ECS Southwest, LLP

Geotechnical Engineering Report

Zaxby's on Potranco Road

Potranco Road (FM 1957) and Zeta Drive
San Antonio/Bexar, Texas

ECS Project No. 20:1359

January 28, 2022

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Avants Foods, Inc.
c/o Mr. Jeff Carter
Carter Engineering Consultants
3651 Mars Hill Road, Suite 2000
Watkinsville, GA 30677

ECS Project No. 20:1359

Reference: Geotechnical Engineering Report
Zaxby's – Potranco Road
Potranco Road (FM 1957) and Zeta Drive
San Antonio, Texas

Dear Mr. Carter:

ECS Southwest, LLP (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

This report is provided for the exclusive use of Carter Engineering Consultants, Avants Foods, and their project specific design team. This report is not intended to be used or relied upon in connection with other projects or by other third parties. ECS disclaims liability for any such third-party use or reliance without express written permission.

We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions assumed for this report. Should you have questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southwest, LLP

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Electronic seal approved by Richard E. Webb, P.E. on January 28, 2022

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EXECUTIVE SUMMARY

The following summarizes the major findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the executive summary should not be utilized in lieu of reading the entire geotechnical report.

- The borings generally encountered dark brown to light brown, lean clay (CL) to fat clay (CH) in the upper 10 to 14 feet. A very hard chalk was encountered below the surficial clays and extended to the termination of the borings. Groundwater was not encountered in our borings.

- We have estimated potential heave in the proposed building area utilizing the TxDOT PVR method (Tex 124-E). We estimate the existing PVR in the proposed building area to range from about 2-1/2 to 3 inches.

- The proposed building can be supported on a slab-on-grade foundation system provided the necessary earthwork remediation is constructed as recommended in this report.

- Rigid Concrete and/or Flexible Asphalt pavements can be used at this site. Our report includes our recommended pavement sections for both automotive areas and heavy duty (drives) pavements to accommodate heavier loadings due to trucks.

- The chalk that occurs approximately below 13-1/2 to 14-1/3 feet was observed to be very hard and cemented. The chalk may include localized areas of marl and cemented rock-like seams and layers. The excavations to install the below-grade structures may encountered very hard rock-like conditions that may be difficult to excavated with standard excavation equipment.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for design and construction of the proposed Zaxby's and associated site improvements. The project will include the design and construction of single-story building, parking areas, driveways and associated site improvements. The recommendations developed for this report are based on project information supplied by Carter Engineering Consultant, Inc.

Our services were provided in accordance with the Project Authorization Agreement as a supplement to the Master Services Master Agreement between Carter Engineering Consultants, Inc. and ECS, dated May 1, 2014. The Project Authorization Agreement authorizing our services was signed by Mr. Jeff Carter, P.E. on January 6, 2022.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, characterization, engineering analyses, and recommendations for the design and construction of the project.

This report includes the following items:

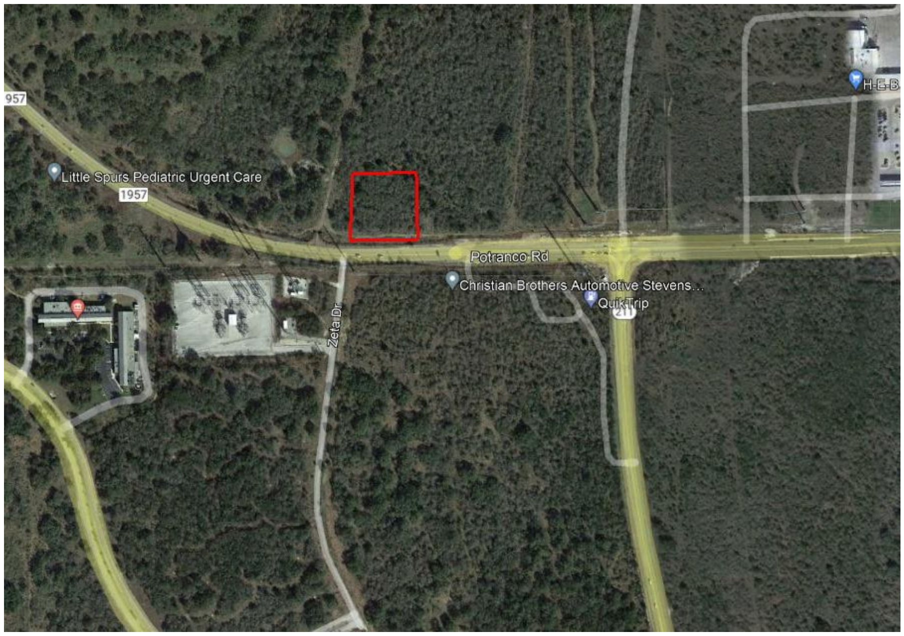
- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of surface features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Final test boring logs.
- Recommendations for site preparation, grading and drainage.
- Recommendations for foundation design and construction.

The scope of services for this project did not include an environmental assessment for determining the presence or absence of wetlands, or corrosive, hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

2.0 PROJECT INFORMATION

2.1 Project Location / Current Site / Present Site Use

The project site is located on Potranco Road (FM 1957) north of its intersection with Zeta Drive in San Antonio, Texas. The site is approximately 0.81 acres and is undeveloped. The site location is shown in the Figure below and on the Site Location Diagram included in Appendix A.



ECS reviewed the available Google Earth historical aerial imagery from December 1985 to August 2021. The photographs generally indicate the site has been undeveloped. Most of the trees, brush and other low-lying vegetation were cleared between April 2021 and August 2021 with the development of adjacent properties.

2.2 Proposed Construction

The following information explains our understanding of the planned development including proposed buildings and related infrastructure. A grading plan was unavailable at the time this report was prepared.

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
Building Footprint	Approximately 3,200 square feet in plan view
# of Stories	1-story
Usage	Restaurant
Framing	Not Provided. Anticipated to be wood framing or light-gauge metal framing
Maximum Column Loads (Compressive/Uplift)	25/15 kips, anticipated.
Maximum Wall Loads	1 kip per linear foot, anticipated.
Finish Floor Elevation	EL. 981.50 feet

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are presented in the Subsurface Exploration Procedures included in Appendix B. Our scope of work included drilling 12 borings. Five borings were drilled to depths between 13.5 and 14.8 feet. The remaining seven borings were drilled to depths of approximately 10 feet. Our borings were located with a handheld GPS unit and their approximate locations are shown on the Boring Location Diagram in Appendix A.

3.1 Subsurface characterization

The *Geologic Atlas of Texas*, San Antonio Sheet, indicates that this site is underlain by soils of the Pecan Gap formation as shown on the Site Geologic Diagram in Appendix A. The Pecan Gap consists of hard bluish-gray calcareous clay shale and very hard bluish-gray marl in the unweathered subsurface which weathers to a tan and gray buff color. Intermittent harder and softer seams and layers, as well as bentonitic zones, are common to the formation. The Pecan Gap soils are described geologically as chalk and chalky marl, and very light yellow to yellowish brown in color. In the weathered zone, the Pecan Gap typically, but not always, consists of a highly-plastic (expansive) clay.

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soils and rock strata. Please refer to the boring logs in Appendix B.

Stratum	Approximate Depth to Bottom of Strata Below Grade (feet)	Material Description	Consistency/Density
I	8.5 to 13.5	LEAN (CL) to FAT CLAY (CH), dark brown, light brown, light yellowish brown, light orangish brown	Firm to Very Hard
II	13.5 to 14.8	CHALK, light yellowish brown, light brown	Very Hard

A graphical presentation of the subsurface conditions is shown on the Subsurface Cross Section Diagrams included in Appendix A.

3.2 Groundwater Observations

The borings were advanced using relatively dry techniques in the upper portion of the borings, enabling the potential detection of the presence of groundwater during exploration operations. No free groundwater was observed during drilling. Upon completion of field operations, the boreholes were backfilled with soil cuttings generated during our field operations

The highest groundwater observations are normally encountered in the late winter and early spring. Fluctuation in the location of the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities and other factors not immediately apparent at the time of his investigation. Therefore, the groundwater conditions at this site are expected to be significantly influenced by surface water runoff and rainfall.

3.3 Laboratory Testing

Samples were transported to the ECS laboratory where they were examined and visually classified by an ECS geotechnical engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM D2488. To aid in classification of the soils and determination of their selected engineering characteristics, a testing program was conducted on selected samples in general accordance with the following standards:

Laboratory Test	Test Standard
Sieve Analyses	ASTM D1140 and ASTM D422
Moisture Content	ASTM D2216
Atterberg Limits	ASTM D4318

Results of the laboratory tests are included in the Appendix on the boring logs (Appendix B) and on the laboratory test summary tables (Appendix C). Laboratory test results were used to classify the soils encountered as outlined by USCS in general accordance with ASTM D2487. The USCS group symbols for each soil type are indicated in parentheses with the soil descriptions on the test boring logs.

Samples not tested in the laboratory will be stored for a period of 60 days after submittal of this report and will be discarded after this period, unless we receive alternate instructions regarding their disposition.

4.0 DESIGN RECOMMENDATIONS

The following sections present more detailed recommendations for the proposed development. These include recommendations for foundations, drainage, earthwork, ground slabs, and pavements. The following recommendations have been developed based on the described project characteristics and subsurface conditions. If there are changes to the project characteristics or if different subsurface conditions are encountered during construction, ECS should be consulted so that the recommendations of this report can be reviewed.

Site grading information was not provided during this report; however, we have assumed that the finished floor elevation will be within 2 feet from the existing site elevations. If the finished floor elevation deviates from this assumed site grades, the recommendations provided below should be evaluated by our office. Discussion of the factors affecting the building foundations for the proposed structures, as well as additional recommendations regarding design and construction at the project site are included below.

4.1 Potential Vertical Rise

Structural damage and/or cosmetic/operational distress can be caused by volume changes in clay soils. The expansive soils found at this site are capable of swelling and shrinking in volume dependent on potentially changing soil water conditions during or after construction. Clays can shrink when they lose water and swell (grow in volume) when they gain water. The potential of expansive clays to shrink and swell is related to; amongst other things, the Plasticity Index (PI). Clays with a higher PI generally have a greater potential for soil volume changes due to moisture content variations.

We have estimated potential heave for this site utilizing the TxDOT method (Tex-124-E). The Tex-124-E method provides an estimate of potential vertical rise (PVR) using the liquid limits, plasticity indices, grain size analyses, and existing water contents for soils. The PVR is estimated in the seasonally active zone, which can be up to about 15 feet in the site vicinity.

Estimated PVR values are based upon anticipated typical changes in soil moisture content from a dry (existing) to wet condition; however, soil movements in the field depend on the actual changes in moisture content. Thus, actual soil movements could be less than that calculated if little soil moisture variations occur, or the actual movement could exceed the estimated values if soil moisture content changes exceed those anticipated. This condition is often the result of excessive droughts, flooding, "perched" groundwater infiltration, poor surface-drainage, excessive irrigation adjacent to building foundations, and/or leaking irrigation lines or plumbing.

We estimate the existing PVR at the site to be about 2½ to 3 inches. To reduce the PVR to about 1 inch, we recommend undercutting the existing ground as required to construct the building pad with at least 5 feet of properly compacted select fill. Alternatively, the building pad can be prepared by undercutting as required to provide a minimum of 5 feet of moisture conditioned and recompacted on-soils with a 2-foot thick select fill cap to achieve a design PVR of 1 inch.

In this general area, many structural and geotechnical engineers consider a PVR of 1 inch to be within allowable tolerances for properly designed foundation systems. However, this movement does not take into consideration the movement criteria required or perceived by the facility owner or occupants. These "operational" performance criteria may be, and often are, more restrictive than the structural criteria or tolerances.

Grade-supported foundation or floor slab movements that approach 1 inch may cause doors to stick, cracks in sheetrock or brittle floor covering, cracks in exterior finishes and other forms of cosmetic distress. Measures can and should be taken during the design and construction of the facility to help limit the extent and severity of these types of distress. However, these magnitudes of movement typically do not cause "structural distress."

4.2 Foundation Recommendations

Based on our subsurface exploration and laboratory testing, we are providing the following recommendations to support the proposed building structure using a slab on-grade supported by a monolithic slab-on-grade foundation. The design team members (Owner/Developer/Architect and/or the Structural Engineer-of-Record) should discuss and select the appropriate foundation systems for the proposed structures.

4.3 Monolithic Slab-on-Grade

The proposed building at the site can be supported by a monolithic beam and slab-on-grade foundation system. The rigidity of a beam and slab foundation system can reduce the effects of differential soil movement due to compression of soils due to structural loads or shrink-swell due to expansive soils. This type of slab can be designed with conventionally reinforced perimeter and interior stiffening grade beams, and/or with post-tensioning adequate to provide sufficient rigidity to the slab element. The grade beam width and depth will be determined by the project Structural Engineer. Grade beams may be thickened and widened at column or load bearing wall locations to support concentrated load areas, if necessary.

Grade beams and floor slabs should be adequately reinforced with steel to reduce cracking and support bending moments caused by loading and minor movements of foundation soils.

The design values below are based on the subsurface conditions encountered during this exploration and the recommendations for building pad grading provided herein. If the project information changes, we should be contacted to review; and if necessary, provide alternate design parameters based on the changed conditions. These parameters are provided to assist the Structural Engineer in design of a foundation that is stiffened using grade beams (ribs), post tensioning, or a combination thereof.

Post-Tensioned Slab Parameters PTI 3rd Edition with 2008 Supplements	
Design Parameter	**1-Inch PVR Design Values**
e_m Edge	4.1 feet
e_m Center	8.0 feet
y_m Edge	2.2 inches
y_m Center	1.5 inches
Design Parameter	**1-Inch PVR Design Values**
Effective PI	30
Climatic Rating	17
Unconfined Compressive Strength (TSF)	1.5
Soil-Climate Support Index (1-C)	0.15

Grade beams and widened column areas at least 12 inches wide and 18 inches deep can be designed using a net allowable bearing capacity of 2,500 psf. This value can be increased by one-third when including transient wind or seismic loading. To utilize the parameters listed above, the subgrade should be prepared in accordance with the "Site Preparation, Grading and Drainage" sections of this report.

