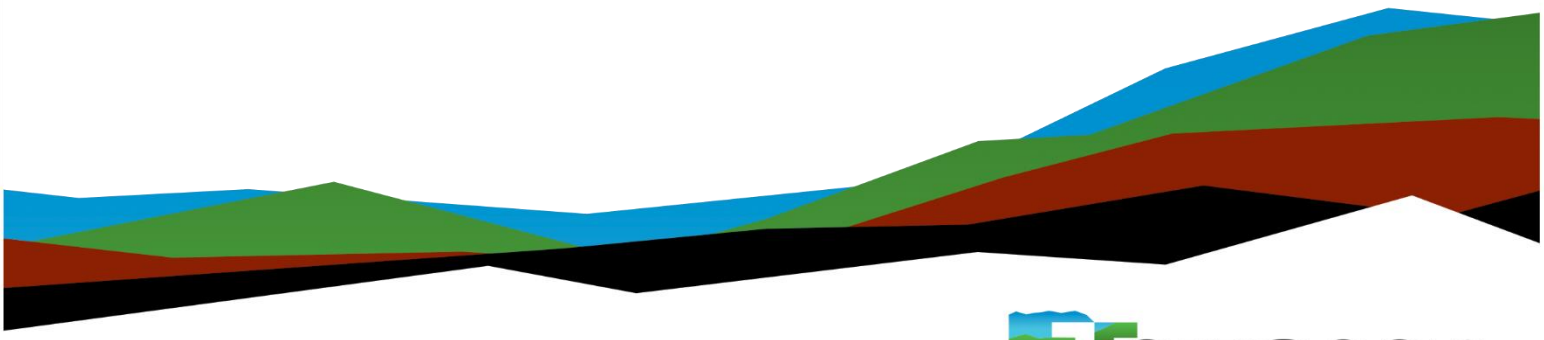
DSC Stores Building

Geotechnical Engineering Report

September 28, 2023 | Terracon Project No. 96235206

Prepared for:

Lower Colorado River Authority
3700 Lake Austin Boulevard
Austin, Texas 78703



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September 28, 2023

Lower Colorado River Authority
3700 Lake Austin Boulevard
Austin, Texas 78703

Attn: Joseph Luke, P.E.
P: (512) 578-2188
E: Joe.Luke@lcra.org

Re: Geotechnical Engineering Report
DSC Stores Building
3505 Montopolis Drive
Austin, Texas
Terracon Project No. 96235206

Dear Mr. Luke:

We have completed the scope of Geotechnical Engineering services for the above referenced project was performed in general accordance with PO 145925 dated August 31, 2023. This report presents the findings of the previous subsurface exploration performed at the site and provides geotechnical recommendations concerning earthwork and the design of foundations and floor slabs for the proposed project.

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

Sincerely,
Terracon Consultants, Inc.
TBPELS Firm Registration TX-F3272

Alexander D. Krumenacher, P.E.
Senior Project Manager

Bryan S. Moulin, P.E.
Senior Principal, Geotechnical Services

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Attachments

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

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed DSC Stores Building which will be located at 3505 Montopolis Drive in Austin, Texas. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction

Terracon reviewed subsurface information from the field exploration that was performed for Project No. 96215386 dated August 19, 2022, which included three borings in close proximity to the adjacent north to depths of 50 feet each and determined that additional borings were not necessary and that the information from the previous borings will be sufficient for the design of the new structure. No new project specific borings were drilled for this report.

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

Project Description

Item	Description
Project Description	The project includes the construction of a one-story, 100’ x 100’ pre-engineered steel-frame building.
Building Construction	Pre-engineered steel-frame construction with a stiffened slab-on-grade foundation system.
Finished Floor Elevation	Unknown, but assumed to be within 1 to 2 feet of existing grade.
Grading	Unknown, but cuts/fills of up to about 2 feet are assumed to be required to achieve final grade.

Item	Description
Maximum Loads	▪ Columns: Up to 50 kips maximum ▪ Walls: 2 to 4 kips per linear foot (klf) maximum (assumed) ▪ Slabs: 100 to 150 pounds per square foot (psf) maximum (assumed)
Below-Grade Structures	None.
Free-Standing Retaining Walls	None.

Site Conditions

Item	Description
Parcel Information	The project is in the eastern portion of the LCRA Dalchau Service Center at 3505 Montopolis Drive in Austin, Texas. See **Site Location**
Existing Improvements	None. The site appears to be in use as a materials storage yard.
Current Ground Cover	Gravel base material.
Existing Topography	Unknown. Based on a review of publicly available topographic maps, the site appears to be relatively level, varying from about 584 to 582 feet across the proposed building area.
Geology	Based on our review of available geologic information and the samples obtained from the test borings, the site lies within an area characterized by High Terrace deposits of Quaternary age, underlain by the Taylor Formation of Upper Cretaceous Age. The terrace deposits typically consist of gravel, sand, silt, and clay mixtures deposited through historic river action. The Taylor Formation consists of highly plastic expansive clay ranging in color from tan to dark gray. The Taylor Formation soils exhibit a very high shrink/swell potential.

