

GEOTECHNICAL BASELINE REPORT

REPLACEMENT BRIDGE OVER CALABASH BRANCH

S-46-732 – BOYD ROAD

SCDOT FILE NO. 46.039094.10

SCDOT PIN NO. 39094_RD10

YORK COUNTY, SOUTH CAROLINA

S&ME PROJECT NO. 1261-11-044

Prepared For:



3820 Faber Place Drive, Suite 300
North Charleston, South Carolina 29405

Prepared by:



301 Zima Park Drive
Spartanburg, South Carolina 29301

May 9, 2011



May 9, 2011

AECOM
3820 Faber Place Drive, Suite 300
North Charleston, South Carolina 29405

Attention: Mr. Charles Dwyer

Reference: **GEOTECHNICAL BASELINE REPORT**
Replacement Bridge over Calabash Branch
S-46-732 – Boyd Road
SCDOT File No. 46.039094.10
SCDOT PIN No. 39094_RD10
York County, South Carolina
S&ME Project No. 1261-11-044

Dear Mr. Dwyer:

The purpose of this report is to provide preliminary geotechnical information to the design team. The information contained in this report pertains to design of the proposed replacement bridge. Our services were authorized by the subconsulting agreement between S&ME and AECOM that commenced on December 15, 2010.

As requested, representatives of S&ME, Inc. were present at the above referenced site between April 6 and 7, 2011 to conduct two standard penetration test (SPT) borings (B-1 and B-2). Also shear wave velocity measurements were obtained near the west end bent location using both Multi-channel Analysis of Surface Waves (MASW) methods. The borings were conducted at each end bent in the roadway, approximately 6 feet from the center line. Closure of one lane of the roadway was required to perform the field exploration.

Boring locations were established in the field by measuring distances from the existing bridge and intersecting roads. Stationing was referenced from the provided information.

The existing bridge location is shown on Figure 1 – *Site Location Map*. Approximate boring locations and MASW sounding location are shown on Figure 2 – *Test Location Map*. The existing bridge is a two-lane structure (# 4670073200100) as documented on Figure 3 – *Photographic Log*. A summary of the borings and sounding is presented in Table 1.

Table 1 – Test Borings and Sounding

BORING ID	REFUSAL DEPTH	TERMINATION DEPTH	STATION	OFFSET	TYPE	NOTE
B-1	26.7	46.7	60+12	6R	SPT & ROCK CORE	WEST END BENT
B-2	19.2	39.2	61+22	6R	SPT & ROCK CORE	EAST END BENT
S-1	N/A	N/A	N/A	N/A	MASW	WEST END BENT

Soil sampling and penetration testing were performed in general accordance with ASTM D1586, “*Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*” using rotary wash boring methods described in the Appendix and as noted on the boring logs. The borings encountered refusal material at depths of 26.7 and 19.2 feet below the ground surface (bgs). Rock coring was performed in general accordance with ASTM D2113, “*Rock Core Drilling and Sampling of Rock for Site Investigation*” using methods described in the Appendix and as noted on the boring logs. The borings were terminated at depths of 46.7 and 39.2 feet bgs. The borings were backfilled with bentonite pellets upon completion of the drilling.

Ground water measurements were not attempted following termination of drilling because of the rotary wash drilling methods used. Stabilized ground water levels were measured in borings B-1 and B-2 at depths of 17.5 and 16.8 feet bgs., respectively.

Soils were classified in general accordance with ASTM D2488, “*Practice for Description and Identification of Soils*”. Details of the subsurface conditions encountered by the SPT borings and rock coring are shown on the soil test boring logs in the Appendix. These logs represent our interpretation of the subsurface conditions based on the test data. Stratification lines on the boring logs represent approximate boundaries between soil types; however, the actual transition may be gradual and the thicknesses of the strata will vary across the site. The soil and rock samples will be retained at our laboratory until SCDOT requests them, until completion of the new bridge, or 365 days after drilling, which ever is least.

