

STATE PROJECT NO. 19014-1169-04

FEDERAL PROJECT NO. NH-I-440-4(84)

I-440 FROM I-40 TO I-24

Pin No. 125325.00

DAVIDSON COUNTY, TN





September 21, 2017

Mr. Travis W. Smith, PE Civil Engineering Manager 1
Materials and Tests Division – Geotechnical Engineering Section
A Building, 1st Floor
6601 Centennial Boulevard
Nashville, TN 37243

RE: Geotechnical Exploration Summary Letter Work Order No. 06, Contract No. E1897

State Project No. 19014-1169-04 Federal Project No. NH-I-440-4(84)

I-440 From I-40 to I-24 Pin No. 125325.00 Davidson County

Dear Mr. Smith:

American Engineers, Inc. (AEI) is pleased to submit this letter report that summarizes the results of our geotechnical drilling performed at the above referenced site and lab testing performed on the samples obtained.

1. SITE AND PROJECT DESCRIPTION

Seventy-four (74) pavement borings were drilled at the above referenced site. The location and number of borings drilled at the corresponding locations are represented in Table 1.

Number of Borings Boring Location 18 Westbound Shoulder 15 **Eastbound Shoulder** 15 **Eastbound Driving Lane** 22 Westbound Driving Lane 4 **Right Shoulder** 4 **Foundation Boring** 2 Piezometers

Table 1: Boring Locations

The four (4) foundation borings were drilled under the overpass traveling along I-440 over I-65. Two piezometers were installed off of the westbound right shoulders. The borings were drilled to auger refusal, or a predetermined boring termination depth of approximately 10 feet, to obtain an indication of the soil types and soil strength consistencies. Upon encountering refusal eight (8) of the pavement borings, five (5) in the westbound shoulder and three (3) in the eastbound shoulder, were advanced five feet into the underlying bedrock to determine the strength and rock types. Foundation borings were advanced until ten (10) feet of competent bedrock was encountered. The piezometers were installed five (5) feet into the underlying bedrock.

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Borings B-1, B-22, SH-2 and SH-3 were not drilled due to safety concerns. Boring BR-4 was not drilled due to accessibility issues.

Six-inch pavement cores were obtained in each of the pavement borings (74 in total). Four-inch pavement cores were obtained from the center of ten of the six-inch pavement cores, to be subjected to unconfined compressive strength testing.

The Tennessee Department of Transportation (TDOT) is rehabilitating Interstate 440 (I-440). The project includes removing and replacing the existing pavement. Removal of the existing grass median and adding capacity to provide a minimum of six (6) travel lanes (3 in each direction) throughout the corridor.

2. RESULTS OF EXPLORATION

The borings were located by AEI field services and TDOT geotechnical personnel with respect to the existing site features. An AEI survey field crew was on-site during each night to locate and elevate the borings subsequent to drilling activities. The near-surface soils encountered at the site can be generally classified as lean clay, CL, (Clay of Low plasticity), fat clay, CH, (Clay of High plasticity) and well graded gravel, GW in accordance with the Unified Soil Classification System (USCS). The lean clay soils were typically described as containing variable amounts of sand or gravel, brown to gray in color and moist of the optimum moisture content for compaction. The fat clay soils were typically described as containing variable amounts of gravel, brown in color and moist of the optimum moisture content for compaction. The gravels were typically described as containing various amounts of clay and sand, gray to white in color, coarse to fine grained, and damp to moist of the optimum moisture for densification. A copy of the boring logs can be found attached in Appendix A.

Laboratory testing consisted of natural moisture content determination, Atterberg limits, standard Proctor testing and California Bearing Ratio (CBR) testing. Natural moisture contents were performed on all samples and are indicated on the boring logs attached in Appendix A. Atterberg limits testing was performed on samples of the representative soil horizons. Unconfined compressive strength testing was performed on select rock core samples and pavement core samples. Standard Proctor and CBR testing results were performed on three bulk samples obtained near the beginning, middle and end of the project. Results of all laboratory testing can be found in Appendix B.

3. Groundwater

Groundwater was encountered in Boring B-30 during drilling operations. Groundwater, at the time of drilling, was encountered at a depth of three feet below the existing ground surface. In cohesive soils such as some of those encountered at the site, a long time is required for the hydrostatic groundwater level to come to equilibrium in the borehole. The short-term groundwater levels reported by the drill crew are not generally indicative of the long-term groundwater level.

To accurately determine the long-term groundwater level, as well as the seasonal and precipitation induced fluctuations of the groundwater level, piezometers were installed along the westbound shoulder, and are available to be monitored for an extended length of time.

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We appreciate the opportunity to be of service to you on this project and hope to provide further support on this and other projects in the future. Please contact us if you have any questions regarding this report.

Respectfully,

AMERICAN ENGINEERS, INC.

Jackson Daugherty, EIT Geotechnical Engineer

Dennis Mitchell, PE

Dein Mikelell

Director of Geotechnical Services

Attachments

- Boring Location Summary Table
- Boring Logs
- Results of Laboratory Testing
- Pictures of Broken Concrete Cylinders

APPENDIX A

Boring Location Summary Table

B			Communication (Contract)	December 1	Defeed Beetle (feet)	Book Company (foot)
Boring No. B-2	West Bound	Driving Lane	Concrete Depth (inches) 10.25	Base Depth (inches)	Refusal Depth (feet) 9.8	Rock Core Depth (feet) N/A
B-2 B-3	East Bound	Driving Lane Driving Lane	10.25	7	2.4	N/A
B-3	West Bound	Driving Lane	10.25	6.5	3.9	N/A
B-5	East Bound	Driving Lane	13	4	5.7	N/A
B-6	East Bound	Shoulder	8	1	8	N/A
B-7	West Bound	Driving Lane	10.25	5.5	2.9	N/A
B-8	West Bound	Shoulder	8.5	0	3.1	8.1
B-9	East Bound	Driving Lane	11	8	4.6	N/A
B-10	East Bound	Shoulder	9.5	11	1.7	N/A
B-11	West Bound	Driving Lane	10	4.8	2.3	N/A
B-12	West Bound	Shoulder	7.75	6	5.7	N/A
B-13 B-14	East Bound East Bound	Driving Lane Shoulder	10 12	5 13	8.4 2.1	N/A N/A
B-14	West Bound	Driving Lane	9.75	10	2.1	N/A
B-16	West Bound	Shoulder	8.5	9.6	5.5	N/A
B-17	East Bound	Driving Lane	10	7	3.4	N/A
B-18	East Bound	Shoulder	7.5	6	3.5	8.5
B-19	West Bound	Driving Lane	9.75	8.4	6	N/A
B-20	West Bound	Shoulder	8	7.2	5.1	N/A
B-21	East Bound	Driving Lane	10	4	7.3	N/A
B-22	East Bound	Shoulder	N/A	N/A	N/A	N/A
B-23	West Bound	Driving Lane	10	6	3.3	N/A
B-24 B-25	West Bound East Bound	Shoulder Driving Lane	7.75 11	6 4	3.1 5	N/A N/A
B-25 B-26	East Bound	Shoulder	7.5	19.2	3.8	N/A
B-27	West Bound	Driving Lane	9.5	6	3.8	N/A
B-28	West Bound	Shoulder	7.75	4.2	3	8
B-29	East Bound	Driving Lane	10.5	7	NR (BOH 10')	N/A
B-30	East Bound	Shoulder	8	4.2	4.5	N/A
B-31	West Bound	Driving Lane	10	4.8	NR (BOH 10')	N/A
B-32	West Bound	Shoulder	7.25	13.25	1.7	N/A
B-33	East Bound	Driving Lane	9.5	7.2	5.2	N/A
B-34	East Bound	Shoulder	7.5 10.5	6	2.2	N/A
B-35 B-36	West Bound West Bound	Driving Lane Shoulder	8.25	6	3.4 3.5	N/A N/A
B-37	East Bound	Driving Lane	9.5	8.5	2.6	N/A
B-38	East Bound	Shoulder	8	6	4	9
B-39	West Bound	Driving Lane	10	13.75	2	N/A
B-40	West Bound	Shoulder	8	6	NR (BOH 10.5')	N/A
B-41	East Bound	Driving Lane	9.5	7.2	4	N/A
B-42	East Bound	Shoulder	7.5	6	8.3	N/A
B-43	West Bound	Driving Lane	10	6	2.7	N/A
B-44	West Bound	Shoulder	7.75	4.8	5.5	N/A
B-45 B-46	East Bound East Bound	Driving Lane Shoulder	8.75	6 8.5	4.7 3.6	N/A N/A
B-40	West Bound	Driving Lane	9.75	6	8.4	N/A
B-47	West Bound	Shoulder	9	0	2.7	7.7
B-49	West Bound	Driving Lane	10.75	7	3	N/A
B-50	West Bound	Shoulder	9	6	2.4	N/A
B-51	East Bound	Driving Lane	11.75	6	3.1	N/A
B-52	East Bound	Shoulder	10	3.6	2.7	N/A
B-53	West Bound	Driving Lane	18	3.5	2.3	N/A
B-54	West Bound	Shoulder	10.75	3.6	2.8	N/A
B-55 B-56	East Bound East Bound	Driving Lane Shoulder	10 9	6 4.8	5.6 2.6	N/A 8
B-56 B-57	West Bound	Driving Lane	11	4.8	6.2	N/A
B-57	West Bound	Shoulder	8.5	6	NR (BOH 10.5')	N/A
B-59	East Bound	Driving Lane	10.5	3.6	2.8	N/A
B-60	East Bound	Shoulder	9.25	3	3.2	N/A
B-61	West Bound	Driving Lane	10.5	4.8	3.1	N/A
B-62	West Bound	Shoulder	9.75	4.8	3.6	N/A
B-63	West Bound	Driving Lane	10	7.2	1.8	N/A
B-64	East Bound	Shoulder	7.75	4.8	4.2	N/A
B-65 B-66	West Bound West Bound	Driving Lane Shoulder	9.75 10	4.8 0	3.8 0.9	N/A 7.5
B-67	West Bound West Bound	Driving Lane	9.25	4.8	9.1	7.5 N/A
B-68	West Bound	Shoulder	7.5	7.2	NR (BOH 10')	N/A
B-69	West Bound	Driving Lane	10.5	3.6	3.4	N/A
B-70	West Bound	Shoulder	10	2.4	3.3	8.3
B-71	West Bound	Driving Lane	9.5	3.6	NR (BOH 10')	N/A
BR-1	N/A	N/A	N/A	N/A	0.2	25.2
BR-2	N/A	N/A	N/A	N/A	0.1	15.1
BR-3	N/A	N/A	10.75	3.5	2.3	17.3
BR-5 PZ-1	N/A West Bound	N/A Right Shoulder	N/A N/A	N/A N/A	17.5 9	63.5
PZ-1 PZ-2	West Bound West Bound	Right Shoulder	N/A N/A	N/A N/A	5.7	13.7
SH-1	East Bound	Right Shoulder	10	7.8	3.2	N/A
SH-4	East Bound	Right Shoulder	9.5	4.5	2.8	N/A
SH-5	West Bound	Right Shoulder	8	4.8	4.1	N/A
SH-6	West Bound	Right Shoulder	9.5	4.8	3	N/A

* NR - No Refusal Encounter *BOH - Bottom of Hole (boring terminated)

			Project	Project	TN State Plane	TN State Plane	
Boring No	Latitude	Longitude	Northing	Easting	Northing	Easting	Elevation (ft)
B-2	36.15214238	86.82255481	663121.014	1725761.816	663081.2291	1725658.277	613.9
B-3	36.15000401	86.82268311	662342.87	1725717.3	662303.1338	1725613.855	604.8
B-4	36.14972682	86.82246307	662241.419	1725781.509	662201.6869	1725677.968	602.1
B-5	36.14725211	86.82235249	661340.24	1725806.589	661300.566	1725703.047	590.5
B-6	36.14563388	86.82224206	660750.86	1725834.24	660711.2213	1725730.7	578.6
B-7	36.14460083	86.82223038	660374.763	1725834.533	660335.1429	1725730.989	567.3
B-8	36.1435862	86.82246073	660005.967	1725763.415	659966.369	1725659.875	555.5
B-9	36.14232767	86.82285343	659548.821	1725643.588	659509.2125	1725540.077	542.3
B-10	36.14089909	86.82301788	659029.127	1725590.676	658989.5876	1725487.147	539.5
B-11	36.13936458	86.82265596	658469.604	1725692.851	658430.0982	1725589.316	542.6
B-12	36.13792069	86.82204078	657942.439	1725870.09	657902.9648	1725766.544	546.2
B-13	36.13651394	86.82130224	657428.495	1726083.876	657389.0517	1725980.317	549.6
B-14	36.13529861	86.8206011	656984.327	1726287.211	656944.9103	1726183.64	551.9
B-15	36.13441388	86.81970411	656660.029	1726549.396	656620.6318	1726445.809	555
B-16	36.13302263	86.81883528	656151.407	1726801.729	656112.0403	1726698.127	557.4
B-17	36.13170238	86.8181475	655669.085	1727000.821	655629.7472	1726897.207	555.7
B-18	36.13021754	86.81713343	655126.038	1727295.779	655086.7328	1727192.147	551.8
B-19	36.12938531	86.81641573	654821.305	1727505.203	654782.0181	1727401.559	549.6
B-20	36.12822473	86.81568936	654397.017	1727716.196	654357.7555	1727612.539	546.6
B-21	36.12679298	86.81493091	653873.935	1727935.848	653834.7049	1727832.178	543.2
B-23	36.12488032	86.81307454	653173.088	1728478.311	653133.9	1728374.609	557.3
B-24	36.12406436	86.81130093	652871.698	1728999.669	652832.5281	1728895.935	569.3
B-25	36.12361973	86.80962451	652705.736	1729493.45	652666.576	1729389.687	570.1
B-26	36.12336885	86.80809323	652610.665	1729944.955	652571.5107	1729841.165	563.5
B-27	36.12296057	86.80606568	652457.096	1730542.561	652417.9509	1730438.735	561.5
B-28	36.12238981	86.80493069	652246.557	1730876.069	652207.4246	1730772.223	568.3
B-29	36.12123249	86.80359648	651822.007	1731266.669	651782.9	1731162.799	579.1
B-30	36.11998273	86.80243479	651364.23	1731606.048	651325.1505	1731502.158	584.2
B-31	36.11947029	86.80180232	651176.149	1731791.327	651137.0808	1731687.426	582.7
B-32	36.11848937	86.80099574	650817.105	1732026.635	650778.0583	1731922.72	576.1
B-33	36.11737204	86.80016746	650408.349	1732267.956	650369.3268	1732164.026	561.6
B-34	36.11649956	86.79884434	650087.538	1732656.173	650048.5351	1732552.22	542.2
B-35	36.11617224	86.79739196	649964.884	1733084.195	649925.8885	1732980.216	535.1
B-36	36.11611069	86.79479247	649936.228	1733851.835	649897.2342	1733747.81	530.1
B-37	36.11605827	86.79340263	649913.815	1734262.201	649874.8225	1734158.152	528
B-38	36.11613539	86.79215237	649938.9	1734631.723	649899.906	1734527.651	525.7
B-39	36.11626304	86.7906166	649981.702	1735085.725	649942.7054	1734981.626	526
B-40	36.11617833	86.7887697	649946.462	1735631.002	649907.4676	1735526.87	528.4
B-41	36.11600941	86.78740059	649881.709	1736034.907	649842.7184	1735930.751	530.5
B-42	36.11597833	86.78566101	649866.267	1736548.644	649827.2774	1736444.457	532.4
B-43	36.11606388	86.78424427	649894.055	1736967.363	649855.0637	1736863.151	529.3
B-44	36.11596483	86.78224095	649853.259	1737558.806	649814.2701	1737454.559	517.5
B-45	36.1157971	86.78086139	649788.944	1737965.807	649749.959	1737861.535	510.3
B-46	36.1157711	86.77897867	649775.047	1738521.84	649736.0628	1738417.535	512.8
B-47	36.11583546	86.77711378	649794.097	1739072.869	649755.1117	1738968.531	531.9
B-48	36.11579101	86.77584495	649774.944	1739447.523	649735.9598	1739343.162	546.9
B-49	36.11680768	86.77081065	650133.302	1740937.449	650094.2963	1740832.999	540.7

			Project	Project	TN State Plane	TN State Plane	
Boring No	Latitude	Longitude	Northing	Easting	Northing	Easting	Elevation (ft)
B-50	36.11745369	86.76934322	650365.065	1741372.734	650326.0454	1741268.258	522.1
B-51	36.11805753	86.76818453	650582.199	1741716.701	650543.1664	1741612.204	517.9
B-52	36.11937787	86.76665081	651059.307	1742173.477	651020.2458	1742068.953	522.3
B-53	36.12000635	86.76614146	651286.923	1742325.712	651247.8481	1742221.179	525.4
B-54	36.12084921	86.76497347	651591.058	1742673.089	651551.9649	1742568.535	525.6
B-55	36.12145353	86.76333938	651807.287	1743157.445	651768.1809	1743052.862	518.9
B-56	36.12179711	86.76171016	651928.619	1743639.617	651889.5056	1743535.005	527
B-57	36.12194448	86.76052749	651979.549	1743989.341	651940.4326	1743884.708	539.6
B-58	36.12170836	86.75851005	651888.969	1744584.532	651849.858	1744479.863	553.4
B-59	36.12145382	86.75682127	651792.442	1745082.602	651753.3368	1744977.903	564.7
B-60	36.1216457	86.75468946	651887.822	1745689.931	651848.7111	1745585.196	567.6
B-61	36.12216019	86.7538386	652042.794	1745965.53	652003.6738	1745860.778	564.3
B-62	36.12267701	86.75213726	652227.069	1746469.471	652187.9377	1746364.689	554.9
B-63	36.12327756	86.75037617	652441.705	1746991.286	652402.5609	1746886.473	539.9
B-64	36.12375273	86.74772245	652608.686	1747776.381	652569.5318	1747671.521	529.1
B-65	36.12414623	86.74575251	652747.498	1748359.288	652708.3355	1748254.393	527
B-66	36.12425769	86.74382278	652783.737	1748929.535	652744.5723	1748824.606	522.1
B-67	36.12437622	86.74117081	652820.944	1749713.107	652781.7771	1749608.131	516.7
B-68	36.12439833	86.73958374	652825.449	1750181.899	652786.2818	1750076.894	518.7
B-69	36.12463613	86.73693439	652906.113	1750965.023	652866.941	1750859.971	526
B-70	36.12508717	86.73437753	653064.636	1751721.407	653025.4545	1751616.31	535.6
B-71	36.12574241	86.73222724	653298.413	1752358.265	653259.2175	1752253.13	545.5
BR-1	36.1158606	86.77445472	649797.023	1739858.363	649758.0375	1739753.978	489.6
BR-2	36.11589053	86.77398704	649806.829	1739996.59	649767.8429	1739892.196	485.3
BR-3	36.1160913	86.77313254	649877.92	1740249.565	649838.9297	1740145.156	485
BR-5	36.11677516	86.77164112	650123.397	1740692.058	650084.3919	1740587.623	535
PZ-1	36.12664874	86.81442939	653820.193	1728083.526	653780.9661	1727979.847	542.6
PZ-2	36.1160484	86.77912956	649876.351	1738478.074	649837.3608	1738373.772	507.2
SH-1	36.13900286	86.82239884	658337.283	1725767.667	658297.7851	1725664.127	541.4
SH-4	36.11571876	86.78064538	649759.916	1738029.383	649720.9327	1737925.107	509
SH-5	36.11591411	86.77751524	649823.672	1738954.516	649784.6849	1738850.185	526.6
SH-6	36.12375329	86.74772267	652608.89	1747776.318	652569.7358	1747671.458	529.1

