce the compressive strength of the concrete as well as the overall strength of the pier foundation.

In the event that groundwater cannot be adequately removed using conventional pump methods, alternative means such as the tremie method should be utilized to displace the existing groundwater during concrete placement. Concrete should be placed directly down the center of the drilled pier under pressure provided by a pump truck or other means, uninterrupted by reinforcing bars or tie-wires. Although groundwater was not encountered during our investigation, it is our recommendation that the Contractor should plan and budget for the utilization of temporary casing during the installation of drilled piers; particularly due to the anticipated depth to competent end-bearing material.

Drilled piers that may be in an uplift condition may utilize an allowable uplift skin friction value of 500 psf for overburden soils, 3 ksf for any weathered/low-competency rock encountered during probing, and 5 ksf for the competent limestone material. ***Skin friction calculations should negate the top two (2) feet of the drilled pier length, regardless of the subgrade material at this depth.***

Total and/or differential foundation settlement under the building structure(s) supported by a drilled pier and grade beam foundation system can be anticipated to be negligible to one-eighth (⅛) inch based on the known loading conditions. Adequate control joints within structure walls should be used to control any settlement that may occur between the foundation piers.

Adequate bearing material should be encountered before beginning the recommended rock socket. This material herein referred to as 'competent', may utilize a net allowable end bearing capacity of 100 ksf for design purposes as previously mentioned. ***It is imperative to note that hard drilling conditions <u>will</u> be presented by the Stratum IV materials and the results of probing operations may require additional drilling through these materials to achieve the required rock socket.***

The competent material is generally described as hard limestone with interbedded chert on the boring logs in Appendix B, and on the Profile of Borings in Appendix D.

Based on our findings, the competent cherty limestone was generally encountered between 26 and 45 feet below the existing surface elevations across the site and extends to greater depths relevant to the current project scope. The elevations at which competent deep foundation bearing material was encountered and the corresponding anticipated bottom of drilled pier elevations are provided in Table 3 below. It should be noted that the estimated drilled pier depths utilize a drilled pier diameter of 36 inches for current reference.

Table 3: Anticipated Drilled Pier Depths and Elevations

Boring ID	Ground Elevation at Boring Location	Auger Refusal Depth (ft)	Est. Elevation of Consistent Rock	Est. Drilled Pier Depth (ft)	Estimated Drilled Pier Elevation (ft)
B-01	1284.0	28.5	1255.5	30.5	1253.5
B-02	1282.5	26.0	1256.5	28.0	1254.5
B-03	1281.5	45.0	1236.5	47.0	1234.5
B-04	1280.0	34.5	1245.5	36.5	1243.5
B-05	1279.5	37.0	1242.5	39.0	1240.5
B-06	1283.5	23.5	1260.0	25.5	1258.0
B-07	1283.0	24.0	1259.0	26.0	1257.0
B-08	1282.5	23.8	1258.8	25.8	1256.8
B-09	1281.0	37.5	1243.5	39.5	1241.5
B-10	1281.0	41.5	1239.5	43.5	1237.5
B-11	1282.5	28.5	1254.0	30.5	1252.0
B-12	1281.5	28.5	1253.0	30.5	1251.0
B-13	1281.5	37.0	1244.5	39.0	1242.5

Elevations shown in Table 3 are rounded to the nearest 0.5 feet, based on the *Boundary & Topographic* survey; provided by Bates & Associates, Inc.

Coring operations at project boring B-06 uncovered a shelf of hard rock, encountered for approximately eight (8) feet, underlain by a five (5) foot layer of non-rock material prior to encountering hard, consistent rock. It is unknown at this time if this condition will be present throughout the project site. Again, we would like to detail the importance of probing a minimum of an additional depth of twice the individual drilled pier diameter (2L:1D) or an additional five (5) feet into competent rock, whichever is greater, beyond the bottom of the rock socket depth.

Groundwater – Site Dewatering

Though groundwater was not encountered by any of the project borings, it is possible that perched groundwater will be encountered during either drilled piers or RAP installation. As water percolates down through the subgrade, it is common for groundwater to "perch" right above hard clays and/or in-situ rock materials. When this situation is encountered during drilling operations, that perched water appears as groundwater. Groundwater observations were made by the drill crew during drilling operations and at the completion of drilling each boring.

Long-term groundwater monitoring was not included in our scope of work. The installation and periodic measurement of monitoring wells would be required to establish seasonal piezometric surfaces below the project site. Building foundations should include perimeter drain systems with a minimum four (4) – inch perforated pipe, drained to daylight or onsite drainage features, but it is not anticipated that the site will require an enveloped waterproofing or dewatering system for the proposed Whole Health School of Medicine & Health Sciences based on the groundwater observations at the time of drilling.

Rock Excavation

It is not anticipated that construction operations will require rock removal techniques (with the exception of drilled pier installation) due to the relatively shallow excavation requirements allowed by the recommended foundation systems compared to the depth at which rock materials were encountered. However, the below-grade parking area may encounter rock material depending on the finalized depth below existing grades and could require the usage of rock removal techniques. Should this be the case, rock removal techniques will likely be required where excavation operations extend beyond auger refusal materials or where N-Values are greater than 50. Refusal materials consisting of limestone with interbedded chert indicative of the Boone Formation were encountered between 23.5 and 45 feet below the existing surface elevations.

The encountered rock materials will be difficult to excavate, particularly in vertical trench excavations, such as project utilities. In this case, excavation operations would require the use of rock removal techniques, such as hammer hoe attachments. Mass excavation of these materials may be more feasible than vertical trench excavation but will likely still require rock removal techniques. As noted previously, drilled pier operations should expect hard rock drilling above the recommended Stratum V end-bearing material to complete the recommended rock sockets.

Table 4: Rock Coring – Depths and Ultimate Strengths

Boring ID	Sample ID	Sample Depth (ft)	Unit Weight (pcf)	Est. Compressive Strength (tsf)
B-06	C-01	24	154.6	949.5
B-06	C-02	30	158.1	959.9
B-06	C-03	40	156.1	1213.2
B-09	C-01	38.5	158.7	533.9
B-09	C-02	46	162.4	618.5

The encountered in-situ rock materials were observed as being a fine-grained limestone with interbedded chert. Estimated compressive strength varied due to the amount of chert as compared to limestone in the collected samples.

Building Slab-on-Grade

Slab-on-grade construction may be utilized where applicable, provided a minimum four (4) inch cushion of sand, crushed stone or gravel is placed below the slab areas with a vapor barrier directly below the concrete.

Depending on the final grading plans, either stable Stratum II/III soils should be exposed beneath the slab dimensions or an appropriate amount of select fill material should be placed to provide stable under-slab conditions, per planned fill operations. The entirety of the slab subgrade area is recommended to be verified during construction by proof-rolling as described in previous sections. Stable subgrade soils should be exposed prior to fill operations, where applicable. All select fill materials should be compacted per the recommendations in Table 6 on the following page.

Site Retaining Structures – Lateral Earth Pressures

At the time of preparing this report, below-grade retaining elements are anticipated to be included within the design of the planned underground parking area. Below-grade retaining structures within the footprint of the planned parking area as well as other potential below-grade features should be designed to resist the minimum equivalent fluid weights provided in Table 5 on the following page. The recommended minimum factor of safety against sliding and overturning is 1.5 and 2.0 respectively. The provided lateral earth pressures assume a drained condition for the backfill material.

To achieve a drained condition, the retaining structures should be backfilled using a free-draining granular material and be provided with thru-wall drains or a gravity trench drain system graded to daylight for the release of any hydrostatic pressure which may develop.

The values provided by Table 5 below for No. 57 or No. 67 crushed stone gravel assume a 1H:1V maximum backfill slope from the heel of the retaining wall foundation. If a vertical "chimney drain" is provided by the No. 57 or No. 67 stone, then the values for onsite soils should be used based on proximity and relevancy towards the material behind the gravel. No. 57 and No. 67 stone used as retaining backfill should be installed in hand-compacted lifts. Select fill material installed behind this crushed stone gravel should be installed and compacted per the recommendations stated in Table 6.

Table 5: Lateral Earth Pressures

Soil/Backfill Type	Moist Unit Weight (lbs/ft^3)	Friction Angle, ϕ (°)	Equivalent Fluid Pressure (lbs/ft^3)		
			Active	Passive	At-Rest
Onsite Soils (Stratum II)	110	15	65	187	82
Onsite Soils (Stratum III)	120	25	49	296	69
Select Fill Material (GC or GM)	120	28	43	332	64
No. 57 or No. 67 Stone	95	35	25	350	41

A coefficient of friction of 0.40 may be used provided the retaining structure is supported on a minimum of four (4) inches of placed and compacted Class 7 Base Course material. A friction value of 0.35 may be used provided the retaining structures are supported directly on select fill material or stable onsite soils.

Select Fill Material

Any select fill material required for the project is recommended to be a locally available reddish-brown silty or clayey chert gravel meeting Unified Soils Classification as a GC or GM material and having a Plasticity Index of 35 or less, a Liquid Limit of 55 or less, a minimum of 30% retained on the ¾-inch sieve and a maximum of 35% passing the No. 200 sieve. Onsite materials, specifically Stratum III materials, may qualify as acceptable for use as select fill material but should be confirmed by classification and proctor testing prior to use on the project.

Any material to be used as select fill on the project should be reviewed and approved by the Geotechnical Engineer. All fill and backfill should be placed in horizontal lifts. When placing fill next to existing slopes, the slope face should be stripped of all vegetation and the face "benched" to allow the placement of horizontal lifts and bonding to the slope face. Table 6 below provides the recommended compaction parameters for select fill and Class 7 base course to be used on the project. Select fill and base course materials meeting the below-stated compaction requirements shall not impact structure settlement beyond the previously stated parameters of each foundation type.

Table 6: Compaction Requirements

Type of Material	Test Specifications	Minimum Dry Density (%)	Optimum Moisture Range (%)
Select Fill	ASTM D698	98	-2% to +2%
Base Course	ASTM D1557	95	Near Optimum

Paved Parking and Driveway Areas

Site grading for the proposed paved parking and driveway areas should consist of initial stripping and proof-rolling as previously described in the *Subgrade Verification* section of the report. Subgrade conditions are generally anticipated to be stable in the upper one (1) to two (2) feet below the existing surface elevation as described in previous report sections. This recommendation assumes that site conditions at the time of construction are similar to those experienced at the time of our investigation.

