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

A UES Company

November 8, 2023

Chesmar Homes
211 N Loop 1604 E, Ste. 179
San Antonio, Texas 78232

Attention: Danny Blue

SUBJECT: **SUBSURFACE EXPLORATION, LABORATORY TESTING PROGRAM AND PAVEMENT EVALUATION**
FOR THE PROPOSED BRIGGS RANCH PHASE 1 & 2
TEXAS RESEARCH PKWY
SAN ANTONIO, TEXAS
ROCK Project No.: G223618

Dear Mr. Blue,

In accordance with our agreement, we have conducted a subsurface exploration, laboratory testing program and pavement evaluation for the above referenced project. The results of this exploration, together with our recommendations, are to be found in the accompanying report, an electronic copy of which is being transmitted herewith. ROCK will provide up to two (2) versions of this report in hard copy at the request of the client.

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

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

Sincerely,

Kyle D. Hammock, P.E.
Vice President - San Antonio

ROCK ENGINEERING & TESTING LABORATORY, LLC

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SUBSURFACE EXPLORATION, LABORATORY TESTING PROGRAM AND PAVEMENT EVALUATION FOR THE PROPOSED BRIGGS RANCH PHASE 1 & 2 TEXAS RESEARCH PKWY SAN ANTONIO, TEXAS

ROCK PROJECT NUMBER: G223618

PREPARED FOR:

CHESMAR HOMES
211 N LOOP 1604 E, STE. 179
SAN ANTONIO, TEXAS 78232

NOVEMBER 8, 2023

PREPARED BY:

ROCK ENGINEERING AND TESTING LABORATORY, LLC
10856 VANDALE ST.
SAN ANTONIO, TEXAS 78216
PHONE: (210) 495-8000; FAX: (210) 495-8015

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION NUMBER 2101

Kyle D. Hammock, P.E.
Vice President - San Antonio

A UES Company

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INTRODUCTION

This report presents the results of a subsurface exploration, laboratory testing program and pavement evaluation for the proposed Briggs Ranch Phase 1 & 2 subdivision roadways to be constructed off Texas Research Pkwy in San Antonio, Texas. This study was conducted for Chesmar Homes.

Authorization

The work for this project was performed in accordance with ROCK Proposal Number SGP092623A dated September 28, 2023. The proposal contained a scope of work, lump sum fee and limitations. The proposal was approved, signed, and returned to ROCK via email.

Purpose and Scope

The purpose of this exploration was to evaluate the soil and rock conditions at the site and to provide pavement recommendations suitable for the proposed new subdivision roadways.

The scope of the exploration and evaluation included the subsurface exploration, field and laboratory testing, engineering analysis and evaluation of the subgrade soils, provision of pavement recommendations, and preparation of this report.

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

General

The exploration and analysis of the subsurface conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the pavement designs. The recommendations submitted for the proposed project are based on the available soil information and the preliminary design details provided by the client. If the engineer requires additional soil parameters to complete the pavement design, and the requested information can be obtained from the agreed upon scope of work, ROCK will provide the requested information as a supplement to this report.

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

FIELD EXPLORATION

Scope

The field exploration completed in order to evaluate the engineering characteristics of the pavement materials included a reconnaissance of the project site, drilling the test borings, and recovering disturbed split spoon samples.

Nine (9) test borings were performed at the site and drilled to a depth of 20-feet below the existing ground surface. Six (6) previous borings were completed within the proposed Phase 1 & Phase 2 project limits to a depth of 20-feet below the existing ground surface during the preliminary study completed in July 2023. A composite bulk sample of weathered limestone cuttings was collected at boring locations B-2, B-3, and B-5. ROCK determined the number, depth and general location of the borings and staked the borings in the field. ROCK performed the boring operations. Upon completion of the drilling operations and obtaining the groundwater observations, the bore holes were backfilled with excavated soil and rock. A Boring Location Plan is provided in the Appendix of this report.

Drilling and Sampling Procedures

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

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

Field Tests and Measurements

Penetration Tests - During the sampling procedures, standard penetration tests (SPT) were performed to obtain the standard penetration value of the soil and rock. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer falling 30 inches required to advance the split-barrel sampler 1-foot into the soil. The sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three successive 6-inch penetrations. The "N" value is obtained by adding the second and third 6-inch increment number of blows. The results of standard penetration tests indicate the relative density of cohesionless soils and comparative consistency of cohesive soils and rock, thereby providing a basis for estimating the relative strength and compressibility of the soil profile components.

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

Ground Surface Elevations - Ground surface elevations were not provided at the boring locations. All depths referred to in this report are reported from the actual ground surface elevations at the boring locations during the time of our field investigation.

LABORATORY TESTING PROGRAM

In addition to the field investigation, a laboratory-testing program was conducted to determine additional pertinent engineering characteristics of the subgrade materials necessary in developing the pavement recommendations for the roadways.