APPENDIX B

Boring Logs



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

PAGE 1 OF 1

		(2.5) 55. 1225										
CLIE	NT TE	OOT PR	ROJECT	NAME	I-440							
PROJ	IECT N	UMBER _216-137 PR	ROJECT	LOCAT	<u> </u> NOI	Nashville, Ti	N					
DATE	STAR	TED 9/7/17 COMPLETED 9/7/17 GF	ROUND	ELEVA1	TION _	613.9 ft						
DRILI	LER _	Adam Cash GF	ROUND	WATER	LEVE	LS:						
DRILI	LING M	IETHOD Hollow Stem Auger	ΑT	TIME OF	DRIL	LING						
LOGG	GED BY	CHECKED BY Dennis Mitchell	ΑT	END OF	DRILL	.ING						
NOTE	ES		AF.	TER DRII	LING							
				H.	%	BLOW COUNTS (N-VALUE)	z	ш ^{(%}	AT	TERBE LIMITS		
Įξ.	GRAPHIC LOG			SAMPLE TYPE NUMBER	RECOVERY (RQD)	OUN	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		ပ	<u></u>	REMARKS
DEPTH (ft)	LS RA	MATERIAL DESCRIPTION		IPLE IUM	ŠS	W C I-VA	KE S	ISE F	LIQUID	PLASTIC LIMIT		■MB
	٥			SAN	REC	3LO' (N	PQ	ĕō	= =	7 -	PLASTICITY INDEX	_ ≅
0	20800	CONCRETE (10.25")				ш					п	
-	<u> </u>	_ CRUSHED AGGREGATE (6.0")										
-	176	(GW) GRAVEL, gray, moist, very dense to medium dense	[SPT 1	31	25-29-50 (79)	N/A	2				
-	A					(10)			-			
5				SPT	13	11-9-6	N/A	10	30	16	14	Poor recovery
				2		(15)						flight sample obtained
		(CL) gravelly CLAY with boulder fill fragements, brown, moist, ha	ard									
-			ŀ	SPT	40	18-18-14	1.8	4	-			
-				3		(32)						
-				SPT 4	0	12-9-50 (59)	N/A	2				
	<i>K/P/N</i>	Refusal at 9.8 feet.				(-0)			<u> </u>			
:I		Bottom of borehole at 9.8 feet.										

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 11:59 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SER



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

PAGE 1 OF 1

CLIE	NT TE	OOT	PROJEC [*]	TNAME	I-440							
PROJ	ECT N	UMBER _216-137	PROJEC	T LOCAT	_ NOI	Nashville, Tl	N					
DATE	STAR	TED <u>8/28/17</u>	GROUND	ELEVA1	TION _	604.8 ft						
DRILI	LER _/	Adam Cash	GROUND	WATER	LEVE	LS:						
DRILI	LING M	IETHOD Hollow Stem Auger	_ A T	TIME OF	DRIL	LING						
LOGG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LLING							
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ı	PLASTIC PLASTIC LIMIT	} ≻	REMARKS
		CONCRETE (11") CRUSHED AGGREGATE (7") (CL-ML) silty CLAY with gravel, cement stabilized Refusal at 2.4 feet.		SPT 1	0	8-14-50 (64)	N/A	8				
-1		Neiusal at 2.4 leet.										1

Bottom of borehole at 2.4 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 11:59 - TAGEOTECH SUPPORTITDOTIREGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



PROFESSIONAL ENGINEERING

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CLIENT TDOT PROJECT NAME | 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 9/7/17 **COMPLETED** 9/7/17 **GROUND ELEVATION** 602.1 ft DRILLER Adam Cash **GROUND WATER LEVELS:** DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING _---LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell AT END OF DRILLING _---**NOTES** AFTER DRILLING _---ATTERBERG SAMPLE TYPE NUMBER BLOW COUNTS (N-VALUE) POCKET PEN. (tsf) MOISTURE CONTENT (%) LIMITS GRAPHIC LOG RECOVERY (RQD) REMARKS DEPTH (ft) PLASTICITY INDEX PLASTIC LIMIT LIQUID MATERIAL DESCRIPTION CONCRETE (10.25") CRUSHED AGGREGATE (6.5") 6-6-18 N/A 13 (CL) gravelly lean CLAY with boulder fill fragments, dark brown, dry, (24)very stiff to hard

> Refusal at 3.9 feet. Bottom of borehole at 3.9 feet.



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		(===)										
CLIE	NT TE	OOT	PROJEC [*]	TNAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJEC	T LOCAT	ION _	Nashville, Tl	N					
DATE	STAR	TED 8/28/17 COMPLETED 8/28/17	GROUNE	ELEVAT	TION _	590.5 ft						
DRILI	LER _	Adam Cash	GROUNE	WATER	LEVE	LS:						
DRILI	LING M	IETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	S		AF	TER DRII	LING							
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	I	PLASTIC FIMIT LIMIT	} -	REMARKS
 - 5		CONCRETE (13") CRUSHED AGGREGATE (4") (CL) lean CLAY with gravel, brown, moist, very stiff		SPT 1	53	6-10-18 (28) 3-7-2 (9)	4.5+ N/A	19	31 43	21 24	10 19	Bulk Obtained 3'-5'

Refusal at 5.7 feet. Bottom of borehole at 5.7 feet.

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			Glasgow, KY 42141 (270) 651-7220									PAG	E 1 OF 1
CLIE	ENT TD	OT		PROJEC	TNAME	I-440							
PRO	JECT N	UMBER 216-137		PROJEC	T LOCAT	NOI	Nashville, Ti	N					
DAT	E STAR	TED 8/28/17	COMPLETED 8/28/17	GROUND	ELEVA1	TION _	578.6 ft						
DRIL	LER A	dam Cash		GROUNE	WATER	LEVE	LS:						
DRIL	LING M	ETHOD Hollow Ste	em Auger	AT	TIME OF	DRILI	LING						
LOG	GED BY	Clint Ervin	CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOT	ES			_ AF	TER DRII	LLING							
DEPTH (#)	GRAPHIC LOG		MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC IMIT	} -	REMARKS
5			<u> </u>		SPT 1 SPT 2	73	3-40-31 (71) 5-22-14 (36)	1.5	15				
0.00 0.	-		Refusal at 8.0 feet. Bottom of borehole at 8.0 feet.		SPT 3	80	12-22-50 (72)	0.8	13				

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 11:59 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICE



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65 Aberdeen Drive Glasgow, KY 42141

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		(270) 651-7220									IAGL	- 1 01 1
CLIEN	NT TD	OT PR	ROJECT	T NAME	I-440							
PROJ	ECT N	JMBER <u>216-137</u> PR	ROJECT	LOCAT	ION _	Nashville, Ti	١					
DATE	STAR	TED <u>9/7/17</u>	ROUND	ELEVAT	TION _	567.3 ft						
DRILL	ER A	dam Cash GR	ROUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILI							
LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING						
NOTE	:s		AF	TER DRII	LING							
о DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l	PLASTIC HEBER IN THE PROPERTY OF THE PROPERTY	-	REMARKS
		CONCRETE (10.25") — CRUSHED AGGREGATE (5.5") (CL) gravelly lean CLAY with boulder fill fragments, ddark brown, to moist, hard	dry	SPT 1	58	8-12-50 (62)	N/A	6				

Refusal at 2.9 feet. Bottom of borehole at 2.9 feet.

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PROFESSIONAL ENGINEERING 65 Aberdeen Drive

		Glasgow, KY 42141 (270) 651-7220									PAG	E 1 OF 1
CLIEN	NT TD	ООТ	PROJEC	T NAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJEC	T LOCAT	NOI	Nashville, Tl	N					
DATE	STAR	TED 9/6/17 COMPLETED 9/6/17	GROUND	ELEVAT	TION _	555.5 ft						
DRILI	ER _A	Adam Thompson	GROUND	WATER	LEVE	LS:						
DRILI	ING M	IETHOD HSA/ Diamond impregnated coring bit	AT	TIME OF	DRILI	LING						
LOGO	SED BY	Y _Jackson Daugherty	AT	END OF	DRILL	.ING						
NOTE	S		AF	TER DRII	LLING							
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	} ≻	REMARKS
 5		CONCRETE (8.5") (SP) gravely SAND, gray to brown, moist, hard LIMESTONE, gray to white, thinly to thickly bedded, hard, be planes at 45 degree angles indicating boulders or sloping roof fractured and weathered		SPT 1 RC 2	93 76 (0)	5-19-50 (69)	N/A	8	26	16	10	

Refusal at 3.1 feet. Bottom of borehole at 8.1 feet.

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		(270) 651-7220									1 701	_ 1 01 1
CLIEN	NT _TE	OOT	PROJEC	T NAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJEC	T LOCAT	NOI	Nashville, T	N					
DATE	STAR	RTED 8/29/17 COMPLETED 8/29/17	GROUNE	ELEVA1	TION _	542.3 ft						
DRILL	ER _/	Adam Cash	GROUNE	WATER	LEVE	LS:						
DRILL	ING N	IETHOD Hollow Stem Auger	AT	TIME OF	DRILI	LING						
LOGG	SED B	Y Clint Ervin CHECKED BY Dennis Mitchell		END OF	DRILL	.ING						
NOTE	s		_ AF	TER DRI	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT LIMIT	S ≻	REMARKS
 		CONCRETE (11")		SPT 1	47	9-40-36 (76)	1.5	5	-			bedded material at er
		Refusal at 4.6 feet. Bottom of borehole at 4.6 feet.										of sample

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		(===)									
CLIEN	NT TD	OT	PROJEC	T NAME	I-440						
PROJ	ECT N	UMBER _216-137	PROJEC	T LOCAT	ION N	Nashville, T	ĪN				
DATE	STAR	TED <u>8/29/17</u> COMPLETED <u>8/29/17</u>	GROUNE	ELEVA1	TION _	539.5 ft					
DRILL	ER A	dam Thompson	GROUNE	WATER	LEVE	LS:					
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILL	_ING					
LOGG	SED BY	Jackson Daugherty CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING					
NOTE	s		AF	TER DRI	LLING						
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC LIMIT	}	REMARKS
	A 4 4	CONCRETE (9.5")									
	†. ••	CRUSHED AGGREGATE (11")									
		Defined at 4.7 feet									

Refusal at 1.7 feet. Bottom of borehole at 1.7 feet.

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| PROJECT NAME | 1-440 | | PROJECT NAME | 216-137 | PROJECT LOCATION | Nashville, TN | | PROJECT STARTED | 9/6/17 | COMPLETED | 9/6/17 | GROUND ELEVATION | 542.6 ft | | PROJECT LOCATION | Nashville, TN | PROJECT NAME | 1-440 | PROJECT NAME | 1-440 | PROJECT LOCATION | Nashville, TN | PROJECT LOCATION | P

NOTE	s	AF	TER DRII	LLING					
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC PLASTIC LIMIT	REMARKS
		CONCRETE (10") — CRUSHED AGGREGATE (4.8") — (GC) clayey GRAVEL, brown to gray, moist, very dense	SPT	113	21-50	N/A	8		

Refusal at 2.3 feet. Bottom of borehole at 2.3 feet.

GEOTECH BH COLUMNS - GINT STD US LAB, GDT - 9/21/17 12:00 - T3/GEOTECH SUPPORTITDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



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CLIEN	CLIENT TDOT PROJECT NAME 1-440										
PROJI	ECT N	JMBER <u>216-137</u> PROJE	CT LOCAT	NOI	Nashville, T	N					
DATE	STAR	TED 9/7/17 COMPLETED 9/7/17 GROUN	ID ELEVA	TION _	546.2 ft						
DRILL	ER A	dam Cash GROUN	ID WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	T TIME O	- DRILI	LING						
LOGG	ED BY	Clint Ervin CHECKED BY Dennis Mitchell A	T END OF	DRILL	.ING						
NOTE	s		FTER DRI	LLING							
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIMIT	PLASTIC LIMIT		REMARKS
	•	CONCRETE (7.75")CRUSHED AGREGGATE (6.0")(CL) gravelly CLAY with boulder fill fragments, dark brown, moist, stiff to hard	SPT 2	13	8-13-50 (63) 12-7-8 (15)	3.0 N/A	7 23	42	18	24	
		Refusal at 5.7 feet.			<u> </u>						

Bottom of borehole at 5.7 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:00 - T\GEOTECH SUPPORT\TDON\REGION 3 ON-CALL SERVICES 2016-2020\1440\GEOT



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		(270) 651-7220									PAG	E 1 OF 1
CLIEN	NT TD	ОТ	PROJEC	T NAME	I-440							
PROJI	ECT N	UMBER _216-137	PROJEC	T LOCAT	ION _	Nashville, TI	N					
DATE	STAR	TED <u>8/29/17</u> COMPLETED <u>8/29/17</u>	GROUNE	ELEVA	TION _	549.6 ft						
DRILL	ER A	dam Cash	GROUNE	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	ED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRI	LLING							
_	O			YPE	% \	INTS E)	PEN.	₹ (%)		TERBE LIMITS	}	S
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N-VALUE)	POCKET P (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT	PLASTICITY INDEX	REMARKS
0		CONCRETE (10")				ш					Д.	
		CRUSHED AGGREGATE (5") (GM) silty GRAVEL, small & large gravel, brown, moist, hard		SPT 1	36	10-20-16 (36)	0.25	4				
5				SPT 2	40	6-18-22 (40)	0.0	3				
- 				SPT 3		10-50	N/A	2				
		Refusal at 8.4 feet. Bottom of borehole at 8.4 feet										

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - T\(\)GEOTECH SUPPORT\(\)TDOT\(\)REGION 3 ON-CALL SERVICES 2016-2020\(\)440\(\)GEOTECH\(\)LAB TESTING\(\)JAO.



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CLIEN	NT TE	ООТ	PROJEC	TNAME	I-440						
PROJ	ECT N	UMBER 216-137	PROJEC	T LOCAT	NOI	Nashville, T	N				
DATE	STAR	TED 9/7/17 COMPLETED 9/7/17	GROUNE	ELEVA	TION _	551.9 ft					
DRILL	LER _/	ndam Thompson	GROUND	WATER	LEVE	LS:					
DRILL	LING M	ETHOD Hollow Stem Auger	АТ	TIME OF	DRILI	LING					
LOGG	GED BY	Mathaniel Blackburn CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING					
NOTE	s		AF	TER DRI	LLING						
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l .	PLASTIC FIMIT	REMARKS
	2 3 4 5 3 4 4	CONCRETE (12")									
	•••	CHRUSHED AGGREGATE (13")									
		Refusal at 2.1 feet					-		•	•	

Bottom of borehole at 2.1 feet.