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our

understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** of this report.

Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not observed in the borings while drilling, nor for the short duration the borings could remain open. However, this does not necessarily mean no groundwater may be present at the site as groundwater conditions can (and likely will) vary between the time of the geotechnical investigation and the timeframe of construction activities.

Groundwater seepage is possible at this site, particularly in the form of seepage traveling along pervious seams/fissures in the soil and/or along soil stratum interfaces. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Groundwater conditions should be evaluated immediately prior to construction.

A relatively long period may be necessary for a groundwater level to develop and stabilize in a borehole. Long-term observations in piezometers sealed from the influence of surface water are often required to further define groundwater levels. The installation of piezometers was not in the prior or current scopes. Please contact us if this is desired.

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties observed at the site and as described on the exploration logs and results, our professional opinion is for that a **Seismic Site Classification of C** be considered for the project. Subsurface explorations at this site were extended to a maximum depth of 50 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Geotechnical Overview

Based on our previous test borings at this site, expansive soils (some of the Stratum 1 fills and the Stratum 3 fat clays) that exhibit a moderate to very high potential for volumetric change during moisture variations are present at the site. The soils exhibit a Potential Vertical Rise (PVR) of up to about 4 inches, as estimated by the Texas Department of Transportation (TxDOT) Method TEX-124-E, if present in a dry condition.

In addition to the PVR discussed above, the Stratum 1 soils were observed to consist of fill which introduces the potential for variable settlement. The fills were observed to depths ranging from about 6 to 6½ feet. We have no records to indicate if the fill was placed in a controlled manner. In addition, portions of the fills consist of highly expansive fat clay (CH) and are not appropriate for re-use as select fill. In the absence of documentation of proper fill construction, the potential variability of the fill and the possible effects of that variability on the building performance must be considered and thus we are recommending complete removal and replacement of the Stratum 1 fill soils with properly placed and compacted select fill.

The **Slab-on-Grade Foundations** section addresses the support of the structure on a slab on grade beam foundation system bearing in select fill. The **Floor Slabs** section addresses slab-on-grade support of the building using overexcavation techniques.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Earthwork

Site Preparation

Construction areas should be stripped of all vegetation, loose soils, topsoil, and other unsuitable material currently present at the site. Roots of trees to be removed within construction areas should be grubbed to full depths, including the dry soil around the roots. If any unusual items are unearthed during or after demolition, please contact us for further evaluation. Utilities to be abandoned should be completely removed from all proposed construction areas. If this is not feasible, then the abandoned utility piping should be filled with flowable fill (TxDOT Item No. 401 or COA Item 402S) and plugged such that it does not become a conduit for water flow. We recommend that Terracon be retained to assist in evaluating exposed subgrades during earthwork so that unsuitable materials, if any, are removed at the time of construction.

Proof-Rolling

Once initial subgrade elevations have been achieved (i.e., after cuts but prior to fills), the exposed subgrade in all construction areas (except landscaping) should be carefully and thoroughly proof-rolled per TxDOT Item 216 with a pneumatic roller, fully-loaded dump truck, or similar equipment to detect weak zones in the subgrade. Weak areas detected during proof-rolling, zones containing debris or organics, and voids resulting from removal of tree roots, utilities, fill, etc. should be removed and replaced with soils exhibiting similar classification, moisture content, and density as the adjacent in-situ soils (or flowable fill). Proper site drainage should be maintained during construction so that ponding of surface runoff does not occur and cause construction delays and/or inhibit site access.

Fill Material Types

Fill required to achieve design grade should be classified as select fill and general fill. Select fill is material used below, and within 5 feet of structures. General fill is material used to achieve grade outside of these areas. Material property requirements for on-site soil for use as general fill and select fill are noted in the table below:

Fill Type [1]	USCS Classification	Acceptable Specifications
Imported Select Fill [2,3]	CL, SC, and/or GC	▪ TxDOT Item 247, Type A, Grade 3, OR ▪ Percent Retained on No. 4 Sieve ≤ 40 percent with 5≤PI≤20 and rocks ≤ 4 inches in maximum dimensions
General Fill [4]	CH, CL, SC and/or GC	▪ On-Site Soils: Rocks ≤ 4 inches in maximum dimension ▪ Imported Soils: PI ≤ 30; Rocks ≤ 4 inches in maximum dimension

1. Select and general fill should consist of approved materials free of organic matter and debris. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.
2. As an alternative to the Acceptable Specifications above, a low-plasticity granular material which does not meet these specifications may be used only if approved by Terracon.
3. Based on the laboratory testing performed during the previous field exploration, the Stratum 1 and 2 soils are not suitable for re-use as select fill.
4. Excavated on-site soils (free of organics, debris, and rocks larger than 4 inches) may be considered for re-use as fill in landscape or other general areas. If general fill is imported, the PI should not exceed 30.