The laboratory-testing program included supplementary visual classification (ASTM D2487) on all samples. In addition, selected samples were subjected water content tests (ASTM D2216), Atterberg limits tests (ASTM D4318), percent material finer than the #200 sieve tests (ASTM D1140), sulfate content determination (TEX-145E), moisture density relationship tests (ASTM D698), and California Bearing Ratio (CBR) tests (ASTM D1883).

All phases of the laboratory-testing program were conducted in general accordance with applicable ASTM or TxDOT Specifications. The results of these tests are to be found in this report or on the accompanying boring logs provided in the Appendix.

SUBSURFACE CONDITIONS

General

The types of subsurface materials encountered in the test borings have been visually classified and are described in detail on the boring logs. The results of the standard penetration tests, water level observations and laboratory tests are presented on the boring logs in numerical form.

Representative samples of the soils and rock were placed in polyethylene bags and are now stored in the laboratory for further analysis, if desired. Unless notified to the contrary, all samples will be disposed of 3 months after issuance of this report.

The stratification of the soil and rock, as shown on the boring logs, represents the soil conditions at the actual boring locations. Variations may occur between, or beyond, the boring locations. Lines of demarcation represent the approximate boundary between different soil types, but the transition may be gradual, or not clearly defined. It should be noted that, whereby the test borings were drilled and sampled by experienced technicians, it is sometimes difficult to record changes in stratification within narrow limits. In the absence of foreign substances, it is also difficult to distinguish between discolored soils and clean soil fill.

Generalized Soil Conditions

The soil and rock conditions at the project site generally consist of an upper stratum of dark brown to brown clayey soils underlain by severely weathered to competent limestone rock that extends to the boring termination depths of 20-feet. The upper clayey soils are low in plasticity with tested plasticity index (PI) values ranging from 11 to 19. For all of the explored locations, these upper soils are relatively thin and range in thickness from a few inches to approximately 2½-feet. The underlying limestone is low in plasticity and very hard, with SPT “N”-values of 22 blows per foot to penetration refusal. Marly lean clay was encountered below the limestone materials at boring locations B-6 and B-7 at depths of approximately 12-feet and 6-feet, respectively.

Detailed descriptions of the soils and rock encountered at the boring locations are provided on the Logs of Boring attached. Representative samples of the soils and rock were placed in polyethylene bags and are now stored in the laboratory for further analysis, if desired. Unless notified to the contrary, the samples will be disposed of three months after issuance of this report.

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

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

Sulfate Test Results

The sulfate test results on the representative composite subgrade sample is provided in the following table:

UPPER CLAY SUBGRADE SULFATE TEST RESULT	
Boring No.	**Sulfate (ppm)**
B-2, 3, 5 (Bulk)	<100

The TxDOT Technical Memorandum for treatment of soils containing sulfates with lime indicates the following risk levels:

SULFATE RISK LEVELS	
Sulfate (ppm)	**Risk**
<3,000	Low
3,000-5,000	Moderate
5,000-7,000	Moderate to High
>7,000	High and Unacceptable

The sulfate concentration indicates the subgrade soils at the site are in a low risk level of using lime as a treatment method.

Groundwater Observations

Groundwater was not encountered during the drilling operations and the borings were dry upon completion of the drilling. It should be noted that water levels in open boreholes may require anywhere from several hours to several days to stabilize depending on the permeability of the soils and that groundwater levels at this site may be subject to seasonal conditions, recent rainfall, drought or temperature effects.

PAVEMENT RECOMMENDATIONS

Project Information

Based on the information provided to ROCK, it is understood that new subdivision roadways will be constructed in accordance with the Bexar County Flexible Pavement Design Criteria for an “Arterial”, “Local B/Collector Street”, and “Local A Street”.

Flexible Pavement Recommendations

In designing the proposed pavements, the existing subgrade conditions must be considered together with the expected traffic use and loading conditions.

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

1. Bearing values of the subgrade. These values can be represented by a California Bearing Ratio (CBR) for the design of flexible asphalt pavements.
2. Vehicular traffic, in terms of the number and frequency of vehicles and their range of axle loads.
3. Probable increase in vehicular use over the life of the pavement.

4. The availability of suitable materials to be used in the construction of the pavement and their relative costs.

Specific laboratory testing to define the subgrade strength (i.e. CBR/K values) has been performed for this analysis. The upper clayey soils are relatively thin, and based on the proposed cut/fill operations, the subgrade will mostly be limestone rock or cut/milled limestone embankment materials. **Based upon the CBR test results and the plasticity indices and strengths of the natural subgrade soils, an average CBR value 3.3 has been selected for design.** We have evaluated the proposed new subdivision roadways considering the Bexar County Flexible Pavement Design Criteria for a "Local A Street" and a "Local B Street", respectively. **The required AASHTO 18-kip ESAL for a "Local A Street" is 100,000. The required AASHTO 18-kip ESAL for a "Local B Street" is 2,000,000. The required AASHTO 18-kip ESAL for an "Arterial" is 3,000,000.**

ROCK used the following pavement design parameters for the flexible pavement designs:

AASHTO PAVEMENT DESIGN PARAMETER	DESIGN VALUE
Local A Reliability (R)	70%
Local B/Collector Reliability (R)	90%
Arterial Reliability (R)	95%
Overall Deviation	0.45
Initial Serviceability	4.2
Terminal Serviceability (Local A & B)	2.0
Terminal Serviceability (Collector & Arterial)	2.5
Subgrade Design CBR	3.3
Design Life	20 years

The following limestone base and hot mix asphaltic concrete layer coefficients were selected for the pavement design.