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	(270) 031-7220									
CLIENT _T	DOT	PROJEC	TNAME	I-440						
PROJECT	NUMBER 216-137	PROJEC	T LOCAT	NOI	Nashville, T	N				
DATE STA	RTED 9/6/17 COMPLETED 9/6/17	GROUND	ELEVA1	TION _	555 ft					
DRILLER _	Adam Thompson	GROUND	WATER	LEVE	LS:					
DRILLING	METHOD Hollow Stem Auger	_ АТ	TIME OF	DRILI	LING					
LOGGED E	Y Nathaniel Blackburn CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING					
NOTES		AF	TER DRII	LLING						
O DEPTH (ft)	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC LIMIT	-	REMARKS
	CONCRETE (9.75") CRUSHED STONE BASE (10") (GC) clayey GRAVEL, gray to white, moist, very dense,		X SPT	100	50	N/A	5			
			١ 1	ı						i

Refusal at 2.1 feet. Bottom of borehole at 2.1 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - TAGEOTECH SUPPORTITDOTIREGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



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CLIE	NT TD	OT PRO	JECT NA	ME _	I-440							
PRO.	JECT NU	JMBER 216-137 PRO	JECT LO	CATIO	<u> </u>	Nashville, TI	N					
DAT	E STAR	TED <u>9/7/17</u>	OUND ELE	VATI	ON _	557.4 ft						
DRIL	LER A	dam Cash GRO	OUND WA	TER L	EVE	LS:						
DRIL	LING MI	ETHOD Hollow Stem Auger	AT TIME	OF	DRILL	_ING						
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT END	OF E	RILL	ING						
NOT	ES		AFTER	DRIL	LING							
O DEPTH		MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC HIMIT LIMIT		REMARKS
F.L		CONCRETE (8.5")										i
_		CRUSHED AGGREGATE (9.6") (CL) lean CLAY with boulder fill fragments, brown, moist, very stiff		SPT 1	67	14-13-12 (25)	4.2	6				i
5_5												
2		Refusal at 5.5 feet.										ı

Bottom of borehole at 5.5 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:00 - T./GEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTE



A	EL	PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220	DPO IEO	T NAME	1.440						B-17 E 1 OF 1
1	T_TDOT CT NUMBER _216-137		_	T NAME _.		Nashville, TI	N				
		COMPLETED 8/29/17		D ELEVAT			· ·				
1	ER Adam Cash			WATER							
	NG METHOD Hollow Ste	em Auger	_								
1	ED BY Clint Ervin					ING					
NOTES	·		_	TER DRII		<u></u>					
	GRAPHIC	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC LIMIT	S	REMARKS
B TESTINGN 440.	CONCRETE (10 CRUSHED AGO (CL) gravelly lea		 ist, hard	SPT 1		10-19-50 (69)		7			
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:00 - TAGEOTECH SUPPORTITIONREGION 3 ON-CALL SERVICES 2016-2020/1-440/GEOTECH/LAB TESTING/1-440.GPJ											
GEOTECH BH COLUMNS - GINT ST											



PROFESSIONAL ENGINEERING
65 Aberdeen Drive

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	Glasgow, KY 42141 (270) 651-7220									PAG	E 1 OF 1
CLIENT TO	OOT PRO	OJEC1	NAME	I-440							
PROJECT N	UMBER _216-137 PRO	OJEC1	LOCAT	ON _	Nashville, T	N					
DATE STAF	RTED 9/7/17 COMPLETED 9/7/17 GRO	OUND	ELEVAT	TION _	551.8 ft						
DRILLER _	Adam Thompson GRO	OUND	WATER	LEVE	LS:						
DRILLING N	METHOD HSA/ Diamond impregnated coring bit	ΑT	TIME OF	DRILI	LING						
LOGGED B	Y Nathaniel Blackburn CHECKED BY Dennis Mitchell	ΑT	END OF	DRILL	.ING						
NOTES		AF	TER DRIL	LING							
O DEPTH O (ft) GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT LIMIT	} -	REMARKS
5	CRUSHED AGGREGATE (6") (CL) gravelly CLAY, brown to light gray, moist, hard LIMESTONE, light gray, thinly to thickly bedded, hard, weathered, fractured	^ -	SPT 1	90 (34)	5-12-20 (32)	4.5+	24	22	14	8	
	Refusal at 3.5 feet. Bottom of borehole at 8.5 feet.										

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - T\(\)GEOTECH SUPPORT\(\)TDOT\(\)REGION 3 ON-CALL SERVICES 2016-2020\(\)440\(\)GEOTECH\(\)LAB TESTING\(\)JAO.



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Boulder at 5.3'

		(270) 651-7220									17101	0
CLIEN	IT _TD	OOT P	PROJECT	ΓNAME .	I-440							
PROJ	ECT N	UMBER 216-137 F	PROJECT	LOCAT	ION _	Nashville, TN	١					
DATE	STAR	RTED 9/6/17 COMPLETED 9/6/17 G	GROUND	ELEVAT	ION _	549.6 ft						
DRILL	ER _/	Adam Thompson G	GROUND	WATER	LEVE	LS:						
DRILL	ING N	IETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	ED B	Y Nathaniel Blackburn CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRIL	LING							
o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC TIMIT		REMARKS
		CONCRETE (9.75") CRUSHED AGGREGATE (8.4") (CL) lean CLAY with gravel, brown, moist, very stiff to hard		SPT 1 SPT 2	100	12-10-10 (20) 3-9-27 (36)	4.5+ 3.0	15 27	33	15	18	

Refusal at 6.0 feet. Bottom of borehole at 6.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - T\(\)GEOTECH SUPPORT\(\)TDOT\(\)REGION 3 ON-CALL SERVICES 2016-2020\(\)440\(\)GEOTECH\(\)LAB TESTING\(\)JAO.



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	CLIEN	NT TD	OT PROJE	CT NAME	<u>l-440</u>						
	PROJ	ECT N	JMBER 216-137 PROJE	CT LOCA	ION _	Nashville, TI	N				
	DATE	STAR	TED 9/7/17 COMPLETED 9/7/17 GROUN	ID ELEVA	TION _	546.6 ft					
	DRILL	ER A	dam Cash GROUN	ID WATER	LEVE	LS:					
	DRILL	ING M	ETHOD Hollow Stem Auger	T TIME O	- DRIL	LING					
	LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell A	T END OF	DRILL	ING					
				FTER DR	LLING						
2 5	o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT LIMIT	REMARKS
ECHLAD I ECHINOLIA	 5	• •	CONCRETE (8.0") CRUSHED AGGREGATE (7.2") (CL) gravelly lean CLAY, coarse gravel and boulder fill fragments, dark brown, moist, hard	SPT 1		7-17-38 (55) 11-24-50 (74)	4.5 N/A	6			
GEC .			Refusal at 5.1 feet. Bottom of borehole at 5.1 feet.			(17)	,		•		

GEOTECH BH COLUMNS - GINT STD US LAB, GDT - 9/21/17 12:00 - TYGEOTECH SUPPORTITDOTIREGION 3 ON-CALL SERVICES 2016-20201/440/GEOTECHIL



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

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		(270) 651-7220								PAGI	E 1 OF 1
CLIE	NT TD	OT PROJECT	T NAME	I-440							
PRO.	JECT N	UMBER 216-137 PROJEC	T LOCAT	ON _	Nashville, TI	N					
DATE	E STAR	TED <u>8/29/17</u>	ELEVA1	TION _	543.2 ft						
DRIL	LER A	dam Cash GROUND	WATER	LEVE	LS:						
DRIL	LING M	ETHOD Hollow Stem Auger AT	TIME OF	DRILI	LING						
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell AT	END OF	DRILL	.ING						
NOTE	ES	AF	TER DRI	LLING							
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT LIMIT	} -	REMARKS
ES		CONCRETE (10") CRUSHED AGGREGATE (4") (CL-ML) gravelly silty CLAY, boulder fill fragments, grayish brown to brown, moist, hard	SPT 1	80	12-24-30 (54)	2.0	8				
440/GEO ECHILAB		(CL) gravelly lean CLAY, boulder fill fragments, brown, dry, hard	SPT 2 SPT 3	53	8-15-31 (46) 12-29-50 (79)	4.5+ N/A	5	27	13	14	
	<u>r////</u>	Refusal at 7.3 feet. Bottom of borehole at 7.3 feet.		4	\	1			-		

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/2/1/7 12:00 - T.\GEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-



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CLIEN	NT TD	OOT PRO	OJEC	NAME	I-440						
PROJ	ECT N	UMBER 216-137 PRO	OJEC ⁻	LOCAT	ION _	Nashville, TI	N				
DATE	STAR	TED <u>9/7/17</u> COMPLETED <u>9/7/17</u> GR	OUND	ELEVAT	ION _	557.3 ft					
DRILL	ER A	dam Cash GR	OUND	WATER	LEVE	LS:					
DRILL	ING M	ETHOD Hollow Stem Auger	ΑT	TIME OF	DRILI						
LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell	ΑT	END OF	DRILL	ING					
NOTE	S		AF	TER DRII	LING						
SAMPLE TYPE NUMBER NUMBER (RQD) BLOW COUNTS (RQD) CONTENT (%) LIQUID LIMIT PLASTICITY INDEX INDE								REMARKS			
		CONCRETE (10.0") — CRUSHED AGGREGATE (6.0") (CL) gravelly lean CLAY with medium sized boulder fill fragments, brown, moist, stiff	 ⁄- ⁻	SPT 1	60	7-11-9 (20)	1.0	6			
		Refusal at 3.3 feet. Bottom of borehole at 3.3 feet.									

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1-440/GEOTECH/LAB TESTING/1-440.GPJ



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		(270) 651-7220									17101	- 1 01 1
CLIE	NT TD	ОТ	PROJEC	TNAME	I-440							
PROJ	IECT N	UMBER _ 216-137	PROJEC	T LOCAT	ION _	Nashville, TI	N					
DATE	STAR	TED 9/6/17 COMPLETED 9/6/17	GROUND	ELEVA1	TION _	569.3 ft						
DRIL	LER _A	dam Cash	GROUNE	WATER	LEVE	LS:						
DRIL	LING M	ETHOD Hollow Stem Auger	_ A T	TIME OF	DRIL	LING						
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT		REMARKS
		CONCRETE (7.75") CRUSHED AGGREGATE (6.0") (GC) clayey GRAVEL, grayish clay, moist, medium dense,		SPT 1	33	10-14-15 (29)	N/A	4	-			
		Refusal at 3.1 feet. Bottom of borehole at 3.1 feet.										

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



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ı			(270) 651-7220								FAGI	= 1 OF 1			
ı	CLIEN	IT _TD	OOT PROJECT	CT NAME	<u>l-440</u>										
l	PROJE	ECT N	UMBER 216-137 PROJECT	PROJECT LOCATION Nashville, TN											
l	DATE	STAR	TED <u>8/29/17</u>	GROUND ELEVATION 570.1 ft											
ı	DRILL	.ER _/	dam Cash GROUN	GROUND WATER LEVELS:											
ı	DRILL	ING M	ETHOD Hollow Stem Auger	AT TIME OF DRILLING											
ı	LOGG	ED BY	Clint Ervin CHECKED BY Dennis Mitchell A	T END OF	DRILL	ING									
l	NOTE	s	A	FTER DRI	LLING										
5	o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	TIMIT CIMIT	PLASTIC FIMIT LIMIT		REMARKS			
LOI L. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	 5		CONCRETE (11") CRUSHED AGGREGATE (4") (ML) gravelly SILT with boulder fragments, brown, dry, hard (CL) lean CLAY with boulder fill fragments, brown, moist to wet, stiff	SPT 1 SPT 2	73	18-61-37 (98) 12-18-6 (24)	N/A 1.0	3 35	36	15	21				
3			Refusal at 5.0 feet.												

Bottom of borehole at 5.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



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		(=: 5) 55: 1 ==5										
CLIE	NT TD	OT	PROJECT	NAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJECT LOCATION Nashville, TN									
DATE	STAR	TED <u>8/29/17</u>	GROUND	ELEVAT	TION _	563.5 ft						
DRIL	LER A	dam Cash (GROUND	WATER	LEVE	LS:						
DRILI	LING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRIL	LING							
o DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	TIMIT LIMIT	PLASTIC FIMIT LIMIT	} -	REMARKS
		CONCRETE (7.5") CRUSHED AGGREGATE (19.2") (CL) lean CLAY with boulder fill fragments, brown, moist, hard		SPT 1	67	12-21-17 (38)	N/A	9				
		Refusal at 3.8 feet. Bottom of borehole at 3.8 feet.										

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

PAGE 1 OF 1

		(270) 651-7220												
CLIEN	NT TD	OOT PR	OJECT	NAME	I-440									
PROJECT NUMBER 216-137				LOCAT	ION _N	Nashville, T	N							
DATE	STAR	TED <u>9/6/17</u>	ROUND	ELEVAT	ION _	561.5 ft								
DRILL	ER A	Adam Cash GR	GROUND WATER LEVELS:											
DRILL	ING M	ETHOD Hollow Stem Auger	AT TIME OF DRILLING											
LOGG	SED BY	CHECKED BY Dennis Mitchell	ΑT	END OF	DRILL	ING								
NOTE	s		AF	TER DRIL	LING									
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l	PLASTIC PLASTIC LIMIT	3	REMARKS		
		CRUSHED AGGREGATE (6.0") (CL) lean CLAY trace gravel and fill fragments, dark brown, dry, v stiff	 /ery	SPT 1	47	7-6-17 (23)	4.5+	15						
	Refusal at 3.0 feet.													

Bottom of borehole at 3.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:00 - T\(\)GEOTECH SUPPORT\(\)TDOT\(\)REGION 3 ON-CALL SERVICES 2016-2020\(\)440\(\)GEOTECH\(\)LAB TESTING\(\)JAO.



AK			INEERING erdeen Drive w, KY 42141									-	B-28			
CLIENT TD	OT	(27	(0) 651-7220	PROJEC	TNAME	I-440						PAGI	E 1 OF 1			
				PROJECT LOCATION Nashville, TN												
	•	COMPLETED		_												
	dam Thompson				WATER											
DRILLING MI	ETHOD HSA/ Diar	mond impregnated coring	g bit	_ A1	TIME OF	DRILL	.ING									
LOGGED BY Nathaniel Blackburn CHECKED BY Dennis Mitchell							ING									
NOTES		AFTER DRILLING														
o DEPTH (ft) GRAPHIC LOG		MATERIAL DESCR	IPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		PLASTIC HIMIT LIMIT		REMARKS			
11NG/1440		.75") GREGATE (4.2") Inded GRAVEL with sand	 , brown to gray, mo		▼ SPT	100	6-8-12	N/A	6	_						
ES.	medium dense				1 RC	0.4	(20)									
1440\GEOTECHLAE	EIMESTONE, IIG fractured, 45 de	ght to medium gray, thin gree bedding planes like	ly to thickly bedded. Ily boulders or dippi	, nard, ng rock	2	84 (48)										
5020		Refusal at 8.0	foot													
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:00 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\(1440\)\GEOTECH\LAB TESTING\(1440\)\GEOTECH\LAB TEST																



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DATE STA DRILLER DRILLING LOGGED I	DOT	PROJECT LOCATION Nashville, TN GROUND ELEVATION 579.1 ft GROUND WATER LEVELS: AT TIME OF DRILLING AT END OF DRILLING										
O DEPTH O (ff) GRAPHIC	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT	} 	REMARKS	
5	CRUSHED AGGREGATE (7") (CL) lean CLAY with gravel, brown to dark brown, moist, ve	y stiff	SPT 1 ST 2	93	7-10-13 (23)	4.5+		44	20	24		
10	(CL) lean CLAY trace gravel, brown, moist, stiff Bottom of borehole at 10.0 feet.		SPT 3 SPT 4	100	2-3-7 (10) 4-3-9 (12)	4.4	22	44	20	24		

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:00 - T.:GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SER\



PROFESSIONAL ENGINEERING

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		(=1.5)										
CLIE	NT T	OOT PRO	JECT	NAME	I-440							
PRO.	JECT N	UMBER 216-137 PRO	JECT	LOCAT	_ NO I	Nashville, TI	N					
DATI	E STAR	RTED <u>8/29/17</u>	UND	ELEVA1	TION _	584.2 ft						
DRIL	LER _/	Adam Cash GRO	UND	WATER	LEVE	LS:						
DRIL	LING N	1ETHOD Hollow Stem Auger	Z AT	TIME OF	DRIL	L ING 3.0 f	t / Elev	/ 581.2	20 ft			
LOG	GED B	Y Clint Ervin CHECKED BY Dennis Mitchell	ΑT	END OF	DRILL	.ING						
NOTI	ES		AF	TER DRII	LING							
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ı	PLASTIC FIMIT LIMIT	<u>}</u>	REMARKS
- -		CONCRETE (8") CRUSHED AGGREGATE (4.2") (GC) clayey GRAVEL and boulder fill fragements, brown to gray, dr dense (CL) lean CLAY trace boulder fragements, brown, moist to wet, very stiff		SPT 1	80	13-17-20 (37) 15-7-9 (16)	N/A 4.5	14	41	22	19	Water on spoon after sample
	<u> </u>	Refusal at 4.5 feet.				,						

Bottom of borehole at 4.5 feet.