Fill Placement and Compaction Requirements

Select and general fill should meet the following compaction requirements.

Item	Select Fill & General Fill
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e., jumping jack or plate compactor) is used
Minimum Compaction Requirements	95% of max. [1,2,3]
Water Content Range	Low plasticity cohesive (PI≤20): ±3% of optimum [1] High plasticity cohesive (PI>20): Optimum to +4% of optimum [1] Granular: ±3% of optimum [1]

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).
2. High plasticity cohesive fill should not be compacted to more than 100% of standard Proctor maximum dry density.
3. For fills greater than 5 feet in depth, if any, the compaction should be increased to at least 100 percent of the ASTM D 698 maximum dry unit weight

Grading and Drainage

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

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

program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

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

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

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

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas.

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

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project

provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Slab-on-Grade Foundations

A slab-on-grade beam foundation may be considered to support the structure at this site. Parameters commonly used to design this type of foundation are provided on the table below. The slab foundation design parameters presented are based on the criteria published by the Wire Reinforcement Institute (WRI). These are essentially empirical design methods and the recommended design parameters are based on our understanding of the proposed project, our interpretation of the information and data collected as a part of this study, our area experience, and the criteria published in the WRI design manual.

Conventional Method Parameters	**Value**
Net Allowable Bearing Pressures [1]	2,500 psf
Subgrade Modulus (k)	100 pci
Potential Vertical Rise (PVR)	1-inch
WRI Method Parameters	
Effective Plasticity Index (PI) [2]	27
Climatic Rating (C_w)	17
Soil – Climate Support Index (I_c)	0.87

1. The net allowable bearing pressure provided above includes a Factor of Safety (FS) of at least 3. Based on building pad preparation recommended in this report.
2. The WRI effective PI is the weighted average of the PI values in the upper 15 feet of the soil profile. The upper 5 feet has a weight factor of 3; the depth range from 5 to 10 feet has a weight factor of 2; the depth range of 10 to 15 feet has a weight factor of 1.

We recommend that exterior grade beams be at least 18 inches below the finished exterior grade. These recommendations are for a proper development of bearing capacity for the continuous beam sections of the foundation system and to reduce the potential for water to migrate beneath the slab foundation. These recommendations are not based on structural considerations. Grade beam depths may need to be greater than recommended herein for structural considerations and should be properly evaluated and designed by the Structural Engineer. The grade beams or slab portions may be thickened and widened to serve as spread footings at concentrated load areas.

For a slab on grade foundation system designed and constructed as recommended in this report, post-construction consolidation settlements should be less than 1-inch. Settlement response of a slab-on-grade foundation is influenced more by the quality of construction than by soil-structure interaction. Therefore, it is essential that the recommendations for foundation construction be strictly followed during the construction phases of the pad and foundation.

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

Floor Slabs

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

Subgrade Preparation

Information about existing and proposed grade and FFE for the proposed structure has not been provided to Terracon at this time; however, we assume that the planned FFE is within two feet of existing grades. If these assumptions are incorrect, Terracon should be notified to review and modify or verify recommendations in writing.

Subsequent to site stripping/grading operations, we recommend that any remaining surficial Stratum 1 fill soils (observed 6 to 6½ feet deep at the borings) should be completely removed from the building areas. Properly compacted select fill should then be used to achieve the planned FFE's. At a minimum, a properly compacted select fill pad no less than 5 feet thick should be provided within all portions of the building areas. The subgrade preparation discussed above should limit post-construction movements to about 1-inch.

