History of Construction for Water Recycle Ponds

Entergy Arkansas, Inc.
White Bluff Steam Electric Station
Redfield, Jefferson County, Arkansas

November 2018

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
NO. 8136
R. KENT NILSSON

Prepared For
Entergy Arkansas, Inc.

11/5/18

R. Kent Nilsson, P.E.
Senior Engineer

Jason House
Project Manager

8550 United Plaza Blvd, Ste 502 Baton Rouge, LA 70809, • 225.216.7483 Phone • 225.216.0732 Fax • www.TRCsolutions.com

Table of Contents

List of Figures

List of Appendices

Section 1
Introduction

Entergy Arkansas, Inc. (Entergy) operates the White Bluff Steam Electric Station (Plant), located at 1100 White Bluff Road, Redfield, AR 72132. This Plant operates two Water Recycle Ponds (A and B (Ponds)) as part of its process water system for bottom ash transport. Pond A has a height of five feet or more and a storage volume of 20 acre-feet or more. Pursuant to United States Environmental Protection Agency (USEPA) Disposal of Coal Combustion Residuals (CCR) From Electric Utilities Final Rule (CCR Rule) Section 40 Code of Federal Regulations (CFR) § 257.73, a History of Construction must be prepared for Pond A as specified in 40 CFR § 257.73(c). As the Water Recycle Ponds A and B were constructed simultaneously, this report documents the history of construction for both ponds. Section 40 CFR § 257.73(c)(1) identifies the requirements of the history of construction, which must include the following information:

- The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.
- The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 71⁄2 minute or 15-minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.
- A statement of the purpose for which the CCR unit is being used.
- The name and size in acres of the watershed within which the CCR unit is located.
- A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.
- A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.
- At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

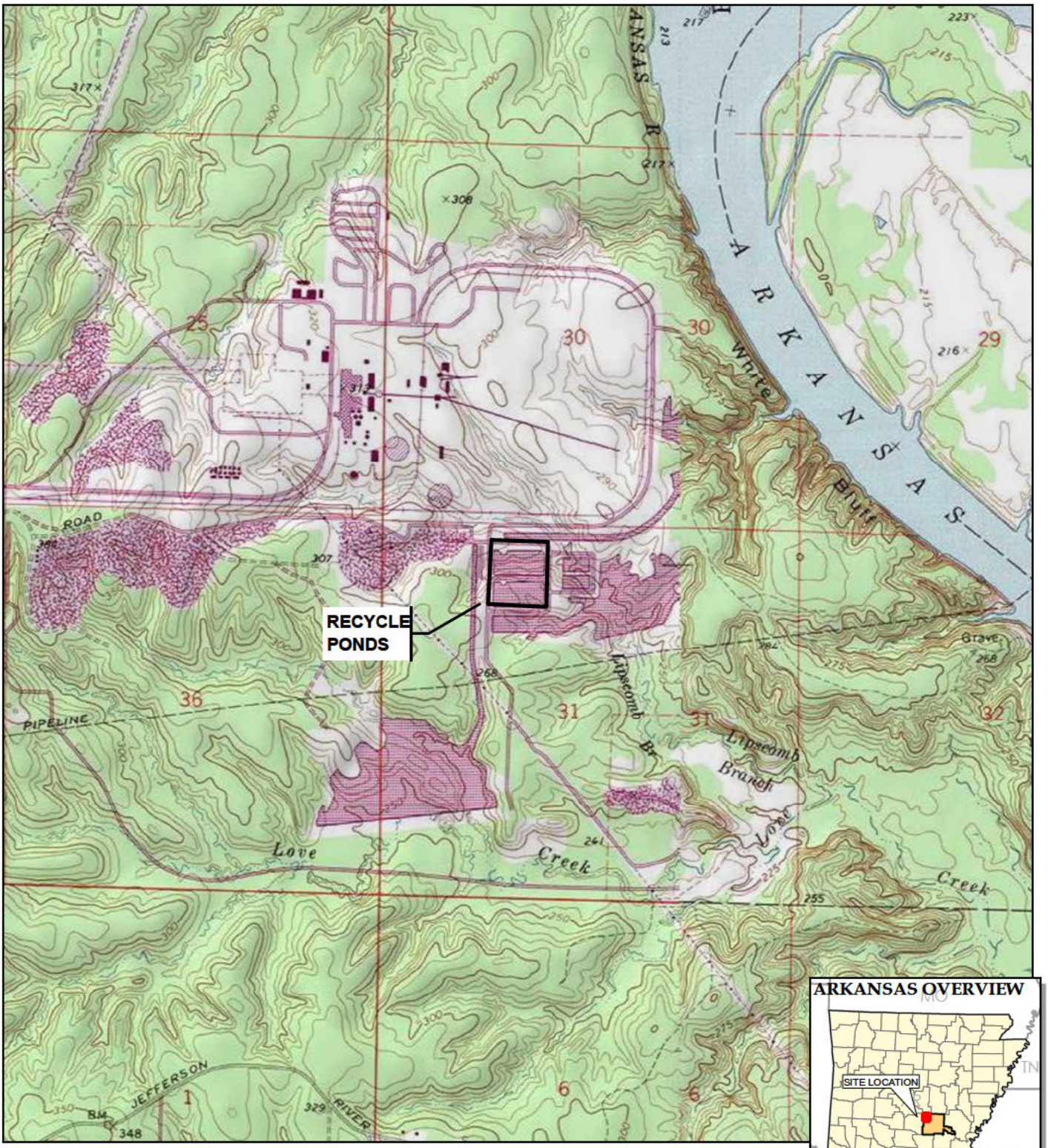
- A description of the type, purpose, and location of existing instrumentation.
- Area-capacity curves for the CCR unit.
- A description of each spillway and diversion design features and capacities and calculations used in their determination.
- The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.
- Any record or knowledge of structural instability of the CCR unit.

Section 2
Brief Description

The Plant is located near Redfield, Jefferson County, Arkansas (Figure 1). The Plant is located at approximate latitude 34˚25′11.4″ N, longitude 92˚9′20.60″ W (front gate). The Ponds are located in the southeast portion of the Plant. Pond A has an approximate surface area of 7.0 acres and Pond B has an approximate surface area of 6.5 acres. The typical water level elevation in each pond is approximately 278 ft North American Vertical Datum of 1988 (NAVD88) based on field observations during June 2018. Topography surrounding the immediate vicinity of the Ponds is generally flat-lying, with existing ground surface elevations ranging from approximately 277 to 285 ft NAVD88. Natural topography in the vicinity of the ponds is gently to steeply sloping.

Water contained in the Ponds is part of the facility's bottom ash transport system. There are storm water swales around the Ponds to control storm water and limit the volume of run-on. The natural ground beyond the ponds gently slopes to the southeast. A topographic survey completed by B&F Engineering, Inc. in October 2018 confirmed the elevations of the surrounding ground surface.

The Plant initiated construction in 1975, however due to a series of hearings before the Arkansas Public Service Commission, construction ceased from January 1976 until construction resumed May 26, 1977. Brown & Root was responsible for the design and construction of the Plant including the two water recycle ponds. Due to delays in construction, the first power generating unit was not completed until 1980 and the second power generating unit did not begin commercial operation until 1981. The water recycle ponds were constructed during the initial development phase of the Plant.



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

1" = 2,000'
1:24,000

0 2,000 4,000 FEET

TRC

Two United Plaza
8550 United Plaza Blvd., Suite 502
Baton Rouge, LA
Phone: 225 216.7483

TRC - GIS

PROJECT:

ENTERGY WHITE BLUFF PLANT
RECYCLE PONDS
REDFIELD, JEFFERSON COUNTY, ARKANSAS

TITLE:

SITE LOCATION MAP

DRAWN BY:	R. WIXON
CHECKED BY:	N. ADDISON
APPROVED BY:	J. HOUSE
DATE:	SEPTEMBER 2018
PROJ. NO.:	302967
FILE:	Fig01_302967-001slm.mxd

FIGURE 1

E:\Entergy\Arkansas\2018_302967\Fig01_302967-001slm.mxd – Saved By: RWIXON on 9/20/2018, 14:45:36 PM

Section 3
History of Construction

3.1 Contact Information

Entergy is the current owner and operator of the Ponds. The current contact information is:

Entergy White Bluff Plant
1100 White Bluff Road
Redfield, AR 72132.

NPDES Permit Number AR000930 is assigned to this facility.

3.2 Location

The Ponds are located in the southeast portion of the Plant. Pond A is approximately 7.1 acres (768′ X 403′) and has a capacity (volume) of 190,600 cubic yards (CY). Pond B is approximately 6.6 acres (750′ X 385′) and has a capacity (volume) of 153,400 CY. Figure 1 shows the location of the ponds on the Base Map from USGS 7.5-minute topographic quadrangle series.

3.3 Purpose

The Ponds were designed and utilized as part of the Plant's bottom ash transport water system and comply with the requirements of 40 CFR § 257.82(b). Water discharges from the Plant are permitted through the ADEQ for the National Pollutant Discharge Elimination System.

3.4 Watershed Information

The Ponds are part of the Lower Arkansas-Maumelle Watershed. The Lower Arkansas-Maumelle watershed lies within the Arkansas River Basin in Central Arkansas and has a drainage area of approximately 730,000 acres or 1,113 square miles according to Arkansaswater.org. The hydrologic unit code for this watershed is 11110207.

3.5 Physical and Engineering Properties

The Plant's Ponds began construction in approximately May 1977 per the design drawing by Chas. T. Main. Inc. titled "General Arrangement & Yard Piping Recycle Pond Area" (Appendix A) and completed prior to 1980. The Ponds were constructed on native ground. In June of 2018, FTN Associates Ltd. was contracted to install several monitoring wells and perform borings around the perimeter of the Ponds. The geotechnical laboratory test performed on the boring samples included the following: triaxial, unconfined compression, consolidation, direct

shear, organic content and pH (Appendix B). The laboratory results of the soil borings and monitoring wells show a mixture of clay and sand soil properties to a depth of approximately 30 feet, classified as CH, CL, SC, SM according to the Unified Soil Classification System. No additional information or records were readily available to evaluate a further detailed response.

3.6 Construction Details

The Ponds were designed by Chas. T. Main. Inc., drawing titled "General Arrangement & Yard Piping Recycle Pond Area" (Appendix A), in May of 1977. The Ponds were constructed on native soil and recent borings performed by FTN Associates Ltd. (Appendix B) were used to delineate the surrounding soil composition and characteristics. No additional information or records were readily available to evaluate a further detailed response.

3.7 Detailed Drawings

Available detailed design drawings for the Ponds are presented in Appendix A.

3.8 Instrumentation

There is no existing instrumentation around the Ponds

3.9 Area-Capacity Curves

Area-capacity curves have not been developed for the Ponds. Hydrologic and hydraulic capacity of the impoundment is presented in the Initial Inflow Design Flood Control System Plan prepared by TRC (2018).

3.10 Spillway and Diversion Design Features

Site infrastructure enables the Ponds to be operated either singularly, in parallel, or in series. Each pond has a 24" inlet pipe from the power block which conveys bottom ash transfer water from the power generation units of the Plant. Additionally, Pond A has an inlet from an overflow weir in Pond B at elevation 273 ft NAVD88. The Ponds can be drained via pumps in a pump house located between the ponds with a 30-inch intake pipe from each pond. The Ponds were designed to operate with 2 feet of freeboard, height difference from the top of the surrounding ground surface to the design water level.

The following features are available for spillways and diversion:

- An overflow weir at elevation 273 ft NAVD88 in Pond B that drains to Pond A.
- Operate pumps as needed to control the Pond water levels.
- An 18-inch diameter emergency overflow pipe at elevation 279.65 ft NAVD88 that drains to the Surge Pond.

3.11 Surveillance, Maintenance, and Repair

Surveillance, maintenance, and repair of the Ponds occur through the periodic inspections required by 40 CFR § 257.83. These include at a minimum weekly, monthly, and annual inspections by a qualified person (40 CFR § 257.83(a)) or a professional engineer (40 CFR § 257.83(b)).

3.12 Instability

Entergy completed a slope stability and soil liquefaction analysis of Pond B in October 2018 (FTN). The analysis concluded that foundation soils presents side-slopes that meet structural stability criteria. The Ponds were constructed at the same time and constructed on native soils. Geotechnical data documents similar soil types throughout the areas around the Ponds.

Section 4
Amendments

In accordance with 40 CFR § 257.73(c)(2), Entergy may amend this history of construction at any time. Specifically, Entergy will amend the history of construction whenever there is a significant change to the information provided in this document or in the operation of the CCR unit that would substantially affect the written plan in effect.

Section 5
References

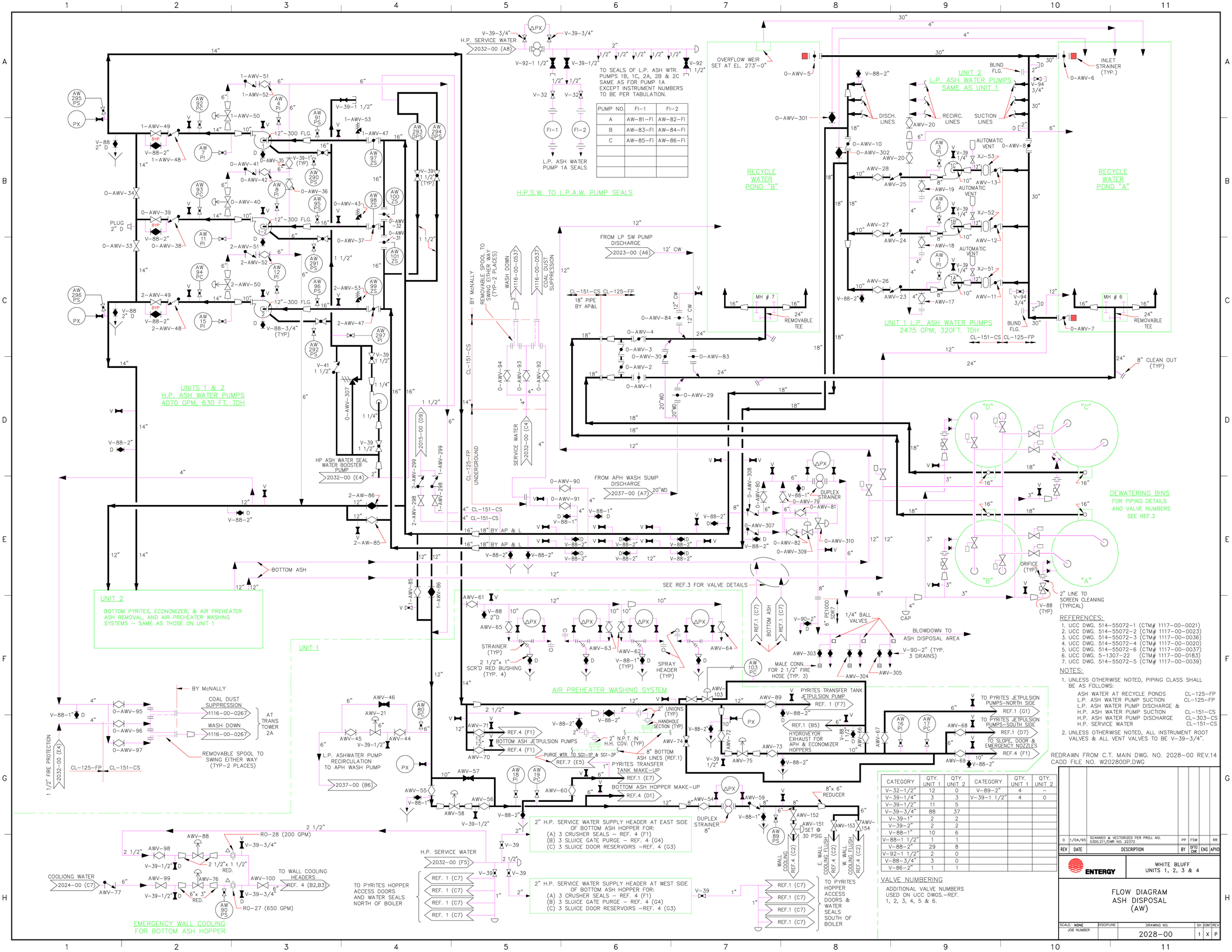
B&F Engineering, Inc. 2018. White Bluff Recycle Ponds Entergy Arkansas. October 1, 2018. Topographic Survey Drawing.

Chas. T. Main, Inc. 1981. White Bluff Steam Electric Station: 1977-1980 – 2800MW (Net) Installation – Units 1 Thru 4: General Arrangement & Yard Piping: Recycle Pond Area. Rev. 4, 7/25/79. Chas. T. Main, Inc. Drawing No. 3013-02-2236

FTN Associates Ltd. 2018. Entergy White Bluff Plant Recycle Pond B: Slope Stability and Soil Liquefaction Analysis.

TRC [TRC Environmental Corporation]. 2018. Initial Inflow Design Flood Control System Plan for Water Recycle Ponds, Entergy Arkansas, Inc., White Bluff Plant, Redfield, Jefferson County, Arkansas. Baton Rouge: TRC Environmental Corporation.

Appendix A
Drawings



CATEGORY	QTY. UNIT 1	QTY. UNIT 2	CATEGORY	QTY. UNIT 1	QTY. UNIT 2
V–32–1/2"	12	0	V–89–2"	4	–
V–39–1/4"	3	3	V–39–1 1/2"	4	0
V–39–1/2"	11	5			
V–39–3/4"	88	37			
V–39–1"	2	2			
V–39–2"	2	2			
V–88–1"	10	6			
V–88–1 1/2"	1	1			
V–88–2"	29	8			
V–92–1 1/2"	2	0			
V–88–3/4"	3	0			
V–86–2"	1	1			

REV	DATE	DESCRIPTION	BY	DFTG CHK	ENG	APVD
0	1/04/95	SCANNED & VECTORIZED PER PROJ. NO. 0300.211/DWR NO. 22372	PP	FSW		RR

3013-2-2236

NO	NEW LOW PRESS. WATERLINE	REG	REG	B.S./B.S.	10/09/02
9	AS-BUILT PER DCR No. 24-003	LW	[illegible]	[illegible]	5-22-03
8	AS-BUILT	CWG	KW	[illegible]	7/14/96
7	REVISED PER DCR #1247	LS			1/28/93
6	INCD DCR 894 Rev1 (GS)	BLG	LW	[illegible]	12/10/80
5	INCD DCR 388 G (GS)	BLG	LEC	[illegible]	10/21/80
REV NO.	ISSUED FOR	BY	CHK	APPROVED	DATE

PART PLAN AE (H-7)
SCALE: 3/16" = 1'-0"

SECTION BX-BX (B-2)
SCALE: 3/16" = 1'-0"

SECTION BZ-BZ (H-9)
SCALE: 1/8" = 1'-0"

PART PLAN A-F (C-11)
SCALE 1" = 200"

SECTION BY-BY (H-1)
SCALE 1/8" = 1'-0"

PART PLAN AG (H-6)
SCALE: 1/8" = 1'-0"

PART PLAN AH (H-7)
SCALE: 1/8" = 1'-0"

PLAN
SCALE: 1" = 60'-0"

NO	ISSUED FOR	BY	CHK	APPROVED	DATE
4	ADDED 2CW(DRAIN)@6-CWV-112 (H-6)	W.J.C.	RK	[illegible]	7/26/77
3	MISC REVS. (SEE REV. NOTE 2 & 6)	W.J.C.	RK	[illegible]	5/12/78
2	MIC REVISIONS	O.W.	W.J.C.	[illegible]	1-11-77
1	MISC. REVISIONS	W.J.C.	RK	[illegible]	7/13/77
0	CONSTRUCTION	W.J.C.	O.W.	[illegible]	4/5/77

FOR REVISIONS SEE ZONE H-8

REV. NO.	ISSUED FOR	BY	CHK.	APPROVED	DATE
DRW. K.J.	CHK. O.W.	ENG.			
DES. W.J.C.	SQ.				

ARKANSAS POWER & LIGHT COMPANY

WHITE BLUFF STEAM ELECTRIC STATION

1977-1980 — 2800MW (NET) INSTALLATION — UNITS 1 THRU 4

GENERAL ARRANGEMENT & YARD PIPING

RECYCLE POND AREA

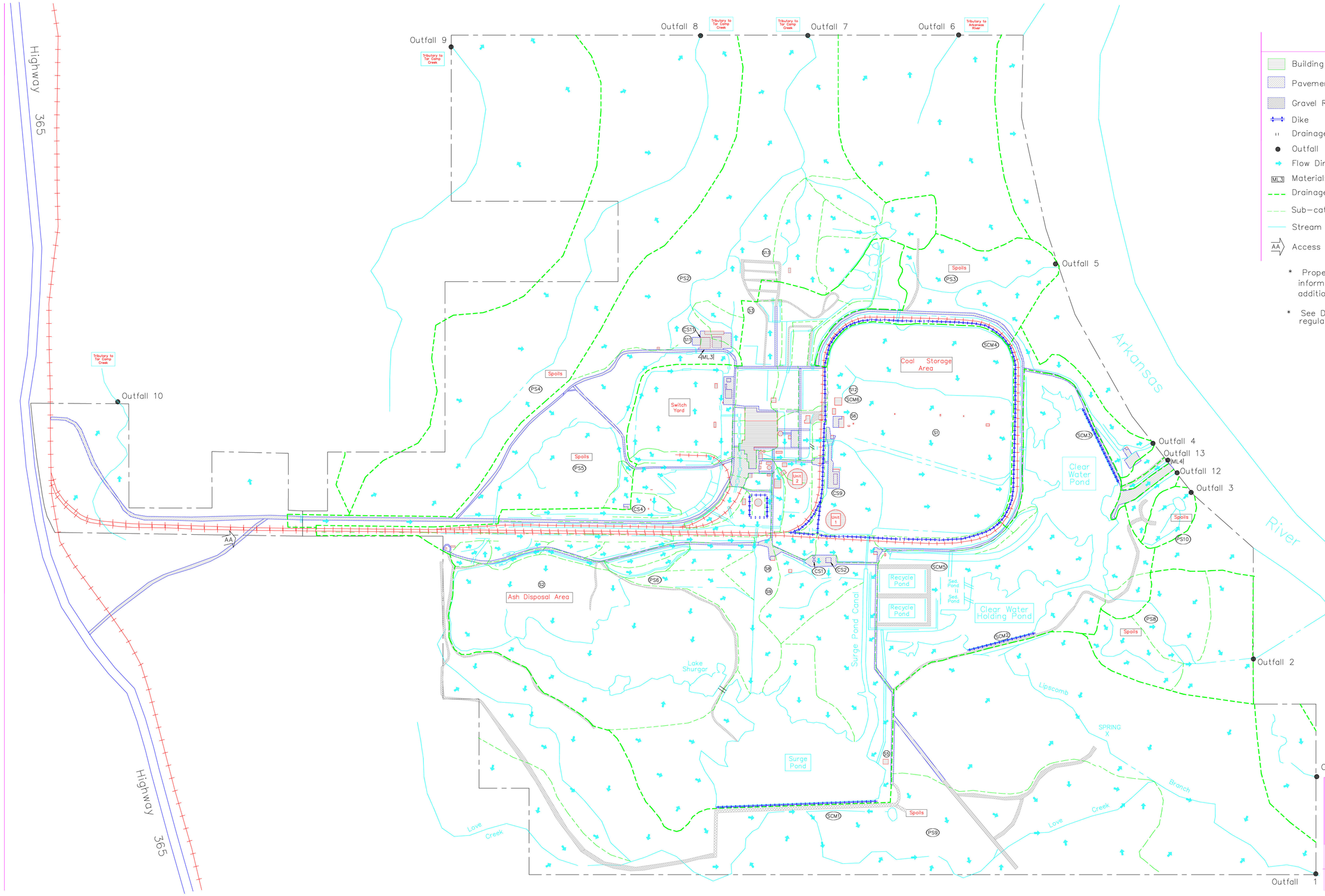
MAIN CHAS. T. MAIN, INC. BOSTON MASSACHUSETTS CHARLOTTE NORTH CAROLINA

SCALE: AS NOTED DATE: MAY 31, 1977

CLIENT | JOB | DWG. NO. 3013-2-2236-0 | REV. 10

RELEASED FOR UNITS #2

The Draftboard, Inc.



Legend

- Building
- Pavement
- Gravel Road
- Dike
- Drainage Grate
- Outfall
- Flow Direction
- ML3 Materials Loading Area
- Drainage Boundary
- Sub-catchment Boundary
- Stream / Ditch
- AA Access Area
- CS1 Present Storage (covered)
- PS1 Past Storage (not covered)
- S4 Present Storage (not covered)
- SCM1 Structural Control Meas.
- Drainage Pipe

* Property lines shown were based on information supplied by AP&L. No additional survey was performed.

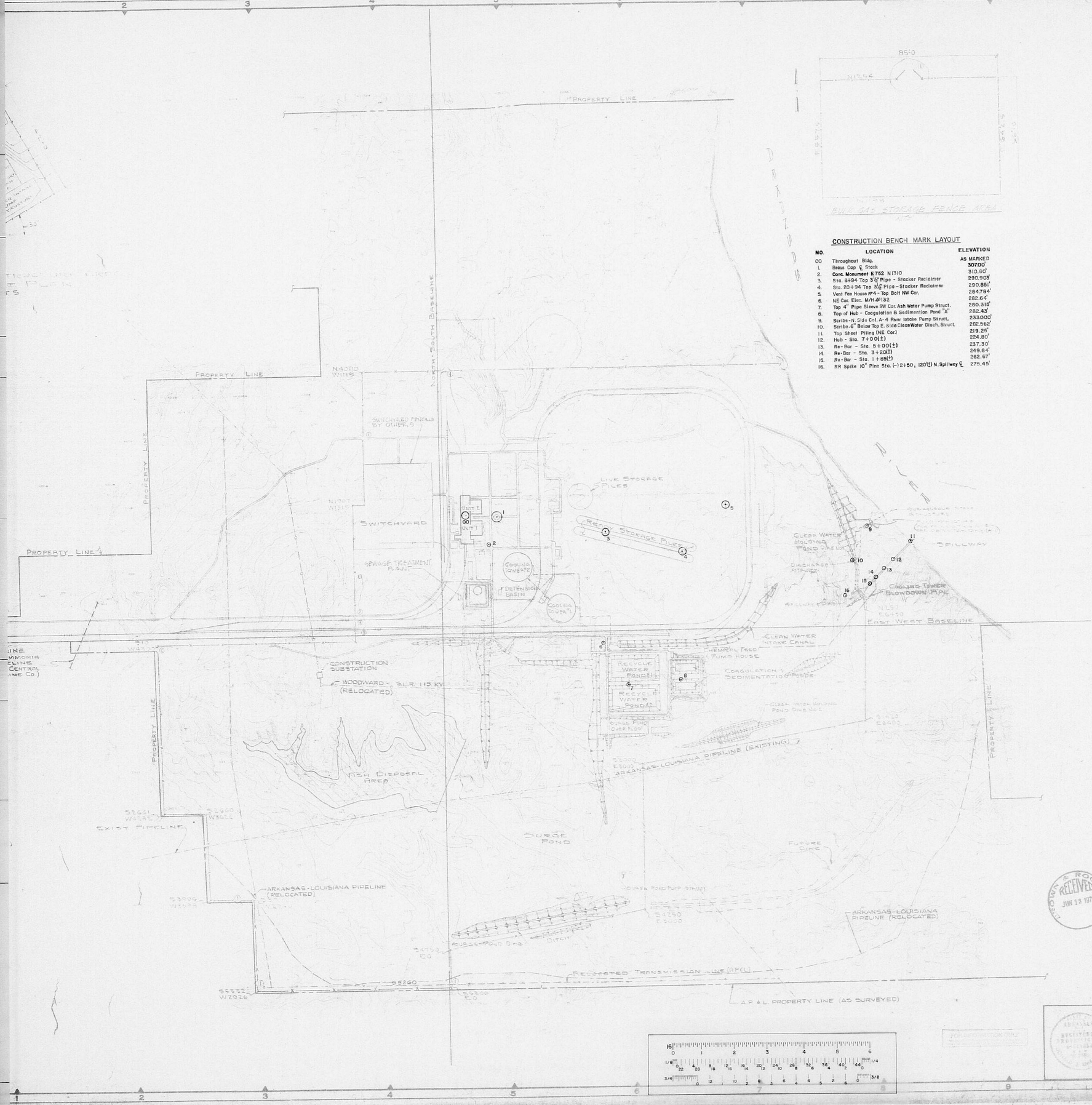
* See DETAIL Map for stormwater regulated areas in immediate plant vicinity.

DWG. NO. 3001-04
FILE NO. W3001040.DWG

Arkansas Power & Light Co.

WHITE BLUFF
SITE MAP

Project No. 6040-021 03/31/92



CONSTRUCTION BENCH MARK LAYOUT

NO.	LOCATION	ELEVATION
00	Throughout Bldg.	AS MARKED
1.	Brass Cap ℄ Stack	307.00'
2.	Conc. Monument E752 N1310	310.80'
3.	Sta. 8+94 Top 3½" Pipe - Stacker Reclaimer	290.903'
4.	Sta. 20+94 Top 3½" Pipe - Stacker Reclaimer	290.851'
5.	Vent Fan House #4 - Top Bolt NW Cor.	264.784'
6.	NE Cor. Elec. M/H #132	282.64'
7.	Top 4" Pipe Sleeve SW Cor. Ash Water Pump Struct.	280.319'
8.	Top of Hub - Coagulation & Sedimentation Pond "A"	282.43'
9.	Scribe-N. Side Col. A-4 River Intake Pump Struct.	233.000'
10.	Scribe-6" Below Top E. Side Clean Water Disch. Struct.	282.562'
11.	Top Sheet Piling (NE Cor.)	219.25'
12.	Hub - Sta. 7+00(±)	224.80'
13.	Re-Bar - Sta. 5+00(±)	237.30'
14.	Re-Bar - Sta. 3+20(±)	249.84'
15.	Re-Bar - Sta. 1+85(±)	262.67'
16.	RR Spike 10" Pine Sta. (-) 2+50, 120'(±) N. Spillway ℄	275.45'

GENERAL NOTES:

1. ALL COORDINATES REFER TO THE PLANT BASE LINES WHICH WERE ESTABLISHED BY EXTENDING THE SOUTH BOUNDARY LINE OF SECTION 25, ALSO DESCRIBED AS THE NORTH BOUNDARY LINE OF SECTION 36 IN JEFFERSON COUNTY, ARKANSAS.
2. ALL EARTH WORK SHALL BE IN ACCORDANCE WITH CHAS. T. MAIN, INC. SPECIFICATION NO. 3013-2-1355-01.
3. ALL SIDE SLOPES IN CUT OR EMBANKMENT SHALL BE AT LEAST 3 HORIZONTAL TO 1 VERTICAL, EXCEPT WHERE NOTED.
4. THE ELEVATIONS INDICATED HEREIN REPRESENT FINISH GRADES FOR THE WORK TO BE PERFORMED UNDER THIS CONTRACT, BUT DO NOT NECESSARILY REPRESENT FINISH OR FINAL PLANT GRADES, I.E., THE RAILROAD PROFILE GRADES ARE BASED ON TOP OF SUBGRADE, TWO FEET BELOW TOP OF RAIL.
5. DITCHES SHALL IN GENERAL FOLLOW THE SAME SLOPE AS ADJACENT R.R. & ROADS WHERE INVERT ELEVATIONS ARE NOT GIVEN. MINIMUM SLOPE = .0025 FT/FT.
6. CULVERT PIPES SHALL, IN THE CASE OF EXISTING STREAMS, BE ADJUSTED TO LINE AND GRADE TO SUIT EXISTING CONDITIONS AND SHALL, AT ALL TIMES, ADHERE TO THE SPECIFICATIONS OF THIS CONTRACT AND THAT OF THE MANUFACTURER. MINIMUM SLOPE = .0025 FT/FT.
7. RIPRAP SHALL BE PROVIDED AT INLET AND OUTLET OF CULVERTS AND FOR DITCHES WITH SLOPE IN EXCESS OF 6%.

THE STRENGTH OF CONCRETE CULVERT IS SPECIFIED BY ITS CLASS ACCORDING TO A.S.T.M. DESIGNATION C-76.

FOR DITCHES, COORDINATES ARE GIVEN AT THE CENTERLINE OF THE DITCH. FOR ALL DITCHES, THE MINIMUM BOTTOM WIDTH IS 2.0' AND THE MINIMUM DEPTH IS 1.0', UNLESS OTHERWISE NOTED.

LEGEND:

FINISH GRADE ELEVATION	EL. 320.0
ROUGH GRADE ELEVATION	320.0
INVERT ELEVATION	INV. EL. 320.0
CONTOUR ELEVATION	320
STREAM OR EDGE OF WATER	
DRAINAGE FLOW DIRECTION	
RAILROAD	
TOP OF SLOPE	
BOTTOM OF SLOPE	
CULVERT	
CULVERT WITH HEADWALL	
DITCH SLOPE	D.S.
DROP INLET	D.I.
PROPOSED FENCE LOCATION	X X

NOTES:

EXISTING PIPELINE TO BE LOWERED TO ATTAIN ADEQUATE COVER OVER THE PIPELINE BELOW THE ROAD AND RAILROAD. PIPELINE TO BE LOWERED BEFORE START OF CONSTRUCTION OF THE ACCESS ROAD AND RAILROAD. (i.e., 10' AMMONIA PIPELINE.)

ALL EMBANKMENT SLOPES CONSTRUCTED UNDER THIS CONTRACT SHALL BE GRADED AND SOD MULCHED IN ACCORDANCE WITH SECTION-12 OF THE TECHNICAL SPECIFICATIONS.

REFERENCE DRAWINGS:

DRAWING TITLE	DWG. NO.
SITE PLAN	3001-01
PROPOSED PLANT BOUNDARY LINES	3002-00
PLANT SITE AND PLANT ACCESS CLEARING PLAN	3002-00
PLANT AREA GRADING & DRAINAGE PLAN	3004-00
COAL HANDLING AREA GRADING & DRAINAGE PLAN	3005-00
PLANT SITE SECTIONS - SHEET 1 & SHEET 2	3006-01 & 3006-02
PLANT ACCESS ROAD PLAN - RTE. 65 TO PLANT	3008-00
PLANT ACCESS ROAD ON PLANT SITE, TYPICAL ROAD & RAILROAD CROSS SECTIONS	3009-00
PLANT ACCESS ROAD - PROFILE	3010-00
INTERSECTION OF RTE. 65 & PLANT ACCESS ROAD	3011-00
PLANT ACCESS RAILROAD, PLAN AND PROFILE - MISSOURI PACIFIC RAILROAD AND ACCESS SPUR CONNECTION	3012-00
PLANT ACCESS RAILROAD, PLAN AND PROFILE - ACCESS SPUR TO PLANT AREA	3013-00
PLANT AREA AND COAL UNLOADING AREA - RAILROAD PLAN	3014-00
PLANT AREA AND COAL UNLOADING AREA - RAILROAD PROFILE	3015-00
PLANT AREA RAILROAD - SECTIONS & DETAILS	3015-00
SEWAGE AND WATER TREATMENT AREA, GRADING AND DRAINAGE PLAN	3022-00
DRAINAGE DETAILS	3025-00
BORING LOCATION PLAN	3027-00
ROAD, R.R. & CULVERT CROSS SECTIONS & DETAILS - SHEET 1	3017-01
ROAD, R.R. & CULVERT CROSS SECTIONS & DETAILS - SHEET 2	3017-02
ROAD, R.R. & CULVERT CROSS SECTIONS & DETAILS - SHEET 3	3017-03
CULVERT & DROP INLET SCHEDULES	3026-00

(1) VEHICLE GATES W/ PADLOCKS (5)
(2) ELECTRICALLY OPERATED VEHICLE GATE, MONITORED BY TV CAMERA AND MICROPHONE W/ WIRING - CAPACITY FOR FUTURE INSTALLATION OF PRESSURE SWITCH (2)
(3) ELECTRICALLY OPERATED RAILROAD CAR GATE, MONITORED BY TV CAMERA AND MICROPHONE W/ WIRING - CAPACITY FOR FUTURE INSTALLATION OF PRESSURE SWITCH (2)

Ref. Dwg. 3001-00

REV. NO.	ISSUED FOR	BY	CHK.	APPROVED	DATE
4	BUILDING & STORAGE AREA FENCE ADDED	DJW	HWB	EM/WPE	8/29/79
3	ADDED DETENTION BASIN, ADDED RAILROAD PER NG BY OTHERS & MISC REVISIONS	MKE	CSL	EM/WPE	8/9/79
2	ADDED TIMBER RETAINING WALL AT AREA NEAR PROPERTY LINES PER NOTES FOR AS BUILT	RCD		EM/WPE	7/9/79
1	ADDED PROPOSED COAL UNLOADING AREA & ROADWAY	DJW	HL	EM/WPE	6/8/77
0	FOR CONSTRUCTION	CSL		EM	1/31/75

DRW. CSL CHK. JFK ENG. EM/WPE
DES. RCD SQL. CSL

RECEIVED JUN 13 1979 WINSON & ROOT, INC.

ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF STEAM ELECTRIC STATION
1977-1980 — 2800MW (NET) INSTALLATION — UNITS 1 & 2

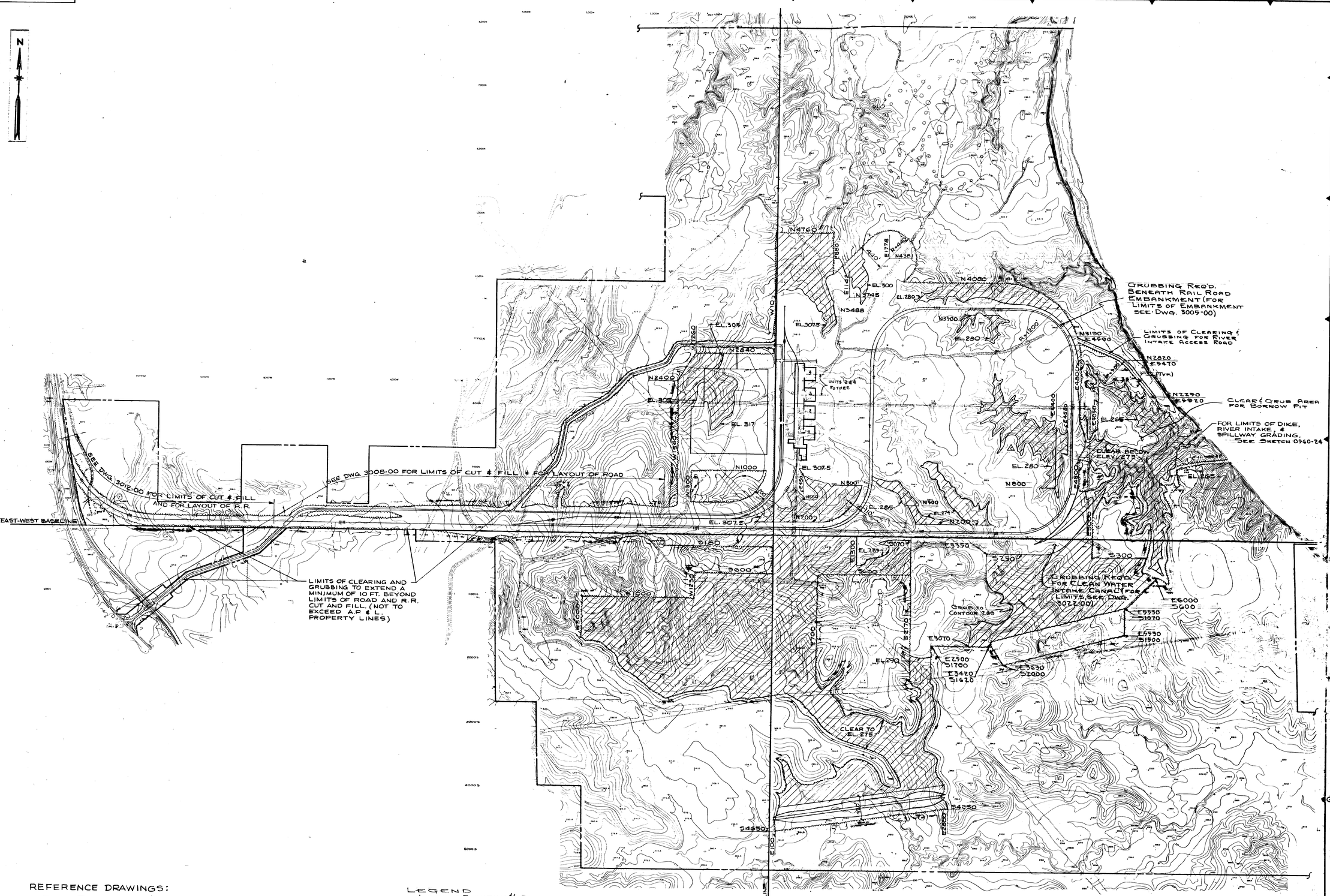
CONSTRUCTION BENCH MARK LAYOUT

MAIN
CHAS. T. MAIN, INC.
BOSTON MASSACHUSETTS — CHARLOTTE NORTH CAROLINA

SCALE 1" = 500' | DATE JAN. 31, 1975
DWG. NO. 3001-06 | 0

3001-06

3013-2-3002-00



REFERENCE DRAWINGS:

SITE PLAN	3001-01
PLOT PLAN	2051-01
RIVER INTAKE AREA GRUBBING PLAN	0560-24

LEGEND
LIMITS OF CLEARING & GRUBBING
AREAS NOT TO BE GRUBBED

REV NO.	ISSUED FOR	BY	CHK.	APPROVED	DATE
5	(NO CHANGE FROM REV. 4). AS-BUILT AS PER A. F. & I. TRANSMITTAL DATED 6-10-81 & B. & R. LETTER BRY-016-81 DATED 6-10-81	PEC.	J.Z.		10/7/81
4	MINOR REVISION AS PER FIELD REVISION, REV. PROPERTY LINES (INCL.) REV. CLEARING LINE S.E. CORNER, ROADD AREA FOR PERMANENT CONSTR. ACCESS ROAD	CSL	BK	EM WPR	11/1/80
3	LOCATED CLEARING & GRUBBING FOR RIVER INTAKE RD./SURGE POND DIKE	CSL	JFK	EM/WPR	5-14-75
2	REV. GRUBBING	CSL	JFK	EM	3-25-75
1	REDRAWN GEN. REV.	CSL	JFK	EM	6-17-74
0	FOR CONSTRUCTION	G.W.	JFK	W.P.L.	7-16-73
D	GENERAL CONTRACT BID	M.C.		CM	3-22-74
C	FOR CLIENT REVIEW	RZM		ASL	3-3-74
B	FOR CLIENT REVIEW	ASL	JFK		2-26-73
A	CLIENT INFO. & COMMENTS	ASL	JFC		7-27-73
REV NO	ISSUED FOR	BY	CHK.	APPROVED	DATE

STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 3582 DONALD J. McALISTER

DRW. D.A.	CHK. RZM	ENG. EM/W.P.L.	
DES. RCD	SQL. CSL		

ARKANSAS POWER & LIGHT COMPANY

WHITE BLUFF STEAM ELECTRIC STATION

1977-1980 — 2800MW (NET) INSTALLATION — UNITS 1 THRU 4

PLANT SITE AND PLANT ACCESS CLEARING PLAN

MAIN
CHAS. T. MAIN, INC.
BOSTON MASSACHUSETTS — CHARLOTTE NORTH CAROLINA

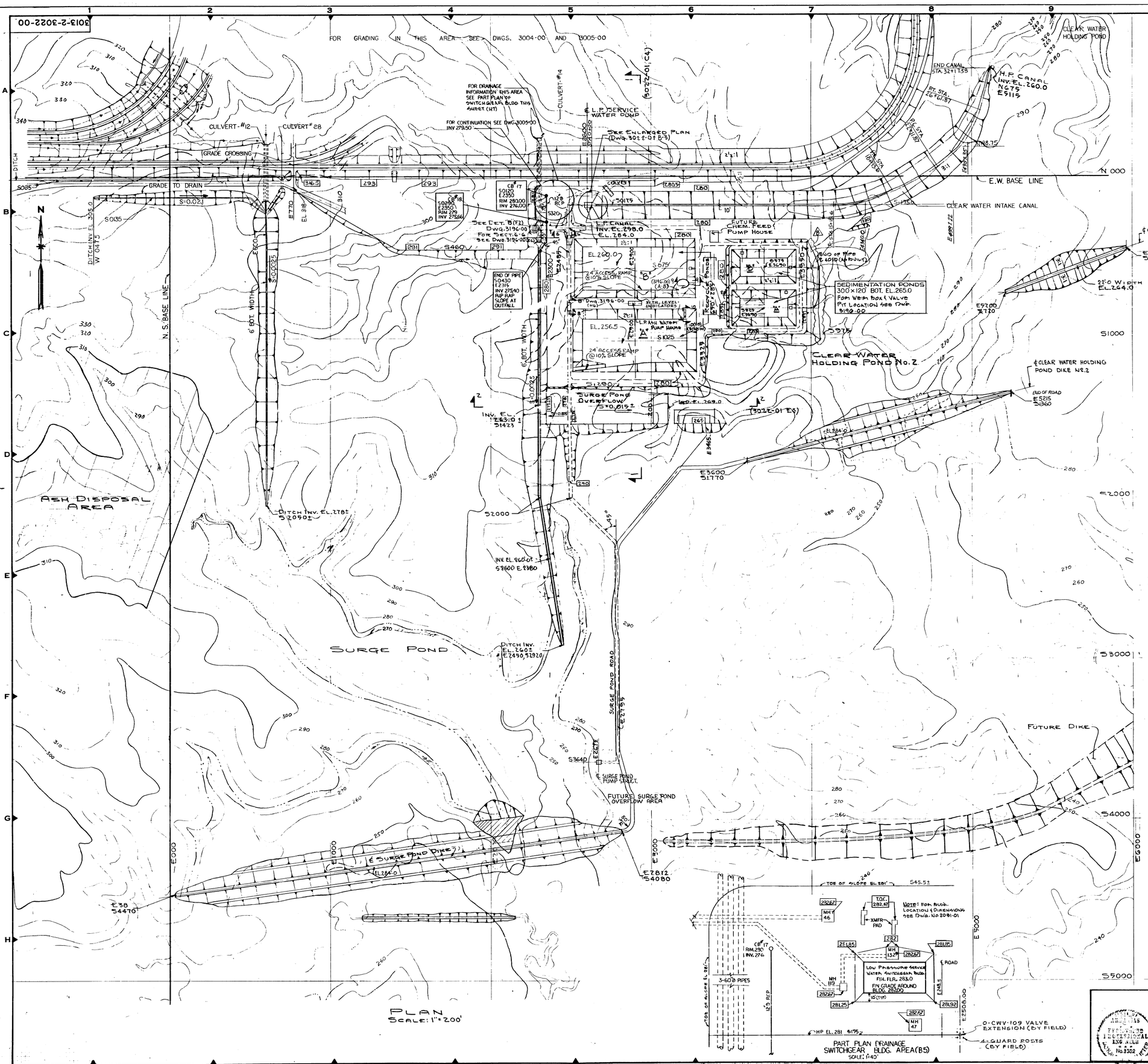
SCALE	DATE	CLIENT	JOB	DWG. NO.	REV.
1" = 500'	7-27-73			3013-2-3002-00	5

The Draftboard, Inc.

R112575

3013-2-3022-00

Rec'd 4-8-82



NOTES:

1. FOR GENERAL NOTES SEE DWG. 3001-01
2. REVISED CLEAR WATER INTAKE CANAL (A-8) AS PER MEMO J.A. BEIMER TO. W.G. SHURGAR/W.H. JONES AND BROWN & ROOT FIELD SKETCH WBFSK-C-042.
3. RELOCATED ACCESS RAMP & L.P. ASH WATER PUMP INLET PLATFORM (C-6) AS PER FIELD NOTES BY F.E.

LEGEND:

SEE DWG. ——— 3001-01

ISSUED FOR, UNITS 1&2 ONLY
DCR #765, 637, & 660 PENDING

REFERENCE DWGS:

SITE PLAN	3001-01
PLANT SITE & PLANT ACCESS CLEARING PLAN	3002-00
PLANT AREA GRADING & DRAINAGE PLAN	3004-00
COAL HANDLING AREA GRADING & DRAINAGE PLAN	3005-00
DRAINAGE DETAILS	3025-00
CULVERT & DROP INLET SCHEDULES	3026-00
BORING LOCATION PLAN	3027-00
PLAN SURGE POND DIKE	3214-01
SURGE POND DIKE SECTIONS	3214-02
CLEAN WATER HOLDING POND DIKE No. 2	3214-03
~~SURGE POND OVERFLOW, HOLDING POND #2 AND WATER TREATING AREA SECT. & DETAILS~~	~~3022-01~~

REV. NO.	ISSUED FOR	BY	CHK.	APPROVED	DATE
8	REVISED PER DCP1 #81	L.G.			1-24-80
7	REVISED AS PER BROWN & ROOT INC. AS-BUILT WBF-2A1-3022-00, REV. 0, REV. 1 & REV. 2 DCR # 325, DCR # 396	H.M.	J.Z.		5/14/82
6	REVISED ACCESS RAMP @ EXCITER PANEL, ADDED WEIR BOX & VALVE PIT LOCATION NOTE & ELEVATIONS REV. AS PER FIELD REVISION	R.E.M.	SK	EM	6/19/79
5	REVISED SWITCHGEAR AREA (B-5) & ADDED ART PLAN (C-7)	DLV	SK	EM/WPE	6/19/79
4	REV. ASH HANDLING ROAD, FUTURE DIKE RELOCATION, ROAD PAVD, PUMP STRUCT. & PUMP REQ.	R.M.H. B.E.H.	CL	EM/WPE	7-16-77
3	REV. E-2300 DITCH & MISC. REVISION, ADDED W150 ROAD	R.T.B.	TCC	EM/EM	4-20-76
2	ADDED CANAL DITCH INVERT, LOCATIONS. REV. TITLE, SURGE POND DIKE & OVERFLOW, HOLDING DIKE AND WATER TREATING AREA	C.T.L.	C.T.L.	E.M.	3-9-76
1	ADDED GRADING FOR SURGE POND OVERFLOW FOR COMMENTS	C.T.L.	JFK	EM	2-12-75
0	FOR CONSTR.	C.T.L.	JFK	EM	1-9-75
D	CONSTR. ISSUE FOR APPROVAL	G.W.		EM	11-25-74
C	GENERAL CONTRACT BID	W.C.		EM	3-21-74
B	FOR CLIENT REVIEW	R.E.M.			8/8/73
A	FOR CLIENT REVIEW	W.L.	R.E.M.		12/26/73

DRW. P.L.P. CHK. JFK ENG. C. Max Nunez, W.H. Lentell
DES. R.E.M. SQL. JFK Donald A. McWilliams

ARKANSAS POWER & LIGHT COMPANY

WHITE BLUFF STEAM ELECTRIC STATION

1977-1980 — 2800MW (NET) INSTALLATION — UNITS 1 THRU 4

ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 3302

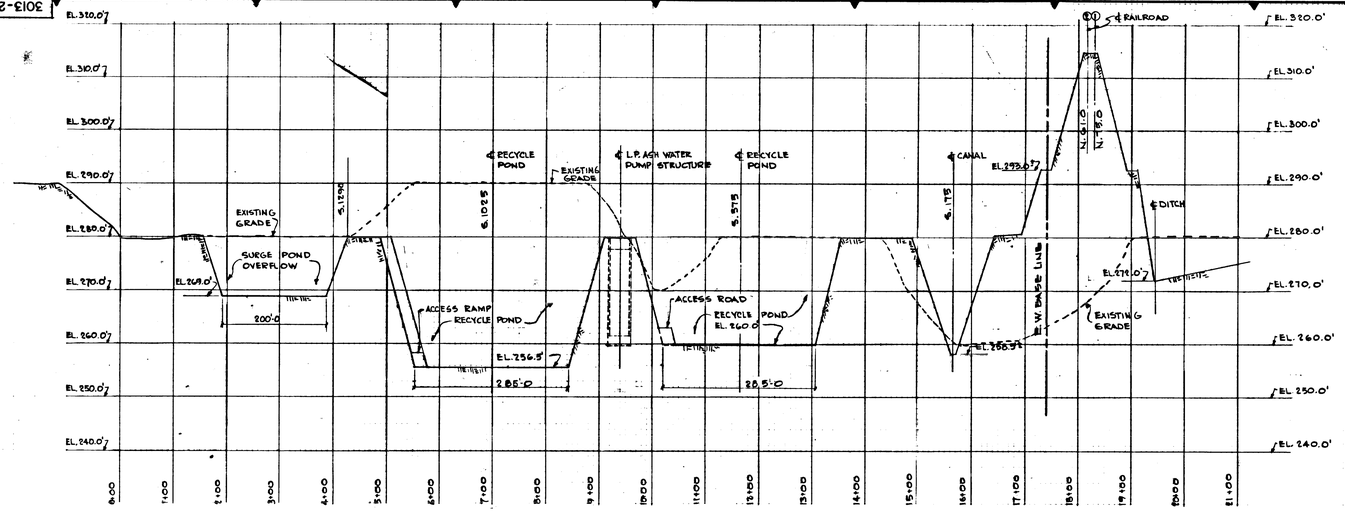
SURGE POND OVERFLOW HOLDING POND NO. 2 & WATER TREATING AREA-PLAN

MAIN
CHAS. T. MAIN, INC.
BOSTON MASSACHUSETTS — CHARLOTTE NORTH CAROLINA

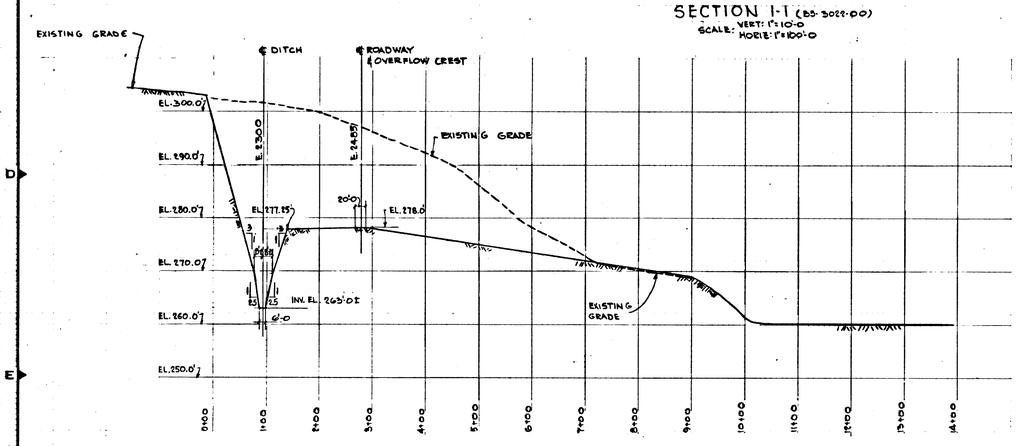
SCALE: AS NOTED | DATE: 12-26-73
CLIENT | JOB | DWG. NO. 3013-2-3022-00 | REV. 8

2112562

3013-2-3022-01



SECTION 1-1 (DS. 3022-00)
SCALE: VERT: 1"=10'-0
HORIZ: 1"=100'-0



SECTION 2-2 (DS. 3022-00)
SCALE: VERT: 1"=10'-0
HORIZ: 1"=100'-0

NOTES:
FOR NOTES SEE DWG. 3022-00

REFERENCE DWGS:
SURGE POND OVERFLOW, HOLDING POND NO. 2 & WATER TREATING AREA - PLAN DWG.-3022-00

REV. NO.	ISSUED FOR	BY	CHK.	APPROVED	DATE
2	AS-BUILT AS PER A. P. & L. TRANSMITTAL DATED 6-10-81 & B. & R. LETTER BRT-016-81 DATED 6-10-81 (NO CHANGE FROM REV. 1)	P.E.C.	J.T.Z.		12/7/81
1	REVISED PLAN AS REV. 1 REVISED P.E. & ALTERATIONS	R.T.Z.	JCC		2-18-76
0	CONSTRUCTION	R.T.Z.	R.L.		2-5-76

DRW. R.T.Z. CHK. DES. R.T.Z. R.L. SUL. ENG.

ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF STEAM ELECTRIC STATION
1977-1980 — 2800MW (NET) INSTALLATION — UNITS 1 THRU 4

SURGE POND OVERFLOW
HOLDING POND NO. 2 &
WATER TREATING AREA
SECTIONS & DETAILS

MAIN
CHAS. T. MAIN, INC.
BOSTON MASSACHUSETTS — CHARLOTTE NORTH CAROLINA

SCALE: AS NOTED
DATE: 2-18-76
CLIENT JOB DWG. NO.: 3013-2-3022-01
REV. 2

STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER NO. 8603 ARTHUR PAUL PARTRIDGE

The Drafting Co., Inc.

