STATE OF ALABAMA
No. 3365
RICK N. LATHAN
REGISTERED ARCHITECT

LATHAN ARCHITECTS

300 CHASE PARK SOUTH • SUITE 200 • HOOVER, ALABAMA 35244
205-988-9112

ADDENDUM NO. 2
CLASSROOM ADDITION TO LINCOLN HIGH SCHOOL
Architect Job No. 22-20
February 28, 2023
DCM # 2023129
Bid Number 1745

ALL BIDS SHALL BE OPENED AT:
2:00 p.m., local time on
Tuesday, March 21, 2023
At Talladega County Board of Education
106 South Street West
Talladega, AL 35161

IF BIDS ARE HAND DELIVERED, THEY MUST BE RECEIVED:
Tuesday, March 21, 2023 between
1:00 - 2:00 p.m., local time
At Talladega County Board of Education
106 South Street West
Talladega, AL 35161

IF BIDS ARE MAILED, THEY MUST BE RECEIVED AT THE OFFICE OF THE ARCHITECT BY:
Lathan Associates Architect, P.C.
300 Chase Park South, Suite 200
Birmingham, AL 35244
10:00 a.m., local time on
Tuesday, March 21, 2023

The Plans and Specifications are here by amended. The following supersedes all contrary and/or conflicting information and is made part of the contract documents.

SPECIFICATIONS

1. Add **Section 01030 Special Requirements**

GEOTECHNICAL INVESTIGATION ENTITLED:

"REPORT OF GEOTECHNICAL EXPLORATION "
PROJECT NO. E1225186
was prepared by: Terracon Consultants, Inc. - 2147 Riverchase Office Road, Birmingham, AL 35244.

The General Contractor and Subcontractors are responsible for familiarizing themselves with geotechnical information, for visiting the site, ascertaining the conditions thereof, and conditions under which work is to be done. The General Contractor shall include in their bid the cost of meeting the requirements and conditions of the geotechnical investigation.
A copy of this report immediately follows this Section.

CLARIFICATIONS

1. **S2.2** the farthest EAST section cut (located at the end of the attic walkway) has been mislabeled. It should reference **Section 5/S3.3.**
2. The owner shall be on spring break during the week of March 20 – March 24, 2023. The board office personnel will not be present to receive mailed in bids. Bid proposal Documents must be delivered in person to the board office on the day of the bid between 1pm and 2pm on March 21, 2023 or must be mailed to Lathan Associates Architects office no later than 10 am on Tuesday, March 21, 2023. **It is the responsibility of the bidder to verify the Architect/Owner have received the Bid Proposal Documents.**

ALL BIDS SHALL BE OPENED AT:
2:00 p.m., local time on
Tuesday, March 21, 2023
At Talladega County Board of Education
106 South Street West
Talladega, AL 35161

IF BIDS ARE HAND DELIVERED, THEY MUST BE RECEIVED:
Tuesday, March 21, 2023 between
1:00 - 2:00 p.m., local time
At Talladega County Board of Education
106 South Street West
Talladega, AL 35161

IF BIDS ARE MAILED, THEY MUST BE RECEIVED AT THE OFFICE OF THE ARCHITECT BY:
Lathan Associates Architect, P.C.
300 Chase Park South, Suite 200
Birmingham, AL 35244
10:00 a.m., local time on
Tuesday, March 21, 2023

APPROVED MANUFACTURERS

The following manufacturers have submitted data for prior approval and have been approved by our office, **contingent upon the stipulation that their products must meet or exceed the contract specifications**.

Product	Manufacturer
FL300T Thermal Storefront System	Coral Architectural Products

Geotechnical Engineering Report

Proposed Lincoln High School Classroom Addition
Lincoln, Talladega County, Alabama
December 7, 2022
Terracon Project No. E1225186

Prepared for:
Talladega County Board of Education
Talladega, Alabama

Prepared by:
Terracon Consultants, Inc.
Birmingham, Alabama

December 7, 2022

Talladega County Board of Education
106 S Street W
Talladega, Alabama 35160

Attn: Dr. Suzanne Lacy

Re: Geotechnical Engineering Report
Proposed Lincoln High School Classroom Addition
Lincoln High School
Lincoln, Talladega County, Alabama
Terracon Project No. E1225186

Dear Dr. Lacy:

Terracon has completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PE1225186 dated October 18, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and other site development elements.

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

Sincerely,
Terracon Consultants, Inc.

Samuel E. Brancheau, P.E.
Project Engineer
Registration PE 50489

Bryan C. Ritenour, P.E.
Senior Engineer
Registration PE 17908

CC: Lathan Architects

REPORT TOPICS

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

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report
Proposed Lincoln High School Classroom Addition
Lincoln High School
Lincoln, Talladega County, Alabama
Terracon Project No. E1225186
December 7, 2022

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed classroom addition to be located at the existing Lincoln High School in Lincoln, Talladega County, Alabama. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per IBC
- Lateral earth pressures

The geotechnical engineering Scope of Services for this project included the advancement of 7 borings to depths of 15 below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section.