Floor Slab Design Parameters

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder,

the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

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

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

Floor Slab Construction Considerations

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

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

General Comments

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

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

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

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

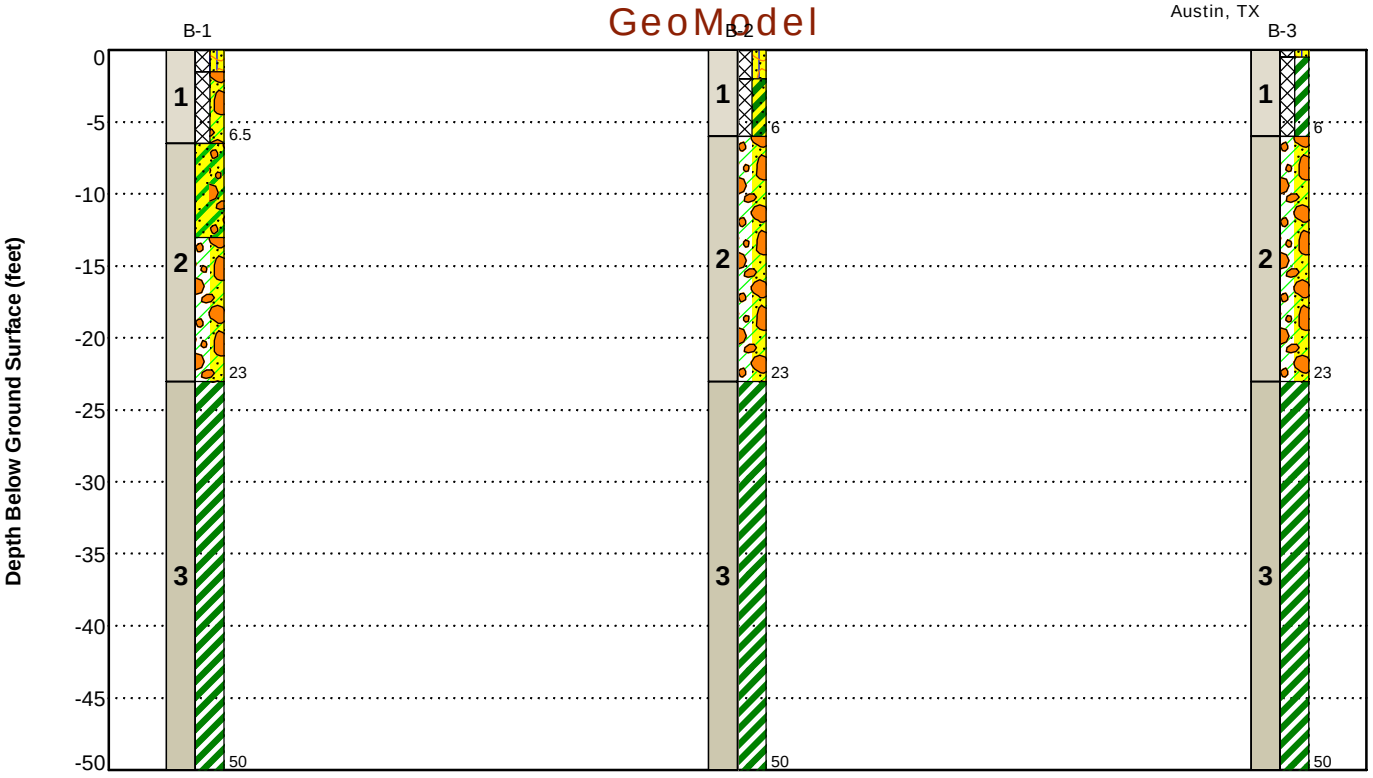
Figures

Contents:

DSC Stores Building
3505 Montopolis Drive | Austin, Texas
Terracon Project No. 96235206

Terracon
5307 Industrial Oaks Blvd Ste 160
Austin, TX

GeoModel



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

Model Layer	Layer Name	General Description
1	Fill	Varies in color from pale brown to dark brown to dark gray. Generally more gravelly/sandy in the upper portion and more clayey in the lower portion.
2	High Terrace Deposits	Brown to tan clayey sand (SC) to clayey gravel (GC). The zone below approximately 10 to 13 feet, and extending to about 23 feet, exhibited a strong cementation.
3	Taylor Formation	Dark gray shaley fat clay (CH).

LEGEND

- Silty Gravel with Sand
- Clayey Gravel with Sand
- Clayey Sand with Gravel
- Fat Clay
- Sandy Fat Clay

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

Attachments

Exploration and Testing Procedures

Field Exploration

Terracon reviewed subsurface information from the field exploration that was performed for Project No. 96215386 dated August 19, 2022, which included three borings at the adjacent site to the north to depths of 50 feet each and determined that additional borings were not necessary and that the information from the previous borings will be sufficient for the design of the new structure. No new project specific borings were drilled.

Boring Layout and Elevations: The selected borings were originally located based on existing features present at that time and/or with the use of handheld GPS units with an estimated horizontal accuracy of about ±10 feet.

Subsurface Exploration Procedures: Our subcontractors drilled the borings with truck-mounted rotary drill rig using continuous flight augers. Five samples were obtained in the upper 5 feet of each boring and at intervals of 5 feet thereafter. Soil sampling was performed using thin-wall tube (Shelby tubes) and/or split-barrel sampling procedures. The split-barrel samplers were driven in accordance with the standard test method for standard penetration test (SPT). We observed and recorded groundwater levels during drilling and sampling.

