APPENDIX

March 3, 2016

Mr. W. Allen Krivsky, P.E., Vice-President
Heath & Lineback Engineers, Inc.
2390 Canton Road, Building 200
Marietta, GA 30066

RE: Report of Geotechnical Exploration
Proposed Retaining Walls
Interstate North Parkway and Interstate North Circle Realignment
Cobb County, Georgia

ECS Project No. 10:8838

Dear Mr. Krivsky:

ECS Southeast, LLC (ECS) is pleased to submit our report of geotechnical review for the above referenced project. This letter report presents an introduction to the proposed project, results of our exploration, subsurface conditions, and our recommendations. The work was completed in general accordance with ECS Proposal No. 10:11662 and the executed subcontract agreement dated January 5, 2016 signed by Mr. John A. Heath, President of Heath & Lineback Engineers, Inc.

PROJECT INFORMATION

The information presented in this section is based on information provided by Heath & Lineback Engineers, Inc. and our site reconnaissance.

The project name is:

Cobb County Project No. E4190
MIS Contract No. 000911
Interstate North Parkway and Interstate North Circle Realignment
H&L Project No. 2015.037

The project is located along Interstate North Parkway and Interstate North Circle in Cobb County, Georgia. A Site Location Diagram is attached as Figure 1. The planned realignment project will include the construction of several retaining walls. Our study investigated the soil conditions at Walls 2, 3, 4, 5a, 5b, 7 and 8.

- Wall 2 is located on the eastern side of Interstate North Circle SE just north of the intersection of Interstate North Parkway and Interstate North Circle SE. The wall will be approximately 225 feet long wall. The maximum design wall height is 14 feet.

- Wall 3 is located on the western side of Interstate North Circle SE beginning at the intersection of Interstate North Parkway and Interstate North Circle SE. The wall will be approximately 177 feet long wall. The maximum design wall height is 20 feet.

- Walls 5a and 5b – Wall 5a is located on the western side of Interstate North Circle SE beginning approximately 100 feet north of Wall 3 and continues north-northwesterly approximately 640 feet to the intersection of Interstate North Circle SE and Windy Ridge Parkway SE. The wall continues as Wall 5b in a westerly direction along the southern side of Windy Ridge Parkway SE for about 340 feet. The design wall height is 8 feet.

- Wall 7 is located on the western side of Interstate North Circle SE beginning just north of the intersection of Interstate North Circle SE and Windy Ridge Parkway SE. The wall will be approximately 315 feet long wall. The design wall height is 6 feet.

- Wall 8 is located on the northeastern side of Interstate North Parkway beginning near the driveway entrance for the Marriott Hotel, extending easterly towards Interstate North Circle SE. The wall will be approximately 178 feet long wall. The maximum design wall height is 10 feet.

FIELD EXPLORATION AND LABORATORY TESTING

Subsurface Exploration

To explore the subsurface conditions at the wall locations, a total of 18 hand augers and 18 Wildcat Dynamic Cone Penetrometer (WDCP) tests were performed in the proposed retaining wall areas. The hand auger logs and the WDCP testing logs have been included with this report.

The hand auger and WDCP testing locations were determined in the field by our representative who measured distances and estimated right angles from existing site features. As these methods are not precise, the hand auger locations shown on the attached Hand Auger Location Plans (Figures 2 through 7) should be considered approximate.

The hand auger borings were performed by ECS representatives using hand operated equipment. Representative soil samples for hand auger borings were obtained by means of the hand operated auger sampling procedure in general accordance with ASTM Specification D-1452. In this procedure, the auger boring was made by rotating and advancing the auger bucket to the desired depths while periodically removing the bucket from the hole to clear and examine the auger cuttings.

An ECS representative prepared a field log of the soils encountered in the auger borings. After recovery, each sample was removed from the sampler and visually classified by the ECS representative. Representative portions of each sample were then sealed and brought to our laboratory in Marietta, Georgia for further visual examination and laboratory testing by ECS.

WDCP testing was conducted to provide relative bearing values at regular intervals throughout the boring profile. In WDCP testing, a cone with a diameter of 1.47 inches is driven into the soil by a 34.94-pound hammer falling 15 inches. The number of blows required to drive the cone through 10 centimeter intervals is recorded. The blows obtained from WDCP can be correlated to SPT N-values. Soil samples were not collected during the WDCP testing.

Laboratory Testing Program

Representative soil samples were selected and tested in our laboratory to check visual classifications and to determine pertinent engineering properties. The laboratory testing program included visual classifications of soil samples as well as gradation analysis and natural moisture content testing on selected soil samples.

A geotechnical engineer/geologist classified each soil sample on the basis of texture and plasticity in accordance with the Unified Soil Classification System. The group symbols for each soil type are indicated in parentheses followed by the soil descriptions on the boring logs. The geotechnical engineer/geologist grouped the various soil types into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs and profiles are approximate; in-situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposition.

FINDINGS AND RECOMMENDATIONS

General

Our findings and recommendations for each of the wall locations are provided below.

Wall 2

- WDCP testing indicates that the soils likely to be encountered at the wall bearing elevation will be variable along the alignment. Medium dense silty Sand (SM) is anticipated in the areas near HA-2-1 and HA-2-2. Very loose to loose silty Sand (SM) is anticipated in the area north of HA-2-2 and around HA-2-3.

- We anticipate that some undercutting will be required to remove the near surface loose soft soils and to improve the subgrade soil conditions in the northern section of the wall alignment (north of HA-2-2 and around HA-2-3).

- The recommended maximum allowable soil bearing pressure is 3,000 psf.

Wall 3

- WDCP testing indicates that the soils likely to be encountered at the wall bearing elevation will be variable along the alignment. Loose to medium dense silty Sand (SM) is anticipated in the area around HA-3-1. Around HA-3-2 medium dense to very dense silty Sand is anticipated. Medium dense silty Sand (SM) is anticipated in the area around HA-3-3.

- Depending upon the conditions encountered in the wall excavation, isolated areas may require undercutting to remove the near surface loose soft soils and to improve the subgrade soil conditions in the southern section of the wall alignment (around HA-3-1).

- The recommended maximum allowable soil bearing pressure is 4,000 psf.

Walls 5a and 5b

- WDCP testing indicates that the soils likely to be encountered at the wall bearing elevation will likely consist of medium dense to very dense silty Sand.

- Depending upon the conditions encountered in the wall excavation, isolated areas may encounter difficult excavation (i.e. very dense soils with possible boulders).

- The recommended maximum allowable soil bearing pressure is 4,000 psf.

Wall 7

- WDCP testing indicates that the soils likely to be encountered at the wall bearing elevation will be variable along the alignment. Loose to medium dense silty Sand (SM) is anticipated in the area around HA-7-1. Around HA-7-2 dense to very dense silty Sand is anticipated. Medium dense to dense silty Sand (SM) is anticipated in the area around HA-7-3.

- Depending upon the conditions encountered in the wall excavation, undercutting to remove the near surface loose soft soils and to improve the subgrade soil conditions will likely be require in the southeastern section of the wall alignment (around HA-7-1).

- The recommended maximum allowable soil bearing pressure is 4,000 psf.

Wall 8

- WDCP testing indicates that the soils likely to be encountered at the wall bearing elevation will likely consist of medium dense to very dense silty Sand.

- Depending upon the conditions encountered in the wall excavation, isolated areas may encounter difficult excavation (i.e. very dense soils with possible boulders).

- The recommended maximum allowable soil bearing pressure is 4,000 psf.

Retaining Walls

The following soil design parameters are recommended for use for each of the proposed walls:

Cohesion	C= 0 psf
Soil Unit Weight,	γ= 110 pcf
Angle of Internal Friction	ϕ= 28°
Coefficient of Sliding Friction	μ= 0.45

The recommended maximum allowable soil bearing pressure is either 3,000 psf or 4,000 psf, depending upon the wall. Please see the paragraphs above. If the walls design pressure exceeds the maximum allowable pressure, then the wall should be constructed to a height equivalent to the allowable bearing pressure, and after a 30-day waiting period, the walls may be constructed to their final height.

Special Problems - Loose Soils

Very lose to loose soils were encountered at some of the test locations (HA-2-2, HA-2-3, HA-3-1, HA-7-1) near the planned wall bearing elevation. Depending upon the conditions encountered in the wall excavation, isolated areas may require undercutting to remove the near surface loose soft soils and to improve the subgrade soil conditions in along some sections of the wall alignment. <u>We recommend a grading allowance for unsuitable materials be set aside as a contingency and that localized undercutting of unsuitable or soft materials should be anticipated during site grading</u>. Refer to the attached Hand Auger Logs and Wildcat Dynamic Cone Logs for additional information.