Foundations at this site should be expected to undergo some vertical movements. These movements can potentially cause cosmetic distress and should be accounted for in the design process. Contraction, control, or expansion joints should be designed and placed in various portions of the structure. Properly planned placement of these joints will assist in controlling the degree and location of material cracking which normally occurs due to material shrinkage, thermal effects, soil movements, and other related structural conditions.

Where moisture sensitive floor coverings or equipment will be installed, we recommend that at least a 10-mil vapor retarder be used beneath the slab. The vapor retarder should conform to ASTM E1745, Class C or better and should have a maximum water vapor permeance of 0.044 when tested in accordance with ASTM E96. Consideration to specifying a thicker, more durable vapor retarder should also be made where anticipated construction traffic dictates. Please refer to the latest edition of ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials and ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs for additional guidance on this issue.

4.4 Seismic Design Considerations

For the purposes of seismic design, a Site Class C (Very Dense Soil and Soft Rock) as defined in the International Building Code (IBC) / ASCE 7 is recommended for use at the project site. The site class is based on our review of geologic maps and literature and the subsurface conditions encountered in our soil borings. Using this site class and the location of the project site (lat. 29.422°, long. -98.786°), probabilistic ground motion values were determined for this project and are shown in the following table:

PERIOD (Seconds)	DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS	SITE COEFFICIENT, F_A	SITE COEFFICIENT, F_V
0.2	0.043 (S_{DS})	1.3	---
1.0	0.020 (S_{D1})	---	1.5

Our borings at the project site extended to maximum depths of 15 feet below the ground surface, whereas ASCE 7 site classifications are based on characterization of the upper 100 feet of the soil profile. The seismic parameters shown in the above table are based on the information provided in the IBC manual on Tables 1613.2.3(1) and 1613.2.3(2), the site classification, and mapped spectral response accelerations at the short and one second time periods.

4.5 Building Slab and Perimeter Conditions

We recommend paving/sidewalks be placed adjacent to the structures to reduce seasonal drying of the near surface soils near the perimeter of the structures. Irrigation of lawn and landscaped areas should be moderate, with no excessive wetting or drying of soils around the perimeter of the structures allowed. Sprinkler systems should be used around the perimeter of the structure to maintain a uniform moisture distribution around the foundation slab.

Positive drainage away from the structures should be provided and strictly maintained during the life of the structures. Where flatwork is placed against or near the structure, a positive seal should be installed and adequately maintained to help reduce water intrusion. Down spouts and gutters should be used to collect and distribute water at least 10 feet away from the structure.

Trees and bushes/shrubs planted near the perimeter of the structures can withdraw large amounts of water from the soils. We recommend trees not be planted or left in place (existing trees) closer than half the canopy diameter of mature trees from the grade beams, typically a minimum of 20 feet. If vegetation is planted closer than the anticipated mature height away from the building, then a root barrier should be installed to a depth of at least 5 feet below finished grade.

4.6 Pavement Design

ECS has prepared the following recommendations for the design and construction of both flexible and rigid pavement systems for use on the subject project. The "AASHTO Guide for Design of Pavement Structures" published by the American Association of State Highway and Transportation Officials was used to develop the pavement thickness recommendations in this report. This method of design considers pavement performance, traffic, roadbed soil, pavement materials, environment, drainage and reliability. Each of these items is incorporated into the design methodology.

We have based our analysis on the following ESAL information and pavement-related subgrade design parameters, which are considered to be typical for the area. A CBR (California Bearing Ratio) value of 3 percent was selected for design purposes. The CBR value was estimated based on ECS's knowledge and experience with similar soils and projects in this area.

Reliability	70
Initial Serviceability Index, Flexible Pavements	4.2
Initial Serviceability Index, Rigid Pavements	4.5
Terminal Serviceability Index, Pavements	2.0
Standard Deviation, Flexible Pavements	0.45
Standard Deviation, Rigid Pavements	0.35

Based on the design parameters listed above, we developed recommendations for "light duty," "moderate duty," and "heavy duty" pavement sections. "Light duty" pavements are intended for general parking areas with passenger vehicles only and have an approximate capacity of 20,000 ESAL. "Moderate duty" pavements are intended for areas subject to channelized traffic and have an approximate capacity of 80,000 ESAL. "Heavy duty" pavements are intended for areas subject to heavier vehicles such as trucks and have an approximate capacity of 250,000 ESAL. If the owner or other members of the design team feel that the ESAL values used for design are not appropriate, ECS should be notified in writing, so new information can be reviewed, and if necessary, the pavement recommendations revised accordingly.

The minimum recommended thickness for both hot mixed asphalt concrete (HMAC) and reinforced Portland cement concrete (PCC) pavement sections are presented in the following table for the described "light", "moderate" and "heavy" traffic conditions.

Component	**Light-Duty 20,000 ESALs**		**Moderate-Duty 80,000 ESALs**		**Heavy-Duty 250,000 ESALs**	
	Rigid	**Asphalt**	**Rigid**	**Asphalt**	**Rigid**	
Portland Cement Reinforced Concrete (PCC)	5.0 in	--	6.0 in	--	7.0 in.	--
Hot Mixed Asphalt Concrete (HMAC)	--	2.0 in	--	2.5 in	--	--
Crushed Limestone Base (CLB)	--	7.5.0 in	--	9.5 in	--	--
Lime Treated Subgrade (Option)	6.0 in	8.0 in	6.0 in	8.0 in	6.0 in	--

The pavement sections described above are considered suitable for general-purpose usage for the anticipated subgrade conditions and were designed using the AASHTO Pavement and Analysis System. An aggressive maintenance program to keep joints and cracks sealed to prevent moisture infiltration will help extend the pavement life.

We recommend that rigid pavement sections be used in heavy truck traffic areas. The concrete pavement should extend throughout the areas that require extensive turning and maneuvering of the delivery vehicles, etc. Waste dumpster pads, loading areas and other heavily loaded pavement areas that are not designed to accommodate these conditions often experience localized pavement failures, particularly if flexible pavement sections are used.

4.6.1 Pavement Materials

Recommendations regarding material requirements for the various pavement sections are summarized below:

Portland Cement Concrete - Concrete used for paving should have a minimum compressive strength of 3,500 psi at 28-days. The air content at the point of placement should range from 2 to 4 percent. The concrete pavements should be reinforced and jointed per current ACI recommendations.

Hot Mix Asphalt Concrete (HMAC) Surface Course - The asphalt concrete surface course should be plant mixed, hot laid Type D (Fine Graded Surface) or Type C (Coarse Graded Surface Course) meeting the specifications requirements of TxDOT Item 340 and specific criteria for the job mix formula. The mix should be compacted to between 92 and 97 percent of the maximum theoretical density as determined by Tex-227-F.

Crushed Limestone Base Course - Crushed limestone base should be placed in maximum 6-inch compacted lifts. The base materials should be compacted to at least 98 percent of the maximum dry density as determined by ASTM D698. Flexible base materials should be moisture conditioned to between -1 and +3 percentage points of the optimum moisture content during compaction. Flexible base materials should meet the requirements specified in 2014 TxDOT Standard Specification Item 247, Type A, Grade 1-2.

4.6.2 Rigid Pavement

Joints are typically placed in rigid pavements to control cracking, to facilitate construction, and to isolate a section of pavement from a structure or an adjacent pavement section. Joints used to control cracking are typically known as contraction or control joints as they are intended to control cracking that arises out of the shrinkage of concrete as it cures. Construction joints are used to provide clean breaks between pavement sections that result from the construction process. Isolation joints (or expansion joints) are used to separate the pavement from other structures or pavements and typically include the use of compressible materials in the joint as opposed to contraction or construction joints. Contraction joints should be spaced no greater than 15 feet between the nearest parallel joints with joint depths of at least ¼ of the slab thickness. Contraction and construction joints should be no wider than ⅛ inch whereas isolation joints may be up to 1 inch wide.

Steel reinforcement is commonly used where subgrade conditions are not likely to provide uniform support to the concrete pavement. Generally, sites with expansive soils present are often unable to provide such support to rigid pavement sections. Therefore, reinforcing steel should be used to span between construction and isolation (expansion) joints and should consist of at-minimum #3 bars spaced 18 inches on-centers each way. The rebar should be Grade 60 steel.

As with steel reinforcement, in situations where the subgrade may not provide uniform support to the pavement, dowels are commonly used to transfer loads across joints. Smooth dowels can be used for this purpose and should be utilized as recommended in the following table.

Dowel Design Information				
Slab Thickness, in.	**Dowel Diameter, in.**	**Min. Dowel Embedment Each side, in.**	**Min. Dowel Length, in.**	**Dowel Spacing On-Centers, in**
5.0	⅝	5	12	12
6.0	¾	6	14	12
7.0	⅞	7	16	12

The joint and reinforcing design of a rigid pavement system is largely a function of geometry for the pavement area. The proper length of concrete panels (defined as the distance between discontinuous pavement sections; e.g. between construction or isolation joints, or a combination of the two) and the location of contraction, construction, and isolation (expansion) joints are not included as a function of the above concrete pavement guidelines. Rather, these features should be determined based on the geometry and construction sequencing of the pavement. Actual joint spacing should be based on actual pavement areas and final panel lengths so that joints are evenly spaced. Joints should be designed to form approximately square panels where geometrically feasible. The values provided herein are guidelines and the recommendations selected by the project civil engineer and guidelines not provided or mentioned herein should not exceed the American Concrete Institute (ACI) 330R recommendations.

4.6.3 General Pavement Design Comments

Longitudinal cracks and apparent distress due to expansive soils may appear in the pavement after construction and the introduction of landscape irrigation. These cracks and distress are not pavement failures with respect to traffic support, although they may be aesthetically undesirable. In addition, without regular maintenance, the cracks can allow additional moisture intrusion and rapid degradation of the pavement section. The pavement sections are primarily designed to support the traffic and will not resist the forces generated by swelling soils.

Positive drainage should be provided on and around pavement areas to prevent ponding of water. Irrigation of lawn and landscaped areas adjacent to the pavements should be moderate, with no excessive wetting or drying of soils adjacent to the pavements. If landscaped islands are provided, they should be designed to restrict excess water from migrating to the pavement subgrade by using self-contained beds, raised planter boxes, vertical moisture barriers, and/or edge drains. Curbs should extend through the base course and at least 4 inches into the underlying subgrade. Good perimeter surface drainage guiding surface water away from the pavement area is also recommended.

Utility trench backfill can act materially different than adjacent natural soils, even if properly placed and compacted. Differential movements may occur which can lead to crack development near the edges of utility trenches, riser structures, manholes, etc., with the more noticeable cracks appearing in deeper fill zones. This type of cracking is considered typical for this type of construction if special care is not taken to prevent it.

As an option to help mitigate the effects of differential soil movements, we recommend that fill placed at depths greater than 5 feet be compacted to no less than 98% of the maximum dry density between minus one (-1) and plus three (+3) percentage points of the optimum moisture content (ASTM D698).

5.0 SITE CONSTRUCTION RECOMMENDATIONS

Preparation of the subgrade soils for areas to receive structures, fills or pavements should be conducted in accordance with the recommendations presented in the following sections.

5.1 General Site Preparation

Existing vegetation, organic laden soil, surficial debris, abandoned underground utilities, loose or soft soils and other deleterious materials should be removed from the proposed construction areas and properly disposed. Excavations resulting from the removals should be cleaned down to firm soils and backfilled with general fill in accordance with this report.

After stripping and required cuts have been completed, the subgrade soils should be scarified, moisture conditioned and compacted to at least 95 percent of the maximum dry density as determined by ASTM D698 to a depth of at least 8 inches. The soils should be moisture conditioned to between 0 and +4 percentage points of the optimum moisture content just prior to compaction.

Proof-rolling should be performed where possible with a heavy (minimum 20 tons) rubber-tired vehicle such as a loaded dump truck. Soils that are observed to rut or deflect excessively under the moving load should be under-cut and replaced with compacted structural fill that meets the requirements of the section titled General Fill. Proof-rolling and under-cutting activities should be observed by ECS and should be performed during periods of dry weather.

After stripping, removals, subgrade preparation, proof-rolling and evaluation has been completed, fill placement may begin where required. Excavated soil that meets the material requirements in the General Fill section below may be used as compacted fill. If suitable fill soils have to be imported to the site, they should meet the material and compaction requirements of the General Fill section of this report.

5.2 Building Pad Grading

To mitigate soil expansion potential in the building pad area to about 1-inch PVR, we recommend that the existing ground surface be undercut as discussed in **Section 4.1 Potential Vertical Rise** of this report. The stripping and removal operations and fill placement to finished pad grade should extend at least 5 feet beyond the building perimeter and beneath adjacent movement sensitive concrete flatwork.

After stripping and the required cuts have been completed, the subgrade soils should be scarified, moisture conditioned and compacted to at least 95 percent of the maximum dry density as determined by ASTM D698 to a depth of at least 8 inches. The soils should be moisture conditioned to between optimum and plus +4 percentage points of the optimum moisture content just prior to compaction.

Proof-rolling should be performed where possible with a heavy (minimum 20 tons) rubber-tired vehicle such as a loaded dump truck. Soils that are observed to rut or deflect excessively under the moving load should be under-cut and replaced with compacted structural fill that meets the requirements of the section titled General Fill. Proof-rolling and under-cutting activities should be observed by ECS and should be performed during periods of dry weather.