As with the structure footprint, any soft and/or yielding subgrade materials should be remediated by undercutting and replacement with select fill. The frequency of these areas and the total depth of required undercut may increase based on site conditions at the time of earthwork operations, particularly if construction occurs during a wet weather pattern. Recommendations regarding undercut should be directed and verified by the Geotechnical Engineer, or his/her representative, based on the results of proof-rolling during construction. It is recommended that the Contractor carry an allowance of up to one (1) foot for an additional undercut beyond the recommended minimum stripping depth. Select fill material under the parking and driveway areas should be placed per the requirements in Table 6 above.

Thickened “bridging” lifts in the order of 18 to 24 inches may be utilized if beneficial beneath pavement areas, particularly to prevent additional or excessive undercutting in excess of three (3) feet.

Thickened lifts should only be implemented at the direction of a Geotechnical Engineer. The top eight (8) inches of any thickened lift should be compacted and tested per project specifications. A minimum of one (1) standard lift should be placed above any thickened lift utilized beneath pavement areas. **Bridging lifts should not be utilized within structure footprints.**

Minimum Project Pavement Recommendations

The following pavement recommendations in this section are based on stable subgrade material and/or select fill material existing beneath planned pavement sections. This requirement would be provided by proper placement of approved select fill material and/or stable onsite material being verified by proof-rolling within the pavement subgrade dimensions. Minimum project pavement sections are recommended to be as shown in Table 7 below.

For the recommendations contained herein, light-duty pavements are considered to be those pavements with low-volume traffic areas such as pedestrian sidewalks, parking and staging areas, and areas primarily subjected to passenger vehicles. The standard-duty pavement recommendations in this section are intended to be applicable to higher-volume traffic areas, and other pavement area dimensions that are to be periodically subjected to heavy trucks. The standard-duty pavements are recommended as performing similar to a typical city street pavement section with a residential classification. Heavy-duty pavements are recommended for areas in which a dumpster pad or frequent truck traffic may be utilized.

Table 7: Minimum Recommended Project Pavement Sections

		Light Duty	Standard Duty	Heavy Duty
Concrete Pavement	Portland Cement Concrete	4"	N/A	6"
	Class 7 Base Course (95% MPD)	6"	N/A	8"
	Stable Subgrade or Compacted Select Fill (98% SPD)	24"	N/A	24"
Asphalt Pavement	ACHM Surface Course (1/2")	2"	3"	2"
	ACHM Binder (1")	N/A	N/A	3"
	Class 7 Base Course (95% MPD)	6"	8"	8"
	Stable Subgrade or Compacted Select Fill (98% SPD)	24"	24"	24"

The pavement sections provided by Table 7 should be viewed as minimums and can be increased through the design process by the project Civil Engineer if warranted.

Construction Materials Testing and Special Inspections

Construction materials testing and special inspection services are recommended to be provided by MCE to provide consistency with the recommendations in this report and the documentation of those recommendations being implemented during construction. Testing of the earthwork, concrete, paving, structure and other phases is recommended to be conducted and documented during construction to assure the Owner and Engineer that the construction complies with the specifications. In particular, field verification of earthwork operations will be required to confirm the recommendations contained herein. Additionally, all trenching and excavations should be conducted in accordance with Arkansas State Law and OSHA guidelines and requirements.

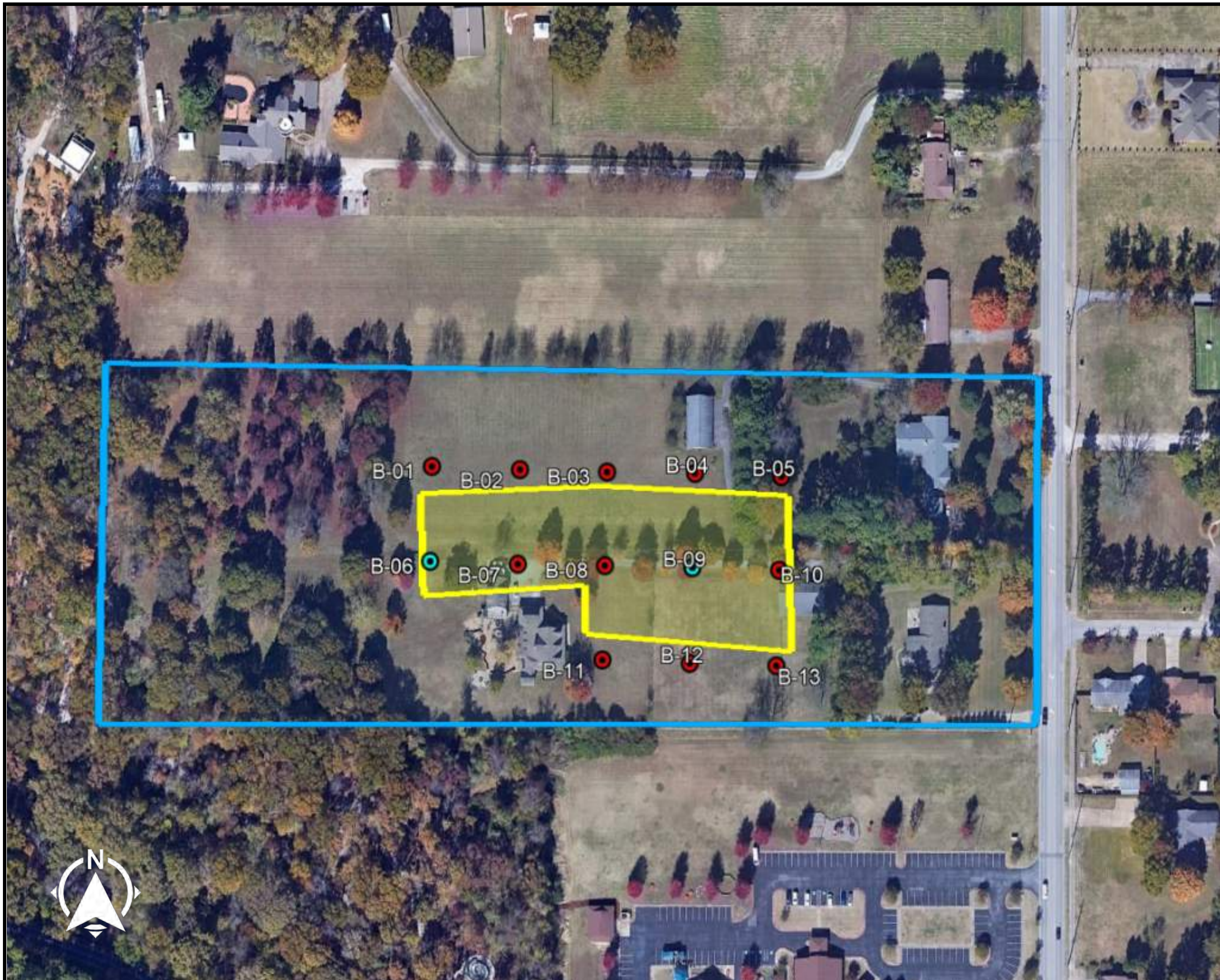
Limitations and Reserved Rights

The recommendations and conclusions made in this report are based on the assumption that the subsoil conditions do not deviate appreciably from those disclosed in the subsurface exploration. Should significant subsoil variations or undesirable conditions be encountered during construction that are not described herein, the Geotechnical Engineer reserves the right to inspect these conditions for the purpose of reevaluating this report. A review of the final construction plans and specifications by this office is encouraged to ensure compliance with the intent of these recommendations.

Appendix A: Boring Layout

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

Little Rock
Fayetteville
Fort Smith
Tulsa



WALTON ENTERPRISES

110 NW 2nd Street, Suite 300
Bentonville, Arkansas 72702

PROJECT NUMBER

21-3942

MCE McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

mce.us.com

Whole Health School of Medicine & Health Sciences

Bentonville, Arkansas

PLATE 1

Appendix B: Boring Logs

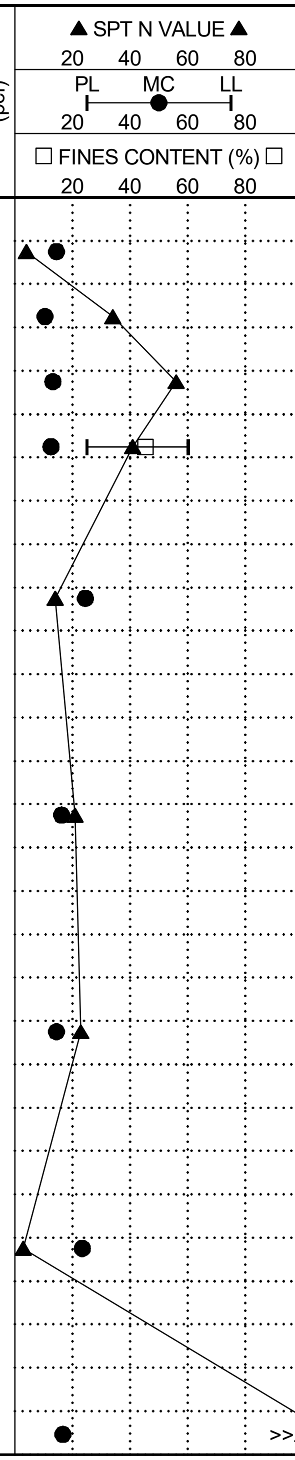
McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE
Little Rock
Fayetteville
Fort Smith
Tulsa

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

BORING NUMBER B-01

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/4/22 **COMPLETED** 1/4/22
GROUND ELEVATION 1284 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY D. Bunch **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (4")					
	(CL) SANDY LEAN CLAY: Light Brown to Brown; Medium-Stiff; Low to Moderate Plasticity; Moist	SS 1	33	1-1-3 (4)		
	- Hard	SS 2	39	16-21-13 (34)		
	(GC) CLAYEY GRAVEL WITH SAND: Dark Reddish-Brown; Very Dense; Moderate to High Plasticity; Little Coarse and Fine Gravel; Few Coarse Sand; Trace Medium and Fine Sand; Moist	SS 3	89	13-39-17 (56)		
5		SS 4	94	12-15-26 (41)		
10	- Medium-Dense	SS 5	106	3-6-8 (14)		
15		SS 6	117	9-15-6 (21)		
20	- Medium-Dense to Dense	SS 7	100	13-15-8 (23)		
25	- Very Loose	SS 8	28	3-2-1 (3)		
		SS 9	100	50/1"		