Pavement Constituent	Layer Coefficient (α)
New Crushed Limestone Base (TxDOT Item 247 Type A, Grade 1-2)	0.14
Type B HMAC	0.38
Type D HMAC	0.44

The recommended pavement sections are provided in the following tables:

"ARTERIAL" (Required AASHTO 18-KIP ESAL = 3,000,000)	
Type D HMAC	3"
Type B HMAC	5.5"
Crushed Limestone Base Material (TxDOT Item 247 Type A; Gr. 1-2)	12"
Calculated AASHTO 18-kip ESAL	3,140,000

"COLLECTOR" (Required AASHTO 18-KIP ESAL = 2,000,000)	
Type D HMAC	2"
Type B HMAC	5"
Crushed Limestone Base Material (TxDOT Item 247 Type A; Gr. 1-2)	13"
Calculated AASHTO 18-kip ESAL	2,280,000

"LOCAL B" (Required AASHTO 18-KIP ESAL = 2,000,000)	
Type D HMAC	2"
Type B HMAC	4.5"
Crushed Limestone Base Material (TxDOT Item 247 Type A; Gr. 1-2)	12"
Calculated AASHTO 18-kip ESAL	2,145,000

"LOCAL A STREET" (Required AASHTO 18-KIP ESAL = 100,000)	
Type D HMAC	2.5"
Crushed Limestone Base Material (TxDOT Item 247 Type A; Gr. 1-2)	10"
Calculated AASHTO 18-kip ESAL	130,000

Compacted Subgrade and Embankment

All surface organics and deleterious materials should initially be removed from the pavement areas. The upper 6-inches of exposed subgrade soils in all areas to receive embankment fill should be scarified, moisture conditioned and compacted to a minimum density of 95-percent of the maximum dry unit weight of the subgrade soils as determined by TEX-113E and at or above the optimum moisture content. All embankment fill shall be placed in 8-inch maximum loose lifts and compacted as specified above.

Limestone Base

Limestone base materials should meet the requirements set forth in the Texas Department of Transportation (TxDOT) Item 247, Type A, Grade 1-2. The base material should be placed in maximum 8-inch thick loose lifts and compacted to a minimum density of 100-percent of the maximum dry density as determined by TEX-113E within -2 to +2 percentage points of the optimum moisture content.

Hot Mix Asphalt

Hot mix asphaltic concrete should meet the requirements set forth in TxDOT Item 340 or Item 340 or 341; Type D surface course and Type B base course. The asphaltic concrete should be compacted to between 91.5 and 96.3-percent of the maximum theoretical density as determined by the Rice specific gravity.

Drainage

Proper drainage is very important for the adequate performance of asphaltic pavements. Ruts and birdbaths in asphalt pavements allow for quick deterioration of the pavement primarily due to saturation of the underlying base materials and subgrade soils.

The pavement design recommendations in this report are based on the assumption that the pavements will have good drainage. A minimum of 1-percent slope in the pavement surface is recommended.