After stripping, removals, subgrade preparation and evaluation has been completed, fill placement may begin. Fills in the building pad area should consist of materials meeting the requirements of the Select Fill section below. Consideration should be given to creating an "all weather" working surface with the upper 6 inches of the select fill building pad. Such a working surface should consist of compacted TxDOT Item247 Type A, Grade 1-2 Flexible Base material. The use of an "all weather" working surface can significantly improve the accessibility of the site to construction traffic during periods of wet weather.

5.3 General Fill

General fill for site grading outside of the proposed building pads can consist of on-site or imported soils, provided they meet the requirements described below. General fill materials should not contain organics, construction debris, deleterious materials, and rocks larger than 4 inches in greatest dimension. General fill materials which are imported should have a PI of less than 30. Proposed general fill should be evaluated and tested by ECS prior to placement in the field.

ECS recommends that general fill be placed in horizontal loose lifts of not more than 8 inches in thickness. Lift thickness should be decreased when using light compaction equipment. General fill should be compacted to at least 95% of the maximum dry density at moisture contents within the range of 0 to +4 percentage points of the optimum moisture content (ASTM D698).

5.4 Select Fill

Select fill for use in the building pad preparation can consist of on-site or imported soils, provided they meet the requirements described below. Select fill materials should not contain organics, construction debris, deleterious materials, and rocks larger than 4 inches in greatest dimension. Select fill should have a Plasticity Index of between 5 and 20. Select fill should be evaluated and tested by ECS prior to placement in the field.

ECS recommends that select fill be placed in horizontal loose lifts of not more than 8 inches in thickness. Select fill should be compacted to at least 95% of the maximum dry density at moisture contents within the range of -1 to +3 percentage points of the optimum moisture content (ASTM D698).

5.5 Drainage

Water should not be allowed to collect in or adjacent to the foundation excavations, on foundation surfaces, or on prepared subgrades within the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of collected rainwater, groundwater, or surface runoff. Final grading should be designed to promote positive drainage away from the structures and pavements. Soil areas within 10 feet of the building should slope at a minimum of 5 percent away from the structure. Adjacent pavements and concrete hardscape should slope at 1½ to 2 percent away from the structure. Roof leaders and downspouts should discharge onto paved surfaces sloping away from the structure or into a closed pipe system which outfalls to the street gutter pan or directly to the storm drain system.

Also, to help control drainage in the vicinity of the structure, we recommend that roof/gutter downspouts and landscaping irrigation systems not be located adjacent to the building foundation. Where a select fill overbuild is provided outside of the floor slab/foundation footprint, the surface should be sealed with an impermeable layer (pavement or clay cap) to reduce infiltration of both irrigation and surface waters. Owners and landscape architects should be advised that trees should not be located closer than ½ their mature height from the foundations. Careful consideration should also be given to the location of water bearing utilities, as well as to provisions for drainage in the event of leaks in water bearing utilities. Leaks should be immediately repaired.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Earthwork

Effort should be made to keep fill, slab, pavement, and foundation subgrade areas properly drained and free of ponding water. Vehicle traffic on top of the subgrade should be prevented when the subgrade is visibly wet and should be kept to a minimum at other times. Site grading and fill placement should preferably be performed during drier seasons of the year.

Fill materials should not be placed on soils that have been recently subjected to precipitation or saturation. Wet soils should be removed or allowed to dry prior to continuation of fill placement operations. Borrow fill materials, if required, should not contain wet materials at the time of placement.

If problems are encountered during the earthwork operations, or if site conditions deviate from those encountered during our subsurface exploration, the ECS Geotechnical Engineer should be notified immediately to determine the effect on recommendations expressed in this report.

Certain construction practices can reduce the magnitude of problems associated with moisture content increases of subgrade soil for slabs and areas to receive compacted fill. The contractor should seal exposed subgrade areas at the end of the workday with a smooth drum roller to reduce the potential for infiltration of water into the subgrade. Site grading should be continuously evaluated to assure that surface runoff will drain away from slab and fill areas.

6.2 Shallow Foundations

Exposure to the environment may weaken the soils at the foundation bearing level if the foundation excavations remain exposed during periods of inclement weather. Therefore, foundation concrete should be placed as soon as possible after final excavation is achieved and after the subgrade has been evaluated by a representative of the geotechnical engineer. If the bearing soils are softened by surface water absorption or exposure to the environment, the softened soils should be removed from the foundation excavation bottom prior to placement of concrete. If the foundation excavation must remain open an extended period of time, or if rainfall is apparent while the bearing soils are exposed, we suggest that a 1 to 3-inch thick "mud mat" of "lean" concrete be placed over the exposed bearing soils before the placement of reinforcing steel.

6.3 Groundwater Considerations

Groundwater was not encountered during the field exploration. Perched groundwater could still be encountered however, particularly after a rainfall event. If groundwater is encountered during construction, an ECS geotechnical engineer should be consulted to determine if additional permanent drainage provisions are necessary in the design and construction. Sump pumping and surface runoff ditches may be adequate for temporary control of surface runoff and groundwater during construction.

The surface of the site should be kept property graded to enhance drainage of surface water away from the proposed construction area during construction. Care should be taken that subgrades are unyielding prior to the placement of aggregate base and asphaltic concrete courses.

6.4 Utility Trench Construction

Utility trenches in the building pad should be backfilled above the utility bedding and shading materials with select fill, and general fill material outside the building pad area. The backfill materials should be placed in lifts not to exceed 8 inches loose measure, or 6 inches compacted measure. Thinner lifts may be required when using handheld compaction equipment. Backfill materials should be moisture conditioned to between 0 and +4 percentage points of the optimum moisture content and compacted to at least 95 percent of the maximum dry density as determined by ASTM D698.

Utility trenches should be sealed with lean concrete, lean clayey soil, controlled low-strength material or flowable fill where the utility approaches and enters the building pad area. This would reduce the potential for migration of water beneath the building through the bedding and shading materials in the utility trench.

6.5 Rock Excavation Considerations

Chalk was encountered at the site during our subsurface exploration at depths ranging from approximately 8½ to 13½ feet. Chalk may be encountered at shallower depths at other locations on the site. Rock excavation techniques will be required if excavations extend into the chalk. For purposes of contract terms, we recommend that "rock" be defined as follows: "Rock shall be defined as those natural materials which cannot be excavated in an open excavation with a Caterpillar Model No. D-8, heavy duty tract type-tractor, weighted at not less than 285 hp (flywheel power) and equipped with a single-shank hydraulic ripper, capable of exerting not less than 45,000 lbs. breakout force, or equivalent machinery. For footings, utility trenches and pits, rock shall be defined as those materials that cannot be excavated with a Caterpillar Model No. 215D LC tract-type hydraulic excavator, equipped with a 42-inch wide short-tip radius rock bucket, rated at not less than 120 hp flywheel power with bucket-curling force of not less than 25,000 lbs. and stick-crowd force of not less than 18,000 lbs."

Depending on the excavation methods, the rock at this site will likely excavate in relatively large, blocky and platy pieces, which are difficult to compact for suitable long-term performance. Also, these materials experience rapid degradation due to weathering over relatively short periods of time, once exposed to air and water conditions. Therefore, these larger pieces, which break up as rock-like fragments in the initial excavation, should be compacted with sufficient compaction energy to substantially break them down into soil size particles during construction.

The excavated chalk materials may be suitable for fill within the building and paving limits. For the purposes of this report, rock materials excavated at the site will be considered nondurable. Nondurable rock materials removed during excavations may be used as fill if suitably decomposed by mechanical effort. Durability is the term used to describe the ability of a rock or rock-like material to withstand long term chemical and mechanical weathering without size degradation. Rock excavated from the site and used as earthwork fill should have a well-graded grain size distribution with rock and soil particles ranging from clay or silt size particles to a maximum size of 4 inches in diameter with 2-inch thick plates. Particles larger than this should be decomposed by mechanical compaction equipment to achieve the desired grain size distribution.

Once appropriately broken down, this material may then be placed and compacted at workable moisture contents above the optimum moisture content and compacted to at least 95% of the Maximum Dry Density as obtained using the Standard Proctor method.

7.0 FIELD OBSERVATIONS & TESTING

Personnel from ECS should perform the field observations and testing recommended in this report because of our familiarity with the project and site conditions. The performance of foundations and pavements is primarily controlled by the quality of the construction. To avoid misinterpretation of our recommendations, ECS should be retained to perform full time conformance testing, and documentation during construction of the foundations, slabs, and pavements.

The performance of slabs and pavements placed on new fill material is controlled by the quality of the compaction and the materials selection for the fill material. ECS should be retained to perform conformance testing during selection, placement, and compaction of the fill material.

7.1 Earthwork and Pavements

Field observations and testing should be performed during the earthwork operations to document proper construction. Stripping should be observed by the Geotechnical Engineer to help locate unsuitable materials that should be removed prior to placement of fill, slab, or pavement materials. Field observation and conformance testing should include final approval of subgrades prior to placement of compacted fill, slabs, or pavement. Proof-rolling should be performed by a heavy rubber-tired vehicle such as a loaded dump truck on slab and pavement subgrades. Appropriate laboratory tests such as Proctor moisture-density tests and Atterberg Limits should be performed on samples of fill material and pavement base course material. Field moisture-density tests and visual observation of lift thickness and material types should be performed during compaction operations to document that the construction satisfies material and compaction requirements. The frequency of field density tests should be at least 1 test per lift in the building area, at least 1 test per lift per 10,000 sf of pavement area, and at least 1 test per lift per 200 linear feet of utility trench. The frequency of confirmatory swell testing during moisture conditioned fill placement in the building pad area should be at least 1 swell test per lift. The placed materials should swell less than 1% at the modeled in-site overburden pressures. Moisture conditioning recommendations may need to be adjusted based upon testing performed during construction.

7.2 Shallow Foundations

Prior to concrete placement, the Geotechnical Engineer should observe the foundation excavations to determine if the foundations are being placed on suitable materials and to determine if loose materials have been removed. Geotechnical probing can be performed to help evaluate the foundation bearing surfaces. In areas where the subgrade is soft or loose, the soil should be removed and foundations lowered to bear on firm compacted soils, or foundation subgrade elevations can be restored using properly compacted select fill or lean concrete (e.g., 2,000 psi). The selection of an alternative is controlled by the depth and condition of the subgrade. The Geotechnical Engineer should be consulted to determine the proper selection.

Footing dimensions and reinforcing steel should also be observed. Concrete material should be sampled and tested for compressive strength, and placement operations should be monitored to record concrete slump, temperature, air content, and age at time of placement. Concrete batch tickets should be provided by the supplier so that water-cement ratios and cement content can be checked and documented.

8.0 EXCAVATIONS

Our comments on excavation are based on our experience in the project vicinity and examination of the recovered samples. Excavation depends on the contractor's equipment, capabilities, and experience. Therefore, it is the contractor's responsibility to determine the desirable effective methods for excavation. The above comments are intended for informational purposes for the design team only and may be used to review the contractor's proposed excavation methods.

Excavations that will receive compacted fill should have vertical or benched sidewalls so that lifts of fill material will be placed and compacted on horizontal planes. Stockpiles of soil or materials, and heavy equipment should not be placed immediately above and adjacent to unbraced vertical excavation walls (trenches).

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, subpart P". This document was issued to protect the safety of workmen entering trenches or excavations.

It is mandated by this federal regulation that excavations such as utility trenches, basement excavation, or footing excavations be constructed in accordance with the new OSHA guidelines.

The contractor is solely responsible for designing and constructing stable, temporary excavations and for shoring, sloping, or benching the sides of excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person as defined in 29 CFR Part 1926 should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. ECS does not assume responsibility for construction site safety or the contractor's or other party's compliance with local, state, and federal regulations.

9.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Carter Engineering Consultant, Inc. If this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

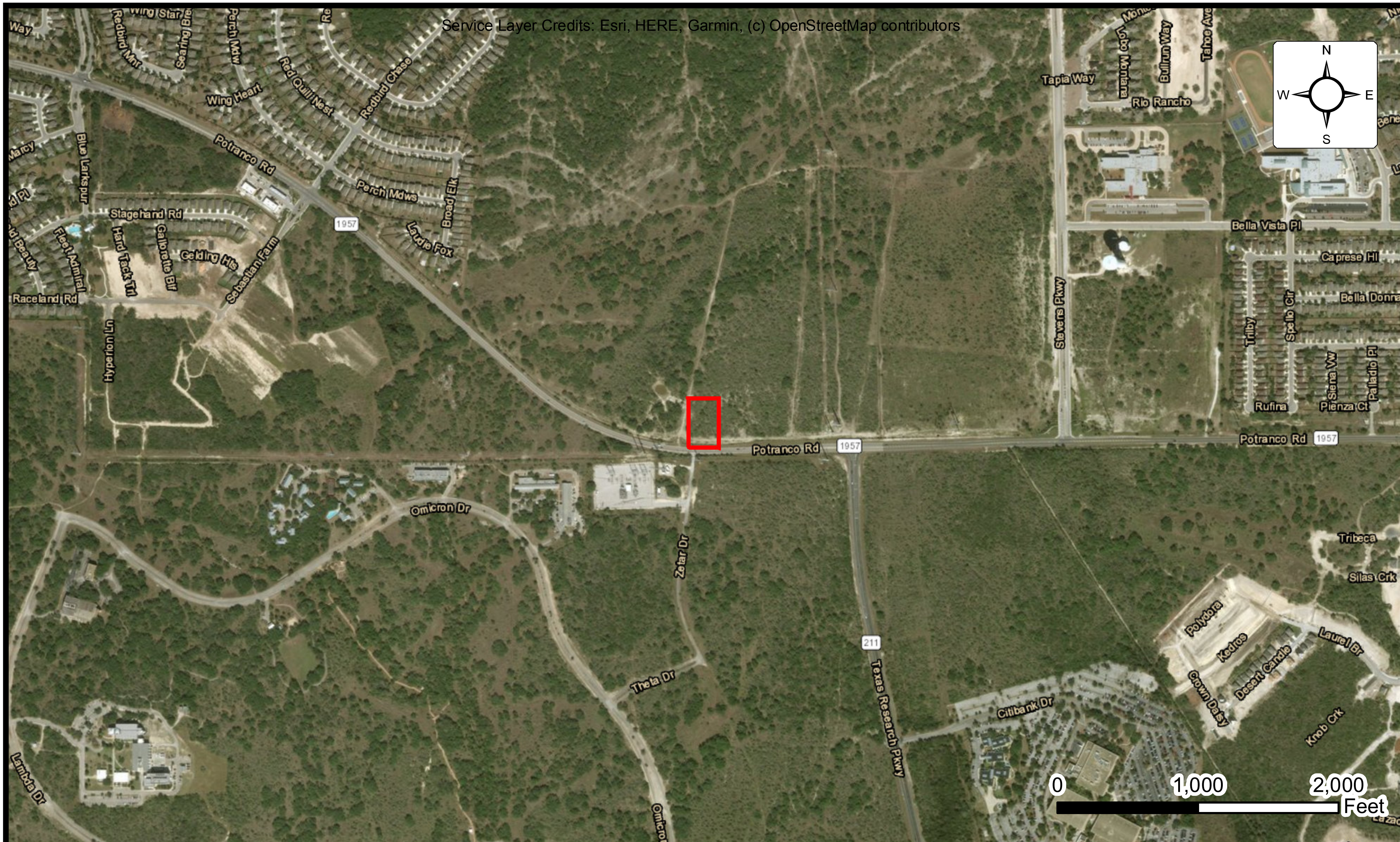
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Diagrams & Reports