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

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Dry Unit Weight
- Unconfined Compression
- Atterberg Limits

- Sieve Analysis

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location

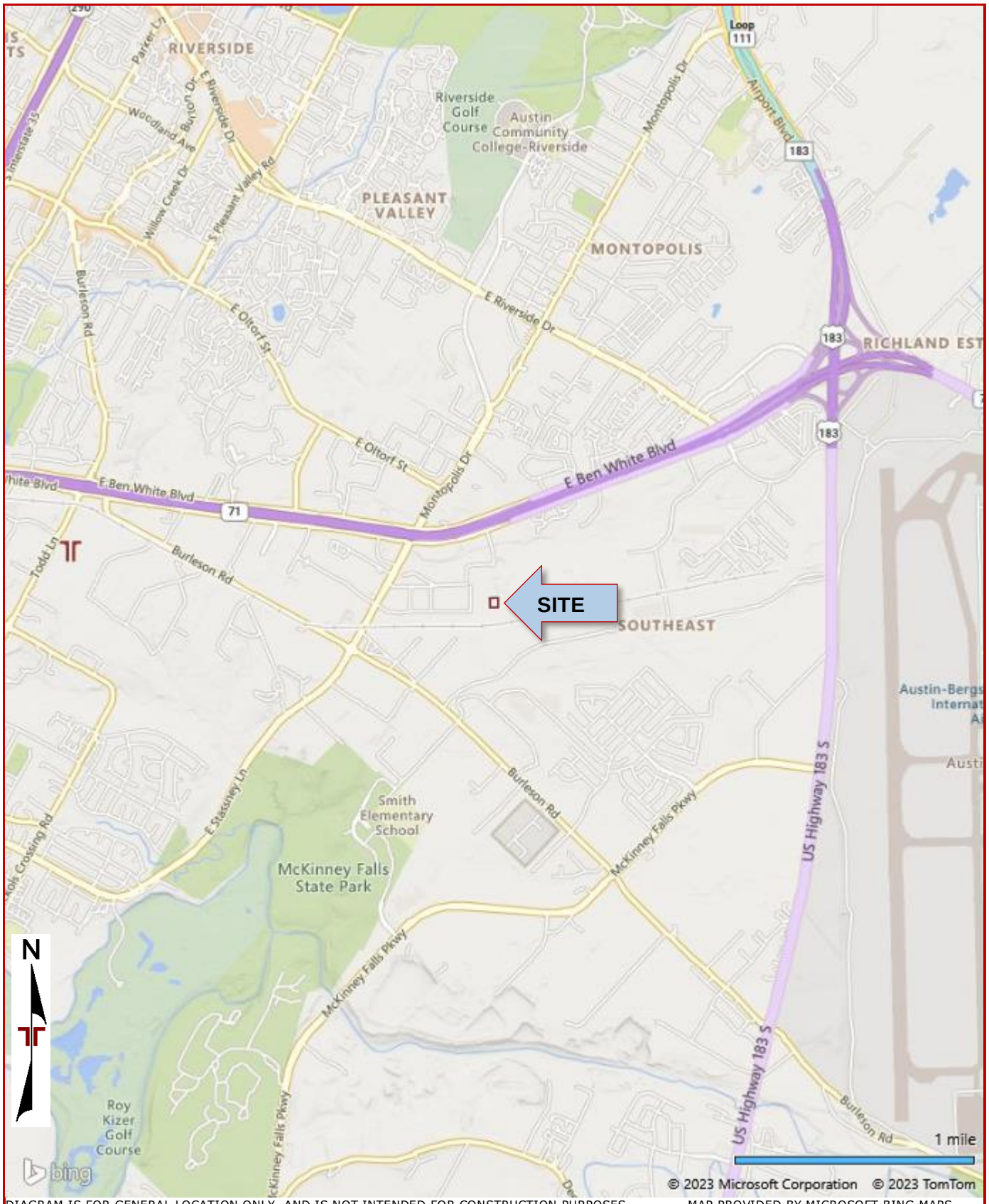


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

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

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless noted above.

DSC Stores Building
3505 Montopolis Drive | Austin, Texas
Terracon Project No. 96235206

Terracon
5307 Industrial Oaks Blvd Ste 160
Austin, TX

Boring Log No. B-1

Location: See Exploration Plan

Latitude: 30.2090° Longitude: -97.7068°

Model Layer	Depth (Ft.)	Description	Field Test Results	Test Type	Compressive Strength (tsf)	Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1	1.5	**FILL - SILTY GRAVEL WITH SAND (GM)**, pale brown, medium dense	14-17-7 N=24				12.3			
1	6.5	**FILL - CLAYEY GRAVEL WITH SAND (GC)**, dark brown to dark grayish-brown, dense to very dense, varies to gravelly fat clay (CH) pale brown to tan below about 4 feet	6-12-21 N=33				16.5			33
1			16-22-29 N=51				7.7			19
1			24-50/5"				11.2			
2	13.0	**CLAYEY SAND WITH GRAVEL (SC)**, light brown to tan, very dense	20-50/5"				8.3		33-13-20	36
2	23.0	**CLAYEY GRAVEL WITH SAND (GC)**, tan, very dense, strong cementation (dry auger refusal)	50/1"							
			50/1"							
3	50.0	**FAT CLAY (CH)**, dark gray, hard, shaley	50/4"							
3			18-22-29 N=51							
3			50/6"							
3			50/5"							
3			37-50/4"							
3			26-50/5"							
		Boring Terminated at 50 Feet								

Depth (Ft.) — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Dry Augered 0 to 15 feet; Wet Rotary Wash 15 to 50 feet

Abandonment Method
Boring backfilled with Auger Cuttings and/or Bentonite

Drill Rig
Mobile B-59

Hammer Type
Automatic

Driller
Core Tech Drilling, Inc.

