



UNITED  
CONSULTING

# REPORT

**For Megan Hanifan, P.E.  
Dewberry**

Geotechnical Exploration  
Avondale Estates Regenerative  
Stormwater

Banbury Cross and Berkley Road  
Avondale Estates, DeKalb County,  
Georgia

Project No.: DEWBY-24-GA-08243-01



February 13, 2024

Megan Hanifan, P.E.  
**Dewberry**  
2835 Brandywine Road  
Suite 100  
Atlanta, Georgia 30341

Via Email: [mhanifan@Dewberry.com](mailto:mhanifan@Dewberry.com)

RE: Report of Geotechnical Exploration  
**Avondale Estates Regenerative Stormwater**  
Banbury Cross and Berkley Road  
Avondale Estates, DeKalb County, Georgia  
Project No.: DEWBY-24-GA-08243-01

Dear Ms. Hanifan,

United Consulting is pleased to submit this letter report of our Geotechnical Exploration for the above-referenced project. On January 31 and February 1, 2024, United Consulting visited the project site at 1122 Banbury Cross and 1122 Berkeley Road in Avondale Estates to hand auger six (6) soil borings (designated as borings B-1 to B-6) to depths of about 6 feet below the ground surface to test and assess the soil type at the project site. Please see the attached Figure 1 – Boring Location Plan for approximate locations of the borings. All boring locations were checked for buried utility lines before drilling took place.

## 1. Subsurface Conditions

The borings initially encountered about 2 feet of fill (possible fill) soils that were classified as either sandy clay or gravel with varying amounts of sand and clay. The fill materials were generally clean and noted as soft to firm with dynamic cone penetrometer resistance (N-values) values ranging from 4 to 7 blows per 1.75 inch of penetration (bpi).

Below the fills, residual soils of the Piedmont Geologic Province were encountered in the borings. The residual soils typically consisted of firm to hard clay with varying amounts of silt and sand. A layer of stiff silt with some sand and clay was also found in borings B-5 and B-6. The dynamic cone penetrometer N-values ranged from 7 to more than 30 bpi.

Groundwater was encountered at the time of drilling in the borings at depths ranging from 4 to 6 feet below the ground surface. Stabilized groundwater was measured after 24 hours of drilling in boring B-2 at a depth of 4.5 feet. Groundwater levels should be anticipated to fluctuate with the change of seasons, during periods of very low or high precipitation, or due to changes in floodplain or watershed upstream of the site. Soils at this site are also susceptible to development of perched water conditions during period of wet water due to the significant amount of the clay content.

Boring B-4 encountered hand auger refusal at 5.5 feet whereas the remaining borings were terminated at depths of 6 feet below the ground surface. Hand auger refusal at this site might be due to continuous caving of the borehole below the groundwater level.

The locations of the borings are shown on the attached Figure 1 - Boring Location Plan. For a more precise description of the conditions encountered within the borings, please refer to the Boring Logs.

## 2. Infiltration Testing

One (1) infiltration test (designated as I-1) was performed at 2 feet below the grade between borings B-3 and B-4 using an Aardvark Permeameter (Model 2840K2) in order to obtain automated hydraulic conductivity reading. The Aardvark is a constant head permeameter, meaning that the depth of the water in the borehole does not change during the measurement periods. The rate of water supplied corresponds to the soil infiltration rate from the bottom and side surfaces of the borehole.

Preparation of the test hole consisted of hand augering an approximately 3.5-inch diameter borehole to depth of about 2 feet below the ground surface, then the Aardvark Permeameter was lowered into the borehole to start the test.

Once a steady state flow rate was established in the borehole, the saturated hydraulic conductivity ( $K_{sat}$ ) rate was calculated using the Elrick and Reynolds Solution method and converted calculated value into the final infiltration rate using a reduction factor. The reduction factor is used to adjust for exfiltration through the sidewalls of the test area and is determined by the following formula:

$$Rf = (2D1 - \Delta d)/DIA + 1$$

Where:

Rf = Reduction factor

D1 = initial water depth (in)

$\Delta d$  = average/ final water level drop (in)

DIA = diameter of the percolation test hole (in)

Table 1 below provides the result of our infiltration testing. It should be noted that the result is an estimate of the infiltration rate at the location and the depth tested. Variations in soil conditions across the full extent of the proposed stormwater systems may result in different infiltration rates at other locations under the systems. Changes in atmospheric conditions or site-specific conditions may also result in varied test results if additional tests are conducted at a later date.

**Table 1 – Result of Infiltration Rate**

Boring Number	Date Tested	Approximate Depth (ft.)	Infiltration Rate in/hr (Unfactored)	Infiltration Rate in/hr (Factored)
I-1	2/1/2024	2	0.01	< 0.01

## 3. Laboratory Testing

Laboratory testing for this project included six (6) unified soil classification system (USCS) tests including wash 200 grain size tests, Atterberg limits tests, and natural moisture content tests. Narrative descriptions of the laboratory tests and test results are included in the Appendix. The Table 2 below summarized the results of USCS tests.

**Table 2 – Summary of USCS Tests**

Boring Number	Depth (ft)	Percent Passing #200	Liquid Limits	Plasticity Index	Natural Moisture Content	USCS
B-1	0 (Surface)	12.1	38	9	15.7%	GM
B-2	4	79.8	53	27	29.6%	CH
B-3	2	63.1	44	20	25.7%	CL
B-4	2	53.5	53	25	22.8%	CH
B-5	2	73.9	68	25	30.7%	MH
B-6	4	71.0	44	21	22.8%	CL

**Note:**  
USCS: Unified Soil Classification System

We appreciate the opportunity to assisting on this project. If you should have any questions, please do not hesitate to contact our office.