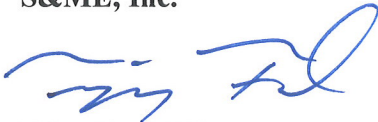
Shear wave velocities were measured using MASW methods (Multi-Channel Analysis of Surface Waves) near the west end of the existing bridge structure. The testing was conducted using a 24-channel GeoMetrics Geode seismograph and the test data reduced using the OYO Corporation SeisImager software. The results of the active and passive sources were combined to produce a single shear wave velocity profile and are included in the Appendix.

Our laboratory performed compressive strength of intact rock core tests on two samples of the cored rock. Testing was performed in general accordance with ASTM and/or AASHTO test procedures. Results of the laboratory testing are included on the test data sheet in the Appendix.

Environmental assessment of soils, water, wetland, and endangered species was not included in our scope of services for this project. The boring log and sounding information are intended for SCDOT's engineering interpretation of the data collected.

S&ME appreciates this opportunity to work with AECOM as your local geotechnical consultant on this project. If you have any questions or need further information in regard to this letter, please do not hesitate to contact us at 864-547-2360.

Sincerely,
S&ME, Inc.



Tripp Ford, PE
Project Engineer
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Michael Revis, PE
Senior Engineer
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TF/MR

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APPENDIX

Figure 1 - Site Location Map

Figure 2 –Test Location Map

Figure 3 – Photographic Log

Legend to Soil Classification and Symbols

Boring Logs

Field Testing Procedures

MASW Sounding Data

Laboratory Test Data Sheet

Map of the Clover, South Carolina area showing the proposed site location. The map displays a network of roads, including US 321 and SC 55, and various local streets. A callout box labeled "Site Location" points to a specific area near the intersection of S-64 and S-151. A north arrow is located in the top left corner. The map is sourced from ESRI Base Data and SCDOT GIS Data.



BRIDGE REPLACEMENT OVER
CALABASH CREEK
S-46-732
YORK COUNTY, SC

1

S:\GEOTECH\2011\6111044 {Replacement Bridge Over Calabash Br}\001 - Geotech\Drawings\Figure 2.mxd



SCALE: 1" = 100 Feet
DATE: 04-18-2011
DRAWN BY: RB
PROJECT NO: 1261-11-044



TEST LOCATION MAP
BRIDGE REPLACEMENT OVER
CALABASH CREEK
S-46-732
YORK COUNTY, SC

FIGURE NO.

2



Looking East



Looking West

SCALE:	NTS
CHECKED:	MGR
DRAWN:	LTF
DATE:	5/9/2011



<p>PHOTOGRAPHIC LOG CALABASH CREEK YORK COUNTY, SOUTH CAROLINA PROJECT NO.: 1261-11-044</p>

FIGURE NO.