Special Problems - Boulders/ PWR/Rock

Very dense materials resulting in refusal of hand auger borings and/or associated wildcat dynamic cone penetration testing were encountered near or above the anticipated wall bearing elevation at several test locations. These very dense materials, which may include boulders/PWR or rock may require hoe-ramming for removal. Refer to the attached Hand Auger Logs and Wildcat Dynamic Cone Logs for additional information.

Subgrade Preparation

The subgrade preparation should consist of stripping vegetation, rootmat, topsoil, and any other soft or unsuitable material from the retaining wall base or foundation area. We recommend the earthwork clearing be extended to a minimum of 5 feet beyond the retaining wall base or foundation limits wherever practical. Stripping limits should be extended laterally an additional 1 foot for each foot of fill required to achieve the planned wall foundation or base bearing elevation at any location.

After stripping to the desired grade, and prior to wall construction or fill placement, it is critical the stripped surface be evaluated by an engineer from ECS. Proofrolling using a vibratory drum roller should be performed at that time to aid in identifying localized soft or unsuitable material which must be removed. As needed, additional backhoe test pits or additional hand augers with Dynamic Cone Penetrometer (DCP) testing can be used to delineate any unsuitable material found during proofrolling. **Where unacceptable materials are encountered, they must be evaluated by ECS and may require remedial measures. Remedial options include drying and recompaction or undercutting and replacement with soil/gravel fill.**

The preparation of retaining wall subgrades should be observed on a full-time basis by a representative of ECS to document that any unsuitable materials have been removed and that the subgrade is suitable for support of the proposed retaining walls.

Fill Placement

Fill materials should consist of an approved material free of organic matter and debris, with rocks less than 6 inches and a Liquid Limit less than 40 and a Plasticity Index less than 20. Unacceptable fill materials include topsoil, organic materials, lightweight material with a maximum dry density less than 95 pcf, and highly plastic silts and clays. Unsuitable materials removed during grading operations should be either stockpiled for later use in landscaped areas, or placed in approved disposal areas either on site or off site.

In general, the existing fill materials and residual soils appear generally suitable for re-use as structural fill if they are free from deleterious materials, such as organics and debris. Depending on the rainfall conditions at the time of construction, the silty and clayey fill materials at the site could become unworkable. Existing and off-site fill materials should be tested by ECS prior to use as structural fill.

Fill Placement (Cont.)

Fill operations should be observed on a full-time basis by a qualified soil technician from ECS to determine that minimum compaction requirements are being met. A minimum of one compaction test per 2,500 square foot area should be tested in every one foot compacted lift placed. The elevation and location of the tests should be clearly identified and recorded at the time of fill placement.

Fill materials should be placed in lifts not exceeding 8 inches in loose thickness and moisture conditioned to within +/- 3 percent of the optimum moisture content to facilitate proper compaction. Controlled fill soils should be compacted to a minimum of 95 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method.

The upper one foot of soil supporting structures, pavements, slabs-on-grade, sidewalks, should be “firm and unyielding” and any new fill compacted to a minimum of 98 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method.

Retaining Wall Drainage

Drainage behind below grade walls is considered essential to relieve hydrostatic pressures. Drainage can be established by providing a perimeter drainage system (foundation drain) located just above the below grade wall footings which discharges by gravity flow to a suitable outfall. This system should consist of perforated pipe or other geosynthetic drainage layer. Drain lines should be surrounded by a minimum 6 inches of free-draining, granular filter material (such as #57 stone) having a gradation compatible with the size of the openings utilized in the perforated pipe and the surrounding soils to be drained, or be gravel wrapped in filter fabric. Above the foundation drain and tied into it, a wall drainage system (such as a stone "chimney" drain, geotextile drainage mat, etc.) will be needed if the wall is not designed to withstand hydrostatic forces. *Piedmont soils are typically not acceptable for reuse as drainage material*.

Additional Considerations

Exposure to the environment may weaken the soils at the retaining wall bearing level if the retaining wall foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are dug. If surface water intrusion or exposure softens the bearing soils, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, we recommend that the foundation excavtions

Additional Considerations (Cont.)

be covered or otherwise protected.

Positive site drainage should be maintained during earthwork operations, which should help maintain the integrity of the soil. Placement of fill on the near surface soils, which have become saturated, could be very difficult. When wet, these soils will degrade quickly with disturbance from contractor operations and will be extremely difficult to stabilize for fill placement.

CLOSING

This letter has been prepared in accordance with generally accepted geotechnical engineering practice. No warranty is expressed or implied. This letter is provided for the exclusive use of Cobb County DOT, Heath & Lineback Engineers, Inc. and their project specific design team. This report is not intended to be used or relied upon in connection with other projects or by other third parties. ECS disclaims liability for any such third party use or reliance without express written permission.

We appreciate the opportunity of working with you on this project and look forward to our continued association. Should you have questions regarding our findings or need additional consultations, please do not hesitate to contact our office at (770) 590-1971.

Respectfully,

ECS SOUTHEAST, LLC represented by:

Robert H. Barnes, P.E., P.G.
Principal Engineer
GA PE Registration No. 29715

Jay Hornsby, P.G.
Geotechnical Department Manager
GA Registration No. 1978

Attachments:

- Figure 1 – Site Location Diagram
- Figure 2, 3, 4, 5, 6, and 7 – Hand Auger Location Plans
- Unified Soil Classification System
- Reference Notes
- Hand Auger Boring Logs (18)
- Wildcat Dynamic Cone Logs (18)
- Laboratory Testing Summary
- ASFE Information about Geotechnical Reports

GEORGIA REGISTERED No. 29715 PROFESSIONAL ENGINEER 3-3-16 ROBERT H. BARNES

Attachments

FIGURE 1 - SITE LOCATION DIAGRAM

RETAINING WALLS - INTERSTATE N. PKWY & INTERSTATE N. CIRCLE

COBB COUNTY, GA

ENGINEER	
SCALE	1 " = 1,500 '
PROJECT NO.	10:8838
SHEET	1 OF 1
DATE	2/23/2016

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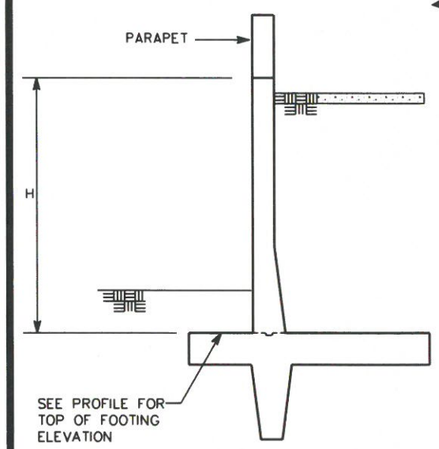
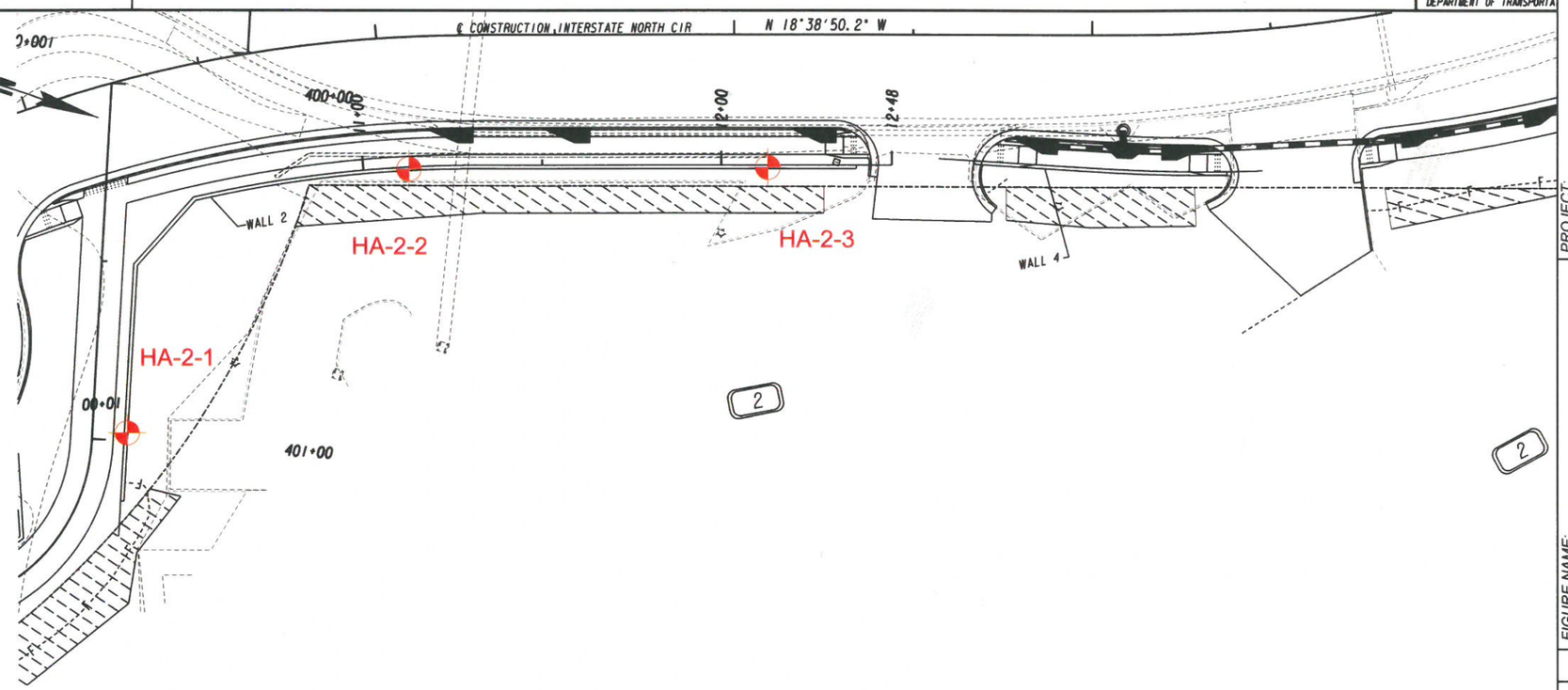