Logged by
Johnny/Aaron

Boring Started
07-29-2022

Boring Completed
07-29-2022

DSC Stores Building
3505 Montopolis Drive | Austin, Texas
Terracon Project No. 96235206

Terracon
5307 Industrial Oaks Blvd Ste 160
Austin, TX

Boring Log No. B-2

Location: See Exploration Plan

Latitude: 30.2088° Longitude: -97.7070°

Model Layer	Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
			FILL - SILTY GRAVEL WITH SAND (GM), pale brown, medium dense				23-8-4 N=12				6.7			
1		2.0	**FILL - SANDY FAT CLAY (CH)**, trace gravel, dark brown to dark grayish-brown, medium stiff to stiff				1.5 tsf (HP)	UC	0.83	3.6		109		65
				5			1.5 tsf (HP)	UC	1.26	2.8	46.4	74		
2		6.0	**CLAYEY GRAVEL WITH SAND (GC)**, brown to tan, very dense				4.5 tsf (HP)	UC	1.21	5.6	18.9	118		40
							4.5 tsf (HP)				24.6			36
			strong cementation below about 10 feet (dry auger refusal)	10										
							50/1"							
				15										
							50/1"							
				20										
							50/6"							
				25										
							50/6"							
				30										
							50/5"							
3				35										
							50/5"							
				40										
							50/6"							
				45										
							50/5"							
		50.0	***Boring Terminated at 50 Feet***	50										

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
Mobile B-59

Hammer Type
Automatic

Driller
Core Tech Drilling, Inc.

Logged by
Johnny/Aaron

Boring Started
07-28-2022

Boring Completed
07-28-2022

Notes

Advancement Method
Dry Augered 0 to 10 feet; Wet Rotary Wash 10 to 50 feet

Abandonment Method
Boring backfilled with Auger Cuttings and/or Bentonite

DSC Stores Building
3505 Montopolis Drive | Austin, Texas
Terracon Project No. 96235206

Terracon
5307 Industrial Oaks Blvd Ste 160
Austin, TX

Boring Log No. B-3

Location: See Exploration Plan

Latitude: 30.2087° Longitude: -97.7072°

Model Layer	Depth (Ft.)	Graphic Log	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
1	0.5				8-10-12 N=22				25.2			
					3-4-6 N=10				44.6			93
	5				1.5 tsf (HP)	UC	1.50	1.8	41.6	76		
2	6.0				20-7-9 N=16				20.0			26
	10				4.5 tsf (HP)	UC	1.30	5.2	19.7	111	77-25-52	38
	15				50/1"							
	20				50/1"							
	23.0											
3	25				50/3"							
	30				30-32-36 N=68							
	35				24-50/6"							
	40				29-41-50/3"							
	45				43-50/3"							
	50.0				50/6"							

FILL - SILTY GRAVEL WITH SAND (GM), pale brown, medium dense

FILL - FAT CLAY (CH), trace sand and gravel, dark brown to dark gray, stiff to very stiff

CLAYEY GRAVEL WITH SAND (GC), brown, medium dense

very dense and strong cementation below about 13 feet (dry auger refusal)

FAT CLAY (CH), dark gray, hard, shaley

Boring Terminated at 50 Feet

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
Mobile B-59

Hammer Type
Automatic

Driller
Core Tech Drilling, Inc.