		PR		w, KY 42141									-	B-31
CI IEN	IT TO	OT.	(27	0) 651-7220	DDO IEC	TNAME	1.440						FAGE	I OF I
								lachville T	N					
				-					IN					
		·		Dennis Mitchell										
NOIL					AF	I EK DKI	LLING			1			DC	
o DEPTH (ft)	GRAPHIC LOG	ņ	MATERIAL DESCRI	IPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		IMITS		REMARKS
	D 5 4	CONCRETE (10.0")												
-		CRUSHED AGGREG (CL) lean CLAY with very stiff	SATE (4.8") some gravel, dark b	brown to brown, mois	st, hard to	SPT 1	80	8-8-10 (18)	4.5	29	41	24	17	
5		(CH) fat CLAY trace moist, stiff	small gravel, yellow	rish brown to light bro	 own,	SPT 2	73	4-3-6 (9)	4.2	26	52	23	29	
-		(CL) lean CLAY, brow	wn, moist, stiff			SPT 3	100	3-4-5 (9)	2.3	15				
-		(CL) sandy lean CLA	Y trace fine gravel,	brown, dry, medium	stiff	SPT	0	3-3-3	N/A	25	39	17	22	
	PROJIDATE DRILL DRILL LOGG NOTE (‡)	DRILLING M LOGGED BY NOTES TOTAL O O TOTAL TOTAL O TOTAL TOTAL	DRILLER Adam Cash DRILLING METHOD Hollow Stem A LOGGED BY Clint Ervin NOTES CONCRETE (10.0") CRUSHED AGGREG (CL) lean CLAY with very stiff (CH) fat CLAY trace moist, stiff (CL) lean CLAY, brov (CL) sandy lean CLA	DRILLER Adam Cash DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY NOTES CONCRETE (10.0") CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark invery stiff (CL) lean CLAY brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, 10	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 DRILLER Adam Cash DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell NOTES MATERIAL DESCRIPTION CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to brown, moivery stiff (CH) fat CLAY trace small gravel, yellowish brown to light bromoist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium	PROJECT NUMBER 216-137 PROJECT DATE STARTED 9/6/17 COMPLETED 9/6/17 GROUND DRILLER Adam Cash GROUND DRILLING METHOD Hollow Stem Auger AT LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell AT NOTES AF CONCRETE (10.0") CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to brown, moist, hard to very stiff (CL) lean CLAY trace small gravel, yellowish brown to light brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 GROUND ELEVATORILLER Adam Cash DRILLER Adam Cash DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell AT END OF NOTES MATERIAL DESCRIPTION CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to brown, moist, hard to very stiff (CL) lean CLAY trace small gravel, yellowish brown to light brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff SPT 4	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 GROUND ELEVATION EDUCATION DESCRIPTION DRILLER Adam Cash DRILLING METHOD Hollow Stem Auger AT TIME OF DRILL AT END OF DRILLING METHOD CHECKED BY Dennis Mitchell NOTES AFTER DRILLING MATERIAL DESCRIPTION CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to brown, moist, hard to very stiff (CL) lean CLAY with some gravel, yellowish brown to light brown, moist, stiff (CL) lean CLAY, brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff SPT 100 SPT 100 SPT 0 SPT 100 SPT 0 SPT 100 SPT 0 SPT 0 SPT 0	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 GROUND ELEVATION 582.7 ft GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell AT END OF DRILLING NOTES AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to brown, moist, hard to very stiff (CL) lean CLAY trace small gravel, yellowish brown to light brown, moist, stiff (CL) lean CLAY, brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff SPT 73 4-3-6 (9) (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff SPT 0 3-3-3 4 0 3-3-3 6)	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 GROUND ELEVATION 582.7 ft GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell NOTES MATERIAL DESCRIPTION MATERIAL DESCRIPTION CCONCRETE (10.0") CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to light brown, moist, stiff (CL) lean CLAY trace small gravel, yellowish brown to light brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff SPT 100 3-3-3 (9) Nashville, TN GROUND ELEVATION 582.7 ft GROUND WATER LEVELS: AT TIME OF DRILLING AT END OF DRILLING AFTER DRILLING	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 DRILLER Adam Cash CROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell NOTES MATERIAL DESCRIPTION MAT	PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 DRILLER Adam Cash CROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell NOTES MATERIAL DESCRIPTION MATERIAL DESCRIPTION MATERIAL DESCRIPTION CRUSHED AGGREGATE (4.8") (CL) lean CLAY with some gravel, dark brown to light brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff PROJECT LOCATION Nashville, TN GROUND ELEVATION 582.7 ft GROUND WATER LEVELS: AT TIME OF DRILLING AT END OF DRILLING AT END OF DRILLING ATTERBEL LIMITS ATTER	PROJECT NUMBER 216-137 DATE STARTED 9/6/17 COMPLETED 9/6/17 DRILLER Adam Cash CRILLING METHOD Hollow Stem Auger LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell MATERIAL DESCRIPTION MATERIAL DESCRIPTION CONCRETE (10.0") CONCRETE (10.0") CRUSHED AGGREGATE (4.8") (CL) lean CLAY trace small gravel, yellowish brown to light brown, moist, stiff (CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff PROJECT LOCATION Nashville, TN GROUND ELEVATION 582.7 ft GROUND WATER LEVELS: AT TIME OF DRILLING AT END OF DRILLING AT END OF DRILLING ATTERBERG LIMITS ATTERBERG LIMIT



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		(270) 651-7220									17101	_ ' O' '
CLIEN	IT TD	OT	PROJEC	T NAME	I-440							
PROJE	ECT N	UMBER 216-137	PROJEC	T LOCAT	ION _	Nashville, T	N					
DATE	STAR	TED <u>9/6/17</u> COMPLETED <u>9/6/17</u>	GROUND	ELEVA1	TION _	576.1 ft						
DRILL	ER A	dam Thompson	GROUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILL							
LOGG	ED BY	Nathaniel Blackburn CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING						
NOTE	s		AF	TER DRII	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT		REMARKS
	•	CONCRETE (7.25") CRUSHED AGGREGATE (13.25")										
,		Refusal at 1.7 feet.										

Bottom of borehole at 1.7 feet.



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CLIE	NT TD	OT PROJE	CT NAME	<u>l-440</u>							
PROJ	ECT N	JMBER <u>216-137</u> PROJE	CT LOCAT	TION _	Nashville, Tl	N					
DATE	STAR	TED <u>8/29/17</u>	ND ELEVA	TION _	561.6 ft						
DRILI	LER A	dam Cash GROUI	ND WATER	LEVE	LS:						
DRILI	LING M	ETHOD Hollow Stem Auger	AT TIME O	F DRIL	LING						
LOGG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT END OF	DRILL	_ING						
NOTE	s		AFTER DRI	LLING							
o DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC IMIT	S >-	REMARKS
5		CONCRETE (9.5") CRUSHED AGGREGATE (7.2") (GC) clayey GRAVEL with boulder fill fragments, brown clay, white to gray boulders, dry, very dense to dense	SPT 1 SPT 2	60	7-21-33 (54) 14-15-16 (31)	N/A N/A	8				no recovery; flight sample obtained
		Refusal at 5.2 feet.	•	•			•	•			



PROFESSIONAL ENGINEERING

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PAGE 1 OF 1

CLIENT TDOT	PROJECT NAME 1-440											
PROJECT NUMBER 216-137	PROJECT LOCATION Nashville, TN											
DATE STARTED 8/30/17 COMPLETED 8/30/17	GROUND ELEVATION 542.2 ft											
DRILLER Adam Cash	GROUND WATER LEVELS:											
DRILLING METHOD Hollow Stem Auger	AT TIME OF DRILLING											
LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell	AT END OF DRILLING											
NOTES	AFTER DRILLING											
	β β β ATTERBERG LIMITS											
	│ H │ S │ Y											

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		PLASTIC INIT LIMIT		REMARKS
	• •	CONCRETE (7.5") CRUSHED AGGREGATE (6.0") (CL) lean CLAY, brown, dry to moist, very stiff	SPT 1	64	7-7-50 (57)	4.5+	10	33	16	17	

Refusal at 2.2 feet. Bottom of borehole at 2.2 feet.



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		(270) 651-7220										
CLIEN	NT TD	OOT PR	ROJEC	T NAME	I-440							
PROJ	ECT N	UMBER 216-137 PR	ROJEC	T LOCAT	ION _	Nashville, TI	N					
DATE	STAR	TED <u>9/6/17</u>	ROUND	ELEVAT	ION _	535.1 ft						
DRILL	LER A	Adam Cash GF	ROUND	WATER	LEVE	LS:						
DRILL	LING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILI	_ING						
LOGG	GED BY	CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING						
NOTE	s		AF	TER DRII	LING							
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		PLASTIC PLASTIC LIMIT		REMARKS
		CONCRETE (10.5") CRUSHED AGGREGATE (4") (CL) gravelly lean CLAY, coarse gravel, brown, dry to moist, hard	<u>-</u>	SPT 1	60	6-6-24 (30)	4.5	7	48	18	30	

Refusal at 3.4 feet. Bottom of borehole at 3.4 feet.



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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		(270) 031-7220									
CLIE	NT _TE	OOT PRO	JECT NAI	/IE <u> </u> -440)						
PRO	JECT N	UMBER _216-137 PRO.	JECT LO	CATION	Nashville, T	N					
DATI	STAR	TED <u>9/6/17</u>	UND ELE	VATION	530.1 ft						
DRIL	LER _/	Adam Thompson GRO	UND WAT	ER LEVI	ELS:						
DRIL	LING N	IETHOD Hollow Stem Auger	AT TIME	OF DRIL	LING						
LOG	GED B	Jackson Daugherty CHECKED BY Dennis Mitchell	AT END	OF DRIL	LING						
NOTI	ES		AFTER I	ORILLING	} <u></u>						
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER RECOVERY % (ROD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	TIMIT LIMIT	PLASTIC FINIT LIMIT	S -	REMARKS
_		CONCRETE (8.25") — CRUSHED AGGREGATE (6") (GW) GRAVEL with sand, brown to gray, moist, very dense		PT 100 1	10-30-22 (52)	N/A	4				
!		Refusal at 3.5 feet.									

Bottom of borehole at 3.5 feet.



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

		(270) 651-7220									FAGI	= 1 OF 1
CLIEN	NT TD	OT	PROJECT	NAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJECT	LOCAT	_ NOI	Nashville, TI	N					
DATE	STAR	TED <u>8/30/17</u> COMPLETED <u>8/30/17</u>	GROUND	ELEVA1	TION _	528 ft						
DRILL	ER A	dam Cash	GROUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l .	PLASTIC LIMIT	S	REMARKS
		CONCRETE (9.5") CRUSHED AGGREGATE (8.5") (CL) gravelly lean CLAY with boulder fill fragments, brown, n	noist, hard	SPT 1	73	10-30-50 (80)	3.2	8				
		Refusal at 2.6 feet.										

Bottom of borehole at 2.6 feet.



AEL	PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220								-	B-38 E 1 OF 1
CLIENT TDOT		PROJECT	NAME	I-440						
PROJECT NUMBER	2 216-137	PROJEC1	LOCAT	ION _N	lashville, Tl	N				
DATE STARTED _8	3/30/17 COMPLETED 8/30/17	GROUND	ELEVAT	ION _	525.7 ft					
DRILLER Adam Ca	ash	GROUND	WATER	LEVE	.S:					
DRILLING METHOD	MSA/ Diamond impregnated coring bit	AT	TIME OF	DRILL	.ING					
LOGGED BY Clint	Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING					
NOTES		AF'	TER DRIL	LING						
O DEPTH (ft) GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC LIMIT		REMARKS
CR (CL moi	NCRETE (8') USHED AGGREGATE (6") .) lean CLAY with small gravel and boulder fragment fill, brist, very stiff MESTONE, white to gray, thinly to thickly bedded, moderate hly fractured, moderately weathered,		SPT 1	70 (10)	9-15-12 (27)	3.0	11			
	Refusal at 4.0 feet. Bottom of borehole at 9.0 feet.									

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - T.\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\|440\\GEOTECH\LAB\TEST\NG\|440\\GEOTECH\LAB\TEST\NG\|40\\GEOTECH\LAB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|AB\TEST\NG\|40\\GEOTECH\|40\\GEOTECH\|40\\GEOTECH\|40\\GEOTECH\|40\\GEOTECH\|40\\GEOTECH\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\GOT\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|40\TE\|



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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		(270) 631-7220											
CLIEN	NT TD	OT	PROJEC	NAME	I-440								
PROJ	ECT N	JMBER 216-137	PROJEC	T LOCAT	ION N	Nashville, T	N						
DATE	STAR	TED 9/6/17 COMPLETED 9/6/17	GROUND	ELEVA1	TION _	526 ft							
DRILL	ER A	dam Thompson	GROUND	WATER	LEVE	LS:							
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILL	LING							
LOGG	ED BY		AT	END OF	DRILL	.ING							
NOTE	s		AF	TER DRII	LLING								
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l .	PLASTIC LIMIT	} >	REMARKS	
		CONCRETE (10") CRUSHED STONE BASE (13.75")											
		Defined at 0.0 feet											

Refusal at 2.0 feet. Bottom of borehole at 2.0 feet.



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	A		65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220									PAGI	B-40 E 1 OF 1
l	CLIEN	IT _TD	DOT PRO	OJECT	NAME	I-440							
ı	PROJ	ECT N	UMBER _216-137 PRO	OJECT	LOCAT	NOI	Nashville, Tl	N					
ı	DATE	STAR	TED <u>9/6/17</u>	OUND	ELEVAT	ION _	528.4 ft						
ı	DRILL	ER _A	Adam Cash GRC	OUND	WATER	LEVE	LS:						
ı	DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILI	LING						
ı	LOGG	ED B	CHECKED BY Dennis Mitchell	ΑT	END OF	DRILL	.ING						
l	NOTE	s		AF1	TER DRII	LING							
İ					ш	%	S	-j	(9)	AT	TERBE		
ı	Ŧ	GRAPHIC LOG			SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	<u> </u>			ЗКS
ı	DEPTH (ft)	SAPI LOG	MATERIAL DESCRIPTION		ار JMB	Rac	/ CC	(tsf)	IST	LIQUID	STIC	ēΨ	REMARKS
ı		9			N N) EC	N-CO	00	88	≘≦	PLASTIC LIMIT	PLASTICITY INDEX	RE
5	0	20 0000 000 0			0)	ш.	B	Ь.			_	Ч	
?		• •	CONCRETE (8") CRUSHED AGGREGATE (6")	- <u>-</u>									
			(CL) lean CLAY with gravel and boulder fragment fill, brown. moist, very stiff	t,	SPT 1	73	5-10-10 (20)	4.5+	11				
	 		(GW) GRAVEL and boulder fragment fill, trace clay, white to light g moist, medium dense	gray,									
	5		(CL) gravelly lean CLAY with boulder fragment fill, brown, moist, st	stiff	SPT 2	47	6-9-10 (19)	N/A	7				
1					-								
107	-			•	SPT 3	53	14-8-7	1.5	16	-			
2	_			4	3		(15)			-			
000	10				SPT 4	87	5-7-5 (12)	1.25	26	35	22	13	
			Bottom of borehole at 10.5 feet.						•	•			
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PROFESSIONAL ENGINEERING

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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	(270) 331 7220									
CLIENT _	DOT	PROJEC	TNAME	I-440						
PROJECT	NUMBER 216-137	PROJEC	T LOCAT	ION _	Nashville, TI	N				
DATE STA	RTED <u>8/30/17</u> COMPLETED <u>8/30/17</u>	GROUNE	ELEVA1	TION _	530.5 ft					
DRILLER	Adam Cash	GROUNE	WATER	LEVE	LS:					
DRILLING	METHOD Hollow Stem Auger	АТ	TIME OF	DRIL	LING					
LOGGED I	BY Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING					
NOTES _		AF	TER DRII	LING						
O DEPTH (ft) GRAPHIC	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT	REMARKS
	CONCRETE (9.5") CRUSHED AGGREGATE (7.2") (CL) gravelly lean CLAY, brown, dry to moist, stiff		SPT 1	87	18-13-10 (23)	1.5	14			

Refusal at 4.0 feet. Bottom of borehole at 4.0 feet.



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

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			(270) 651-7220								1710	0
	CLIEN	IT TD	OT PROJECT	T NAME	I-440							
	PROJ	ECT N	UMBER 216-137 PROJEC	T LOCAT	NOI	Nashville, Ti	٧					
	DATE	STAR	TED <u>8/30/17</u> COMPLETED <u>8/30/17</u> GROUN	D ELEVA	TION _	532.4 ft						
	DRILL	ER A	dam Cash GROUN	D WATER	LEVE	LS:						
	DRILL	ING M	ETHOD Hollow Stem Auger	T TIME OF	DRIL	LING						
	LOGG	ED BY	Clint Ervin CHECKED BY Dennis Mitchell A	T END OF	DRILL	.ING						
	NOTE	s	A	FTER DRI	LLING							
J	DЕРТН (#)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIMIT LIMIT	PLASTIC HIMIT	} -	REMARKS
AB LESTING/1-440.GP	0 	•	CONCRETE (7.5") CRUSHED AGGREGATE (6") (CL) lean CLAY with boulder fragment fill, brown, moist, stiff to hard, boulder at end of sample	SPT 1	73	6-30-36 (66)	4.5	13			<u></u>	
2020\I-440\GEO I ECH\L	5 		(CL) lean CLAY with some gravel, brown, moist, medium stiff	SPT 2 SPT 3	0	13-28-19 (47) 9-9-13 (22)	N/A N/A	16 25				No recovery in SPT; flight sample obtained No recovery in SPT; flight sample obtained

Refusal at 8.3 feet. Bottom of borehole at 8.3 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - 17/GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2



PROFESSIONAL ENGINEERING

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220 **B-43**

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CLIENT TDOT	PROJECT NAME 1-440
PROJECT NUMBER 216-137	PROJECT LOCATION Nashville, TN
DATE STARTED 8/30/17 COMPLETED 8/30/17	GROUND ELEVATION 529.3 ft
DRILLER Adam Cash	GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger	AT TIME OF DRILLING
LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell	AT END OF DRILLING
NOTES	AFTER DRILLING
	ш s g ATTERBERG

L											
GPJ	o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC PLASTIC LIMIT	-	REMARKS
TESTING/I-440.			CONCRETE (10.0") CRUSHED AGGREGATE (6.0") (CL) gravelly lean CLAY, coarse gravel and boulder fill fragments, dark brown, dry, hard	SPT 1	86	7-12-50 (62)	4.5	5			
⊢ I											

Refusal at 2.7 feet. Bottom of borehole at 2.7 feet.



PROFESSIONAL ENGINEERING

65 Aberdeen Drive Glasgow, KY 42141

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		(270) 651-7220								17101	_ ' O' '
CLIEN	NT _TE	OOT PROJE	CT NAMI	I -440							
PROJ	IECT N	UMBER 216-137 PROJE	CT LOCA	ATION _	Nashville, T	N					
DATE	STAR	TED 9/6/17 COMPLETED 9/6/17 GROU	ND ELEV	ATION _	517.5 ft						
DRILL	LER _/	Adam Cash GROU	ND WATE	R LEVE	LS:						
DRILL	LING N	IETHOD Hollow Stem Auger	AT TIME	OF DRIL	LING						
LOGG	GED B	Y Clint Ervin CHECKED BY Dennis Mitchell	AT END C	F DRILL	_ING						
NOTE	s		AFTER DI	RILLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	} -	REMARKS
5		CONCRETE (7.75") CRUSHED AGGREGATE (4.8") (CL) gravelly lean CLAY, coarse gravel and boulder fill fragments, light brown, moist, stiff (CL) gravelly lean CLAY, coarse gravel and boulder fill fragments, brown, dry to miost, stiff to hard	SP 2	T 60	7-6-5 (11) 5-4-42 (46)	3.8	20	39	20	19	
		Refusal at 5.5 feet.									

Bottom of borehole at 5.5 feet.



