

ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 1B
 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 4/5/04 Hammer Wt. 140
 Date Completed 4/5/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.22										
Auger Refusal @ 3.5 feet										
	3.50									
FRACTURED SANDSTONE: Gray (N5.5), fine grained, many small (<1mm) coal seams, horiz. fractures along seams @ 3.7, 3.75, 4.25, 4.6, 4.9, 5.0, 5.15, 5.5	1836.72	5								
SANDSTONE: Gray (N5.5), fine grained, horiz. fracture w/ FeO2 clay residue @5.5, angular fractures w/coal @ 5.9, 6.2, 6.42, 6.75, horiz. fracture w/coal @ 6.25	1834.72									
	7.00									
SANDSTONE: Gray (N5.5) fine grained, significant FeO2 staining, angular fractures w/limonite @7.25, 7.45	1833.22									
	7.50									
SANDSTONE: Gray (N5.5) fine grained, angular fracture w/minor FeO2 stain @ 7.9, angular fractures w/coal and loose coarse grained material @ 8.1, 8.6, 8.9, 9.15	1832.72									
	9.25									
TTU LAB	1830.97									
SANDSTONE: Gray (N5.5) fine grained, angular fractures w/coal @ 9.7, 10	1830.72	10								
FRACTURED SANDSTONE: Gray (N5.5) fine grained, many small (<1mm) coal seams, horiz. fractures along seams @ 10.05, 10.1, 10.3, 10.35, 10.4, 10.5, 10.6	1830.22			RC01	RC		REC 94.2% RQD 29.7%			
	10.75									
SANDSTONE: Brown gray (5YR 4/1), fine grained, angular fracture w/ FeO2 staining @ 10.9, horiz. fractures w/limonite @ 11, 11.03, 11.1	1829.47									
	11.15									
	1829.07									
SANDSTONE: Med. gray (N6), fine grained, angular fractures w/hematite mud @ 11.17, 11.28, 11.35, horiz. fractures @ 11.5, 12, 12.15	1828.07									
	13.00									
SANDSTONE: Med gray (N6.5), fine grained, heavy FeO2 staining, angular fractures w/hematite mud @ 12.2, 12.4, 12.55, 12.8, 13.0	1827.22									
	14.30									
	1825.92									
	15									

SAMPLER TYPE

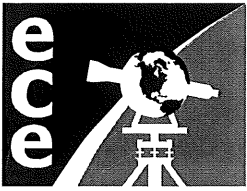
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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



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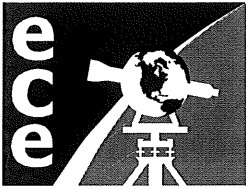
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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.22										
SANDSTONE: Med gray (N6.5), angular fractures w/heavy FeO2 @14.05, 14.27, angular fracture @ 13.67 w/ FeO2 stain very coarse grained weathered	15.00 1825.22 15.75									
FRACTURED SANDSTONE: Med. gray (N6.5) fine grained, heavy FeO2 staining, horiz. fractures w/ hematite mud @ 14.4, 14.6, 14.7, 14.75, 14.83, 15	1824.47 16.25 1823.97									
SANDSTONE: Gray (N5.5), fine grained, small (<1mm) coal seams, angular fracture w/coal @ 15.7	16.75 1823.47									
INTERBEDDED SANDSTONE: Gray (N5.5) fine grained, many small (<1mm) coal seams, horiz. fractures along seams @ 15.88, 15.9, 15.95, 16.15, 16.25	17.50 1822.72 18.25 1821.97									
SANDSTONE: Gray (N5.5), fine grained, small (<1mm) coal seams, angular fractures w/coal @ 16.55, 16.75, 16.85, horiz. fracture w/coal @ 16.65		20								
FRACTURED SANDSTONE: Gray (N5.5), fine grained, heavily fractured areas w/numerous coal seams, sub horiz. fractures w/coal @ 16.9, 17, 17.05, 17.1, 17.15, 17.23, 17.25, 17.3, 17.4, 17.45										
TTU LAB	22.00									
SANDSTONE: Med. gray (N6), fine grained, clean angular fracture w/olive mud @ 18.2, angular fracture w/bituminous coal @ 18.45, angular fracture w/coal @ 18.85, 19, 19.3, horiz. fractures w/ coal @ 19.7, 20.15, 20.35, 21, 22	1818.22 22.40 1817.82 22.60 1817.62									
COAL: Black (N1), dull, microcrystalline, many fractures @ 22.15, 22.18, 22.2, 22.24, 22.3, 22.4	22.80 1817.42									
SANDSTONE: Med. gray (N6), fine grained	23.75									
COAL: Black (N1), dull, microcrystalline, fractures @ 22.6, 22.65, 22.7	1816.47 24.00	25								
SANDSTONE: Med. gray (N6), fine grained, angular fractures @23.15, 23.35, 23.4	1816.22 25.50									
COAL: Black (N1), dull, microcrystalline, fracture @23.9	1814.72									
Missing	26.40									
TTU LAB	1813.82									
SANDSTONE: Med. gray (N6), fine grained, angular fractures w/ coal @ 26.43, 26.75	26.75 1813.47									
COAL: Black (N1) dull, microcrystalline	27.00									
FRACTURED SANDSTONE: Gray (N5.5) fine grained, heavily fractured area, sub. horiz. fractures w/coal @ 27.15, 27.17, 27.2, 27.25, 27.3	1813.22 27.30 1812.92									
	28.50	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
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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.22										
INTERBEDDED SANDSTONE: Gray (N5.5) fine grained, many small (<1mm) coal seams, horiz. fractures along seams @ 27.7, 27.75, 27.8, 27.85, 28.1, 28.15, 28.2, 28.23, 28.4	1811.72 28.60 1811.62 28.75									
COAL: Black (N1) dull, microcrystalline, fracture @ 28.5	1811.47 29.00									
SANDSTONE: Med. gray (N6) fine grained, horiz. fracture w/coal @ 28.75	1811.22 29.25									
COAL: Black (N1) dull, microcrystalline	1810.97 29.45									
INTERBEDDED SANDSTONE: Med. gray (N6), fine grained, many small (<1mm) coal seams, horiz. fractures along seams @ 29, 29.03, 29.1, 29.13, 29.15, 29.2, 29.25	1810.77 29.55									
SANDSTONE: Med. gray (N6) fine grained	1810.67									
SANDSTONE: Gray (N5) med. fine grained, bounded by a pair of stylolites	30.00 1810.22	35								
SANDSTONE: Med. gray (N6) fine grained, fractures w/coal @ 29.55, 29.65, 29.9, 29.65 also has coarse pitting	30.75 1809.47 32.00									
TTU LAB	1808.22									
SANDSTONE: Med. gray (N6) fine grained, angular fracture w/moderate coarse pitting @ 31.5	35.00 1805.22									
Missing										
SANDSTONE: Med. gray (N6), fine grained, angular fractures w/coal @35.25, 35.9, 36.3, 36.6, 36.65, 36.67, 36.7, 38.9, angular fractures w/pitting @ 35.55, 37.07, 37.9, 38.1	38.75 1801.47			RC03	RC		REC 100% RQD 57%			
SANDSTONE: Med. gray (N6) fine grained, angular fractures w/coal @ 39.13, 39.5, 39.6, 39.75, 40.75, large inclusions of 5YR4/1 @ 39	41.00	40								
FRACTURED SANDSTONE: Gray (N5.5), fine grained, many small (<1mm) coal seams, horiz. fractures along seams @ 41.05, 41.1, 41.2, 41.3, 41.35, 41.37, 41.4, 41.45, 41.6, 41.65, 41.7, 41.8	1799.22 41.80 1798.42									
SANDSTONE: Med gray (N6) fine grained, angular fractures w/coal @ 41.9, 42.7, angular fracture w/ slickenlines @ 42.1	42.75 1797.47 43.30									
INTERBEDDED SANDSTONE: Med. gray (N6) fine grained, interbeds of 5YR 4/4 along criss crossing fracture traces, vert. fracture from 42.8-43.1, angular	1796.92 43.75 1796.47									

SAMPLER TYPE

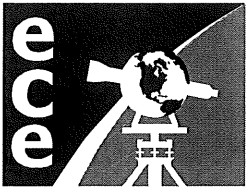
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GROUND WATER DEPTH

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

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.22										
fracture @ 43.3										
SANDSTONE: Med. gray (N6) fine grained, pair of stylolites @ 43.35 angular fracture w/coal @ 43.65 coarse pitting obvious grains	46.00	1794.22								
TTU LAB Missing										
		50		RC04	RC		REC 100% RQD 70.8%			
	51.00									
SANDSTONE: Med. gray (N6) fine grained, angular fracture w/coarse pitting @ 51, stylolites @ 51.16, 51.3, 51.45, 51.5, angular fracture w/ bituminous coal @ 51.6	1789.22	51.75								
	1788.47									
SANDSTONE: Med. gray (N6) fine grained, angular fracture w/coal @ 51.75, 51.95, 52.77, 53.77, 53.8, 55, stylolites @ 53.68, 53.73, 55.3, horiz. fracture w/ coal @ 55.3, clean horiz. fracture @ 55.9		55								
	55.90			RC05	RC		REC 100% RQD 77%			
SANDSTONE: Med. gray (N6) med. fine grained, vert. fracture trace from 56-56.1, entire length has discreet >1/4" milky white quartz inclusions	1784.32	56.20								
	1784.02									
SANDSTONE: Med. gray (N6), fine grained, horiz. fracture w/mud @ 56.3	56.50	1783.72								
SANDSTONE: Med. gray (N6) med. fine grained, entire length has discreet >1/4" milky white quartz inclusions	56.75	1783.47								
FRACTURED SANDSTONE: Med. gray (N6), fine grained, angular fracture w/ coal, @ 56.8, clean angular fracture @ 57.1, horiz. fracture w/coal @ 57.2	57.25	1782.97								
	58.50	1781.72								
		60								

SAMPLER TYPE

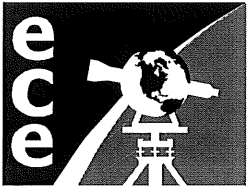
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GROUND WATER DEPTH

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

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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.22										
TTU LAB	59.60									
SANDSTONE: Med gray (N6) fine grained, clean angular fracture @ 58.6	1780.62 59.80									
SANDSTONE: Brown gray (5YR 5/2) fine grained, clean angular fracture w/mica @ 59.7, angular fracture w. bituminous coal @ 59.78, angular fracture w/ "sparry" coal @ 59.8	1780.42 60.50 1779.72 60.60									
SANDSTONE: Med. gray (N6) fine grained, angular blocky fracture @ 59.9 >50% coal, angular fracture from 60.35-60.5	1779.62 61.50 1778.72									
SANDSTONE: Brown gray (5YR 5/2) fine grained	62.00									
SANDSTONE: Med. gray (N6) fine grained, sub horiz. fractures w/coal @ 60.7, 61.57, angular fracture w/coal @ 61.1	1778.22 63.50 1776.72	65		RC06	RC		REC 100% RQD 70%			
SANDSTONE: Med. gray (N6) fine grained, horiz. fracture in an area of concentrated stylolites @ 61.86, entire length has discreet >1/4" milky white quartz inclusions	65.50 1774.72 65.80									
SANDSTONE: Med. gray (N6) fine grained, between 62.1-62.16 there are discreet >1/4" milky white quartz inclusions, angular fracture w/coal @62.29, angular fracture w/pitting and coal @ 63.5	1774.42 67.25 1772.97									
SANDSTONE medgray(N6.5), fine grain, many fract traces, vert fract trace f/m 63.6-63.9, conc stylolites b/w 63.5-64.15, sub horiz fract pitted w/sand @64.15,65.65,65.7, vert fract trace f/m 64.25-64.7, stylolites@64.85,64.9, ang fract pitted w/sand&mica @65.65.5	67.35 1772.87									
COAL: Black (N1) dull, microcrystalline, fractures @ 65.75, 65.78, 65.8	1770.47 70.00	70								
SANDSTONE: Med. gray (N6.5) , fine grained, clean horiz. fracture @ 66.2, horiz. fracture w/ <25% coal & mica @ 66.4	1770.22									
COAL: Black (N1) dull, microcrystalline										
SANDSTONE: Med. gray (N6.5) fine grained, angular fracture pitted w/sand @67.85, horiz. fracture w/coal @68.05, horiz. fracture coarse pitting w/mud @68.15, 69.67, angular fracture w/<25 % coal @ 68.7										
SANDSTONE: Med. gray (N6) , fine grained, angular fracture w/bituminous coal @ 70										
Terminated Rockcore at 70'										

SAMPLER TYPE

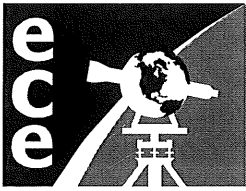
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GROUND WATER DEPTH

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 ▽ AFTER _____ FT.
 WATER ON RODS _____ FT.

BORING METHOD

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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 572438.578 Easting 2236068.104
 Date Started 10/6/04 Hammer Wt. 140
 Date Completed 10/6/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

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SURFACE ELEVATION - 1840.11										
TOPSOIL: Auger refusal @ 0.5 feet	0.50									
FRACTURED SANDSTONE: Very pale orange (10YR 8/4), lower angular and vertical fractures, iron stain visible	1839.61									
	2.50									
FRACTURED SANDSTONE: Very pale orange, (10YR 8/4), lower angular and vertical fractures, iron stain fragment inclusion, weathered angular fractures with mud in lower part, iron stain visible	1837.61									
	5.00	5								
FRACTURED SANDSTONE: Very pale orange (10YR 8/4) lower angular fractures, weathered with mud, pitting and iron staining	1835.11			RC01	RC		REC 44% RQD 24.5%			
	7.50									
SANDSTONE: Light grayish orange pink (5YR 7/2) angular and vertical fractures with iron staining	1832.61									
	10.00	10								
FRACTURED SANDSTONE: Light grayish orange pink (5YR 7/2) angular and few vertical fractures with shale and iron staining, few small pitting	1830.11									
	12.50									
FRACTURED SANDSTONE: Very light gray (N8), lower angular fractures with thin wavy coal or shale layers	1827.61									
	15.00	15					REC 80.9%			

SAMPLER TYPE

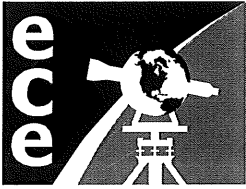
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SURFACE ELEVATION - 1840.11										
SANDSTONE: Very light gray (N8) lower angular and horizontal fractures with thin and wavy coal and shale layers	1825.11			RC02	RC		RQD 37.4%			
SANDSTONE: Very light gray (N8), a few angular fractures with shale and pitting	1822.61									
	20.00	20								
SANDSTONE: Yellowish gray (5Y 8/1), lower angular fractures with coal or shale	1820.11			RC03	RC		REC 203% RQD 149.6%			
	22.50									
INTERBEDDED SANDSTONE: Yellowish gray (5Y 8/1) lower angular fractures; Coal seams, brownish black (5YR 2/1), microcrystalline, bituminous, horizontal fractures; shale blurbs exist	1817.61									
	25.00	25								
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with thin coal layers	1815.11									
	27.50			RC04	RC		REC 74.9% RQD 44.9%			
SANDSTONE: Yellowish gray (5Y 8/1), few angular fractures with coal	1812.61									
	30.00	30								

SAMPLER TYPE

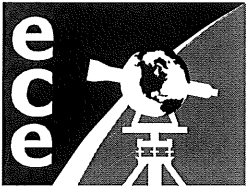
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 Date Completed 10/6/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.11										
SANDSTONE: Yellowish gray(5Y 8/1), few angular fractures with coal	1810.11									
	32.50									
INTERBEDDED SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with coal seams	1807.61									
	35.00	35								
SANDSTONE: Yellowish gray (5Y 8/1), few angular fractures	1805.11									
	36.00									
SANDSTONE: Very light gray (N8) few clean angular fractures	1804.11			RC05	RC		REC 91.8% RQD 65.1%			
	40.00	40								
SANDSTONE: Very light gray (N8), angular and horizontal fractures a part iron stain visible	1800.11									
	42.50									
SANDSTONE: Very light gray (N8), variety angular fractures with coal or shale	1797.61									
	45.00	45								

SAMPLER TYPE

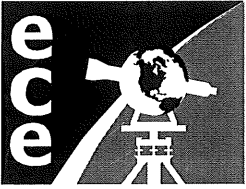
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 1C
 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 572438.578 Easting 2236068.104
 Date Started 10/6/04 Hammer Wt. 140
 Date Completed 10/6/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.11										
SANDSTONE: Very light gray (N8) angular fractures with coal or shale, higher angular ones with iron staining in lower part	1795.11			RC06	RC		REC 90.1% RQD 69%			
FRACTURED SANDSTONE: Yellowish gray (5Y 8/1) angular and vertical fractures with iron staining and coal layer, few feldspars exist in coal layer	47.50 1792.61									
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with shale or thin coal layers, shale pebbles or blurb visible	50.00 1790.11	50								
SANDSTONE: Yellowish gray (5Y 8/1) few angular fractures with thin shale and coal, fine quartz visible	52.50 1787.61									
SANDSTONE: Yellowish gray (5Y 8/1) few angular and horizontal fractures with shale	55.00 1785.11	55								
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with shale and coal layers	57.50 1782.61			RC07	RC		REC 82.3% RQD 75.9%			
	60.00	60								

SAMPLER TYPE

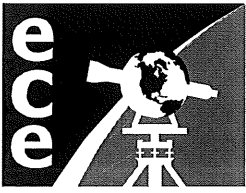
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GROUND WATER DEPTH

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

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SURFACE ELEVATION - 1840.11										
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with shale and little coal	1780.11									
	62.50									
SANDSTONE: Yellowish gray (5Y 8/1) a few angular fractures with shale	1777.61									
	65.00	65								
SANDSTONE: Yellowish gray (5Y 8/1) angular and vertical fractures with coal or shale layers	1775.11									
	67.50									
SANDSTONE: Yellowish gray (5Y 8/1) horizontal and lower angular fractures with thin coal layers	1772.61									
	70.00	70								
FRACTURED SANDSTONE: Yellowish gray (5Y 8/1) angular and horizontal fractures with shale and coal layers	1770.11			RC08	RC		REC 87.5% RQD 80.4%			
	72.50									
SANDSTONE: Yellowish gray (5Y 8/1) a few lower angular fractures with shale or coal, and fine quartz visible	1767.61									
	75.00	75								

SAMPLER TYPE

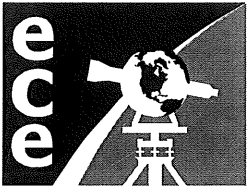
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 ST - PRESSED SHELBY TUBE
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GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

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SURFACE ELEVATION - 1840.11										
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with thin coal layers, shale pebbles and quartz exist	1765.11			RC09	RC		REC 117.8% RQD 93.6%			
	77.50									
SANDSTONE: Yellowish gray (5Y 8/1) angular and horizontal fractures with shale and thin bituminous coal layers	1762.61									
	80.00	80								
SANDSTONE: Yellowish gray (5Y 8/1) lower angular fractures with shale and coal	1760.11									
	82.50									
FRACTURED SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with shale and thin coal layers	1757.61									
	85.00	85								
SANDSTONE: Yellowish gray (5Y 8/1) few horizontal and angular fractures with shale or coal	1755.11			RC10	RC		REC 67.3% RQD 58.2%			
	87.50									
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with shale and bituminous coal	1752.61									
	90.00	90								

SAMPLER TYPE

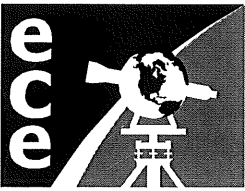
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GROUND WATER DEPTH

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- ▽ AFTER _____ FT.
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SURFACE ELEVATION - 1840.11										
SANDSTONE: Yellowish gray (5Y 8/1) conglomerate, an angular fracture with coal	1750.11									
	92.50									
FRACTURED SANDSTONE: Yellowish gray (5Y 8/1) various angular fractures with coal and shale layers	1747.61									
	95.00	95								
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with coal or shale layers, thin coal seam in lower part	1745.11									
	97.50									
SANDSTONE: Yellowish gray (5Y 8/1) conglomerate, angular fracture in higher part	1742.61									
	100.00	100		RC11	RC		REC 81.5% RQD 70.7%			
SANDSTONE: Light greenish gray (5GY 8/1) clean angular fractures	1740.11									
	102.50									
SANDSTONE: Light greenish gray (5GY 8/1) clean angular and a few horizontal fractures	1737.61									
	105.00	105								

SAMPLER TYPE

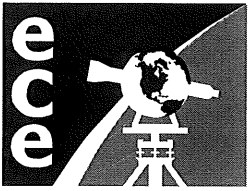
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GROUND WATER DEPTH

∇ AT COMPLETION N/A FT.
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 WATER ON RODS _____ FT.

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ece SERVICES

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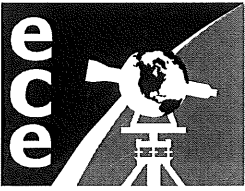
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/FL.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1840.11										
INTERBEDDED SANDSTONE: Light greenish gray (5GY 8/1) angular and vertical fractures with coal, about 1 feet thick coal or shale seam with angular fractures in lower part	1735.11		[Lithology: Sandstone with coal/shale]	RC12	RC		REC 117.5% RQD 89.5%			
SANDSTONE: Very light gray (N8) conglomerate and medium crystalline sandstone	1732.61		[Lithology: Sandstone]							
SANDSTONE: Very light gray (N8) angular fractures with shale or coal layers, pitting or blurbs visible	1730.11	110	[Lithology: Sandstone]							
SANDSTONE: Yellowish gray (5Y 8/1) angular fractures with shale and coal layers and pebbles packaged	1727.61		[Lithology: Sandstone]	RC13	RC		REC 52.6% RQD 40%			
SANDSTONE: Yellowish gray (5Y 8/1) few angular fractures with shale and coal, shale pebbles visible	1725.11	115	[Lithology: Sandstone]							
SANDSTONE: Yellowish gray (5Y 8/1) conglomerate and medium crystalline sandstone with some small shale blurbs	1722.61		[Lithology: Sandstone]							
	120.00	120								

SAMPLER TYPE
 SS - DRIVEN SPLIT SPOON
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GROUND WATER DEPTH
 ∇ AT COMPLETION N/A FT.
 ∇ AFTER _____ FT.
 WATER ON RODS _____ FT.

BORING METHOD
 HSA - HOLLOW STEM AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 2
 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 572411.4405 Easting 2235845.9555
 Date Started 4/6/04 Hammer Wt. 140
 Date Completed 4/6/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/FT.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1792.73										
Auger Refusal @ 8 feet										
		5								
	8.00									
SANDSTONE: Med. gray (N6.5) fine grained, generally free from coal seams, clean horiz. fractures @ 8.2, 8.3, 8.65	1784.73 8.65 1784.08									
FRACTURED SANDSTONE: Med. gray (N6.5) vert. fracture 8.65-9, clean horiz fractures @ 9, 9.2, 9.3, horiz. fracture w/ FeO2 staining at 9.15	9.75 1782.98	10								
SANDSTONE: Med. gray (N6.5) clean angular fracture @9.75, angular fractures w/moderate pitting and coal @ 10.25, 10.8, 10.9, 11.55, horiz. fracture w/ a. " qtz pbl @ 10.35, horiz. fracture w/ mud @ 11.3	11.55									
SANDSTONE: Med. gray (N6.5) clean angular fracture @ 11.9 sub-horiz. fractures w/ moderate pitting & coal @ 14.05, 15.29 horiz. fractures w/ mud @ 13.1, 13.53, clean horiz. fracture @ 15	1781.18									
		15								

SAMPLER TYPE

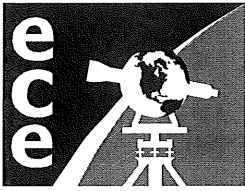
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GROUND WATER DEPTH

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 ▽ AFTER _____ FT.
 WATER ON RODS _____ FT.

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SURFACE ELEVATION - 1792.73										
	30.75									
SANDSTONE: Med. gray (N6) fine grained, sub-horiz. fracture w/moderate pitting @31.2, horiz fracture @ 31.61	1761.98									
	31.61									
SANDSTONE: Med. gray (N6.5) angular fracture w/pitting and coal @ 31.68, 33.4, 33.71, clean angular fracture @ 32.56, horiz. fracture w/ <25% coal @ 33.1	1761.12									
	33.75									
SANDSTONE: Med. gray (N6.5) angular fracture w/rounded pieces of coal @ 35, 35.33, 35.9, horiz. fracture w/minor pitting and mica @ 36.1, horiz. fracture w/minor pitting, mica and mud @ 36.35, 36.45, 37.13	1758.98									
	37.13	35								
INTERBEDDED SANDSTONE: Gray (N5.5) many small (<1mm) coal interbeds, sub-horiz. fracture with sandy mud @ 38.46, sub-horiz. fractures w/ <25% coal @ 38.64, 38.8, 39.03, 39.1	1755.60									
	39.10									
SANDSTONE: Med. gray (N6.5) fine grained, large (>.5") coal inclusions @ 39.15, 39.3, clean horiz. fracture @ 40.2, 40.5, 40.87	1753.63			RC03	RC		REC 96.6% RQD 85.8%			
	40									
	45.00	45								

SAMPLER TYPE

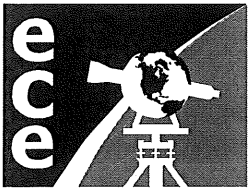
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GROUND WATER DEPTH

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 WATER ON RODS _____ FT.

