

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>101</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/13/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/14/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void	3.85						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", fracture/joints @ 4.0' & 5.3'	1823.35 5.30	5		Box 1	CC	#1 at 6' to 6.54' -Compressive Strength =3671 psi - Break Type 3 - Weight = 4.75 lbs; #2 at 8.85' to 9.12' -Compressive Strength =3961 psi - Break Type 3 - Weight = 4.70 lbs	98.0% / 98.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", multiple joints/pieces from 7.4' to 7.65', joints @ 8.25', 9.3', 12.08'	1821.90	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2" w/ dark gray aggregate f/m 17.7' to 21.4', joints @ 13.25', 15.5', 18.83', 19.9', 21.35', 22.7'	12.90 1814.30	15		Box 2	CC	#3 at 16.75' to 17.29' -Compressive Strength =3236 psi - Break Type 5 - Weight = 4.75 lbs; #4 at 22.19' to 22.73' - Compressive Strength =3408 psi - Break Type 3 - Weight = 4.65 lbs	87.0% / 87.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 1-1/2", joints/cracks @ 23.43', 25.7', 27.05', 27.7', 28.18', 28.85', 29.65', 30.4', 31.1', 32.6'	22.70 1804.50	20 25		Box 3	CC	#5 at 26.53' to 27.07' - Compressive Strength =3168 psi - Break Type 3 - Weight = 4.65 lbs; #6 at 29.28' to 29.81' - Compressive Strength =3165 psi - Break Type 3 - Weight = 4.65 lbs	100.0% / 100.0%
		30					

#### SAMPLER TYPE

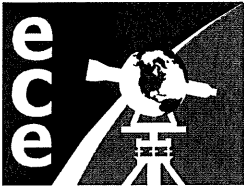
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 101  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/13/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/14/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
SANDSTONE, light gray, strong, fine grained, medium bedding, slightly disintegrated & decomposed, mod. fract, yellowish orange oxidation on fract. faces, grayish black shale/coal partings and on all fracture faces, black coal seams at 39.5', 39.6', 40.6' Horizontal Fractures @ 33.2', 33.4', 33.8', 34.3', 34.7', 35', 35.43', 36.2', 36.7', 36.98', 37.75', 39.03', 39.78', 39.98', 40.03' --- Vertical Fracture from 33.2'-33.85'	32.60	35		Box 4	RC	#7 at 35.66' to 36.20' - Compressive Strength = 5035 psi - Break Type 3 - Weight = 5.10 lbs; #8 at 38.32' to 38.85' - Compressive Strength = 9149 psi - Break Type 3 - Weight = 5.05 lbs	89.0% / 83.0%
	40.60						
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, some grayish black shale/coal partings & on fracture faces Horizontal and Angular Fractures @ 42.3', 42.6', 42.78', 44.78', 44.98', 46.68', 47.38', 47.7', 48.5', 49.7'	1786.60	45		Box 5	RC	#9 at 41.70' to 42.24' - Compressive Strength = 9127 psi - Did not break - Weight = 5.15 lbs; #10 at 49.25' to 49.79' - Compressive Strength = 4697 psi - Break Type 2 - Weight = 5.25 lbs	88.0% / 88.0%
	49.70						
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, some grayish black shale/coal partings & on fracture faces Horizontal Fractures @ 51.48', 52.65', 52.85', 53.5', 54.08', 54.4', 56.43', 56.9', 57.25', 57.55', 58', 58.95' --- Angular Fractures @ 53.45', 54.85', 55.7', 56.45', 57.25'-57.55'	1777.50	55		Box 6	RC	#11 at 52.08' to 52.61' - Compressive Strength = 9133 psi - Did not break - Weight = 5.10 lbs; #12 at 58.31' to 58.85' - Compressive Strength = 6668 psi - Break Type 5 - Weight = 5.15 lbs	100.0% / 100.0%
	58.95						
SANDSTONE, light greenish gray, strong, fine grained,	1768.25	60					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

## LOG OF TEST BORING

Client City of Crossville Boring # 101  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

### DRILLING AND SAMPLING INFORMATION

### TEST DATA

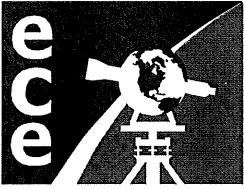
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/13/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/14/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
thickly bedded, fresh, competent, slightly to moderately fractured, trace grayish black shale/coal partings & on fracture faces	68.30 1758.90	65	[Lithology: Shale with coal partings]	Box 7	RC	#13 at 63.35' to 63.88' - Compressive Strength =16009 psi - Break Type 3 - Weight = 5.10 lbs; #14 at 66.12' to 66.66' - Compressive Strength =7065 psi - Break Type 3 - Weight = 5.15 lbs	80.0% / 80.0%
Horizontal Fractures @ 59.6', 59.68', 59.9', 60.35', 60.7', 61.4', 62.33', 62.85', 67.3', 67.7', 67.8' --- Angular Fractures @ 60.55', 64.25', 65.2', 65.73', 66.1', 66.9', 67', 67.05', 67.2', 67.45', 68.3'	76.05	75	[Lithology: Shale with coal partings]	Box 8	RC	#15 at 69.32' to 69.86' - Compressive Strength =4403 psi - Break Type 5 - Weight = 5.10 lbs; #16 at 75.43' to 75.97' - Compressive Strength =3552 psi - Break Type 3 - Weight = 5.25 lbs	97.0% / 97.0%
SANDSTONE. light greenish gray, strong, fine grained, thickly bedded, fresh, competent, slightly to moderately fractured, trace grayish black shale/coal partings & on fracture faces, moderate brown shale partings at 68.85' & 69.2'	1751.15	80	[Lithology: Sandstone]				
Horizontal Fractures @ 70', 70.65', 73.9', 75.2' --- Angular Fractures @ 68.3', 69.2', 70.15', 72.85', 74.45', 76.05'		85					
Bottom of hole at 76.05' - Terminated Rock Core		90					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 102  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/7/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/7/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.75						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1", joint at 5.05' switching into existing dam concrete	1823.45	5		Box 1	CC	#1 from 4.85'- 5.39' - Length=0.54' - Compressive Strength =4217 psi - Break Type 5 - Weight = 4.70 lbs; #2 from 11'-11.53' - Length=0.53' - Compressive Strength =3575 psi - Break Type 5 - Weight = 4.60 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break @ 7.15', multiple joints/pieces from 7.55' to 7.75', joint/crack @ 12.6'	1822.15	10					
	12.60						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break @ 19.2', joints/cracks@ 13.2', 14.6',15.8',17', 17.5',17.7',18.6',19.3', 20.9',21.3', sandstone pieces@ 13.6',14.6',21'-21.3',21.85'-22.45'	1814.60	15		Box 2	CC	#3 from 14.75'-15.29' - Length=0.54' - Compressive Strength =5983 psi - Break Type 3 - Weight = 4.85 lbs; #4 from 19.6'-20.14' - Length=0.54' - Compressive Strength =4720 psi - Break Type 5 - Weight = 4.80 lbs	100.0% / 100.0%
	20						
	22.10						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ break @ 29.25', joints/cracks @ 24.15', 24.3', 24.8', 25.45', 25.85', 26.75', 27.75', 29.25', 31.6', sandstone pieces @ 24'-24.3', 25.2', 30.6'	1805.10	25		Box 3	CC	#5 from 23.7'-24.24' - Length=0.54' - Compressive Strength =3078 psi - Break Type 3 - Weight = 4.70 lbs; #6 from 28.1'-28.63' - Length=0.53' - Compressive Strength =4205 psi - Break Type 3 - Weight = 4.75 lbs	99.0% / 99.0%
	30						

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 102  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/7/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/7/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH-LOG	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break @ 33.1', concrete to bedrock transition with no break @ 35.45', joints/cracks @ 32.2', 32.8', 34.4', sandstone pieces @ 33.6'-34.05'	31.60 1795.60			Box 4	CC	#7 from 31.8'-32.34' - Length=0.54' - Compressive Strength =10521 psi - Break Type 3 - Weight = 5.00 lbs	100.0% / 100.0%
SANDSTONE, light gray, strong, fine grained, medium bedding, fresh, competent, moderately to slightly fractured, some moderate brown shale partings, fractures @ 35.65', 36.4', 36.5', 36.7', 36.85', 37', 37.55', 37.7', 39.25', 39.45', 40', 40.2', 40.3'	1791.75 37.00 1790.20	35		Box 4	RC	#8 from 37.91'-38.45' - Length=0.54' - Compressive Strength = >9219 psi - Did not Break - Weight = 5.10 lbs	100.0% / 88.0%
COAL seam	39.45						
COAL seam	1787.75	40					
COAL seam	40.30						
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, some moderate brown shale partings, black coal on some fracture faces and some partings	1786.90 40.50 1786.70			Box 5	RC	#9 from 41.2'-41.74' - Length=0.54' - Comp Strength =>9170 psi - Did not Break - Weight = 5.20 lbs; #10 from 47.95'-48.49' - Length=0.54' - Comp. Strength =>9172 psi - Break Type 3 - Wt = 5.20 lbs - Cont. loading after sample had vertical break occur	100.0% / 95.0%
Horizontal Fractures @ 42.2', 42.9', 44', 44.65', 46', 46.65', 46.75', 48.95', 49.25', 49.5' --- Angular Fractures @ 47.4', 47.55', 47.65'	46.75	45					
COAL seam	1780.45						
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, some moderate brown shale partings, some grayish black shale/coal on fracture faces	49.50 1777.70	50		Box 6	RC	#11 from 50'-50.33' - Length=0.33' - Compressive Strength =10443 psi - Break Type 3 - Weight = 3.15 lbs - Cont. loading after sample had initial break; #12 from 56.75'-57.29' - Length=0.54' - Comp Strength =4017 psi - Break Type 3 - Weight = 5.20 lbs	100.0% / 89.0%
Horizontal Fractures @ 50.65', 51.2', 52.85', 52.9', 53.7'-54.4', 54.7', 56.85', 57.65', 58.35', 59' --- Angular Fractures @ 51.7', 52.8', 55.3', 55.8', 55.85', 55.9' --- Vertical Fractures @ 49.5'-49.85', 54.7'-55'	59.00	55					
SANDSTONE, light gray, strong, fine grained, thickly	1768.20	60					

#### SAMPLER TYPE

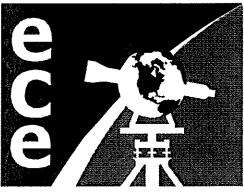
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>102</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

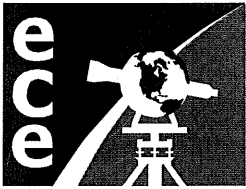
#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/7/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/7/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
bedded, fresh, competent, slightly fractured, some moderate brown shale partings, some grayish black shale/coal on fracture faces	67.45 1759.75	65		Box 7	RC	#13 from 59.2'-59.74' - Length=0.54' - Compressive Strength =9162 psi - Break Type 3 - Weight = 5.20 lbs - Cont. loading after sample had initial break; # 14 from 66.05'-66.38' - Length=0.33' - Comp Strength =>9156 psi - Did not break - Weight = 3.2	100.0% / 95.0%
Horizontal Fractures @ 60.7', 62.7', 63.6', 63.65', 65.1', 67.45' --- Angular Fractures @ 60.2', 64.3', 66.9' --- Vertical Fracture @ 66.9'-67.45'	77.60 1749.60	70		Box 8	RC	#15 from 67.95'-68.49' - Length=0.54' - Compressive Strength =>9153 psi - Did not break - Weight = 5.30 lbs; #16 from 73.5'-74.04' - Length=0.54' - Compressive Strength =>11053 psi - Did not break - Weight = 5.20 lbs	100.0% / 84.0%
SANDSTONE, light gray, strong, fine grained, medium bedded, fresh, competent, moderately fractured, grayish black shale/coal on most fracture faces	80	80					
Horizontal Fractures @ 70.55', 70.7', 71.8', 73.25', 74.6', 74.95', 75.1', 75.25', 75.65', 76.05', 76.1', 76.2', 77.6' --- Angular Fractures @ 67.6', 69.05', 70.05', 70.35', 71.45', 71.55', 71.65', 72.5', 76.15', 76.3', 76.45', 76.5'	85	85					
Bottom of hole at 77.6' - Terminated Rock Core	90	90					

<b>SAMPLER TYPE</b>	<b>GROUND WATER DEPTH</b>	<b>BORING METHOD</b>
SS - DRIVEN SPLIT SPOON	∇ AT COMPLETION <u>N/A</u> FT.	HSA - HOLLOW STEM AUGERS
ST - PRESSED SHELBY TUBE	▼ AFTER _____ FT.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	WATER ON RODS _____ FT.	DC - DRIVING CASING
RC - ROCK CORE		RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 103  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

### DRILLING AND SAMPLING INFORMATION

### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/5/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/6/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.71						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1", break joint at 5.05' switching into existing dam concrete, break @ 3.75'	1823.49	5		Box 1	CC	#1 from 6.18'-6.72' - Length=0.54' - Compressive Strength =3919 psi - Break Type 5 - Weight = 4.75 lbs; #2 from 10.5'-11.03' - Length=0.53' - Compressive Strength =5206 psi - Break Type 5 - Weight = 4.80 lbs	100.0% / 90.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break @ 7.25', joints/cracks @ 5.75', 7.6', 8.1', 8.9', 10.25', 12.2', 13.2', sandstone @ 7.9', 10.15'-10.4'	1822.15	10					
	12.70						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break @ 19.25', joints/cracks @ 15.95', 16.3', 17.7', 20.95', 22.1', 22.3', 22.6' sandstone @ 16'-16.3', 22.1'-22.6'	1814.50	15		Box 2	CC	#3 from 16.8'-17.347' - Length=0.54' - Compressive Strength =5031 psi - Break Type 2 - Weight = 4.75 lbs; #4 from 21.05'-21.58' - Length=0.53' - Compressive Strength =4506 psi - Break Type 2 - Weight = 4.75 lbs	100.0% / 94.0%
	20						
	22.60						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break @ 28.15', joints/cracks @ 23.2', 23.4', 24.9', 26.25', 27.6', 29.4', 31.65', 32', sandstone @ 23.6'-23.95', 25.15'-25.5', 27.6'-27.95', 28.5'-28.7', 30.15'-30.45'	1804.60	25		Box 3	CC	#5 from 24.8'-25.34' - Length=0.54' - Compressive Strength =2725 psi - Break Type 2 - Weight = 4.80 lbs; #6 from 29.9'-30.44' - Length=0.54' - Compressive Strength =2624 psi - Break	100.0% / 95.0%
	30						

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT APPROXIMATE \_\_\_\_\_ FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 103  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