Sincerely,

**UNITED CONSULTING**

  
**Nhan Pham, E.I.T.**  
Staff Geotechnical Engineer

JJ/NP/MM/nj

Attachments: Figure 1: Boring Location Plan  
Boring Logs (6 Pages)  
Exploration Procedures  
Laboratory Testing Procedures  
USCS Test Results (7 Pages)

H:\GEOTECHNICAL\REPORTS\2024\DEWBY-24-GA-08243-01



# ATTACHMENTS

Figure 1: Boring Location Plan  
Boring Logs (6 Pages)  
Exploration Procedures  
Laboratory Testing Procedures  
USCS Test Results (7 Pages)



<b>Prepared by:</b>	NP	<b>Title:</b>	Boring Location Plan
<b>Checked by:</b>	MM	<b>Project:</b>	Avondale Estates Regenerative Stormwater
<b>Date:</b>	2/12/2024	<b>Project No.:</b>	DEWBY-24-GA-08243-01
<b>Scale:</b>	NTS	<b>Client:</b>	Dewberry

**FIG. 1**





**UNITED CONSULTING**  
 625 HOLCOMB BRIDGE ROAD  
 NORCROSS, GEORGIA 30071  
 (770)209-0029, FAX (770)582-2800

# LOG OF BORING

HAND AUGER

CONTRACTED WITH: DEWBERRY BORING NO.: B-2  
 PROJECT NAME: AVONDALE ESTATES JOB NO.: DEWBY-24-GA-08243-01 DATE: 1/31/2024

ELEV.	DESCRIPTION	DEPTH in FEET	PENETROMETER TESTS		NOTES
			NO.	BLOWS PER 2" 1.75"	
	No topsoil	0			Latitude: 33.761910 degrees Longitude: -84.262752 degrees  LL-53, PI=27, MC=29.6% Stabilized groundwater measured at 4.5 feet after 24 hours.  Groundwater encountered at 5.5 feet at the time of drilling.  LL = Liquid Limit PI = Plasticity Index MC = Natural Moisture Content
	Gravel, some sand and clay; brown (Fill) (GM)		1	4	
		2			
	Clay-sandy, trace silt and gravel; reddish brown (Residual) (CL)		2	10	
		4			
	-some sand and silt; brown (CH)		3	10	
		▼			
		▽			
		6			
	BORING TERMINATED AT 6 FEET.		4	12	
		8			
		10			
		12			
		14			
		16			



**UNITED CONSULTING**  
 625 HOLCOMB BRIDGE ROAD  
 NORCROSS, GEORGIA 30071  
 (770)209-0029, FAX (770)582-2800

# LOG OF BORING

HAND AUGER

CONTRACTED WITH: DEWBERRY BORING NO.: B-3  
 PROJECT NAME: AVONDALE ESTATES JOB NO.: DEWBY-24-GA-08243-01 DATE: 1/31/2024

ELEV.	DESCRIPTION	DEPTH in FEET	PENETROMETER TESTS		NOTES
			NO.	BLOWS PER 2" 1.75"	
	No topsoil	0			Latitude: 33.761915 degrees Longitude: -84.262689 degrees
	Clay-sandy, trace silt and trace gravel; reddish brown (Fill) (CL)		1	4 4	
		2			LL=44, PI=20, MC=25.7%
	Clay-sandy, trace silt and gravel; reddish brown (Residual) (CL)		2	10 10	
		4			
	-some sand; light gray		3	9 13	
	BORING TERMINATED AT 6 FEET.	6	4	12 7	Groundwater encountered at 6 feet at the time of drilling.
		8			
		10			
		12			
		14			
		16			

LL = Liquid Limit  
 PI = Plasticity Index  
 MC = Natural Moisture Content



**UNITED CONSULTING**  
 625 HOLCOMB BRIDGE ROAD  
 NORCROSS, GEORGIA 30071  
 (770)209-0029, FAX (770)582-2800

# LOG OF BORING

HAND AUGER

CONTRACTED WITH: DEWBERRY BORING NO.: B-4  
 PROJECT NAME: AVONDALE ESTATES JOB NO.: DEWBY-24-GA-08243-01 DATE: 1/31/2024

ELEV.	DESCRIPTION	DEPTH in FEET	PENETROMETER TESTS		NOTES
			NO.	BLOWS PER 2" 1.75"	
	No topsoil	0			Latitude: 33.761919 degrees Longitude: -84.262628 degrees
	Clay-sandy, trace silt and gravel; dark brown (Fill) (CH)		1	7 5	
		2			LL=53, PI=25, MC=22.8%
	Clay-sandy, trace silt and gravel; brown (Residual) (CH)		2	10 15	
					Groundwater encountered at 4 feet at the time of drilling.
	-some sand; light gray	4	3	24 29	
	HAND AUGER REFUSAL AT 5.5 FEET.	6	4	>30	LL = Liquid Limit PI = Plasticity Index MC = Natural Moisture Content
		8			
		10			
		12			
		14			
		16			



**UNITED CONSULTING**  
 625 HOLCOMB BRIDGE ROAD  
 NORCROSS, GEORGIA 30071  
 (770)209-0029, FAX (770)582-2800

# LOG OF BORING

HAND AUGER

CONTRACTED WITH: DEWBERRY BORING NO.: B-5  
 PROJECT NAME: AVONDALE ESTATES JOB NO.: DEWBY-24-GA-08243-01 DATE: 1/31/2024

ELEV.	DESCRIPTION	DEPTH in FEET	PENETROMETER TESTS		NOTES
			NO.	BLOWS PER 2" 1.75"	
	No topsoil	0			Latitude: 33.761926 degrees Longitude: -84.262572 degrees
	Clay-sandy, trace silt and gravel; reddish brown (Fill) (CH)		1	5 7	
		2			LL=68, PI=25, MC=30.7%
	Silt-some clay and sand; reddish brown (Residual) (MH)		2	20 15	
		4			Groundwater encountered at 5 feet at the time of drilling.
	Clay-some sand and silt; light gray (CL)		3	14 14	
		5			
	BORING TERMINATED AT 6 FEET.	6	4	13 14	
		8			LL = Liquid Limit PI = Plasticity Index MC = Natural Moisture Content
		10			
		12			
		14			
		16			