SITE CONDITIONS

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

Item	Description
Site Location	The project site is located at the existing Lincoln High School in Lincoln, Talladega County, Alabama. Approximate GPS coordinates are 33.6354N, 86.1025W (see **Site Location**)
Existing Improvements	Mostly grassed, with concrete sidewalks. A drainage swale and culvert runs along the existing asphalt road.
Current Ground Cover	Grass and concrete sidewalks

Item	Description
Existing Topography	The site is relatively level, with about 3 feet of relief from north to west.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. Our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Site layout plan, conceptual grading plan, and information provided via email by Lathan Associates Architects and LBYD
Project Description	Proposed 9 Classroom addition New Restrooms New Teachers Workroom New mechanical room
Building Construction	One-story masonry construction with a concrete slab-on-grade and brick veneer
Finished Floor Elevation	FFE = 530.04
Maximum Loads	Assumed 50 kips for columns Assumed 2 to 3 klf for walls Assumed 100 psf for floor slab
Grading (Assumed)	We anticipate up to 4 feet or less of fill will be required to grade the site. Cuts of 1 feet or less are anticipated within the eastern portion of the building addition.
Retaining Walls (Assumed)	Foundation walls with a maximum height of about 4 feet are anticipated at the western side of the proposed building addition.

GEOTECHNICAL CHARACTERIZATION

Site Geology

Published maps from the Geological Survey of Alabama indicate that the project site lies within the Coosa Valley District of the Alabama Valley and Ridge Physiographic Region, and is underlain by Ordovician- to Cambrian-aged Knox Group undifferentiated. This formation is characterized by light-gray to light-brown locally sandy dolomite, dolomitic limestone, and limestone, and abundant light-colored chert.

Carbonate rocks, such as those underlying the subject site, are soluble in slightly acidic groundwater. Weathering is typified by a chemical solutioning process that progresses along joints, fractures and bedding planes in the bedrock. This process often results in a highly irregular rock profile that contains deep weathered slots filled with soft soils. Voids or caves may also be present in the bedrock. Surface depressions or sinkholes are formed when the soil overburden is lost into these subsurface caverns.

No visible evidence of sinkholes was noted on the project site during the course of this exploration. However, as with any site underlain by a carbonate bedrock formation, there is always the risk of future sinkhole development. Prediction of future sinkhole occurrence is very difficult and even an extensive subsurface exploration would not likely rule out the possibility of sinkhole activity. Should sinkholes be encountered during construction, we can provide sinkhole remediation recommendations.

Subsurface Conditions

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the individual boring logs.

Model Layer	Layer Name	General Description
1	**Topsoil**	Dark Brown
2	**Existing Fill**	Typically dark red-brown sandy lean clay and fat clay with variable gravel content, contains trace topsoil
3	**Silts and Sands**	Orange-brown, hard silts (ML) with variable sand content, and very dense silty sand (SM)
4	**Clays and Clayey Sand**	Typically varicolored, very stiff to hard clays (CL/CH) with variable sand and gravel content, and medium dense clayey sand (SC) with variable gravel content

All of the borings were terminated at the target depth of 15 feet below the ground surface. Please refer to the **Exploration Results** for further information.

Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not observed in any of the borings during exploration.

A relatively long period of time may be necessary for a groundwater level to develop and stabilize in a borehole in these materials, particularly in the weathered rock. Further, potential groundwater levels in the shale bedrock could not be observed, as water is artificially added to the borehole during the coring process. Long term observations in piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs.

GEOTECHNICAL OVERVIEW

Based on the information obtained from our subsurface exploration, the following geotechnical considerations were identified:

Beneath the 2- to 3-inch topsoil layer, where encountered, existing fill consisting of sandy lean clay, fat clay, and silty sand was encountered in borings B-1, B-2 and B-3 to depths of 3 to 6 feet below existing grade. However, the upper 3 feet of the existing fill appears to be mixed with topsoil. With the exception of the upper 3 feet in boring B-2, Standard Penetration Test (SPT) N-values taken in the fill indicate some degree of compactive effort during placement.

Below the fill, or topsoil/ground surface in all other borings, the borings encountered native, stiff to hard clays and silts with variable sand and cherty gravel content, and medium- to very-dense clayey and silty sands with variable cherty gravel content.

The fill containing topsoil (i.e. upper 3 feet) does not appear to be suitable for support of footings, or for support of floor slabs and new engineered fill. Therefore, we recommend the upper 3 feet of existing fill be completely removed and replaced with new engineered fill. The undercut excavation should extend at least 5 feet beyond the building limits.

After removal of the topsoil and concrete sidewalks where applicable, followed by the recommended undercutting of the topsoil laden existing fill, and any initial cuts to achieve finished subgrade, the exposed subgrade should be proof rolled with a fully-loaded tandem axle dump truck. The proof roll should be performed under the direction of the Geotechnical Engineer, and any areas exhibiting excessive moisture and/or deflection (pumping/rutting) should be undercut and replaced with new engineered fill in accordance with the **Fill Material Types** and **Fill Material Requirements** section of this report.

The native silty and clayey soils will become unstable with typical earthwork and construction traffic, especially after precipitation events. The effective drainage should be completed early in the construction sequence and maintained after construction to avoid potential issues. If possible, the grading should be performed during the warmer and drier times of the year. If construction begins in the winter months, the risk for undercutting and replacement of unstable soils or the need for other mitigation measures increases. Options for stabilization of subgrade include but are not limited to undercutting and replacement or cement stabilization.

Due to the currently developed nature of the site, we caution that burn pits, burial pits, organic debris, construction debris or other deleterious materials could exist, between or away from our test borings. Buried debris may not become evident until construction. All buried utilities currently used to service the existing developments onsite will likely require removal and replacement. We anticipate existing fill to be encountered mostly along the existing drainage ditch, which parallels the northern and western footing edges of the proposed building addition.

Following proper site preparation measures, the approved native soils, approved existing fill and new engineered fill will provide adequate support for shallow spread footing foundations and floor slabs. The **Shallow Foundations** section addresses foundations bearing on new engineered fill or suitable natural soils. The **Floor Slabs** section addresses slab-on-grade support on native soils, approved existing fill, or new engineered fill. We recommend that the geotechnical engineer be retained to evaluate the bearing material for the foundations. Subsurface conditions, as identified by the field and laboratory testing programs, have been reviewed and evaluated with respect to the proposed plans known to us at this time

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, excavations, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and floor slabs.

