



*Report of*  
**GEOTECHNICAL  
EXPLORATION**

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AMERICAN ENGINEERS, INC.

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

DESIGNING YOUR FUTURE, TODAY.





September 21, 2017

Mr. Travis W. Smith, PE Civil Engineering Manager 1  
Materials and Tests Division – Geotechnical Engineering Section  
A Building, 1<sup>st</sup> 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.

**Table 1: Boring Locations**

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

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.

**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.

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  
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

Boring No.	Location		Concrete Depth (inches)	Base Depth (inches)	Refusal Depth (feet)	Rock Core Depth (feet)
B-2	West Bound	Driving Lane	10.25	6	9.8	N/A
B-3	East Bound	Driving Lane	11	7	2.4	N/A
B-4	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	East Bound	Driving Lane	10	5	8.4	N/A
B-14	East Bound	Shoulder	12	13	2.1	N/A
B-15	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	West Bound	Shoulder	7.75	6	3.1	N/A
B-25	East Bound	Driving Lane	11	4	5	N/A
B-26	East Bound	Shoulder	7.5	19.2	3.8	N/A
B-27	West Bound	Driving Lane	9.5	6	3	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	6	2.2	N/A
B-35	West Bound	Driving Lane	10.5	4	3.4	N/A
B-36	West Bound	Shoulder	8.25	6	3.5	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	East Bound	Driving Lane	11	6	4.7	N/A
B-46	East Bound	Shoulder	8.75	8.5	3.6	N/A
B-47	West Bound	Driving Lane	9.75	6	8.4	N/A
B-48	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	East Bound	Driving Lane	10	6	5.6	N/A
B-56	East Bound	Shoulder	9	4.8	2.6	8
B-57	West Bound	Driving Lane	11	6	6.2	N/A
B-58	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	West Bound	Driving Lane	9.75	4.8	3.8	N/A
B-66	West Bound	Shoulder	10	0	0.9	7.5
B-67	West Bound	Driving Lane	9.25	4.8	9.1	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	N/A	N/A	N/A	N/A	17.5	63.5
PZ-1	West Bound	Right Shoulder	N/A	N/A	9	13.7
PZ-2	West Bound	Right Shoulder	N/A	N/A	5.7	10.7
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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/7/17

**COMPLETED 9/7/17**

**GROUND ELEVATION** 613.9 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
5		CONCRETE (10.25")									
		CRUSHED AGGREGATE (6.0")	✖ SPT 1	31	25-29-50 (79)	N/A	2				
		(GW) GRAVEL, gray, moist, very dense to medium dense									
			✖ SPT 2	13	11-9-6 (15)	N/A	10	30	16	14	Poor recovery; flight sample obtained
		(CL) gravelly CLAY with boulder fill fragments, brown, moist, hard									
			✖ SPT 3	40	18-18-14 (32)	1.8	4				
			✖ SPT 4	0	12-9-50 (59)	N/A	2				

Refusal at 9.8 feet.  
Bottom of borehole at 9.8 feet.

**AMERICAN ENGINEERS, INC.**

PROFESSIONAL ENGINEERING

65 Aberdeen Drive  
Glasgow, KY 42141  
(270) 651-7220**B-3**

PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/28/17 COMPLETED 8/28/17GROUND ELEVATION 604.8 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (11")									
		CRUSHED AGGREGATE (7")									
		(CL-ML) silty CLAY with gravel, cement stabilized	SPT 1	0	8-14-50 (64)	N/A	8				
		Refusal at 2.4 feet. Bottom of borehole at 2.4 feet.									

**CLIENT** TDOT

**PROJECT NAME** I-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 ---**

[illegible]

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/28/17

**COMPLETED** 8/28/17

**GROUND ELEVATION** 590.5 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (13")									
		CRUSHED AGGREGATE (4")									
		(CL) lean CLAY with gravel, brown, moist, very stiff	 SPT 1	53	6-10-18 (28)	4.5+	19				
			 SPT 2	20	3-7-2 (9)	N/A	21	31	21	10	
5								43	24	19	Bulk Obtained 3'-5'

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/28/17

**COMPLETED** 8/28/17

**GROUND ELEVATION** 578.6 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8")									
		CRUSHED AGGREGATE (1")									
		(CL-ML) gravely to silty CLAY, grayish brown, moist, hard	 SPT 1	73	3-40-31 (71)	1.5	15				
		(CL) lean CLAY, brown, moist, hard	 SPT 2	47	5-22-14 (36)	1.5	10				
			 SPT 3	80	12-22-50 (72)	0.8	13				
<p>Refusal at 8.0 feet. Bottom of borehole at 8.0 feet.</p>											

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/7/17 COMPLETED 9/7/17GROUND ELEVATION 567.3 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (10.25")									
		CRUSHED AGGREGATE (5.5")									
		(CL) gravelly lean CLAY with boulder fill fragments, dark brown, dry to moist, hard	SPT 1	58	8-12-50 (62)	N/A	6				

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 555.5 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---



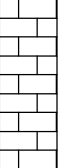

**LOGGED BY** Jackson Daugherty

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8.5") (SP) gravelly SAND, gray to brown, moist, hard	 SPT 1	93	5-19-50 (69)	N/A	8	26	16	10	
5		LIMESTONE, gray to white, thinly to thickly bedded, hard, bedding planes at 45 degree angles indicating boulders or sloping rock, highly fractured and weathered	 RC 2	76 (0)							

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



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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/29/17 COMPLETED 8/29/17GROUND ELEVATION 542.3 ftDRILLER Adam Cash

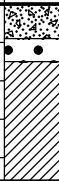

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 11:59 - T:\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\I-440\GEOTECHLAB TESTING\I-440.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (11") ----- CRUSHED AGGREGATE (8") ----- (CL) gravelly lean CLAY, brown, moist, hard	 SPT 1	47	9-40-36 (76)	1.5	5				
		Refusal at 4.6 feet. Bottom of borehole at 4.6 feet.									bedded material at end of sample



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CLIENT TDOT  
PROJECT NUMBER 216-137  
DATE STARTED 8/29/17 COMPLETED 8/29/17  
DRILLER Adam Thompson  
DRILLING METHOD Hollow Stem Auger  
LOGGED BY Jackson Daugherty CHECKED BY Dennis Mitchell  
NOTES \_\_\_\_\_

PROJECT NAME I-440  
PROJECT LOCATION Nashville, TN  
GROUND ELEVATION 539.5 ft  
GROUND WATER LEVELS:  
AT TIME OF DRILLING ---  
AT END OF DRILLING ---  
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (9.5")									
		CRUSHED AGGREGATE (11")									

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

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 11:59 - T:\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\I-440\GEOTECHLAB TESTING\I-440.GPJ

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/6/17COMPLETED 9/6/17GROUND ELEVATION 542.6 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Nathaniel BlackburnCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (10")									
		CRUSHED AGGREGATE (4.8")									
		(GC) clayey GRAVEL, brown to gray, moist, very dense	SPT 1	113	21-50	N/A	8				

Refusal at 2.3 feet.

Bottom of borehole at 2.3 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/7/17

**COMPLETED 9/7/17**

**GROUND ELEVATION** 546.2 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (7.75") CRUSHED AGREGGATE (6.0") (CL) gravelly CLAY with boulder fill fragments, dark brown, moist, stiff to hard	 SPT 1	42	8-13-50 (63)	3.0	7				
5			 SPT 2	13	12-7-8 (15)	N/A	23	42	18	24	

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



PAGE 1 OF 1

**AFTER DRILLING ---**

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Refusal at 8.4 feet.  
Bottom of borehole at 8.4 feet.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/7/17COMPLETED 9/7/17GROUND ELEVATION 551.9 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Nathaniel BlackburnCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (12")									
		CHRUSHED AGGREGATE (13")									

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

**CLIENT** TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

**DATE STARTED** 9/6/17      **COMPLETED** 9/6/17

**GROUND ELEVATION** 555 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger




AT TIME OF DRILLING ---

**LOGGED BY** Nathaniel Blackburn      **CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.75")									
		CRUSHED STONE BASE (10")									
		(GC) clayey GRAVEL, gray to white, moist, very dense,	▲ SPT	100	50	N/A	5				
		Refusal at 2.1 feet. Bottom of borehole at 2.1 feet.	1								

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/7/17

**COMPLETED** 9/7/17

**GROUND ELEVATION** 557.4 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8.5") 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				
5			 SPT 2	0	13-8-4 (12)	N/A	10				

Refusal at 5.5 feet.  
Bottom of borehole at 5.5 feet.



