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- CONSTRUCTION MATERIALS ENGINEERING & TESTING
- SOILS • ASPHALT • CONCRETE

December 19, 2023

SCI of Texas
1929 Allen Parkway
Houston, Texas 77019

Attention: Austin Dicks
Austin.Dicks@sci-us.com

SUBJECT: GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED FUNERAL FACILITY
NW QUAD of BAGDAD ROAD and VISTA RIDGE DRIVE
LEANDER, TEXAS
RETL Job No.: G323294

Dear Mr. Dicks;

In accordance with our agreement, Rock Engineering and Testing Laboratory, LLC (RETL) has conducted a geotechnical engineering evaluation for the above referenced project. The results of this exploration, together with our recommendations, are presented in the accompanying report, an electronic copy of which is being transmitted herewith. RETL will provide up to two (2) copies of this report in hard copy at the request of the client.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. Rock Engineering and Testing Laboratory, LLC (RETL), would be pleased to continue its role as the Geotechnical Engineer during project implementation.

RETL also has great interest in providing materials testing and special inspection services during the construction phase of this project. If you will advise us of the appropriate time to discuss these engineering services, we will be pleased to meet with you at your convenience.

Sincerely,

A. King Hammock

Arnie, K. Hammock, P.E.
Vice President - Round Rock

GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED FUNERAL FACILITY
NW QUAD of BAGDAD ROAD and VISTA RIDGE DRIVE
LEANDER, TEXAS

RETL JOB NUMBER: G323294

PREPARED FOR:

SCI of TEXAS
1929 ALLEN PARKWAY
HOUSTON, TEXAS 77019

DECEMBER 19, 2023

PREPARED BY:

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ENGINEERING & TESTING ROCK LABORATORY LLC
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TABLE OF CONTENTS

INTRODUCTION

This report presents the results of a subsurface exploration and foundation and pavement evaluation for the proposed Funeral Facility project to be constructed at the northwest quadrant of the intersection of Bagdad Road and Vista Ridge Drive in Leander, Texas. This study was conducted for SCI of Texas.

Authorization

The work for this project was performed in accordance with RETL Proposal Number RGP102523A dated October 27, 2023. The proposal was approved and signed by Austin Dicks representing SCI of Texas and returned to RETL via email.

Purpose and Scope

The purpose of this exploration was to evaluate the subsurface conditions at the subject site and to provide foundation and pavement design recommendations suitable for the proposed project. The scope of the exploration and evaluation included the following:

- Subsurface exploration
- Field and laboratory testing
- Engineering analysis and evaluation of the subsurface materials
- Provision of foundation and pavement design recommendations
- Preparation of this report

Our scope of services did not include an environmental assessment. Any statements in this report, or on the Logs of Boring, regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of the client.

General

The exploration and analysis of the subsurface conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation and pavement designs. The recommendations submitted for the proposed project are based on the available subsurface information and the preliminary design details provided in an email dated October 26, 2023 prepared by Mr. Steve Hampton representing N-Vizion which included a plan titled *“Architectural Site Plan”* prepared by N-Vizion depicting the project layout.

If the engineers require additional geotechnical design parameters to complete the foundation and pavement designs, RETL will provide the requested information as a supplement to this report.

The Geotechnical Engineer states that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in a manner consistent with the level of care and skill ordinarily exercised by reputable members of the Geotechnical Engineer's profession practicing contemporaneously under similar conditions in the locality of the project. RETL operates in general accordance with "*Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction*" (ASTM D3740). No other representations are expressed or implied, and no warranty or guarantee is included or intended.

This report has been prepared for the exclusive use of SCI of Texas, for the specific application towards the proposed Funeral Facility project to be constructed at the northwest quadrant of the intersection of Bagdad Road and Vista Ridge Drive in Leander, Texas.

DESCRIPTION OF SITE

The subject site is located at the northwest quadrant of the intersection of Bagdad Road and Vista Ridge Drive in Leander, Texas. The site is bounded by South Bagdad Road to the east, Vista Ridge Drive to the south, residential properties to the west, and an undeveloped property to the north, as depicted in the following aerial image taken from Google Earth:

At the time of our subsurface exploration, the subject site was undeveloped, and the majority of the surface was covered with grass and trees. Based on visual observations the site appeared to slope downward from the northwest toward the southeast with approximately 15-feet of change in elevation. The surficial soils were firm, and the drilling crew experienced little difficulty moving about the site.

FIELD EXPLORATION

Scope

The subsurface exploration for this project site, completed to evaluate the engineering characteristics of the foundation and pavement materials included a reconnaissance of the project site, drilling the test borings, and recovering disturbed split spoon samples. For the purpose of obtaining geotechnical information, eight (8) test borings were performed at this site to depths ranging from 10 to 15-feet below the existing site grades at the test boring locations.

RETL personnel determined the number, location, and depth of the test borings, as well as located the test borings at the subject site using the referenced plan. The drilling operations were performed by an RETL drilling crew. Upon completion of the drilling operations and after obtaining groundwater observations, the boreholes were backfilled with excavated soil and rock materials generated during the drilling operations. A Test Boring Location Plan, which is a reproduction of the referenced Site Plan is provided in the Appendix of this report.

Drilling and Sampling Procedures

The test borings were performed using a drilling rig equipped with a rotary head utilizing solid flight auger drilling methods to advance the boreholes to their desired depths. Disturbed samples were obtained employing split-barrel sampling procedures in general accordance with the procedures for “*Penetration Test and Split-Barrel Sampling of Soils*” (ASTM D1586).