Site Preparation

The first phase of construction should consist of removing all topsoil, vegetation, concrete sidewalks, and any other deleterious materials from the site. Often, poorly compacted backfill is found in the trenches made to install the buried utilities. The upper 3 feet of existing fill soils, where encountered, should be completely removed and replaced with engineered fill.

After the required clearing, grubbing, and recommended removal of existing fill, but prior to placing any new fill, the subgrade should be compacted. Following compaction, the subgrade should be proof-rolled with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck. The proof-rolling should be performed under the observation of the Geotechnical Engineer. Areas excessively deflecting under the proof-roll should be delineated and subsequently addressed by the Geotechnical Engineer. Such unstable areas will require undercutting and replacement in building areas. Undercutting of unstable subgrade should extend 5 feet beyond the building lines.

Following the Engineer's evaluation and any necessary undercut or stabilization efforts, new engineered fill may be placed to establish the planned finish grade.

Fill Material Types

Earthen materials used for structural and general fill should meet the following material property requirements:

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Lean clay	CL (LL<50 and PI<25)	All locations and elevations
Silt	ML (LL<50 and PI<25)	All locations and elevations
Sand	SW, SC, SM, SP	All locations and elevations
On-Site Soils	Varies	All native soils which are free of organics appear suitable for reuse as fill; however, moisture conditioning (wetting or drying) should be anticipated if on-site soils are used as fill. Existing fill soil containing topsoil should not be reused as engineered fill.

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

Fill Compaction Requirements

Structural fill should meet the following compaction requirements.

Item	Structural Fill
Maximum Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used

Item	Structural Fill
Minimum Compaction Requirements [1]	98% of maximum standard Proctor density at all locations and elevations
Water Content Range [1]	Low plasticity cohesive: -2% to +2% of optimum Granular: -3% to +4% of optimum

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the guidance of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proof-rolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building area. One density and water content test should be performed on each lift of fill for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Shallow Foundation Design Parameters – Compressive Loads

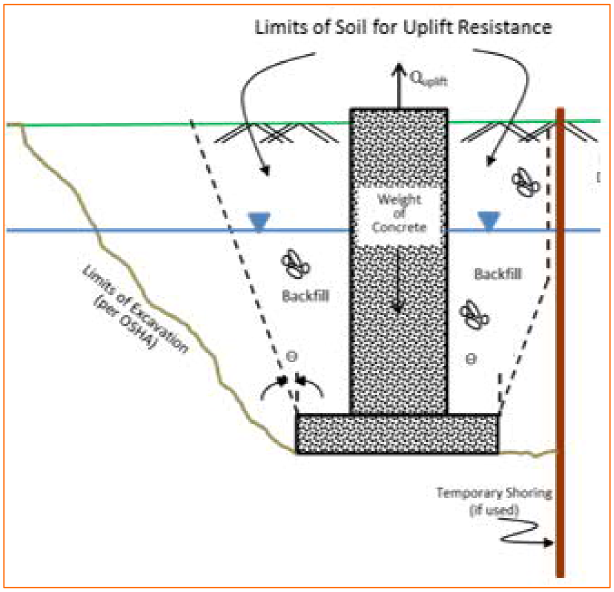
Item	Description
Maximum Net Allowable Bearing pressure [1, 2]	2,000 psf
Required Bearing Stratum [3]	Stiff/ medium dense or better native soils, new engineered fill, or approved existing fill
Minimum Foundation Dimensions	Columns: 30 inches Continuous: 18 inches
Ultimate Passive Resistance [4] **(equivalent fluid pressures)**	330 pcf (cohesive backfill) 420 pcf (granular backfill)
Ultimate Coefficient of Sliding Friction [5]	0.30

Minimum Embedment below Finished Grade [6]	18 inches
Estimated Total Settlement from Structural Loads [2]	1 inch or less
Estimated Differential Settlement [2, 7]	¾ inch or less

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. These bearing pressures can be increased by 1/3 for transient loads unless those loads have been factored to account for transient conditions. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**.
3. Bearing material should be observed by Terracon prior to steel reinforcement placement. Undercutting of existing topsoil-laden should be anticipated.
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Apply a factor of safety of at least 1.5 when designing for lateral force resistance to reduce the lateral movement necessary to mobilize this force.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions.
6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7. Differential settlements are as measured over a span of 40 feet.

Shallow Foundation Design Parameters - Uplift Loads

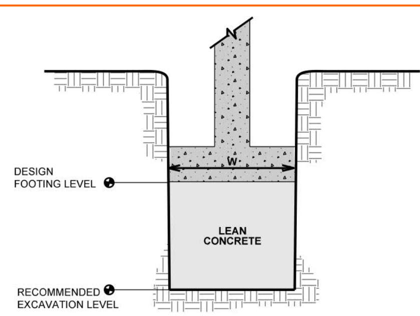
Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle, θ, of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A maximum total unit weight of 120 pcf should be used for the backfill. This unit weight should be reduced to 57 pcf for portions of the backfill or natural soils below the groundwater elevation.



Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Some undercutting of low consistency native soil should be anticipated. Therefore, if unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the sketch below.



LEAN CONCRETE BACKFILL

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 15 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area.

FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support [1]	Minimum 4 inches of free-draining (less than 5% passing the U.S. No. 200 sieve) [2, 3] Stiff/medium dense or better native soils, approved existing fill, or new engineered fill underlying the free-draining crushed aggregate
Estimated Modulus of Subgrade Reaction [2]	110 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Free-draining granular material should have less than 5% fines (material passing the No. 200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

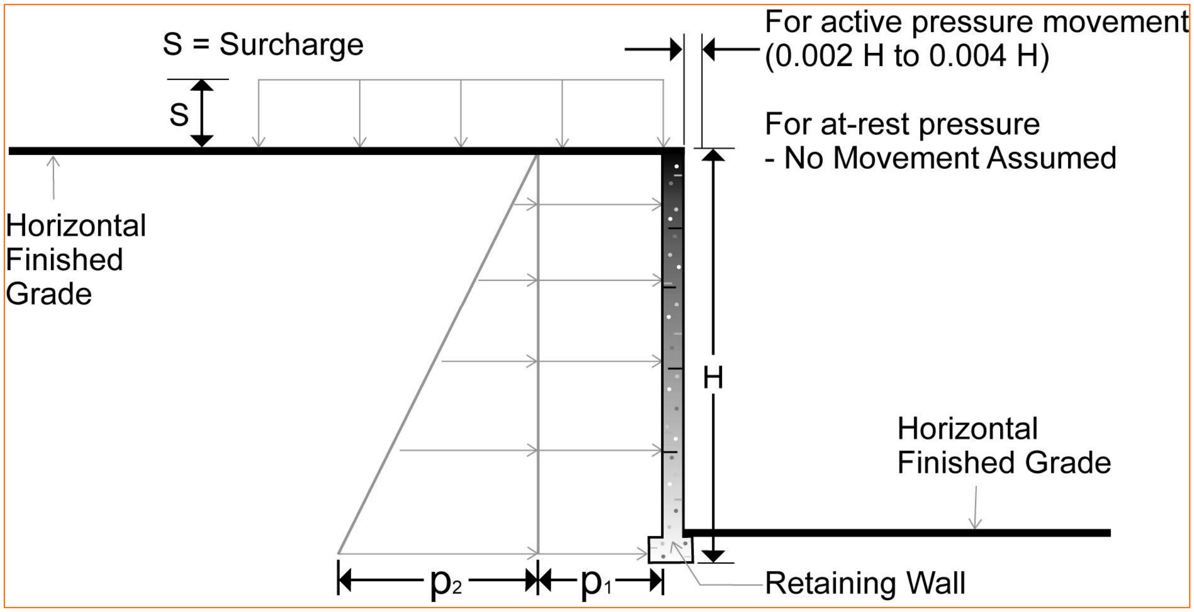
Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

LATERAL EARTH PRESSURES

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The “at-rest” condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Earth Pressure Conditions	Coefficient for Backfill Type	Equivalent Fluid Density (pcf)	Surcharge Pressure, p_1 (psf)	Earth Pressure, p_2 (psf)
Active (Ka)	Crushed Stone - 0.26 Engineered Soil Fill - 0.36	29 45	(0.26)S (0.36)S	(29)H (45)H
At-Rest (Ko)	Open Graded Crushed Stone - 0.41 Engineered Soil Fill - 0.53	45 66	(0.41)S (0.53)S	(45)H (66)H
Passive (Kp)	Open Graded Crushed Stone – 3.85 Engineered Soil Fill – 2.77	424 330	- -	- -

Applicable conditions to the above include:

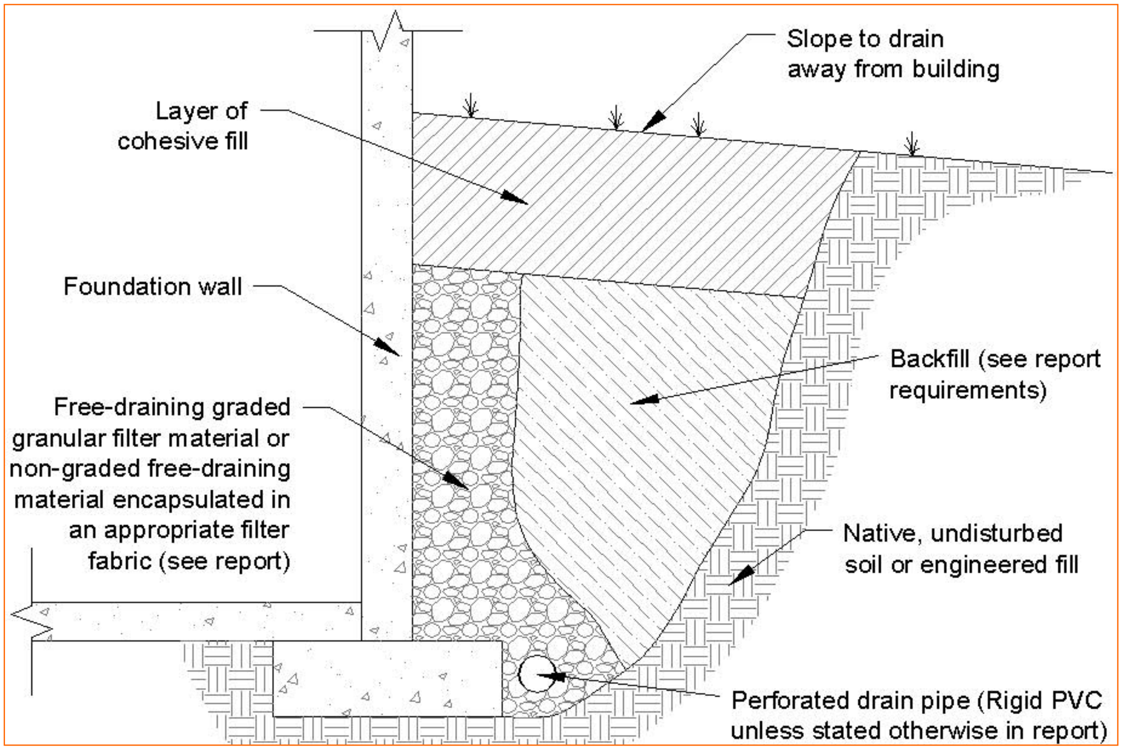
- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 H to 0.004 H, where H is wall height
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance
- Uniform surcharge, where S is surcharge pressure

- In-situ soil backfill weight a maximum of 125 pcf; 110 pcf for open graded stone
- Horizontal backfill, compacted between 95 and 98 percent of standard Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall
- No dynamic loading
- No safety factor included in soil parameters
- Ignore passive pressure in frost zone

Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the open graded granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively.

Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls and extends below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 5% passing the No. 200 sieve, such as ALDOT No. 57 stone. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 2 feet of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system.



As an alternative to free-draining granular fill, a pre-fabricated drainage structure may be used. A pre-fabricated drainage structure is a plastic drainage core or mesh which is covered with filter fabric to prevent soil intrusion, and is fastened to the wall prior to placing backfill.

If controlling hydrostatic pressure behind the wall as described above is not possible, then combined hydrostatic and lateral earth pressures should be calculated for cohesive backfill using an equivalent fluid weighing 85 and 95 pcf for active and at-rest conditions, respectively. For granular backfill, an equivalent fluid weighing 75 and 82 pcf should be used for active and at-rest, respectively. These pressures do not include the influence of surcharge, equipment or pavement loading, which should be added. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.

GENERAL COMMENTS

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

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

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

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

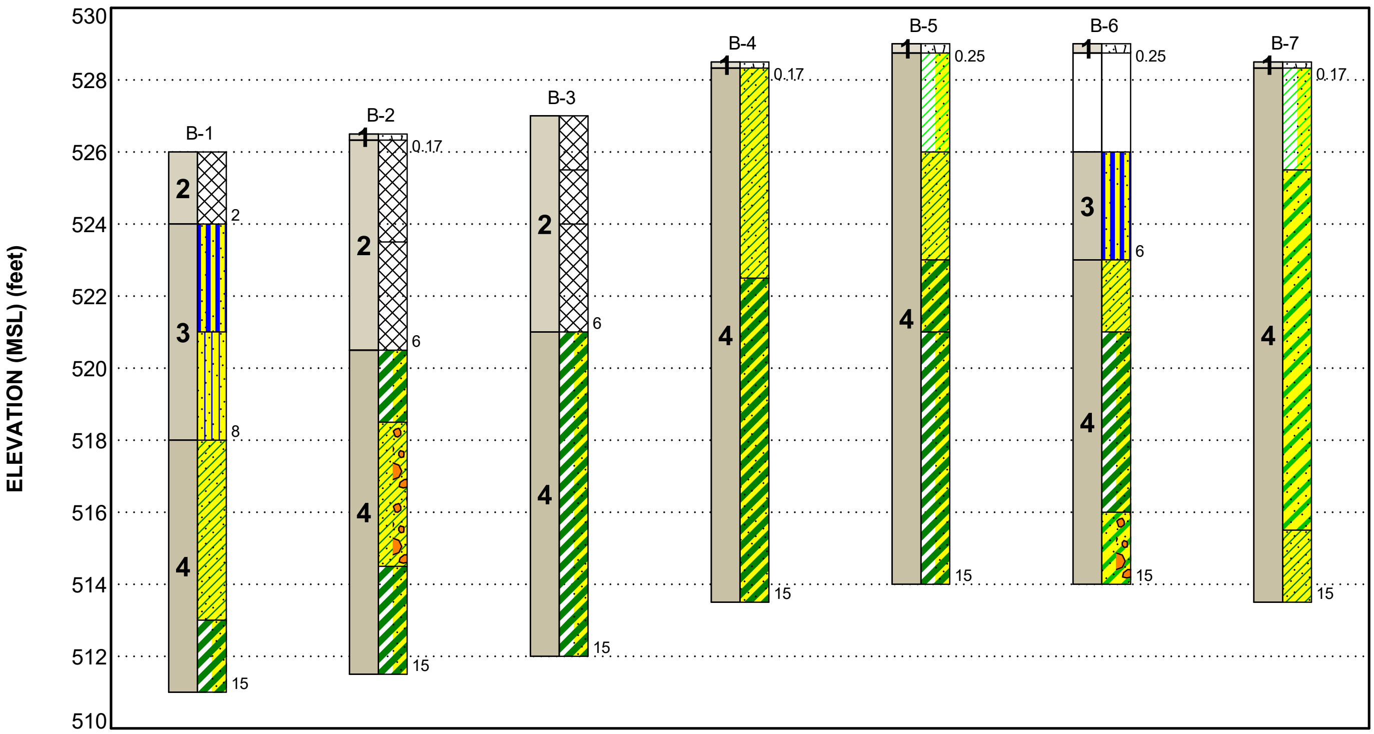
FIGURES

Contents:

GEOMODEL

Lincoln High School Addition ■ Lincoln, AL
Terracon Project No. E1225186

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Topsoil	Dark brown
2	Existing Fill	Typically dark red-brown Sandy Lean and Fat Clay with variable gravel content. Contains trace topsoil
3	Silts and Sands	Orange-brown, hard Silts (ML) with variable sand content, and very dense Silty Sand (SM)
4	Clays and Clayey Sand	Typically varicolored, very stiff to hard Clays (CL/CH) with variable sand and gravel content, and medium dense Clayey Sand (SC) with variable gravel content

LEGEND

- Fill
- Sandy Silt
- Silty Sand
- Sandy Lean Clay
- Fat Clay with Sand
- Topsoil
- Sandy Lean Clay with Gravel
- Sandy Fat Clay
- Lean Clay with Sand
- Clayey Sand with Gravel
- Clayey Sand

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet) [1]	Location
7	15	Perimeter of planned building addition

1. Below ground surface.

Boring Layout and Elevations: Terracon personnel provided the boring layout using a conceptual site plan provided by the design team. Boring locations were laid out in the field by measuring from existing site features.