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	65 Aberdeen Drive Glasgow, KY 42141 (270) 651 7320										D-43 E 1 OF 1
CLIENT TD	(270) 651-7220 DOT	PROJEC	T NAME	<u>l-440</u>							
	UMBER _216-137				Nashville, T	N					
DATE STAR	TED <u>8/30/17</u>	GROUNI	ELEVA1	TION _	510.3 ft						
DRILLER A	Adam Cash	GROUNI	WATER	LEVE	LS:						
DRILLING M	IETHOD Hollow Stem Auger	A1	TIME OF	DRILI							
LOGGED BY	CHECKED BY Dennis Mitchell	A1	END OF	DRILL	ING						
NOTES		AF	TER DRI	LLING							
O DEPTH (ft) GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		PLASTIC FINIT LIMIT	} 	REMARKS
	CRUSHED AGGREGATE (6.0") (ML) gravelly SILT, grayish brown, dry, medium stiff		SPT 1	27	15-28-21 (49)	N/A	10	-			
	(CL) gravelly lean CLAY trace sand, grayish brown, moist, st Refusal at 4.7 feet.	tiff 	SPT 2	71	9-50	N/A	5	-			



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		(270) 631-7220								
CLIE	NT TD	OT PROJECT	CT NAME	I-440						
PROJ	ECT N	UMBER 216-137 PROJECT	CT LOCAT	ION _	Nashville, T	N				
DATE	STAR	TED <u>8/30/17</u> COMPLETED <u>8/30/17</u> GROUN	D ELEVA	TION _	512.8 ft					
DRIL	LER A	dam Cash GROUN	D WATER	LEVE	LS:					
DRIL	LING M	ETHOD Hollow Stem Auger	T TIME OF	DRIL	LING					
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell A	T END OF	DRILL	ING					
NOTE	s	A	FTER DRI	LLING						
o DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT LIMIT	REMARKS
		CONCRETE (8.75") CRUSHED AGGREGATE (8.5") (CL) gravelly lean CLAY with boulder fragment fill, brown, moist, very stiff	SPT 1	60	6-12-15 (27)	2.25	12			
	Refusal at 3.6 feet.									



PROFESSIONAL ENGINEERING 65 Aberdeen Drive

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	.				w, KY 42141 70) 651-7220									PAGE	E 1 OF 1
	CLIEN	IT _TD	ОТ			PROJEC	TNAME	I-440							
	PROJ	ECT N	JMBER 216-137			PROJEC	T LOCAT	_ NOI	Nashville, TN	N					
	DATE	STAR	TED _9/6/17	COMPLETED	9/6/17	GROUNE	ELEVA1	TION _	531.9 ft						
	DRILL	ER A	dam Cash			GROUNE	WATER	LEVE	LS:						
	DRILL	ING M	ETHOD Hollow Stem Au	iger		_ A T	TIME OF	DRILI	LING						
	LOGG	ED BY	Clint Ervin	_ CHECKED BY	Dennis Mitchell	_ AT	END OF	DRILL	.ING						
	NOTE	s				_ AF	TER DRII	LING							
	_	<u>0</u>					YPE :R	% \X	JNTS IE)	PEN.	RE (%)	AT1	TERBE LIMITS	3	
رد	O DEPTH (ff)	GRAPHIC LOG	M	IATERIAL DESCR	EIPTION		SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT	PLASTICITY INDEX	REMARKS
440.GI	U		CONCRETE (9.75")												
resting\∟			CRUSHED AGGREG (CL) gravelly lean CLA brown to grayish brow	AY, coarse gravel	and boulder fill fragnard	nents,	SPT 1	40	10-11-13 (24)	1.5	6				
OTECH\LAB '	 5						SPT 2	33	12-22-20 (42)	N/A	5				
2020\I-440\GEOTECH\LAB TESTING\I-440.GPJ	 						SPT 3	33	5-5-11 (16)	1.5	15				
S 2016-2		1/////	В	Refusal at 8.4 ottom of borehole					ı		1				

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICE



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	$\mid F \mid$			Glass	SINEERING Aberdeen Drive gow, KY 42141 270) 651-7220								B-48 E 1 OF 1
	CLIE	NT TE	ООТ		270,001.7220	_ PROJEC	T NAME	I-440					
	PROJ	ECT N	UMBER 216-137				T LOCAT	ION N	ashville, T	N			
	DATE	STAR	TED 9/5/17	COMPLETED	9/5/17	_ GROUNI	D ELEVAT	TION _5	46.9 ft				
	DRILI	ER _/	Adam Thompson			GROUNI	D WATER	LEVEL	.S:				
	DRILI	ING M	IETHOD HSA/ Dia	mond impregnated cori	ng bit	_ A1	TIME OF	DRILL	ING				
	LOGG	SED BY	/ Jackson Daugher	rty CHECKED B	Y Dennis Mitchell	_ A1	FEND OF	DRILLI	NG				
	NOTE	s				_ AF	TER DRIL	LLING					
.GPJ	O DEPTH (ft)	GRAPHIC LOG		MATERIAL DESC	RIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC FIMIT LIMIT	REMARKS
STING\I-440.			(GW) GRAVEL limestone	"), coarse to fine grained	, white to gray, very	 dense, wx	▼ SPT	57	20-50	N/A	3		
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\1440\GEOTECH\LAB TESTING\\440.GPJ	_		LIMESTONE, n weathered	nedium to light gray, thi	nly bedded, hard, fra	actured,	RC 2	60 (12)					
-440\0							Ш						
2020\		<u> </u>		Refusal at 2.	7 feet.								
2016-				Bottom of borehole	e at 7.7 feet.								
ALL SERVIC													
ION 3 ON-C													
TYTDOT/REG													
CH SUPPOR													
- T:\GEOTE													
/21/17 12:01													
AB.GDT - 9													
T STD US L													
JMNS - GIN													
TH BH COLI													
GEOTEC													



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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		(270) 651-7220										
CLIEN	NT TD	OT PRO	OJECT	NAME	I-440							
PROJ	ECT N	JMBER _216-137 PRO	OJECT	LOCAT	_ NO I	Nashville, TI	١					
DATE	STAR	TED <u>9/5/17</u> COMPLETED <u>9/5/17</u> GR	OUND	ELEVAT	TION _	540.7 ft						
DRILL	ER A	dam Thompson GR	OUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	SED BY	Jackson Daugherty CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF1	TER DRII	LING							
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l .	PLASTIC PLASTIC LIMIT	-	REMARKS
		CONCRETE (10.75") CRUSHED AGGREGATE (7") (GW) GRAVEL, coarse and fine grained, white to light gray, dry to moist, very dense, wx limestone		SPT 1	100	21-30-20 (50)	N/A	8				

Refusal at 3.0 feet. Bottom of borehole at 3.0 feet.



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65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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CLIEN	IT TD	OT	PROJECT	T NAME	I-440							
PROJI	ECT N	JMBER 216-137	PROJECT	T LOCAT	ION _	Nashville, TI	N					
DATE	STAR	TED 9/5/17 COMPLETED 9/5/17	GROUND	ELEVAT	TION _	522.1 ft						
DRILL	ER A	dam Cash	GROUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILI	LING						
LOGG	ED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER RECOVERY % (RQD) BLOW COUNTS (N-VALUE) Area free free free free free free free f					MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	} -	REMARKS
	• •	CONCRETE (9.0") CRUSHED AGGREGATE (6.0") (CL) gravelly lean CLAY, coarse gravel, brown, moist to wet, s	 	SPT 1	36	5-10-50 (60)	1.5	7				
		Defined at 0.4 feet		$\overline{}$	$\overline{}$		$\overline{}$					

Refusal at 2.4 feet. Bottom of borehole at 2.4 feet.



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CLIENT TDOT PROJECT NAME | 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 8/30/17 **COMPLETED** 8/30/17 **GROUND ELEVATION** 517.9 ft DRILLER Adam Cash **GROUND WATER LEVELS:** DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING _---LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell AT END OF DRILLING _---**NOTES** AFTER DRILLING _---BLOW COUNTS (N-VALUE) ATTERBERG SAMPLE TYPE NUMBER POCKET PEN. (tsf) MOISTURE CONTENT (%) LIMITS GRAPHIC LOG RECOVERY (RQD) REMARKS DEPTH (ft) PLASTICITY INDEX PLASTIC LIMIT LIQUID MATERIAL DESCRIPTION CONCRETE (11.75")

100

6-26-50

4.5+

10

31

21

10

SPT

Refusal at 3.1 feet. Bottom of borehole at 3.1 feet.

(CL) lean CLAY with boulder fragments, brown, dry to moist, hard

CRUSHED AGGREGATE (6.0")



A 4

CONCRETE (10.0")

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CLIEN	IT _TD	OOT	PROJEC	T NAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJEC	T LOCAT	_ NOI	Nashville, T	N					
DATE	STAR	TED 8/30/17 COMPLETED 8/30/17	GROUNE	ELEVAT	TION _	522.3 ft						
DRILL	.ER _/	Adam Cash	GROUNE	WATER	LEVE	LS:						
DRILL	ING M	IETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	ED BY	Y Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRIL	LING							
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l .	PLASTIC LIMIT	-	REMARKS

SPT 1

12-23-29 (52)

4.5+

Refusal at 2.7 feet. Bottom of borehole at 2.7 feet.

CRUSHED AGGREGATE (3.6")
(CL) lean CLAY with boulder fill fragments, brown, dry, hard



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$\mid P \mid$	\ I			Aberdeen Drive sgow, KY 42141										B-53 1 OF 1
CLIEN	NT TD	OT			PROJEC	TNAME	I-440						17101	. 1 01 1
					_			ashville, T	N					
DRILL	ER A	dam Thompson			GROUNE	WATER	LEVEL	S:						
DRILL	ING M	ETHOD Hollow Ste	em Auger		_ AT	TIME OF	DRILL	ING						
LOGG	SED BY	Jackson Daugher	ty CHECKED I	BY Dennis Mitchell	_ AT	END OF	DRILLI	NG						
NOTE	:s				_ A F	TER DRI	LLING							
O DEPTH (ft)	GRAPHIC LOG		MATERIAL DES	CRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l	IMITS	}	REMARKS
	8 <i>7</i> 9 <i>X</i>	CRUSHED AGO	GREGATE (3.5")		<u>-</u>		100	50	4.0	8				
		(GC) clayey GR	Refusal at 2	2.3 feet.	imestone /	<u> 1</u>	l							
	DELLI LOGO NOTE	CLIENT TD PROJECT NI DATE STAR DRILLER A DRILLING M LOGGED BY NOTES	CLIENT _TDOT PROJECT NUMBER _216-137 DATE STARTED _9/5/17 DRILLER _Adam Thompson DRILLING METHOD _Hollow St. LOGGED BY _Jackson Daugher NOTES	CLIENT _TDOT PROJECT NUMBER _216-137 DATE STARTED _9/5/17	CLIENT _TDOT PROJECT NUMBER _216-137 DATE STARTED _9/5/17	CLIENT _TDOT	CLIENT TDOT PROJECT NAME PROJECT NUMBER 216-137 PROJECT LOCAT DATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVAN DRILLER Adam Thompson GROUND WATER DRILLING METHOD Hollow Stem Auger AT TIME OF LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT END OF NOTES AFTER DRIL ###################################	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION N DATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVATION 5 DRILLER Adam Thompson GROUND WATER LEVEL DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLI LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT END OF DRILLI NOTES AFTER DRILLING WATERIAL DESCRIPTION AFTER DRILLING CONCRETE (18") CRUSHED AGGREGATE (3.5") (GC) clayey GRAVEL, gray to brown, wet, very dense, wx limestone Refusal at 2.3 feet.	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TDATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVATION 525.4 ft DRILLER Adam Thompson GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT END OF DRILLING NOTES AFTER DRILLING MATERIAL DESCRIPTION SET JUNE 100 50 100 50 100 50 100 100 100 100 10	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVATION 525.4 ft DRILLER Adam Thompson GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT END OF DRILLING NOTES AFTER DRILLING NOTES AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING CONCRETE (18") CONCRETE (18") CRUSHED AGGREGATE (3.5") SPT 100 50 4.0 (GC) clayey GRAVEL, gray to brown, wet, very dense, wx limestone Refusal at 2.3 feet.	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 9/5/17 COMPLETED 9/5/17 DRILLER Adam Thompson GROUND ELEVATION 525.4 ft GROUND WATER LEVELS: AT TIME OF DRILLING NOTES AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING CONCRETE (18") CRUSHED AGGREGATE (3.5") (GC) clayey GRAVEL, gray to brown, wet, very dense, wx limestone Refusal at 2.3 feet.	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVATION 525.4 ft DRILLER Adam Thompson GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING NOTES AFTER DRILLING NOTES AFTER DRILLING AT END OF DRILLING AFTER DRILLING AFTER DRILLING AFTER DRILLING CONCRETE (18") CONCRETE (18") CRUSHED AGGREGATE (3.5") (GC) clayey GRAVEL, gray to brown, wet, very dense, wx limestone Refusal at 2.3 feet.	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVATION 525.4 ft DRILLER Adam Thompson GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT END OF DRILLING NOTES AFTER DRILLING NATERBE LIMITS ATTERBE LIMITS ATTERBE LIMITS ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: AT END OF DRILLING AFTER DRILLING ATTERBE LIMITS ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: AT TIME OF DRILLING ATTERBE LIMITS ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING ATTERBE LIMITS O HONOR STEMPTON WATER LEVELS: ATTIME OF DRILLING AT	CLIENT TDOT PROJECT NAME 1-440 PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN DATE STARTED 9/5/17 COMPLETED 9/5/17 GROUND ELEVATION 525.4 ft DRILLER Adam Thompson GROUND WATER LEVELS: DRILLING METHOD Hollow Stem Auger AT TIME OF DRILLING LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT END OF DRILLING NOTES AFTER DRILLING MATERIAL DESCRIPTION AT END OF DRILLING AFTER DRILLING AF



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CLIENT _	TDOT	PROJEC [®]	TNAME	I-440							
PROJECT	NUMBER 216-137	PROJEC	T LOCAT	NOI	Nashville, TI	N					
DATE ST	ARTED 9/6/17 COMPLETED 9/6/17	GROUND	ELEVAT	ION _	525.6 ft						
DRILLER	Adam Cash	GROUND	WATER	LEVE	LS:						
DRILLING	METHOD Hollow Stem Auger	AT	TIME OF	DRILI	LING						
LOGGED	BY Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTES _		AF	TER DRII	LING							
O DEPTH (ft) GRAPHIC	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l	PLASTIC PLASTIC LIMIT	} -	REMARKS
	CONCRETE (10.75") CRUSHED AGGREGATE (3.6") (CL) gravelly lean CLAY, gray, moist, hard		SPT 1	47	5-10-23 (33)	4.2	11	29	18	11	

Refusal at 2.8 feet. Bottom of borehole at 2.8 feet.



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			(=,										
c	LIENT	TD	OT	PROJEC	T NAME	I-440							
P	ROJEC	T NU	JMBER _216-137	PROJEC	T LOCAT	_ NOI	Nashville, TI	N					
	ATE ST	TAR	FED 8/30/17 COMPLETED 8/30/17	GROUNE	ELEVA	TION _	518.9 ft						
	RILLEF	R _A	dam Cash	GROUNE	WATER	LEVE	LS:						
	RILLIN	G M	ETHOD _ Hollow Stem Auger	AT	TIME OF	DRIL	LING						
L	.OGGE	BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING						
N	IOTES _			_ AF	TER DRI	LLING							
	O DEPTIN (ff) GRAPHIC	FOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	-	REMARKS
	5	•	CONCRETE (10.0") CRUSHED AGGREGATE (6.0") (GC) clayey GRAVEL with boulder fragments, dry, very den	se	SPT 1	73	12-27-25 (52) 25-23-15 (38)	N/A N/A	4				
į			Refusal at 5.6 feet. Bottom of borehole at 5.6 feet										ı



PROFESSIONAL ENGINEERING 65 Aberdeen Drive

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		Glasgow, KY 42141 (270) 651-7220								PAG	E 1 OF 1
CLIE	NT TD	OT PROJEC	T NAME	I-440							
PRO.	JECT N	JMBER 216-137 PROJEC	T LOCAT	_ NOI	Nashville, T	N					
DATE	E STAR	TED <u>8/31/17</u> COMPLETED <u>8/31/17</u> GROUND	ELEVA	TION _	527 ft						
DRIL	LER _A	dam Cash GROUNE	WATER	LEVE	LS:						
DRIL	LING M	ETHOD HSA/ Diamond impregnated coring bit AT	TIME OF	DRIL	LING						
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell AT	END OF	DRILL	.ING						
NOTE	ES	AF	TER DRI	LLING							
			, PE	% ,	YTS (ii)	z Z	E (%)	АТ	TERBE	3	· "
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT	PLASTICITY INDEX	REMARKS
1 ESTING/1440.GP		CONCRETE (9.0") — CRUSHED AGGREGATE (4.8") (CL) lean CLAY, brown, dry to moist, very stiff LIMESTONE, white to gray, thinly to thickly bedded, moderately hard,	SPT 1 RC	0 85	6-10-50 (60)	N/A	14	35	19	16	-
2201440/0EO ECHLAB ES ING/1440.0FJ		,, ,, ,, ,, ,, ,, ,	2	(56)							Weathered from 5.5' to 7.2' Clay filled void from 6.7' to 7.0'
20105		Refusal at 2.6 feet. Bottom of borehole at 8.0 feet.									