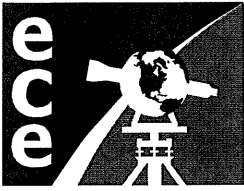
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/5/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/6/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ break @ 32.9', joints/cracks @ 32.4', 32.8', 32.9', 34.3', 37.6', 41.5', sandstone @ 37.6'-37.75', 39.5'-39.8'	32.00 1795.20	35		Box 4	CC	Type 3 - Weight = 4.90 lbs  # 7 from 34.35'-34.89' - Length=0.54' - Compressive Strength =3547 psi - Break Type 3 - Weight = 4.65 lbs; #8 from 37.95'-38.49' - Length=0.54' - Compressive Strength =3595 psi - Break Type 5 - Weight = 4.60 lbs	100.0% / 96.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition w/ break @ 42.5'	41.50 1785.70 42.50	40					
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, some grayish black shale/coal on fracture faces Horizontal Fractures @ 46.5', 46.6', 46.95', 47.5' --- Angular Fractures @ 44.1', 44.6', 45.75', 46.35', 47.3', 47.9', 48.95', 49' --- Vertical Fractures @ 42.5'-43.3', 46.6'-46.95'	49.00 1784.70	45				Box 5	RC
SANDSTONE, light gray, strong, fine grained, medium bedded, fresh, competent, moderately to slightly fractured, some moderate brown shale partings, some grayish black shale/coal on fracture faces and some partings Horizontal Fractures @ 50.65', 52.15', 52.75', 52.95', 55.3', 57.45', 57.65', 57.8' --- Angular Fractures @ 50.8', 51.5', 51.75', 52.35', 53.5', 55.65', 56.05'	57.80 1778.20	50 55	Box 6	RC	#11 from 49.2'-49.74' - Length=0.54' - Compressive Strength =2658 psi - Break Type 3 - Weight = 5.20 lbs; #12 from 56.55'-57.09' - Length=0.54' - Compressive Strength =2671 psi - Break Type 3 - Weight = 5.25 lbs	100.0% / 83.0%	
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly	57.80 1769.40	60				# 13 from 61.15'-61.69' -	

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>103</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

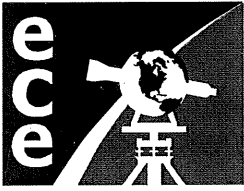
#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/5/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/6/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
fractured, trace moderate brown shale partings, trace grayish black shale/coal on fracture faces and trace partings Horizontal Fractures @ 57.85', 58.15', 59', 60.15', 61.1', 61.55', 62.65', 62.85', 64.1', 64.25', 64.45', 65.25', 66.4' --- Angular Fractures @ 63.75', 65.65'	66.40	65		Box 7	RC	Length=0.54' - Compressive Strength =>9144 psi - Did not break - Weight = 5.15 lbs; #14 from 64.5'-64.83' - Length=0.33' - Compressive Strength =9150 psi - Break Type 3 - Weight = 3.15 lbs	100.0% / 94.0%
SANDSTONE, light gray, strong, fine grained, medium bedded, fresh, competent, moderately fractured, grayish black shale/coal on most fracture faces Horizontal Fractures @ 70.15', 70.3', 70.45', 70.5', 70.65', 71.5', 72.05', 72.8', 73.2', 73.25', 73.75', 73.8', 74.6', 75.45', 76' --- Angular Fractures @ 71', 74.8', 74.85', 75.3' --- Many Fractures @ 71'-71.35', 71.5'-71.8'	1760.80	70		Box 8	RC	# 15 from 67.35'-67.88' - Length=0.53' - Compressive Strength =>9128 psi - Did not break - Weight = 5.10 lbs; #16 from 73.75'-74.29' - Length=0.54' - Compressive Strength =>9294 psi - Did not break - Weight = 5.25 lbs	100.0% / 85.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, some moderate brown shale partings, some grayish black shale/coal on fracture faces Horizontal Fractures @ 77.55', 78.1', 78.45', 78.85', 78.95', 79.2', 79.65', 81.4', 82.25', 82.3', 84.15', 84.2', 84.3' --- Angular Fractures @ 77.5', 80.95', 81.7', 83.15', 85.5', 85.6' --- Vertical Fracture @ 84.3'-84.5'	1751.20	80		Box 9	RC	# 17 between 76'-80.95' - Length=0.34' - Compressive Strength =>9252 psi - Did not break - Weight = 3.25 lbs; # 18 between 80.95'-85.6' - Length=0.54' - Compressive Strength =>9165 psi - Did not break - Weight = 5.20 lbs	100.0% / 85.0%
Bottom of hole at 85.6' - Terminated Rock Core	85.60	85					
	1741.60						
		90					

<b>SAMPLER TYPE</b>	<b>GROUND WATER DEPTH</b>	<b>BORING METHOD</b>
SS - DRIVEN SPLIT SPOON	AT COMPLETION <u>N/A</u> FT.	HSA - HOLLOW STEM AUGERS
ST - PRESSED SHELBY TUBE	AFTER _____ FT.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	WATER ON RODS _____ FT.	DC - DRIVING CASING
RC - ROCK CORE		RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 104  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.80						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 6.25' switching into existing dam concrete, vertical break from 3.8'-5.4'	1823.40	5					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", joints/cracks @ 6.35', 6.7', 9.5', 10.2', 11.55', sandstone @ 10.05'-10.2'	1820.95	10		Box 1	CC	#1 from 4.8'-5.33' - Length=0.53' - Compressive Strength =6518 psi - Break Type 5 - Weight = 4.80 lbs; #2 from 11.2'-11.73' - Length=0.53' - Compressive Strength =4405 psi - Break Type 3 - Weight = 4.70 lbs	100.0% / 61.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break at 18', joints/cracks @ 14.625', 16.5', 20.9', 21.7', 22.35', sandstone @ 17.05'-17.2', 18.05'-18.35', 20.8'-20.9'	1812.58	15		Box 2	CC	#3 from 15.05'-15.59' - Length=0.54' - Compressive Strength =4854 psi - Break Type 5 - Weight = 4.75 lbs; #4 from 19.85'-20.37' - Length=0.52' - Compressive Strength =6217 psi - Break Type 5 - Weight = 4.55 lbs	100.0% / 79.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition w/ no break at 31.5', joints/cracks @ 26.25', 26.6', 27.45', 30.35', 31.6', sandstone @ 26.6'-26.85', 29'-29.75'	1803.15	25		Box 3	CC	#5 from 28.1'-28.63' - Length=0.53' - Compressive Strength =3027 psi - Break Type 5 - Weight = 4.60 lbs; #6 from 32.1'-32.62' -	100.0% / 97.0%
	24.05						
	1803.15	30					

#### SAMPLER TYPE

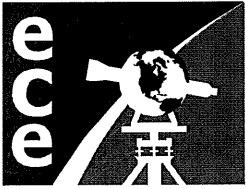
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 104  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

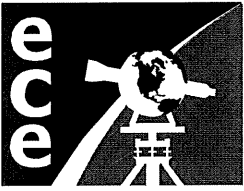
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", joints/cracks @ 33.725', 35.35', 35.8', 36.5', 40.6', 40.95', 41.7', sandstone @ 33.725'-33.95', 35'-35.35', 39.6'-39.95', 40.6'-40.95'	33.73 1793.48	35		Box 4	CC	Length=0.52' - Compressive Strength =2934 psi - Break Type 3 - Weight = 4.70 lbs  #7 from 34.2'-34.72' - Length=0.52' - Compressive Strength =3916 psi - Break Type 2 - Weight = 4.65 lbs; #8 from 39'-39.51' - Length=0.51' - Compressive Strength =2311 psi - Break Type 5 - Weight = 4.40 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with no break at 43.35'	43.00 1784.20 43.35 1783.85	45		Box 5	RC	#9 from 43.6'-43.93' - Length=0.33' - Compressive Strength =9143 psi - Break Type 5 - Weight = 3.15 lbs; #10 from 48.85'-49.37' - Length=0.52' - Compressive Strength =>9148 psi - Did not Break - Weight = 4.95 lbs	100.0% / 79.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black shale/coal partings and on fracture faces Horizontal Fractures @ 43.55', 44.45', 45.05', 46.25', 46.4', 47', 47.25', 51.3' --- Angular Fractures @ 43.5', 44.15', 45.4', 45.7', 47.5', 48.55', 49.2'	52.25 1774.95	55		Box 6	RC	#11 from 54.2'-54.72' - Length=0.52' - Compressive Strength =1806 psi - Break Type 5 - Weight = 5.05 lbs; #12 from 59.05'-59.57' - Length=0.52' - Compressive Strength =>9156 psi - Did	100.0% / 77.0%

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 104  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

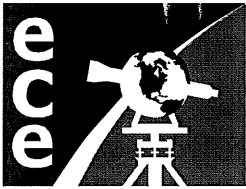
SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, trace grayish black shale/coal on fracture faces, some moderate brown shale partings Horizontal Fractures @ 62.75', 63.8', 65.4', 66.1', 66.7', 69.15', 69.4', 69.55' --- Angular Fractures @ 62.8', 66.85'	62.60 1764.60	65		Box 7	RC	not Break - Weight = 4.95 lbs  #13 from 63.4'-63.91' - Length=0.51' - Compressive Strength =>9151 psi - Did not Break - Weight = 4.95 lbs; #14 from 68.25'-68.76' - Length=0.51' - Compressive Strength =8336 psi - Break Type 3 - Weight = 4.85 lbs	100.0% / 100.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, many grayish black shale/coal partings & on fracture faces, many moderate brown shale partings Horizontal Fractures @ 72.1', 73.2', 75.3', 76.25', 76.7', 76.8', 77', 77.6', 77.7', 78.55', 79.5' --- Angular Fractures @ 71.05', 71.45', 71.65', 73.05', 74.4', 74.6', 74.9', 75'	70.83 1756.38	75		Box 8	RC	#15 from 74.3'-74.82' - Length=0.52' - Compressive Strength =>10616 psi - Did not Break - Weight = 5.00 lbs; #16 from 76.75'-77.27' - Length=0.52' - Compressive Strength =4245 psi - Break Type 2 - Weight = 5.10 lbs	100.0% / 73.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, many grayish black shale/coal partings & on fracture faces, many moderate brown shale partings Horizontal Fractures @ 81.05', 81.275', 81.85', 82.4', 84.35', 84.45', 84.9', 85.1', 85.2', 85.35', 85.85', 86.075', 86.15', 86.275' --- Angular Fractures @ 82.6', 83.2', 83.4'	80.63 1746.58	85		Box 9	RC	#17 from 84.95'-85.47' - Length=0.52' - Compressive Strength =>9152 psi - Did not Break - Weight = 5.00 lbs; #18 from 85.85'-86.18' - Length=0.33' - Compressive Strength =5824 psi - Break Type 5 - Weight = 0.85 lbs	100.0% / 69.0%
Bottom of hole at 86.6' - Terminated Rock Core	86.60 1740.60						

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▽ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 105  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void	3.67						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.05' switching into existing dam concrete, horizontal break @ 3.95'	1823.53	5	[Lithology: Concrete with limestone aggregate]	Box 1	CC	#1 from 6.8'-7.34' - Length=0.54' - Compressive Strength =4162 psi - Break Type 2 - Weight = 4.70 lbs, #2 from 9.5'-10.05' - Length=0.55' - Compressive Strength =3614 psi - Break Type 2 - Weight = 4.65 lbs	100.0% / 97.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition with no break @ 12.25', joints/cracks @ 5.45', 6.75', 7.7', 7.8', 8.2', 8.8', 11.15', 12.8', sandstone @ 5.9'-6.25', 11.3'-11.55'	1822.15	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition with no break @ 20.95' & with break @ 15.8' & 19.2', joints/cracks @ 16.95', 17.75', 17.95', 20.6', 21.9', 22.5', sandstone @ 20.1'-20.6', 21.9'-22.3'	1814.50	15	[Lithology: Concrete with limestone aggregate]	Box 2	CC	#3 from 15.15'-15.65' - Length=0.50' - Compressive Strength =4960 psi - Break Type 2 - Weight = 4.75 lbs, #4 from 21.96'-22.5' - Length=0.54' - Compressive Strength =3921 psi - Break Type 2 - Weight = 4.55 lbs	100.0% / 98.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition with break @ 29.55', joints/cracks @ 23', 23.9', 25.2', 26.7', 27.8', 28.05', 30.8', 31.75', sandstone @ 23.8'-24.1', 25'-25.2', 26.35'-26.7'	1804.95	20					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition with break @ 29.55', joints/cracks @ 23', 23.9', 25.2', 26.7', 27.8', 28.05', 30.8', 31.75', sandstone @ 23.8'-24.1', 25'-25.2', 26.35'-26.7'	22.25	25	[Lithology: Concrete with limestone aggregate]	Box 3	CC	#5 from 24.68'-25.21' - Length=0.53' - Compressive Strength =2665 psi - Break Type 5 - Weight = 4.65 lbs, #6 from 31.43'-31.94' - Length=0.51' - Compressive Strength =4959 psi - Break Type 5 - Weight = 4.50 lbs	100.0% / 96.0%
	1804.95	30					

#### SAMPLER TYPE

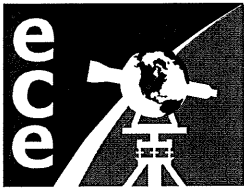
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 105  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete layer transition with break @ 33.05', joints/cracks @ 37.25', 37.45', 38.05', 39.6', 41.15', sandstone @ 36.95'-37.15', 38.05'-38.35', 39.95'-40.1'	31.50 1795.70	35		Box 4	CC	# 7 from 35.92'-36.45' - Length=0.53' - Compressive Strength =3597 psi - Break Type 5 - Weight = 4.65 lbs, # 8 from 38.89'-39.42' - Length=0.53' - Compressive Strength =3839 psi - Break Type 5 - Weight = 4.65 lbs	100.0% / 89.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 43.6', joints/cracks @ 42', 42.8', sandstone @ 42.8'-43.35'	41.00 1786.20	40		Box 5	CC	# 9 from 43.1'-43.62' - Length=0.52' - Compressive Strength =3621 psi - Break Type 5 - Weight = 4.85 lbs	100.0% / 90.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Horizontal Fractures @ 44.05', 44.2', 44.3', 47.35', 47.7', 49', 50.65' --- Angular Fractures @ 44.1', 46.1', 47.85', 48.3' --- Vertical Fracture @ 43.75'-44.05'	43.60 1783.60	45		Box 5	RC	# 10 from 48.3'-48.81' - Length=0.51' - Compressive Strength =4372 psi - Break Type 5 - Weight = 4.95 lbs	100.0% / 90.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Horizontal Fractures @ 52.45', 56.9', 57.35', 57.6', 57.7' --- Angular Fractures @ 51.2', 51.55', 52.6', 52.9', 54.3', 54.85', 56.45', 56.65', 57.5', 58.05', 59.4'	50.50 1776.70	50		Box 6	RC	# 11 from 52.95'-53.47' - Length=0.52' - Compressive Strength =1052 psi - Break Type 5 - Weight = 5.00 lbs, # 12 from 58.15'-58.67' - Length=0.52' - Compressive Strength =>9120 psi - Did not Break - Weight = 4.95 lbs	100.0% / 74.0%
	59.38 1767.83	55					
	60						