21125G3

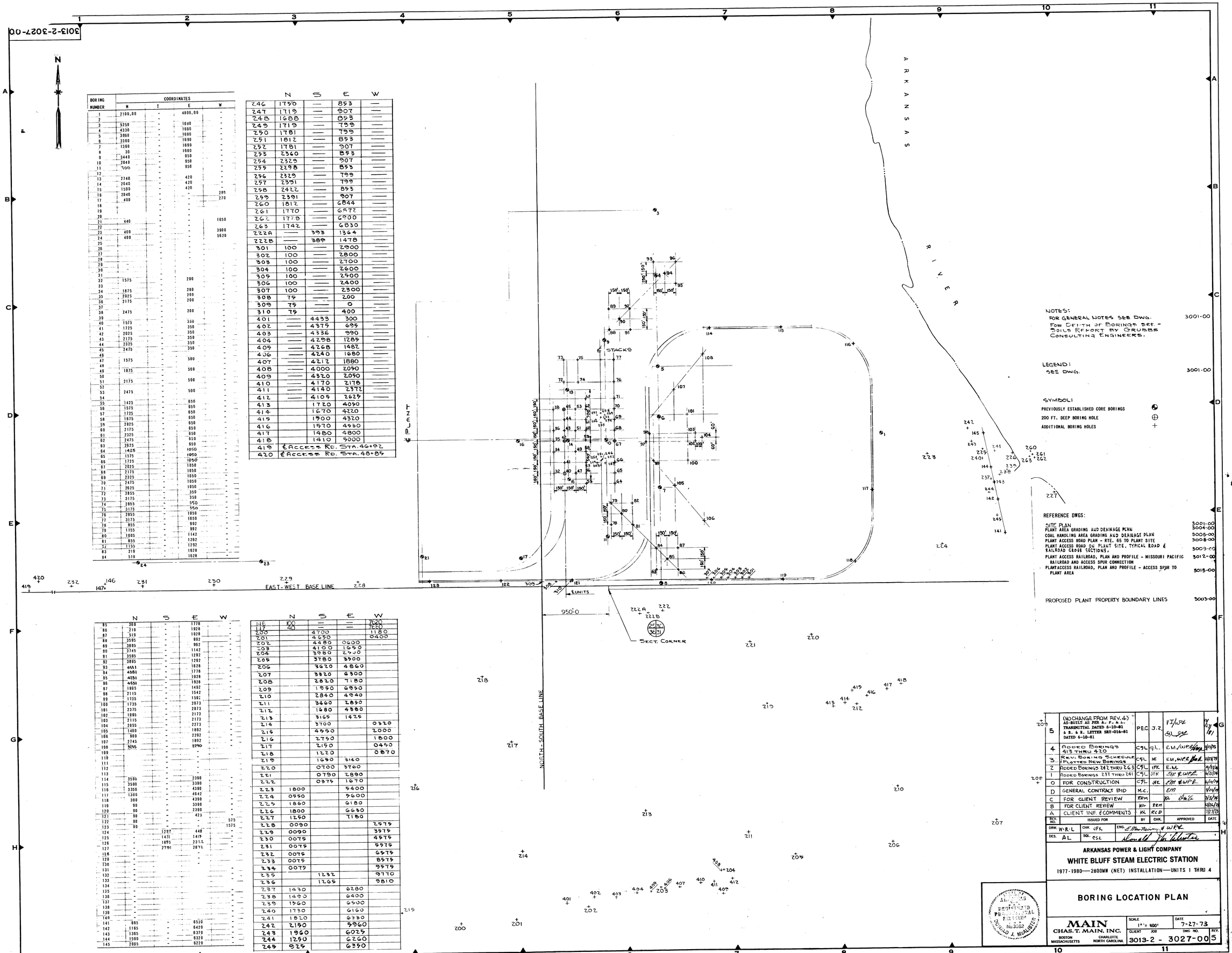
3013-2-3027-00

BORING NUMBER	COORDINATES N	S	E	W
1	2100.00	-	4800.00	-
2		-		-
3	5250	-	1690	-
4	4330	-	1690	-
5	3800	-	1690	-
6	2360	-	1690	-
7	1360	-	1690	-
8	30	-	1690	-
9	3440	-	950	-
10	2040	-	950	-
11	700	-	950	-
12		-		-
13	2740	-	420	-
14	2040	-	420	-
15	1500	-	420	-
16	2940	-	-	285
17	400	-	-	270
18		-	-	
19		-	-	
20		-	-	
21	440	-	-	1650
22		-	-	
23	400	-	-	3900
24	400	-	-	5620
25		-	-	
26		-	-	
27		-	-	
28		-	-	
29		-	-	
30		-	-	
31		-	-	
32	1575	-	200	-
33		-		-
34	1875	-	200	-
35	2025	-	200	-
36	2175	-	200	-
37		-		-
38	2475	-	200	-
39		-		-
40	1575	-	350	-
41	1725	-	350	-
42	2025	-	350	-
43	2175	-	350	-
44	2325	-	350	-
45	2475	-	350	-
46		-		-
47	1575	-	500	-
48		-		-
49	1875	-	500	-
50		-		-
51	2175	-	500	-
52		-		-
53	2475	-	500	-
54		-		-
55	1425	-	850	-
56	1575	-	850	-
57	1725	-	850	-
58	1875	-	850	-
59	2025	-	850	-
60	2175	-	850	-
61	2325	-	850	-
62	2475	-	850	-
63	2625	-	850	-
64	1425	-	1050	-
65	1575	-	1050	-
66	1725	-	1050	-
67	2025	-	1050	-
68	2175	-	1050	-
69	2325	-	1050	-
70	2475	-	1050	-
71	2625	-	1050	-
72	2855	-	350	-
73	3175	-	350	-
74	2855	-	550	-
75	3175	-	550	-
76	2855	-	1050	-
77	3175	-	1050	-
78	855	-	992	-
79	1155	-	992	-
80	1005	-	1142	-
81	855	-	1292	-
82	1155	-	1292	-
83	219	-	1628	-
84	519	-	1628	-

	N	S	E	W
85	369	-	1778	-
86	219	-	1928	-
87	519	-	1928	-
88	3595	-	992	-
89	3895	-	992	-
90	3745	-	1142	-
91	3595	-	1292	-
92	3895	-	1292	-
93	4531	-	1628	-
94	4381	-	1778	-
95	4231	-	1928	-
96	4531	-	1928	-
97	1895	-	1492	-
98	2115	-	1542	-
99	1735	-	1592	-
100	1735	-	2073	-
101	2375	-	2073	-
102	1895	-	2173	-
103	2115	-	2173	-
104	2855	-	2273	-
105	1400	-	1892	-
106	980	-	2292	-
107	2745	-	1892	-
108	3235	-	2290	-
109		-	-	
110		-	-	
111		-	-	
112		-	-	
113		-	-	
114	3590	-	2398	-
115	3590	-	3398	-
116	3350	-	4398	-
117	1300	-	4642	-
118	380	-	4398	-
119	90	-	3398	-
120	90	-	2398	-
121	90	-	423	-
122	90	-	-	575
123	90	-	-	1575
124	-	1287	448	-
125	-	1431	1419	-
126	-	1895	2332	-
127	-	2781	2872	-
128	-		-	
129	-		-	
130	-		-	
131	-		-	
132	-		-	
133	-		-	
134	-		-	
135	-		-	
136	-		-	
137	-		-	
138	-		-	
139	-		-	
140	-		-	
141	865	-	6520	-
142	1165	-	6420	-
143	1365	-	6370	-
144	1590	-	6320	-
145	2865	-	6220	-

	N	S	E	W
146	1750	—	853	—
247	1719	—	907	—
248	1688	—	853	—
249	1719	—	799	—
250	1781	—	799	—
251	1812	—	853	—
252	1781	—	907	—
253	2360	—	853	—
254	2329	—	907	—
255	2298	—	853	—
256	2329	—	799	—
257	2391	—	799	—
258	2422	—	853	—
259	2391	—	907	—
260	1812	—	6844	—
261	1770	—	6872	—
262	1778	—	6900	—
263	1742	—	6830	—
222A	—	393	1344	—
222B	—	389	1478	—
301	100	—	2900	—
302	100	—	2800	—
303	100	—	2700	—
304	100	—	2600	—
305	100	—	2500	—
306	100	—	2400	—
307	100	—	2300	—
308	75	—	200	—
309	75	—	0	—
310	75	—	400	—
401	—	4433	300	—
402	—	4375	695	—
403	—	4336	990	—
404	—	4298	1289	—
405	—	4268	1482	—
406	—	4240	1680	—
407	—	4212	1880	—
408	—	4000	2090	—
409	—	4320	2090	—
410	—	4170	2178	—
411	—	4140	2372	—
412	—	4105	2625	—
413		1720	4090	
414		1670	4220	
415		1500	4320	
416		1570	4450	
417		1480	4800	
418		1410	5000	
419	℄ ACCESS RD. STA. 46+92			
420	℄ ACCESS RD. STA. 48+85			

	N	S	E	W
HG	100	—	—	2000
HF	40	—	—	2600
200		4700		1180
201		4650		0400
202		4480	0600	
203		4100	1650	
204		3980	2500	
205		3780	3900	
206		3620	4860	
207		3820	6300	
208		2820	7180	
209		1850	6950	
210		2840	4940	
211		3460	2850	
212		1680	4380	
213		3165	1425	
214		3700		0320
215		4550		2000
216		2750		1800
217		2150		0450
218		1220		0870
219		1680	3140	
220		0700	3760	
221		0790	2880	
222		0375	1670	
223	1800		5400	
224	0950		5600	
225	1860		6180	
226	1800		6630	
227	1250		7180	
228	0090			3575
229	0090			3575
230	0075			4575
231	0075			5575
232	0075			6575
233	0075			8575
234	0075			9575
235		1232		9770
236		1265		9810
237	1430		6280	
238	1480		6400	
239	1560		6500	
240	1730		6160	
241	1820		6330	
242	2150		5960	
243	1960		6025	
244	1250		6260	
245	925		6350	



NOTES:
FOR GENERAL NOTES SEE DWG. 3001-00
FOR DEPTH OF BORINGS SEE - SOILS REPORT BY GRUBBS CONSULTING ENGINEERS.

LEGEND:
SEE DWG. 3001-00

SYMBOL:
PREVIOUSLY ESTABLISHED CORE BORINGS
200 FT. DEEP BORING HOLE
ADDITIONAL BORING HOLES

REFERENCE DWGS:

SITE PLAN	3001-00
PLANT AREA GRADING AND DRAINAGE PLAN	3004-00
COAL HANDLING AREA GRADING AND DRAINAGE PLAN	3005-00
PLANT ACCESS ROAD PLAN - RTE. 65 TO PLANT SITE	3008-00
PLANT ACCESS ROAD ON PLANT SITE, TYPICAL ROAD & RAILROAD CROSS SECTIONS.	3009-00
PLANT ACCESS RAILROAD, PLAN AND PROFILE - MISSOURI PACIFIC RAILROAD AND ACCESS SPUR CONNECTION	3012-00
PLANT ACCESS RAILROAD, PLAN AND PROFILE - ACCESS SPUR TO PLANT AREA	3015-00
PROPOSED PLANT PROPERTY BOUNDARY LINES	3003-00

REV. NO.	ISSUED FOR	BY	CHK.	APPROVED	DATE
5	(NO CHANGE FROM REV. 4) AS-BUILT AS PER A. F. & I. TRANSMITTAL DATED 6-10-81 & B. & R. LETTER SRX-016-81 DATED 6-10-81	PEC	J.Z.	WPF	7/1/82
4	ADDED BORINGS 413 THRU 420	CSL	RL.	EM/WPF	7/14/75
3	REV. BORING SCHEDULE PLOTTED NEW BORINGS	CSL	ME	EM, WPF	10/28/74
2	ADDED BORINGS 242 THRU 263	CSL	JFK	E.M.	10/25/74
1	ADDED BORINGS 237 THRU 241	CSL	JFK	EM & WPF	10/21/74
0	FOR CONSTRUCTION	CSL	JFK	EM & WPF	6/12/74
D	GENERAL CONTRACT BID	M.C.		EM	5/24/74
C	FOR CLIENT REVIEW	RDM		JGL	3/8/74
B	FOR CLIENT REVIEW	MK	RDM		12/26/73
A	CLIENT INF. & COMMENTS	MK	RCD		12/17/73

DRW. W.R.L CHK JFK ENG. E. MacNaughton & W.P.F.
DES. AL SQL. CSL

ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF STEAM ELECTRIC STATION
1977-1980—2800MW (NET) INSTALLATION—UNITS 1 THRU 4

REGISTERED PROFESSIONAL ENGINEER No. 3382 DONALD J. McALISTER

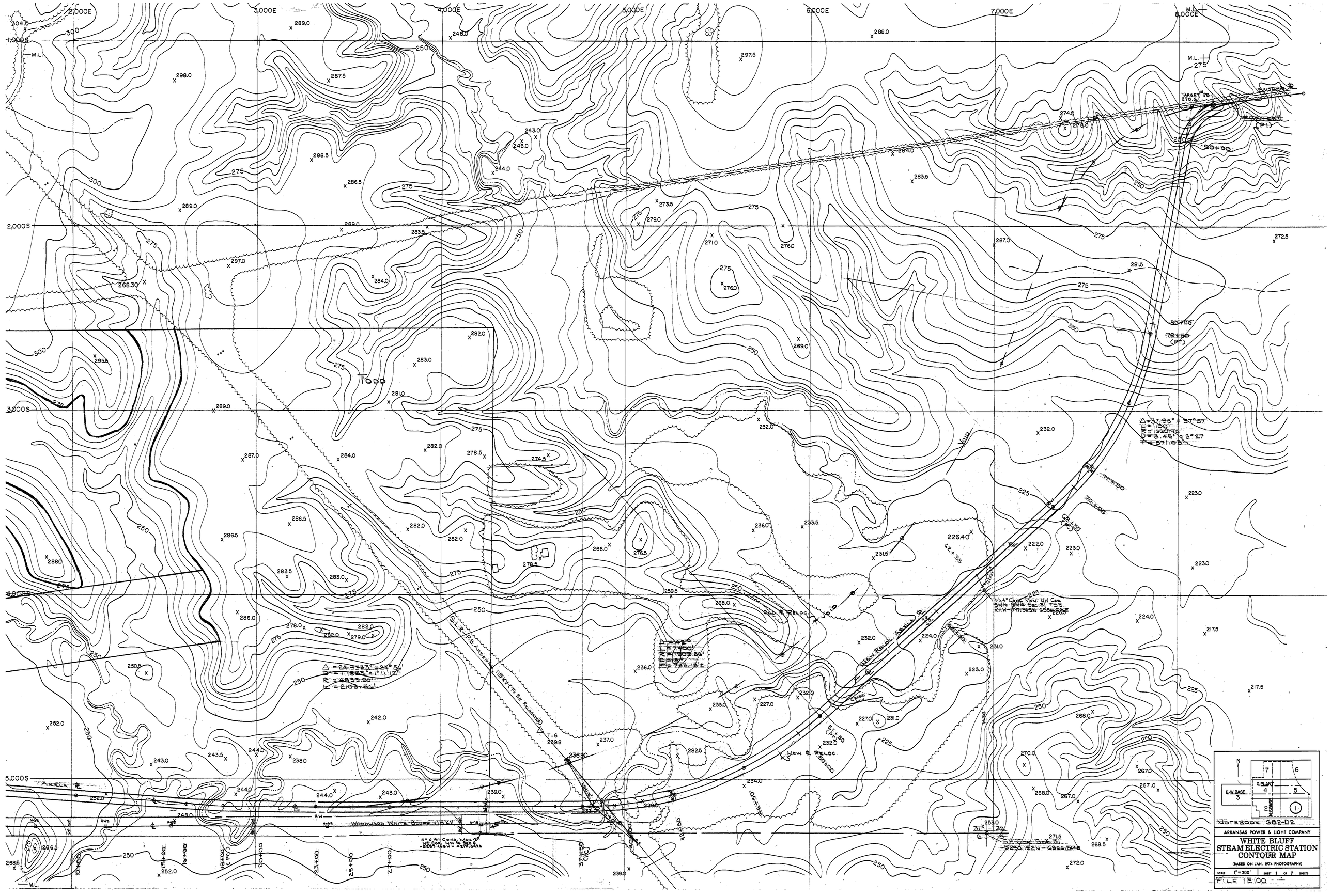
BORING LOCATION PLAN

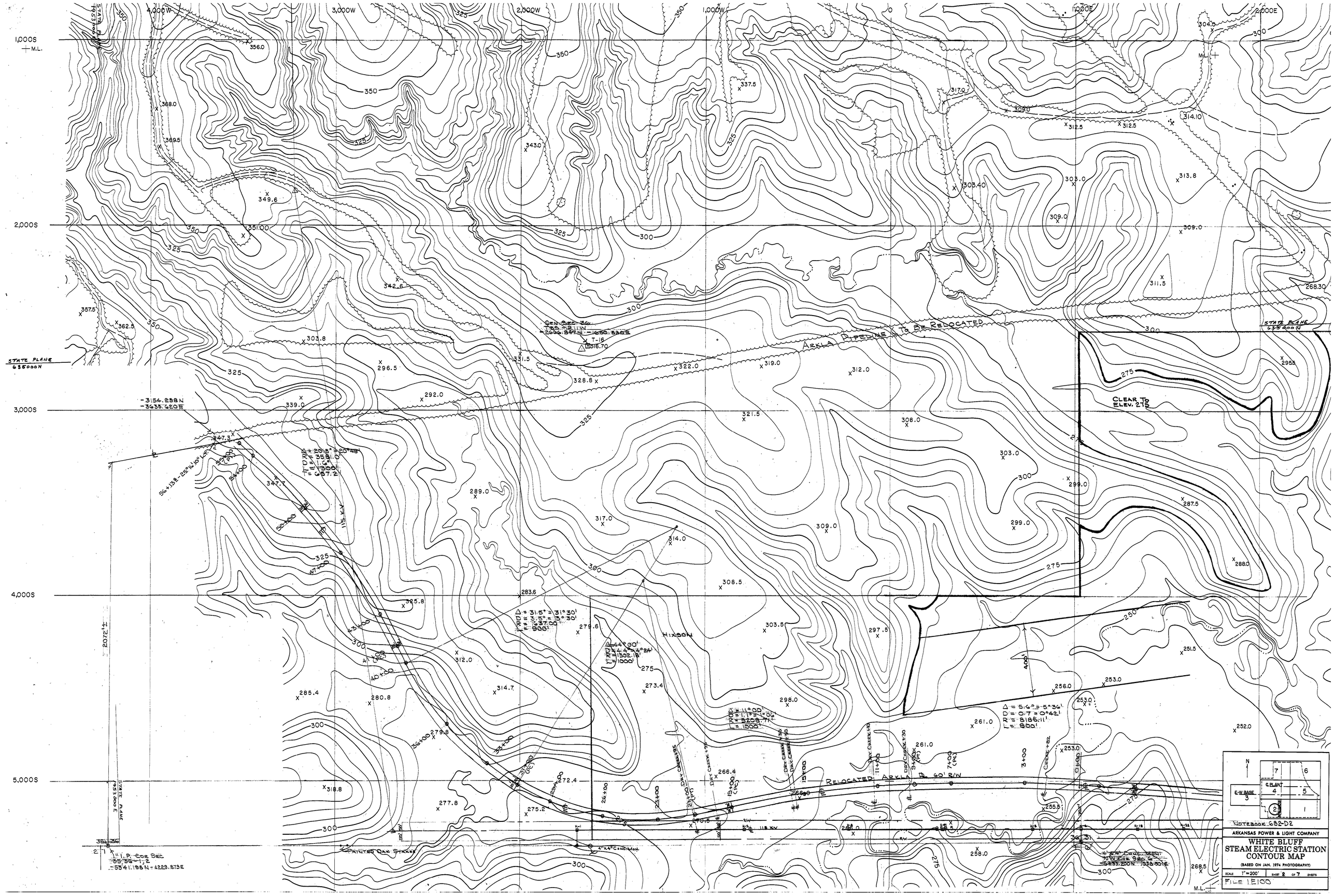
MAIN
CHAS. T. MAIN, INC.
BOSTON MASSACHUSETTS — CHARLOTTE NORTH CAROLINA

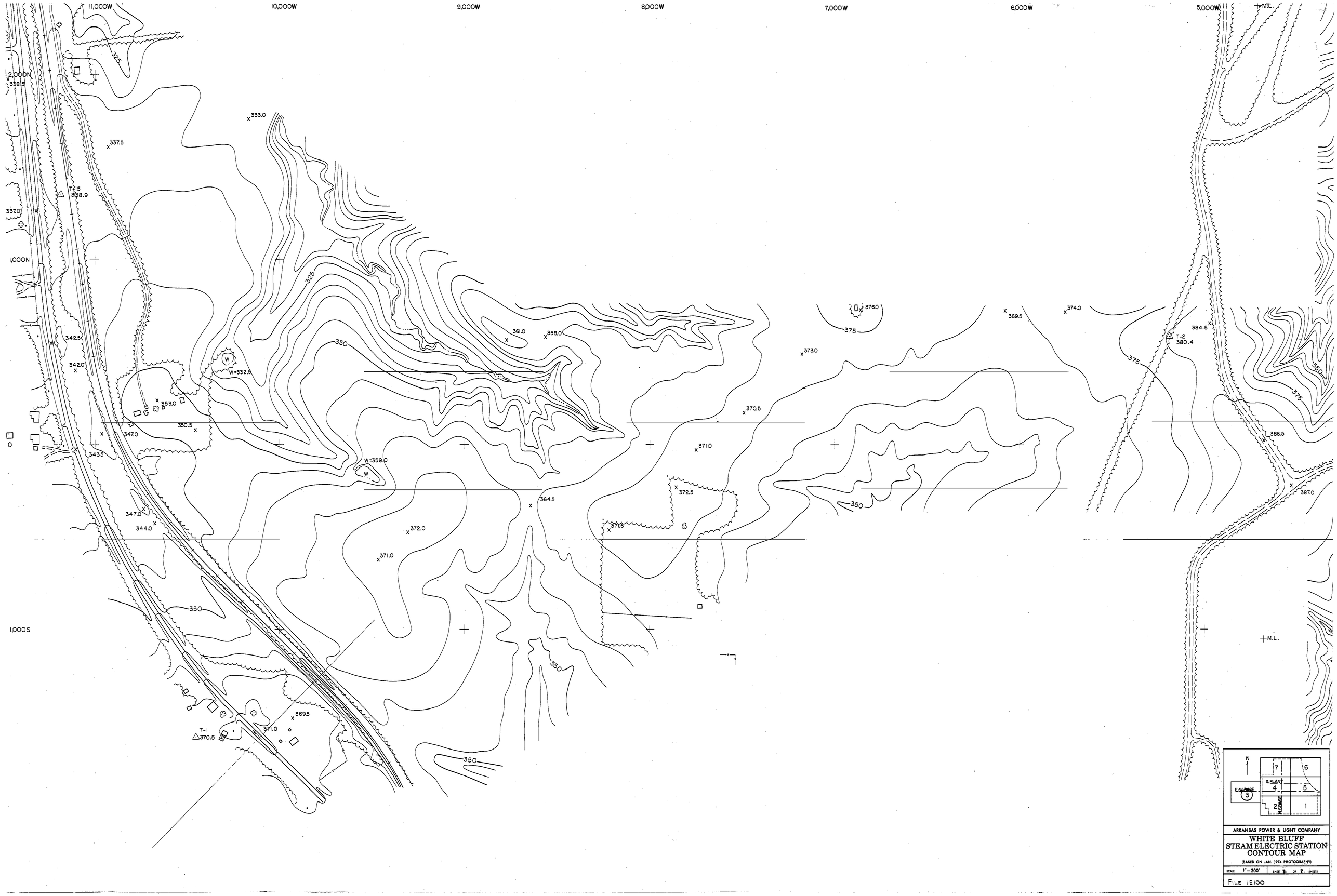
SCALE	DATE	CLIENT	JOB	DWG. NO.	REV.
1" = 400'	7-27-73	3013-2	-	3027-00	5

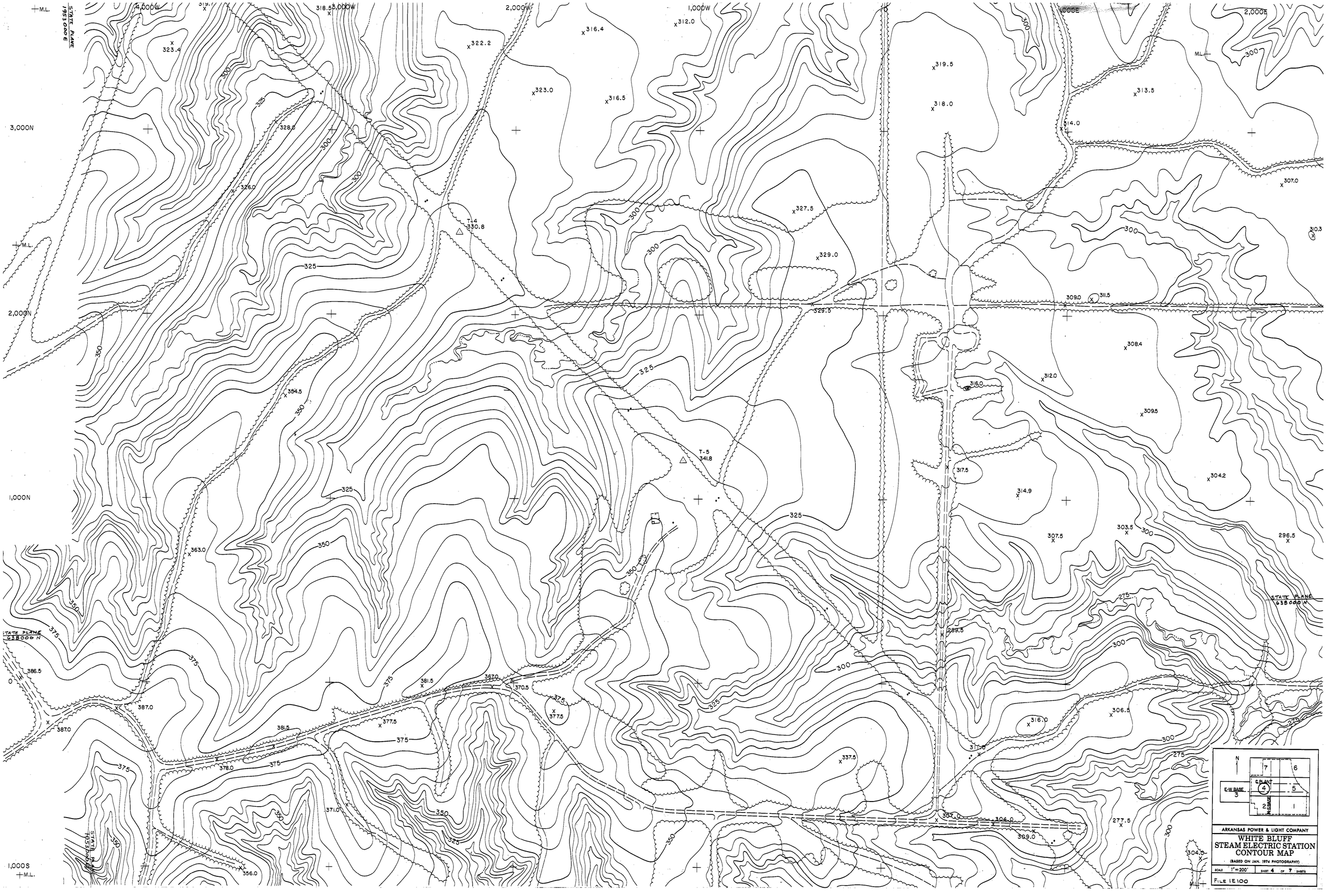
2112568

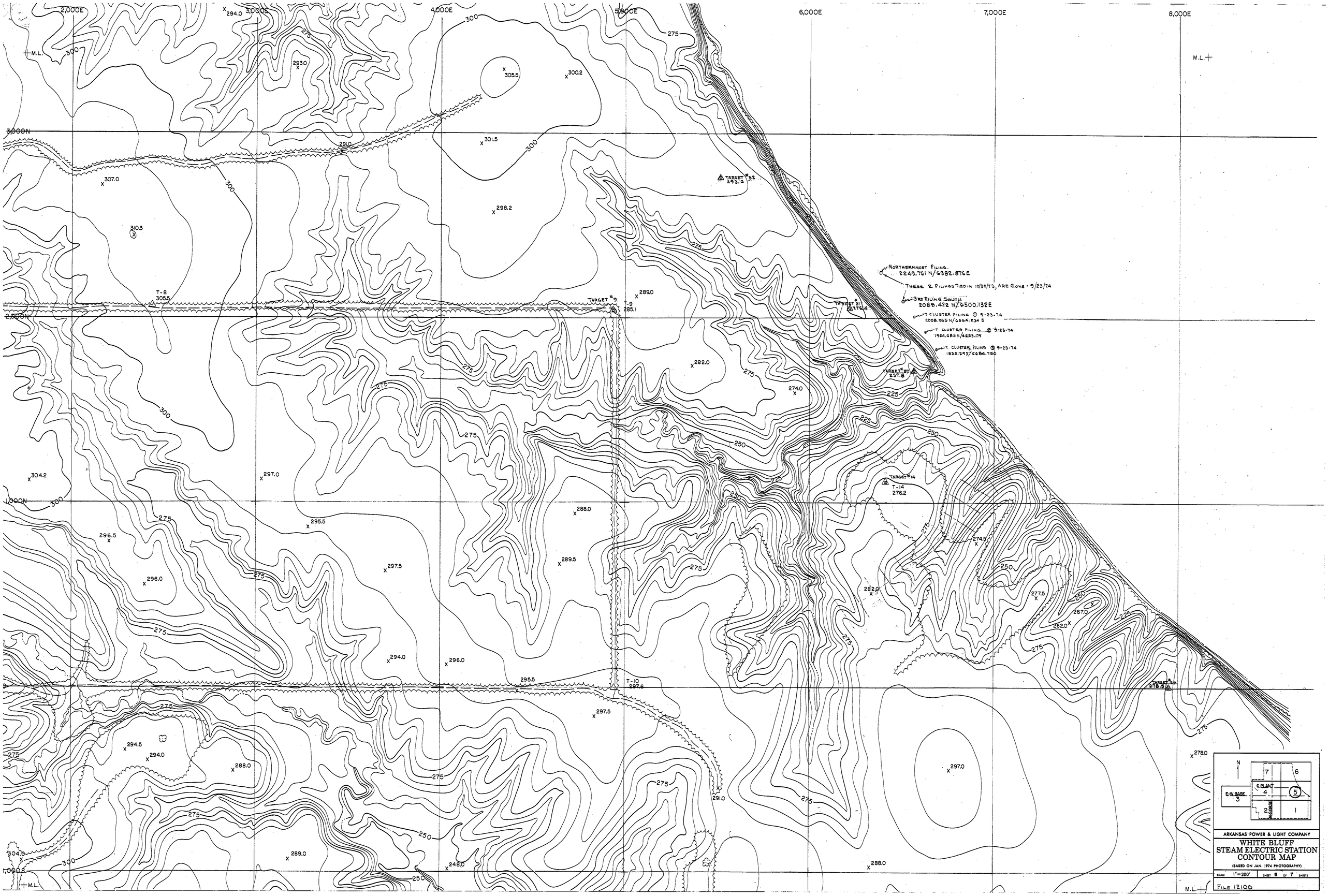
The Draftboard, Inc.

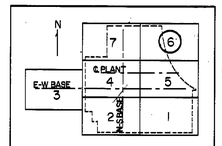

2,000E
3,000E
4,000E
5,000E
6,000E
7,000E
8,000E
1,000S
2,000S
3,000S
4,000S
5,000S
M.L.
TODD
Δ = 37.95° = 37°57'
D = 1°00'
R = 5730.75'
D = 3.45° = 3°27'
T = 571.03'
80+00
79+50 (PT)
TARGET #28 270.6
SEMI-STATION
(PT)
30+00
Δ = 24.3333° = 24°5.6'
D = 1.863° = 1°11.7'
R = 4833.80'
L = 2103.56'
S.L.R.P.B. ARSENAL 115KV (TO BE RELOCATED)
T-6
239.8
236.90
HOWARD
N = 11,400
N = 11,305.84
E = 3
E = 733.13
OLD R. RELOC.
NEW RELOC. ARKELA R.
NEW R. RELOC.
ARKELA R.
WOODWARD WHITE BLUFF 115 KV
4" X 4" Conc. Mon. NW Cor.
SW¼ SW¼ Sec. 31 T.3S.
R11W - 34°13'36"N 092°14'06"E
4" X 4" Conc. Mon. - 2X
NE Cor. SW¼ Sec. 6
34°13'46"N - 92°14'19"E
SE Cor. Sec. 31
34°13'52"N - 92°14'06"E
N
7
6
C.PLANT
E-W BASE
4
5
3
2
N-S BASE
1
NOTEBOOK 682-D2
ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF
STEAM ELECTRIC STATION
CONTOUR MAP
(BASED ON JAN. 1974 PHOTOGRAPHY)
SCALE 1" = 200'
SHEET 1 OF 7 SHEETS
FILE 1E100


WHITE BLUFF
STEAM ELECTRIC STATION
CONTOUR MAP
(BASED ON JAN. 1974 PHOTOGRAPHY)
SCALE 1" = 200'
SHEET 2 OF 7 SHEETS
FILE 1E100
ARKANSAS POWER & LIGHT COMPANY
NOTEBOOK 682-D2
ARKLA PIPELINE TO BE RELOCATED
RELOCATED ARKLA PIPELINE
CLEAR TO ELEV. 275
HIXSON
STATE PLANE 635000N
STATE PLANE 1933000E
1,000S
2,000S
3,000S
4,000S
5,000S
4,000W
3,000W
2,000W
1,000W
0
1,000E
2,000E


11,000W
10,000W
9,000W
8,000W
7,000W
6,000W
5,000W
2,000N
1,000N
1,000S
M.L.
T-15
338.9
T-2
380.4
T-1
370.5
W=332.5
W=359.0
325
350
375
333.0
337.5
337.0
342.5
342.0
343.5
347.0
344.0
353.0
350.5
361.0
358.0
376.0
373.0
369.5
374.0
384.5
370.5
371.0
372.5
364.5
372.0
371.6
386.5
387.0
N
7
6
E-W RAGE
3
C.PLANT
4
5
2
1
ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF
STEAM ELECTRIC STATION
CONTOUR MAP
(BASED ON JAN. 1974 PHOTOGRAPHY)
SCALE 1"=200'
SHEET 3 OF 7 SHEETS
FILE 1E100


ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF
STEAM ELECTRIC STATION
CONTOUR MAP
(BASED ON JAN. 1974 PHOTOGRAPHY)
SCALE 1"=200'
SHEET 4 OF 7 SHEETS
FILE 1E100
STATE PLANE 1955000 E
STATE PLANE 638000 N
3,000N
2,000N
1,000N
1,000S
M.L.
4,000W
3,000W
2,000W
1,000W
0
1,000E
2,000E
T-4 330.8
T-5 341.8
E-W BASE
PLANT
N


2,000E
3,000E
4,000E
5,000E
6,000E
7,000E
8,000E
3,000N
2,000N
1,000N
1,000S
M.L.
NORTHERNMOST PILING
2249.761 N/6382.876 E
THESE 2 PILINGS TIED IN 10/30/73, ARE GONE - 9/23/74
3RD PILING SOUTH
2088.422 N/6500.132 E
T CLUSTER PILING @ 9-23-74
2008.965 N/6564.234 E
T CLUSTER PILING @ 9-23-74
1924.685 N/6623.179
T CLUSTER PILING @ 9-23-74
1835.293/6684.750
TARGET #32
293.6
TARGET #31
277.4
TARGET #30
237.8
TARGET #14
T-14
276.2
TARGET #12
278.3
TARGET #9
T-9
285.1
T-8
305.5
T-10
287.6
N
E-W BASE
N-S BASE
℄ PLANT
1
2
3
4
5
6
7
ARKANSAS POWER & LIGHT COMPANY
WHITE BLUFF
STEAM ELECTRIC STATION
CONTOUR MAP
(BASED ON JAN. 1974 PHOTOGRAPHY)
SCALE 1" = 200'
SHEET 5 OF 7 SHEETS
FILE 1E100



ARKANSAS POWER & LIGHT COMPANY

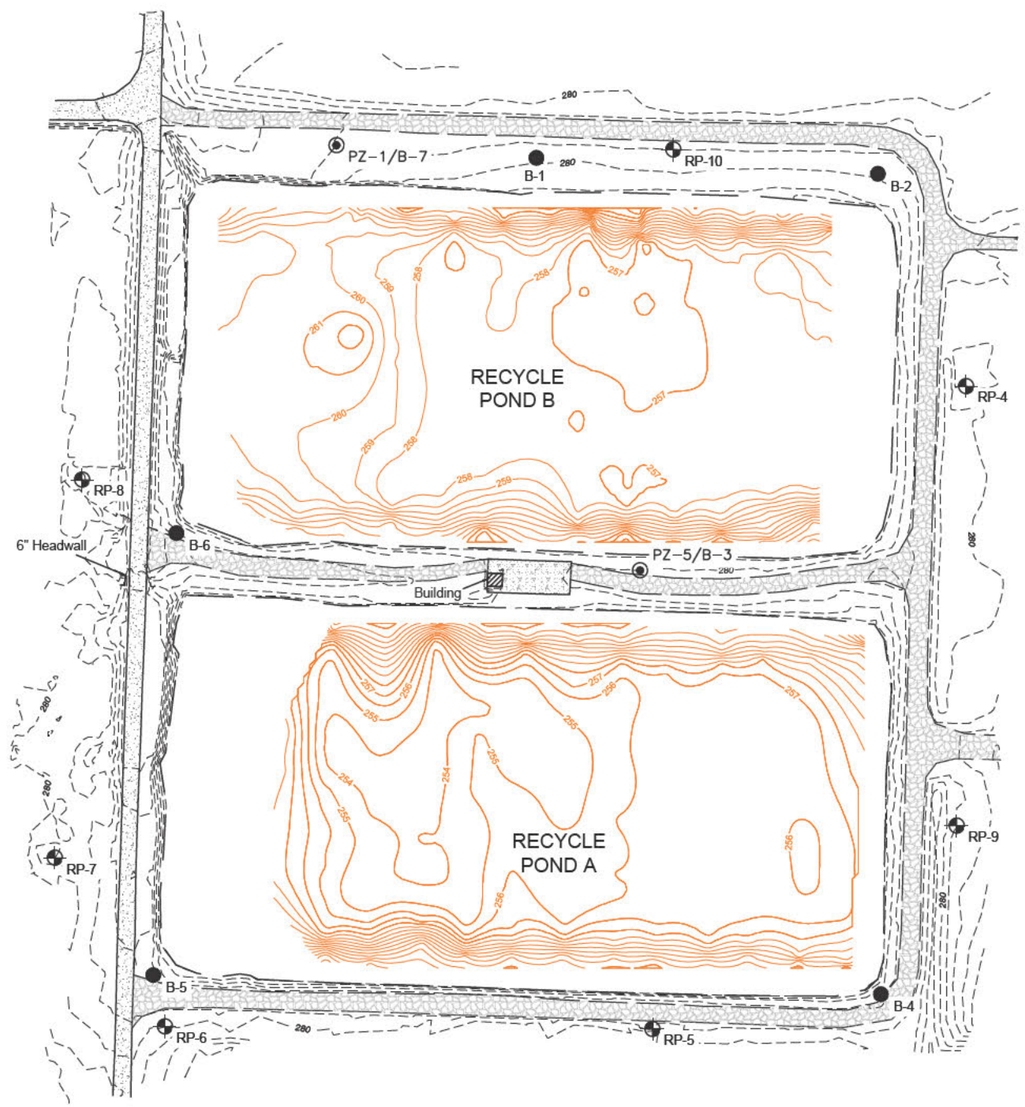
WHITE BLUFF STEAM ELECTRIC STATION CONTOUR MAP

(BASED ON JAN. 1974 PHOTOGRAPHY)

SCALE 1" = 200' | SHEET 6 OF 7 SHEETS

FILE 1E100

Appendix B
Geotechnical Data



LEGEND

- 280 — 5-FT INDEX CONTOUR
- 1-FT INTERMEDIATE CONTOUR
- PAVED ROAD
- GRAVEL ROAD
- CONCRETE PAD
- B-1 SOIL BORING
- PZ-1 PIEZOMETER
- RP-6 MONITORING WELL
- POND BOTTOM CONTOUR, GEOVIEW, INC. JUNE 2018
- EDGE OF WATER, JUNE 2018

NOTES:

1. TOPOGRAPHIC INFORMATION OUTSIDE OF POND AREA IS FROM SURVEY PERFORMED BY HARMON SURVEYING, INC., JUNE 2018.
2. DRAWING IS BASED ON ARKANSAS STATE PLANE SYSTEM, NAD83, U.S. FEET.

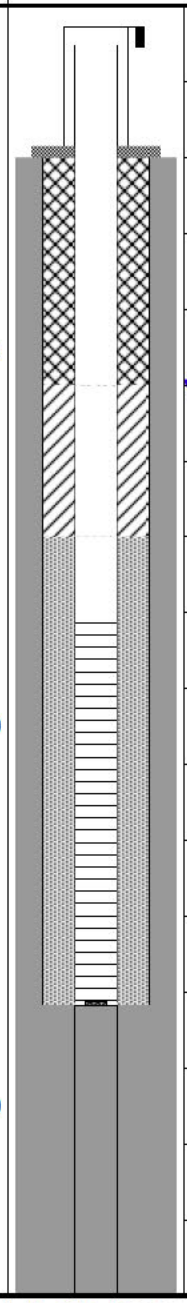
R:\projects\07920-1862-001\cad\dwg\257-60 Groundwater\07920-1862-001-FG01.DWG

Figure 1. Site Map, Entergy White Bluff Recycle Ponds.

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-1**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-1**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949807.4**	EASTING: **1273086.5**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **282.8 ft**	TOC ELEVATION: **285.72 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **25.3 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.97 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/13/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	TOP SOIL	
		LEAN CLAY, light gray with reddish brown and orange mottles, stiff, moist.	
4			30
	CL		
8		@ 10 ft, SANDY LEAN CLAY, pinkish tan with dark pinkish tan clay lenses and orange and bright yellow mottling. Stiff, moist.	
12			
		CLAYEY SAND, tan with orange and bright yellow mottles, dense, moist.	
	SC		100
16		SANDY LEAN CLAY, pinkish tan with dark pinkish tan clay lenses and orange and bright yellow mottling, stiff, moist.	
	CL		
		CLAYEY SAND, tan with orange and bright yellow mottles, dense, moist.	
20	SC		
		FAT CLAY, dark pinkish tan, laminated with light gray silt, stiff, moist.	
24			100
	CH	@ 26 ft, color changes to olive gray.	
28			

Well Construction



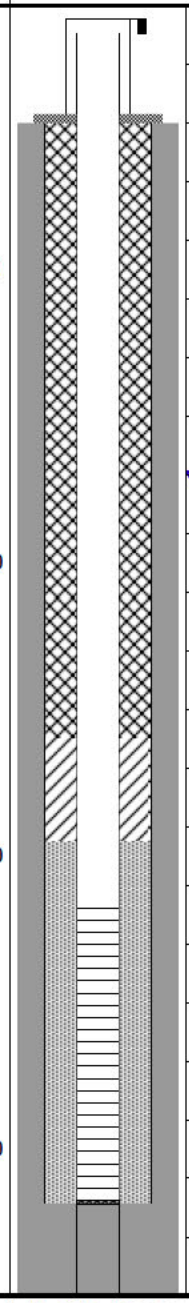
- -4: Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 0: 15.2 ft of 4 in Sch. 40 PVC including 2.9 ft of stickup (vented below cap)
- 4: Cement/bentonite grout from 0 to 6 ft bgs
- 8: Bentonite seal from 6.0 to 10.0 ft. bgs
- 12: Silica size 20/40 filter pack from 10.0 to 22.0 ft bgs
- 16: 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 20: 0.1 ft 4 in dia. Sch 40 PVC end cap
- 24: Slough from 22.0 ft to 30.0 ft in 4 in dia., borehole.
- 28: Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-2**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-2**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1950042**	EASTING: **1274004**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **288.9 ft**	TOC ELEVATION: **291.92 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **39.9 ft below TOC**	DEPTH TO WATER: (7/17/2018) **15.14 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/13/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	TOP SOIL	
		LEAN CLAY, light gray with orange mottles and light gray silt lenses, stiff, dry.	
4			30
8	CL		
12		@ 14 ft, color changes to greenish gray with orange mottles.	
		FAT CLAY, pinkish tan with orange and some bright yellow mottles, blocky, very stiff, moist.	100
16			
20		@ 20 ft, color to reddish light brown with few mottles.	
	CH	@ 22 3 ft, FAT SANDY CLAY, silty, olive gray, fine-grained, increasing sand content with depth, very stiff.	
24			100
28		CLAYEY SAND, fine-grained, olive gray, dense, moist.	
32	SC		
36			100
		FAT SANDY CLAY, olive gray, very stiff, moist.	
40	CH		

Well Construction



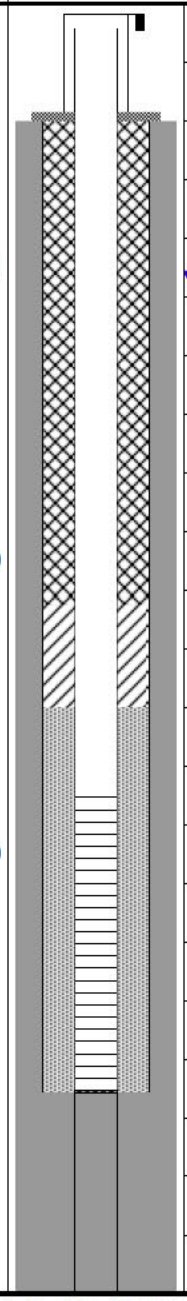
- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 29.8 ft of 4 in Sch. 40 PVC including 3.0 ft of stickup (vented below cap)
- Cement/bentonite grout from 0 to 21 ft bgs
- Bentonite seal from 21.0 to 24.5 ft bgs
- Silica size 20/40 filter pack from 24.5 to 37.0 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 37.0 ft to 40.0 ft in 4 in dia., borehole.
- Drilling terminated at 40 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-3**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-3**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949489.5**	EASTING: **1273729.9**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.0 ft**	TOC ELEVATION: **284.15 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **36.3 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.6 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/12/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-4				
0			FAT CLAY, tan with yellowish orange mottles and some fine-grained sand, stiff, moist.	
4				30
8	CH			
12				
16				100
20			CLAYEY SAND, olive gray, stiff, moist.	
24	SC			100
28			POORLY GRADED SAND, fine-grained, clayey , olive gray, soft, moist.	
32	SP		LEAN CLAY, olive gray, laminated with light gray silt and very fine-grained sand, stiff, moist	
36	CL			
40				

Well Construction



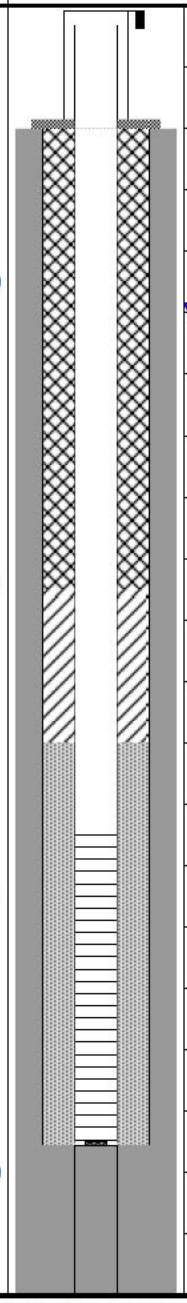
- -4: Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 4: 26.2 ft of 4 in Sch. 40 PVC including 3.2 ft of stickup (vented below cap)
- 12: Cement/bentonite grout from 0 to 16.5 ft bgs
- 16: Bentonite seal from 16.5 to 20.0 ft bgs
- 20: Silica size 20/40 filter pack from 20.0 to 33.0 ft bgs
- 28: 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 32: 0.1 ft 4 in dia. Sch 40 PVC end cap
- 36: Slough from 33.0 ft to 40.0 ft in 4 in dia., borehole.
- 40: Drilling terminated at 40 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-4**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-4**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949249.3**	EASTING: **1272808.4**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **280.8 ft**	TOC ELEVATION: **284.17 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **36.5 ft below TOC**	DEPTH TO WATER: (7/17/2018) **9.34 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/6/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
0	CL		TOP SOIL FAT CLAY, yellowish orange with some fine-grained sand and small gravel, stiff, moist to dry.	
4	CH		@ 4-5 5 ft, FAT SANDY CLAY with some well-rounded gravel (< 2 inch) dia, tan, stiff, moist @ 6-6 3 ft, with clayey sand, red, medium to coarse grained sand, stiff.	100
8	CL		SILTY to SANDY CLAY, light gray to tan with some orange and red staining, fine-grained sand, stiff, moist.	
	CH		FAT CLAY, yellowish orange with some fine-grained sand and small gravel, stiff, moist to dry.	
12	ML		SILT, gray with black organic matter, sulfur smell.	
	CL/ML		LEAN CLAY to S LT with sand, gray, increasing sand content with depth, medium stiff, moist.	50
16	CH		FAT CLAY, yellowish orange, with orange mottles.	
	SC		CLAYEY SAND, fine-grained, red and light gray, medium stiff, moist.	
20	SM		SILTY SAND, red to bright red, stiff.	
	CH		FAT CLAY, light gray with some red mottles, soft to medium stiff, moist.	
24	ML/CL		CLAYEY S LT to LEAN CLAY, gray, sulfur smell.	
	CH		FAT SANDY CLAY, yellowish orange to olive green with some orange and red mottles. @ 26.2 - 26.5 ft, with silt laminations.	60
28	ML		SILT, light gray with lenses of olive gray clay, soft, moist. @ 27 2 - 27 3 ft, layer of organic matter.	
32	CH		FAT CLAY, laminated with lenses of white silt to fine-grained sand, stiff, moist.	100
36			@ 38 ft, decreasing silt and sand content with depth.	

Well Construction



Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

26.4 ft of 4 in Sch. 40 PVC including 3.4 ft of stickup (vented below cap)

Cement/benontite grout from 0 to 15.0 ft bgs

Bentonite seal from 15.0 to 20.0 ft bgs

Silica size 20/40 filter pack from 20.0 to 33.0 ft bgs

10 ft of 4 in dia. 0.010 in. slot, Sch 40 PVC well screen

0.1 ft 4 in dia. Sch 40 PVC end cap

Slough from 33.0 ft to 38.0 ft in 4 in dia., borehole.

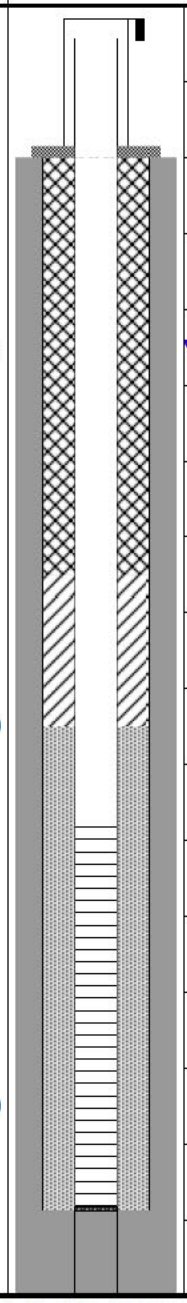
Drilling terminated at 38 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-5**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-5**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948586.2**	EASTING: **1272475.8**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.4 ft**	TOC ELEVATION: **284.57 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **30.9 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.23 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/5/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-4				
0	FILL		F LL, consisting of nepheline syenite gravel.	
4	CH		FAT CLAY, yellowish orange to tan with oxidized orange silt and sand lenses, medium stiff to stiff, moist.	20
8				
12			@ 12 ft, FAT SANDY CLAY, increasing sand content with depth, yellow and orange silt and fine-grained sand lenses.	
16	SC		CLAYEY SAND, yellow and orange silt lenses, decreasing clay content with depth, medium stiff, moist.	100
	SC/SM		CLAYEY SAND to SILTY SAND, tan with orange oxidized staining that decreases with depth, increasing clay content with depth, soft to medium stiff to soft, wet.	
20	CH		FAT SANDY CLAY, orange and yellow staining along silt and sand lenses.	
	SC		CLAYEY SAND, fine-grained, olive gray, decreasing clay content with depth, loose to medium dense.	
24	SM		SILTY SAND, fine-grained, olive gray, medium dense, wet.	100
28	CH		FAT SANDY CLAY, olive gray, stiff, moist. @ 27 5 ft, FAT CLAY, laminated lenses of white silt to fine-grained sand with some greenish gray to green clay layers.	

Well Construction



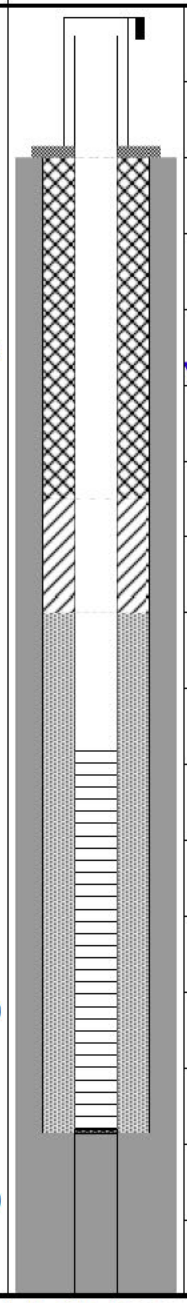
- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 20.8 ft of 4 in Sch 40 PVC including 3.2 ft of stickup (vented below cap)
- Cement/benonite grout from 0 to 11 ft bgs
- Bentonite seal from 11.0 to 15.0 ft bgs
- Silica size 20/40 filter pack from 15.0 to 28.0 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 28.0 ft to 30.0 ft in 4 in dia., borehole.
- Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-6**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-6**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948590.9**	EASTING: **1271958.9**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **280.6 ft**	TOC ELEVATION: **283.81 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **28.9 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.82 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/5/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
	CH		FAT CLAY, yellowish orange with some rootlets in upper 3 inches, medium stiff to stiff, moist.	
	ML		SILT, with layers of fine-grained sand, yellowish orange with oxidation along silt layers, dry to moist with moisture increasing with depth.	
	CL		LEAN CLAY, yellowish orange, silt content decreases with depth, stiff, moist.	60
	CH		FAT CLAY, yellowish brown with yellow and orange silt lenses that decrease in frequency with depth, moist. @ 9.7 ft, color changes to olive gray. @ 10 ft, increasing fine-grained sand content with depth.	
	SC		CLAYEY SAND, fine-grained, olive gray, medium dense, moist.	
	CH		FAT SANDY CLAY, olive gray with lenses of fine-grained sand, stiff.	
	SC		CLAYEY SAND, fine-grained, olive gray, medium dense, moist.	8
	CH		FAT SANDY CLAY, olive gray with lenses of fine-grained sand, stiff.	
	SC		CLAYEY SAND, fine-grained, olive gray, decreasing sand content with depth, medium dense, moist.	
	SM		SILTY SAND, olive gray, medium dense. @ 23 8 ft, layer of organic matter.	100
	SC		CLAYEY SAND, fine-grained, olive gray, increasing clay and lenses of white silt to fine-grained sand with depth, medium dense, moist.	
	CH		FAT CLAY, with laminated lenses of white silt to fine-grained sand, stiff, moist to dry. @ 25 ft, with greenish gray clay layers.	100

Well Construction



Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

18.8 ft of 4 in Sch 40 PVC including 3.2 ft of stickup (vented below cap)

Cement/bentonite grout from 0 to 9.0 ft bgs

Bentonite seal from 9.0 to 12.0 ft bgs

Silica size 20/40 filter pack from 12.0 to 26.0 ft bgs

10 ft of 4 in dia. 0.010 in. slot, Sch 40 PVC well screen

0.1 ft 4 in dia. Sch 40 PVC end cap

Slough from 26.0 ft to 30.0 ft in 4 in dia., borehole.

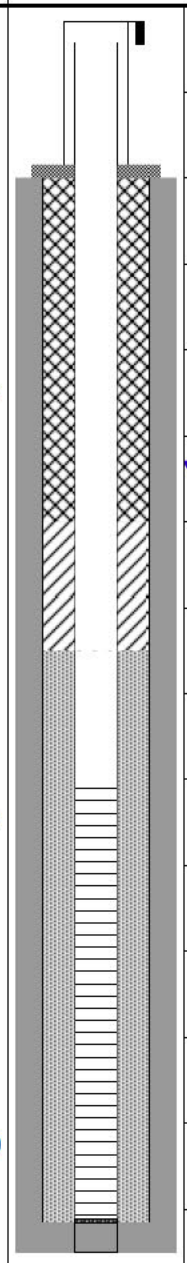
Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-7**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-7**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948766.8**	EASTING: **1271839.4**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.3 ft**	TOC ELEVATION: **284.46 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **27.5 ft below TOC**	DEPTH TO WATER: (7/17/2018) **9.98 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/5/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-4				
0	CL		TOP SO L and GRAVEL	
	CH		FAT SANDY CLAY, yellowish orange, rootlets, medium stiff, moist.	
	ML		SILT, with clayey fine-grained sand, yellowish orange, increasing clay content with depth, moist to dry.	
4	CL		LEAN CLAY, yellowish orange with lenses of oxidized silt to fine-grained sand, stiff, moist.	80
8	CH		FAT CLAY, olive gray with lenses of white silt to fine-grained sand, stiff, moist.	
12				
16	SC		CLAYEY SAND, fine-grained, medium dense, moist.	80
	CH		FAT SANDY CLAY, olive gray, medium stiff, moist.	
20	SC		CLAYEY SAND, fine-grained, medium dense, moist.	
	SM		SILTY SAND, fine-grained, olive gray, wet.	
	SC		CLAYEY SAND, fine-grained, medium dense, moist.	100
24	CH		FAT CLAY, with laminated lenses of white silt to fine-grained sand, very stiff, moisture decreases with depth.	

Well Construction



-4 Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

0 17.4 ft of 4 in Sch 40 PVC including 3.2 ft stickup (vented below cap)

4 Cement/bentonite grout from 0 to 8.0 ft bgs

8 Bentonite seal from 8.0 to 11.0 ft bgs

12 Silica size 20/40 filter pack from 11.0 to 24.0 ft bgs

16 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen

20 0.1 ft 4 in dia. Sch 40 PVC end cap

Slough from 24.0 ft to 25.0 ft in 4 in dia., borehole.

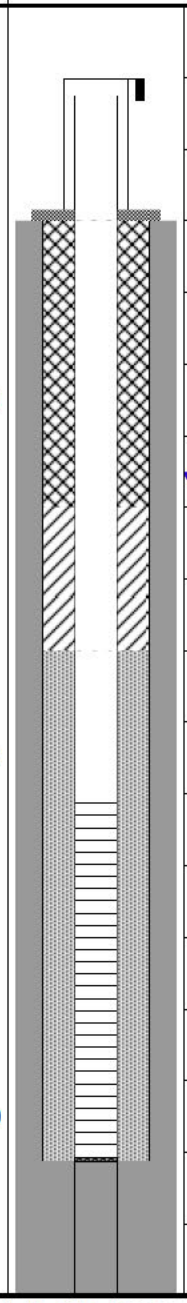
24 Drilling terminated at 25 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-8**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-8**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949162.5**	EASTING: **1271875.3**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **282.1 ft**	TOC ELEVATION: **285.60 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **29.7 ft below TOC**	DEPTH TO WATER: (7/17/2018) **10.75 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/4/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-6				
-2				
	CH		FAT SANDY CLAY, yellowish orange, increasing sand and silt content with depth, medium stiff, moist.	
2	ML		SILT, with clayey fine-grained sand, tan to yellowish orange with lenses of clay, moist to dry.	
6	CH/CL		FAT SANDY CLAY to LEAN CLAY, orange oxidized lenses of silt within fat sandy clay, sand content increasing with depth, stiff.	80
10			@ 10 ft, medium stiff, increasing moisture with depth.	
14	SC		CLAYEY SAND, yellowish brown, loose to medium dense. @ 13 8 ft, color changes to olive gray.	80
18	CH		FAT SANDY CLAY, olive gray, medium stiff to stiff, moist.	
	SC		CLAYEY SAND, yellowish brown, loose to medium dense. @ 20 ft, decreasing clay content with depth.	
22	SM		SILTY SAND, fine-grained, olive gray, loose, moist.	
26	CH		FAT CLAY, with laminated lenses of white silt to fine-grained sand.	100
30				

Well Construction



Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

19.6 ft of 4 in Sch 40 PVC including 3.5 ft stickup (vented below cap)

Cement/bentonite grout from 0 to 8.0 ft bgs

Bentonite seal from 8.0 to 12.0 ft bgs

Silica size 20/40 filter pack from 12.0 to 26.3 ft bgs

10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen

0.1 ft 4 in dia. Sch 40 PVC end cap

Slough from 26.3 ft to 30.0 ft in 4 in dia., borehole.

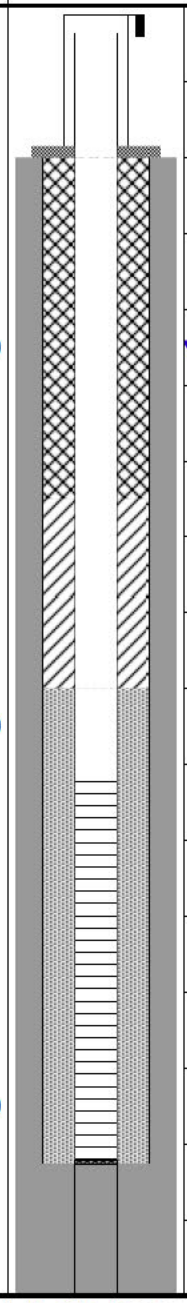
Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-9**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-9**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948797.6**	EASTING: **1272803.3**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.4 ft**	TOC ELEVATION: **284.68 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **29.8 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.35 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/6/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
0	CL		TOP SOIL	
	CH		FAT CLAY, yellowish orange to tan, rootlets in upper 1 ft, increasing silt with depth, hard, dry.	
4	ML		SILT, with fine-grained sand that increases with depth, tan, soft to medium stiff, moist.	
	SM		SILTY SAND, fine-grained, tan with orange oxide staining, medium stiff to stiff, moisture increases with depth.	
	GC		CLAYEY GRAVEL with sand, well graded angular to subrounded sand with subrouneded to rounded gravel (<1 in), dry to moist.	100
	SM		SILTY SAND, fine-grained, tan with orange oxide staining, medium stiff to stiff, moisture increases with depth.	
8	GM/SW		WELL GRADED SAND and GRAVEL, very fine-grained to coarse-grained, angular to subrounded sand and subangular to subrounded gravel (<2 in), dry to moist.	
	GW		WELL GRADED GRAVEL, angular to subrounded (<2 in).	
12	CH		FAT SANDY CLAY, tan with oxidized lenses of silt and fine-grained sand, sand content increases with depth, soft to medium stiff,	
	SC		CLAYEY SAND, light gray, soft, wet.	
16	SM		SILTY SAND, light gray with some orange oxide staining, loose, wet.	100
	CL/CH		LEAN SANDY CLAY to FAT SANDY CLAY, lenses of silt and sand, heavily oxidized, decreasing clay content with depth, soft, wet.	
20	SM		SILTY SAND, fine-grained, tan to yellow, loose, wet.	
24	CH		FAT CLAY, tan, stiff, moist. @ 25 ft, color changes to olive gray.	100
28				

Well Construction



Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

19.7 ft of 4 in Sch 40 PVC including 3.3 ft stickup (vented below cap)

Cement/bentonite grout from 0 to 9.0 ft bgs

Bentonite seal from 9.0 to 14.0 ft bgs

Silica size 20/40 filter pack from 14.0 to 26.5 ft bgs

10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen

0.1 ft 4 in dia. Sch 40 PVC end cap

Slough from 26.5 ft to 30.0 ft in 4 in dia., borehole.

