September 17, 2021

Capstone Collegiate Communities, LLC
431 Office Park Drive
Birmingham, Alabama 35223

Attention: Mr. J.Davis Maxwell

Reference: **ADDENDUM TO REPORT OF A GEOTECHNICAL EXPLORATION**
St. Augustine - Golf
St. Augustine, Florida
UES Project No. 0930.2100209.0000 Report No. 1899797

Dear Mr. Maxwell:

Universal Engineering Sciences, Inc. has completed the additional borings in the vicinity of the previously backfilled pond at the subject site in St. Augustine, Florida. These services were provided in general accordance with our Proposal No. 1895794 dated August 30, 2021. We previously transmitted a Report of a Geotechnical Exploration (UES Report No. 1887682, UES Project No. 0930.2100162.0000 dated July 27, 2021) This addendum to our report contains the results of our additional exploration.

Field Exploration

The purpose of this exploration was to perform borings within the vicinity of the previously backfilled pond to evaluate the backfill materials and their suitability to remain in place beneath the proposed construction. The additional field exploration was initiated on September 9 and completed September 10, 2021. The boring locations were provided to us prior to our evaluation. The approximate boring locations are shown on the attached Boring Location Plan in the Appendix. The approximate boring locations were determined in the field by our personnel using a hand-held GPS unit and should be considered accurate only to the degree implied by the method of measurement used. Samples of the soils encountered will be held in our laboratory for your inspection for 60 days unless we are notified otherwise.

To explore the subsurface conditions within the area of the previously backfilled pond, we located and drilled eleven (11) Standard Penetration Test (SPT) borings to depths of approximately 20 feet below the existing ground surface in general accordance with the methodology outlined in ASTM D 1586. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory for further evaluation.

Laboratory Testing

Eleven (11) fines content test, and eleven (11) moisture content tests were conducted in the laboratory on representative soil samples obtained from the borings in general accordance with ASTM D2434, D1140, and D2216. These tests were performed to aid in classifying the soils and to help quantify and correlate engineering properties.

Subsurface Conditions

The additional borings generally encountered loose to medium dense fine sand (SP), fine sand with clay (SP-SC), clayey fine sand (SC) and fine sand with silt (SP-SM) to silty fine sand (SM) extending to the maximum boring termination depth of 20 feet below the existing grade. Additionally borings B-19, B-24, B-25, and B-27 through B-29 encountered fine sand to silty fine sand with various amounts of wood, concrete and construction debris (Debris) from the existing grade to 9 feet below the existing grade and extending to 6 to 18 feet below the existing grade.

The groundwater level was encountered during our exploration at depths of approximately 2.5 to 9.5 feet below the existing grade. The variations in groundwater level is due in part to topographical changes, effects of the debris and other factors.

Recommendations

Borings B-19, B-24, B-25, and B-27 through B-29 encountered fine sand to silty fine sand with various amounts of wood, concrete and construction debris (Debris) from the existing grade to 9 feet below the existing grade and extending to 6 to 18 feet below the existing grade. Based on the borings it appears the materials are typically not suitable to remain in place beneath the proposed construction. However, in pavement areas it may be possible to utilize a geo-synthetic material and partial overexcavation of debris in lieu of total over excavation. We recommend backhoe-excavated test pits be performed to better evaluate the composition of the soils, the need for over-excavation of these soils, and to delineate the vertical and horizontal extent, if warranted.

We trust this report addendum meets your needs and addresses the geotechnical issues associated with the proposed construction. We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,