The samples were classified in the field, placed in plastic bags, marked according to their test boring number, depth and any other pertinent field data, and stored in special containers. At the completion of the drilling operations the samples were delivered to the laboratory for testing.

Field Tests and Measurements

Penetration Tests - During the sampling procedures, standard penetration tests (SPT) were performed to obtain the standard penetration value of the subsurface materials encountered. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling 30-inches, required to advance the split-barrel sampler 1-foot into the soil.

The sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three successive 6-inch penetrations. The “N” value is obtained by adding the second and third 6-inch increment number of blows. The results of standard penetration tests indicate the relative density of cohesionless soils and comparative consistency of cohesive soils, thereby providing a basis for estimating the relative strength and compressibility of the soil profile components.

Water Level Observations - Water level observations were obtained during the test boring drilling operations and are noted on the Logs of Boring provided in the Appendix. The amount of water in open boreholes largely depends on the permeability of the soils encountered at the test boring locations. In relatively pervious soils, such as sandy soils, the indicated depths are usually reliable groundwater levels. In relatively impervious soils, a suitable estimate of the groundwater depth may not be possible, even after several days of observation. Seasonal variations, temperature, land-use, proximity to a body of water, and recent rainfall conditions may influence the depth to the groundwater.

Ground Surface Elevations - The ground surface elevations at the test boring locations were not provided at the time this report was prepared. The depths referred to in this report are therefore measured from the ground surface at the test boring locations during the time of our field investigation.

LABORATORY TESTING PROGRAM

In addition to the field investigation, a laboratory-testing program was conducted to determine additional pertinent engineering characteristics of the subsurface materials necessary in analyzing the behavior of the foundation and pavement systems for the proposed project. The laboratory-testing program included supplementary visual classification (ASTM D2487) and water content tests (ASTM D2216) on the samples obtained. In addition, selected samples were subjected to Atterberg limits tests (ASTM D4318) and percent material finer than the #200 sieve (ASTM D1140).

The phases of the laboratory-testing program were conducted in general accordance with applicable ASTM Specifications. The results of these tests are presented on the accompanying Logs of Boring provided in the Appendix.

SUBSURFACE CONDITIONS

General

The types of materials encountered in the test borings have been visually classified and are described in detail on the Logs of Boring. The results of the standard penetration tests, water level observations, and laboratory tests are presented on the Logs of Boring in numerical form. Representative samples of the materials encountered in the test borings were placed in polyethylene bags and are now stored in the laboratory for further analysis, if desired. Unless notified to the contrary, the samples will be disposed of three (3) months after issuance of this report.

The stratification, as shown on the Logs of Boring, represents the subsurface conditions at the actual test boring locations. Variations may occur between, or beyond, the test boring locations. Lines of demarcation represent the approximate boundary between different material types, but the transition may be gradual, or not clearly defined.

It should be noted that, whereby the test borings were drilled and sampled by experienced personnel, it is sometimes difficult to record changes in stratification within narrow limits. In the absence of foreign substances, it is also difficult to distinguish between discolored soils and clean soil fill.

Subsurface Materials

The generalized subsurface conditions encountered at the project site have been summarized and soil properties including classification, strength, plasticity and grain size are provided in the following table:

SUMMARY OF TEST BORINGS

D	Description	LL	PI	C	θ	γ_e	-#200	N
0-2	**CLAYEY** Sand Lean **CLAY***	27-43	9-21	3,000	0	120	22-54	21 to 50/3”
2-15	**LIMESTONE**	---	---	>5,000	0	135	---	50/5” to 50/1”

*Denotes stratum extended to a depth of approximately 3½-feet in Test Boring B-3 and 5-feet in Test Boring B-8

Where: D = Depth in feet below existing grade
LL = Liquid Limit (%)
PI = Plasticity Index
C = Average Soil Cohesion, psf (undrained)
θ = Angle of Internal Friction, deg. (undrained)
γ_e = Effective Soil Unit Weight, pcf
-#200 = Percent Material Finer than a #200 Sieve
N = Standard Penetration Value, blows per foot

Based on the observations completed during the field investigation and our experience with similar projects in the vicinity of the subject site, the following items should be noted:

- ***Fractured rock, boulders, or rock "slabs" may be encountered at depths shallower than the "bedrock" depths noted above; these fractured rock bodies may behave like "bedrock" in terms of rock strength and difficulty in excavation.***
- ***Soils identified as clayey sand may consist of severely weathered limestone and behave like "bedrock" in terms of rock strength and difficulty in excavation.***
- ***The limestone materials at this site are very hard in consistency; high powered rock excavation equipment and/or high torque drilling equipment, or other comparable heavy-duty earth moving equipment, such as a hoe ram breaker and rock bucket, will be necessary to excavate these materials at this site.***

Detailed descriptions of the materials encountered in the test borings are provided on the Logs of Boring included in the Appendix.

Seismic Site Class

The field investigation did not include a 100-foot deep test boring therefore, the subsurface properties are not known in sufficient detail to determine the Site Class per IBC. In general, this site has very stiff to hard clayey soils underlain by hard limestone material extending to the deepest boring termination depth of approximately 15-feet. Chapter 20 of ASCE 7 indicates that Site Class C materials should have average soil undrained shear strengths greater than 2,000 psf and average standard penetration resistances greater than 50 blows per foot. The materials extending to approximately the 15-foot depth have strengths similar to Site C materials therefore, RETL recommends that Site Class C, "very dense soil and soft rock profile" be utilized.

Groundwater Observations

Groundwater (GW) was not encountered during drilling nor measured upon completion of the drilling operations. It should be noted that water levels in open boreholes may require several hours to several days to stabilize depending on the permeability of the soils and that groundwater levels at this site may be subject to seasonal conditions, recent rainfall, drought, or temperature effects.