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ece SERVICES

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SURFACE ELEVATION - 1792.73										
SANDSTONE: Med. gray (N6) fine grained, angular fracture w/pitting and coal @ 45.25, sub-horiz. fracture w/coal @ 45.85	1747.73 45.85									
SANDSTONE: Med. gray (N6.5) fine grained	1746.88									
SANDSTONE: Med. gray (N6) fine grained, sub-horiz. fracture w/coal @ 47.1, horiz fractures w/ coal @ 47.34, 47.4, 47.5	1746.63 47.50									
INTERBEDDED SANDSTONE: Med. gray (N6) fine grained, sub-horiz. fractures @ 47.88, 47.96, 48.07	1745.23 48.10									
TTU LAB	1744.63									
		50		RC04	RC		REC 100% RQD 88.8%			
SANDSTONE: Med. gray (N6) fine grained, sub-horiz. fractures w/ minor pitting and mica @ 51.16, 51.34, sub-horiz. fractures w/ coal @ 51.88, 51.97, 52.23, 52.62, horiz. fractures w/ coal @ 53.2, 53.4, angular fracture w/coal @ 53.1	1741.57 53.50									
INTERBEDDED SANDSTONE: Med. gray (N6) fine grained, sub-horiz. fractures w/bituminous coal @ 53.85, 54.3, 54.4, 54.5, 54.7, 54.9, 55, 55.25, 55.5	1739.23 55.50	55								
SANDSTONE: Med. gray (N6.5) fine grained, sub-horiz. fracture w/pitting @ 55.55, clean sub-horiz. fracture @ 55.65	1737.23 56.25 1736.48									
TTU LAB	57.20									
SANDSTONE: Med. gray (N6) fine grained, vert. fracture from 57.2-57.5, clean horiz. fractures @ 57.5, 58, 58.6	1735.53 58.60									
SANDSTONE: Med. gray (N6.5) fine grained, angular fractures @ 58.85, 59.05	1734.13 59.05									
SANDSTONE: Med. gray (N6) fine grained, horiz.	1733.68 59.60	60								

SAMPLER TYPE

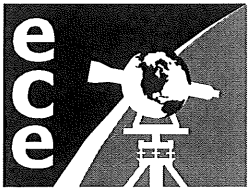
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GROUND WATER DEPTH

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 ▽ AFTER _____ FT.
 WATER ON RODS _____ FT.

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SURFACE ELEVATION - 1792.73										
fractures w/ coal @ 59.2, 59.25, 59.6 (bituminous)	1733.13									
	61.25 1731.48									
	62.25 1730.48			RC05	RC		REC 100% RQD 85.4%			
SANDSTONE: Med gray (N6) fine grained, angular fracture w/ coal @ 60.7										
FRACTURED SANDSTONE: Gray (N5.5) fine grained, fracture zone w/coal										
SANDSTONE: Grayish red (5R 4/2) fine grained light and spotty FeO2 stain throughout, horiz. fracture @ 62.67, horiz. fracture w/pitting @ 63.57, 64.8, 64.9, 65, angular fractures w/ pitting @ 65.78, 65.95, 66.28		65								
TTU LAB	1726.45 67.00									
FRACTURED SANDSTONE: Med. gray (N6) fine grained, cert. fracture from 67.15-66.58 w/ many cross cutting horiz. fractures	1725.73									
	68.58									
SANDSTONE: Med. gray (N6) fine grained, horiz. fractures w/pitting @ 68.8, 69, angular fracture w/pitting @ 69.43	1724.15									
	69.50									
FRACTURED SANDSTONE: Med. gray (N6) fine grained, angular fractures @ 69.6, 70, 70.2	1723.23 70.20	70								
FRACTURED SANDSTONE: Med. gray (N6) fine grained, angular fractures @ 70.75, 72.65, 73.04	1722.53									
	74.75									
							REC 98.8%			

SAMPLER TYPE

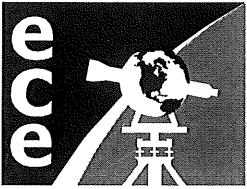
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 2
 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

Northing 572411.4405 Easting 2235845.9555
 Date Started 4/6/04 Hammer Wt. 140
 Date Completed 4/6/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

TEST DATA

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1792.73										
COAL: Glossy, vitreous, black bituminous coal	1717.98			RC06	RC		RQD 69.6%			
SANDSTONE: Med. gray (N6) fine grained, angular fractures w/coal @ 75	74.90 1717.83									
FRACTURED SANDSTONE: Med. fray (N6) fine grained with much interbedded coal, sub-horiz. fractures w/ coal @ 75.45, 75.55, angular fractures w/ coal @ 75.8, 76.2, horiz. fractures @ 76.45	75.00 1717.73 76.50 1716.23									
SANDSTONE: Grayish red (5R 4/2) fine grained, light and spotty FeO2 stain throughout, angular fractures w/ coal @ 77.5, 77.87, 78	78.00 1714.73									
SANDSTONE: Gray (N5.5) fine grained, sub-horiz. fracture @ 78.3	79.00 1713.73									
INTERBEDDED SANDSTONE: Gray (N5) fine grained, intense area of interbedded matte coal, angular fractures w/coal @ 79.18, 79.37, 79.65, interbedded matte coal, angular fractures w/ coal @ 79.18, 79.37, 79.65	80.00 1712.73	80								
SANDSTONE: Med. gray (N6) fine grained, angular fractures w/ coal @ 80.45, 80.68, 81.15, 81.95	82.00									
INTERBEDDED SANDSTONE: Med. gray (N6) fine grained, horiz. fractures w/coal @ 82, 82.05, 82.35, 82.5, vert. fracture from 82.1-82.35	1710.73 82.50 1710.23									
SANDSTONE: Med. gray (N6) fine grained, angular, fractures w/coal @ 83.2, 83.5, 83.9										
	85.00	85								
SANDSTONE: Brownish gray (5YR 5/1) fine grained, microlaminations throughout, pitted sub horiz. fracture w/mica @ 85.62, clean horiz. fracture @ 86.4	1707.73 86.50									
SANDSTONE: Light bluish gray (5B 7/1) fine grained, sub horiz. fracture @ 87.48, sub horiz. fracture w/coal @ 88.4	1706.23 88.40									
SANDSTONE: Brwnish gray (5YR 5/1) fine grained, microlaminations throughout, pitted sub-horiz. fractures w/mica @ 90.1, 90.38	1704.33									
		90					REC 98.8%			

SAMPLER TYPE

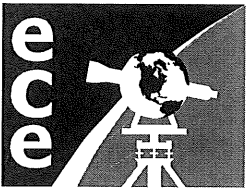
SS - DRIVEN SPLIT SPOON
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 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 2
 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

Northing 572411.4405 Easting 2235845.9555
 Date Started 4/6/04 Hammer Wt. 140
 Date Completed 4/6/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

TEST DATA

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1792.73	90.40			RC07	RC		RQD 59.6%			
SANDSTONE: Light bluish gray (5B 7/1) fine grained, sub horiz. fracture w/ coal @ 91.25, angular fracture w/slickenlines @ 91.55, angular fracture along stylolites w/coal @ 92.03	1702.33									
INTERBEDDED SANDSTONE: Brownish gray (5YR 5/1) fine grained, heavy interbedded wavy sub parallel coal seams, sub horiz. fractures w/coal @ 92.36, 92.81, 93.2, fracture @ 92.81 had brown fine sand on the face (void?)	92.03 1700.70 93.20 1699.53									
SANDSTONE: Light bluish gray (5B 7/1) fine grained, angular fracture w/ FeO2 stains, @ 94.05, horiz. fractures @ 94.78, 94.88, 95.07		95								
Air Rotary	96.00 1696.73									
Terminated Rockcore at 100'	100.00 1692.73	100								

SAMPLER TYPE

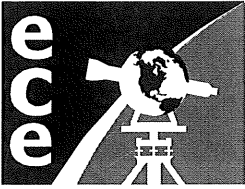
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 3
 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 572592.8712 Easting 2235685.4298
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1841.04										
Auger Refusal @ 2 feet										
	2.00									
SANDSTONE: Med. gray (N6) fine grained generally free from coal seams, horiz. fracture that is weakly cemented @ 2.5	1839.04	2.75								
FRACTURED SANDSTONE: Med. gray (N6) horiz. fracture w/ FeO2 staining @ 2.85, 2.9, 2.95, 3	1838.29	3.00								
SANDSTONE: Reddish gray (10R 5/6) fine grained, heavy FeO2 staining, horiz. fracture w/ FeO2 @ 3.4	1837.54	3.50								
SANDSTONE: Med. gray (N6) horiz. fracture w/ FeO2 staining @ 3.85, 4	1837.04	4.00								
FRACTURED SANDSTONE: Heavy fracturing low recovery, estimated length based on pieces (10R 5/6) weakly cemented	1837.04	5.00								
SANDSTONE: Med. gray (N6) horiz. fracture w/FeO2 staining (limonite) @ 5.3, sub-horiz. fracture w/ Limonite @ 6	1835.04	6.00								
FRACTURED SANDSTONE: Heavy fracturing low recovery, estimated length based on pieces (10R 5/6), weakly cemented, FeO2 staining	1833.04	8.00								
SANDSTONE: Med. gray (N6) horiz. fracture, clean @ 8.17	1832.79	8.25		RC01	RC		REC 61.6% RQD 19%			
SANDSTONE: Estimated reddish gray (10R 5/6) fine grained, heavy FeO2 staining, angular fracture w/ FeO2 stains	1832.79	10.00								
INTERBEDDED SANDSTONE: Med. gray (N6) fine grained, w/ interbedded coal seams fractures @ 10.7, 10.9	1830.54	10.90								
SANDSTONE: Med. gray (N6) horiz. fracture w/ coal <25% @ 11.15, 11.24	1829.79	11.25								
SANDSTONE: Reddish gray (10R 5/6) fine grained, horiz. fracture w/ FeO2 @ 11.33	1829.54	11.50								
SANDSTONE: Med. gray (N6) fine grained, between 11.74 to 11.8 a weaker cement, sub-horiz. fracture w/FeO2 stain @ 12	1829.04	12.00								
SANDSTONE: Reddish gray (10R 5/6) fine grained, horiz. fracture w/FeO2 and coal @ 12.5, stylolite @ 13.06 w/	1827.79	13.25								
	14.00									

SAMPLER TYPE

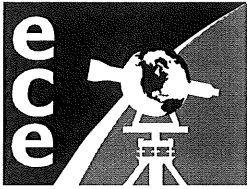
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 3
 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

Northing 572592.8712 Easting 2235685.4298
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

TEST DATA

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/FT.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1841.04										
recrystallization along plane, matrix less cemented	1827.04									
FRACTURED SANDSTONE: Heavy fracturing, estimated length based on pieces (10R 5/6) all fractures have hematite mud on them. Vert. fracture from 13.35-13.6	14.20 1826.84									
SANDSTONE: Med. gray (N6) sub-horiz. fracture w/FeO2 stain @ 14.2	1826.64 15.20									
SANDSTONE: Reddish gray (10R 5/6) fine grained, horiz. fracture w/ FeO2 @ 14.35	1825.84 15.50			RC02	RC		REC 80.8% RQD 32.5%			
FRACTURED SANDSTONE: Med. gray (N6) horiz. fractures @ 14.58, 14.64, 14.65, 14.75, 15 all clean	1825.54 16.10									
SANDSTONE: Reddish gray (10R 5/6) fine grained, weakly cemented FeO2 stained, horiz. fracture w/ FeO2 @ 15.23, 15.4	1824.94 16.50 1824.54									
SANDSTONE: Med. gray (N6) fine grained horiz. fracture w/ FeO2 stain @ 15.73, angular fracture w/ FeO2 stain @ 16.05, horiz. fracture @ 16.1 clean	16.65 1824.39 16.80	20								
SANDSTONE: Reddish gray (10R 5/6) fine grained vert. fracture w/ FeO2 from 16.1-16.4	1824.24 17.75									
SANDSTONE: Med. gray (N6) horiz. fracture w/ FeO2 stain @ 16.55	1823.29 18.00									
SANDSTONE: Reddish gray (10R 5/6) fine grained horiz. fracture w/ FeO2 @ 16.8	1823.04 19.25									
FRACTURED SANDSTONE: Med. gray (N6) horiz. fractures w/ FeO2 and mud @ 16.9, 17, 17.23, 17.55, 17.7	1821.79 19.65 1821.39									
FRACTURED SANDSTONE: Gray (N5) fractured piece w/ stylolites amd gray mud	20.00 1821.04									
SANDSTONE: Reddish gray (10R 5/6) fine grained heavily FeO2 stained, 0.5 inch vugs @ 18.35, ang. fractures w/ FeO2 @ 18.55, 18.7, 18.85	20.50 1820.54 22.50	25		RC03	RC		REC 90% RQD 35.8%			
SANDSTONE: Gray (N5.5) stylolites from 19.55-19.65	1818.54									
SANDSTONE: Reddish gray (10R 5/6) fine grained tightly cemented	23.25 1817.79									
SANDSTONE: Med. gray (N6) fine grained	23.90									
SANDSTONE: Reddish gray (10R 5/6), fine grain weathered zone sub hor. fract. w/ FeO2 @ 20.9, 20.95, stylolite zone f/m 20.5-20.9, hor. fract. w/FeO2 stains & lrg. coarse grain qtz crystals on face @ 21.2, 21.6, 22.1, hor. fract. w/FeO2 @ 22.4	1817.14 24.00 1817.04 24.50									
vert. fract. f/m 22.15-22.37	1816.54 25.60 1815.44									

SAMPLER TYPE

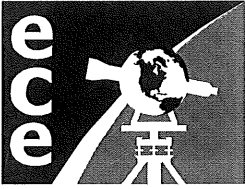
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 3
 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 572592.8712 Easting 2235685.4298
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/FT.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1841.04										
SANDSTONE: Med. gray (N6) fine grained clean horiz fracture 22.85, horiz fracture w/coal @ 23. Coal stylolites from 23-23.2	26.75 1814.29 30.10		[Diagonal Hatching]	RC04	RC		REC 92.5% RQD 62.5%			
FRACTURED SANDSTONE: Gray (N5.5) fractures along coal seams @ 23.3, 23.4, 23.45, 23.5, 23.6, 23.65, 23.7, 23.8, 23.9	1810.94 30.40 1810.64									
SANDSTONE: Gray (N5.5) fine grained	32.75									
SANDSTONE: Med. gray (N6) fine grained sub-horiz. fracture @ 24.45 minor coal <15%	1808.29									
FRACTURED SANDSTONE: Med. gray (N6) fine grained angular fracture w/slickenlines @ 24.55, sub-horiz. fracture @ 24.75 w/mud, sub-horiz. fractures @ 24.9, 25, 25.13, 25.25, 25.45, 25.5, 25.6 w/coal	33.50 1807.54									
SANDSTONE: Reddish gray (10R 5/6) fine grained, vugs @ 26.05, horiz. fractures w/ FeO2 @ 26.15, 26.32 (Limonite) horiz. fracture @ 26.7 clean	35 35.75	35								
FRACTURED SANDSTONE: Med. gray (N6) fine grained, angular fractures w/FeO2 @ 27.1, 27.5 angular fracture @ 27.6 clean, angular fractures w/coal @ 28.85 (pitted) 29.15, 29.25, 29. 29.7 (pitted) 30.1, clean angular fracture @ 29.9	1805.29 36.40 1804.64 37.40 1803.64									
SANDSTONE: Reddish gray (10R 5/6) fine grained horiz. fracture w/ FeO2 @ 30.2 horiz. fracture w/ FeO2 and mud @ 30.35										
FRACTURED SANDSTONE: Heavy fracturing, estimated length based on pieces (N6) angular fractures w/ bituminous coal@30.5, 31. Below 31 only pieces.	39.80									
SANDSTONE: Reddish gray (10R 5/6) fine grained, angular fracture w/FeO2 @ 32.9 vert. fracture w/ FeO2 from 32.7-33, angular fracture w/coal @ 33.5	1801.24 40 40.75 1800.29	40								
SANDSTONE: Med. gray (N6) fine grained, angular fractures w/ coal (<30%) @ 33.7, 34.1, 34.2, 34.95, vugs @ 35.4	42.00									
SANDSTONE: Reddish gray (10R 5/6) med. fine grained angular fracture w/ FeO2 @ 39.35 weathering zone	1799.04									
SANDSTONE: Med. gray (N6) fine grained, sub-horiz. irregular fracture w/coal @ 37.3										
SANDSTONE: Gray (N5.5) fine grained sub-horiz. irregular fracture w/coal @ 37.8 stylolites @ 38.06, clean horiz. fracture @ 39.05 horiz fracture w/ coal										

SAMPLER TYPE

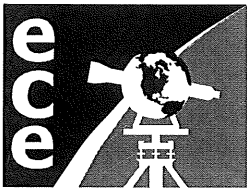
SS - DRIVEN SPLIT SPOON
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 RC - ROCK CORE

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 # 3
 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 572592.8712 Easting 2235685.4298
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1841.04										
(<10%) @ 39.8										
FRACTURED SANDSTONE: Gray (N5.5) fine grained horiz. fractures w/coal (<10%) @ 39.87, 39.91, 40.2, 40.25, 40.4, 40.45, 40.55, 40.7										
SANDSTONE: Med. gray (N6) fine grained FeO2 staining from 41-41.2, clean horiz. fractures @ 41.2, 42										
Terminated Rockcore at 42'										
		50								
		55								
		60								

SAMPLER TYPE

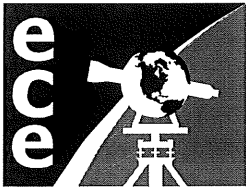
GROUND WATER DEPTH

BORING METHOD

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

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

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



ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 3C
 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 572528.712 Easting 2235587.545
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N: Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85										
TOPSOIL: Auger refusal @ 2 feet										
	2.00									
SANDSTONE: Light grayish orange (5YR 7/2), fine grain, clean qtz sandstone, hor. frac. @ 2.2, 2.3, 4.1, 4.2, 5.5, 6.67, 6.75, 7.84, 7.95, 8 all of these hor. fract on the fract plane weather to fines & ang fract @ 2.78, 3.1, 3.7 FeO2 zones @ 4.95 b/w 6.87-7.08, 7.95-8.0, vug @ 6.8	1816.85	5								
	8.00									
FRACTURED SANDSTONE : Light grayish orange (5YR7/2), fine grain, numerous hor. frags. w/ hematite mud @ 8.1, 8.15, 8.27, 8.49, 8.72, 8.86, 9.21, 9.3, 9.57, 10.13, 10.25, 10.36, 10.6, 10.75, 10.98, 11.05, b/w 11.27-11.8, 12, 12.05, 12.15, 12.2, 12.3, 12.4	1810.85	10		RC01	RC		REC 61.6% RQD 19%			
	12.40									
FRACTURED SANDSTONE: Light bluish gray (5B7/1) fine grained, hor. fractures w/ coal @ 12.49, 12.57, 12.75, 13, 14.3, 14.8, 15.02, 15.3, 15.8, 15.95, 16.15	1806.45									
	15									

SAMPLER TYPE

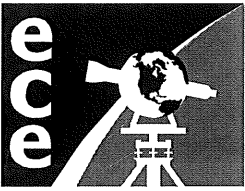
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 3C
 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 572528.712 Easting 2235587.545
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85										
FRACTURED SANDSTONE: Light bluish gray (5B 7/1) med fine grained (weathered) indiv grains visible, weathering into sand not well cemented limonite staining on core in amorphous patterns, angular fractw/FeO2 stained sand @ 16.6, 16.65, 17.04 most of this sect is missing	16.50		[Hatched Pattern]	RC02	RC		REC 80.8% RQD 32.5%			
	1802.35	20		RC03	RC		REC 90% RQD 35.8%			
FRACTURED SANDSTONE: Light gray (N6.5), fine grained, horiz. fractures @ 27.1, 27.32, 27.39, 27.46, 27.65	1791.85 27.75 1791.10		[Dotted Pattern]							
SANDSTONE: Light gray (N6.5) fine grained, angular fracture @ 28.07, coal stylolites between 28.25-28.4, vug w/very soft coal @ 28.53	28.55 1790.30									
FRACTURED SANDSTONE: Light gray (N6.5) fine grain, hor. fract. w/bituminous coal @ 28.75, 28.87,		30	[Hatched Pattern]							

SAMPLER TYPE

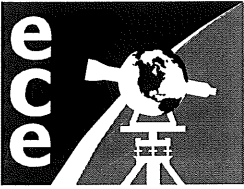
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GROUND WATER DEPTH

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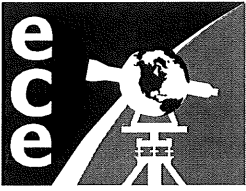
Northing 572528.712 Easting 2235587.545
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85										
28.9,29.2,29.25, 29.4,29.6,29.7, 29.85,30.06,30.15,30.25, 30.25,30.3,30.37,30.55, some wavy parallel interbeds of coal, vugs w/very soft coal@29	34.00									
SANDSTONE: Light gray (N6.5) fine grained horiz. fractures w/bituminous coal@ 34.62,34.73,34.75,34.9, some wavy parallel interbeds of coal	1784.85	35		RC04	RC		REC 92.5% RQD 62.5%			
INTERBEDDED SANDSTONE: Light gray (N6) fine grained, horiz. fractures along numerous continuous wavy parallel interbeds of coal @ 36.86,36.94, 37.1, 37.2, 37.3	1782.35 37.30 1781.55									
SANDSTONE: Lightgray(N7) finegrain, subhor. fract w/bituminous coal@37.6 hor. fract w/ mod pits & coal@38.47,38.61,39.62,39.65,39.84, 39.9,41.28,41.5,41.67,42.05, 42.2,42.48,42.75,46.2,46.3,46.45,47.35 ang frac@39,39.45,40.2,40.6,47.55 vert fract f/m40.74-41	44.00	40								
SANDSTONE: Light bluish gray(5B7/1) med fine grained (weathered) indiv grains visible, weathering into sand	1774.85									

SAMPLER TYPE
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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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 3C
 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

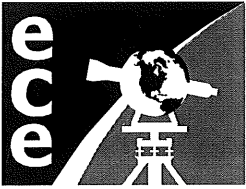
Northing 572528.712 Easting 2235587.545
 Date Started 7/13/04 Hammer Wt. 140
 Date Completed 7/13/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85										
limonite staining on core in amorphous patterns, angular fracture w/ FeO2 stained sand @45.2	45.75									
SANDSTONE: Light bluish gray(5B7/1) fine grained horiz. fractures w/coal@46, 46.6, 47.4,47.7, vert. fracture from 47.4-47.7	1773.10									
	47.75									
SANDSTONE: Light bluish gray (5B7/1) fine graiend horiz. fractures w/coal@47, 48.18,48.3, vert. fracture trace from 48.3-48.9, vug q/coal @48.85, clean horiz. fractures @49.32,49.37,49.95	1771.10									
	50.00	50								
SANDSTONE: Pale red (5R 5/2) fine grained horiz. fractures w/FeO2 stains & pitting@50.53,51.54,52.07,52.24,52.93,53.95,54.16, angular fracture w/FeO2 staining@52.65, vug@52.53	1768.85									
	54.20									
SANDSTONE: Light bluish gray (5B7/1) fine grained clean horiz. fractures 58,58.12,58.25,58.36,58.53,58.7,59.62,59.95,60.03,60.13	1764.65	55								

SAMPLER TYPE
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 ST - PRESSED SHELBY TUBE
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 RC - ROCK CORE

GROUND WATER DEPTH
 ∇ AT COMPLETION N/A FT.
 ∇ AFTER _____ FT.
 WATER ON RODS _____ FT.

BORING METHOD
 HSA - HOLLOW STEM AUGERS
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ece SERVICES

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85										
SANDSTONE: Light bluish gray (5B7/1), fine grain, horiz fracts w/coal @60.9, 61.11, 61.63, 62.33, 62.55, 62.7, 62.9, 63.1, 63.2, 63.25, 63.45, vug@63.5, moderate discontinuous wavy layers of coal throughout although conc. btw 61.6-62.14	60.20 1758.65									
SANDSTONE: Light gray (N7) fine grained, clean horiz. fractures @64.3, 65.15, 66, 67.2, 67.7, 68.3, 68.58, 70.35, 70.84, 71.58, angular fractures @64.4,65.25, vert fracture from 70.9-71.48	63.50 1755.35	65								
INTERBEDDED SANDSTONE: Light gray (N7) fine grained, many thin beds of coal visible, angular fracture @71.9	71.50 1747.35 72.00 1746.85									
SANDSTONE: Light gray (N7) fine grained	73.00									
INTERBEDDED SANDSTONE: Light gray (N7) fine grained, many thin beds of coal visible, clean horiz. fractures @73.08, 73.4, 73.52	1745.85 73.50 1745.35									
SANDSTONE: Light gray (N7) fine grained	74.50									
INTERBEDDED SANDSTONE: Light gray (N7) fine	1744.35									

SAMPLER TYPE

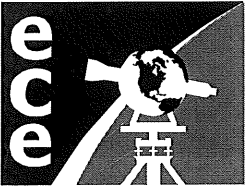
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GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

LOG OF TEST BORING

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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85	75.00									
grained, many thin beds of coal visible, clean horiz. fracture @74.9	1743.85									
	75.75									
	1743.10									
FRACTURED SANDSTONE: Light gray (N7) fine grained not much sample retained blocky fracture		80								
SANDSTONE: Light gray (N7) fine grained, clean sub horiz fractures @78.26,78.83,79.34,79.75,81.27,82.7, horiz fractures w/pitting@80.4,80.66,82.1 rounded to elongate inclusions of coal@76.85, 77.9, 78.59, 81.69, 82.4, stylolites@82.14, 82.58, 82.61		82.75								
SANDSTONE: Light brownish gray (5YR7/1) med fine grained not as compact as previous horz fract w/pits @coal @83.46, 84.93,85.85, 86.2,87.6,87.7,clean hor.fract@86.4 stylolites@82.78,82.82,83.83.1,83.6, 84.97,86.32,86.4, 87.47,87.7 vug w/missing coal@86.6		85								
	87.75									
SANDSTONE:Light brownish gray(5YR7/1) fine grain, hor frags w/pits @coal@88.69,88.85, 89.2,90.35,90.59,91.08,91.65, 92.05,hor fract w/bituminous coal@91.33, 92.12,92.4 stylolites@87.85, 88,88.7,88.77,90.3,90.6,90.7,90.72, 90.75,90.88,91,91.25,91.55,91.83		90								

SAMPLER TYPE

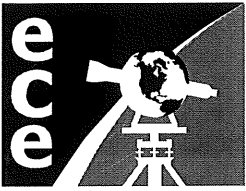
SS - DRIVEN SPLIT SPOON
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GROUND WATER DEPTH

▽ 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 # 3C
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
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 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

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TEST DATA

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 Date Started 7/13/04 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1818.85										
	92.50									
SANDSTONE: Light gray (N7) fine grained angular fracture @92.6 horiz fracture w/pitting & coal @93.85	1726.35									
	95.00	95								
SANDSTONE: Light brownish gray (5YR 7/1) fine grained horiz fractures w/pitting & coal @95.4, 97.16, 97.7, stylolites@95.2, 95.24, 96.03, 96.06, 96.35, 97.19, 97.45, 97.67	1723.85									
	97.70									
SANDSTONE: Light gray (N7) fine grained horiz fracture w/pitting & coal @ 98.2,100, 100.42, 100.52, angular fractures w/coal @99, 99.77, near vert fracture @101, stylolites@97.73, 97.8, 97.86 ,98.98, 99.7, 100.05, 100.1,100.45,101.6	1721.15									
	102.00	100								
SANDSTONE: Light gray (N7) fine grained horiz fracture w/pitting & coal @102.38, 103.2, stylolites @102.7	1716.85									
	103.20									
SANDSTONE: Light bluish gray (5B7/1) fine grained horiz fractures w/coal@103.52,104.45,107.33,108,108.34,109.2, angular fracture w/pitting & coal @105.25,109.86,	1715.65									
	105									

SAMPLER TYPE

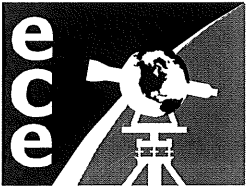
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GROUND WATER DEPTH

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 WATER ON RODS _____ FT.