**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/29/17

**COMPLETED** 8/29/17

**GROUND ELEVATION** 555.7 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10") ----- CRUSHED AGGREGATE (7") ----- (CL) gravelly lean CLAY, fine and coarse gravel, brown, moist, hard	 SPT 1		10-19-50 (69)		7				

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/7/17

**COMPLETED** 9/7/17

**GROUND ELEVATION** 551.8 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---







**LOGGED BY** Nathaniel Blackburn

**CHECKED BY** Dennis Mitchell

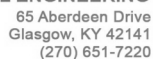
AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (7.5")									
		CRUSHED AGGREGATE (6")									
		(CL) gravelly CLAY, brown to light gray, moist, hard	 SPT 1	80	5-12-20 (32)	4.5+	24	22	14	8	
5		LIMESTONE, light gray, thinly to thickly bedded, hard, weathered, fractured	 RC 2	90 (34)							

Refusal at 3.5 feet.  
Bottom of borehole at 8.5 feet.



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## NOTES

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/7/17 COMPLETED 9/7/17GROUND ELEVATION 546.6 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8.0")									
		CRUSHED AGGREGATE (7.2")									
		(CL) gravelly lean CLAY, coarse gravel and boulder fill fragments, dark brown, moist, hard	SPT 1	80	7-17-38 (55)	4.5	6				
5			SPT 2	136	11-24-50 (74)	N/A	2				

Refusal at 5.1 feet.  
Bottom of borehole at 5.1 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/29/17

**COMPLETED** 8/29/17

**GROUND ELEVATION** 543.2 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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				
			 SPT 2	53	8-15-31 (46)	4.5+	5	27	13	14	
5		(CL) gravelly lean CLAY, boulder fill fragments, brown, dry, hard	 SPT 3	0	12-29-50 (79)	N/A					

Refusal at 7.3 feet.  
Bottom of borehole at 7.3 feet.



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## AFTER DRILLING

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Refusal at 3.3 feet.  
Bottom of borehole at 3.3 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 569.3 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/29/17 COMPLETED 8/29/17GROUND ELEVATION 570.1 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (11")									
		CRUSHED AGGREGATE (4")									
		(ML) gravelly SILT with boulder fragments, brown, dry, hard	SPT 1	73	18-61-37 (98)	N/A	3				
		(CL) lean CLAY with boulder fill fragments, brown, moist to wet, stiff	SPT 2	67	12-18-6 (24)	1.0	35	36	15	21	
5											

Refusal at 5.0 feet.  
Bottom of borehole at 5.0 feet.



**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/29/17

**COMPLETED** 8/29/17

**GROUND ELEVATION** 563.5 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 561.5 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.5")									
		CRUSHED AGGREGATE (6.0")									
		(CL) lean CLAY trace gravel and fill fragments, dark brown, dry, very stiff	 SPT 1	47	7-6-17 (23)	4.5+	15				

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 568.3 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

**LOGGED BY** Nathaniel Blackburn

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

[illegible]

Refusal at 8.0 feet.  
Bottom of borehole at 8.0 feet.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/29/17COMPLETED 8/29/17GROUND ELEVATION 579.1 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint ErvinCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

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

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (10.5")									
		CRUSHED AGGREGATE (7")									
		(CL) lean CLAY with gravel, brown to dark brown, moist, very stiff	SPT 1	93	7-10-13 (23)	4.5+	23				
			ST 2	55		4.5+					
5											
		(CL) lean CLAY trace gravel, brown, moist, stiff	SPT 3	93	2-3-7 (10)	4.2	24	44	20	24	
			SPT 4	100	4-3-9 (12)	4.4	22				
10											

Bottom of borehole at 10.0 feet.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/29/17 COMPLETED 8/29/17GROUND ELEVATION 584.2 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger▽ AT TIME OF DRILLING 3.0 ft / Elev 581.20 ftLOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8")									
		CRUSHED AGGREGATE (4.2")									
		(GC) clayey GRAVEL and boulder fill fragments, brown to gray, dry, dense	SPT 1	80	13-17-20 (37)	N/A	14				
		(CL) lean CLAY trace boulder fragments, brown, moist to wet, very stiff	SPT 2	40	15-7-9 (16)	4.5	35	41	22	19	Water on spoon after sample
Refusal at 4.5 feet. Bottom of borehole at 4.5 feet.											

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/6/17 COMPLETED 9/6/17GROUND ELEVATION 582.7 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

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

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (10.0")									
		CRUSHED AGGREGATE (4.8")									
		(CL) lean CLAY with some gravel, dark brown to brown, moist, hard to very stiff	SPT 1	80	8-8-10 (18)	4.5	29	41	24	17	
		(CH) fat CLAY trace small gravel, yellowish brown to light brown, moist, stiff	SPT 2	73	4-3-6 (9)	4.2	26	52	23	29	
		(CL) lean CLAY, brown, moist, stiff	SPT 3	100	3-4-5 (9)	2.3	15				
		(CL) sandy lean CLAY trace fine gravel, brown, dry, medium stiff	SPT 4	0	3-3-3 (6)	N/A	25	39	17	22	
10											

Bottom of borehole at 10.0 feet.

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PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/6/17 COMPLETED 9/6/17GROUND ELEVATION 576.1 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Nathaniel Blackburn CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (7.25")									
		CRUSHED AGGREGATE (13.25")									

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/29/17

**COMPLETED** 8/29/17

**GROUND ELEVATION** 561.6 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
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	60	7-21-33 (54)	N/A	8				
			SPT 2	0	14-15-16 (31)	N/A	6				no recovery; flight sample obtained

Refusal at 5.2 feet.  
Bottom of borehole at 5.2 feet.



**CLIENT** TDOT

**PROJECT NAME** I-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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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	
<p>Refusal at 2.2 feet. Bottom of borehole at 2.2 feet.</p>											

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 535.1 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10.5")									
		CRUSHED AGGREGATE (4") (CL) gravelly lean CLAY, coarse gravel, brown, dry to moist, hard	 SPT 1	60	6-6-24 (30)	4.5	7	48	18	30	
<p>Refusal at 3.4 feet. Bottom of borehole at 3.4 feet.</p>											



PAGE 1 OF 1

**AFTER DRILLING** ---

## MATERIAL DESCRIPTION

Refusal at 3.5 feet.  
Bottom of borehole at 3.5 feet.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/30/17 COMPLETED 8/30/17GROUND ELEVATION 528 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.5") CRUSHED AGGREGATE (8.5") (CL) gravelly lean CLAY with boulder fill fragments, brown, moist, hard	SPT 1	73	10-30-50 (80)	3.2	8				
Refusal at 2.6 feet. Bottom of borehole at 2.6 feet.											

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/30/17

**COMPLETED** 8/30/17

**GROUND ELEVATION** 525.7 ft

**DRILLER** Adam Cash

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---





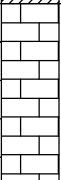

**LOGGED BY** Clint Ervin

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8')									
		CRUSHED AGGREGATE (6")									
		(CL) lean CLAY with small gravel and boulder fragment fill, brown, moist, very stiff	 SPT 1	53	9-15-12 (27)	3.0	11				
5		LIMESTONE, white to gray, thinly to thickly bedded, moderately hard, highly fractured, moderately weathered,	 RC 2	70 (10)							

Refusal at 4.0 feet.  
Bottom of borehole at 9.0 feet.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/6/17COMPLETED 9/6/17GROUND ELEVATION 526 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Jackson DaughertyCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (10")									
		CRUSHED STONE BASE (13.75")									

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

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/6/17 COMPLETED 9/6/17GROUND ELEVATION 528.4 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 9/21/17 12:01 - T:\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\I-440\GEOTECHLAB TESTING\I-440.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (8")									
		CRUSHED AGGREGATE (6")									
		(CL) lean CLAY with gravel and boulder fragment fill, brown, moist, very stiff	SPT 1	73	5-10-10 (20)	4.5+	11				
		(GW) GRAVEL and boulder fragment fill, trace clay, white to light gray, moist, medium dense									
5		(CL) gravelly lean CLAY with boulder fragment fill, brown, moist, stiff	SPT 2	47	6-9-10 (19)	N/A	7				
			SPT 3	53	14-8-7 (15)	1.5	16				
10			SPT 4	87	5-7-5 (12)	1.25	26	35	22	13	

Bottom of borehole at 10.5 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/30/17

**COMPLETED** 8/30/17

**GROUND ELEVATION** 530.5 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 ---**

[illegible]

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



**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/30/17

**COMPLETED** 8/30/17

**GROUND ELEVATION** 532.4 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
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				
5		(CL) lean CLAY with some gravel, brown, moist, medium stiff	 SPT 2	13	13-28-19 (47)	N/A	16				No recovery in SPT; flight sample obtained
			 SPT 3	0	9-9-13 (22)	N/A	25				No recovery in SPT; flight sample obtained

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

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CLIENT TDOT PROJECT NAME I-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 ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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				
Refusal at 2.7 feet. Bottom of borehole at 2.7 feet.											