FOUNDATION RECOMMENDATIONS

Project Description

Based on the information provided, RETL understands that the proposed project will consist of the construction of the following:

- Construction of one (1) stand-alone building with a plan area of 11,800 square feet.
- Surficial paved areas for parking spaces and drive lanes
- Trash Enclosure
- Detention Pond

RETL understands that the proposed structure will be of wood frame construction. RETL anticipates that the structure will be supported on a slab-on-grade foundation system. RETL also anticipates that the proposed paved areas will consist of either flexible or rigid concrete pavement sections.

PVR Discussion

Differential vertical movements associated with the shrinking and swelling of plastic clay soils can adversely affect the performance of a slab-on-grade foundation system and soils supported concrete floor systems resulting in cracking of exterior facades, brittle floor coverings and interior partitions. The laboratory test results indicate that the clay soils encountered in the test borings completed at the subject site are generally low to moderate in plasticity and have a low to moderate swell potential. **The estimated total potential vertical rise (PVR) for slab-on-grade construction at the building area test boring locations is less than 1-inch.**

The calculated PVR values were determined using the Texas Department of Transportation Method TEX-124E and took into account the average depth of active zone, estimated to extend to a depth of approximately 2-feet, and the Atterberg limits test results of the soils encountered within the active zone. The estimated PVR value is based on a concrete floor or flatwork system applying a sustained surcharge load of approximately 1.0 pound per square inch on the subgrade soils.

The value represents the vertical rise that can be experienced by dry subsoils if they are subjected to conditions that allow them to become saturated, such as poor drainage. Using dry soil conditions to calculate the PVR is generally considered the worst case scenario. The actual movement of the subsoils is dependent upon their change in moisture content. Differential vertical movements can potentially be equal to the expected total movements. Differential vertical movements associated with the soils at this site may occur over a distance on the order of 2-feet.

Slab-on-Grade Design Recommendations

If a PVR movement of approximately 1-inch is acceptable to the owner and design team, stiffened, a slab-on-grade foundation may be used to support the proposed structure planned for construction at the subject site. If PVR movements of approximately 1-inch cannot be tolerated, drilled piers and a structurally suspended floor slab should be utilized.

Grade beams and footings should be founded entirely in either undisturbed natural materials or properly compacted Select Fill. ***In order to avoid the potential for damaging differential settlement, it is recommended that the foundation not bear partially on limestone material and partially on soil. Therefore, if limestone is encountered at the grade beam bearing depth, RETL recommends that excavation be performed to allow the placement of at least 12-inches of Select Fill below the bottom of beam elevation or that the beam excavations be deepened to bear completely in limestone.***

Grade beams bearing in properly compacted Select Fill or undisturbed natural materials may design for an allowable bearing pressure of 2,500 psf. The allowable bearing pressure values incorporate a safety factor of at least 3.0.

Grade beams and footings should have a minimum depth of 2-feet below the finished floor slab elevation. Perimeter beams and footings should also have an embedment depth of 2-feet below the final exterior grades adjacent to the foundation. The beams should be a minimum of 12-inches wide to reduce the potential for localized shear failure. The Structural Engineer may vary beam depths and widths based on experience designing and constructing similar type structures on sites with similar subsurface soil conditions.

The design criteria in the following table are provided for a conventional rebar reinforced slab-on-grade foundation at this site based on the *"Design of Slab-On-Ground Foundations"* published by the Wire Reinforcement Institute, Inc. (Aug., 1981) for a PVR of approximately 1-inch:

WRI DESIGN CRITERIA	
Climatic Rating (Cw)	17
Effective Plasticity Index	16
Soil/Climatic Rating Factor (1-C)	0.02
Maximum Beam Spacing (ft)	20

Even slight differential foundation movements may cause distress to interior wall partitions and rigid exterior facades supported by a slab-on-grade foundation resulting in cosmetic damage. This potential for movement should be understood and addressed during the design phase of the proposed structure planned for construction at this site.

Utilities which project through slab-on-grade floors should be designed with either some degree of flexibility, or with sleeves, in order to prevent damage to these lines should movement occur.

Foundation excavations should be observed by a representative of RETL prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and to identify the acceptability of the bearing materials. Soft or loose zones encountered at the bottom of the beam excavations should be removed to the level of competent materials as directed by the Geotechnical Engineer. Cavities formed as a result of excavation of soft or loose zones should be backfilled as directed by RETL.

After opening, foundation excavations should be observed and concrete placed as quickly as possible to avoid exposure of the beam bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. If it is required that foundation excavations be left open an extended period, they should be protected to reduce evaporation or entry of moisture.

PAVEMENT CONSIDERATIONS

In designing the proposed automobile parking areas as well as the driveways and service areas, the existing subgrade conditions must be considered together with the expected traffic use and loading conditions.

The conditions that influence pavement design can be summarized as follows:

1. Bearing values of the subgrade. These values can be represented by a California Bearing Ratio (CBR) for the design of flexible asphalt pavements, or a Modulus of Subgrade Reaction (K) for rigid concrete pavements.
2. Vehicular traffic, in terms of the number and frequency of vehicles and their range of axle loads.
3. Probable increase in vehicular use over the life of the pavement.
4. The availability of suitable materials to be used in the construction of the pavement and their relative costs.

Specific laboratory testing to define the subgrade strength (i.e. CBR/K values) has not been performed for this analysis. Based upon local experience and the plasticity indices of the in-situ subgrade soils, the CBR and K value for design has been selected as 5 and 140 pci, respectively.