**UNITED CONSULTING**  
 625 HOLCOMB BRIDGE ROAD  
 NORCROSS, GEORGIA 30071  
 (770)209-0029, FAX (770)582-2800

# LOG OF BORING

HAND AUGER

CONTRACTED WITH: DEWBERRY BORING NO.: B-6  
 PROJECT NAME: AVONDALE ESTATES JOB NO.: DEWBY-24-GA-08243-01 DATE: 1/31/2024

ELEV.	DESCRIPTION	DEPTH in FEET	PENETROMETER TESTS		NOTES	
			NO.	BLOWS PER 2" 1.75"		
	2" topsoil	0			Latitude: 33.761929 degrees Longitude: -84.262510 degrees	
	Clay-sandy, trace silt and gravel; reddish brown (Fill) (CH)		1	5 7		
		2				
	Silt-some clay and sand; reddish brown (Residual) (MH)		2	14 14		
		4				
	Clay-some sand and silt; brown (CL)		3	15 14		LL=44, PI=21, MC=22.8%
	BORING TERMINATED AT 6 FEET.	6	4	12 11		Groundwater encountered at 6 feet at the time of drilling.
			8			
			10			
			12			
			14			
		16				

LL = Liquid Limit  
 PI = Plasticity Index  
 MC = Natural Moisture Content

## EXPLORATION PROCEDURES

Hand auger borings with dynamic cone penetration testing were advanced manually by the use of a post-hole auger. The soils encountered were identified in the field and from cuttings brought to the surface by the augering process. Representative soil samples were placed in Ziploc bags and transported to our laboratory where they were visually classified by an engineer according to the visual manual procedure described in ASTM D 2488. Boring locations were established in the field by the Project Engineer with use of measuring tape, the provided aerial photography, and a handheld GPS. The Hand Auger Dynamic Cone Penetration (DCP) testing was completed at 2-foot intervals and performed in accordance with ASTM Special Publication No. 399.

## **LABORATORY TESTING PROCEDURES**

### **Moisture Content**

The moisture content was determined for selected soil samples obtained in the split-barrel sampler. A representative portion of each sample was weighed and then placed in an oven and dried at 110 degrees Centigrade for at least 15 to 16 hours. After removal from the oven, the soil was again weighed. The weight of the moisture lost during drying thus was determined. From this data, the moisture content of the sample was then calculated as the weight of moisture divided by dry weight of soil, expressed as a percentage. This test was conducted according to ASTM D 2216.

Moisture content is a useful index of a soil's compressibility. If the soil is to be used as fill, the moisture content may be compared to the range of water contents for which proper compaction may be achieved. The moisture content results are indicated on the boring logs attached and on the Summary of USCS Tests.

### **Unified Soil Classification System (USCS)**

Soils to be classified as per Unified Soil Classification System (USCS) are generally required to perform grain size analysis (particle size distribution), liquid limit and plasticity index tests when precise classification is required. After performing the required tests, the classification was generally performed in accordance with ASTM D 2487.

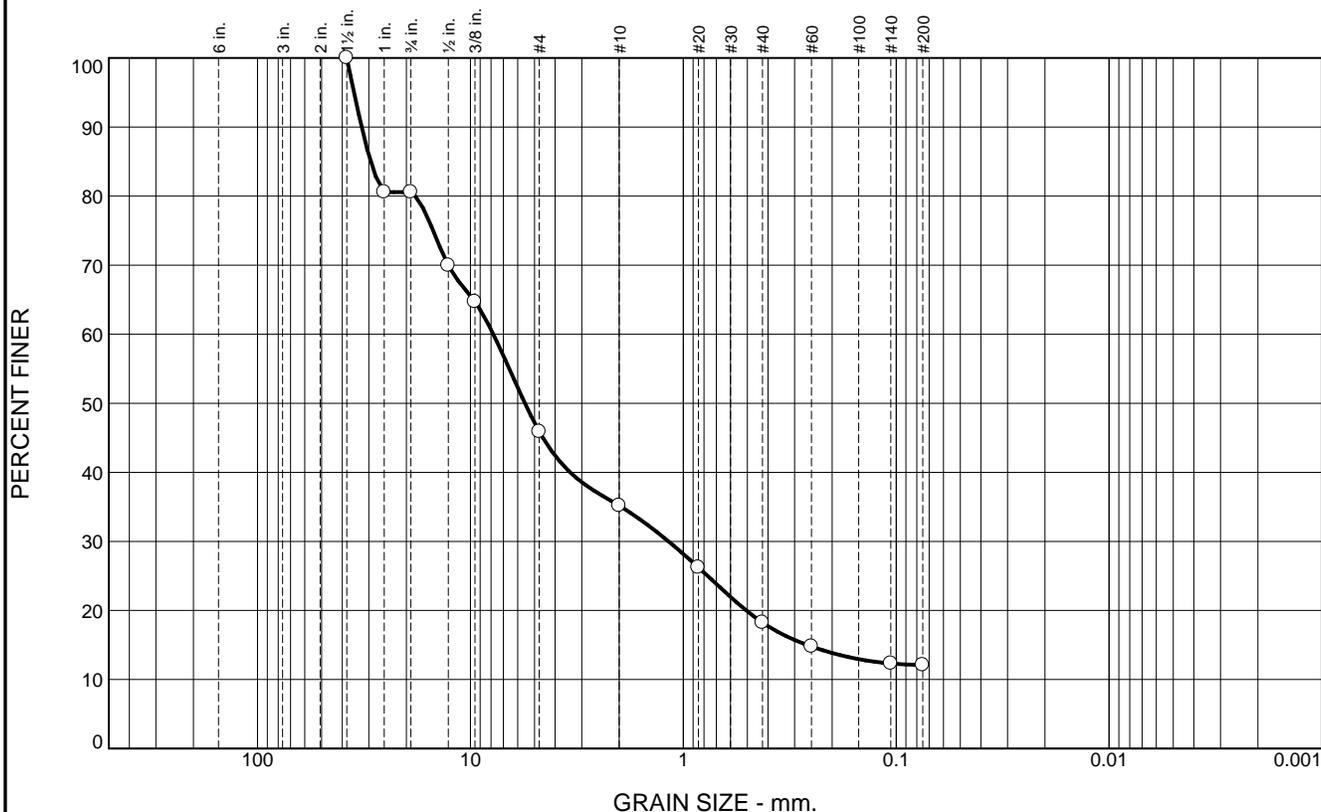
### **Grain Size (Sieve) Analysis without Hydrometer**