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ece SERVICES

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SURFACE ELEVATION - 1818.85										
clean angular fracture @107.7										
	109.90									
SANDSTONE: Brownish gray (5YR4/1) med fine grained (weathered) ind frains visible, angular fracture @110	1708.95	110								
horiz fractures @110.32, 110.42	110.50									
	1708.35									
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained, numerous discontinuous wavy coal seams sub horiz fractures along coal seams@	111.55									
111.2, 111.25, 111.37, 111.54	1707.30									
	111.70									
COAL: Brownish black (5YR 2/1) microcrystalline, bituminous, horiz fracture @111.6	1707.15									
	112.50									
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained, numerous discontinuous wavy coal seams sub horiz fractures along coal seams@112.03	1706.35									
	113.50									
	1705.35									
	114.00									
	1704.85									
SANDSTONE: Light bluish gray (5B7/1) fine grained		115								
COAL: Brownish black (5YR2/1) microcrystalline, bituminous, concoidal fracture horiz fractures @113.8, 113.9	116.10									
	1702.75									
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained numerous discontinuous wavy coal seams, angular fracture along coal seams@114.45, horiz fractures along coal seams @115.32, 116.1	116.20									
	1702.65									
	116.50									
	1702.35									
COAL: Brownish black (5YR 2/1) microcrystalline, bituminous	116.75									
	1702.10									
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained numerous discontinuous wavy coal seams, horiz fracture w/coal @ 116.47	117.50									
	1701.35									

SAMPLER TYPE

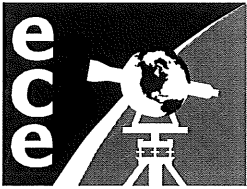
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GROUND WATER DEPTH

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 WATER ON RODS _____ FT.

BORING METHOD

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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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SURFACE ELEVATION - 1818.85										
INTERBEDDED SANDSTONE: Gray (N5) fine grained, rhythmically bedded parallel layers of shale, horiz fractures @116.5, 116.55, 116.6, 116.65	120.30 1698.55									
SANDSTONE: Light gray (N7) fine grained, angular fracture w/coal@117										
SANDSTONE: Light gray (N6) fine grained, horiz fractures @117.7, 118.53, 118.78, 118.82, 119, angular fracture @119.9, discontinuous wavy shale beds between 120-120.3										
INTERBEDDED SANDSTONE: Light gray (N6) fine grained, wavy discontinuous shale interbeds throughout sub horiz fractures w/shale@120.55, 120.6, 120.66, 120.78, 120.9, 121.4, 121.44, 121.6, 122.1, 122.48, 122.8, 122.85, 123.76, 124.45	124.50 1694.35	125								
INTERBEDDED SANDSTONE: Gray (N5) fine grained, rythmically bedded parallel layers of shale, horiz fractures @125, 125.11, 125.28, 125.41, 125.46, 125.82, 126.03, 126.32, 126.44, 126.55, 126.6, 126.68, 126.87, 127.18, 127.35, 127.7										
Terminated Rockcore at 128'	128.00 1690.85									
		130								
		135								

SAMPLER TYPE

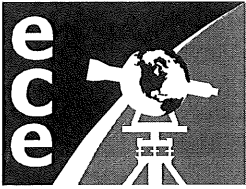
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GROUND WATER DEPTH

- ▽ 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 # 4
 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 571927.964 Easting 2234232.044
 Date Started 7/15/04 Hammer Wt. 140
 Date Completed 7/15/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
TOPSOIL	0.50									
CLAY: Tan	1884.75									
Missing (core was not provided by drillers) 4.1 feet to 18 feet	4.10	5		RC01	RC		REC 100% RQD 86%			
	1881.15	10								
		15								
							REC 97.5%			

SAMPLER TYPE

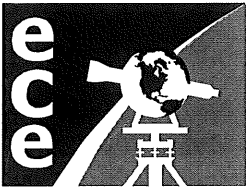
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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

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TEST DATA

Northing 571927.964 Easting 2234232.044
 Date Started 7/15/04 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
	18.00			RC02	RC		RQD 63%			
SANDSTONE: Light brownish gray (5YR 7/1) fine grained, polished, dense, visible bedding/cross bedding from 19.65-20.45, clean sub horiz fractures@18.6, 19.4, vug @19, horiz fracture w/ FeO2 stain @19.9	1867.25	20								
FRACTURED SANDSTONE: Light brownish gray (5YR 7/1) fine grained, FeO2, staining along all fractures both vert and horiz	1864.75									
SANDSTONE: Grayish pink (5YR 7/2) med. fine grained clean sub horiz fractures@ 22.45, 22.6	1863.50									
FRACTURED SANDSTONE: Grayish pink (5YR 7/2) med fine grained, FeO2 staining along all fractures vert fracture entire length	1862.25									
SANDSTONE: Grayish red (5R 4/2) fine grained area of heavy FeO2 staining	1861.90	25		RC03	RC		REC 84% RQD 47%			
SANDSTONE: Grayish pink (5YR 7/2) fine grained, noticeable dissolution along bedding planes, clean angular fracture @23.6 sub horiz fracture w/ FeO2 staining @ 24.45	1860.75									
SANDSTONE: Light brownish gray (5YR 7/1) fine grained polished dense clean sub horiz fractures @ 25.5, 25.8	1857.25									
SANDSTONE: Ligh brownish gray (5YR 7/1) fine grained polished dense visible bedding/cross bedding	1856.50									
FRACTURED SANDSTONE: Light brownish gray (5YR 7/1) fine grained, FeO2 staining along horiz fractures	30.00	30								

SAMPLER TYPE

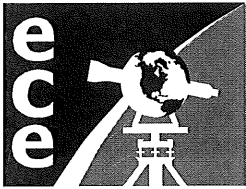
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 571927.964 Easting 2234232.044
 Date Started 7/15/04 Hammer Wt. 140
 Date Completed 7/15/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
FRACTURED SANDSTONE: Grayish red (5R 4/2) fine grained, horiz fractures w/ FeO2 @30, 30.45, 31.1, vert. fracture w/ FeO2 staining and limonite from 30.45-31	1855.25 31.00 1854.25			RC04	RC		REC 100% RQD 92%			
FRACTURED SANDSTONE: Grayish red (5R 4/2) fine grained, light brown mud seam w/shale partings, FeO2 on fractures	32.00 1853.25									
SANDSTONE: Light brownish gray (5YR 7/1) fine grained, vert fracture w/FeO2 stains from 32.05-32.3, clean horiz. fracture @32.68, angular fracture w/pinkish mud @33.25	33.25 1852.00 33.50									
FRACTURED SANDSTONE: Light brownish gray (5YR 7/1) fine grained pinkish mud	1851.75									
SANDSTONE: Light bluish gray (5B 8/1) fine grained	35.00	35								
SANDSTONE: Light bluish gray (5B 8/1) fine grained	1850.25									
SANDSTONE: Light bluish gray (5B 7/1) fine grained w/abundant coal stringers, angular fracture w/sinckenlines @ 35.55, irregular angular fractures @37.1, 37.7, 37.4	35.50 1849.75									
	37.70									
SANDSTONE: Light bluish gray (5B 8/1) fine grained, clean angular fractures @38, 38.8, clean horiz fractures @39.8, 40	1847.55			RC05	RC		REC 100% RQD 74%			
	40.00	40								
SANDSTONE: Light bluish gray (5B 8/1) fine grained, irregular angular fracture w/minor coal @42, clean angular fracture @43.8 clean horiz fractures @44.4, 44.6	1845.25									

SAMPLER TYPE

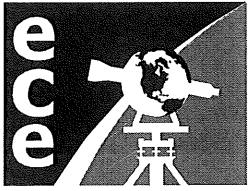
SS - DRIVEN SPLIT SPOON
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 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

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TEST DATA

Northing 571927.964 Easting 2234232.044
 Date Started 7/15/04 Hammer Wt. 140
 Date Completed 7/15/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
	45.75									
SANDSTONE: Light bluish gray (5B 8/1) fine grained clean angular fractures @46.2, 47.25, 47.85 horiz fracture w/ FeO2 stain @48	1839.50									
	48.00									
SANDSTONE: Grayish red (5R 4/2) fine grained, area of heavy FeO2 staining, horiz fracture w/FeO2 @48.13	1837.25									
	48.15									
SANDSTONE: Light bluish gray (5B 8/1) fine grained, clean angular fracture @50, matrix is such that you can see individual grains	1837.10									
	50.00	50		RC06	RC		REC 90% RQD 80%			
Missing (core was not provided by drillers) 50-70 feet	1835.25									
		55								
				RC07	RC		REC 87% RQD 83%			
		60								

SAMPLER TYPE

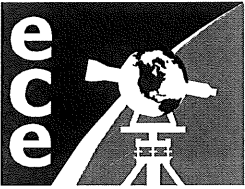
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GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.
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 WATER ON RODS _____ FT.

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/FT.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
COAL: According to drillers log (no rock core sample provided by driller)	65.00 1820.25	65		RC08	RC		REC 100% RQD 84%			
Missing (core was not provided by drillers) 50-70 feet	65.25 1820.00									
SANDSTONE: Light gray (N7) fine grained, dense, polished clean angular fractures @ 70.1, 72.93, clean horiz. fractures @70.65, 71.7, 71.86, 72.7, 73.45	70.00 1815.25	70								
CONGLOMERATE: light gray (N7) sub rounded milky white qtz pebbles >1/4", moderate brown pebbles also	74.00 1811.25 74.25									

SAMPLER TYPE

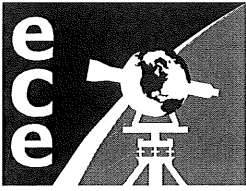
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GROUND WATER DEPTH

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

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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
SANDSTONE: Light gray (N7) fine grained	1811.00									
CONGLOMERATE: Light gray (N7) sub rounded milky white qtz pebbles >1/4" moderate brown pebbles also	74.35 1810.90									
SANDSTONE: Light gray (N7) fine grained, clear angular fractures @75.4, 76.5, 77.05	75.00 1810.25 77.05									
SANDSTONE: Light gray (N7) fine grained, dense, polished, angular fracture w/coal @77.1, angular fracture w/pitting @ 78.1, 78.55	1808.20 78.55			RC09	RC		REC 100% RQD 94%			
FRACTURED SANDSTONE: Light gray (N7) fine grained, dense, polished, angular fracture w/bituminous coal @ 78.8, 78.9, 79.3	1806.70 79.50									
CONGLOMERATE: Light gray (N7) sub rounded milky white qtz pbls >1/4" moderate brown pbls also	1805.75 79.75	80								
FRACTURED SANDSTONE: Light gray (N7) fine grained, dense polished angular fracture w/slickenlines @79.8	1805.50 80.00									
FRACTURED SANDSTONE: Light gray (N7) fine grained, dense, polished	1805.25 80.50									
SANDSTONE: Light gray (N7) fine grained, clean sub horiz fracture @86	1804.75									
		85								
		86.00								
FRACTURED SANDSTONE: Light gray (N7) fine grained angular fractures stained w/FeO2 & many coal inclusions	1799.25 86.80									
SANDSTONE: Light gray (N7) fine grained, angular fracture w/coal @ 86.9	1798.45 87.10 1798.15									
SANDSTONE: Grayish red (5R 4/2) fine grained area of heavy FeO2 staining, angular fracture w/FeO2 @87.15	87.15 1798.10									
SANDSTONE: Light gray (N7) fine grained, clean, angular fracture @87.85	87.85 1797.40									
FRACTURED SANDSTONE: Medium gray (N6) fine	90.00						REC 100%			

SAMPLER TYPE

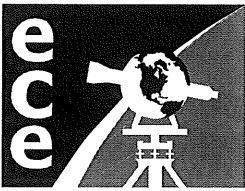
SS - DRIVEN SPLIT SPOON
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 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 4
 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.

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 Date Completed 7/15/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

TEST DATA

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1885.25										
grained many angular fractures w/bituminous coal 88.7, the rest are too highly fractured to recreate exact location	1795.25			RC10	RC		RQD 79%			
	92.00									
	1793.25									
	92.25									
	1793.00									
	92.75									
	1792.50									
		95								
SANDSTONE: Light gray (N7) fine grained clean horiz fracture @91.03, clean angular fracture @91.77, angular fracture w/coal @ 92				RC11	RC		REC 88% RQD 71%			
FRACTURED SANDSTONE: Medium gray (N6) fine grained, many horiz fractures w/bituminous coal too highly fractured to recreate exact location										
FRACTURED SANDSTONE: Grayish red (5R 4/2) fine grained area of heavy FeO2 staining, horiz. fractures w/FeO2 @ 92.43 92.55 92.7	99.50									
	1785.75									
SANDSTONE: Light gray (N7) fine grained, clean sub horiz fractures @92.93, 93.3, 98.5, 98.7, 99.25, sub horiz fracture w/FeO2 stain @94.25, pitted angular fractures w/coal @ 94.65, 95.6, 98.8		100		RC12	RC		REC 100% RQD 100%			
SANDSTONE: Light gray (N7) fine grained, dense, polished, sub horiz fracture w/FeO2 stain @ 100 clean horiz fracture @ 101.8, single line of FeO2 stain from 100.35-101.8	102.00									
	1783.25									
Terminated Rockcore at 102'										
		105								

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 # 4B
 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 571740.16 Easting 2234210.33
 Date Started 9/22/04 Hammer Wt. 140
 Date Completed 9/22/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1877.83										
CLAY										
	3.50									
CLAY: Auger refusal at 7.1 feet	1874.33									
		5								
	7.10									
No Recovery	1870.73									
	9.00									
FRACTURED SANDSTONE: Moderate reddish gray (5R 5/4), med. fine grained highly weathered sugary arkosic sandstone, weathering to quartz sand	1868.83									
	10.25	10								
SANDSTONE: Moderate reddish gray (5R 5/4), med. fine grained, competent, arkosic sandstone	1867.58									
	11.00									
FRACTURED SANDSTONE: Moderate reddish gray (5R 5/4), med. fine grained highly weathered sugary arkosic sandstone, weathering to quartz sand	1866.83									
	12.00									
FRACTURED SANDSTONE: Pinkish gray (5YR 8/1), fine grained, angular fractures w/ pitting @ 12.4, 12.5, horiz. fractures w/ pitting @ 12.8, 13.1, 13.3, 13.7 sugary texture where weathered	1865.83									
	13.70									
SANDSTONE: Pinkish gay (5YR 8/1), fine grained, horiz. fractures w/ heavy FeO2 stains as well as hematite and limonite recrystallization @ 14.6, 15	1864.13									
	15.00	15								

SAMPLER TYPE

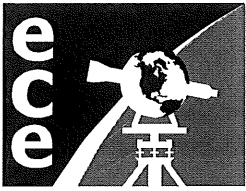
SS - DRIVEN SPLIT SPOON
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 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 4B
 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 571740.16 Easting 2234210.33
 Date Started 9/22/04 Hammer Wt. 140
 Date Completed 9/22/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1877.83	1862.83									
SANDSTONE: very light gray (N7.5), fine grained, clean sub horiz. fracture @ 16.63, angular fractures w/ pitting & limonite staining @ 16.73, 16.94	17.25									
SANDSTONE: pale red (10R 6/2), fine grained, horiz. fractures w/ light FeO2 stains @ 17.9, 18.03, angular fractures w/ pitting & light FeO2 stains @ 18.1, 18.25	1860.58									
	19.50									
SANDSTONE: grayish red (5R 5/2), fine graiend, darker red along bedding, angular fracture w/ FeO2 stain @ 20.03	1858.33	20								
	20.03									
FRACTURED SANDSTONE: moderate reddish brown (5YR 4/4), fine grained, darker red along bedding, healed fracture line throughout	1857.80									
	20.25									
	1857.58									
SANDSTONE: light gray (N7), fine grained, angular fractures w/ pitting & FeO2 stianing @ 21.45, 21.84, 22.05, 22.55, 22.9, 23.5, clean horiz. fractures @ 25.6, 26	26.00	25								
	1851.83									
	27.00									
SANDSOTNE: light gray (N7), fine grained, sub horiz. fractures @ 27.05, 27.1, 27.25, 28, 28.2, 28.3, 31, 32, 32.64, 33.26, 34, 34.4, 34.7, angular fracture @ 30.4, angular fracture w/ pitting @ 35.6	1850.83									
	30									

SAMPLER TYPE

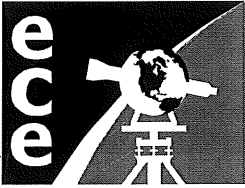
SS - DRIVEN SPLIT SPOON
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 RC - ROCK CORE

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 # 4B
 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 571740.16 Easting 2234210.33
 Date Started 9/22/04 Hammer Wt. 140
 Date Completed 9/22/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1877.83										
		35								
		36.00								
FRACTURED SANDSTONE: light gray (N7), fine grained, horiz. fractures @ 36.35, 36.55, 36.63, 36.68, 36.82, 37	1841.83									
		37.00								
SANDSTONE: light gray (N7), fine grained, horiz. fractures w/ FeO2 staining @ 37.7, 39, angular fractures w/ pitting @ 37.85, 39.7, 41.8, 41.9, 42.18, angular fracture w/ FeO2 staining @ 40.65	1840.83									
		40								
		42.50								
SANDSTONE: moderate reddish brown (5YR 4/4), fine grained, darker red along bedding, healed fracture lines throughout, highly weathered	1835.33									
		43.00								
		1834.83								
SANDSTONE: faintly mottled light gray (N7), fine grained, horiz. fractures @ 44.85, horiz. fractures w/ FeO2 stains @ 45.5, 45.6, 45.7, angular fracture w/ FeO2										
		45								

SAMPLER TYPE

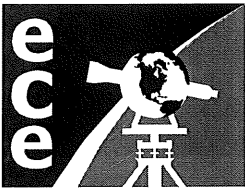
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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staining @ 46. The fracture @ 45.7 exhibits a cavity filled w/ limonitic mud in place.	46.00									
FRACTURED SANDSTONE: light gray (N7), fine grained, angular fracture @ 46 has limonitic mud in place, vertical fracture from 46.1-47.2	1831.83 47.20									
SANDSTONE: mottled light gray (N7), fine grained, discontinuous wavy lenses of shale throughout, angular fractures @ 48.07, 48.4	1830.63 48.40									
SANDSTONE: light gray (N7), fine grained, angular fracture w/ FeO2 staining @ 49.53, horiz. fractures @ 50.2, 50.8, 51.55, angular fracture @ 51.16	1829.43 51.55	50								
FRACTURED SANDSTONE: grayish orange pink (10R 8/2), fine grained, intensely fractured between 51.55-52, horiz. fractures w/ pitting & FeO2 staining @ 52, 52.95, 53.3, 53.8, 54.3, vertical fractures from 52-52.6 & 53.3-54.3	1826.28 55.00	55								
SANDSTONE: light gray (N7), fine grained	1822.83 56.00									
SANDSTONE: pale reddish brown (10R 5/4), fine grained, numerous horiz./sub horiz. fractures @ 56.25, 56.4, 56.45, 56.5, 56.6, 56.65, 56.75	1821.83 56.75									
SANDSTONE: light gray (N6) fine grained, horiz. fractures @ 56.95, 57.2, 58.46, 58.5, 59.4, 59.45, 59.6 along stylolitic coal seams	1821.08 60.00									

SAMPLER TYPE

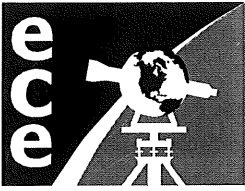
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
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GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

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Client City of Crossville Boring # 4B
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
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 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

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Northing 571740.16 Easting 2234210.33
 Date Started 9/22/04 Hammer Wt. 140
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 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1877.83										
SANDSTONE: light gray (N6) med. fine grained, indiv. white grains visible, horiz. fracture w/ trace coal @ 60.53, horiz. fracture w/ heavy pitting @ 61.2	1817.83 61.75									
SANDSTONE: pale reddish brown (10R 5/4), fine grained, horiz. fracture @ 62.1	1816.08 62.15									
SANDSTONE: light gray almost buff (N7), fine grained, jagged sub horiz. fracture @ 62.2, solution vug @ 62.5	1815.68 62.50									
CONGLOMERATE: pale reddish brown (10R 5/4), fine grained, horiz. fracture @ 62.75 w/ visible grains and pebbles	1815.33 62.75 1815.08									
SANDSTONE: grayish orange pink (10R 8/2), fine grained, weathering/depositional/diagenetic cavity from 65.1-65.2 w/ visible >.25" quartz pebbles encompasses ~90% of core diameter	65.20 1812.63	65								
SANDSTONE: light gray (N6) med. fine grained, indiv. white grains visible, horiz. fracture w/ coal @ 66.02	67.00									
SANDSTONE: light gray (N6) fine grained, vert. fracture trace w/ FeO2 staining from 67.3-68.8, horiz. fractures pitted & weathered @ 67.2, 67.3, horiz. fracture w/ pitting & FeO2 stains @ 70, 71.4, 72, 72.4, 72.8	1810.83 72.80	70								
SANDSTONE: light gray (N7.5), fine grained, horiz. fractures pitted & weathered @ 73.87, 74.3, 81.86, 82.27, angular fracture @ 83.4 w/ FeO2 staining	1805.03	75								

SAMPLER TYPE

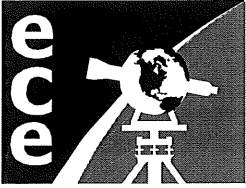
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 4B
 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 571740.16 Easting 2234210.33
 Date Started 9/22/04 Hammer Wt. 140
 Date Completed 9/22/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1877.83										
		80								
SANDSTONE: Light gray (N7.5), fine grained, fractures along coal seams @ 84.55, 84.93, vug @ 85.82, angular fractures w/ pitting and sand @ 85.25, vertical fracture w/ FeO2 staining from 85.1-85.8	1794.33	85								
	83.50									
FRACTURED SANDSTONE: light gray (N7.5) fine grained, high fracture zone w/ residual sand, Fe staining along fractures	1790.33									
	88.00									
SANDSTONE: light bluish gray (5B 8/1) fine grained, denser than previous in that indiv. grains not apparent, vert. fracture traces f/m 88.25-88.56, sub. horiz.	1789.83									
	87.50									
		90								

SAMPLER TYPE

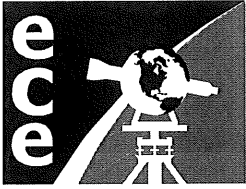
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GROUND WATER DEPTH

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SURFACE ELEVATION - 1877.83										
fracture w/ coarse pitting @ 89.5, angular fracture w/ fine pitting & limonite staining @ 90.1	90.10 1787.73									
SANDSTONE: light bluish gray (5B 8/1) fine grained, dense/polished, vert. fracture trace / FeO2 stain from 90.65-91.75, angular fracture @ 90.6, sub horiz. fracture @ 92.48 w/ white silty CLAY material	92.50									
FRACTURED SANDSTONE: light bluish gray (5B 8/1) fine grained, dense/polished, vert. fracture for entire length w/ white silty CLAY material, sub horiz. fracture @ 92.74 w/ white silty CLAY material	1785.33 92.75 1785.08									
SANDSTONE: light bluish gray (5B 8/1) fine grained, dense/polished, angular fracture @ 93.6 w/ white silty CLAY material, horiz. fracture w/ minor pitting and with silty CLAY material @ 96	96.00	95								
SANDSTONE: grayish red (5R 4/2), fine grained, angular fracture w/ FeO2 stain @ 96.03	1781.83 96.05									
SANDSTONE: light bluish gray (5B 8/1) fine grained, dense/polished, horiz. fracture w/ pitting @ 97.05, stylolites between 97.4-97.76, horiz. fracture w/ pitting and 25% coal @ 97.85	1781.78 97.85 1779.98									
SANDSTONE: light bluish gray (5B 7/1) fine grained, horiz. fractures w/ pitting and coal @ 98.85, 99.6, 100.95, angular fractures w/ pitting and coal @ 101.3, 103.7, 104.98, clean horiz. fractures @ 105.75, 106.26, 106.4, 106.7	100									

SAMPLER TYPE

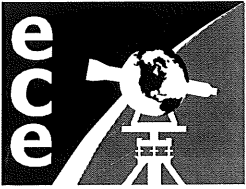
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GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 4B
 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 571740.16 Easting 2234210.33
 Date Started 9/22/04 Hammer Wt. 140
 Date Completed 9/22/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1877.83										
	106.75									
FRACTURED SANDSTONE: light bluish gray (5B 7/1) fine grained, numerous clean fractures	1771.08									
SANDSTONE: light bluish gray (5B 7/1) fine grained, angular fracture w/ slickenlines @ 108.1	107.25									
	1770.58									
	109.25									
SANDSTONE: light bluish gray (5B 8/1) fine grained	1768.58	110								
	111.00									
SANDSTONE: light bluish gray (5B 8/1), fine grained, horiz. fracture @ 111.1, 112.75, 113.33, 114.05, 115, 116.87, clean angular fracture @ 111.85, brown inclusion @ 112.6, conglomeritic zone @ 113.7-113.85	1766.83	115								
	117.00									
SANDSTONE: light bluish gray (5B 7/1) fine grained, sub horiz. fractures w/ pitting & coal @ 117.77, 118.81, 120.26, 120.87, 121.58, vert. fracture from 121.8-122.1	1760.83									
	120									