Since traffic counts and design vehicles have not been provided, it is possible to provide a non-engineered pavement section suitable for light and heavy-duty service based on pavement sections that have provided adequate serviceability for similar type applications.

Allowances for proper drainage and proper material selection of base materials are most important for performance of asphaltic pavements. Ruts and birdbaths in asphalt pavements allow for quick deterioration of the pavement primarily due to saturation of the underlying base materials and subgrade soils. The paving areas can be designed with either a flexible or rigid pavement. It is important that the exposed subgrade is properly prepared prior to pavement installation.

RETL is of the opinion that the recommended Heavy-Duty sections presented in the following tables should be installed in the Fire Lane to support the load of a 90,000 pound fire truck apparatus.

Flexible Pavement Section Recommendations

The recommended light and heavy-duty flexible pavement section options, using the locally available base material, are provided in the following tables:

Light Duty Flexible Pavement (Automobile Parking Areas)	
Hot Mix Asphaltic Concrete	2"
Crushed Limestone Base Material (TxDOT Item 247 Type A; Gr. 1-2)	7"
Compacted Subgrade	8"

Heavy Duty Flexible Pavement (Driveways and Service Areas)	
Hot Mix Asphaltic Concrete	2"
Crushed Limestone Base Material (TxDOT Item 247 Type A; Gr. 1-2)	10"
Compacted Subgrade	8"

Rigid Pavement Section Recommendations

The use of concrete for paving has become more prevalent in recent years due to the long-term maintenance cost benefits of concrete pavement compared to asphalt pavements. The recommended light and heavy-duty rigid concrete pavement sections are provided in the following table:

Rigid Pavement	Light Duty	Heavy Duty
Reinforced Concrete	5½”	7"
Compacted Subgrade	8"	8"

Concrete pavement is recommended in areas that receive continuous repetitive traffic such as the parking lot entrances and trash dump approach areas. The heavy-duty concrete at the location of the trash dumpster should be 7-inches in thickness and be large enough to accommodate both the front and rear wheels of the vehicles used to pick up the trash dumpsters. Maintenance or operations managers need to stress the importance of placing the trash dumpsters in their proper locations to reduce the distress trash pickup operations place on the pavement.

Pavement Material Recommendations

Compacted Subgrade – After surface improvements, organics and deleterious materials have been removed as described in the **"Construction Considerations"** section of this report, the exposed soils should be proof-rolled with a minimum 20-ton rubber tire dump truck or loader under the supervision of RETL. If soft pockets or pumping areas are identified, these materials should be removed to expose firm materials and the excavation replaced with compacted fill.

After proof-rolling operations are completed, the upper 8-inches of exposed soils should be compacted to at least 92-percent of the maximum dry density as determined by the modified Proctor test (ASTM D1557). The moisture content of the exposed soils should be maintained between 1-percent below to 3-percent above the optimum moisture content value. Scarification and recompaction of competent limestone material is not recommended.

Compacted Fill - After subgrade preparation is complete, the placement of properly compacted fill soils may begin in the paved areas to raise the grades, where required. Fill soils may consist of on-site soils free of organics and other deleterious materials or imported soils, with a maximum plasticity index of 25. The fill used to raise the grade in the proposed parking and driveway areas should be placed in no greater than 8-inch thick loose lifts. Each lift should be compacted to at least 92-percent of the maximum dry density as determined by the modified Proctor test (ASTM D1557). The moisture content of the soils should be maintained between 1-percent below to 3-percent above the optimum moisture content value.

Fill slopes, with a 2-percent drainage gradient, shall extend beyond the edge of pavement sections at least 10-feet prior to sloping. Long-term slopes of fill material shall not be steeper than 3H:1V.

Base Material - Base materials in flexible pavement areas should meet the requirements set forth in the Texas Department of Transportation (TxDOT) 2014 Standard Specifications for Construction of Highways, Streets and Bridges; Item 247, Type A, Grade 1-2. The base material should be placed in maximum 8-inch thick loose lifts and compacted to at least 95-percent of the maximum dry density as determined by the modified Proctor test (ASTM D1557). The moisture content of the base materials should be maintained within 2-percent of the optimum moisture content.

Hot Mix Asphaltic Concrete - Hot mix asphaltic concrete should meet the requirements set forth in TxDOT Item 340 or 341; Type D surface course. The asphaltic concrete should be compacted to between 91.5 and 96.2-percent of the theoretical density.

Rigid Concrete - The concrete pavement should be properly reinforced and jointed, as per ACI, and should have a minimum 28-day compressive strength of 3,500 psi. Control joint spacing should not exceed 15-feet and preferably less to adequately control cracking. Joints should be thoroughly cleaned, and sealant should be installed without overfilling so that moisture infiltration into the subgrade soils and resultant concrete deterioration at the joints is minimized. Sealing of joints should be performed before the pavement is opened to traffic.

Based on past experience with concrete pavements supported on similar subgrade soils, RETL recommends that reinforcement for concrete pavement consist of #4 bars (½-inch diameter) spaced at 18 and 14-inches on center each way for light and heavy-duty options, respectively. The splice length for #4 bars should not be less than 20-inches.