GENERAL COMMENTS

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

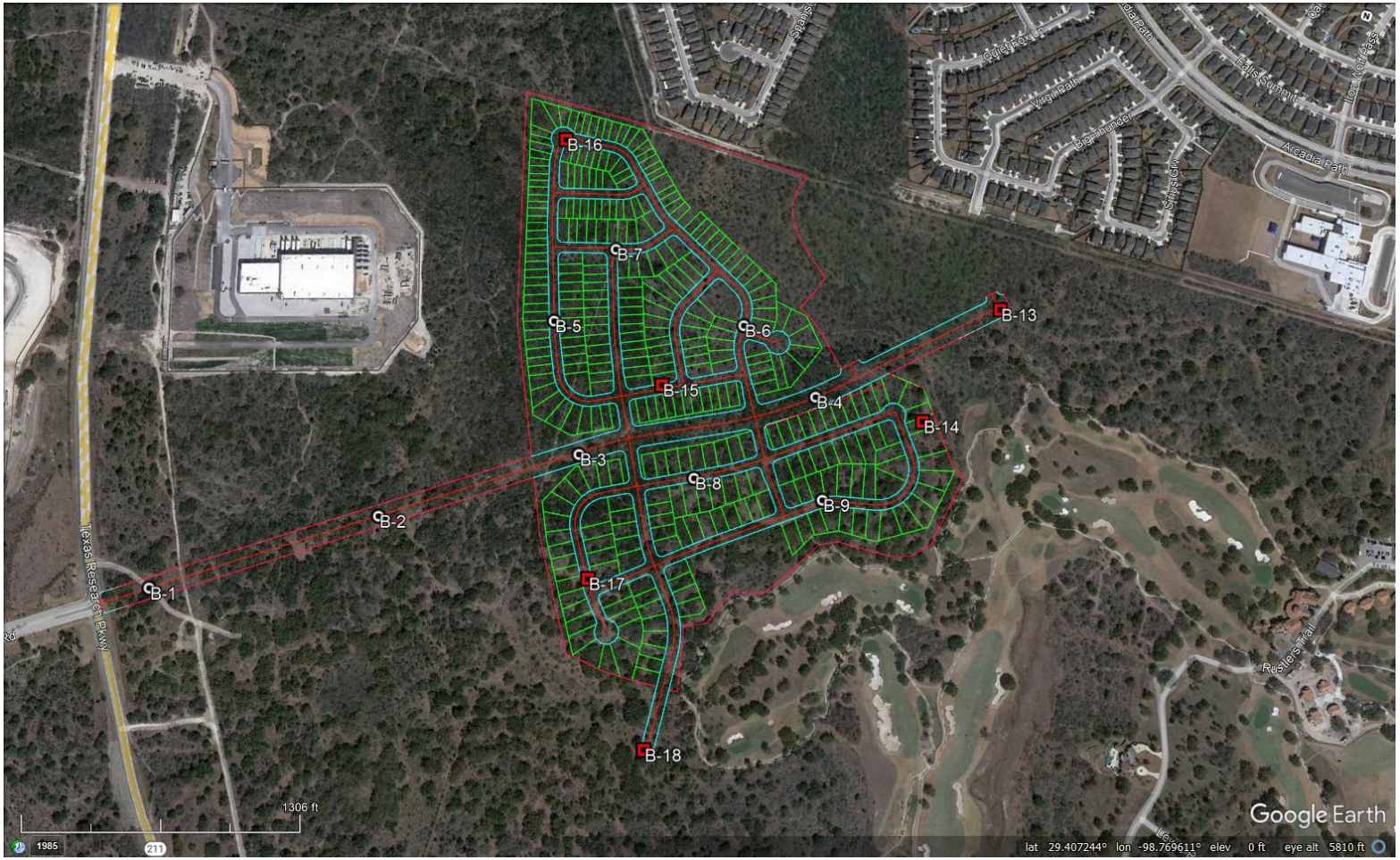
It is recommended that the services of ROCK be engaged to test and evaluate the subgrade soils in the pavement areas prior to placing pavement constituents in order to verify that the soils are consistent with those encountered in the borings. ROCK cannot accept any responsibility for any conditions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

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

APPENDIX

BORING LOCATION PLAN

NO SCALE
BORING LOCATIONS ARE APPROXIMATE



November 8, 2023
Chesmar Homes
ROCK Project No.: G223618

BRIGGS RANCH PHASE 1 & 2
Texas Research Pkwy
San Antonio, Texas

A UES COMPANY

ROCK ENGINEERING AND TESTING LABORATORY, LLC
10856 VANDALE STREET
SAN ANTONIO, TEXAS 78216
(210) 495-8000

LOG OF BORING 1

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/09/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=20	7						49	**CLAYEY SAND WITH GRAVEL,** dark brown, dry, very stiff.
		SPT S-2		N=50/5"	3							**WEATHERED LIMESTONE,** tan, dry, very hard.
	5	SPT S-3		N=50/3"	3							Same as above.
		SPT S-4		N=50/3"	4							Same as above.
		SPT S-5		N=50/2"	3							Same as above.
	10											
		SPT S-6		N=50/2"	4							Same as above.
	15											
		SPT S-7		N=50/2"	4							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.403200°, W -98.776847°

LOG OF BORING 2

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/09/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=50/3"	7							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-2		N=50/3"	6							Same as above.
	5	SPT S-3		N=50/1"	5							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-4		N=50/1"	6							Same as above.
		SPT S-5		N=50/1"	5							Same as above.
	10											
		SPT S-6		N=50/0"	2							Same as above, tan.
	15											
		SPT S-7		N=50/0"	2							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.404946°, W -98.773878°

LOG OF BORING 3

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/09/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=50/4"	6						29	**CLAYEY SAND,** dark brown. **WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-2		N=50/2"	3							Same as above.
	5	SPT S-3		N=50/3"	8							Same as above.
		SPT S-4		N=50/3"	8							Same as above.
		SPT S-5		N=50/3"	6							Same as above.
	10											
		SPT S-6		N=50/1"	5							**LIMESTONE,** light brown, dry, very hard.
	15											
		SPT S-7		N=50/2"	8							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.406473°, W -98.771250°