Subsurface Exploration Procedures: We advanced the borings with a trailer-mounted, rotary drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. All borings were backfilled with auger cuttings after their completion.

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

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle Size Analysis of Soils

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Note: All attachments are one page unless noted above.

SITE LOCATION

Proposed Lincoln High School Classroom Addition ■ Lincoln, Talladega County, Alabama
December 7, 2022 ■ Terracon Project No. E1225186

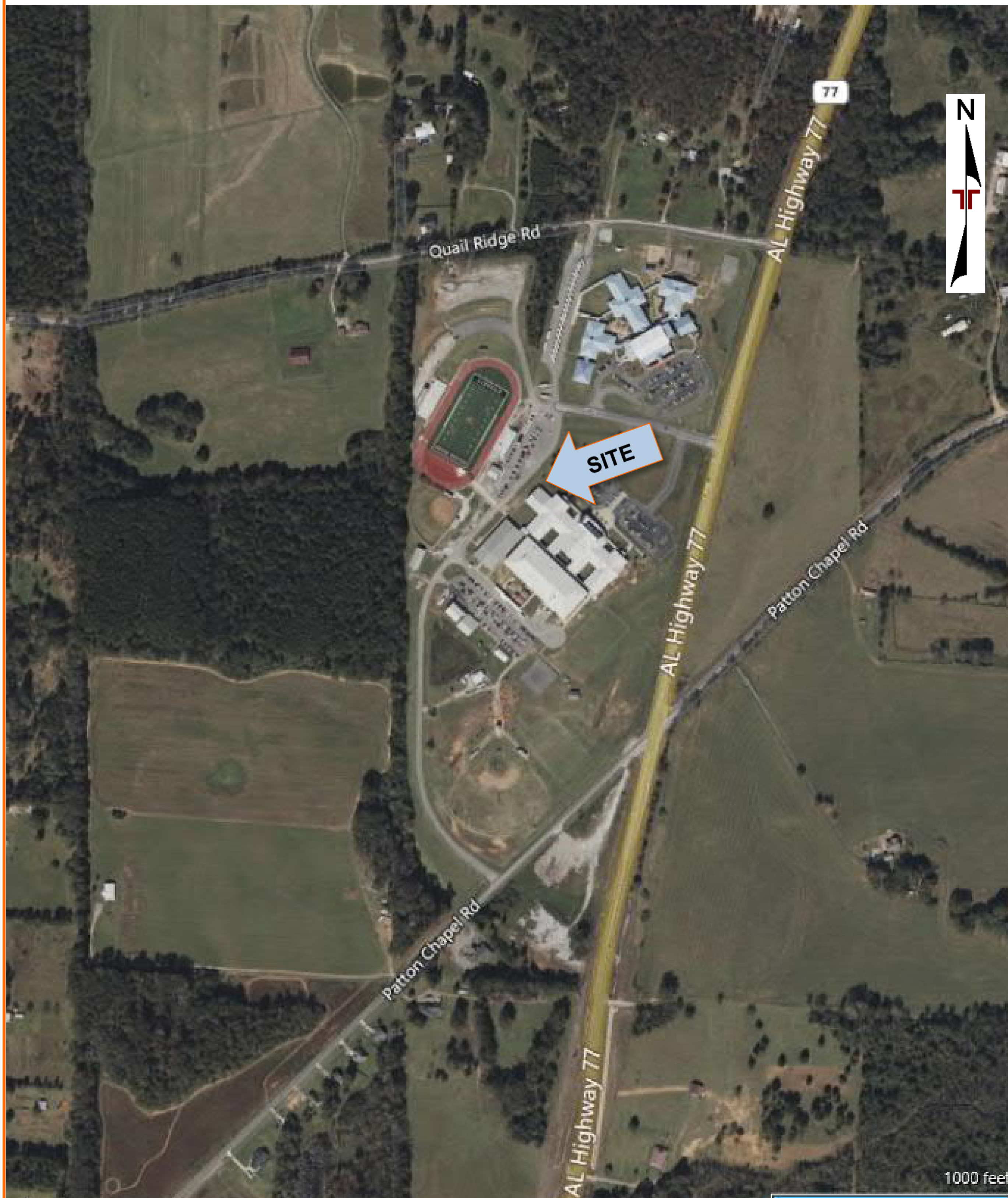


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Terracon GeoReport

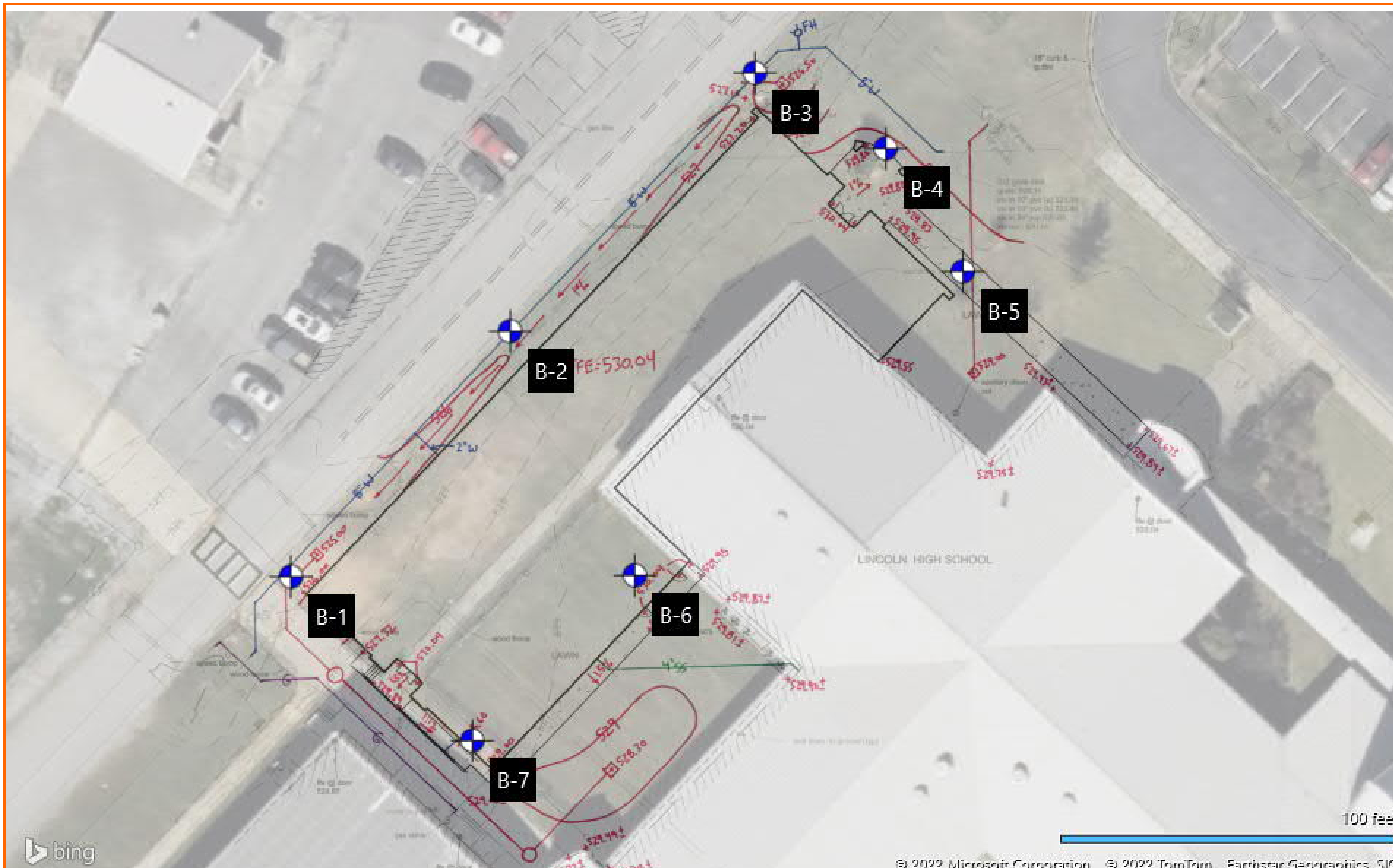


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY LBYD

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: Lincoln High School Addition

CLIENT: Talladega County Board of Education
Talladega, AL

SITE: 78989 AL-77
Lincoln, AL

LOCATION See Exploration Plan

Surface Elev.: 526 (Ft.)

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2	2.0	**FILL - SAND AND GRAVEL**, red and brown	524							
3	5.0	**SANDY SILT (ML)**, orange-yellow-brown, hard	521			X	18-24-50/5" N=50+	14.7		
3	8.0	**SILTY SAND (SM)**, orange-brown, very dense	518	5		X	24-50/4" N=50+			