SITE IMPROVEMENT METHODS

General Considerations

A majority of foundation related problems in the project area are attributable, at least in part, to poor drainage. Cohesive soils expand or shrink by absorbing or losing water. Reducing a soil's variation in moisture content will reduce its variation in volume. A number of measures may be used to attain a reduction in subsoil moisture content variations, thus reducing the soil's volume change potential. Some of these measures are outlined below:

- During construction, a positive drainage scheme should be implemented to prevent ponding of water on the subgrade.
- Positive drainage should be maintained around the structure through a roof/gutter system connected to piping or directed to paved surfaces, transmitting water away from the foundation perimeter. In addition, positive grades sloping away from the foundation should be designed and implemented. We recommend that others devise an effective site drainage plan prior to commencement of construction to provide positive drainage away from the foundation perimeter and off the site, both during, and after construction.
- The top 2-feet of utility trenches should be backfilled with low plasticity clays to assure the trenches do not serve as aqueducts that could transport water beneath the structure due to excessive surface water infiltration.

- Vegetation placed in landscape beds that are adjacent to the structure should be limited to plants and shrubs that will not exceed a mature height of 3-feet. Large bushes and trees should be planted away from any slab foundation at a distance that will exceed their full mature height and canopy width.

Project features beyond the scope of those discussed above should be planned and designed similarly to attain a region of relatively uniform moisture content within the foundation areas. Poor drainage schemes are generally the primary cause of foundation problems on clay soils.

Concrete Flatwork

Concrete site flatwork such as sidewalks and driveways will be subject to PVR movements when constructed over clay soils. Changes in the moisture content of the supporting plastic soils causes volumetric changes, resulting in differential movements of the flatwork. Provisions in the site development should be made in order to maintain relative uniform moisture contents of the supporting soils.

Individual panels of concrete flatwork should be dowelled together to minimize trip hazards as a result of differential movements within the flatwork. All efforts should be made to avoid having situations where site flatwork panels are partially supported on compacted select fill soils and partially supported on natural in-situ highly plastic soils. This may result in differential movement and may also result in a negative slope back to the building causing ponding of water next to the structures.

CONSTRUCTION CONSIDERATIONS

General Discussion

A Grading Plan depicting proposed final elevations for the proposed structure was not available at the time this report was prepared. The recommendations contained in the following sections anticipate that the Finish Floor Elevation (FFE) of the proposed structure will be constructed within 2-feet of the existing site grades. Once available, RETL should be provided with proposed final elevation information prior to design finalization so that we may determine if the recommendations presented in this report remain applicable.

Site Preparation

Within the areas of the subject site where engineered improvements are planned, vegetation, roots, objectionable materials, and topsoil should be stripped from the surface. The stripped material should either be stockpiled for use in non-structural / landscaped areas or removed from the site. A stripping depth of at least 6-inches is recommended unless competent soil materials are encountered at depths shallower than 6-inches.

Building Pad Area – To maintain the PVR condition at approximately 1-inch or less for slab-on-grade construction and provide relatively uniform support to the concrete slabs, ***RETL recommends that the upper soils within the building pad areas be over-excavated to allow the placement of at least 12-inches of Select Fill below the concrete slabs.*** A greater thickness of Select Fill is acceptable from a geotechnical perspective. The excavation should extend at least 3-feet laterally from the foundation perimeter. The excavation should then be filled, and the building pad areas raised to the Design Subgrade Elevation by placing properly compacted, low-plasticity Select Fill. The Select Fill soils shall meet the specifications and compaction/moisture requirements as presented in the "**Engineered Fill"** section of this report.

Paved Areas – In the proposed paved areas, excavation should be performed, where required, to achieve the design subgrade elevation. Excavated on-site soils may be used as properly compacted General Fill. The General Fill soils shall meet the specifications and compaction/moisture requirements as presented in the "**Engineered Fill"** section of this report.

Subgrade Preparation

After the completion of the stripping and excavation operations, the exposed soils should be proof-rolled with a minimum 20-ton rubber tire dump truck or loader under the supervision of RETL to detect any soft areas prior to fill placement. After proof-rolling operations are completed, the exposed soils should be scarified to a depth of 8-inches, moisture conditioned if necessary, and compacted. The exposed soils should be compacted to at least 92-percent of the maximum dry density as determined by the modified Proctor test (ASTM D1557). The moisture content of the soils should be maintained between 1-percent below to 3-percent above the optimum moisture content value. Scarification and recompaction of competent limestone material is not recommended.

Engineered Fill Materials

After subgrade preparation is complete, properly compacted fill soils should be used to the raise the site to the Design Subgrade Elevations where engineered improvements are planned. Fill soils placed to raise the site to the design subgrade elevations should consist of Select Fill for the building pad areas and General Fill soils for non-structural areas.

Select Fill - Select Fill shall consist of imported, crushed limestone. The Geotechnical Engineer shall approve Select Fill utilized at this site.

Imported crushed limestone - shall meet the gradation and plasticity requirements set forth in Texas Department of Transportation (TxDOT) Standard Specifications 2014; Item 247, Type A or B, Grade 3 or better.

Select Fill soils should be placed in no greater than 8-inch-thick loose lifts and shall be compacted to at least 95-percent of the maximum dry density as determined by the modified Proctor test (ASTM D1557). The moisture content of the Select Fill soils shall be maintained between 1-percent below to 3-percent above the optimum moisture content value.

General Fill - On-site excavated soils free of organics and deleterious materials or imported off-site soils can be used to raise the site grades as necessary. Imported General Fill soils shall be clayey soils, free of organics and other deleterious materials, with a plasticity index (PI) not greater than 25, a maximum gravel content (percentage retained on No. 4 sieve) of 40-percent, and a maximum particle size of 2-inches. The Geotechnical Engineer shall approve General Fill utilized at this site. General Fill soils should be placed in no greater than 8-inch thick loose lifts and shall be compacted to at least 95-percent of the maximum dry density as determined by the modified Proctor test (ASTM D1557). The moisture content of the General Fill soils shall be maintained between 1-percent below to 3-percent above the optimum moisture content value.