LOG OF BORING 4

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/10/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=32	5						40	**CLAYEY SAND,** dark brown. **SEVERELY WEATHERED LIMESTONE,** tan, dry, hard.
		SPT S-2		N=17-50/5"	5							Same as above, very hard.
	5	SPT S-3		N=50/2"	4							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-4		N=50/3"	5							Same as above.
		SPT S-5		N=50/3"	6							Same as above.
	10											
		SPT S-6		N=50/2"	4							Same as above.
	15											
		SPT S-7		N=50/2"	5							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.408097°, W -98.768048°

LOG OF BORING 5

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/09/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=7	6	36	23	13			63	**GRAVELLY LEAN CLAY** dark brown, dry, firm. (CL)
		SPT S-2		N=31	2							**SEVERELY WEATHERED LIMESTONE,** tan, dry, hard.
	5	SPT S-3		N=63	3	21	15	6			49	Same as above.
		SPT S-4		N=50/4"	3							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-5		N=50/1"	2							**LIMESTONE,** tan, dry, very hard.
	10											
		SPT S-6		N=50/0"	3							Same as above.
	15											
		SPT S-7		N=50/0"	3							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.408087°, W -98.772216°

LOG OF BORING 6

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/10/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=14	9	38	19	19			76	**LEAN CLAY WITH SAND** dark brown, dry, stiff. (CL)
		SPT S-2		N=22	4							**SEVERELY WEATHERED LIMESTONE,** tan, dry, very stiff.
	5	SPT S-3		N=43	3							Same as above, hard.
		SPT S-4		N=32-50/5"	3							Same as above, very hard.
		SPT S-5		N=50/4"	4							**WEATHERED LIMESTONE,** tan, dry, very hard.
	10											
		SPT S-6		N=33	12	47	12	35			86	**LEAN CLAY,** marly, light brown, moist, hard. (CL)
	15											
		SPT S-7		N=60	12							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.408748°, W -98.769407°

LOG OF BORING 7

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/09/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=17	5	32	21	11			73	**LEAN CLAY WITH SAND** dark brown, dry, very stiff. (CL)
		SPT S-2		N=29	5							**SEVERELY WEATHERED LIMESTONE,** with marl, tan, dry, very stiff.
	5	SPT S-3		N=60	3							Same as above, hard.
		SPT S-4		N=28-50/5"	5	27	12	15			82	**LEAN CLAY,** marly, light brown, dry, very hard. (CL)
		SPT S-5		N=63	8							Same as above, hard.
	10											
		SPT S-6		N=50/5"	6							Same as above, very hard.
	15											
		SPT S-7		N=50/4"	6							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.409255°, W -98.771634°

LOG OF BORING 8

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/09/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=47	9						41	**SEVERELY WEATHERED LIMESTONE,** with marl, tan, dry, hard.
		SPT S-2		N=50	5							Same as above.
	5	SPT S-3		N=50/3"	6							**WEATHERED LIMESTONE,** tan, dry, very hard.
		SPT S-4		N=14-50/4"	5							Same as above, with marl.
		SPT S-5		N=50/1"	5							**LIMESTONE,** light brown, dry, very hard.
	10											
		SPT S-6		N=50/1"	4							Same as above.
	15											
		SPT S-7		N=50/1"	4							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.406604°, W -98.769474°

LOG OF BORING 9

Rock Engineering
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Phase 1 & 2
LOCATION: Texas Research Pkwy; San Antonio, TX
NUMBER: G223618
DATE(S) DRILLED: 10/10/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=11-50/5"	6							**SEVERELY WEATHERED LIMESTONE,** tan, dry, very hard.
		SPT S-2		N=40	7						41	Same as above, hard.
	5	SPT S-3		N=18-50/1"	5							Same as above, with chert.
		SPT S-4		N=50/2"	3							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-5		N=50/1"	4							Same as above.
	10											
		SPT S-6		N=50/2"	8							Same as above.
	15											
		SPT S-7		N=50/1"	6							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.406808°, W -98.767518°

LOG OF BORING B-13

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Tract
LOCATION: Texas Research Pkwy; San Antonio; Texas
NUMBER: G223396
DATE(S) DRILLED: 06/30/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling, and the boring was dry upon completion of the drilling.

SURFACE ELEVATION:

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=50/5"	4						22	**CLAY,** dark brown. **LIMESTONE,** light brown, dry, hard.
		SPT S-2		N=50/5"	2							**WEATHERED LIMESTONE,** light brown, dry, very hard.
	5	SPT S-3		N=50/2"	2						19	**LIMESTONE,** light brown, dry, very hard.
		SPT S-4		N=50/1"	3							Same as above.
		SPT S-5		N=50/2"	7							Same as above.
	10											
		SPT S-6		N=50/3"	7							Same as above.
	15											
		SPT S-7		N=50/2"	5							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.409917°, W -98.765710°

LOG OF BORING B-14

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

A UES COMPANY

CLIENT: Aspire Development
PROJECT: Briggs Ranch Tract
LOCATION: Texas Research Pkwy; San Antonio; Texas
NUMBER: G223396
DATE(S) DRILLED: 06/30/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling, and the boring was dry upon completion of the drilling.