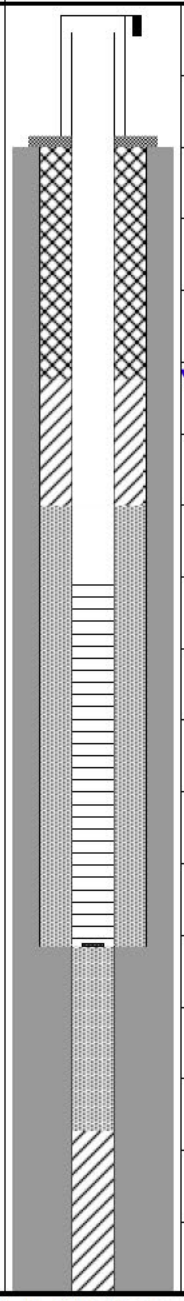
Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-10**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-10**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949510.5**	EASTING: **1272499**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **280.5 ft**	TOC ELEVATION: **283.66 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **25.5 ft below TOC**	DEPTH TO WATER: (7/17/2018) **9.6 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/12/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-4				
0	FILL		F LL, consisting of nepheline syenite gravel.	
4	CH		FAT CLAY, tan with yellowish orange mottles, some fine-grained sand, stiff, moist.	40
8				
12			@ 12 ft, SANDY FAT CLAY.	
	SC		CLAYEY SAND, fine-grained, gray with orange mottles, dense, moist.	
16	SP		POORLY GRADED SAND, fine-grained, silty, gray with orange mottles, wet.	100
20				
	CL		SILT and FAT CLAY, brownish tan clay with light gray silt, medium stiff, moist.	
24	CH		FAT CLAY, dark gray with light gray laminated silt lenses, stiff, moist.	100
28				
32				

Well Construction



- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 15.4 ft of 4 in Sch 40 PVC including 3.2 ft stickup (vented below cap)
- Cement/bentonite grout from 0 to 6.5 ft bgs
- Bentonite seal from 6.5 to 10.0 ft bgs
- Silica size 20/40 filter pack from 10.0 to 22.3 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Silica size 20/40 filter pack from 22.3 to 27.5 ft bgs in a 4 in dia. borehole
- Bentonite seal from 27.5 to 32.0 ft bgs in a 4 in dia. borehole
- Drilling terminated at 32 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-1**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **N/A**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949501.9**	EASTING: **1272354.9**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **280.3 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **10 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/16/2018**	DATE COMPLETED: **5/16/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		FILL		FILL
1	77	GW		WELL GRADED GRAVEL with sand, medium to coarse sand, fine to coarse-grained angular to round gravel, medium dense to loose, dry.
2				
3		CH		FAT SANDY CLAY, tan with orange oxide staining, lenses of fine sand, stiff, moist.
4				
5				
6	66			
7				
8		CL		LEAN CLAY with fine-grained sand, silty yellowish brown and gray, moist.
9				
10				Boring terminated at 10 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-2**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **N/A**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949485.1**	EASTING: **1272715.5**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **280.2 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **10 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/16/2018**	DATE COMPLETED: **5/16/2018**

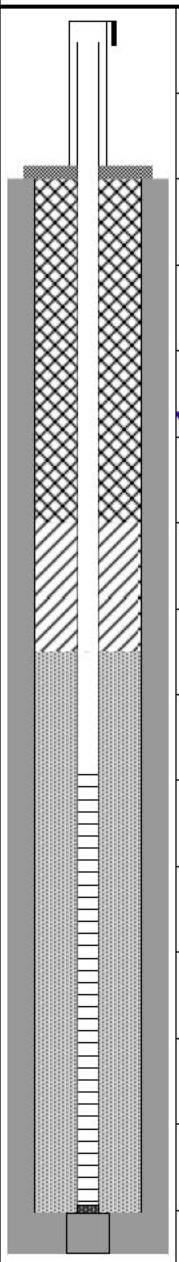
Depth (feet)	% REC	USCS	Graphic Log	Description
0				FAT SANDY CLAY, light gray with orange and red oxide staining, fine grained sand, rootlets, very stiff, dry to moist.
1				
2	100			
3				
4				
5		CH		@ 4.6 ft FAT CLAY with sand and some rounded gravels, soft, moist. @ 5 ft FAT SANDY CLAY, light gray with orange and red oxide staining, fine grained sand, very stiff, dry to moist.
6				
7	50			
8				
9				
10				

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-3**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **PZ-5**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949067.5**	EASTING: **1272460.6**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **279.9 ft**	TOC ELEVATION: **283.01 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **27.2 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.72 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/15/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CH	FAT CLAY, light brown, stiff, moist.	50
		@ 4 8 ft, with rounded gravel.	
4		SANDY CLAY, light gray to tan with some iron stained lenses, soft, moist.	33
8	CL		
	SC	CLAYEY SAND, tan, soft, moist to wet.	
12	CL	LEAN SANDY CLAY, light gray to tan with some iron stained lenses, soft, moist to wet.	80
	CH	FAT SANDY CLAY, tan with lenses of fine-grained sand, stiff, moist.	
16	SC	CLAYEY SAND,fine-grained, tan with orange oxide staining, clay content decreasing with depth, loose, wet.	100
20	SM	SILTY SAND, tan with some oxide staining, loose, wet.	
		@ 20 8 - 21 ft layer of fat clay.	
		@ 22 9 - 23 ft, lenses of olive gray clay.	100
24	CH	FAT CLAY, olive gray, laminated with white silt to fine-grained sand, stiff, dry.	

Well Construction



Depth (feet)	Well Construction
-4	Above ground completion includes 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
0	17.0 ft of 2 in Sch 40 PVC including 3.1 ft stickup (vented below cap)
4	Cement/bentonite grout from 0 to 8.0 ft bgs
8	Bentonite seal from 8.0 to 11.0 ft bgs
12	Silica size 20/40 filter pack from 11.0 to 24.0 ft bgs
16	
20	10 ft of 2 in dia. 0.010 in slot, Sch 40 PVC well screen
24	0.18 ft 2 in dia. Sch 40 PVC end cap Slough from 24 ft bgs to 25 ft bgs Drilling terminated at 25 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-4**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **N/A**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948619**	EASTING: **1272718.6**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **280.8 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **10 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/17/2018**	DATE COMPLETED: **5/17/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		FILL		FILL
				FAT CLAY with sand, yellowish orange with orange to red oxide staining, sand content increasing with depth, stiff, moist.
1				@1.6-1.7 ft layer of white silt.
2				
3				
4	88			@ 4 ft FAT SANDY CLAY, light gray to olive gray, fine grained, sand content increases with depth, stiff, moist.
5		CH		@ 5-5.3 ft small gravel.
6				
7				
8				
9				
10				Boring terminated at 10 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-5**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **N/A**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948639.2**	EASTING: **1271950.5**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **281.0 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **12 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/17/2018**	DATE COMPLETED: **5/17/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0				FILL
1	66	FILL		
2				
3				LEAN CLAY with sand, yellowish orange with yellow and orange staining, stiff, dry.
4				
5				
6	100	CL		
7				
8				
9		CH		FAT CLAY with sand, stiff, moist.
10				LEAN CLAY, light brown, silty, some fine-grained sand, trace fine-grained gravel, moist.
11		CL		
12				Boring terminated at 12 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-6**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **N/A**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949105.8**	EASTING: **1271974.9**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **281.9 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **30 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/14/2018**	DATE COMPLETED: **6/14/2018**

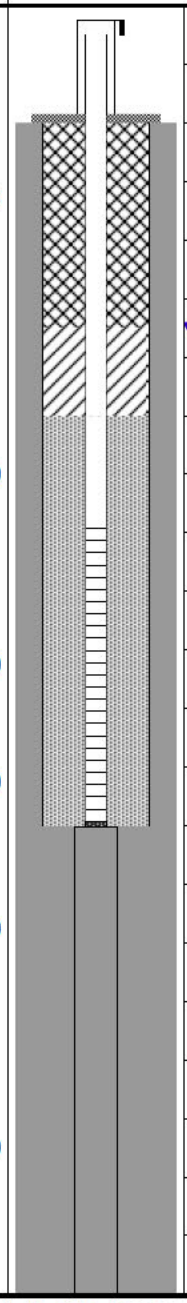
Depth (feet)	% REC	USCS	Graphic Log	Description
0–2		FILL		FILL
2–10	25	CL		LEAN CLAY with sand, tan with lenses of sand and greenish gray silt, soft, wet.
11–16	100	SM		SILTY SAND, tan with lenses of orange to yellow oxidized sand. @ 15 ft color changes to tan and greenish gray, increasing clay content with depth.
16–19		CH		FAT SANDY CLAY, brown to tan with orange oxidation along sandy lenses, fine-grained sand, medium stiff, moist. @ 18 ft color changes to olive gray.
19–20		SC		CLAYEY SAND, olive gray, decreasing clay with depth, medium stiff, moist to wet.
20–26	100	SM		SILTY SAND, fine-grain, olive gray, medium stiff, saturated. @ 24-25 ft then lenses of dark gray clay.
26–30		CH		FAT CLAY with sand, olive gray to greenish gray clay with laminated lenses of white silt to fine-grained sand, stiff. Borehole terminated at 30 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-7**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **PZ-1**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949513.9**	EASTING: **1272146.8**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.9 ft**	TOC ELEVATION: **284.94 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **27.1 ft below TOC**	DEPTH TO WATER: (7/17/2018) **10.09 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/16/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	FILL	F LL	46
4	CH	FAT SANDY CLAY, tan with orang staining, decreasing clay content with depth, medium stiff, moist.	
8	SC	CLAYEY SAND, tan with oxide staining, loose, moist to wet.	100
12	CH	FAT SANDY CLAY, tan with oxide staining along sandy lenses, stiff, moist.	
	SC	SANDY CLAY, oxide stained, decreasing sand content with depth, medium stiff, moist.	
16	SM	SILTY SAND, fine-grain, tan with oxide staining in upper 1 ft, very loose, wet.	100
20	SC	CLAYEY SAND, tan to orange with lenses of light gray to olive gray clay, moisture increases with depth. @ 23.2 fine-grained olive gray sand, loose, wet.	100
24	CH	FAT CLAY, with lenses of silt to very fine-grained sand, blocky, stiff to very stiff, moist. @ 25 ft laminations of white silt to fine-grained sand, blocky, stiff to hard, somewhat moist to dry.	100
28		@ 30 ft, silt and sand laminations decrease with depth.	
32			100
36		@ 38 ft, with lenses of fine to medium-grained olive gray to greenish gray sand.	
40			

Well Construction



Depth (feet)	Construction
-4	Above ground completion includes 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
0	16.9 ft of 2 in Sch 40 PVC including 3.0 ft stickup (vented below cap)
4	Cement/bentonite grout from 0 to 7 ft bgs
8	Bentonite seal from 7.0 to 10.0 ft bgs
12	Silica size 20/40 filter pack from 10.0 to 24.0 ft bgs
16	10 ft of 2 in dia. 0.010 in slot, Sch 40 PVC well screen
20	
24	0.18 ft 2 in dia. Sch 40 PVC end cap
28	
32	Slough from 24.0 ft to 40.0 ft in 4 in dia., borehole.
36	
40	Drilling terminated at 40 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN/ENTERGY WHITE BLUFF/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B-1	UD	3.0-5.0'	CH	29.0	63	17	46	0.27	100.0	88.9	59.5	-	-	-	29.0	92.8	1.6E-08	-
B-1	UD	8.0-10.0'	CL	25.0	44	15	29	0.35	100.0	53.8	40.4	-	-	2.57	25.0	93.9	-	T-CU w/pp
B-3	UD	5.0-7.0'	CL	24.1	37	17	20	0.37	100.0	73.3	47.7	-	-	-	24.1	98.7	2.2E-08	-
B-3	UD	10.0-12.0'	SC	21.6	32	20	12	0.18	100.0	41.9	31.0	-	-	2.58	21.6	100.9	-	T-CU w/pp
B-3	UD	15.0-17.0'	SC	19.0	34	15	19	0.23	100.0	28.2	22.0	-	-	-	19.0	110.5	6.3E-06	-
B-3	UD	20.0-22.0'	SM	31.5	NP	NP	NP	NP	100.0	18.1	9.5	-	-	-	31.5	79.2	-	DS
B-4	UD	8.0-10.0'	CH	33.5	59	30	29	0.13	100.0	94.7	51.5	-	-	-	33.5	86.1	4.6E-08	-
B-5	UD	3.0-5.0'	CL	26.6	42	21	21	0.28	95.4	73.1	28.0	-	-	2.69	26.6	91.7	-	T-CU w/pp
B-5	UD	10.0-12.0'	CL	17.1	35	16	19	0.07	97.6	90.3	46.0	-	-	-	17.1	113.8	1.5E-08	-
B-7	UD	5.0-7.0'	SM	20.5	34	26	8	-0.73	90.4	40.0	21.1			2.66	20.5	104.7	-	T-CU w/pp
B-7	UD	7.0-9.0'	CL	21.8	34	20	14	0.13	100.0	52.7	34.5	-	-	-	21.8	98.1	6.7E-07	-
B-7	UD	15.0-17.0'	SC	21.9	28	19	9	0.36	100.0	36.5	24.0	-	-	2.62	21.9	102.2	-	T-CU w/pp
RP-4	UD	20.0-22.0'	CL	22.2	44	15	29	0.24	93.0	66.9	39.5	-	-	2.67	22.2	101.8	-	T-CU w/pp
RP-4	UD	30.0-32.0'	CH	37.1	54	21	33	0.47	100.0	96.3	57.4			-	37.1	80.2	3.5E-07	-
RP-9	UD	30.0-32.0'	CH	30.2	54	24	30	0.19	100.0	98.8	44.0	-	-	2.67	30.2	88.9	-	C

ABBREVIATIONS:
- LIQUID LIMIT (LL)
- PLASTIC LIMIT (PL)
- PLASTICITY INDEX (PI)
- LIQUIDITY INDEX (LI)
- SPECIFIC GRAVITY (Gs)
- MOISTURE (Mc)

NOTES:
- T = TRIAXIAL TEST
- U = UNCONFINED COMPRESSION TEST
- C = CONSOLIDATION TEST
- DS = DIRECT SHEAR TEST
- O = ORGANIC CONTENT
- P = pH

FTN/ENTERGY WHITE BLUFF/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B-2	Bag	5.0-7.5'	CH	24.7	52	21	31	0.13	100.0	86.0	55.0	-	-	-	-	-	-	-
B-3 (P2-5)	Bag	13.0-14.0'	CL	23.3	40	19	21	0.18	100.0	54.1	41.0	-	-	-	-	-	-	-
B-3 (P2-5)	Bag	23.0-24.0'	SM	30.0	NP	NP	NP	NP	100.0	28.1	16.5	-	-	-	-	-	-	-
B-5	Bag	4.0-6.0'	ML	27.4	46	30	16	-0.17	100.0	70.7	33.0	-	-	-	-	-	-	-
B-5	Bag	9.0-10.0'	ML	26.3	49	31	18	-0.27	100.0	89.1	45.0	-	-	-	-	-	-	-
B-6	Bag	11.0-12.0'	SM	12.4	NP	NP	NP	NP	100.0	27.6	20.0	-	-	-	-	-	-	-
B-6	Bag	16.0-17.0'	CL	21.3	36	23	13	-0.11	100.0	54.2	38.0	-	-	-	-	-	-	-
B-6	Bag	22.0-24.0'	SM	10.9	NP	NP	NP	NP	100.0	28.6	18.9	-	-	-	-	-	-	-
B-7	Bag	18.0-20.0'	SM	22.8	NP	NP	NP	NP	100.0	21.4	15.0	-	-	-	-	-	-	-
RP-3	Bag	18.0-20.0'	CH	27.1	56	27	29	0.02	100.0	95.6	44.0	-	-	-	-	-	-	-
RP-3	Bag	29.0-30.0'	SM	22.4	NP	NP	NP	NP	100.0	26.3	20.0	-	-	-	-	-	-	-
RP-4	Bag	8.0-9.0'	CL	13.4	30	16	14	-0.17	100.0	50.8	29.0	-	-	-	-	-	-	-
RP-4	Bag	25.0-26.0'	ML	37.7	48	30	18	0.40	100.0	98.7	43.0	-	-	-	-	-	-	-
RP-5	Bag	15.0-18.0'	SC-SM	24.4	28	22	6	0.51	100.0	34.0	25.9	-	-	-	-	-	-	-
RP-7	Bag	16.6-17.4'	SC	22.3	36	19	17	0.20	100.0	46.7	34.0	-	-	-	-	-	-	-

ABBREVIATIONS:
LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES:
T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

FTN/ENTERGY WHITE BLUFF/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
RP-9	Bag	9.0-10.0'	SC-SM	4.2	20	15	5	-2.35	67.7	16.4	9.5	-	-	-	-	-	-	-
RP-9	Bag	26.0-27.0'	CH	31.3	50	20	30	0.36	100.0	98.1	54.0	-	-	-	-	-	-	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

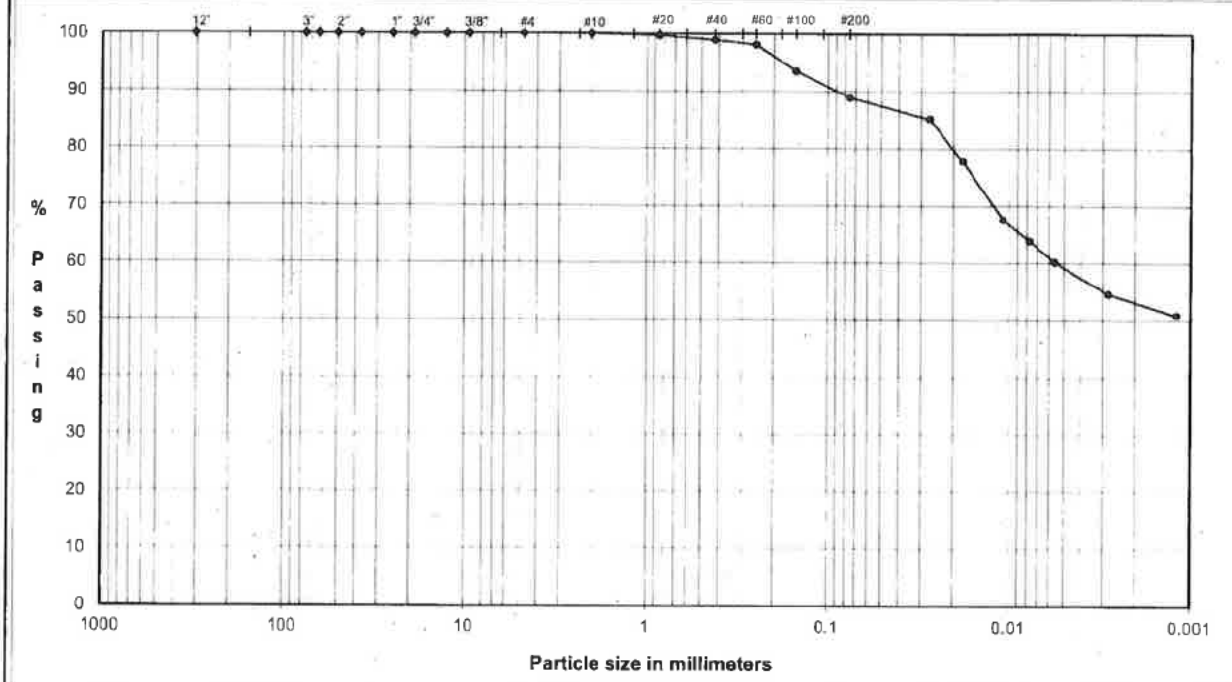
Golder Associates Inc.

JUNE 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-1** Depth: **3.0-5.0'**
TYPE: **UD**



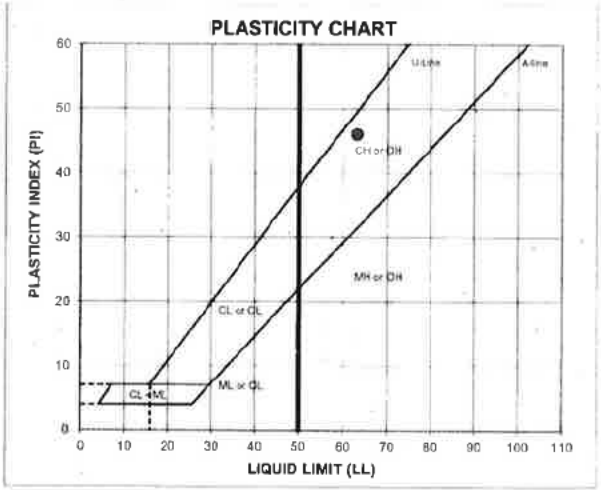
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.6		
#40	0.43	98.9	Medium Sand	1.1
#60	0.25	98.1		
#100	0.15	93.5		
#200	0.075	88.9	Fine Sand	10.0

Hydrometer Analysis

(mm)	% Finer		
0.027	85.2		
0.018	77.8		
0.011	67.6	Fines	
0.0078	63.9	Silt or Clay	88.9
0.0056	60.2		
0.0028	54.6		
0.0012	50.9		



ATTERBERG LIMITS

Method -B (Dry preparation)

M.	LL	PL	PI	LI
29.0	63	17	46	0.27

LL (oven-dried)	
0.75 - ORGANIC (OL-OH)	

DESCRIPTION: CLAY, some fine to medium sand; yellowish brown.

USCS: CH

TECH	TB
DATE	7/23/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	12	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-1	3.0-5.0'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.114	B-Value, f	0.97	Height, inches	3.142
Diameter, inches	2.836	Cell Pres.	88.0	Diameter, inches	2.858
Area, cm^2	40.75	Bot. Pres.	80.0	Area, cm^2	41.39
Volume, cm^3	322.35	Top Pres.	80.0	Volume, cm^3	330.31
Mass, g	618.40	Tot. B.P.	80.0	Mass, g	632.58
Moisture Content, %	29.04	Head, max.	137.16	Moisture Content, %	31.99
Dry Density, pcf	92.77	Head, min.	137.16	Dry Density, pcf	90.54
Spec. Gravity (assumed)	2.720	Max. Grad.	17.19	Volume Solids, cm^3	176.19
Volume Solids, cm^3	176.19	Min. Grad.	17.19	Volume Voids, cm^3	154.12
Volume Voids, cm^3	146.15			Void Ratio	0.87
Void Ratio	0.83			Saturation, %	99.5%
Saturation, %	95.2%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	618.40	715.61
Wt Soil & Tare, f	g	479.25	562.37
Wt Tare	g	0.00	83.41
Wt Moisture Lost	g	139.15	153.24
Wt Dry Soil	g	479.25	478.96
Water Content	%	29.04%	31.99%

DESCRIPTION

CLAY, some fine to medium sand; yellowish brown.

Flow Pump Rate 1.18E-05 cm^3/sec

USCS CH

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
07/23/18	43304	9	0	20.5	0	0	0	0	1.95	137.16	17.19	1.6E-08	
07/23/18	43304	9	5	20.5	5	5	300	300	1.95	137.16	17.19	1.6E-08	
07/23/18	43304	9	10	20.5	5	10	300	600	1.95	137.16	17.19	1.6E-08	
07/23/18	43304	9	15	20.5	5	15	300	900	1.95	137.16	17.19	1.6E-08	*
07/23/18	43304	9	20	20.5	5	20	300	1200	1.95	137.16	17.19	1.6E-08	*
07/23/18	43304	9	25	20.5	5	25	300	1500	1.95	137.16	17.19	1.6E-08	*
07/23/18	43304	9	30	20.5	5	30	300	1800	1.95	137.16	17.19	1.6E-08	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.6E-08 cm/sec **

DATE	7/23/18
CHECK	
REVIEW	
APPROVE	

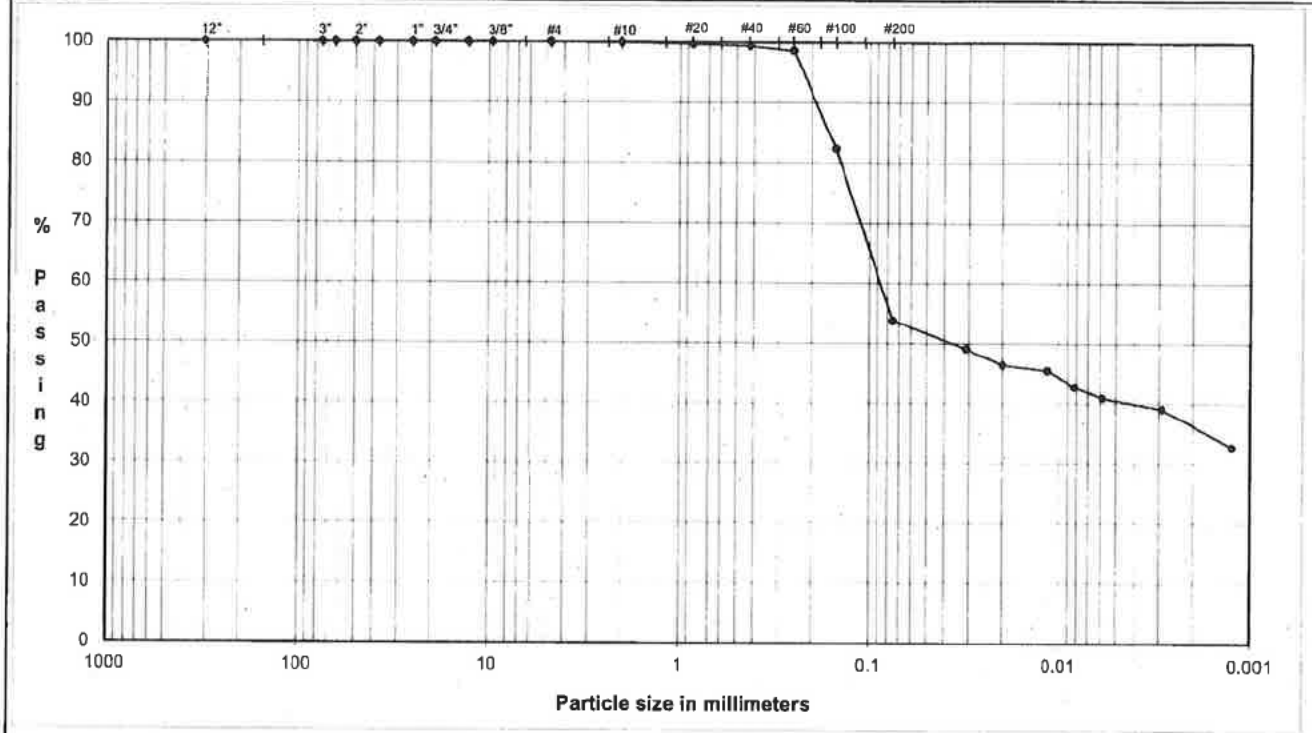
JULY 2018

18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-1** Depth: **8.0-10.0'**
TYPE: **UD**



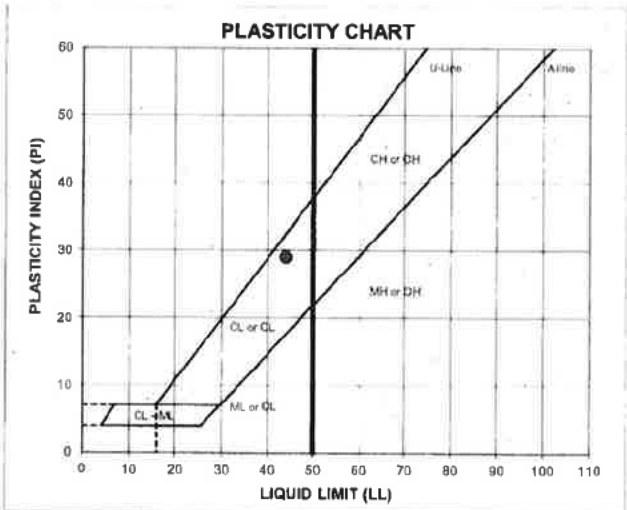
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.9	Coarse Sand	0.1
#20	0.85	99.7		
#40	0.43	99.4	Medium Sand	0.5
#60	0.25	98.6		
#100	0.15	82.3		
#200	0.075	53.8	Fine Sand	45.6

Hydrometer Analysis

(mm)	%Finer		
0.031	49.1		
0.020	46.4		
0.011	45.5	Fines	
0.0082	42.8	Silt or Clay	53.8
0.0059	40.9		
0.0029	39.1		
0.0012	32.8		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
25.0	44	15	29	0.35

LL (oven-dried)	
0.75 · ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; yellowish brown and gray.

USCS: CL

TECH	TB/HH/BA
DATE	7/20/18
CHECK	
REVIEW	
APPROVE	

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY WHITE BLUFF/AR**		
PROJECT NUMBER	**18103173**	**SAMPLE ID**	**B-1**
		SAMPLE TYPE	**UD**
TESTED FOR	**Gs**	**SAMPLE DEPTH**	**8.0-10.0'**

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	**203.53**
Weight Soil and Tare, Final (gm)	**203.11**
Weight Of Tare (gm)	**51.24**
Weight Of Moisture (gm)	**0.42**
Weight Of Dry Soil (gm)	**151.87**
Hygroscopic Moisture In (%)	**0.3%**

Test Method		**Method - B**
Pycnometer Number		**24**
Weight Pycnometer Empty (gm)		181.79
Volume of Pycnometer (gm)		499.61
Weight Pycnometer and Water (gm)		680.37
Mass of Pycnometer and Water at the test Temperture	(A)	679.99
Observed Temperature (Tb), for (Mb) In Degrees C		24.50
Weight of Soil, Water & Pycnometer (gm)	(B)	**710.61**
Temperature, C		**24.5**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**50.04**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	50.04
Temperature Coefficient		0.9990

SPECIFIC GRAVITY (G) **2.575**

G @ 20^0 C = [C/(A-(B - C))]*(K)

METHOD - A WET METHOD

METHOD - B OVEN-DRIED METHOD

METHOD OF AIR REMOVAL: VACUUM

Recommended Mass for Test Specimen

Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	TJ
DATE	7/20/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-1		Boring or Test Pit:	B-1		Boring or Test Pit:	B-1	
Sample:	UD		Sample:	UD		Sample:	UD	
Depth:	8.0-10.0'	ft	Depth:	8.0-10.0'	ft	Depth:	8.0-10.0'	ft
Point No.:	1		Point No.:	2		Point No.:	3	

	Initial		Initial		Initial	
Length =	6.234	in	6.070	in	6.034	in
Diameter =	2.856	in	2.869	in	2.870	in
Wet Mass =	2.835	lb	2.565	lb	2.631	lb
Area =	6.406	in^2	6.465	in^2	6.469	in^2
Volume =	39.937	in^3	39.241	in^3	39.035	in^3
Specific Gravity =	2.57	(ASTM D854)	2.57	(ASTM D854)	2.57	(ASTM D854)
Dry Mass of Solids =	2.291	lb	2.079	lb	2.060	lb
Moisture Content =	23.8%		23.4%		27.7%	
Wet Unit Weight =	122.7	pcf	112.9	pcf	116.5	pcf
Dry Unit Weight =	99.1	pcf	91.5	pcf	91.2	pcf
Void Ratio =	0.62		0.75		0.76	
Percent Saturation =	99%		80%		94%	

	After Consolidation		After Consolidation		After Consolidation	
Length =	6.173	in	5.950	in	5.890	in
Diameter =	2.917	in	2.847	in	2.858	in
Area =	6.682	in^2 (Method B)	6.365	in^2 (Method B)	6.415	in^2 (Method B)
Volume =	41.249	in^3	37.868	in^3	37.784	in^3
Moisture Content =	26.1%		26.9%		27.3%	
Wet Unit Weight =	121.0	pcf	120.3	pcf	119.9	pcf
Dry Unit Weight =	96.0	pcf	94.8	pcf	94.2	pcf
Void Ratio =	0.67		0.69		0.70	
Percent Saturation =	100%		100%		100%	

B Parameter =	0.99		B Parameter =	1.00		B Parameter =	0.97	
Shear Rate =	0.012%	/min.	Shear Rate =	0.012%	/min.	Shear Rate =	0.012%	/min.
t_{50} =	5.84	min.	t_{50} =	14.95	min.	t_{50} =	9.87	min.
Strain at Failure =	3.2%		Strain at Failure =	3.3%		Strain at Failure =	2.3%	

Cell Pressure =	89.0	psi	Cell Pressure =	98.0	psi	Cell Pressure =	107.0	psi
Back Pressure =	80.0	psi	Back Pressure =	80.0	psi	Back Pressure =	80.0	psi
Confining Pressure =	9.0	psi	Confining Pressure =	18.0	psi	Confining Pressure =	27.0	psi

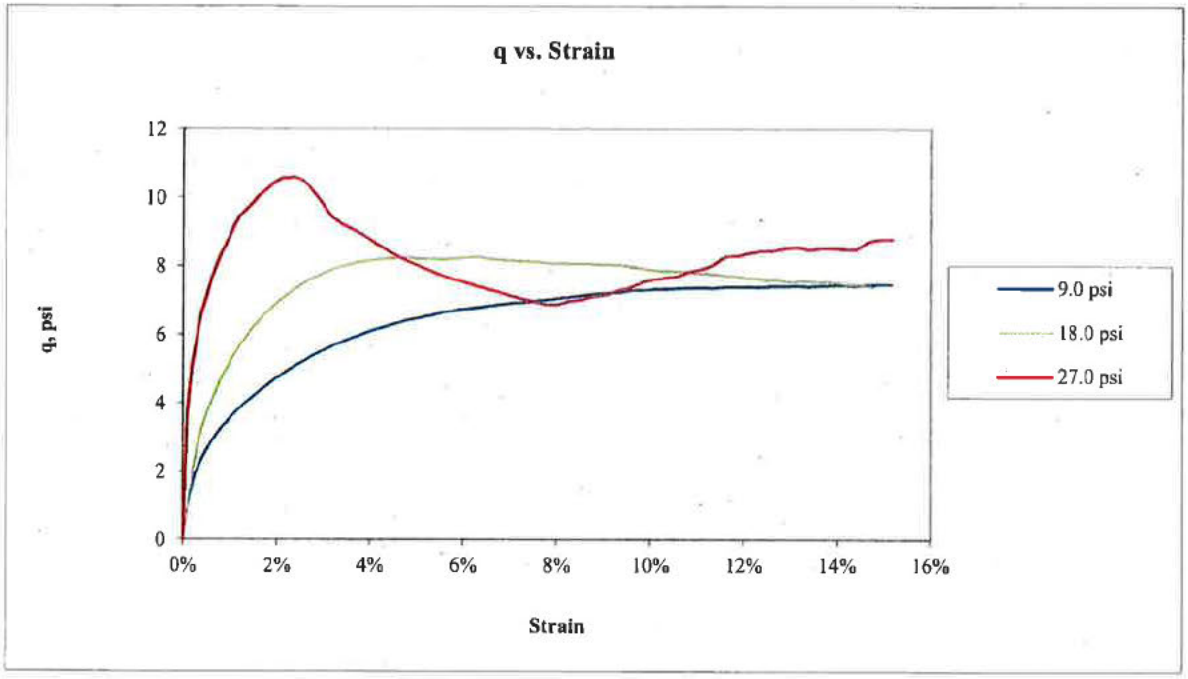
Notes: Sample description: (CL) SILTY CLAY and SAND, fine to coarse; yellowish brown and gray

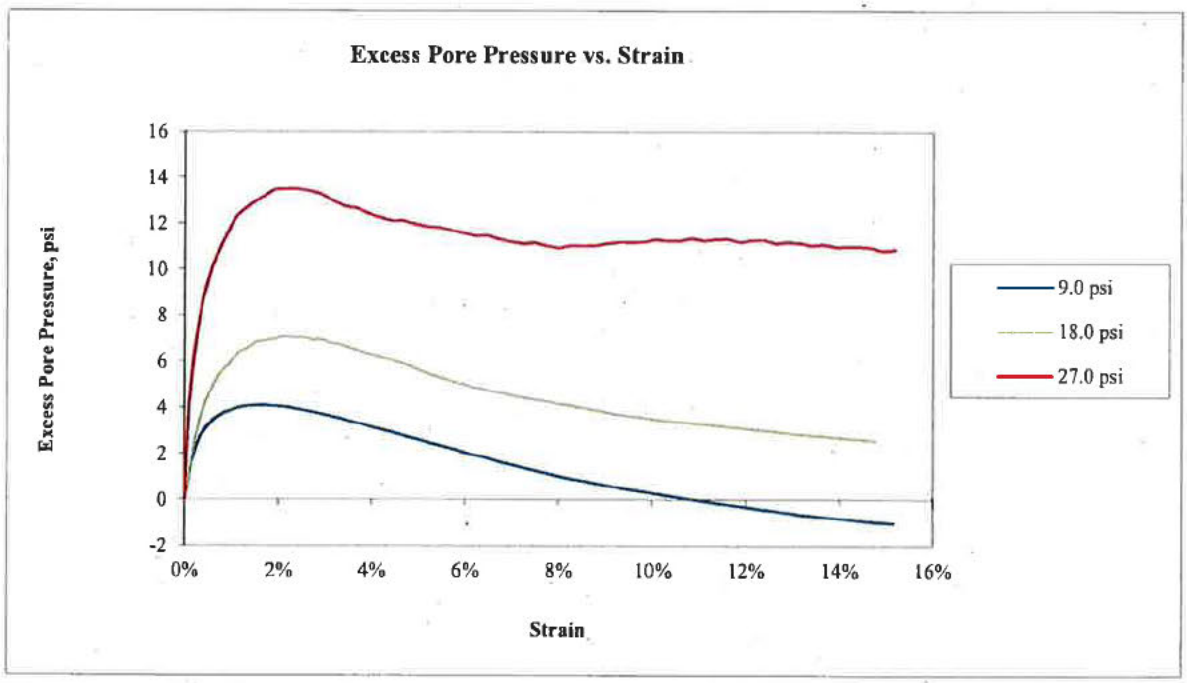
Atterberg limits: LL = 44 PL = 15 PI = 29 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 54% (ASTM D422, refer to separate report for gradation curve)

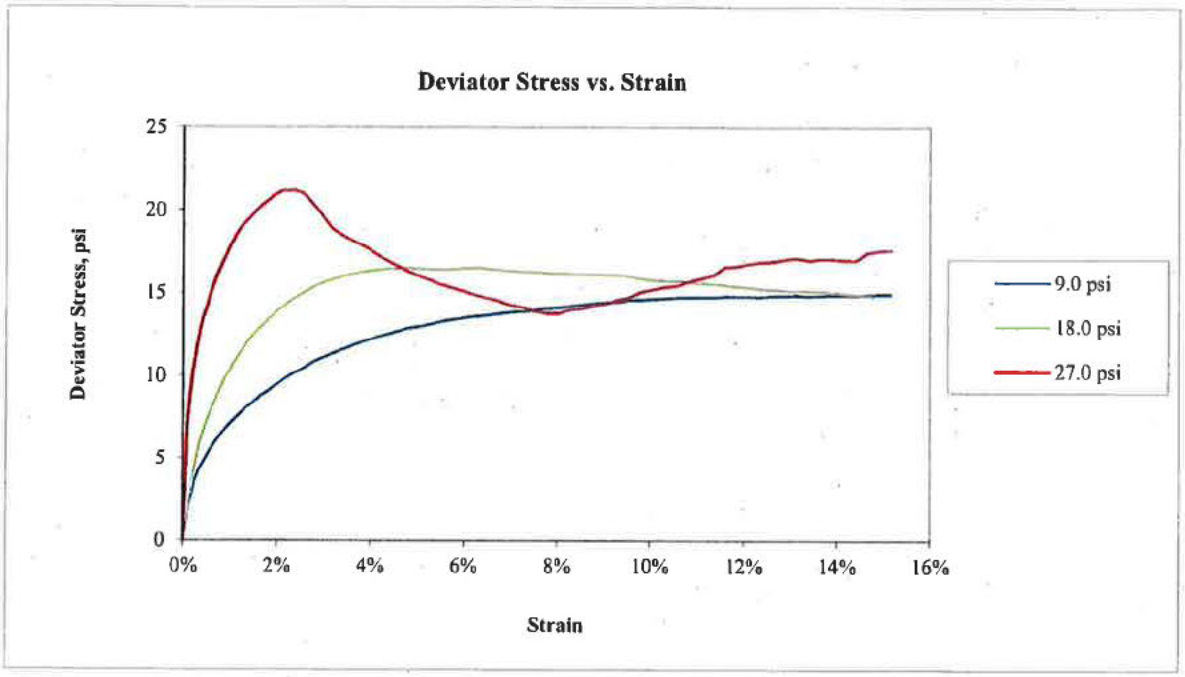
Specimen type:	X	Intact		Reconstituted	
Moisture from:		Cuttings	X	Entire specimen	
Saturation method:	X	Wet		Dry	
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$	% strain
Membrane effect:	X	Corrected		Not Corrected	

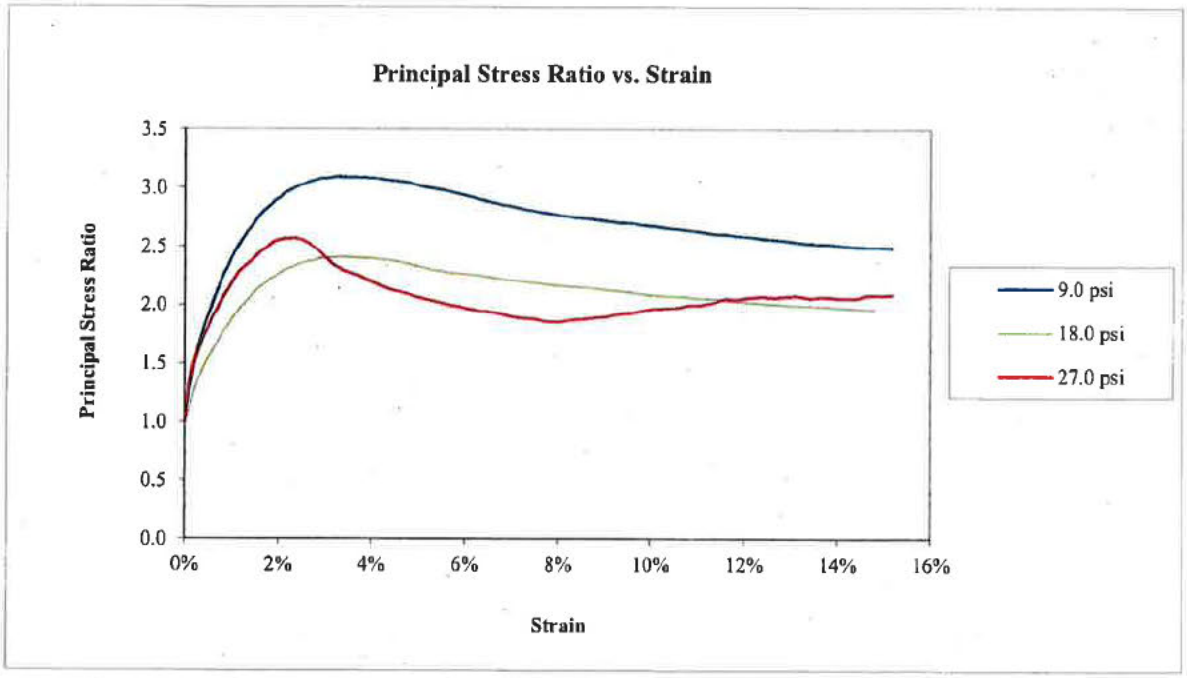
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-1 UD 8.0-10.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **1**



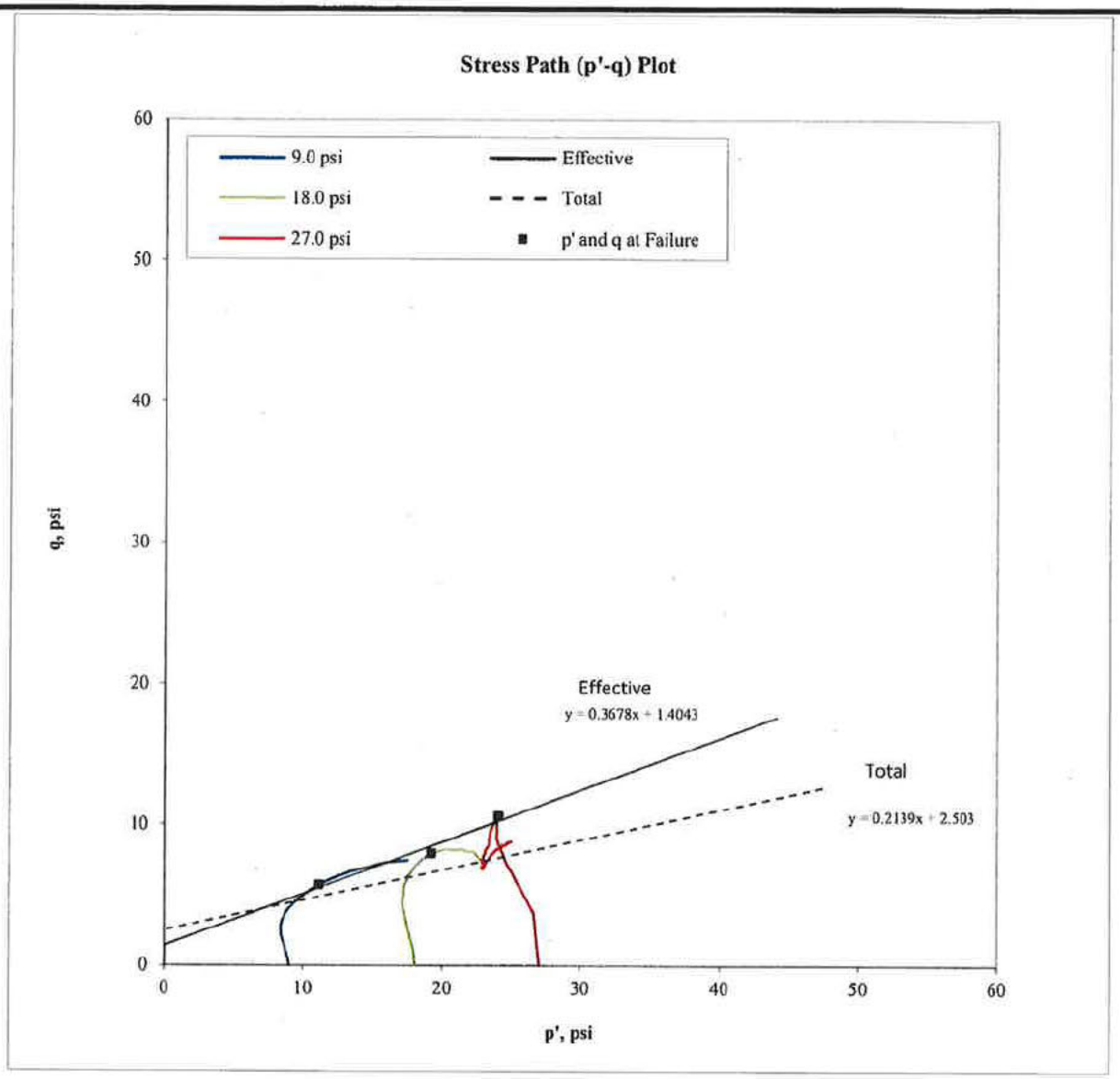


Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-1 UD 8.0-10.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 7/17/2018	Job Number: 18103173	Figure: 2





Golder Associates Inc. **Atlanta, Georgia**	Title: **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **DEVIATOR STRESS AND PRINCIPAL STRESS RATIO PLOT**				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-1 UD 8.0-10.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 7/17/2018	Job Number: 18103173	Figure: 3



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
9.0	14.7	11.1	5.7
18.0	26.0	19.2	8.0
27.0	37.6	24.1	10.6

Effective

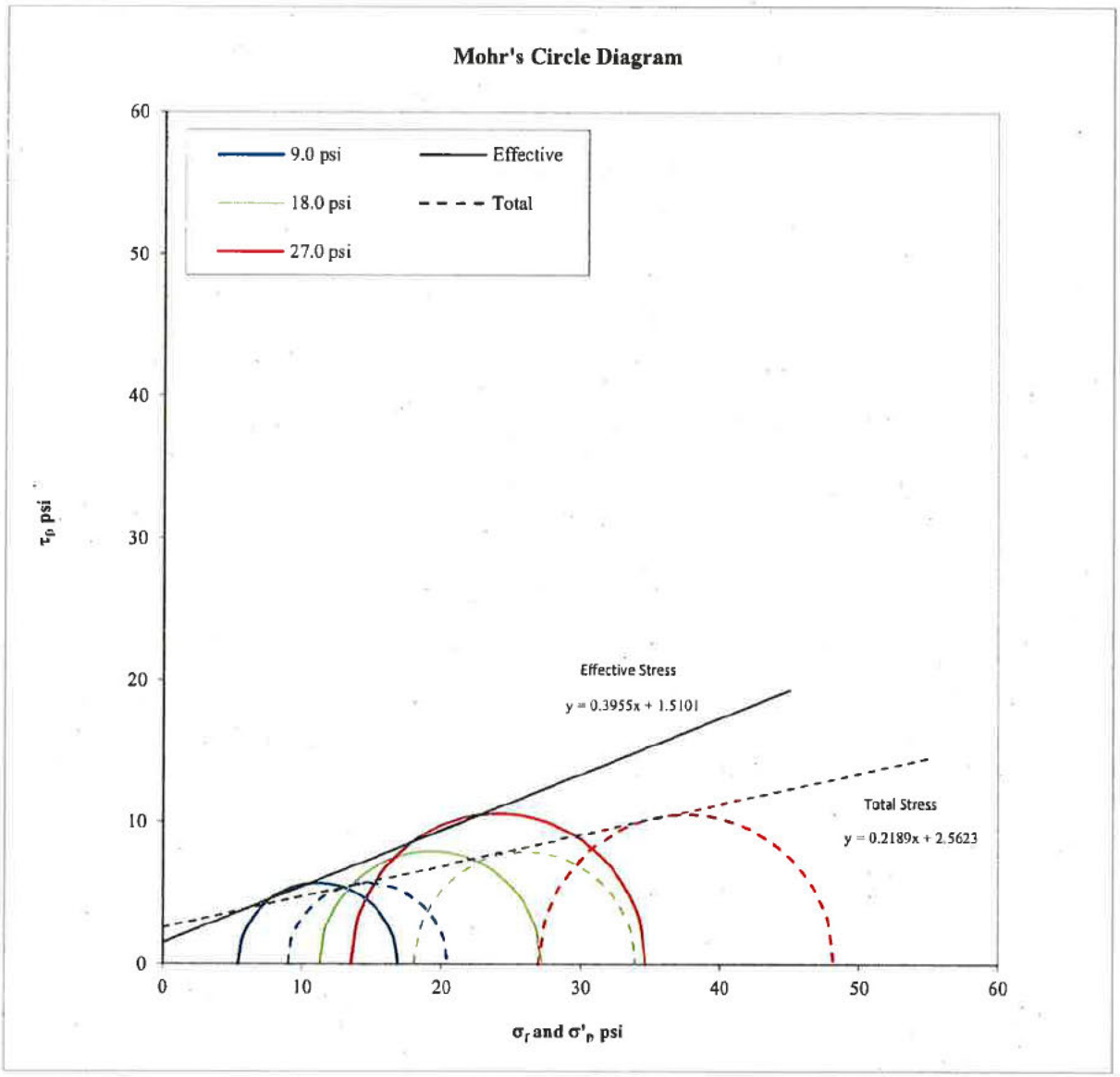
α' =	20.2	degree
a' =	1.4	psi

Total

α =	12.1	degree
a =	2.5	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-1 UD 8.0-10.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **4**



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
9.0	16.8	5.4	20.4	9.0
18.0	27.2	11.3	33.9	18.0
27.0	34.7	13.5	48.2	27.0

Effective

ϕ' =	21.6	degree
c' =	1.5	psi

Total

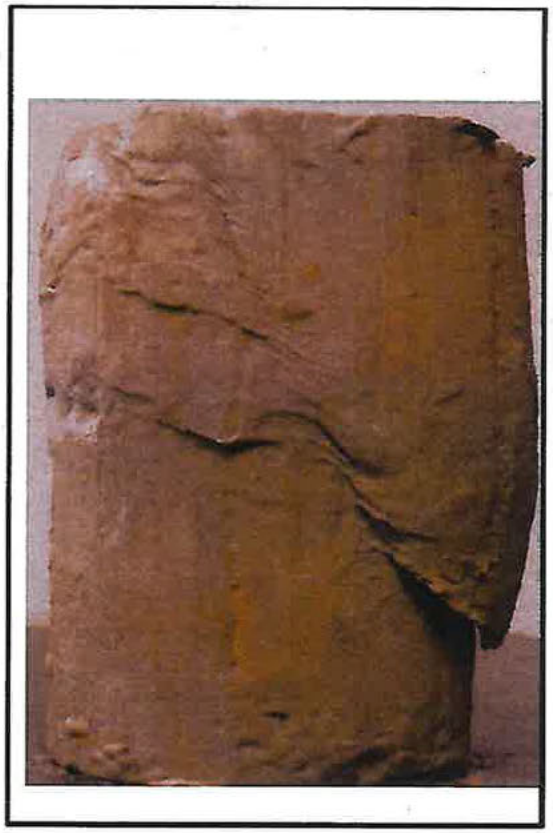
ϕ =	12.3	degree
c =	2.6	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-1 UD 8.0-10.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **5**

9.0 psi

18.0 psi



27.0 psi

NOTE: Pore pressure built up before shearing, adjusted results to initial backpressure.

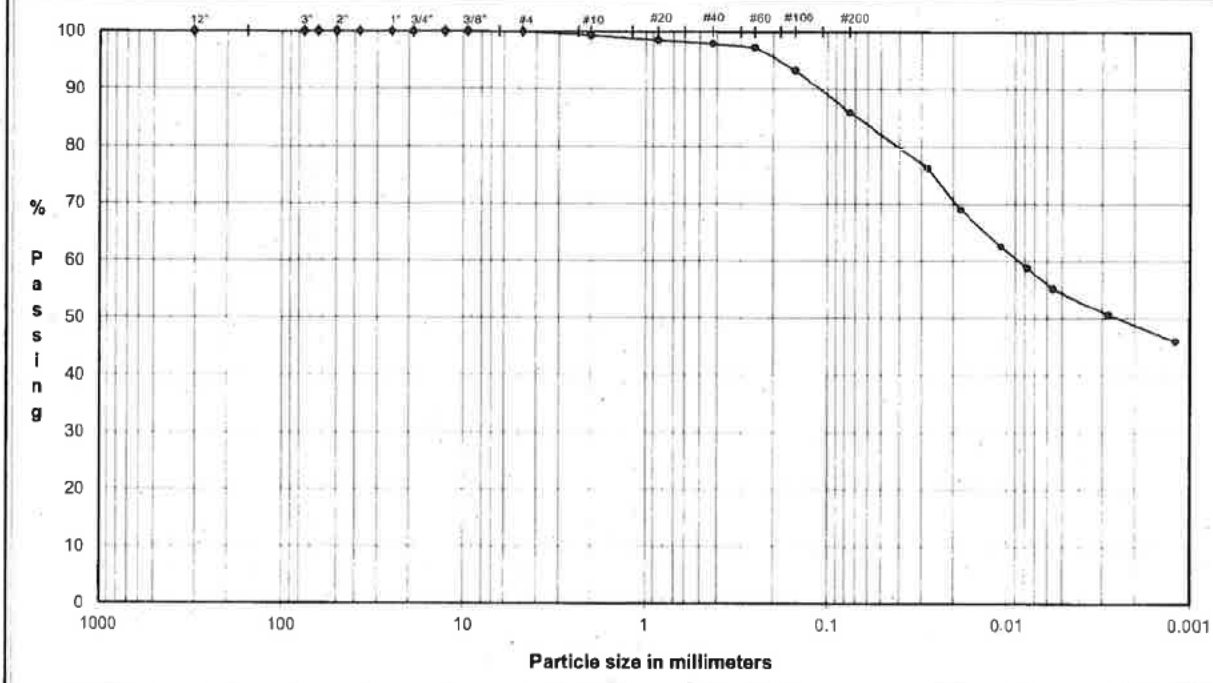
Golder Associates Inc. **Atlanta, Georgia**	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMENS PHOTOGRAPH - 9.0 18.0 27.0 psi				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-1 UD 8.0-10.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 7/17/2018	Job Number: 18103173	Figure: 6

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-2 Depth: 5.0-7.5'
TYPE: Bag



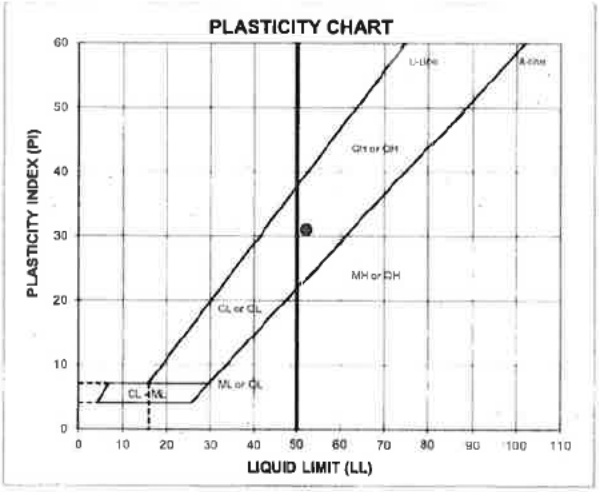
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.3**	Coarse Sand	**0.7**
#20	0.85	**98.5**		
#40	0.43	**97.9**	Medium Sand	**1.4**
#60	0.25	**97.4**		
#100	0.15	**93.2**		
#200	0.075	**86.0**	Fine Sand	**11.9**

Hydrometer Analysis

(mm)	%Finer		
0.028	**76.4**		
0.018	**69.0**		
0.011	**62.6**	Fines	
0.0078	**58.9**	Silt or Clay	**86.0**
0.0056	**55.2**		
0.0028	**50.6**		
0.0012	**46.0**		



ATTERBERG LIMITS

Method -B (Dry preparation)

ML	LL	PL	PI	LI
24.7	52	21	31	0.13

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: sandy CLAY, fine to coarse; yellowish brown.

USCS: CH

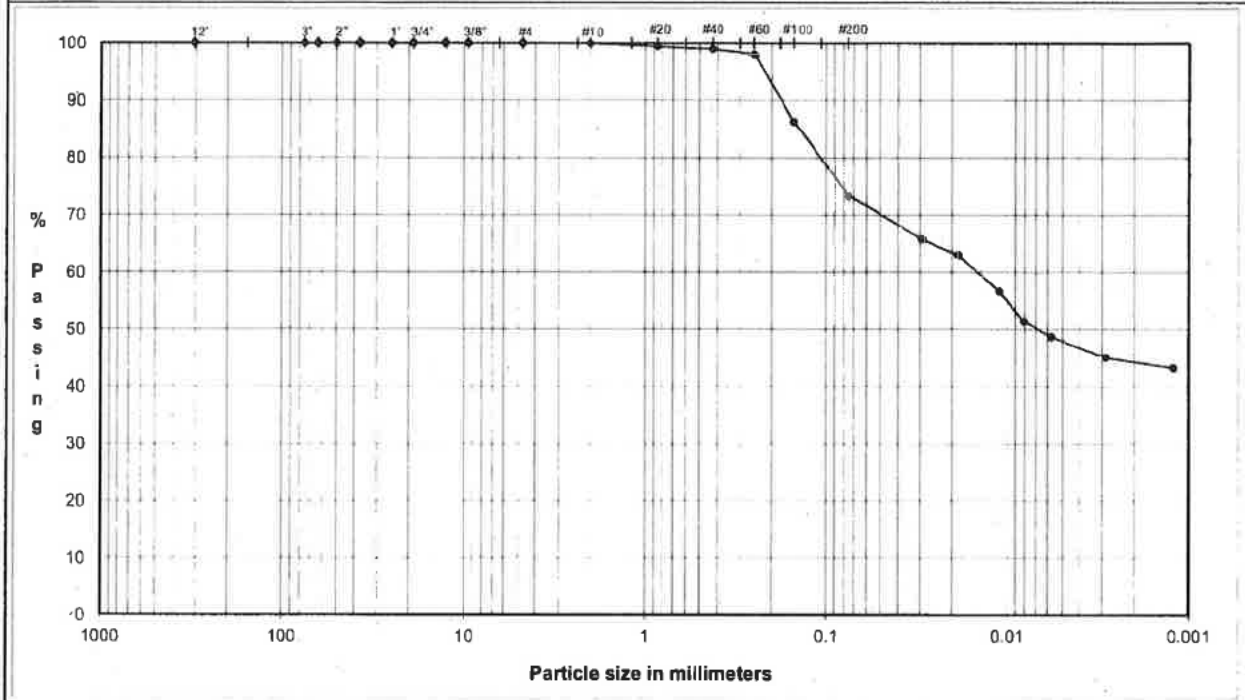
TECH	HH/BA/TB
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-3** Depth: **5.0-7.0'**
TYPE: **UD**



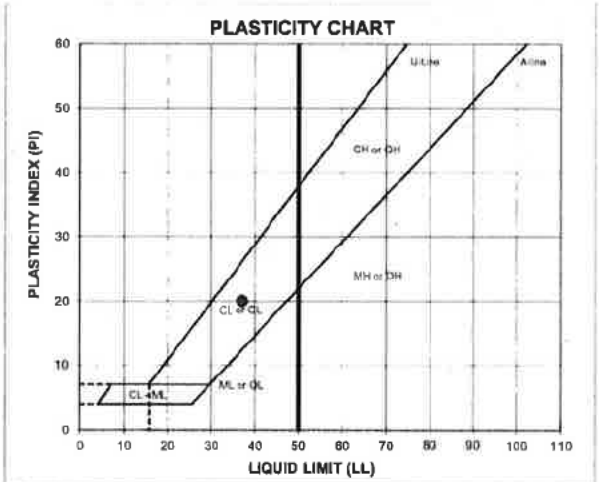
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**99.4**		
#40	0.43	**99.0**	Medium Sand	**1.0**
#60	0.25	**98.1**		
#100	0.15	**86.3**		
#200	0.075	**73.3**	Fine Sand	**25.6**

Hydrometer Analysis

(mm)	%Finer		
0.029	**65.8**		
0.019	**63.1**		
0.011	**56.8**	Fines	
0.0081	**51.4**	Silt or Clay	**73.3**
0.0057	**48.7**		
0.0029	**45.1**		
0.0012	**43.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
24.1	**37**	**17**	**20**	**0.37**

LL (oven-dried)	
0.75 - ORGANIC (OL/OH)	

DESCRIPTION: sandy SILTY CLAY, fine to medium; yellowish brown, gray, and brown.

