McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

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

September 20, 2023

Thaden School
800 SE C Street
Bentonville, Arkansas 72712

ATTN: **Ms. Cheryl Humann**
Construction Manager
Walton Enterprises, Inc.

RE: Geotechnical Report for
Thaden Athletic Facility Development in
Bentonville, Arkansas
MCE Project Number: 23-3887

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

Dear Ms. Humann:

We are submitting herewith the report for the Geotechnical Report 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
09/20/2023

Marshall Roberson, E.I.
Project Designer

Enclosure: Geotechnical Report

1580 East Stearns Street
Fayetteville, Arkansas 72703
mce.us.com

GEOTECHNICAL INVESTIGATION

Thaden Athletic Facility Development

Project No. 23-3887
September, 2023

Prepared For:
Walton Enterprises, Inc.
Ms. Cheryl Humann
Thaden School
800 SE C Street
Bentonville, Arkansas 72712
chumann@weioffice.com

GEOTECHNICAL REPORT

Thaden Athletic Facility Development

MCE Project Number: 23-3887

Bentonville, Arkansas

FOR

Thaden School
800 SE C Street
Bentonville, Arkansas 72712

Executive Summary

This is a report of the findings of the Geotechnical Investigation for the Athletic Facility expansion to the existing Thaden School campus in Bentonville, Arkansas. This report includes information on surface materials and subsurface conditions in addition to providing recommendations for site preparation, grading, structure foundations, estimated lateral earth pressures, 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.

- This Geotechnical Investigation consisted of a total of four (4) borings; the project borings were located based on discussions with the Client and placed to capture an adequate amount of subsurface data across the development area. The table below provides details on the locations of the borings, their planned target depths, and how the borings relate to the planned development features.

Boring ID	Target Depth (ft)	Location in the Development Area
B-01	15.0	Northwest Corner of Building Footprint
B-02	15.0	Northeast Corner of Building Footprint
B-03	15.0	Southwest Corner of Building Footprint
B-04	15.0	Southeast Corner of Building Footprint

- The surface materials (Stratum I) consisted of grass with topsoil materials. The thickness of the encountered topsoil was found to be three (3) inches at each investigated location.
- The materials that make up Stratum II consist of Lean Clay (CL), Sandy Lean Clay (CL), Lean Clay with Gravel (CL), and Lean Clay with Sand (CL). These fine-grained materials contained varying amounts and gradations of sand and gravel.
- Stable Stratum II Materials were encountered at varying depths across the development area. Moisture conditions of these soils increased with depth and groundwater was encountered in three (3) of the four (4) project borings.
- Following stripping and initial grading, the subgrade should be initially evaluated by the Geotechnical Engineer or his/her representative. All subgrade materials should be proof-rolled with a tandem-axle fully-loaded dump truck weighing approximately 60,000 pounds, or equivalent construction equipment.
- Based on the provided information, current project scope, and encountered subgrade materials, we recommend that a shallow foundation system composed of continuous and/or individual (spread) footings will be suitable for the support of the proposed building footprint. It is recommended that a minimum of three (3) feet of select fill material is budgeted below footings. This should be field-verified by MCE during construction operations.
- Slab-on-grade construction may be utilized for the planned structure provided a minimum of four (4) inch cushion of sand, crushed stone, or gravel is placed below the slab areas with a vapor barrier directly below the concrete.
- The following pavement recommendations provided in this section are based on stable subgrade material and/or select fill material existing beneath the recommended pavement sections.

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Appendices

1.0 Introduction

McClelland Consulting Engineers, Inc. (MCE) conducted a subsurface investigation for the planned Athletic Facility expansion to the existing Thaden School campus in Bentonville, Arkansas. The investigation was requested and authorized by Ms. Cheryl Humann, with Walton Enterprises, Inc. This investigation was intended to explore the subsurface soil conditions within the planned development area in an effort to provide recommendations for site preparation, grading, structure foundations, lateral earth pressures, and recommended minimum pavement sections. Thank you for providing the preliminary development drawings used as an aid in the preparation of the recommendations and considerations contained herein.

2.0 Existing Site Description

The planned site is located on the northeast quadrant of the intersection of South Main Street and Southeast 10th Street in Bentonville, Arkansas. Specifically, the site is located in the southwest corner of the existing Thaden School campus. The development area is understood to encompass approximately 1.18 acres of previously undeveloped greenspace within the existing campus. The existing topography may be described as relatively flat-lying, with maximum grade differentials on the order of three (3) feet. Existing vegetation consists of unkept grass and shrubbery.

3.0 Project Scope

It is understood that the scope of the Thaden Athletic Facility includes the new construction of one (1) indoor gym/athletic facility structure. The structure is expected to primarily be a single-story structure with a second-floor mezzanine and an approximate structural footprint of 19,928 square feet (SF) and a total area of 21,584 SF. MCE also understands the gym structure is planned to be a pre-engineered, steel-framed structure, that will utilize a concrete slab-on-grade and will be supported by a shallow foundation system.

MCE understands that a previous investigation was conducted by Geotechnical & Testing Services, Inc. (GTS). This investigation took place in March of 2017 and was primarily aimed at investigating the areas for the Home Building and other now-existing structures that are part of the Thaden School campus. MCE was provided the data and information for this development by the Client, with the intent to utilize them during this investigation.

Finalized Design Drawings were not available at the time of this report. However, based on the existing developments and associated parking features of the Thaden School, it is anticipated that finished floor elevations (FFE) are to be at or very near the existing ground elevations.

Additionally, the provided Architectural Site Plan did not include any pavement improvement areas associated with the new facility. MCE anticipates some pavement improvements may be required to provide access to the new facility from existing parking areas and/or the bordering streets. These pavement improvements will likely be constructed utilizing asphalt paving materials above a coarse-aggregate base section.

4.0 Field Investigation

Based on the provided information from the preliminary Geotechnical Investigation conducted by GTS, our understanding of the project scope, as well as our experience in the area with projects of similar scope, MCE conducted a geotechnical investigation consisting of four (4) project borings.

Table 1 on the following page provides details on the locations of the final borings, their planned target depths, and how the borings relate to the planned Athletic Facility Structure.

Table 1: Project Boring Locations and Target Depths

Boring ID	Planned Target Depth (ft)	Location in the Development Area
B-01	15.0	Northwest Corner of Building Footprint
B-02	15.0	Northeast Corner of Building Footprint
B-03	15.0	Southwest Corner of Building Footprint
B-04	15.0	Southeast Corner of Building Footprint

All project borings were conducted using a CME 45-B truck-mounted drill rig, utilizing 4.25-inch diameter solid stem augers. Soil samples were obtained at the depths indicated on the boring logs with 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 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 split-spoon sampler or depths where auger refusal were encountered.

In addition to Standard Penetration Testing (SPT), the field tests performed included visual soil classifications and groundwater observations. The visual soil classifications are given on the boring logs, which can be referenced in Appendix B on Plates 2 through 5; a key to the symbols on the boring logs is provided on Plate 6. Table 2 below provides details for each of the project borings.