#### SAMPLER TYPE

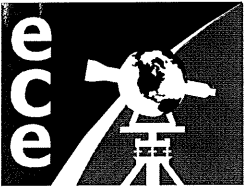
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 105  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Horizontal Fractures @ 62.15', 62.75', 62.85', 63.2', 63.3', 63.35', 64.1', 64.75', 65.05', 65.5', 65.6', 66.05', 67.5' --- Angular Fractures @ 59.8', 60.9', 61.3', 62.65', 65.8', 66.7'	67.64	65		Box 7	RC	#13 from 60.25'-60.78' - Length=0.53' - Compressive Strength =8634 psi - Break Type 3 - Weight = 5.10 lbs, # 14 from 66.25'-66.58' - Length=0.33' - Compressive Strength =>9173 psi - Did not Break - Weight = 3.15 lbs	100.0% / 73.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Horizontal Fractures @ 67.6', 68.8', 69.7', 70', 71', 72.65', 73.05', 73.7', 73.9', 75.3'-75.6' (many) --- Angular Fractures @ 68.4', 71.85', 72.05', 72.15', 74.2', 74.35', 74.4', 74.7', 75.7', 76.05'	1759.56	70		Box 8	RC	# 15 from 71.25'-71.78' - Length=0.53' - Compressive Strength =>9140 psi - Did not Break - Weight = 5.10 lbs, # 16 from 75.95'-76.49' - Length=0.54' - Compressive Strength =>9169 psi - Did not Break - Weight = 5.25 lbs	100.0% / 100.0%
Horizontal Fractures @ 76.4'-76.75' (many), 79.35'-79.6' (many), 81.75', 82.45', 83.6', 85.4' --- Angular Fractures @ 77', 77.45', 77.9', 78.4', 78.5', 78.85', 79.9', 80.45', 81', 81.3', 82.8', 82.9', 84.1', 84.35', 84.45', 84.75', 85.3'	1749.82	75					
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings	85.43	80		Box 9	RC	# 17 from 78.6'-78.93' - Length=0.33' - Compressive Strength =>9174 psi - Did not Break - Weight = 3.30 lbs, # 18 from 82.12'-82.45' - Length=0.33' - Compressive Strength =>11754 psi - Did not Break - Weight = 3.15 lbs	100.0% / 74.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings, many fractures from 86.05'-86.75'	1741.77 86.75 1740.45	85		Box 10	RC	# 19 from 86.1'-86.64' - Length=0.54' - Compressive Strength =2743 psi - Break type 5 - Weight = 5.20 lbs	100.0% / 74.0%

#### SAMPLER TYPE

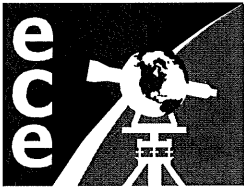
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 105  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

**DRILLING AND SAMPLING INFORMATION**

**TEST DATA**

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/3/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/4/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Bottom of hole at 86.75' - Terminated Rock Core							
		95					
		100					
		105					
		110					
		115					
		120					

**SAMPLER TYPE**

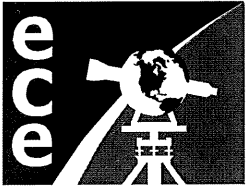
- SS - DRIVEN SPLIT SPOON
- ST - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

**GROUND WATER DEPTH**

- ∇ AT COMPLETION N/A FT.
- ▼ AFTER \_\_\_\_\_ FT.
- WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**

- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 106  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

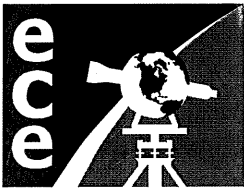
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/20/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/21/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.67						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.0' switching into existing dam concrete, fracture @ 4.23'	1823.55	5		Box 1	CC	#1 from 5.92'-6.45' - Length=0.53' - Compressive Strength =>9128 psi - Break Type None - Weight = 5.20 lbs; #2 from 9.86'-10.39' - Length=0.53' - Compressive Strength =>9125 psi - Break Type None - Weight = 5.20 lbs	98.0% / 98.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 7.33', 7.45', 7.55', 8.17', 8.96', 12.24', 12.6', joints/fractures with sandstone @ 12.95'	5.00 1822.22						
	12.95	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 17.62', 17.7', 18.54', 19.22', 22.33', joints/fractures with sandstone @ 15.88', 19.8', 20.78'	1814.27	15		Box 2	CC		99.0% / 99.0%
	20						
	22.33	20					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.66', 22.7', 24.15', 26.1', 27.57', 27.75', 31.44', joints/fractures with sandstone @ 23.8', 26.57'	1804.89	25		Box 3	CC		96.0% / 96.0%
	25						
		30					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▽ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 106  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/20/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/21/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 31.52', 32.75', 33.21', 35.29', 36.15', 36.82', 37.7', 39.53', 40.95'	31.44 1795.78	35		Box 4	CC		99.0% / 98.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 43.65', concrete joints/fractures @ 42.02', 42.65', 43.65'	40.95 1786.27	40		Box 5	CC		100.0% / 84.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, some grayish black shale/coal partings and on fracture faces Fractures @ 44.15', 44.42', 44.57', 45.16', 45.43', 46.96', 47.18', 47.39', 47.65', 49.82' --- Fractures with coal/shale seams @ 46.35', 46.4'	43.65 1783.57	45		Box 5	RC		100.0% / 84.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensley fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 50.49', 51.52', 51.78', 52.21', 52.57', 53', 55.7', 55.9', 55.97', 56.33', 56.65', 57.78' --- Fractures with coal/shale seams @ 53.26', 57.29', 57.7'	49.82 1777.40	50		Box 6	RC		100.0% / 87.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, compoent, moderately to	57.78 1769.44	55					
	60						

#### SAMPLER TYPE

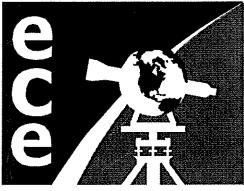
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>106</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/20/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/21/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22  intensley fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 57.86', 61.53', 61.95', 62.25', 62.75', 62.98', 64.09', 64.24', 64.58', 65.78', 66.96', 67.2', 67.3' --- Fractures with coal/shale seams @ 59.94', 63.21', 63.26', 63.8', 64.48', 66'	67.30	65		Box 7	RC		98.0% / 79.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, compoent, moderately to intensley fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 68.83', 69.98', 71.26', 72', 72.9', 73.52', 73.83', 73.85', 74.35', 74.5', 74.55', 74.67', 75.63', 75.83', 76.52', 76.89', 77.25' --- Fractures with coal/shale seams @ 68.33', 70.22', 72.33'	77.25	70		Box 8	RC		94.0% / 87.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, compoent, moderately to intensley fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 77.28', 77.52', 77.55', 77.69', 78.04', 78.33', 79.75', 80.01', 81.59', 82.14', 82.47', 82.55', 82.87', 82.98', 83.81', 84.08', 84.97', 85.08', 85.16' --- Fracture with coal/shale seam @ 84.72'	86.10	80		Box 9	RC		99.0% / 79.0%
Bottom of hole at 86.1' - Terminated Rock Core	1741.12	85					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 107  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/27/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/28/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void	3.70						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.02' switching into existing dam concrete, joint/fracture @ 3.7'	1823.52 5.02 1822.20	5		Box 1	CC	#1 from 4'-4.6' - Length=0.6' - Compressive Strength =2649 psi - Break Type 2 - Weight = 5.20 lbs; #2 from 8.6'-9.2' - Length=0.6' - Compressive Strength =3899 psi - Break Type 2 - Weight = 5.35 lbs	96.0% / 93.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 7.63', 12.3', joints/fractures with sandstone @ 6.07', 6.51', 7.7', 7.83', 8.2', 12.7'	12.70	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 19.13', 21.85', joints/fractures with sandstone @ 13.26', 13.54', 17.7'	1814.52	15		Box 2	CC	#3 from 14.1'-14.7' - Length=0.6' - Compressive Strength =2954 psi - Break Type 3 - Weight = 5.40 lbs; #4 from 18.1'-18.7' - Length=0.6' - Compressive Strength =3698 psi - Break Type 2 - Weight = 5.60 lbs	100.0% / 97.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.21', 22.8', 26.2', 27.75', 27.95', 28.53', 28.74', 31.27', joints/fractures with sandstone @ 25.5'	21.85 1805.37	20 25		Box 3	CC	#5 from 29'-29.6' - Length=0.6' - Compressive Strength =4570 psi - Break Type 2 - Weight = 5.35 lbs; #6 from 29.9'-30.5' - Length=0.6' - Compressive Strength =1991 psi - Break Type 2 - Weight = 5.30 lbs	100.0% / 96.0%
	30						

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 107  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/27/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/28/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 32.6', 37.1', 40.5', void from 32.28'-32.6'	31.27 1795.95	35		Box 4	CC	#7 from 35'-35.6' - Length=0.6' - Compressive Strength =2859 psi - Break Type 2 - Weight = 5.15 lbs; #8 from 39.7'-40.3' - Length=0.6' - Compressive Strength =3393 psi - Break Type 2 - Weight = 5.05 lbs	97.0% / 94.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 44.68', concrete joints/fractures @ 40.8', 42.55', 42.7'	40.50 1786.72	40		Box 5	CC	#9 from 41.6'-42.2' - Length=0.6' - Compressive Strength =>9193 psi - Break Type None - Weight = 5.35 lbs	97.0% / 91.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces Fractures @ 44.74', 44.97', 46.32', 46.9', 47.66', 47.8', 48.39', 48.81', 49.39' --- Fracture with coal/shale seam @ 46.06'	44.68 1782.54	45		Box 5	RC	#10 from 47.1'-47.7' - Length=0.6' - Compressive Strength =802 psi - Break Type 2 - Weight = 5.85 lbs	97.0% / 91.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 50.08', 51.63', 52.58', 52.7', 53.34', 53.91', 54.15', 54.37', 56.11', 56.77', 57.25', 57.8' --- Void from 57.46'-57.8'	49.39 1777.83	50		Box 6	RC	#11 from 50.9'-51.5' - Length=0.6' - Compressive Strength =10394 psi - Break Type 5 - Weight = 5.80 lbs; #12 from 55'-55.6' - Length=0.6' - Compressive Strength =2739 psi - Break Type 3 - Weight = 5.85 lbs	96.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated,	57.80 1769.42	55 60					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 107  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/27/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 2/28/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
moderately fractured, many grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 60.85', 61.37', 61.8', 62.27', 62.33', 62.45', 64.96', 66.46', 67.34', --- Fractures with coal/shale seams @ 58.91', 63.1', 63.17' --- Fracture Zone from 65.02'-66.46'	67.34	65	[Lithology: Shale with fractures]	Box 7	RC	#13 from 60.3'-60.9' - Length=0.6' - Compressive Strength =>9229 psi - Break Type None - Weight = 5.65 lbs; #14 from 63.6'-64.2' - Length=0.6' - Compressive Strength =4417 psi - Break Type 3 - Weight = 5.75 lbs	100.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, trace grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 69.08', 69.59', 70.41', 70.86', 71.21', 72.2', 72.46', 72.68', 73.32', 73.55', 73.9', 74', 74.1', 74.24', 75.89', 76.4', 77.05', 77.1' --- Fractures with coal/shale seams @ 68.65', 76.26', 76.67', 76.74' --- Void from 71.91'-72.2'	1759.88	70	[Lithology: Sandstone]	Box 8	RC	#15 from 68'-68.6' - Length=0.6' - Compressive Strength =4943 psi - Break Type 3 - Weight = 5.80 lbs; #16 from 74.3'-74.9' - Length=0.6' - Compressive Strength =>9706 psi - Break Type None - Weight = 5.85 lbs	97.0% / 81.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, many grayish black shale/coal partings and on fracture faces, some moderate brown shale partings, Void/No return from 82.06'-82.5', 86.18'-87.75' Fracts. @ 78.75', 79.08', 80.14', 80.5', 80.7', 80.74', 81.69', 84.14', 84.24', 84.45', 84.5' --- Fracts. w/ coal/shale seams @ 77.61', 77.94', 78.13', 78.28', 80.2', 81.01', 81.3', 81.5', 82.5', 83.31', 83.42', 83.6', 83.91', 85.8'	1750.12	80	[Lithology: Sandstone]	Box 9	RC	#17 from 79.4'-80' - Length=0.6' - Compressive Strength = Sample broke prior to load - Break Type - Weight = 5.75 lbs; #18 from 85.1'-85.7' - Length=0.6' - Compressive Strength =>11168 psi - Break Type None - Weight = 5.80 lbs	81.0% / 58.0%
Bottom of hole at 87.75' - Terminated Rock Core	1739.47	87.75	[Lithology: None]				
		90					

#### SAMPLER TYPE

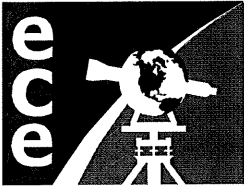
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▽ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 108  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/29/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/1/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.75						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.14' switching into existing dam concrete, joint/fracture @ 3.75', 4.35'	1823.47	5	[Concrete with limestone aggregate]	Box 1	CC	#1 from 6.1'-6.7' - Length=0.6' - Compressive Strength =800 psi - Break Type 2 - Weight = 5.10 lbs; #2 from 11'-11.6' - Length=0.6' -Compressive Strength =3373 psi - Break Type 3 - Weight = 5.30 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.04', 12.23', 12.7', 13.41', joints/fractures with sandstone @ 7.8', 8.52', 8.98'	1822.08	10					
	13.41						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 16.97', 17.75', 21.73', 22.6', joints/fractures with sandstone @ 18.16'	1813.81	15	[Concrete with limestone aggregate]	Box 2	CC	#3 from 14.1'-14.7' - Length=0.6' - Compressive Strength =3536 psi - Break Type 5 - Weight = 5.10 lbs; #4 from 20.6'-21.2' - Length=0.6' - Compressive Strength =3644 psi - Break Type 3 - Weight = 5.25 lbs	100.0% / 100.0%
	20						
	22.60						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 26.25', 27.35', 27.7', 32.21', joints/fractures with sandstone @ 23.64'	1804.62	25	[Concrete with limestone aggregate]	Box 3	CC	#5 from 22.7'-23.3' - Length=0.6' - Compressive Strength =4891 psi - Break Type 3 - Weight = 5.25 lbs; #6 from 28'-28.6' - Length=0.6' - Compressive Strength =2759 psi - Break	100.0% / 100.0%
	30						