Earthwork and Foundation Acceptance

Exposure to the environment may weaken the soils at the foundation bearing level if excavations remain open for long periods of time. Therefore, it is recommended that the foundation excavations be extended to final grade and that the foundations be constructed as soon as possible to minimize potential damage to the bearing soils. The foundation bearing level should be free of loose soil, ponded water, or debris and should be observed prior to concreting by the Geotechnical Engineer, or his designated representative.

Foundation concrete should not be placed on soils that have been disturbed by rainfall or seepage. If the bearing soils are softened by surface water intrusion, or by desiccation, the unsuitable soils must be removed from the foundation excavation and be replaced with properly compacted select fill prior to placement of concrete.

The Geotechnical Engineer, or his designated representative, should monitor subgrade preparation and placement of select fill. As a guideline, a minimum of one in-place density test should be performed on the subgrade soils and each subsequent lift of fill for each 3,000 SF of slab area, or a minimum of 3 in-place density tests per testing interval, whichever is greater. Any areas not meeting the required compaction should be recompacted and retested until compliance is met.

Vapor Retarder

A vapor retarder with a permeance of less than 0.3 US perms (ASTM E96) should be placed under the concrete floor slab on the ground to reduce the transmission of water vapor from the supporting soil through the concrete slab and to function as a slip sheet to reduce subgrade drag friction. Polyethylene film with a minimum thickness of 10 mils (0.25 mm) is typically used for reduced vapor transmission and durability during and after its installation. The vapor retarder should be installed according to the ASTM E1643, "*Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*." In addition, a minimum 4-inch thick granular drainage break should be placed below the vapor retarder.

All penetrations through the vapor retarder should be sealed to ensure its integrity. The vapor retarder should be taped around all openings to ensure the effectiveness of the barrier. Grade stakes should not be driven through the barrier and care should be taken to avoid punctures during reinforcement and concrete placement.

Placement of slab concrete directly on the vapor retarder increases the risks of surface dusting, blistering and slab curling making good concrete practice critical. A low water to cement ratio concrete mix design combined with proper and adequate curing procedures will help ensure a good quality slab.

Utilities

Utilities that project through slab-on-grade floors should be designed with either some degree of flexibility, or with sleeves, in order to prevent damage to these lines should movement occur.

Expansion/Control Joints

Expansion and or control joints should be designed and placed in various portions of the structures, especially rigid brick walls. Properly planned placement of these joints will assist in controlling the degree and location of material cracking that normally occurs due to material shrinkage, thermal affects, soil movements and other related structural conditions.

GENERAL COMMENTS

If significant changes are made in the character or location of the proposed project, a consultation should be arranged to review any changes with respect to the prevailing soil conditions. At that time, it may be necessary to submit supplementary recommendations.

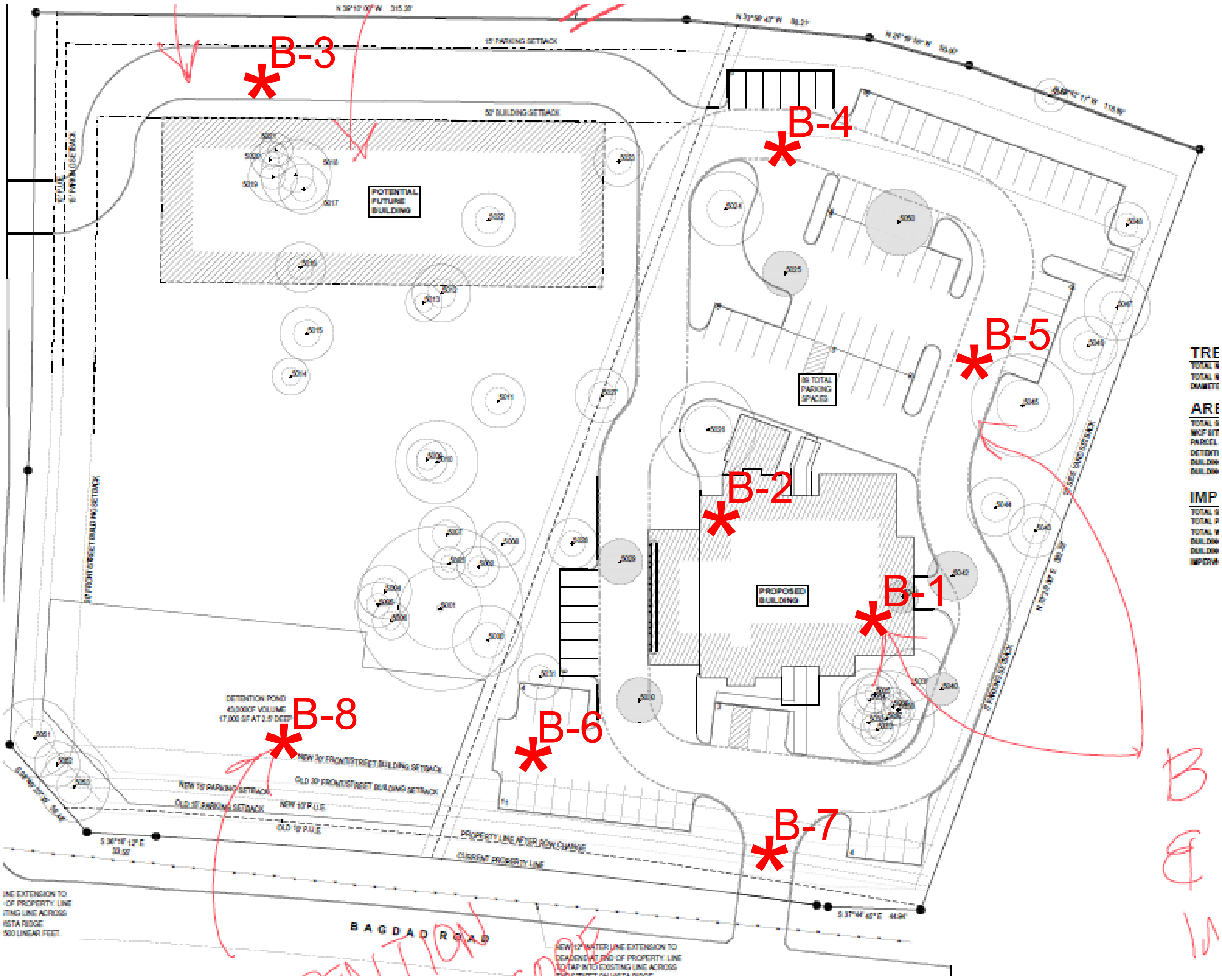
It is recommended that the services of RETL be engaged to test and evaluate the soils in the foundation excavations or pavement areas prior to concreting or placing pavement constituents in order to verify that the bearing soils are consistent with those encountered in the borings. RETL cannot accept any responsibility for any conditions that deviate from those described in this report, nor for the performance of the foundations and pavements if not engaged to also provide construction observation and testing for this project. If it is required for RETL to accept any liability, then RETL must agree with the plans and perform such observation during construction as we recommend.