UNIVERSAL ENGINEERING SCIENCES
Certificate of Authorization No. 549

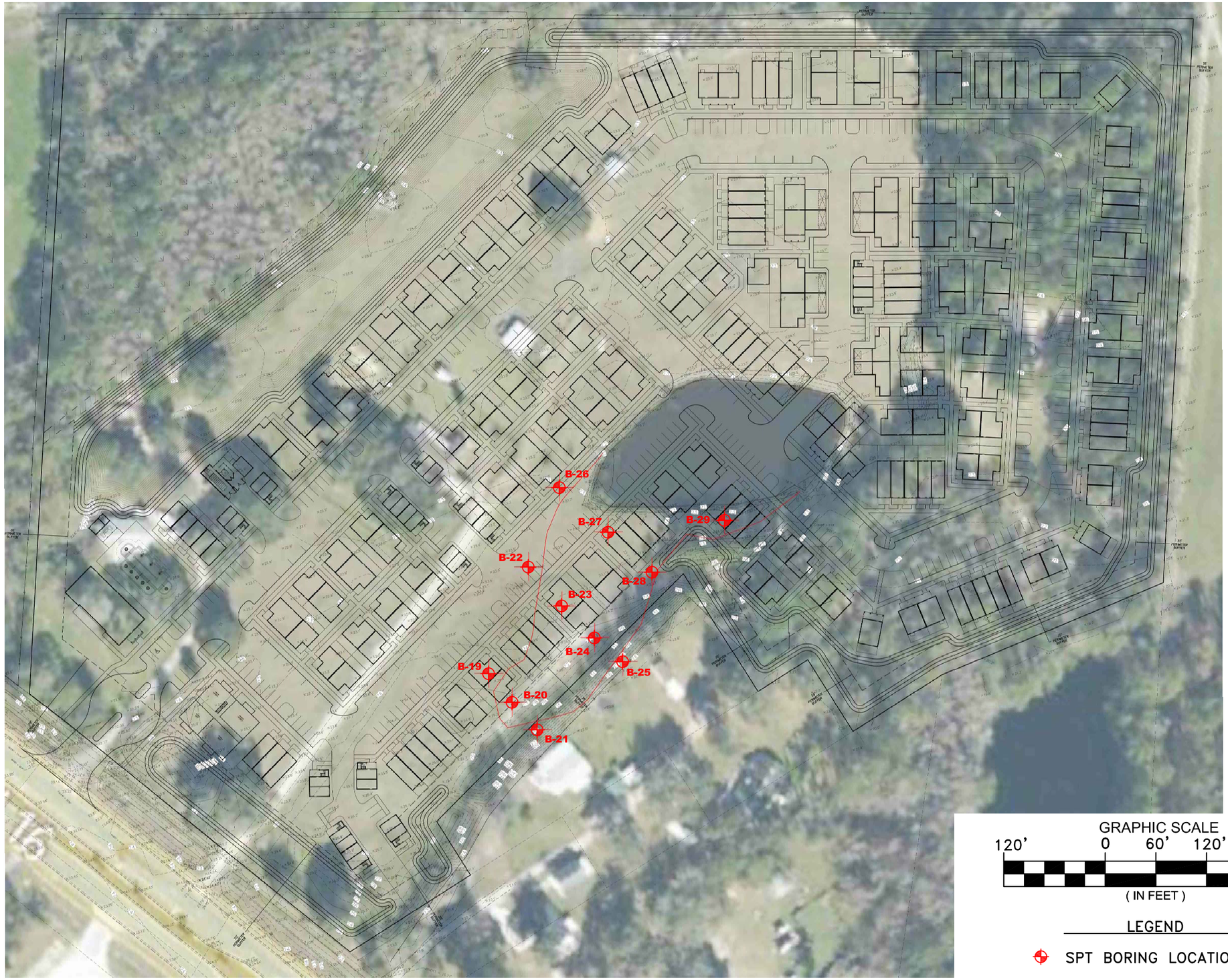
JAKE D. COCHRAN
LICENSE
No. 90493
STATE OF FLORIDA
PROFESSIONAL ENGINEER

9/17/21

Stephen R. Weaver, P.E.
Geotechnical Services Manager
FL P.E. No. 37389

Jake D. Cochran, P.E.
Senior Geotechnical Engineer
FL P.E. No. 90493

SRW/jdc



North

GRAPHIC SCALE
120' 0 60' 120' 240'
(IN FEET)

LEGEND

SPT BORING LOCATION

GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF – ADDITIONAL
ST. AUGUSTINE, FLORIDA