USCS: CL

TECH	BA/HH
DATE	7/26/18
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	9	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-3	5.0-7.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.147	B-Value, f	1.00	Height, inches	3.139
Diameter, inches	2.854	Cell Pres.	88.0	Diameter, inches	2.837
Area, cm²	41.27	Bot. Pres.	80.0	Area, cm²	40.78
Volume, cm³	329.91	Top Pres.	80.0	Volume, cm³	325.16
Mass, g	647.92	Tot. B.P.	80.0	Mass, g	656.52
Moisture Content, %	24.12	Head, max.	187.10	Moisture Content, %	25.76
Dry Density, pcf	98.74	Head, min.	187.10	Dry Density, pcf	100.18
Spec. Gravity (assumed)	2.750	Max. Grad.	23.47	Volume Solids, cm³	189.83
Volume Solids, cm³	189.83	Min. Grad.	23.47	Volume Voids, cm³	135.33
Volume Voids, cm³	140.08			Void Ratio	0.71
Void Ratio	0.74			Saturation, %	99.4%
Saturation, %	89.9%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	647.92	736.33
Wt Soil & Tare, f	g	522.03	601.84
Wt Tare	g	0.00	79.81
Wt Moisture Lost	g	125.89	134.49
Wt Dry Soil	g	522.03	522.03
Water Content	%	24.12%	25.76%

DESCRIPTION

sandy SILTY CLAY, fine to medium; yellowish brown, gray, and brown.

Flow Pump Rate 2.25E-05 cm³/sec

USCS CL

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
07/26/18	43307	13	0	22.3	0	0	0	0	2.66	187.10	23.47	2.2E-08	
07/26/18	43307	13	5	22.3	5	5	300	300	2.66	187.10	23.47	2.2E-08	
07/26/18	43307	13	10	22.3	5	10	300	600	2.66	187.10	23.47	2.2E-08	
07/26/18	43307	13	15	22.3	5	15	300	900	2.66	187.10	23.47	2.2E-08	*
07/26/18	43307	13	20	22.3	5	20	300	1200	2.66	187.10	23.47	2.2E-08	*
07/26/18	43307	13	25	22.3	5	25	300	1500	2.66	187.10	23.47	2.2E-08	*
07/26/18	43307	13	30	22.3	5	30	300	1800	2.66	187.10	23.47	2.2E-08	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 2.2E-08 cm/sec **

DATE	7/26/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-3		Boring or Test Pit:	B-3		Boring or Test Pit:	B-3	
Sample:	UD		Sample:	UD		Sample:	UD	
Depth:	10.0-12.0 ft		Depth:	10.0-12.0 ft		Depth:	10.0-12.0 ft	
Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**	
Length =	6.001	in	Length =	5.995	in	Length =	5.996	in
Diameter =	2.829	in	Diameter =	2.871	in	Diameter =	2.858	in
Wet Mass =	2.610	lb	Wet Mass =	2.758	lb	Wet Mass =	2.793	lb
Area =	6.286	in^2	Area =	6.474	in^2	Area =	6.415	in^2
Volume =	37.721	in^3	Volume =	38.810	in^3	Volume =	38.466	in^3
Specific Gravity =	2.58	(ASTM D854)	Specific Gravity =	2.58	(ASTM D854)	Specific Gravity =	2.58	(ASTM D854)
Dry Mass of Solids =	2.117	lb	Dry Mass of Solids =	2.316	lb	Dry Mass of Solids =	2.285	lb
Moisture Content =	23.3%		Moisture Content =	19.1%		Moisture Content =	22.2%	
Wet Unit Weight =	119.6	pcf	Wet Unit Weight =	122.8	pcf	Wet Unit Weight =	125.5	pcf
Dry Unit Weight =	97.0	pcf	Dry Unit Weight =	103.1	pcf	Dry Unit Weight =	102.7	pcf
Void Ratio =	0.65		Void Ratio =	0.56		Void Ratio =	0.56	
Percent Saturation =	92%		Percent Saturation =	88%		Percent Saturation =	102%	
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	5.941	in	Length =	5.957	in	Length =	5.930	in
Diameter =	2.844	in	Diameter =	2.884	in	Diameter =	2.879	in
Area =	6.353	in^2 (Method B)	Area =	6.533	in^2 (Method B)	Area =	6.508	in^2 (Method B)
Volume =	37.747	in^3	Volume =	38.920	in^3	Volume =	38.593	in^3
Moisture Content =	25.5%		Moisture Content =	21.8%		Moisture Content =	22.1%	
Wet Unit Weight =	121.6	pcf	Wet Unit Weight =	125.2	pcf	Wet Unit Weight =	124.9	pcf
Dry Unit Weight =	96.9	pcf	Dry Unit Weight =	102.8	pcf	Dry Unit Weight =	102.3	pcf
Void Ratio =	0.66		Void Ratio =	0.56		Void Ratio =	0.57	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.97		B Parameter =	0.97		B Parameter =	0.99	
Shear Rate =	0.012%	/min.	Shear Rate =	0.090%	/min.	Shear Rate =	0.090%	/min.
t_{50} =	28.79	min.	t_{50} =	2.39	min.	t_{50} =	1.03	min.
Strain at Failure =	2.3%		Strain at Failure =	4.3%		Strain at Failure =	4.7%	
Cell Pressure =	90.0	psi	Cell Pressure =	100.0	psi	Cell Pressure =	110.0	psi
Back Pressure =	80.0	psi	Back Pressure =	80.0	psi	Back Pressure =	80.0	psi
Confining Pressure =	10.0	psi	Confining Pressure =	20.0	psi	Confining Pressure =	30.0	psi

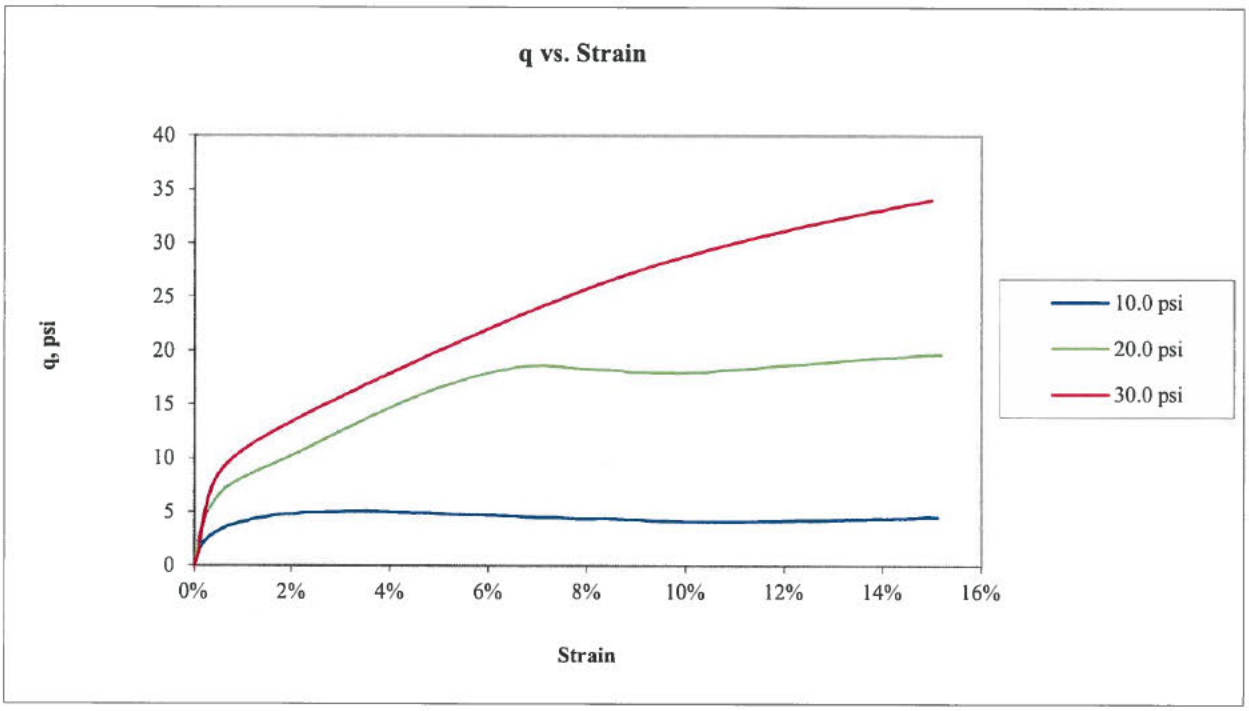
Notes: Sample description: (SC) SAND and SILTY CLAY, fine to coarse; light gray and yellow.

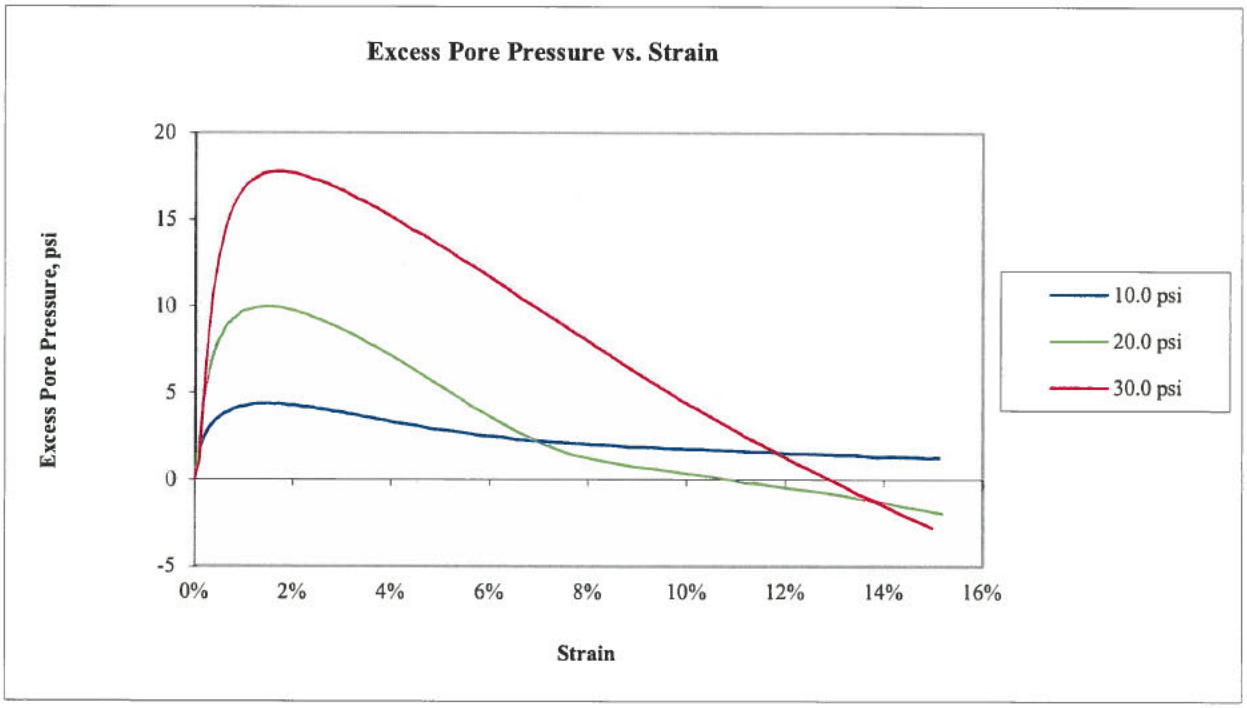
Atterberg limits: LL = 32 PL = 20 PI = 12 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 42% (ASTM D422, refer to separate report for gradation curve)

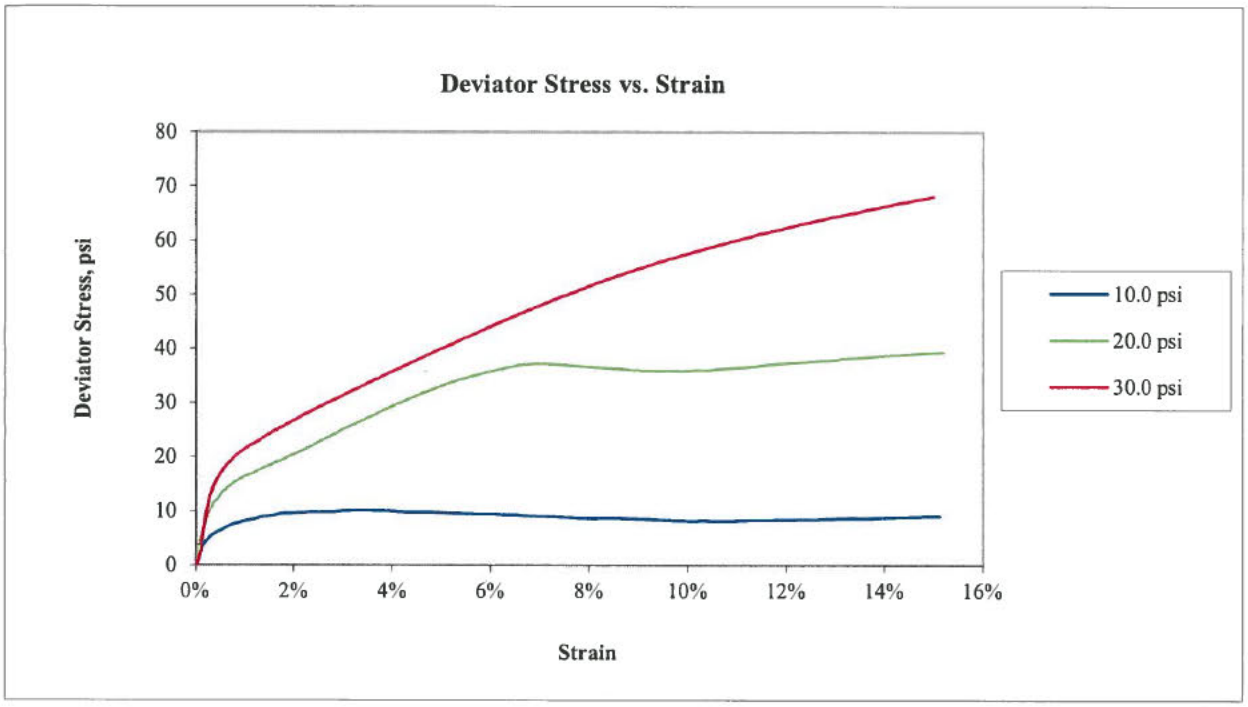
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

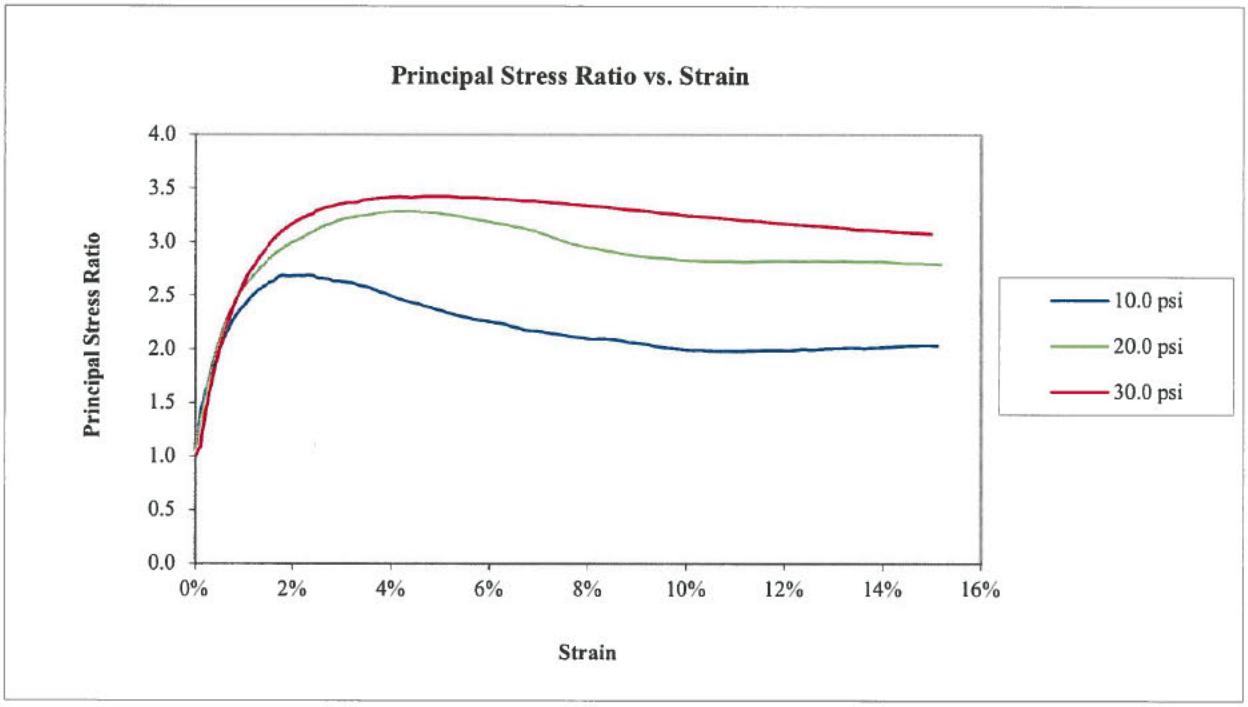
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 10.0-12.0'**	**Technician:** **PWM/FT** **Check:** PWM	**Reviewed:** **Approved:**	**Start Date:** **8/24/2018**	**Job Number:** **18103173**	**Figure:** **1**



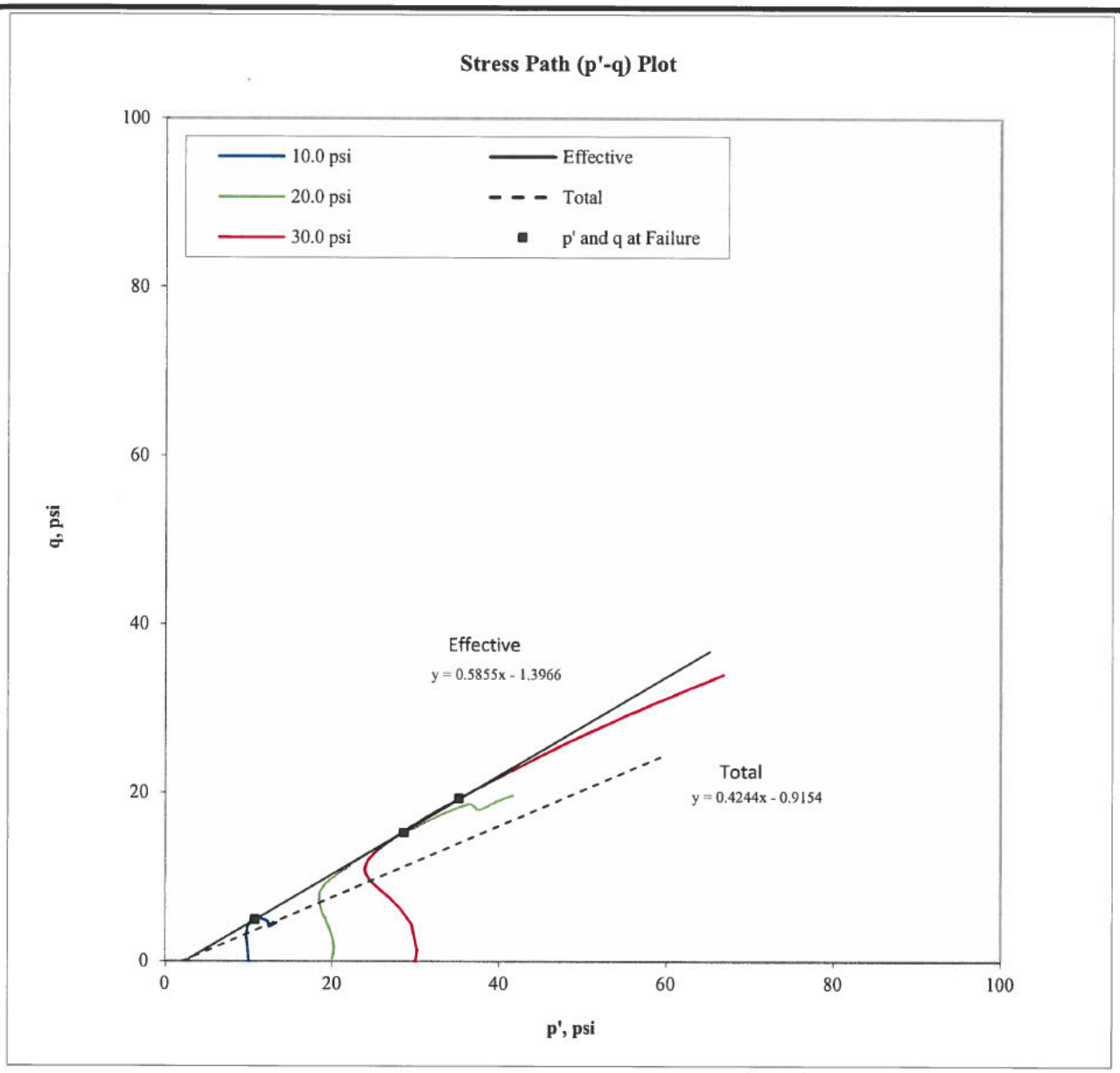


Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-3 UD 10.0-12.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 8/24/2018	Job Number: 18103173	Figure: 2





Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **DEVIATOR STRESS AND PRINCIPAL STRESS RATIO PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 10.0-12.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/24/2018**	**Job Number:** **18103173**	**Figure:** **3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
10.0	14.9	10.8	4.9
20.0	35.2	28.6	15.2
30.0	49.3	35.2	19.3

Effective

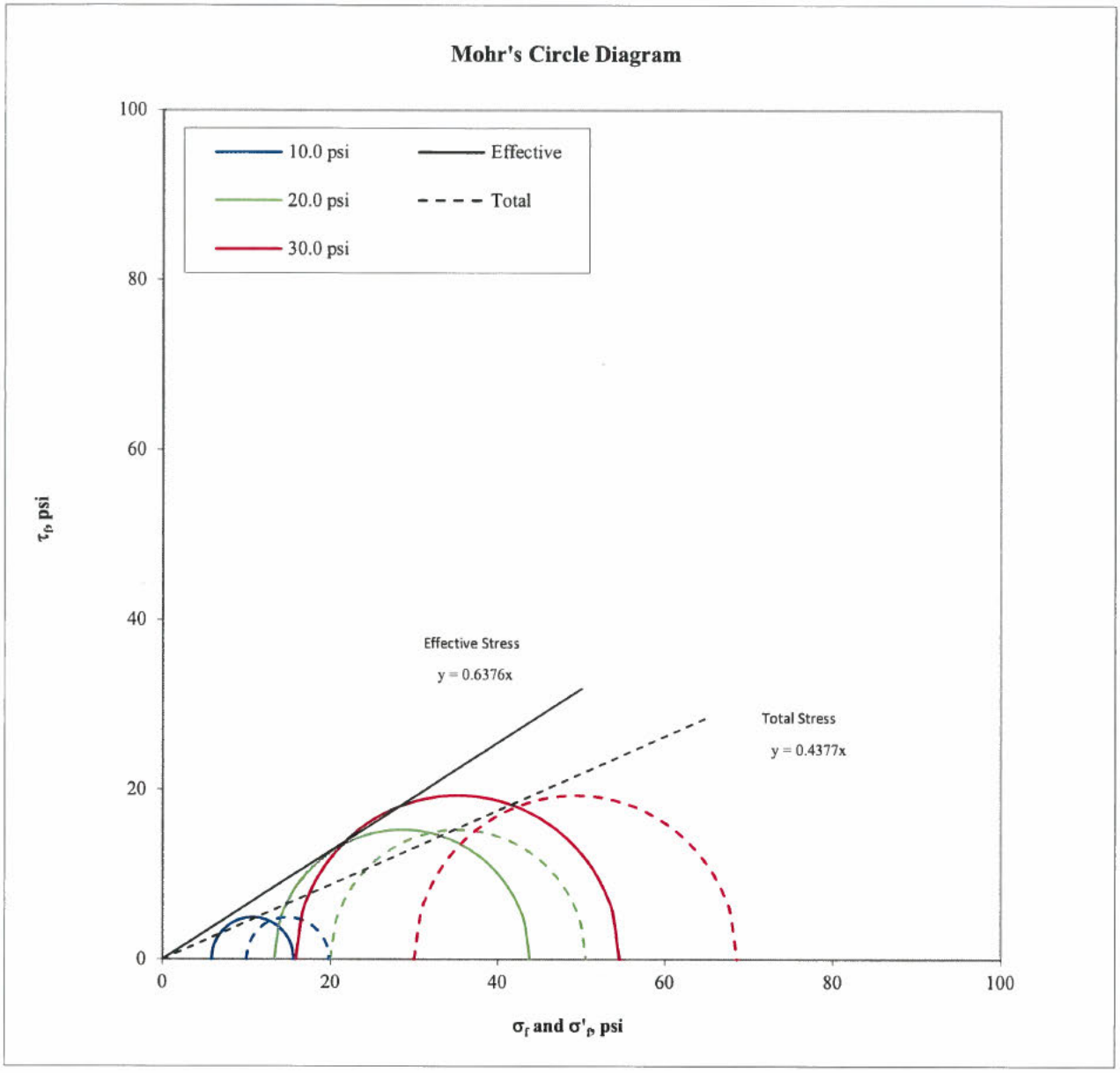
α ' =	28.3	degree
a' =	0.0	psi

Total

α =	21.9	degree
a =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 10.0-12.0'**	**Technician:** **PWM/FT** **Check:** PWM	**Reviewed:** **Approved:**	**Start Date:** **8/24/2018**	**Job Number:** **18103173**	**Figure:** **4**



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
10.0	15.7	5.8	19.9	10.0
20.0	43.8	13.3	50.5	20.0
30.0	54.5	15.9	68.6	30.0

Effective

ϕ' =	32.5	degree
c' =	0.0	psi

Total

ϕ =	23.6	degree
c =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 10.0-12.0'**	**Technician:** **PWM/FT** **Check:** PWM	**Reviewed:** **Approved:**	**Start Date:** **8/24/2018**	**Job Number:** **18103173**	**Figure:** **5**

10.0 psi

20.0 psi

30.0 psi

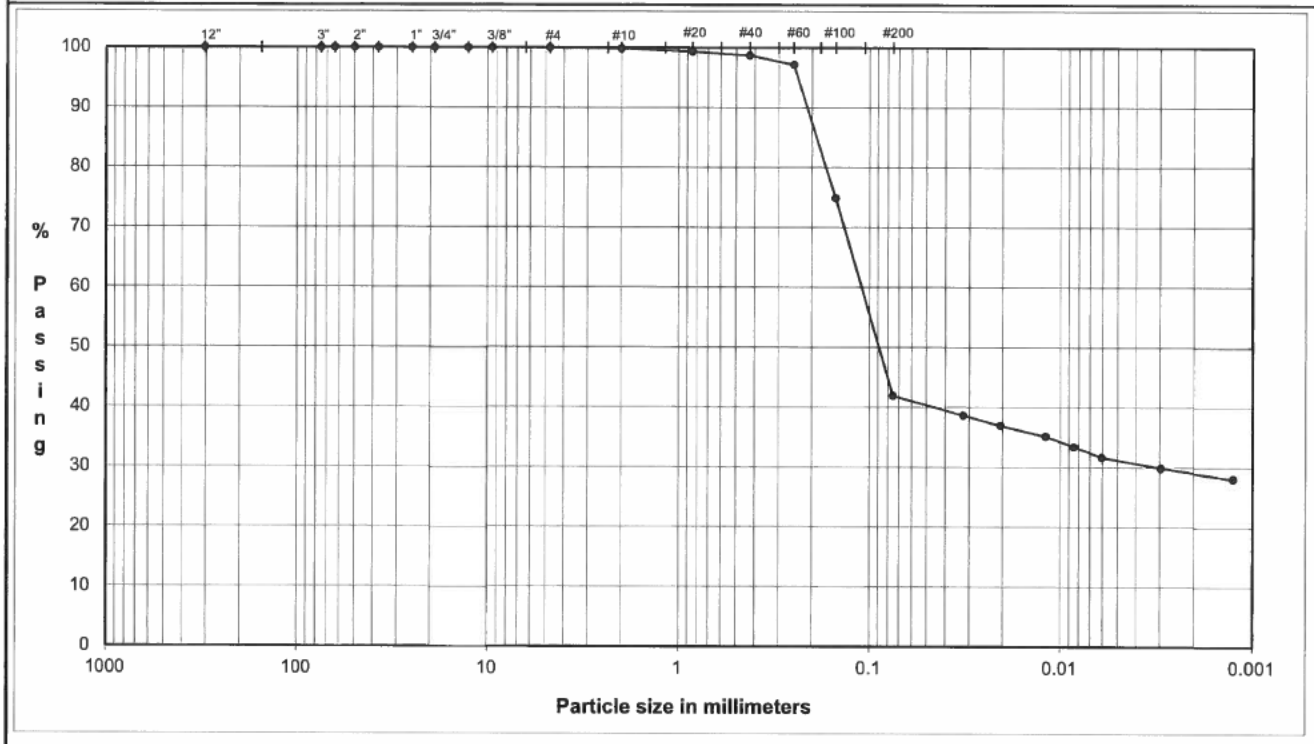
Golder Associates Inc. **Atlanta, Georgia**	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMENS PHOTOGRAPH - 10.0 20.0 30.0 psi				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-3 UD 10.0-12.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 8/24/2018	Job Number: 18103173	Figure: 6

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-3** Depth: **10.0-12.0'**
TYPE: **UD**



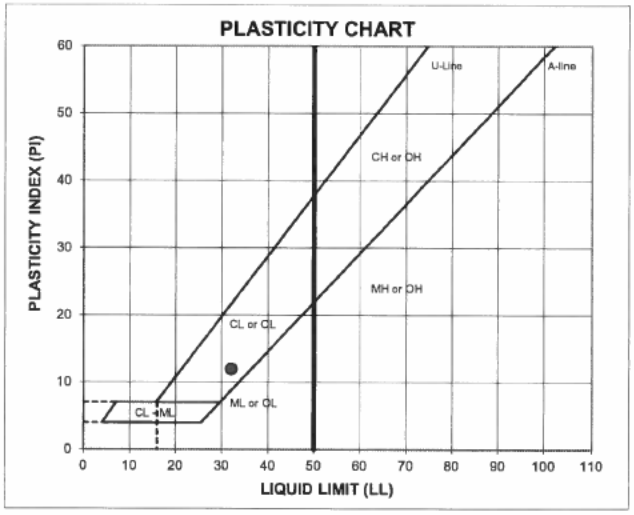
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.3**		
#40	0.43	**98.7**	Medium Sand	**1.1**
#60	0.25	**97.1**		
#100	0.15	**74.9**		
#200	0.075	**41.9**	Fine Sand	**56.8**

Hydrometer Analysis

(mm)	%Finer		
0.032	**38.7**		
0.020	**36.9**		
0.012	**35.1**	Fines	
0.0085	**33.4**	Silt or Clay	**41.9**
0.0060	**31.6**		
0.0030	**29.9**		
0.0012	**28.1**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.6	**32**	**20**	**12**	**0.18**

LL (oven-dried)	
< 0.75 – ORGANIC (OL/OH)	

DESCRIPTION: SAND and SILTY CLAY, fine to coarse; light gray and yellow.

USCS: SC

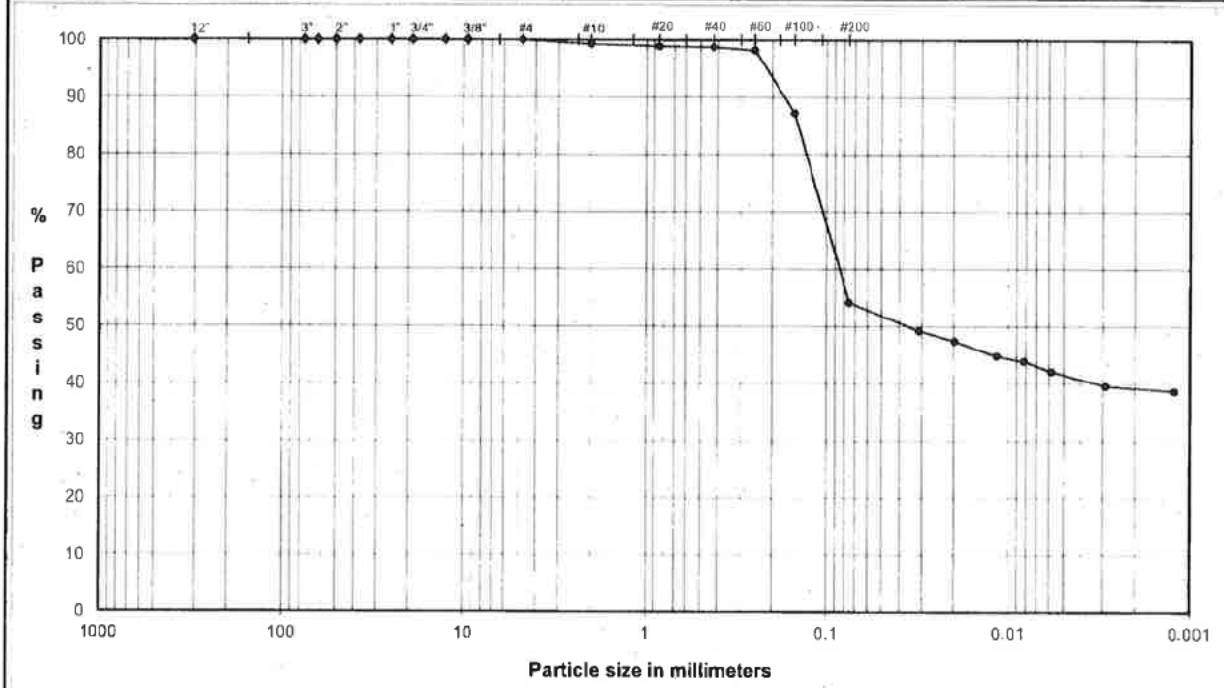
TECH	TJ/BA/HH
DATE	8/23/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-3 (P2-5) Depth: 13.0-14.0'
TYPE: Bag



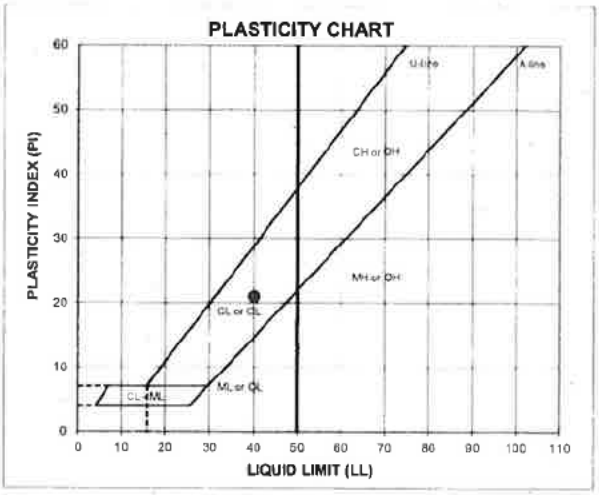
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.3	Coarse Sand	0.7
#20	0.85	98.9		
#40	0.43	98.8	Medium Sand	0.5
#60	0.25	98.2		
#100	0.15	87.2		
#200	0.075	54.1	Fine Sand	44.7

Hydrometer Analysis

(mm)	%Finer		
0.031	49.2		
0.020	47.4		
0.012	44.8	Fines	
0.0082	43.9	Silt or Clay	54.1
0.0058	42.2		
0.0029	39.5		
0.0012	38.7		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
23.3	40	19	21	0.18

LL (oven-dried) / 0.75 ORGANIC (OL-OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; light gray.

USCS: CL

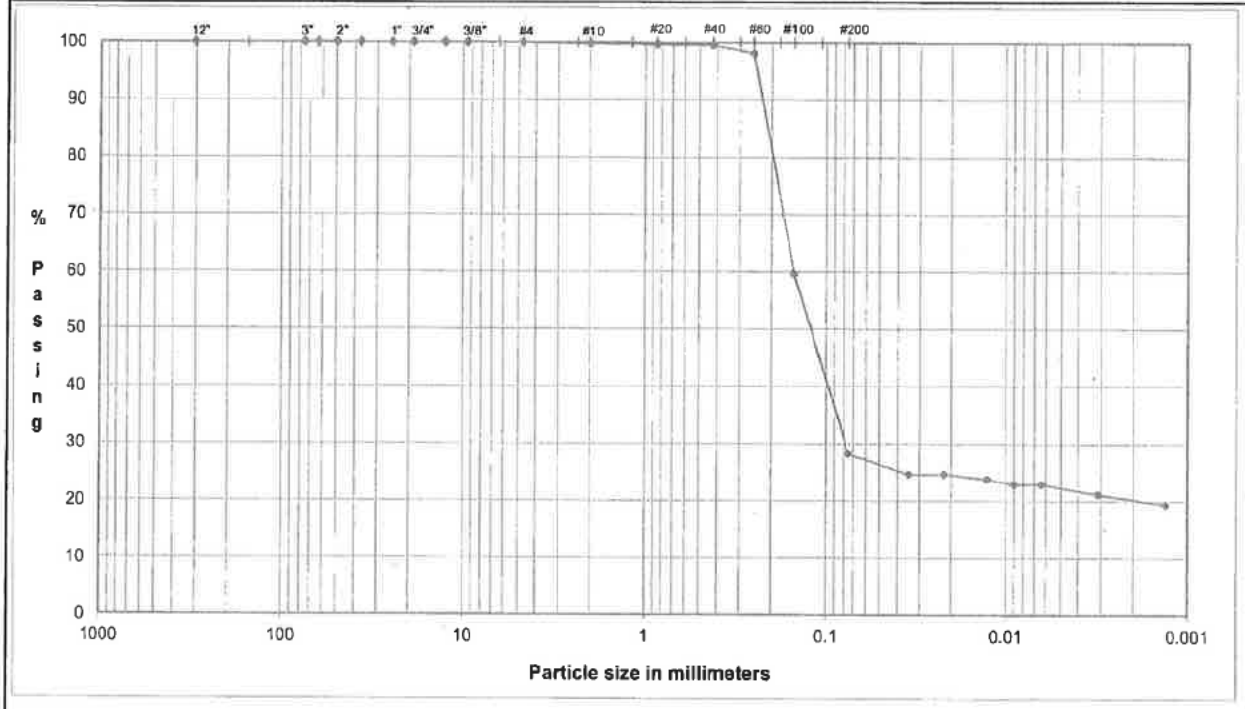
TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-3 Depth: 15.0-17.0'
TYPE: UD



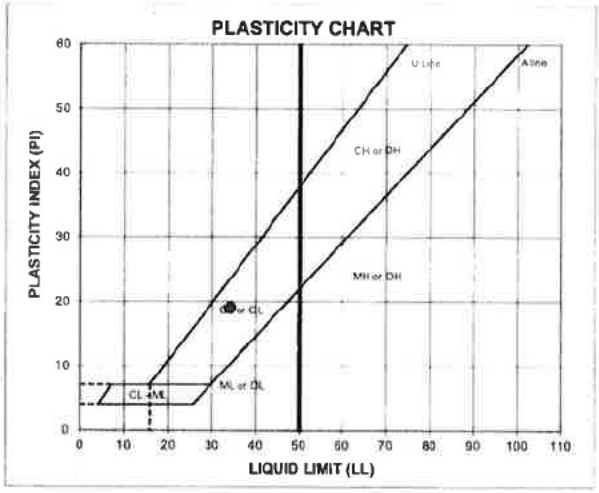
COBBLES	GRAVEL			SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine		Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.8	Coarse Sand	0.2
#20	0.85	99.6		
#40	0.43	99.6	Medium Sand	0.2
#60	0.25	98.1		
#100	0.15	59.6		
#200	0.075	28.2	Fine Sand	71.4

Hydrometer Analysis

(mm)	%Finer		
0.035	24.7		
0.022	24.7		
0.013	23.8	Fines	
0.0090	22.9	Silt or Clay	28.2
0.0063	22.9		
0.0031	21.1		
0.0013	19.4		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
19.0	34	15	19	0.23

LL (oven-dried)
0.75 ORGANIC (OL/OH)

DESCRIPTION: CLAYEY SAND, fine to coarse; light brown.

USCS: SC

TECH	TB/BA
DATE	6/19/18
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	5	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-3	15.0-17.0'	Flow Pump Speed	5	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.008	B-Value, f	0.99	Height, inches	3.009
Diameter, inches	2.839	Cell Pres.	88.0	Diameter, inches	2.848
Area, cm²	40.84	Bot. Pres.	80.0	Area, cm²	41.10
Volume, cm³	312.03	Top Pres.	80.0	Volume, cm³	314.12
Mass, g	657.54	Tot. B.P.	80.0	Mass, g	660.77
Moisture Content, %	19.00	Head, max.	33.76	Moisture Content, %	19.59
Dry Density, pcf	110.50	Head, min.	33.76	Dry Density, pcf	109.76
Spec. Gravity (assumed)	2.700	Max. Grad.	4.42	Volume Solids, cm³	204.64
Volume Solids, cm³	204.64	Min. Grad.	4.42	Volume Voids, cm³	109.47
Volume Voids, cm³	107.39			Void Ratio	0.53
Void Ratio	0.52			Saturation, %	98.9%
Saturation, %	97.8%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	657.54	742.00
Wt Soil & Tare, f	g	552.54	634.47
Wt Tare	g	0.00	85.52
Wt Moisture Lost	g	105.00	107.53
Wt Dry Soil	g	552.54	548.95
Water Content	%	19.00%	19.59%

DESCRIPTION

CLAYEY SAND, fine to coarse; light brown.

Flow Pump Rate 1.17E-03 cm³/sec

USCS SC

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
06/19/18	43270	10	0	20.9	0	0	0	0	0.48	33.76	4.42	6.3E-06	
06/19/18	43270	10	5	20.9	5	5	300	300	0.48	33.76	4.42	6.3E-06	
06/19/18	43270	10	10	20.9	5	10	300	600	0.48	33.76	4.42	6.3E-06	
06/19/18	43270	10	15	20.9	5	15	300	900	0.48	33.76	4.42	6.3E-06	*
06/19/18	43270	10	20	20.9	5	20	300	1200	0.48	33.76	4.42	6.3E-06	*
06/19/18	43270	10	25	20.9	5	25	300	1500	0.48	33.76	4.42	6.3E-06	*
06/19/18	43270	10	30	20.9	5	30	300	1800	0.48	33.76	4.42	6.3E-06	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.3E-06 cm/sec **

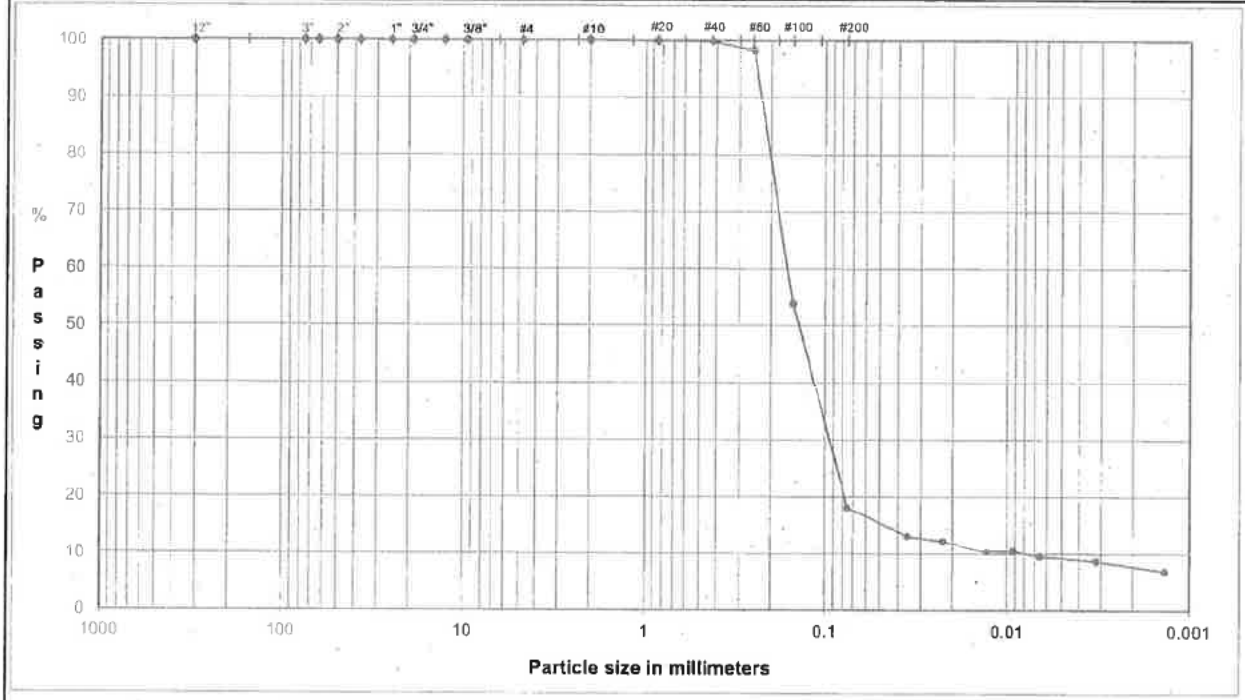
DATE	6/19/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-3 - Depth: 20.0-22.0'
TYPE: UD



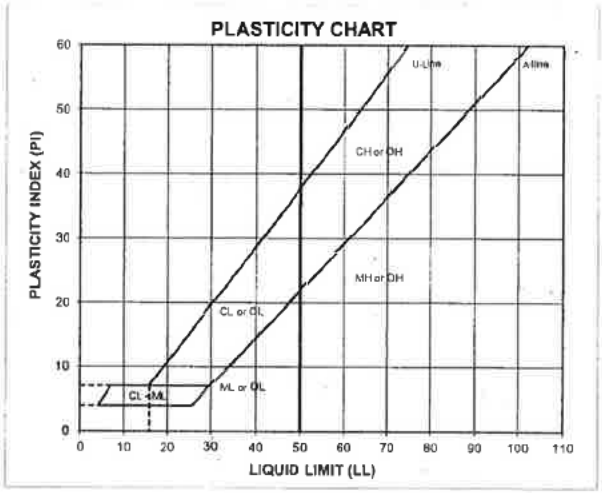
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.9		
#40	0.43	99.8	Medium Sand	0.2
#60	0.25	98.3		
#100	0.15	53.8		
#200	0.075	18.1	Fine Sand	81.7

Hydrometer Analysis

(mm)	% Finer		
0.036	13.1		
0.022	12.2		
0.013	10.5	Fines	
0.0092	10.5	Silt or Clay	18.1
0.0066	9.6		
0.0032	8.7		
0.0013	7.0		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
31.5	NP	NP	NP	NP

LL (oven-dried)	
0.75 ORGANIC (OL-OH)	

DESCRIPTION: SILTY SAND, fine to medium; light yellowish brown.

USCS: SM

TECH	TB
DATE	7/13/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

Boring or Test Pit: B-3	Boring or Test Pit: B-3	Boring or Test Pit: B-3
Sample: UD	Sample: UD	Sample: UD
Depth: 20.0-22.0'	Depth: 20.0-22.0'	Depth: 20.0-22.0'
Point No.: 1	Point No.: 2	Point No.: 3

Initial			Initial			Initial		
Thickness =	0.750	in	Thickness =	0.750	in	Thickness =	0.750	in
Diameter =	2.500	in	Diameter =	2.500	in	Diameter =	2.500	in
Wet Mass =	0.220	lb	Wet Mass =	0.211	lb	Wet Mass =	0.235	lb
Area =	4.909	in^2	Area =	4.909	in^2	Area =	4.909	in^2
Volume =	3.682	in^3	Volume =	3.682	in^3	Volume =	3.682	in^3
Specific Gravity =	2.67	(Assumed)	Specific Gravity =	2.67	(Assumed)	Specific Gravity =	2.67	(Assumed)
Dry Mass of Solids =	0.167	lb	Dry Mass of Solids =	0.160	lb	Dry Mass of Solids =	0.179	lb
Moisture Content =	31.5%		Moisture Content =	31.5%		Moisture Content =	31.5%	
Wet Unit Weight =	103.1	pcf	Wet Unit Weight =	99.0	pcf	Wet Unit Weight =	110.4	pcf
Dry Unit Weight =	78.4	pcf	Dry Unit Weight =	75.3	pcf	Dry Unit Weight =	83.9	pcf
Void Ratio =	1.12		Void Ratio =	1.21		Void Ratio =	0.98	
Percent Saturation =	75%		Percent Saturation =	70%		Percent Saturation =	86%	

Pre-Shear			Pre-Shear			Pre-Shear		
Thickness =	0.739	in	Thickness =	0.663	in	Thickness =	0.641	in
Diameter =	2.500	in	Diameter =	2.500	in	Diameter =	2.500	in
Area =	4.909	in^2	Area =	4.909	in^2	Area =	4.909	in^2
Volume =	3.628	in^3	Volume =	3.254	in^3	Volume =	3.147	in^3
Moisture Content =	35.1%		Moisture Content =	42.1%		Moisture Content =	28.2%	
Wet Unit Weight =	107.4	pcf	Wet Unit Weight =	121.0	pcf	Wet Unit Weight =	125.9	pcf
Dry Unit Weight =	79.5	pcf	Dry Unit Weight =	85.2	pcf	Dry Unit Weight =	98.2	pcf
Void Ratio =	1.09		Void Ratio =	0.95		Void Ratio =	0.70	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	

Shear Rate =	0.001	in/min	Shear Rate =	0.001	in/min	Shear Rate =	0.001	in/min
Normal Stress =	18	psi	Normal Stress =	36	psi	Normal Stress =	54	psi

Notes:

Sample description: (SM) SILTY SAND, fine to medium; light yellowish brown.

Atterberg limit: LL = NP PL = NP PI = NP (ASTM D4318)

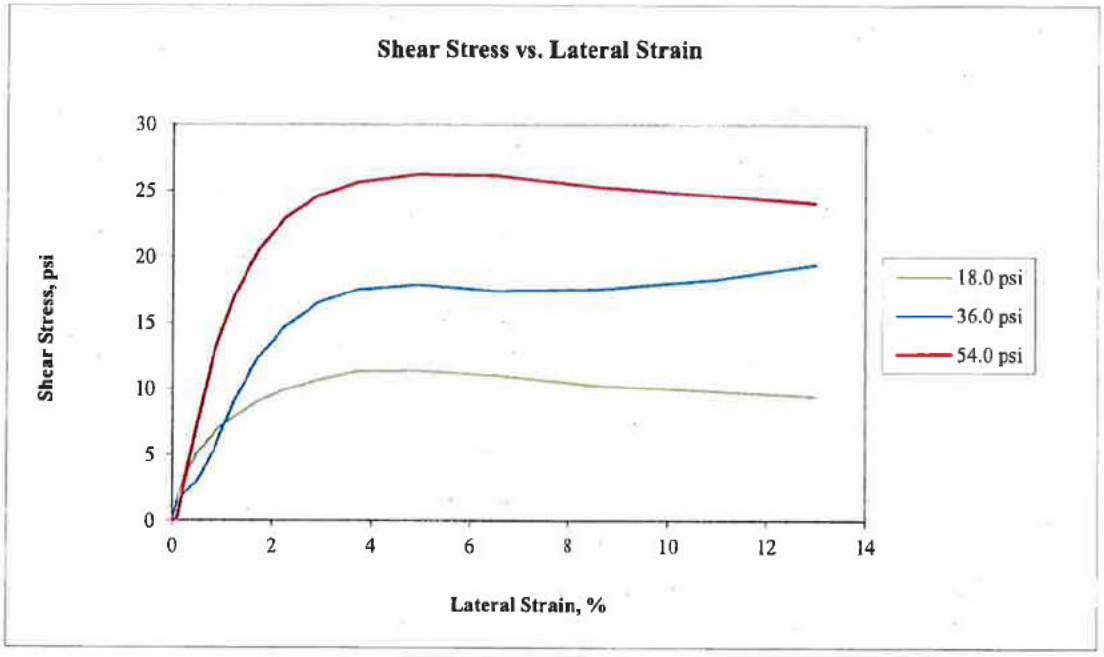
Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 18% (ASTM D422, refer to separate report)

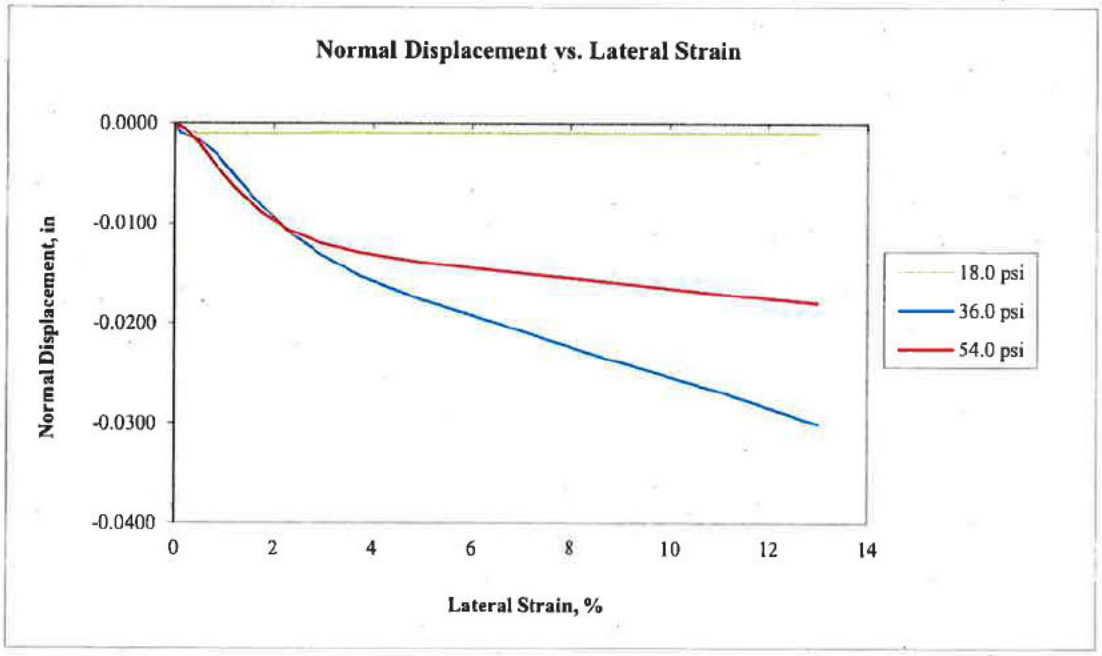
Specimen type: [X] Intact [ ] Reconstituted

Inundation: At seating load of approximately 100 psf

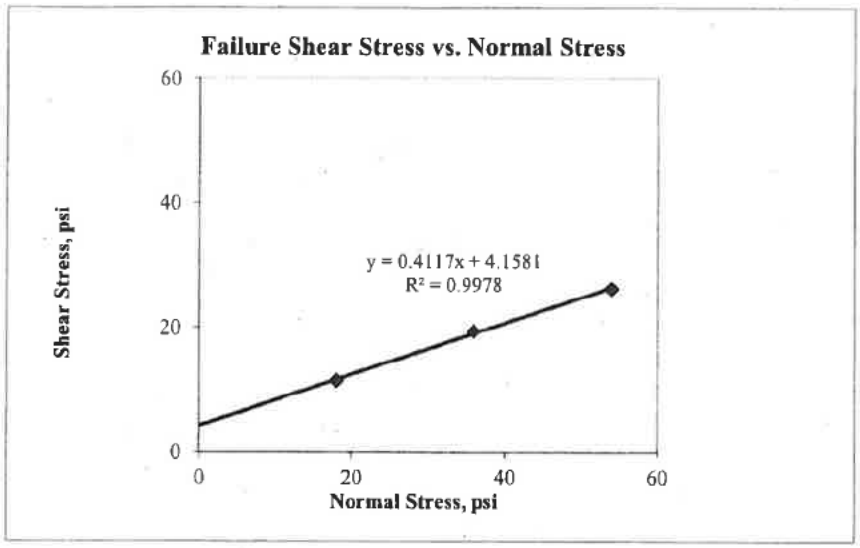
Apparatus: 2.5 -inch nominal diameter box, Humboldt Material Testing Software and Equipment.