4	13.0	**SANDY LEAN CLAY (CL)**, brown-orange, hard	513	10		X	11-18-16 N=34			
4	15.0	**FAT CLAY WITH SAND (CH)**, varicolored, very stiff	511	15		X	7-9-9 N=18			

Boring Terminated at 15 Feet

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

BORING LOG NO. B-2

PROJECT: Lincoln High School Addition

**CLIENT: Talladega County Board of Education
Talladega, AL**

**SITE: 78989 AL-77
Lincoln, AL**

LOCATION See Exploration Plan

Surface Elev.: 526.5 (Ft.)

MODEL LAYER	DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1	0.2	526.3	**TOPSOIL (2")**							
2	3.0	523.5	**FILL - SANDY LEAN CLAY**, red to dark brown, contains topsoil			X	5-2-2 N=4			
2	6.0	520.5	**FILL - SANDY LEAN CLAY WITH GRAVEL**, orange-brown, cherty sand and gravel	5		X	6-10-8 N=18	14.6		
4	8.0	518.5	**FAT CLAY WITH SAND (CH)**, varicolored, stiff			X	5-8-8 N=16	32.2		
4	12.0	514.5	**SANDY LEAN CLAY WITH GRAVEL (CL)**, varicolored, very stiff, cherty gravel	10		X	10-11-13 N=24			
4	15.0	511.5	**FAT CLAY WITH SAND (CH)**, yellowish-brown-red, very stiff	15		X	6-9-10 N=19			

Boring Terminated at 15 Feet

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

BORING LOG NO. B-3

PROJECT: Lincoln High School Addition

CLIENT: Talladega County Board of Education
Talladega, AL

SITE: 78989 AL-77
Lincoln, AL

LOCATION See Exploration Plan

Surface Elev.: 527 (Ft.)