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - T\\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES (



PROFESSIONAL ENGINEERING 65 Aberdeen Drive

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			Glasgow, KY 42141 (270) 651-7220									PAGI	E 1 OF 1
CLIEN	NT TD	OT		PROJECT	NAME	I-440							
PROJ	ECT N	UMBER 216-137		PROJECT	LOCAT	ION N	Nashville, Tl	N					
DATE	STAR	TED 9/5/17	COMPLETED 9/5/17	GROUND	ELEVA	TION _	539.6 ft						
DRILL	ER A	Adam Cash		GROUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Aug	ger	_ AT .	TIME OF	DRILL							
LOGG	SED BY	Clint Ervin	CHECKED BY Dennis Mitchell	_ AT	END OF	DRILL	ING						
NOTE	s			_ AFT	ER DRI	LLING							
DEPTH (ft)	GRAPHIC LOG	M <i>i</i>	ATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	1	PLASTIC PLASTIC PLASTIC	} }	REMARKS
	•		ATE (6.0") Y, brown, moist, very stiff brown, moist, medium stiff		SPT 1	67 53	11-10-8 (18) 6-3-3 (6)	4.5	17				
	***********	Вс	Refusal at 6.2 feet. Itom of borehole at 6.2 feet.	<u>'</u>					•	•	•		

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/2/1/7 12:01 - T\\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016



			65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220									PAGI	E 1 OF 1
	CLIE	NT TD		PROJECT	ГИАМЕ	I-440							
	PRO.	JECT N	JMBER 216-137	PROJECT	LOCAT	ON _	Nashville, Tl	N					
	DATE	STAR	TED _9/5/17	GROUND	ELEVAT	TION _	553.4 ft						
	DRIL	LER A	dam Thompson	GROUND	WATER	LEVE	LS:						
	DRIL	LING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILI	LING						
	LOG	GED BY	Jackson Daugherty CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
	NOTE	ES		AF	TER DRII	LING							
.GPJ	O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		PLASTIC LIMIT		REMARKS
I-440/GEOTECH/LAB TESTING/I-440.G			CONCRETE (8.5") CRUSHED AGGREGATE (6.0") (CH) fat CLAY trace to some fine sand and coarse gravel, brow some black mottling, moist, very stiff to medium stiff	vn with	SPT 1	100	8-14-16 (30)	4.5+	16				Bulk sample obtained from 2' to 5'
EOTECHIL	5				SPT 2	87	2-3-6 (9)	4.5+	18	76	35	41	
20/I-440/GE	- ·				SPT	100	1-4-4	3.0	32				
ES 2016-2020\	- - 10				3 SPT 4	100	(8) 2-3-10 (13)	4.0	31				Weathered Limestone in
S			(CL-ML) silty lean CLAY with some gravel, dark gray, wet, soft, Bottom of borehole at 10.5 feet.				(13)						end of spoon sample
TECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - T:/GEOTECH SUPPORT/TDOT/REGION 3 ON-CALL (



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		(270) 651-7220									FAG	E I OF I
CLIEN	NT TD	ООТ	PROJEC	TNAME	I-440							
PROJ	IECT N	UMBER 216-137	PROJEC	T LOCAT	_ NOI	Nashville, T	N					
DATE	STAR	TED 8/31/17 COMPLETED 8/31/17	GROUNE	ELEVAT	TION _	564.7 ft						
DRILI	LER _A	ndam Cash	GROUNE	WATER	LEVE	LS:						
DRILI	LING M	ETHOD Hollow Stem Auger	_ AT	TIME OF	DRILI	_ING						
LOGO	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	_ AT	END OF	DRILL	ING						
NOTE	S		_ AF	TER DRII	LING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l	PLASTIC TIMIT CALIMATE		REMARKS
		CONCRETE (10.5") — CRUSHED AGGREGATE (3.6") (CL) gravelly lean CLAY, brown, dry, hard,		SPT 1	53	5-28-23 (51)	4.5+	9				Boulder fill fragments at end of sample
I		Refusal at 2.8 feet										

Bottom of borehole at 2.8 feet.



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

		(270) 651-7220								FAGI	= 1 OF 1
CLIEN	NT TD	OT PROJECT	T NAME	I-440							
PROJ	ECT N	UMBER 216-137 PROJEC	T LOCAT	ION _	Nashville, TI	N					
DATE	STAR	TED <u>8/31/17</u> COMPLETED <u>8/31/17</u> GROUN	D ELEVA	TION _	567.6 ft						
DRILL	ER A	dam Cash GROUN	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	TIME OF	DRIL	LING						
LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell A	END OF	DRILL	.ING						
NOTE	s	Al	TER DRI	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC FIMIT	} -	REMARKS
 		CONCRETE (9.25") CRUSHED AGGREGATE (3.0") (GC) clayey GRAVEL, grayish brown, coarse gravel, moist, very dense	SPT 1	0	12-26-22 (48)	N/A	6	23	17	6	
		Refusal at 3.2 feet.				<u>-</u>			<u> </u>		

Bottom of borehole at 3.2 feet.



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		(270) 651-7220									I AGE	_ 1 O1 1
CLIEN	NT _TD	OOT PF	ROJECT	NAME	I-440							
PROJ	ECT N	UMBER 216-137 PF	ROJECT	LOCAT	_ NOI	Nashville, TN	١					
DATE	STAR	TED <u>9/5/17</u>	ROUND	ELEVAT	ION _	564.3 ft						
DRILL	ER _/	Adam Cash Gi	ROUND	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	SED BY	CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	} >-	REMARKS
		CONCRETE (10.5") — CRUSHED AGGREGATE (4.8") (GC) clayey GRAVEL, coarse, moist, dense, boulder fill fragmen	 	SPT 1	73	11-30-18 (48)	N/A	9				
		Refusal at 3.1 feet.										

Bottom of borehole at 3.1 feet.



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		(=,										
CLIEN	NT TD	ООТ	PROJEC	TNAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJEC	T LOCAT	NOI	Nashville, T	N					
DATE	STAR	TED 9/5/17 COMPLETED 9/5/17	GROUNE	ELEVA1	TION _	554.9 ft						
DRILL	ER A	ndam Cash	GROUNE	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger	_ AT	TIME OF	DRIL	LING						
LOGG	SED BY	CHECKED BY Dennis Mitchell	_ AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT	S	REMARKS
		CONCRETE (9.75") — CRUSHED AGGREGATE (4.8") (GC) clayey GRAVEL, gray, moist, very dense		SPT 1	60	9-30-24 (54)	N/A	5	-			
		Refusal at 3.6 feet.										i

Bottom of borehole at 3.6 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:02 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\1440\GEOTECH\LAB TESTING\1440\GPJ

AMERICAN ENGINEERS, INC.

Glas	IGINEERING Aberdeen Drive sgow, KY 42141 (270) 651-7220									B-63
CLIENT TDOT	(270) 031-7220	PROJECT	Г NAME	I-440						
PROJECT NUMBER 216-137		PROJECT			ashville, T	N				
DATE STARTED 9/5/17 COMPLETE	D 9/5/17	GROUND	ELEVA	FION _5	39.9 ft					
DRILLER Adam Thompson		GROUND	WATER	LEVEL	S:					
DRILLING METHOD Hollow Stem Auger		AT	TIME OF	DRILLI	NG					
LOGGED BY _Jackson Daugherty CHECKED E	Y Dennis Mitchell	AT	END OF	DRILLII	NG					
NOTES		AF	TER DRI	LLING _						
O DEPTH (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)	CRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC MENT STIMIT STIMIT	REMARKS
CONCRETE (10.0")										
CRUSHED AGGREGATE (7.2") (GW) GRAVEL, gray, moist, very den	se, weathered limeston	<i></i>	SPT	33	50	N/A	4_			
Refusal at 1	.8 feet.		1_1_	I						
Bottom of boreho	e at 1.8 feet.									



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CLIEN	NT TD	OT	PROJEC [*]	Γ NAME	I-440							
PROJ	ECT N	UMBER 216-137	PROJEC [*]	T LOCAT	ION N	lashville, T	N					
DATE	STAR	TED <u>8/31/17</u> COMPLETED <u>8/31/17</u>	GROUND	ELEVA1	TION _	529.1 ft						
DRILL	LER A	dam Cash	GROUND	WATER	LEVEL	_S:						
DRILL	LING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRILL	.ING						
LOGG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING						
NOTE	S		AF	TER DRII	LLING							_
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIMIT	PLASTIC LIMIT	} 	REMARKS
		CONCRETE (7.75") CRUSHED AGGREGATE (4.8") (GC) clayey GRAVEL, brown, moist, very dense		SPT 1	38 (615)	16-50	N/A	5				Limestone at bottom of sample
ا ز		Refusal at 4.2 feet										

Bottom of borehole at 4.2 feet.



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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		(=13) 551 1=25											
CLIENT TDOT				PROJECT NAME _I-440									
PROJECT NUMBER 216-137				PROJECT LOCATION Nashville, TN									
DATE STARTED 9/5/17 COMPLETED 9/5/17				GROUND ELEVATION 527 ft									
DRILLER Adam Cash				GROUND WATER LEVELS:									
DRILLING METHOD Hollow Stem Auger				AT TIME OF DRILLING									
LOGG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT END OF DRILLING										
NOTES				AFTER DRILLING									
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ı	PLASTIC TIMIT	S	REMARKS	
		CONCRETE (9.75") — CRUSHED AGGREGATE (4.8") (CL) gravelly lean CLAY trave silt, brown, dry to moist, hard		SPT 1	73	8-29-30 (59)	4.5	11	29	20	9		
	Refusal at 3.8 feet.												

Bottom of borehole at 3.8 feet.



PROFESSIONAL ENGINEERING 65 Aberdeen Drive

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	1			Glasgo	w, KY 42141 (0) 651-7220									PAGI	E 1 OF 1
	CLIEN	NT TD	ОТ	,	,	PROJECT	NAME	I-440							
	PROJ	ECT N	JMBER _216-137				LOCAT	NOI	Nashville, Ti	N					
	DATE	STAR	TED _9/5/17	COMPLETED	9/5/17	GROUND	ELEVAT	TION _	522.1 ft						
	DRILL	ER A	dam Thompson			GROUND	WATER	LEVE	LS:						
	DRILL	ING M	ETHOD HSA/ Diam	nond impregnated coring	g bit	AT .	TIME OF	DRIL	LING						
	LOGO	SED BY	Jackson Daughert	ty CHECKED BY	Dennis Mitchell				ING						
	NOTE	:s					ER DRII								
ł									(0			AT	TERBE	RG	
GPJ	o DEPTH (ft)	GRAPHIC LOG		MATERIAL DESCR	IPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC ELIMIT	PLASTICITY INDEX	REMARKS
440		7///	CONCRETE (10												Carad through
ING/			(CL) lean CLAY hard	trace to some fine grave	el, light brown, mios	st to wet,	RC 1	(0)	18-14-28 (42)	4.5+	10				Cored through boulder from 0.85' to 1.0' an
TEST			LIMESTONE, lig	ht to dark gray, thinly to	thickly bedded, ha	rd, highly	SPT 2	73 68							sampled beneath
I/LAB		Ш	weathered, highl	y fractured,	•		RC 3	(0)							
널	5						J								
/GEO															
1440															
2020				Refusal at 0.9			_								
2016-				Bottom of borehole	at 7.5 feet.										
SES 2															
ERVIC															
IL SE															
N-CA															
130															
GION															
TIRE															
100															
PORT															
SUP															
ECH															
GEO-															
2 - T:\															
12:0															
21/17															
76 - T															
B.GD															
SLA															
U CL															
INTS															
S-G															
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:02 - T:\GEOTECH SUPPORTITDOT\REGION 3 ON-CALL SERVICES 2016-2020\\440\GEOTECH\LAB TESTING\\440\GPU															
1001															
HB															
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PROFESSIONAL ENGINEERING

		65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220									D-0 / E 1 OF 1
CLI	ENT _		PROJEC	Г NAME	I-440						
		IUMBER 216-137	-	•		Nashville, T	N				
DA.	TE STA	RTED 9/5/17 COMPLETED 9/5/17	GROUND	ELEVAT	ION _	516.7 ft					
DRI	LLER	Adam Cash	GROUND	WATER	LEVE	LS:					
DRI	LLING	METHOD Hollow Stem Auger	_ A T	TIME OF	DRILL						
- 1		Y Clint Ervin CHECKED BY Dennis Mitchell	_ AT	END OF	DRILL	ING					
NO.	TES _		_ AF	TER DRIL	LING						
l a	GRAPHIC			SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l	PLASTIC INIT	REMARKS
TESTING/1440		CONCRETE (9.25") CRUSHED AGGREGATE (4.8") (CL) lean CLAY with gravel, brown, dry to miost, stiff, boulded fragments	<i>_</i> -	SPT 1	53	6-9-6 (15)	3.5	14			
EOTECHILAB 2		(CL) lean CLAY, light brown with dark brown mottling, moist	t, stiff	SPT 2	73	5-4-8 (12)	3.2	31			
2020\I-440\G	-	(ML) SILT trace clay, brown, wet to saturated, soft		SPT 3	100	3-2-1 (3)	0.5	30			
2016-		Refusal at 9.1 feet.		SPT 4	0	3-50	N/A	24			
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:02 - T./GEOTECH SUPPORTITDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ											



PROFESSIONAL ENGINEERING

Ш	Γ		1		Glasgov	rdeen Drive v, KY 42141 D) 651-7220										E 1 OF 1
	LIEN	TDC	DT			,,	_ PROJEC	T NAME	I-440							
F	ROJ	ECT NU	MBER 216-137					T LOCAT	ION N	lashville, T	N					
	ATE	START	ED <u>9/5/17</u>	COMP	LETED _	9/5/17	GROUND	ELEVA1	TION _5	518.7 ft						
	RILL	ER Ad	am Cash				GROUND	WATER	LEVEL	.S:						
	RILL	ING ME	THOD Hollow Stem					TIME OF	DRILL	.ING						
L	.OGG	ED BY	Clint Ervin	CHECI	KED BY	Dennis Mitchell	_ AT	END OF	DRILLI	NG						
N	IOTE	s					_ AF	TER DRII	LING							
	0 (#)	GRAPHIC LOG		MATERIAL	DESCRI	PTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		PLASTIC IN LIMIT		REMARKS
AB TESTING\I-440	- -		CONCRETE (7.5" CRUSHED AGGR (CL-ML) silty lean stiff	REGATE (7.2"			own, moist,	SPT 1	100	5-6-7 (13)	2.5	21				
SEOTECHI	5		(ML) SILT, light ye	ellowish brown	n, dry to n	noist, stiff		SPT 2	93	4-6-7 (13)	3	26	39	25	14	
020\I-440\G	-							SPT 3	93	3-4-7 (11)	1.5	22				
ES 2016-2	- 10			Bottom of bo				SPT 4	0	5-9-7 (16)	N/A	21				
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:02 - T./GEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1.440/GEOTECH/LAB TESTING/1/440.GPJ																



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		(270) 651-7220										
CLIEN	NT TE	ООТ	PROJEC	T NAME	I-440							
PROJ	ECT N	UMBER _216-137	PROJECT	T LOCAT	NOI	Nashville, T	N					
DATE	STAR	TED 9/5/17 COMPLETED 9/5/17	GROUND	ELEVA1	TION _	526 ft						
DRILL	ER _/	Adam Cash	GROUND	WATER	LEVE	LS:						
DRILL	ING M	IETHOD Hollow Stem Auger	AT	TIME OF	DRILI	LING						
LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AF	TER DRII	LLING							
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	1	PLASTIC PLASTIC LIMIT	-	REMARKS
 		CONCRETE (10.5") CRUSHED AGGREGATE (3.6") (CL) lean CLAY with gravel and sand, brown, moist, very stiff	<u>-</u>	SPT 1	73	4-3-14 (17)	3.1	23	-			
		Refusal at 3.4 feet. Bottom of borehole at 3.4 feet.	•			•						

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1-440/GEOTECH/LAB TESTING/1-440.GPJ



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

	(270) 651-7220									FAGI	= 1 OF 1
CLIENT TO	DOT P	PROJEC [*]	NAME	I-440							
PROJECT N	UMBER _216-137 P	PROJEC [*]	T LOCAT	ION N	Nashville, T	N					
DATE STAF	RTED 9/5/17 COMPLETED 9/5/17 G	GROUND	ELEVA1	TION _	535.6 ft						
DRILLER _	Adam Thompson G	GROUND	WATER	LEVE	LS:						
DRILLING N	METHOD HSA/ Diamond impregnated coring bit	AT	TIME OF	DRILL							
LOGGED B	Y _Jackson Daugherty _ CHECKED BY _ Dennis Mitchell _	AT	END OF	DRILL	ING						
NOTES		AF	TER DRII	LLING							
O DEPTH (ft) GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	l .	PLASTIC FIMIT LIMIT	} -	REMARKS
5	CONCRETE (10") CRUSHED AGGREGATE (2.4") (CL) lean CLAY trace to some fine sand, brown to black, moist, LIMESTONE, dark to light gray, thinly to thickly bedded, hard, hi fractured, weathered near soil/ rock interface,		SPT 1	100 (22)	1-4-7 (11)	4.5+	22	40	25	15	
	Refusal at 3.3 feet. Bottom of borehole at 8.3 feet.										

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

		(270) 651-7220									PAG	E I OF I
CLIE	NT TE	ООТ	PROJEC	T NAME	I-440							
PROJ	JECT N	UMBER 216-137	PROJEC	T LOCAT	ION N	lashville, T	N					
DATE	STAR	TED 9/5/17 COMPLETED 9/5/17	GROUNE	ELEVA1	TION _	545.5 ft						
		Adam Cash										
DRILI	LING M	IETHOD Hollow Stem Auger				ING						
LOG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell				ING						
				Й	%	SI	j	@	AT	TERBE LIMITS		
ᆫ	GRAPHIC LOG			SAMPLE TYPE NUMBER	RECOVERY 9 (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)			1	- X
DEPTH (ft)	XAP LOC	MATERIAL DESCRIPTION		PLE JMB	PVE	A CC	(fsf)	IS E	≘Ę	SE F	듣쬬	REMARKS
	р.			N N	(EC	ŠŻ	00	8 S S	LIQUID	PLASTIC LIMIT	PLASTICITY INDEX	R H
0				o)	Ľ	B	Ь.	U		<u> </u>	<u></u>	
L .		CONCRETE (9.5")										
L .		CRUSHED AGGREGATE (3.6") (CH) fat CLAY, brown, moist, stiff		SPT 1	53	3-6-7 (13)	3.75	25	66	26	40	Bulk obtained
L .						(10)			-			from 2.0' to 4.
L .												
_ 5				SPT 2	100	2-3-4 (7)	2.5	25				
L .												
L .	-1914	(ML) SILT trace sand and gravel, brown, moist to wet, soft		SPT	100	3-2-2	1.0	32	33	27	6	
L .				3		(4)						
L.]. [d [c			SPT	100	2-2-2	1.0	25	-			
10	<u> </u>			4		(4)						
		Bottom of borehole at 10.0 feet.										