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 517.5 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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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 moist, stiff to hard	 SPT 1	47	7-6-5 (11)	3.8	20	39	20	19	
5			 SPT 2	60	5-4-42 (46)	4.5	6				

Refusal at 5.5 feet.  
Bottom of borehole at 5.5 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/30/17

**COMPLETED** 8/30/17

**GROUND ELEVATION** 510.3 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (11.0")									
		CRUSHED AGGREGATE (6.0")									
		(ML) gravely SILT, grayish brown, dry, medium stiff	SPT 1	27	15-28-21 (49)	N/A	10				
		(CL) gravely lean CLAY trace sand, grayish brown, moist, stiff									
		Refusal at 4.7 feet	SPT 2	71	9-50	N/A	5				

Refusal at 4.7 feet.  
Bottom of borehole at 4.7 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/30/17

**COMPLETED** 8/30/17

**GROUND ELEVATION** 512.8 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (8.75") ----- CRUSHED AGGREGATE (8.5") ----- (CL) gravely 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.  
Bottom of borehole at 3.6 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/6/17

**COMPLETED** 9/6/17

**GROUND ELEVATION** 531.9 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.75")									
		CRUSHED AGGREGATE (6.0")									
		(CL) gravelly lean CLAY, coarse gravel and boulder fill fragments, brown to grayish brown, very stiff and hard	 SPT 1	40	10-11-13 (24)	1.5	6				
5			 SPT 2	33	12-22-20 (42)	N/A	5				
			 SPT 3	33	5-5-11 (16)	1.5	15				

Refusal at 8.4 feet.  
Bottom of borehole at 8.4 feet.

**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** 546.9 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

**LOGGED BY** Jackson Daugherty

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9")									
		(GW) GRAVEL, coarse to fine grained, white to gray, very dense, wx limestone									
		LIMESTONE, medium to light gray, thinly bedded, hard, fractured, weathered	SPT 1	57	20-50	N/A	3				
5			RC 2	60 (12)							

Refusal at 2.7 feet.  
Bottom of borehole at 7.7 feet.

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PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/5/17 COMPLETED 9/5/17GROUND ELEVATION 540.7 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Jackson Daugherty CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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.											



**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** 522.1 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.0")									
		CRUSHED AGGREGATE (6.0")									
		(CL) gravelly lean CLAY, coarse gravel, brown, moist to wet, stiff	 SPT 1	36	5-10-50 (60)	1.5	7				
<p>Refusal at 2.4 feet.</p> <p>Bottom of borehole at 2.4 feet.</p>											

**CLIENT** TDOT

PROJECT NAME I-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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (11.75")									
		CRUSHED AGGREGATE (6.0")									
		(CL) lean CLAY with boulder fragments, brown, dry to moist, hard	 SPT 1	100	6-26-50 (76)	4.5+	10	31	21	10	

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

**CLIENT** TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

**DATE STARTED** 8/30/17 **COMPLETED** 8/30/17

**GROUND ELEVATION** 522.3 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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10.0")									
		CRUSHED AGGREGATE (3.6")									
		(CL) lean CLAY with boulder fill fragments, brown, dry, hard	 SPT 1	53	12-23-29 (52)	4.5+	7				

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

**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** 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (18")									
		CRUSHED AGGREGATE (3.5")									
		(GC) clayey GRAVEL, gray to brown, wet, very dense, wx limestone	SPT 1	100	50	4.0	8				
<p>Refusal at 2.3 feet. Bottom of borehole at 2.3 feet.</p>											

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PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/6/17 COMPLETED 9/6/17GROUND ELEVATION 525.6 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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.



PAGE 1 OF 1

**AFTER DRILLING ---**

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Refusal at 5.6 feet.  
Bottom of borehole at 5.6 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/31/17

**COMPLETED** 8/31/17

**GROUND ELEVATION** 527 ft

**DRILLER** Adam Cash

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---





**LOGGED BY** Clint Ervin

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.0")									
		CRUSHED AGGREGATE (4.8")									
		(CL) lean CLAY, brown, dry to moist, very stiff	SPT 1	0	6-10-50 (60)	N/A	14	35	19	16	
		LIMESTONE, white to gray, thinly to thickly bedded, moderately hard,	RC 2	85 (56)							
5											Weathered from 5.5' to 7.2'  Clay filled void from 6.7' to 7.0'

Refusal at 2.6 feet.  
Bottom of borehole at 8.0 feet.

Weathered  
from 5.5' to 7.2'  
Clay filled void  
from 6.7' to 7.0'

**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** 539.6 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 ---**

[illegible]

Refusal at 6.2 feet.  
Bottom of borehole at 6.2 feet.



**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** 553.4 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 ---**

[illegible]

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PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 8/31/17 COMPLETED 8/31/17GROUND ELEVATION 564.7 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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

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

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/31/17

**COMPLETED** 8/31/17

**GROUND ELEVATION** 567.6 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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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. Bottom of borehole at 3.2 feet.											

**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** 564.3 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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10.5") ----- CRUSHED AGGREGATE (4.8") ----- (GC) clayey GRAVEL, coarse, moist, dense, boulder fill fragments	 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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# B-62

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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 554.9 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 ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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.  
Bottom of borehole at 3.6 feet.

**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** 539.9 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 ---**

[illegible]

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/31/17

**COMPLETED** 8/31/17

**GROUND ELEVATION** 529.1 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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

Refusal at 4.2 feet.  
Bottom of borehole at 4.2 feet.

**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 ---





**LOGGED BY** Clint Ervin

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (9.75")									
		CRUSHED AGGREGATE (4.8")									
		(CL) gravely lean CLAY trace 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.



**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** 522.1 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---




**LOGGED BY** Jackson Daugherty

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10.0")									
		(CL) lean CLAY trace to some fine gravel, light brown, moist to wet, hard	RC 1	0 (0)	18-14-28 (42)	4.5+	10				Cored through boulder from 0.85' to 1.0' and sampled beneath
		LIMESTONE, light to dark gray, thinly to thickly bedded, hard, highly weathered, highly fractured,	SPT 2	73 68 (0)							
5			RC 3								

Refusal at 0.9 feet.  
Bottom of borehole at 7.5 feet.

**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** 516.7 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (9.25")									
		CRUSHED AGGREGATE (4.8")									
		(CL) lean CLAY with gravel, brown, dry to moist, stiff, boulder fill fragments	 SPT 1	53	6-9-6 (15)	3.5	14				
		(CL) lean CLAY, light brown with dark brown mottling, moist, stiff									
			 SPT 2	73	5-4-8 (12)	3.2	31				
5											
		(ML) SILT trace clay, brown, wet to saturated, soft	 SPT 3	100	3-2-1 (3)	0.5	30				
			 SPT 4	0	3-50	N/A	24				
Refusal at 9.1 feet											

Refusal at 9.1 feet.  
Bottom of borehole at 9.1 feet.

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CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/5/17COMPLETED 9/5/17GROUND ELEVATION 518.7 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint ErvinCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

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\GEOTECH\LAB TESTING\I-440.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (7.5"0									
		CRUSHED AGGREGATE (7.2")									
		(CL-ML) silty lean CLAY with trace gravel, light brown to brown, moist, stiff	SPT 1	100	5-6-7 (13)	2.5	21				
5		(ML) SILT, light yellowish brown, dry to moist, stiff	SPT 2	93	4-6-7 (13)	3	26	39	25	14	
			SPT 3	93	3-4-7 (11)	1.5	22				
10			SPT 4	0	5-9-7 (16)	N/A	21				

Bottom of borehole at 10.0 feet.