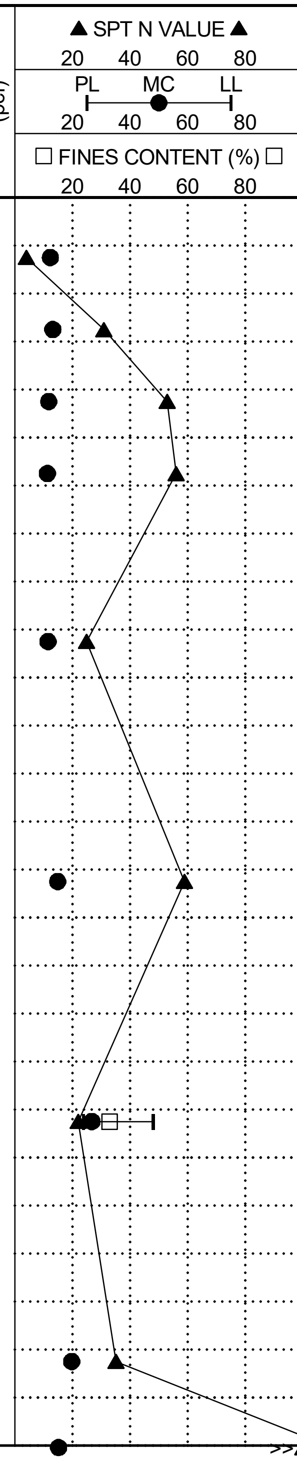
Refusal at 28.0 feet.
Bottom of borehole at 29.0 feet.

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

BORING NUMBER B-02

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/5/22 **COMPLETED** 1/5/22
GROUND ELEVATION 1282.5 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY D. Bunch **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (2")					
	(CL) SANDY LEAN CLAY: Dark Reddish-Brown; Medium-Stiff; Low to Moderate Plasticity; Moist	SS 1	58	2-2-2 (4)		
	- Hard	SS 2	94	5-8-23 (31)		
	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist	SS 3	97	17-25-28 (53)		
5		SS 4	94	17-32-24 (56)		
	- Dense	SS 5	72	7-13-12 (25)		
10						
	- Very Dense	SS 6	78	5-33-26 (59)		
15						
	(SC) CLAYEY SAND WITH GRAVEL: Reddish-Brown; Medium-Dense; Moderate to High Plasticity; Moist	SS 7	72	5-10-12 (22)		
20						
	- Dense	SS 8	92	9-24-11 (35)		
25						
		SS 9	100	50/1"		



Refusal at 26.0 feet.
Bottom of borehole at 26.0 feet.

BORING NUMBER B-03

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises

PROJECT NAME Whole Health School of Medicine & Health Sciences

PROJECT NUMBER 21-3942

PROJECT LOCATION Bentonville, Arkansas

DATE STARTED 1/5/22 **COMPLETED** 1/5/22

GROUND ELEVATION 1281.5 ft **HOLE SIZE** 4.25 inches

DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.

GROUND WATER LEVELS:

DRILLING METHOD Solid Stem Auger

AT TIME OF DRILLING ---

LOGGED BY W. Hopkins **CHECKED BY** D. Lawrence

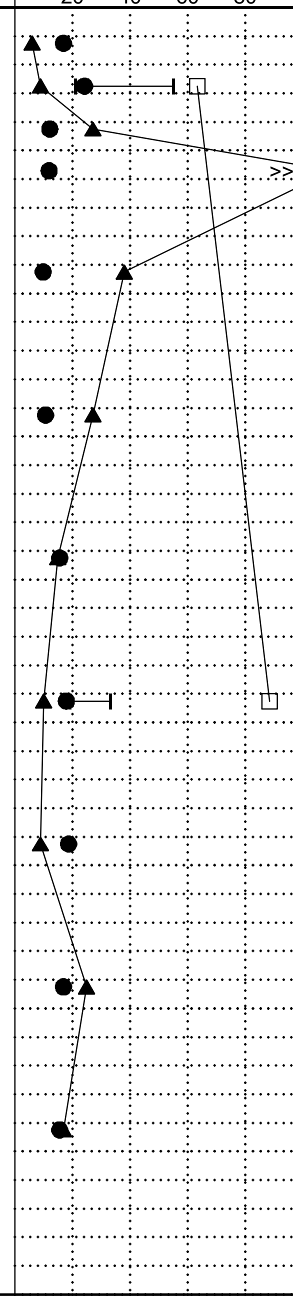
AT END OF DRILLING ---

NOTES Conducted Using A CME 45B Truck-Mounted Rig

AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (3")					
	(CL) SANDY LEAN CLAY: Reddish-Brown to Brown; Medium-Stiff to Stiff; Low to Moderate Plasticity; Moist	SS 1	94	2-2-4 (6)		
		SS 2	58	3-3-6 (9)		
	(CH) SANDY FAT CLAY: Light Reddish-Brown; Stiff; Moderate to High Plasticity; Little Fine Gravel; Few Coarse and Fine Sand; Little Medium Sand; Moist	SS 3	117	4-9-18 (27)		
5	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist	SS 4	76	25-40-50/5"		
10		SS 5	106	6-20-18 (38)		
15	- Dense	SS 6	92	6-14-13 (27)		
20	- Medium-Dense	SS 7	94	5-8-7 (15)		
25	(CL) LEAN CLAY: Dark Reddish-Brown; Stiff; Low to Moderate Plasticity; Moist	SS 8	133	3-3-7 (10)		
30		SS 9	40	5-3-6 (9)		
35	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Dense; Moderate to High Plasticity; Moist	SS 10	47	17-17-8 (25)		
40	- Medium-Dense	SS 11	56	8-8-9 (17)		
45		NR 12				

▲ SPT N VALUE ▲ 20 40 60 80
PL MC LL 20 40 60 80
☐ FINES CONTENT (%) ☐ 20 40 60 80



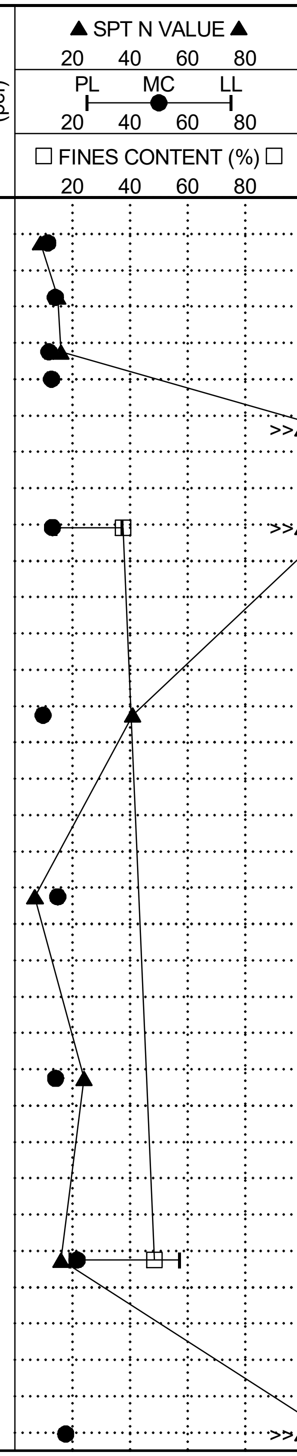
Refusal at 45.0 feet.
Bottom of borehole at 45.0 feet.

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE
McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

BORING NUMBER B-04

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/5/22 **COMPLETED** 1/5/22
GROUND ELEVATION 1280 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Hopkins **CHECKED BY** D. Lawrence
AT END OF DRILLING ---
NOTES Conducted Using A CME 45B Truck-Mounted Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	COARSE-AGGREGATE BASE (6")					
	(CL) SANDY LEAN CLAY: Reddish-Brown; Stiff; Low to Moderate Plasticity; Moist	SS 1	78	5-5-4 (9)		
	- Very Stiff	SS 2	89	4-6-9 (15)		
5		SS 3	100	4-7-9 (16)		
	(SC) CLAYEY SAND WITH GRAVEL: Reddish-Gray; Very Dense; Moderate to High Plasticity; Little Fine Gravel; Few Coarse Sand; Little Medium and Fine Sand; Moist	SS 4	100	13-50/3"		
10		SS 5	100	20-20-50/2"		
15		SS 6	72	10-29-12 (41)		
20	(CL) SANDY LEAN CLAY: Reddish-Brown; Stiff; Low to Moderate Plasticity; Moist	SS 7	117	4-3-4 (7)		
25	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Dense; Moderate to High Plasticity; Little Coarse and Fine Gravel; Few Coarse Sand; Trace Medium and Fine Sand; Moist	SS 8	69	6-10-14 (24)		
30	- Medium-Dense	SS 9	92	8-8-8 (16)		
		SS 10	81	5-12-50/1"		



Refusal at 34.5 feet.
Bottom of borehole at 34.5 feet.