TYPICAL WALL SECTION (CASE I)
NOT TO SCALE

ALLOWABLE SOIL BEARING PRESSURE = 3000 PSF (1.5 TSF)



WALL 2 - PLAN VIEW

LEGEND

Approximate Hand Auger Location

HA-X Hand Auger Designation

Graphic Scale 1"=40'

40 20 0 10 20 30 40

ECS

PROJECT: Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment
Cobb County, GA

PREPARED FOR: Heath & Lineback Engineers, Inc.

FIGURE NAME: HAND AUGER LOCATION PLAN

REFERENCE: Interstate N. Pkwy & Interstate N Circle Realignment Retaining Wall Plan & Profile Provided by Heath & Linebach Engineers, Inc.

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Figure No.: 2

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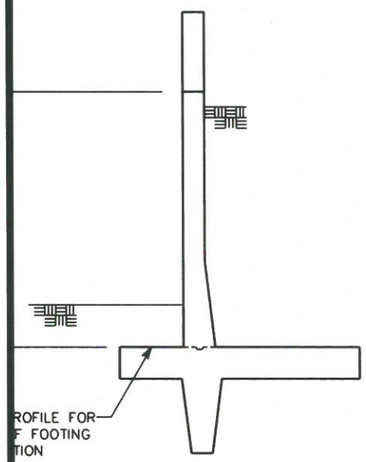
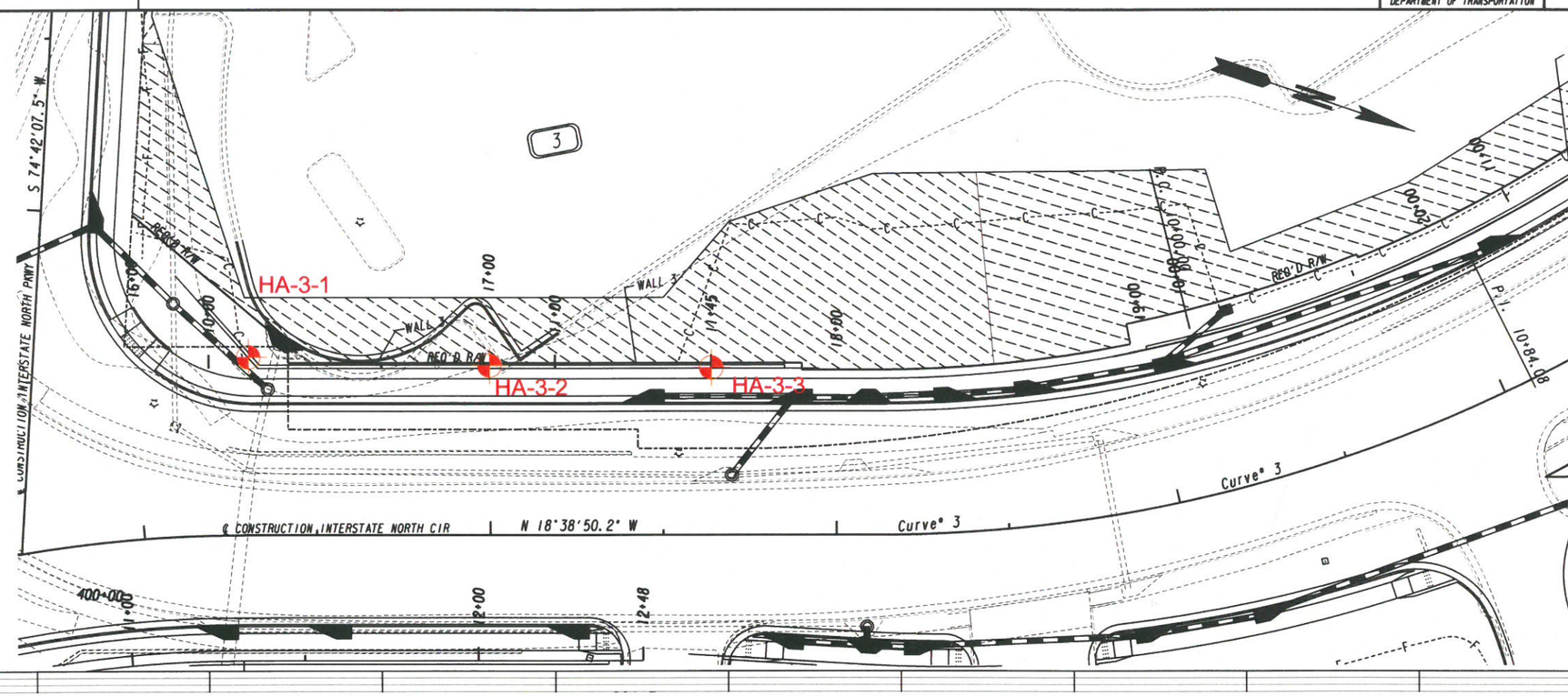
DEPARTMENT OF TRANSPORTATION



TYPICAL WALL SECTION (CASE I)
NOT TO SCALE

LOWABLE SOIL BEARING PRESSURE = 3000 PSF (1.5 TSF)



WALL 3 - PLAN VIEW

LEGEND

Approximate Hand Auger Location

HA-X Hand Auger Designation

Graphic Scale 1"=40'

40 20 0 10 20 30 40

ECS

PROJECT: Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment Cobb County, GA

PREPARED FOR: Heath & Lineback Engineers, Inc.

FIGURE NAME: HAND AUGER LOCATION PLAN

REFERENCE: Interstate N. Pkwy & Interstate N Circle Realignment Retatining Wall Plan & Profile Provided by Heath & Linebach Engineers, Inc.