**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** 526 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 ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10.5") ----- CRUSHED AGGREGATE (3.6") ----- (CL) lean CLAY with gravel and sand, brown, moist, very stiff	 SPT 1	73	4-3-14 (17)	3.1	23				
<p>Refusal at 3.4 feet. Bottom of borehole at 3.4 feet.</p>											

**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** 535.6 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---





**LOGGED BY** Jackson Daugherty

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10")									
		CRUSHED AGGREGATE (2.4") (CL) lean CLAY trace to some fine sand, brown to black, moist, stiff	 SPT 1	53	1-4-7 (11)	4.5+	22	40	25	15	
5		LIMESTONE, dark to light gray, thinly to thickly bedded, hard, highly fractured, weathered near soil/ rock interface,	RC 2	100 (22)							

Refusal at 3.3 feet.  
Bottom of borehole at 8.3 feet.

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PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/5/17COMPLETED 9/5/17GROUND ELEVATION 545.5 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint ErvinCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

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\GEOTECHLAB TESTING\I-440.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (9.5")									
		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 from 2.0' to 4.0'
5			SPT 2	100	2-3-4 (7)	2.5	25				
		(ML) SILT trace sand and gravel, brown, moist to wet, soft	SPT 3	100	3-2-2 (4)	1.0	32	33	27	6	
10			SPT 4	100	2-2-2 (4)	1.0	25				

Bottom of borehole at 10.0 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 8/28/17

**COMPLETED** 8/28/17

**GROUND ELEVATION** 489.6 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

**LOGGED BY** Jackson Daugherty

**CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING ---**

[illegible]

Refusal at 0.2 feet.  
Bottom of borehole at 25.2 feet.

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

**DATE STARTED** 8/31/17 **COMPLETED** 8/31/17

**GROUND ELEVATION** 485.3 ft

**DRILLER** Adam Thompson

**GROUND WATER LEVELS:**

**DRILLING METHOD** HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

**LOGGED BY** Jackson Daugherty      **CHECKED BY** Dennis Mitchell

AT END OF DRILLING ---

## NOTES

**AFTER DRILLING** ---

[illegible]

Refusal at 0.1 feet.  
Bottom of borehole at 15.1 feet.



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PAGE 1 OF 1

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/7/17 COMPLETED 9/7/17GROUND ELEVATION 485 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD HSA/ Diamond impregnated coring bitAT TIME OF DRILLING ---LOGGED BY Nathaniel Blackburn CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CONCRETE (10.75")									
		CRUSHED STONE BASE (3.5")									
		LIMESTONE, medium to light gray, thinly bedded, fractured	SPT 1	125	11-30-16	N/A	7				SPT sample driven to 3.0 feet likely due to sloping rock or boulder
			RC 2	70 (24)	(46)						
5			RC 3	100 (40)							
10			RC 4	100 (80)							
15											

Refusal at 2.3 feet.  
Bottom of borehole at 17.3 feet.

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PAGE 1 OF 2

CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/11/17COMPLETED 9/13/17GROUND ELEVATION 535 ftDRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD HSA/ Diamond impregnated coring bitAT TIME OF DRILLING ---LOGGED BY Jacob CowanCHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES

AFTER DRILLING ---

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\GEOTECH\LAB TESTING\I-440.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		TOPSOIL (26.5")									
		(CL) lean CLAY with some gravel, light brown, moist, very stiff 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					
20		LIMESTONE, gray, medium grained, laminated to thinly bedded, hard, weathered, boulder fill	RC 6	33 (0)							
			RC 7	46 (28)							Clay seam from 20.5' to 20.8' Clay seam from 21.4' to 21.7'
25			RC 8	10 (0)							
30			RC 9	38 (24)							
35											

(Continued Next Page)

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS	
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
35												
		LIMESTONE, light gray, medium grained, thinly to thickly bedded, hard, boulder fill (continued)	RC 10	58 (32)							Clay seam from 40.0' to 40.3'	
40			RC 11	48 (18)								Clay seam from 42.2' to 42.4'
			RC 12	26 (0)								
45			RC 13	38 (38)								
			RC 14	98 (96)								
50			RC 15	100 (100)								
		LIMESTONE, fine to medium grained, thinly to thickly bedded, hard										
55												
60												
Refusal at 17.5 feet. Bottom of borehole at 63.5 feet.												



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PZ-1

PAGE 1 OF 1

CLIENT TDOT  
PROJECT NUMBER 216-137  
DATE STARTED 9/8/17 COMPLETED 9/8/17  
DRILLER Adam Cash  
DRILLING METHOD HSA/ Diamond impregnated coring bit  
LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell  
NOTES \_\_\_\_\_

PROJECT NAME I-440  
PROJECT LOCATION Nashville, TN  
GROUND ELEVATION 542.6 ft  
GROUND WATER LEVELS:  
AT TIME OF DRILLING ---  
AT END OF DRILLING ---  
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		TOPSOIL (6 inches) (CL) lean CLAY									
5											
10		PZ Installed 5.0' into bedrock									

Refusal at 9.0 feet.  
Bottom of borehole at 13.7 feet.

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PZ-2

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CLIENT TDOT  
PROJECT NUMBER 216-137  
DATE STARTED 9/8/17 COMPLETED 9/8/17  
DRILLER Adam Cash  
DRILLING METHOD HSA/ Diamond impregnated coring bit  
LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell  
NOTES \_\_\_\_\_

PROJECT NAME I-440  
PROJECT LOCATION Nashville, TN  
GROUND ELEVATION 507.2 ft  
GROUND WATER LEVELS:  
AT TIME OF DRILLING ---  
AT END OF DRILLING ---  
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		TOPSOIL (3") (CL) lean CLAY, silty with gravel									
5		PZ Installed 5.0' into bedrock									
10											

Refusal at 5.7 feet.  
Bottom of borehole at 10.7 feet.

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**CLIENT** TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/7/17

**COMPLETED** 9/7/17

**GROUND ELEVATION** 541.4 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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		CONCRETE (10") ----- CRUSHED AGGREGATE (7.8") ----- (CL) gravely 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.



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SH-4

PAGE 1 OF 1

CLIENT TDOT  
PROJECT NUMBER 216-137  
DATE STARTED 9/8/17 COMPLETED 9/8/17  
DRILLER Adam Cash  
DRILLING METHOD Hollow Stem Auger  
LOGGED BY Clint Ervin CHECKED BY Dennis Mitchell  
NOTES \_\_\_\_\_

PROJECT NAME I-440  
PROJECT LOCATION Nashville, TN  
GROUND ELEVATION 509 ft  
GROUND WATER LEVELS:  
AT TIME OF DRILLING ---  
AT END OF DRILLING ---  
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		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 - T:\GEOTECH SUPPORT\TDOT\REGION 3 ON-CALL SERVICES 2016-2020\I-440\GEOTECHLAB TESTING\I-440.GPJ

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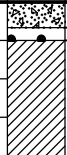
CLIENT TDOTPROJECT NAME I-440PROJECT NUMBER 216-137PROJECT LOCATION Nashville, TNDATE STARTED 9/7/17 COMPLETED 9/7/17GROUND ELEVATION 526.6 ftDRILLER Adam Cash

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem AugerAT TIME OF DRILLING ---LOGGED BY Clint Ervin CHECKED BY Dennis MitchellAT END OF DRILLING ---

NOTES \_\_\_\_\_

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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 auger from 1.0' to 4.1'

Refusal at 4.1 feet.  
Bottom of borehole at 4.1 feet.