SAMPLER TYPE

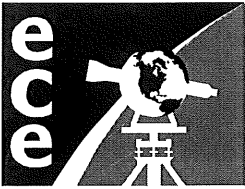
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GROUND WATER DEPTH

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SURFACE ELEVATION - 1877.83										
	124.50									
SANDSTONE: med. brown (5YR 4/4), fine grained	1753.33									
SANDSTONE: light bluish gray (5B 7/1), fine grained, sub	124.60	125								
horiz. fractures w/ pitting & coal @ 125.1, 125.43	1753.23									
INTERBEDDED SANDSTONE: light gray (N6), fine grained,	125.45									
many wavy interbeds of coal w/ angular fracturing along	1752.38									
seams	126.00									
SANDSTONE: light gray (N6) fine grained, angular	1751.83									
fracturing along coal seams @ 121.77, 128.17, 128.4,										
129.15										
	129.75									
INTERBEDDED SANDSTONE: light gray (N6), fine grained,	1748.08	130								
many wavy interbeds of coal w/ angular fracturing along	130.50									
seams	1747.33									
SANDSTONE: light gray (N6) fine grained										
	133.50									
INTERBEDDED SANDSTONE: brownish gray (10YR 4/2)	1744.33									
fine grained, many wavy parallel interbedded coal										
micro-seams										

SAMPLER TYPE

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 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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SURFACE ELEVATION - 1877.83										
SANDSTONE: light gray (N6) fine grained, sub horiz. fracture w/ pitting & coal @ 137.15, 137.35, 137.8, 138.4, 138.9, 139.1, 139.5, 141.87	135.50									
	1742.33	140								
INTERBEDDED SANDSTONE: light gray (N6), fine grained, wavy non parallel discontinuous stringers of coal w/ angular fracturing along seams	141.75									
	1736.08	145								
No Recovery	147.75									
	1730.08	150								

SAMPLER TYPE

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GROUND WATER DEPTH

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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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SURFACE ELEVATION - 1877.83										
		155								
		160								
		163.00								
Terminated Rockcore at 163'	1714.83									
		165								

SAMPLER TYPE

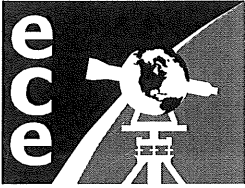
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GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 5
 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 571827.52 Easting 2231877.92
 Date Started 8/20/04 Hammer Wt. 140
 Date Completed 8/20/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1884.11										
TOPSOIL										
	3.00									
CLAY: Red, auger refusal @ 5 feet	1881.11									
	5.00	5								
SANDSTONE: Light brown reddish gray (5YR 6/2) weathered to sand & clay, not competent	1879.11									
	6.00									
CLAY: Red	1878.11									
FRACTURED SANDSTONE: Light brown reddish gray (5YR 6/2) fine grained weathered to sand & clay, not competent	1877.86			RC01	RC		REC 16.6% RQD 0%			
	11.00	10								
SANDSTONE: Light gray (N7) fine grained sub horiz. fractures w/reddish brown mud @ 11.45, 11.56, 11.62, 11.75	1873.11 11.75 1872.36									
FRACTURED SANDSTONE: Light brown reddish gray (5YR 6/2) fine grained, weathered to sand & clay, not competent	1872.11									
SANDSTONE: Light gray (N7) fine grained, sub horiz. fractures w/reddish brown mud @ 12.5, 12.65, 13.1, 13.3, 13.45, 14.3, angular fractures w/reddish brown mud @13.9, 14.6, 15.92				RC02	RC		REC 105% RQD 68.7%			

SAMPLER TYPE

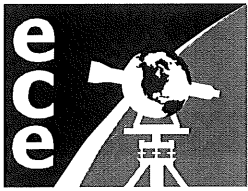
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 5
 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 571827.52 Easting 2231877.92
 Date Started 8/20/04 Hammer Wt. 140
 Date Completed 8/20/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1884.11										
	15.50									
FRACTURED SANDSTONE: Pale reddish gray (10R 4/4) fine grained angular fracture w/reddish brown mud @ 15.6, 15.93, 16.08, 16.13, 16.24, 16.45	1868.61									
SANDSTONE: Light gray (N7) fine grained, pitted angular fracture w/reddish brown mud @ 17.2	1867.61									
FRACTURED SANDSTONE: Pale red (5R 6/2) fine grained, highly fractured w/many healed traces, some very red areas surfaces, hematite rich clay	1866.91									
	20.00	20								
SANDSTONE: Light gray (N7) med. fine grained, (weathered) indiv. grains visible, angular fractures w/ sand & FeO ₂ @ 21.1, 21.65, 22.1, 22.45, 22.8, 23.2, 23.5, 23.6	1864.11			RC03	RC		REC 70% RQD 48%			
	23.60									
FRACTURED SANDSTONE: Pale red (5R 6/2) fine grained, highly fractured, hematite rich clay seam	1860.51									
	24.00									
SANDSTONE: Light gray (N7) fine grained horiz. fractures w/tan vf. sand @ 24.71, 25.2, 25.45, 26.2, 26.9, 27	1860.11									
	27.00	25								
SANDSTONE: Light gray (N6.5) fine grained, dense, polished pitted angular fractures @ 27.5, 27.6, 27.9	1857.11									
	28.00									
SANDSTONE: Light gray (N7) fine grained, dense, polished, pitted sub horiz. fract w/ vf sand @28.75,29.5,29.8,30.1,30.63, >1/4"vug@29.65, pitted ang fract w/vf sand@30.25,31.35,vert fract trace from 32.3-33.83,clean angular fract @ 33.5	1856.11									
		30								

SAMPLER TYPE

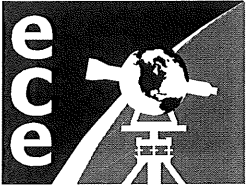
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GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

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 Inspector _____ Rock Core Dia. NXB WL
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SURFACE ELEVATION - 1884.11										
				RC04	RC		REC 43.9% RQD 24.5%			
SANDSTONE: Pale red (5R 6/2) fine grained, angular fracture w/ FeO2 stains @ 33.9	1850.26 33.85 33.90									
SANDSTONE: Light gray (N7) fine grained, irregular fracture w/FeO2 stains @34.5, solution vug @ 34.91, angular fracture w/ light pitting @ 34.95	1850.21 34.95 1849.16	35		RC05	RC		REC 97% RQD 72.5%			
SANDSTONE: Pale reddish gray (10R 4/4) fine grained	35.10									
SANDSTONE: Light gray (N7) fine grained, horiz fractures w/light pitting & vf sand @ 35.67, 36.7, 37, clean angular fracture @ 35.8, angular fracture w/ light pitting & vf sand @ 36.5	1849.01 37.00 1847.11									
SANDSTONE: Light gray (N7) fine grained, angular fractures w/ light pitting & vf sand @ 37.1, 37.15, 37.25	37.25 1846.86									
SANDSTONE: Light gray (N7) fine grained horiz. fractures w/light pitting & vf sand @ 38.1, 39, 41.35, 41.75, clean angular fracture @ 40, angular fractures w/light pitting & vf sand @ 37.8, 41.4		40		RC06	RC		REC 100% RQD 90.4%			
	41.50									
SANDSTONE: Light gray (N7) fine grained, clean angular fracture @ 45.15	1842.61			RC07	RC		REC 38% RQD 17%			

SAMPLER TYPE

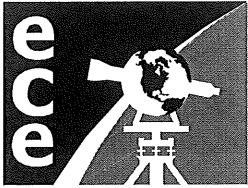
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GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

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SURFACE ELEVATION - 1884.11										
	46.00									
FRACTURED SANDSTONE: Light gray (N7) fine grained too fractured to reconstruct indiv. fracture locations, fracture faces clean w/one showing moderate light pitting and one angular fracture w/FeO2 staining	1838.11			RC08	RC		REC 72% RQD 68%			
SANDSTONE: Light gray (N7) fine grained, clean horiz fractures @47.9, 47.95, angular fractures w/pitting @48.5, 49	1836.61			RC09	RC		REC 90% RQD 41%			
SANDSTONE: Reddish brown gray (5R 5/2) fine grained, horiz. fracture w/ light pitting @ 49.7, angular fractures w/pitting @ 50.2, 50.3 w/in a fracture zone between 49.9-50.3	1835.11	50		RC10	RC		REC 97.5% RQD 73.7%			
SANDSTONE: Light gray (N7) fine grained, clean horiz. fracture @ 51.13, horiz fracture w/pitting @ 51.23, vertical fracture from 51.13-51.5 w/FeO2 staining	1833.61									
SANDSTONE: Reddish brown gray (5R 5/2) fine grained, horiz fracture w/ pitting @ 51.7	1832.61									
SANDSTONE: Grayish red (5R 4/2) fine grained, visible bedding or crossbedding, angular fracture w/FeO2 staining, & light pitting @ 51.85	1832.36									
SANDSTONE: Reddish brown gray (5R 5/2) fine grained, sub horiz. fracture w/pitting @ 52.6	1831.61									
SANDSTONE: Reddish brown gray (5R 5/2) fine grained, sub horiz. fracture w/pitting @ 52.6	53.00									
SANDSTONE: Lightgray(N7)finegrain,ang frac w/pits@53.7,60.5 clean irreg frac@54.2stylolites@54.25,54.4,54.5,54.65, 54.68,54.74,54.83,54.88,54.91,54.98,55,59.42, 59.65,59.98,60.05,60.55,hor frac@59.5 angfrac/minorcoal@60.76cleanhorfrac@60.85,60.96,61,61.95	1831.11	55		RC11	RC		REC 62% RQD 57.9%			

SAMPLER TYPE

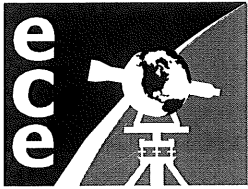
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GROUND WATER DEPTH

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SURFACE ELEVATION - 1884.11										
SANDSTONE: Pale reddish brown (10R 5/4) fine grained, visible bedding or crossbedding, angular fracture w/FeO2 staining @ 61.9	61.90 1822.21 62.10 1822.01			RC12	RC		REC 91.6% RQD 80.3%			
SANDSTONE: Light gray (N7) fine grained, sub horiz. fractures @ 63.4, 64.45 vert fracture from 63.5-64.5 w/minor FeO2 precipitation more like xtl growth than staining	65.00 1819.11	65		RC13	RC		REC 90% RQD 88.2%			
FRACTURED SANDSTONE: Grayish red (5R 4/2) fine grained, visible bedding or crossbedding, angular fracture w/ FeO2 staining @ 64.9, 65.35, vert fractures from 64.9-65.4 and 65.6-67	69.00 1815.11									
SANDSTONE: Reddish brown gray (5R 6/2) fine grained	69.25									
SANDSTONE: Grayish red (5R 4/2) fine grained	1814.86	70								
	70.75									
FRACTURED SANDSTONE: Pale reddish brown (10R 5/4) fine grained horiz fracture w/FeO2 stains @ 69.9, angular fracture w/FeO2 stains @69.9 angular fracture w/FeO2 stains@70.6, zone of intense fracturing w/healed fractures between 69.45-70 all FeO2 stained	1813.36			RC14	RC		REC 95% RQD 92%			
	74.00									
SANDSTONE: Light gray (N7) fine grained, sub horiz. fracture w/ coal @ 71.2, sub horiz fracture w/ pitting @	1810.11									
	75.00	75								

SAMPLER TYPE

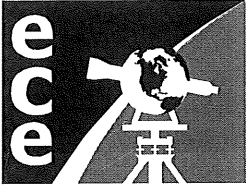
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GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

LOG OF TEST BORING

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DRILLING AND SAMPLING INFORMATION

TEST DATA

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71.72, clean, angular fracture@71.85, vugs@ 71.95, 72.4, fracture traces @ 72, 72.15, 72.6, angular fractures w/pitting @ 73.13, 73.9 SANDSTONE: Grayish red (5R 4/2) fine grained	1809.11									
SANDSTONE: Light gray (N7) fine grained, clean sub horiz fractures @75.06-75.8,77.16	1806.95	77.16		RC15	RC		REC 87% RQD 85%			
SANDSTONE: Pinkish gray (5YR 7/1) fine grained, angular fracture w/FeO2 @ 77.13, clean horiz fracture @77.74	1806.11	80								
SANDSTONE: Light gray (N7) fine grained, clean irregular fracture @ 78.35, sub horiz. fractures w/pitting @ 79.80, angular fracture w/FeO2 staining @ 80.55	1803.56	80.55								
FRACTURED SANDSTONE: Light gray (N7) fine grained, angular fractures w/FeO2 staining, sub horiz. & Irregular fractures w/pitting	1802.11	82.00		RC16	RC		REC 95.3% RQD 73.3%			
SANDSTONE: Light gray (N7) fine grained, dense, polished, clean irregular fracture @83.4	1800.71	83.40								
		85								
		90					REC 93%			

SAMPLER TYPE

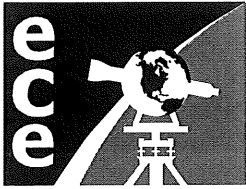
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GROUND WATER DEPTH

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SURFACE ELEVATION - 1884.11										
	90.50			RC17	RC		RQD 84.5%			
SANDSTONE: Light gray(N7) fine grained ang fract w/pitting&coal@84.84,3,85,86.23,clean ang fract@86.8,subhoriz fract w/coarse pitting@87.4,89.52,89.79,89.85,89.9,90.45clean horiz fract@85.4horiz fract w/coal@87.66ang fract traces(3)from 88.9-89.08	1793.61 90.75 1793.36									
SANDSTONE:: Grayish red (5R 4/2) fine grained	93.25									
SANDSTONE: Pale reddish brown (10R 5/4) fine grained angular fracture w/pitting@ 91.05 sub horiz. fractures w/coal @ 92,92.14	1790.86									
	95.30	95								
SANDSTONE: Light gray (N6) fine grained, angular fracture @93.75, weathered matrix from 93.85-94.4, sub horiz fractures w/vf sand @94.45, 94.52, 94.6, 95.05, 95.3	1788.81									
	97.00									
SANDSTONE: Light gray (N6) fine grained, vug from 95.66-95.73, pitted sub horiz fracture w/ mud & coal @96.2 angular fractures w/minor coal@ 96.67, 97, many coal stringers from 96.4-97	1787.11 97.80 1786.31 98.00									
FRACTURED SANDSTONE: Gray (N5) fine grained, many interbedded coal seams, horiz fractures w/coal@97.15, 97.3, 97.38, 97.53, 97.8	1786.11 98.75 1785.36									
SANDSTONE: Grayish red (5R 4/2) fine grained	98.92	100		RC18	RC		REC 92% RQD 70%			
SANDSTONE: Light gray (N6) fine grained, sub horiz fractures w/pitting@ 98.22, 98.35, 98.55, 98.75, vert fracture from 98.55-98.75	1785.19 99.15 1784.96									
SANDSTONE: Grayish red (5R 4/2) fine grained, angular fracture w/FeO2 staining @98.92	100.00 1784.11									
SANDSTONE: Light gray (N6) fine grained, angular fracture@ 99.15 w/FeO2 stain, vert fracture w/FeO2 staining from 98.92-99.15	102.00 1782.11									
SANDSTONE: Grayish red (5R 4/2) fine grained, angular fracture w/pitting @ minor coal @ 99.67										
SANDSTONE: Light gray (N6) fine grained sub horiz fractures w/coal @ 100.8, 101.75										

SAMPLER TYPE

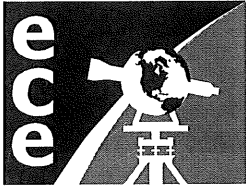
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GROUND WATER DEPTH

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 WATER ON RODS _____ FT.

BORING METHOD

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SURFACE ELEVATION - 1884.11										
				RC19	RC		REC 91% RQD 54.5%			
SANDSTONE: Light gray (N6) w/ slight brown overtones finegrain pitted ang frac w/ v.fine sand@102,102.67,102.88,103.6 sub hor frac w/coal@104.22, 104.28,104.37,104.5,105.13, 105.4,105.5,105.75,106.1 clean ang frac@107.55,108,109.6 pitted angfrac	110.75	110								
FRACTURED SANDSTONE: Light gray (N6) fine grained many criss crossing fracture traces w/coarsely pitted angular fractures @ 110.9 and 111	1773.36 111.00 1773.11									
SANDSTONE: Light gray (N6) w/slight brown overtones, fine grained sub horiz. fract w/pitting @111.1,112.32,112.5,113.67,114.25, clean horiz fract@111.23, sub horiz fract w/coal@111.73 clean angular fract@112.9, many stylolites between 111.45-112.03	114.00	115		RC20	RC		REC 65.8% RQD 70.8%			
SANDSTONE: Light gray (N6) fine grained angular fractures w/pitting @117.9, 118.4, 118.6, 118.75, 119	119.00 1765.11									

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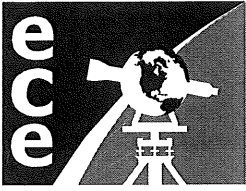
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GROUND WATER DEPTH

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1884.11										
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained, 40% H2O loss between 110.8-120, vert fracture from 119-119.6 sub horiz fractures @ 119.6, 119.7, 120.1, 121	121.00 1763.11									
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding fine grained, vert fracture from 121-121.3, angular fracture w/pitting @121.92, sub horiz fractures w/pitting & gray silty sand @ 122.36, 122.65, 123.07	123.07 1761.04 123.22 1760.89 123.50 1760.61									
COAL: Brownish black (5YR 2/1) microcrystalline, horiz. fracture @123.22		125								
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained angular fractures w/gray silty sand @ 123.83, 128.6, horiz fracture w/gray silty sand @124.96				RC21	RC		REC 75% RQD 70.5%			
FRACTURED SANDSTONE: Light gray (N6) fine grained, vert fracture from 128.6-129 otherwise too fractured to recreate	128.50 1755.61 129.00 1755.11									
SANDSTONE: Light gray (N6) fine grained, clean horiz fracture @ 129.47, angular fracture w/coal@ 130.4		130								
FRACTURED SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained, clean vert fracture from 130.4-131.9, clean sub horiz fractures @ 131, 131.15, 131.63, angular fracture w/pitting @131.9	132.00 1753.71 132.00 1752.11 132.50 1751.61									
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained										
SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained, angular fracture @ 136.25										

SAMPLER TYPE

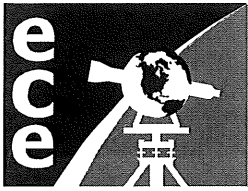
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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



ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 5
 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 571827.52 Easting 2231877.92
 Date Started 8/20/04 Hammer Wt. 140
 Date Completed 8/20/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1884.11										
	136.50									
COAL: Brownish black (5YR 2/1) microcrystalline, horiz fracture @ 136.62	1747.61 136.65									
SANDSTONE: Light gray (N6) Fine grained sub horiz fracture w/coal @ 137.15, vert fracture from 137.15-137.55	1747.46 137.55 1746.56			RC22	RC		REC 101.5% RQD 93%			
COAL: Brownish black (5YR 2/1) microcrystalline, horiz fracture 137.75	137.75 1746.36									
SANDSTONE: Light gray (N6) fine grained sub horiz fracture w/coal @ 138.43, vert fracture from 138-138.38, angular fracture @ 139	139.00 1745.11 139.50	140								
FRACTURED SANDSTONE: Light gray (N6) w/slight brown overtones along bedding, fine grained, many stylolites, angular fracture @ 139.1, horiz fracturs w/coal @ 139.2, 139.25, 139.35, 139.5	1744.61									
SANDSTONE: Light gray (N6.5) w/slight brown overtones along bedding, fine grained, sub horiz fracture w/coal @ 139.77, 140.02, 141, 142, vert fracture trace from 140.6-141	142.00 1742.11									
FRACTURED SANDSTONE: Light gray (N7) fine grained, white banding, deformed core, 100% H2O loss from 148-148.7, clean irregular fractures @ 148.5, 148.68, 149.04, 149.4		145								
	149.50			RC23	RC		REC 68.5% RQD 61.4%			
SANDSTONE: Light gray (N6.5) fine grained, sub horiz	1734.61	150								

SAMPLER TYPE

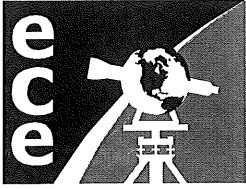
SS - DRIVEN SPLIT SPOON
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GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

Client City of Crossville Boring # 5
 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 571827.52 Easting 2231877.92
 Date Started 8/20/04 Hammer Wt. 140
 Date Completed 8/20/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1884.11										
fractures @ 150, 150.35	150.35									
SANDSTONE: Light gray (N6) fine grained, angular fractures @ 150.9, 151.1, horiz fracture w/pitting @ 151.43	1733.76									
SANDSTONE: Light gray (N6) fine grained, pitted sub horiz fractures w/coal @ 151.54, 151.58, 152.23, 152.42, 153	151.43			RC24	RC		REC 98.8% RQD 61.3%			
	1732.68									
COAL: Olive brown (5Y 4/4) conoidal fracture too fractured to reconstruct	153.00									
	1731.11	155								
	159.00			RC25	RC		REC 71.2% RQD 37.8%			
SANDSTONE: Light gray (N7.5) fine grained, clean angular fracture @ 159.45, vert. fracture trace from 159.45-160, angular fractures w/black bituminous coal @ 160.52, 161.25, 161.67, 162.04, 162.2, 163.5	1725.11	160								
	163.50									
FRACTURED SANDSTONE: Light gray (N7.5) fine grained, sub horiz fractures w/black bituminous coal @ 163.55, 163.67, 163.78, 164	1720.61 164.00 1720.11									
	165									

SAMPLER TYPE

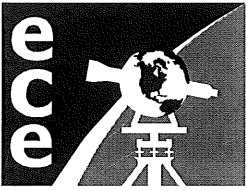
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 5
 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

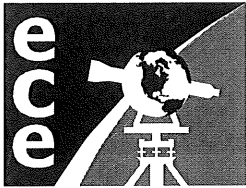
Northing 571827.52 Easting 2231877.92
 Date Started 8/20/04 Hammer Wt. 140
 Date Completed 8/20/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1884.11										
SANDSTONE: Light gray (N7.5) fine grained, angular fract w/black bituminous coal@ 164.35,164.57,165.36,165.59,165.85,165.95,clean irreg fract@166.13,168,vert fract trace from 164.75-165&170-170.45, ang fract w/coal@169 clean vert fract frm 168.78-169		170		RC26	RC		REC 65.6% RQD 54.4%			
SANDSTONE: Light gray (N7.5) fine grained, angular fractures w/pitting @ 173.65, 174.75, 174.95, 178	1711.11	175		RC27	RC		REC 78% RQD 72%			
Terminated Rockcore at 178'	1706.11									

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
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ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

Client City of Crossville Boring # 6
 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 570527.972 Easting 2231491.683
 Date Started 8/9/04 Hammer Wt. 140
 Date Completed 8/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
TOPSOIL	1.00									
Auger Refusal at 5'	1897.48									
SANDSTONE: light gray (N7), fine grained, light FeO2 staining, abundant mica, <5% pebbles, a weathered weakly cemented zone from 5-5.17, angular fractures w/ FeO2 @ 5.2, 5.8, sub horiz. fracture along stylolite @ 5.5	5.00 1893.48	5								
SANDSTONE: grayish orange pink (5YR 7/2), fine grained, at 7.3, 8.3, and 9.3 a 4, 5, and 10 mm respectively dark reddish brown layer (10R 4/2), horiz. fractures @ 7.66, 8.08, 8.6, crossbedded from 9.4-9.5, weakly cemented weathered zone f/m 8.7-10	7.25 1891.23									
SANDSTONE: light gray (N7), fine grained, horiz. fractures w/ pitting @ 10.8, 11.1, 13, vugs @ 11.5, 12, weathered zone from 12.25-12.5	10.00 1888.48	10		RC01	RC		REC 89% RQD 34%			
Missing	13.00 1885.48									
	15.00	15								

SAMPLER TYPE

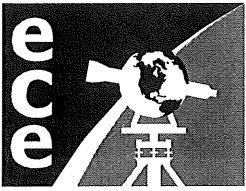
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GROUND WATER DEPTH

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

BORING METHOD

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
SANDSTONE: light brown (5YR 6/4), fine grained, fractures @ 15.25, 15.6, 15.75, 16.1, 16.75, vert. fracture from 16.5-16.75	1883.48									
	20.00	20		RC02	RC		REC 44% RQD 23.5%			
SANDSTONE: light gray (N7), fine grained	1878.48									
SANDSTONE: pinkish gray(5YR 8/1), fine grained, pitted angular fract. w/ FeO2 stain @21.2, sub horiz. frags. very coarsely pitted w/ FeO2 staining @ 21.45, 22.3, clean horiz. frags. @21.65, 22, 22.1, cavity no crystals @21.9, 22, stylolites @22.2, 22.25	20.50 1877.98									
	22.50									
SANDSTONE: light gray (N8), fine grained, vert. fract. f/m 22.7-23.6, horiz. frags. w/ pitting & FeO2 stain @24, 24.8, healed vert. seams f/m 24-24.8, vugs @ 23.8, offset fract. possible fault trace offset to right @24.6 and @24.7 vert. fract. terminates	1875.98									
	24.80									
SANDSTONE: med. brown (5YR 4/4), fine grained, sub horiz. fract. @24.85, angular frags. w/ FeO2 stain and slickenlines @25, 25.3, horiz. fract. w/ FeO2 stain and slickenlines @25.1	1873.68 25.30 1873.18 25.55	25								
INTERBEDDED SANDSTONE: light gray (N6.5), fine grained, fract. w/ coal @25.55	1872.93									
FRACTURED SANDSTONE: light gray (N7), med./fine grained, vert. fract. f/m 25.8-26.1, visible angular coarse grains	1872.38 26.25 1872.23									
SANDSTONE: light gray (N7), fine grained, horiz. fract. @ 26.15	26.35 1872.13									
SANDSTONE: light gray (N7), med./fine grained, >1/4" milky white quartz pebbles	27.20 1871.28									
	30									