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



	65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220										SK-1 E 1 OF 1
NT TD	OT .	PROJECT	NAME	I-440							
JECT NU	MBER _216-137	PROJECT	LOCAT	ION N	lashville, T	N					
E START											
LER A	dam Thompson										
ES		AF	TER DRII	LLING							I
GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	LIMITS	S 	REMARKS
	─ TOPSOIL (2.5") LIMESTONE, dark to light gray, thinly to thickly bedded, hard fossiliferous, containing brachiopods, highly fractured, with contempt intermittent — TOPSOIL (2.5") LIMESTONE, dark to light gray, thinly to thickly bedded, hard fossiliferous, containing brachiopods, highly fractured, with contempt intermittent. — TOPSOIL (2.5") d, clay seams	RC 1	50 (0)							Highly fracture with clay seams from 0.2' to 10.2'	
			RC 2	60 (8)							
			RC 3	2 (0)							Clay filled voic from 10.2' to 16.0'
	LIMESTONE, dark to light gray, thinly to thickly bedded, mod hard, some weathered clay seams	derately	RC 4	80 (40)							
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			RC 5	86 (60)							
	Refusal at 0.2 feet. Bottom of borehole at 25.2 feet.					-		,			
	NT TDO JECT NU E START LER AC LING ME GED BY ES	INT TDOT JECT NUMBER 216-137 E STARTED 8/28/17 COMPLETED 8/28/17 LER Adam Thompson LING METHOD HSA/ Diamond impregnated coring bit GED BY Jackson Daugherty CHECKED BY Dennis Mitchell ES MATERIAL DESCRIPTION TOPSOIL (2.5") LIMESTONE, dark to light gray, thinly to thickly bedded, hard fossiliferous, containing brachiopods, highly fractured, with containing brachiopods, highly fractured, with containing brachiopods, highly fractured, with containing brachiopods and the containing brachiopods. LIMESTONE, dark to light gray, thinly to thickly bedded, more hard, some weathered clay seams Refusal at 0.2 feet.	PROJECT NUMBER 216-137 PROJECT STARTED 8/28/17 COMPLETED 8/28/17 GROUND LER Adam Thompson LING METHOD HSA/ Diamond impregnated coring bit AT GED BY Jackson Daugherty CHECKED BY Dennis Mitchell AT ES AF TOPSOIL (2.5") LIMESTONE, dark to light gray, thinly to thickly bedded, hard, fossiliferous, containing brachiopods, highly fractured, with clay seams intermittent LIMESTONE, dark to light gray, thinly to thickly bedded, moderately hard, some weathered clay seams Refusal at 0.2 feet.	NT	PROJECT NAME1440_ JECT NUMBER216-137	PROJECT NAME _ 1-440 PROJECT NAME _ 1-400 PROJECT NAME 1-440 PROJECT NAME 1-400 PROJECT NAME 1-400	PROJECT NAME 1-440 PROJECT LOCATION Nashville, TN GROUND ELEVATION 489.6 ft GROUND WATER LEVELS: LING METHOD HSAV Diamond impregnated coring bit GROUND WATER LEVELS: LING METHOD HSAV Diamond impregnated coring bit AT TIME OF DRILLING	NT TDOT PROJECT NAME 1-440 PROJECT LOCATION Nashville, TN PROJECT LOCATION	PROJECT NAME -440 PROJECT NAME -440 PROJECT NAME -440 PROJECT LOCATION Neathwile, TN RESTARTED 8/28/17 COMPLETED 8/28/17 GROUND BLEVATION 489.6 ft GROUND BLEVATION 489.6 ft GROUND WATER LEVELS: AT TIME OF DRILLING	NT TDOT PROJECT NAME 1440 PROJECT LOCATION Nashville, TN GROUND ELEVATION 499.6 ft GROUND WATER LEVELS: ATTIME OF DRILLING	



PROFESSIONAL ENGINEERING

	JU		Glass	Nberdeen Drive gow, KY 42141 270) 651-7220										1 OF 1
CLIEN	TDC	ТС			PROJEC	T NAME	<u>l-440</u>							
		JMBER 216-137						lashville, T	N					
				8/31/17										
		dam Thompson												
		ETHOD HSA/ Diamor Jackson Daugherty												
		Jackson Daugherty		1 Dennis Millenen		TER DRI								
NO.E					_ ^-	1			T		AT	TERBE	RG	
	GRAPHIC LOG		MATERIAL DESC	RIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	LIMITS		REMARKS
		TOPSOIL (1") LIMESTONE, dark fractured, highly we	gray, thinly to thick eathered, clay seam	ly bedded, hard, highl is intermittent,	y	RC 1	6 (0)							
5		LIMESTONE, gray	, thinly to thickly bed	dded, hard		RC 2	88 (48)							
10						RC	100							
15						3	(100)							
			Refusal at 0. Bottom of borehole											
0 5 10 15 10 10 10 10 10			BOROTT OF BOTEFIOLE	at 15.1 leet.										



	$\mid F \mid$		65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220										BR-3 E 1 OF 1
	CLIE	NT _TD	оот	PROJEC	T NAME	I-440							
	PROJ	ECT N	UMBER _216-137	PROJEC	T LOCAT	ION _	Nashville, Tl	N					
	DATE	STAR	TED 9/7/17 COMPLETED 9/7/17										
			Adam Thompson										
			IETHOD HSA/ Diamond impregnated coring bit										
			Mathaniel Blackburn CHECKED BY Dennis Mitchell										
	NOTE	:S		Аг		LLING				ΔΤ	TERBE	DC.	
3PJ	о ОЕРТН (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	LIMITS	S	REMARKS
440.G	Ů		CONCRETE (10.75")										
NG/I-	-		CRUSHED STONE BASE (3.5")		▼ SPT	125	11-30-16	N/A	7				SPT sample
TEST			LIMESTONE, medium to light gray, thinly bedded, fractured		1 RC	70	(46)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u> </u>	-			driven to 3.0 feet likely due
\LAB					2	(24)							to sloping rock or boulder
TECH	5	开											
\GEO													
N-440		士											
-2020					RC 3	100 (40)							
2016													
/ICES	10												
SER\													
CALL	-				RC	100							
3 ON-	-				4	(80)							
SION	15												
T)RE(
VTD0													
SUPPORT			Refusal at 2.3 feet. Bottom of borehole at 17.3 feet.										
EOTECH S													
2:02 - T:\G													
- 9/21/17 1													
LAB.GDT													
AT STD US													
GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - T\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\1440\GEOTECH\LAB TESTING\1440.GPJ													
1 BH COLU													
GEOTECH													

AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING

	65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220								E 1 OF 2
CLIENT _		PROJECT	NAME	I-440					
PROJECT	IUMBER 216-137	PROJECT	LOCAT	ION _	Nashville, T	N			
DATE STA	RTED 9/11/17 COMPLETED 9/13/17	GROUND	ELEVA	TION _	535 ft				
DRILLER	Adam Thompson	GROUND	WATER	LEVE	LS:				
DRILLING	METHOD HSA/ Diamond impregnated coring bit	AT	TIME OF	DRILI					
LOGGED I	Y Jacob Cowan CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING				
NOTES _		_ AF1	TER DRII	LING					
10 10 20 10 10 10 10 10 10 10 10 10 10 10 10 10	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	PLASTIC PLASTIC LIMIT	REMARKS
	TOPSOIL (26.5") (CL) lean CLAY with some gravel, light brown, moist, very st	iff to soft	SPT 1	73	3-8-9 (17)	4.5+	13		
 5			SPT 2	67	4-4-3 (7)	1.75	15		
 			SPT 3	33	4-5-11 (16)	1.5	24		
10			SPT 4	47	1-3-4 (7)	1.25	22		
 15			SPT 5	0	1-2-1 (3)	N/A			
	LIMESTONE, gray, medium grained, laminated to thinly bed weathered, boulder fill	ded, hard,	RC 6	33 (0)					
20]	weathered, boulder fill		RC	46					Clay seam fro
			7	(28)					20.5' to 20.8 Clay seam fro 21.4' to 21.7
25			RC 8	10 (0)					
30									
- 			RC 9	38 (24)					
35	}								



65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

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CLIENT TDOT PROJECT NAME | 1-440

PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN **ATTERBERG** BLOW COUNTS (N-VALUE) SAMPLE TYPE NUMBER MOISTURE CONTENT (%) POCKET PEN. (tsf) LIMITS RECOVERY % (RQD) GRAPHIC LOG REMARKS DEPTH (ft) PLASTICITY INDEX PLASTIC LIMIT LIQUID MATERIAL DESCRIPTION 35 LIMESTONE, light gray, medium grained, thinly to thickly bedded, hard, boulder fill *(continued)* 10 (32)GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - T.\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\1440\GEOTECH\LAB TESTING\\440\GP\ 40 Clay seam from 40.0' to 40.3' RC 48 (18)Clay seam from 42.2' to 42.4' RC 26 12 (0) Clay seam fron 49.4' to 50.5' 50 RC 38 13 (38) LIMESTONE, fine to medium grained, thinly to thickly bedded, hard RC 98 14 (96)RC 100 15 (100)Refusal at 17.5 feet. Bottom of borehole at 63.5 feet.



PROFESSIONAL ENGINEERING

DATE STAR DRILLER _A DRILLING M LOGGED BY	OT UMBER _216-137 TED _9/8/17 dam Cash ETHOD _HSA/ Diam ' Clint Ervin	Glasgor (27	9/8/17 Dennis Mitchell	PROJECT GROUND GROUND AT AT	T LOCATO ELEVATOR WATER	TION <u>N</u> TION <u>S</u> R LEVEL F DRILL	542.6 ft .S: .ING ING					PAGE	PZ-1
o DEPTH (ft) (ft) (CRAPHIC LOG		MATERIAL DESCR	IPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT	}	REMARKS
GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:02 - T;GEOTECH SUPPORTITIONREGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ	PZ Installed 5.0												



PROFESSIONAL ENGINEERING

PZ-2

		Glasgow, KY 42141 (270) 651-7220									PAGI	1 OF 1
CLIE	NT T	ООТ	PROJEC	T NAME	I-440							
PRO.	JECT N	IUMBER 216-137	PROJEC	T LOCAT	ON _	Nashville, T	N					
DAT	E STAF	RTED 9/8/17 COMPLETED 9/8/17	GROUNE	ELEVA	TION _	507.2 ft						
DRIL	LER _	Adam Cash	GROUNE	WATER	LEVE	LS:						
DRIL	LING N	METHOD HSA/ Diamond impregnated coring bit	AT	TIME OF	DRILI							
LOG	GED B	Y Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING						
NOT	ES		AF	TER DRI	LLING							
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	TIMIT LIMIT	PLASTIC PLASTIC LIMIT	}	REMARKS
		TOPSOIL (3") (CL) lean CLAY, silty with gravel										
10	- - - -	PZ Installed 5.0' into bedrock Refusal at 5.7 feet.										
יינו פון סברסוווס - סואן סוף סט בחסיסטן - שבונון וביער - היטרסן בען סטן טאווינס הייני-טיטיט טוא טייבר ס		Bottom of borehole at 10.7 feet.										



PROFESSIONAL ENGINEERING

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220 **SH-1** PAGE 1 OF 1

		(===,==================================									
CLIEN	NT TD	OT PROJEC	TNAME	I-440							
PROJ	ECT N	UMBER <u>216-137</u> PROJEC	T LOCAT	NOI	Nashville, T	N					
DATE	STAR	TED 9/7/17 COMPLETED 9/7/17 GROUND	ELEVA1	TION _	541.4 ft						
DRILL	ER A	dam Cash GROUNI	WATER	LEVE	LS:						
DRILL	ING M	ETHOD Hollow Stem Auger AT	TIME OF	DRIL	LING						
LOGG	SED BY	Clint Ervin CHECKED BY Dennis Mitchell AT	END OF	DRILL	ING						
NOTE	s	AF	TER DRII	LLING							
—					1			_ A T		.00	
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	TIMIT	PLASTIC PLASTIC LIMIT	} 	REMARKS
 		CONCRETE (10") CRUSHED AGGREGATE (7.8") (CL) gravelly lean CLAY, with boulder fill fragments, brown, moist, stiff to hard	SPT 1	40	7-50	3.2	8				

Refusal at 3.2 feet. Bottom of borehole at 3.2 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ



PROFESSIONAL ENGINEERING

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

SH-4 PAGE 1 OF 1

CLIEN	IT TD	ОТ	PROJECT NAME 1-440									
PROJI	ECT N	UMBER _216-137	PROJECT LOCATION Nashville, TN									
DATE	STAR	TED <u>9/8/17</u> COMPLETED <u>9/8/17</u>	GROUND ELEVATION 509 ft									
DRILL	ER A	dam Cash	GROUND WATER LEVELS:									
DRILL	ING M	ETHOD Hollow Stem Auger	AT	TIME OF	DRIL	LING						
LOGG	ED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	.ING						
NOTE	s		AFTER DRILLING									
о ОЕРТН (#)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	-	REMARKS
		CONCRETE (9.5") — CRUSHED AGGREGATE (4.5") (GC) clayey GRAVEL, dry, medium dense		SPT 1	47	15-11-17 (28)	N/A	4				

Refusal at 2.8 feet. Bottom of borehole at 2.8 feet.

GEOTECH BH COLUMNS - GINT STD US LAB. GDT - 9/21/17 12:02 - TAGEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1-440/GEOTECH/LAB TESTING/1-440. GPJ



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141

SH-5

		(270) 651-7220									PAG	E 1 OF 1	
CLIEN	NT TD	ОТ	PROJEC	NAME	I-440								
PROJ	ECT N	UMBER 216-137	PROJECT	T LOCAT	ION _	Nashville, T	N						
DATE	STAR	TED 9/7/17 COMPLETED 9/7/17	GROUND	ELEVA1	TION _	526.6 ft							
DRILL	LER A	dam Cash	GROUND WATER LEVELS:										
DRILL	LING M	ETHOD Hollow Stem Auger	AT TIME OF DRILLING										
LOGG	GED BY	Clint Ervin CHECKED BY Dennis Mitchell	AT	END OF	DRILL	ING							
NOTE	s		AF	TER DRII	LLING								
O DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC LIMIT		REMARKS	
		CONCRETE (8") CRUSHED AGGREGATE (4.8") (CL) lean CLAY with boulder fragment fill, brown, moist, hard		SPT 1	40	6-22-12 (34)	4.2	14				difficult to auge from 1.0' to 4.1	
		Refusal at 4.1 feet. Bottom of borehole at 4.1 feet.											

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:02 - T.\GEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020\I-440\



PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

SH-6 PAGE 1 OF 1

		(270) 651-7220										
CLIE	NT T	OOT PROJECT	CT NAME	<u>l-440</u>								
PRC	JECT N	UMBER 216-137 PROJECT	CT LOCAT	ION _	Nashville, Tl	N						
DAT	E STAR	TED <u>9/7/17</u>	GROUND ELEVATION 529.1 ft									
DRII	LER _/	dam Cash GROUN	GROUND WATER LEVELS:									
DRII	LING N	ETHOD Hollow Stem Auger	T TIME OF	- DRIL	LING							
LOG	GED B	Clint Ervin CHECKED BY Dennis Mitchell A	T END OF	DRILL	.ING							
NOT	ES	A	AFTER DRILLING									
O DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC PLASTIC LIMIT	-	REMARKS	
		CONCRETE (9.5") — CRUSHED AGGREGATE (4.8") (CL) gravelly lean CLAY, with boulder fill fragments, dark brown, dry, hard	SPT 1	60	9-15-47 (62)	4.5	10					
]		Refusal at 3.0 feet. Bottom of borehole at 3.0 feet.										

APPENDIX C

Laboratory Testing Results

AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING

ATTERBERG LIMITS RESULTS

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

CLIENT TDOT PROJECT NAME 1-440

PROJECT LOCATION Nashville, TN PROJECT NUMBER 216-137 60 (CL) (CH) 50 LASTICITY 40 30 • **⊙**⊕ ⊗ * N D E X 20 **@**3 10 CL-ML (ML)(MH)0 20 40 60 100 80 0

2016-2020\(\) 440\(\)GEOTECH\(\)LAB TESTING\(\)\(\) 440\(\)GPJ	I N D E X	20		Δ	@	⊗ ☆	•	
EOTECH\LAB 1		10 CL-ML		*			ML	MH
0/I-440/GF		0	20	0		40		60 80 100 LIQUID LIMIT
16-202	BOF	REHOLE	DEPTH	LL	PL	PI	Fines	Classification
CES 20	B-2	2	4.0	30	16	14		LEAN CLAY (CL)
SERVICES	B-5	5	3.0	31	21	10		LEAN CLAY (CL)
ON-CALL	B-5	5	3.5	43	24	19		LEAN CLAY (CL)
	₽ B-8	3	1.5	26	16	10		LEAN CLAY (CL)
SUPPORT/TDOT/REGION 3	B-1	12	4.0	42	18	24		LEAN CLAY (CL)
DOT\R	> B-1	18	1.5	22	14	8		LEAN CLAY (CL)
ORTIT	B-1	19	4.0	33	15	18		LEAN CLAY (CL)
	△ B-2	21	3.0	27	13	14		LEAN CLAY (CL)
T:\GEOTECH	B-2	25	3.0	36	15	21		LEAN CLAY (CL)
T:\GEC	₽ B-2		6.0	44	20	24		LEAN CLAY (CL)
3:37 -	□ B -3		3.0	41	22	19		LEAN CLAY (CL)
21/17 1	9 B-3	31	1.2	41	24	17		LEAN CLAY (CL)
75 - 9/	B -3		4.0	52	23	29		FAT CLAY (CH)
AB,	₹ B -3		8.5	39	17	22		LEAN CLAY (CL)
3 5	3 B-3		1.1	33	16	17		LEAN CLAY (CL)
GINT STD			1.2	48	18	30		LEAN CLAY (CL)
1	B -4		9.0	35	22	13		LEAN CLAY (CL)
<u></u>) B-4		1.1	39	20	19		LEAN CLAY (CL)
RBER >			1.9	31	21	10		LEAN CLAY (CL)
¥ TE	B-5	54	1.2	29	18	11		LEAN CLAY (CL)

AEI AMER

CLIENT TDOT

AMERICAN ENGINEERS, INC.