**CLIENT** TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

DATE STARTED 9/7/17

**COMPLETED** 9/7/17

**GROUND ELEVATION** 529.1 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** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0											
		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

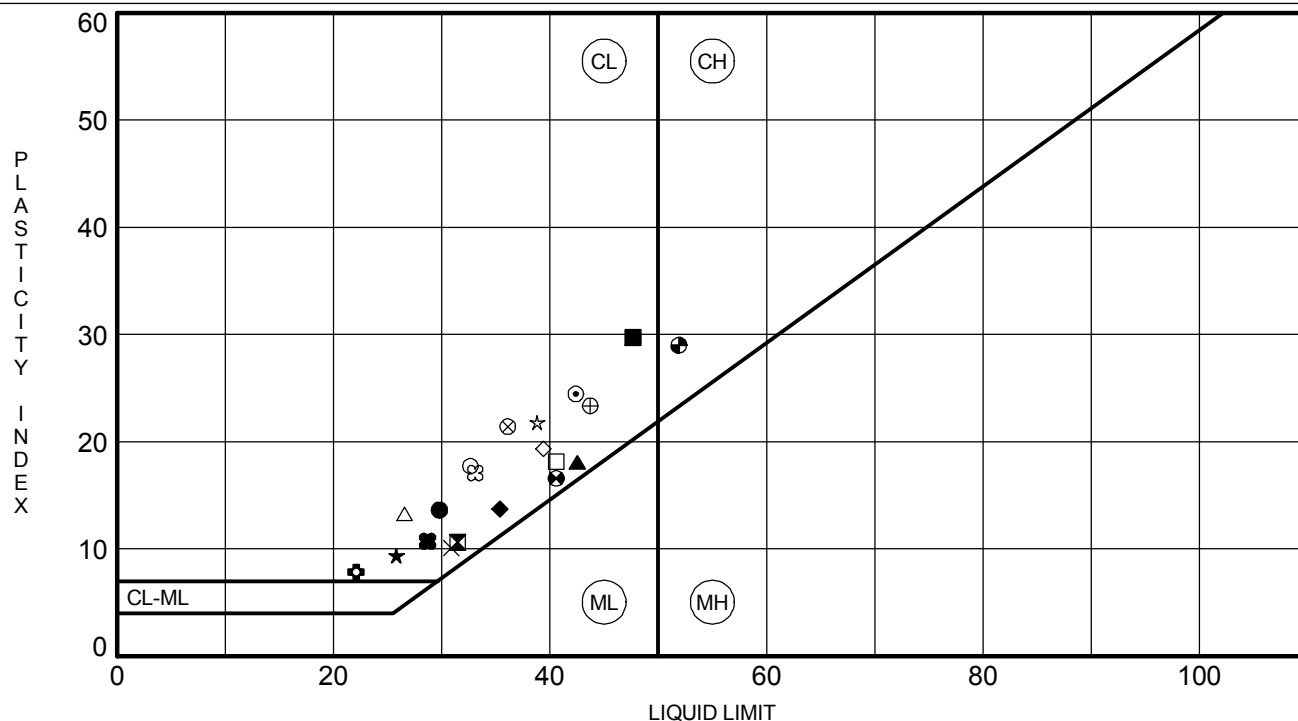
## Laboratory Testing Results

**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	B-2	4.0	30	16	14		LEAN CLAY (CL)
☒	B-5	3.0	31	21	10		LEAN CLAY (CL)
▲	B-5	3.5	43	24	19		LEAN CLAY (CL)
★	B-8	1.5	26	16	10		LEAN CLAY (CL)
⊙	B-12	4.0	42	18	24		LEAN CLAY (CL)
⊕	B-18	1.5	22	14	8		LEAN CLAY (CL)
○	B-19	4.0	33	15	18		LEAN CLAY (CL)
△	B-21	3.0	27	13	14		LEAN CLAY (CL)
⊗	B-25	3.0	36	15	21		LEAN CLAY (CL)
⊕	B-29	6.0	44	20	24		LEAN CLAY (CL)
□	B-30	3.0	41	22	19		LEAN CLAY (CL)
⊕	B-31	1.2	41	24	17		LEAN CLAY (CL)
⊕	B-31	4.0	52	23	29		FAT CLAY (CH)
☆	B-31	8.5	39	17	22		LEAN CLAY (CL)
⊗	B-34	1.1	33	16	17		LEAN CLAY (CL)
■	B-35	1.2	48	18	30		LEAN CLAY (CL)
◆	B-40	9.0	35	22	13		LEAN CLAY (CL)
◇	B-44	1.1	39	20	19		LEAN CLAY (CL)
×	B-51	1.9	31	21	10		LEAN CLAY (CL)
■	B-54	1.2	29	18	11		LEAN CLAY (CL)

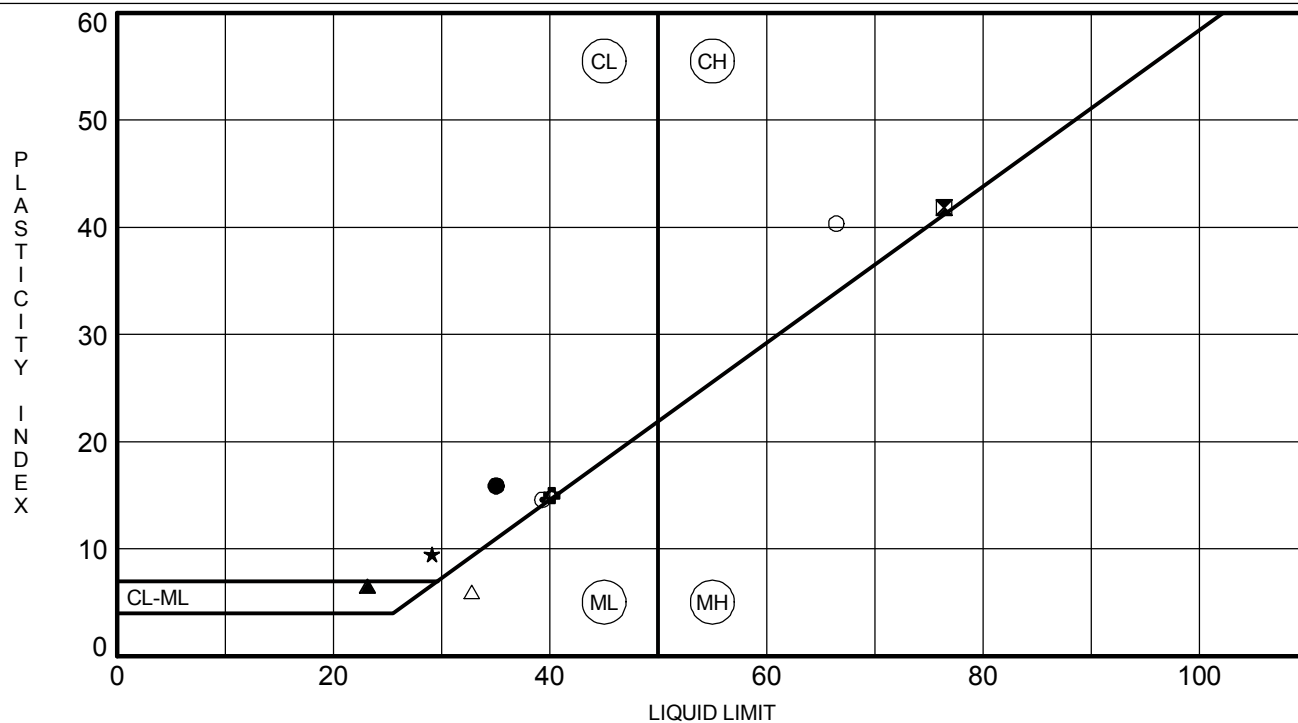
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**CLIENT** TDOT

**PROJECT NAME** I-440

PROJECT NUMBER 216-137

**PROJECT LOCATION** Nashville, TN

[illegible]



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# MOISTURE-DENSITY RELATIONSHIP

CLIENT TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

PROJECT LOCATION Nashville, TN

Source of Material

B-5 3.0

Description of Material

LEAN CLAY (CL)