SAMPLER TYPE

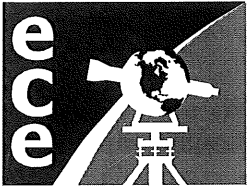
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 6
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.
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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 570527.972 Easting 2231491.683
 Date Started 8/9/04 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
SANDSTONE: light gray (N7), fine grained, horiz. fractu. @26.8, angular fract. w/ pitting & coal @26.95, 27, 27.2	30.25 1868.23 30.30			RC03	RC		RQD 26.5%			
INTERBEDDED SANDSTONE: yellowish brown (10YR 6/2), fine grained, many <1mm coal seams, angular fract. w/ pitting @ 27.2, 28, 28.8, sub horiz. fract. pitted w/ coal @30.05, stylolite @29.95	1868.18 30.40 1868.08 30.50									
SANDSTONE: light gray (N7), med./fine grained, stylolites	1867.98 30.55									
SANDSTONE: yellowish brown (10YR 6/2), fine grained	1867.93									
SANDSTONE: light gray (N7), fine grained										
SANDSTONE: med. brown (5YR 4/4), fine grained										
SANDSTONE: light gray (N7), fine grained, horiz. fract. w/ coal @31.65, 32, 32.75, 33, 33.9, 34.85, 35.2, 35.5, 35.7, angular fract. pitted w/ coal @ 37.8, 38.55, 39.2		35		RC04	RC		REC 103.25% RQD 43.7%			
	39.20									
INTERBEDDED SANDSTONE: yellowish brown (10YR 6/2), fine grained, horiz. fract. w/ coal & pitting @39.7, 40, 40.55, 42.6, many <1mm coal seams, angular fract. w/ slickenlines @ 42.45	1859.28 40									
	43.00			RC05	RC		REC 61.25% RQD 35.9%			
SANDSTONE: light gray (N6), fine grained, horiz. fract. w/ coal @43, angular fract. w/ coal @43.5, vert. fract. entire length	1855.48 43.50 1854.98									
SANDSTONE: light gray (N6), med./fine grained, sub horiz. fract. w/ mica & <25% coal @43.9	43.90 1854.58									

SAMPLER TYPE

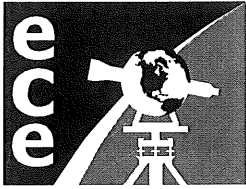
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

Client City of Crossville Boring # 6
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.
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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 570527.972 Easting 2231491.683
 Date Started 8/9/04 Hammer Wt. 140
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 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
SANDSTONE: light gray (N6), fine grained, angular fract. w/ coal & mud @44.4, vert. fract. f/m 43.9-44.2	44.50 1853.98									
SANDSTONE: light gray (N6.5), fine grained, horiz. fract. w/ coal @45, vert. fract. trace f/m 45-45.6, zone of large >1/4" milky white quartz pebbles between 45.7-45.75	45.75 1852.73									
FRACT. SANDSTONE: light gray (N6.5), fine grain, sub hor frac w/ mica & <25% coal @45.9, stylolites @46.1, 48.25, 48.37, vert frac trace f/m 46.65-47, vert frac f/m 47-47.5, sub hor frac @47.85, ang frac w/ minor coal @48.1, 48.7, clean ang frac @48.9, sub hor frac w/ coal @49.15	49.25									
SANDSTONE: light gray (N7), med./fine grained, sub horiz. fract. w/ minor coal @49.3	1849.23 50.00	50								
SANDSTONE: light gray (N6.5), fine grained, sub horiz. fract. w/ minor coal @ 50.4, 50.8	1848.48 50.80			RC06	RC		REC 54% RQD 34.2%			
SANDSTONE: light gray (N6), fine grained, horiz. fracture @ 50.95	1847.68 50.95									
SANDSTONE: light gray (N6), med./fine grained	1847.53									
SANDSTONE: light gray (N6), fine grained, pitted sub horiz. fract. minor coal @51.2, 51.55, 51.8, clean horiz. fract. @51.3, angular fract. w/ coal @51.4, fract. trace no seperation @ 51.7, large milky white quartz pebbles f/m 51.65-51.7	51.00 1847.48 51.80 1846.68 52.50									
SANDSTONE: light gray (N6.5), fine grained, angular fract. w/ coal & sand @52.1, large inclusion of 10YR 4/2 f/m 52.15-52.2, horiz. fract. w/ coal & sand @52.35, sub. horiz. fract. w/ coal (faint slickenlines) @52.6	1845.98 52.60 1845.88 53.50	55								
SANDSTONE: very light gray (N8), med./fine grained	1844.98									
SANDSTONE: light gray (N7), fine grained, sub horiz. fract. w/ coal @ 52.7, vert. fract. trace f/m 53.1-53.3, horiz. fract. w/ coal @53.1, 53.5, stylolites @52.84, 52.9, 53.05	54.25 1844.23 54.50 1843.98									
SANDSTONE: light gray (N6.5), fine grained, horiz. fract. w/ mica @53.7, fract. w/ minor pitting @ 54	54.75 1843.73									
SANDSTONE: pale brown (5YR 5/2), fine grained	54.80									
SANDSTONE: light gray (N6.5), fine grained, stylolite @54.83	1843.68 54.85									
SANDSTONE: pale brown (5YR 5/2), fine grained	1843.63									
SANDSTONE: very light gray (N8), med./fine grained,	55.70 1842.78									

SAMPLER TYPE

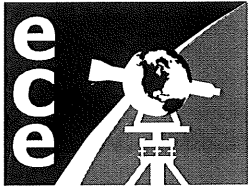
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

Client City of Crossville Boring # 6
 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 570527.972 Easting 2231491.683
 Date Started 8/9/04 Hammer Wt. 140
 Date Completed 8/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
horiz. fract. w/ coal @54.9	55.90 1842.58 58.25 1840.23 58.50 1839.98		[Hatched Pattern]	RC07	RC		RQD 40.7%			
FRACTURED SANDSTONE: light gray (N6.5), fine grained, horiz. fract. w/ coal @ 55.32, 55.45, 55.5, 55.6, 55.7	59.25 1839.23 59.70 1838.78		[Dotted Pattern]							
Missing										
SANDSTONE: light gray (N6.5), fine grained, vert. fract. trace f/m 55.9-56.1, stylolite @ 56.15, angular fract. w/ slickenlines @ 57.15, sub horiz. fract. @ 57.6, 57.85	59.75 1838.73 60.20		[Dotted Pattern]							
SANDSTONE: med. gray (N4), fine grained, horiz. fract. w/ coal @ 58.42	1838.28 61.80	65	[Dotted Pattern]							
SANDSTONE: light gray (N6.5), fine grained, horiz. fract. w/ coal @ 58.6, 58.85	1836.68 62.00		[Dotted Pattern]							
SANDSTONE: pale brown (5YR 5/2), fine grained, stylolites @ 59.42, 59.65, sub horiz. fract. w/ coal @ 59.45, vert. fract. trace offset by stylolite @ 59.65 f/m 59.58-59.7	1836.48 63.00 1835.48 63.25		[Dotted Pattern]							
SANDSTONE: brownish gray (5YR 4/1), fine grained, stylolite @ 59.7, sub horiz. fract. w/ coal @ 59.75	1835.23 63.35		[Dotted Pattern]							
SANDSTONE: pale brown (5YR 5/2), fine grained, fract. w/ coal @ 59.92, 60.15	1835.13 63.50		[Dotted Pattern]							
FRACTURED SANDSTONE: light gray (N6.5), fine grained, vert. fracture f/m 60.15-60.4, horiz. fract. w/ coal @ 60.4, 61, 61.15, 61.4, 61.8, stylolites @ 60.45, 60.95	1834.98 64.75 1833.73 64.95	70	[Dotted Pattern]	RC08	RC		REC 107.25% RQD 50%			
Missing	1833.53									
SANDSTONE: light gray (N6.5), fine grained, vert. fract. f/m 62-62.2	65.60 1832.88		[Dotted Pattern]							
SANDSTONE: light gray (N7), med./fine grained, sub horiz. fract. w/ minor coal @ 63.1	65.70 1832.78		[Dotted Pattern]							
SANDSTONE: light gray (N6.5), fine grained	66.65									
SANDSTONE: light gray (N6.5), med./fine grained, sub horiz. fract. @ 63.65, small minor pitting	1831.83 67.45		[Hatched Pattern]							
SANDSTONE: light gray (N6.5), fine grained, stylolite @ 64.05, vert. fract. trace from 63.7-63.9	1831.03 68.00		[Dotted Pattern]							
SANDSTONE: pale brown (5YR 4/1), fine grained,	1830.48 70.25		[Hatched Pattern]							

SAMPLER TYPE

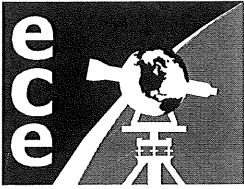
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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



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 Date Completed 8/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
stylolite @ 64.65	1828.23 71.35 1827.13 72.00									
SANDSTONE: light gray (N6.5), fine grained, stylolites @ 64.85, 65.48, 65.52, 65.6	1826.48 72.80			RC09	RC		REC 83.75% RQD 45.3%			
SANDSTONE: pale brownish gray (5YR 5/1), fine grained, horiz. fract. w/ coal	1825.68 76.00									
SANDSTONE: light gray (N6), fine grained, vert. fract. trace f/m 66.37-66.65	1822.48 76.25									
SANDSTONE: light gray (N6.5), fine grained, horiz. fract. @ 67.45, slightly pitted w/ coal	1822.23 79.00									
SANDSTONE: light gray (N6.5), fine grained, horiz. fract. @ 67.7 w/ coal, stylolites @ 67.75, 67.85, 67.9	1819.48 79.23	80								
No Sample	1819.25			RC10	RC		REC 33.3% RQD 30.2%			
SANDSTONE: light gray (N6), fine grained, horiz. fract. @ 70.3, pitted w/ coal, stylolites @ 70.35, 70.86, 70.9, fract. @71, minor pitting, horiz. fract. @ 71.35	1818.98 79.60									
SANDSTONE: light brown reddish gray (5YR 6/1), fine grained, vert. fract. trace @ 71.35-71.55, clean horiz. fract. @ 71.55 (false?), fract. @ 72 w/ coal	1818.88 80.00 1818.48									
FRACTSANDSTONE: light gray(N6.5), finegrain, ang frac w/coal@72.8,76.15,vert frac@72.8-72.9,vertfrac f/m73.55-74.1,&74.3-75.05, hvy pitted hor frac@74.1,lrg inclusion (5YR4/4) f/m74.15-74.2,hor frac@74.3,stylolites@75.18,75.7,75.8,75.85,frac @76w/ lite pits	85.25	85								
Missing	1813.23			RC11	RC		REC 36.4% RQD 31.2%			
SANDSTONE: light gray(N6.5), fine grained, many stylolites throughout section, sub horiz. fract. w/ coal @ 77, stylolites @77.6,77.78,77.9,77.94,77.97,77.99,78,78.93, horiz. fract. w/ coal @78.1, clay inclusions @ 78.15-78.2, vert. fract. f/m 78.52-79	85.50 1812.98 85.00 1812.58									
Missing										
SANDSTONE: light gray(N6.5), fine grained, coal fracture @79.23, beginning of vert. fract. f/m 79.5-80										
SANDSTONE: light gray(N7), med/fine grained, coarser zone, continuation of vert. fract. f/m 79.5-80										
	90.00	90								

SAMPLER TYPE

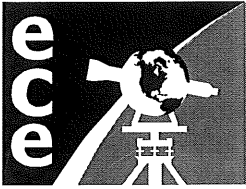
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GROUND WATER DEPTH

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

BORING METHOD

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SURFACE ELEVATION - 1898.48										
SANDSTONE: light gray(N6.5), fine grained, end of vert. fract. f/m 79.5-80, minor coal	1808.48									
SANDSTONE: light gray(N6), fine grained, vert. fract. f/m 80-80.35, very "dirty" discont. coal seams 80.35-82.75, horiz. fract. @82.75, 82.83, 82.87, 82.95, ang. fract. @83, horiz. fract. @83.15, 83.55, 84.2, 84.55, 84.75, ang. fract. w/coal @85	92.50									
SANDSTONE: pale brown(5YR 5/2), fine grained, facies change	1805.98									
SANDSTONE: light gray (N6), fine grained, fract. @ 85.75, small pitting, fract. @ 85.9 w/ clay										
FRACTURED SANDSTONE: light gray (N6.5), fine grained, horiz. fract. w/ coal @ 86.1, 86.4, 87.1, vug @ 87.26-87.29, horiz. fract. @ 87.35, 87.9, 89, sub horiz. fract. w/ coal @ 88.8, 89.5, 90, stylolite @ 89.43, 89.8	95									
SANDSTONE: light brown reddish gray (5YR 6/1), fine grained										
FRACSNDSTN: Litebrwnredgray(5YR6/1), fine grain, fracw/minorpits@91.2, 92.5(ang), 92.7(20%coal), horfrac@92.95, 93.15, 93.9, 94.55allw/minor tracesofcoal&nopits, horfrac@94.8(50%coal), 95.1(50%coal), 95.65, subhorfracw/coal@95.8, angfracw/coal@96.4, vertfrac96.6-96.8	96.80 1801.68 97.90 1800.58									
SANDSTONE: light brown reddish gray (5YR 6/1), fine grained, stylolite @ 96.97, horiz. fract. w/ coal & a light gray mud @97, stylolite @ 97.38, sub horiz. fract. w/coal and mud @ 97.65, sub horiz. fract. w/ coal @ 97.9	98.90 1799.58 100.10	100								
SANDSTONE: dark gray(N3), fine grained, mottled, significantly darker horizon, significantly more coal present, fracture w/ coal @ 98.3, fracture w/ coal @ 98.9	1798.38 100.90 1797.58									
SANDSTONE: light gray (N6.5), fine grained, vert. fract. f/m 98.9-99.1, light FeO2 staining throughout section	102.70									
SANDSTONE: light gray (N6), fine grained	1795.78									
SANDSTONE: brownish gray (5YR 4/1), fine grained, mottled ang. fract. zone f/m 101-101.25, sub horiz. fract. @ 102.25, vert. fract. f/m 102.25-102.7 w/bifurcating horiz. fract. @ 102.38 & 102.53, ang. fract. w/ coal @ 102.7 (probably a seam)	104.00 1794.48 105.05									
		105								

REC 64.9%
RQD 51.59%

RC12 RC

SAMPLER TYPE

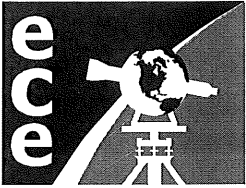
SS - DRIVEN SPLIT SPOON
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GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.
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 WATER ON RODS _____ FT.

BORING METHOD

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SURFACE ELEVATION - 1898.48										
SANDSTONE: light gray (N6), fine grained, ang. fract. w/ coal @ 103, frags. @ 103.3, 103.6, 104, fract. @ 104 w/ coal	1793.43 105.15 1793.33									
SANDSTONE: medium gray (N5), fine grained, coal seams becoming more pervasive, stylolites @ 104.5, 104.8, sub horiz. fract. w/ coal @ 105.05	105.45 1793.03 105.55									
SANDSTONE: brownish gray (5YR 4/1), fine grained	1792.93									
SANDSTONE: medium gray (N5), fine grained, stylolite @ 105.45	105.65 1792.83									
SANDSTONE: dark gray (N3), fine grained, fract. w/ coal @ 105.55, area of concentrated coal seams	105.85 1792.63									
SANDSTONE: medium gray (N5), fine grained	106.25									
SANDSTONE: med. dark gray (N4), fine grained, thinly laminated coal seams, fract. w/ coal @ 107.8	1792.23 108.35	110		RC13	RC		REC 74.7% RQD 55.3%			
SANDSTONE: dark yellowish brown (10YR 4/2), fine grained, frags. @ 106.15, 106.2	1790.13 110.80									
SANDSTONE: brownish gray (5YR 4/1), fine grained, vert. fract. f/m 107.55-108, sub horiz. fract. w/ coal @ 108, mottled brown gray, angular fract. @ 108.2, 108.35	1787.68 112.25									
SANDSTONE: med. gray (N5), fine grained, numerous small coal seams, sub horiz. fract. w/ coal & one sm <1cm area of pyrite fract. @ 109.1, fract. w/ coal w/ minor trace of pyrite @ 110, sub horiz. fract. w/ bituminous coal @ 110.5	1786.23 113.00 1785.48 113.70 1784.78									
SANDSTONE: light gray (N6.5), med./fine grained, concentrated area of buffers w/ coal seam stylolites, angular fract. w/ highly bituminous coal @ 111.5	115.00 1783.48	115								
SANDSTONE: moderate brown (5YR 3.5/4), fine grained, sharp facies change below an area of concentrated stylolites										
SANDSTONE: pale brownish gray (5YR 5/1), fine grained, concentrated area of stylolites, gradational color change, horiz. frags. @ 113.28, 113.4, 113.7 all w/ coal										
SANDSTONE: light gray (N6), fine grained, sub horiz. fract. w/ minor coal @ 114, many small coal stylolites, angular fract. w/ lots of bituminous coal @ 114.45-114.7	118.00 1780.48			RC14	RC		REC 102% RQD 89%			
COAL: coal (N1), coal seam per ECE	119.50 1778.98									

SAMPLER TYPE

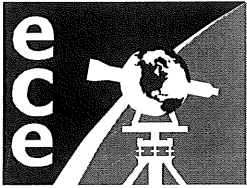
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GROUND WATER DEPTH

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SURFACE ELEVATION - 1898.48										
SANDSTONE: light gray (N6), very fractured w/ numerous small coal stylolites concentrated between 118-119.4, horiz. fract. w/ heavily bituminous coal @ 119.4	120.00 1778.48 121.00 1777.48									
SANDSTONE: light brown reddish gray (5YR 6/1), fine grained, more compact than above, minor coal stylolites, definite change, angular fract. w/ minor coal @ 120	121.25 1777.23									
FRACTURED SANDSTONE: pale grayish brown (5YR 4/2), fine grained, numerous healed fract. w/ quartz replacement, clay included	123.00 1775.48			RC15	RC		REC 64.5% RQD 48.7%			
SANDSTONE: light gray (N6), fine grained, gradational transition from above, almost no clay inclusions or fractures, very competent	125.00 1773.48	125								
SANDSTONE: light gray (N6.5), fine grained, many pieces missing, appears to be fracture zone Core barrel jammed, no recovery										
SANDSTONE: light gray (N7), fine grained, ang. fract. w/ small crystal pyrite @ 125, 125.44, 125.91, stylolite @ 126.25, ang. fract. @ 126.4, horiz. fract. @ 126.55, vert. fract. trace f/m 126.55-126.75	127.00 1771.48 127.30 1771.18									
FRACTURED SANDSTONE: light gray (N7), fine grained, fract. zone, ang. fract. w/ minor coal @ 127, 127.3										
SANDSTONE: light gray (N7), fine grain, ang. fract. w/ coal @ 127.5, very ang. fract. @ 127.7-128, hor. fract. @ 128.3, solid w/ nostyls. (clean/compt.) f/m 127.5-131, hor. fract. @ 130.5, 132.6, (w/pits @ 130.2, 130.85, 131), hor. fract. w/ coal @ 131.45, 131.53, 132.34, ang. fract. @ 131.9, stylolite @ 132.4, 132.43		130								
	132.50									
SANDSTONE: light gray (N6), fine grained, horiz. fract. w/ some mud present @ 132.7, horiz. fract. (man-made?) @ 132.9	1765.98 133.25 1765.23									
SANDSTONE: light gray (N7), fine grained, fract. @ 133.73, grad. color change from above	133.75 1764.73									
SANDSTONE: light gray (N7), fine grained, horiz. fract.							REC 55.4%			

SAMPLER TYPE

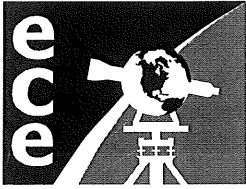
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GROUND WATER DEPTH

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SURFACE ELEVATION - 1898.48										
@ 135.25, 136.1, 136.5, 140.25, 141.7 w/ mod. pitting, 135.7 w/ heavy pitting, 137.2 w/ minor pitting, smooth horiz. fract. @ 142		140		RC16	RC		RQD 43.1%			
SANDSTONE: light brown reddish gray (5YR 6/1), fine grained, ang. fract. w/ coal @ 143 occurring in the middle of stylolite area, stylolites @ 142.94, 143.05, 143.13, horiz. fract. w/ coal @ 144.35	142.90									
SANDSTONE: grayish brown (5YR 3/2), fine grained, browner area w/ thinly laminated coal seams between 144.65-144.7, horiz. fract. w/ minor coal @ 144.7	1755.58									
SANDSTONE: light gray (N6.5), fine grained, sub horiz. frags. w/ mod. pitting @ 146.25 and 146.43	144.35									
SANDSTONE: medium gray (N5.5), fine grained, sub horiz. frags. w/ fine pitting & some residual clay @ 147.75, 148.55, 148.67, 150.4, sub horiz. frags. @ 151, 151.3, 151.9, all smooth	1754.13	145		RC17	RC		REC 102% RQD 82%			
	144.70									
	1753.78									
	147.00									
	1751.48									

SAMPLER TYPE

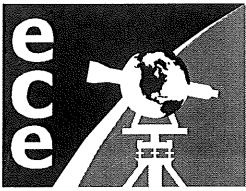
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GROUND WATER DEPTH

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 WATER ON RODS _____ FT.

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SURFACE ELEVATION - 1898.48										
				RC18	RC		REC 79% RQD 77%			
INTERBEDDED SANDSTONE: medium gray (N5), fine grained, w/ a much higher component of thinly bedded coal seams, has tints of 5YR 4/1, sharp and smooth horiz. fract. @ 152.3, 152.4, 152.7, 153.16	152.00 1746.48									
SANDSTONE: medium gray (N5.5), fine grained, sub horiz. fract. w/ coal and minor pitting @ 153.45, sub horiz. fract. @ 154, 50% coal thin layer, minor pitting	153.20 1745.28 154.00 1744.48									
SANDSTONE: light gray (N6.5), fine grained, sub horiz. fract. w/ coal @ 154.5, 154.8, 155.1, coal is 50% not well developed	155.10 1743.38	155								
SANDSTONE: brownish gray (5YR 4/1), fine grained, mottled brown gray w/ some cross grain of quartz visible, vert. fract. trace the whole length	155.75 1742.73 155.85 1742.63									
SANDSTONE: yellowish brown (10YR 6/2), med./fine grained, larger grain, mottled brownish gray w/ large <1/4" subrounded pieces of milky white qtz, similar in size to small pbls >25% f/m 155.93-156.7 not as concn. as above but 7-10% milky white qtz pbls	156.70 1741.78 158.25 1740.23			RC19	RC		REC 87.7% RQD 73.5%			
COAL: coal (N1), dull, soft, not bituminous										
SANDSTONE: yellowish brown (10YR 6/2), med. fine grained, mottled brownish gray										
SANDSTONE: light gray (N6), fine grained, vert. fract. f/m 158.37-158.83, vert. fract. f/m 159.84-160, sub horiz. fract. @ 159.55	160.00 1738.48	160								
Missing	161.00									
SANDSTONE: light gray (N6.5), fine grained, sub horiz. fract. w/ mod. pitting @ 161.31, sub horiz. fract. w/ minor pitting @ 162.88, vert. fract. f/m 163.1-163.35, clear horiz. fract. @ 163.35	1737.48									
SANDSTONE: light gray (N6), fine grained, vert. fract. f/m 163.35-163.73, clear horiz. fract. @ 163.55 and 164.1	163.35 1735.13 164.10									
SANDSTONE: light gray (N6.5), fine grained, ang. fract. w/ minor pitting @ 165	1734.38 165.00									

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 # 6
 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

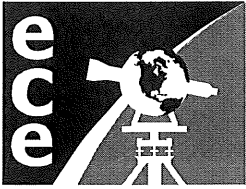
Northing 570527.972 Easting 2231491.683
 Date Started 8/9/04 Hammer Wt. 140
 Date Completed 8/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
FRACTURED SANDSTONE: light gray(N6), fine grained, thin beds of brown 5YR 4/1, more stylolites, ang. frags. @ 165.34,165.85,166.35,166.65,166.8,167.3,167.4, all except 166.35 have moderately fine pitting	1733.48									
FRACTURED SANDSTONE: light gray(N6.5), med./fine grained, ang. frags. w/ moderately fine pitting @ 168.4, 168.85, 169.6, 170, 170-170.15 large milky quartz crystals	168.00 1730.48									
FRACTURED SANDSTONE: light gray (N6), fine grained, horiz. frags. @ 170.6, 170.9, 171.3, 171.4, 171.8, frags. @ 171.4 and 171.8 have moderately fine pitting	170.15 1728.33	170		RC20	RC		REC 101.6% RQD 87.6%			
SANDSTONE: light gray(N6), fine grained, sub horiz. fract. w/ heavy pitting & coal @ 172.45, horiz. fract. w/ mod. fine pitting @ 172.63, ang. fract. w/ fine pitting @ 180.05, ang. fract. w/ coarse pitting @ 180.4 & 181.2, sub horiz. fract. (man-made?) @ 181.9	171.80 1726.68	175								

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

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SURFACE ELEVATION - 1898.48										
	181.90									
SANDSTONE: light gray (N6), fine grained, ang. frags. @ 183.15 & 183.34, both have heavy coarse pitting w/ a man-made vert. fract. between them	1716.58									
	183.34									
FRACTURED SANDSTONE: brownish gray (5YR 4/1), fine grained, vert. fract. f/m 183.34-184.1, more coarse grained white quartz possibly crossbedded, frags. @ 183.9, 184.25, 184.45, 184.5, 184.6	1715.14									
	185.00	185								
SANDSTONE: light gray (N6), fine grained, bituminous coal on jagged fract. @ 185.7, ang. fract. w/ minor fine pitting @ 186.17	1713.48									
	186.85									
Missing	1711.63									
	190.00									
SANDSTONE: light gray (N6), fine grain, vert. fract. f/m 190-190.55, ang. frac w/ minor fine pits @ 190.95, ang. frac w/ deep hvypits & coal @ 191.35, ang. frac w/ deep hvypits @ 192, sub hor frac/ minor med pits, ang. frags w/ mod fine pits @ 194.7, 194.8, 195.15, 196, 196.9, 197.55, sub hor frac @ 198.4	1708.48	190								
	195									

SAMPLER TYPE

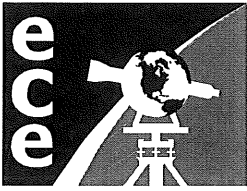
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GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.
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 WATER ON RODS _____ FT.