Table 2: Project Boring Details

Boring ID	Existing Surface Elevations (ft)	Topsoil Thickness (in)	Planned Target Depth (ft)	Auger Refusal Depth (ft)	End of Boring Depth (ft)	End of Boring Elevation (ft)
B-01	1291.0	3	15.0	11.0	11.0	1280.0
B-02	1291.0	3	15.0	13.0	13.0	1278.0
B-03	1289.0	3	15.0	11.0	11.0	1278.0
B-04	1292.0	3	15.0	14.0	14.0	1278.0

NOTES: Elevations shown in Table 2 are rounded to the nearest 1.0 foot, and are based on the current grading information provided by the CEI Alta Survey (dated 9/1/23). Reported thicknesses of the surface materials are rounded to the nearest one (1) inch.

4.1 Supplemental Boring Information

As mentioned briefly in Section 3.0, a previous investigation was conducted for this project by GTS in March of 2017 to provide recommendations relevant to the Thaden School campus buildings. This investigation consisted of 61 project borings and multiple Geotechnical Reports relevant to the now existing Thaden School site, but did not include borings within the immediate development area of the new Athletic Facility.

Given the lack of relevant information contained within these reports as it relates to the new Thaden School Athletic Facility, the data contained within the Geotechnical Reports provided by GTS was not utilized as a primary reference for the recommendations contained herein. However, recommendations given in the furnished reports regarding site grading and shallow foundations that were utilized on other structures within the Thaden School campus were taken into consideration.

4.2 Encountered Groundwater Conditions

At the time of this investigation, perched groundwater was encountered within three (3) boring locations (B-02, B-03, and B-04) at depths ranging from 11 feet to 13.5 feet below the existing surface elevations. It should be noted, that these groundwater conditions were encountered immediately before hard rock materials resulting in Auger Refusal (see Section 4.3). As a result of the low permeability created by these subsurface materials, groundwater has the potential to collect above them in a “perched” condition during and after precipitation events.

Encountering perched groundwater could cause significant issues during undercutting and utility installation operations if not properly mitigated. Any groundwater or perched water must be removed, if encountered during construction, prior to the placement of fill or paving elements. To help reduce the potential for issues related to perched groundwater, it is recommended that earthwork operations take place during historically dry portions of the calendar year (June through September). Earthwork operations conducted outside of this recommended timeframe should expect general dewatering measures to be required to maintain a desirable construction schedule.

The installation and periodic measurement of monitoring wells would be required to establish seasonal piezometric surfaces below the project site. Project grading should be properly designed to discharge any surface water that may develop following precipitation events.

4.3 Encountered Auger Refusal Materials

Auger Refusal materials are generally defined as those that, when encountered, prevent the advancement of the boring through traditional auger drilling techniques. Refusal is somewhat subjective and is dependent on the type of drilling equipment used and the down pressures exerted by the drill rig. At the time of this investigation, materials resulting in auger refusal were encountered by all four (4) of the project borings. These auger refusal materials were encountered at depths ranging from 11 feet to 14 feet below existing surface elevations at the time of the investigation.

Based on our knowledge of the underlying materials and the associated geologic formation, MCE recommends the Contractor budget for potential rock removal efforts in excavations exceeding five (5) feet in depth. Specifically, excavation efforts required to extend to depths where auger refusal or hard consistency values were recorded.

More information on the local geology and how it may affect the project site can be found in the *Local Geology* section of this report (Section 7.0). Additional guidance regarding these materials and the potential for difficult excavation conditions are provided in the *Rock Excavation Considerations* section of this report (Section 10.8).

5.0 Laboratory Analysis

Laboratory tests were performed on soil samples recovered from the borings. The laboratory tests were conducted to determine the engineering properties of the project soil strata. The laboratory tests were conducted following the American Society for Testing and Materials (ASTM) designations. The tests performed on samples from the borings included moisture content, Atterberg Limits, and sieve analyses.

The natural soil moisture content was determined on all soil samples to provide a moisture profile for each boring. Atterberg Limits tests (liquid and plastic limits) were performed on selected samples to aid in the soil classification and to help evaluate the volume-change characteristics of each soil stratum. Sieve analyses were performed on representative soil samples to aid in the soil classification of the selected soil strata. Results of laboratory testing for the project borings are provided on the boring logs and the Laboratory Test Results Summary in Appendix C. A key to the terms and symbols used on the boring logs is also presented in Appendix B. Table 3 below shows the relevant test method specifications utilized on the project.

Table 3: Laboratory Test Method Specifications

Test Designation	Test Method
ASTM D2488	Standard Practice for Description and Identification of Soils (Visual)
ASTM D 2487	Standard Practice for Classification of Soils for Engineering Purpose (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

6.0 On-Site Soil Conditions

The following project sections provide information regarding onsite conditions at the project location. This information includes descriptions of the existing soil types, imagery showing the approximate location of the existing soil types, and details about the local geology.

6.1 United States Department of Agriculture (USDA) Soil Types and Map

The following soil types exist in the project area according to current USDA soil maps, with descriptions from the Natural Resources Conservation Service (NRCS). The project site is located in Benton County in Northwest Arkansas. The existing soil types are briefly detailed in Table 4 below. Figure 1 below provides imagery of the approximate site location and how it relates to the existing soil types.

Table 4: USDA Local Soil Types

USDA Soil Type	USDA Symbol	USDA Descriptions
Cherokee Silt Loam	Cs	The Cherokee Series consists of very deep, somewhat poorly drained soils that formed in fine textured sediments of the Cherokee Prairies (MLRA 112). Cherokee soils are on terraces, upland benches or in head of drains. Slope ranges from 0 to 3 percent.

Figure 1: USDA Soil Survey Report Image
The image was produced by the United States Department of Agriculture.

7.0 Local Geology of the Project Site

According to maps and literature published by the United States Geological Survey (USGS) and the Arkansas Geological Survey (AGS), the project site is underlain by the Mississippian Age (300 to 350 million years ago) Boone Formation. A brief description from the Stratigraphic Summary of Arkansas – Information Circular 36 (IC36) of the local geologic formation is provided below, as well as how these materials may impact the project site.

7.1 The Boone Formation

The Boone Formation is primarily comprised of fine to coarse-grained limestone with interbedded chert. The quantity and quality of the chert are known to vary considerably both vertically and horizontally within the Boone section. Residual soils formed from the Boone Formation typically consist of various gradations of clay, sand, and chert gravel. The Boone Formation is named after exposures in Boone County, Arkansas. The Boone Formation is well known for its karst features such as springs and sinkholes. The Boone Formation is thought to range from 300 to 400 feet in thickness, according to most literature.

The chert layers associated with the Boone Formation are known to provide excavation difficulties depending on the quality and consistency of the chert. The weathered cherts associated with the Boone have a "chalky" texture and tend to be easier to excavate than those with a more competent structure. Both of these chert types are anticipated to be present across the project site. Figure 2 below provides a visual of the local geologic formation in relation to the project site.