Site Location Diagram
Boring Location Diagram
Generalized Subsurface Soil Profiles
Site Geologic Diagram



SITE LOCATION DIAGRAM
ZAXBY'S ON POTRANCO

POTRANCO ROAD, SAN ANTONIO, TEXAS

ZAX LLC

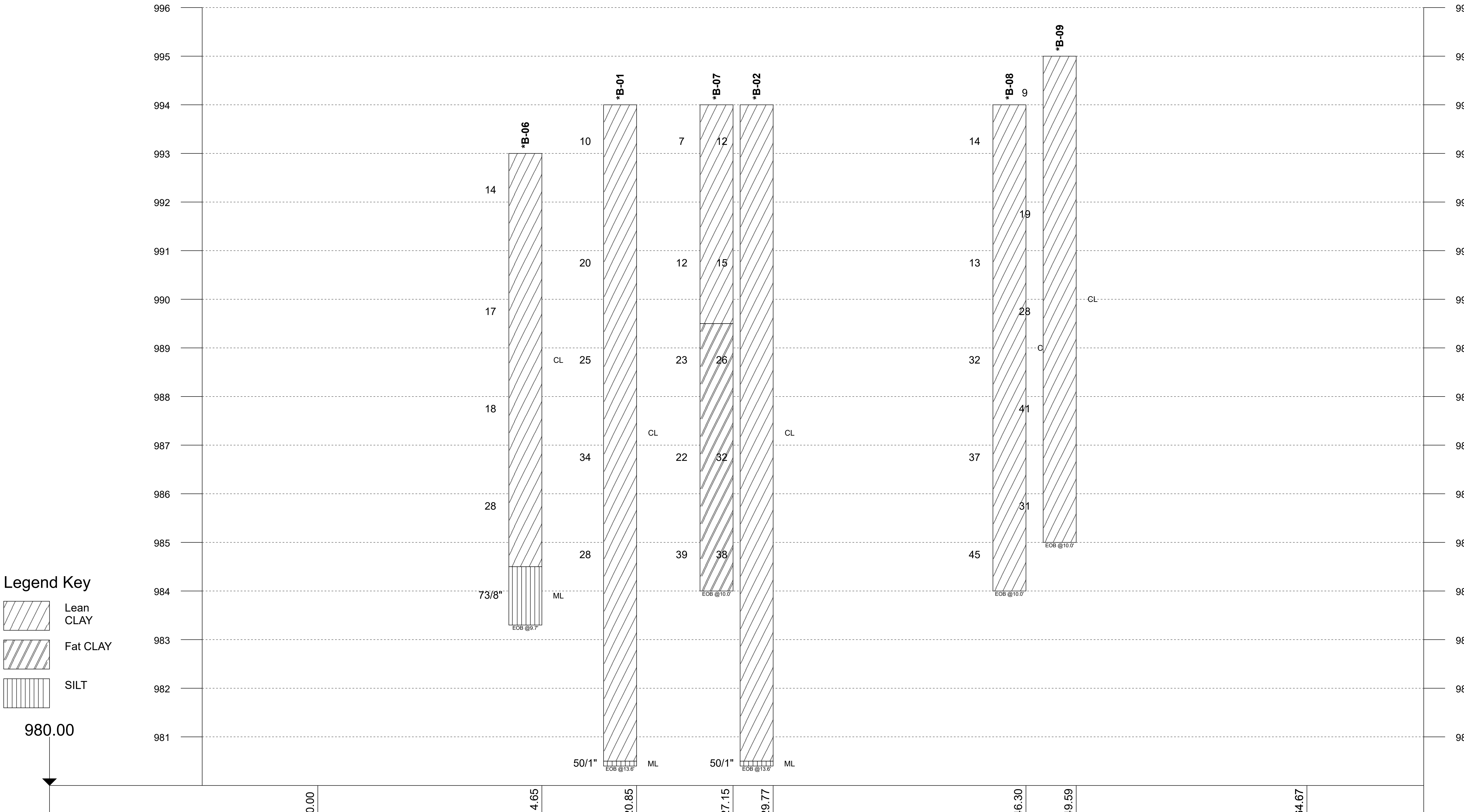
ENGINEER	REW1
SCALE	AS NOTED
PROJECT NO.	20:1359
SHEET	1 OF 1
DATE	1/28/2022

BORING LOCATION DIAGRAM
ZAXBY'S ON POTRANCO

POTRANCO ROAD, SAN ANTONIO, TEXAS

ZAX LLC

ENGINEER	REW1
SCALE	AS NOTED
PROJECT NO.	20:1359
SHEET	1 OF 1
DATE	1/28/2022



Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit Water Content Liquid Limit	WL (First Encountered)	Fill
[FINES CONTENT %]	WL (Completion)	Possible Fill
BOTTOM OF CASING	WL (Seasonal High Water)	Probable Fill
LOSS OF CIRCULATION	WL (Stabilized)	Rock

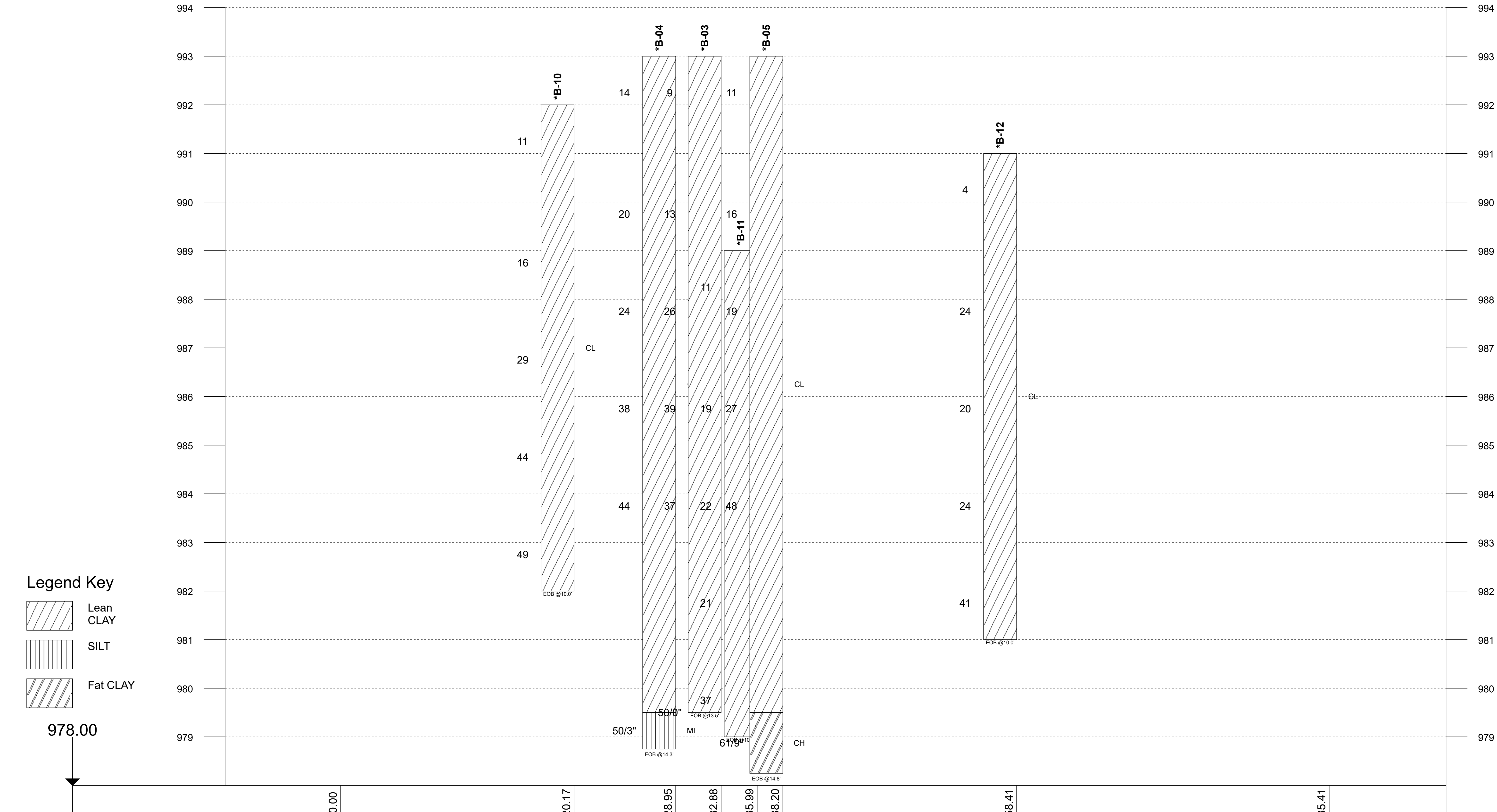
GENERALIZED SUBSURFACE SOIL PROFILE Section line A-A'

Zaxby's on Potranco

Zax LLC

Potranco Road, San Antonio, Texas 78253

Project No:	20:1359	Date:	01/28/2022



Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit X Water Content ● Liquid Limit △	WL (First Encountered)	Fill
[FINES CONTENT %]	WL (Completion)	Possible Fill
BOTTOM OF CASING	WL (Seasonal High Water)	Probable Fill
LOSS OF CIRCULATION	WL (Stabilized)	Rock

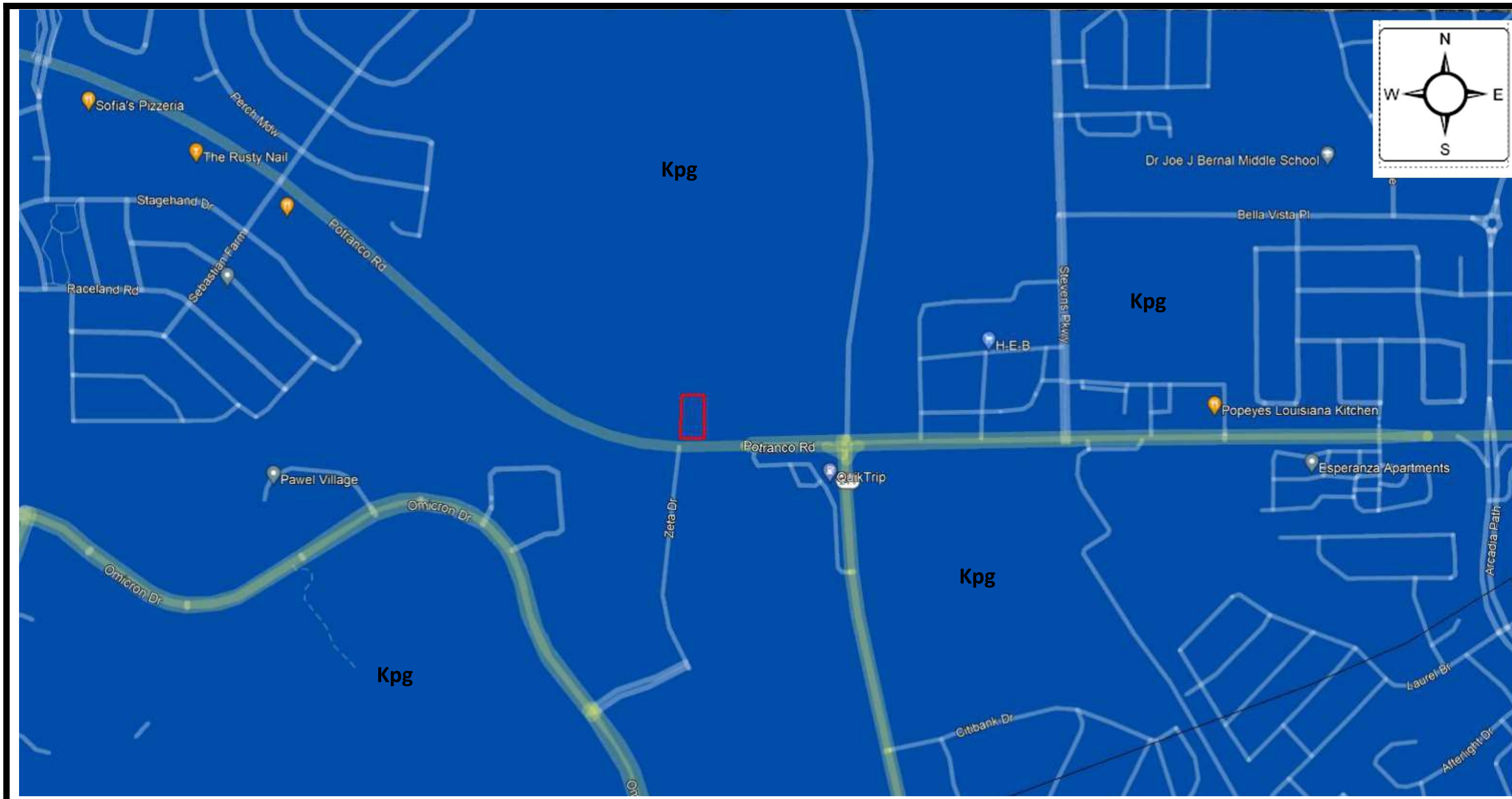
GENERALIZED SUBSURFACE SOIL PROFILE Section line B-B'

Zaxby's on Potranco

Zax LLC

Potranco Road, San Antonio, Texas 78253

Project No: 20:1359 Date: 01/28/2022



Kpg Pecan Gap Chalk, Chalk and Marl

ECS™

SITE GEOLOGIC DIAGRAM
Zaxby's on Potranco

Potranco Road and Zeta Drive, San Antonio, TX

Carter Engineering Consultants, Inc.