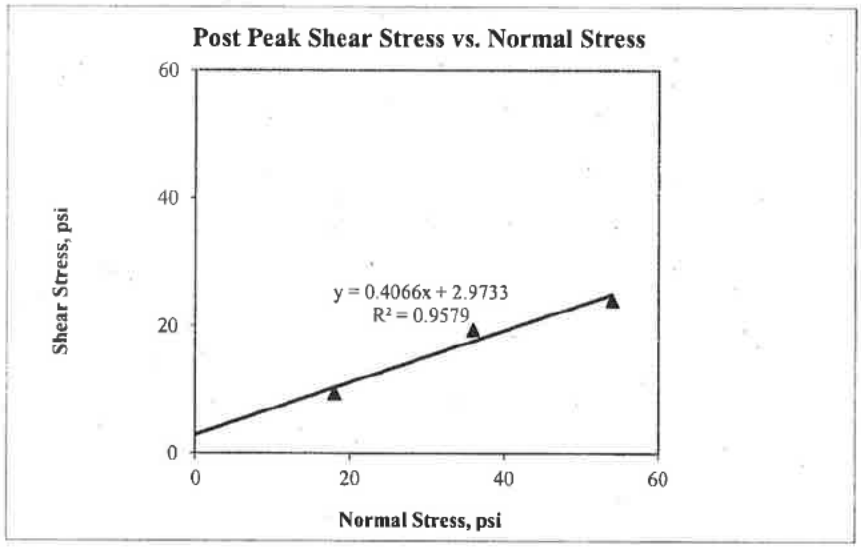
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	**Technician:** **FT**	**Checked:** AWM **Reviewed:**	**Date:** **7/16/2018**	**Job Number:** **18103173**	**Figure:** **1**





Golder Associates Inc. **Atlanta, Georgia**	Title: **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	Technician: **FT**	Checked: Reviewed:	Date: **7/16/2018**	Job Number: **18103173**	Figure: **2**





Normal Stress psi	Peak Shear Stress psi
18.0	11.4
36.0	19.4
54.0	26.2

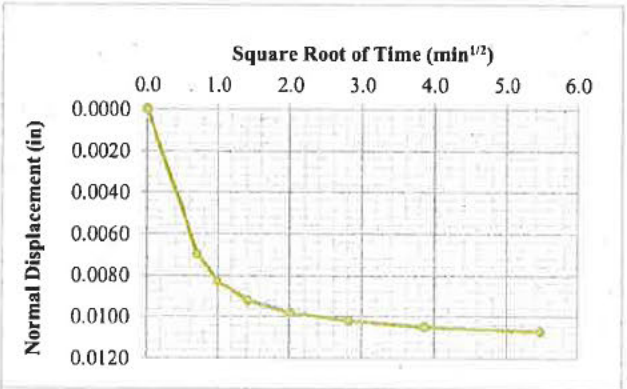
Normal Stress psi	Post Peak Shear Stress psi
18.0	9.4
36.0	19.4
54.0	24.0

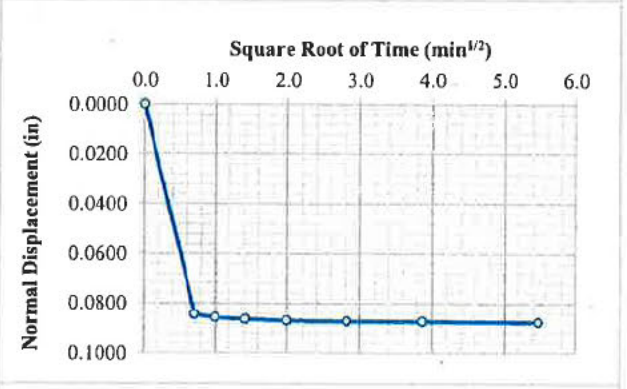
Failure	Post Peak
ϕ = 22.4 °	ϕ = 22.1 °
c = 4.2 psi	c = 3.0 psi

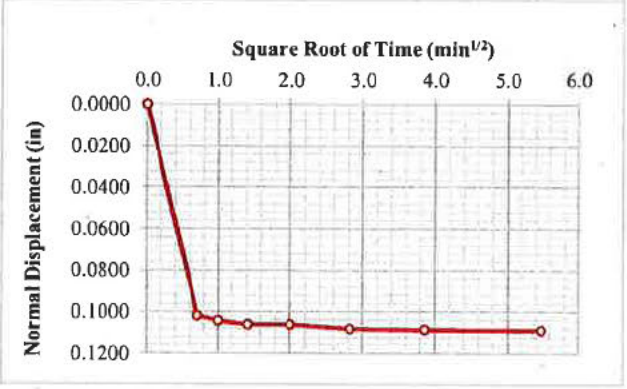
Golder Associates Inc. **Atlanta, Georgia**	Title: **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **FAILURE ENVELOPES**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	Technician: **FT**	Checked: Reviewed:	Date: **7/16/2018**	Job Number: **18103173**	Figure: **3**

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **SPECIMEN PHOTOGRAPH - 18 psi**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	**Technician:** **FT**	**Reviewed:**	**Date:** **7/16/2018**	**Job Number:** **18103173**	**Figure:** **4**

Consolidation Data Used to Determine Shear Rate







TIME, MIN	SQUARE ROOT OF TIME	DIAL READING
Point No. 1		
0.000	0.00	0.0000
0.50	0.71	0.0070
1.0	1.00	0.0083
2.0	1.41	0.0092
4.0	2.00	0.0098
8.0	2.83	0.0102
15.0	3.87	0.0105
30.0	5.48	0.0107
Point No. 2		
0.000	0.00	0.0000
0.50	0.71	0.0846
1.0	1.00	0.0858
2.0	1.41	0.0865
4.0	2.00	0.0870
8.0	2.83	0.0873
15.0	3.87	0.0874
30.0	5.48	0.0877
Point No. 3		
0.000	0.00	0.0000
0.50	0.71	0.1021
1.0	1.00	0.1044
2.0	1.41	0.1062
4.0	2.00	0.1062
8.0	2.83	0.1082
15.0	3.87	0.1086
30.0	5.48	0.1090

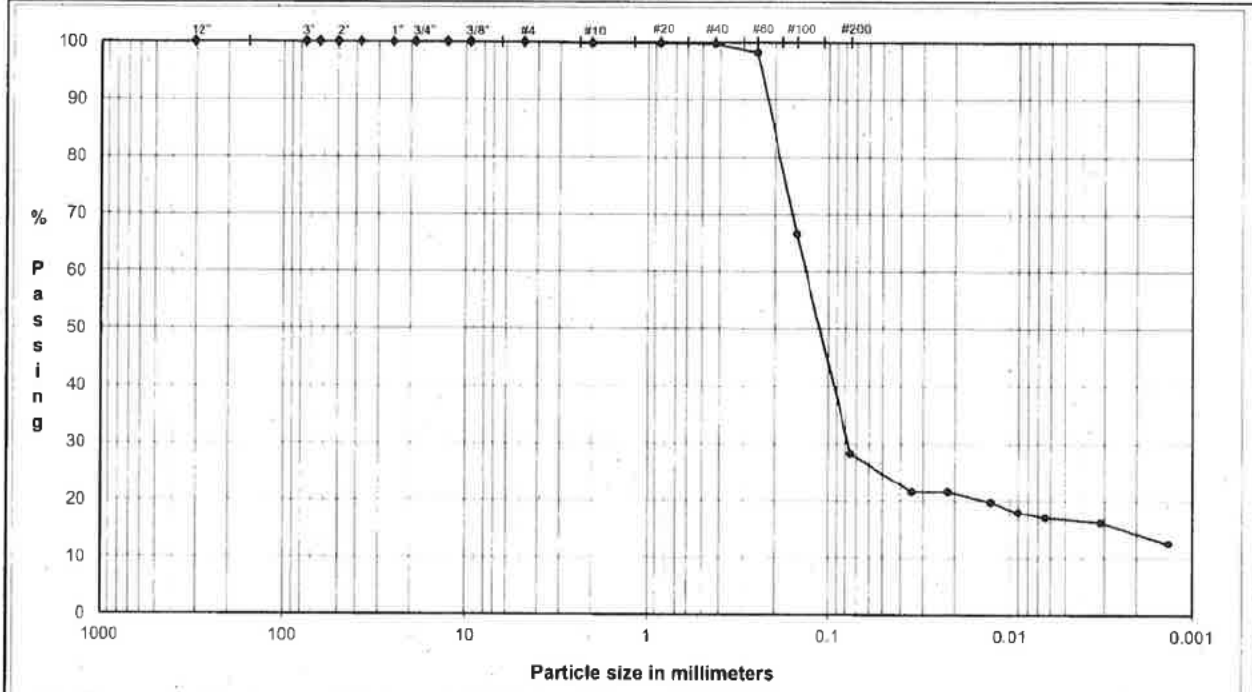
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **CONSOLIDATION DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	**Technician:** **FT**	**Reviewed:**	**Date:** **7/16/2018**	**Job Number:** **18103173**	**Figure:** **5**

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-3 (P2-5)** Depth: **23.0-24.0'**
TYPE: **Bag**



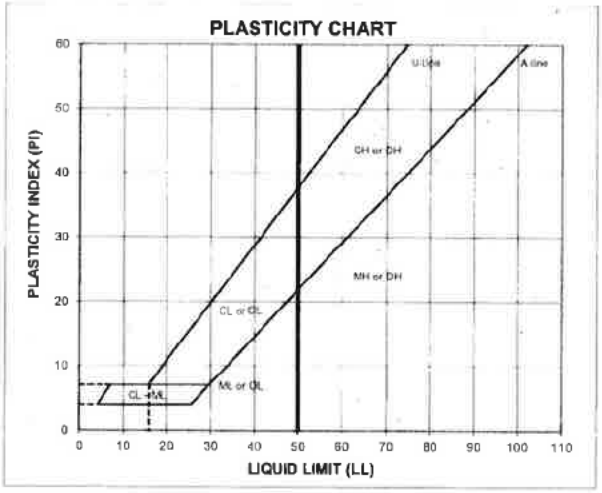
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.8**		
#40	0.43	**99.7**	Medium Sand	**0.1**
#60	0.25	**98.3**		
#100	0.15	**66.5**		
#200	0.075	**28.1**	Fine Sand	**71.6**

Hydrometer Analysis

(mm)	%Finer		
0.035	**21.6**		
0.022	**21.6**		
0.013	**19.8**	Fines	
0.0090	**18.0**	Silt or Clay	**28.1**
0.0064	**17.1**		
0.0032	**16.2**		
0.0013	**12.6**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
30.0	**NP**	**NP**	**NP**	**NP**

LL (oven-dried) / 0.75 · ORGANIC (OL/OH)

DESCRIPTION: SILTY SAND, fine to coarse; brownish gray.

USCS: SM

TECH	HH/BA
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

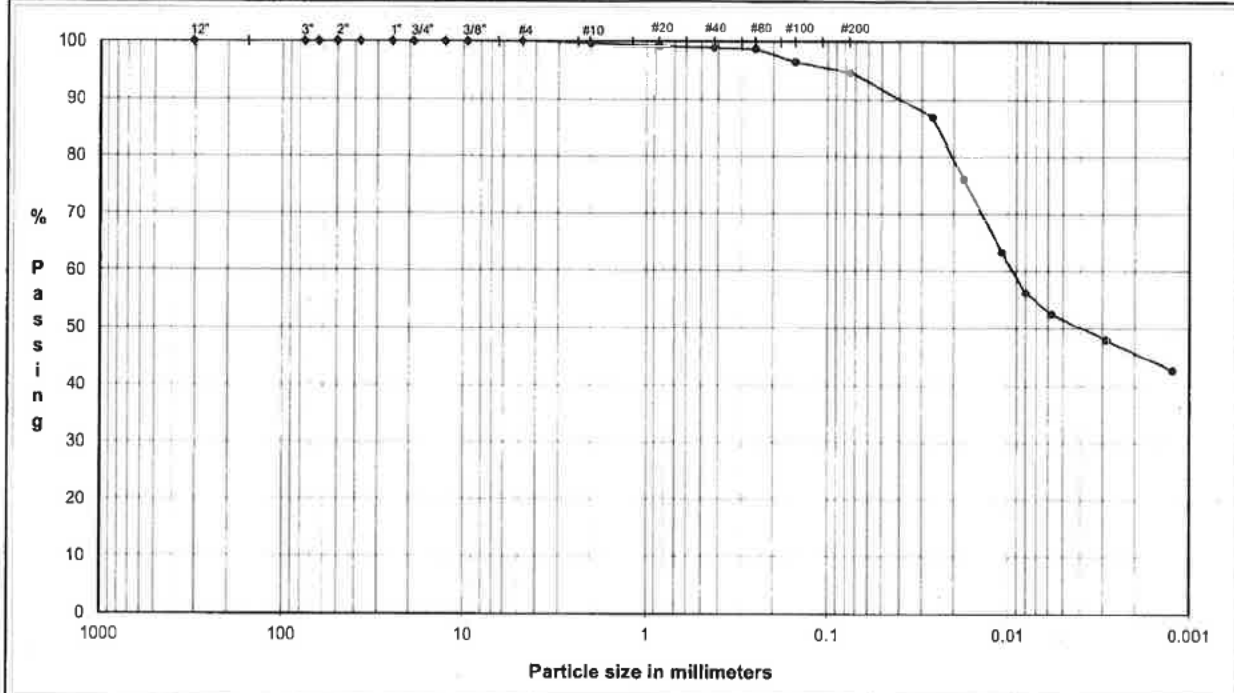
Golder Associates Inc.

JUNE 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-4 Depth: 8.0-10.0'
TYPE: UD



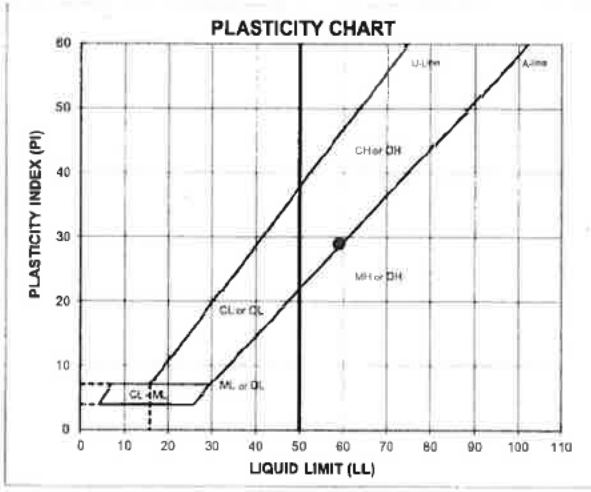
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.6	Coarse Sand	0.4
#20	0.85	99.2		
#40	0.43	98.9	Medium Sand	0.7
#60	0.25	98.7		
#100	0.15	96.5		
#200	0.075	94.7	Fine Sand	4.2

Hydrometer Analysis

(mm)	%Finer		
0.026	87.0		
0.018	76.1		
0.011	63.4	Fines	
0.0080	56.2	Silt or Clay	94.7
0.0058	52.6		
0.0029	48.0		
0.0012	42.6		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
33.5	59	30	29	0.13

LL (oven-dried)	
0.75 ORGANIC (OL/OH)	

DESCRIPTION: CLAY, some fine to coarse sand; yellowish brown.

USCS: CH

TECH	TJ/BA/TB
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	2	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-4	8.0-10.0'	Flow Pump Speed	9	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.999	B-Value, f	0.99	Height, inches	3.002
Diameter, inches	2.869	Cell Pres.	88.0	Diameter, inches	2.899
Area, cm²	41.71	Bot. Pres.	80.0	Area, cm²	42.58
Volume, cm³	317.71	Top Pres.	80.0	Volume, cm³	324.71
Mass, g	585.31	Tot. B.P.	80.0	Mass, g	596.72
Moisture Content, %	33.46	Head, max.	162.49	Moisture Content, %	36.07
Dry Density, pcf	86.13	Head, min.	162.49	Dry Density, pcf	84.28
Spec. Gravity (assumed)	2.700	Max. Grad.	21.31	Volume Solids, cm³	162.43
Volume Solids, cm³	162.43	Min. Grad.	21.31	Volume Voids, cm³	162.29
Volume Voids, cm³	155.28			Void Ratio	1.00
Void Ratio	0.96			Saturation, %	97.5%
Saturation, %	94.5%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	585.31	686.79
Wt Soil & Tare, f	g	438.55	528.69
Wt Tare	g	0.00	90.33
Wt Moisture Lost	g	146.76	158.10
Wt Dry Soil	g	438.55	438.36
Water Content	%	33.46%	36.07%

DESCRIPTION
CLAY, some fine to coarse sand; yellowish brown.

Flow Pump Rate 4.26E-05 cm³/sec

USCS CH

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
06/08/18	43259	13	0	20.9	0	0	0	0	2.31	162.49	21.31	4.6E-08	
06/08/18	43259	13	5	20.9	5	5	300	300	2.31	162.49	21.31	4.6E-08	
06/08/18	43259	13	10	20.9	5	10	300	600	2.31	162.49	21.31	4.6E-08	
06/08/18	43259	13	15	20.9	5	15	300	900	2.31	162.49	21.31	4.6E-08	*
06/08/18	43259	13	20	20.9	5	20	300	1200	2.31	162.49	21.31	4.6E-08	*
06/08/18	43259	13	25	20.9	5	25	300	1500	2.31	162.49	21.31	4.6E-08	*
06/08/18	43259	13	30	20.9	5	30	300	1800	2.31	162.49	21.31	4.6E-08	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.6E-08 cm/sec **

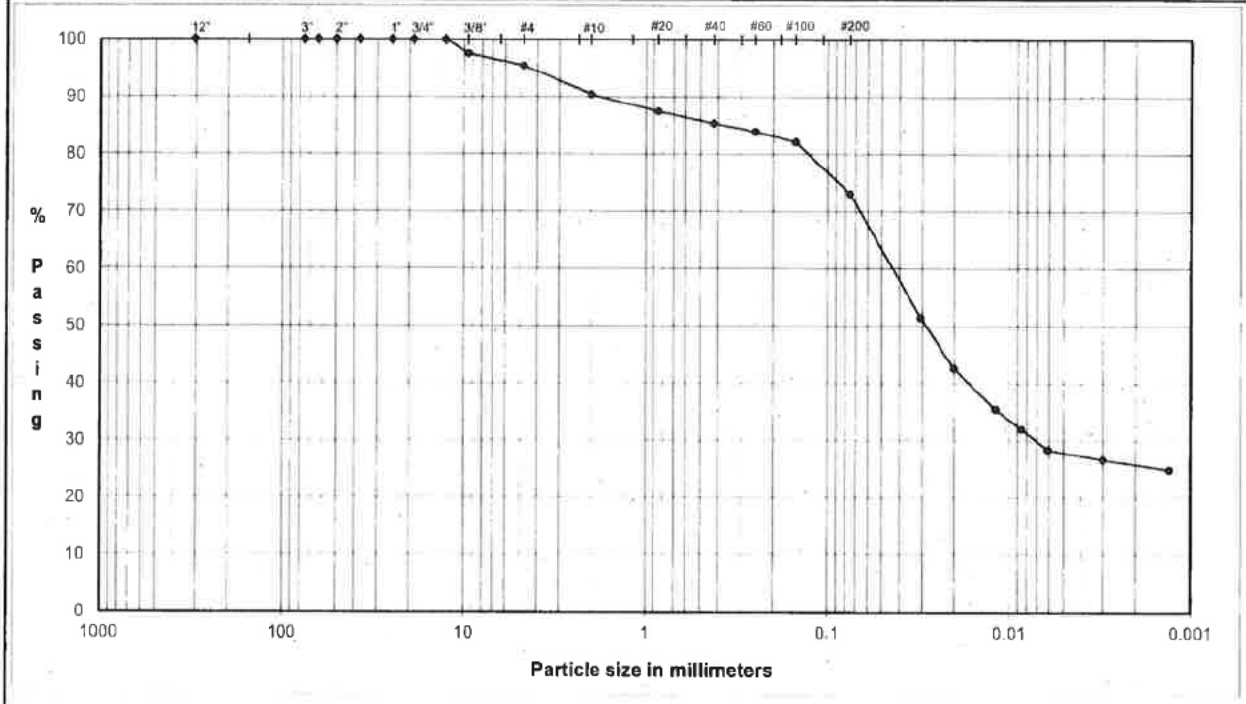
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: **3.0-5.0'**
TYPE: **UD**



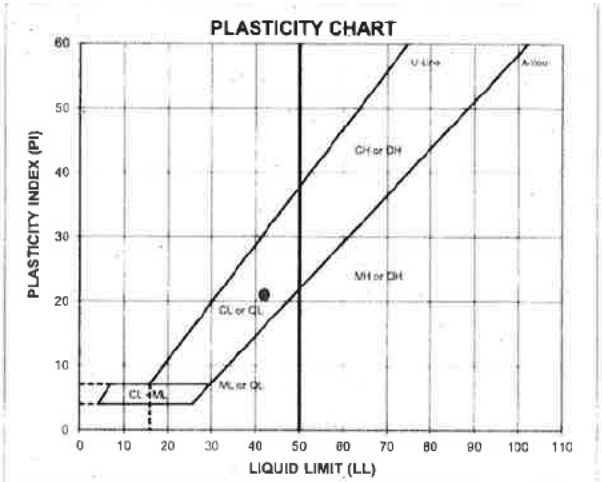
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**97.5**		
#4	4.8	**95.4**	Fine Gravel	**4.6**
#10	2.00	**90.4**	Coarse Sand	**5.0**
#20	0.85	**87.4**		
#40	0.43	**85.4**	Medium Sand	**5.0**
#60	0.25	**84.0**		
#100	0.15	**82.1**		
#200	0.075	**73.1**	Fine Sand	**12.3**

Hydrometer Analysis

(mm)	%Finer		
0.031	**51.4**		
0.020	**42.6**		
0.012	**35.5**	Fines	
0.0085	**31.9**	Silt or Clay	**73.1**
0.0061	**28.4**		
0.0030	**26.6**		
0.0013	**24.8**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
26.6	**42**	**21**	**21**	**0.28**

LL (oven-dried) / 0.75 · ORGANIC

DESCRIPTION: SAND and SILTY CLAY, fine to medium; dark brown.

USCS: CL

TECH	TB/HH/TJ
DATE	6/25/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

Boring or Test Pit:	B-5		Boring or Test Pit:			Boring or Test Pit:		
Sample:	1		Sample:			Sample:		
Depth:	3.0-5.0	ft	Depth:			Depth:		
Point No.:	1		Point No.:			Point No.:		
Initial								
Length =	6.012	in	Length =	6.009		Length =	5.925	
Diameter =	2.877	in	Diameter =	2.842		Diameter =	2.863	
Wet Mass =	2.625	lb	Wet Mass =			Wet Mass =		
Area =	6.501	in^2	Area =			Area =		
Volume =	39.083	in^3	Volume =			Volume =		
Specific Gravity =	2.69	(ASTM D854)	Specific Gravity =			Specific Gravity =		
Dry Mass of Solids =	2.073	lb	Dry Mass of Solids =			Dry Mass of Solids =		
Moisture Content =	26.6%		Moisture Content =			Moisture Content =		
Wet Unit Weight =	116.1	pcf	Wet Unit Weight =			Wet Unit Weight =		
Dry Unit Weight =	91.7	pcf	Dry Unit Weight =			Dry Unit Weight =		
Void Ratio =	0.83		Void Ratio =			Void Ratio =		
Percent Saturation =	86%		Percent Saturation =			Percent Saturation =		
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	6.009	in	Length =	5.925	in	Length =	5.849	in
Diameter =	2.842	in	Diameter =	2.863	in	Diameter =	2.881	in
Area =	6.345		Area =	6.436		Area =	6.519	in^2 (Method B)
Volume =	38.129		Volume =	38.129		Volume =	38.129	in^3
Moisture Content =			Moisture Content =			Moisture Content =	29.2%	
Wet Unit Weight =			Wet Unit Weight =			Wet Unit Weight =	121.4	pcf
Dry Unit Weight =			Dry Unit Weight =			Dry Unit Weight =	94.0	pcf
Void Ratio =			Void Ratio =			Void Ratio =	0.78	
Percent Saturation =			Percent Saturation =			Percent Saturation =	100%	
B Parameter =	0.99		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.089%	/min.	Shear Rate =	0.099%	/min.	Shear Rate =	0.092%	/min.
t_{50} =	0.3	min.	t_{50} =	0.6	min.	t_{50} =	0.1	min.
Strain at Failure =	1.3%		Strain at Failure =	2.7%		Strain at Failure =	4.3%	
Cell Pressure =	74.0	psi	Cell Pressure =	80.0	psi	Cell Pressure =	85.0	psi
Back Pressure =	70.0	psi	Back Pressure =	70.0	psi	Back Pressure =	70.0	psi
Confining Pressure =	4.0	psi	Confining Pressure =	10.0	psi	Confining Pressure =	15.0	psi

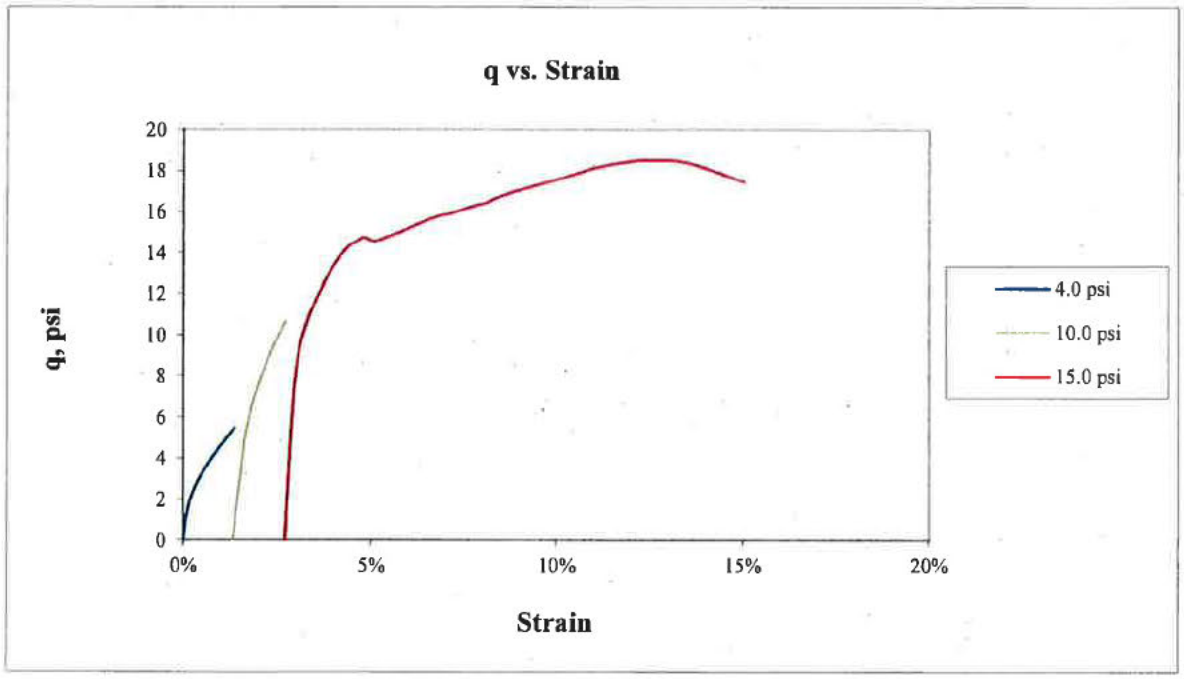
Notes: Sample description: (CL) SAND and SILTY CLAY, fine to medium; dark brown.

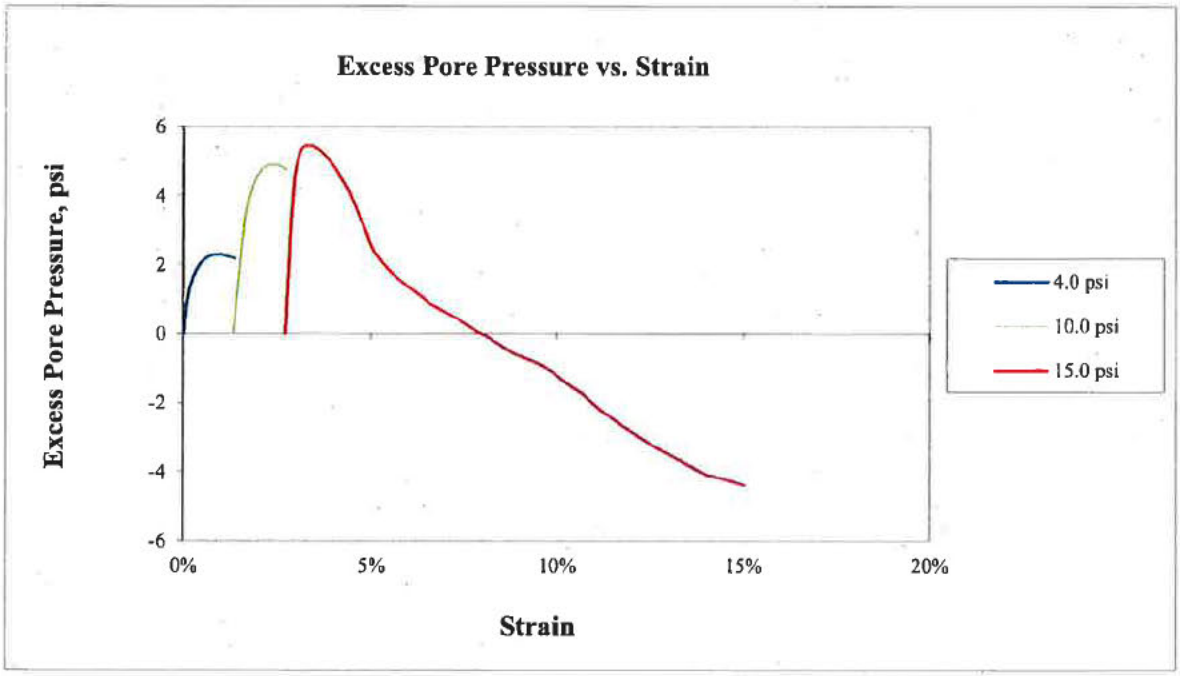
Atterberg limits: LL = 42 PL = 21 PI = 21 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 95.4% No. 200 = 73.1% (ASTM D422, refer to separate report for gradation curve)

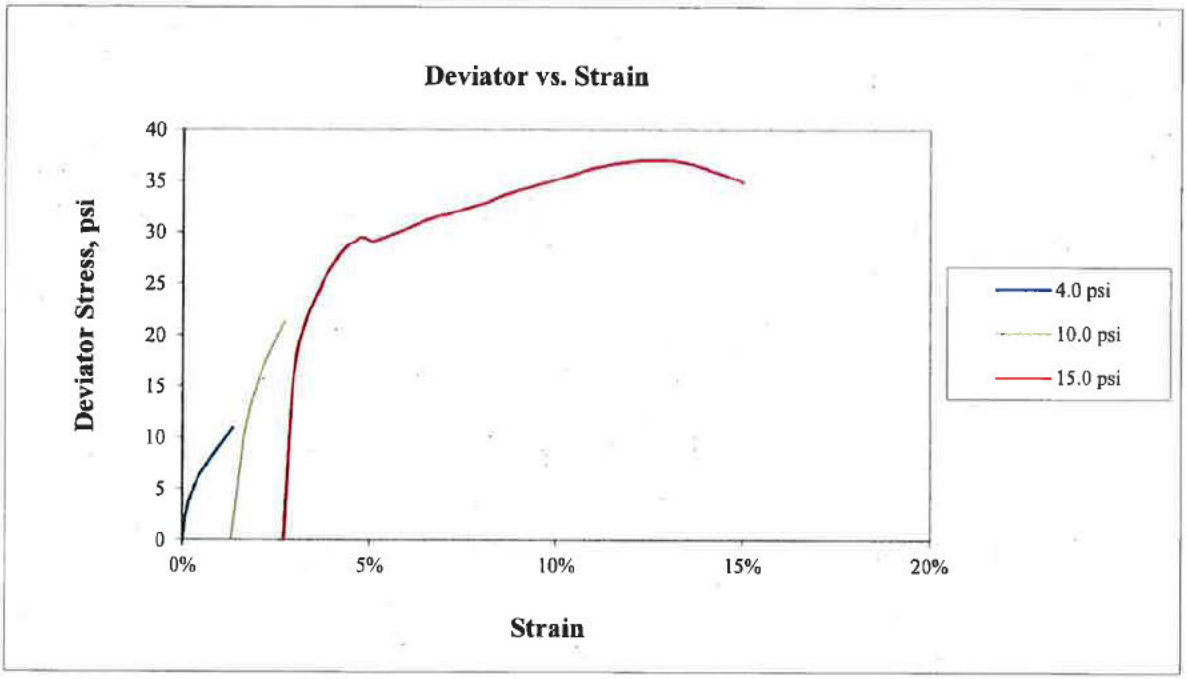
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

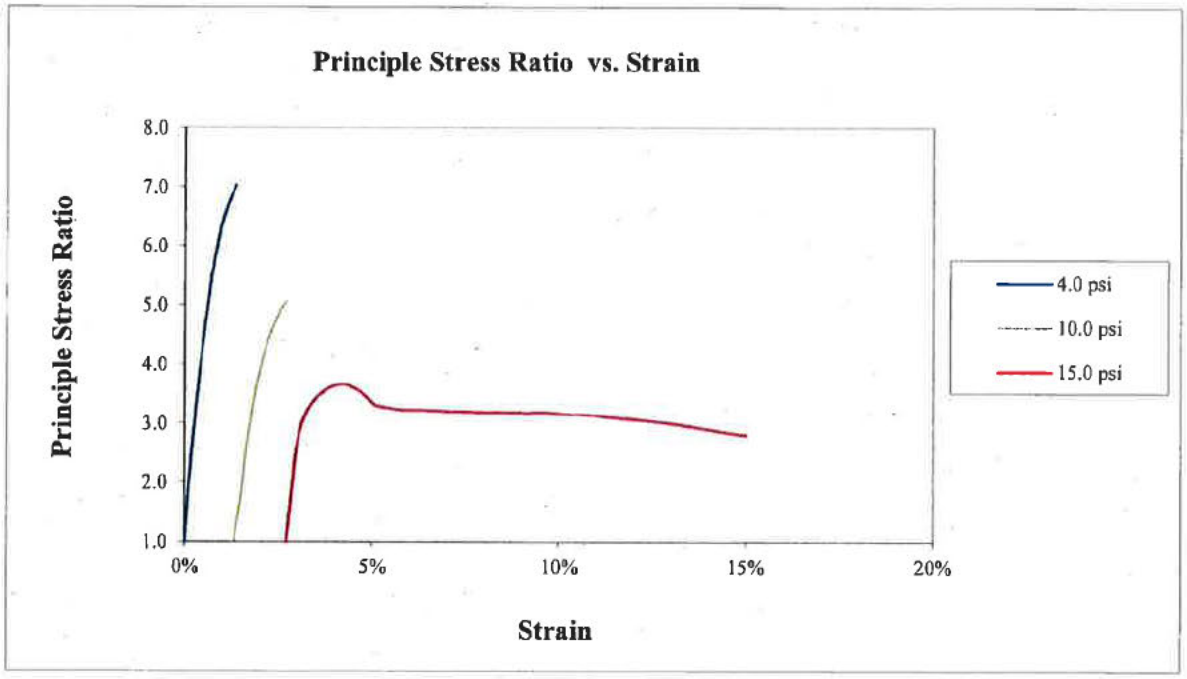
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **1**



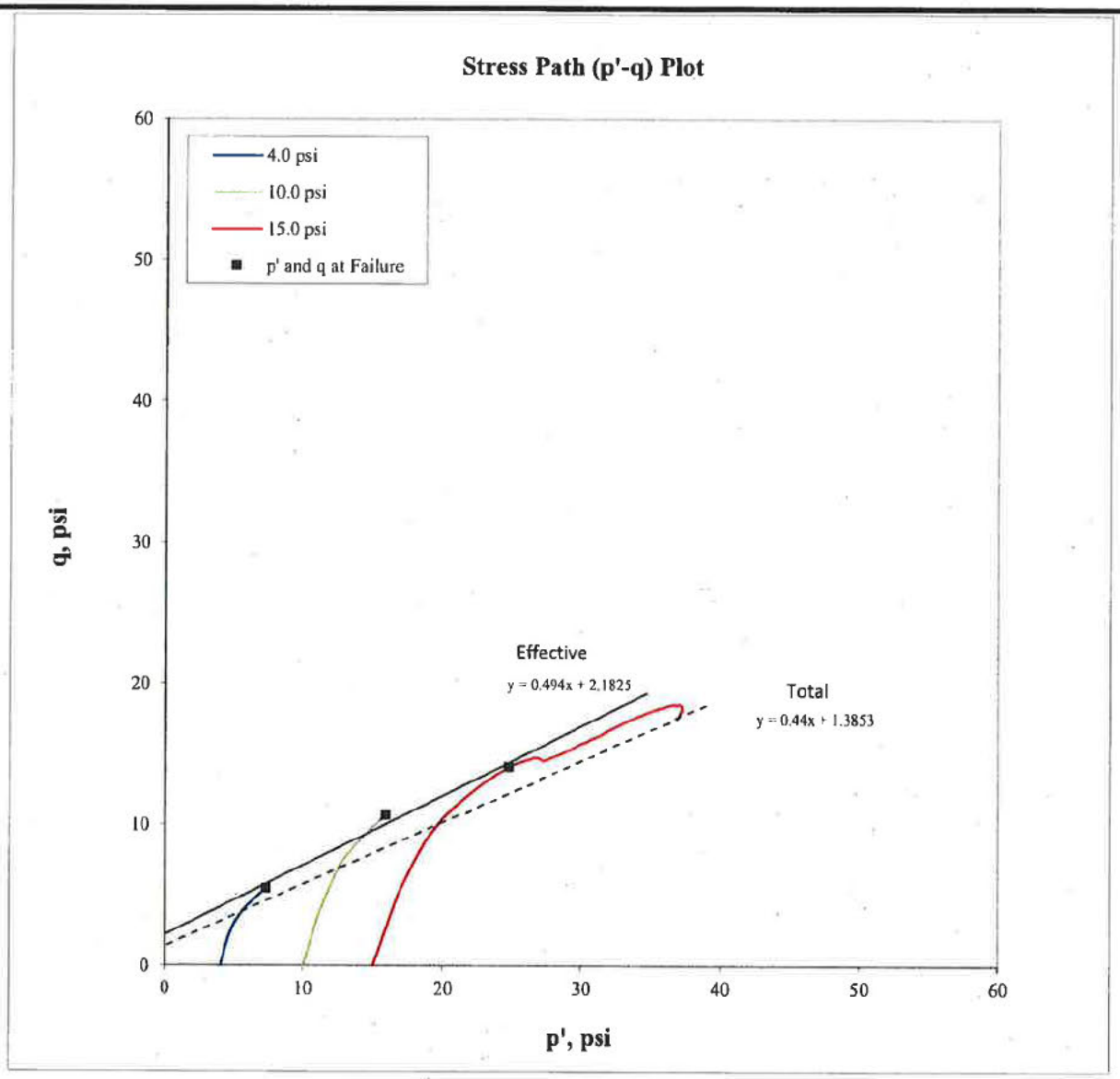


Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	Technician: FT/PWM Check: PWM	Reviewed: SK Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 2





Golder Associates Inc. **Atlanta, Georgia**	Title: **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	Technician: FT/PWM Check:	Reviewed: Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 3



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
4.0	9.5	7.3	5.5
10.0	20.6	15.9	10.6
15.0	29.1	24.7	14.1

Effective

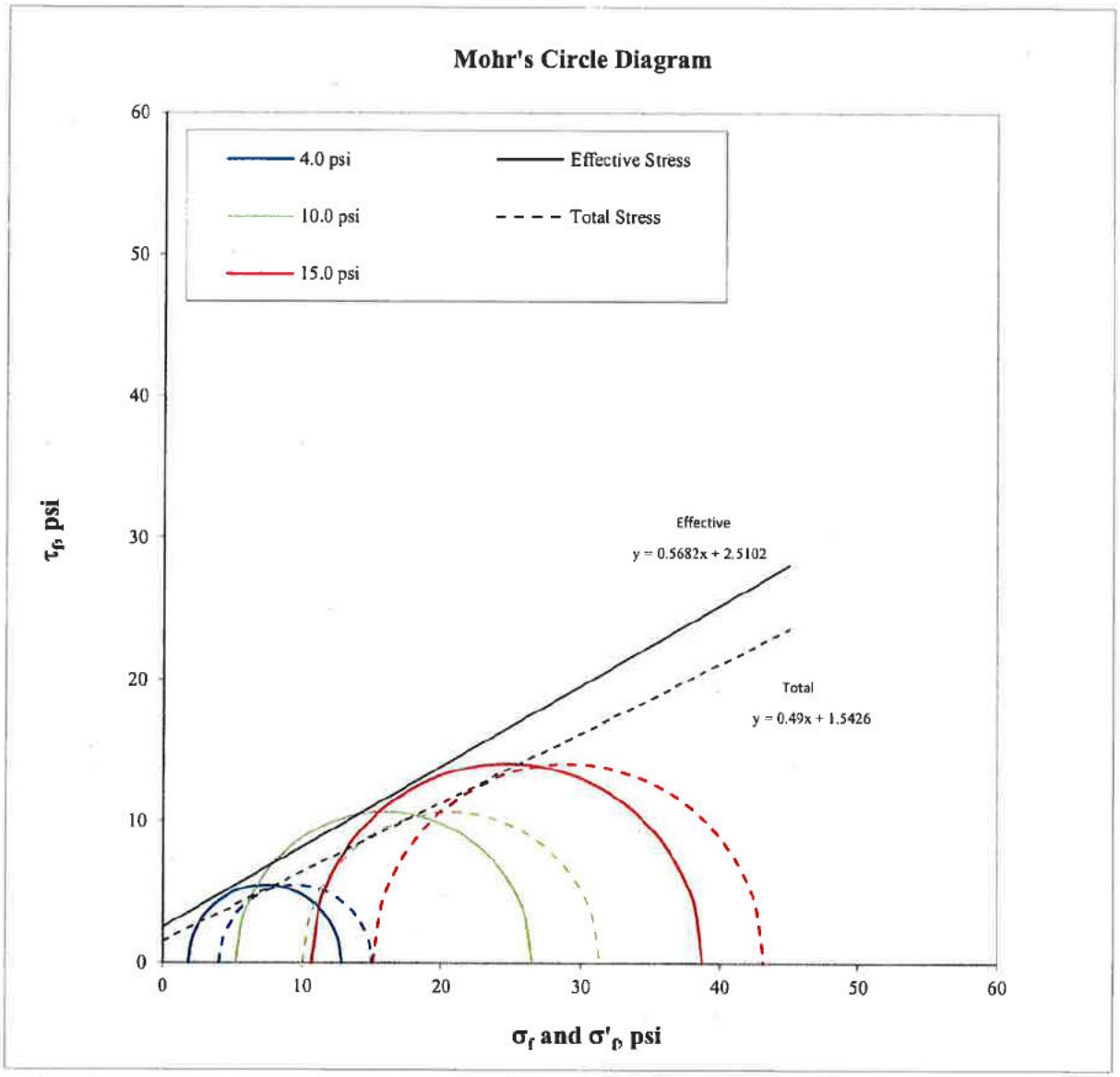
α' =	26.3	degree
a' =	2.2	psi

Total

α =	23.7	degree
a =	1.4	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **4**



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
4.0	12.8	1.8	15.0	4.0
10.0	26.5	5.2	31.3	10.0
15.0	38.8	10.6	43.2	15.0

Effective

ϕ' =	29.6	degree
c' =	2.5	psi

Total

ϕ =	26.1	degree
c =	1.5	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Check:** IWM	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **5**

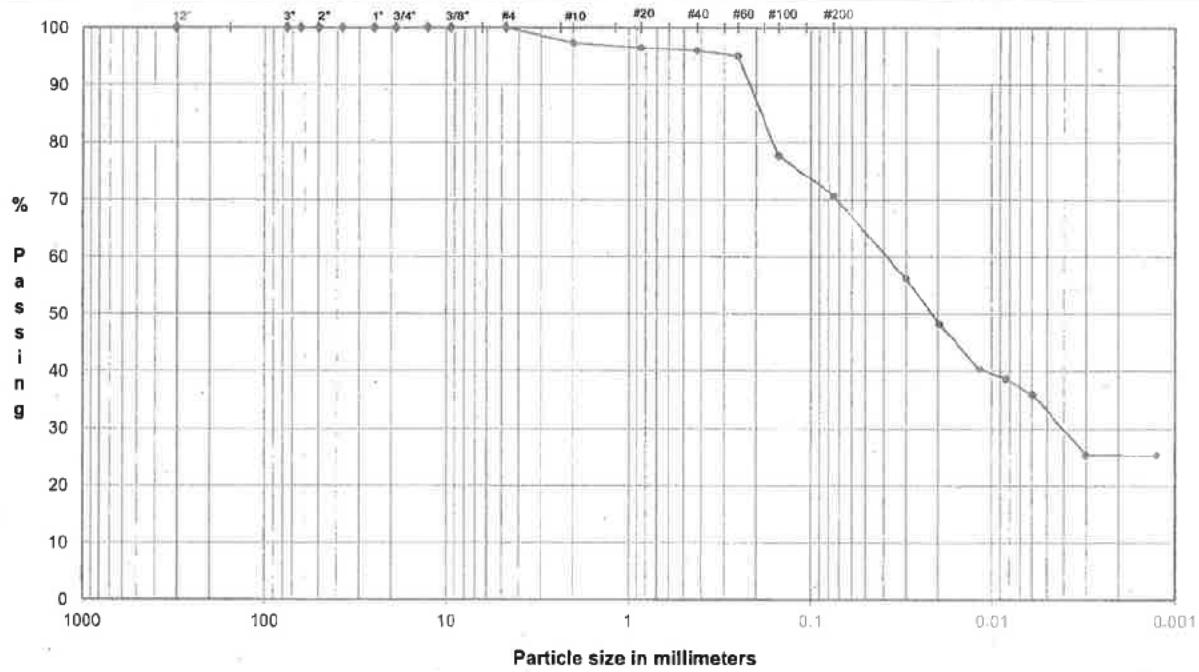
Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMEN PHOTOGRAPH - Single Specimen				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	Technician: FT/PWM Check:	Reviewed: Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 6

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: 4.0-6.0'
TYPE: **Bag**



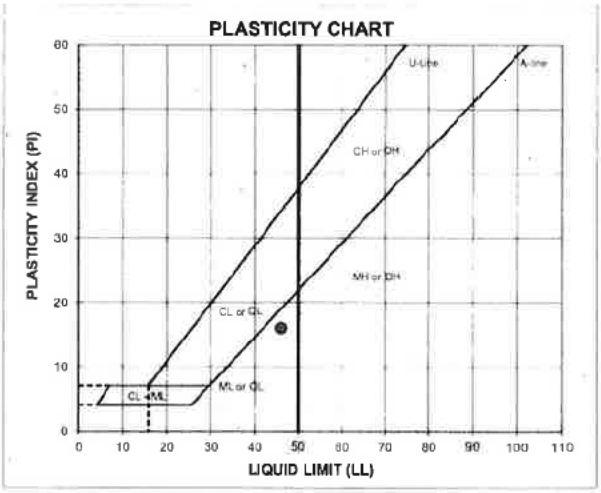
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**97.4**	Coarse Sand	**2.6**
#20	0.85	**96.5**		
#40	0.43	**96.0**	Medium Sand	**1.4**
#60	0.25	**95.0**		
#100	0.15	**77.6**		
#200	0.075	**70.7**	Fine Sand	**25.3**

Hydrometer Analysis

(mm)	%Finer		
0.030	**56.1**		
0.020	**48.2**		
0.012	**40.3**	Fines	
0.0084	**38.6**	Silt or Clay	**70.7**
0.0060	**36.0**		
0.0030	**25.4**		
0.0013	**25.4**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
27.4	**46**	**30**	**16**	**-0.17**

LL (oven-dried) | |
0.75 : ORGANIC (OL/OH) | |

DESCRIPTION: sandy CLAYEY SILT, fine to coarse; yellowish brown.

USCS: ML

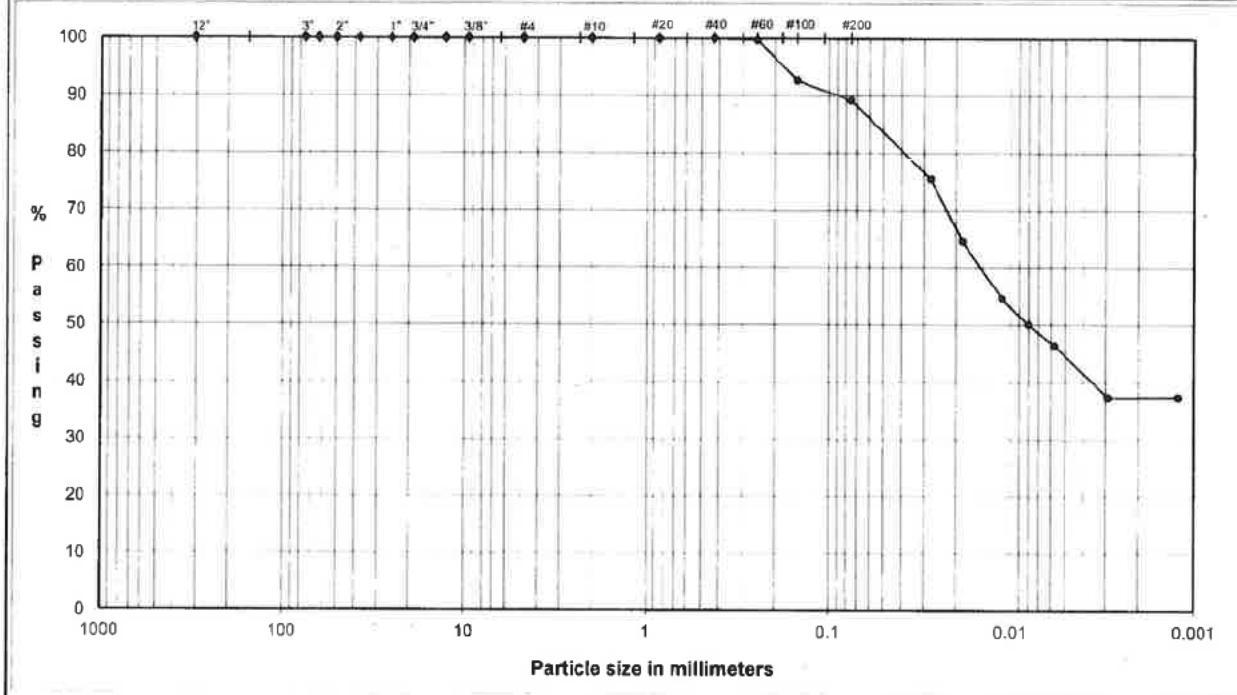
TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: **9.0-10.0'**
TYPE: **Bag**



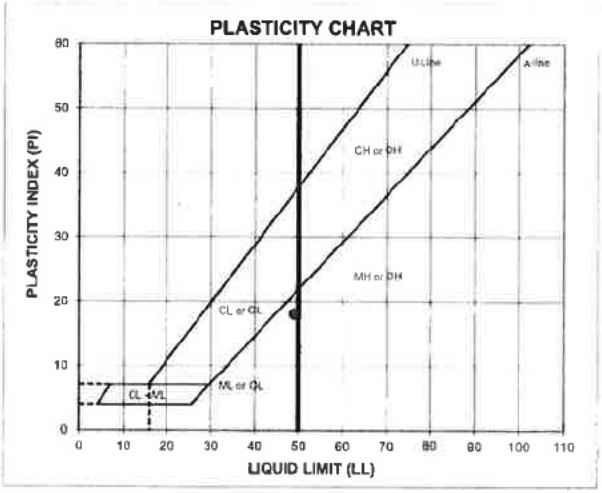
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**99.7**		
#100	0.15	**92.7**		
#200	0.075	**89.1**	Fine Sand	**10.9**

Hydrometer Analysis

(mm)	%Finer		
0.028	**75.6**		
0.018	**64.6**		
0.011	**54.6**	Fines	
0.0080	**50.1**	Silt or Clay	**89.1**
0.0058	**46.4**		
0.0029	**37.3**		
0.0012	**37.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
26.3	**49**	**31**	**18**	**-0.27**

LL (oven-dried)
0.75 ORG \NK (OL/OH)

DESCRIPTION: CLAYEY SILT, some fine sand; dark gray.

USCS: ML

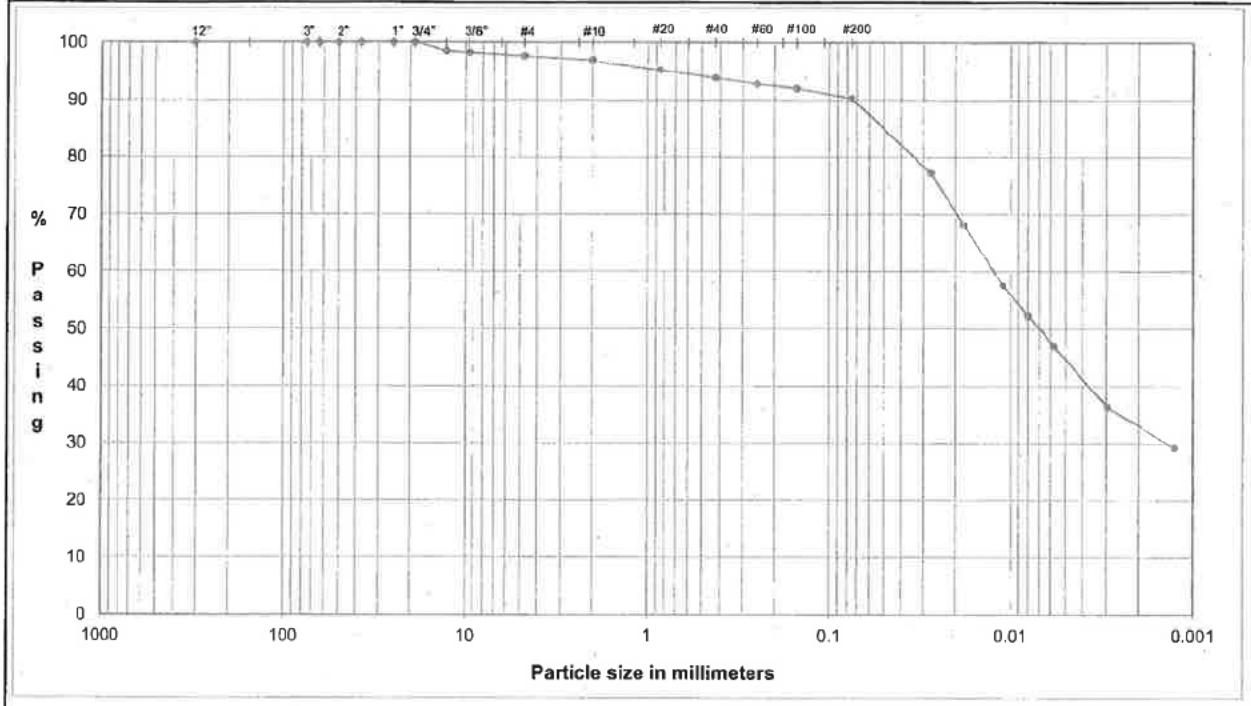
TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	FWM
APPROVE	

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: **10.0-12.0'**
TYPE: **UD**



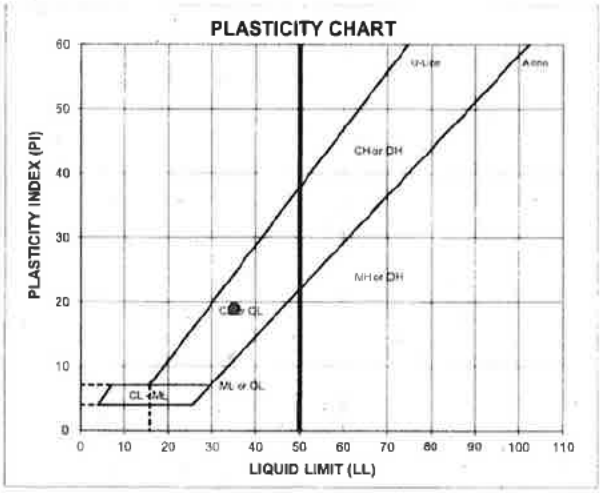
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**98.4**		
0.375"	9.5	**98.2**		
#4	4.8	**97.6**	Fine Gravel	**2.4**
#10	2.00	**96.9**	Coarse Sand	**0.7**
#20	0.85	**95.2**		
#40	0.43	**93.8**	Medium Sand	**3.1**
#60	0.25	**92.8**		
#100	0.15	**92.0**		
#200	0.075	**90.3**	Fine Sand	**3.5**

Hydrometer Analysis

(mm)	%Finer		
0.027	**77.2**		
0.018	**68.3**		
0.011	**57.7**	Fines	
0.0080	**52.3**	Silt or Clay	**90.3**
0.0058	**47.0**		
0.0030	**36.4**		
0.0013	**29.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
17.1	**35**	**16**	**19**	**0.07**

LL (oven-dried)	
0.75 ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY, some fine to coarse sand, trace fine gravel; light brown.

USCS: CL

TECH	HH/TB
DATE	6/20/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	8	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-5	10.0-12.0'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.000	B-Value, f	1.00	Height, inches	3.004
Diameter, inches	2.836	Cell Pres.	88.0	Diameter, inches	2.898
Area, cm^2	40.75	Bot. Pres.	80.0	Area, cm^2	42.56
Volume, cm^3	310.55	Top Pres.	80.0	Volume, cm^3	324.70
Mass, g	663.16	Tot. B.P.	80.0	Mass, g	674.45
Moisture Content, %	17.07	Head, max.	135.05	Moisture Content, %	19.06
Dry Density, pcf	113.82	Head, min.	135.05	Dry Density, pcf	108.86
Spec. Gravity (assumed)	2.700	Max. Grad.	17.70	Volume Solids, cm^3	209.80
Volume Solids, cm^3	209.80	Min. Grad.	17.70	Volume Voids, cm^3	114.90
Volume Voids, cm^3	100.75			Void Ratio	0.55
Void Ratio	0.48			Saturation, %	94.0%
Saturation, %	96.0%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	663.16	756.65
Wt Soil & Tare, f	g	566.46	648.69
Wt Tare	g	0.00	82.40
Wt Moisture Lost	g	96.70	107.96
Wt Dry Soil	g	566.46	566.29
Water Content	%	17.07%	19.06%

Flow Pump Rate 1.18E-05 cm^3/sec

USCS CL

DESCRIPTION

SILTY CLAY, some fine to coarse sand, trace fine gravel; light brown.

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
06/25/18	43276	12	0	21.7	0	0	0	0	1.92	135.05	17.70	1.5E-08	
06/25/18	43276	12	5	21.7	5	5	300	300	1.92	135.05	17.70	1.5E-08	
06/25/18	43276	12	10	21.7	5	10	300	600	1.92	135.05	17.70	1.5E-08	
06/25/18	43276	12	15	21.7	5	15	300	900	1.92	135.05	17.70	1.5E-08	*
06/25/18	43276	12	20	21.7	5	20	300	1200	1.92	135.05	17.70	1.5E-08	*
06/25/18	43276	12	25	21.7	5	25	300	1500	1.92	135.05	17.70	1.5E-08	*
06/25/18	43276	12	30	21.7	5	30	300	1800	1.92	135.05	17.70	1.5E-08	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.5E-08 cm/sec **

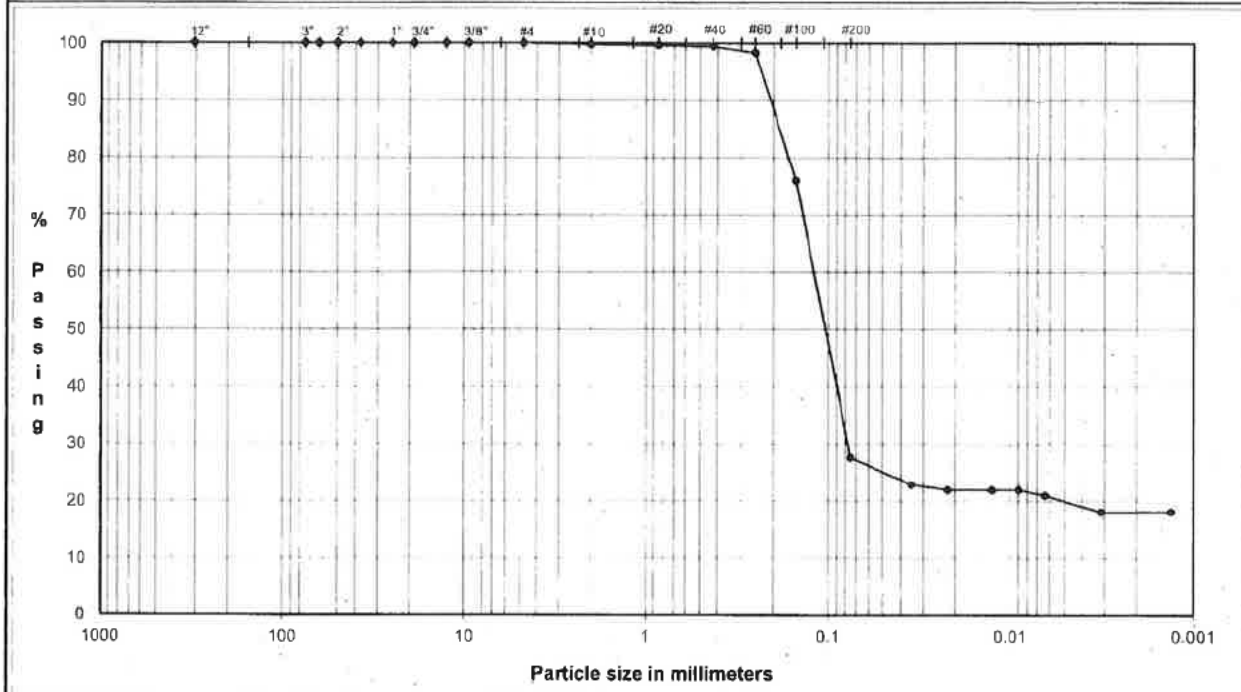
DATE	6/25/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-6 Depth: 11.0-12.0'
TYPE: Bag



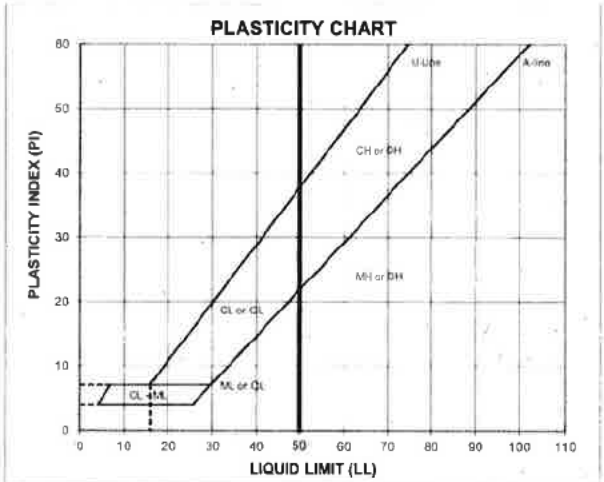
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.8	Coarse Sand	0.2
#20	0.85	99.6		
#40	0.43	99.4	Medium Sand	0.4
#60	0.25	98.3		
#100	0.15	76.0		
#200	0.075	27.6	Fine Sand	71.8

Hydrometer Analysis

(mm)	%Finer		
0.035	22.9		
0.022	21.9		
0.013	21.9	Fines	
0.0089	21.9	Silt or Clay	27.6
0.0064	21.0		
0.0031	18.1		
0.0013	18.1		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
12.4	NP	NP	NP	NP

LL (oven-dried)
0.75 ORGANIC (OL OH)

DESCRIPTION: SILTY SAND, fine to coarse; yellowish brown.