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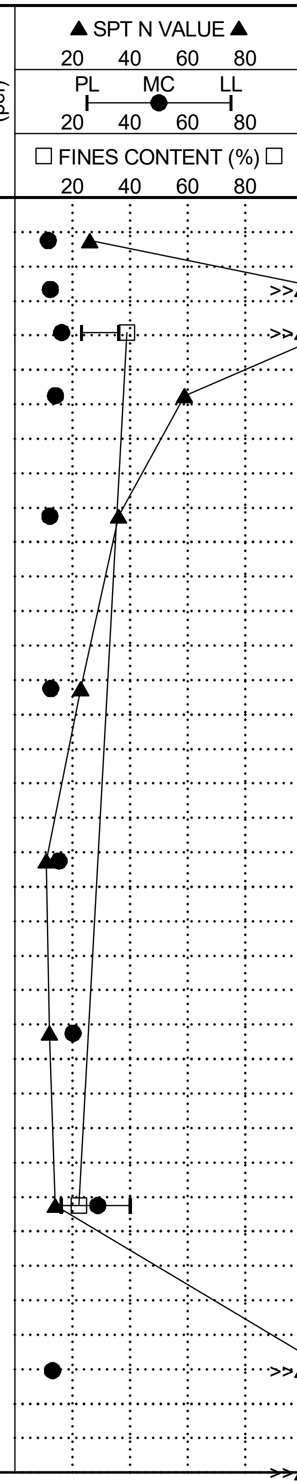
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

BORING NUMBER B-05

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/7/22 **COMPLETED** 1/7/22
GROUND ELEVATION 1279.5 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 6.25"
AT TIME OF DRILLING ---
LOGGED BY J. Self **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0		TOPSOIL (4")					
		(SC) CLAYEY SAND WITH GRAVEL: Reddish-Orange to Reddish-Brown; Dense; Low to Moderate Plasticity; Few Coarse Gravel; Little Fine Gravel; Little Coarse and Fine Sand; Few Medium Sand; Moist	SS 1	100	4-4-22 (26)		
			SS 2	100	5-33-50/4"		
5		- Very Dense	SS 3	100	15-50/4"		
			SS 4	72	14-24-35 (59)		
10		- Dense	SS 5	17	7-13-23 (36)		
15		- Medium-Dense to Dense	SS 6	89	15-13-10 (23)		
20		(GC) CLAYEY GRAVEL WITH SAND: Light Reddish-Brown; Medium-Dense; Moderate to High Plasticity; Little Coarse and Fine Gravel; Few Coarse, Medium. and Fine Sand; Moist	SS 7	56	13-6-5 (11)		
25			SS 8	50	5-7-5 (12)		
30			SS 9	50	5-10-4 (14)		
35		- Very Dense	SS 10	54	10-14-50/1"		
			NR 11		50/0"		



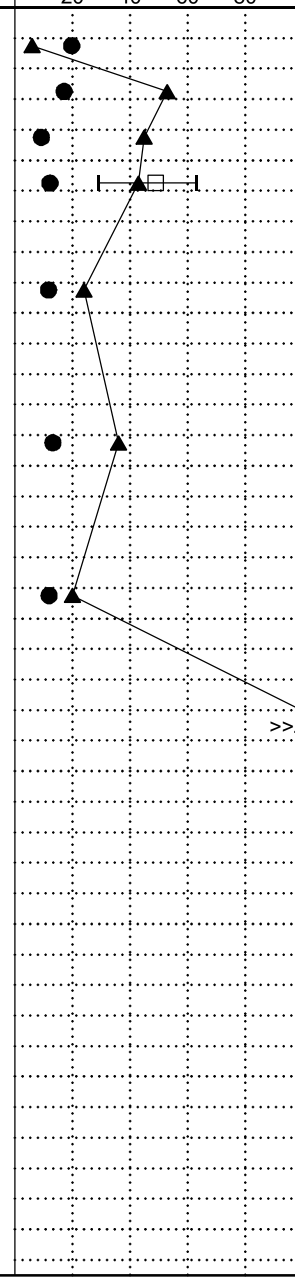
Refusal at 37.0 feet.
Bottom of borehole at 37.0 feet.

BORING NUMBER B-06

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/4/22 **COMPLETED** 1/4/22
GROUND ELEVATION 1283.5 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY D. Bunch **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (3")					
0.25	(CL) SANDY LEAN CLAY: Dark Brown; Medium-Stiff to Stiff; Low to Moderate Plasticity; Moist	SS 1	56	2-2-4 (6)		
2.5	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Trace Coarse Gravel; Some Fine Gravel; Few Coarse and Medium Sand; Trace Fine Sand; Moist	SS 2	56	7-23-30 (53)		
		SS 3	78	12-26-19 (45)		
		SS 4	94	6-9-34 (43)		
	- Dense	SS 5	89	5-8-16 (24)		
		SS 6	78	5-21-15 (36)		
	- Medium-Dense	SS 7	17	5-8-12 (20)		
23.5	LIMESTONE (Boone Formation): Light Gray; Hard; Fine-Grained; Chert Interbedding	SS 8		50/0"		
	Core Sample #1 (24 Feet) Unit Weight: 154.6 pcf Strength: 949.5 tsf — **CORE RUN #1 (23.5-28.5)** REC = 98%RQD = 76%					
	Core Sample #2 (30 Feet) Unit Weight: 158.1 pcf Strength: 959.9 tsf — **CORE RUN #2 (28.5-33.5)** REC = 62%RQD= 45%					
	- Void Encountered from 31.5 to 36.5 feet — **CORE RUN #3 (36.5-41.5)** REC = 98%RQD = 75%					
	Core Sample #3 (40 Feet) Unit Weight: 156.1 pcf Strength: 1,213 tsf					



Refusal at 23.5 feet.
Bottom of borehole at 41.5 feet.

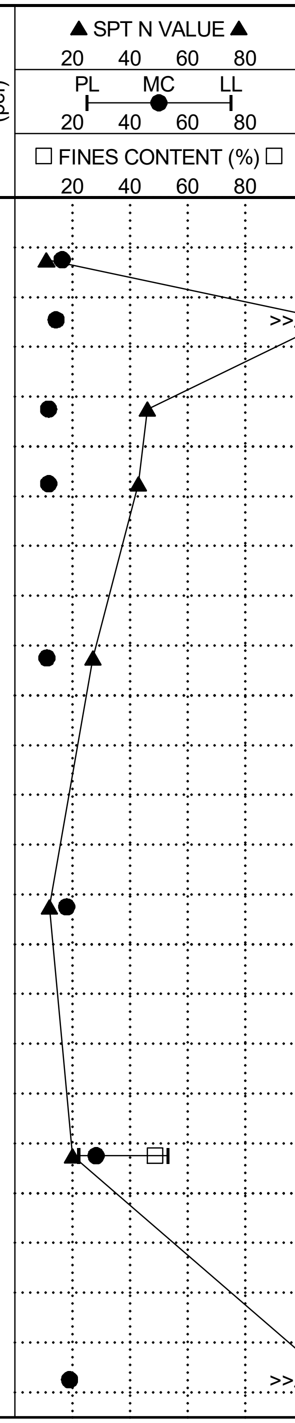
McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

BORING NUMBER B-07

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/6/22 **COMPLETED** 1/6/22
GROUND ELEVATION 1283 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Hopkins **CHECKED BY** D. Lawrence
AT END OF DRILLING ---
NOTES Conducted Using A CME 45B Truck-Mounted Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION
0	ASPHALT (2")
	(CL) SANDY LEAN CLAY: Dark Brown; Stiff; Low to Moderate Plasticity; Moist
	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Some Fine Gravel; Few Coarse, Medium, and Fine Sand; Moist
5	
	- Dense
10	
	- Medium-Dense
15	
20	

SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
SS 1	56	5-4-7 (11)		
SS 2	100	36-50/5"		
SS 3	83	42-36-10 (46)		
SS 4	89	8-28-15 (43)		
SS 5	78	19-16-11 (27)		
SS 6	72	11-5-7 (12)		
SS 7	83	4-9-11 (20)		
SS 8	117	3-50/0"		



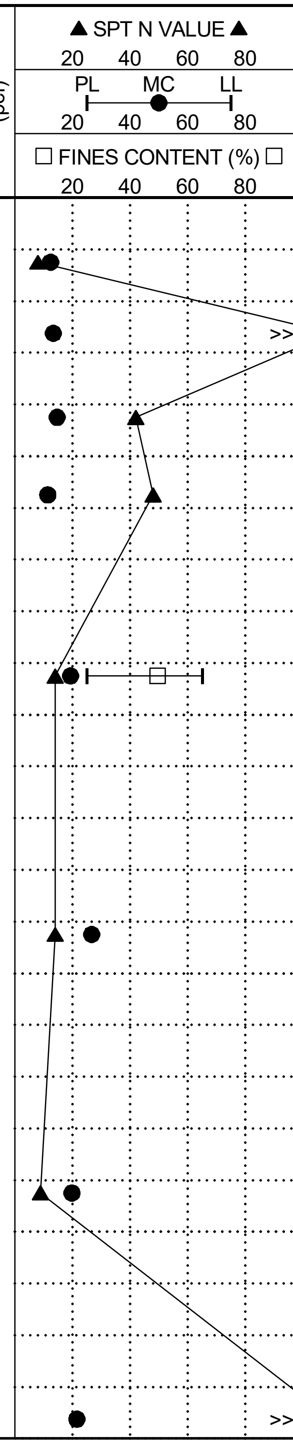
Refusal at 24.5 feet.
Bottom of borehole at 24.5 feet.

BORING NUMBER B-08

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/6/22 **COMPLETED** 1/6/22
GROUND ELEVATION 1282.5 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Hopkins **CHECKED BY** D. Lawrence
AT END OF DRILLING ---
NOTES Conducted Using A CME 45B Truck-Mounted Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	ASPHALT (3")					
	COARSE-AGGREGATE BASE (2")					
	(CL) SANDY LEAN CLAY: Dark Brown; Stiff; Low to Moderate Plasticity; Moist	SS 1	61	7-3-5 (8)		
	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist	SS 2	87	6-9-50/3"		
5		SS 3	100	38-27-15 (42)		
		SS 4	89	20-34-14 (48)		
10	(SC) CLAYEY SAND: Reddish-Brown; Medium-Dense; Moderate to High Plasticity; Few Coarse Gravel; Trace Coarse Sand; Little Medium and Fine Sand; Moist	SS 5	111	6-5-9 (14)		
15		SS 6	106	4-7-7 (14)		
20		SS 7	81	8-5-4 (9)		
		SS 8	100	50/3"		



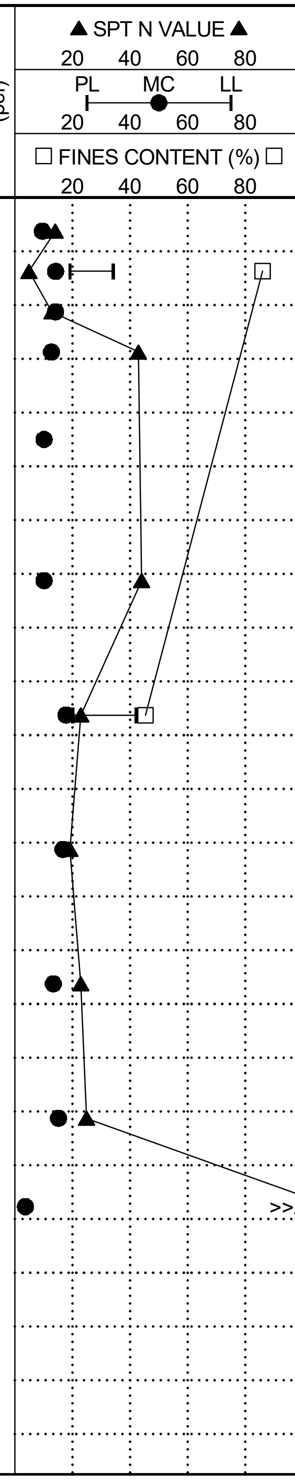
Refusal at 24.0 feet.
Bottom of borehole at 24.0 feet.