Grain Size Analysis tests were performed to determine the particle size distribution of selected samples tested. The grain size distribution of soils coarser than a number 200 sieve was determined by passing the samples through a standard set of nested sieves. Materials finer than the number 200 sieve was suspended in water and the grain size distribution computed from the time rate of settlement of the different size particles (hydrometer test). Air-dried soil is passed through a #200 sieve, and 50 grams of this soil is then soaked in sodium hexametaphosphate agent for a minimum of 8 hours. Soil is then put in a graduated cylinder with a hydrometer. Readings are taken at specified times. A graph of grain size distribution is then drawn from data. These procedures were performed in accordance with the specifications and were similar to those described by ASTM D 421 and D 422. The data obtained are summarized on the enclosed Summary of USCS Test Data.

### **Liquid and Plastic Limits (Atterberg Limits)**

Liquid Limit and Plastic Limit tests aid in the classification of the soils and provide an indication of the soil behavior with moisture change. The Plasticity Index is calculated by subtracting the Plastic Limit (PL) from the Liquid Limit (LL). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous fluid and is the upper limit of the plastic range, as determined in accordance with ASTM D 4318. The Plastic Limit is the moisture content at which the soil begins to lose its plasticity, as determined in accordance with ASTM D 4318. The Liquidity Index is the ratio of the difference between the in-place moisture and the plastic limit to the Plasticity Limit. The data obtained are summarized on the enclosed Summary of USCS Test Data.

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.4	34.7	10.7	16.9	6.2	12.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	80.6		
0.750	80.6		
0.5	70.0		
0.375	64.7		
#4	45.9		
#10	35.2		
#20	26.2		
#40	18.3		
#60	14.8		
#140	12.3		
#200	12.1		

**Material Description**

Gravel, some sand, trace clay and silt, brown

**Atterberg Limits**

PL= 29      LL= 38      PI= 9

**Coefficients**

D<sub>90</sub>= 32.4269      D<sub>85</sub>= 29.3935      D<sub>60</sub>= 7.8056  
D<sub>50</sub>= 5.5479      D<sub>30</sub>= 1.1735      D<sub>15</sub>= 0.2617  
D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**

USCS= GM      AASHTO= A-2-4(0)

**Remarks**

\* (no specification provided)

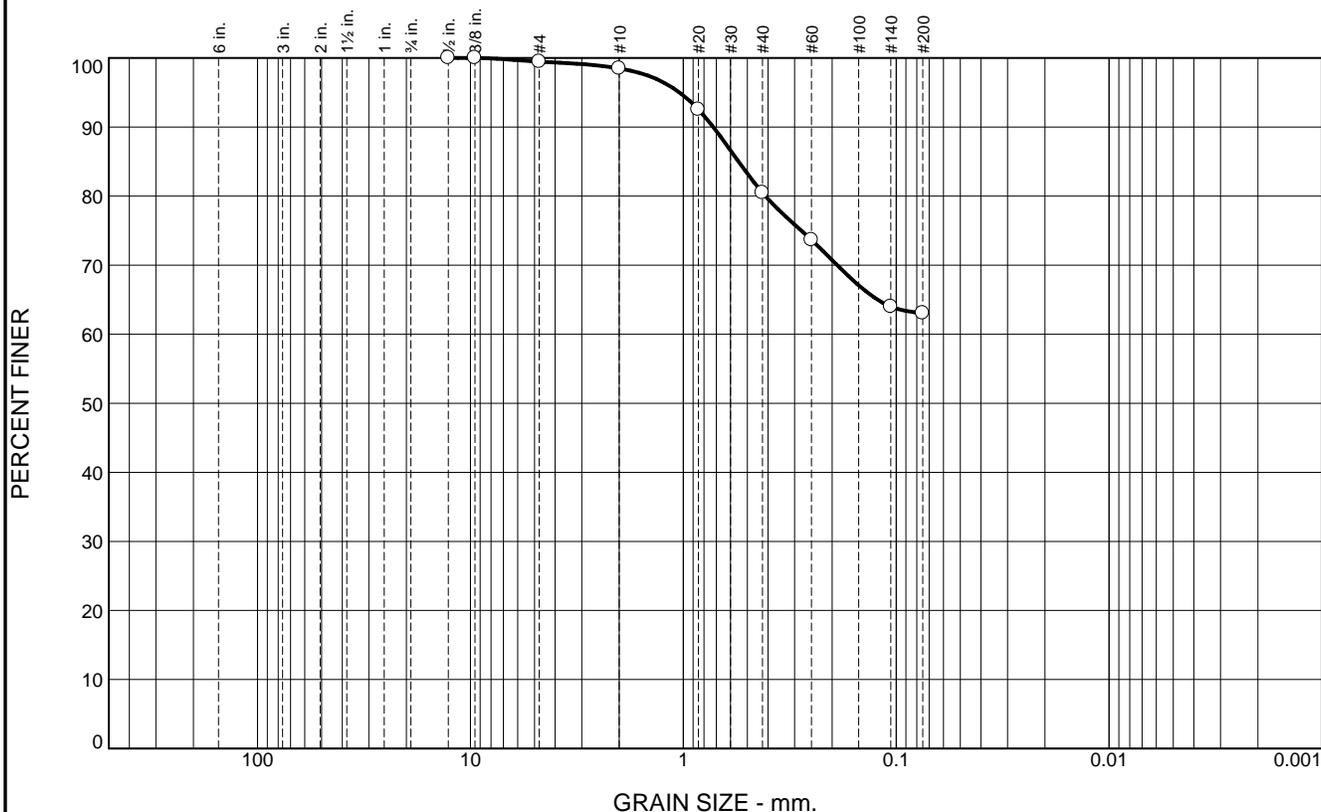
Sample Number: B-1      Depth: Surface

Date: 02/06/2024

<p style="font-size: 1.2em; margin: 0;"><b>United Consulting</b></p> <p style="margin: 0;"><b>Norcross, Georgia</b></p>	<p>Client: Dewberry Engineers</p> <p>Project: Dunwick Drive Geotechnical &amp; Laboratory Analysis-13436</p> <p>Project No: DEWBY24GA0824301</p> <p style="text-align: right;">Figure</p>
---	---



# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	1.0	18.0	17.4	63.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5	100.0		
0.375	100.0		
#4	99.5		
#10	98.5		
#20	92.5		
#40	80.5		
#60	73.6		
#140	64.0		
#200	63.1		

**Material Description**  
Clay-sandy, trace silt and gravel, red brown

**Atterberg Limits**  
 PL= 24      LL= 44      PI= 20

**Coefficients**  
 D<sub>90</sub>= 0.7240      D<sub>85</sub>= 0.5505      D<sub>60</sub>=  
 D<sub>50</sub>=              D<sub>30</sub>=              D<sub>15</sub>=  
 D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= CL      AASHTO= A-7-6(11)

**Remarks**

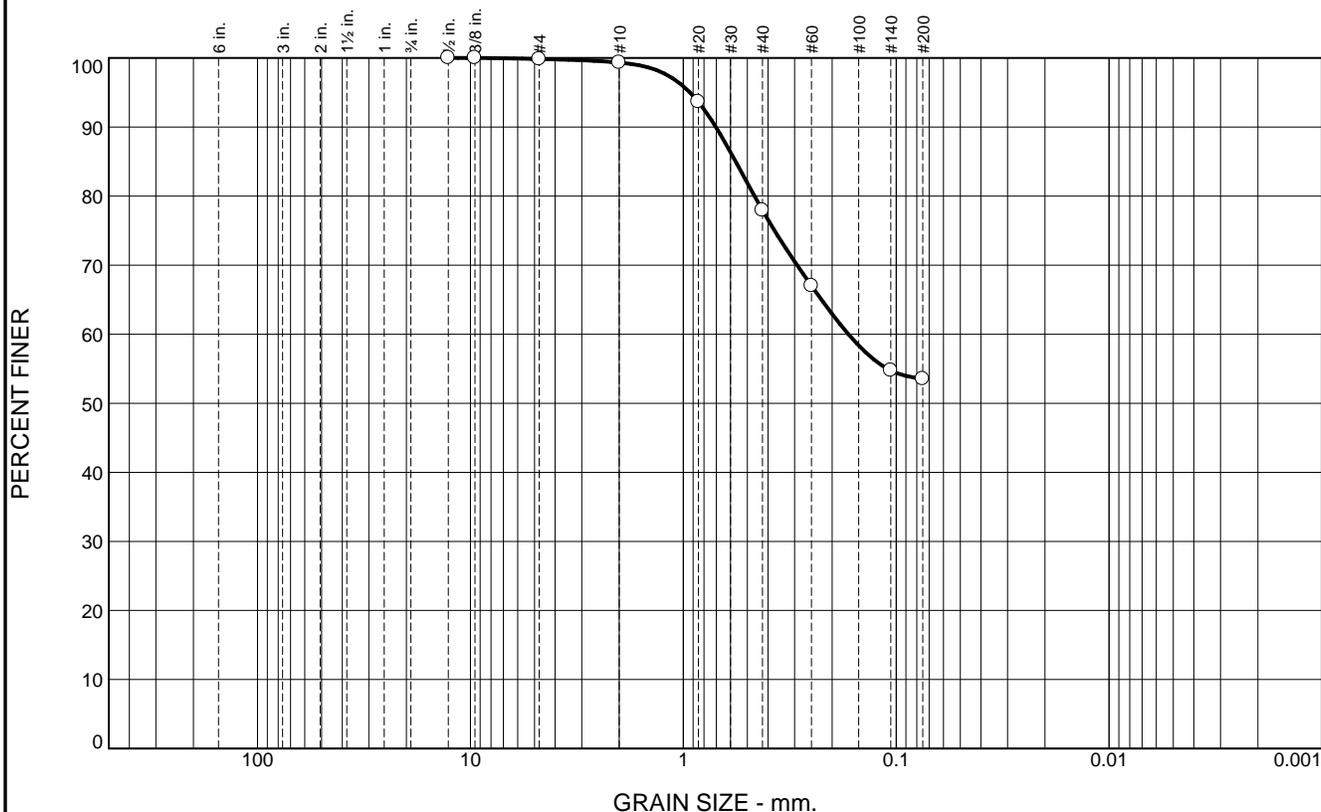
\* (no specification provided)

Sample Number: B-3      Depth: 2'

Date: 02/06/2024

<p style="font-size: 1.2em; margin: 0;"><b>United Consulting</b></p> <p style="margin: 0;">Norcross, Georgia</p>	<p>Client: Dewberry Engineers</p> <p>Project: Dunwick Drive Geotechnical &amp; Laboratory Analysis-13436</p> <p>Project No: DEWBY24GA0824301</p> <p style="text-align: right;">Figure</p>
--	---

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.5	21.4	24.4	53.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5	100.0		
0.375	100.0		
#4	99.8		
#10	99.3		
#20	93.6		
#40	77.9		
#60	67.0		
#140	54.7		
#200	53.5		

**Material Description**  
Clay-sandy, trace silt and gravel, brown

**Atterberg Limits**  
 PL= 28      LL= 53      PI= 25

**Coefficients**  
 D<sub>90</sub>= 0.7038      D<sub>85</sub>= 0.5678      D<sub>60</sub>= 0.1677  
 D<sub>50</sub>=              D<sub>30</sub>=              D<sub>15</sub>=  
 D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= CH      AASHTO= A-7-6(11)