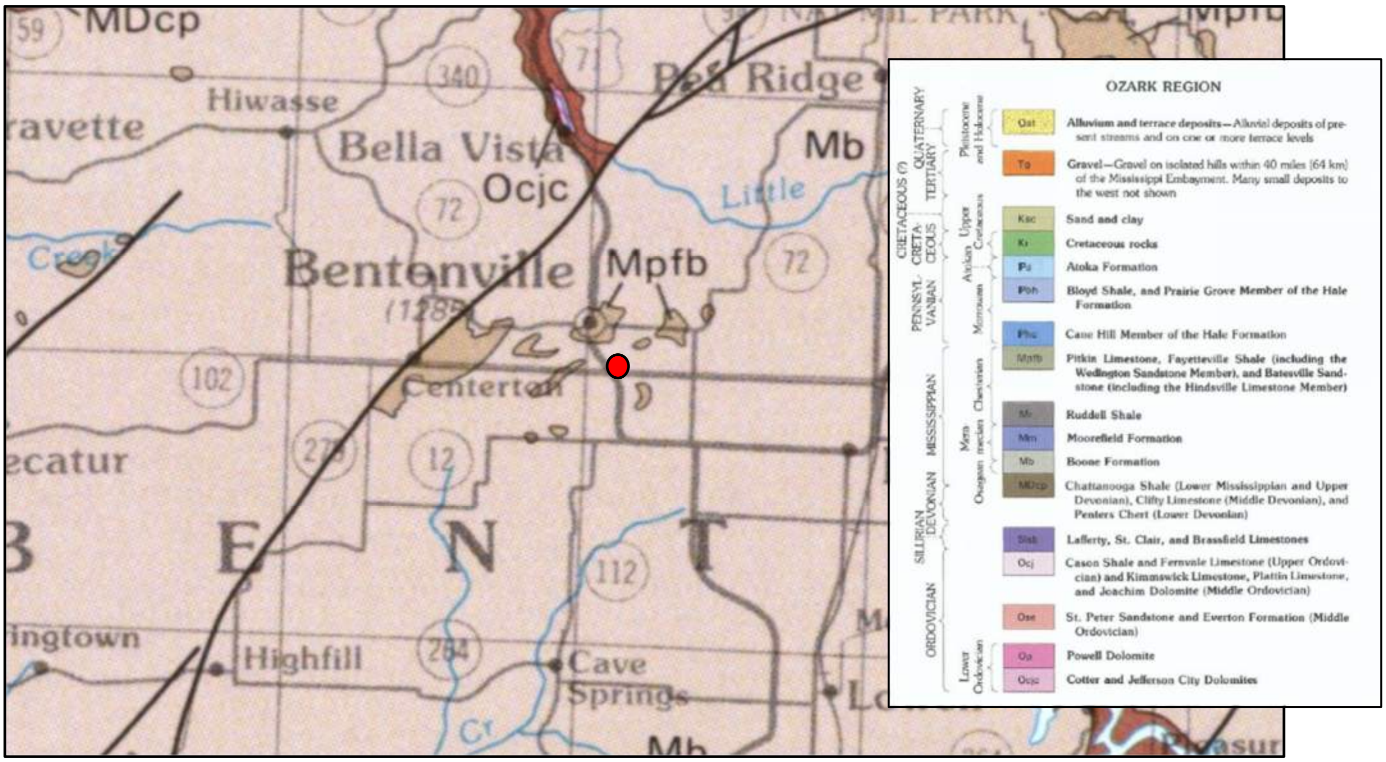

Figure 2: Image from the Geologic Map of Arkansas (1993)
The red dot represents the approximate location of the project site.

8.0 IBC Site Classification

The planned 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 **0.139** and **0.091** respectively, with reference to Section 1613 of the 2021 IBC, and current Applied Technology Council (ATC) information based on a Site Class C for the soil profile within the project area.

9.0 On-Site Soil Stratum Summary

This summary is based on a collection of field notes and field-testing values recorded during the investigation, notes recorded during the lab analysis, and results from the laboratory testing. The encountered subsurface soil conditions are summarized below.

9.1 Stratum I – Surface Materials

The surface materials across the site consisted of grass and topsoil. For this report, topsoil is defined as the horizon that contains the majority of the root mat from the existing vegetation. The encountered topsoil thickness was found to be three (3) inches at the investigated areas. MCE anticipates that the thickness of these materials across the development area may vary due to the utilization of this portion of the Thaden School property as a staging area during construction; based on historical imagery from Google Earth.

9.2 Stratum II – Fine-Grained Subgrade Materials

The materials that make up Stratum II consist of Lean Clay (CL), Sandy Lean Clay (CL), Lean Clay with Gravel (CL), and Lean Clay with Sand (CL). These fine-grained materials contained varying amounts and gradations of sand and gravel.

Consistency values for the Stratum II CL Materials ranged from soft to hard, with corresponding N-values ranging from three (3) to 44. The natural soil moisture content for these materials ranged from 4.3 to 31.7 percent. The Liquid Limit (LL) of these materials ranged from 26 to 38, with a Plasticity Index (PI) value that ranged from 13 to 26. The fine fraction of these materials exhibited moderate plasticity characteristics and moderate potential for volumetric changes due to alterations in the soil's moisture content. The fine fraction of these soils make up between 71.7 and 88.1 percent of the overall soil mass, as indicated by the results of gradation analysis from the borings.

10.0 Engineer's Analysis and Recommendations

It is understood that the scope of the Thaden Athletic Facility includes the new construction of one (1) indoor gym/athletic facility structure. The primary structure is expected to be a single story with a second-floor mezzanine and an approximate structural footprint of 19,928 square feet (SF). MCE also understands the gym structure is planned to be a pre-engineered, steel-framed structure, that will utilize a concrete slab-on-grade and will be supported by a shallow foundation system.

Finalized Design Drawings were not available at the time of this report. However, based on the existing developments and associated parking features of the Thaden School, it is anticipated that finished floor elevations (FFE) are to be at or very near the existing ground elevations. MCE anticipates the proposed building will be constructed with light-to-medium gauge steel framing supported on shallow foundations. We expect that the structure will experience moderate loading conditions with maximum column loads not to exceed 100 kips and wall loads on the order of 3 kips per linear foot.

The purpose of this investigation was to obtain adequate subsurface information from which to provide recommendations and considerations for the proposed structure and anticipated site developments. Those recommendations and considerations are presented in the following sub-sections of this report.

10.1 Initial Site Preparation – Stripping/Grubbing

As previously described in the Stratum I summary (Section 9.1), the project borings encountered topsoil materials at the surface at each of the four (4) final boring locations. The encountered topsoil was found to have a thickness of three (3) inches at each location.

MCE recommends that all Stratum I topsoil and organic materials be removed full-depth as part of the initial site preparation. MCE recommends that the Contractor carry a budget for the removal of a minimum of eight (8) inches of stripping and grubbing of topsoil materials across the planned development area.