Test Method

ASTM D698 Method A

## TEST RESULTS

Maximum Dry Density

118.0 PCF

Optimum Water Content

12.7 %

## ATTERBERG LIMITS

LL  
31

PL  
21

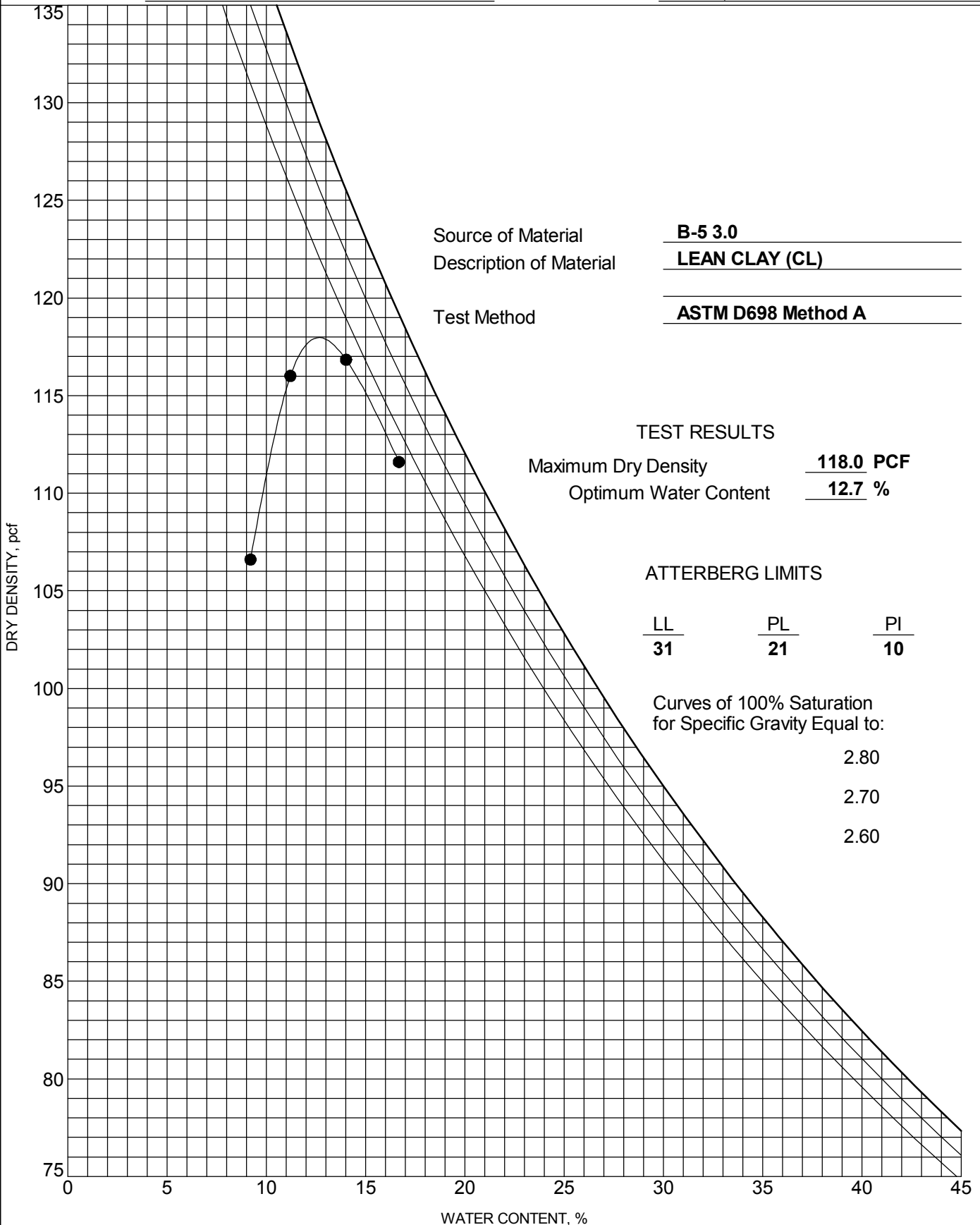
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Curves of 100% Saturation  
for Specific Gravity Equal to:

2.80

2.70

2.60





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# MOISTURE-DENSITY RELATIONSHIP

CLIENT TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

PROJECT LOCATION Nashville, TN

Source of Material

B-31 4.0

Description of Material

FAT CLAY (CH)

Test Method

ASTM D698 Method A

## TEST RESULTS

Maximum Dry Density

100.9 PCF

Optimum Water Content

23.9 %

## ATTERBERG LIMITS

LL  
52

PL  
23

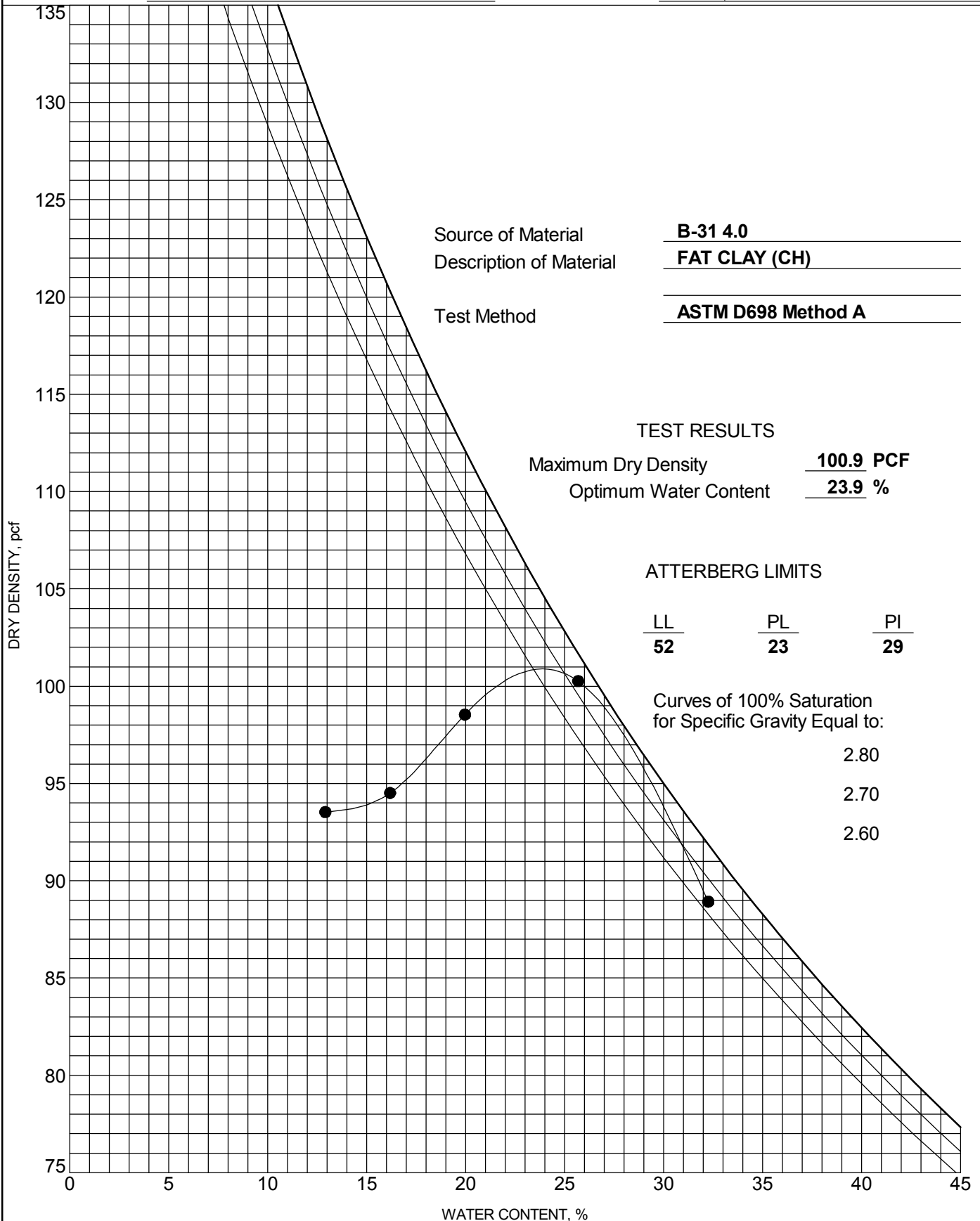
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Curves of 100% Saturation  
for Specific Gravity Equal to:

2.80

2.70

2.60





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# MOISTURE-DENSITY RELATIONSHIP

CLIENT TDOT

PROJECT NAME I-440

PROJECT NUMBER 216-137

PROJECT LOCATION Nashville, TN

Source of Material

B-71 2.0

Description of Material

FAT CLAY (CH)