BORING NUMBER B-09

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises	**PROJECT NAME** Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942	**PROJECT LOCATION** Bentonville, Arkansas
DATE STARTED 1/5/22 **COMPLETED** 1/5/22	**GROUND ELEVATION** 1281 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.	**GROUND WATER LEVELS:**
DRILLING METHOD Hollow Stem Auger 6.25"	**AT TIME OF DRILLING** ---
LOGGED BY J. Self **CHECKED BY** W. Hopkins	**AT END OF DRILLING** ---
NOTES Conducted Using A Diedrich D-50 Track Rig	**AFTER DRILLING** ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	ASPHALT (3")					
	COARSE-AGGREGATE BASE (4")	SS 1	67	12-6-8 (14)		
	(CL) LEAN CLAY: Dark Brown; Very Stiff; Low to Moderate Plasticity; Trace Fine Gravel; Trace Coarse and Medium Sand; Few Fine Sand; Moist	SS 2	89	2-3-2 (5)		
		SS 3	100	3-5-8 (13)		
	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist	SS 4	100	4-6-37 (43)		
10		SS 5	100	7-50		
		SS 6	78	11-24-20 (44)		
20	(SC) CLAYEY SAND WITH GRAVEL: Reddish-Brown; Medium-Dense to Dense; Low to Moderate Plasticity; Little Fine Gravel; Few Coarse and Medium Sand; Little Fine Sand; Moist	SS 7	67	13-14-9 (23)		
	- Medium-Dense	SS 8	100	6-6-13 (19)		
30	- Medium-Dense to Dense	SS 9	67	14-14-9 (23)		
	- Dense	SS 10	72	7-9-16 (25)		
	LIMESTONE (Boone Formation): Light Gray; Hard; Fine-Grained; Chert Interbedding	SS 11	100	50/1"		
40	Core Sample #1 (38.5 Feet) Unit Weight: 158.7 pcf Strength: 533.9 tsf — **CORE RUN #1 (37.5-42.5)** REC = 50% RQD = 67%					
	Core Sample #2 (47 Feet) Unit Weight: 162.4 pcf Strength: 618.5 tsf — **CORE RUN #2 (42.5-47.5)** REC = 85% RQD = 63%					



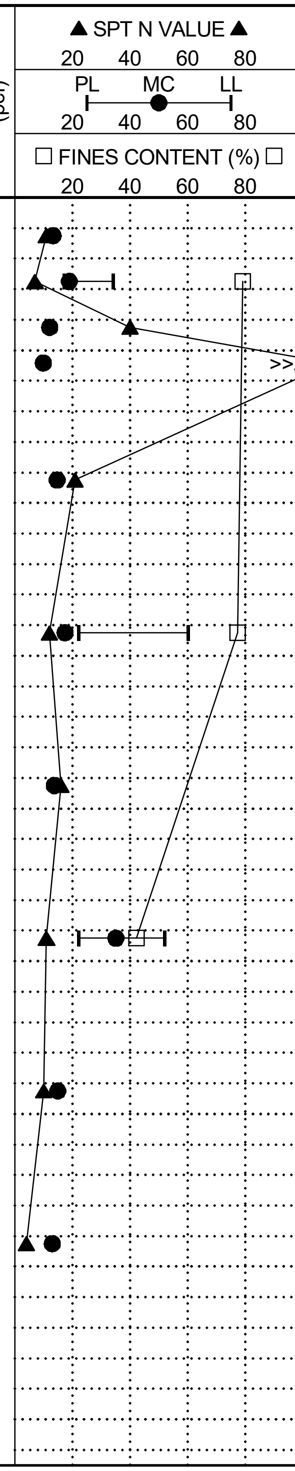
Refusal at 37.5 feet.
Bottom of borehole at 47.5 feet.

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

BORING NUMBER B-10

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/6/22 **COMPLETED** 1/6/22
GROUND ELEVATION 1281 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Hopkins **CHECKED BY** D. Lawrence
AT END OF DRILLING ---
NOTES Conducted Using A CME 45B Truck-Mounted Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	ASPHALT (3")					
	COARSE-AGGREGATE BASE (3")	SS 1	82	5-8-3 (11)		
	(CL) LEAN CLAY WITH SAND: Dark Brown; Stiff; Low to Moderate Plasticity; Few Coarse and Fine Gravel; Trace Coarse, Medium, and Fine Sand; Moist	SS 2	61	2-3-4 (7)		
5	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist	SS 3	111	10-20-20 (40)		
		SS 4	100	23-50/4"		
10	- Medium-Dense	SS 5	81	9-9-12 (21)		
15	(CH) FAT CLAY WITH SAND: Dark Reddish-Brown; Stiff to Very Stiff; Few Fine Gravel; Few Coarse and Medium Sand; Trace Fine Sand; Moist	SS 6	139	5-6-6 (12)		
20	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Medium-Dense; Moderate to High Plasticity; Little Coarse and Fine Gravel; Few Coarse, Medium, and Fine Sand; Moist	SS 7	94	13-6-10 (16)		
25		SS 8	78	5-4-7 (11)		
30		SS 9	72	2-7-3 (10)		
35	- Loose	SS 10	61	3-2-2 (4)		
40		NR 11				



Refusal at 41.5 feet.
Bottom of borehole at 41.5 feet.

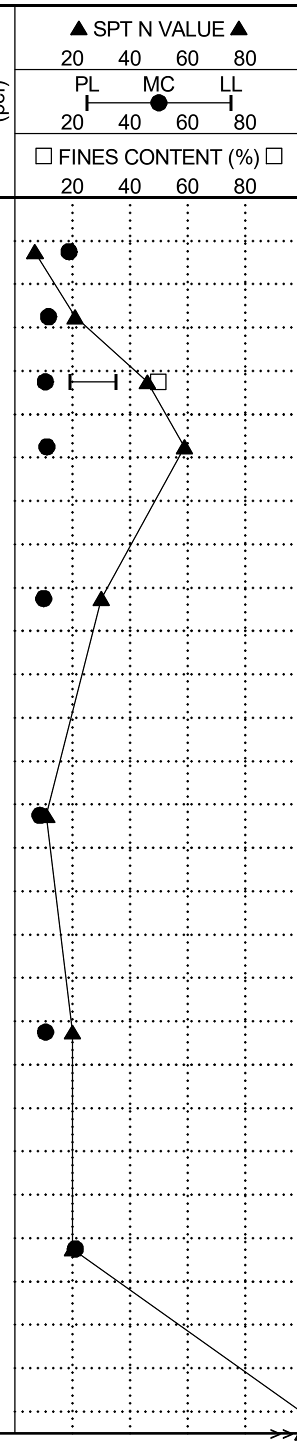
BORING NUMBER B-11

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/7/22 **COMPLETED** 1/7/22
GROUND ELEVATION 1282.5 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 6.25"
AT TIME OF DRILLING ---
LOGGED BY J. Self **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (5")					
	(CL) LEAN CLAY: Dark Brown; Stiff; Low to Moderate Plasticity; Moist	SS 1	122	2-3-4 (7)		
	- Very Stiff	SS 2	122	3-6-15 (21)		
5	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Few Coarse Gravel; Little Fine Gravel; Few Coarse, Medium, and Fine Sand; Moist	SS 3	117	3-19-27 (46)		
		SS 4	111	23-29-30 (59)		
10	- Dense	SS 5	100	11-17-13 (30)		
15	- Medium-Dense	SS 6	89	5-6-5 (11)		
20		SS 7	67	8-9-11 (20)		
25		SS 8	94	8-10-10 (20)		
	Refusal at 28.0 feet. Bottom of borehole at 28.5 feet.	SS 9		50/0"		



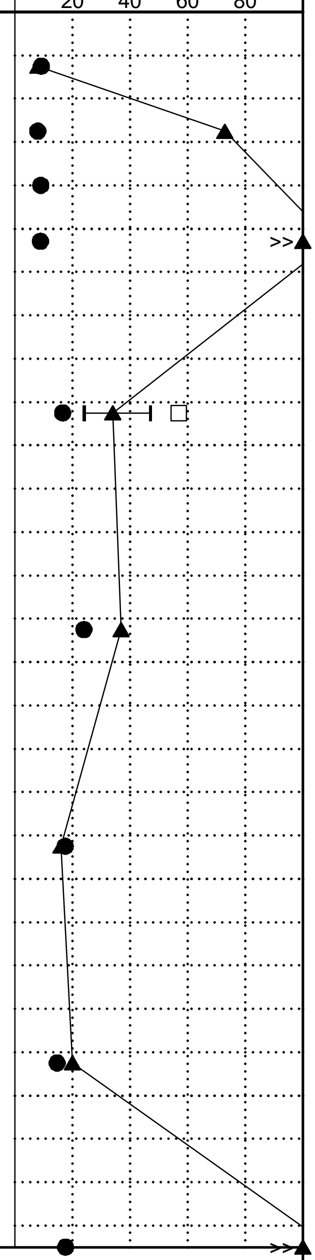
BORING NUMBER B-12

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/6/22 **COMPLETED** 1/6/22
GROUND ELEVATION 1281.5 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 6.25"
AT TIME OF DRILLING ---
LOGGED BY J. Self **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (4")					
	(CL) LEAN CLAY: Dark Brown; Stiff; Low to Moderate Plasticity; Moist	SS 1	133	2-3-5 (8)		
	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist	SS 2	111	8-33-40 (73)		
		SS 3	100	17-50		
5		SS 4	100	38-50/1"		
10	(CL) SANDY LEAN CLAY WITH GRAVEL: Dark Reddish-Brown; Hard; Moderate to High Plasticity; Little Fine Gravel; Few Coarse and Medium Sand; Trace Fine Sand; Moist	SS 5	92	17-16-18 (34)		
15		SS 6	72	4-18-19 (37)		
20	- Very Stiff	SS 7	56	7-8-8 (16)		
25	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Medium-Dense; Moderate to High Plasticity; Moist	SS 8	69	10-11-9 (20)		
		SS 9		50/0"		

▲ SPT N VALUE ▲ 20 40 60 80
PL MC LL 20 40 60 80
☐ FINES CONTENT (%) ☐ 20 40 60 80



Refusal at 28.5 feet.
Bottom of borehole at 28.5 feet.