10.2 Subgrade Verification Method

Following stripping and initial grading in the building and any pavement areas, the subgrade should be initially evaluated by the Geotechnical Engineer or his/her representative prior to any undercut. All subgrade materials should be proof-rolled with a tandem-axle fully-loaded dump truck weighing approximately 60,000 pounds, or equivalent construction equipment. The stability of soils beneath the foundation footprint can also be evaluated by alternate means if proof rolling is not feasible, provided that it is verified by a representative of the Geotechnical Engineer. These recommendations assume that weather conditions at the time of construction are similar to those experienced at the time of our investigation.

The proof-rolling should serve as final means to verify and document stable subgrade conditions/recommendations. Any soft and/or yielding subgrade areas encountered should be repaired by undercutting and backfilling with select fill material and then subsequently evaluated by the Geotechnical Engineer or his/her representative for approval. Recommendations for select fill material thickness and/or undercut in building and pavement areas should only occur following the subgrade evaluation process.

10.3 Site Grading Considerations – Proposed Building Footprint

Based on the data from the final borings conducted during this investigation, MCE anticipates that stable materials exist at varying depths within the planned development area. Project Boring B-01 encountered stable materials within the upper two (2) feet, Project Boring B-02 encountered stable materials within the upper 3.5 feet, relatively stable subgrade materials were first encountered by Project Boring B-03 at a depth of six (6) feet below the surface, and Project Boring B-04 encountered favorable material within the upper five (5) feet. A moderately hard-to-hard chert rock seam was encountered by B-04 at an approximate depth of 4.5 feet below the existing ground elevation. It should be noted that the majority of the stable materials encountered across the site were encountered atop soil strata with elevated moisture conditions that are not favorable for support of the anticipated loading conditions if exposed.

MCE anticipates that following initial stripping, excavation operations on the order of five (5) to six (6) feet may be required to expose stable subgrade materials in some areas of the building footprint; particularly on the west side of the structure, depending on site conditions at the time of construction. It is recommended that earthwork operations take place during relatively dry periods of the calendar year (June through October) with favorable moisture conditions. Any undercut operations should be coordinated so that the exposed subgrade may be covered with approved Select Fill materials prior to prolonged exposure to the elements, as outlined in Section 10.13 of this report.

Mass undercut and backfilling of the structure footprint may reduce the effects of long-term settlement by allowing a period of “pre-loading” directly following fill placement and prior to the placement of structural elements.

Thickened lifts or “bridging” lifts should not be utilized within the structure’s footprint. Additionally, MCE highly recommends that the Geotechnical Engineer or his/her representative be on-site during the undercut operations mentioned above to help reduce total undercut where applicable.

10.4 Site Grading Considerations – Anticipated Pavement Improvement Areas

MCE recommends the project budgets for the placement of a minimum of two (2) feet of newly placed, properly compacted, and moisture-conditioned select fill materials under any additional parking and access drive areas. This recommendation is provided with the anticipation that finished pavement surface elevations will be at or very near existing surface elevations and also intends to be conservative should isolated areas require undercut. The implemented thickness of select fill material should recommended by a representative of the Geotechnical Engineer based on conditions at the time of construction. A thickened “bridging” lift on the order of 18 to 24 inches should only be implemented within the parking and access drive areas under the direction of the Geotechnical Engineer or his/her representative. 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.

10.5 Site Grading Considerations – Excavated Slopes/Vertical Trenching

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. Although not anticipated, if excavation efforts require deep vertical trenching (deeper than five (5) feet), and the minimum 2H:1V ratio is not achievable, then the Contractor must establish a comprehensive Shoring Plan. That Shoring Plan should be reviewed and stamped by a licensed Professional Engineer (PE) prior to excavation.

10.6 Rock Excavation Considerations

As mentioned previously in Section 4.3, materials resulting in auger refusal were encountered by all four (4) project borings during the investigation at depths ranging from 11 feet to 14 feet below existing surface elevations. Although excavation efforts to these depths are not anticipated, MCE expects that these materials exist throughout the project site at varying elevations. This expectation is based on our current knowledge of the underlying materials and the associated geologic formation.

These materials consisted of very dense or hard chert and limestone. Hard chert and limestone materials are common in the Boone Formation. These materials are known to vary in consistency and composition and could provide excavation difficulties at depths deeper than those investigated during this investigation. MCE anticipates that all Stratum II Materials may generally be excavated using medium-to-heavy-duty equipment and techniques in the upper five (5) to 10 feet. However, the Auger Refusal Materials that exist at deeper depths may require rock excavation techniques to advance excavation efforts. Such techniques may consist of jackhammering, hammer hoe attachments, ripper teeth, or other means.

10.7 General Foundation Recommendations

The foundations relevant to the structure addition 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 by 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. These factors, as well as construction considerations related to the existing soil and ground conditions, were influential in the preparation of the recommendations presented hereinafter.

10.8 Shallow Foundation Recommendations

Based on the provided information, current project scope, and encountered subgrade materials, we recommend that a shallow foundation system composed of continuous and/or individual (spread) footings will be suitable for the support of the planned structure.

The shallow foundations should bear on a minimum of one (1) foot of newly-placed, properly-compacted, and moisture-conditioned select fill material meeting the criteria outlined in the *Select Fill Material* section of this report. Stable subgrade conditions should be exposed prior to placing any select fill or footing elements. It is anticipated that up to three (3) feet of select fill material may be required beneath foundations in certain areas of the structure footprint, based on the subgrade conditions encountered by the borings and also those known to exist at the project site. It is recommended that all foundations for this structure bear on select fill material to provide consistent conditions regarding bearing capacity and settlement.

In this case, "stable" subgrade conditions within the planned addition footprint should include the stiff to very stiff Stratum II CL soils that were encountered at varying depths across the investigated area. The anticipated site grading for the structure is briefly detailed in *Section 10.3 Site Grading Considerations – Proposed Building Footprint*.

Footings bearing on newly placed, properly compacted, and moisture-conditioned select fill material can utilize safe allowable bearing pressures of 2,500 pounds per square foot (psf) for continuous foundations and 3,000 psf for spread or individual foundations. The allowable bearing pressures provide a minimum factor of safety of three (3) and were calculated using a minimum footing width of two (2) feet, a minimum footing thickness of one (1) foot, and a minimum footing depth of two (2) feet below exterior ground elevations, which is adequate to protect against frost heave in the project area.

The total long-term foundation settlement for footings bearing on properly placed select fill material with the assumed dimensions and loading is anticipated to be approximately ¾-inch. The maximum differential settlement between footings is anticipated to be on the order of ½-inch between individual footings or along a 40-foot span for continuous footings.

10.9 Subgrade Improvements – Aggregate Piers

An additional foundation option for the new Thaden Athletic Facility that would greatly reduce undercut and backfilling operations is continuous and individual (spread) footings placed on soils improved by an aggregate pier deep foundation system.

The recommendation for the aggregate pier system would be aimed at improving the subgrade capacity and conditions within the structure footprint by their installation. The implementation of the aggregate pier 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. However, finalized shaft diameters may vary upon the finalized design. 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 aggregate pier system would provide an advantage over drilled piers in that they would not require additional equipment, such as concrete pump trucks and cranes. The aggregate pier system would provide an additional benefit over a drilled pier foundation system in that it would not require temporary or permanent casing elements. The installation of an aggregate pier 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 aggregate pier installation would occur after pad construction (recommended two (2) feet of moisture-conditioned and properly compacted select fill material) within the relevant building areas.