#### SAMPLER TYPE

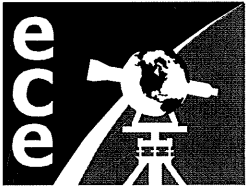
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 108  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/29/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/1/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 32.65', 35.31', 36.89', 40.74', 41.75', joints/fractures with sandstone @ 37.8', 39.55'	32.21 1795.01	35		Box 4	CC	Type 2 - Weight = 5.20 lbs  #7 from 33.4'-34' - Length=0.6' - Compressive Strength =2845 psi - Break Type 5 - Weight = 5.20 lbs; #8 from 38'-38.6' - Length=0.6' - Compressive Strength =2282 psi - Break Type 3 - Weight = 4.90 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 43.45', concrete joint/fracture @ 42.65'	41.75 1785.47 43.45 1783.77	40		Box 5	CC	#9 from 42.7'-43.3' - Length=0.6' - Compressive Strength =2927 psi - Break Type 3 - Weight = 5.10 lbs	97.0% / 70.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 46.06', 49.76', 50.2' --- Fractures with coal/shale seams @ 43.72', 44.01', 44.26', 44.33', 44.37', 44.42', 44.7', 44.87', 45.12', 45.27', 45.37', 47.11', 47.16', 47.36', 47.7', 48.27', 48.84' --- Void/No Return from 47.46'-47.7'	50.20 1777.02	45		Box 5	RC	#10 from 49.6'-50.2' - Length=0.6' - Compressive Strength =>9203 psi - Break Type None - Weight = 5.85 lbs	97.0% / 70.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 56', 57.18', 57.28', 57.3', 59.4' --- Fractures with coal/shale seams @ 50.86', 52.8', 53.17', 53.7', 54.84', 56.39', 58.66', 59.17' --- Void/No Return from 52.15'-52.8'	59.40 1767.82	50		Box 6	RC	#11 from 54'-54.6' - Length=0.6' - Compressive Strength =>9575 psi - Break Type None - Weight = 5.80 lbs; #12 from 57.6'-58.2' - Length=0.6' - Compressive Strength =>9481 psi - Break Type None - Weight = 5.80 lbs	93.0% / 90.0%
	60						

#### SAMPLER TYPE

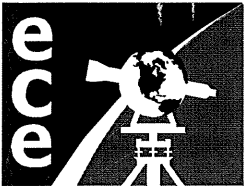
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 108  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 2/29/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/1/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, compotent, moderately to slightly fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 62.65', 64.16', 67.6', 68.9' --- Fractures with coal/shale seams @ 60.8', 61', 61.46', 61.56', 68.09', 68.2'	68.90	65		Box 7	RC	#13 from 61.7'-62.3' - Length=0.6' - Compressive Strength =6376 psi - Break Type 3 - Weight = 5.75 lbs; #14 from 65'-65.6' - Length=0.6' - Compressive Strength =7075 psi - Break Type 3 - Weight = 5.70 lbs	100.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces, Voids/No Return from 72.38'-72.45', 76.8'-77' Fractures @ 72.45', 73.6', 76.5', 77' ---- Fractures with coal/shale seams @ 69.44', 69.62', 69.69', 69.76', 70.22', 70.53', 70.92', 71.15', 72.65', 73.08', 73.19', 74.66', 74.85', 75.03', 75.17', 75.4', 76.18', 77.32', 78.04', 78.11'	78.11	70 75		Box 8	RC	#15 from 71.3'-71.9' - Length=0.6' - Compressive Strength =13863 psi - Break Type 2 - Weight = 5.90 lbs; #16 from 73.8'-74.4' - Length=0.6' - Compressive Strength =>9194 psi - Break Type None - Weight = 5.80 lbs	97.0% / 80.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed to fresh, compotent, intensely to moderately fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 82.7', 82.88', 83.87', 85.11', 85.61', 86.02', 86.34' --- Fractures with coal/shale seams @ 78.37', 79.52', 79.71', 80.06', 80.23', 80.37', 80.5', 80.98', 81.15', 81.5', 82.22', 82.44' --- Vertical Fractures from 82.88'-83.87', 85.11'-85.61'	86.75	80 85		Box 9	RC	#17 from 78.5'-79.1' - Length=0.6' - Compressive Strength =>9195 psi - Break Type None - Weight = 5.95 lbs; #18 from 84.1'-84.7' - Length=0.6' - Compressive Strength =1472 psi - Break Type 3 - Weight = 5.75 lbs	100.0% / 80.0%
Bottom of hole at 86.75' - Terminated Rock Core	1740.47	90					

#### SAMPLER TYPE

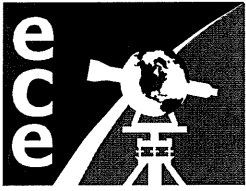
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 109  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/5/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/6/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.65						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.02' switching into existing dam concrete, joint/fracture @ 3.65'	1823.57 5.02 1822.20	5		Box 1	CC	#1 from 4.25'-4.85' - Length=0.6' - Compressive Strength =2952 psi - Break Type 2 - Weight = 5.00 lbs; #2 from 11.6'-12.2' - Length=0.6' - Compressive Strength =3069 psi - Break Type 3 - Weight = 5.20 lbs	99.0% / 98.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 5.83', 7.6', 7.65', 9.23', 10.17', 12.75', sandstone @ 13.34', Void/No Return from 7.48'-7.6'	13.34	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 16.11', 17.36'-17.65' (many), 19.16', 22.45', 22.85', concrete joints/fractures with sandstone @ 13.7', 16.78', 18', 18.31'	1813.88	15		Box 2	CC	#3 from 13.6'-14.2' - Length=0.6' - Compressive Strength =2045 psi - Break Type 3 - Weight = 5.40 lbs; #4 from 18.7'-19.1' - Length=0.6' - Compressive Strength =4083 psi - Break Type 3 - Weight = 5.30 lbs	100.0% / 97.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 26.2', 27.22', 27.8', 29.43', 32.38', concrete joints/fractures with sandstone @ 23.71', 25.6'	22.85 1804.37	20 25		Box 3	CC		
		30					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▽ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 109  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/5/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/6/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 32.75', 34.3', 35.55', 37.25', 37.85', 40.36'	32.38 1794.84	35		Box 4	CC	Type 2 - Weight = 5.20 lbs  #7 from 32.8'-33.4' - Length=0.6' - Compressive Strength =2661 psi - Break Type 3 - Weight = 5.10 lbs; #8 from 39'-39.6' - Length=0.6' - Compressive Strength =3142 psi - Break Type 3 - Weight = 5.20 lbs	92.0% / 92.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 42'	40.36 1786.86 42.00	40		Box 5	CC		100.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 42.55', 45.6', 45.78', 46.34', 47.01', 47.32', 47.7' --- Fractures with coal/shale seam @ 42.6', 42.75', 43.18', 43.38', 43.6', 43.84', 44.81', 45.13', 48.01', 48.6', 49.34' --- Vertical Fractures from 42'-42.55', 42.6'-42.75'	1785.22 49.34	45		Box 5	RC	#9 from 44.3'-44.9' - Length=0.6' - Compressive Strength =1665 psi - Break Type 3 - Weight = 5.70 lbs; #10 from 48.7'-49.3' - Length=0.6' - Compressive Strength =>9167 psi - Break Type None - Weight = 5.70 lbs	100.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 52.46'-52.7' (many), 57.01', 57.29', 57.55' --- Fractures with coal/shale seam @ 50.62', 50.94', 50.96', 51.67', 51.83', 52.96', 56.78' --- Vertical fracture from 55.1'-56.78'	1777.88 57.55	50 55		Box 6	RC	#11 from 51'-51.6' - Length=0.6' - Compressive Strength = Broke in handling - Break Type None - Weight = 5.85 lbs; #12 from 53.5'-54.1' - Length=0.6' - Compressive Strength = None Recorded - Break Type None - Weight = 5.70 lbs	100.0% / 83.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, many grayish black	1769.67	60				#13 from 61'-61.6' -	

#### SAMPLER TYPE

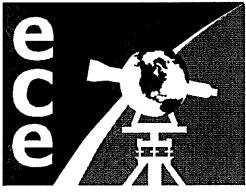
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 109  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/5/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/6/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 62.6', 67.43' --- Fractures with coal/shale seams @ 58', 58.47', 58.67', 59.75', 61.87', 62.93', 63.33', 63.55', 63.75', 65.25', 66.86'	67.43	65		Box 7	RC	Length=0.6' - Compressive Strength =>9171 psi - Break Type None - Weight = 5.70 lbs; #14 from 66'-66.6' - Length=0.6' - Compressive Strength =>9221 psi - Break Type None - Weight = 5.75 lbs	100.0% / 94.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces, some moderate brown shale partings, Void/No Return f/m 67.62'-67.7' Fracts. @ 67.43'-67.62' (vert.), 69.73', 70.77', 72.11', 72.35'-72.5', 76.87' - Fracts. w/ coal/shale seams @ 67.7', 67.92', 67.94', 68.03', 68.85', 69', 70.03', 70.96', 71.91', 73.01', 73.17', 73.39', 74.16', 74.71', 75.01', 75.73', 75.95', 76.33', 76.5'	1759.79	70		Box 8	RC	#15 from 68.2'-68.8' - Length=0.6' - Compressive Strength =>9140 psi - Break Type None - Weight = 5.80 lbs; #16 from 73.6'-74.2' - Length=0.6' - Compressive Strength =8830 psi - Break Type 3 - Weight = 5.90 lbs	99.0% / 76.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 77.23', 78.21', 78.31', 82.7', 83.01', 84.4' --- Fractures with coal/shale seams @ 77.55', 78.41'-78.58', 79.16', 79.47', 80.07', 80.53', 80.84', 81.7', 82.39', 84.28' --- Void/No Return from 77.46'-77.55', 84.84'-84.95'	1750.35	80		Box 9	RC	#17 from 81'-81.6' - Length=0.6' - Compressive Strength =8088 psi - Break Type 3 - Weight = 5.70 lbs; #18 from 83.2'-83.8' - Length=0.6' - Compressive Strength =2589 psi - Break Type 3 - Weight = 5.70 lbs	98.0% / 89.0%
Bottom of hole at 84.95' - Terminated Rock Core	84.95	85					
	1742.27						

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

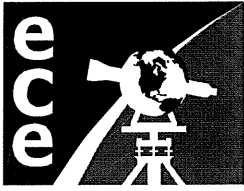
#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>110</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/12/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/12/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.65						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.1' switching into existing dam concrete, joint/fracture @ 3.75'	1823.57 5.10 1822.12	5		Box 1	CC	#1 from 6.6'-7.2' - Length=0.6' - Compressive Strength =3255 psi - Break Type 2 - Weight = 5.35 lbs; #2 from 12'-12.6' - Length=0.6' - Compressive Strength =2805 psi - Break Type 5 - Weight = 5.40 lbs	99.0% / 92.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.2', 7.6', 7.88', 10.32', 11.2', 12.8', joints/fractures with sandstone @ 9.66', 10.08', 10.93', Void/No Return from 7.54'-7.6', 12.47'-12.8'	12.80	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 20.33', 21.16', joints/fractures with sandstone @ 17.37', 17.8', 19.29', 22.22', Void/No Return from 17.76'-17.8'	1814.42	15		Box 2	CC	#3 from 15.5'-16.1' - Length=0.6' - Compressive Strength =1522 psi - Break Type 5 - Weight = 5.40 lbs; #4 from 21.5'-22.1' - Length=0.6' - Compressive Strength =2919 psi - Break Type 5 - Weight = 5.45 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.98', 25.24', 25.72', 27.02', 27.8', 29.49', 30.7', 31.73', joints/fractures with sandstone @ 22.75', 23.82'	22.22 1805.00	25		Box 3	CC	#5 from 24'-24.6' - Length=0.6' - Compressive Strength =3015 psi - Break Type 3 - Weight = 5.00 lbs; #6 from 29.7'-30.3' - Length=0.6' - Compressive Strength =2129 psi - Break Type 3 - Weight = 5.55 lbs	100.0% / 98.0%
		30					

<b>SAMPLER TYPE</b> SS - DRIVEN SPLIT SPOON ST - PRESSED SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER RC - ROCK CORE	<b>GROUND WATER DEPTH</b> ▽ AT COMPLETION <u>N/A</u> FT. ▽ AFTER _____ FT. WATER ON RODS _____ FT.	<b>BORING METHOD</b> HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVING CASING RW - ROTARY WASH
--	---	---



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 110  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/12/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/12/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 40.41', concrete joints/fractures @ 32.75', 33.23', 37.28', 37.75', 39.05', joints/fractures with sandstone @ 36.27'	31.73 1795.49	35		Box 4	CC	#7 from 34'-34.6' - Length=0.6' - Compressive Strength =2046 psi - Break Type 2 - Weight = 5.05 lbs; #8 from 38'-38.6' - Length=0.6' - Compressive Strength =2211 psi - Break Type 2 - Weight = 5.15 lbs	100.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, fractures @ 40.66', 40.99'	40.41 1786.81 40.99 1786.23	40		Box 4	RC		100.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 41.37', 41.87', 45.65', 47.18', 47.6', 47.7', 49.27', 49.29' --- Fractures with coal/shale seams @ 41.52', 42.85', 44.01', 44.81', 46.72', 50.22'	40.99 1786.23	45		Box 5	RC	#9 from 43'-43.6' - Length=0.6' - Compressive Strength =4400 psi - Break Type 3 - Weight = 5.75 lbs; #10 from 49.6'-50.2' - Length=0.6' - Compressive Strength =7902 psi - Break Type 3 - Weight = 5.85 lbs	100.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, many grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 51.2', 52.8', 58.29', 59.68' --- Fractures with coal/shale seams @ 51.19', 55.03', 55.39', 55.62', 55.75', 57.10', 57.6'	50.22 1777.00	50		Box 6	RC	#11 from 54'-54.6' - Length=0.6' - Compressive Strength =>9176 psi - Break Type None - Weight = 5.90 lbs; #12 from 59'-59.6' - Length=0.6' - Compressive Strength =>9231 psi - Break Type None - Weight = 5.90 lbs	100.0% / 96.0%
	59.68	60					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 110  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