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Figure No.: 3

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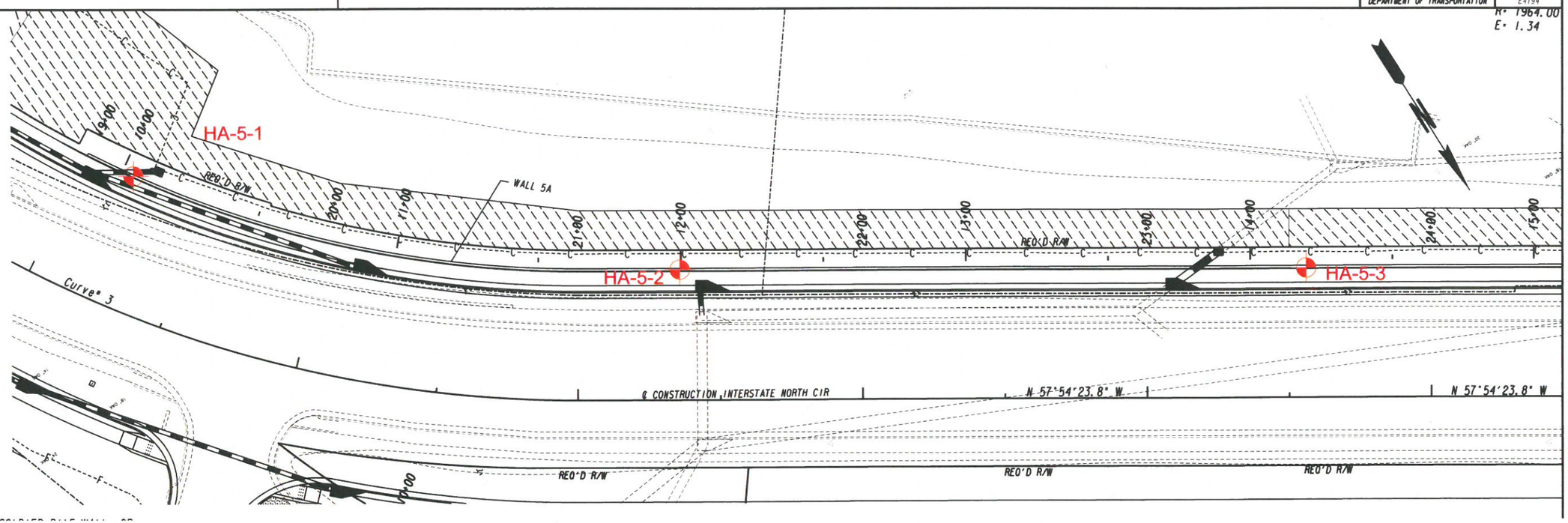

LEGEND

Approximate Hand Auger Location

HA-X Hand Auger Designation

WALL 5A - PLAN VIEW (PARTIAL)

Graphic Scale 1"=40'

40 20 0 10 20 30 40

ECS

PROJECT:
Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment
Cobb County, GA

PREPARED FOR:
Heath & Lineback Engineers, Inc.

FIGURE NAME:
HAND AUGER LOCATION PLAN

REFERENCE:
Interstate N. Pkwy & Interstate N Circle Realignment
Retaining Wall Plan & Profile
Provided by Heath & Linebach Engineers, Inc.

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Figure No.:
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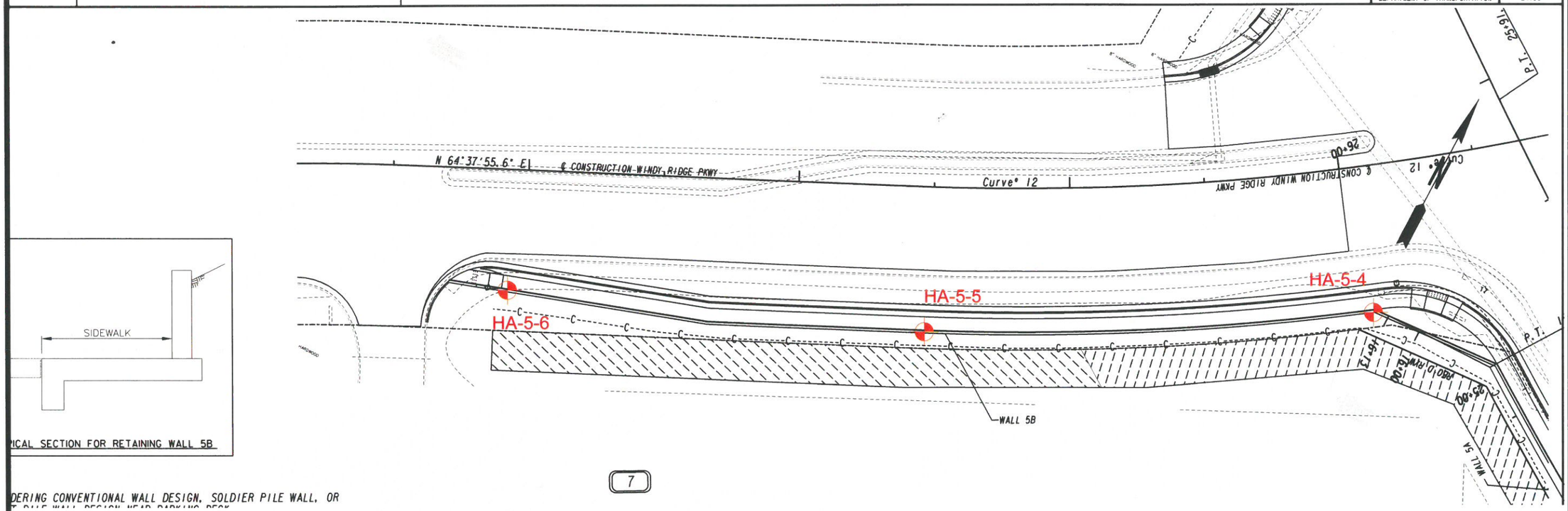

ICAL SECTION FOR RETAINING WALL 5B

DERING CONVENTIONAL WALL DESIGN, SOLDIER PILE WALL, OR

WALL 5B - PLAN VIEW

LEGEND

Approximate Hand Auger Location

HA-X Hand Auger Designation

Graphic Scale 1"=40'

40 20 0 10 20 30 40

ECS

PROJECT:
Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment
Cobb County, GA

PREPARED FOR:
Heath & Lineback Engineers, Inc.

FIGURE NAME:
HAND AUGER LOCATION PLAN

REFERENCE:
Interstate N. Pkwy & Interstate N Circle Realignment
Retaining Wall Plan & Profile
Provided by Heath & Lineback Engineers, Inc.

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Figure No.:
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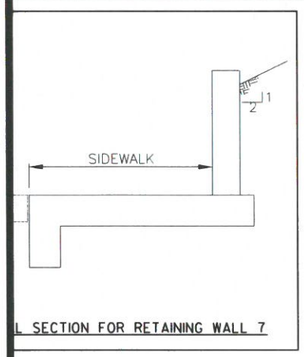

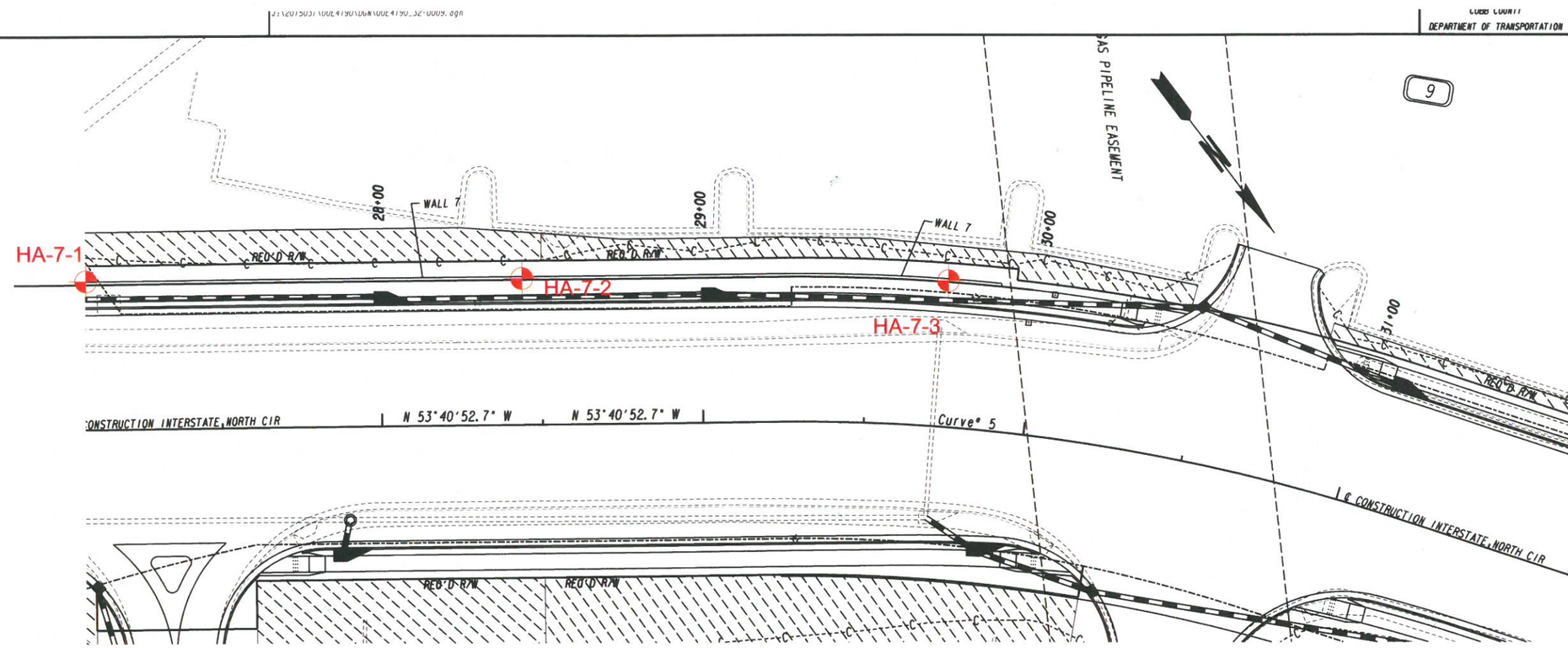

WALL 7 - PLAN VIEW

LEGEND

Approximate Hand Auger Location

HA-X Hand Auger Designation

Graphic Scale 1"=40'

40 20 0 10 20 30 40

ECS

PROJECT: Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment Cobb County, GA

PREPARED FOR: Heath & Lineback Engineers, Inc.