Precise bearing capacity values should be directed by the chosen aggregate pier designer, but a minimum capacity on the order of 5,000 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 6,000 psf can be achieved, but this should be confirmed with the aggregate pier designer once more finalized structure loading information is available. For aggregate piers that may be in an uplift condition, the initial project design constraints may utilize a maximum uplift capacity of 15 kips per pier.

By providing proper installation energy, whether through vibration or compaction methods, 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 aggregate pier system.

Should the design team desire to pursue this alternative foundation option, MCE would be happy to provide further recommendations and coordination to assist in this process.

10.10 Structure Slab-on-Grade

Slab-on-grade construction may be utilized for the planned structure provided a minimum of four (4) inch cushion of sand, crushed stone, or gravel is placed below the slab areas with a vapor barrier directly below the concrete. MCE recommends that a minimum of two (2) feet of select fill materials be placed and compacted underneath the planned Slab-on-Grade.

This select fill should be properly placed beneath the slab dimensions to provide adequate subgrade support and stable under-slab conditions. These recommendations will likely be satisfied during initial earthwork operations if the recommended process is followed as described in Section 10.8. The entirety of the structure slab is recommended to be verified by proof-rolling, as previously described in the *Subgrade Verification* section of this report.

10.11 Site Retaining Structures – Lateral Earth Pressures

Should any below ground drainage structures or retaining walls be included in this scope of work, MCE recommends all earth-retaining structures should be designed to resist the minimum equivalent fluid weights provided in Table 5 below.

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-drains or a gravity trench drain system graded to daylight for the release of any hydrostatic pressure that may develop. The values provided in Table 5 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 to the material behind the gravel.

Table 5: Estimated Lateral Earth Pressures

Soil/Backfill Type	Moist Unit Weight (lbs/ft^3)	Friction Angle φ (^{0})	Equivalent Fluid Pressure (lbs/ft^3)		
			Active	Passive	At-Rest
Onsite Soils Stratum II	105	15	62	178	78
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 onsite soils.

10.12 Minimum Pavement Section Recommendations

The following pavement recommendations provided in this section are based on stable subgrade material and/or a minimum of two (2) feet of select fill material existing beneath the recommended 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 pavement sections are recommended to be as shown in Table 6 and Table 7 below.

For the recommendations provided in Tables 6 and 7, standard-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 pavements are recommended as performing similarly to a typical city street pavement section with a local/residential classification which would primarily receive passenger vehicle traffic with intermittent truck traffic. Heavy-duty pavement recommendations are intended to apply to areas subjected to frequent heavy-truck traffic, such as dumpster pads.

Table 6: Minimum Project Pavement Sections – Asphalt Materials

Pavement Type	Pavement Materials	Light Duty	Standard Duty	Heavy Duty
Asphalt Pavement	ACHM Surface Course (1/2")	2"	3"	2"
	ACHM Binder Course (1")	N/A	N/A	3"
	Class 7 Base Course (95% MPD)	6"	8"	10"

Table 7: Minimum Project Pavement Sections – Concrete Materials

Pavement Type	Pavement Materials	Light Duty	Standard Duty	Heavy Duty
Concrete Pavement	Portland Cement Concrete	4"	N/A	6"
	Class 7 Base Course (95% MPD)	6"	8"	8"

The pavement sections provided in Tables 6 and 7 should be viewed as minimums and can be increased through the design process by the project Civil Engineer if warranted.

10.13 Select Fill Materials

Any select fill material required for the project is recommended to be an off-site borrow material of locally available 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.

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 8 below provides the recommended compaction parameters for select fill and Class 7 base course to be used on the project.

Table 8: Compaction Requirements

Material Type	Test Standard	Minimum Dry Density (%)	Optimum Moisture Range (%)
Select Fill	ASTM D698 / AASHTO T99	98	-3% to +3%
Base Course	ASTM D1557 / AASHTO T180	95	Near Optimum

Any material to be used as a select fill on the project should be reviewed and approved by the Geotechnical Engineer.

11.0 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 following the current Arkansas State Law and Occupational Safety and Health Administration (OSHA) guidelines and requirements.

12.0 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.

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APPENDIX A:
BORING LAYOUT

WALTON ENTERPRISES

Thaden School
800 SE C Street
Bentonville, Arkansas
72712

PROJECT NUMBER
23-3887

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE
mce.us.com

Thaden Athletic Facility Development
Bentonville, Arkansas

PLATE 1

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

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Fayetteville, Arkansas 72703
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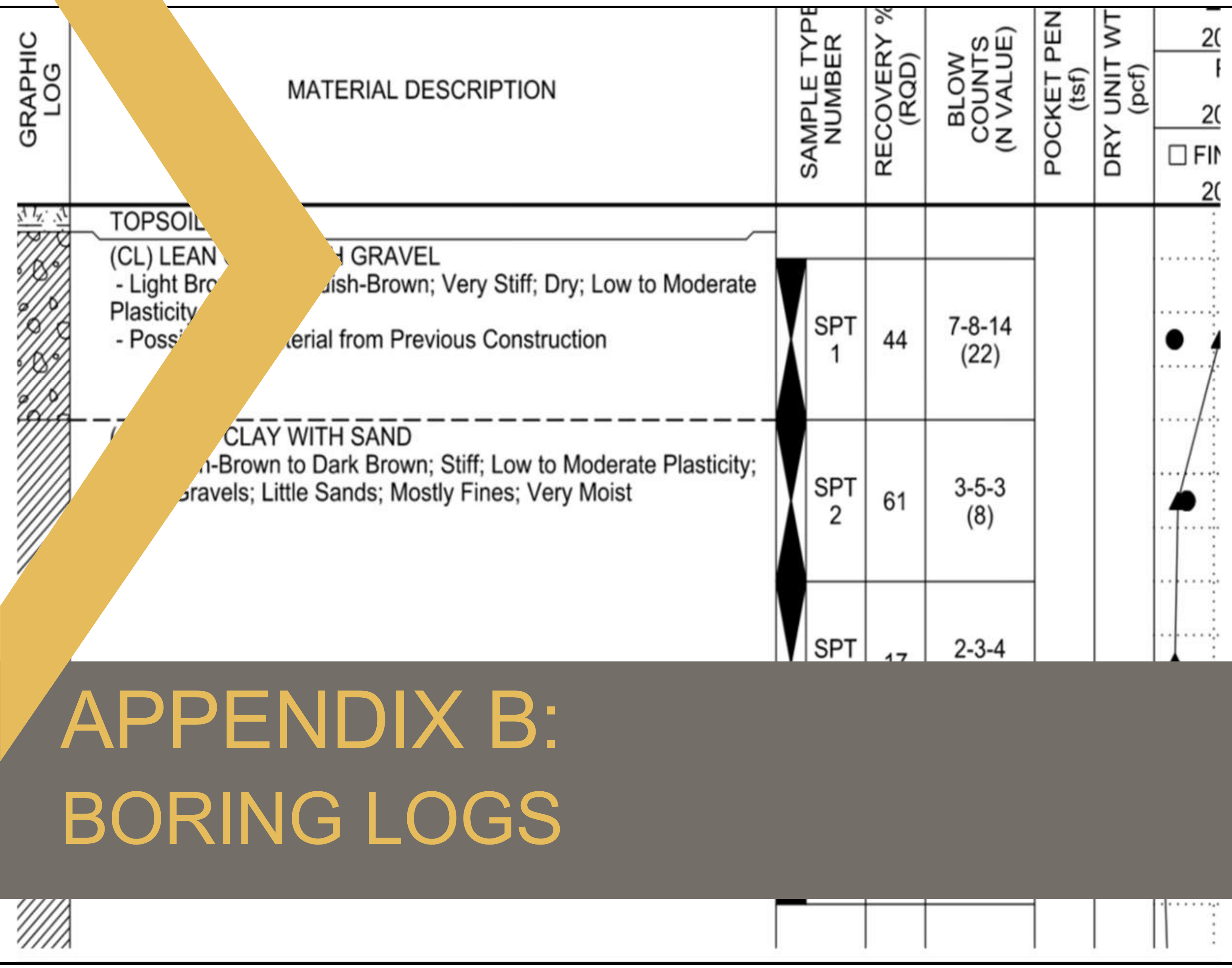