**Remarks**

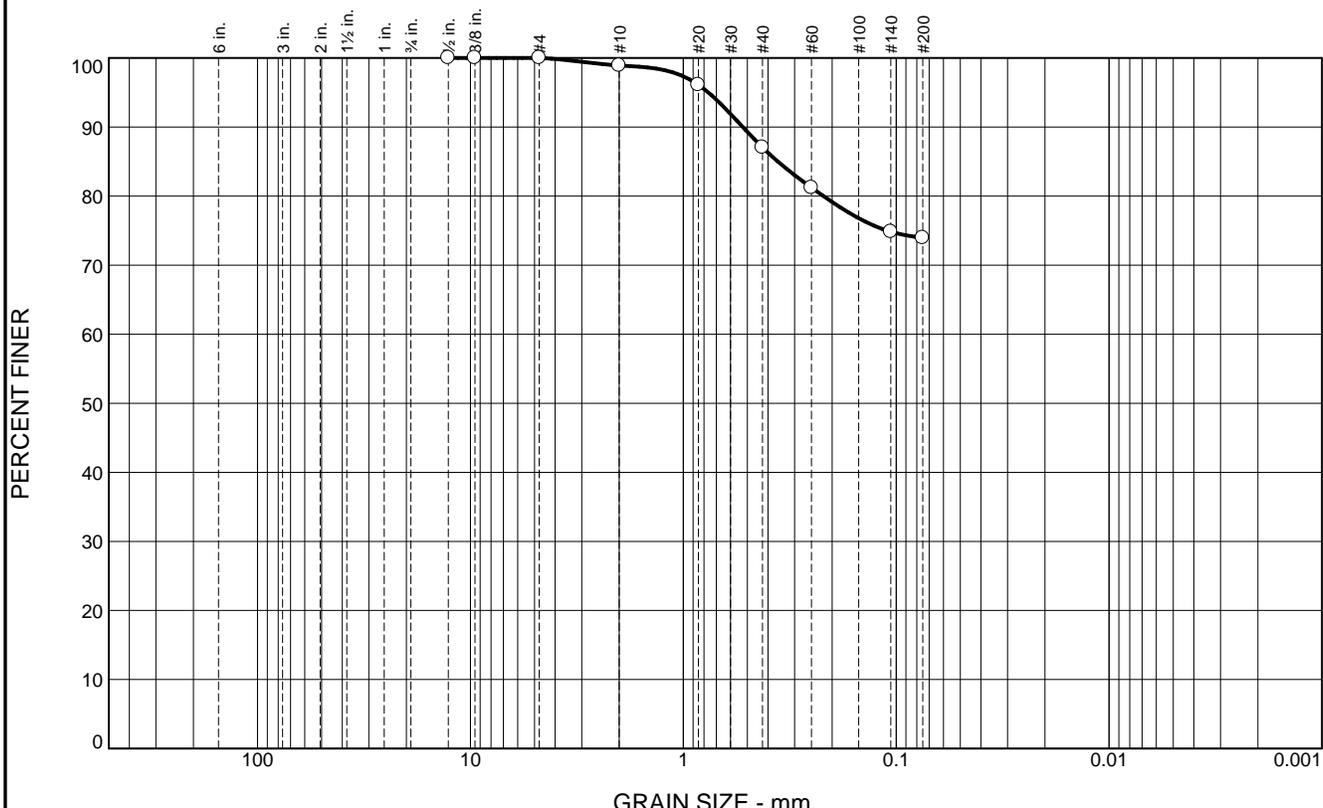
\* (no specification provided)

Sample Number: B-4      Depth: 2'

Date: 02/06/2024

<b>United Consulting</b>  <b>Norcross, Georgia</b>	<b>Client:</b> Dewberry Engineers <b>Project:</b> Dunwick Drive Geotechnical & Laboratory Analysis-13436  <b>Project No:</b> DEWBY24GA0824301 <b>Figure</b>
--	--

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.1	11.9	13.1	73.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	98.9		
#20	96.1		
#40	87.0		
#60	81.2		
#140	74.8		
#200	73.9		

**Material Description**

Silt, some clay and sand, red brown

**Atterberg Limits**  
 PL= 43      LL= 68      PI= 25

**Coefficients**  
 D<sub>90</sub>= 0.5257      D<sub>85</sub>= 0.3598      D<sub>60</sub>=  
 D<sub>50</sub>=              D<sub>30</sub>=              D<sub>15</sub>=  
 D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= MH      AASHTO= A-7-5(22)