BORING LOCATION PLAN

CLIENT:
CAPSTONE COLLEGIATE COMMUNITIES, LLC

DRAWN BY: TW	DATE: 9/13/21
CHECKED BY: JC	DATE: 9/13/21
SCALE: 1" = 120'	
PROJECT NO: 0930.2100209.0000	REPORT NO: 1899797

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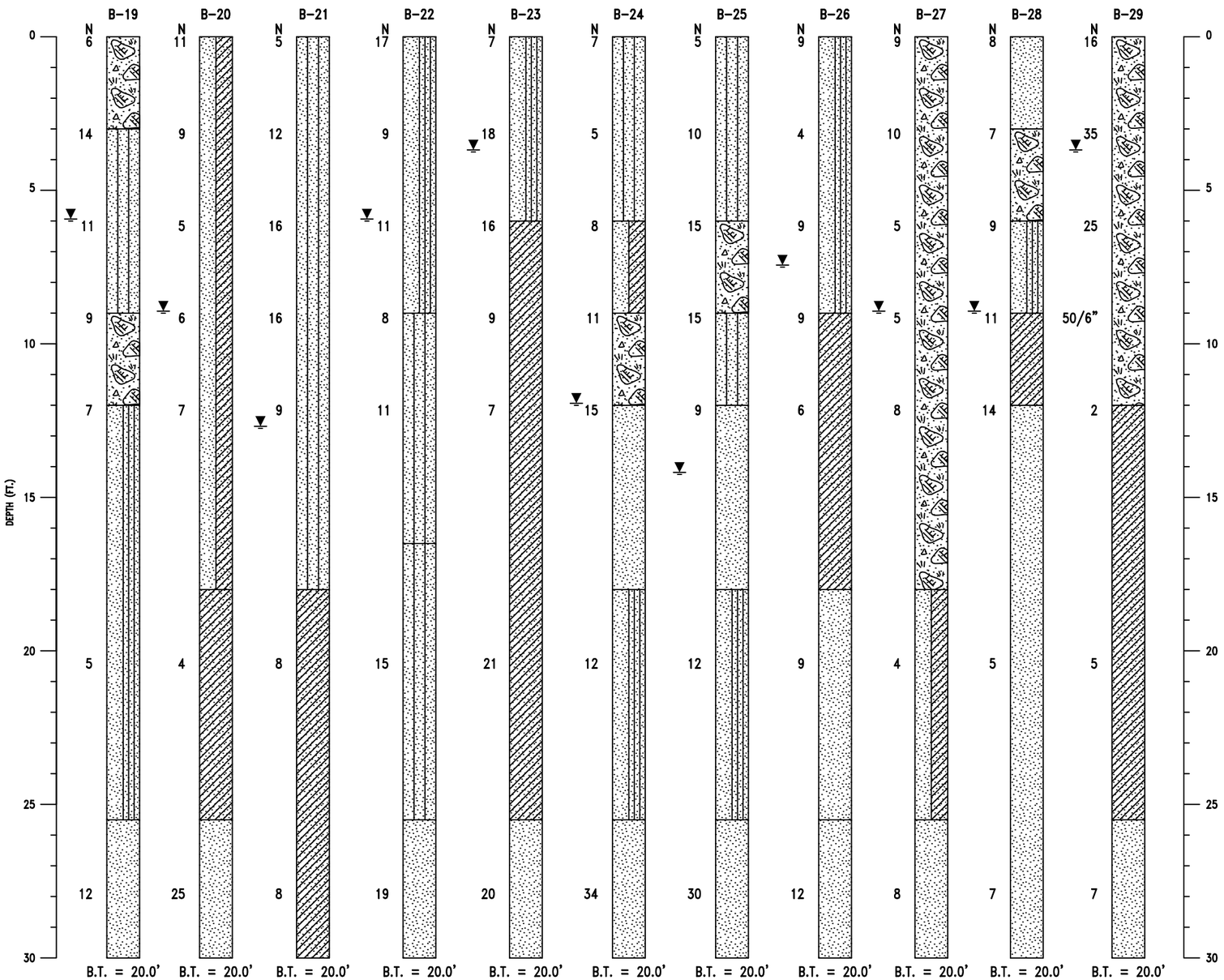
PAGE NO:
FIGURE A-1



CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

DRAWN BY: TW | DATE: 9/13/21

CHECKED BY: JC | DATE: 9/13/21

SCALE: AS SHOWN

PROJECT NO: 0930.2100209.0000 | REPORT NO: 1899797

GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF – ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

SOIL BORING PROFILES

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FIGURE A–2

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BORING LOG

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-19** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.0
DATE OF READING: 9/9/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		2-2-4-5	6			Loose dark gray Silty fine SAND with pieces of Wood (DEBRIS)						
		7-7-7-7	14	▼		Medium dense gray Silty fine SAND (SM)	16.2	17.3				
5		5-6-5-4	11			Loose gray fine SAND with Silt and pieces of Wood Debris (DEBRIS)						
		5-4-5-4	9			Loose dark gray fine SAND with Silt (SP-SM)						
10		5-3-4-4	7									
15		3-2-3	5			Loose brown fine SAND (SP)						
20		6-6-6	12									

BORING_LOG 0930.2100209.0000-ST. AUGUSTINE GOLF.GPJ UNIENGSC.GDT 9/17/21

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ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-20** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 6.0
DATE OF READING: 9/10/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/10/21
DATE FINISHED: 9/10/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		3-4-7-8	11			Loose to medium dense gray fine SAND with Clay and some Shell and some small Roots (SP-SC)						
		6-5-4-3	9									
5		4-3-2-2	5	▼								
		4-3-3-3	6									
10		3-4-3-2	7									
						Loose light gray Clayey fine SAND (SC)						
15		3-2-2	4				16.0	27.8				
						Medium dense gray fine SAND (SP)						
20		10-13-12	25									

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ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-21** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 8.5
DATE OF READING: 9/10/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/10/21
DATE FINISHED: 9/10/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose to medium dense gray Silty fine SAND (SM)						
		1-2-3-3	5									
		4-6-6-6	12				15.1	7.5				
5												
		4-8-8-8	16									
		7-8-8-8	16	▼								
10		4-6-3-2	9									
						Loose gray Clayey fine SAND (SC)						
15		4-3-5	8									
20		3-5-3	8									

BORING_LOG 0930.2100209.0000-ST. AUGUSTINE GOLF.GPJ UNIENGSC.GDT 9/17/21

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-22** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.0
DATE OF READING: 9/9/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		4-7-10-10	17			Loose to medium dense dark brown fine SAND with Silt (SP-SM)						
		7-5-4-6	9	▼								
5												
		5-5-5-5	11			Loose to medium dense gray Silty fine SAND (SM)						
		5-4-4-4	8				5.7	26.1				
10		2-5-6-7	11			Medium dense brown Silty fine SAND (SM)						
15		2-7-8	15			Medium dense gray fine SAND (SP)						
20		8-9-10	19									

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-23** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.5
DATE OF READING: 9/9/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose to medium dense dark gray fine SAND with Silt (SP-SM)						
		3-3-4-7	7	▼								
		7-9-9-10	18			Loose to medium dense gray Clayey fine SAND (SC)						
5		5-7-9-8	16									
		7-5-4-4	9				15.9	18.9				
10		3-4-3-4	7									
15		2-1-1	21			Medium dense gray fine SAND (SP)						
20		10-10-10	20									

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ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-24** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 8.0
DATE OF READING: 9/10/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/10/21
DATE FINISHED: 9/10/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		3-3-4-4	7			Loose dark gray Silty fine SAND (SM)						
		4-3-2-2	5			Loose gray Clayey fine SAND (SP-SC)	12.2	16.1				
5		2-3-5-7	8			Medium dense gray fine SAND with Clay with pieces of Wood debris(DEBRIS)						
		6-5-6-5	11	▼		Medium dense gray fine SAND (SP)						
10		3-8-7-7	15									
						Medium dense dark brown fine SAND with Silt (SP-SM)						
15		5-5-7	12									
						Dense gray fine SAND (SP)						
20		13-15-19	34									