3

SCDOT Soil Test Boring Log

File No.:	46.039094	Project No. (PIN):	39094_RD10	County:	York	Eng./Geo.:	B. Boland
Site Description:	S-46-732 (Boyd Road) Over Calabash Branch					Route:	S-46-732
Boring No.:	B-1	Boring Location:	60+12	Offset:	6R	Alignment:	Mainline
Elev.:	ft	Latitude:		Longitude:		Date Started:	4/6/2011
Total Depth:	46.7 ft	Soil Depth:	26.7 ft	Core Depth:	46.7 ft	Date Completed:	4/6/2011
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)	Liner Used:	Y (N)
Drill Machine:	CME 55	Drill Method:	RW-RC	Hammer Type:	Automatic	Energy Ratio:	
Core Size:	NQ	Driller:	Miller & Baucom	Groundwater:	TOB	24HR	17.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> <div>0 10 20 30 40 50 60 70 80 90</div> </div>
	0.0	FILL: CLAYEY SAND (SC) - very loose to loose, red orange, fine to medium, trace mica		0.0	SS-1	11	3	4	7	●
	2.0			2.0	SS-2	2	2	2	4	●
	4.0	FILL: WELL GRADED SAND WITH CLAY (SW-SC) - very loose, brown red, fine to medium		4.0	SS-3	2	2	2	4	●
	6.0			6.0	SS-4	3	4	5	9	●
	8.0	FILL: SANDY LEAN CLAY (CL) loose, red orange, fine to medium, trace mica		8.0	SS-5	2	2	3	5	●
	10.0			10.0	SS-6	2	2	3	5	●