ENGINEER	JJC
SCALE	AS NOTED
PROJECT NO.	20:1359
SHEET	1 OF 1
DATE	1/28/2022

APPENDIX B – Field Operations

Subsurface Exploration Operations
Reference Notes for Boring Logs
Boring Logs

SITE EXPLORATION PROCEDURE

The field exploration was planned with the objective of characterizing the project site in general geotechnical and geological terms and to evaluate subsequent field and laboratory data to assist in the determination of geotechnical recommendations.

The subsurface conditions were explored by 12 borings drilled to approximate depths ranging from 10 to 15 feet below the existing site grades. A truck-mounted drill rig with continuous flight augers was utilized to drill the borings. The boring locations were determined by and identified in the field by ECS personnel using the boring locations provided. The approximate as-drilled boring locations are shown on the Boring Location Diagram in Appendix A. The ground surface elevations noted in this report were estimated using Google Earth Pro.

Standard Penetration Tests (SPTs) were performed to obtain representative samples and penetration resistance measurements in general accordance with ASTM D 1586. Soil samples were obtained at various intervals with the 1.625-inch inside diameter, 2-inch outside diameter, Split-Barrel sampler. The Split-Barrel sampler was first seated 6 inches to penetrate any loose cuttings, and then was driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler each 6-inch increment was recorded. The penetration resistance "N-value" is defined as the number of hammer blows required to drive the sampler the final 12 inches and is indicated on the test boring logs. In very dense materials such as weathered rock material, the SPT test is usually stopped after 50 blows from the hammer and the measurement is recorded as 50 blows per distance penetrated (i.e., 50 over 3 inches).

Field logs of the soils encountered in the borings were maintained by the drill crew. After recovery, each geotechnical soil sample was removed from the sampler and visually classified. Representative portions of each soil sample were then wrapped in plastic and transported to our laboratory for further visual examination and laboratory testing. After completion of the drilling operations, the boreholes were backfilled with auger cuttings to the existing ground surface.

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]

	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
GW	WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
GP	POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
GM	SILTY GRAVEL gravel-sand-silt mixtures
GC	CLAYEY GRAVEL gravel-sand-clay mixtures
SW	WELL-GRADED SAND gravelly sand, little or no fines
SP	POORLY-GRADED SAND gravelly sand, little or no fines
SM	SILTY SAND sand-silt mixtures
SC	CLAYEY SAND sand-clay mixtures
ML	SILT non-plastic to medium plasticity
MH	ELASTIC SILT high plasticity
CL	LEAN CLAY low to medium plasticity
CH	FAT CLAY high plasticity
OL	ORGANIC SILT or CLAY non-plastic to low plasticity
OH	ORGANIC SILT or CLAY high plasticity
PT	PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, QP[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS[6]

- ▽ WL (First Encountered)
- ▼ WL (Completion)
- ▼ WL (Seasonal High Water)
- ▽ WL (Stabilized)

FILL AND ROCK

FILL | POSSIBLE FILL | PROBABLE FILL | ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-01**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Zaxby's on Potranco	

SITE LOCATION:	LOSS OF CIRCULATION
Potranco Road, San Antonio, Texas 78253	BOTTOM OF CASING

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973905.8	**850188.5**		**994.0**

Plastic Limit X—— Water Content ● —— Liquid Limit △

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

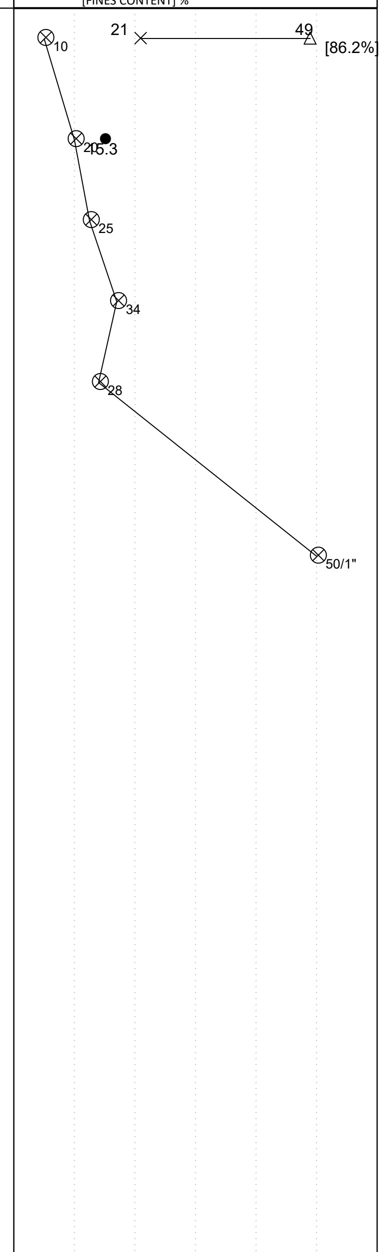
RQD (red line)

REC (black line)

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light brown, stiff to very stiff			6-6-4 (10)
	S-2	SS	18	18				7-9-11 (20)
5	S-3	SS	18	18			989	11-10-15 (25)
	S-4	SS	18	18				9-16-18 (34)
	S-5	SS	18	18				6-13-15 (28)
10							984	
	S-6	SS	1	1	CHALK, light yellowish brown, very hard			50/1" (50/1")
					END OF DRILLING AT 13.6 FT			
15							979	
20							974	
25							969	
30							964	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**	CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**	HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck** / LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)		

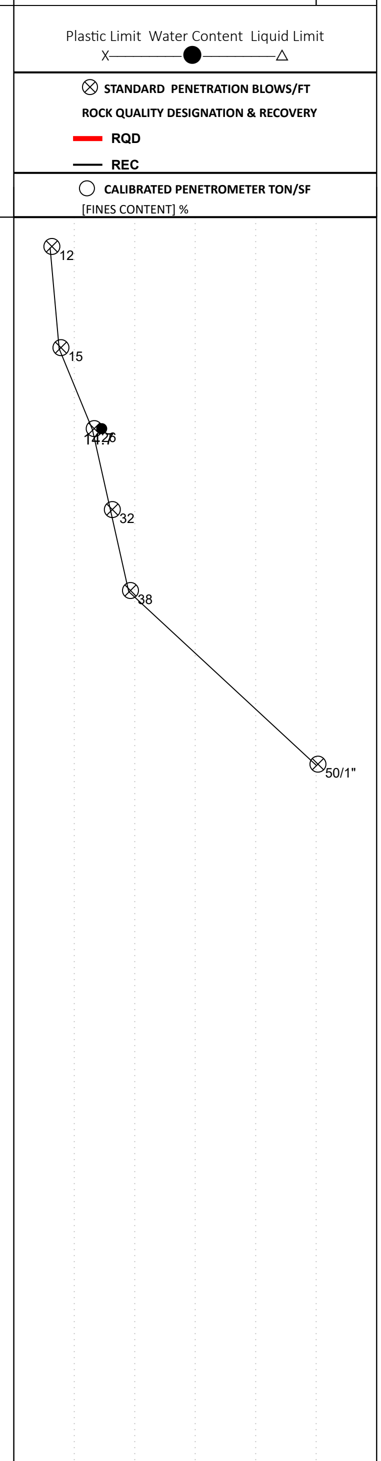
GEOTECHNICAL BOREHOLE LOG

CLIENT: Zax LLC	PROJECT NO.: 20:1359	BORING NO.: B-02	SHEET: 1 of 1
PROJECT NAME: Zaxby's on Potranco	DRILLER/CONTRACTOR:		
SITE LOCATION: Potranco Road, San Antonio, Texas 78253			

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973904.1	850197.4		994.0

LOSS OF CIRCULATION
BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light brown, stiff to hard			5-6-6 (12)
	S-2	SS	18	18				7-7-8 (15)
5	S-3	SS	18	18			989	7-11-15 (26)
	S-4	SS	18	18				10-15-17 (32)
	S-5	SS	18	18				8-16-22 (38)
10							984	
	S-6	SS	1	1	CHALK, light brown, very hard			50/1" (50/1")
					END OF DRILLING AT 13.6 FT			
15							979	
20							974	
25							969	
30							964	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: Jan 12 2022	CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: Jan 13 2022	HAMMER TYPE: Auto
WL (Seasonal High Water)	EQUIPMENT: Truck / LOGGED BY:	DRILLING METHOD: SS, Solid Stem Auger
WL (Stabilized)		

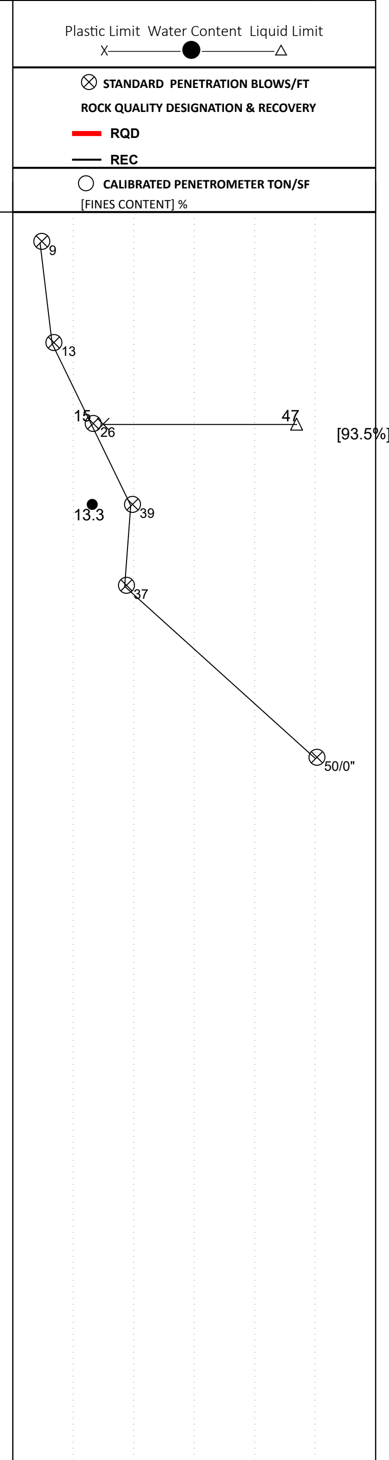
GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-03**	**1 of 1**
PROJECT NAME: **Zaxby's on Potranco**	DRILLER/CONTRACTOR:		
SITE LOCATION: **Potranco Road, San Antonio, Texas 78253**			
NORTHING: **2973890.9**	EASTING: **850194.0**	STATION:	SURFACE ELEVATION: **993.0**

LOSS OF CIRCULATION

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light yellowish brown, stiff to hard			4-5-4 (9)
	S-2	SS	18	18				7-6-7 (13)
5	S-3	SS	18	18			988	8-12-14 (26)
	S-4	SS	18	18				11-15-24 (39)
	S-5	SS	18	18				15-17-20 (37)
10							983	
	S-6	SS	0	0	CHALK, light yellowish brown, very hard			50/0" (50/0")
					END OF DRILLING AT 13.5 FT			
15							978	
20							973	
25							968	
30							963	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**		CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck**	LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-04**	**1 of 1**
PROJECT NAME: **Zaxby's on Potranco**	DRILLER/CONTRACTOR:		
SITE LOCATION: **Potranco Road, San Antonio, Texas 78253**			LOSS OF CIRCULATION
NORTHING: **2973878.1**	EASTING: **850190.0**	STATION:	SURFACE ELEVATION: **993.0**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light yellowish brown, stiff to hard			6-5-9 (14)
	S-2	SS	18	18				6-9-11 (20)
5	S-3	SS	18	18			988	10-11-13 (24)
	S-4	SS	18	18				11-15-23 (38)
	S-5	SS	18	18				17-21-23 (44)
10							983	
	S-6	SS	9	9	CHALK, light yellowish brown, very hard			7-50/3" (50/3")
					END OF DRILLING AT 14.3 FT			
15							978	
20							973	
25							968	
30							963	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