### DRILLING AND SAMPLING INFORMATION

### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/12/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/12/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, some grayish black shale/coal partings & on fracture faces, some moderate brown shale partings Fractures @ 61.84', 62.31', 62.63'-62.8' (many), 67.65' --- Fractures with coal/shale seams @ 60.34', 61.35', 62', 62.04', 62.8', 63.54', 63.75', 65.19', 66.35', 66.76', 67.12', 68.48'	1767.54	65	[Lithology: Sandstone with fractures]	Box 7	RC	#13 from 60.5'-61.1' - Length=0.6' - Compressive Strength =4280 psi - Break Type 3 - Weight = 5.90 lbs; #14 from 64'-64.6' - Length=0.6' - Compressive Strength =>9259 psi - Break Type None - Weight = 5.75 lbs	100.0% / 90.0%
COAL Seam	66.76						
	1760.46						
	68.48						
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings & on fracture faces, some moderate brown shale partings Fractures with coal/shale seams @ 69.08', 69.24', 69.38', 69.75', 70.03', 70.53', 71.22', 71.82', 72'-72.24', 72.53', 72.8', 73.7', 74.24', 74.39', 74.5', 75.2', 75.35', 75.69' (angular), 75.88', 76.14', 76.43', 76.67', 77.46'	1758.74	70	[Lithology: Sandstone with fractures]	Box 8	RC	#15 from 70.45'-71.05' - Length=0.6' - Compressive Strength =6489 psi - Break Type 3 - Weight = 5.70 lbs; #16 from 76.4'-77' - Length=0.6' - Compressive Strength =>9186 psi - Break Type None - Weight = 5.80 lbs	100.0% / 67.0%
	77.46						
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black shale/coal partings & on fracture faces Fractures @ 78.75', 79.6', 80.54', 81.82', 82.02', 82.38'-82.85' (many) --- Fractures with coal/shale seams @ 77.85', 78.05', 78.16', 78.69' (angular)	1749.76	80	[Lithology: Sandstone with fractures]	Box 9	RC	#17 from 78.7'-79.3' - Length=0.6' - Compressive Strength =5126 psi - Break Type 3 - Weight = 5.75 lbs	100.0% / 81.0%
Bottom of hole at 82.85' - Terminated Rock Core	82.85						
	1744.37	85					
	90						

#### SAMPLER TYPE

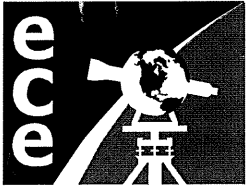
- SS - DRIVEN SPLIT SPOON
- ST - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>111</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

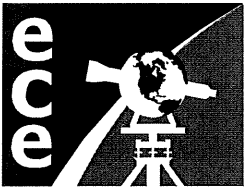
#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/12/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/13/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.75						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 4.89' switching into existing dam concrete, joints/cracks @ 4.06'-4.45' (many)	1823.45	4.89		Box 1	CC	#1 from 5'-5.34' - Length=0.34' - Compressive Strength =3258 psi - Break Type 3 - Weight = 2.80 lbs; #2 from 10.95'-11.49' - Length=0.54' - Compressive Strength =4301 psi - Break Type 3 - Weight = 4.75 lbs	100.0% / 93.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 5.39', 5.84', 6.45', 7.38', 7.58', 8', 11.37', 12.75', concrete joint/fracture with sandstone @ 10.36'	1822.31						
	12.75						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 15.85', 16.85', 17.75', 21.66', 22.57', concrete joint/fracture with sandstone @ 14.4', 19.25'	1814.45			Box 2	CC	#3 from 15.45'-15.99' - Length=0.54' - Compressive Strength =4424 psi - Break Type 5 - Weight = 4.95 lbs; #4 from 18.9'-19.44' - Length=0.54' - Compressive Strength =4841 psi - Break Type 5 - Weight = 4.90 lbs	100.0% / 100.0%
	22.57						
	1804.63						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 23.61', 26.06', 27.35', 27.7', 29.31', 31.57', 31.97'				Box 3	CC	#5 from 25.4'-25.94' - Length=0.54' - Compressive Strength =2621 psi - Break Type 3 - Weight = 4.95 lbs; #6 from 27.95'-28.49' - Length=0.54' - Compressive Strength =3439 psi - Break	100.0% / 100.0%

<b>SAMPLER TYPE</b> SS - DRIVEN SPLIT SPOON ST - PRESSED SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER RC - ROCK CORE	<b>GROUND WATER DEPTH</b> ▽ AT COMPLETION <u>N/A</u> FT. ▽ AFTER _____ FT. WATER ON RODS _____ FT.	<b>BORING METHOD</b> HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVING CASING RW - ROTARY WASH
--	---	---



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 111  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/12/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/13/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 36.91', concrete joints/fractures @ 32.47'-32.8' (many breaks with gravel)	31.97 1795.23	35		Box 4	CC	Type 6 - Weight = 4.70 lbs  #7 from 35.3'-35.84' - Length=0.54' - Compressive Strength =1908 psi - Break Type 5 - Weight = 4.75 lbs	100.0% / 93.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces Horizontal Fractures @ 37.75', 38.05'-38.35' (many), 39.65', 40.75', 41.72' --- Angular Fractures @ 38.65', 38.75', 40.35' --- Vertical Fractures @ 37'-37.75'	36.91 1790.29	40		Box 4	RC	#8 from 39.75'-40.29' - Length=0.54' - Compressive Strength =>9585 psi - Did not Break - Weight = 5.30 lbs	100.0% / 93.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Horizontal Fractures @ 42.3', 43', 44.3', 45.45', 46', 46.9', 47.35', 49.7', 49.75', 51.01' --- Angular Fractures @ 43.75', 43.8', 47.75', 48.4', 49' --- Vertical Fractures @ 46'-46.9', 50.4'-51'(crack visible but not broken)	41.72 1785.48	45		Box 5	RC	#9 from 44.45'-44.99' - Length=0.54' - Compressive Strength =>9186 psi - Did not Break - Weight = 5.20 lbs; #10 from 50.35'-50.89' - Length=0.54' - Compressive Strength =826 psi - Break Type 5 - Weight = 5.20 lbs	100.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings, coal bed at 60.4' Horizontal Fractures @ 52.9', 53.45', 53.85', 54', 55.65', 56', 57.1', 57.85', 58.85', 60.4', 60.72' --- Angular Fractures @ 52.05', 53.9', 54.2', 54.35', 55.15', 55.35', 60.05'	51.01 1776.19	55		Box 6	RC	#11 from 51.45'-51.99' - Length=0.54' - Compressive Strength =8763 psi - Break Type 3 - Weight = 5.25 lbs; #12 from 58.2'-58.75' - Length=0.55' - Compressive Strength =6995 psi - Break Type 5 - Weight = 5.30 lbs	100.0% / 91.0%
	60						

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 111  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/12/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/13/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Horizontal Fractures @ 63', 65.45', 67.95', 68.2' --- Angular Fractures @ 61.1', 61.95', 62.2', 65.25', 65.35', 66.05', 67.25', 67.6', 68.05', 68.55', 68.85', 69.34'	60.72						
	1766.48	65		Box 7	RC	#13 from 64.35'-64.89' - Length=0.54' - Compressive Strength =>9136 psi - Did not Break - Weight = 5.20 lbs; #14 from 66.45'-66.99' - Length=0.54' - Compressive Strength =>9140 psi - Did not Break - Weight = 5.25 lbs	100.0% / 89.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Horizontal Fractures @ 72.35', 72.45', 72.95', 73.2', 75.65', 76.05', 76.15', 77', 77.4', 78' --- Angular Fractures @ 70.95', 71.9', 72.6', 72.85', 73.6', 73.8', 74.25', 74.5', 74.6', 74.8', 75.1', 76', 78.5', 78.8' --- Vertical Fractures @ 76.5'-77'	69.34						
	1757.86	70		Box 8	RC	#15 from 70.3'-70.84' - Length=0.54' - Compressive Strength =>9198 psi - Did not Break - Weight = 5.15 lbs; #16 from 78.13'-78.47' - Length=0.34' - Compressive Strength =>9134 psi - Did not Break - Weight = 3.25 lbs	100.0% / 72.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Bottom of hole at 79.32' - Terminated Rock Core	78.19						
	1749.01 79.32 1747.88	80		Box 9	RC	#17 from 79.3'-79.83' - Length=0.53' - Compressive Strength =2647 psi - Break Type 5 - Weight = 5.20 lbs	100.0% / 100.0%
		85					
		90					

#### SAMPLER TYPE

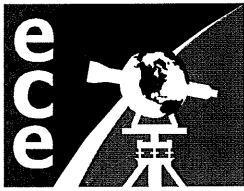
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 112  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/14/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/14/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spill/Trumpet Void							
	3.75						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.16' switching into existing dam concrete, joint/fracture @ 3.75'	1823.47	5	[Lithology: Concrete with limestone aggregate]	Box 1	CC	#1 from 4.44'-4.98' - Length=0.54' - Compressive Strength =2869 psi - Break Type - Weight = 4.50 lbs; #2 from 9.22'-9.76' - Length=0.53' - Compressive Strength =3473 psi - Break Type 5 - Weight = 4.75 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.18', 6.82', 7.77', 9.94', 12.6', joints/fractures with sandstone @ 9.06'	1822.06	10					
	12.60						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 17', 17.37', 18.4', 20.69', 22.03', joints/fractures with sandstone @ 17.65'	1814.62	15	[Lithology: Concrete with limestone aggregate]	Box 2	CC	#3 from 13.36'-13.89' - Length=0.53' - Compressive Strength =3747 psi - Break Type 5 - Weight = 4.95 lbs; #4 from 17.84'-18.37' - Length=0.53' - Compressive Strength =4061 psi - Break Type 5 - Weight = 4.85 lbs	100.0% / 97.0%
	20						
	22.03						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.75', 24.35', 26.14', 26.71', 27.9', 29.51', 31.27', joints/fractures with sandstone @ 23.71'	1805.19	25	[Lithology: Concrete with limestone aggregate]	Box 3	CC	#5 from 24'-24.54' - Length=0.54' - Compressive Strength =3702 psi - Break Type 5 - Weight = 4.85 lbs; #6 from 28.06'-28.6' - Length=0.54' - Compressive Strength =2629 psi - Break Type 5 - Weight = 4.50 lbs	100.0% / 100.0%
	30						

#### SAMPLER TYPE

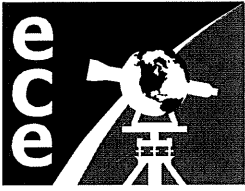
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 112  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/14/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/14/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

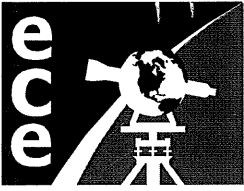
SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 31.79'	31.27 1795.95 31.79 1795.43			Box 4	CC		100.0% / 87.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces, many moderate brown shale partings Fractures @ 31.99', 32.15', 32.7', 33.13', 34.91', 35.23', 37.6', 39.43' --- Fractures with coal/shale seams @ 33.2', 33.74', 34.12', 34.16', 34.21', 34.26', 35.64', 36.09'-36.21', 36.7', 37.17'-37.42', 38.94', 39.96'		35		Box 4	RC	#7 from 32.25'-32.575' - Length=0.325' - Compressive Strength =9144 psi - Break Type 5 - Weight = 3.10 lbs; #8 from 38.18'-38.72' - Length=0.54' - Compressive Strength =3273 psi - Break Type 2 - Weight = 5.15 lbs	100.0% / 87.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 41.58', 42.05', 42.6', 47.58'-47.85' --- Fractures with coal/shale seams @ 44.49', 45.88', 46.85', 48.02', 49.17'	39.96 1787.26	40		Box 5	RC	#9 from 44'-44.53' - Length=0.53' - Compressive Strength =3353 psi - Break Type 3 - Weight = 5.15 lbs; #10 from 46.14'-46.68' - Length=0.54' - Compressive Strength =>9183 psi - Break Type None - Weight = 5.20 lbs	100.0% / 95.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 50.37'-50.42', 53.54', 54.09', 54.63', 55.28', 57.7', 58.76' --- Fractures with coal/shale seams @ 50.03', 51.28', 51.62', 52.1', 52.14', 52.8', 57.66', 57.99' --- Void/No Return from 52.61'-52.8'	49.17 1778.05	45		Box 6	RC	#11 from 50.85'-51.39' - Length=0.54' - Compressive Strength =9457 psi - Break Type 3 - Weight = 5.20 lbs; #12 from 56.17'-56.7' - Length=0.53' - Compressive Strength =8093 psi - Break Type 2 - Weight = 5.15 lbs	98.0% / 94.0%
SANDSTONE, light gray, strong, fine grained, thickly	58.76 1768.46	50					
		55					
		60					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<b>City of Crossville</b>	Boring #	<b>112</b>
Architect/Engineer	<b>Environmental and Civil Engineering Services</b>	Job #	<b>3002</b>
Project Name	<b>Meadow Park Dam</b>	Drawn By	<b>Mary Beth Elrod, E.I.</b>
Project Location	<b>Cumberland County, TN</b>	Approved By	<b>Scott J. Christian, P.E.</b>

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started **3/14/12** Hammer Wt. \_\_\_\_\_  
 Date Completed **3/14/12** Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector **ECE** Rock Core Dia. **PQ WL 5"**  
 Boring Method **Wireline Core** Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings	67.70	65	[Lithology: Shale with fractures]	Box 7	RC	#13 from 61.83'-62.37' - Length=0.54' - Compressive Strength =>9154 psi - Break Type None - Weight = 5.10 lbs; #14 from 63.29'-63.83' - Length=0.54' - Compressive Strength =>9140 psi - Break Type None - Weight = 5.15 lbs	98.0% / 77.0%
	1759.52			Box 8			
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings	73.65	70	[Lithology: Sandstone]		RC	#15 from 68.4'-68.94' - Length=0.53' - Compressive Strength =8066 psi - Break Type 3 - Weight = 5.15 lbs; #16 from 72.95'-73.28' - Length=0.33' - Compressive Strength =7976 psi - Break Type 3 - Weight = 3.25 lbs	100.0% / 73.0%
	1753.57						
Fractures @ 60.02', 60.39', 60.7', 60.8', 62.37', 62.75', 62.92' --- Fractures with coal/shale seams @ 58.86', 59.2'-59.5', 59.74', 63.64', 64.34', 64.38', 64.64', 64.84', 66.24', 67', 67.35', 67.7' --- Void/No Return from 67.5'-67.7'		75					
Bottom of hole at 73.65' - Terminated Rock Core		80					
		85					
		90					