FIGURE NAME: HAND AUGER LOCATION PLAN

REFERENCE: Interstate N. Pkwy & Interstate N Circle Realignment Retaining Wall Plan & Profile Provided by Heath & Linebach Engineers, Inc.

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Figure No.: 6

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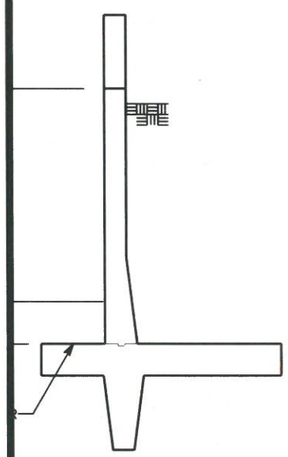
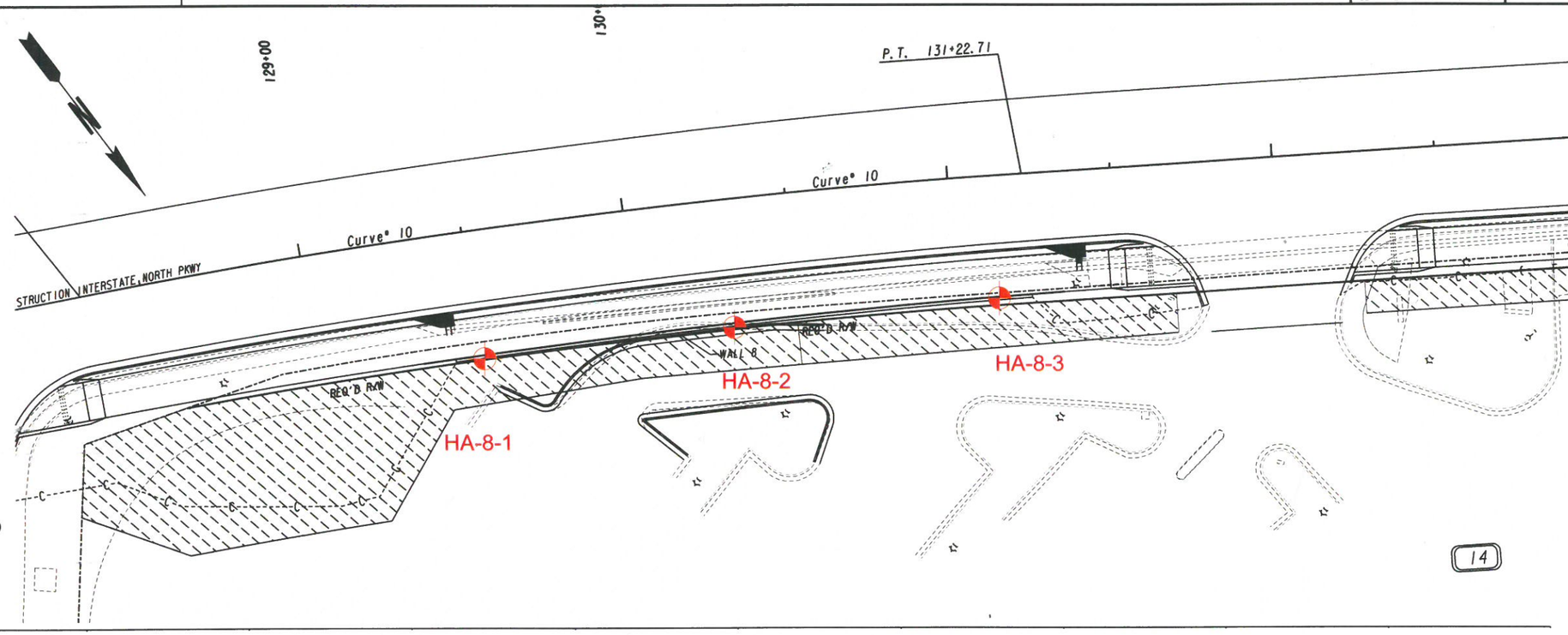


ICAL WALL SECTION (CASE I)
NOT TO SCALE

OIL BEARING PRESSURE = 3000 PSF (1.5 TSF)



WALL 8 - PLAN VIEW

LEGEND

Approximate Hand Auger Location

HA-X Hand Auger Designation

Graphic Scale 1"=40'

40 20 0 10 20 30 40

ECS

PROJECT: Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment
Cobb County, GA

PREPARED FOR: Heath & Lineback Engineers, Inc.

FIGURE NAME: HAND AUGER LOCATION PLAN

REFERENCE: Interstate N. Pkwy & Interstate N Circle Realignment Retaining Wall Plan & Profile Provided by Heath & Linebach Engineers, Inc.

REVISIONS

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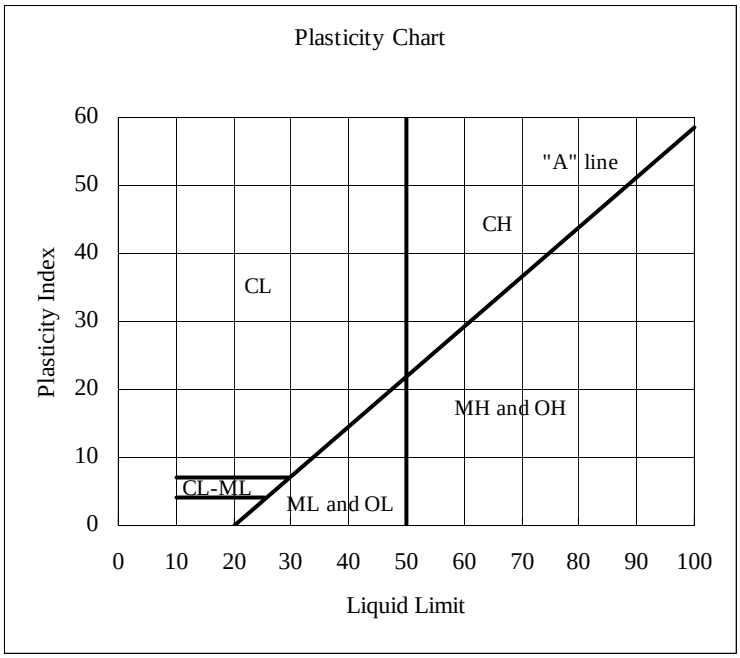
Figure No.: 7

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP; More than 12 percent GM, GC, SM, SC; 5 to 12 percent Borderline cases requiring dual symbols [b]	$C_u = D_{60}/D_{10}$ greater than 4 $C_c = (D_{30})^2/(D_{10} x D_{60})$ between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a]	d	Silty gravels, gravel-sand mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			GC		Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below "A" line or P.I. less than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines		$C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2/(D_{10} x D_{60})$ between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a]	d	Silty sands, sand-silt mixtures		Atterberg limits above "A" line or P.I. less than 4	Limits plotting in CL-ML zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 Sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty 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 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			
	Highly Organic soils		Pt		Peat and other highly organic soils			



[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC,well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

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

II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density		*Relative Properties*	
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

Particle Size Identification		
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to slight	0 – 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 – 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00–8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL	Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS	While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD	While Drilling	▽	Est. Groundwater Level	▼	Est. Seasonal High GWT

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

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-2-1
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 850
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	850	Topsoil Depth [2"]					
		(SM POSSIBLE FILL) SILTY SAND, Contains Slight Mica, Brown, Moist					
1	849		M			S-1	15.0
2	848						
		HAND AUGER REFUSAL @ 2.5'					
3	847						
4	846						
5	845						
6	844						

REMARKS:

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

GROUND WATER: While Drilling After Drilling

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-2-2
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 854
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	854	Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Contains Mica, Brown, Moist					
1	853						
2	852		E				
3	851						
4	850						
5	849	END OF HAND AUGER @ 5'					
6	848						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-2-3
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 853
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	853	Topsoil Depth [2"]					
		(SM PROBABLE FILL) SILTY SAND, Contains Slight Mica, Brown, Moist					
1	852		M				
2	851					S-1	
		(SM) SILTY SAND, Contains Mica, Gray to Brown, Moist					
3	850		VD			S-2	23.7
		HAND AUGER REFUSAL @ 3.5'					
4	849						
5	848						
6	847						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-3-1
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 869.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [3"]					
	869	(SM FILL) SILTY SAND, Contains Mica, Brown, Moist					
1							
	868						
2							
	867		M				
3							
	866					S-1	16.5
4							
	865						
5		END OF HAND AUGER @ 5'					
	864						
6							
	863						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-3-2
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 872
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	872	Topsoil Depth [2"]					
		(SM) SILTY SAND, Contains Mica, Brown, Moist					
1	871						
2	870		M				
3	869						
4	868						
5	867	END OF HAND AUGER @ 5'					
6	866						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-3-3
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 867
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	867	Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Brown to Gray, Moist					
1	866		M				
2	865						
3	864	HAND AUGER REFUSAL @ 3'					
4	863						
5	862						
6	861						

REMARKS:

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

GROUND WATER: While Drilling After Drilling

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-5-1
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 866.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [3"]					
	866	(SM) SILTY SAND, Contains Mica, Brown to Gray, Moist	VD			S-1	
1		HAND AUGER REFUSAL @ 1'					
	865						
2							
	864						
3							
	863						
4							
	862						
5							
	861						
6							
	860						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/29/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-5-2
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 877
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	877	Topsoil Depth [2"]					
		(SM/SC FILL) SILTY/CLAYEY SAND, Contains Mica, Brown, Moist					
1	876						
2	875		M				
3	874						
4	873						
5	872	END OF HAND AUGER @ 5'					
6	871						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/29/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-5-3
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 891
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	891	Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Contains Mica, Gray to Brown, Moist					
1	890		M				
2	889						
		(SM) SILTY SAND, Contains Mica, Gray, Moist					
3	888		VD			S-1	15.8
		HAND AUGER REFUSAL @ 3.5'					
4	887						
5	886						
6	885						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/29/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-5-4
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 895.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [2"]					
		(SM) SILTY SAND, Contains Rock Fragments, Brown to Gray, Moist					
	895						
1							
	894		D				
2							
	893						
3		HAND AUGER REFUSAL @ 3'					
	892						
4							
	891						
5							
	890						
6							
	889						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/29/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-5-5
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 906.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Brown, Moist					
	906						
1			D				
	905						
2							
	904	HAND AUGER REFUSAL @ 2.5'					
3							
	903						
4							
	902						
5							
	901						
6							
	900						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/29/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-5-6
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 912
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	912	Topsoil Depth [2"]					
		(SM) SILTY SAND, Contains Rock Fragments, Gray to White, Moist					
1	911					S-1	19.9
		HAND AUGER REFUSAL @ 1.5'					
2	910						
3	909						
4	908						
5	907						
6	906						

REMARKS:

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

GROUND WATER: While Drilling After Drilling

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/29/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-7-1
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 888.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [2"]					
		(SM) SILTY SAND, Contains Mica, Brown, Moist					
	888						
1			D				
	887						
2						S-1	20.4
	886	HAND AUGER REFUSAL @ 2.5'					
3							
	885						
4							
	884						
5							
	883						
6							
	882						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-7-2
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 898
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	898	Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Contains Mica and Roots, Brown, Moist					
1	897		D				
2	896						
		HAND AUGER REFUSAL @ 2.5'					
3	895						
4	894						
5	893						
6	892						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/27/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-7-3
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 903.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [1"]					
		(SM) SILTY SAND, Contains Slight Mica, Brown, Moist					
	903						
1							
	902		D				
2						S-1	18.2
	901						
3		HAND AUGER REFUSAL @ 3'					
	900						
4							
	899						
5							
	898						
6							
	897						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/28/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-8-1
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 921
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	921	Topsoil Depth [2"]					
		(SM) SILTY SAND, Contains Rock Fragments, Gray to Brown, Moist					
1	920		D			S-1	
2	919		VD			S-2	10.9
3	918	HAND AUGER REFUSAL @ 3'					
4	917						
5	916						
6	915						

REMARKS:

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

GROUND WATER: While Drilling After Drilling

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/27/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-8-2
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 925.5
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0		Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Contains Rock Fragments, Gray to Brown, Moist	D			S-1	
	925						
1							
	924						
2							
	923						
3							
	922	HAND AUGER REFUSAL @ 3.5'					
4							
	921						
5							
	920						
6							
	919						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/27/16	Feet		Dry	

PROJECT NAME:		HAND AUGER #
Retaining Walls - Interstate N. Pkwy & Interstate N. Circle Realignment		HA-8-3
CLIENT: Heath & Lineback Eng.	JOB #: 10:8838	SURFACE ELEVATION 925
LOCATION: Interstate N. Parkway and Interstate N. Circle, Cobb County, GA	ARCH./ENG:	

DEPTH (FT.)	ELEV. (FT.)	DESCRIPTION OF MATERIAL	EXCAV. EFFORT	DCP	QP (TSF)	SAMPLE NO.	MOIST. CONT. (%)
0	925	Topsoil Depth [2"]					
		(SM FILL) SILTY SAND, Brown to Gray, Moist					
1	924	(SM Possible FILL) SILTY SAND WITH GRAVEL, Gray, Moist	D				
2	923						
		HAND AUGER REFUSAL @ 2.5'					
3	922						
4	921						
5	920						
6	919						

REMARKS:

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

GROUND WATER: While Drilling ▽ After Drilling ▼ | EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

ECS REP.:	DATE:	UNITS:	Cave-in Depth:	Groundwater While Drilling:	Groundwater:
F.M.	01/27/16	Feet		Dry	

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-2-1
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 850
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
- 1 ft	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
- 2 ft	18	79.9	••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
-	20	88.8	••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	27	119.9	••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 3 ft	24	106.6	••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 1 m	40	177.6	••	25+	DENSE	HARD
-			WDCP Refusal @ 3'3"			
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-2-2
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 854
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 ft	3	13.3	•••	3	VERY LOOSE	SOFT
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 2 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	0	0.0		0	VERY LOOSE	VERY SOFT
- 3 ft	0	0.0		0	VERY LOOSE	VERY SOFT
- 1 m	0	0.0		0	VERY LOOSE	VERY SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 4 ft	29	111.9	••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	21	81.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
-	18	69.5	••••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
- 5 ft	25	96.5	••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	20	77.2	••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
-	21	81.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
- 6 ft	21	81.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
-	22	84.9	•••••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
- 2 m	21	81.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
- 7 ft	40	136.8	••••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	50	171.0	••	25+	DENSE	HARD
-			WDCP Refusal @ 7'3"			
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-2-3
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 853
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	2	8.9	••	2	VERY LOOSE	SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
- 1 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
- 2 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 3 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
- 1 m	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
- 4 ft	9	34.7	••••••••••	9	LOOSE	STIFF
-	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
-	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
- 5 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	9	34.7	••••••••••	9	LOOSE	STIFF
- 6 ft	15	57.9	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	12	46.3	••••••••••••••	13	MEDIUM DENSE	STIFF
- 2 m	10	38.6	••••••••••••	11	MEDIUM DENSE	STIFF
- 7 ft	14	47.9	••••••••••••••	13	MEDIUM DENSE	STIFF
-	17	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	16	54.7	••••••••••••••••	15	MEDIUM DENSE	STIFF
- 8 ft	15	51.3	••••••••••••••••	14	MEDIUM DENSE	STIFF
-	17	58.1	••••••••••••••••	25+	DENSE	HARD
-	17	58.1		16	MEDIUM DENSE	VERY STIFF
- 9 ft	16	54.7	••••••••••••••••	15	MEDIUM DENSE	STIFF
-	12	41.0	••••••••••••	11	MEDIUM DENSE	STIFF
-	12	41.0	••••••••••••	11	MEDIUM DENSE	STIFF
- 3 m 10 ft	11	37.6	••••••••••	10	LOOSE	STIFF
-	11	33.7	•••••••••	9	LOOSE	STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	8	24.5	•••••••	6	LOOSE	MEDIUM STIFF
- 11 ft	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	7	21.4	••••••	6	LOOSE	MEDIUM STIFF
-	7	21.4	••••••	6	LOOSE	MEDIUM STIFF
- 12 ft	7	21.4	••••••	6	LOOSE	MEDIUM STIFF
-	7	21.4	••••••	6	LOOSE	MEDIUM STIFF
-	5	15.3	••••	4	VERY LOOSE	SOFT
- 4 m 13 ft	5	15.3	••••	4	VERY LOOSE	SOFT