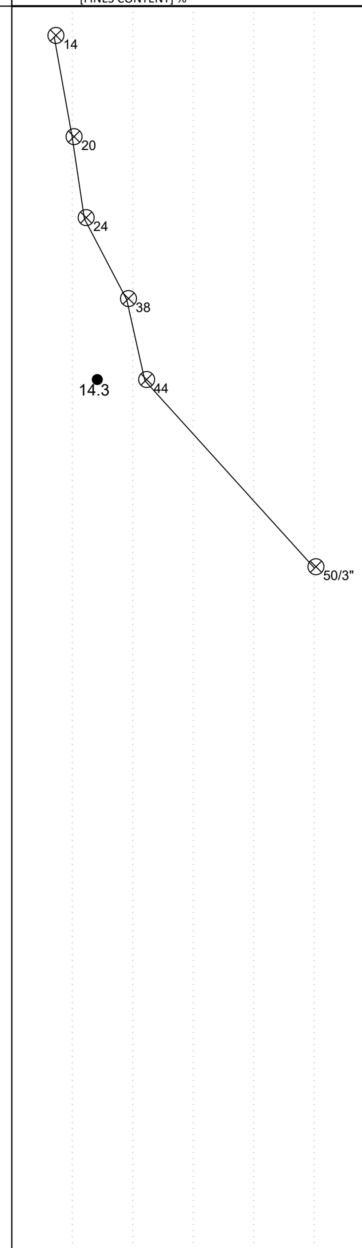
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**		CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck**	LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-05**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Zaxby's on Potranco	

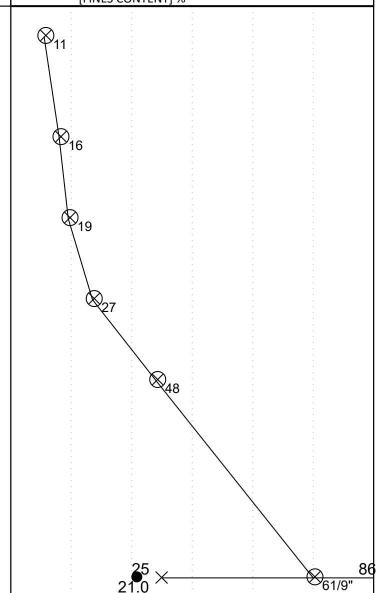
SITE LOCATION:
Potranco Road, San Antonio, Texas 78253

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973878.3	**850199.2**		**993.0**

LOSS OF CIRCULATION
BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit
STANDARD PENETRATION BLOWS/FT
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
CALIBRATED PENETROMETER TON/SF
[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light orangish brown, stiff to hard			5-5-6 (11)
	S-2	SS	18	18				6-7-9 (16)
5	S-3	SS	18	18			988	7-9-10 (19)
	S-4	SS	18	18				9-11-16 (27)
	S-5	SS	18	18				19-22-26 (48)
10							983	
	S-6	SS	15	15	(CH) FAT CLAY, light yellowish brown, very hard			10-11-50/3" (61/9")
15					CHALK, light yellowish brown, very hard		978	
					END OF DRILLING AT 14.8 FT			
20							973	
25							968	
30							963	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**	CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**	HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck** / LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)		

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-06**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Zaxby's on Potranco	

SITE LOCATION:	LOSS OF CIRCULATION
Potranco Road, San Antonio, Texas 78253	

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:	BOTTOM OF CASING
2973929.5	**850183.4**		**993.0**	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

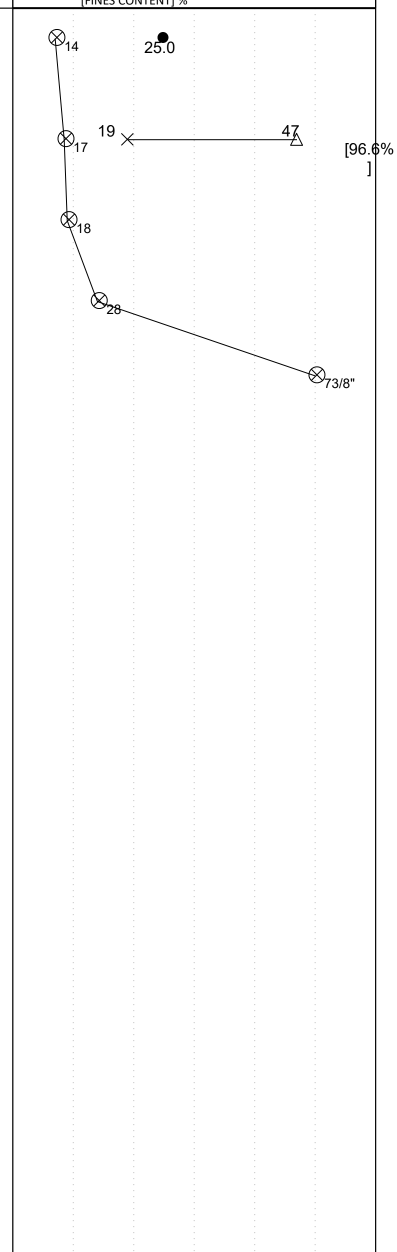
RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light brown, stiff to very stiff			7-7-7 (14)
	S-2	SS	18	18				6-8-9 (17)
5	S-3	SS	18	18			988	4-8-10 (18)
	S-4	SS	18	18				8-13-15 (28)
	S-5	SS	14	14	(CH) FAT CLAY, light brown, very stiff			6-23-50/2" (73/8")
10					CHALK, light yellowish brown, very hard		983	
					END OF DRILLING AT 9.7 FT			
15							978	
20							973	
25							968	
30							963	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**		CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck**	LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-07**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Zaxby's on Potranco			

SITE LOCATION:	LOSS OF CIRCULATION
Potranco Road, San Antonio, Texas 78253	BOTTOM OF CASING

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973919.4	**850195.4**		**994.0**

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

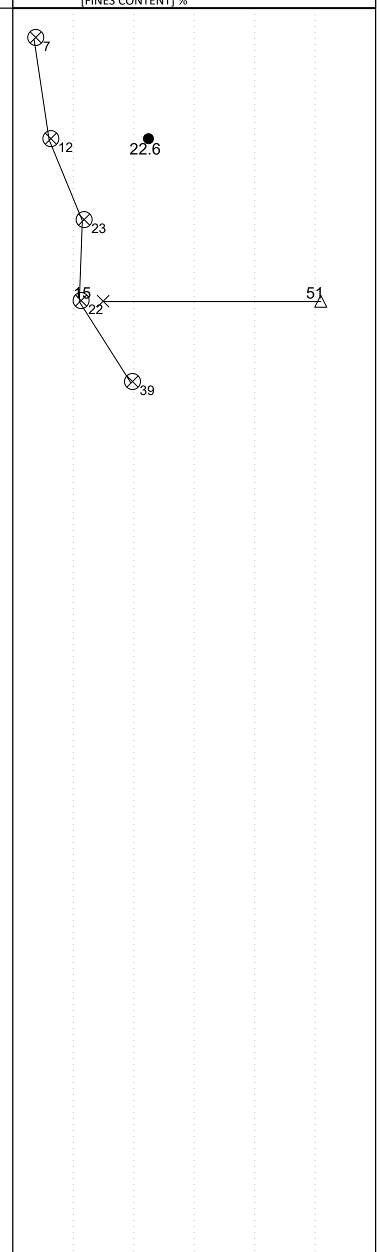
RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light orangish brown, firm to hard			4-4-3 (7)
	S-2	SS	18	18				4-6-6 (12)
5	S-3	SS	18	18	(CH) FAT CLAY. Light yellowish brown to light orangish brown, very stiff to hard		989	6-10-13 (23)
	S-4	SS	18	18				9-9-13 (22)
	S-5	SS	18	18				9-18-21 (39)
10					**END OF DRILLING AT 10.0 FT**		984	
15							979	
20							974	
25							969	
30							964	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**		CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck**	LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

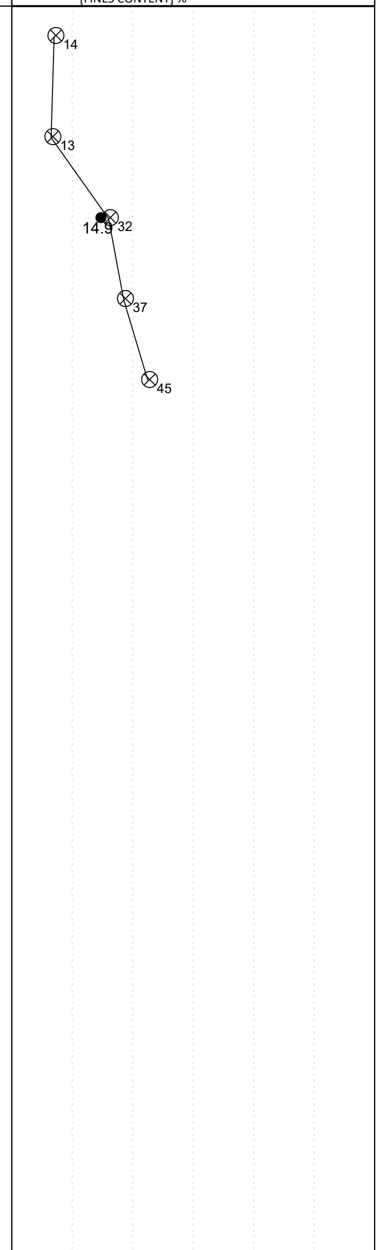
CLIENT: Zax LLC	PROJECT NO.: 20:1359	BORING NO.: B-08	SHEET: 1 of 1
PROJECT NAME: Zaxby's on Potranco	DRILLER/CONTRACTOR:		
SITE LOCATION: Potranco Road, San Antonio, Texas 78253			LOSS OF CIRCULATION
NORTHING: 2973927.5	EASTING: 850215.0	STATION:	SURFACE ELEVATION: 994.0

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light yellowish brown, stiff to hard			6-7-7 (14)
	S-2	SS	18	18				6-6-7 (13)
5	S-3	SS	18	18			989	7-13-19 (32)
	S-4	SS	18	18				12-17-20 (37)
	S-5	SS	18	18				17-20-25 (45)
10					**END OF DRILLING AT 10.0 FT**		984	
15							979	
20							974	
25							969	
30							964	

Plastic Limit Water Content Liquid Limit
X———●———△

⊗ STANDARD PENETRATION BLOWS/FT
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
○ CALIBRATED PENETROMETER TON/SF
[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	BORING STARTED: Jan 12 2022		CAVE IN DEPTH:
▼ WL (Completion)	BORING COMPLETED: Jan 13 2022		HAMMER TYPE: Auto
⊻ WL (Seasonal High Water)	EQUIPMENT: Truck	LOGGED BY:	DRILLING METHOD: SS, Solid Stem Auger
⊽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT: Zax LLC	PROJECT NO.: 20:1359	BORING NO.: B-09	SHEET: 1 of 1
PROJECT NAME: Zaxby's on Potranco	DRILLER/CONTRACTOR:		

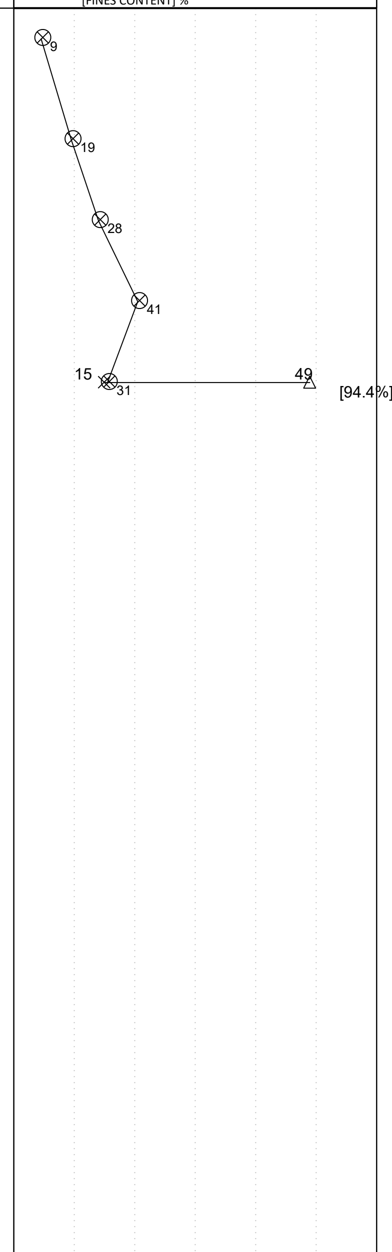
SITE LOCATION: Potranco Road, San Antonio, Texas 78253

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973893.2	850216.7		995.0

LOSS OF CIRCULATION
BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit
STANDARD PENETRATION BLOWS/FT
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
CALIBRATED PENETROMETER TON/SF
[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light yellowish brown, stiff to hard			4-4-5 (9)
	S-2	SS	18	18				6-9-10 (19)
5	S-3	SS	18	18			990	10-12-16 (28)
	S-4	SS	18	18				13-18-23 (41)
	S-5	SS	18	18				12-15-16 (31)
10					**END OF DRILLING AT 10.0 FT**		985	
15							980	
20							975	
25							970	
30							965	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: Jan 12 2022	CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: Jan 13 2022	HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: Truck / LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)		

GEOTECHNICAL BOREHOLE LOG

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-10**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Zaxby's on Potranco	

SITE LOCATION: **Potranco Road, San Antonio, Texas 78253**

LOSS OF CIRCULATION

BOTTOM OF CASING

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973871.6	**850181.1**		**992.0**