	12.0			12.0	SS-7	1	2	3	5	●
	14.0			14.0	SS-8	3	3	5	8	●
	16.0	POSSIBLE FILL: SILTY SAND (SM) loose, red dark tan, fine to medium, trace mica		16.0	SS-9	2	1	2	3	●
	18.0	ALLUVIUM: SANDY SILT (ML) soft, orange tan, fine to medium, little mica		18.0	SS-10			WOH	0	●
	20.0	ALLUVIUM: FAT CLAY WITH SAND (CH) - very soft, gray, fine, trace mica								
	23.5	ALLUVIUM: POORLY GRADED SAND (SP) - loose, tan gray, medium to coarse		23.5	SS-11	3	3	3	6	●
	26.7	QUARTZITE - gray white, slightly weathered, very hard		26.7	RC-1					Rec = 76%, RQD = 22%
	31.7			31.7	RC-2					Rec = 58%, RQD = 30%
	36.7	QUARTZ MONZONITE - gray white, fresh weathered, very hard		36.7	RC-3					Rec = 74%, RQD = 74%
	41.7			41.7	RC-4					Rec = 100%, RQD = 100%
	46.7	TRI-CONE REFUSAL AT 26.7 FEET CORING TERMINATED AT 46.7 FEET								

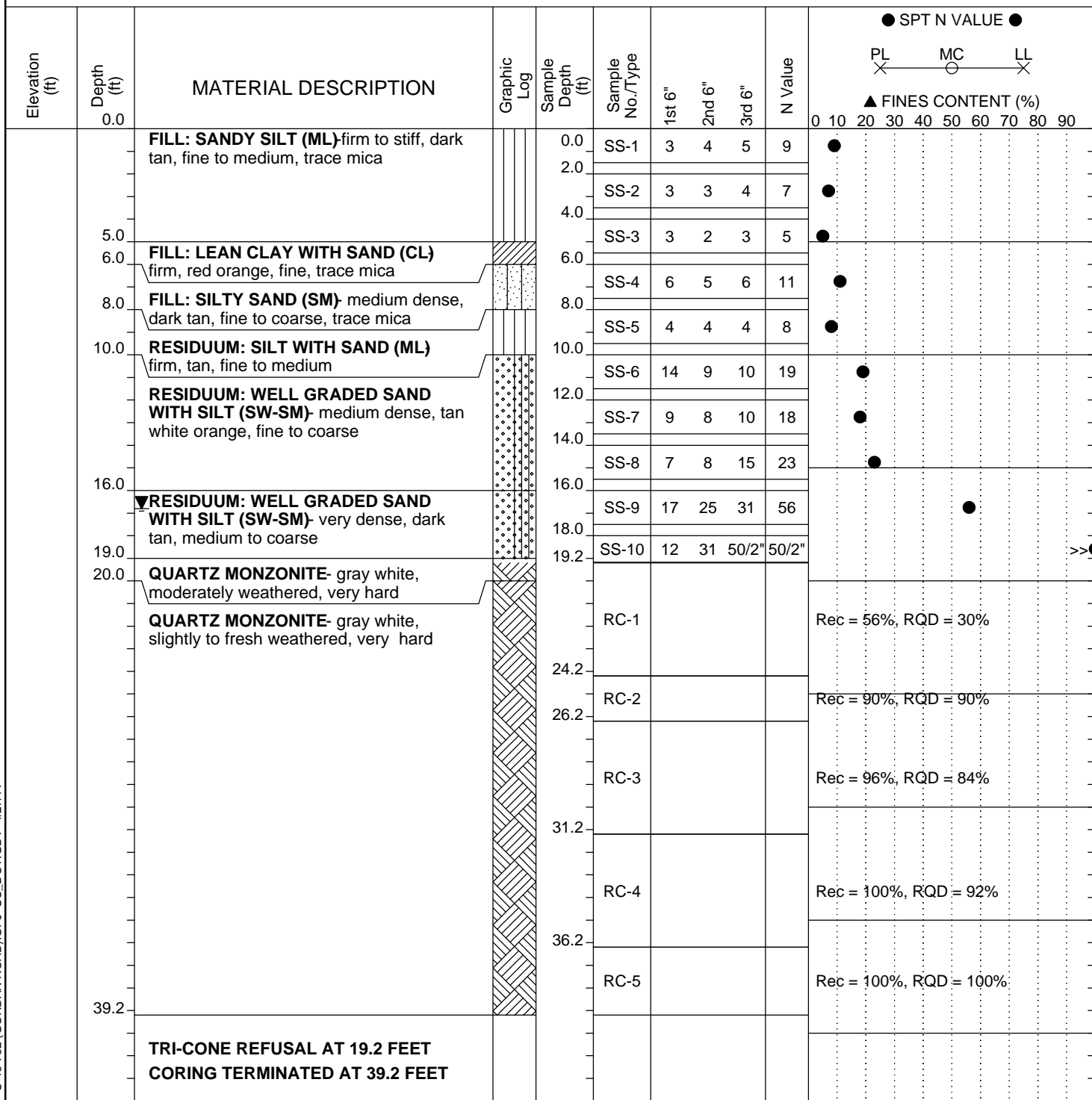
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS	- Split Spoon	HSA	- Hollow Stem Auger
ST	- Shelby Tube	CFA	- Continuous Flight Augers
AWG	- Rock Core, 1-1/8"	DC	- Driving Casing
NQ	- Rock Core, 1-7/8"	RW	- Rotary Wash
CU	- Cuttings	RC	- Rock Core
CT	- Continuous Tube		