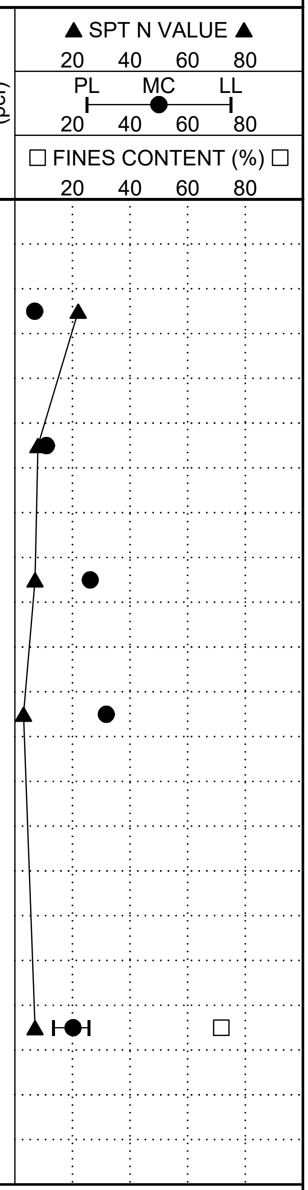
APPENDIX B:
BORING LOGS

McClelland Consulting Engineers
1580 E Stearns St
Fayetteville, AR 72703
Telephone: 4734432377

BORING NUMBER B-01

CLIENT Thaden School
PROJECT NAME Thaden School Athletic Facility
PROJECT NUMBER 23-3887
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 8/31/23 **COMPLETED** 8/31/23
GROUND ELEVATION 1291 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 C. Chiddister **CHECKED BY** M. Roberson
AT END OF DRILLING ---
NOTES Conducted Utilizing a CME-45B Truck Mounted Drill 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)
0.0		TOPSOIL (3")					
		(CL) LEAN CLAY WITH GRAVEL - Light Brown to Reddish-Brown; Very Stiff; Dry; Low to Moderate Plasticity - Possible Fill Material from Previous Construction	SPT 1	44	7-8-14 (22)		
2.5		(CL) LEAN CLAY WITH SAND - Reddish-Brown to Dark Brown; Stiff; Low to Moderate Plasticity; Trace Gravels; Little Sands; Mostly Fines; Very Moist	SPT 2	61	3-5-3 (8)		
			SPT 3	17	2-3-4 (7)		
5.0		- Dark Grayish-Brown; Soft to Medium-Stiff; Wet	SPT 4	83	2-1-2 (3)		
7.5		- Light Grayish-Brown; Stiff; Moist	SPT 5	78	3-3-4 (7)		
10.0							



Refusal at 11.0 feet.
Bottom of borehole at 11.0 feet.

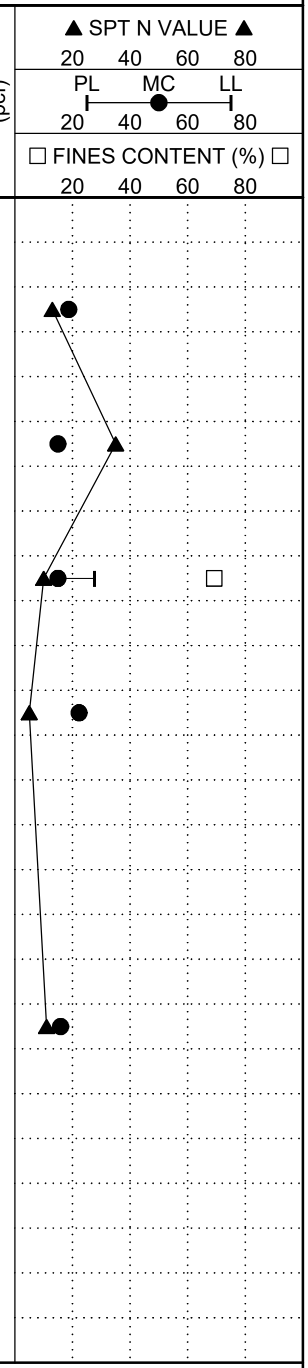
GEOTECH BH PLOTS - GINT STD US LAB.GDT - 9/13/23 10:52 - L:\CURRENT PROJECTS\GEOTS\23-GEOT\23-3887 - BENTONVILLE, AR - THADEN SCHOOL ATHLETIC FACILITY DEVELOPMENT (GEOT)\GEOTECH REPORT\23-3887 - THADEN ATHLETIC FACILITY DEVEL

McClelland Consulting Engineers
1580 E Stearns St
Fayetteville, AR 72703
Telephone: 4734432377

BORING NUMBER B-02

CLIENT Thaden School	**PROJECT NAME** Thaden School Athletic Facility
PROJECT NUMBER 23-3887	**PROJECT LOCATION** Bentonville, Arkansas
DATE STARTED 8/31/23 **COMPLETED** 8/31/23	**GROUND ELEVATION** 1291 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.	**GROUND WATER LEVELS:**
DRILLING METHOD Solid Stem Auger	▽ **AT TIME OF DRILLING** 13.00 ft / Elev 1278.00 ft
LOGGED BY C. Chiddister **CHECKED BY** M. Roberson	**AT END OF DRILLING** ---
NOTES Conducted Utilizing a CME-45B Truck Mounted Drill Rig	**AFTER DRILLING** ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0	TOPSOIL (3")					
	(CL) SANDY LEAN CLAY - Dark Brown; Very Stiff; Low to Moderate Plasticity; Trace Gravels; Little Sands; Mostly Fines; Moist	SPT 1	28	9-7-6 (13)		
2.5	- Hard; Some Gravels	SPT 2	17	6-25-10 (35)		
	- Stiff	SPT 3	50	6-5-5 (10)		
5.0	- Medium-Stiff; Very Moist	SPT 4	44	2-2-3 (5)		
7.5						
	- Light Brown; Stiff	SPT 5	33	16-5-6 (11)		
10.0						
12.5	▽					