<b>SAMPLER TYPE</b>	<b>GROUND WATER DEPTH</b>	<b>BORING METHOD</b>
SS - DRIVEN SPLIT SPOON	▽ AT COMPLETION <u>N/A</u> FT.	HSA - HOLLOW STEM AUGERS
ST - PRESSED SHELBY TUBE	▼ AFTER _____ FT.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	WATER ON RODS _____ FT.	DC - DRIVING CASING
RC - ROCK CORE		RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 113  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/15/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/16/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void	3.75						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.19' switching into existing dam concrete	1823.47 5.19 1822.03	5		Box 1	CC	#1 from 6.6'-7.2' - Length=0.6' - Compressive Strength =2663 psi - Break Type 3 - Weight = 5.35 lbs; #2 from 11.3'-11.9' - Length=0.6' - Compressive Strength =5357 psi - Break Type 3 - Weight = 5.50 lbs	100.0% / 99.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.27', 7.6', 8.35', 11.16', 12.17', 12.55', joints/fractures with sandstone @ 9.56', 11'	12.55	10		Box 2	CC	#3 from 13'-13.6' - Length=0.6' - Compressive Strength =3257 psi - Break Type 2 - Weight = 5.45 lbs; #4 from 19.4'-20' - Length=0.6' - Compressive Strength =2665 psi - Break Type 3 - Weight = 5.30 lbs	100.0% / 99.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 15.88', 16.96', 17.51', 18.19', 19.05', 19.11', 20.13', 22.22', joints/fractures with sandstone @ 13.95', 17.6'	1814.67	15		Box 2	CC	#5 from 23'-23.6' - Length=0.6' - Compressive Strength =3000 psi - Break Type 3 - Weight = 5.40 lbs; #6 from 27.8'-28.4' - Length=0.6' - Compressive Strength =3251 psi - Break Type 3 - Weight = 5.25 lbs	98.0% / 93.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 28.84', joint/fracture @ 24.49', 26.45', 27.75', joint/fracture w/ sandstone @ 22.6', 23.94', Void/No Return f/m 27.58'-27.75'	22.22 1805.00	25		Box 3	CC		
SANDSTONE, light gray, strong, fine grained, thickly	28.84 1798.38	30					98.0% /

#### SAMPLER TYPE

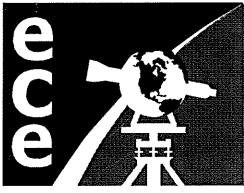
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 113  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/15/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/16/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
bedded, slightly decomposed, slightly disintegrated, slightly fractured, fractures @ 29.02', 29.22', 29.27', 31.39'	31.39 1795.83			Box 3	RC		93.0%
		35		Box 4	RC	#7 from 37.9'-38.5' - Length=0.6' - Compressive Strength =>9231 psi - Break Type None - Weight = 5.75 lbs;	100.0% / 87.0%
	40.09	40					
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces, many moderate brown shale partings Fractures @ 32.05', 32.75', 37.7', 40.09' --- Fractures with coal/shale seams @ 31.53', 33.09'-33.25', 34.04'-34.52', 35.3', 35.59', 36.34', 36.98', 37.07', 38.75', 39.61'	1787.13			Box 5	RC	#8 from 43'-43.6' - Length=0.6' - Compressive Strength =>9192 psi - Break Type None - Weight = 5.85 lbs; #9 from 46.3'-46.9' - Length=0.6' - Compressive Strength =2259 psi - Break Type 3 - Weight = 5.85 lbs	97.0% / 94.0%
		45					
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 40.38'-40.41', 47.9', 49.28' --- Fractures with coal/shale seams @ 40.41', 41.1', 41.83', 42.75', 43.66', 44.37', 44.77', 45.25', 46.16', 47.01', 48.38' --- Void/No Return @ 42.5'-42.75'	49.28 1777.94			Box 6	RC	#10 from 51.2'-51.8' - Length=0.6' - Compressive Strength =>9467 psi - Break Type None - Weight = 5.80 lbs; #11 from 55'-55.6' - Length=0.6' - Compressive Strength =>9191 psi - Break Type None - Weight = 5.80 lbs	97.0% / 88.0%
		50					
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 49.94', 52.02', 52.6', 54.63', 57.23', 57.85' --- Fractures with coal/shale @ 49.76', 50.47', 50.8', 51.07', 53.01', 53.11', 55.79', 56.05', 56.78' --- Vertical Fracture from 54.15'-54.63' --- Void/No Return from 57.59'-57.85'	57.85 1769.37						
		55					
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 49.94', 52.02', 52.6', 54.63', 57.23', 57.85' --- Fractures with coal/shale @ 49.76', 50.47', 50.8', 51.07', 53.01', 53.11', 55.79', 56.05', 56.78' --- Vertical Fracture from 54.15'-54.63' --- Void/No Return from 57.59'-57.85'							
		60					
						#12 from 58'-58.6' -	

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>113</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

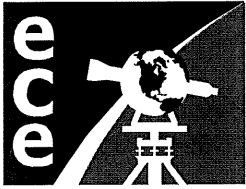
#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/15/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/16/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
bedded, fresh, compotent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings	66.57	65	[Lithology: Fractured shale/coal partings]	Box 7	RC	Length=0.6' - Compressive Strength =>9265 psi - Break Type None - Weight = 5.80 lbs; #13 from 64.9'-65.5' - Length=0.6' - Compressive Strength =>11874 psi - Break Type None - Weight = 5.75 lbs	100.0% / 83.0%
	1760.65						
Fractures @ 59.75', 61.15' (angular), 61.43', 62.35', 62.9', 63.81', 64.03', 64.34', 64.58', 66.57' --- Fractures with coal/shale seams @ 58.82', 59.2', 59.54', 61.39' (angular), 63.09', 63.3', 65.33', 65.82', 65.97'	71.05	70	[Lithology: Fractured shale/coal partings]	Box 8	RC	#14 from 69'-69.6' - Length=0.6' - Compressive Strength =>9224 psi - Break Type None - Weight = 5.80 lbs	97.0% / 85.0%
	1756.17						
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, compotent, moderately fractured, trace grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings		80					
Fractures @ 67.05', 67.7' --- Fractures with traces of coal/shale on faces @ 68.19', 68.6'-68.85', 69.86', 70.36', 70.65'							
Bottom of hole at 71.05' - Terminated Rock Core		85					
		90					

<b>SAMPLER TYPE</b> SS - DRIVEN SPLIT SPOON ST - PRESSED SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER RC - ROCK CORE	<b>GROUND WATER DEPTH</b> ▽ AT COMPLETION <u>N/A</u> FT. ▽ AFTER _____ FT. WATER ON RODS _____ FT.	<b>BORING METHOD</b> HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVING CASING RW - ROTARY WASH
--	---	---



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 202  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

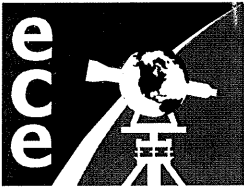
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/28/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/2/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.72						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.1' switching into existing dam concrete	1823.50	5	[Concrete with limestone aggregate pattern]	Box 1	CC	#1 from 6.4'-7' - Length=0.6' - Compressive Strength =4088 psi - Break Type 3 - Weight = 5.35 lbs; #2 from 11.6'-12.2' - Length=0.6' - Compressive Strength =2816 psi - Break Type 2 - Weight = 5.25 lbs	98.0% / 95.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.25', 7.65', 9.05', 10.24', 11.29', 12.16', 12.6', Void/No Return from 12.4'-12.6'	1822.12						
	12.60	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 14.6', 15.65', 17.7', 19.21', 20.81', 21.97', concrete joint/fractures with sandstone @ 17.23'	1814.62	15	[Concrete with limestone aggregate pattern]	Box 2	CC	#3 from 13'-13.6' - Length=0.6' - Compressive Strength =2709 psi - Break Type 3 - Weight = 5.25 lbs; #4 from 19.4'-20' - Length=0.6' - Compressive Strength =4888 psi - Break Type 2 - Weight = 5.25 lbs	100.0% / 100.0%
	20						
	21.97	20					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.66', 27.65', 29.3', 31.51', concrete joint/fractures with sandstone @ 25.25', 26.34', 26.66', 30.74'	1805.25	25	[Concrete with limestone aggregate pattern]	Box 3	CC	#5 from 23'-23.6' - Length=0.6' - Compressive Strength =2660 psi - Break Type 5 - Weight = 5.45 lbs; #6 from 29.8'-30.4' - Length=0.6' - Compressive Strength =2896 psi - Break Type 2 - Weight = 5.25 lbs	100.0% / 100.0%
	25						
	30	25					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ∇ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 202  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

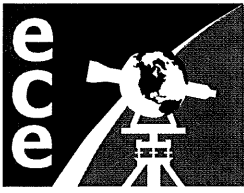
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/28/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/2/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITHOLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 33.85', joint/fracture @ 32.75'	31.51 1795.71 33.85			Box 4	CC	#7 from 34.4'-35' - Length=0.6' - Compressive Strength =3170 psi - Break Type 2 - Weight = 5.25 lbs	100.0% / 81.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 35.45' (angular), 36.05'-36.5' (weathered), 37.46', 37.65', 40.55', 40.62' --- Fractures with coal/shale seams @ 38.74'-39.19', 39.39', 39.44', 39.82', 39.87', 40.07', 40.12'	1793.37 40.62	35 40		Box 4	RC	#8 from 37.9'-38.5' - Length=0.6' - Compressive Strength =9272 psi - Break Type 5 - Weight = 5.70 lbs	100.0% / 81.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, slightly disintegrated to compotent, moderately fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 42.8', 44.1', 45.98' --- Angular Fractures @ 40.62', 41.83', 44.87', 45.66', 45.77', 47.6', 48.02', 48.32' --- Fractures with coal/shale seams @ 41.99', 46.34', 48.32', 49.24'	1786.60 49.24	45		Box 5	RC	#9 from 43'-43.6' - Length=0.6' - Compressive Strength =487 psi - Break Type 3 - Weight = 5.70 lbs; #10 from 48.5'-49.1' - Length=0.6' - Compressive Strength =6512 psi - Break Type 3 - Weight = 5.75 lbs	100.0% / 95.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, slightly disintegrated, intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fracts @ 49.75', 50.03', 50.64', 52.75', 53.65', 55.3', 55.84', 57.36'-57.52' - Ang. Fracts @ 51.51', 52.16', 52.35'-52.75', 54.27' -- Fracts w/coal/shale @ 50.3', 50.45'-50.64', 51.51', 52.04', 54.27', 54.46', 56.1', 57.22', 57.85' -- Vert. Fract. f/m 50.97'-51.51'	1777.98 57.85	50 55		Box 6	RC	#11 from 53'-53.6' - Length=0.6' - Compressive Strength =10509 psi - Break Type 5 - Weight = 5.80 lbs; #12 from 56.2'-56.8' - Length=0.6' - Compressive Strength =9784 psi - Break Type 5 - Weight = 5.80 lbs	100.0% / 73.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, compotent, moderately fractured, some	1769.37	60					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▽ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 202  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

**DRILLING AND SAMPLING INFORMATION**

**TEST DATA**

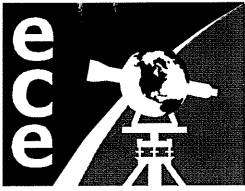
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/28/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/2/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 57.99', 58.24', 58.68', 62.32', 65.18'-65.58' --- Fractures with coal/shale @ 59.96', 60.77', 62.8', 63.74', 64.41', 65.58' --- Angular Fractures @ 64.41' --- Void/No Return @ 62.42'-62.8', 67.66'-68.05'	68.05	65		Box 7	RC	#13 from 59'-59.6' - Length=0.6' - Compressive Strength =>9493 psi - Break Type None - Weight = 5.80 lbs	92.0% / 85.0%
Bottom of hole at 68.05' - Terminated Rock Core	1759.17	70					
		75					
		80					
		85					
		90					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▽ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client	<u>City of Crossville</u>	Boring #	<u>204</u>
Architect/Engineer	<u>Environmental and Civil Engineering Services</u>	Job #	<u>3002</u>
Project Name	<u>Meadow Park Dam</u>	Drawn By	<u>Mary Beth Elrod, E.I.</u>
Project Location	<u>Cumberland County, TN</u>	Approved By	<u>Scott J. Christian, P.E.</u>

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/27/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/28/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.77						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.14' switching into existing dam concrete, concrete joints/fractures @ 3.89', 4.04'	1823.45	5		Box 1	CC	#1 from 5.4'-6' - Length=0.6' - Compressive Strength =2839 psi - Break Type 3 - Weight = 5.25 lbs; #2 from 10'-10.6' - Length=0.6' - Compressive Strength =3040 psi - Break Type 5 - Weight = 5.35 lbs	100.0% / 97.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 7.7', 9.46', 11.11', 12.8'	1822.08	10					
	12.80						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 14.51', 15.61', 17.2', 17.88', 19.24', 20.53', 21.08', concrete joints/fractures with sandstone @ 18.33', 20.03', 21.91', Void/No Return from 17.06'-17.2'	1814.42	15		Box 2	CC	#3 from 13'-13.6' - Length=0.6' - Compressive Strength =2851 psi - Break Type 3 - Weight = 5.30 lbs; #4 from 19.4'-20' - Length=0.6' - Compressive Strength =2920 psi - Break Type 3 - Weight = 5.20 lbs	98.0% / 98.0%
		20					
	21.91						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.31', 22.8', 26.64', 27.7', 31.05', concrete joints/fractures with sandstone @ 23.56', 26.24', Void/No Return from 27.61'-27.7'	1805.31	25		Box 3	CC	#5 from 23.7'-24.3' - Length=0.6' - Compressive Strength =2368 psi - Break Type 5 - Weight = 5.15 lbs; #6 from 28'-28.6' - Length=0.6' - Compressive Strength =3135 psi - Break Type 2 - Weight = 5.15 lbs	99.0% / 99.0%
		30					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