Logged by
Johnny/Aaron

Boring Started
08-01-2022

Boring Completed
08-01-2022

Notes

Advancement Method
Dry Augered 0 to 15 feet; Wet Rotary Wash 15 to 50 feet

Abandonment Method
Boring backfilled with Auger Cuttings and/or Bentonite

DSC Stores Building
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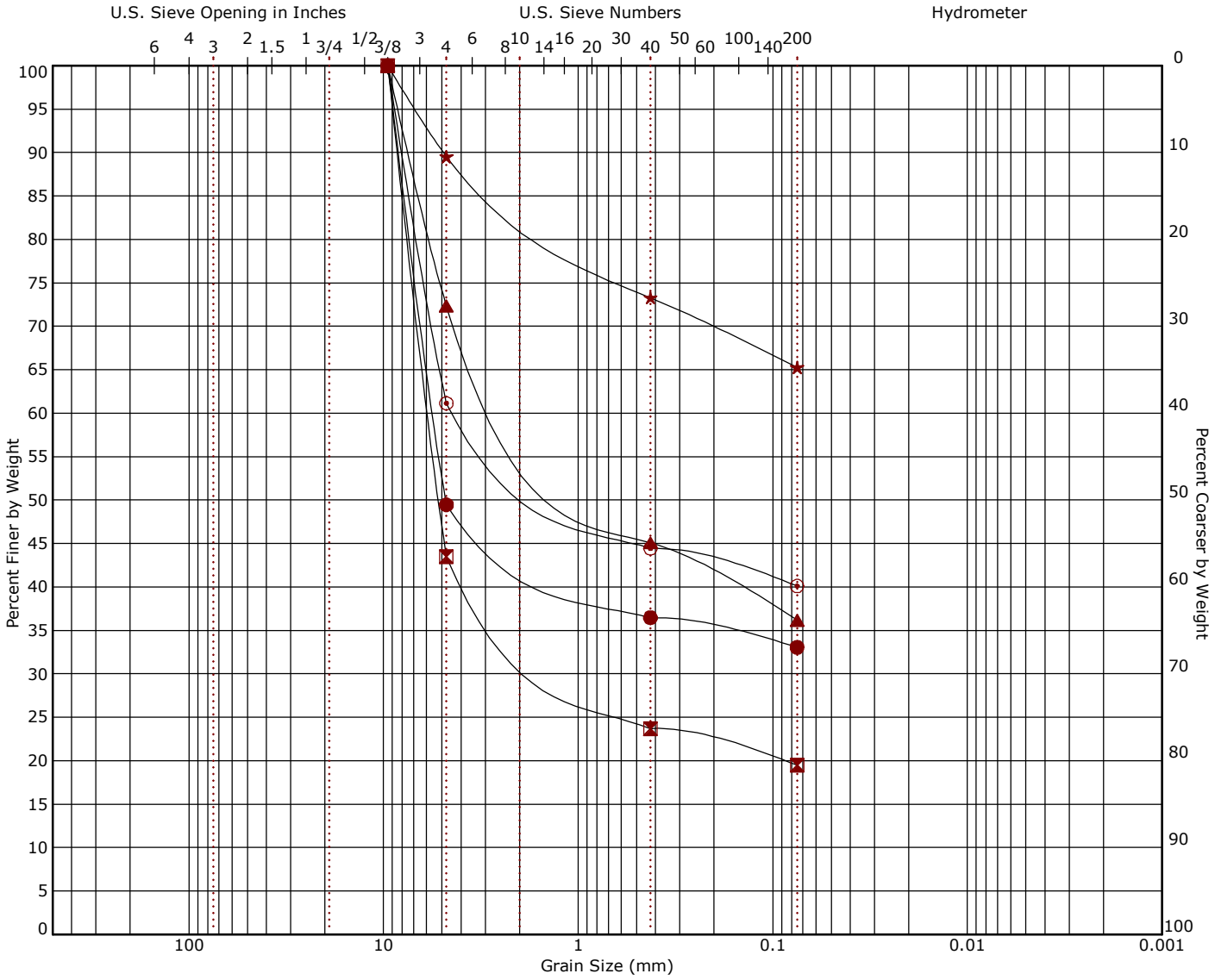
Terracon Project No. 96235206

Terracon
5307 Industrial Oaks Blvd Ste 160
Austin, TX

Grain Size Distribution

ASTM D422 / ASTM C136



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	B-1	2 - 3.5							
⊠	B-1	4 - 5.5							
▲	B-1	8.5 - 9.4	CLAYEY SAND with GRAVEL	SC	33	13	20		
★	B-2	2 - 4							
⊙	B-2	6 - 8							

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-1	2 - 3.5	9.5	5.489			0.0	50.5	16.4	33.1		
⊠	B-1	4 - 5.5	9.5	5.817	0.916		0.0	56.5	24.0	19.5		
▲	B-1	8.5 - 9.4	9.5	1.593			0.0	27.7	36.1	36.2		
★	B-2	2 - 4	9.5				0.0	10.5	24.3	65.3		
⊙	B-2	6 - 8	9.5	4.026			0.0	38.9	21.0	40.1		