Refusal at 13.0 feet.
Bottom of borehole at 13.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 9/13/23 10:52 - L:\CURRENT PROJECTS\GEOTS\23-GEOT\23-3887 - BENTONVILLE, AR - THADEN SCHOOL ATHLETIC FACILITY DEVELOPMENT (GEOT)\GEOTECH REPORT\23-3887 - THADEN ATHLETIC FACILITY DEVEL

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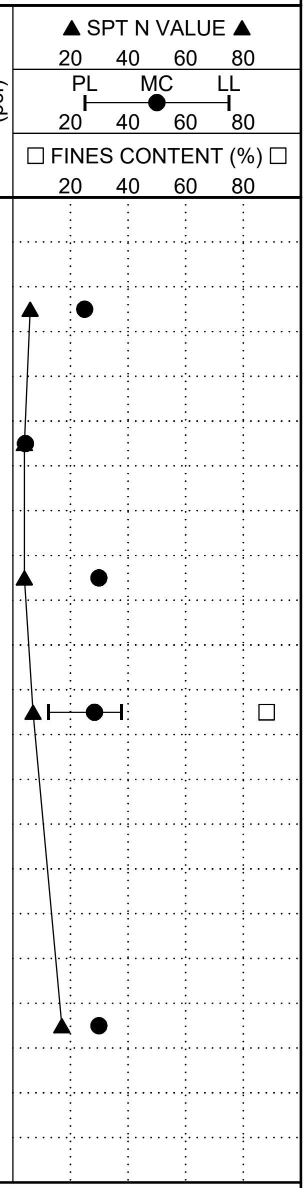
Fayetteville, AR 72703
Telephone: 4734432377

BORING NUMBER B-03

CLIENT Thaden School
PROJECT NAME Thaden School Athletic Facility
PROJECT NUMBER 23-3887
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 8/31/23 **COMPLETED** 8/31/23
GROUND ELEVATION 1289 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING 11.00 ft / Elev 1278.00 ft
LOGGED BY C. Chiddister **CHECKED BY** M. Roberson
AT END OF DRILLING ---
NOTES Conducted Utilizing a CME-45B Truck Mounted Drill 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)
0.0		TOPSOIL (3")					
		(CL) SANDY LEAN CLAY WITH GRAVEL - Light Brown; Medium-Stiff to Stiff; Low to Moderate Plasticity; Dry	SPT 1	22	4-3-3 (6)		
2.5		- Medium-Stiff	SPT 2	6	2-2-2 (4)		
		(CL) LEAN CLAY - Dark Brown; Medium-Stiff; Little Sands; Mostly Fines; Very Moist	SPT 3	22	2-1-3 (4)		
5.0		- Light Brown to Gray; Stiff	SPT 4	89	2-2-5 (7)		
7.5							
		- Very Stiff	SPT 5	61	2-8-9 (17)		
10.0							



Refusal at 11.0 feet.
Bottom of borehole at 11.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 9/13/23 10:52 - L:\CURRENT PROJECTS\GEOTS\23-GEOT\23-3887 - BENTONVILLE, AR - THADEN SCHOOL ATHLETIC FACILITY DEVELOPMENT (GEOT)\GEOTECH REPORT\23-3887 - THADEN ATHLETIC FACILITY DEVEL

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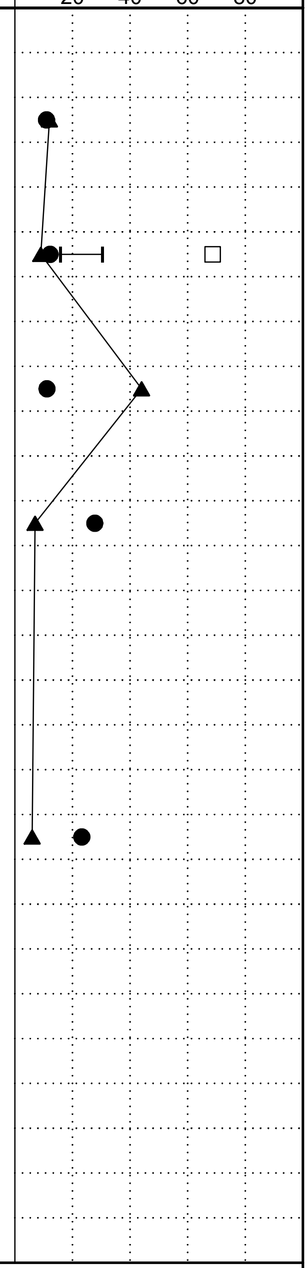
1580 E Stearns St
Fayetteville, AR 72703
Telephone: 4734432377

BORING NUMBER B-04

CLIENT Thaden School
PROJECT NAME Thaden School Athletic Facility
PROJECT NUMBER 23-3887
PROJECT LOCATION Bentonville, Arkansas
DATE STARTED 8/31/23 **COMPLETED** 8/31/23
GROUND ELEVATION 1292 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR McClelland Consulting Engineers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING 13.50 ft / Elev 1278.50 ft
LOGGED BY C. Chiddister **CHECKED BY** M. Roberson
AT END OF DRILLING ---
NOTES Conducted Utilizing a CME-45B Truck Mounted Drill Rig
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0	TOPSOIL (3")					
	(CL) SANDY LEAN CLAY - Dark Brown; Stiff to Very Stiff; Few Gravels; Little Sands; Mostly Fines; Dry	SPT 1	39	5-6-6 (12)		
2.5		SPT 2	50	3-5-4 (9)		
	- Stiff	SPT 3	28	2-7-37 (44)		
5.0	- Hard (Chert Seam Encountered 4.5' - 5')					
	- Dark Brown; Stiff; Very Moist	SPT 4	39	7-4-3 (7)		
7.5						
	- Medium-Stiff to Stiff; Moist	SPT 5	67	0-2-4 (6)		
10.0						
12.5						
13.5	∇					



Refusal at 14.0 feet.
Bottom of borehole at 14.0 feet.