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)
2	1.5	**FILL - SILTY SAND**, dark brown, contains topsoil	525.5
2	3.0	**FILL - SANDY FAT CLAY**, red-brown, cherty sand and gravel, trace topsoil	524
2	6.0	**FILL - SANDY LEAN CLAY**, dark brown-red, fine to coarse cherty sand, trace gravel and topsoil	521
4	15.0	**FAT CLAY WITH SAND (CH)**, varicolored, hard, trace chert gravel; becomes very stiff	512
		Boring Terminated at 15 Feet	

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1.0–2.5		X	6-9-13 N=22	15.8		
3.5–5.0		X	6-4-9 N=13	14.7		
6.0–7.5		X	18-15-21 N=36			
8.5–10.0		X	10-11-12 N=23			
13.5–15.0		X	8-11-11 N=22			

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

BORING LOG NO. B-4

PROJECT: Lincoln High School Addition

CLIENT: Talladega County Board of Education
Talladega, AL

SITE: 78989 AL-77
Lincoln, AL

LOCATION See Exploration Plan

Surface Elev.: 528.5 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		0.2	**TOPSOIL (2")**	528.3							
4			**SANDY LEAN CLAY (CL)**, varicolored, stiff, trace chert gravel				X	7-8-8 N=16	32.2		
			becomes very stiff				X	7-8-9 N=17	27.5		
		6.0		522.5	5						
			SANDY FAT CLAY (CH), varicolored, very stiff				X	8-10-11 N=21			
					10		X	7-9-12 N=21			
			becomes brown and red-brown				X	7-8-9 N=17			
		15.0		513.5	15						
			Boring Terminated at 15 Feet								

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

BORING LOG NO. B-5

PROJECT: Lincoln High School Addition

CLIENT: Talladega County Board of Education Talladega, AL

SITE: 78989 AL-77 Lincoln, AL

LOCATION See Exploration Plan

Surface Elev.: 529 (Ft.)

MODEL LAYER	DEPTH	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1	0.3	**TOPSOIL (3")**	528.8							
		LEAN CLAY WITH SAND (CL), varicolored, very stiff, trace gravel				X	8-10-13 N=23	30.3		
	3.0		526							
		SANDY LEAN CLAY (CL), yellow-orange-brown, estimated very stiff, possible chert cobbles				X	50/4" N=50+			
	6.0		523	5						
4		**SANDY FAT CLAY (CH)**, varicolored, very stiff, trace chert gravel				X	8-9-11 N=20			
	8.0		521							
		FAT CLAY WITH SAND (CH), orange-brown to brown, very stiff				X	8-8-9 N=17			
				10						
		becomes stiff				X	7-7-8 N=15			
	15.0		514	15						
		Boring Terminated at 15 Feet								

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

BORING LOG NO. B-6

PROJECT: Lincoln High School Addition

CLIENT: Talladega County Board of Education Talladega, AL

SITE: 78989 AL-77 Lincoln, AL

LOCATION See Exploration Plan

Surface Elev.: 529 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		0.3	**TOPSOIL (3")**	528.8							
		3.0	**NO SAMPLING TO 3' (SEE NOTES)**	526							
3		6.0	**SANDY SILT (ML)**, varicolored, very stiff	523	5		X	9-9-11 N=20	32.0		
4		8.0	**SANDY LEAN CLAY (CL)**, orange-red-brown, very stiff	521			X	8-9-11 N=20			
4		13.0	**FAT CLAY WITH SAND (CH)**, brown to red-brown, stiff, trace chert gravel	516	10		X	8-11-3 N=14			
4		15.0	**CLAYEY SAND WITH GRAVEL (SC)**, varicolored, medium dense, chert and dolomite gravel	514	15		X	10-12-14 N=26			
			Boring Terminated at 15 Feet								

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Auger kicked off on chert boulder upper 1-2'. Drilled through and sampled at 3.5'.

WATER LEVEL OBSERVATIONS

Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

BORING LOG NO. B-7

PROJECT: Lincoln High School Addition

CLIENT: Talladega County Board of Education
Talladega, AL

SITE: 78989 AL-77
Lincoln, AL

LOCATION See Exploration Plan

Surface Elev.: 528.5 (Ft.)

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1	0.2	**TOPSOIL (2")**	528.3							
4		**LEAN CLAY WITH SAND (CL)**, brown to red-brown, very stiff, trace chert gravel				X	7-11-12 N=23	23.1	41-20-21	74
	3.0		525.5							
		CLAYEY SAND (SC), dark reddish-brown, medium dense				X	9-10-9 N=19			
				5		X	8-11-13 N=24			
		becomes brown				X	13-13-15 N=28			
				10						
	13.0		515.5							
		SANDY LEAN CLAY (CL), varicolored, hard				X	9-14-18 N=32			
	15.0		513.5	15						
		Boring Terminated at 15 Feet								

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

Advancement Method:
Hollow stem auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Water not observed during drilling

Terracon
2147 Riverchase Office Rd
Hoover, AL

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Mobile B-47	Driller: Earth Core
Project No.: E1225186	

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Lincoln High School Addition ■ Lincoln, AL

Terracon Project No. E1225186

SAMPLING	WATER LEVEL		FIELD TESTS	
Standard Penetration Test	▽	Water Initially Encountered	N	Standard Penetration Test Resistance (Blows/Ft.)
	▽	Water Level After a Specified Period of Time	(HP)	Hand Penetrometer
	▼	Water Level After a Specified Period of Time	(T)	Torvane
		Cave In Encountered	(DCP)	Dynamic Cone Penetrometer
	Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.		UC	Unconfined Compressive Strength
			(PID)	Photo-Ionization Detector
			(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3 [E]	GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E]	SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.