USCS: SM

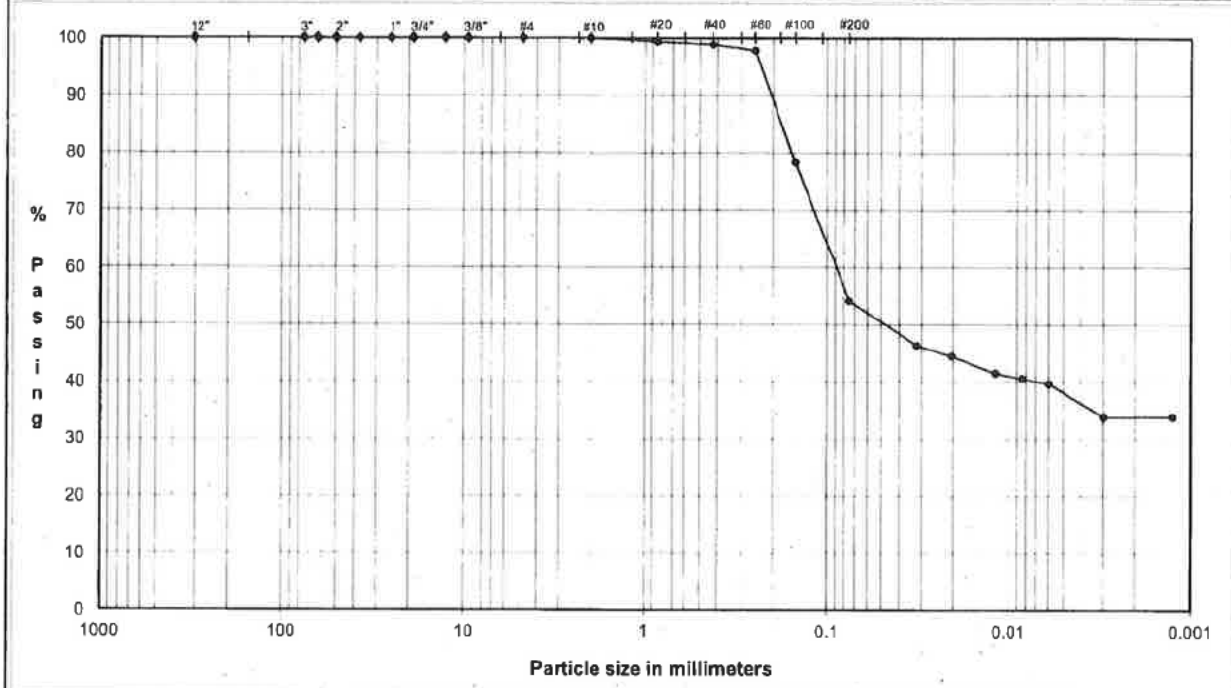
TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-6 Depth: 16.0-17.0'
TYPE: Bag



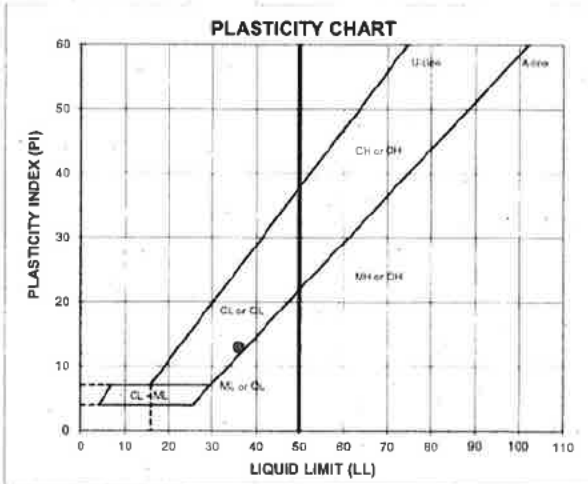
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.9	Coarse Sand	0.1
#20	0.85	99.4		
#40	0.43	98.9	Medium Sand	1.0
#60	0.25	97.9		
#100	0.15	78.3		
#200	0.075	54.2	Fine Sand	44.8

Hydrometer Analysis

(mm)	%Finer		
0.032	46.4		
0.020	44.5		
0.012	41.6	Fines	
0.0084	40.6	Silt or Clay	54.2
0.0060	39.6		
0.0030	33.8		
0.0012	33.8		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.3	36	23	13	-0.11

LL (oven-dried)
0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; dark yellowish brown

USCS: CL

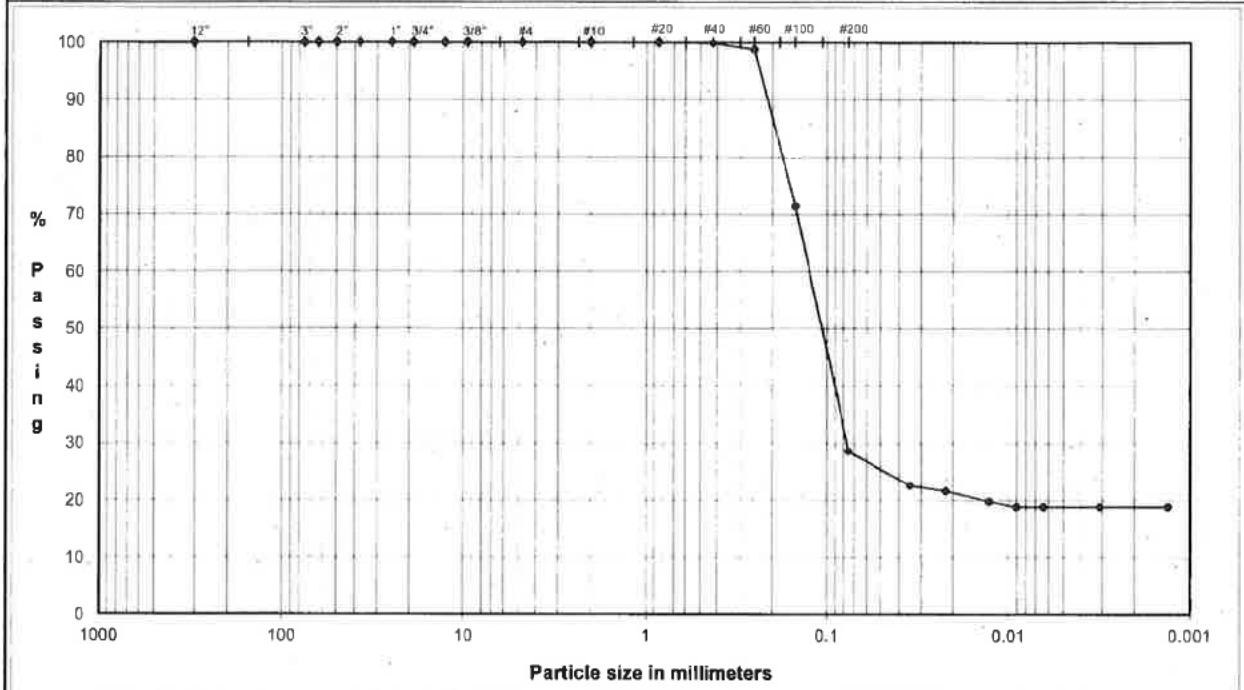
TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-6 Depth: 22.0-24.0'
TYPE: Bag



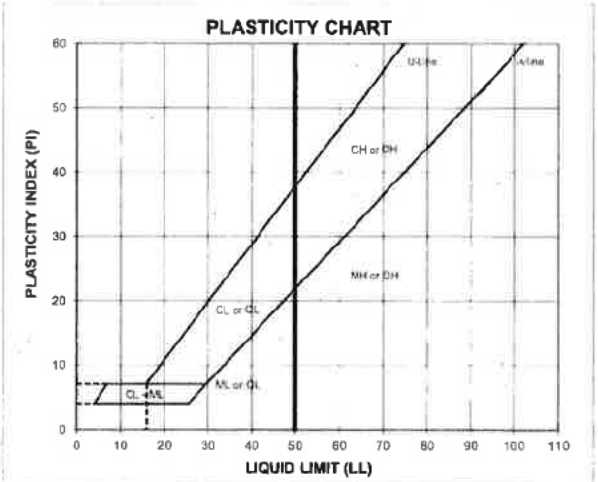
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	99.9	Medium Sand	0.1
#60	0.25	98.8		
#100	0.15	71.5		
#200	0.075	28.6	Fine Sand	71.3

Hydrometer Analysis

(mm)	%Finer		
0.034	22.5		
0.022	21.6		
0.013	19.8	Fines	
0.0090	18.9	Silt or Clay	28.6
0.0064	18.9		
0.0031	18.9		
0.0013	18.9		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
10.9	NP	NP	NP	NP

LL (oven-dried)	
0.75 ORGANIC (OL/OH)	

DESCRIPTION: SILTY SAND, fine to medium; dark gray.

USCS: SM

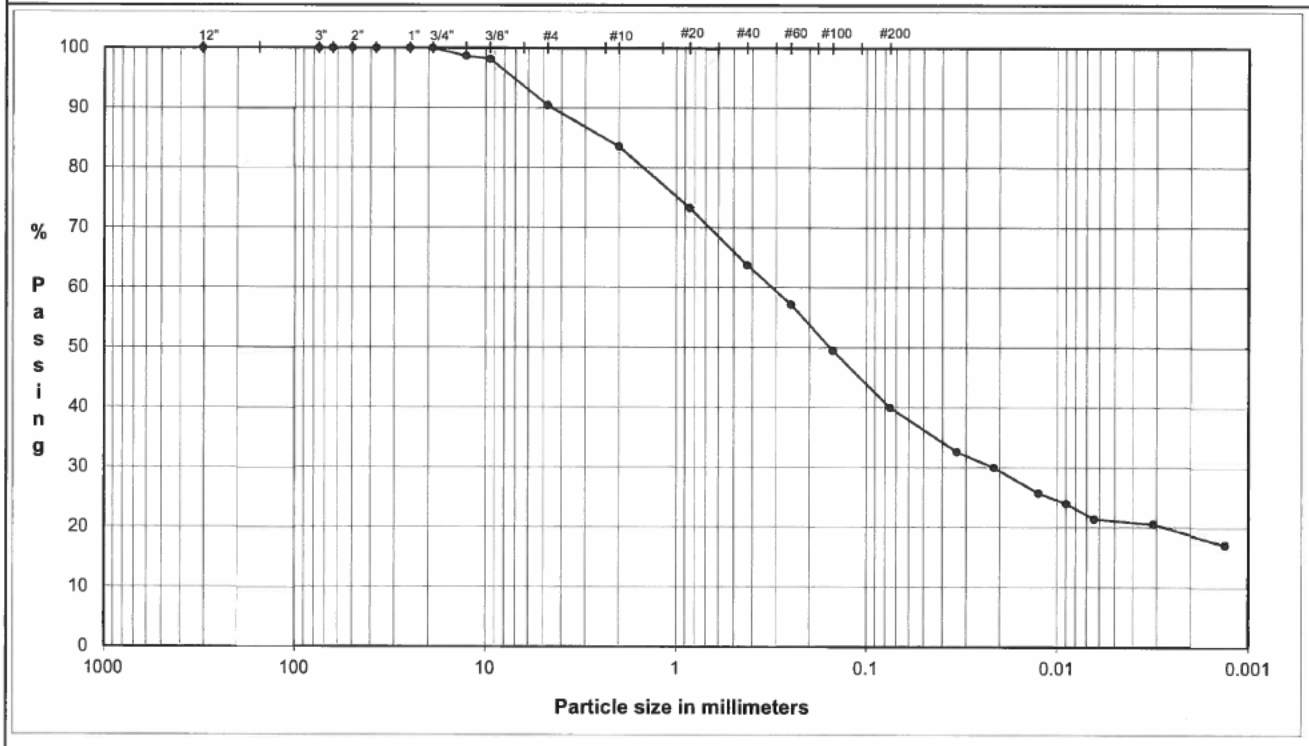
TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-7** Depth: **5.0-7.0'**
TYPE: **UD**



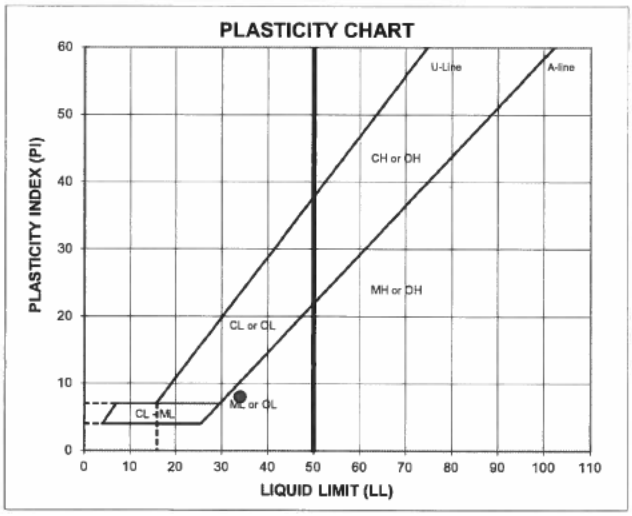
COBBLES	GRAVEL			SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine		Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**98.6**		
0.375"	9.5	**98.1**		
#4	4.8	**90.4**	Fine Gravel	**9.6**
#10	2.00	**83.6**	Coarse Sand	**6.9**
#20	0.85	**73.2**		
#40	0.43	**63.8**	Medium Sand	**19.8**
#60	0.25	**57.2**		
#100	0.15	**49.5**		
#200	0.075	**40.0**	Fine Sand	**23.8**

Hydrometer Analysis

(mm)	%Finer		
0.034	**32.6**		
0.021	**30.0**		
0.013	**25.7**	Fines	
0.0089	**24.0**	Silt or Clay	**40.0**
0.0064	**21.4**		
0.0031	**20.6**		
0.0013	**17.1**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
20.5	**34**	**26**	**8**	**-0.73**

LL (oven-dried)	
0.75 - ORGANIC (OL/OH)	

DESCRIPTION: SILTY SAND, fine to coarse, some fine gravel; gray.

USCS: SM

TECH	TJ/HH/BA
DATE	8/14/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-7		Boring or Test Pit:			Boring or Test Pit:		
Sample:	1		Sample:			Sample:		
Depth:	5.0-7.0	ft	Depth:			Depth:		
Point No.:	1		Point No.:			Point No.:		
Initial								
Length =	6.041	in	Length =	6.023		Length =	5.966	
Diameter =	2.848	in	Diameter =	2.883		Diameter =	2.897	
Wet Mass =	2.811	lb	Wet Mass =			Wet Mass =		
Area =	6.370	in^2	Area =			Area =		
Volume =	38.484	in^3	Volume =			Volume =		
Specific Gravity =	2.66	(ASTM D854)	Specific Gravity =			Specific Gravity =		
Dry Mass of Solids =	2.332	lb	Dry Mass of Solids =			Dry Mass of Solids =		
Moisture Content =	20.5%		Moisture Content =			Moisture Content =		
Wet Unit Weight =	126.2	pcf	Wet Unit Weight =			Wet Unit Weight =		
Dry Unit Weight =	104.7	pcf	Dry Unit Weight =			Dry Unit Weight =		
Void Ratio =	0.58		Void Ratio =			Void Ratio =		
Percent Saturation =	94%		Percent Saturation =			Percent Saturation =		
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	6.023	in	Length =	5.966	in	Length =	5.920	in
Diameter =	2.883	in	Diameter =	2.897	in	Diameter =	2.908	in
Area =	6.529		Area =	6.592		Area =	6.643	in^2 (Method B)
Volume =	39.326		Volume =	39.326		Volume =	39.326	in^3
Moisture Content =			Moisture Content =			Moisture Content =	23.2%	
Wet Unit Weight =			Wet Unit Weight =			Wet Unit Weight =	126.3	pcf
Dry Unit Weight =			Dry Unit Weight =			Dry Unit Weight =	102.5	pcf
Void Ratio =			Void Ratio =			Void Ratio =	0.62	
Percent Saturation =			Percent Saturation =			Percent Saturation =	100%	
B Parameter =	0.96		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.088%	/min.	Shear Rate =	0.087%	/min.	Shear Rate =	0.090%	/min.
t_{50} =	1.2	min.	t_{50} =	0.9	min.	t_{50} =	0.8	min.
Strain at Failure =	0.5%		Strain at Failure =	1.9%		Strain at Failure =	2.8%	
Cell Pressure =	66.0	psi	Cell Pressure =	72.0	psi	Cell Pressure =	78.0	psi
Back Pressure =	60.0	psi	Back Pressure =	60.0	psi	Back Pressure =	60.0	psi
Confining Pressure =	6.0	psi	Confining Pressure =	12.0	psi	Confining Pressure =	18.0	psi

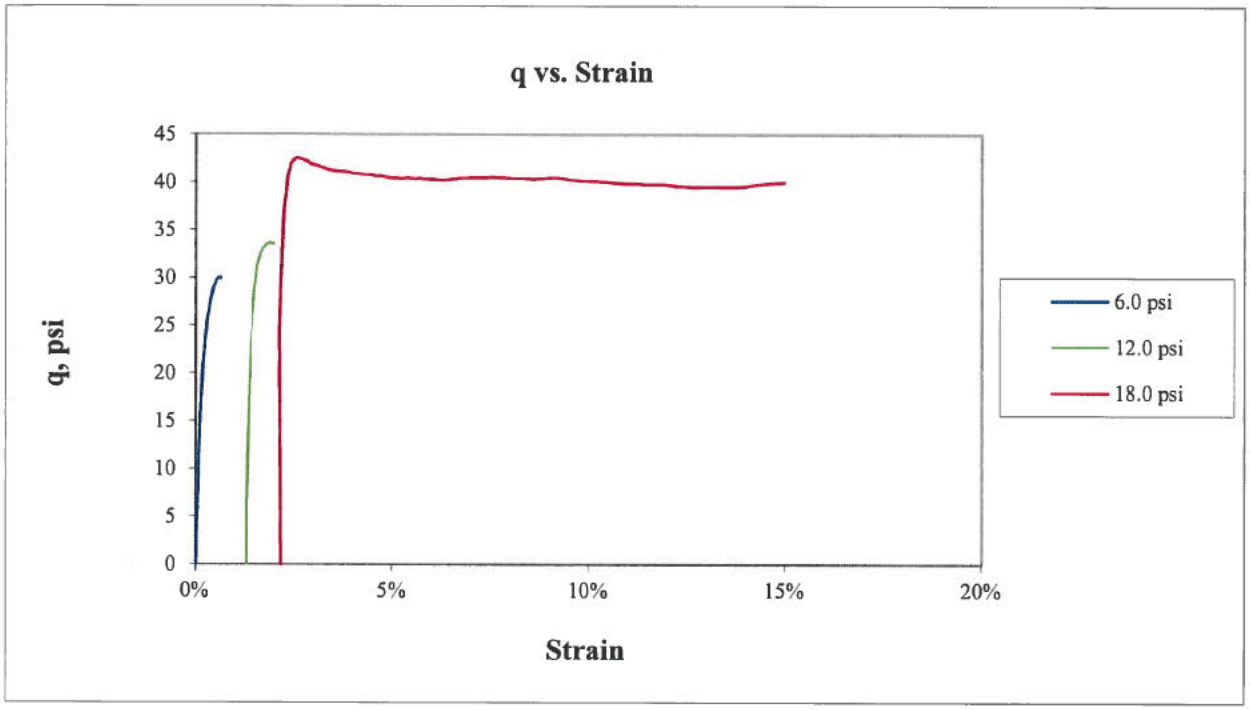
Notes: Sample description: (SM) SILTY SAND, fine to coarse, some fine gravel; gray.

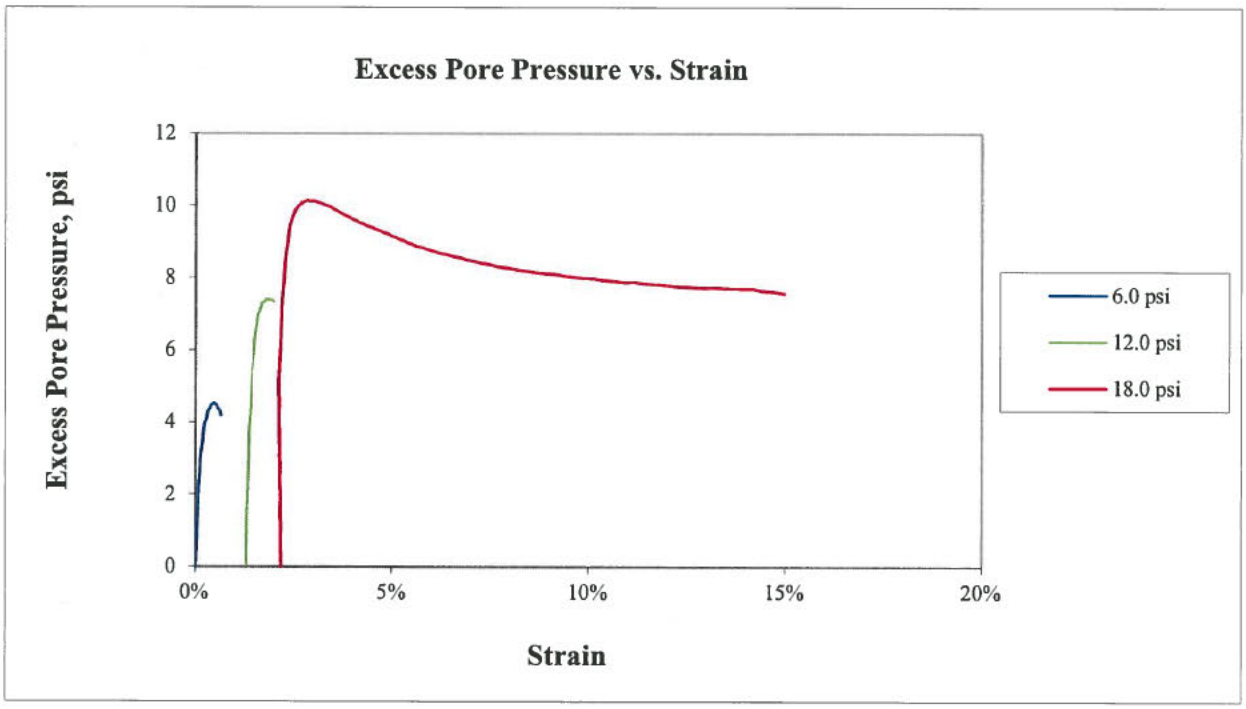
Atterberg limits: LL = 34 PL = 26 PI = 8 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 90.4% No. 200 = 40.0% (ASTM D422, refer to separate report for gradation curve)

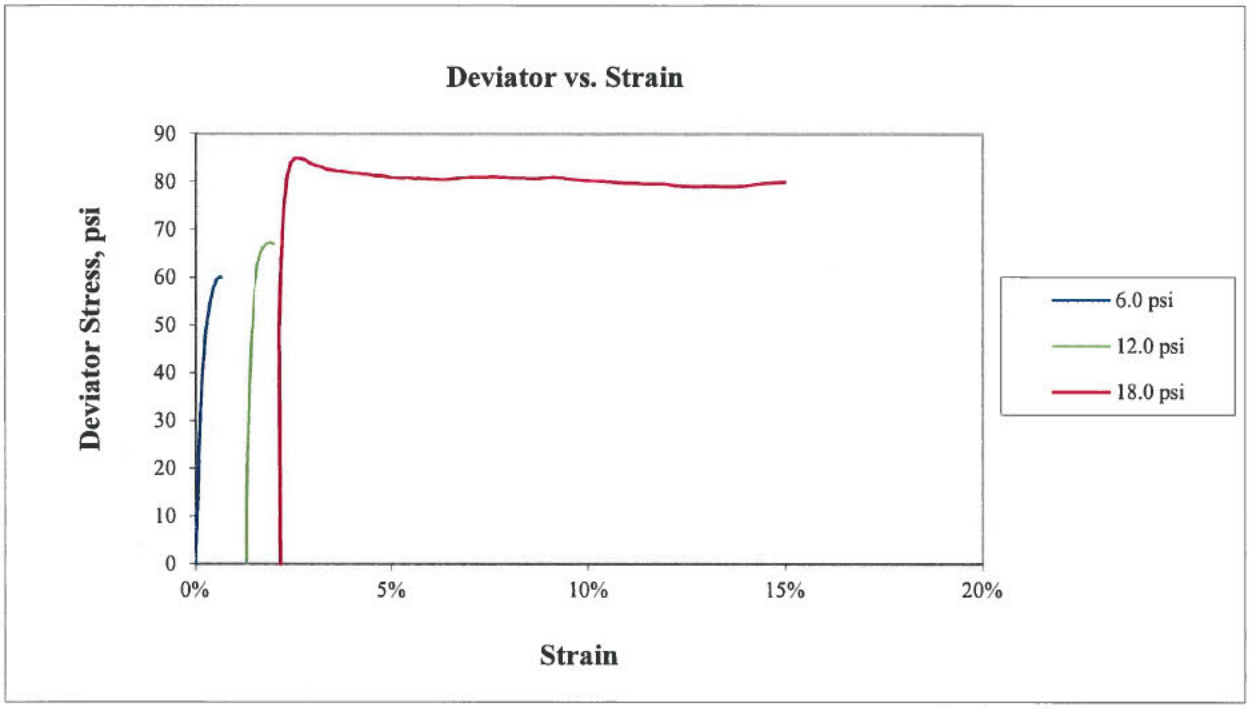
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

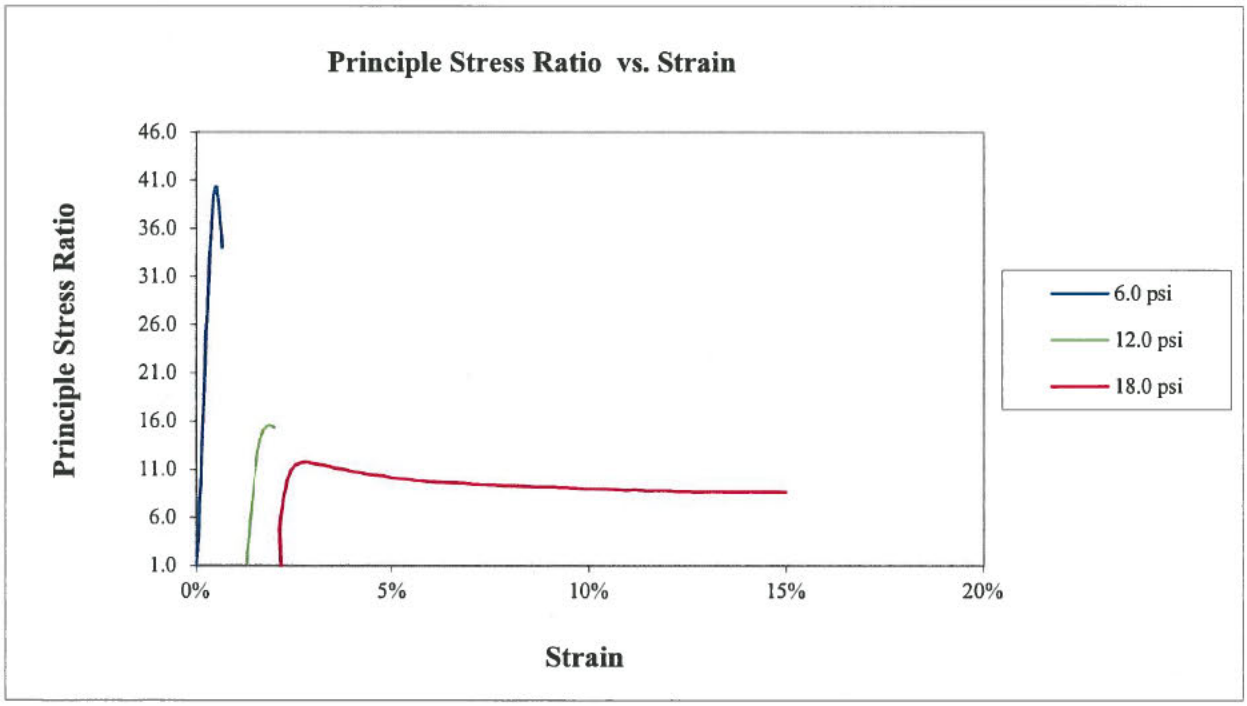
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:** PWM	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **1**



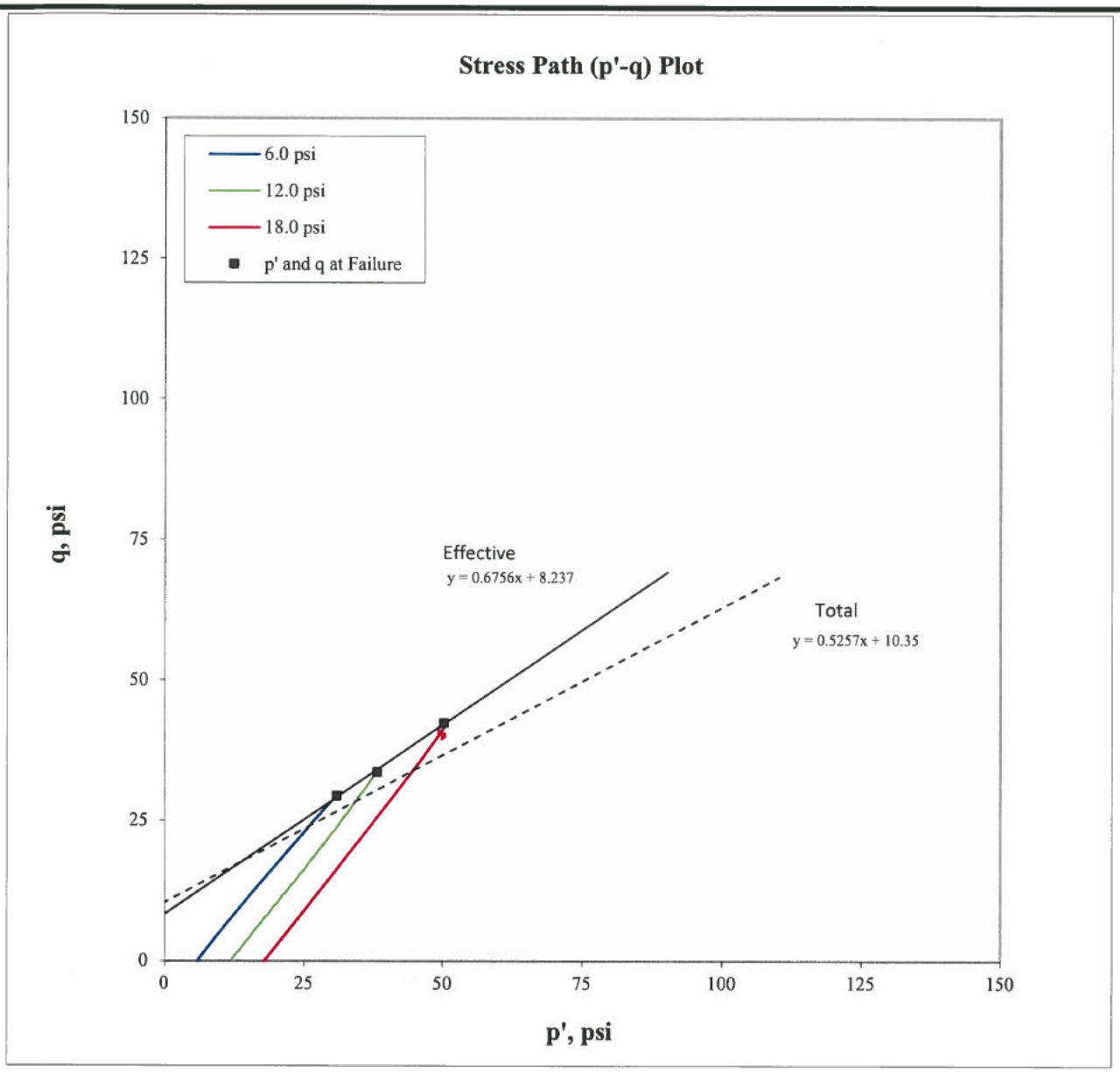


Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 5.0-7.0'	Technician: FT/PWM Check:	Reviewed: Approved:	Start Date: 8/29/2018	Job Number: 18103173	Figure: 2





Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
6.0	35.4	30.9	29.4
12.0	45.6	38.2	33.6
18.0	60.4	50.3	42.4

Effective

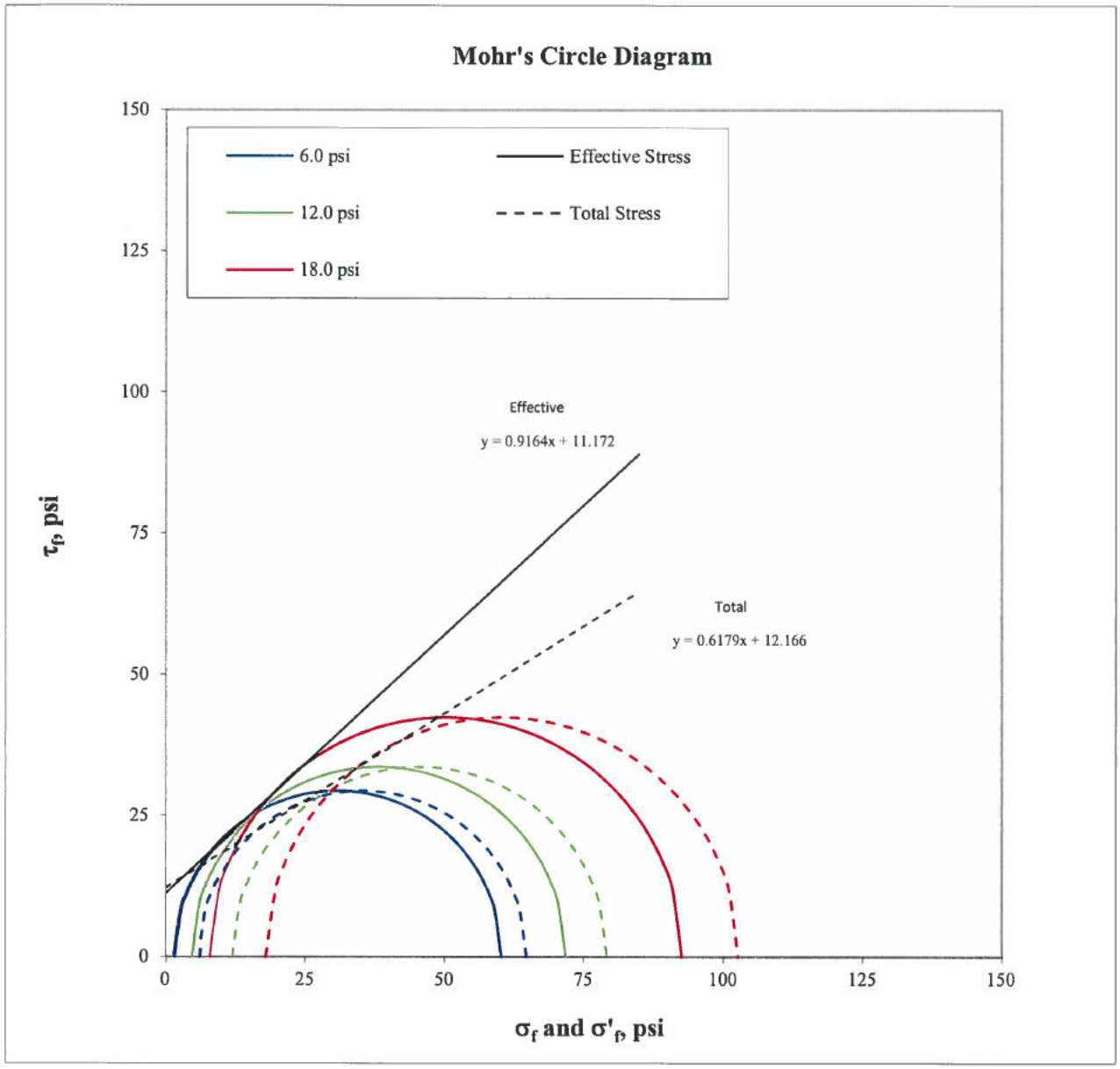
α ' =	34.0	degree
a' =	8.2	psi

Total

α =	27.7	degree
a =	10.3	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **4**



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
6.0	60.2	1.5	64.7	6.0
12.0	71.8	4.6	79.2	12.0
18.0	92.7	7.9	102.8	18.0

Effective

ϕ' =	42.5	degree
c' =	11.2	psi

Total

ϕ =	31.7	degree
c =	12.2	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **5**

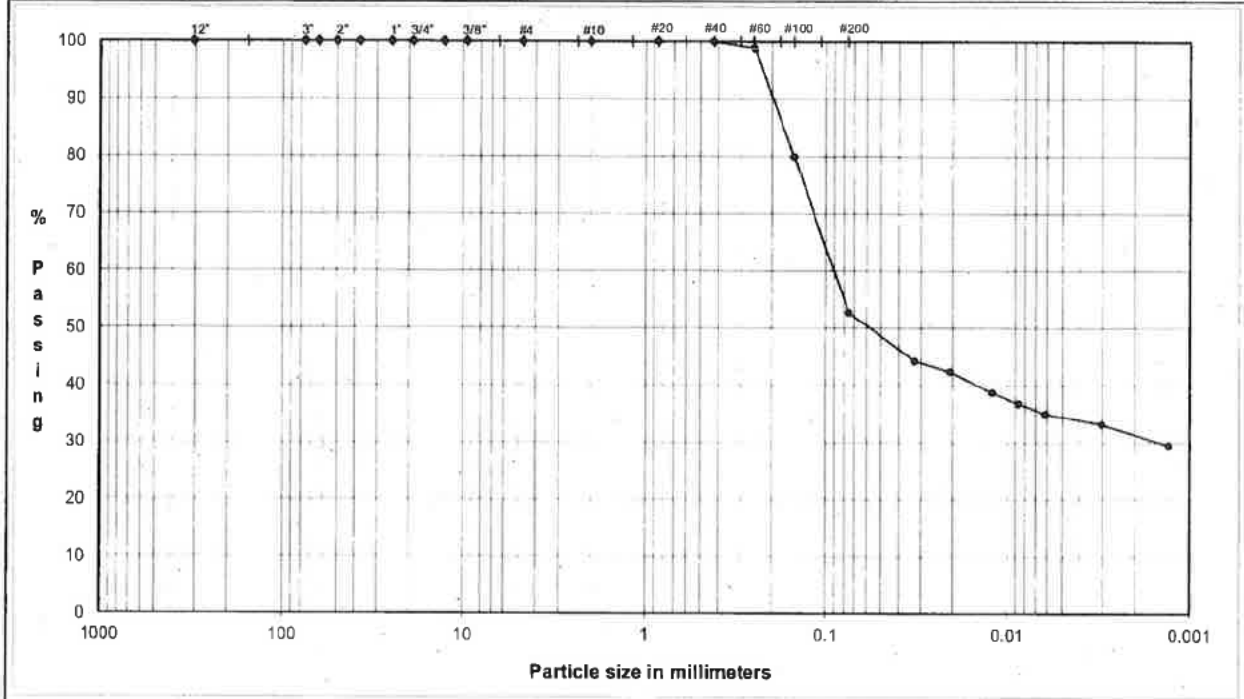
Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMEN PHOTOGRAPH - Single Specimen				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 5.0-7.0'	Technician: FT/PWM Check:	Reviewed: Approved:	Start Date: 8/29/2018	Job Number: 18103173	Figure: 6

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-7 Depth: 7.0-9.0'
TYPE: UD



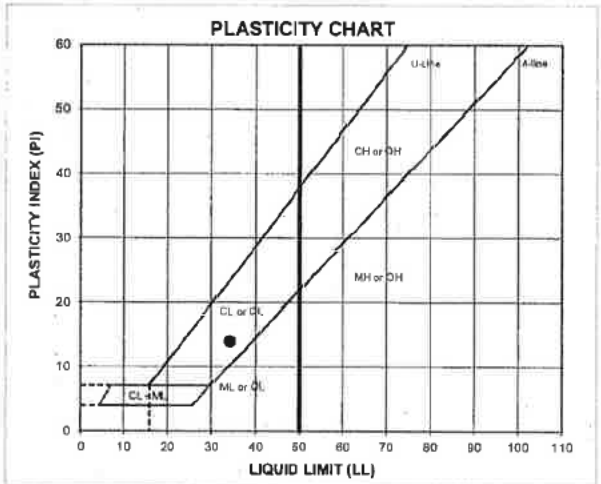
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	100.0	Medium Sand	0.0
#60	0.25	98.9		
#100	0.15	79.9		
#200	0.075	52.7	Fine Sand	47.3

Hydrometer Analysis

(mm)	%Finer		
0.033	44.2		
0.021	42.4		
0.012	38.7	Fines	
0.0086	36.8	Silt or Clay	52.7
0.0062	35.0		
0.0030	33.2		
0.0013	29.5		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.8	34	20	14	0.13

LL (oven-dried)	
0.75 ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY and SAND, fine to medium; yellowish brown.

USCS: CL

TECH	TJ
DATE	6/7/18
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	15	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-7	7.0-9.0'	Flow Pump Speed	7	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.000	B-Value, f	0.98	Height, inches	3.001
Diameter, inches	2.883	Cell Pres.	88.0	Diameter, inches	2.874
Area, cm²	42.12	Bot. Pres.	80.0	Area, cm²	41.85
Volume, cm³	320.92	Top Pres.	80.0	Volume, cm³	319.03
Mass, g	614.74	Tot. B.P.	80.0	Mass, g	632.69
Moisture Content, %	21.80	Head, max.	61.90	Moisture Content, %	25.36
Dry Density, pcf	98.14	Head, min.	61.90	Dry Density, pcf	98.72
Spec. Gravity (assumed)	2.700	Max. Grad.	8.12	Volume Solids, cm³	186.93
Volume Solids, cm³	186.93	Min. Grad.	8.12	Volume Voids, cm³	132.10
Volume Voids, cm³	133.99			Void Ratio	0.71
Void Ratio	0.72			Saturation, %	96.9%
Saturation, %	82.1%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	614.74	714.76
Wt Soil & Tare, f	g	504.72	586.83
Wt Tare	g	0.00	82.29
Wt Moisture Lost	g	110.02	127.93
Wt Dry Soil	g	504.72	504.54
Water Content	%	21.80%	25.36%

DESCRIPTION

SILTY CLAY and SAND, fine to medium; yellowish brown.

Flow Pump Rate 2.38E-04 cm³/sec

USCS CL

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
06/08/18	43259	14	30	21.8	0	0	0	0	0.88	61.90	8.12	6.7E-07	
06/08/18	43259	14	35	21.8	5	5	300	300	0.88	61.90	8.12	6.7E-07	
06/08/18	43259	14	40	21.8	5	10	300	600	0.88	61.90	8.12	6.7E-07	
06/08/18	43259	14	45	21.8	5	15	300	900	0.88	61.90	8.12	6.7E-07	*
06/08/18	43259	14	50	21.8	5	20	300	1200	0.88	61.90	8.12	6.7E-07	*
06/08/18	43259	14	55	21.8	5	25	300	1500	0.88	61.90	8.12	6.7E-07	*
06/08/18	43259	15	0	21.8	5	30	300	1800	0.88	61.90	8.12	6.7E-07	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.7E-07 cm/sec **

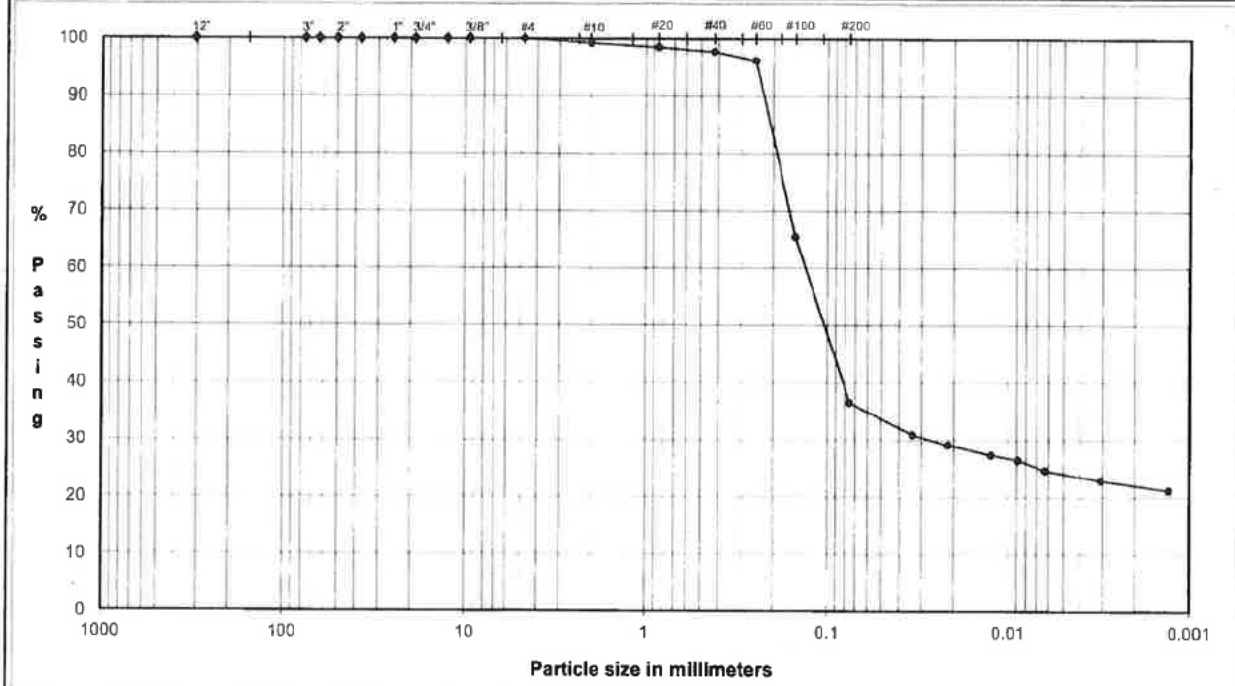
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: B-7 Depth: 15.0-17.0'
TYPE: UD



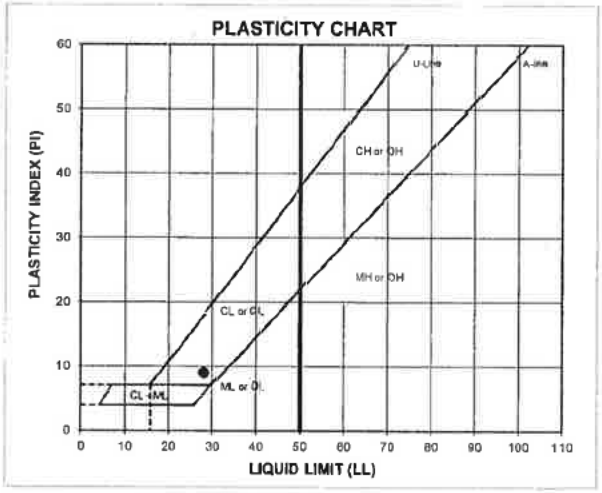
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.3	Coarse Sand	0.7
#20	0.85	98.5		
#40	0.43	97.8	Medium Sand	1.5
#60	0.25	96.2		
#100	0.15	65.4		
#200	0.075	36.5	Fine Sand	61.3

Hydrometer Analysis

(mm)	%Finer		
0.034	30.9		
0.021	29.1		
0.013	27.4	Fines	
0.0088	26.5	Silt or Clay	36.5
0.0063	24.7		
0.0031	22.9		
0.0013	21.2		



ATTERBERG LIMITS

Method -B (Dry preparation)

ML	LL	PL	PI	LI
21.9	28	19	9	0.36

LL (oven-dried) / 0.75 · ORGANIC (OL/OH)

DESCRIPTION: SAND and SILTY CLAY, fine to coarse; grayish brown and yellow.

USCS: SC

TECH	HH/BA/TJ
DATE	7/27/18
CHECK	
REVIEW	
APPROVE	

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		
PROJECT NUMBER	18103173	**SAMPLE ID**	B-7
		SAMPLE TYPE	UD
TESTED FOR	Gs	**SAMPLE DEPTH**	15.0-17.0'

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	166.24
Weight Soil and Tare, Final (gm)	165.14
Weight Of Tare (gm)	42.93
Weight Of Moisture (gm)	1.10
Weight Of Dry Soil (gm)	122.21
Hygroscopic Moisture In (%)	0.9%

Test Method		**Method - B**
Pycnometer Number		11
Weight Pycnometer Empty (gm)		159.54
Volume of Pycnometer (gm)		499.57
Weight Pycnometer and Water (gm)		658.13
Mass of Pycnometer and Water at the test Temperture	(A)	657.81
Observed Temperature (Tb), for (Mb) In Degrees C		23.50
Weight of Soil, Water & Pycnometer (gm)	(B)	**688.66**
Temperature, C		**23.5**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**49.87**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	49.87
Temperature Coefficient		0.9992
SPECIFIC GRAVITY (G)		**2.620**

G @ 20^0 C = [C/(A-(B - C))]*(K)

METHOD - A WET METHOD
METHOD - B OVEN-DRIED METHOD

METHOD OF AIR REMOVAL: VACUUM

Recommended Mass for Test Specimen

Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	FT
DATE	7/31/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-7	Boring or Test Pit:		Boring or Test Pit:	
Sample:	1	Sample:		Sample:	
Depth:	15.0-17.0 ft	Depth:		Depth:	
Point No.:	1	Point No.:		Point No.:	

	Initial						
Length =	6.012	in	Length =	5.936	Length =	5.798	
Diameter =	2.877	in	Diameter =	2.889	Diameter =	2.923	
Wet Mass =	2.817	lb	Wet Mass =		Wet Mass =		
Area =	6.501	in^2	Area =		Area =		
Volume =	39.083	in^3	Volume =		Volume =		
Specific Gravity =	2.62	(ASTM D854)	Specific Gravity =		Specific Gravity =		
Dry Mass of Solids =	2.311	lb	Dry Mass of Solids =		Dry Mass of Solids =		
Moisture Content =	21.9%		Moisture Content =		Moisture Content =		
Wet Unit Weight =	124.5	pcf	Wet Unit Weight =		Wet Unit Weight =		
Dry Unit Weight =	102.2	pcf	Dry Unit Weight =		Dry Unit Weight =		
Void Ratio =	0.60		Void Ratio =		Void Ratio =		
Percent Saturation =	96%		Percent Saturation =		Percent Saturation =		

	After Consolidation			After Consolidation			After Consolidation		
Length =	5.936	in	Length =	5.798	in	Length =	5.704	in
Diameter =	2.889	in	Diameter =	2.923	in	Diameter =	2.947	in
Area =	6.556		Area =	6.712		Area =	6.822	in^2 (Method B)
Volume =	38.914		Volume =	38.914		Volume =	38.914	in^3
Moisture Content =			Moisture Content =			Moisture Content =	22.5%	
Wet Unit Weight =			Wet Unit Weight =			Wet Unit Weight =	125.8	pcf
Dry Unit Weight =			Dry Unit Weight =			Dry Unit Weight =	102.6	pcf
Void Ratio =			Void Ratio =			Void Ratio =	0.59	
Percent Saturation =			Percent Saturation =			Percent Saturation =	100%	

B Parameter =	1.00		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.094%	/min.	Shear Rate =	0.100%	/min.	Shear Rate =	0.099%	/min.
t_{50} =	1.0	min.	t_{50} =	0.7	min.	t_{50} =	0.8	min.
Strain at Failure =	1.0%		Strain at Failure =	2.7%		Strain at Failure =	4.7%	

Cell Pressure =	64.0	psi	Cell Pressure =	78.0	psi	Cell Pressure =	92.0	psi
Back Pressure =	50.0	psi	Back Pressure =	50.0	psi	Back Pressure =	50.0	psi
Confining Pressure =	14.0	psi	Confining Pressure =	28.0	psi	Confining Pressure =	42.0	psi

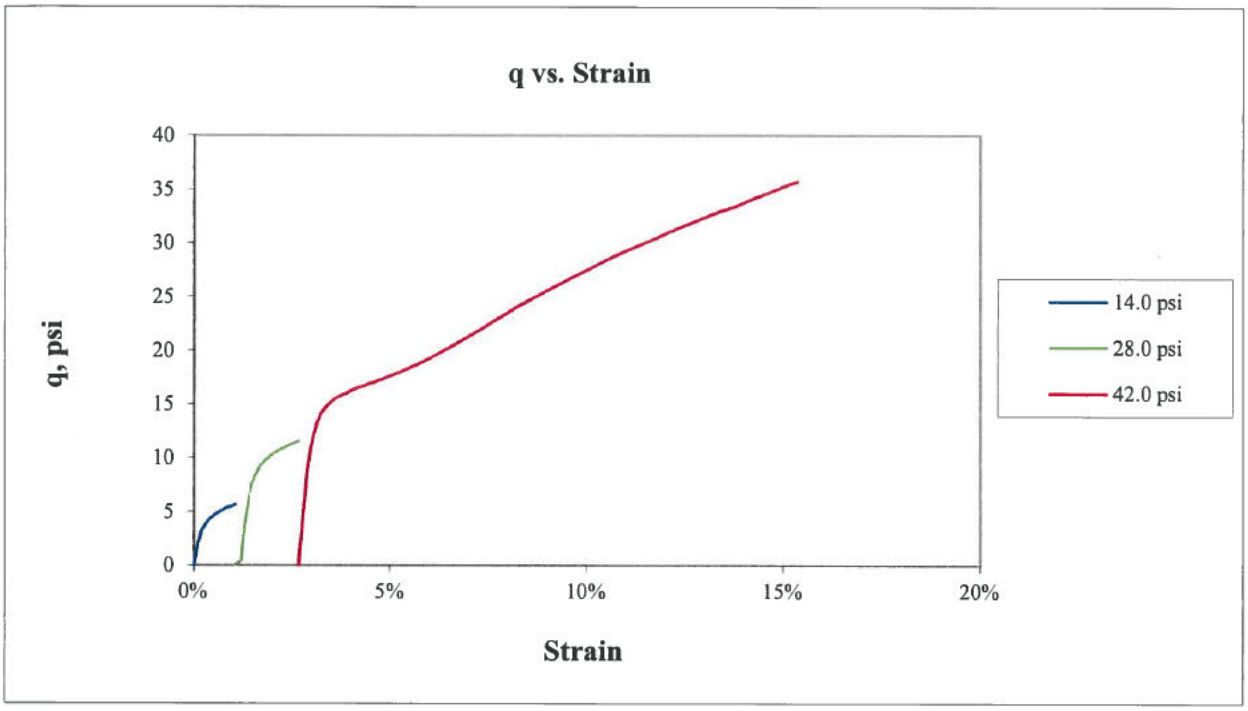
Notes: Sample description: (SC) SAND and SILTY CLAY, fine to coarse; grayish brown and yellow.