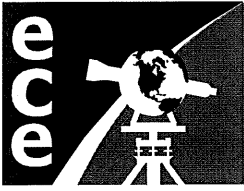
#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 204  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/27/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/28/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 31.63', 32.85', 34.91', 35.83', 36.62', 37.9', 40.62', concrete joints/fractures with sandstone @ 39.73'	31.05 1796.17	35		Box 4	CC	#7 from 33'-33.6' - Length=0.6' - Compressive Strength =2301 psi - Break Type 3 - Weight = 5.30 lbs; #8 from 39'-39.6' - Length=0.6' - Compressive Strength =3225 psi - Break Type 5 - Weight = 5.30 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 43.2', concrete joints/fractures @ 41.18', 42.57', 42.65'	40.62 1786.60	40		Box 5	CC	#9 from 41.3'-41.9' - Length=0.6' - Compressive Strength =3061 psi - Break Type 2 - Weight = 5.20 lbs	100.0% / 88.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 43.26', 45.03'-45.61' (angular), 47.4', 49.36' --- Fractures with coal/shale seams @ 43.51'-43.69', 43.99', 44.83', 44.93', 45.61', 46.74', 48.02'-48.23' (angular), 48.34'	43.20 1784.02	45		Box 5	RC	#10 from 45.5'-46.1' - Length=0.6' - Compressive Strength =4492 psi - Break Type 3 - Weight = 5.75 lbs	100.0% / 88.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fracts @ 50.19'-50.61', 51.42', 53.91', 54.34', 55.07', 55.48', 56.37'-56.64', 58.49' -- Vert. Fracts f/m 50.61'-50.85', 50.85'-51.42'-- Fracts w/ coal/shale seams @50.61', 50.85', 51.42', 51.47', 51.76', 51.92', 52.43', 56.64', 57.09', 57.29', 57.48', 57.75', 58.03'	49.36 1777.86	50		Box 6	RC	#11 from 53'-53.6' - Length=0.6' - Compressive Strength =4001 psi - Break Type 3 - Weight = 5.75 lbs; #12 from 55.6'-56.1' - Length=0.6' - Compressive Strength =>10019 psi - Break Type None - Weight = 5.85 lbs	100.0% / 74.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderately	58.49 1768.73	55					
		60					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 211  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/18/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/18/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.81						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 1-1/2", break joint at 5.18' switching into existing dam concrete, concrete joints/fractures @ 3.96'	1823.41	5					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.35', 6.94', 7.6', 12.11', 12.7', concrete joints/fractures with sandstone @ 9.12', 11.35'	1822.04			Box 1	CC	#1 from 4.75'-5.42' - Length=0.67' - Compressive Strength =3429 psi - Break Type 3 - Weight = 5.70 lbs; #2 from 10.603'-11.303' - Length=0.67' - Compressive Strength =4326 psi - Break Type 2 - Weight = 6.00 lbs	100.0% / 98.0%
	12.70	10					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 13.78', 15.29', 17.01', 17.8', 19.45', 21.62', concrete joints/fractures with sandstone @ 13.53', 16.46', 20.56'	1814.52	15		Box 2	CC	#3 from 14'-14.6' - Length=0.6' - Compressive Strength =4633 psi - Break Type 2 - Weight = 5.20 lbs; #4 from 17.09'-17.69' - Length=0.6' - Compressive Strength =4129 psi - Break Type 2 - Weight = 5.30 lbs	100.0% / 97.0%
	21.62	20					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 23.71', 24.91', 25.8', 26.6', 27.75', 28.57', 28.82', 30.34', 30.79', concrete joints/fractures with sandstone @ 22.65', 22.88'	1805.60	25		Box 3	CC	#5 from 22.95'-23.56' - Length=0.65' - Compressive Strength =3915 psi - Break Type 3 - Weight = 5.45 lbs; #6 from 27.85'-28.45' - Length=0.6' - Compressive Strength =2454 psi - Break Type 2 - Weight = 5.10 lbs	100.0% / 95.0%
		30					

#### SAMPLER TYPE

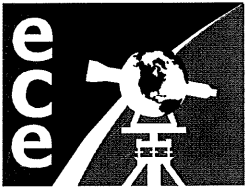
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 211  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/18/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/18/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Cores Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 36.68', concrete joints/fractures @ 32.22', 32.57'-32.8', 36.57'	30.79 1796.43	35		Box 4	CC	#7 from 32.9'-33.5' - Length=0.6' - Compressive Strength =2804 psi - Break Type 2 - Weight = 5.15 lbs	100.0% / 82.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 37.02'-37.42', 37.61', 37.8' --- Fractures with coal/shale @ 38'-38.39', 39.67', 39.97', 40.44'	36.68 1790.54 40.44 1786.78	40		Box 4	RC	#8 from 38.5'-39.1' - Length=0.6' - Compressive Strength =5501 psi - Break Type 3 - Weight = 5.85 lbs	100.0% / 82.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, some grayish black shale/coal partings and on fracture faces, some moderate brown shale partings Fractures @ 42.7'-42.96', 44.07', 45.18', 45.68', 46.48', 46.83', 47.37', 49.69' --- Fractures with coal/shale @ 42.1', 42.51', 42.96', 47.9', 48.82'	49.69 1777.53	45		Box 5	RC	#9 from 42.9'-43.5' - Length=0.6' - Compressive Strength =>9246 psi - Break Type None - Weight = 5.80 lbs; #10 from 47.9'-48.5' - Length=0.6' - Compressive Strength =>9162 psi - Break Type None - Weight = 5.80 lbs	100.0% / 95.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces Fractures @ 51.03', 52.55', 55.18', 56.42', 57.58', 57.85' --- Fractures with coal/shale @ 49.89', 53.2'-53.56', 53.91', 54.29', 55.03', 56.89'	57.85 1769.37	55		Box 6	RC	#11 from 52.1'-52.7' - Length=0.6' - Compressive Strength =>9246 psi - Break Type None - Weight = 5.80 lbs; #12 from 55.4'-56' - Length=0.6' - Compressive Strength =>9302 psi - Break Type None - Weight = 5.70 lbs	100.0% / 88.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely		60					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



# ece SERVICES

## LOG OF TEST BORING

### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 211  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/18/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/18/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings; Void/No Return from 67.28'-67.8'							
Fractures @ 61', 61.3'-61.74' (angular), 61.74', 62.11', 62.29', 62.75', 63.78', 63.83', 64.44'-64.51', 65.48', 66.14', 66.24', 66.58', 66.66', 66.76'-67.01', 67.11', 67.8' --- Fract with coal/shale @ 58.97', 59.47', 60.27', 60.68', 64.51', 65.16', 65.18'	65			Box 7	RC	#13 from 58'-58.6' - Length=0.6' - Compressive Strength =8741 psi - Break Type 3 - Weight = 5.75 lbs; #14 from 63'-63.6' - Length=0.6' - Compressive Strength =>9307 psi - Break Type None - Weight = 5.65 lbs	95.0% / 84.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings; Fractures @ 68', 68.28' (with coal/shale), 68.52'	67.80 1759.42 69.00 1758.22	70		Box 8	RC		100.0% / 40.0%
Bottom of hole at 69' - Terminated Rock Core							

#### SAMPLER TYPE

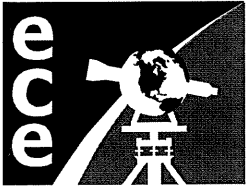
- SS - DRIVEN SPLIT SPOON
- ST - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 304  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

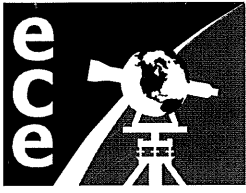
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 4/30/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/30/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD	
SURFACE ELEVATION - 1827.20								
Spool/trumpet void								
	3.97							
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 5.29' switching into existing dam concrete, concrete joint/fracture @ 4.29'	1823.23 5.29 1821.91	5		Box 1	CC	#1 from 4.55'-5.08' - Length=0.53' - Compressive Strength =3273 psi - Weight = 4.70 lbs; #2 from 11.25'-11.78' - Length=0.53' - Compressive Strength =2791 psi - Break Type 5 - Weight = 4.75 lbs	99.0% / 95.0%	
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 7.4', 7.7', 7.99', 8.89' (w/ sandstone), 10.51', 10.61', 11.89', 12.8'(w/ sandstone), Void/No Return from 12.72'-12.8'		10						
	12.80							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 13.94'(w/ sandstone), 14.73', 15.68', 17.64', 17.88', 19.33', 20.37', 21.46', 22.42'(w/ sandstone); Void/No Return from 15.68'-15.84'	1814.40	15		Box 2	CC	#3 from 15.1'-15.63' - Length=0.53' - Compressive Strength =2066 psi - Break Type 5 - Weight = 4.80 lbs; #4 from 20.9'-21.43' - Length=0.53' - Compressive Strength =3054 psi - Break Type 3 - Weight = 4.70 lbs	100.0% / 96.0%	
		20						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.6', 23.63', 24.59', 25.65'(w/ sandstone), 26.2'(w/ sandstone), 26.51', 27.14', 27.58', 29.15', 31.45'	1804.78	25		Box 3	CC	#5 from 24.25'-24.78' - Length=0.53' - Compressive Strength =2861 psi - Break Type 3 - Weight = 4.65 lbs; #6 from 27.8'-28.33' - Length=0.53' - Compressive Strength =2619 psi - Break Type 3 - Weight = 4.90 lbs	100.0% / 98.0%	
		30						

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 304  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

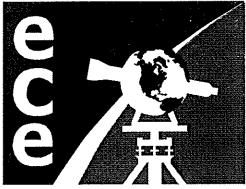
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 4/30/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/30/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 35.54', concrete joints/fractures @ 32.7', 34.4', 35.54'(w/ sandstone)	31.45 1795.75	35		Box 4	CC	#7 from 35.2'-35.73' - Length=0.53' - Compressive Strength =3858 psi - Break Type 3 - Weight = 4.70 lbs	100.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 39.66', 40.06'-40.23' (vertical), 40.23'-40.72' (angular), 40.72' --- Fractures with coal/shale seams @ 36.12', 36.53', 36.71', 37.8', 38.84', 39.22', 39.25', 39.38', 39.96'	35.54 1791.66	40		Box 4	RC	#8 from 36.8'-37.34' - Length=0.54' - Compressive Strength =2356 psi - Break Type 5 - Weight = 5.05 lbs	100.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 44.28', 44.72', 46.05', 47.8', 49.41'-49.71' --- Fractures with coal/shale @ 41.67', 41.91', 42.8', 43.47', 43.68', 43.7', 45.42', 45.71', 47.88', 48.92', 49.71', 49.88' --- Voids/No Return from 42.49'-42.8', 47.33'-47.8'	40.72 1786.48	45		Box 5	RC	#9 from 39.82'-40.35' - Length=0.53' - Compressive Strength =1211 psi - Break Type 2 - Weight = 5.10 lbs; #10 from 45.15'-45.69' - Length=0.54' - Compressive Strength =>9141 psi - Break Type None - Weight = 5.15 lbs	95.0% / 80.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 52.6', 52.7'-52.85', 53.37', 56.51'(angular) --- Fractures with coal/shale @ 51.81', 52', 52.45', 54.51', 54.91'-55.1', 57.66'-57.7' --- Angular Fractures with coal/shale @ 52.85', 53.2', 55.1', 55.5', 55.7', 57.25'	49.88 1777.32	55		Box 6	RC	#11 from 51.52'-52.06' - Length=0.54' - Compressive Strength =3407 psi - Break Type 5 - Weight = 5.15 lbs; #12 from 55.74'-56.33' - Length=0.54' - Compressive Strength =3659 psi - Break Type 2 - Weight = 5.15 lbs	100.0% / 85.0%
Bottom of hole at 57.7' - Terminated Rock Core	57.70 1769.50	60					

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 305  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 4/2/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/2/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

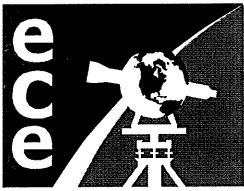
SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.79						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 5.59' switching into existing dam concrete	1823.41	5	[Lithology: Concrete with limestone aggregate]	Box 1	CC	#1 from 7.05'-8.01' - Length=0.6' - Compressive Strength =4585 psi - Break Type 3 - Weight = 5.05 lbs; #2 from 11'-11.6' - Length=0.6' - Compressive Strength =4499 psi - Break Type 3 - Weight = 5.40 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 7.23', 8.59', 9.6' (w/ sandstone), 10.13'(w/ sandstone), 11.62', 12.75'(w/ sandstone)	1821.61	10					
	12.75						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 14.72', 15.81'(angular), 17.21', 17.75', 19.11', 20.12'(angular w/ sandstone), 10.13'(w/ sandstone), 21.04'(angular), 21.88', Void/No Return from 17.58'-17.75'	1814.45	15	[Lithology: Concrete with limestone aggregate]	Box 2	CC	#3 from 13.8'-14.4' - Length=0.6' - Compressive Strength =3489 psi - Break Type 5 - Weight = 5.30 lbs; #4 from 19.5'-20.1' - Length=0.6' - Compressive Strength =3081 psi - Break Type 2 - Weight = 5.25 lbs	100.0% / 100.0%
	20						
	21.88						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joint with no break @ 22.7', concrete joints/fractures @ 23.61', 26.95', 27.6', 30.89', Void/No Return from 22.49'-22.7'	1805.32	25	[Lithology: Concrete with limestone aggregate]	Box 3	CC	#5 from 23'-23.6' - Length=0.6' - Compressive Strength =4763 psi - Break Type 3 - Weight = 5.30 lbs; #6 from 27.9'-28.5' - Length=0.6' - Compressive Strength =2512 psi - Break Type 3 - Weight = 5.30 lbs	98.0% / 98.0%
	30						

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 305  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 4/2/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 4/2/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

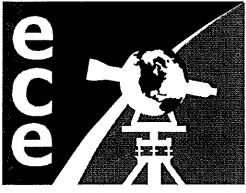
SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with no break @ 39.88', concrete joints/fractures @ 31.51', 32.7', 35.23', 37.65', Void/No Return from 37.53'-37.65'	30.89 1796.31	35		Box 4	CC	#7 from 33.1'-33.7' - Length=0.6' - Compressive Strength =3221 psi - Break Type 5 - Weight = 5.00 lbs; #8 from 38'-38.6' - Length=0.6' - Compressive Strength =3462 psi - Break Type 2 - Weight = 5.05 lbs	99.0% / 97.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, many grayish black shale/coal partings and on fracture faces Fract @42.75', 47.65'-47.8', 48.92' --- Fract w/ coal/shale @40.07', 40.13', 40.33', 40.55'(ang.), 41.03'(ang.), 41.27', 41.53', 41.81', 41.95'-42.09', 42.25', 42.42', 43.65'(ang.),44.02',44.71'-44.96',44.96'(ang.),45.23'-45.98',46.26',46.98',47.65'(vert)	39.88 1787.32	40 45		Box 5	RC	#9 from 42.9'-43.5' - Length=0.6' - Compressive Strength =2309 psi - Break Type 3 - Weight = 5.60 lbs; #10 from 48.4'-49' - Length=0.6' - Compressive Strength =4703 psi - Break Type 3 - Weight = 5.80 lbs	100.0% / 60.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, many grayish black shale/coal partings and on fracture faces Fract @ 49.05'(ang.), 52.7', 53.05', 53.46'-53.66', 55.72'-56.16'(vert.), 57.49' --- Fract w/ coal/shale @ 53.86', 55.21', 56.16', 56.26', 56.74', 57.25', 57.35' --- Angular Fract with coal/shale @ 50.95', 51.22', 51.77', 52.19', 52.48', 53.66', 57.65'	48.92 1778.28	50 55		Box 6	RC	#11 from 49.4'-50' - Length=0.6' - Compressive Strength =1321 psi - Break Type 2 - Weight = 5.70 lbs; #12 from 54.5'-55.1' - Length=0.6' - Compressive Strength =>9938 psi - Break Type None - Weight = 5.70 lbs	100.0% / 80.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces	57.65 1769.55	60				#13 from 58.6'-59.2' - Length=0.6' - Compressive	98.0% /