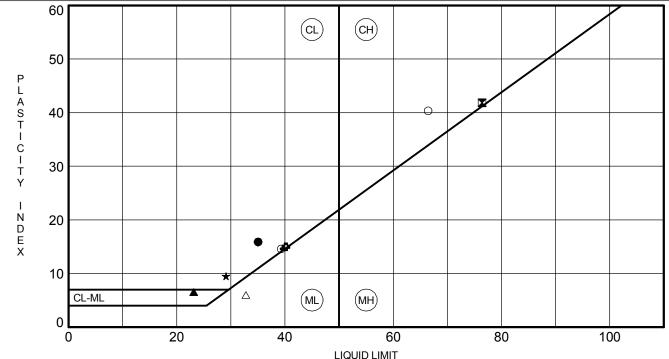
PROFESSIONAL ENGINEERING

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

(270) 651-7220 PROJECT NAME 1-440

ATTERBERG LIMITS RESULTS

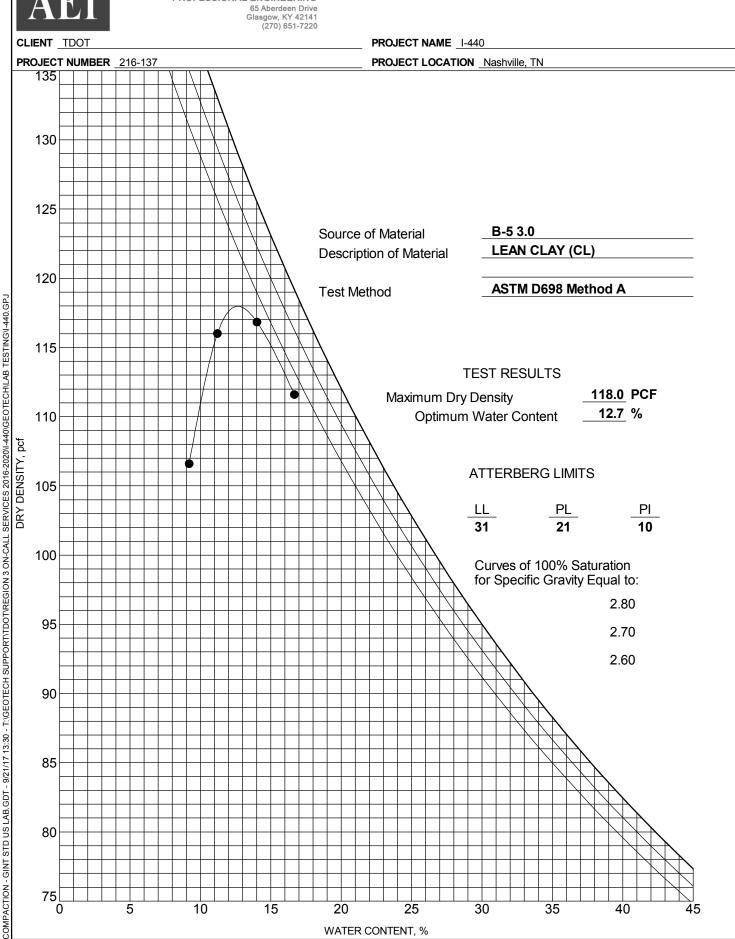
PROJECT NUMBER 216-137 PROJECT LOCATION Nashville, TN



TERBERG LIMITS - GINT STD US LAB.GDT - 9/21/17 13:37 - T./GEOTECH SUPPORT/TDOT/REGION 3 ON-CALL SERVICES 2016-2020/1440/GEOTECH/LAB TESTING/1440.GPJ		I N D E X	10	CL-ML	20	0	* ^	40	ML	MH) 60)	8	0	10	00	
)20\I-44										LIQUID LIMIT						
.016-20		BOR	EHC	DLE	DEPTH	LL	PL	PI	Fines	Classificat	ion					
ICES 2	•	B-56	3		1.2	35	19	16		LEAN CLA	AY (CL)					
SERV		B-58	3		4.0	76	35	41		FAT CLAY						
N-CALL	A	B-60			1.0	23	17	6		SILTY CL		ML)				
N 3 O	\dashv	B-65			1.2	29	20	9		LEAN CLA						
REGIO	•	B-68			4.0	39	25	14		LEAN CLAY (CL)						
ТООТ	-	B-70			1.0	40	25	15		LEAN CLA						
PORT	\dashv	B-71			2.0	66	26	40		FAT CLAY						
HSUP	Δ	B-71	l		6.5	33	27	6		SILT (ML)						
EOTEC																
- T:\GE																
7 13:37																
9/21/17																
GDT -																
IS LAB																
STDU																
- GINT																
IMITS																
ERGL																
TERB																

AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING

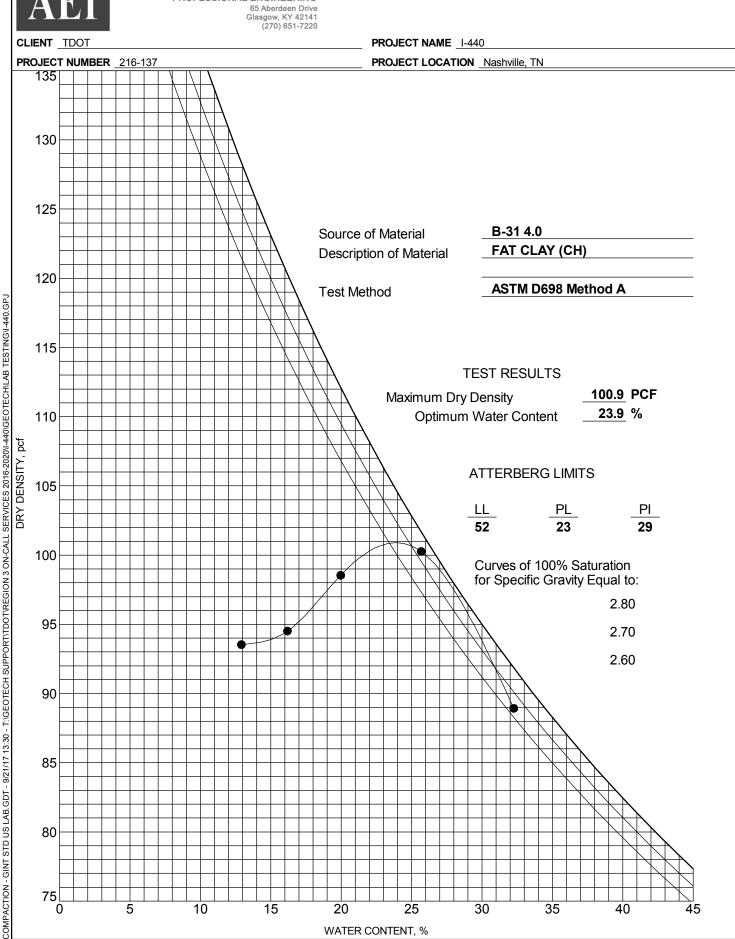
MOISTURE-DENSITY RELATIONSHIP



WATER CONTENT, %

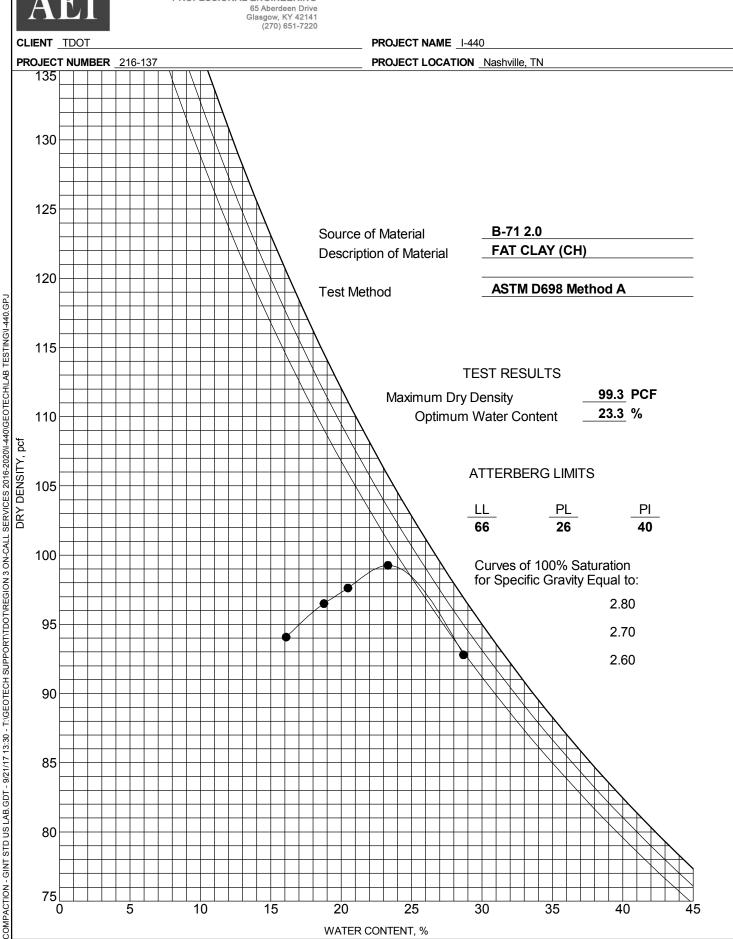
AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING 65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220

MOISTURE-DENSITY RELATIONSHIP



AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING

MOISTURE-DENSITY RELATIONSHIP



WATER CONTENT, %

BEARING RATIO TESTING RESULTS (ASTM D 1883-05)

 Date:
 9/14/2017

 Project No.:
 216-137

 Project:
 I-440

 Location:
 B-5

Depth: 3.0 Sample Number: 1

Material Description: lean CLAY, with gravel, brown, moist, very stiff

USCS Classification: CL

Liquid Limit: 31 Plasticity Index: 10

Test Description:

Maximum Dry Density, pcf: 118 Optimum Moisture Content, %: 12.7

Testing Remarks:

Sample 1 (Surcharge: 12.64 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 102.98 Wt. Soil+Tare, gms. 94.49 Wt. Tare, gms. 30.44 Moisture, % 13.3

Unit Weight

Wt. Mold+Soil, lbs. 25.5 Wt. Mold, lbs. 16.06 Ht. Soil, in. 4.584 Density, pcf 111.1

Swell Data

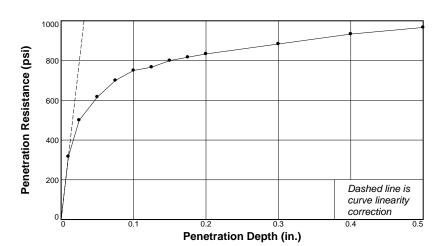
Elapsed	Diai Reading	Sweii
Time, hrs.	in. x 1,000	%
0	339	0.0
72	365	0.6
96	369	0.7
100	369	0.7

Final Water Content

	Wt. Wet			
	Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Тор	130.8	115.76	30.84	17.7
Middle	154.58	136.78	30.68	16.8
Bottom	154.85	137.97	30.78	15.7

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	0	0.0	
0.01	19	316.7	
0.025	30	500.0	
0.05	37	616.7	
0.075	42	700.0	
0.1	45	750.0	75.0
0.125	46	766.7	
0.15	48	800.0	
0.175	49	816.7	
0.2	50	833.3	55.6
0.3	53	883.3	46.5
0.4	56	933.3	40.6
0.5	58	966.7	37.2



American Engineers, Inc.

BEARING RATIO TESTING RESULTS (ASTM D 1883-05)

 Date:
 9/14/17

 Project No.:
 216-137

 Project:
 I-440

 Location:
 B-31

Depth: 4 Sample Number:

Material Description: fat CLAY, trace fine gravel, yellowish brown to light brown, mosit, stiff

USCS Classification: CH

Liquid Limit: 52 Plasticity Index: 29

Test Description:

Maximum Dry Density, pcf: 100.9 Optimum Moisture Content, %: 23.9

Testing Remarks:

Sample 1 (Surcharge: 12.44 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 96.54 Wt. Soil+Tare, gms. 83.46 Wt. Tare, gms. 30.72 Moisture, % 24.8

Unit Weight

Wt. Mold+Soil, lbs. 25.22 Wt. Mold, lbs. 16.00 Ht. Soil, in. 4.584 Density, pcf 98.5

Swell Data

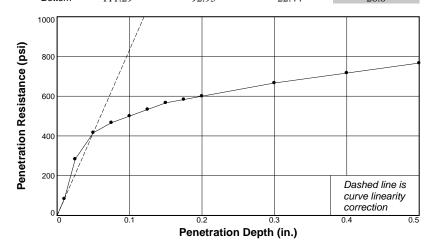
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	236	0.0
72	264	0.6
96	266	0.7

Final Water Content

	vvt. vvet			
	Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Тор	128034	107.8	'30.76	'4608
Middle	137.47	115.32	30.68	26.2
Bottom	111.29	92.95	22.44	26.0

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	0	0.0	
0.01	5	83.3	
0.025	17	283.3	
0.05	25	416.7	
0.075	28	466.7	
0.1	30	500.0	50.0
0.125	32	533.3	
0.15	34	566.7	
0.175	35	583.3	
0.2	36	600.0	40.0
0.3	40	666.7	35.1
0.4	43	716.7	31.2
0.5	46	766.7	29.5



American Engineers, Inc.

BEARING RATIO TESTING RESULTS (ASTM D 1883-05)

 Date:
 9/14/17

 Project No.:
 216-137

 Project:
 I-440

 Location:
 B-71

Depth: 2 Sample Number: 1

Material Description: fat CLAY, brown, moist, stiff

USCS Classification: CH

Liquid Limit: 66 Plasticity Index: 40

Test Description:

Maximum Dry Density, pcf: 99.3 Optimum Moisture Content, %: 23.3

Testing Remarks:

Sample 1 (Surcharge: 12.52 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 88.62 Wt. Soil+Tare, gms. 76.07 Wt. Tare, gms. 22.63 Moisture, % 23.5

Unit Weight

Wt. Mold+Soil, lbs. 25.12 Wt. Mold, lbs. 16.18 Ht. Soil, in. 4.584 Density, pcf 96.5

Swell Data

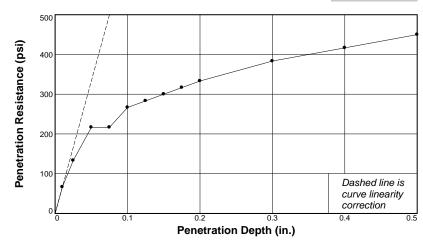
Elapsed	Dial Reading	Swell
Time, hrs.	in. x 1,000	%
0	240	0.0
72	370	2.8
96	376	3.0

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	0	0.0	
0.01	4	66.7	
0.025	8	133.3	
0.05	13	216.7	
0.075	13	216.7	
0.1	16	266.7	26.7
0.125	17	283.3	
0.15	18	300.0	
0.175	19	316.7	
0.2	20	333.3	22.2
0.3	23	383.3	20.2
0.4	25	416.7	18.1
0.5	27	450.0	17.3

Final Water Content

	Wt. Wet			
	Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Тор	113.99	94.9	30.54	29.7
Middle	122.24	103.31	30.59	26.0
Bottom	121.68	103.33	30.85	25.3



American Engineers, Inc.



Rock Core Unconfined Compressive Strength		
Boring Location	Sample Elevation (ft)	Compressive Strength (psi)
B-8	549.5	9,737
B-18	544.3	3,013
B-28	564.3	10,513
B-38	517.7	3,613
B-48	544.2	11,210
B-56	523.5	9,289
BR-1	471.4	7,520
BR-1	466.2	10,549
BR-2	475.2	10,888
BR-2	470.0	8,598
BR-3	474.0	11,777
BR-3	470.0	4,504
BR-5	480.0	9,085
BR-5	473.0	12,166

Pavement Core Unconfined Compressive Strength		
Boring Location	Compressive Strength (psi)	
B-5	6748	
B-12	7390	
B-19	4841	
B-29	6711	
B-34	7100	
B-40	10071	
B-46	7192	
B-54	4315	
B-61	1568	
B-68	7450	

APPENDIX D

Concrete Cylinder Fracture Images



Boring B-5 Pavement Core





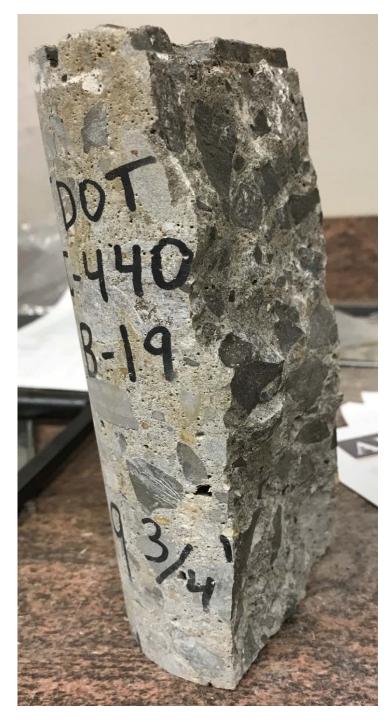


Boring B-12 Pavement Core





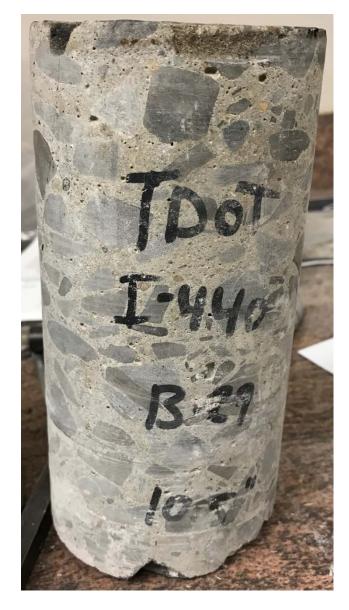
Boring B-19 Pavement Core





Boring B-29 Pavement Core







Boring B-34 Pavement Core





Boring B-40 Pavement Core





Boring B-46 Pavement Core





Boring B-51 Pavement Core





Boring B-54 Pavement Core





Boring B-68 Pavement Core