**Remarks**

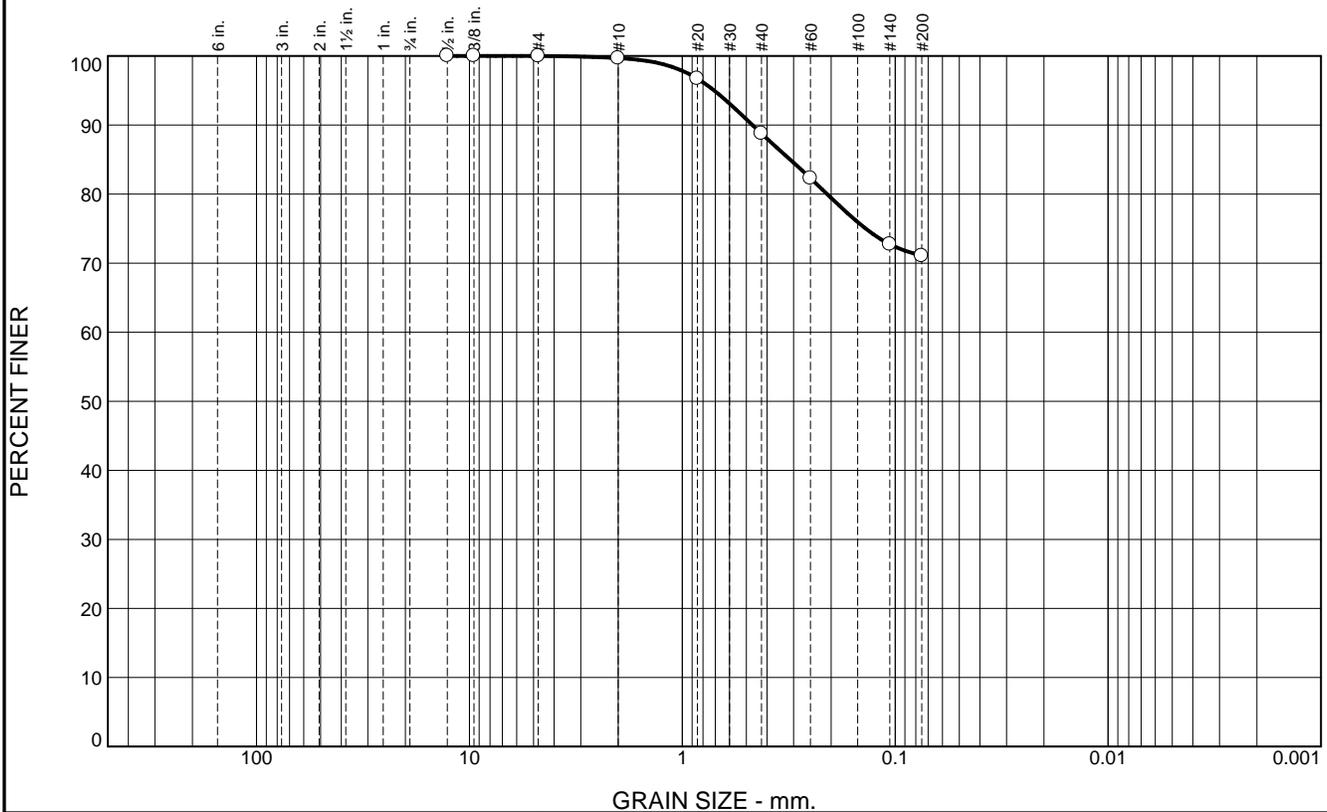
\* (no specification provided)

Sample Number: B-5      Depth: 2'

Date: 02/06/2024

<b>United Consulting</b>  <b>Norcross, Georgia</b>	<b>Client:</b> Dewberry Engineers <b>Project:</b> Dunwick Drive Geotechnical & Laboratory Analysis-13436  <b>Project No:</b> DEWBY24GA0824301 <b>Figure</b>
--	--

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	10.9	17.8	71.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5	100.0		
0.375	100.0		
#4	100.0		
#10	99.7		
#20	96.7		
#40	88.8		
#60	82.3		
#140	72.7		
#200	71.0		

**Material Description**

Clay, some sand and silt, brown

**Atterberg Limits**

PL= 23      LL= 44      PI= 21

**Coefficients**

D<sub>90</sub>= 0.4687      D<sub>85</sub>= 0.3120      D<sub>60</sub>=  
D<sub>50</sub>=              D<sub>30</sub>=              D<sub>15</sub>=  
D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**

USCS= CL      AASHTO= A-7-6(14)

**Remarks**

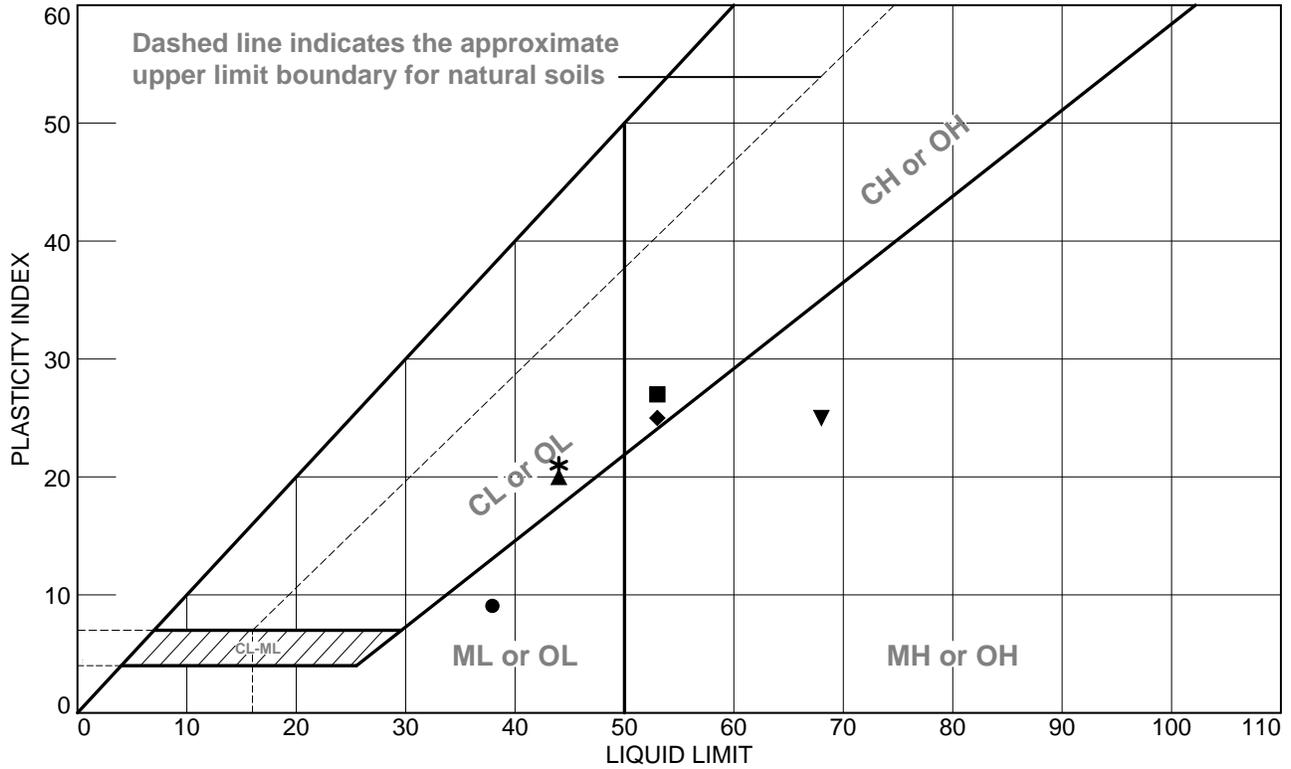
\* (no specification provided)