SURFACE ELEVATION:

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=28	7	35	22	13			52	**SANDY LEAN CLAY,** dark brown, dry, very stiff. (CL)
		SPT S-2		N=22-50/3"	4							**SEVERELY WEATHERED LIMESTONE,** light brown, dry, very hard.
	5	SPT S-3		N=36-50/4"	3						49	Same as above.
		SPT S-4		N=50/3"	2							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-5		N=50/4"	6							Same as above.
	10											
		SPT S-6		N=50/2"	5							Same as above.
	15											
		SPT S-7		N=50/1"	7							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.408179°, W -98.766385°

LOG OF BORING B-15

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Tract
LOCATION: Texas Research Pkwy; San Antonio; Texas
NUMBER: G223396
DATE(S) DRILLED: 06/30/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling, and the boring was dry upon completion of the drilling.

SURFACE ELEVATION:

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=9	9	39	25	14			61	**SANDY LEAN CLAY,** dark brown, dry, stiff. (CL)
		SPT S-2		N=20	4							**SEVERELY WEATHERED LIMESTONE,** with chalk, light brown, dry, very stiff.
	5	SPT S-3		N=56	5						85	Same as above, hard.
		SPT S-4		N=32-50/4"	6							Same as above, sans chalk, very hard.
		SPT S-5		N=40-50/4"	9							Same as above.
	10											
		SPT S-6		N=50/4"	6							**WEATHERED LIMESTONE,** light brown, dry, very hard.
	15											
		SPT S-7		N=50/4"	6							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.407674°, W -98.770374°

LOG OF BORING B-16

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Aspire Development
PROJECT: Briggs Ranch Tract
LOCATION: Texas Research Pkwy; San Antonio; Texas
NUMBER: G223396
DATE(S) DRILLED: 06/30/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling, and the boring was dry upon completion of the drilling.

SURFACE ELEVATION:

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=15	9						36	**CLAYEY SAND,** dark brown to brown, dry, stiff.
		SPT S-2		N=48	6						50	**SEVERELY WEATHERED LIMESTONE,** light brown, dry, hard.
	5	SPT S-3		N=30-50/3"	5							Same as above, very hard.
		SPT S-4		N=50/3"	1							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-5		N=50/5"	4							Same as above.
	10											
		SPT S-6		N=50/1"	5							Same as above.
	15											
		SPT S-7		N=50/2"	5							Same as above.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.410402°, W -98.772804°

LOG OF BORING B-17

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

A UES COMPANY

CLIENT: Aspire Development
PROJECT: Briggs Ranch Tract
LOCATION: Texas Research Pkwy; San Antonio; Texas
NUMBER: G223396
DATE(S) DRILLED: 06/30/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling, and the boring was dry upon completion of the drilling.

SURFACE ELEVATION:

FIELD DATA				LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES / N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT LL	ATTERBERG LIMITS: PLASTIC LIMIT PL	ATTERBERG LIMITS: PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1	N=4-50/3"	9	38	24	14			42	**CLAYEY SAND,** with weathered limestone, dark brown, dry, hard. (SC)
		SPT S-2	N=50/4"	2							**SEVERELY WEATHERED LIMESTONE,** light brown, dry, very hard.
	5	SPT S-3	N=39	10						52	Same as above, with clay seams, moist, hard.
		SPT S-4	N=16-50/4"	11							Same as above, vey hard.
		SPT S-5	N=50/5"	3							Same as above, dry.
	10										
	15	SPT S-6	N=30-50/3"	9	22	15	7			46	Same as above.
		SPT S-7	N=50/0"	8							**LIMESTONE,** light brown, dry, very hard.
	20										Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.404934°, W -98.770571°

LOG OF BORING B-18

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

A UES COMPANY

CLIENT: Aspire Development
PROJECT: Briggs Ranch Tract
LOCATION: Texas Research Pkwy; San Antonio; Texas
NUMBER: G223396
DATE(S) DRILLED: 06/30/2023

DRILLING METHOD(S):
Air Rotary

GROUNDWATER INFORMATION:
Groundwater was not encountered during drilling, and the boring was dry upon completion of the drilling.