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-25** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 9.5
DATE OF READING: 9/10/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/10/21
DATE FINISHED: 9/10/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose brown Silty fine SAND with Silt (SM)						
		2-2-3-3	5									
		3-4-6-6	10			Medium dense brown fine SAND with Clay and pieces of Wood debris (DEBRIS)						
5												
		6-7-8-8	15			Medium dense brown Silty fine SAND (SM)						
		8-7-8-7	15			Loose gray fine SAND (SP)	15.9	8.7				
				▼								
10		4-5-4-3	9									
						Medium dense dark brown fine SAND with Silt (SP-SM)						
15		5-6-6	12									
						Dense gray fine SAND (SP)						
20		14-15-15	30									

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-26** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.0
DATE OF READING: 9/9/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose dark brown fine SAND with Silt (SP-SM)						
		3-4-5-4	9									
		4-2-2-4	4									
5				▼								
		5-5-4-4	9									
						Loose gray Clayey fine SAND (SC)						
		5-5-4-3	9				14.6	22.1				
10		2-2-4-3	6									
						Loose gray fine SAND (SP)						
15		5-4-5	9									
						Medium dense dark gray fine SAND (SP)						
20		7-6-6	12									

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-27** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC
LOCATION: SEE BORING LOCATION PLAN
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 6.0
DATE OF READING: 9/9/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		2-4-5-9	9			Loose dark brown fine SAND with Silt and small pieces of Wood, Construction Debris and Organics (DEBRIS)						
		7-5-5-4	10				8.3	16.7				
5												
		3-3-2-2	5	▼								
		2-2-3-3	5									
10		3-4-4-3	8									
						Loose dark brown fine SAND with Clay and trace small Roots (SP-SC)						
15		2-2-2	4									
						Loose gray fine SAND (SP)						
20		6-5-3	8									

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ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-28** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 6.0
DATE OF READING: 9/9/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose gray fine SAND (SP)						
		3-4-4-4	8									
						Loose dark brown fine SAND with Silt and some pieces of Wood Debris (SP-SM)						
		3-3-4-5	7									
						Loose brown fine SAND with Silt (SP-SM)						
5												
		4-4-5-5	9	▼								
						Medium dense gray Clayey fine SAND (SC)						
		5-6-5-10	11				15.7	22.3				
						Loose to medium dense gray fine SAND (SP)						
10		8-8-6-5	14									
15		3-2-3	5									
20		4-4-3	7									

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PROJECT: GEOTECHNICAL EXPLORATION
ST. AUGUSTINE GOLF - ADDITIONAL BORINGS
ST. AUGUSTINE, FLORIDA

BORING DESIGNATION: **B-29** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC
LOCATION: SEE BORING LOCATION PLAN
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.5
DATE OF READING: 9/15/21
EST. W.S.W.T. (ft):

DATE STARTED: 9/9/21
DATE FINISHED: 9/9/21
DRILLED BY: JP
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		3-6-10-17	16	▼		Medium dense to very dense dark brown fine SAND with Silt and many pieces of Concrete / Wood debris (DEBRIS)						
		18-18-17-22	35									
5												
		32-12-13-32	25									
		50/6"	50/6"			Very loose to loose gray Clayey fine SAND (SC)						
10		1-1-1-1	2				15.8	25.7				
15		2-2-3	5			Loose light gray fine SAND (SP)						
20		5-3-4	7									

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KEY TO BORING LOGS

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SIOLS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts
			CH	Inorganic clays or clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

*Based on the material passing the 3-inch (75 mm) sieve
** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY
(Sands and Gravels)
Very loose – Less than 4 Blow/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY
(Silts and Clays)
Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Firm – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS
(Limestone)
Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample
Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample
Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample
Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

CONSTRAINTS & RESTRICTIONS

The intent of this document is to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

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