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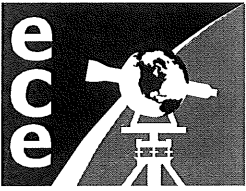
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / ROD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1898.48										
	198.75									
SANDSTONE: light gray (N6.5), fine grained, sub horiz. fract. @ 199.35, w/ a minor piece of coal: sharp contact w/ below	1699.73 199.35 1699.13									
SANDSTONE: light gray (N7), coarse grained, vert. fract. runs from 199.35-199.8, visible quartz crystals	200.00 1698.48	200								
Terminated Rockcore at 200'										
		205								
		210								

SAMPLER TYPE
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 ST - PRESSED SHELBY TUBE
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GROUND WATER DEPTH
 ∇ AT COMPLETION N/A FT.
 ∇ AFTER _____ FT.
 WATER ON RODS _____ FT.

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 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

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Northing 571357.48 Easting 2236495.69
 Date Started 9/9/04 Hammer Wt. 140
 Date Completed 9/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
FILL: limestone fill (ECE notes)	1.25									
WEATHERED SANDSTONE: weathered red/tan sandstone, auger refusal @ 10 feet (ECE notes)	1862.27	5								
FRACTURED SANDSTONE: light brown reddish gray (5R 6/2), fine grained, fractured and weathered extensively	10.00 1853.52	10		RC01	RC		REC 12.5% RQD 0%			
		15								

SAMPLER TYPE

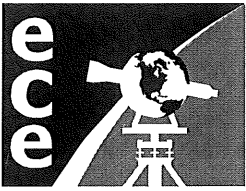
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 ST - PRESSED SHELBY TUBE
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 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
	16.00									
FRACTURED SANDSTONE: light gray (N7), fine grained	1847.52									
	17.50									
INTERBEDDED SANDSTONE: med. dark gray (N4.5), fine grained, interbedded shale and sandstone, angular and vert. fractures w/ micaceous shale	1846.02			RC02	RC		REC 22.5% RQD 3.5%			
	20.25	20								
SANDSTONE: gray (N6), fine grained, sub horiz. fractures w/ gray mud @ 21.75, 22	1843.27									
	22.00									
SANDSTONE: light gray (N7), fine grained, sub horiz. fract. w/ FeO2 staining @ 22.8, 23.2, 30.4, 30.5	1841.52			RC03	RC		REC 29% RQD 4.5%			
		25								
		30								

SAMPLER TYPE

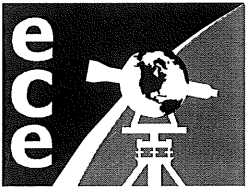
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GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.
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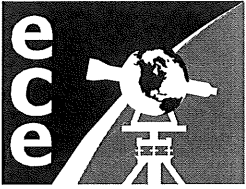
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 Date Started 9/9/04 Hammer Wt. 140
 Date Completed 9/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
	30.75									
SHALE: med. dark gray (N4), fine grained, extensively fractures shale micaceous	1832.77	31.25								
SANDSTONE: gray (N6), fine grained, sub horiz. fractures w/ gray mud @ 31.55, 31.65, 31.8, 32	1832.27	32.00								
INTERBEDDED SANDSTONE: gray (N6), fine grained, horiz. wavy subparallel shale laminations, fractured into ~1inch pieces	1831.52									
		35								
		40								
		41.50								
SHALE: drak gray (N3), fine grained, micaceous, extensively fractured chips <1inch	1822.02	42.00								
INTERBEDDED SHALE: dark gray (N3), micaceous, near vertically bedded (+/-70%), parallel lenticular interbeds of fine grained gray (N6) sandstone, fractured into ~1inch pieces	1821.52	43.00								
		44.00								
SHALE: dark gray (N3), fine grained, micaceous, extensively fractured chips <1inch	1820.52									
		45								
				RC04	RC		REC 26% RQD 0%			

SAMPLER TYPE
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GROUND WATER DEPTH
 ▽ AT COMPLETION N/A FT.
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
		50		RC05	RC		REC 16% RQD 4%			
INTERBEDDED SHALE: dark gray (N3), near vertically bedded (+/-70%), 40% parallel lenticular interbeds of gray N6 sandstone, fractured near vertical along shale beds	52.00 1811.52									
		55								
SHALE: dark gray (N3), fine grained, micaceous, extensively fractured shards ~1inch	55.50 1808.02			RC06	RC		REC 38.5%			
		60								

SAMPLER TYPE

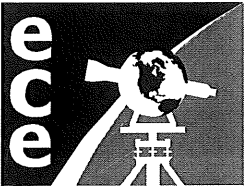
SS - DRIVEN SPLIT SPOON
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GROUND WATER DEPTH

▽ AT COMPLETION N/A FT.
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 WATER ON RODS _____ FT.

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SURFACE ELEVATION - 1863.52										
	62.00						RQD 13.5%			
INTERBEDDED SHALE: dark gray (N3), near vertically bedded (+/-70%), 20% parallel interbeds of gray N6 sandstone, fractured near vertical along shale beds some fracture planes exhibit slickenlines	1801.52	63.00								
INTERBEDDED SANDSTONE: gray (N6), fine grained, horiz. wavy subparallel shale laminations, fractured into ~1inch pieces	1800.52	64.00								
INTERBEDDED SHALE: dark gray (N3), near vertically bedded (+/-70%), 20% parallel interbeds of gray N6 sandstone, fractured near vertical along shale beds some fracture planes exhibit slickenlines	1799.52	65								
		70		RC07	RC		REC 26% RQD 19%			
	71.75									
SHALE: dark gray (N3), appears massively bedded and relatively solid	1791.77	72.00								
INTERBEDDED SHALE: dark gray (N3), near vertically bedded (+/-70%), 20% parallel interbeds of gray N6 sandstone, fractured near vertical along shale beds some fracture planes exhibit slickenlines	1791.52									
		75								

SAMPLER TYPE

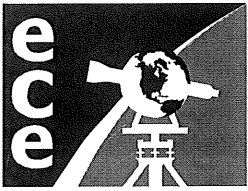
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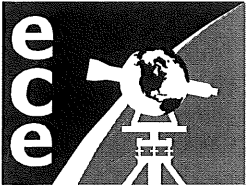
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SURFACE ELEVATION - 1863.52										
				RC08	RC		REC 21.25% RQD 0%			
INTERBEDDED SANDSTONE: gray (N6), fine grained, shale laminations fractured into ~1inch pieces	1781.52	80								
SHALE: dark gray (N3), fine grained, micaceous, extensively fractures chips <1inch	1779.52	82.00		RC09	RC		REC 60% RQD 0%			
INTERBEDDED SANDSTONE: gray (N6), fine grained, angular fractures w/ shale @ 85, 85.2, 85.55, w/ plastic deformation of lenticular shale bedding	1778.52	84.00								
SANDSTONE: light gray (N7), fine grained, numerous discontinuous shale laminae, angular fractures along wavy shale laminations @ 86, 86.2, 86.33, 86.5, 86.8, 86.9	1777.52	85								
SHALE: dark gray (N3), fine grained, micaceous, extensively fractured shards ~1inch	1776.52	86.00								
SANDSTONE: light gray (N7), fine grained, sub horiz. fract. along shale laminations @ 91.6, 91.85, 92	1776.02	87.00								

SAMPLER TYPE
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GROUND WATER DEPTH
 ∇ AT COMPLETION N/A FT.
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 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 571357.48 Easting 2236495.69
 Date Started 9/9/04 Hammer Wt. 140
 Date Completed 9/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
	92.00			RC10	RC		REC 40% RQD 6.4%			
SANDSTONE: light gray(N7), fine grained, numerous discontinuous shale laminae, irreg. frags. along lenticular shale laminations @92.2,92.75,93.9, ang. frags. along shale laminations @93.8,94.35,94.45,94.5,94.75,94.9, clean ang. frags.@92.55,92.95,93.4	1771.52									
	94.90									
SHALE: dark gray (N3), fine grained silty, micaceous, begins f/m 94.9-95.1 as a wavy subparallel interbedded shale becoming extensively fractured	1768.62	95								
	95.90									
SANDSTONE: gray (N6), fine grained, angular frags. w/ shale @ 95.9, 96.5, 97	1767.62									
	97.00			RC11	RC		REC 94% RQD 50%			
SANDSTONE: light gray (N7), fine grained, numerous near vertical discontinuous non parallel shale laminae, angular frags. along shale laminations @ 97.2, 97.6, 98, 98.3, 98.6, 98.7, clean horiz. fract. @ 98.9	1766.52									
	98.90									
SANDSTONE: light gray (N7), fine grained, a few discontinuous near vertical shale laminae, clean irregular fract. @ 101.1	1764.62									
	100									
FRACTURED SANDSTONE: light gray (N7), fine grained, some near vertical discontinuous shale laminae	101.10 1762.42			RC12	RC		REC 76% RQD 45%			
	102.00									
FRACTURED SANDSTONE: gray (N6), fine grained, intense near vertical fracturing along nearly vertical shale interbeds, some fractures exhibit slickenlines	1761.52									
	103.00									
SANDSTONE: light gray (N7), fine grained, a few discontinuous near vertical shale laminae, clean irregular fracture @ 103.75	1760.52 103.75 1759.77									
	104.00									
FRACTURED SANDSTONE: gray (N6), fine grained, intense near vertical fracturing along nearly vertical	1759.52									
	105									

SAMPLER TYPE

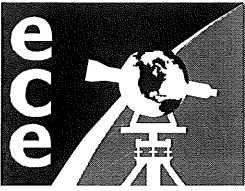
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 12
 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 571357.48 Easting 2236495.69
 Date Started 9/9/04 Hammer Wt. 140
 Date Completed 9/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
shale interbeds, some fractures exhibit slickenlines										
SANDSTONE: light gray (N7), fine grained, a few discontinuous near vertical shale laminae, clean irregular fracture @ 103.75				RC13	RC		REC 52.5% RQD 23.5%			
		110								
		111.00								
FRACTURED SANDSTONE: gray (N6), fine grained	1752.52									
	112.00									
SANDSTONE: light gray (N7), fine grained, a few discontinuous near vertical shale laminae, angular fract. w/ shale @ 112.1	1751.52									
	112.50									
	1751.02									
FRACTURED SANDSTONE: gray (N6), fine grained, intense near vertical fracturing along nearly vertical shale interbeds, some fractures exhibit slickenlines	113.00									
	1750.52									
	114.00									
SANDSTONE: light gray (N7), fine grained, a few discontinuous near vertical shale laminae, angular fracture w/ shale @ 113.3, angular fracture w/ slickenlines @ 113.5, irregular fracture w/ shale @ 113.8	1749.52									
	115									
FRACTURED SANDSTONE: gray (N6), fine grained, intense near vertical fracturing along nearly vertical shale interbeds, some fractures exhibit slickenlines				RC14	RC		REC 40% RQD 13.75%			

SAMPLER TYPE

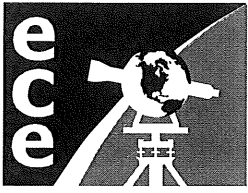
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 12
 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 571357.48 Easting 2236495.69
 Date Started 9/9/04 Hammer Wt. 140
 Date Completed 9/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
SANDSTONE: light gray (N7), fine grained, trace angular shale laminae, clean angular fracture @ 120.8	120.50 1743.02									
SANDSTONE: light gray (N7), fine grained, clean irregular fracture @ 122.25, clean angular fractures @ 122.45, 123.1 clean horiz. fractures @ 122.65, 122.83	122.00 1741.52									
FRACTURED SANDSTONE: gray (N6), fine grained, intense near vertical fracturing along nearly vertical shale interbeds, some fractures exhibit slickenlines	123.10 1740.42 124.00 1739.52									
SANDSTONE: light gray (N7), fine grained, many near vertical shale laminae, angular fractures w/ shale @ 124.15, 124.7, 124.9, 125.15, 125.4, clean horiz. fractures @ 125.67, 125.9		125		RC15	RC		REC 55.4% RQD 40.6%			
		130								
		135		RC16	RC		REC 40.5% RQD 24.75%			

SAMPLER TYPE

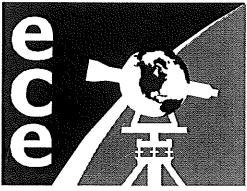
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 12
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
 Project Name Meadow Park Dam Drawn By Mary Beth Elrod, E.I.
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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 571357.48 Easting 2236495.69
 Date Started 9/9/04 Hammer Wt. 140
 Date Completed 9/9/04 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1863.52										
	138.00			RC17	RC		REC 75.7% RQD 74.3%			
Terminated Rockcore at 138'	1725.52									
		140								
		145								
		150								

SAMPLER TYPE

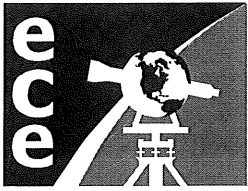
- SS - DRIVEN SPLIT SPOON
- ST - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

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 # 13
 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 572499.5036 Easting 2235753.519
 Date Started 7/24/09 Hammer Wt. 140
 Date Completed 7/30/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. TRI-CONE
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1821.65										
Soil/gravel mix										
REFUSAL at 2.25' - Begin TRI-CONE and video logging	2.25									
very light gray SANDSTONE, some light brown staining	1819.40									
VOID - SANDSTONE fragments/gravel	3.60									
very light gray SANDSTONE, some moderate orange pink SANDSTONE	1818.05									
some oxidation/staining	3.80									
	1817.85	5								
	5.00									
	1816.65									
	7.40									
moderate brown SANDSTONE banding	1814.25									
	8.40									
moderate brown SANDSTONE banding	1813.25									
angular fracturing with oxidation	8.80									
some grayish black SHALE or COAL	1812.85									
	9.30									
	1812.35	10								
	11.60									
very light gray SANDSTONE interbedded with grayish black SHALE	1810.05									
	13.00									
Unable to video log from 13' BGL to bottom of hole at 72' BGL due to water and other obstructions in borehole	1808.65									

SAMPLER TYPE

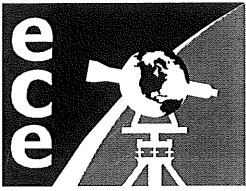
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 13
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Northing 572499.5036 Easting 2235753.519
 Date Started 7/24/09 Hammer Wt. 140
 Date Completed 7/30/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. TRI-CONE
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1821.65										
		20								
		25								
		30								

SAMPLER TYPE

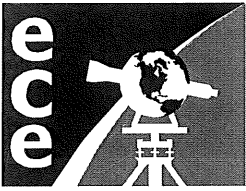
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 13
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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 572499.5036 Easting 2235753.519
 Date Started 7/24/09 Hammer Wt. 140
 Date Completed 7/30/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. TRI-CONE
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1821.65										
		35								
		40								
		45								

SAMPLER TYPE

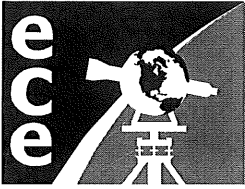
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 13
 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 572499.5036 Easting 2235753.519
 Date Started 7/24/09 Hammer Wt. 140
 Date Completed 7/30/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. TRI-CONE
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1821.65										
		50								
		55								
		60								

SAMPLER TYPE

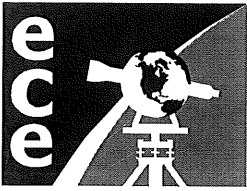
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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



ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 13
 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 572499.5036 Easting 2235753.519
 Date Started 7/24/09 Hammer Wt. 140
 Date Completed 7/30/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. TRI-CONE
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1821.65										
		65								
		70								
Terminated TRI-CONE Rockcore at 72'	72.00									
	1749.65									
		75								

SAMPLER TYPE

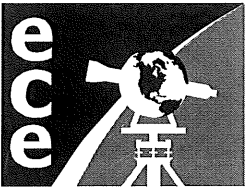
GROUND WATER DEPTH

BORING METHOD

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

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

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 # 14
 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 572561.1447 Easting 2235711.2867
 Date Started 7/30/09 Hammer Wt. 140
 Date Completed 8/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector TRIGONE&NXB WL Rock Core TRIGONE&NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49	0.00									
Begin TRI-CONE and video logging	1834.49									
topsoil/gravel mix	0.70									
SANDSTONE fragments/gravel	1833.79									
	1.70									
very light gray SANDSTONE	1832.79									
		5								
	5.90									
some thin COAL/SHALE partings	1828.59									
angular fractures with oxidation and SHALE	6.40									
	1828.09									
	8.10									
moderate brown SANDSTONE banding	1826.39									
	8.80									
solutional void with oxidation and moderate brown coloration	1825.69									
	9.80									
oxidation with moderate brown coloration	1824.69	10								
	11.20									
angular fractures with oxidation and SHALE	1823.29									
	13.50									
angular fractures with oxidation and staining, some SHALE/COAL seams	1820.99									
	14.00									
angular fractures with oxidation and staining, some SHALE/COAL seams	1820.49									

SAMPLER TYPE

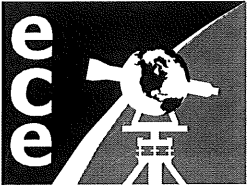
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 14
 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 572561.1447 Easting 2235711.2867
 Date Started 7/30/09 Hammer Wt. 140
 Date Completed 8/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector TRICONE&NXB WL Rock Core TRICONE&NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49										
SHALE/COAL seams	15.50									
fractures with oxidation	1818.99									
	16.10									
	1818.39									
	18.40									
SHALE seam	1816.09									
fractures with oxidation and SHALE	19.20									
gray SANDSTONE interbedded with grayish black SHALE	1815.29	20								
	19.40									
	1815.09									
COAL/SHALE bed	20.90									
	1813.59									
COAL bed	22.00									
COAL bed	1812.49									
oxidation	22.40									
	1812.09									
	22.70									
	1811.79									
solutional voids with oxidation		25								
COAL bed	25.50									
	1808.99									
	26.10									
	1808.39									
fractures with COAL/SHALE	26.90									
	1807.59									
	28.00									
Unable to video log from 28' BGL to 62.5' BGL due to water and other obstructions in borehole, terminated TRI-CONE at 62.5' began NXB Wireline rockcoring	1806.49									

SAMPLER TYPE

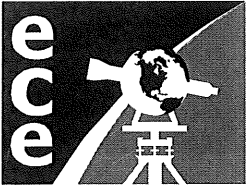
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 14
 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 572561.1447 Easting 2235711.2867
 Date Started 7/30/09 Hammer Wt. 140
 Date Completed 8/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core TRICONE&NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49										
		35								
		40								
		45								

SAMPLER TYPE

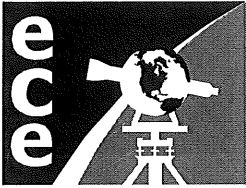
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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Northing 572561.1447 Easting 2235711.2867
 Date Started 7/30/09 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector TRIGONE&NXB WL Rock Core
 Boring Method HSA Shelby Tube O.D.

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49										
		50								
		55								
		60								

SAMPLER TYPE

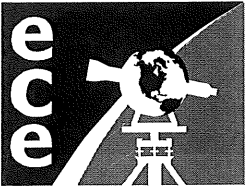
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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 Date Started 7/30/09 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector TRIGONE&NXB WL Rock Core TRIGONE&NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49										
Begin NXB Wireline Rockcore - very light gray SANDSTONE, fine grained, thickly bedded, fresh, competent, moderately fractured, trace moderate brown pitting, trace thinly bedded grayish black SHALE partings, some yellowish orange CLAY staining throughout	62.50 1771.99	65 70 75		RC01	RC		REC 100% RQD 74.32%			

SAMPLER TYPE

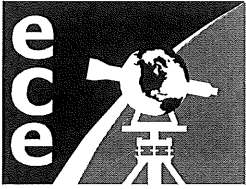
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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 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

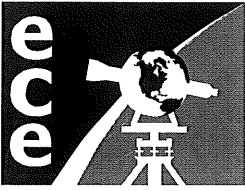
Northing 572561.1447 Easting 2235711.2867
 Date Started 7/30/09 Hammer Wt. 140
 Date Completed 8/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core TRICONE&NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49										
very light gray SANDSTONE, fine grained, thickly bedded, fresh, competent, mod. fractured (some >60deg angular frags.), some thinly bedded grayish black SHALE partings, some yellowish orange CLAY staining, some fracture faces w/ SHALE, trace mod. brown SHALE beds	76.56									
	1757.93	80		RC02	RC		REC 100% RQD 61.2%			
		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
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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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 Date Started 7/30/09 Hammer Wt. 140
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 Inspector _____ Rock Core TRICONE&NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49										
white/very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, competent, moderately fractured (some >60deg angular fract.), trace thinly bedded grayish black SHALE partings, trace SHALE on fracture faces	90.62	1743.87								
	95									
grayish black COAL seam	95.65	1738.84								
white/very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace thinly bedded grayish black SHALE partings	96.19	1738.30								
	96.82									
VOID - contains many grayish black SHALE fragments	1737.67			RC03	RC		REC 83.8% RQD 50.4%			
grayish black SHALE, moderate, aphanitic, laminated, fresh, competent, intensely fractured, covered in light brown silty CLAY	99.15	1735.34								
	100									
light brownish gray SANDSTONE/grayish black SHALE mix, moderate/strong, fine grained/aphanitic, laminated, fresh, competent, intensely fractured, covered in light brown silty CLAY, some COAL at bottom	102.65	1731.84								
	105.00									

SAMPLER TYPE

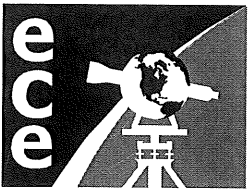
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

AT COMPLETION N/A FT.
 AFTER _____ FT.
 WATER ON RODS _____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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TEST DATA

Northing 572561.1447 Easting 2235711.2867
 Date Started 7/30/09 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core TRICONE&NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.49	1729.49									
Terminated NXB Wireline Rockcore at 105'		110								
		115								
		120								

SAMPLER TYPE

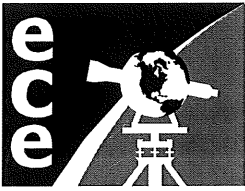
- SS - DRIVEN SPLIT SPOON
- ST - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

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 # 15
 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 572626.2739 Easting 2235648.8374
 Date Started 7/17/09 Hammer Wt. 140
 Date Completed 7/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITHOLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
Soil/Gravel Mix										
REFUSAL at 3.7' - begin NXB wireline rockcoring	3.70									
white weathered SANDSTONE w/yellowish orange clayey SAND residue, strong/moderate, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, mod./intensely fractured, decomposed & disintegrated fracture faces w/yellowish orange stains, some pitting	1843.59	5		RC01	RC		REC 84% RQD 33.5%			
VOID	10.00	10								
white weathered SANDSTONE w/yellowish orange clayey SAND residue, strong/moderate, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, mod./intensely fractured, decomposed & disintegrated fracture faces w/yellowish orange stains, some pitting	11.60			RC02	RC		REC 84% RQD 33.5%			
white weathered SANDSTONE w/ yellowish orange clayey SAND residue, strong/moderate, fine grained, thickly bedded, mod. decomposed, slightly	1835.69									
	13.70									
	1833.59									
		15								

SAMPLER TYPE

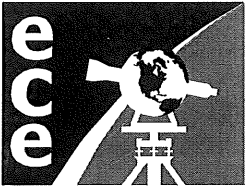
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
disintegrated, moderately fractured, decomposed & disintegrated fracture faces w/ yellowish orange stains, some pitting	18.00			RC03	RC		REC 62.3% RQD 41.6%			
VOID	1829.29	20								
	21.77									
white weathered SANDSTONE w/ yellowish orange clayey SAND residue, strong/moderate, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, moderately fractured, decomposed & disintegrated fracture faces w/ yellowish orange stains, some pitting	1825.52			RC04	RC		REC 62.3% RQD 41.6%			
	23.13			RC05	RC		REC 62.3% RQD 41.6%			
	1824.16									
	23.70									
light gray sandy CLAY seam	1823.59									
white weathered SANDSTONE w/ yellowish orange clayey SAND residue, strong/moderate, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, moderately fractured, decomposed & disintegrated fracture faces w/ yellowish orange stains, some pitting	25.32	25		RC06	RC		REC 35.6% RQD 26.1%			
	1821.97									
VOID - contains light gray sandy CLAY/gravel mix										
	29.31									
white weathered SANDSTONE w/ yellowish orange	1817.98			RC07	RC		REC 35.6% RQD 26.1%			
	29.90	30								

SAMPLER TYPE

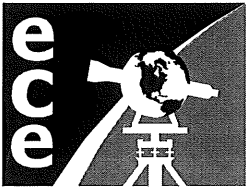
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 572626.2739 Easting 2235648.8374
 Date Started 7/17/09 Hammer Wt. 140
 Date Completed 7/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
clayey SAND residue, strong/moderate, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, moderately fractured, decomposed & disintegrated fracture faces w/ yellowish orange stains, some pitting	1817.39	35		RC08	RC		REC 94%			
	31.00						RQD 61.9%			
white SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, light gray staining, some grayish black thinly bedded SHALE, decomposed & disintegrated fracture faces, some pitting	1816.29	40		RC09	RC		REC 94%			
	31.60						RQD 61.9%			
VOID - contains dried light gray sandy CLAY and grayish black SHALE fragments	1815.69									
white SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, light gray staining, some grayish black thinly bedded SHALE, decomposed & disintegrated fracture faces, some pitting										
	41.90									
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, competent, moderately fractured, trace surface oxidation and light brown/red staining on fracture faces, trace grayish black SHALE, trace pitting	1805.39									