Plastic Limit X—— Water Content ● —— Liquid Limit △

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

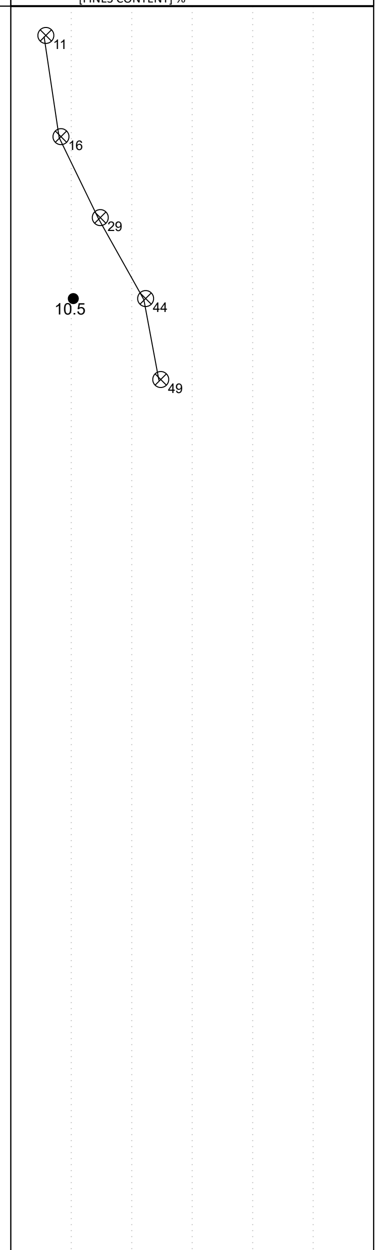
RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY,light grayish brown to light brown, stiff to hard			4-6-5 (11)
	S-2	SS	18	18				6-7-9 (16)
5	S-3	SS	18	18			987	10-13-16 (29)
	S-4	SS	18	18				18-21-23 (44)
	S-5	SS	18	18				13-24-25 (49)
10					**END OF DRILLING AT 10.0 FT**		982	
15							977	
20							972	
25							967	
30							962	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	BORING STARTED: **Jan 12 2022**		CAVE IN DEPTH:
▼ WL (Completion)	BORING COMPLETED: **Jan 13 2022**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck**	LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-11**	**1 of 1**

PROJECT NAME: **Zaxby's on Potranco**

DRILLER/CONTRACTOR:

SITE LOCATION: **Potranco Road, San Antonio, Texas 78253**

LOSS OF CIRCULATION

BOTTOM OF CASING

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973863.0	**850196.9**		**989.0**

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

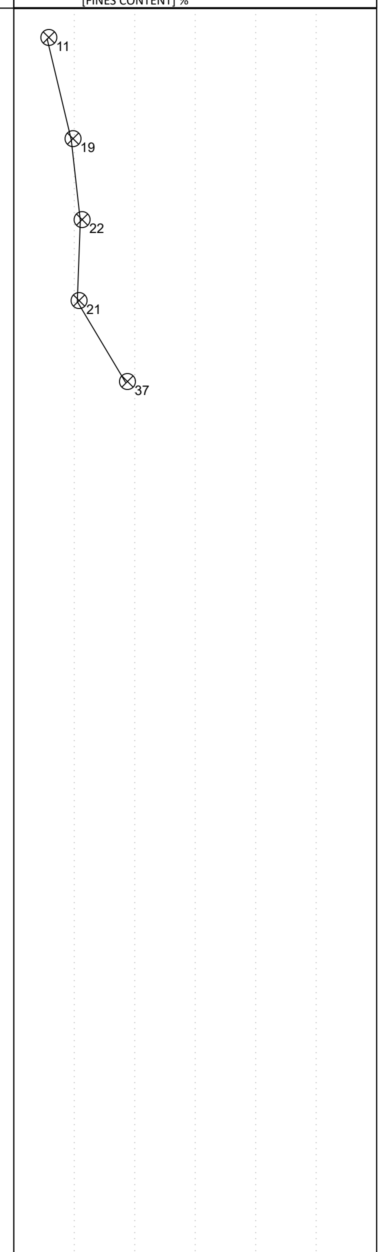
RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY,light grayish brown to light brown, stiff to hard			5-5-6 (11)
	S-2	SS	18	18				7-8-11 (19)
5	S-3	SS	18	18			984	8-11-11 (22)
	S-4	SS	18	18				7-10-11 (21)
	S-5	SS	18	18				15-20-17 (37)
10					**END OF DRILLING AT 10.0 FT**		979	
15							974	
20							969	
25							964	
30							959	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED: **Jan 12 2022**	CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Jan 13 2022**	HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck** / LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)		

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Zax LLC	**20:1359**	**B-12**	**1 of 1**

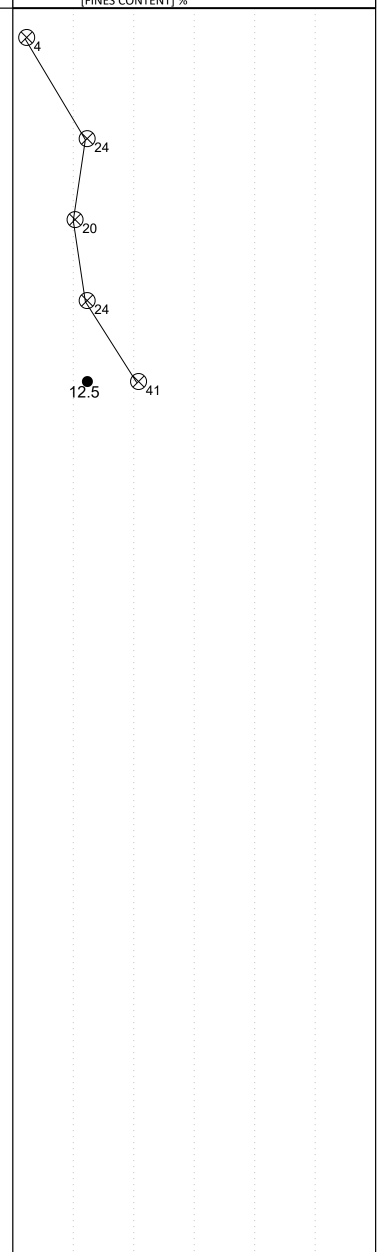
PROJECT NAME:	DRILLER/CONTRACTOR:
Zaxby's on Potranco	

SITE LOCATION:	LOSS OF CIRCULATION
Potranco Road, San Antonio, Texas 78253	BOTTOM OF CASING

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
2973863.8	**850219.3**		**991.0**

Plastic Limit Water Content Liquid Limit
⊗ STANDARD PENETRATION BLOWS/FT
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
○ CALIBRATED PENETROMETER TON/SF
[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
	S-1	SS	18	18	(CL) LEAN CLAY, dark brown to light yellowish brown, soft to hard			3-2-2 (4)
	S-2	SS	18	18				10-13-11 (24)
5	S-3	SS	18	18			986	7-10-10 (20)
	S-4	SS	18	18				9-9-15 (24)
	S-5	SS	18	18				10-24-17 (41)
10					**END OF DRILLING AT 10.0 FT**		981	
15							976	
20							971	
25							966	
30							961	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	BORING STARTED:	**Jan 12 2022**	CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED:	**Jan 13 2022**	HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **Truck**	LOGGED BY:	DRILLING METHOD: **SS, Solid Stem Auger**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

APPENDIX C – Laboratory Testing

Laboratory Test Results Summary
Liquid and Plastic Limits Test Reort
Particle Size Distribution

Laboratory Testing Summary

Sample Source	Sample Number	Start Depth (feet)	End Depth (feet)	Sample Distance (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[4]	Moisture - Density (Corr.)[5]		CBR Value[6]	Organic Content
							LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
B-01	S-1	0.0	1.5	1.5		CL	49	21	28	86.2				
B-01	S-2	2.5	4.0	1.5	15.3									
B-02	S-3	4.5	6.0	1.5	14.7									
B-03	S-3	4.5	6.0	1.5		CL	47	15	32	93.5				
B-03	S-4	6.5	8.0	1.5	13.3									
B-04	S-5	8.5	10.0	1.5	14.3									
B-05	S-6	13.5	14.8	1.3	21.0		86	25	61					
B-06	S-1	0.0	1.5	1.5	25.0									
B-06	S-2	2.5	4.0	1.5		CL	47	19	28	96.6				
B-07	S-2	2.5	4.0	1.5	22.6									
B-07	S-4	6.5	8.0	1.5			51	15	36					
B-08	S-3	4.5	6.0	1.5	14.9									
B-09	S-5	8.5	10.0	1.5		CL	49	15	34	94.4				
B-10	S-4	6.5	8.0	1.5	10.5									
B-12	S-5	8.5	10.0	1.5	12.5									

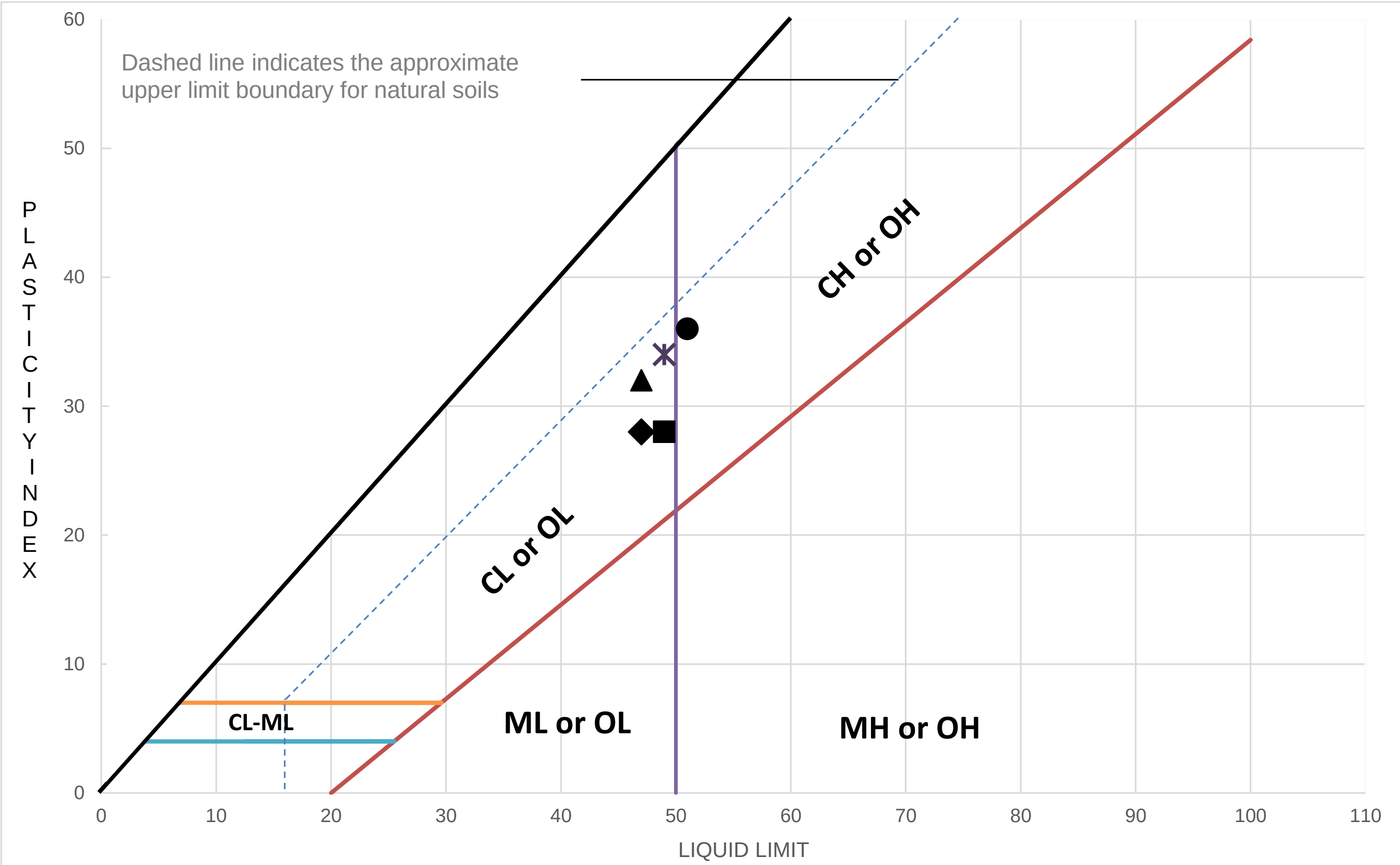
Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ration, OC: Organic Content (ASTM D 2974)

Project No. 20:1359
Project Name: Zaxby's on Potranco
PM: Naveen Kumar Kacchakayala
PE: Richard Webb
Printed On: January 28, 2022

ECS Southwest, LLP - San Antonio
431 Isom Road, Suite 114
San Antonio, TX 78216
Phone: 210-528-1430
Fax: 210-634-2561

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (SINGLE POINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-01	S-1	0-1.5	49	21	28	96.3	86.2	A-7-6	CL	
◆	B-06	S-2	2.5-4	47	19	28	99.8	96.6	A-7-6	CL	
▲	B-03	S-3	4.5-6	47	15	32	99.4	93.5	A-7-6	CL	
●	B-07	S-4	6.5-8	51	15	36				CH	
✳	B-09	S-5	8.5-10	49	15	34	99.6	94.4	A-7-6	CL	
⊗	B-05	S-6	13.5-14.75	86	25	61				CH	