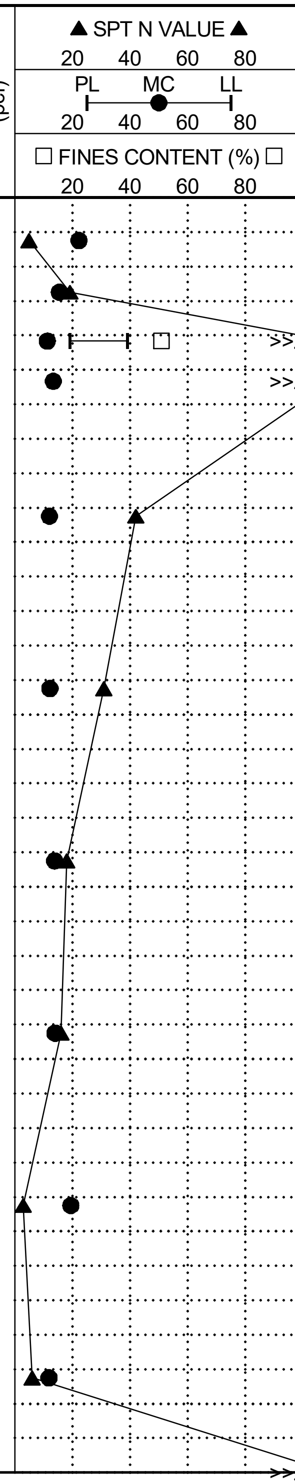
BORING NUMBER B-13

PAGE 1 OF 1

McClelland Consulting Engineers, Inc.
1580 East Stearns Street
Fayetteville, AR 72703
Telephone: 479.587.1303

CLIENT Walton Enterprises
PROJECT NAME Whole Health School of Medicine & Health Sciences
PROJECT NUMBER 21-3942
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 1/6/22 **COMPLETED** 1/6/22
GROUND ELEVATION 1281.5 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 6.25"
AT TIME OF DRILLING ---
LOGGED BY J. Self **CHECKED BY** W. Hopkins
AT END OF DRILLING ---
NOTES Conducted Using A Diedrich D-50 Track Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	TOPSOIL (4")					
	(CL) LEAN CLAY: Dark Brown; Medium-Stiff; Low to Moderate Plasticity; Moist	SS 1	83	0-2-3 (5)		
	(CL) SANDY LEAN CLAY WITH GRAVEL: Reddish-Brown; Hard; Low to Moderate Plasticity; Little Fine Gravel; Little Coarse Sand; Few Medium and Fine Sand; Moist	SS 2	100	3-8-11 (19)		
5		SS 3	100	4-11-50/4"		
		SS 4	100	37-50/2"		
	(GC) CLAYEY GRAVEL WITH SAND: Reddish-Brown; Very Dense; Moderate to High Plasticity; Moist					
10		SS 5	67	11-20-22 (42)		
15	- Dense	SS 6	89	8-16-15 (31)		
20	- Medium-Dense	SS 7	83	9-7-11 (18)		
25	(GM) SILTY GRAVEL WITH SAND: Light Reddish-Brown; Medium-Dense; Negligible to Low Plasticity; Moist	SS 8	56	13-11-5 (16)		
30	- Very Loose to Loose	SS 9	17	3-2-1 (3)		
35	- Loose	SS 10	40	6-3-3 (6)		
		NR 11		50/0"		



Refusal at 37.0 feet.
Bottom of borehole at 37.0 feet.

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KEY TO SYMBOLS

CLIENT Walton Enterprises

PROJECT NAME Whole Health School of Medicine & Health Sciences

PROJECT NUMBER 21-3942

PROJECT LOCATION Bentonville, Arkansas

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

ASPHALT: Asphalt

COARSE-AGGREGATE

CH: USCS High Plasticity Clay

CL: USCS Low Plasticity Clay

GC: USCS Clayey Gravel

GM: USCS Silty Gravel

LIMESTONE: Limestone

SC: USCS Clayey Sand

TOPSOIL: Topsoil

SAMPLER SYMBOLS

No Recovery

Split Spoon

FINE GRAINED ANALYSIS DESCRIPTORS

Descriptor	Meaning
Trace	Less than 5%
Few	5% to 10%
Little	15% to 25%
Some	30% to 45%
Mostly	50% to 100%

IN-SITU SHEAR STRENGTHS

COARSE-GRAINED SOILS			FINE-GRAINED SOILS		
Penetration (blows/foot)		In-Situ Strengths	Penetration (blows/foot)		In-Situ Strengths
Auto	Manual		Auto	Manual	
0 - 3	0 - 4	Very Loose	< 2	< 2	Very Soft
3 - 8	4 - 10	Loose	2 - 3	2 - 4	Soft
8 - 23	10 - 30	Medium-Dense	3 - 6	4 - 8	Medium-Stiff
23 - 38	30 - 50	Dense	6 - 12	8 - 15	Stiff
> 38	> 50	Very Dense	12 - 23	15 - 30	Very Stiff
			> 23	> 30	Hard

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

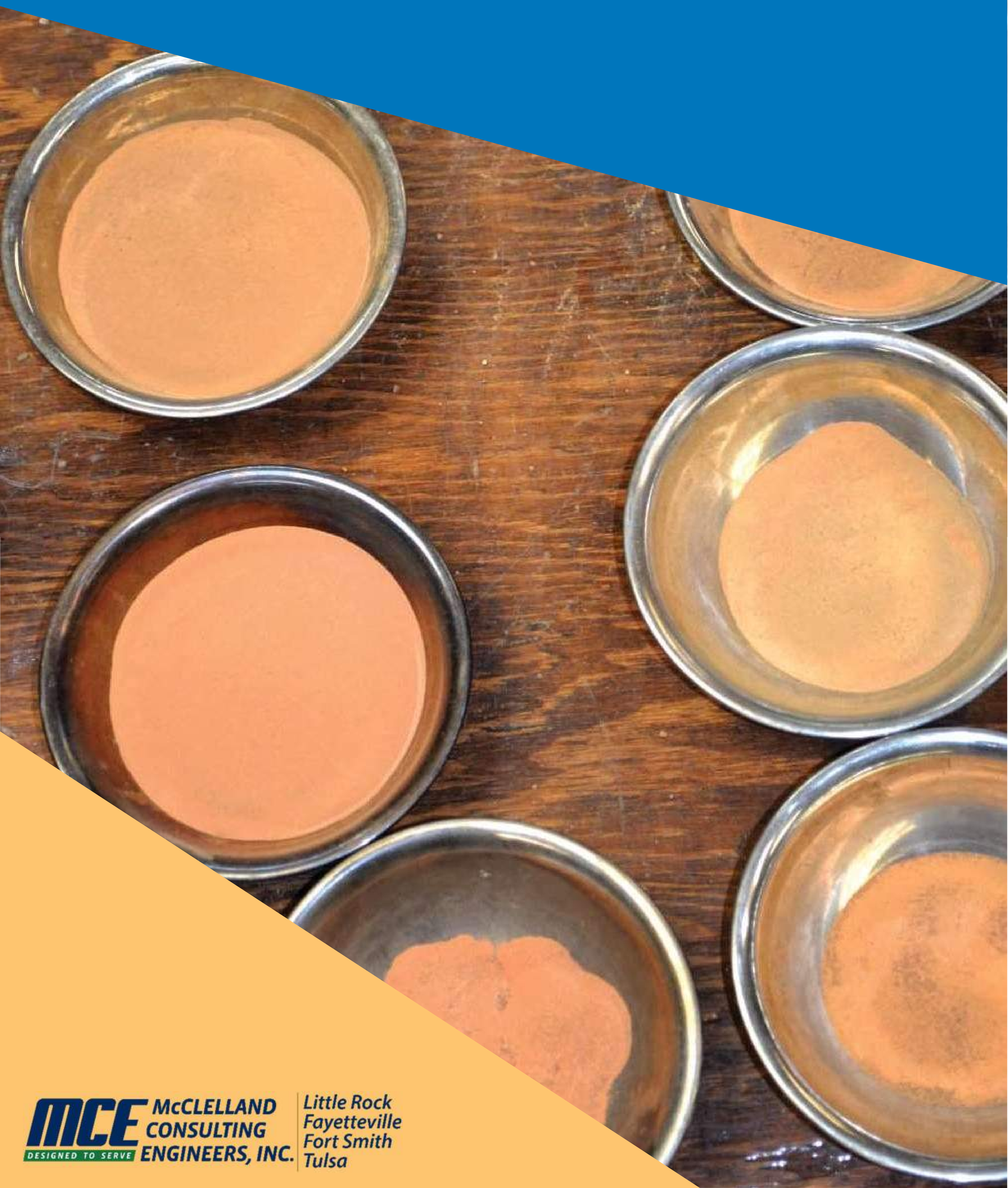
TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

Water Level at Time Drilling, or as Shown

Water Level at End of Drilling, or as Shown

Water Level After 24 Hours, or as Shown

Appendix C: Laboratory Test Results



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SUMMARY OF LABORATORY RESULTS