Sheeting, shoring and bracing of trenches, pits and excavations should be made the responsibility of the contractor and should comply with all current and applicable local, state and federal safety codes, regulations and practices, including the Occupational Safety and Health Administration.

APPENDIX

A UES Company

A UES Company



TEST BORING LOCATION PLAN

NO SCALE – TEST BORING LOCATIONS ARE APPROXIMATE

SCI of Texas
December 19, 2023
RETL Job No.: G323294

PROPOSED FUNERAL FACILITY
NWC Bagdad Road and Vista Ridge Drive
Leander, Texas

LOG OF BORING B-1

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

DEPTH (FT)	SAMPLE NUMBER	N: BLOWS/FT; P: TONS/SQ FT; T: TONS/SQ FT; PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
0–1.5	SS S-1	N= 50/3"	21						38	**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, hard, dry. (SC)
3	SS S-2	N= 50/1"	5							**LIMESTONE**, light brown, hard.
5	SS S-3	N= 50/1"	6							Same as above.
7	SS S-4	N= 50/2"	7							Same as above.
9	SS S-5	N= 50/2"	8							**LIMESTONE**, light brown, hard.
14	SS S-6	N= 50/2"	8							Same as above.
15										Test boring was terminated at a depth of 15-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-2

ROCK Engineering & Testing Laboratory LLC
A UES Company

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/27/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

FIELD DATA				LABORATORY DATA							
DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
0–1.5	SS S-1		N= 50/4"	7						54	**SANDY LEAN CLAY**, with a thin surficial layer of fat clay, light brown, hard, dry. (CL)
2.5–4	SS S-2		N= 50/3"	5							**LIMESTONE**, light brown, hard.
4.5–6	SS S-3		N= 50/2"	6							Same as above.
6.5–8	SS S-4		N= 50/3"	7							Same as above, light gray.
8.5–10	SS S-5		N= 50/4"	7							**LIMESTONE**, light gray, hard.
13.5–15	SS S-6		N= 50/3"	6							Same as above.
15											Test boring was terminated at a depth of 15-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-3

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

DEPTH (FT)	SAMPLE NUMBER	N: BLOWS/FT; P: TONS/SQ FT; T: TONS/SQ FT; PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
0–1	SS S-1	N= 21	9	43	23	20				**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, very stiff, dry. (SC)
2.5–3.5	SS S-2	N= 36, 50/5"	13						38	
3.5										**LIMESTONE**, light brown, hard.
4.5–5.5	SS S-3	N= 50/5"	13							Same as above.
6.5–7.5	SS S-4	N= 28, 50/2"	11							Same as above, with clay seams.
8.5–10	SS S-5	N= 50/4"	8							**LIMESTONE**, light brown, hard.
10										Test boring was terminated at a depth of 10-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-4

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

Depth (ft)	Sample Number	N: Blows/ft, P: Tons/sq ft, T: Tons/sq ft, Percent Recovery/Rock Quality Designation	Moisture Content (%)	LL	PL	PI	Dry Density Pounds/cu.ft	Compressive Strength (Tons/sq ft)	Minus No. 200 Sieve (%)	Description of Stratum
0–1.5	SS S-1	N= 33, 50/3"	6	30	21	9				**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, hard, dry. (SC)
1.5–3.5	SS S-2	N= 50/2"	7							**LIMESTONE**, light brown, hard.
3.5–5.5	SS S-3	N= 50/3"	9							Same as above.
5.5–7.5	SS S-4	N= 50/5"	8							Same as above.
7.5–10	SS S-5	N= 50/1"	5							**LIMESTONE**, light brown, hard.