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KEY TO SYMBOLS

CLIENT Thaden School

PROJECT NAME Thaden School Athletic Facility

PROJECT NUMBER 23-3887

PROJECT LOCATION Bentonville, Arkansas

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

CL: USCS Low Plasticity Clay

CLG: USCS Low Plasticity Gravelly Clay

TOPSOIL: Topsoil

SAMPLER SYMBOLS

Standard Penetration Test

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

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%

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

KEY TO SYMBOLS - GINT STD US LAB.GDT - 9/20/23 15:34 - L:\CURRENT PROJECTS\GEOTS\23-GEOT\23-3887 - BENTONVILLE, AR - THADEN SCHOOL ATHLETIC FACILITY DEVELOPMENT (GEOT)\GEOTECH REPORT\23-3887 - THADEN ATHLETIC FACILITY DEVELOPM

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Fayetteville, Arkansas 72703
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APPENDIX C: LABORATORY RESULTS

McClelland Consulting Engineers
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Fayetteville, AR 72703
Telephone: 4734432377

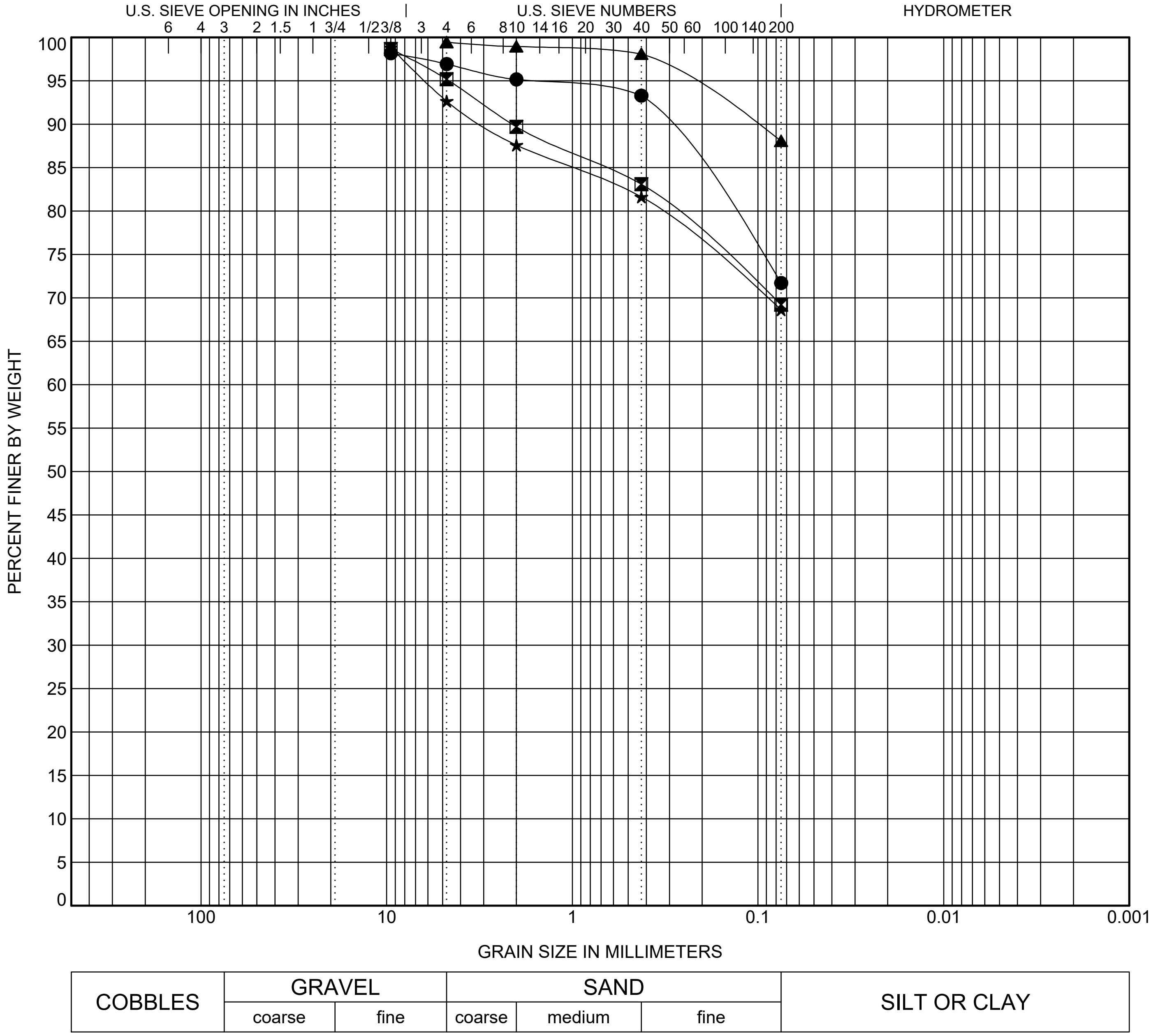
GRAIN SIZE DISTRIBUTION

CLIENT Thaden School

PROJECT NAME Thaden School Athletic Facility

PROJECT NUMBER 23-3887

PROJECT LOCATION Bentonville, Arkansas



	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-01**	**8.5**	**LEAN CLAY with SAND(CL)**	**26**	**13**	**13**		
⧗	**B-02**	**3.5**	**SANDY LEAN CLAY(CL)**	**28**	**15**	**13**		
▲	**B-03**	**5.0**	**LEAN CLAY(CL)**	**38**	**12**	**26**		
★	**B-04**	**2.0**	**SANDY LEAN CLAY(CL)**	**30**	**16**	**14**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-01**	**8.5**	**9.5**				**1.2**	**25.2**	**71.7**	
⧗	**B-02**	**3.5**	**9.5**				**3.5**	**26.0**	**69.2**	
▲	**B-03**	**5.0**	**4.75**					**11.4**	**88.1**	
★	**B-04**	**2.0**	**9.5**				**6.2**	**24.0**	**68.6**	

GRAIN SIZE - GINT STD US LAB.GDT - 9/13/23 10:53 - L:\CURRENT PROJECTS\GEOTS\23-GEOT\23-3887 - BENTONVILLE, AR - THADEN SCHOOL ATHLETIC FACILITY DEVELOPMENT (GEOT)\GEOTECH REPORT\23-3887 - THADEN ATHLETIC FACILITY DEVELOPMENT.G

McClelland Consulting Engineers
1580 E Stearns St
Fayetteville, AR 72703
Telephone: 4734432377

SUMMARY OF LABORATORY RESULTS

CLIENT Thaden School **PROJECT NAME** Thaden School Athletic Facility

PROJECT NUMBER 23-3887 **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							6.9			
B-01	2.0							10.9			
B-01	3.5							26.2			
B-01	5.0							31.7			
B-01	8.5	26	13	13	9.5	72	CL	20.2			
B-02	0.5							18.7			
B-02	2.0							15.0			
B-02	3.5	28	15	13	9.5	69	CL	15.0			
B-02	5.0							22.3			
B-02	8.5							15.9			
B-03	0.5							24.9			
B-03	2.0							4.3			
B-03	3.5							29.9			
B-03	5.0	38	12	26	4.75	88	CL	28.3			
B-03	8.5							29.9			
B-04	0.5							11.0			
B-04	2.0	30	16	14	9.5	69	CL	12.2			
B-04	3.5							11.1			
B-04	5.0							27.7			
B-04	8.5							23.2			

LAB SUMMARY - GINT STD US LAB.GDT - 9/13/23 11:12 - L:\CURRENT PROJECTS\GEOTS\23-GEOT\23-3887 - BENTONVILLE, AR - THADEN SCHOOL ATHLETIC FACILITY DEVELOPMENT (GEOT)\GEOTECH REPORT\23-3887 - THADEN ATHLETIC FACILITY DEVELOPMEN