Sample Number: B-6      Depth: 4'

Date: 02/06/2024

<p style="font-size: 1.2em; margin: 0;"><b>United Consulting</b></p> <p style="font-size: 1.2em; margin: 0;"><b>Norcross, Georgia</b></p>	<p><b>Client:</b> Dewberry Engineers</p> <p><b>Project:</b> Dunwick Drive Geotechnical &amp; Laboratory Analysis-13436</p> <p><b>Project No:</b> DEWBY24GA0824301</p> <p style="text-align: right;"><b>Figure</b></p>
---	---

# LIQUID AND PLASTIC LIMITS TEST REPORT



## SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●		B-1	Surface	15.7	29	38	9	-1.5	GM
■		B-2	4'	29.6	26	53	27	0.1	CH
▲		B-3	2'	25.7	24	44	20	0.1	CL
◆		B-4	2'	22.8	28	53	25	-0.2	CH
▼		B-5	2'	30.7	43	68	25	-0.5	MH
*		B-6	4'	22.8	23	44	21	0.0	CL

**United Consulting**

**Norcross, Georgia**

**Client:** Dewberry Engineers

**Project:** Dunwick Drive Geotechnical & Laboratory Analysis-13436

**Project No.:** DEWBY24GA0824301

**Figure**

# 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.

## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

## Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

## A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

### **Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

### **Give Constructors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

### **Read Responsibility Provisions Closely**

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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.

### **Environmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

### **Obtain Professional Assistance To Deal with Mold**

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

### **Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance**

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBC-Member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910

Telephone: 301/565-2733 Facsimile: 301/589-2017

e-mail: [info@geoprofessional.org](mailto:info@geoprofessional.org) [www.geoprofessional.org](http://www.geoprofessional.org)

Copyright 2015 by Geoprofessional Business Association (GBA). Duplication, reproduction, or copying of this document, or its contents, in whole or in part, by any means whatsoever, is strictly prohibited, except with GBA's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of GBA, and only for purposes of scholarly research or book review. Only members of GBA may use this document as a complement to or as an element of a geotechnical-engineering report. Any other firm, individual, or other entity that so uses this document without being a GBA member could be committing negligent or intentional (fraudulent) misrepresentation.



United Consulting is an engineering consulting firm headquartered in Georgia, specializing in environmental services, geotechnical engineering, geophysical services, automated instrumentation, special inspections, and construction materials testing since 1990. With over 180 employees, including 30 professionally registered engineers and geologists the firm has undertaken some of the most challenging projects in the country.

GEOTECHNICAL SERVICES

- Subsurface Soil Investigations
Geologic Investigations
Foundation Investigations
Rock Stability Analysis
Rock Anchor/Bolt Design
Dam Investigations/Design
Dam Breach Analysis
Pile/Caisson/Foundation Load
Slope Stability Analysis
Tunnel Design
Soil Nailing Design
Value Engineering
Failure Investigations
Pavement Evaluation/Design
Bridge Foundation Investigations
Retaining Wall Foundation Investigations

ENVIRONMENTAL SERVICES

- Phase I Site Assessments
Phase II Contamination Assessments
Brownfield Assessment & Remediation Services
Corrective Action Plans
Asbestos, Lead-Based Paint, & Mold Consulting Services
Indoor/Outdoor Air Quality Assessment & Analysis
Groundwater/Surface Water Modeling & Analysis
Landfill Services
Health & Safety Services
Soil and Groundwater Remedial Design & Implementation
Hazardous Waste Site Assessment & Remediation Services
Regulatory Liaison Services

SUBSURFACE UTILITY ENGINEERING

- Quality Levels A, B, C, D
Ground Penetrating Radar
SUE Surveying/Surface Geophysics

AUTOMATED INSTRUMENTATION

- Vibration Monitoring
Robotic Total Stations
Inclinometers and SAAs
Tiltmeters
Piezometers
Real-Time Website Monitoring & Alarming
Pre-Post Construction Photographic Survey

GEOPHYSICAL SERVICES

- Geologic Mapping
Earth Resistivity
Geophysical Instrumentation
Review of Blasting

Programs

- Earthquake Risk Assessment
Shear Wave Analysis

INSPECTION SERVICES

- Property Condition Survey
Replacement & Reserve Analysis
Repair Cost Estimates
Visual Documentation
Plan & Spec Review
Construction Draw Inspections
Contract Administration
Pre-acquisition Survey
Construction Monitoring

MATERIALS TESTING

- Complete Mortar & Masonry Testing
In-place Density Testing
Foundation Testing
Asphalt/Concrete Testing & Batch Plant

Inspections

- Magnetic Particle & Radiographic Testing
Special Inspections
Failure Investigations
Monitoring Post-Tension Operations
Floor Flatness & Levelness Determinations
Moisture Testing
Fire Proofing Testing
Portland Based Cement
Gypsum Based Cementitious Spray
Cellulose Insulation

ECOLOGICAL SERVICES

- Aquatic Resource Delineation
Wetland/Stream Permitting Services
Wildlife & Protected Species Surveys
Mitigation Design, Implementation/Monitoring
NEPA Assessments



CORPORATE OFFICE
LICENSED TO OPERATE\*

\*Full Legal and Operational Requirements are met in these locations

UNITED CONSULTING LABORATORY

United Consulting's Geotechnical and Materials Testing Laboratory occupies approximately 10,000 SF of space in our 60,000 SF, Norcross, Georgia headquarters. Our laboratory's work and facilities meet or exceed the requirements set forth in ASTM E 329, C 1077, and D 3740. Additionally, our laboratory has been a validated U.S. Army Corp of Engineers laboratory, since 2010.

LICENSED AND REGISTERED NATIONWIDE

United Consulting licensed and registered in 35 states and continues to grow, with offices in Georgia, Alabama, Florida, Texas, and California.



UNITED CONSULTING