Test boring was terminated at a depth of 10-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-5

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0–1.5	SS S-1		N= 31, 50/2"	9	31	19	12				**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, hard, dry. (SC)
	2.5–4	SS S-2		N= 50/2"	8							**LIMESTONE**, light brown, hard.
	4.5–6	SS S-3		N= 50/1"	8							Same as above.
	6.5–8	SS S-4		N= 50/4"	10							Same as above.
	8.5–10	SS S-5		N= 50/3"	8							**LIMESTONE**, light brown, hard.
	10											Test boring was terminated at a depth of 10-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-6

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

DEPTH (FT)	SAMPLE NUMBER	N: BLOWS/FT; P: TONS/SQ FT; T: TONS/SQ FT; PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
0–1.5	SS S-1	N= 37	9	42	21	21				**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, hard, dry. (SC)
2.5–4	SS S-2	N= 50/2"	8							**LIMESTONE**, light brown, hard.
4.5–6	SS S-3	N= 50/4"	6							Same as above.
6.5–8	SS S-4	N= 50/2"	7							Same as above.
8.5–10	SS S-5	N= 50/1"	5							**LIMESTONE**, light brown, hard.
10										Test boring was terminated at a depth of 10-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-7

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

ROCK Engineering & Testing Laboratory LLC — A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0–1.5	SS S-1		N= 33, 50/4"	8	29	19	10			28	**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, hard, dry. (SC)
	2.5–4	SS S-2		N= 50/2"	6							**LIMESTONE**, light brown, hard.
	4.5–6	SS S-3		N= 50/5"	7							Same as above.
	6.5–8	SS S-4		N= 50/5"	7							Same as above.
	8.5–10	SS S-5		N= 50/2"	6							**LIMESTONE**, light gray, hard.
	10											Test boring was terminated at a depth of 10-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

LOG OF BORING B-8

Rock Engineering and Testing Laboratory
7 Roundville Lane
Round Rock, Texas 78664
Telephone: (512) 284-8022

A UES Company

CLIENT: SCI of Texas
PROJECT: Funeral Facility
LOCATION: Bagdad Rd & Vista Ridge Dr; Leander, TX
NUMBER: G323294

DATE(S) DRILLED: 11/28/2023

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling.
The borehole was dry and open upon completion of drilling.

SURFACE ELEVATION:

DEPTH (FT)	SAMPLE NUMBER	N: BLOWS/FT, P: TONS/SQ FT, T: TONS/SQ FT, PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
0–1	SS S-1	N= 31	15							**CLAYEY SAND**, with a thin surficial layer of fat clay, light brown, hard, dry. (SC)
2.5–4	SS S-2	N= 36	10	27	18	9			22	Same as above.
4–5										Same as above.
5	SS S-3	N= 50/5"	11							**LIMESTONE**, light brown, hard.
6.5–7	SS S-4	N= 50/5"	9							Same as above.
8.5–9	SS S-5	N= 50/4"	10							Same as above, light gray.
10										Test boring was terminated at a depth of 10-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:
Test Boring depth and location were determined by RETL. Drilling operations were performed by RETL.

Engineering & Testing Laboratory, Inc.

Rock Engineering & Testing Laboratory
7 Roundville Lane
Round Rock, TX 78664
Telephone: 512-284-8022

KEY TO SOIL CLASSIFICATION AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		SYMBOL	NAME
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well Graded Gravels or Gravel-Sand mixtures, little or no fines
		GP	Poorly Graded Gravels or Gravel-Sand mixtures, little or no fines
		GM	Silty Gravels, Gravel-Sand-Silt mixtures
		GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SAND AND SANDY SOILS	SW	Well Graded Sands or Gravelly Sands, little or no fines
		SP	Poorly Graded Sands or Gravelly Sands, little or no fines
		SM	Silty Sands, Sand-Silt Mixtures
		SC	Clayey Sands, Sand-Clay mixtures
	SILTS AND CLAYS LL < 50	ML	Inorganic Silts and very fine Sands, Rock Flour, Silty or Clayey fine Sands or Clayey Silts
		CL	Inorganic Clays of low to medium plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		OL	Organic Silts and Organic Silt-Clays of low plasticity
	SILTS AND CLAYS LL > 50	MH	Inorganic Silts, Micaceous or Diatomaceous fine Sandy or Silty soils, Elastic Silts
		CH	Inorganic Clays of high plasticity, Fat Clays
		OH	Organic Clays of medium to high plasticity, Organic Silts
NON USCS MATERIALS			Limestone
			Marl/Claystone
			Sandstone

TERMS CHARACTERIZING SOIL STRUCTURE

SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance

FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical

LAMINATED (VARVED) - composed of thin layers of varying color and texture, usually grading from sand or silt at the bottom to clay at the top

CRUMBLY - cohesive soils which break into small blocks or crumbs on drying

CALCAREOUS - containing appreciable quantities of calcium carbonate, generally nodular

WELL GRADED - having wide range in grain sizes and substantial amounts of all intermediate particle sizes

POORLY GRADED - predominantly of one grain size uniformly graded) or having a range of sizes with some intermediate size missing (gap or skip graded)

SYMBOLS FOR TEST DATA

— Groundwater Level (Initial Reading)

— Groundwater Level (Final Reading)

— Shelby Tube Sample

— SPT Samples

— Auger Sample

— Rock Core

— Texas Cone Penetrometer

— Grab Sample

TERMS DESCRIBING CONSISTENCY OF SOIL

COARSE GRAINED SOILS		FINE GRAINED SOILS		
DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	UNCONFINED COMPRESSION TONS PER SQ. FT.
Very Loose	0 - 4	Very Soft	< 2	< 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium	10 - 30	Firm	4 - 8	0.50 - 1.00
Dense	30 - 50	Stiff	8 - 15	1.00 - 2.00
Very Dense	over 50	Very Stiff	15 - 30	2.00 - 4.00
		Hard	over 30	over 4.00

Field Classification for "Consistency" of Fine Grained Soils is determined with a 0.25" diameter penetrometer