SC.DOT 6111044 - S-46-732 (GORDAN ROAD).GPJ SC.DOT.GDT 4/27/11

SCDOT Soil Test Boring Log

File No.:	46.039094	Project No. (PIN):	39094_RD10	County:	York	Eng./Geo.:	B. Boland
Site Description:	S-46-732 (Boyd Road) Over Calabash Branch					Route:	S-46-732
Boring No.:	B-2	Boring Location:	61+22	Offset:	6R	Alignment:	Mainline
Elev.:	ft	Latitude:		Longitude:		Date Started:	4/7/2011
Total Depth:	39.2 ft	Soil Depth:	26.7 ft	Core Depth:	46.7 ft	Date Completed:	4/7/2011
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)	Liner Used:	Y (N)
Drill Machine:	CME 55	Drill Method:	RW-RC	Hammer Type:	Automatic	Energy Ratio:	
Core Size:	NQ	Driller:	Miller & Baucom	Groundwater:	TOB	24HR	16.8 ft

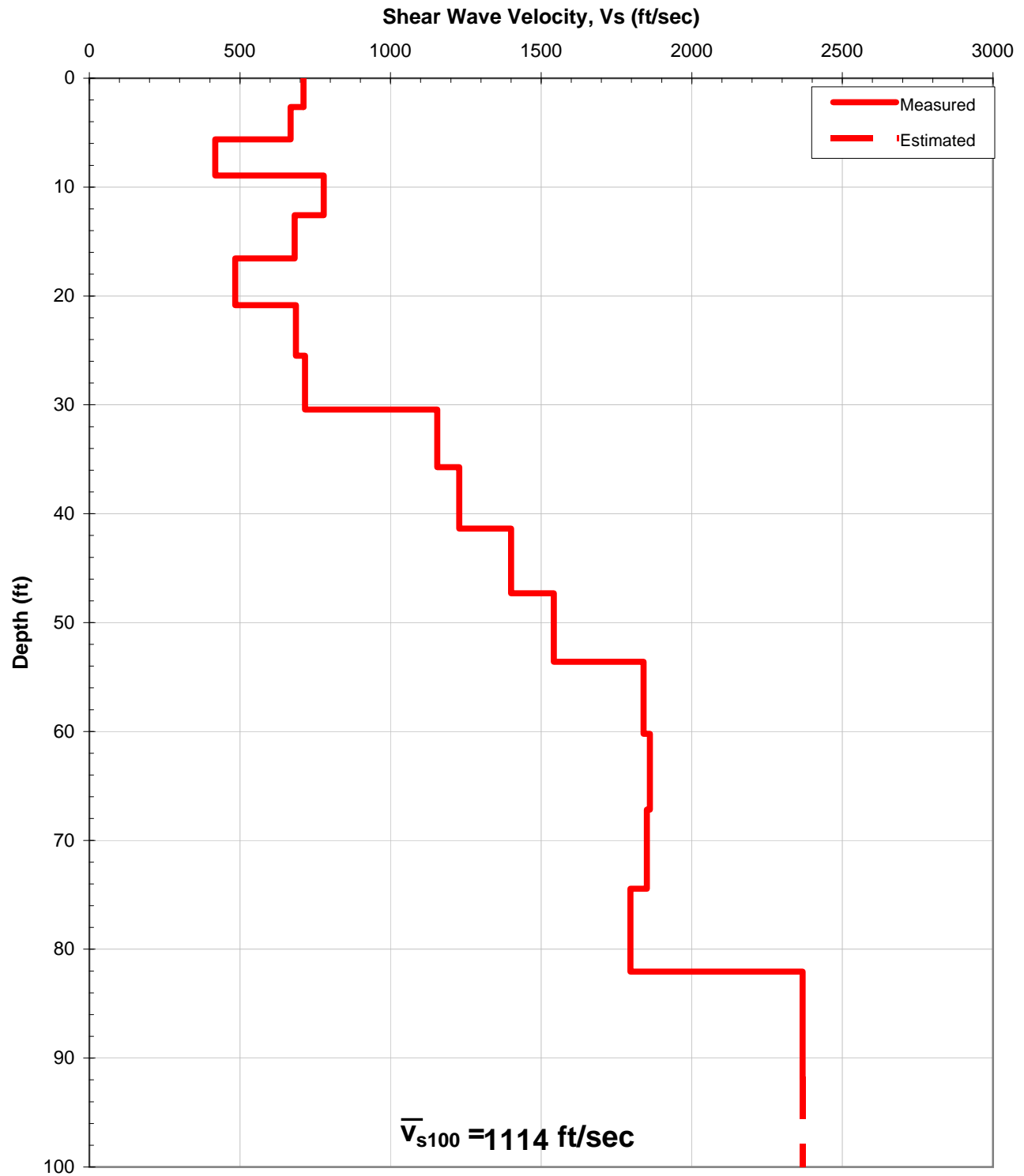


LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS	- Split Spoon	HSA	- Hollow Stem Auger
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NQ	- Rock Core, 1-7/8"	RW	- Rotary Wash
CU	- Cuttings	RC	- Rock Core
CT	- Continuous Tube		



Shear Wave Velocity Profile (S-1)
RBO Calabash Branch
York County, South Carolina
1261-11-044





**COMPRESSIVE STRENGTH
of
INTACT ROCK CORES**
ASTM D 7012

Job Name: S-46-732 (Boyd Road) Replacement Bridge over Calabash Branch

Date Cored: 4/6 & 4/7/11

Job No.: 1261-11-044

Date Tested: 4/26/11

Boring Number	Depth (feet)	Length After Cutting (in.)	Diameter (inches)	Load	Area	L/D Ratio	Compressive Strength (psi)
B-1	42.0	4.01	1.98	62,005	3.08	2.03	20,130
B-2	36.5	4.03	1.98	56,693	3.08	2.04	18,410