SAMPLER TYPE

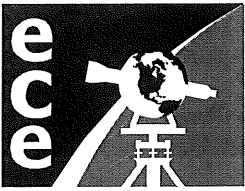
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GROUND WATER DEPTH

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

BORING METHOD

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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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 Date Completed 7/17/09 Hammer Drop 30
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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
				RC10	RC		REC 100% RQD 83.8%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace pitting	51.10 1796.19	50		RC11	RC		REC 100% RQD 89.1%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace pitting, trace grayish black SHALE	54.50 1792.79	55		RC12	RC		REC 100% RQD 74.3%			
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace surface oxidation on fracture faces, trace grayish black SHALE on fracture faces, trace pitting	58.20 1789.09 59.42 1787.87			RC13	RC		REC 100% RQD 61.5%			

SAMPLER TYPE

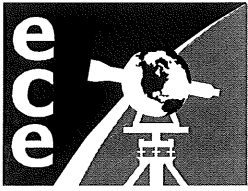
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 CA - CONTINUOUS FLIGHT AUGER
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GROUND WATER DEPTH

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

BORING METHOD

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TEST DATA

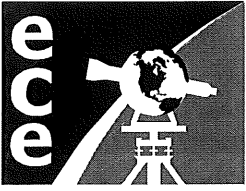
Northing 572626.2739 Easting 2235648.8374
 Date Started 7/17/09 Hammer Wt. 140
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 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace surface oxidation on fracture faces, trace grayish black SHALE on fracture faces, trace pitting	66.89	65	[Lithology: Sandstone with shale partings]	RC14	RC		REC 100% RQD 87.4%			
yellowish/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black SHALE on fracture faces	1780.40	70	[Lithology: Sandstone with shale partings]	RC15	RC		REC 100% RQD 87.4%			
yellowish/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured	1775.53	75	[Lithology: Sandstone]	RC16	RC		REC 100% RQD 66.5%			

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 # 15
 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

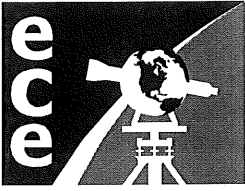
Northing 572626.2739 Easting 2235648.8374
 Date Started 7/17/09 Hammer Wt. 140
 Date Completed 7/17/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
yellowish/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, mod. fractured, some thinly bedded grayish black SHALE partings, many fracture faces w/ SHALE, trace pitting w/ SHALE, trace surface oxidation, trace pinkish gray rock	75.76 1771.53	80		RC17	RC		REC 98.6% RQD 71.7%			
yellowish/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish black SHALE on fracture faces, trace thinly bedded SHALE partings, trace pinkish gray SANDSTONE	85.76 1761.53	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
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Northing 572626.2739 Easting 2235648.8374
 Date Started 7/17/09 Hammer Wt. 140
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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
		95		RC18	RC		REC 99.2% RQD 79%			
yellowish/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, trace grayish black SHALE on fracture faces, trace thinly bedded SHALE partings, trace surface oxidation	95.76	1751.53		RC19	RC		REC 98.8% RQD 87.5%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, slightly fractured, trace grayish black SHALE partings, trace pitting	99.76	1747.53	100	RC20	RC		REC 100% RQD 96.7%			

SAMPLER TYPE

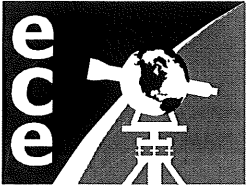
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
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 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1847.29										
very light gray SANDSTONE, strong, fine grained, medium bedded, fresh, competent, moderately fractured, moderate yellow staining, many thinly bedded grayish black SHALE partings, some SHALE beds, many fracture faces w/ SHALE, trace pitting	105.76	110		RC21	RC		REC 95.5% RQD 74.7%			
	1741.53									
pinkish gray SANDSTONE w/ many grayish black SHALE partings, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, many SHALE fracture faces, some moderate brown SHALE pitting	112.16	115		RC22	RC		REC 95.5% RQD 74.7%			
	1735.13									
pinkish gray SANDSTONE w/ many grayish black SHALE partings, strong, fine grained, medium/thinly bedded, fresh, competent, moderately/intensely fractured, many SHALE fracture faces, some moderate brown SHALE pitting, some laminated SHALE beds	115.76	120		RC23	RC		REC 100% RQD 70%			
	1731.53									
	120.01									

SAMPLER TYPE

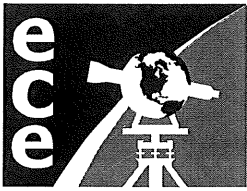
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 ST - PRESSED SHELBY TUBE
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GROUND WATER DEPTH

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

BORING METHOD

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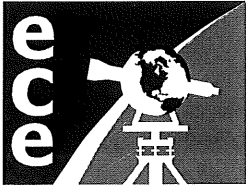
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SURFACE ELEVATION - 1847.29	1727.28									
very light/pinkish gray SANDSTONE w/ many thinly bedded grayish black SHALE partings, strong, fine grained, medium bedded, fresh, compotent, slightly/ moderately fractured, some fracture faces w/ SHALE										
		125		RC24	RC		REC 100% RQD 70%			
Terminated NXB Wireline Rockcore at 125.76'	125.76									
	1721.53									
		130								
		135								

SAMPLER TYPE
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 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
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ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

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SURFACE ELEVATION - 1823.95										
gravel with some soil mix										
REFUSAL at 3.1' - begin NXB wireline rockcoring	3.10									
white SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, intensely fractured, solutional areas at breaks, trace pits with light brown soil, trace reddish brown coloration at top	1820.85	5		RC01	RC		REC 67.6% RQD 0%			
white SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, intensely fractured, solutional areas at breaks	6.65 1817.30			RC02	RC		REC 95% RQD 18%			
white with switch to moderate orange pink SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining	7.55 1816.40	10		RC03	RC					
moderate orange pink SANDSTONE with medium gray SHALE mix, strong to moderate, fine grained to aphantic, medium bedded, moderately decomposed, slightly disintegrated, intensely fractured, fracture faces show surface oxidation and dark gray staining	10.85 1813.10			RC04	RC					
	11.65			RC05	RC		REC 92% RQD 18%			
	12.42			RC06	RC					
white SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining, trace pitting	1811.53 13.25 1810.70			RC07	RC					
grayish black SHALE, moderate to weak, aphantic, thinly bedded, moderately decomposed, moderately	14.30 1809.65 14.52	15		RC08	RC					

SAMPLER TYPE

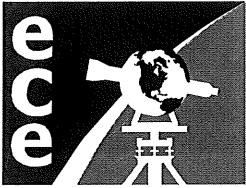
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GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ece SERVICES

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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1823.95										
fractured, surface oxidation on fracture faces	1809.43			RC09	RC					
white SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining	15.51 1808.44 15.95 1808.00			RC10 RC11	RC RC					
grayish black SHALE, moderate to weak, aphanitic, thinly bedded, moderately decomposed, moderately fractured, surface oxidation on fracture faces	16.65 1807.30			RC12	RC		REC 100% RQD 53%			
white SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining, trace grayish black SHALE	19.55 1804.40			RC13	RC					
grayish black SHALE, moderate to weak, aphanitic, thinly bedded, moderately decomposed, moderately fractured, surface oxidation on fracture faces	19.85 1804.10	20		RC14	RC					
white SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining	21.65 1802.30			RC15	RC		REC 100% RQD 53%			
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining, trace grayish black SHALE, trace pitting	23.40 1800.55 23.50			RC16 RC17	RC RC					
grayish black SHALE, moderate to weak, aphanitic, thinly bedded, moderately decomposed, moderately fractured	1800.45 23.95			RC18	RC					
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining	1800.00 24.60 1799.35	25		RC19	RC					
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show dark gray staining, trace grayish black SHALE, trace pitting	26.65 1797.30									
grayish black SHALE, moderate to weak, aphanitic, thinly bedded, moderately decomposed, moderately fractured, surface oxidation on fracture faces				RC20	RC		REC 96% RQD 71%			
very light gray SANDSTONE, very strong, fine grained,										

SAMPLER TYPE

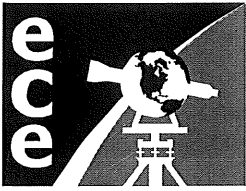
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 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1823.95										
medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show surface oxidation and dark gray staining										
grayish black SHALE, moderate to weak, aphanitic, thinly bedded, moderately decomposed, moderately fractured, some very light gray SANDSTONE	31.65	1792.30								
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately to slightly fractured, fracture faces show dark gray staining, some pitting, some grayish black SHALE				RC21	RC		REC 100% RQD 61%			
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show dark gray staining, contains some areas of thinly bedded grayish black SHALE, some pitting		35								
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, slightly fractured, fracture faces show dark gray staining, contains some areas of thinly bedded black SHALE, some pitting	36.65	1787.30								
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, slightly fractured, fracture faces show dark gray staining, contains some areas of thinly bedded grayish black SHALE, some pitting				RC22	RC		REC 100% RQD 87%			
		40								
	41.65									
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, slightly fractured, fracture faces show dark gray staining, contains trace of thinly bedded black SHALE, some pitting	1782.30			RC23	RC		REC 100% RQD 67%			
		45								

SAMPLER TYPE

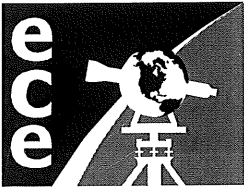
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

AT COMPLETION N/A FT.
 AFTER _____ FT.
 WATER ON RODS _____ FT.

BORING METHOD

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 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

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SURFACE ELEVATION - 1823.95										
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, slightly fractured, fracture faces show dark gray staining, contains trace thin bedded areas, some pitting	46.65	1777.30		RC24	RC		REC 100% RQD 82%			
	50									
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, slightly fractured, fracture faces show dark gray staining, contains trace areas of thinly bedded black SHALE, some pitting	51.65	1772.30		RC25	RC		REC 100% RQD 69%			
	55									
	60									

SAMPLER TYPE

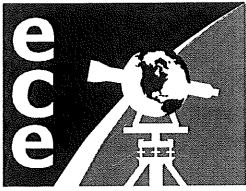
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 WATER ON RODS _____ FT.

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SURFACE ELEVATION - 1823.95										
		65								
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, slightly fractured, fracture faces show dark gray staining, contains some areas of thinly bedded grayish black SHALE, trace pitting	66.65	1757.30		RC26	RC		REC 100% RQD 33%			
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show dark gray staining, contains some areas of thinly bedded grayish black SHALE, some pitting	69.65	1754.30	70	RC27	RC		REC 100% RQD 68%			
		75								

SAMPLER TYPE

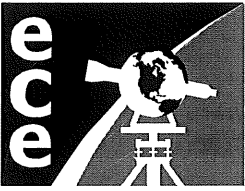
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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1823.95										
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture faces show dark gray staining, contains some areas of thinly bedded black SHALE, trace pitting	76.65	1747.30	[Lithology: Sandstone with shale and pitting]	RC28	RC		REC 100% RQD 62%			
	80									
very light gray SANDSTONE, very strong, medium to coarse grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, fracture	85	1735.30	[Lithology: Sandstone with fracture]	RC29	RC		REC 100%			
	88.65									
	90									

SAMPLER TYPE

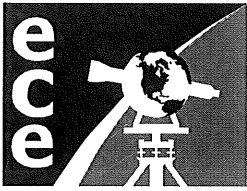
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 16
 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 572396.737 Easting 2235994.1973
 Date Started 10/20/09 Hammer Wt. 140
 Date Completed 10/22/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1823.95										
faces show dark gray staining, contains some areas of thinly bedded black SHALE, trace pitting	91.15						RQD 51%			
pinkish gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, contains some areas of grayish black SHALE	1732.80 91.65 1732.30			RC30	RC					
very light gray/pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, contains trace of grayish black SHALE, trace thinly bedded areas		95		RC31	RC		REC 100% RQD 75%			
Terminated NXB Wireline Rockcore at 99.95'	99.95 1724.00	100								
		105								

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 # 17
 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 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
Soil/Gravel mix										
REFUSAL at 4' - begin NXB wireline rockcoring	4.00									
white/yellowish gray SANDSTONE, very strong, fine grained, thickly bedded, moderately decomposed, slightly disintegrated, moderately fractured, includes some brownish gray SHALE, fracture faces have yellowish orange staining	1830.03 4.30 1829.73	5		RC01	RC		REC 25% RQD 0%			
VOID - contains some SANDSTONE fragments	6.25									
white/yellowish gray SANDSTONE, very strong, fine grained, thickly bedded, moderately decomposed, slightly disintegrated, moderately fractured, includes some brownish gray SHALE, fracture faces have yellowish orange staining	1827.78 6.60 1827.43			RC02	RC		REC 25% RQD 0%			
white SANDSTONE, very strong, fine grained, thickly bedded, moderately decomposed, slightly disintegrated, moderately fractured, includes trace brownish gray SHALE, fracture faces have yellowish orange staining	9.60 1824.43			RC03	RC		REC 100% RQD 60.9%			
yellowish orange/light brown sandy CLAY seam	9.67									
white SANDSTONE, very strong, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, intensely fractured (angular), includes many brownish gray thin bedded SHALE partings, fracture faces w/surface oxidation & yellowish orange staining, some pits	11.20 1822.83			RC04	RC		REC 100% RQD 60.9%			
white SANDSTONE, very strong, fine grained, thickly bedded, mod. decomposed, slightly disintegrated, intensely fractured (angular), includes many brownish gray/black thin bedded SHALE partings, fracture faces w/surface oxidation & yellowish orange staining	13.60 1820.43			RC05	RC		REC 100% RQD 60.9%			
				RC06	RC		REC 100% RQD 38.8%			
				RC07	RC		REC 100%			

SAMPLER TYPE

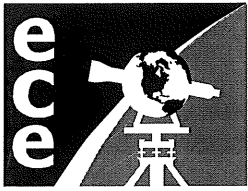
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 17
 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 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured (angular 30-60deg), includes some grayish black thinly bedded SHALE partings, SHALE on fracture faces	16.10 1817.93						RQD 38.8%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured (trace angular 30deg), includes trace grayish black thinly bedded SHALE partings, trace SHALE on fracture faces	19.07			RC08	RC		REC 100% RQD 61.2%			
very light gray SANDSTONE, strong, fine grained, medium bedded with thinly bedded SHALE, slightly decomposed, slightly disintegrated, intensely fractured (angular 30-60deg), includes some grayish black thinly bedded SHALE beds, SHALE on fracture faces	1814.96 19.97 1814.06	20		RC09 RC10	RC RC		REC 100% RQD 61.2% REC 100% RQD 61.2%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, mod. fractured (angular 30-60deg), includes some grayish black thinly bedded SHALE partings, SHALE on fracture faces, some yellowish orange dry CLAY	21.00 1813.03			RC11	RC		REC 100% RQD 49%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, trace grayish black SHALE, some SHALE on fracture faces, one large pit w/ moderate brown SHALE	1811.03 23.80 1810.23 24.55 1809.48			RC12 RC13 RC14	RC RC RC		REC 100% RQD 49% REC 100% RQD 49% REC 100% RQD 49%			
grayish black SHALE, moderate/strong, aphanitic, laminated, slightly decomposed, slightly disintegrated, intensely fractured, includes trace moderate brown SHALE, some very light gray SANDSTONE	24.75 1809.28 25.90 1808.13	25		RC15 RC16	RC RC		REC 100% RQD 49% REC 100% RQD 81.6%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, many grayish black SHALE, some SHALE on fracture faces, trace pitting w/ moderate brown SHALE	26.65 1807.38									
grayish black SHALE, moderate/strong, aphanitic, laminated, slightly decomposed, slightly disintegrated, intensely fractured, some very light gray SANDSTONE				RC17	RC		REC 100% RQD 81.6%			
very light gray SANDSTONE, very strong, fine grained,										

SAMPLER TYPE

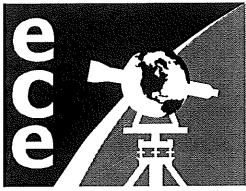
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 17
 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

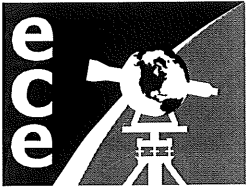
Northing 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH-LOG	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, many grayish black SHALE, some SHALE on fracture faces, trace pitting w/ moderate brown SHALE	30.80	1803.23	[Lithology Diagram]	RC18	RC		REC 100% RQD 80.5%			
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured, some grayish black SHALE, some SHALE on fracture faces										
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, trace SHALE and oxidation on fracture faces.			[Lithology Diagram]	RC19	RC		REC 99.5% RQD 84.7%			
very light gray SANDSTONE, very strong, fine grained, medium bedded, slightly decomposed, slightly disintegrated, moderately fractured, some grayish black thinly bedded SHALE beds, trace moderate brown SHALE and pitting	34.90	1799.13								
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, trace grayish black thinly bedded SHALE partings, trace moderate brown SHALE and pitting, some SHALE on fracture faces			[Lithology Diagram]							

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 # 17
 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 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, mod./slightly fractured, trace grayish black thinly bedded SHALE partings, trace moderate brown SHALE and pitting, some SHALE on fracture faces	49.05 1784.98	50		RC20	RC		REC 100% RQD 71.4%			
		55								
		60								

SAMPLER TYPE

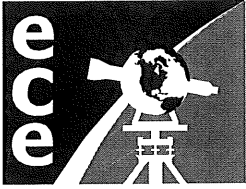
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 17
 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 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
very light/pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, slightly/moderately fractured, some grayish black thinly bedded SHALE partings, some fracture faces w/ SHALE, trace pitting w/ moderate brown SHALE	64.35 1769.68	65 70		RC21	RC		REC 80% RQD 36.2%			

SAMPLER TYPE

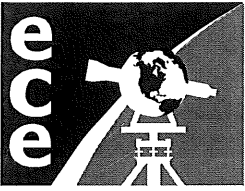
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 17
 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 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
		95								
		100								
		105								

SAMPLER TYPE

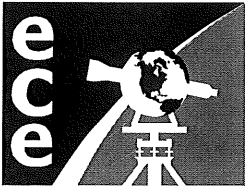
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 17
 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

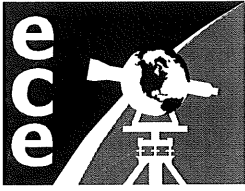
Northing 572415.4982 Easting 2236034.1052
 Date Started 10/30/09 Hammer Wt. 140
 Date Completed 11/4/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1834.03										
Terminated NXB Wireline Rockcore at 105.65'	105.65									
	1728.38									
		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

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

Client City of Crossville Boring # 18
 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 572454.6071 Easting 2236110.8716
 Date Started 10/24/09 Hammer Wt. 140
 Date Completed 10/29/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
gravel/topsoil mix										
REFUSAL at 3.5' - begin NXB wireline rockcoring	3.50									
white SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured	1848.35	5		RC01	RC		REC 62.1% RQD 48.1%			
moderate orange pink SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, moderately fractured	1847.25			RC02	RC					
white SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, trace pitting	5.77			RC03	RC					
VOID - contains greenish gray sandy CLAY/gravel mix	1846.08									
	7.11									
	1844.74			RC04	RC					
	9.48									
white SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, greenish gray staining on top and bottom of sample	1842.37	10		RC05	RC		REC 86.7% RQD 40.6%			
VOID - contains greenish gray sandy CLAY/gravel fragments mix	10.03			RC06	RC					
	1841.82									
white SANDSTONE with yellowish orange staining, strong, aphanitic, thickly bedded, moderately decomposed, slightly disintegrated, surface oxidation and light brown/red staining on fracture faces, moderately fractured	11.20									
	1840.65			RC07	RC					
	13.92									
moderate orange pink with switch to white SANDSTONE, very strong, fine grained, thickly bedded, slightly	1837.93									

SAMPLER TYPE

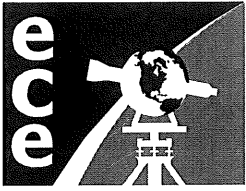
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 18
 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 572454.6071 Easting 2236110.8716
 Date Started 10/24/09 Hammer Wt. 140
 Date Completed 10/29/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
decomposed, slightly disintegrated, moderately fractured, trace surface oxidation and yellowish orange staining on fracture faces	17.06			RC08	RC					
white SANDSTONE with grayish black SHALE mix, strong, fine grained to aphanitic, thickly bedded (SHALE - thinly bedded), slightly decomposed, slightly disintegrated, moderately fractured, covered in light gray sandy CLAY at top	1834.79 1833.55			RC09	RC					
pinkish gray SANDSTONE (med. bedded) w/ thinly bedded grayish black SHALE mix, fine grained/aphantic, strong/mod., slightly decomposed, slightly disintegrated, mod./intensely fractured, surface oxidation & light gray staining on angular (30-60) fracture faces		20		RC10	RC		REC 89% RQD 34.5%			
		25								
		28.30								
moderate orange pink SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, competent, trace surface oxidation and yellowish orange staining on fracture faces, slightly fractured	1823.55									
		30								

SAMPLER TYPE

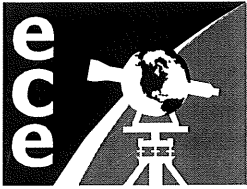
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 18
 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 572454.6071 Easting 2236110.8716
 Date Started 10/24/09 Hammer Wt. 140
 Date Completed 10/29/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
				RC11	RC		REC 96.8% RQD 54.5%			
grayish orange pink SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, trace grayish black SHALE on fracture faces	32.03 1819.82			RC12	RC					
pinkish gray SANDSTONE (med. bedded) w/ thinly bedded grayish black SHALE mix, fine grained/aphantic, strong/mod., slightly decomposed, slightly disintegrated, mod./intensely fractured, surface oxidation & light gray staining on fracture faces	33.43 1818.42 34.75 1817.10	35		RC13	RC					
brownish gray SHALE, moderate, aphanitic, thinly bedded to laminated, moderately decomposed, slightly disintegrated, intensely fractured, trace SANDSTONE, some surface oxidation and staining on fracture faces	36.40 1815.45			RC14	RC					
pinkish gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, many grayish black SHALE areas and fracture faces	37.70 1814.15			RC15	RC					
pinkish gray SANDSTONE (med. bedded) w/ thinly bedded grayish black SHALE mix, fine grained/aphantic, strong/mod., slightly decomposed, slightly disintegrated, moderately fractured, light gray staining on angular (30-60 degree) fracture faces		40		RC16	RC		REC 98% RQD 57%			
		45								

SAMPLER TYPE

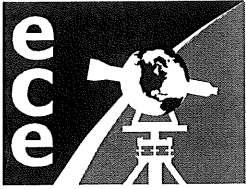
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, some grayish balck SHALE, some fracture faces have SHALE	47.70 1804.15	50		RC17	RC		REC 100% RQD 82.5%			
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, many grayish balck SHALE areas, many fracture faces have SHALE	57.70 1794.15	60								

SAMPLER TYPE

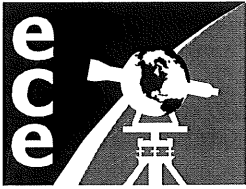
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
		65		RC18	RC		REC 100% RQD 93.5%			
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, slightly fractured, some grayish black SHALE, trace fracture faces have SHALE	67.70 1784.15	70		RC19	RC		REC 98.25% RQD 86.25%			
		75								

SAMPLER TYPE

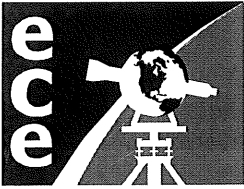
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some grayish balck SHALE mostly at bottom of sample, some fracture faces have SHALE	77.70 1774.15	80		RC20	RC		REC 97.5% RQD 67.2%			
pinkish gray/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, many grayish balck SHALE areas, many fracture faces have SHALE	87.60 1764.25	90								

SAMPLER TYPE

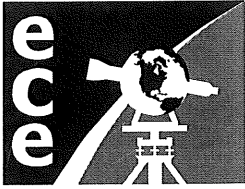
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
		95		RC21	RC		REC 91.8% RQD 85.6%			
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh competent, slightly fractured	1754.55	100		RC22	RC		REC 99.5% RQD 69.7%			
light brownish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately	1747.95	105								

SAMPLER TYPE

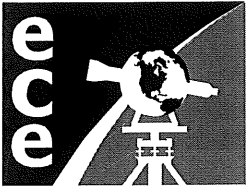
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ece SERVICES

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

LOG OF TEST BORING

Client City of Crossville Boring # 18
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
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 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

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 Date Started 10/24/09 Hammer Wt. 140
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 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1851.85										
fractured, many grayish black SHALE filled pits	106.30			RC23	RC					
pinkish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh competent, slightly fractured	107.40			RC24	RC					
light brownish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, competent, moderately fractured, many grayish black SHALE areas and fracture faces	108.50			RC25	RC		REC 99% RQD 99%			
pinkish gray SANDSTONE banded with light brownish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh competent, slightly fractured, includes some SHALE and SHALE fracture faces at bottom	117.05	110		RC26	RC					
pinkish gray SANDSTONE banded with light brownish gray SANDSTONE, very strong, fine grained, thickly bedded, fresh competent, slightly fractured, includes some SHALE and SHALE fracture faces at bottom	118.65	115		RC27	RC		REC 80.2% RQD 47.3%			
brownish gray SHALE, moderate, aphanitic, thinly bedded to laminated, moderately decomposed, slightly disintegrated, intensely fractured, trace SANDSTONE	119.15			RC28	RC					
	1732.70									

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 19
 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 572440.7324 Easting 2235929.8741
 Date Started 10/7/09 Hammer Wt. 140
 Date Completed 10/9/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1794.91										
Soil/Gravel mix										
REFUSAL at 1.4' - begin NXB wireline rockcoring large loose white SANDSTONE fragments	1.40 1793.51			RC01	RC		REC 80.2% RQD 28.3%			
white SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, compotent, intensely fractured, surface oxidation and staining on fracture faces, trace grayish black SHALE on fracture faces, trace pitting	2.45 1792.46	5		RC02	RC		REC 80.2% RQD 28.3%			
white SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, moderately fractured, trace grayish red SANDSTONE, trace grayish black SHALE on fracture faces	6.70 1788.21	10		RC03	RC		REC 99% RQD 71.9%			
white SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black SHALE on fracture faces, trace pitting w/ moderate brown SHALE	11.50 1783.41	15		RC04	RC		REC 87.5% RQD 77.5%			