WILDCAT DYNAMIC CONE LOG

PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign. PROJECT NUMBER: 10:8838

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	6	16.6	••••	4	VERY LOOSE	SOFT
-	7	19.4	•••••	5	LOOSE	MEDIUM STIFF
- 14 ft	10	27.7	••••••••	7	LOOSE	MEDIUM STIFF
-	8	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	8	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 15 ft	10	27.7	••••••••	7	LOOSE	MEDIUM STIFF
-	12	33.2	•••••••••	9	LOOSE	STIFF
-	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
- 16 ft	11	30.5	•••••••	8	LOOSE	MEDIUM STIFF
- 5 m			End of WDCP @ 16'-0"			
-						
- 17 ft						
-						
-						
- 18 ft						
-						
-						
- 19 ft						
-						
- 6 m						
- 20 ft						
-						
-						
- 21 ft						
-						
-						
- 22 ft						
-						
-						
- 7 m 23 ft						
-						
-						
- 24 ft						
-						
-						
- 25 ft						
-						
-						
- 26 ft						
- 8 m						
-						
- 27 ft						
-						
-						
- 28 ft						
-						
-						
- 29 ft						
-						
- 9 m						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-3-1
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 869.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	3	13.3	•••	3	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 2 ft	8	35.5	••••••••••	10	LOOSE	STIFF
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 3 ft	12	53.3	••••••••••••••••	15	MEDIUM DENSE	STIFF
- 1 m	17	75.5	••••••••••••••••••••••	21	MEDIUM DENSE	VERY STIFF
-	13	50.2	••••••••••••••	14	MEDIUM DENSE	STIFF
- 4 ft	10	38.6	••••••••••••	11	MEDIUM DENSE	STIFF
-	12	46.3	••••••••••••••	13	MEDIUM DENSE	STIFF
-	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
- 5 ft	4	15.4	••••	4	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 6 ft	3	11.6	•••	3	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 2 m	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 7 ft	3	10.3	••	2	VERY LOOSE	SOFT
-	3	10.3	••	2	VERY LOOSE	SOFT
-	2	6.8	•	1	VERY LOOSE	VERY SOFT
- 8 ft	5	17.1	••••	4	VERY LOOSE	SOFT
-	8	27.4	•••••••	25+	DENSE	HARD
-	8	27.4		7	LOOSE	MEDIUM STIFF
- 9 ft	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
-	6	20.5	•••••	5	LOOSE	MEDIUM STIFF
-	13	44.5	••••••••••••	12	MEDIUM DENSE	STIFF
- 3 m 10 ft	10	34.2	•••••••••	9	LOOSE	STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	12	36.7	••••••••••	10	LOOSE	STIFF
-	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
- 11 ft	18	55.1	••••••••••••••••	15	MEDIUM DENSE	STIFF
-	19	58.1	•••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	18	55.1	••••••••••••••••	15	MEDIUM DENSE	STIFF
- 12 ft	18	55.1	••••••••••••••••	15	MEDIUM DENSE	STIFF
-	16	49.0	••••••••••••••	13	MEDIUM DENSE	STIFF
-	18	55.1	••••••••••••••••	15	MEDIUM DENSE	STIFF
- 4 m 13 ft	19	58.1	•••••••••••••••••	16	MEDIUM DENSE	VERY STIFF

HOLE #: HA-3-1

WILDCAT DYNAMIC CONE LOG

PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.

PROJECT NUMBER: 10:8838

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	18	49.9	••••••••••••••	14	MEDIUM DENSE	STIFF
-	30	83.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
- 14 ft	30	83.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
-	29	80.3	••••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
-			End of WDCP @ 14'-3"			
- 15 ft						
-						
-						
- 16 ft						
- 5 m						
-						
- 17 ft						
-						
-						
- 18 ft						
-						
-						
- 19 ft						
-						
- 6 m						
- 20 ft						
-						
-						
- 21 ft						
-						
-						
- 22 ft						
-						
-						
- 7 m 23 ft						
-						
-						
- 24 ft						
-						
-						
- 25 ft						
-						
-						
- 26 ft						
- 8 m						
-						
- 27 ft						
-						
-						
- 28 ft						
-						
-						
- 29 ft						
-						
- 9 m						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-3-2
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 872
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
- 1 ft	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 2 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
- 3 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 1 m	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 4 ft	4	15.4	••••	4	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
- 5 ft	2	7.7	••	2	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 6 ft	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 2 m	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
- 7 ft	50	171.0	••	25+	DENSE	HARD
-			WDCP Refusal @ 4'-3"			
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-3-3
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 867
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 2 ft	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 3 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 1 m	8	35.5	••••••••••	10	LOOSE	STIFF
-	11	42.5	••••••••••••	12	MEDIUM DENSE	STIFF
- 4 ft	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
- 5 ft	10	38.6	•••••••••••	11	MEDIUM DENSE	STIFF
-	10	38.6	•••••••••••	11	MEDIUM DENSE	STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
- 6 ft	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
- 2 m	9	34.7	••••••••••	9	LOOSE	STIFF
- 7 ft	13	44.5	••••••••••••	12	MEDIUM DENSE	STIFF
-	15	51.3	••••••••••••••	14	MEDIUM DENSE	STIFF
-	17	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 8 ft	16	54.7	••••••••••••••••	15	MEDIUM DENSE	STIFF
-	14	47.9	••••••••••••••	25+	DENSE	HARD
-	15	51.3		14	MEDIUM DENSE	STIFF
- 9 ft	14	47.9	••••••••••••••	13	MEDIUM DENSE	STIFF
-	15	51.3	••••••••••••••	14	MEDIUM DENSE	STIFF
-	15	51.3	••••••••••••••	14	MEDIUM DENSE	STIFF
- 3 m 10 ft	10	34.2	•••••••••	9	LOOSE	STIFF
-	12	36.7	••••••••••	10	LOOSE	STIFF
-	12	36.7	••••••••••	10	LOOSE	STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
- 11 ft	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
-	12	36.7	••••••••••	10	LOOSE	STIFF
-	11	33.7	•••••••••	9	LOOSE	STIFF
- 12 ft	19	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	20	61.2	•••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	22	67.3	••••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
- 4 m 13 ft	12	36.7	••••••••••	10	LOOSE	STIFF

HOLE #: HA-3-3

WILDCAT DYNAMIC CONE LOG

PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.

PROJECT NUMBER: 10:8838

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	14	38.8	••••••••••••	11	MEDIUM DENSE	STIFF
-	18	49.9	••••••••••••••••	14	MEDIUM DENSE	STIFF
- 14 ft	17	47.1	•••••••••••••••	13	MEDIUM DENSE	STIFF
-	16	44.3	••••••••••••••	12	MEDIUM DENSE	STIFF
-	21	58.2	••••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 15 ft	21	58.2	••••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	21	58.2	••••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	15	41.6	••••••••••••••	11	MEDIUM DENSE	STIFF
- 16 ft	11	30.5	••••••••	8	LOOSE	MEDIUM STIFF
- 5 m	11	30.5	••••••••	8	LOOSE	MEDIUM STIFF
-			End of WDCP @ 16'-3"			
- 17 ft						
-						
-						
- 18 ft						
-						
-						
- 19 ft						
-						
- 6 m						
- 20 ft						
-						
-						
- 21 ft						
-						
-						
- 22 ft						
-						
-						
- 7 m 23 ft						
-						
-						
- 24 ft						
-						
-						
- 25 ft						
-						
-						
- 26 ft						
- 8 m						
-						
- 27 ft						
-						
-						
- 28 ft						
-						
-						
- 29 ft						
-						
- 9 m						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-5-1
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 866.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	15	66.6	••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
-	33	146.5	••	25+	DENSE	HARD
- 1 ft			WDCP Refusal @ 1'			
-						
-						
- 2 ft						
-						
-						
- 3 ft						
- 1 m						
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-29-2016
DATE COMPLETED: 01-29-2016

HOLE #: HA-5-2
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 877
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 1 ft	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
-	8	35.5	•••••••••	10	LOOSE	STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
- 2 ft	14	62.2	••••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	9	40.0	•••••••••••	11	MEDIUM DENSE	STIFF
- 3 ft	9	40.0	•••••••••••	11	MEDIUM DENSE	STIFF
- 1 m	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 4 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 5 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 6 ft	2	7.7	••	2	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 2 m	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
- 7 ft	18	61.6	••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	31	106.0	••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	50	171.0	••	25+	DENSE	HARD
- 8 ft			WDCP Refusal @ 7'-7"			
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-29-2016
DATE COMPLETED: 01-29-2016