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 309  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

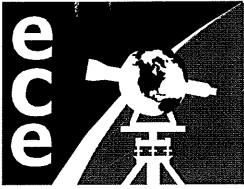
Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/26/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/26/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.76						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 5.1' switching into existing dam concrete	1823.44	5		Box 1	CC	#1 from 6.95'-7.49' - Length=0.54' - Compressive Strength =3809 psi - Break Type 3 - Weight = 4.75 lbs; #2 from 11.75'-12.29' - Length=0.54' - Compressive Strength =4343 psi - Break Type 3 - Weight = 4.85 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.19', 7.55', 8.16', 8.85', 10.08', 11.08', 11.46', 12.28', 12.7'	1822.10	10					
	12.70						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 14.78', 15.54', 16.32', 17.1', 17.39'-17.7', 19.19', 21.83', 22.32'	1814.50	15		Box 2	CC	#3 from 15.97'-16.5' - Length=0.53' - Compressive Strength =3736 psi - Break Type 5 - Weight = 4.65 lbs; #4 from 21.1'-21.63' - Length=0.53' - Compressive Strength =3410 psi - Break Type 5 - Weight = 4.60 lbs	100.0% / 94.0%
	20						
	22.32						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.7', 24.45', 25.8', 26.87', 27.75'(w/ sandstone), 27.99', 28.78'(w/ sandstone)	1804.88	25		Box 3	CC	#5 from 25.3'-25.84' - Length=0.54' - Compressive Strength =2165 psi - Break Type 5 - Weight = 4.65 lbs; #6 from 29.55'-30.09' - Length=0.54' - Compressive Strength =4614 psi - Break Type 5 - Weight = 4.95 lbs	99.0% / 96.0%
	30						

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 309  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/26/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/26/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

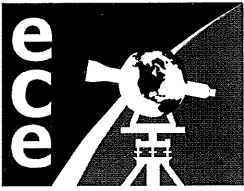
SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH-LOG	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 31.88', 32.7', 34.68'(w/ sandstone), 36.25'(w/ sandstone), 36.8'(w/ sandstone), 36.94', 37.75'(w/ sandstone), 39.44'(w/ sandstone), 40.99'	31.58 1795.62	35		Box 4	CC	#7 from 32.25'-32.79' - Length=0.54' - Compressive Strength =4643 psi - Break Type 5 - Weight = 4.75 lbs; #8 from 40.3'-40.84' - Length=0.54' - Compressive Strength =2702 psi - Break Type 5 - Weight = 4.65 lbs	100.0% / 97.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with no break @ 43.7', joints/cracks @ 42.7'	40.99 1786.21	40		Box 5	CC	#9 from 43.35'-43.88' - Length=0.53' - Compressive Strength =3928 psi - Break Type 5 - Weight = 4.75 lbs	100.0% / 88.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 47.47', 47.6' --- Fractures with coal/shale @ 43.9'-44.19', 44.55'(ang.), 45.65'(ang.), 46.07'(ang.), 47', 47.29', 48.67', 50.05'	43.70 1783.50	45		Box 5	RC	#10 from 47.85'-48.38' - Length=0.53' - Compressive Strength =>10399 psi - Did not Break - Weight = 5.15 lbs	100.0% / 88.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 52.55', 54.29', 54.47', 54.73', 54.87', 55.74', 57.7', 57.93', 58.23'(ang.) --- Fractures with coal/shale @ 50.66', 51.29', 52.47', 53.28', 53.9', 53.95', 55.91', 56.26', 56.71', 56.91' --- Void/No Return from 57.37'-57.7'	50.05 1777.15	50		Box 6	RC	#11 from 53'-53.54' - Length=0.54' - Compressive Strength =923 psi - Break Type 5 - Weight = 5.15 lbs; #12 from 55.6'-56.14' - Length=0.54' - Compressive Strength =>9152 psi - Did not Break - Weight = 5.15 lbs	96.0% / 80.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to intensely	58.23 1768.97	55				#13 from 60.55'-61.08' -	

**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH





### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 310  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 5/1/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 5/1/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
Spool/Trumpet Void							
	3.74						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 5.05' switching into existing dam concrete	1823.46	5		Box 1	CC	#1 from 5.74'-6.28' - Length=0.54' - Compressive Strength =2123 psi - Break Type 3 - Weight = 4.70 lbs; #2 from 11.74'-12.27' - Length=0.53' - Compressive Strength =4679 psi - Break Type 2 - Weight = 4.70 lbs	99.0% / 99.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 6.18', 7.5', 8.37', 8.79', 9.51', 10.71', 12.01', 12.7'(w/ sandstone), Void/No Return from 12.6'-12.7'	5.05	10					
	1822.15						
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 13.31', 15.4', 16.45', 18.35', 19.21', 20.91', 21.72', 22.6', joints/fractures w/ sandstone @ 14.09', 14.57', 17.75', 19.71', Void/No Return f/m 17.66'-17.75'	1814.50	15		Box 2	CC	#3 from 14.84'-15.37' - Length=0.53' - Compressive Strength =4736 psi - Break Type 5 - Weight = 4.85 lbs; #4 from 20.12'-20.65' - Length=0.53' - Compressive Strength =3160 psi - Break Type 3 - Weight = 4.75 lbs	99.0% / 99.0%
	12.70	20					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 23.64', 24.92', 26.1'(w/ sandstone), 26.66', 27.41', 27.8', 29.06', 31.2', 32.34', Void/No Return f/m 27.65'-27.8'	1804.60	25		Box 3	CC	#5 from 25.61'-26.14' - Length=0.53' - Compressive Strength =3511 psi - Break Type 3 - Weight = 4.80 lbs; #6 from 28.76'-29.3' - Length=0.54' - Compressive Strength =3783 psi - Break	98.0% / 96.0%
	22.60	30					

#### SAMPLER TYPE

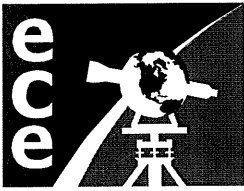
SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 310  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 5/1/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 5/1/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITHOLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.20							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 32.7'(w/ sandstone), 33.59', 35.15', 36.94', 37.6', 38.3', 41.58'	32.34 1794.86	35		Box 4	CC	Type 5 - Weight = 4.75 lbs  #7 from 34.26'-34.8' - Length=0.54' - Compressive Strength =2621 psi - Break Type 3 - Weight = 4.75 lbs; #8 from 38.59'-39.12' - Length=0.53' - Compressive Strength =3120 psi - Break Type 5 - Weight = 4.70 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with break @ 43.62', concrete joints/fractures @ 41.97', 42.7', 43.29'	41.58 1785.62	40		Box 5	CC	#9 from 41.65'-42.19' - Length=0.54' - Compressive Strength =2649 psi - Break Type 6 - Weight = 4.75 lbs	99.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, competent, intensely fractured, many grayish black shale/coal partings and on fracture faces Fractures @ 43.62'-43.71', 44.31', 44.71'-44.81', 44.81'(ang.), 45.18'(ang.), 45.39', 45.64', 49.97' --- Fractures with coal/shale @ 43.71', 43.93', 46.37', 46.5', 46.92', 47.38', 47.95', 49.45', 50.12'	43.62 1783.58	45		Box 5	RC	#10 from 48.8'-49.33' - Length=0.53' - Compressive Strength =>9458 psi - Break Type None - Weight = 5.10 lbs	99.0% / 86.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, slightly decomposed, competent, moderately to intensely fractured, some grayish black shale/coal partings and on fracture faces Fractures @ 50.56'-50.73', 51.52', 51.75'-51.85', 52.56', 56.5', 57.6' --- Fractures with coal/shale @ 52.8', 53.37', 54.92', 55.63', 55.98', 56.12', 57.88', 58.3' --- Void/No Return from 57.55'-57.6'	50.12 1777.08	50		Box 6	RC	#11 from 50.72'-51.05' - Length=0.33' - Compressive Strength =3505 psi - Break Type 3 - Weight = 3.10 lbs; #12 from 57.04'-57.36' - Length=0.32' - Compressive Strength =>9167 psi - Break Type None - Weight = 3.10 lbs	93.0% / 79.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some	58.30 1768.90	55					

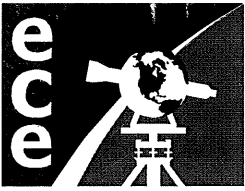
**SAMPLER TYPE**  
 SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

**GROUND WATER DEPTH**  
 ∇ AT COMPLETION N/A FT.  
 ▼ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

**BORING METHOD**  
 HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH







### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 322  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/20/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/20/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
Spool/Trumpet Void							
	3.81						
CONCRETE, new dam cap, angular limestone aggregate 1/4" to 2", break joint at 5.22' switching into existing dam concrete, joint/fracture @ 5.01'	1823.41 5.22 1822.00	5					
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 5.93', 6.32', 7.8', 8.62', 10.03'(w/ sandstone), 11.56', 12.7', Void/No Return from 12.61'-12.7'		10		Box 1	CC	#1 from 5.41'-5.74' - Length=0.33' - Compressive Strength =2922 psi - Break Type 3 - Weight = 2.85 lbs; #2 from 10.69'-11.23' - Length=0.54' - Compressive Strength =3647 psi - Break Type 3 - Weight = 4.80 lbs	99.0% / 97.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 13.6', 17.4', 17.8', 19.36'(w/ sandstone), 20.02'(w/ sandstone), 20.47', 21.31', 22.03'	1814.52	15		Box 2	CC	#3 from 12.95'-13.49' - Length=0.54' - Compressive Strength =3402 psi - Break Type 5 - Weight = 4.75 lbs; #4 from 20.95'-21.49' - Length=0.54' - Compressive Strength =3150 psi - Break Type 3 - Weight = 4.70 lbs	100.0% / 100.0%
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete joints/fractures @ 22.75', 23.98', 25.17'(w/ sandstone), 25.67'(w/ sandstone), 26.74', 27.75', 29.25'(w/ sandstone), 30.37', 31.16'(w/ sandstone)	1805.19	25		Box 3	CC	#5 from 23.17'-23.71' - Length=0.54' - Compressive Strength =3887 psi - Break Type 5 - Weight = 4.85 lbs; #6 from 27.75'-28.29' - Length=0.54' - Compressive Strength =3134 psi - Break Type 3 - Weight = 4.70 lbs	100.0% / 100.0%
	22.03						
	1805.19						
		30					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

AT COMPLETION N/A FT.  
 AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH



### ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 322  
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002  
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.  
 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

#### DRILLING AND SAMPLING INFORMATION

#### TEST DATA

Northing \_\_\_\_\_ Easting \_\_\_\_\_  
 Date Started 3/20/12 Hammer Wt. \_\_\_\_\_  
 Date Completed 3/20/12 Hammer Drop \_\_\_\_\_  
 Drill Foreman \_\_\_\_\_ Spoon Sampler O.D. \_\_\_\_\_  
 Inspector ECE Rock Core Dia. PQ WL 5"  
 Boring Method Wireline Core Shelby Tube O.D. \_\_\_\_\_

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Compression Testing Results	REC / RQD
SURFACE ELEVATION - 1827.22							
CONCRETE, existing dam, angular limestone aggregate 1/4" to 2", concrete to bedrock transition with no break @ 34.72', concrete joints/fractures @ 31.4'(w/ sandstone), 31.67', 32.6', 33.16', 33.82'	31.16 1796.06			Box 4	CC	#7 from 32.16'-32.69' - Length=0.53' - Compressive Strength =1430 psi - Break Type 5 - Weight = 4.60 lbs	100.0% / 89.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, intensely fractured, some grayish black shale/coal partings and on fracture faces, trace moderate brown shale partings Fractures @ 34.72'-34.87', 36.53'-36.86', 40.53' --- Fractures with coal/shale @ 34.87', 35.82', 36.18', 36.86', 37.36', 37.7', 38.12', 38.92', 39.3', 39.67'	34.72 1792.50	35		Box 4	RC	#8 from 38.44'-38.97' - Length=0.53' - Compressive Strength =1462 psi - Break Type 2 - Weight = 5.15 lbs	100.0% / 89.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black shale/coal partings and on fracture faces Fractures @ 41.54', 42.55', 43.53', 44.81' --- Fractures with coal/shale @ 41.64', 42.04'-42.55', 44.56', 46.22', 47.2', 48.4'	40.53 1786.69	40		Box 5	RC	#9 from 41.34'-41.88' - Length=0.54' - Compressive Strength =>9145 psi - Break Type None - Weight = 5.20 lbs; #10 from 46.48'-47.02' - Length=0.54' - Compressive Strength =>9414 psi - Break Type None - Weight = 5.20 lbs	100.0% / 89.0%
SANDSTONE, light gray, strong, fine grained, thickly bedded, fresh, competent, moderately to slightly fractured, some grayish black shale/coal partings and on fracture faces Fractures @ 50.58', 51.64', 52.25', 53.31' --- Fractures with coal/shale @ 49.83', 52.73', 53.01', 54.36', 54.53', 54.96', 55.74' --- Void/No Return from 57.33'-57.45'	48.40 1778.82	50		Box 6	RC	#11 from 51.49'-52.03' - Length=0.54' - Compressive Strength =>9143 psi - Break Type None - Weight = 5.25 lbs; #12 from 56.42'-56.95' - Length=0.53' - Compressive Strength =>10532 psi - Break Type None - Weight = 5.20 lbs	99.0% / 94.0%
Bottom of hole at 57.45' - Terminated Rock Core	57.45 1769.77	55					

#### SAMPLER TYPE

SS - DRIVEN SPLIT SPOON  
 ST - PRESSED SHELBY TUBE  
 CA - CONTINUOUS FLIGHT AUGER  
 RC - ROCK CORE

#### GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.  
 ∇ AFTER \_\_\_\_\_ FT.  
 WATER ON RODS \_\_\_\_\_ FT.

#### BORING METHOD

HSA - HOLLOW STEM AUGERS  
 CFA - CONTINUOUS FLIGHT AUGERS  
 DC - DRIVING CASING  
 RW - ROTARY WASH