SAMPLER TYPE

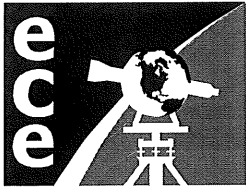
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ece SERVICES

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SURFACE ELEVATION - 1794.91										
white SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black SHALE on fracture faces, trace pitting w/ moderate brown SHALE	16.30 1778.61 17.30 1777.61			RC05	RC		REC 100% RQD 78%			
white SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black SHALE on fracture faces, trace pitting w/ moderate brown SHALE, bottom 0.5' contains many laminated intensely fractured SHALE beds	21.70 1773.21	20		RC06	RC		REC 95.5% RQD 86.4%			
white SANDSTONE, very strong, fine grained, fresh, compotent, thickly bedded, moderately fractured, many fracture faces w/ grayish black SHALE, some thinly bedded SHALE partings, some moderate brown SHALE pitting	26.20 1768.71 27.30 1767.61	25		RC07	RC		REC 100% RQD 95.6%			
white SANDSTONE, very strong, fine grained, fresh, compotent, medium bedded, moderately fractured, many fracture faces w/ grayish black SHALE, many thinly bedded SHALE partings				RC08	RC		REC 100% RQD 54.5%			
white SANDSTONE, very strong, fine grained, fresh, compotent, medium bedded, mod./intensely fractured, many fracture faces w/ grayish black SHALE, many thinly bedded SHALE partings, some moderate brown SHALE pitting				RC09	RC		REC 100% RQD 46.8%			

SAMPLER TYPE

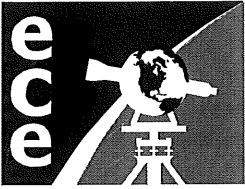
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

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 Date Completed 10/9/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1794.91										
white/very light gray SANDSTONE, very strong, fine grained, fresh, compotent, medium bedded, intensely fractured (many 30-60deg angular), many fracture faces w/ grayish black SHALE, many thinly bedded SHALE partings, trace moderate brown SHALE pitting	32.00 1762.91			RC10	RC		REC 100% RQD 54.5%			
white/very light gray SANDSTONE, very strong, fine grained, fresh, compotent, medium bedded, intensely fractured (many 30-60deg angular), many fracture faces w/ grayish black SHALE, many thinly bedded SHALE partings, trace moderate brown SHALE pitting	34.20 1760.71	35		RC11	RC		REC 100% RQD 78.9%			
white SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, mod./slightly fractured, some fracture faces w/ grayish black SHALE, trace thinly bedded SHALE partings, trace pitting w/ moderate brown SHALE	37.00 1757.91	40		RC12	RC		REC 100% RQD 78.9%			
		45								

SAMPLER TYPE

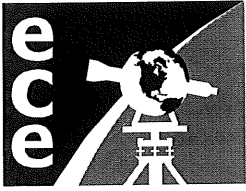
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
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 RC - ROCK CORE

GROUND WATER DEPTH

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

BORING METHOD

HSA - HOLLOW STEM AUGERS
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ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

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SURFACE ELEVATION - 1794.91										
VOID - no recovery/possible sand pocket	45.20 1749.71									
white SANDSTONE, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, contains moderate brown SHALE bed, trace grayish black SHALE on fracture faces	46.20 1748.71 47.50			RC13	RC		REC 100% RQD 78.9%			
VOID - no recovery/possible sand pocket	1747.41									
		50								
		55								
	55.65									
very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderatley/intensely fractured	1739.26			RC14	RC		REC 27% RQD 10%			
	57.00									
very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderatley/intensely fractured, trace moderate brown SHALE partings	1737.91			RC15	RC		REC 40% RQD 13%			
	58.00									
	1736.91									
VOID - possible yellowish orange sandy CLAY seam										
		60								

SAMPLER TYPE

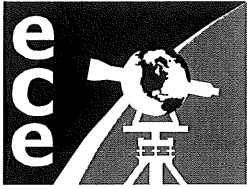
GROUND WATER DEPTH

BORING METHOD

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

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

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 # 19
 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

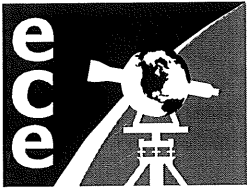
Northing 572440.7324 Easting 2235929.8741
 Date Started 10/7/09 Hammer Wt. 140
 Date Completed 10/9/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1794.91										
	61.00									
white/very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderatley/intensely fractured	1733.91			RC16	RC		REC 40% RQD 13%			
white/very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, slightly disintegrated, moderatley/intensely fractured, trace yellowish orange CLAY staining	1732.91			RC17	RC		REC 76% RQD 16%			
VOID - possible yellowish orange sandy CLAY seam	1731.91									
very light gray SANDSTONE with yellowish orange staining, strong, fine grained, thickly bedded, fresh, slightly disintegrated, intensely fractured	1730.71	65		RC18	RC		REC 76% RQD 16%			
Terminated NXB Wireline Rockcore at 67'	1727.91									
		70								
		75								

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 # 20
 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 572443.7624 Easting 2235900.2285
 Date Started 10/13/09 Hammer Wt. 140
 Date Completed 10/14/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.93										
Soil/gravel mix										
REFUSAL at 7.83' - begin NXB wireline rockcoring	7.83									
white SANDSTONE w/ yellowish orange staining, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractures, trace surface oxidation on fracture faces	1784.10			RC01	RC		REC 59.5% RQD 0%			
white SANDSTONE w/ yellowish orange staining, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, intensely fractures, trace surface oxidation on fracture faces	10.03 1781.90 10.63 1781.30 11.33	10		RC02	RC		REC 42.3% RQD 0%			
VOID	1780.60									
very light gray w/ light brownish gray SANDSTONE mix, strong, fine grained, medium bedded, fresh, competent, intensely fractured (60deg angular), many thinly bedded grayish black SHALE partings, many SHALE fracture faces	13.43 1778.60			RC03	RC		REC 97% RQD 61%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, competent, moderately fractured, trace grayish black SHALE partings, trace		15		RC04	RC		REC 97%			

SAMPLER TYPE

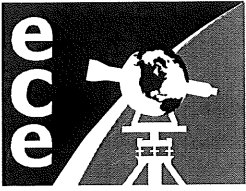
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 20
 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 572443.7624 Easting 2235900.2285
 Date Started 10/13/09 Hammer Wt. 140
 Date Completed 10/14/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.93										
light brownish gray SANDSTONE	16.33						RQD 61%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, moderatley fractured, trace thinly bedded grayish black SHALE partings, trace light brownish gray SANDSTONE, some SHALE fracture faces, trace pitting	1775.60	20		RC05	RC		REC 99% RQD 83%			
very light gray SANDSTONE, strong, fine grained, fresh, compotent, thickly bedded, slightly fractured, trace thinly bedded grayish balck SHALE partings, some SHALE on fracture faces, trace moderate brown SHALE pitting	1770.60	24.03		RC06	RC		REC 100% RQD 100%			
very light gray SANDSTONE, strong, fine grained, fresh, compotent, thickly bedded, slightly fractured, some grayish black SHALE on fracture faces	1767.90	25		RC07	RC		REC 100% RQD 100%			
very light gray SANDSTONE, strong, thickly bedded, fine grained, fresh, slightly disintegrated, intensley fractured	1765.60	26.33		RC08	RC		REC 79% RQD 42%			
very light gray SANDSTONE, strong, fine grained, slightly decomposed, compotent, medium bedded, moderately fractured, many thinly bedded grayish balck SHALE partings, many SHALE on fracture faces, trace moderate brown SHALE pitting	1764.00	27.93		RC09	RC		REC 79% RQD 42%			

SAMPLER TYPE

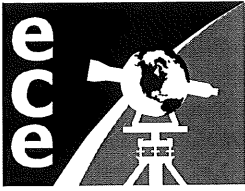
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 20
 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 572443.7624 Easting 2235900.2285
 Date Started 10/13/09 Hammer Wt. 140
 Date Completed 10/14/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.93										
very light gray SANDSTONE, strong, fine grained, slightly decomposed, competent, medium bedded, moderately fractured, many thinly bedded grayish black SHALE partings, many SHALE on fracture faces, trace moderate brown SHALE pitting	31.33 1760.60	35	[Lithology Diagram: Sandstone and shale layers]	RC10	RC		REC 88% RQD 64%			
very light gray SANDSTONE, strong, fine grained, fresh, competent, medium bedded, moderately fractured, many thinly bedded grayish black SHALE partings, many SHALE on fracture faces, trace moderate brown SHALE pitting	36.33 1755.60	40		RC11	RC		REC 17% RQD 10%			
VOID	41.33 1750.60									
very light gray SANDSTONE, strong, fine grained, fresh, competent, medium bedded, moderately fractured, many thinly bedded grayish black SHALE partings, many SHALE on fracture faces, trace moderate brown	43.33 1748.60 43.73 1748.20	45	[Lithology Diagram: Sandstone and shale layers]	RC12	RC		REC 26% RQD 19%			

SAMPLER TYPE

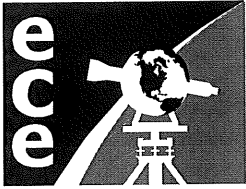
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 20
 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 572443.7624 Easting 2235900.2285
 Date Started 10/13/09 Hammer Wt. 140
 Date Completed 10/14/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.93										
SHALE pitting VOID - soil/sand pocket										
	46.33									
very light gray SANDSTONE, strong, fine grained, fresh, competent, medium bedded, moderately fractured, many thinly bedded grayish balck SHALE partings, many SHALE on fracture faces, trace moderate brown SHALE pitting VOID - soil/sand pocket	1745.60 47.33 1744.60			RC13	RC		REC 6% RQD 0%			
	54.53									
very light gray SANDSTONE, strong, fine grained, fresh, competent, medium bedded, moderately fractured, many thinly bedded grayish balck SHALE partings, many SHALE on fracture faces, trace moderate brown SHALE pitting VOID - soil/sand pocket	1737.40 54.87 1737.06	55		RC14	RC		REC 6% RQD 0%			
	59.33									
very light gray SANDSTONE, strong, fine grained, fresh,	1732.60 59.98	60		RC15	RC		REC 13% RQD 9%			

SAMPLER TYPE

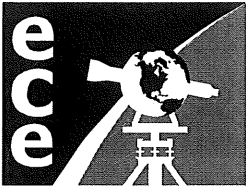
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 20
 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

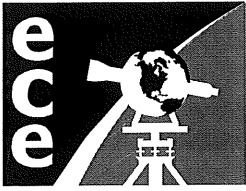
Northing 572443.7624 Easting 2235900.2285
 Date Started 10/13/09 Hammer Wt. 140
 Date Completed 10/14/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.93										
competent, medium bedded, moderately fractured, many thinly bedded grayish black SHALE partings, many SHALE on fracture faces, trace moderate brown SHALE pitting	1731.95 61.33									
VOID - soil/sand pocket	1730.60									
Terminated NXB Wireline Rockcore at 61.33'										
		65								
		70								
		75								

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 # 21
 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 572452.4238 Easting 2235878.0477
 Date Started 9/29/09 Hammer Wt. 140
 Date Completed 10/6/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.36										
Soil/gravel mix										
		5								
REFUSAL at 8.25' - begin NXB wireline rockcoring	8.25									
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, competent, intensely fractured, light brown CLAY staining on fracture faces, trace pitting	1783.11			RC01	RC		REC 94.2% RQD 48.4%			
VOID - clayey SAND/gravel mix	9.03									
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, competent, moderately fractured, light brown CLAY staining on fracture faces, trace pitting, trace thinly bedded grayish black SHALE partings	1782.33									
	9.39									
	1781.97	10		RC02	RC		REC 94.2% RQD 48.4%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, competent, moderately fractured, light brown CLAY staining on fracture faces, trace pitting, trace thinly bedded grayish black SHALE partings	10.69									
	1780.67			RC03	RC		REC 94.2% RQD 48.4%			
very light gray/grayish red SANDSTONE, strong, fine grained, medium bedded, slightly decomposed, competent, moderately fractured	11.91									
	1779.46			RC04	RC		REC 94.2% RQD 48.4%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, competent, moderately fractured, some SHALE on fracture faces, trace pitting, trace thinly bedded grayish black SHALE partings, trace grayish	14.45									
	1776.91	15								

SAMPLER TYPE

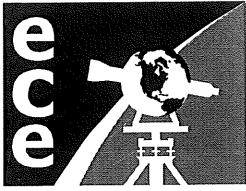
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 21
 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 572452.4238 Easting 2235878.0477
 Date Started 9/29/09 Hammer Wt. 140
 Date Completed 10/6/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.36										
red SANDSTONE very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, moderately fractured, trace light brown CLAY staining, some SAND sediment	16.45			RC05	RC		REC 100% RQD 55%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, compotent, mod. fractured, trace light brown CLAY staining, trace grayish red SANDSTONE, some fract. faces w/ grayish black SHALE, trace thinly bedded SHALE partings	1774.91	20		RC06	RC		REC 97.9% RQD 83%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, compotent, mod. fractured (some 30-60deg angular fract.), trace fract. faces w/ grayish black SHALE, trace thinly bedded SHALE partings, trace mod. brown SHALE pitting	1770.21	25		RC07	RC		REC 100% RQD 52%			
very light gray SANDSTONE, strong, fine grained, medium bedded, slightly decomposed, compotent, mod./slightly fractured, many thinly bedded grayish black SHALE partings, many SHALE fracture faces, some moderate brown SHALE pitting	1765.21	30		RC08	RC		REC 97.9% RQD 84.4%			

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 # 21
 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 572452.4238 Easting 2235878.0477
 Date Started 9/29/09 Hammer Wt. 140
 Date Completed 10/6/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.36										
very light gray SANDSTONE, strong, fine grained, medium bedded, slightly decomposed, compotent, moderate fractured, many thinly bedded grayish black SHALE partings, many SHALE fracture faces, some moderate brown SHALE pitting, some light brownish gray SANDSTONE	30.95 1760.41	35		RC09	RC		REC 100% RQD 62.2%			
very light gray SANDSTONE, strong, fine grained, medium/thickly bedded, slightly decomposed, compotent, moderately fractured, many thinly bedded grayish black SHALE partings, many fracture faces with SHALE	35.45 1755.91			RC10	RC		REC 98.9% RQD 54.4%			
very light gray SANDSTONE, strong, fine grained, medium/thickly bedded, slightly decomposed, compotent, moderately fractured, many thinly bedded grayish black SHALE partings, many fracture faces with SHALE, trace moderate brown SHALE pitting	40.05 1751.31	40		RC11	RC		REC 100% RQD 77.3%			
very light gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, compotent, slightly fractured, some thinly bedded grayish black SHALE partings, some fracture faces with SHALE, trace SHALE beds, trace moderate brown SHALE pitting	41.15 1750.21			RC12	RC		REC 79% RQD 55%			
VOID	43.95 1747.41									
	45.00	45								

SAMPLER TYPE

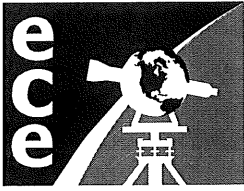
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 21
 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 572452.4238 Easting 2235878.0477
 Date Started 9/29/09 Hammer Wt. 140
 Date Completed 10/6/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1791.36										
very light gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, one moderate brown SHALE bed at top	1746.36			RC13	RC		REC 79% RQD 55%			
white/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black SHALE on fracture faces, trace light brown CLAY staining on fracture faces	1745.21	50		RC14	RC		REC 100% RQD 89.6%			
white/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black SHALE on fracture faces	1740.41	55		RC15	RC		REC 100% RQD 95.6%			
white/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black SHALE on fracture faces	1735.91	55.45		RC16	RC		REC 100% RQD 100%			
white SANDSTONE, very strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, some grayish black SHALE on fracture faces, trace thinly bedded SHALE partings	1735.11	56.25		RC17	RC		REC 100% RQD 90.2%			
light brownish/very light gray SANDSTONE, very strong, fine grained, medium bedded, fresh, compotent, slightly	1732.11	59.25					REC 100%			

SAMPLER TYPE

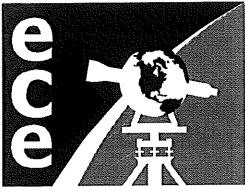
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 22
 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 572466.2323 Easting 2235853.8097
 Date Started 10/16/09 Hammer Wt. 140
 Date Completed 10/19/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.74										
Soil/gravel mix										
		5								
		7.80								
REFUSAL at 7.8' - begin NXB wireline rockcoring	1785.94									
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, surface oxidation and staining along fracture faces, moderately fractured		10		RC01	RC		REC 78.6%			
		10.49								
VOID	1783.25									
		11.61								
very light gray SANDSTONE, very strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, surface oxidation and staining along fracture faces, moderately fractured	1782.13			RC02	RC		REC 100% RQD 64%			
		12.66								
pinkish gray/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh compotent, clean fracture faces, slightly fractured	1781.08									
		15								

SAMPLER TYPE

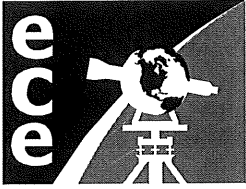
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 22
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 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 572466.2323 Easting 2235853.8097
 Date Started 10/16/09 Hammer Wt. 140
 Date Completed 10/19/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.74										
		20		RC03	RC		REC 100% RQD 90%			
pinkish gray/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh competent, slightly fractured, includes some grayish black SHALE, some thinly bedded SHALE areas, some fracture faces with SHALE	21.30 1772.44	25		RC04	RC		REC 100% RQD 80%			
		30								

SAMPLER TYPE

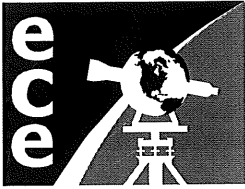
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 22
 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 572466.2323 Easting 2235853.8097
 Date Started 10/16/09 Hammer Wt. 140
 Date Completed 10/19/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.74										
pinkish gray/very light gray SANDSTONE, very strong, fine grained, medium bedded, fresh compotent, moderately fractured, includes many grayish black SHALE, many thinly bedded SHALE areas, many fracture faces with SHALE	35.70 1758.04	35		RC05	RC		REC 100% RQD 45%			
pinkish gray/very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh compotent, slightly fractured, includes trace grayish black SHALE, trace thinly bedded SHALE areas, trace fracture faces with SHALE	39.40 1754.34	40		RC06	RC		REC 100% RQD 86%			
		45								

SAMPLER TYPE

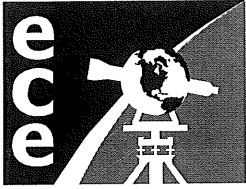
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 22
 Architect/Engineer Environmental and Civil Engineering Services Job # 3002
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 Project Location Cumberland County, TN Approved By Scott J. Christian, P.E.

DRILLING AND SAMPLING INFORMATION

TEST DATA

Northing 572466.2323 Easting 2235853.8097
 Date Started 10/16/09 Hammer Wt. 140
 Date Completed 10/19/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.74										
very light gray SANDSTONE, very strong, fine grained, thickly bedded, fresh compotent, slightly fractured, includes some grayish black SHALE, trace thinly bedded SHALE areas, some fracture faces with SHALE	46.30	50	[Lithology: Sandstone with shale inclusions]	RC07	RC		REC 95% RQD 85.6%			
	1747.44									
white SANDSTONE, very strong, fine grained (trace medium grained in SANDSTONE and SHALE), thickly bedded, fresh compotent, slightly fractured, includes some grayish black SHALE, trace thinly bedded SHALE areas, some fracture faces with SHALE	55.30	55	[Lithology: Sandstone with shale inclusions]	RC08	RC		REC 100% RQD 65%			
	1738.44									
white SANDSTONE, very strong, fine grained (trace medium grained in SANDSTONE and SHALE), thickly bedded, fresh compotent, moderately fractured, includes many black SHALE, many thinly bedded SHALE areas, many fracture faces with SHALE	56.30		[Lithology: Sandstone with shale inclusions]	RC09	RC		REC 97% RQD 77%			
	1737.44									
yellowish gray SANDSTONE, very strong, fine grained	59.27		[Lithology: Sandstone]							
	1734.47	60								

SAMPLER TYPE

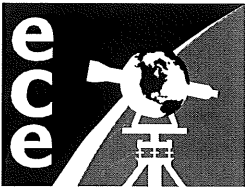
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 22
 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 572466.2323 Easting 2235853.8097
 Date Started 10/16/09 Hammer Wt. 140
 Date Completed 10/19/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.74										
(some medium grained), thickly bedded, fresh compotent, clean fracture faces, slightly fractured				RC10	RC		REC 100% RQD 68%			
Terminated NXB Wireline Rockcore at 64.3'	64.30 1729.44	65								
		70								
		75								

SAMPLER TYPE

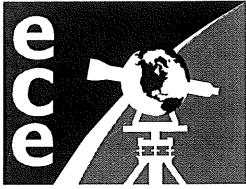
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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 # 23
 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 572481.9898 Easting 2235834.6087
 Date Started 9/21/09 Hammer Wt. 140
 Date Completed 9/28/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.45										
Soil/gravel mix										
REFUSAL at 4.18' - begin NXB wireline rockcoring	4.18									
white/pinkish gray SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, mod. fractured, surface oxidation & yellowish orange stains on fracture faces, trace thinly bedded grayish black SHALE partings, trace mod. brown pits	1789.27	5		RC01	RC		REC 100% RQD 92.5%			
	6.18			RC02	RC		REC 78% RQD 62%			
white SANDSTONE, strong, fine grained, thickly bedded, slightly decomposed, slightly disintegrated, slightly fractured, yellowish orange stains on fracture faces, trace thinly bedded grayish black SHALE partings, trace mod. brown pits	7.11									
	1786.34									
VOID - yellowish orange sandy CLAY seam	8.11									
white SANDSTONE, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, trace yellowish orange stains on fracture faces, trace thinly bedded grayish black SHALE partings, trace mod. brown pits, trace SHALE on fracture faces	1785.34	10		RC03	RC		REC 78% RQD 62%			
	11.18									
very light/yellowish gray SANDSTONE, strong, fine grained, thickly bedded, fresh, competent, slightly fractured, trace thinly bedded grayish black SHALE partings, trace SHALE on fracture faces, trace moderate brown pitting	1782.27			RC04	RC		REC 100% RQD 100%			
	14.68									
	1778.77	15								

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 # 23
 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 572481.9898 Easting 2235834.6087
 Date Started 9/21/09 Hammer Wt. 140
 Date Completed 9/28/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.45										
very light/yellowish gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, moderately fractured, trace thinly bedded grayish black SHALE partings, trace SHALE on fracture faces	16.28			RC05	RC		REC 100% RQD 100%			
very light/yellowish gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, trace grayish black thinly bedded SHALE partings, trace SHALE on fracture faces	1777.17			RC06	RC		REC 81% RQD 61.7%			
VOID	1773.57	20								
	21.58									
very light/yellowish gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, slightly/moderately fractured, some grayish black thinly bedded SHALE partings, trace SHALE on fracture faces	1771.87			RC07	RC		REC 81% RQD 61.7%			
	25.60	25								
VOID - contains some very light/yellowish gray SANDSTONE fragments/gravels	1767.85									
	27.20									
very light/yellowish gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, slightly/moderately fractured, many grayish black thinly bedded SHALE partings, some SHALE on fracture faces	1766.25									
		30								

SAMPLER TYPE

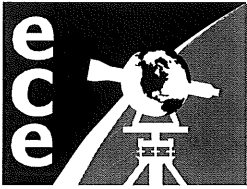
SS - DRIVEN SPLIT SPOON
 ST - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

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
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ece SERVICES

LOG OF TEST BORING

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES

Client City of Crossville Boring # 23
 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 572481.9898 Easting 2235834.6087
 Date Started 9/21/09 Hammer Wt. 140
 Date Completed 9/28/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.45										
				RC08	RC		REC 81% RQD 61.7%			
very light/yellowish gray SANDSTONE, strong, fine grained, medium bedded, fresh, slightly disintegrated, moderately fractured, many thinly bedded grayish black SHALE partings, many fracture faces with SHALE, some light gray staining	33.68 1759.77	35		RC09	RC		REC 100% RQD 75.6%			
very light/yellowish gray SANDSTONE, strong, fine grained, thickly bedded, fresh, compotent, slightly fractured, many thinly bedded grayish black SHALE	43.68 1749.77	45								

SAMPLER TYPE

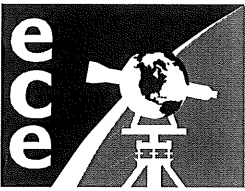
- SS - DRIVEN SPLIT SPOON
- ST - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

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 # 23
 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.

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TEST DATA

Northing 572481.9898 Easting 2235834.6087
 Date Started 9/21/09 Hammer Wt. 140
 Date Completed 9/28/09 Hammer Drop 30
 Drill Foreman ECE Spoon Sampler O.D. 2
 Inspector _____ Rock Core Dia. NXB WL
 Boring Method HSA Shelby Tube O.D. _____

SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH SCALE	LITH- OLOGY	SAMPLE NO.	SAMPLE TYPE	Standard Penetration Test N. Blows/Ft.	REC / RQD DRY UNIT WT (lbs/cu ft)	Pocket Penetrometer (tons/ft) Compressive Strength (psi)	Water Content %	Atterberg Limits LL - Liquid Limit PL - Plastic Limit
SURFACE ELEVATION - 1793.45										
partings, some fracture faces with SHALE, trace pinkish gray SANDSTONE		50		RC10	RC		REC 100% RQD 92.9%			
		55								
		57.28								
very light gray SANDSTONE, strong, fine grained, medium bedded, fresh, competent, moderately fractured, many thinly bedded grayish black SHALE partings, many fracture faces with SHALE, some SHALE beds, trace reddish brown SANDSTONE	1736.17			RC11	RC		REC 100% RQD 94.1%			
		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