CLIENT Walton Enterprises

PROJECT NAME Whole Health School of Medicine & Health Sciences

PROJECT NUMBER 21-3942

PROJECT LOCATION Bentonville, Arkansas

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-01	0.5							14.5			
B-01	2.0							10.5			
B-01	3.5							13.2			
B-01	5.0	60	25	35	19	45	GC	12.6			
B-01	8.5							24.5			
B-01	13.5							16.2			
B-01	18.5							14.4			
B-01	23.5							23.4			
B-01	28.5							16.7			
B-02	0.5							12.3			
B-02	2.0							13.2			
B-02	3.5							11.7			
B-02	5.0							11.3			
B-02	8.5							11.5			
B-02	13.5							14.9			
B-02	18.5	48	24	24	25	33	SC	26.7			
B-02	23.5							19.7			
B-02	26.0							15.2			
B-03	0.5							16.8			
B-03	2.0	55	21	34	9.5	63	CH	24.2			
B-03	3.5							12.1			
B-03	5.0							11.9			
B-03	8.5							9.8			
B-03	13.5							10.6			
B-03	18.5							15.6			
B-03	23.5	33	19	14	9.5	89	CL	17.9			
B-03	28.5							18.6			
B-03	33.5							16.9			
B-03	38.5							15.6			
B-04	0.5							11.4			
B-04	2.0							14.0			
B-04	3.5							11.8			
B-04	5.0							12.7			
B-04	8.5	37	14	23	9.5	38	SC	13.0			
B-04	13.5							9.8			
B-04	18.5							14.9			
B-04	23.5							14.1			
B-04	28.5	57	19	38	19	49	GC	21.6			
B-04	33.5							17.7			
B-05	0.5							11.6			
B-05	2.0							12.3			
B-05	3.5	36	23	13	19	39	SC	16.2			
B-05	5.0							14.1			

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SUMMARY OF LABORATORY RESULTS

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PROJECT NUMBER 21-3942 **PROJECT LOCATION** Bentonville, Arkansas

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-05	8.5							12.1			
B-05	13.5							12.5			
B-05	18.5							15.3			
B-05	23.5							20.2			
B-05	28.5	40	16	24	19	22	GC	28.8			
B-05	33.5							13.1			
B-06	0.5							19.7			
B-06	2.0							17.1			
B-06	3.5							9.2			
B-06	5.0	63	29	34	19	49	GC	12.2			
B-06	8.5							11.7			
B-06	13.5							13.2			
B-06	18.5							11.9			
B-07	0.5							16.4			
B-07	2.0							14.3			
B-07	3.5							11.7			
B-07	5.0							11.7			
B-07	8.5							11.1			
B-07	13.5							18.0			
B-07	18.5	53	22	31	9.5	49	GC	28.2			
B-07	23.5							19.0			
B-08	0.5							12.4			
B-08	2.0							13.3			
B-08	3.5							14.7			
B-08	5.0							11.4			
B-08	8.5	65	25	40	19	50	SC	19.3			
B-08	13.5							26.7			
B-08	18.5							19.8			
B-08	23.5							21.5			
B-09	0.5							9.5			
B-09	2.0	34	19	15	9.5	86	CL	14.1			
B-09	3.5							14.1			
B-09	5.0							12.7			
B-09	8.5							10.1			
B-09	13.5							10.1			
B-09	18.5	42	20	22	9.5	45	SC	17.7			
B-09	23.5							16.7			
B-09	28.5							13.3			
B-09	33.5							15.2			
B-09	37.5							3.7			
B-10	0.5							13.2			
B-10	2.0	34	17	17	25	79	CL	18.9			
B-10	3.5							12.1			

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SUMMARY OF LABORATORY RESULTS

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PROJECT NUMBER 21-3942 **PROJECT LOCATION** Bentonville, Arkansas

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-10	5.0							9.9			
B-10	8.5							14.6			
B-10	13.5	60	22	38	4.75	77	CH	17.4			
B-10	18.5							13.7			
B-10	23.5	52	22	30	19	42	GC	35.1			
B-10	28.5							14.9			
B-10	33.5							13.0			
B-11	0.5							18.8			
B-11	2.0							11.7			
B-11	3.5	35	19	16	19	50	GC	10.6			
B-11	5.0							11.1			
B-11	8.5							10.0			
B-11	13.5							8.7			
B-11	18.5							10.6			
B-11	23.5							21.0			
B-12	0.5							9.2			
B-12	2.0							7.9			
B-12	3.5							9.0			
B-12	5.0							8.8			
B-12	8.5	47	24	23	9.5	57	CL	16.6			
B-12	13.5							24.0			
B-12	18.5							17.5			
B-12	23.5							14.7			
B-12	28.5							17.6			
B-13	0.5							22.3			
B-13	2.0							15.4			
B-13	3.5	39	19	20	9.5	51	CL	11.3			
B-13	5.0							13.3			
B-13	8.5							12.0			
B-13	13.5							12.2			
B-13	18.5							13.8			
B-13	23.5							13.9			
B-13	28.5							19.4			
B-13	33.5							11.8			

Appendix D: Subsurface Diagrams

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Plate 19
B-01
B-02
B-03
B-04
B-05
B-06
B-07
B-08
B-09
B-10
B-11
B-12
B-13
Google Earth
N
400 ft

SUBSURFACE DIAGRAM

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CLIENT Walton Enterprises

PROJECT NUMBER 21-3942

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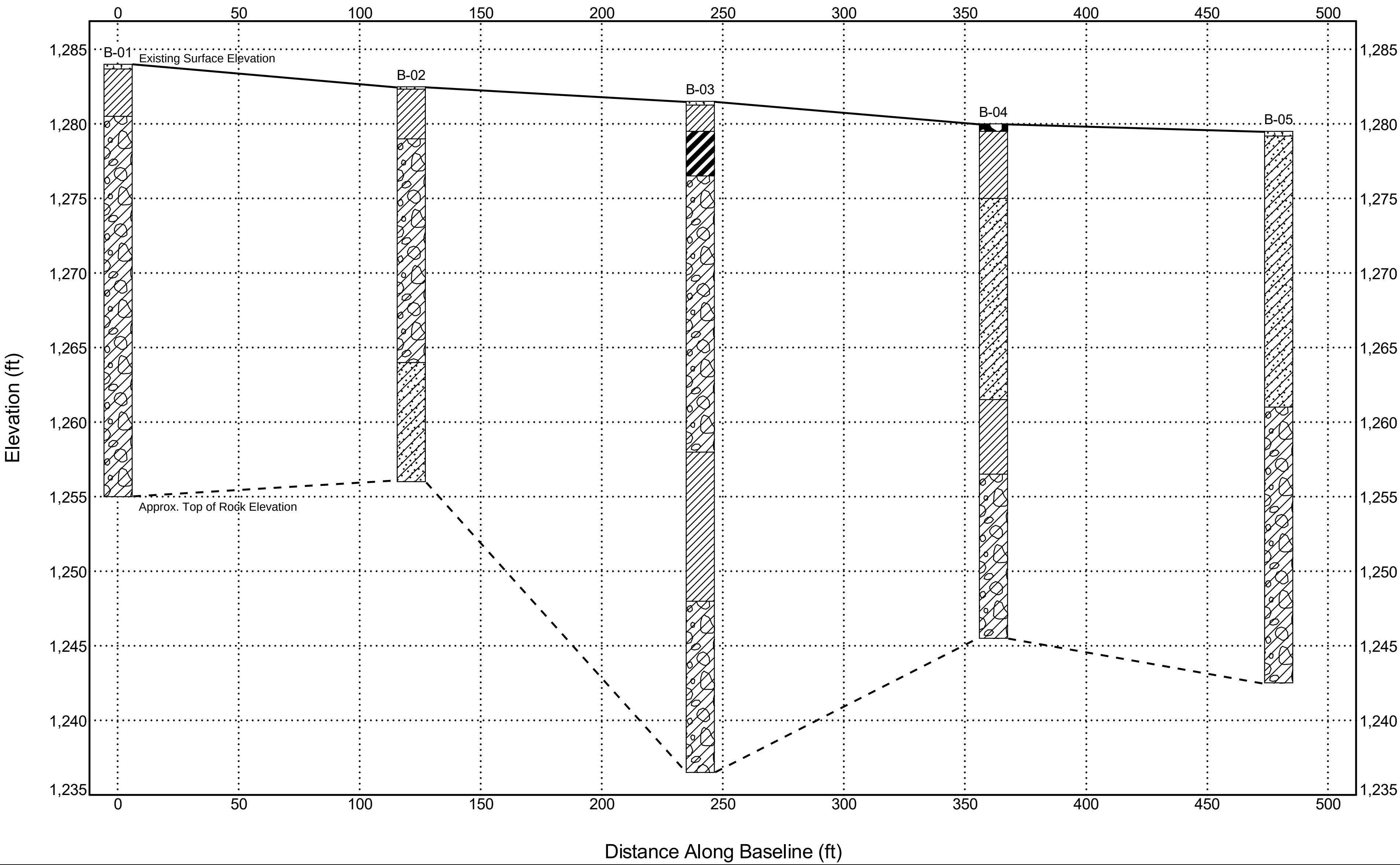