Project: Zaxby's on Potranco
Client: Zax LLC

Project No.: 20:1359
Date Reported: 1/26/2022

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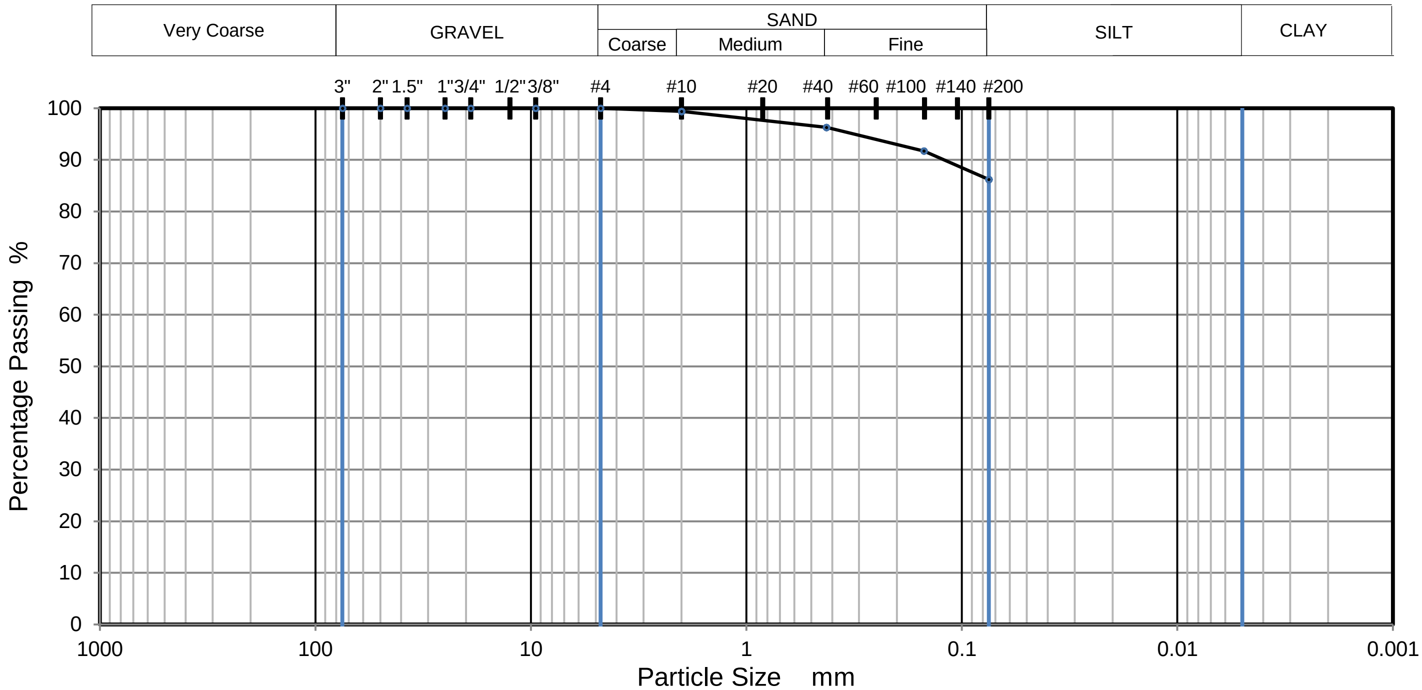
ECS Southwest LLP - San Antonio	431 Isom Road Suite 114 San Antonio, TX 78216	(210)528-1430 (214)483-9684

Tested by	Checked by	Approved by	Date Received
JJCastro	JJCastro	JJCastro	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	99		
#40	96		
#100	92		
#200	86		

Dry Mass of sample, g	218.8

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	1
Medium Sand, #10 to #40	3
Fine Sand, #40 to #200	10
Fines <#200	86

USCS	CL	Liquid Limit	49	D90	0.121	D50		D10	
AASHTO	A-7-6	Plastic Limit	21	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	28	D60		D15		Cc	

Project:	Zaxby's on Potranco	Project No.:	20:1359
Client:	Zax LLC	Depth (ft):	0 - 1.5
Sample Description:		Sample No.:	S-1
Sample Source:	B-01	Date Reported:	1/26/2022

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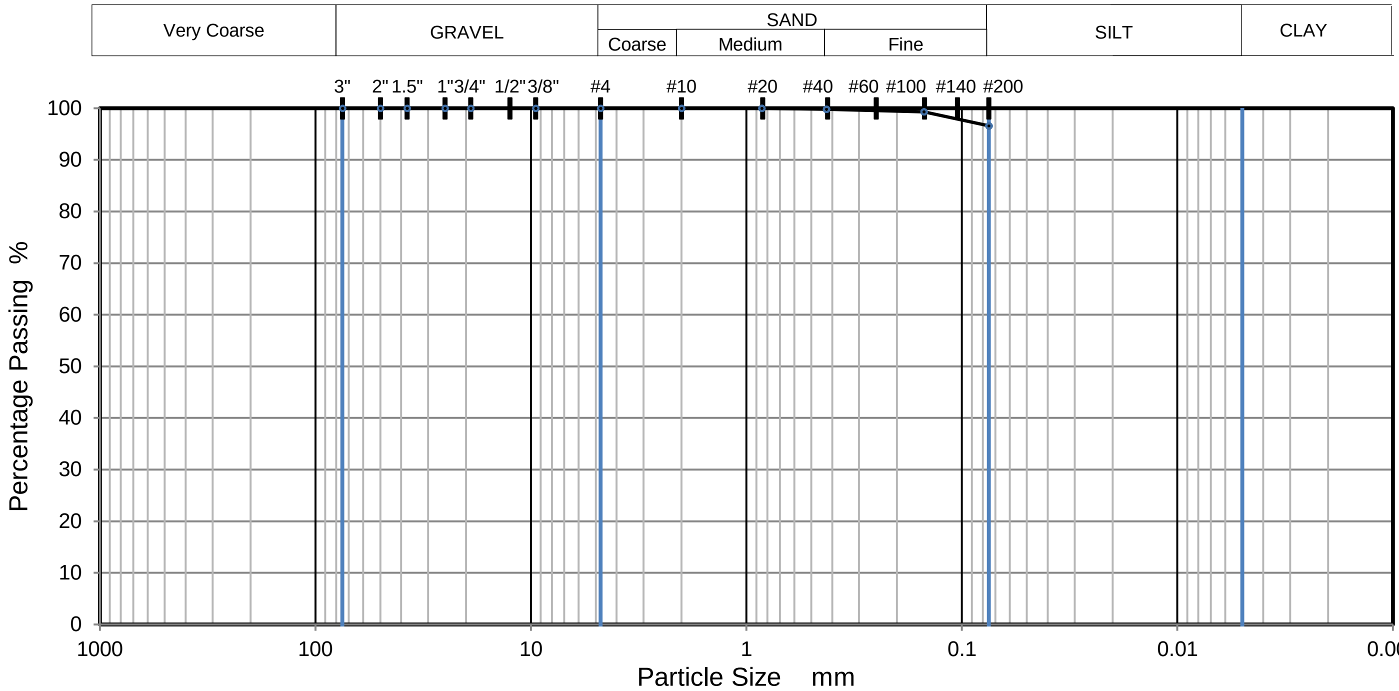
PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	100		
#40	100		
#100	99		
#200	97		

Dry Mass of sample, g	229.4

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	0
Fine Sand, #40 to #200	3
Fines <#200	97

USCS	CL	Liquid Limit	47	D90		D50		D10	
AASHTO	A-7-6	Plastic Limit	19	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	28	D60		D15		Cc	

Project: Zaxby's on Potranco
Client: Zax LLC
Sample Description:
Sample Source: B-06

Project No.: 20:1359
Depth (ft): 2.5 - 4
Sample No.: S-2
Date Reported: 1/26/2022

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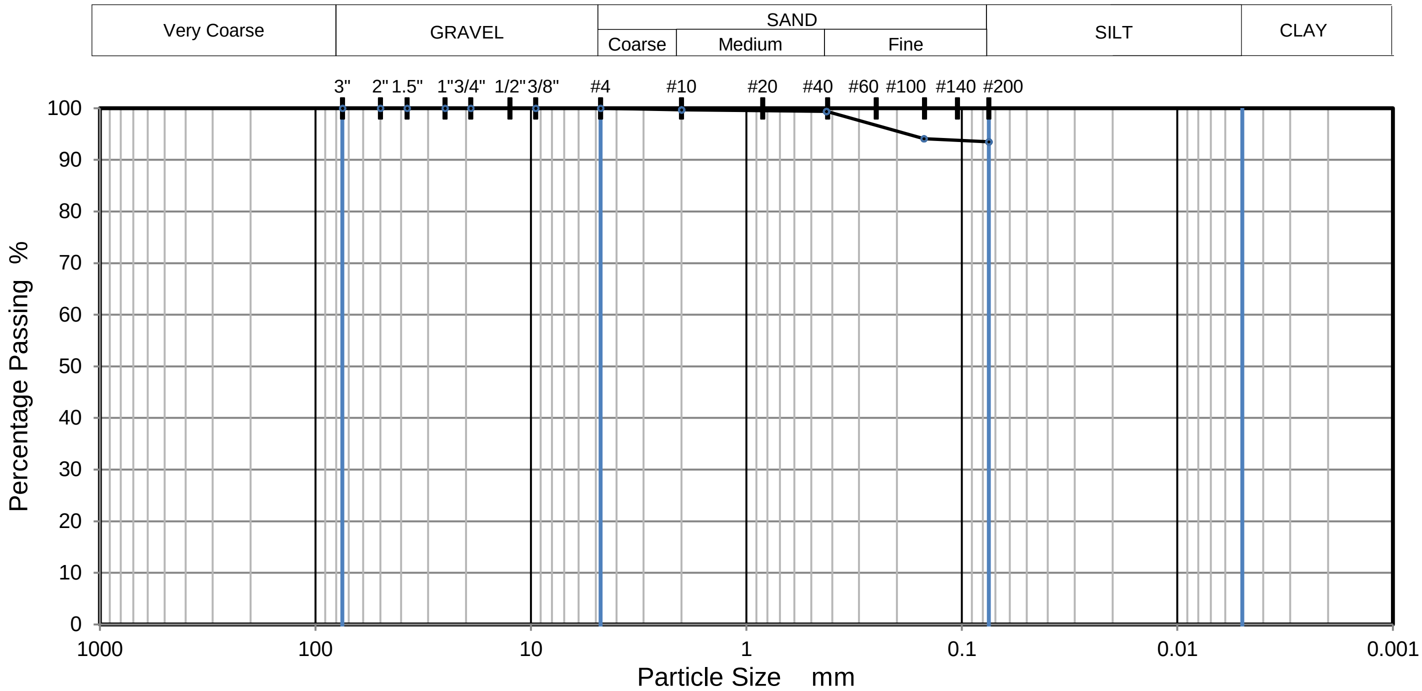
PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#40	99		
#100	94		
#200	94		

Dry Mass of sample, g	187.2

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	0
Fine Sand, #40 to #200	6
Fines <#200	94

USCS	CL	Liquid Limit	47	D90		D50		D10	
AASHTO	A-7-6	Plastic Limit	15	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	32	D60		D15		Cc	

Project: Zaxby's on Potranco
Client: Zax LLC
Sample Description:
Sample Source: B-03

Project No.: 20:1359
Depth (ft): 4.5 - 6
Sample No.: S-3
Date Reported: 1/26/2022

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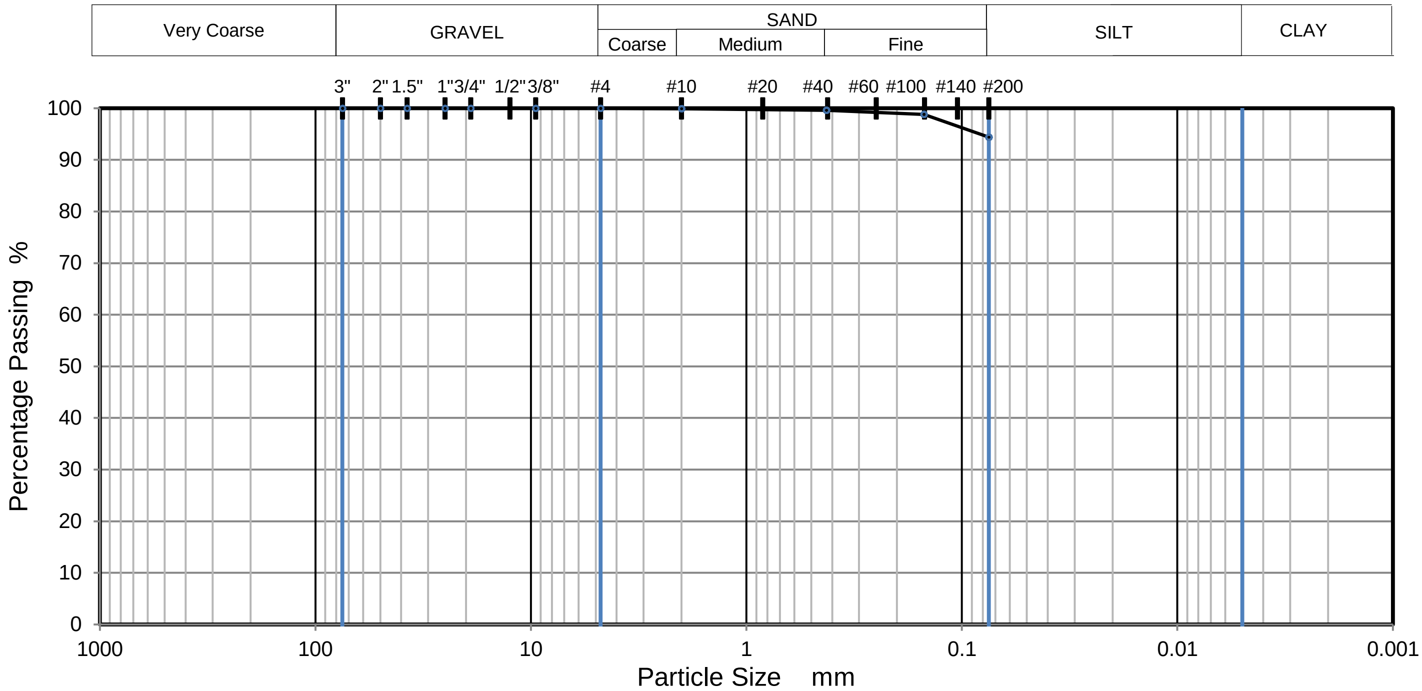
PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#40	100		
#100	99		
#200	94		

Dry Mass of sample, g	265.1

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	0
Fine Sand, #40 to #200	5
Fines <#200	94

USCS	CL	Liquid Limit	49	D90		D50		D10	
AASHTO	A-7-6	Plastic Limit	15	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	34	D60		D15		Cc	

Project: Zaxby's on Potranco
Client: Zax LLC
Sample Description:
Sample Source: B-09

Project No.: 20:1359
Depth (ft): 8.5 - 10
Sample No.: S-5
Date Reported: 1/26/2022

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