SURFACE ELEVATION:

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SPT S-1		N=25	6						31	**CLAYEY SAND,** with weathered limesotne, dark brown to brown, dry, very stiff.
		SPT S-2		N=50/1"	3							**LIMESTONE,** light brown, dry, very hard.
	5	SPT S-3		N=50/2"	1							Same as above.
		SPT S-4		N=50/4"	3							**WEATHERED LIMESTONE,** light brown, dry, very hard.
		SPT S-5		N=50/0"	3							**LIMESTONE,** light brown, dry, very hard.
	10											
	15	SPT S-6		N=50/1"	3							Same as above.
		SPT S-7		N=50/4"	4							Same as above, with weathered limestone.
	20											Boring terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by ROCK. Drilling operations performed by ROCK.
GPS Coordinates: N 29.402968°, W -98.769055°

Engineering & Testing Laboratory, LLC

Rock Engineering & Testing Laboratory
10856 Vandale Street
San Antonio, TX 78216
Telephone: 210-495-8000

KEY TO SOIL CLASSIFICATION AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM

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

TERMS CHARACTERIZING SOIL STRUCTURE

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

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

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

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

CALCAREOUS - containing appreciable quantities of calcium carbonate, generally nodular

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

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

SYMBOLS FOR TEST DATA

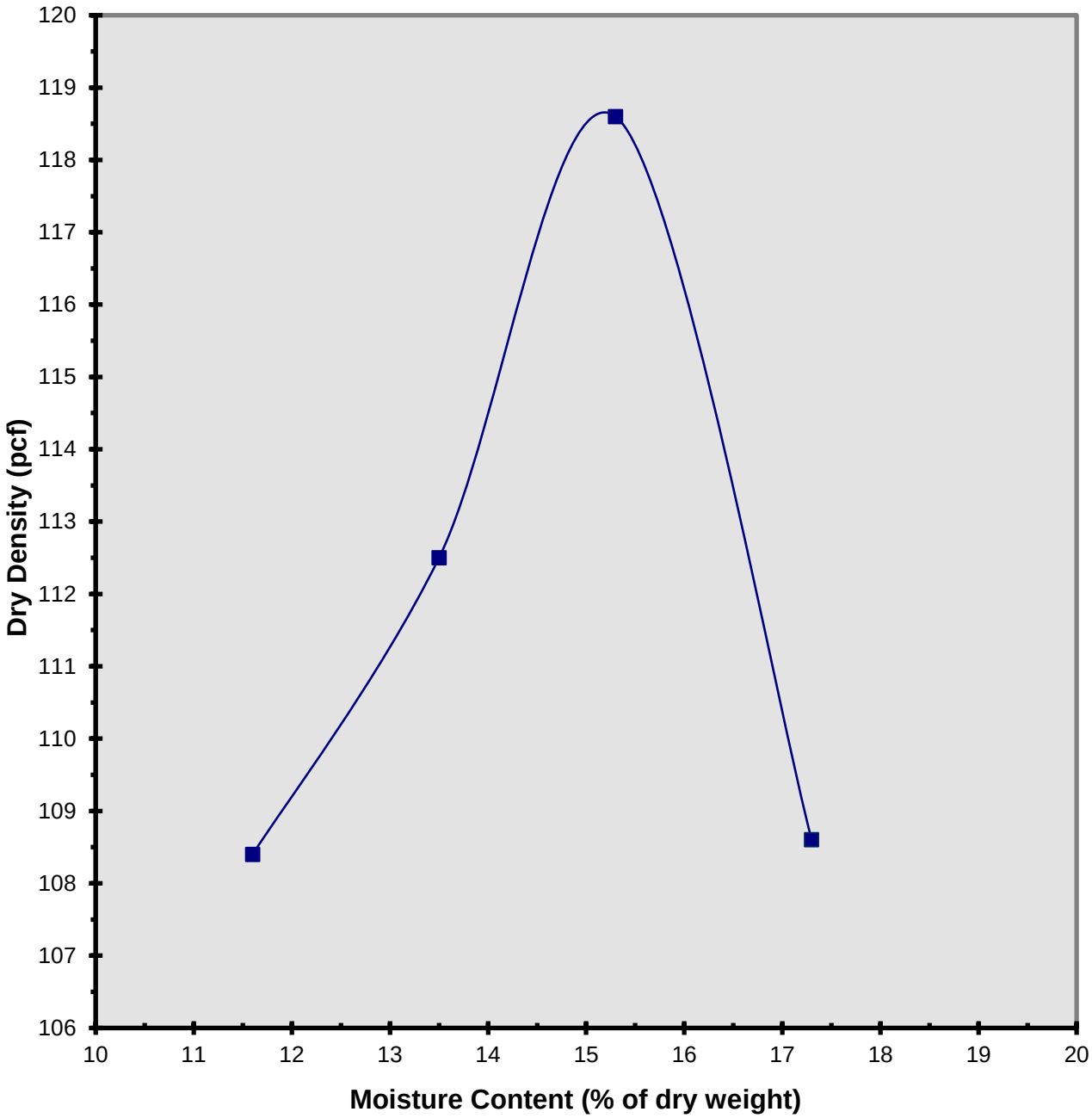
- Groundwater Level (Initial Reading)
- Groundwater Level (Final Reading)
- Shelby Tube Sample
- SPT Samples
- Auger Sample
- Rock Core
- Texas Cone Penetrometer
- Grab Sample