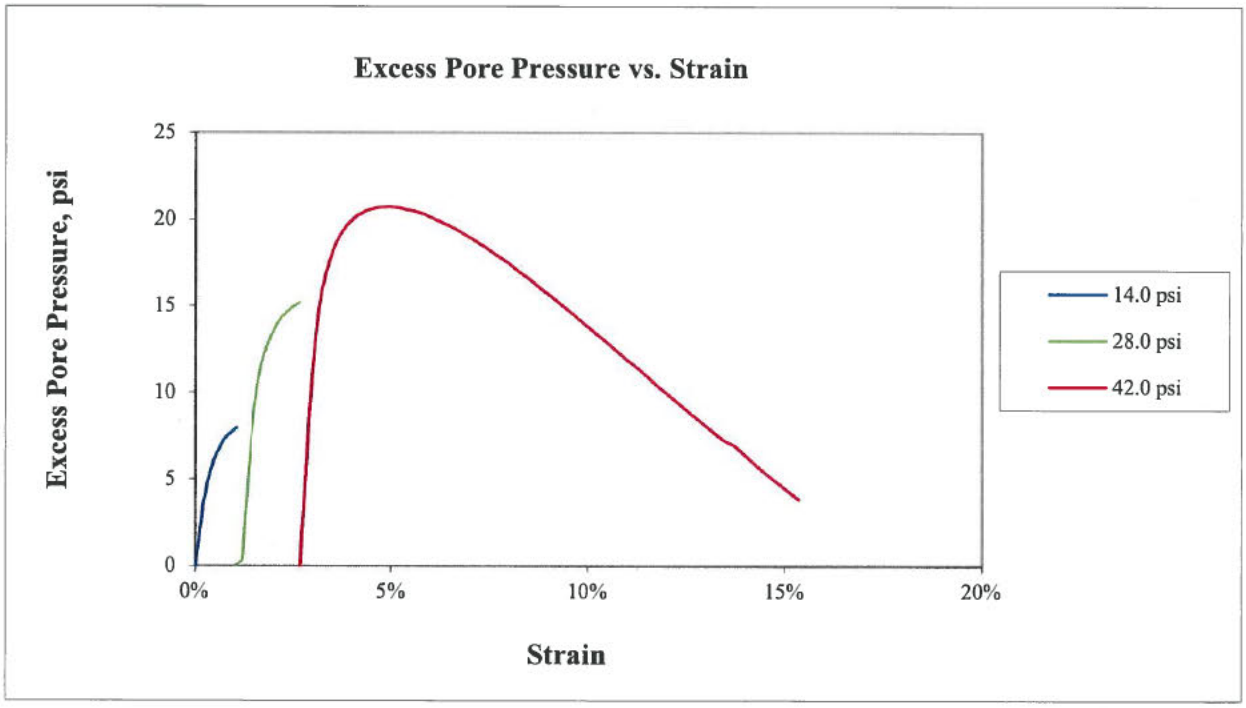
Atterberg limits: LL = 28 PL = 19 PI = 9 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 100.0% No. 200 = 36.5% (ASTM D422, refer to separate report for gradation curve)

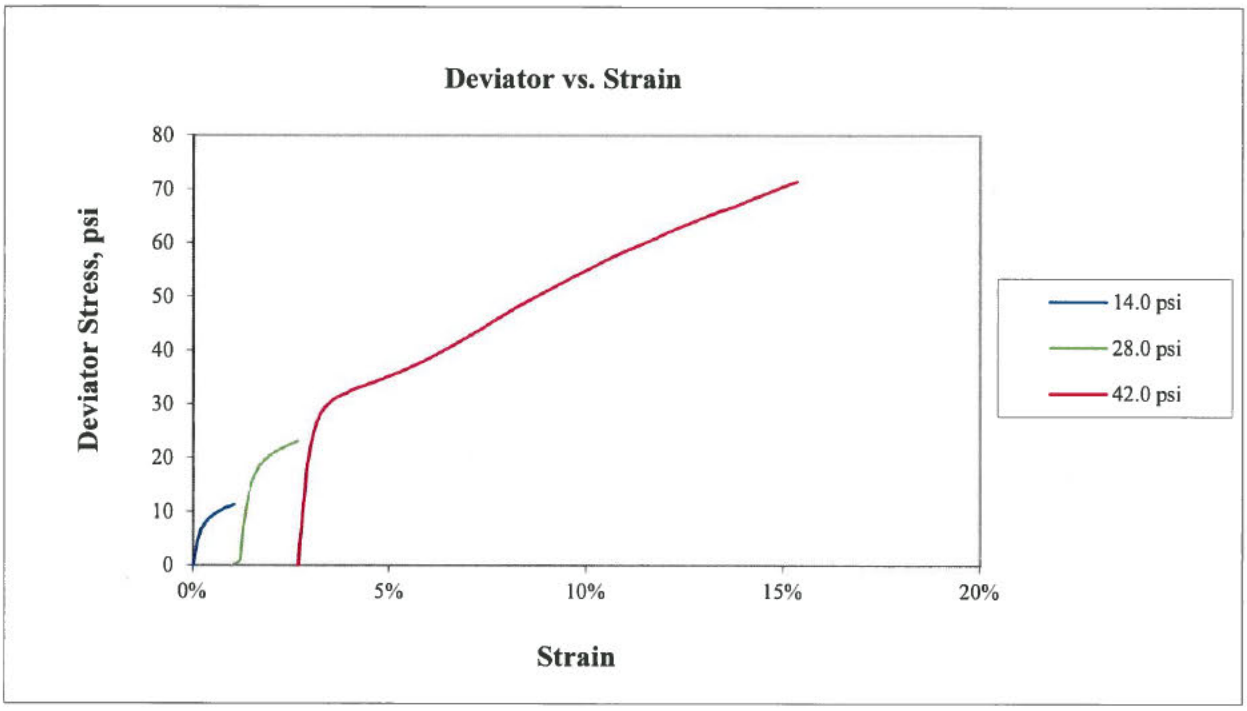
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ [ ] % strain
Membrane effect:	X	Corrected		Not Corrected

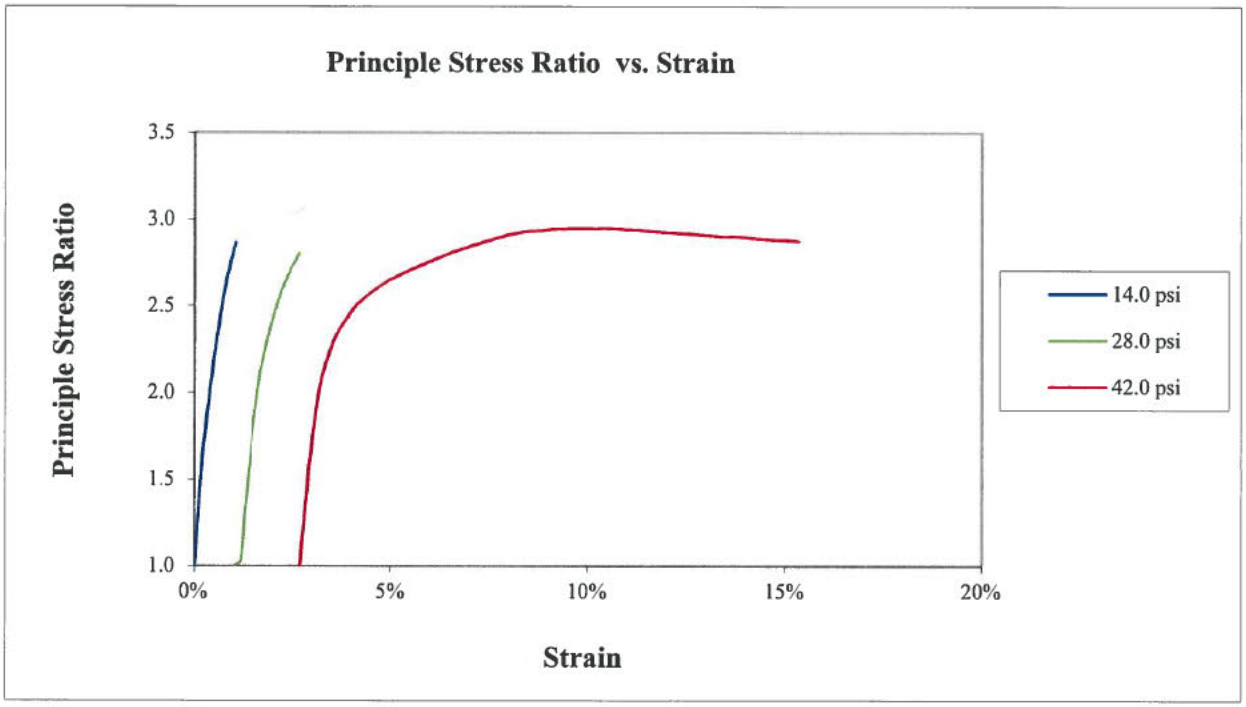
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:** JWM	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **1**



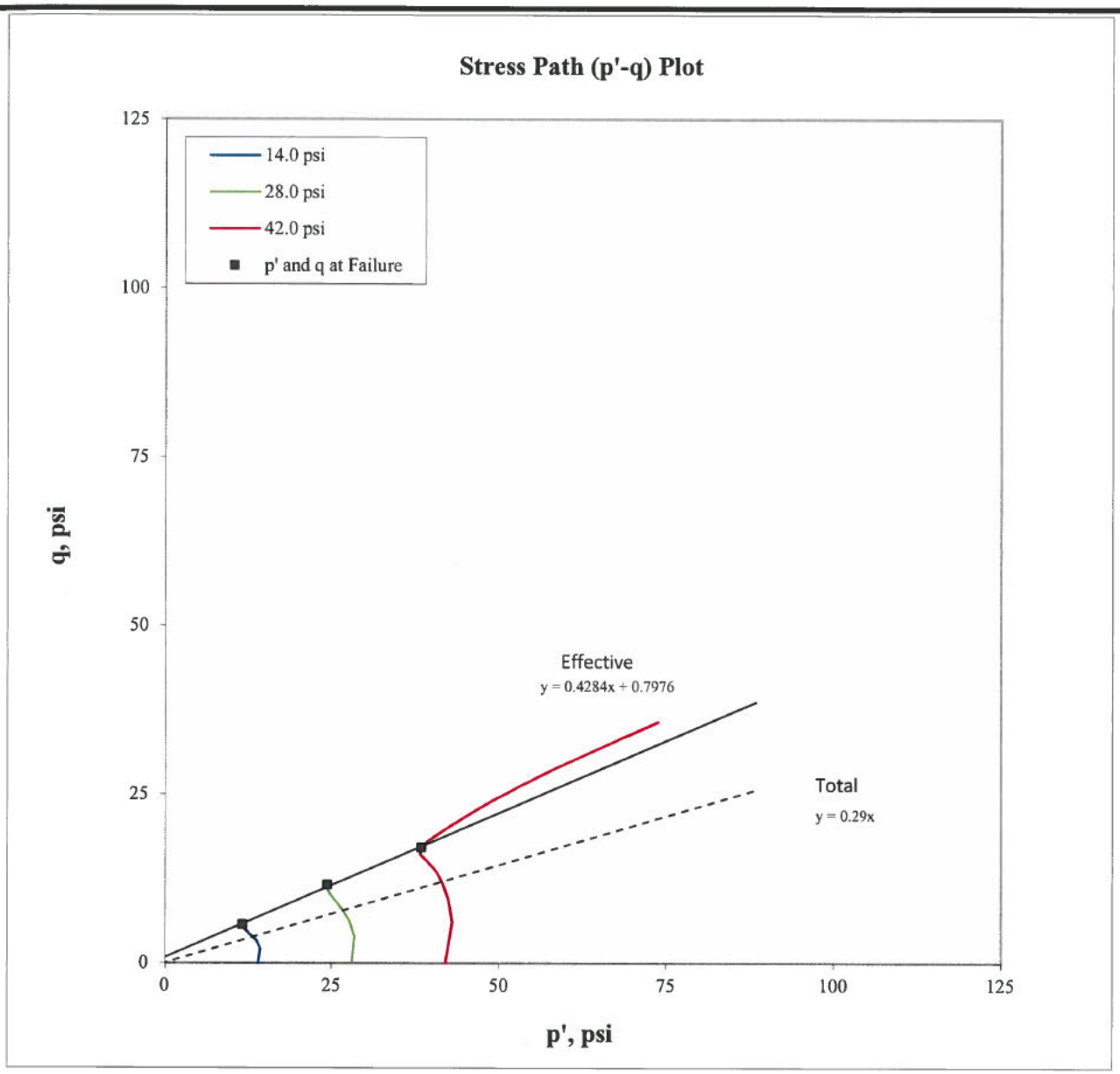


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:** IWN	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **2**





Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
14.0	19.6	11.7	5.6
28.0	39.6	24.4	11.6
42.0	59.1	38.4	17.1

Effective

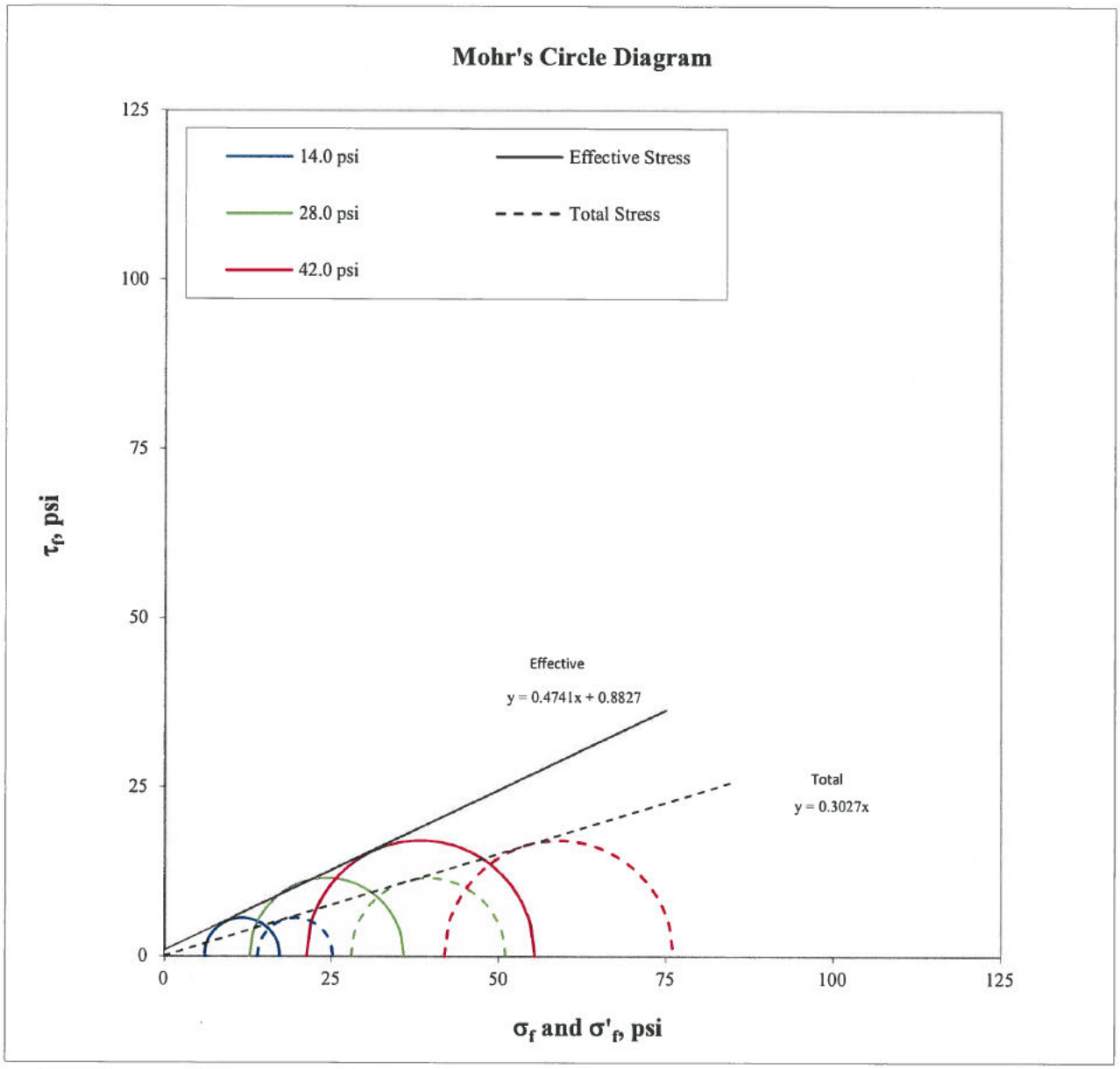
α ' =	23.2	degree
a' =	0.8	psi

Total

α =	16.2	degree
a =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **4**



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
14.0	17.3	6.0	25.3	14.0
28.0	35.9	12.8	51.1	28.0
42.0	55.5	21.3	76.2	42.0

Effective

ϕ' =	25.4	degree
c' =	0.9	psi

Total

ϕ =	16.9	degree
c =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **5**

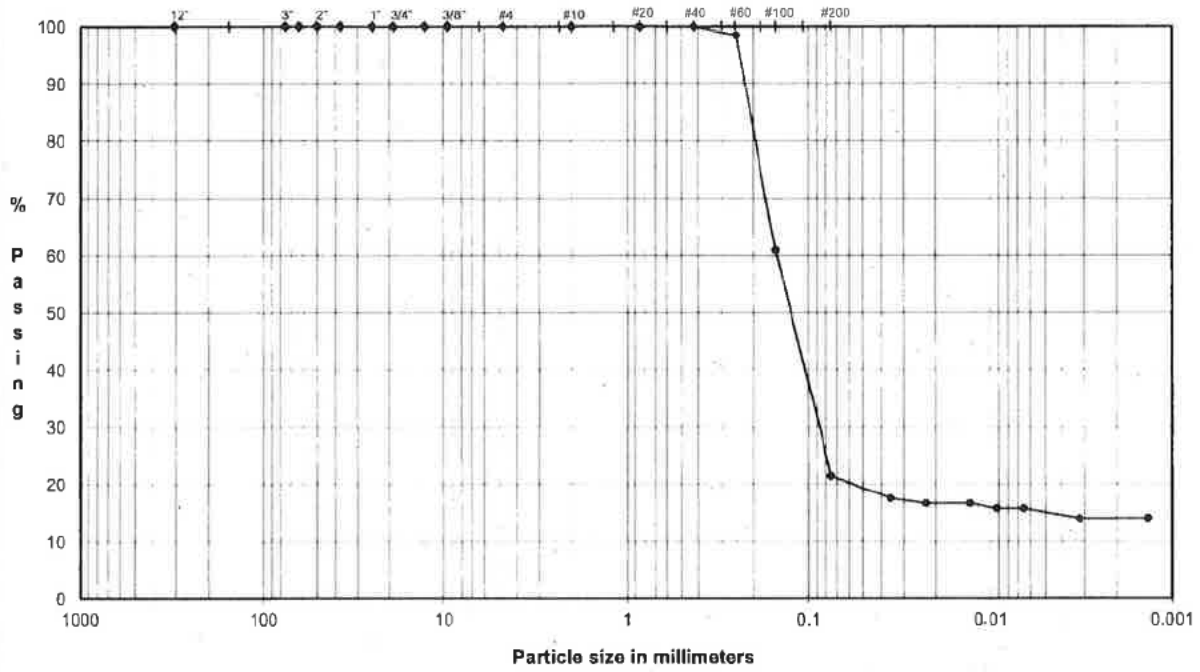
Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMEN PHOTOGRAPH - Single Specimen				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 15.0-17.0'	Technician: FT/PWM Check: PWM	Reviewed: Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 6

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-7** Depth: **18.0-20.0'**
TYPE: **Bag**



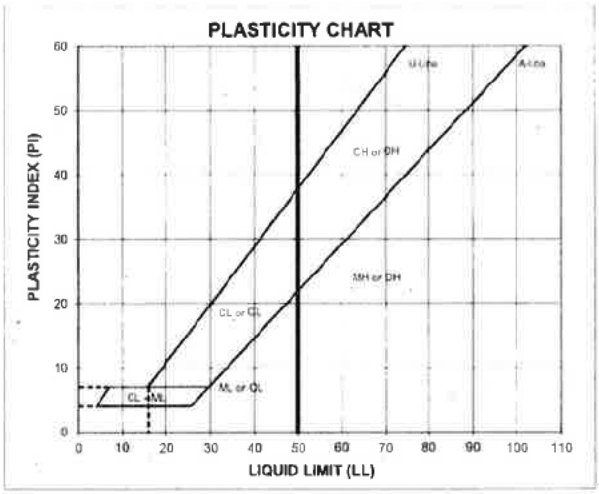
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**98.5**		
#100	0.15	**60.9**		
#200	0.075	**21.4**	Fine Sand	**78.5**

Hydrometer Analysis

(mm)	%Finer		
0.035	**17.5**		
0.023	**16.6**		
0.013	**16.6**	Fines	
0.0092	**15.8**	Silt or Clay	**21.4**
0.0065	**15.8**		
0.0032	**14.0**		
0.0013	**14.0**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.8	**NP**	**NP**	**NP**	**NP**

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

DESCRIPTION: SILTY SAND, fine; light gray.

USCS: SM

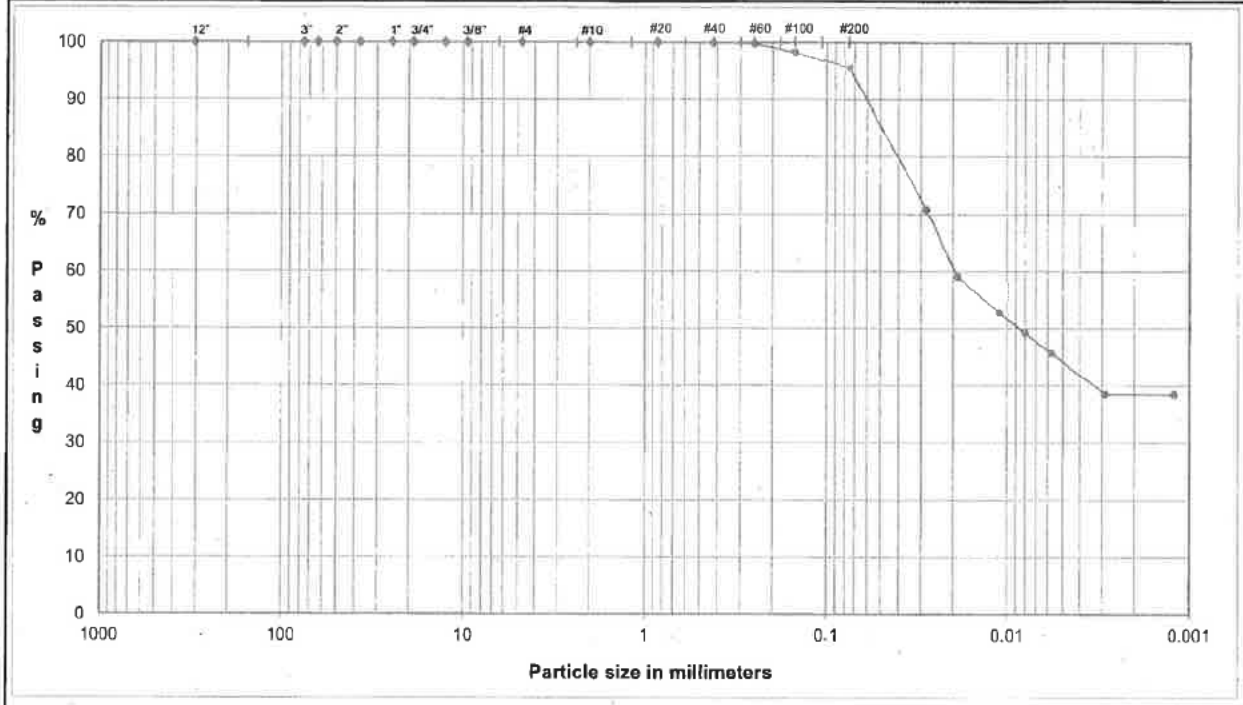
TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-3** Depth: **18.0-20.0'**
TYPE: **Bag**



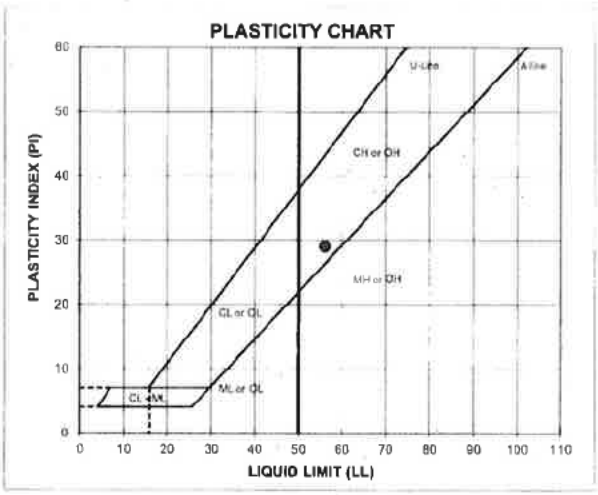
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	99.9	Medium Sand	0.1
#60	0.25	99.8		
#100	0.15	98.2		
#200	0.075	95.6	Fine Sand	4.3

Hydrometer Analysis

(mm)	%Finer		
0.028	70.8		
0.019	59.1		
0.011	52.8	Fines	
0.0080	49.3	Silt or Clay	95.6
0.0058	45.7		
0.0029	38.5		
0.0012	38.5		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_n	LL	PL	PI	LI
27.1	56	27	29	0.02

LL (oven-dried) / 0.75 · ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine to medium sand; dark gray.

USCS: CH

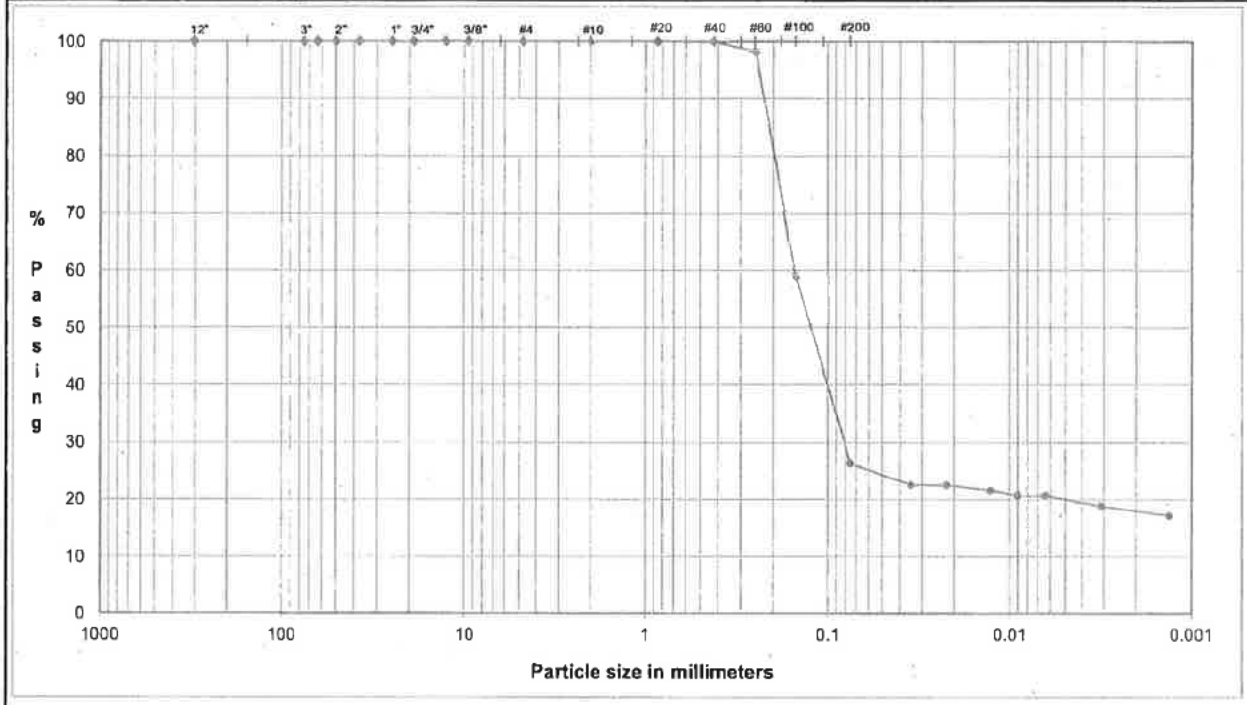
TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: RP-3 Depth: 29.0-30.0'
TYPE: UD



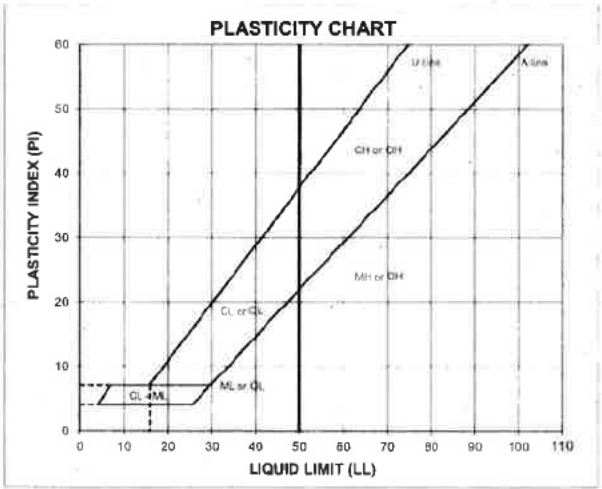
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	100.0	Medium Sand	0.0
#60	0.25	98.2		
#100	0.15	58.9		
#200	0.075	26.3	Fine Sand	73.7

Hydrometer Analysis

(mm)	%Finer		
0.035	22.4		
0.022	22.4		
0.013	21.5	Fines	
0.0090	20.6	Silt or Clay	26.3
0.0064	20.6		
0.0032	18.8		
0.0013	17.1		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.4	NP	NP	NP	NP

LL (oven-dried)	
0.75 · ORGANIC (OL/OH)	

DESCRIPTION: SILTY SAND, fine; dark gray.

USCS: SM

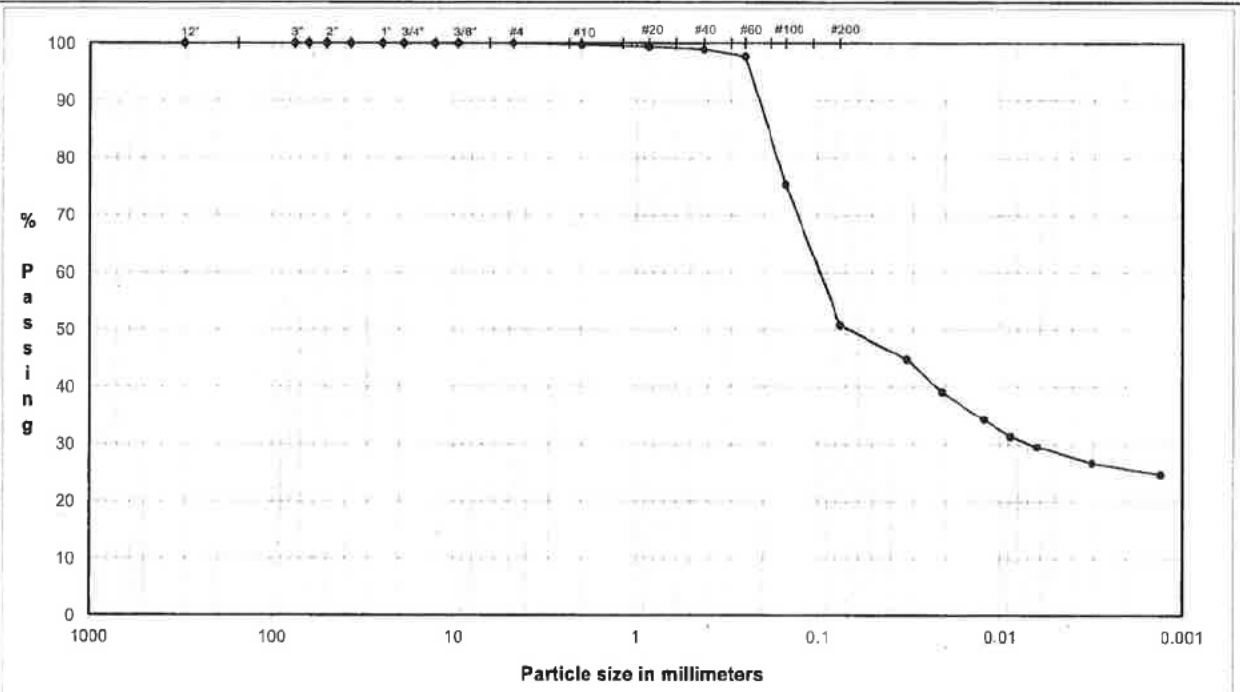
TECH	HH/TJ
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-4** Depth: **8.0-9.0'**
TYPE: **Bag**



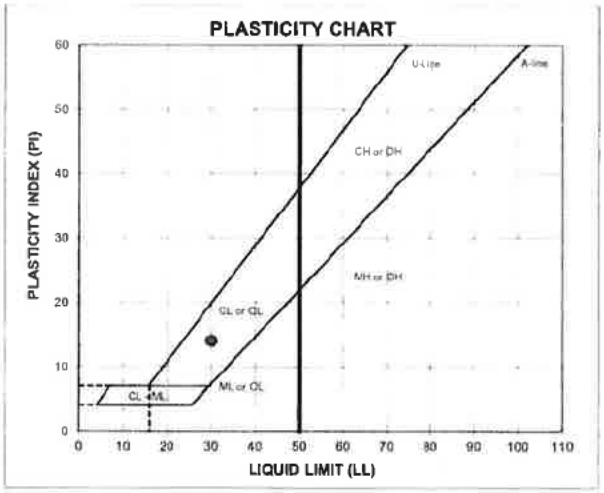
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.4**		
#40	0.43	**99.0**	Medium Sand	**0.8**
#60	0.25	**97.8**		
#100	0.15	**75.4**		
#200	0.075	**50.8**	Fine Sand	**48.2**

Hydrometer Analysis

(mm)	%Finer		
0.032	**44.7**		
0.021	**39.0**		
0.012	**34.3**	Fines	
0.0088	**31.4**	Silt or Clay	**50.8**
0.0063	**29.5**		
0.0031	**26.7**		
0.0013	**24.8**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
13.4	**30**	**16**	**14**	**-0.17**

LL (oven-dried)
0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; brown.

USCS: CL

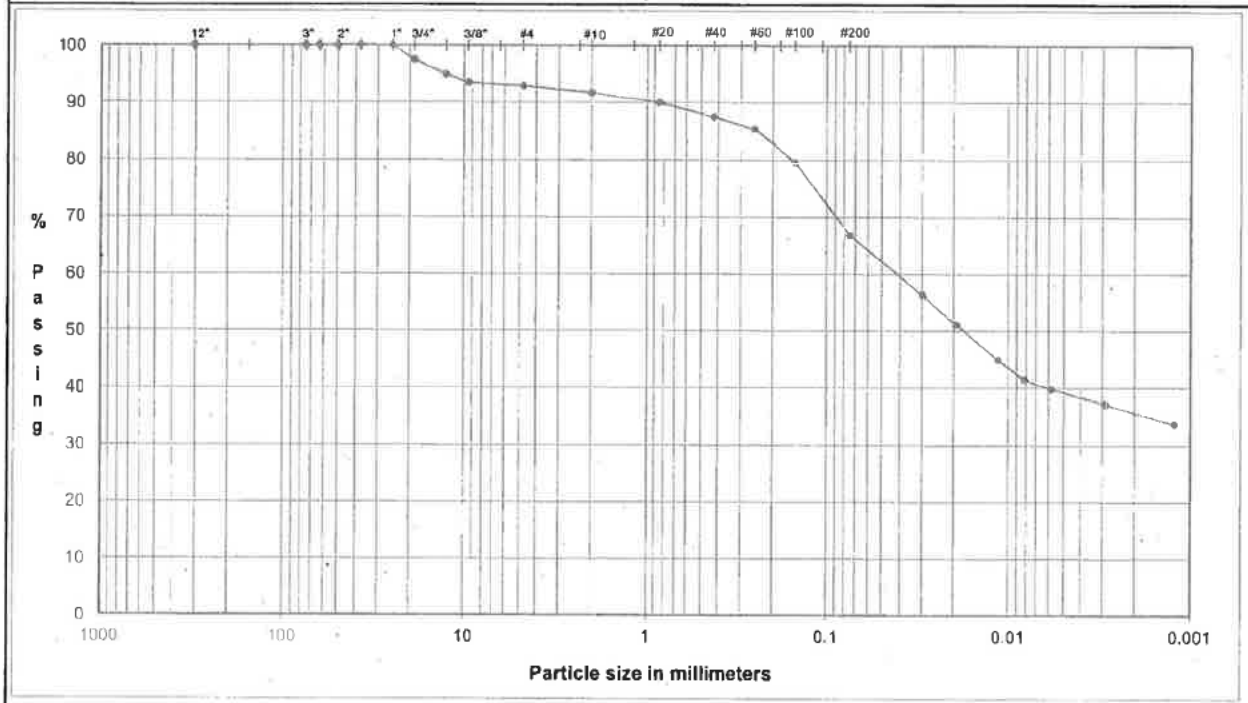
TECH	TJ/HH/HEH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: RP-4 - Depth: 20.0-22.0'
TYPE: UD



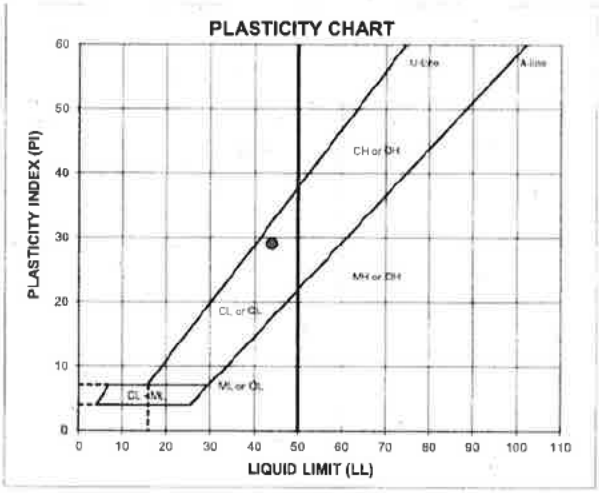
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	97.6	Coarse Gravel	2.4
0.50"	12.7	94.9		
0.375"	9.5	93.5		
#4	4.8	93.0	Fine Gravel	4.7
#10	2.00	91.8	Coarse Sand	1.2
#20	0.85	90.0		
#40	0.43	87.6	Medium Sand	4.2
#60	0.25	85.4		
#100	0.15	79.6		
#200	0.075	66.9	Fine Sand	20.7

Hydrometer Analysis

(mm)	%Finer		
0.030	56.3		
0.019	51.1		
0.011	45.0	Fines	
0.0082	41.6	Silt or Clay	66.9
0.0058	39.8		
0.0029	37.2		
0.0012	33.8		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_n	LL	PL	PI	LI
22.2	44	15	29	0.24

LL (oven-dried)	
0.75 ORGANIC (OL/OH)	

DESCRIPTION: sandy SILTY CLAY, fine to coarse, some fine to coarse gravel; yellowish brown.

USCS: CL

TECH	TB/HH/BA
DATE	7/17/18
CHECK	
REVIEW	
APPROVE	

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY WHITE BLUFF/AR**		
PROJECT NUMBER	**18103173**	**SAMPLE ID**	**RP-4**
		SAMPLE TYPE	**UD**
TESTED FOR	**Gs**	**SAMPLE DEPTH**	**20.0-22.0'**

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	**196.37**
Weight Soil and Tare, Final (gm)	**192.05**
Weight Of Tare (gm)	**51.66**
Weight Of Moisture (gm)	**4.32**
Weight Of Dry Soil (gm)	**140.39**
Hygroscopic Moisture In (%)	**3.1%**

Test Method		**Method - B**
Pycnometer Number		**14**
Weight Pycnometer Empty (gm)		185.81
Volume of Pycnometer (gm)		499.41
Weight Pycnometer and Water (gm)		684.20
Mass of Pycnometer and Water at the test Temperture	(A)	683.75
Observed Temperature (Tb), for (Mb) In Degrees C		25.00
Weight of Soil, Water & Pycnometer (gm)	(B)	**714.40**
Temperature, C		**25.0**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**48.92**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	48.92
Temperature Coefficient		0.9988
SPECIFIC GRAVITY (G)		**2.674**

$G @ 20^0 C = [C/(A-(B - C))]*(K)$

METHOD - A	WET METHOD	METHOD OF AIR REMOVAL
METHOD - B	OVEN-DRIED METHOD	VACUUM

Recommended Mass for Test Specimen

Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	BA
DATE	7/18/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	RP-4		Boring or Test Pit:	RP-4		Boring or Test Pit:	RP-4	
Sample:	UD		Sample:	UD		Sample:	UD	
Depth:	20.0-22.0 ft		Depth:	20.0-22.0 ft		Depth:	20.0-22.0 ft	
Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**	
Length =	5.901	in	Length =	6.114	in	Length =	6.178	in
Diameter =	2.881	in	Diameter =	2.863	in	Diameter =	2.819	in
Wet Mass =	2.777	lb	Wet Mass =	2.837	lb	Wet Mass =	2.765	lb
Area =	6.519	in^2	Area =	6.438	in^2	Area =	6.241	in^2
Volume =	38.468	in^3	Volume =	39.360	in^3	Volume =	38.559	in^3
Specific Gravity =	2.67	(ASTM D854)	Specific Gravity =	2.67	(ASTM D854)	Specific Gravity =	2.67	(ASTM D854)
Dry Mass of Solids =	2.261	lb	Dry Mass of Solids =	2.346	lb	Dry Mass of Solids =	2.253	lb
Moisture Content =	22.9%		Moisture Content =	20.9%		Moisture Content =	22.7%	
Wet Unit Weight =	124.8	pcf	Wet Unit Weight =	124.5	pcf	Wet Unit Weight =	123.9	pcf
Dry Unit Weight =	101.5	pcf	Dry Unit Weight =	103.0	pcf	Dry Unit Weight =	100.9	pcf
Void Ratio =	0.64		Void Ratio =	0.62		Void Ratio =	0.65	
Percent Saturation =	95%		Percent Saturation =	91%		Percent Saturation =	93%	
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	5.819	in	Length =	6.040	in	Length =	6.119	in
Diameter =	2.862	in	Diameter =	2.841	in	Diameter =	2.814	in
Area =	6.431	in^2 (Method B)	Area =	6.341	in^2 (Method B)	Area =	6.219	in^2 (Method B)
Volume =	37.424	in^3	Volume =	38.298	in^3	Volume =	38.050	in^3
Moisture Content =	22.3%		Moisture Content =	21.5%		Moisture Content =	23.5%	
Wet Unit Weight =	127.7	pcf	Wet Unit Weight =	128.6	pcf	Wet Unit Weight =	126.4	pcf
Dry Unit Weight =	104.4	pcf	Dry Unit Weight =	105.8	pcf	Dry Unit Weight =	102.3	pcf
Void Ratio =	0.60		Void Ratio =	0.57		Void Ratio =	0.63	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.96		B Parameter =	0.98		B Parameter =	0.98	
Shear Rate =	0.009%	/min.	Shear Rate =	0.009%	/min.	Shear Rate =	0.008%	/min.
t_{50} =	6.94	min.	t_{50} =	37.68	min.	t_{50} =	30.90	min.
Strain at Failure =	4.9%		Strain at Failure =	3.5%		Strain at Failure =	10.5%	
Cell Pressure =	68.0	psi	Cell Pressure =	86.0	psi	Cell Pressure =	104.0	psi
Back Pressure =	50.0	psi	Back Pressure =	50.0	psi	Back Pressure =	50.0	psi
Confining Pressure =	18.0	psi	Confining Pressure =	36.0	psi	Confining Pressure =	54.0	psi

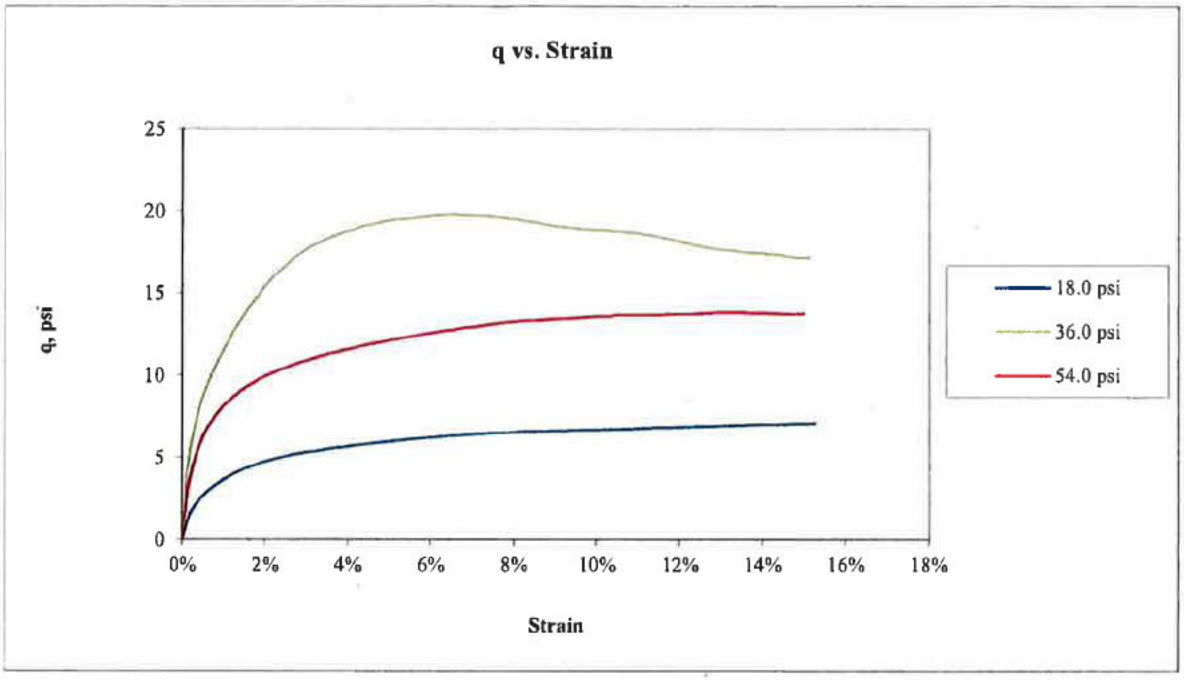
Notes: Sample description: (CL) sandy SILTY CLAY, fine to coarse, some fine to coarse gravel; yellowish brown.

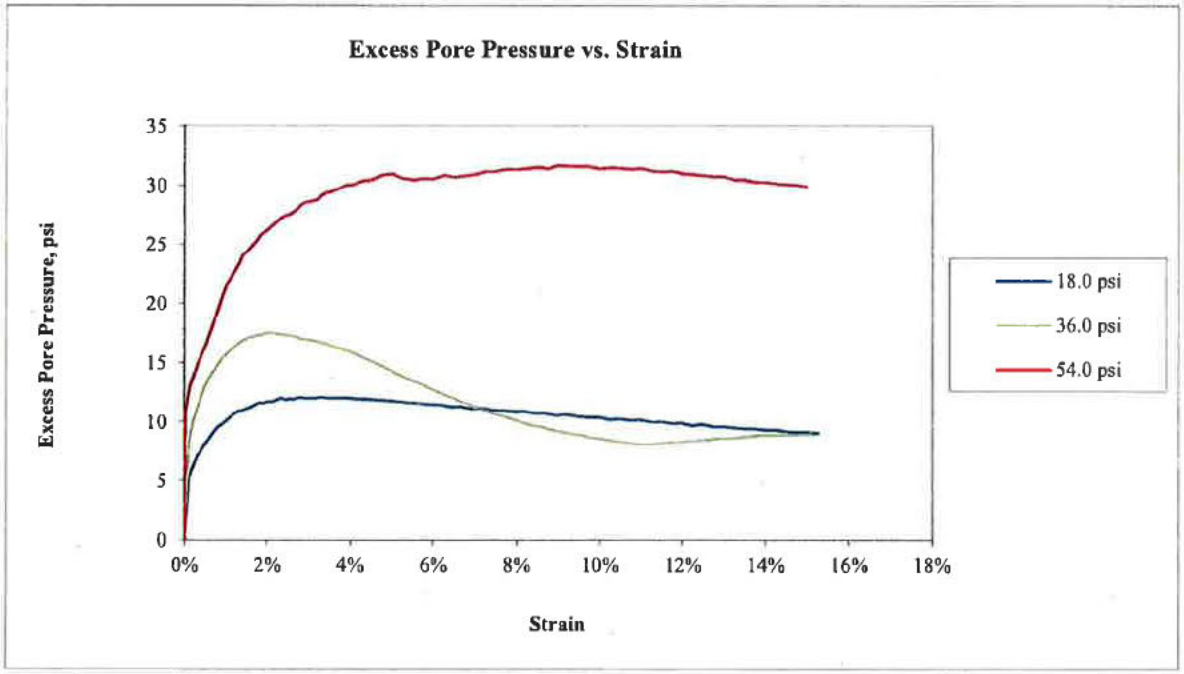
Atterberg limits: LL = 44 PL = 15 PI = 29 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 93% No. 200 = 67% (ASTM D422, refer to separate report for gradation curve)

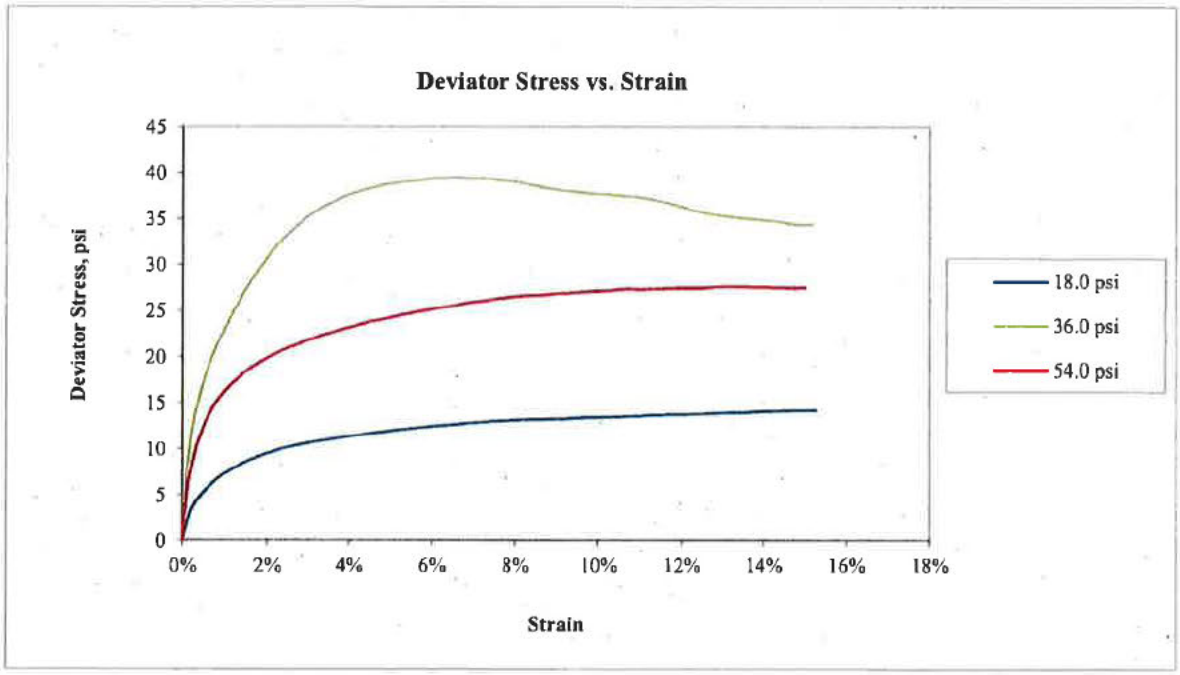
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

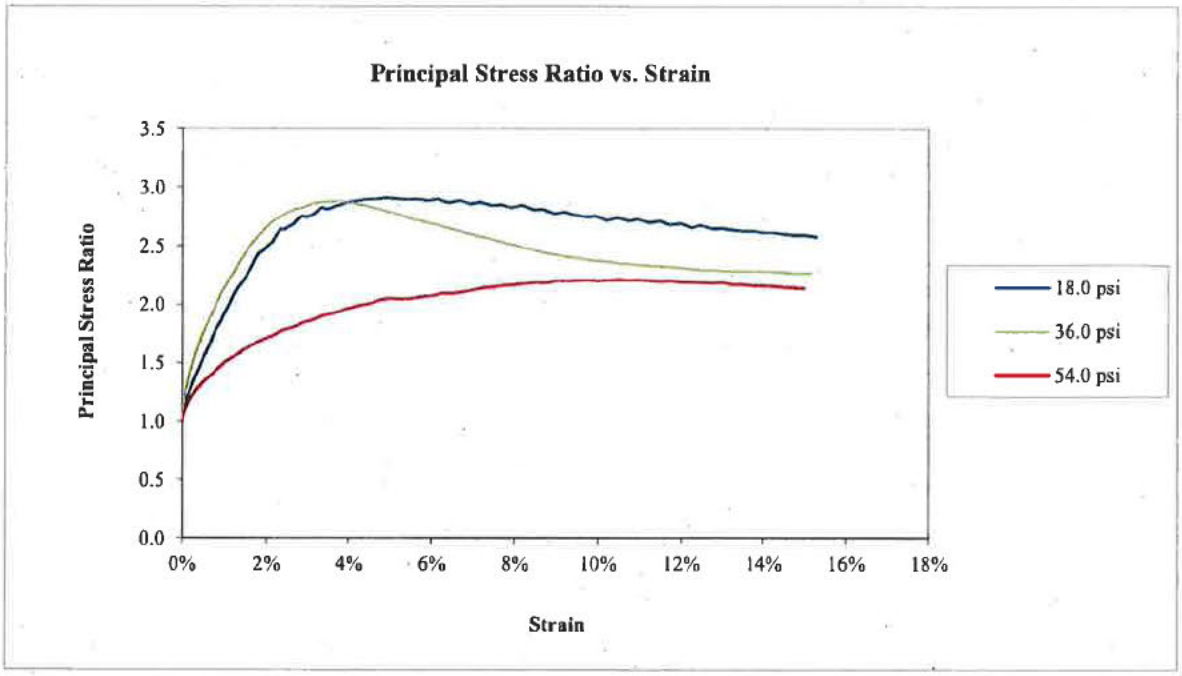
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **1**



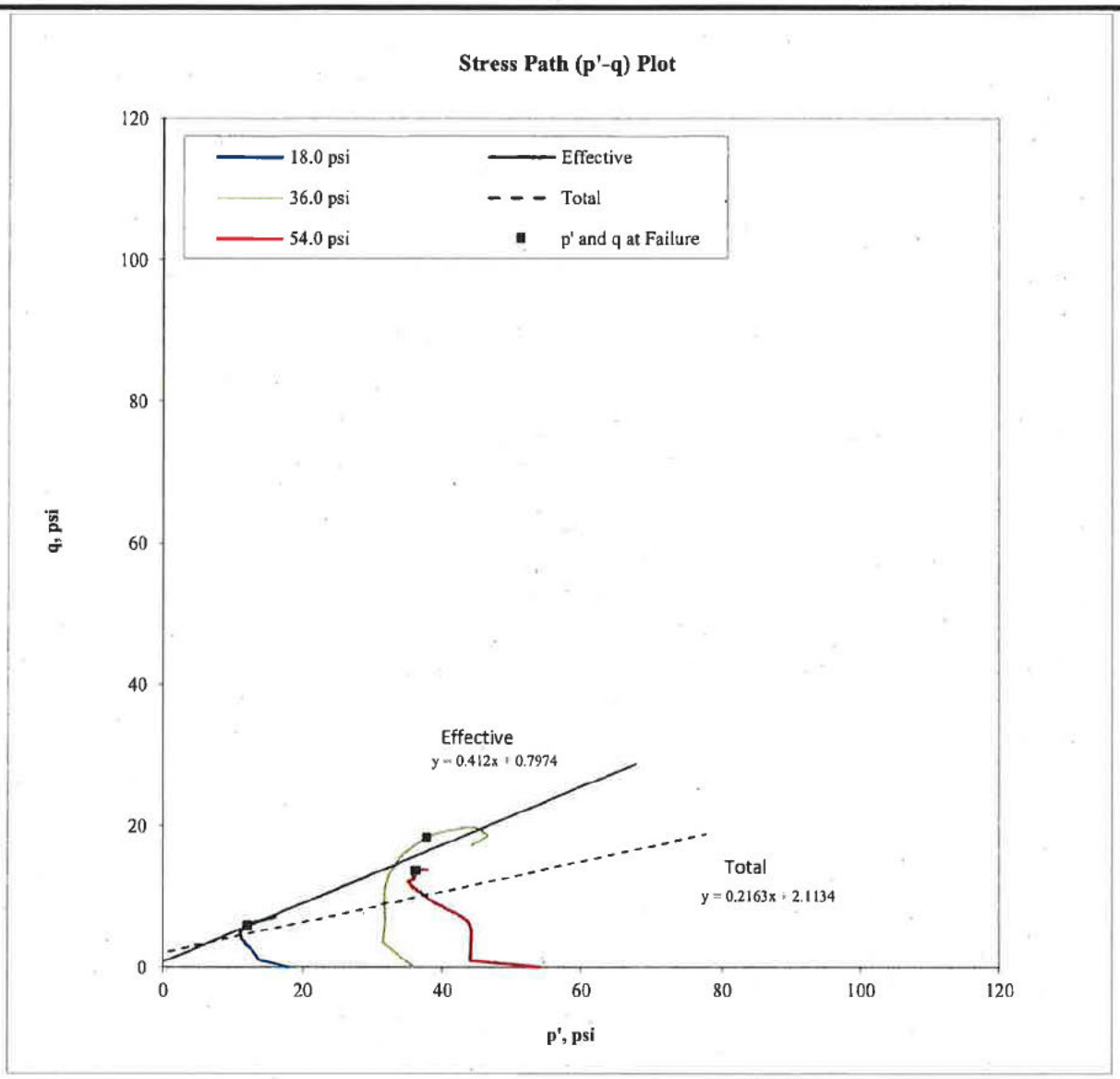


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:** AWM	**Reviewed:** SP **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **2**





Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **DEVIATOR STRESS AND PRINCIPAL STRESS RATIO PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
18.0	23.9	12.2	5.9
36.0	54.3	37.8	18.3
54.0	67.7	36.2	13.7

Effective

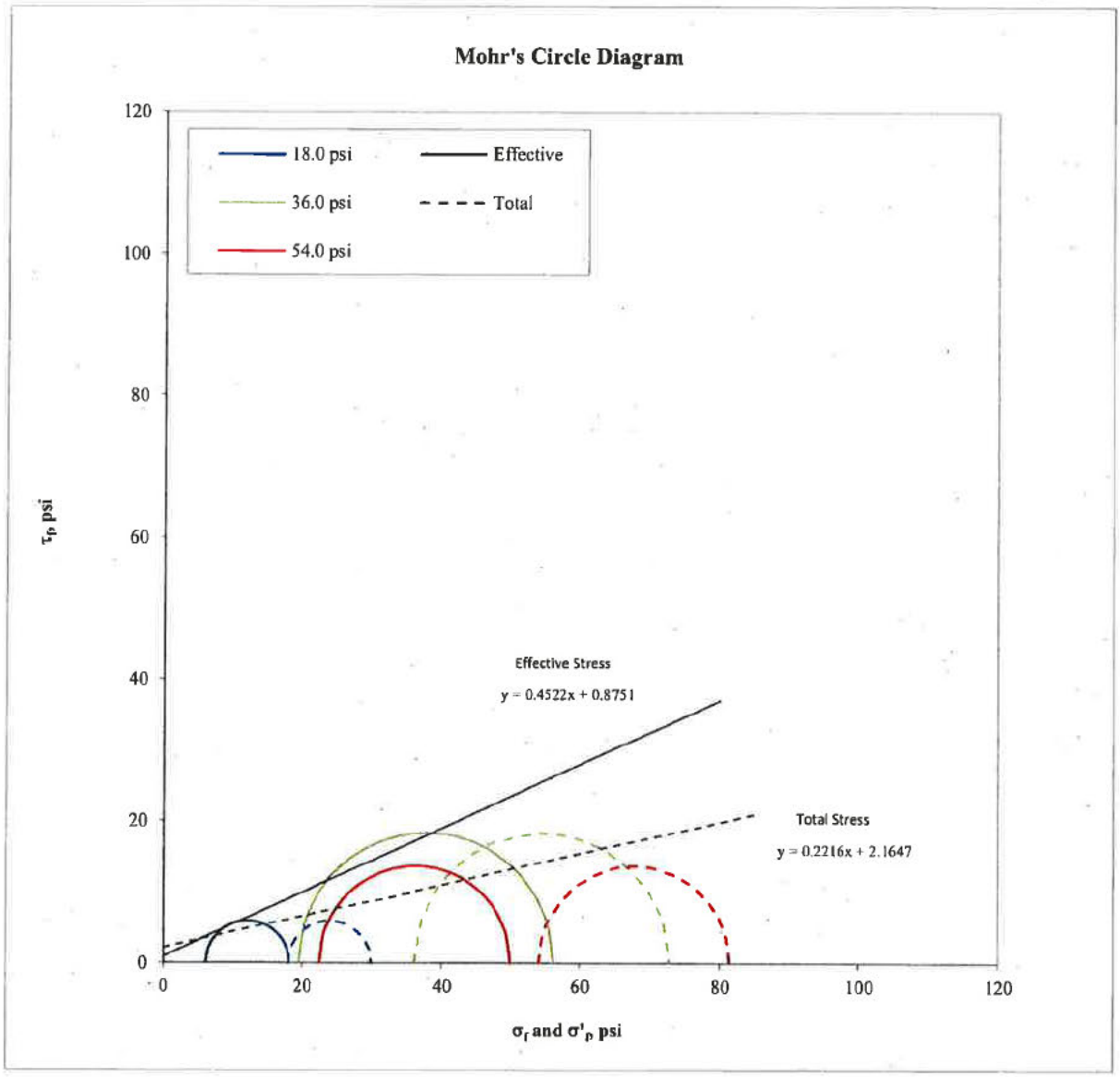
α' =	22.4	degree
a' =	0.8	psi

Total

α =	12.2	degree
a =	2.1	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:** IWM	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **4**



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
18.0	18.1	6.2	29.9	18.0
36.0	56.1	19.5	72.6	36.0
54.0	49.9	22.6	81.3	54.0

Effective

ϕ' =	24.3	degree
c' =	0.9	psi

Total

ϕ =	12.5	degree
c =	2.2	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **5**

18.0 psi

36.0 psi

54.0 psi

NOTE: Pore pressure built up before shearing, adjusted results to initial backpressure.

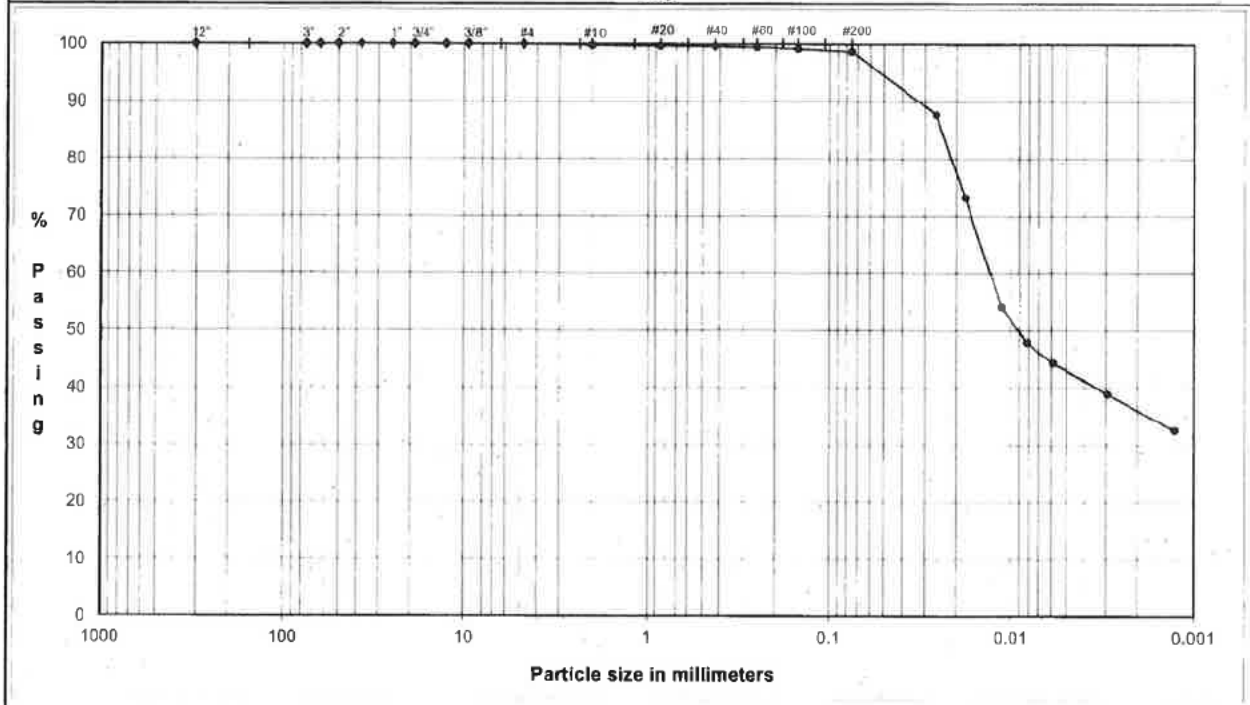
Golder Associates Inc. **Atlanta, Georgia**	**Title:** ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMENS PHOTOGRAPH - 18.0 36.0 54.0 psi				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-4 UD 20.0-22.0'	**Technician:** PWM/FT **Check:**	**Reviewed:** **Approved:**	**Start Date:** 7/17/2018	**Job Number:** 18103173	**Figure:** 6

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-4** Depth: **25.0-26.0'**
TYPE: **Bag**



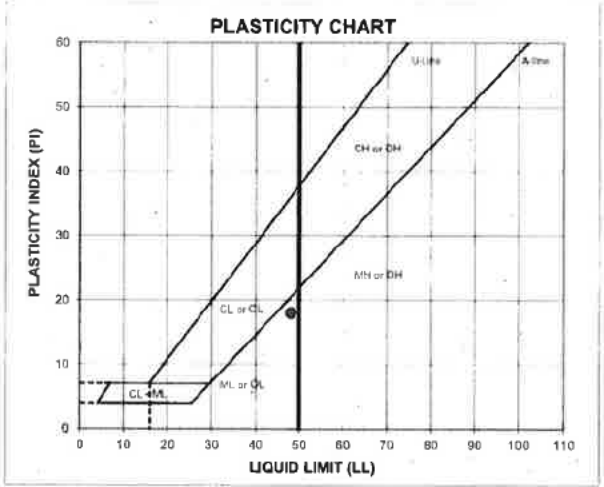
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.7**		
#40	0.43	**99.6**	Medium Sand	**0.2**
#60	0.25	**99.5**		
#100	0.15	**99.2**		
#200	0.075	**98.7**	Fine Sand	**0.9**

Hydrometer Analysis

(mm)	%Finer		
0.026	**87.7**		
0.018	**73.2**		
0.011	**54.2**	Fines	
0.0082	**47.9**	Silt or Clay	**98.7**
0.0059	**44.3**		
0.0029	**38.9**		
0.0013	**32.5**		



ATTERBERG LIMITS

Method -B (Dry preparation)

PL	LL	PL	PI	LI
37.7	**48**	**30**	**18**	**0.40**

LL (oven-dried)	
0.75 × DRGANIC (OL/OB)	

DESCRIPTION: CLAYEY SILT, trace fine to coarse sand; dark yellowish brown.