Test Method

ASTM D698 Method A

## TEST RESULTS

Maximum Dry Density

99.3 PCF

Optimum Water Content

23.3 %

## ATTERBERG LIMITS

LL  
66

PL  
26

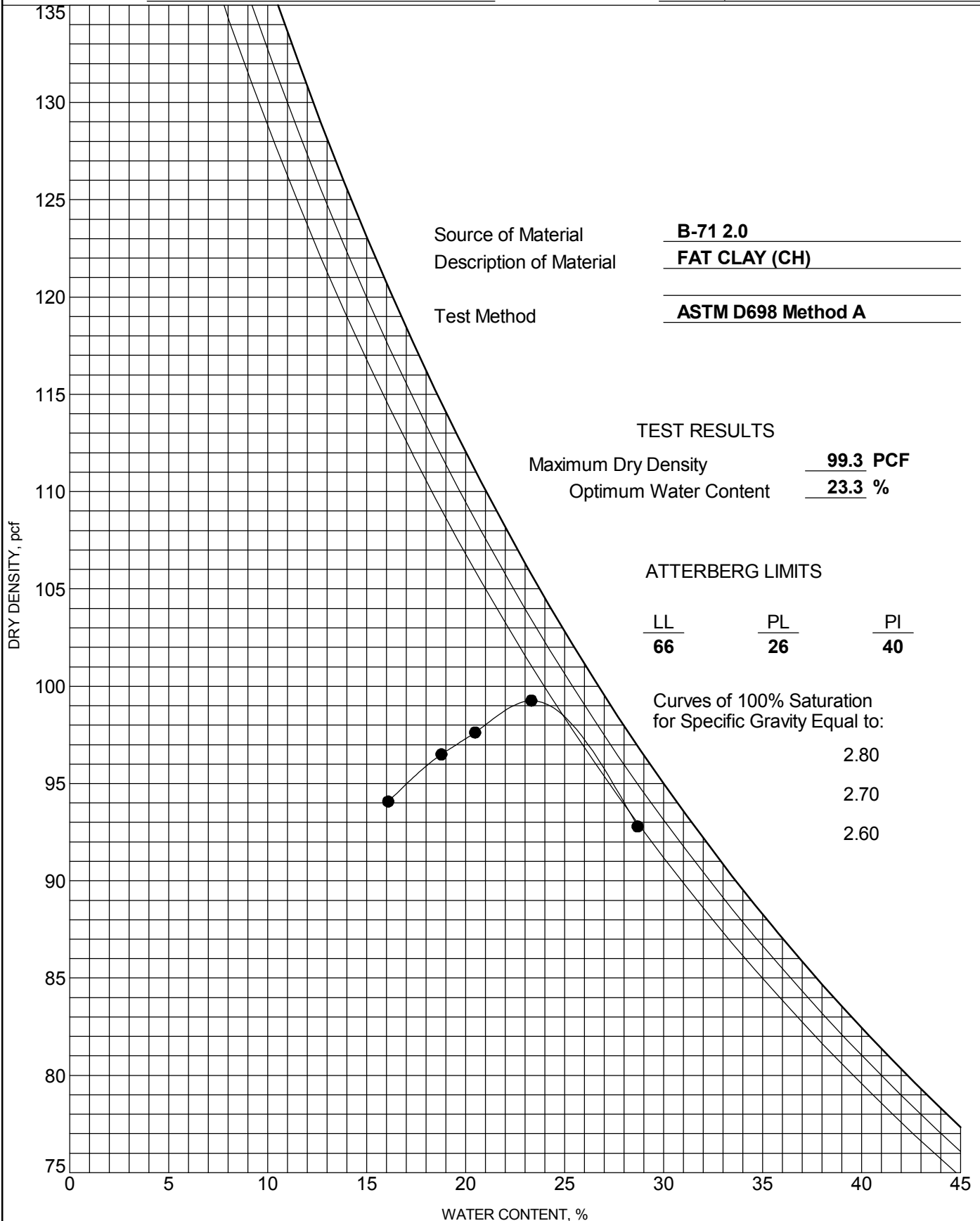
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40

Curves of 100% Saturation  
for Specific Gravity Equal to:

2.80

2.70

2.60



## 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

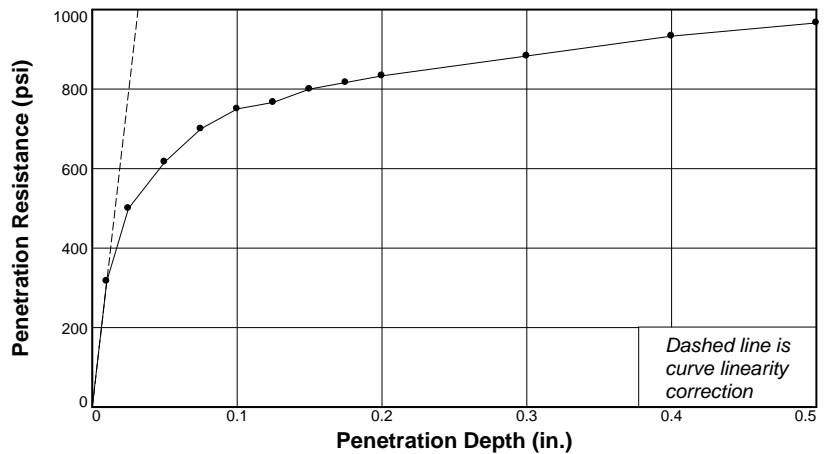
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	339	0.0
72	365	0.6
96	369	0.7
100	369	0.7

#### Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	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





## 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:** 1  
**Material Description:** fat CLAY, trace fine gravel, yellowish brown to light brown, moist, 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

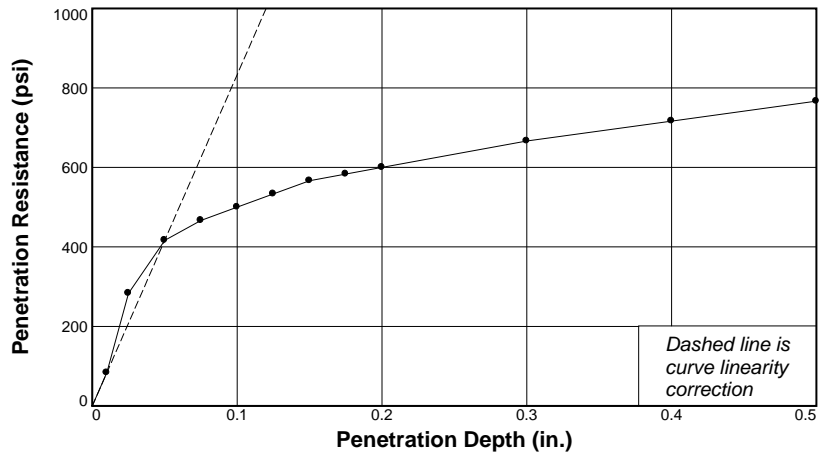
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	236	0.0
72	264	0.6
96	266	0.7

#### Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	128.84	107.8	30.76	46.8
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



## 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

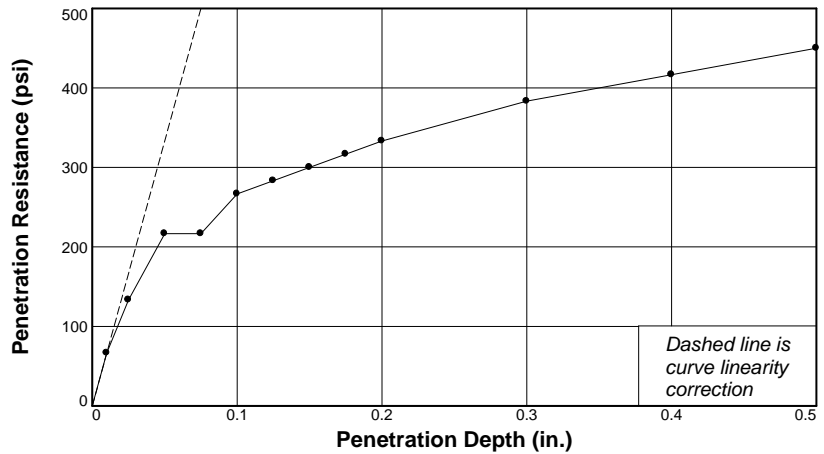
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	240	0.0
72	370	2.8
96	376	3.0

#### Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	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