TERMS DESCRIBING CONSISTENCY OF SOIL

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

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

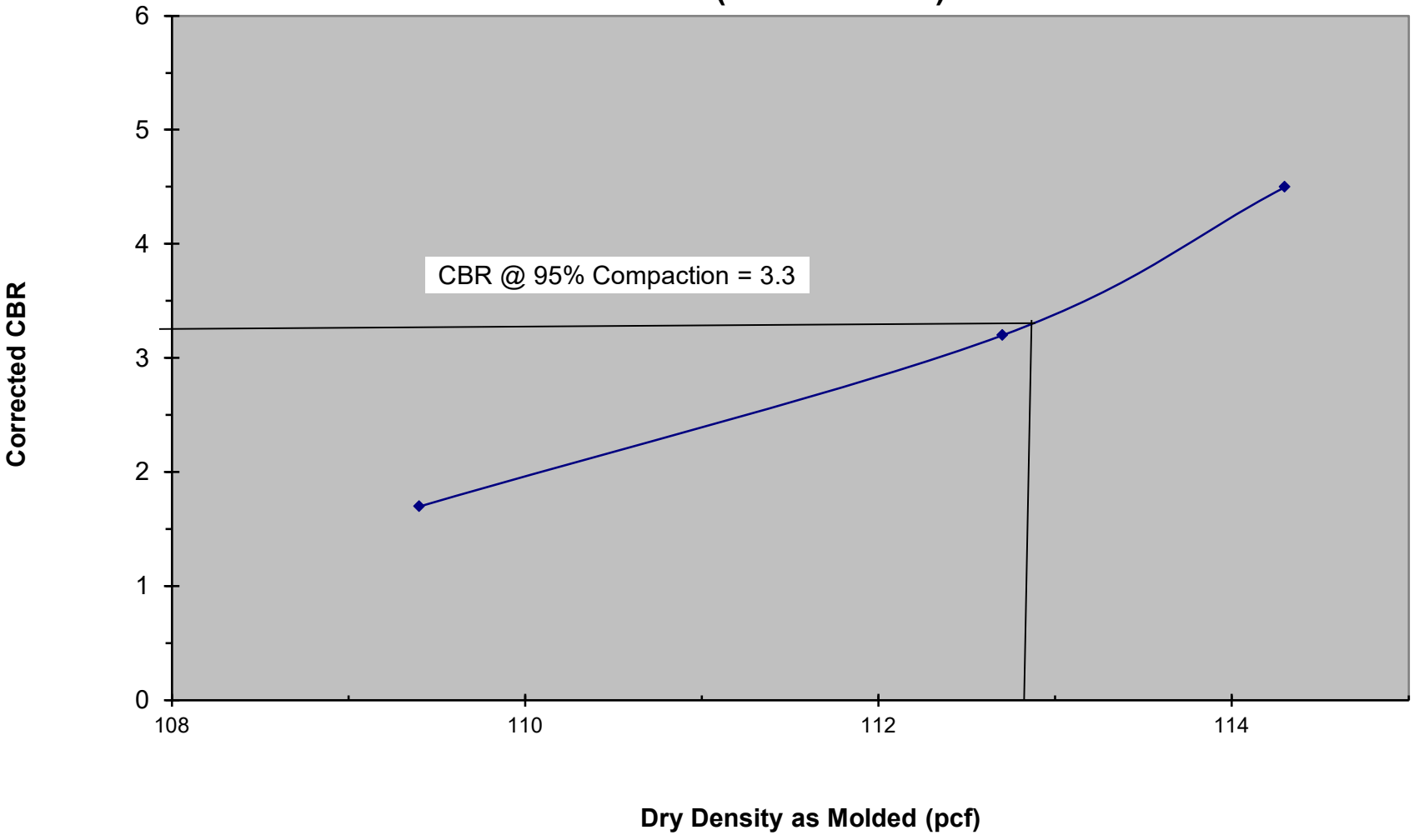
DENSITY VERSUS MOISTURE CURVE
(ASTM D698)



PROJECT	MAXIMUM LAB DENSITY	LAB DATA
Briggs Ranch Phase 1 & 2 San Antonio, Texas	118.6 pcf ASTM D698	LL = 22 PI = 7 Minus #200 = 41%
SAMPLE DESCRIPTION	**OPTIMUM MOISTURE**	**ROCK PROJ. NO.**
Composite B-2 to B-5 Bulk Sample Weathered Limestone Millings	15.4%	G223618

ROCK ENGINEERING AND TESTING LABORATORY, LLC

CBR VERSUS DRY DENSITY
(ASTM D1883)



SAMPLE DESCRIPTION	MAXIMUM LABORATORY DRY DENSITY		Briggs Ranch Phase 1 & 2	
Bulk Sample	118.6 pcf (ASTM D698)		San Antonio, Texas	
Composite B-2 to B-5	CBR at 95% Compaction		TEST DATE	ROCK PROJECT NUMBER
Weathered Limestone Millings	112.7 pcf	3.3	October, 2023	G223618

ROCK ENGINEERING AND TESTING LABORATORY, LLC