USCS: ML

TECH	HH/HEH/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

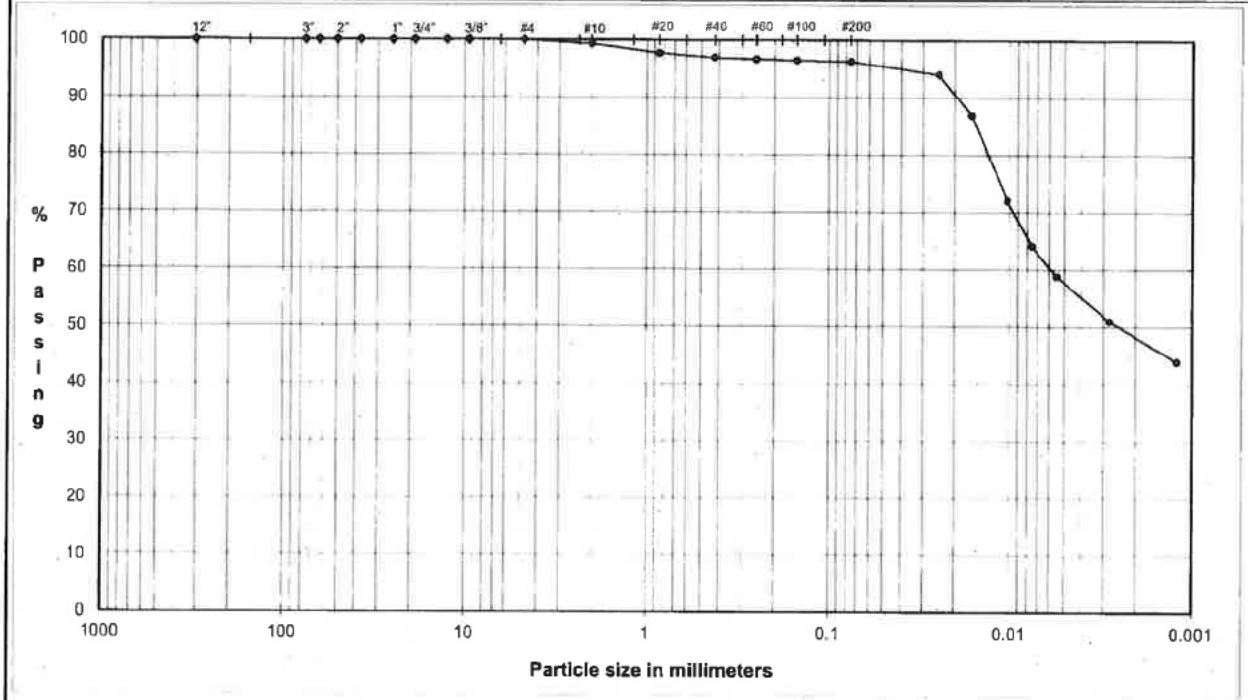
AUGUST 2018

18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-4** Depth: **30.0-32.0'**
TYPE: **UD**



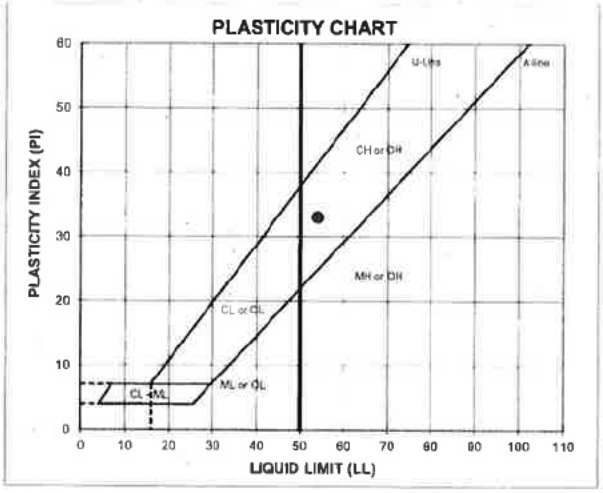
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.3**	Coarse Sand	**0.7**
#20	0.85	**97.8**		
#40	0.43	**97.0**	Medium Sand	**2.3**
#60	0.25	**96.7**		
#100	0.15	**96.5**		
#200	0.075	**96.3**	Fine Sand	**0.7**

Hydrometer Analysis

(mm)	%Finer		
0.024	**94.0**		
0.016	**87.0**		
0.010	**72.1**	Fines	
0.0075	**64.2**	Silt or Clay	**96.3**
0.0055	**58.9**		
0.0028	**51.0**		
0.0012	**43.9**		



ATTERBERG LIMITS

Method -B (Dry preparation)

ML	LL	PL	PI	LI
37.1	**54**	**21**	**33**	**0.47**

LL (oven-dried) / 0.75 - ORGANIC (OL OH)

DESCRIPTION: CLAY, trace fine to coarse sand; brown, yellow, and gray.

USCS: CH

TECH	TB/HH/HEH
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	7	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	RP-4	30.0-32.0'	Flow Pump Speed	7	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.137	B-Value, f	1.00	Height, inches	3.135
Diameter, inches	2.879	Cell Pres.	90.0	Diameter, inches	2.878
Area, cm²	42.00	Bot. Pres.	80.0	Area, cm²	41.97
Volume, cm³	334.65	Top Pres.	80.0	Volume, cm³	334.20
Mass, g	589.95	Tot. B.P.	80.0	Mass, g	596.75
Moisture Content, %	37.08	Head, max.	123.80	Moisture Content, %	38.66
Dry Density, pcf	80.25	Head, min.	123.80	Dry Density, pcf	80.36
Spec. Gravity (assumed)	2.700	Max. Grad.	15.55	Volume Solids, cm³	159.40
Volume Solids, cm³	159.40	Min. Grad.	15.55	Volume Voids, cm³	174.81
Volume Voids, cm³	175.25			Void Ratio	1.10
Void Ratio	1.10			Saturation, %	95.2%
Saturation, %	91.1%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	589.95	711.15
Wt Soil & Tare, f	g	430.37	544.79
Wt Tare	g	0.00	114.47
Wt Moisture Lost	g	159.58	166.36
Wt Dry Soil	g	430.37	430.32
Water Content	%	37.08%	38.66%

DESCRIPTION

CLAY, trace fine to coarse sand; brown, yellow, and gray.

Flow Pump Rate 2.38E-04 cm³/sec

USCS CH

TIME FUNCTIONS, SECONDS								dP					
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)	
08/02/18	43314	10	0	21.4	0	0	0	0	1.76	123.80	15.55	3.5E-07	
08/02/18	43314	10	5	21.4	5	5	300	300	1.76	123.80	15.55	3.5E-07	
08/02/18	43314	10	10	21.4	5	10	300	600	1.76	123.80	15.55	3.5E-07	
08/02/18	43314	10	15	21.4	5	15	300	900	1.76	123.80	15.55	3.5E-07	*
08/02/18	43314	10	20	21.4	5	20	300	1200	1.76	123.80	15.55	3.5E-07	*
08/02/18	43314	10	25	21.4	5	25	300	1500	1.76	123.80	15.55	3.5E-07	*
08/02/18	43314	10	30	21.4	5	30	300	1800	1.76	123.80	15.55	3.5E-07	*

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.5E-07 cm/sec **

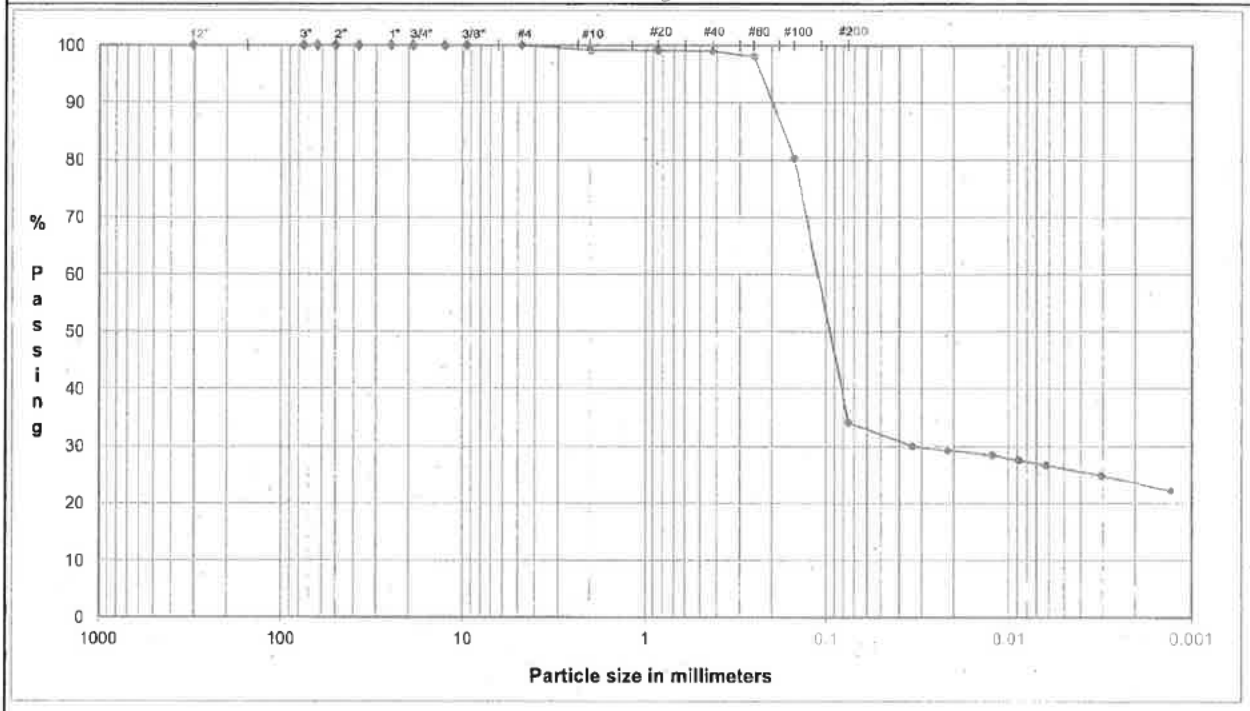
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-5** Depth: **15.0-18.0'**
TYPE: **Bag**



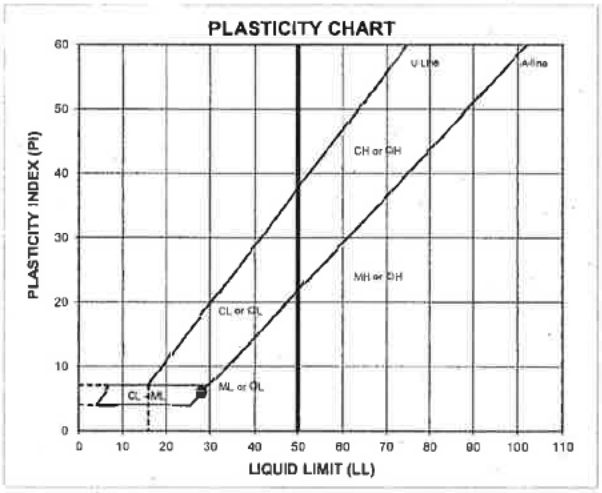
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.2**	Coarse Sand	**0.8**
#20	0.85	**99.1**		
#40	0.43	**99.0**	Medium Sand	**0.2**
#60	0.25	**98.0**		
#100	0.15	**80.3**		
#200	0.075	**34.0**	Fine Sand	**65.0**

Hydrometer Analysis

(mm)	%Finer		
0.034	**30.0**		
0.021	**29.2**		
0.012	**28.3**	Fines	
0.0088	**27.5**	Silt or Clay	**34.0**
0.0063	**26.6**		
0.0031	**24.9**		
0.0013	**22.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
24.4	**28**	**22**	**6**	**0.51**

LL (oven-dried) / 0.75 · ORGANIC (OL/OH)

DESCRIPTION: CLAYEY SAND to SILTY SAND, fine to coarse; yellowish brown.

USCS: SC-SM

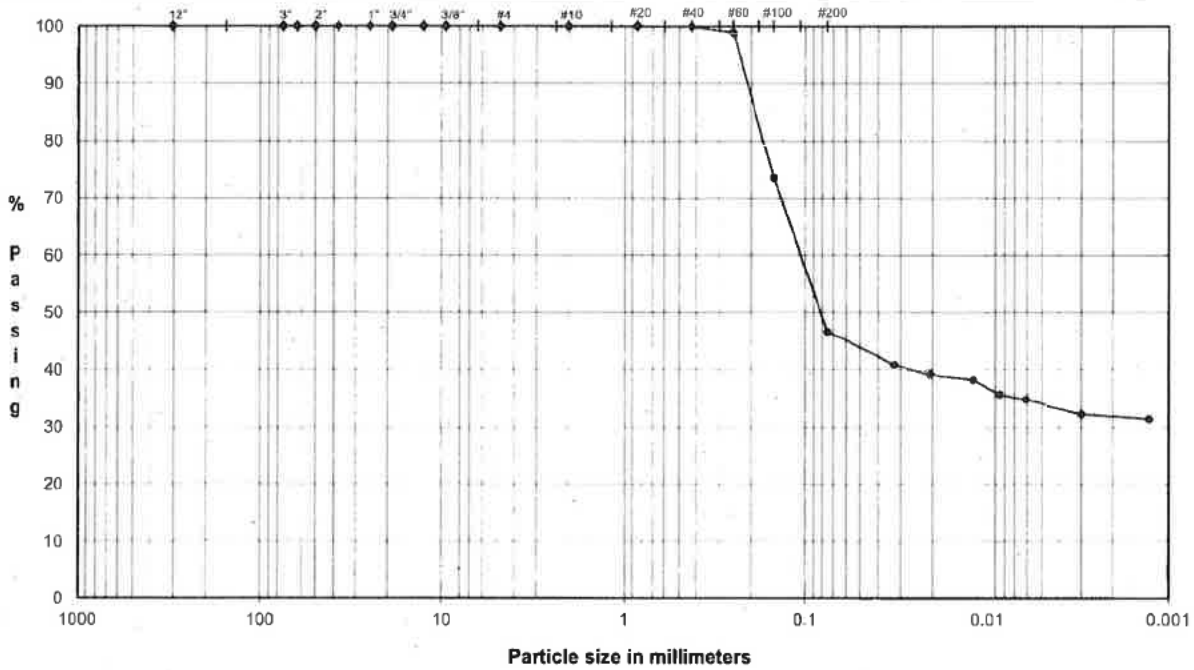
TECH	HH/HEH/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-7** Depth: **16.6-17.4'**
TYPE: **Bag**



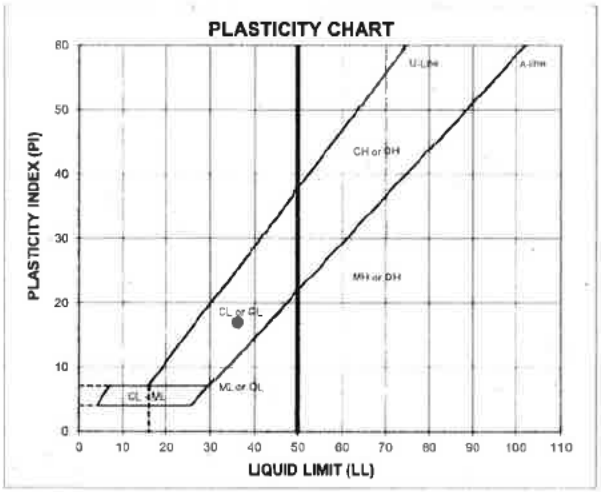
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**99.9**	Medium Sand	**0.1**
#60	0.25	**98.9**		
#100	0.15	**73.6**		
#200	0.075	**46.7**	Fine Sand	**53.3**

Hydrometer Analysis

(mm)	%Finer		
0.032	**40.9**		
0.021	**39.2**		
0.012	**38.3**	Fines	
0.0085	**35.7**	Silt or Clay	**46.7**
0.0061	**34.8**		
0.0030	**32.2**		
0.0013	**31.4**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_n	LL	PL	PI	LI
22.3	**36**	**19**	**17**	**0.20**

LL (oven-dried)	
0.75 ORGANIC (OL/OH)	

DESCRIPTION: SAND and SILTY CLAY, fine to medium; dark gray.

USCS: SC

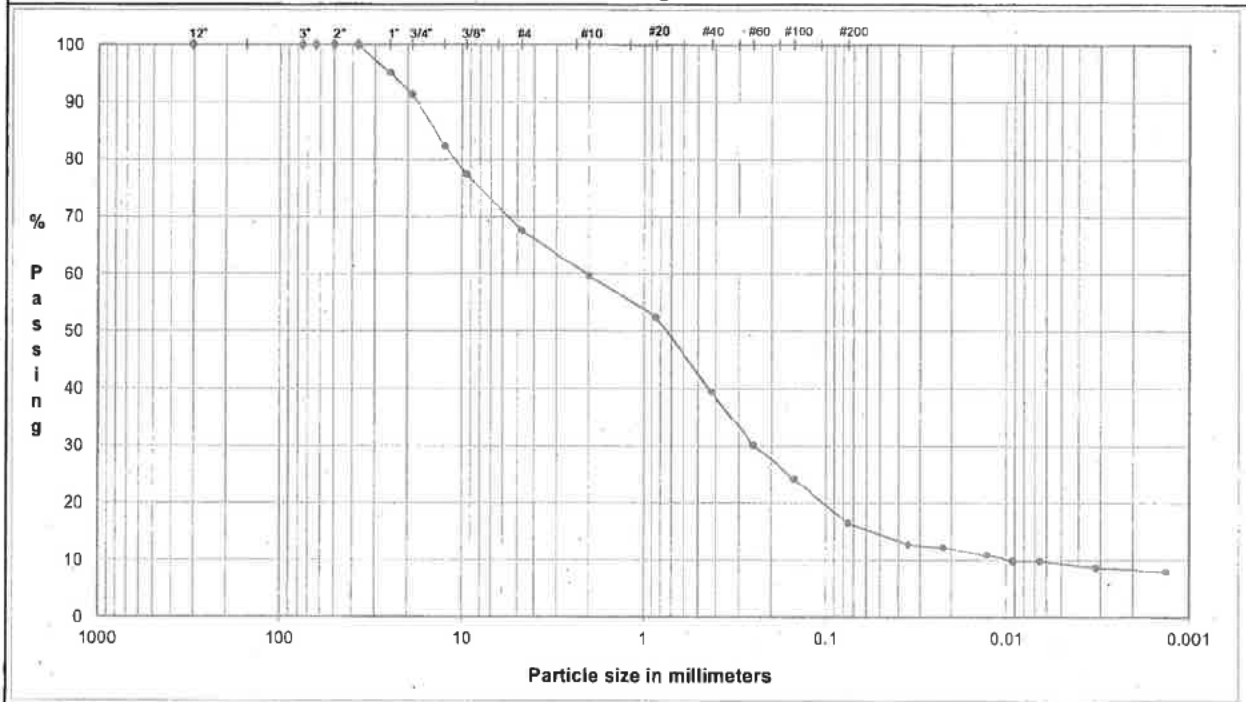
TECH	HH/HEH/TJ
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-9** Depth: **9.0-10.0'**
TYPE: **Bag**



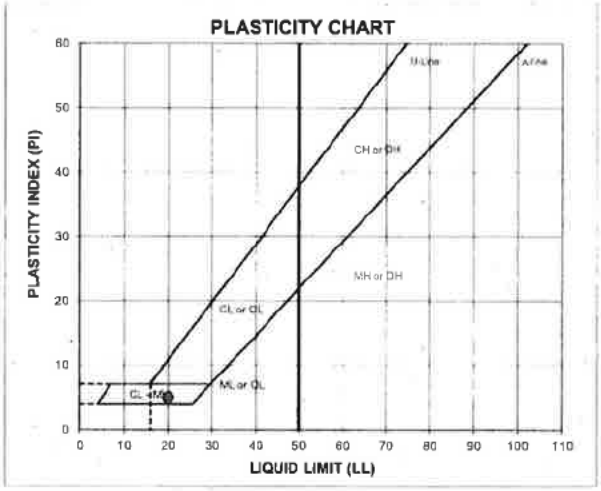
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**95.1**		
0.75"	19.0	**91.4**	Coarse Gravel	**8.6**
0.50"	12.7	**82.4**		
0.375"	9.5	**77.3**		
#4	4.8	**67.7**	Fine Gravel	**23.7**
#10	2.00	**59.7**	Coarse Sand	**8.0**
#20	0.85	**52.5**		
#40	0.43	**39.4**	Medium Sand	**20.3**
#60	0.25	**30.2**		
#100	0.15	**24.2**		
#200	0.075	**16.4**	Fine Sand	**23.0**

Hydrometer Analysis

(mm)	%Finer		
0.035	**12.8**		
0.022	**12.2**		
0.013	**11.0**	Fines	
0.0092	**9.9**	Silt or Clay	**16.4**
0.0065	**9.9**		
0.0032	**8.7**		
0.0013	**8.1**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
4.2	**20**	**15**	**5**	**-2.35**

LL (oven-dried)
0.75 ORGANIC (OL/OH)

DESCRIPTION: gravelly CLAYEY SAND to SILTY SAND, fine to coarse, fine to coarse gravel; reddish brown.

USCS: SC-SM

TECH	HH/HEH/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

NOTE: Insufficient sample received to perform in accordance with ASTM Standards

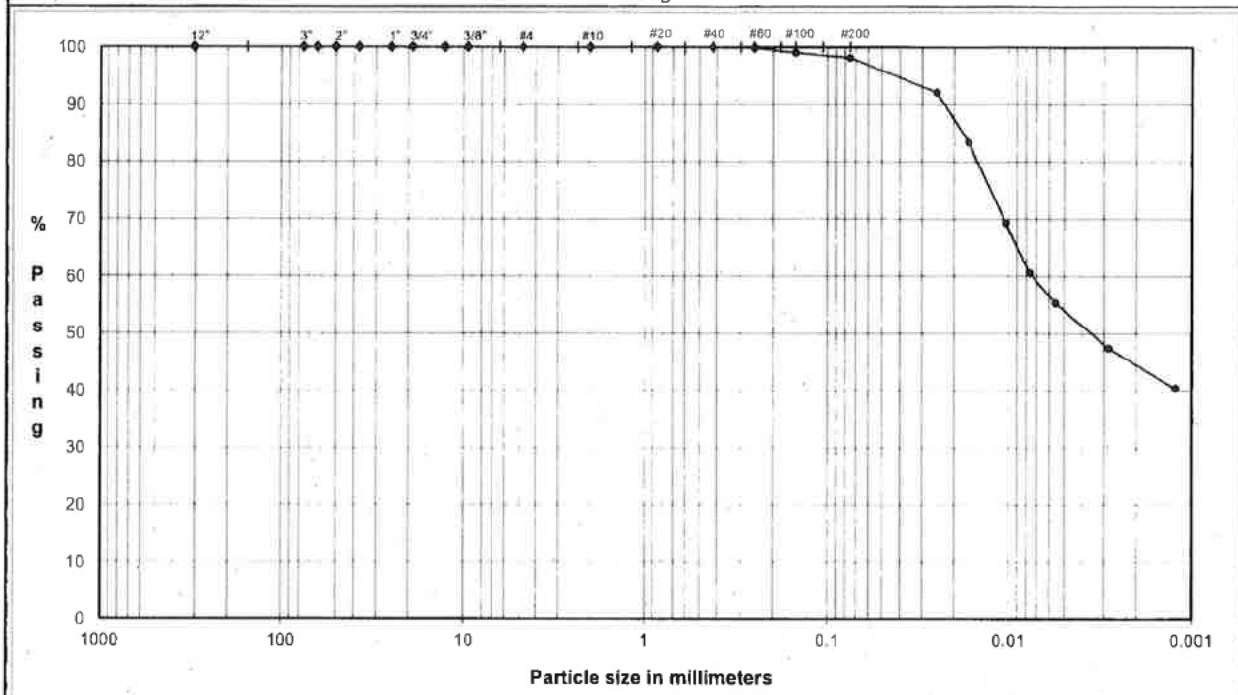
Golder Associates Inc.

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: FTN/ENTERGY WHITE BLUFF/AR
SAMPLE ID: RP-9 Depth: 26.0-27.0'
TYPE: Bag



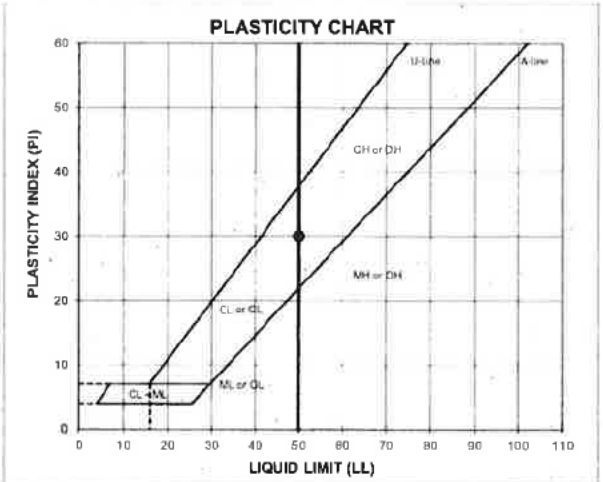
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	100.0	Medium Sand	0.0
#60	0.25	99.9		
#100	0.15	99.0		
#200	0.075	98.1	Fine Sand	1.8

Hydrometer Analysis

(mm)	%Finer		
0.025	92.1		
0.017	83.4		
0.010	69.3	Fines	
0.0077	60.6	Silt or Clay	98.1
0.0056	55.3		
0.0028	47.4		
0.0012	40.4		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
31.3	50	20	30	0.36

LL (oven-dried)
0.75 ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine sand; gray.

USCS: CH

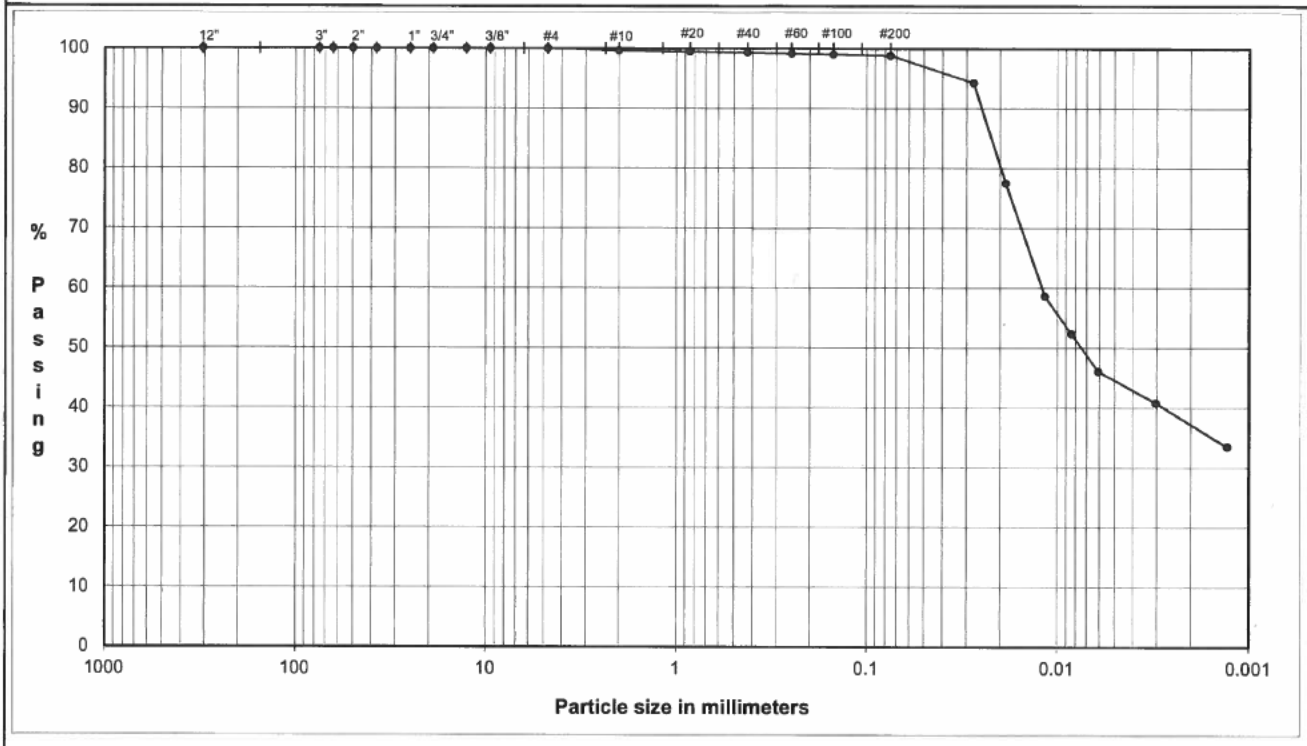
TECH	HH/HEH/TB
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-9** Depth: **30.0-32.0'**
TYPE: **UD**



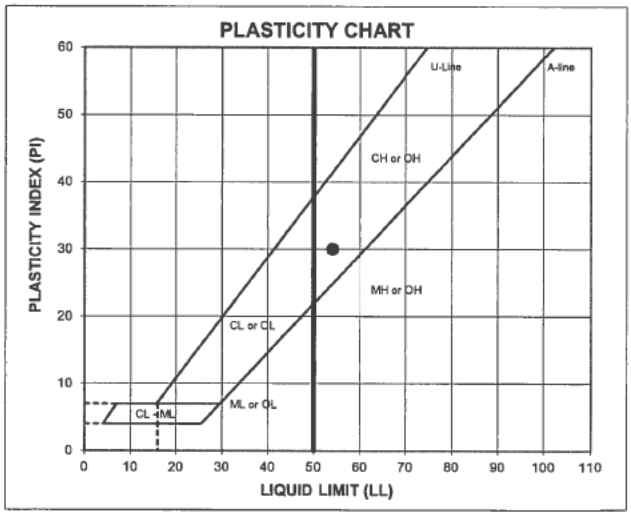
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.6	Coarse Sand	0.4
#20	0.85	99.5		
#40	0.43	99.3	Medium Sand	0.3
#60	0.25	99.2		
#100	0.15	99.0		
#200	0.075	98.8	Fine Sand	0.5

Hydrometer Analysis

(mm)	%Finer		
0.027	94.3		
0.019	77.5		
0.012	58.7	Fines	
0.0084	52.4	Silt or Clay	98.8
0.0061	46.1		
0.0030	40.9		
0.0013	33.5		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
30.2	54	24	30	0.19

LL (oven-dried)	
< 0.75 = ORGANIC (OL/OH)	

DESCRIPTION: CLAY, trace fine to coarse sand; olive gray.

USCS: CH

TECH	HEH/HH/HB/TJ
DATE	8/27/18
CHECK	
REVIEW	
APPROVE	

	Initial		Final		Notes						
Height =	1.000	in	0.988	in	Visual description (Golder procedure):	(CH) CLAY, trace fine to coarse sand; olive gray.					
Diameter =	2.500	in	2.500	in	Atterberg Limits (ASTM D4318):	LL =	54	PL =	24	PI =	30
Area =	4.909	in^2	4.909	in^2	Percent Finer (ASTM D422):	3/4 in. =	100%	No. 4 =	100%	No. 200 =	99%
Volume =	4.909	in^3	4.848	in^3	Specimen Type:	X	Intact		Reconstituted		
Water Content =	30.2%		34.0%		Remold Targets:						
Specific Gravity =	2.67	(ASTM D854)	2.67	(ASTM D854)	Water Content of Trimmings (ASTM D2216):	-					
Height of Solids =	0.5345	in	0.5345	in	Trimming Procedure:	Trimming ring					
Void Ratio =	0.871		0.848		Inundation:		Not inundated	X	Inundated at	1.70	ksf
Degree of Saturation =	92.5%		100.0%		Test Method:		A	X	B		
Wet Mass =	0.329	lb	0.338	lb	Apparatus:	GeoTac automated consolidometer					
Dry Mass =	0.253	lb	0.253	lb	Final Water Content Specimen:	X	Entire		Partial		
Wet Unit Weight =	115.7	pcf	120.6	pcf	Final Differential Height:	0.0000	in				
Dry Unit Weight =	88.9	pcf	90.0	pcf	Estimated Preconsolidation Stress:		ksf				

			At End of Primary Consolidation				At End of Load Duration							
	Axial Stress (ksf)	Load Duration (min)	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Time Deformation Method	Average Void Ratio	Coefficient of Consolidation (ft^2/day)	Time to 50% Consolidation (min)
Seating*	1.70	60					0.0000	0.9925	0.00	0.857				
1	3.7	60					0.0082	0.9843	0.82	0.842				
2	1.0	60					0.0047	0.9877	0.47	0.848				
3	0.3	17					-0.0028	0.9953	-0.28	0.862				
4	0.5	60					-0.0029	0.9953	-0.29	0.862				
5	1.0	60					-0.0028	0.9953	-0.28	0.862				
6	2.0	60					0.0003	0.9922	0.03	0.856				
7	4.0	60					0.0080	0.9845	0.80	0.842				
8	8.0	240	0.0221	0.9704	2.21	0.816	0.0230	0.9695	2.30	0.814	2 (Root time)	0.822	0.322	1.3
9	16.0	240	0.0429	0.9496	4.29	0.777	0.0468	0.9457	4.68	0.769	2 (Root time)	0.790	0.247	1.8
10	4.0	240					0.0327	0.9597	3.27	0.796				
11	1.0	120					0.0147	0.9777	1.47	0.829				
12	0.3	27					0.0048	0.9877	0.48	0.848				

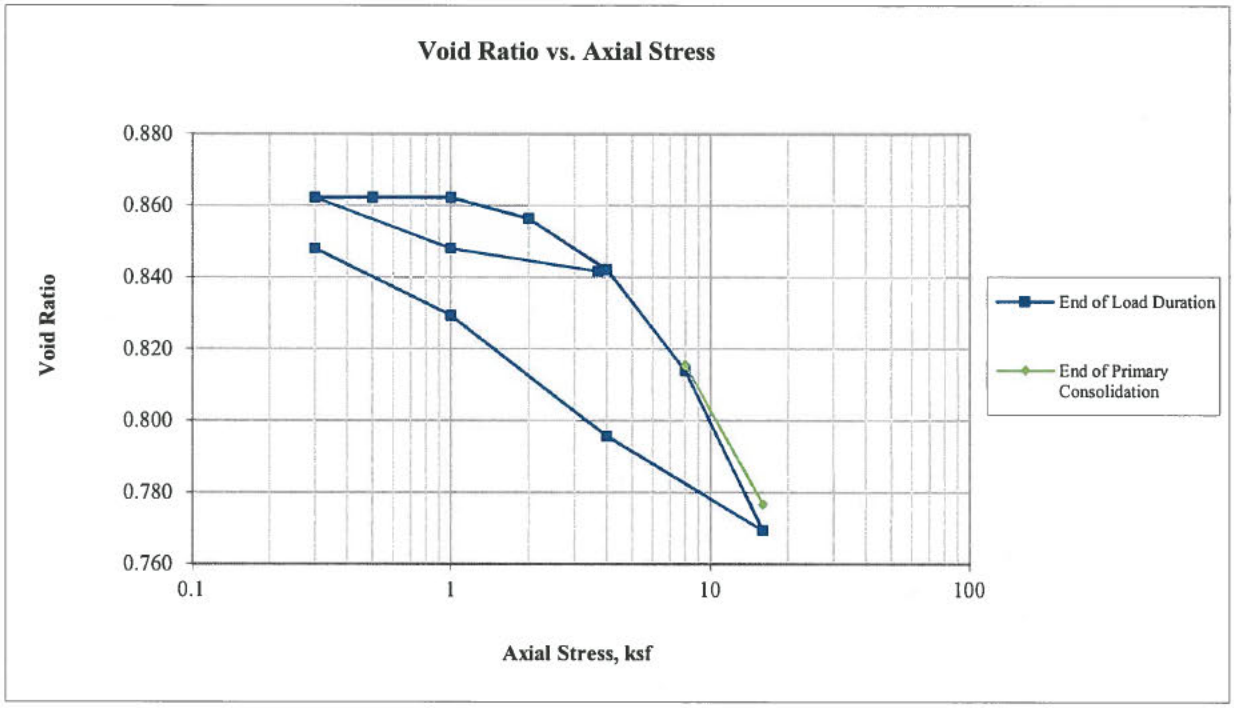
Golder Associates Inc.
Atlanta, Georgia

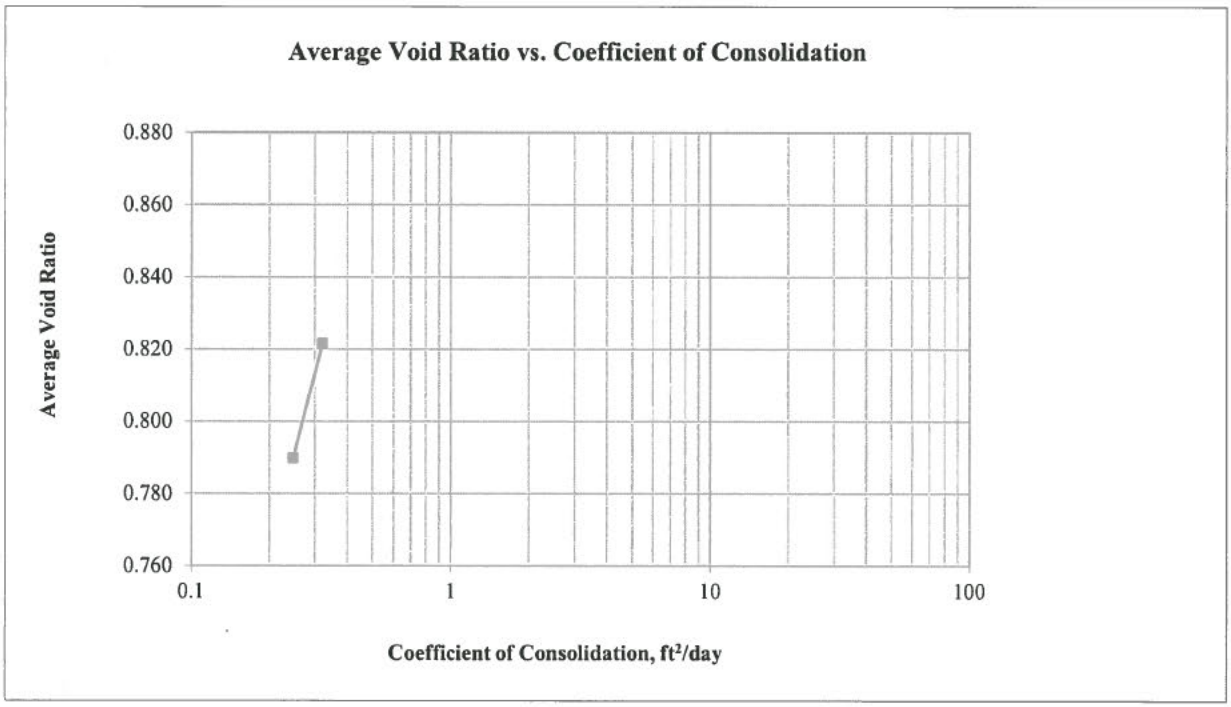
Title:

ASTM D2435
ONE-DIMENSIONAL CONSOLIDATION TEST REPORT
SPECIMEN AND SUMMARY DATA

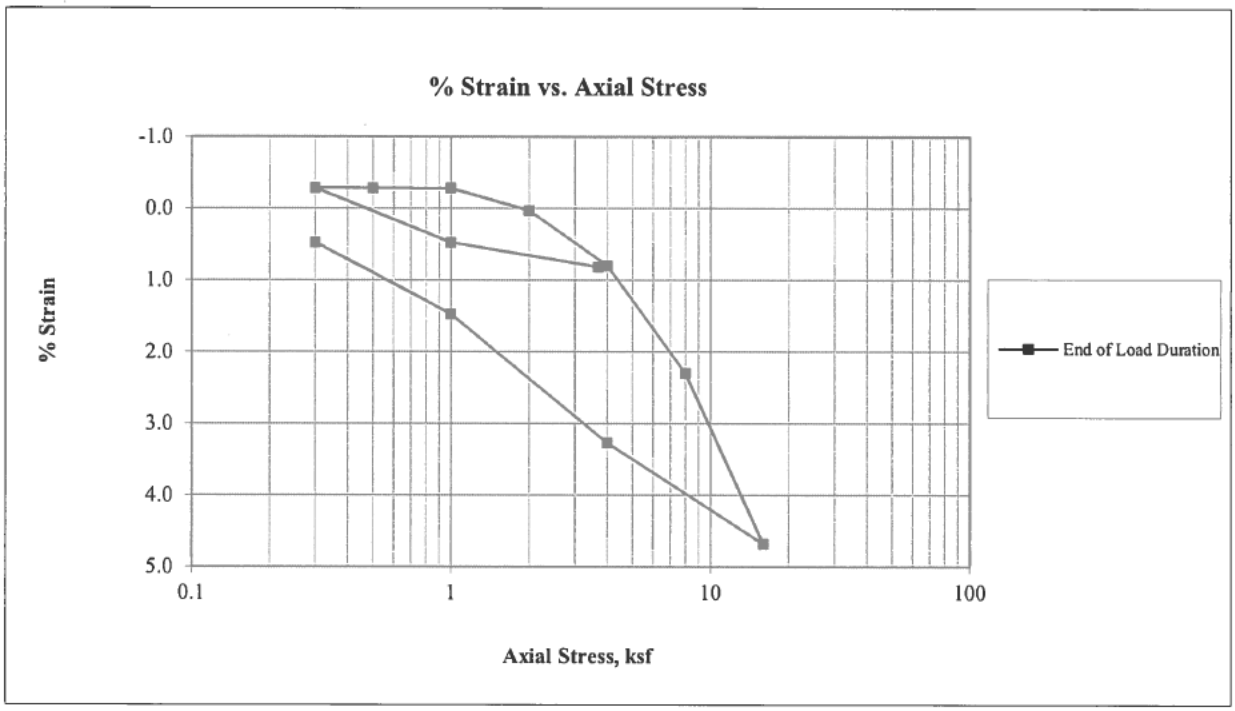
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR

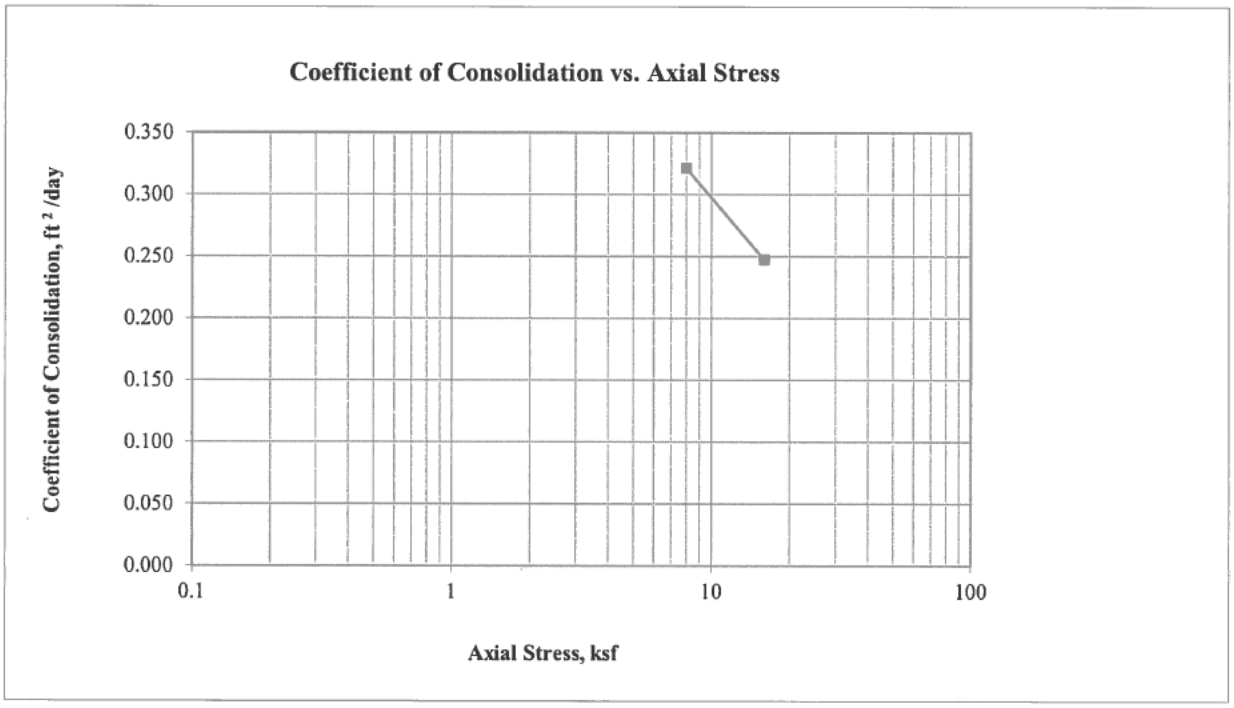
Sample:	Technician:	Checked:	Reviewed:	Approved:	Start Date:	Job Number:	Figure:
RP-9 UD 30.0-32.0'	PWM/FT	PWM			8/28/2018	18103173	1





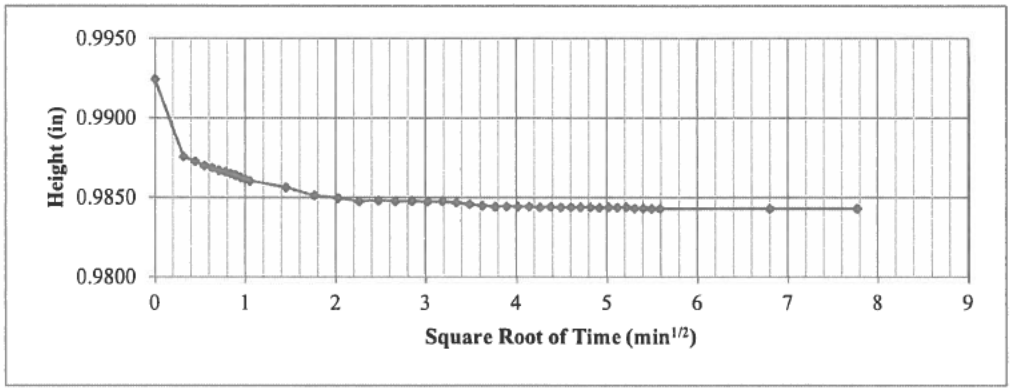
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **CONSOLIDATION PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	**Technician:** **PWM/FT**	**Reviewed:**	**Start Date:** **8/28/2018**	**Job Number:** **18103173**	**Figure:** **2**



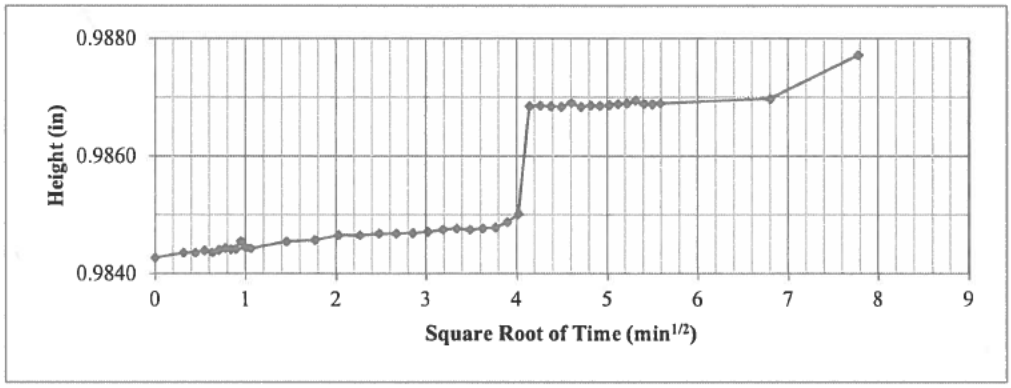


Golder Associates Inc. **Atlanta, Georgia**	Title: **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **CONSOLIDATION PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	Technician: **PWM/FT**	Reviewed:	Start Date: **8/28/2018**	Job Number: **18103173**	Figure: **2A**

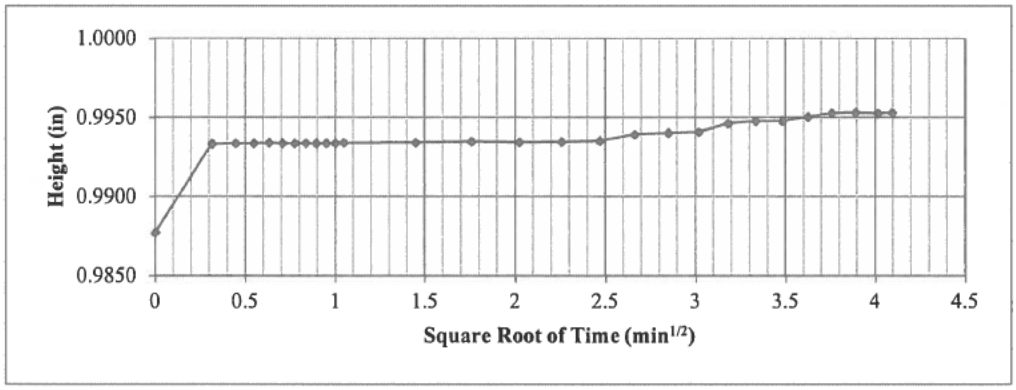
3.7 ksf



1.0 ksf

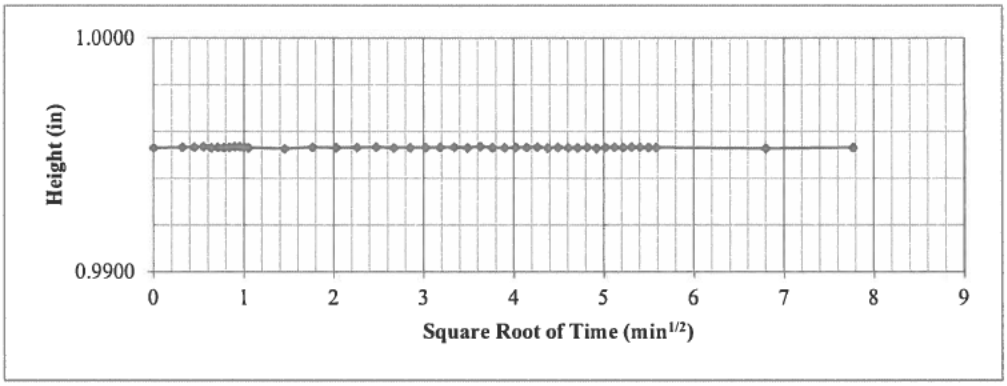


0.3 ksf

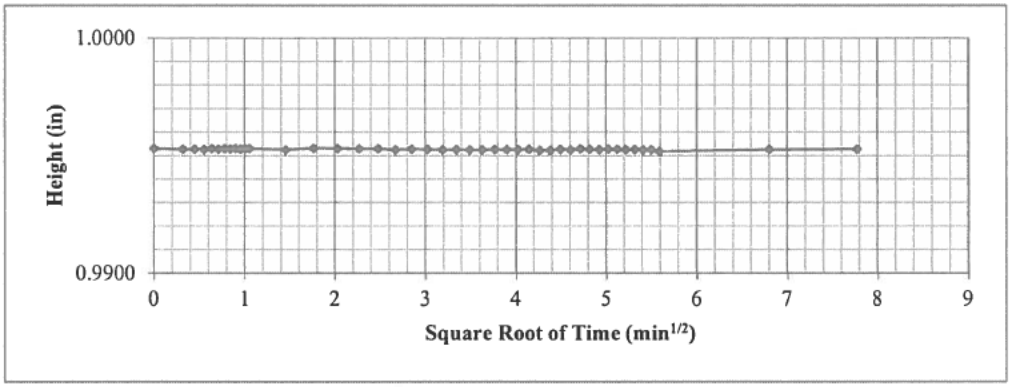


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **TIME-DEFORMATION PLOTS (1)**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	**Technician:** **PWM/FT**	**Reviewed:**	**Start Date:** **8/28/2018**	**Job Number:** **18103173**	**Figure:** **3**

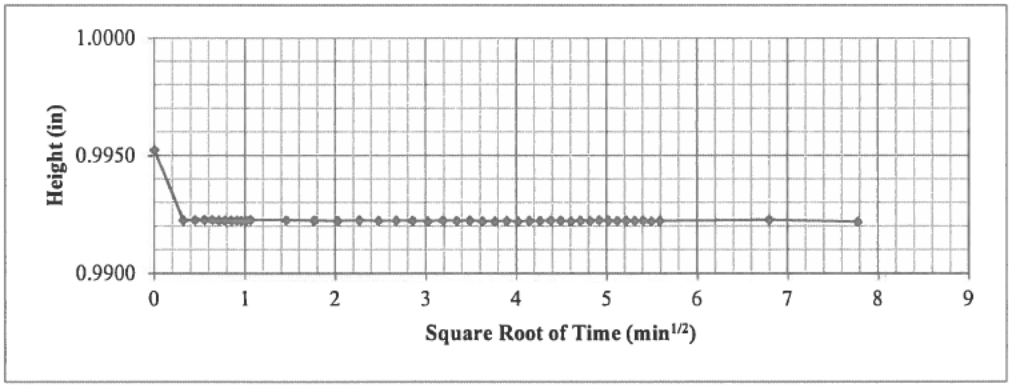
0.5 ksf



1.0 ksf

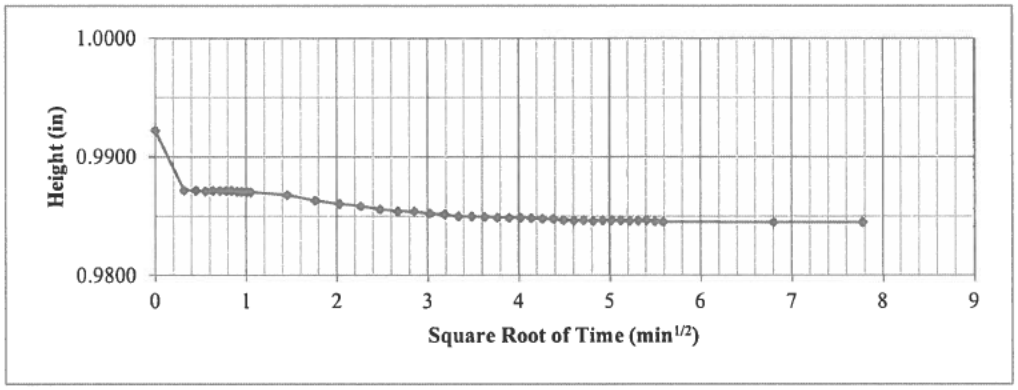


2.0 ksf

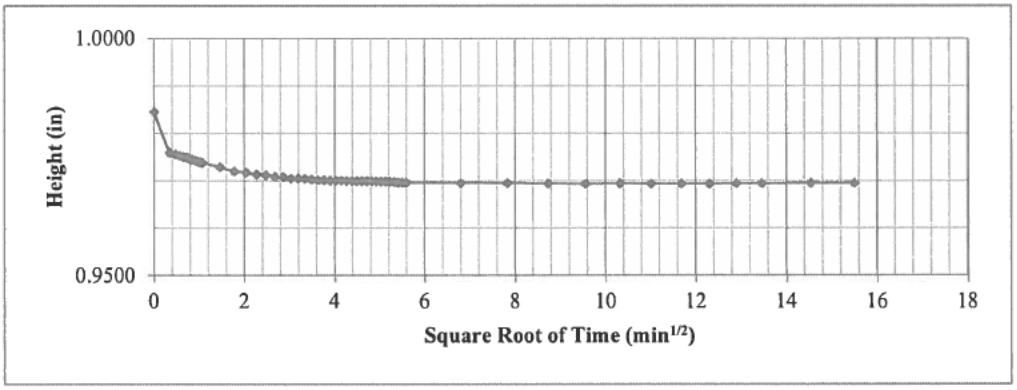


Golder Associates Inc. Atlanta, Georgia	Title: ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT TIME-DEFORMATION PLOTS (2)				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-9 UD 30.0-32.0'	Technician: PWM/FT	Reviewed:	Start Date: 8/28/2018	Job Number: 18103173	Figure: 4

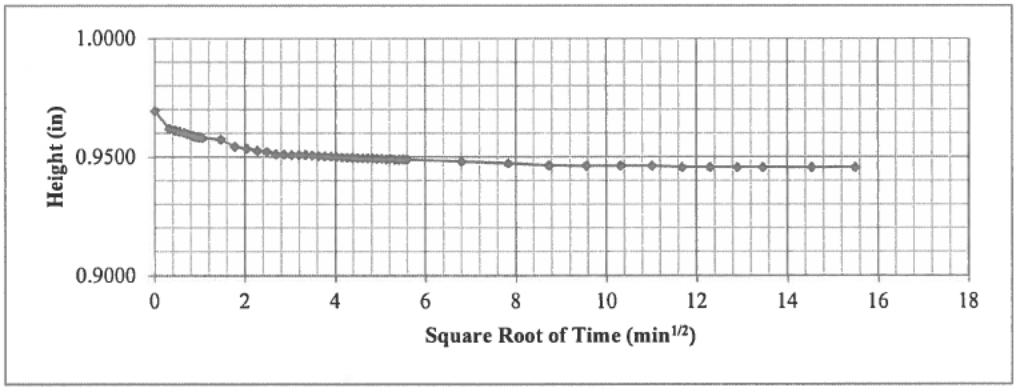
4.0 ksf



8.0 ksf

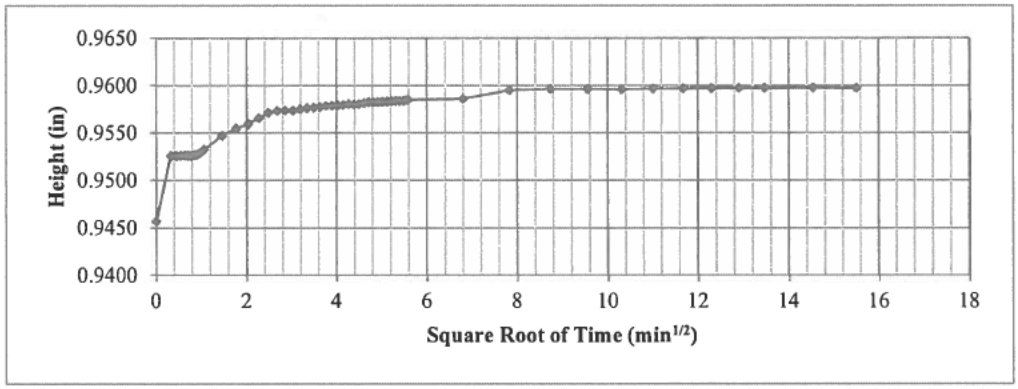


16.0 ksf

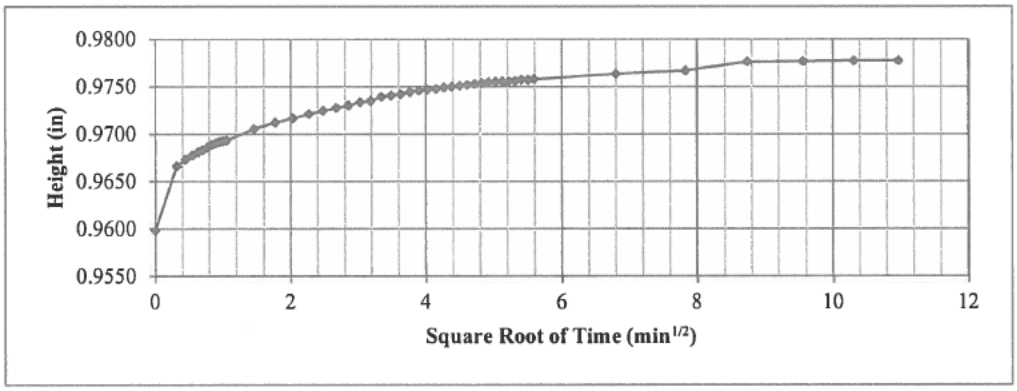


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **TIME-DEFORMATION PLOTS (3)**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	**Technician:** **PWM/FT**	**Reviewed:**	**Start Date:** **8/28/2018**	**Job Number:** **18103173**	**Figure:** **5**

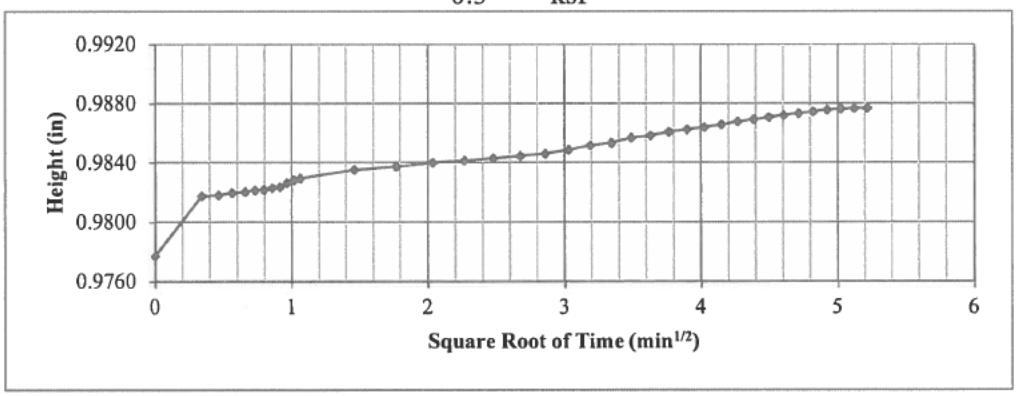
4.0 ksf



1.0 ksf



0.3 ksf



Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **TIME-DEFORMATION PLOTS (4)**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	**Technician:** **PWM/FT**	**Reviewed:**	**Start Date:** **8/28/2018**	**Job Number:** **18103173**	**Figure:** **6**