HOLE #: HA-5-3
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 891
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
- 1 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
- 2 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 3 ft	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 m	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 4 ft	3	11.6	•••	3	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 5 ft	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	15	57.9	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 6 ft	50	193.0	••	25+	VERY DENSE	HARD
-			WDCP Refusal @ 5'-11"			
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-29-2016
DATE COMPLETED: 01-29-2016

HOLE #: HA-5-4
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 895.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 2 ft	7	31.1	••••••••	8	LOOSE	MEDIUM STIFF
-	8	35.5	•••••••••	10	LOOSE	STIFF
-	15	66.6	••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
- 3 ft	17	75.5	•••••••••••••••••••••	21	MEDIUM DENSE	VERY STIFF
- 1 m	20	88.8	••••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	18	69.5	••••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
- 4 ft	35	135.1	••••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	50	193.0	••	25+	VERY DENSE	HARD
-			WDCP Refusal @ 4'-3"			
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-29-2016
DATE COMPLETED: 01-29-2016

HOLE #: HA-5-5
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 906.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
- 1 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
-	23	102.1	••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 2 ft	20	88.8	••••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	17	75.5	••••••••••••••••••••••	21	MEDIUM DENSE	VERY STIFF
-	22	97.7	••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 3 ft	21	93.2	••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 1 m	29	128.8	••••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	25	96.5	••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 4 ft	23	88.8	••••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	21	81.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
-	21	81.1	••••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
- 5 ft	18	69.5	••••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
-	40	154.4	••	25+	DENSE	HARD
-	50	193.0	••	25+	VERY DENSE	HARD
- 6 ft			WDCP Refusal @ 5'7"			
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-29-2016
DATE COMPLETED: 01-29-2016

HOLE #: HA-5-6
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 912
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 1 ft	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	14	62.2	••••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
- 2 ft	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	13	57.7	•••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	13	57.7	•••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 3 ft	50	222.0	••	25+	VERY DENSE	HARD
- 1 m			WDCP Refusal @ 2'-11"			
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-7-1
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 888.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 1 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	9	40.0	••••••••••	11	MEDIUM DENSE	STIFF
-	9	40.0	••••••••••	11	MEDIUM DENSE	STIFF
- 2 ft	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	25	111.0	••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	18	79.9	••••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
- 3 ft	18	79.9	••••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
- 1 m	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	18	69.5	••••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
- 4 ft	19	73.3	•••••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
-	14	54.0	••••••••••••••••	15	MEDIUM DENSE	STIFF
-	12	46.3	••••••••••••••	13	MEDIUM DENSE	STIFF
- 5 ft	9	34.7	••••••••••	9	LOOSE	STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
- 6 ft	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
- 2 m	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
- 7 ft	4	13.7	•••	3	VERY LOOSE	SOFT
-	4	13.7	•••	3	VERY LOOSE	SOFT
-	4	13.7	•••	3	VERY LOOSE	SOFT
- 8 ft	50	171.0	••	25+	DENSE	HARD
-			WDCP Refusal @ 7'10"			
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-7-2
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 898
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
- 1 ft	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
- 2 ft	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	38	168.7	••	25+	DENSE	HARD
-	15	66.6	••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
- 3 ft	18	79.9	••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
- 1 m	40	177.6	••	25+	DENSE	HARD
-	22	84.9	••••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
- 4 ft	14	54.0	••••••••••••••••	15	MEDIUM DENSE	STIFF
-	11	42.5	••••••••••••	12	MEDIUM DENSE	STIFF
-	11	42.5	••••••••••••	12	MEDIUM DENSE	STIFF
- 5 ft	13	50.2	••••••••••••••	14	MEDIUM DENSE	STIFF
-	28	108.1	••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	50	193.0	••	25+	VERY DENSE	HARD
- 6 ft			WDCP Refusal @ 5'7"			
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-28-2016
DATE COMPLETED: 01-28-2016

HOLE #: HA-7-3
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 903.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	8	35.5	••••••••••	10	LOOSE	STIFF
- 1 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 2 ft	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 3 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 1 m	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 4 ft	3	11.6	•••	3	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
-	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
- 5 ft	27	104.2	••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	32	123.5	••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	23	88.8	••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
- 6 ft	21	81.1	••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
-	19	73.3	••••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
- 2 m	25	96.5	••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 7 ft	28	95.8	••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	26	88.9	••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	17	58.1	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 8 ft	15	51.3	••••••••••••••	14	MEDIUM DENSE	STIFF
-	17	58.1	••••••••••••••••	25+	DENSE	HARD
-	23	78.7		22	MEDIUM DENSE	VERY STIFF
- 9 ft	37	126.5	••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	50	171.0	••	25+	DENSE	HARD
-			WDCP Refusal @ 9'2"			
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-27-2016
DATE COMPLETED: 01-27-2016

HOLE #: HA-8-1
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 921
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	9	40.0	••••••••••••	11	MEDIUM DENSE	STIFF
- 1 ft	20	88.8	••••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	19	84.4	••••••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
-	17	75.5	••••••••••••••••••••••	21	MEDIUM DENSE	VERY STIFF
- 2 ft	19	84.4	••••••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
-	24	106.6	••••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	25	111.0	••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 3 ft	21	93.2	••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 1 m	50	222.0	••	25+	VERY DENSE	HARD
-			WDCP Refusal @ 3'3"			
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-27-2016
DATE COMPLETED: 01-27-2016

HOLE #: HA-8-2
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 925.5
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 2 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	9	40.0	••••••••••••	11	MEDIUM DENSE	STIFF
-	9	40.0	••••••••••••	11	MEDIUM DENSE	STIFF
- 3 ft	18	79.9	••••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
- 1 m	17	75.5	••••••••••••••••••••••	21	MEDIUM DENSE	VERY STIFF
-	22	84.9	••••••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
- 4 ft	18	69.5	••••••••••••••••••••	19	MEDIUM DENSE	VERY STIFF
-	16	61.8	••••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	19	73.3	••••••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
- 5 ft	24	92.6	••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	37	142.8	••	25+	DENSE	HARD
-	50	193.0	••	25+	VERY DENSE	HARD
- 6 ft			WDCP Refusal @ 5'-7"			
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:8838
DATE STARTED: 01-27-2016
DATE COMPLETED: 01-27-2016

HOLE #: HA-8-3
CREW: F.M.
PROJECT: Retaining Walls - Interstate N Pkwy & Interstate N Cir. Realign.
ADDRESS: Interstate N Pkwy & Interstate N Cir.
LOCATION: Atlanta, GA

SURFACE ELEVATION: 925
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 ft	3	13.3	•••	3	VERY LOOSE	SOFT
-	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	12	53.3	••••••••••••••••	15	MEDIUM DENSE	STIFF
- 2 ft	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	32	142.1	••••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 3 ft	50	222.0	••	25+	VERY DENSE	HARD
- 1 m			WDCP Refusal @ 2'11"			
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

Laboratory Testing Summary

Sample Source	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[4]	Moisture - Density (Corr.)[5]		CBR Value[6]	Other
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
HA-2-1												
	S-1	1.5-2.0	15.0	SM Possible Fill				34.5				
HA-2-3												
	S-2	3.0-3.5	23.7	SM				28.4				
HA-3-1												
	S-1	3.5-4.0	16.5	SM Fill				22.0				
HA-5-3												
	S-1	3.0-3.5	15.8	SM Fill				22.3				
HA-5-6												
	S-1	1.0-1.5	19.9	SM				22.8				
HA-7-1												
	S-1	2.0-2.5	20.4	SM				36.9				
HA-7-3												
	S-1	2.0-2.5	18.2	SM				35.5				
HA-8-1												
	S-2	2.5-3.0	10.9	SM				16.4				

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

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

Project No. 10:8838

Project Name: Retaining Walls - Interstate N. Parkway & Interstate N. Circle Realignment

Printed On: Wednesday, February 17, 2016

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Important Information About Your

Geotechnical Engineering Report

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

The following information is provided to help you manage your risks.

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 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 your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the 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.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of 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 alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- 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 study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the 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 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 construction recommendations included in your report. *Those 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 recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower 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. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing 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 Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors 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 contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors 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 contractors do not 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.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental 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 geoenvironmental 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, a number of 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 ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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