#### 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





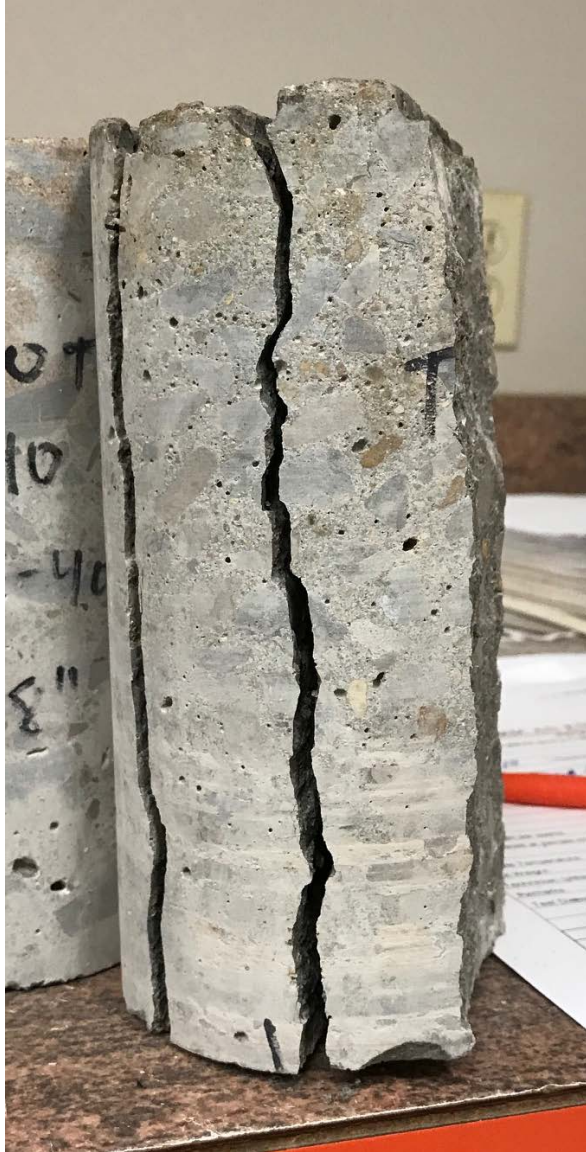
Rock Core Unconfined Compressive Strength		
Boring Location	Sample Elevation (ft)	Compressive Strength (psi)
B-8	549.5	9,737
B-18	544.3	3,013
B-28	564.3	10,513
B-38	517.7	3,613
B-48	544.2	11,210
B-56	523.5	9,289
BR-1	471.4	7,520
BR-1	466.2	10,549
BR-2	475.2	10,888
BR-2	470.0	8,598
BR-3	474.0	11,777
BR-3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

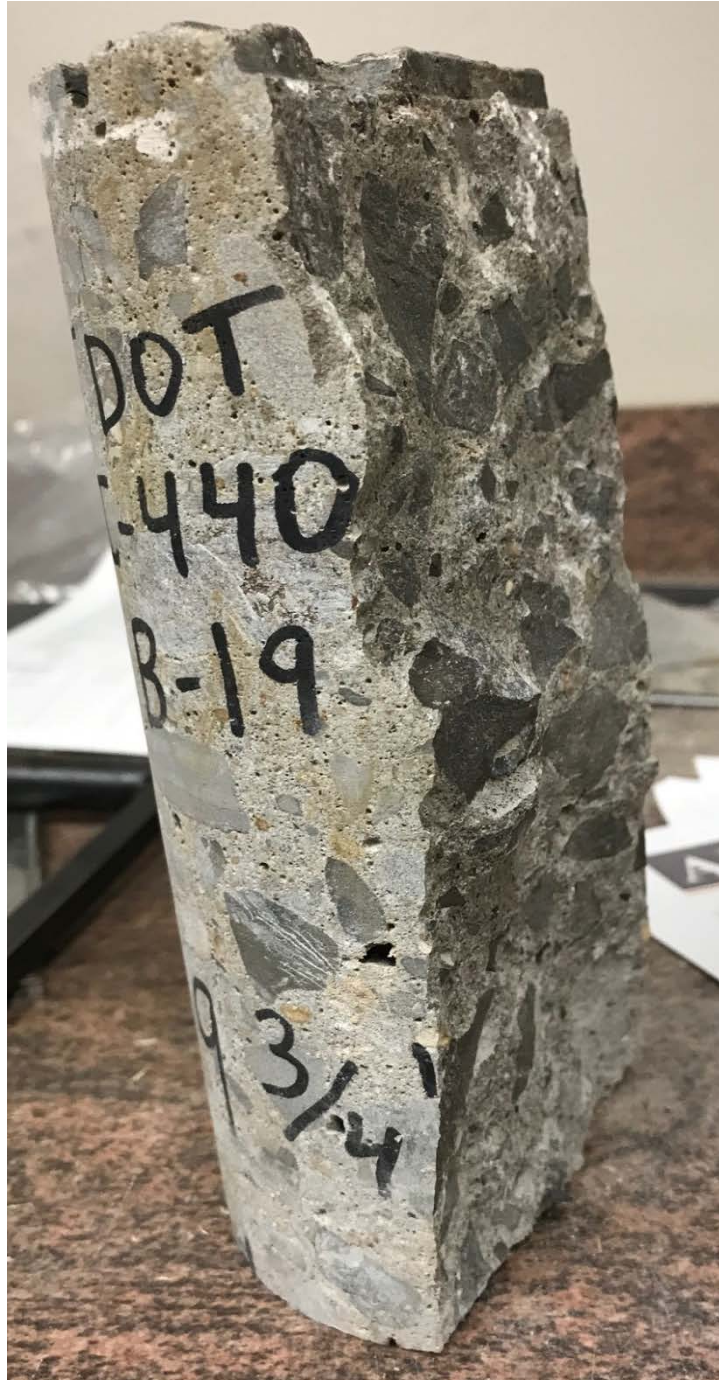




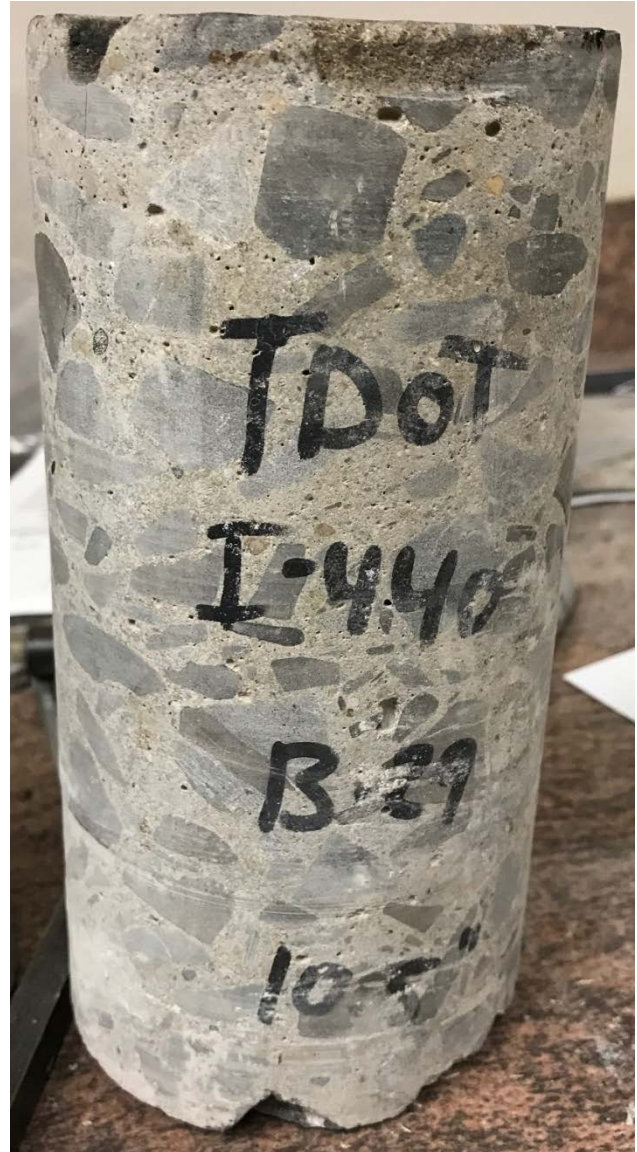


AMERICAN  
ENGINEERS, INC.

## Boring B-19 Pavement Core



**Boring B-29 Pavement Core**





## Boring B-34 Pavement Core



**Boring B-40 Pavement Core**







AMERICAN  
ENGINEERS, INC.

## Boring B-46 Pavement Core



**Boring B-51 Pavement Core**





AMERICAN  
ENGINEERS, INC.

## Boring B-54 Pavement Core





## **Boring B-68 Pavement Core**