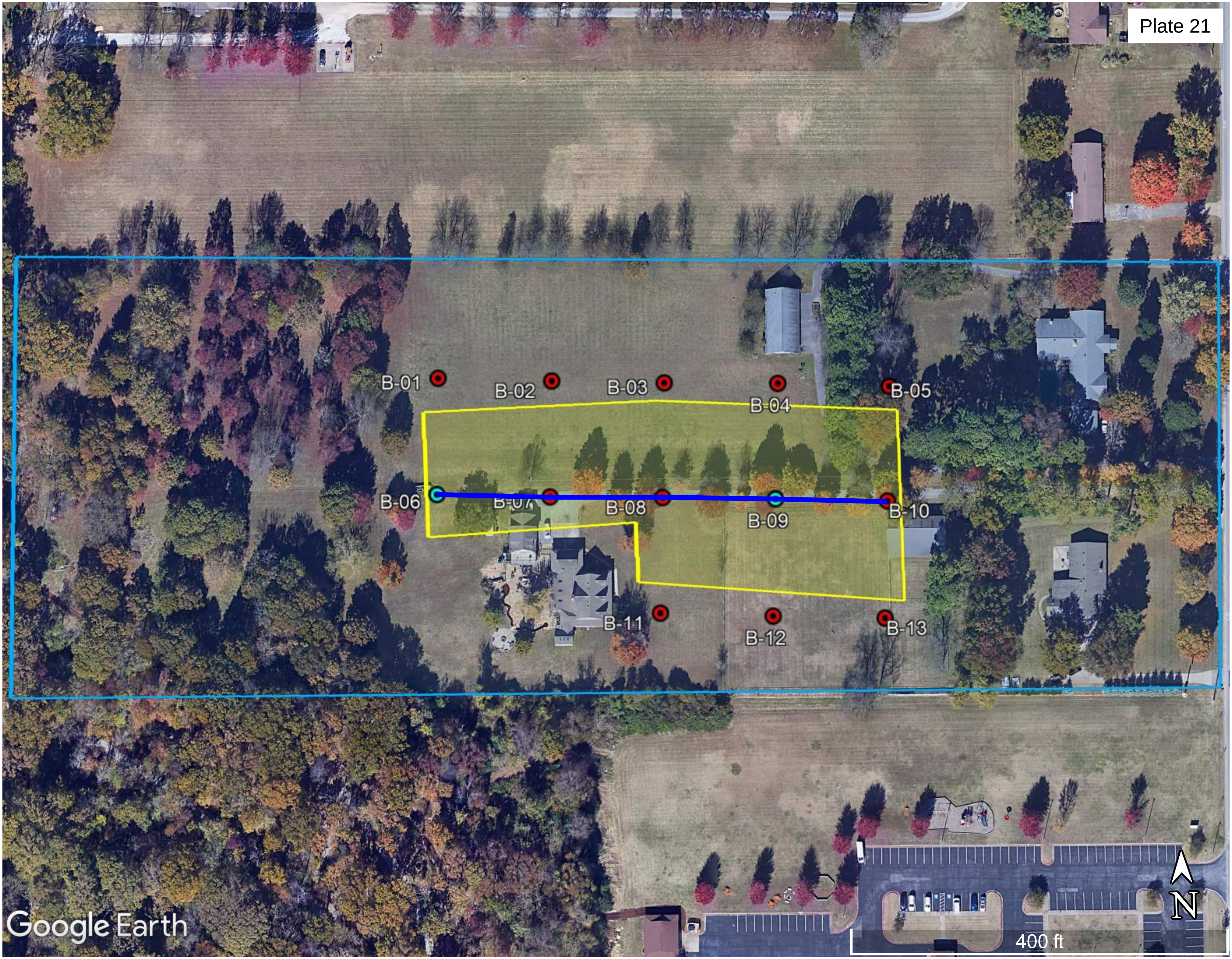

Plate 21
B-01
B-02
B-03
B-04
B-05
B-06
B-07
B-08
B-09
B-10
B-11
B-12
B-13
Google Earth
400 ft
N

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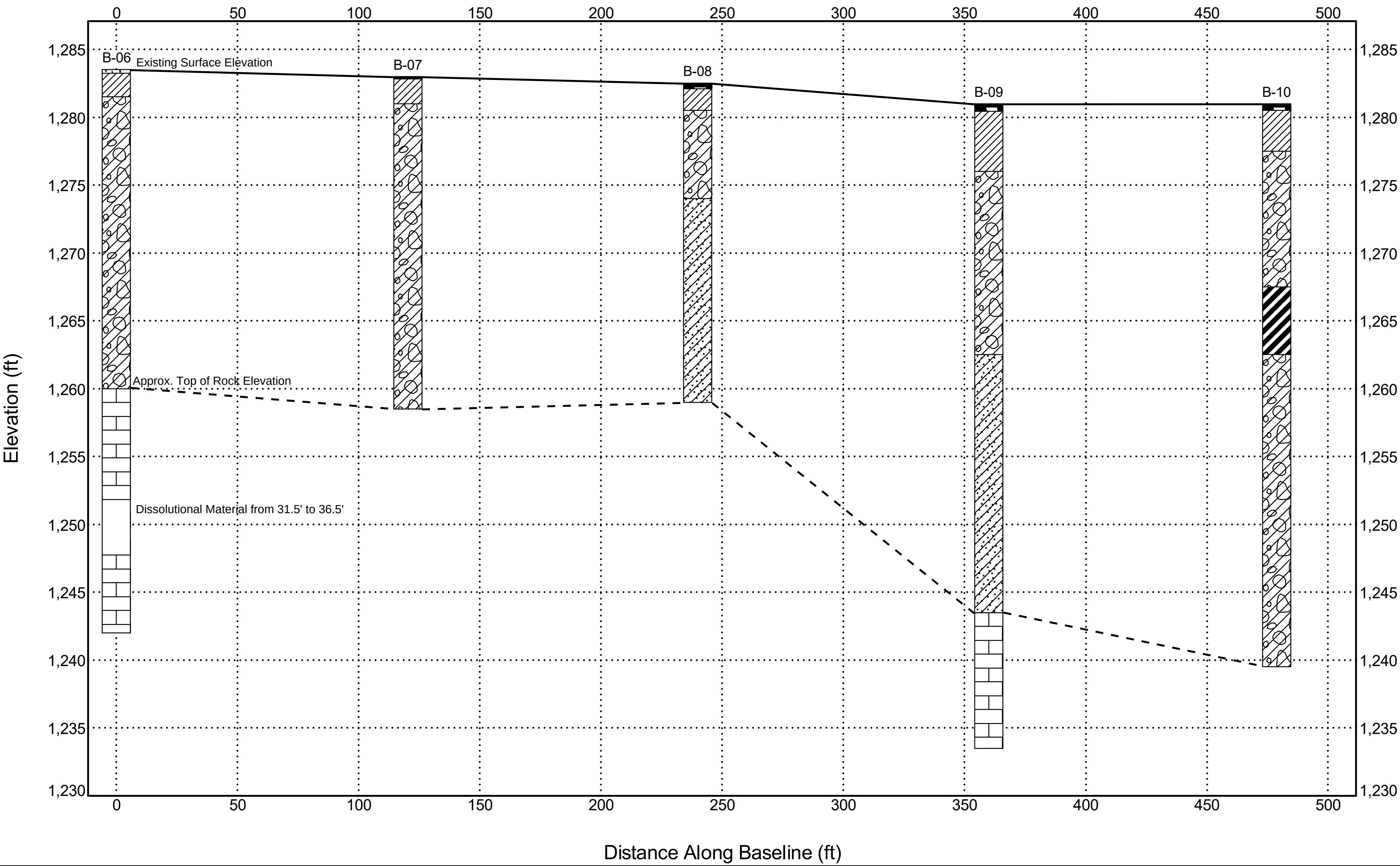
SUBSURFACE DIAGRAM

CLIENT Walton Enterprises

PROJECT NUMBER 21-3942

PROJECT NAME Whole Health School of Medicine & Health Sciences

PROJECT LOCATION Bentonville, Arkansas



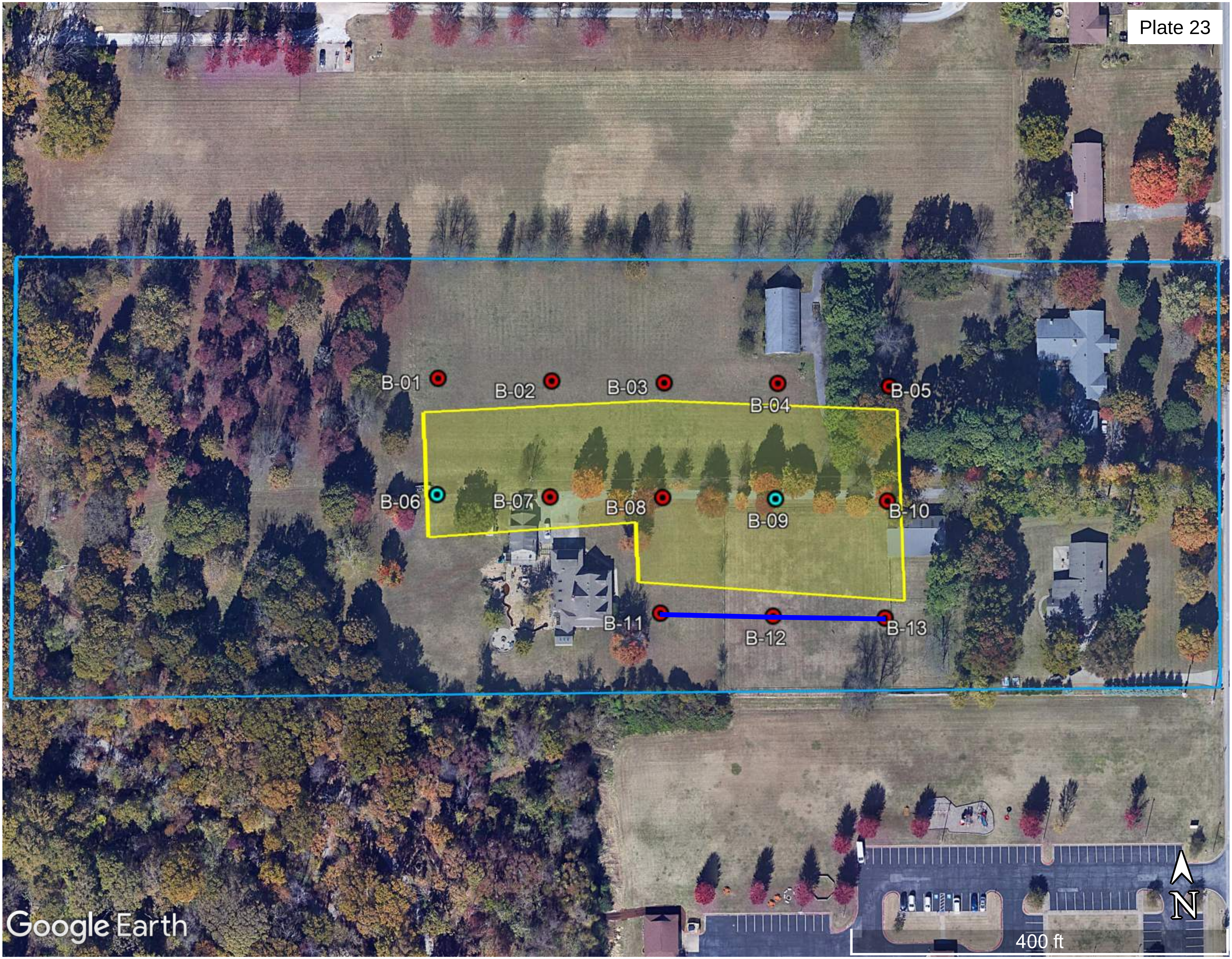


Plate 23
B-01
B-02
B-03
B-04
B-05
B-06
B-07
B-08
B-09
B-10
B-11
B-12
B-13
Google Earth
N
400 ft

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SUBSURFACE DIAGRAM

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