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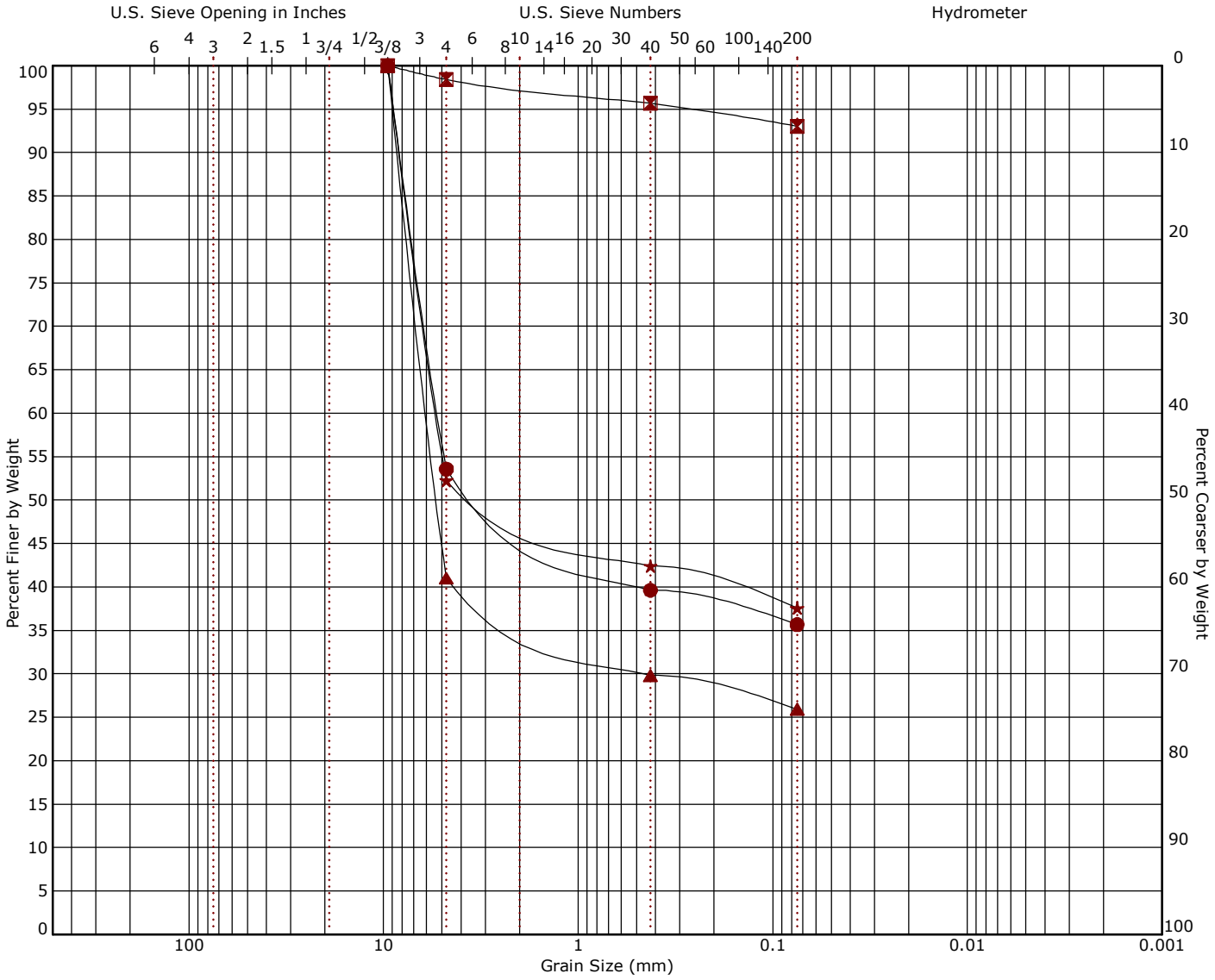
Grain Size Distribution

ASTM D422 / ASTM C136



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	B-2	8 - 10							
⊠	B-3	2 - 3.5							
▲	B-3	6 - 7.5							
★	B-3	8 - 10	CLAYEY GRAVEL	GC	77	25	52		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-2	8 - 10	9.5	5.229			0.0	46.4	17.9	35.7		
⊠	B-3	2 - 3.5	9.5				0.0	1.6	5.4	93.0		
▲	B-3	6 - 7.5	9.5	5.937	0.441		0.0	59.0	15.1	25.9		
★	B-3	8 - 10	9.5	5.315			0.0	47.7	14.7	37.6		

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

Terracon
5307 Industrial Oaks Blvd Ste 160
Austin, TX

General Notes

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

Descriptive Soil Classification

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

Location And Elevation Notes

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

Strength Terms

Relative Density of Coarse-Grained Soils
(More than 50% retained on No. 200 sieve.)
Density determined by Standard Penetration Resistance

Relative Density	Standard Penetration or N-Value (Blows/Ft.)
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 50
Very Dense	> 50

Consistency of Fine-Grained Soils
(50% or more passing the No. 200 sieve.)
Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance

Consistency	Unconfined Compressive Strength Qu (tsf)	Standard Penetration or N-Value (Blows/Ft.)
Very Soft	less than 0.25	0 - 1
Soft	0.25 to 0.50	2 - 4
Medium Stiff	0.50 to 1.00	4 - 8
Stiff	1.00 to 2.00	8 - 15
Very Stiff	2.00 to 4.00	15 - 30
Hard	> 4.00	> 30

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

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

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.