Closure Plan
for Water Recycle Ponds

Entergy Arkansas, LLC
Independence Plant
Newark, Independence County, Arkansas

August 2020

Prepared For
Entergy Arkansas, LLC

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Section 1
Introduction

Entergy Arkansas, LLC (Entergy) operates the Independence Steam Electric Station (Plant), located at 555 Point Ferry Road, Newark, AR 72562. This Plant operates two Water Recycle Ponds: East and West (Ponds), as part of its process water system to manage bottom ash transport water. 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) § 257.102, this Closure Plan (Plan) describes the steps to close the Ponds through removal of CCR per 40 CFR § 257.102(c). Section 40 CFR § 257.102(b) identifies the content of written closure plans, which, for closure by removal, must include the following information:

- A narrative description of how the CCR unit will be closed;
- A description of procedures to remove the CCR and decontaminate the CCR unit;
- An estimate of the maximum inventory of CCR ever onsite over the active life of the CCR unit; and
- A schedule for completing all activities necessary to satisfy the closure criteria.

1.1 Site Information

The Plant is located near Newark, Independence County, Arkansas (Figure 1). The Plant is located at approximate latitude 35˚40'39" N, longitude 91˚24'42" W (front gate). The Ponds are located on approximately 19 acres within the Plant.

Entergy's current National Pollutant Discharge Elimination System (NPDES) Permit AR0037451 has six designated outfalls 01C, 01F, 01G, 01H, 01I, and 002. Internal Outfall 01C is used for treated sanitary wastewater. Internal Outfall 01F is used for discharge from the Ponds consisting of low volume wastewater (boiler blowdown and regeneration wastewater from demineralizer plant), metal cleaning wastewater (wastewater from chemical metal cleaning and boiler fireside wash), and bottom ash transport water. Internal Outfall 01G is used for discharge of landfill leachate to the surge pond. Internal Outfall 01H is used for combined treated wastewater consisting of low volume wastewater (turbine area sump drains, boiler blowdown, regeneration wastewater from demineralizer plant), sanitary wastewater, coal pile runoff, metal cleaning wastewater (wastewater from chemical metal cleaning and boiler fireside wash), bottom ash transport water , landfill leachate, and stormwater runoff from process areas, switchyard, and the landfill. Internal Outfall 01I is used for cooling tower blowdown. Outfall 002 is used for combined treated wastewater consisting of cooling tower blowdown, low volume wastewater, sanitary wastewater, coal pile runoff, metal cleaning wastewater, landfill leachate, and stormwater runoff

from process areas, switchyard, and the landfill. The receiving water is the White River in Segment 4F of the White River Basin. The coordinates for the outfalls are as listed below:

- Internal Outfall 01C: Latitude: 35˚40'30" N; Longitude: 91˚24'38" W
- Internal Outfall 01F: Latitude: 35˚40'15" N; Longitude: 91˚24'31" W
- Internal Outfall 01G: Latitude: 35˚40'09" N; Longitude: 91˚24'29" W
- Internal Outfall 01H: Latitude: 35˚40'14" N; Longitude: 91˚24'13" W
- Internal Outfall 01I: Latitude: 35˚40'23" N; Longitude: 91˚24'25" W
- Outfall 002: Latitude: 35˚39'13" N; Longitude: 91˚24'23" W

Water contained in the Ponds is part of the Plant's bottom ash transport water management system. It should be noted that the NDPES Permit is currently in the renewal process and changes are expected upon finalization.

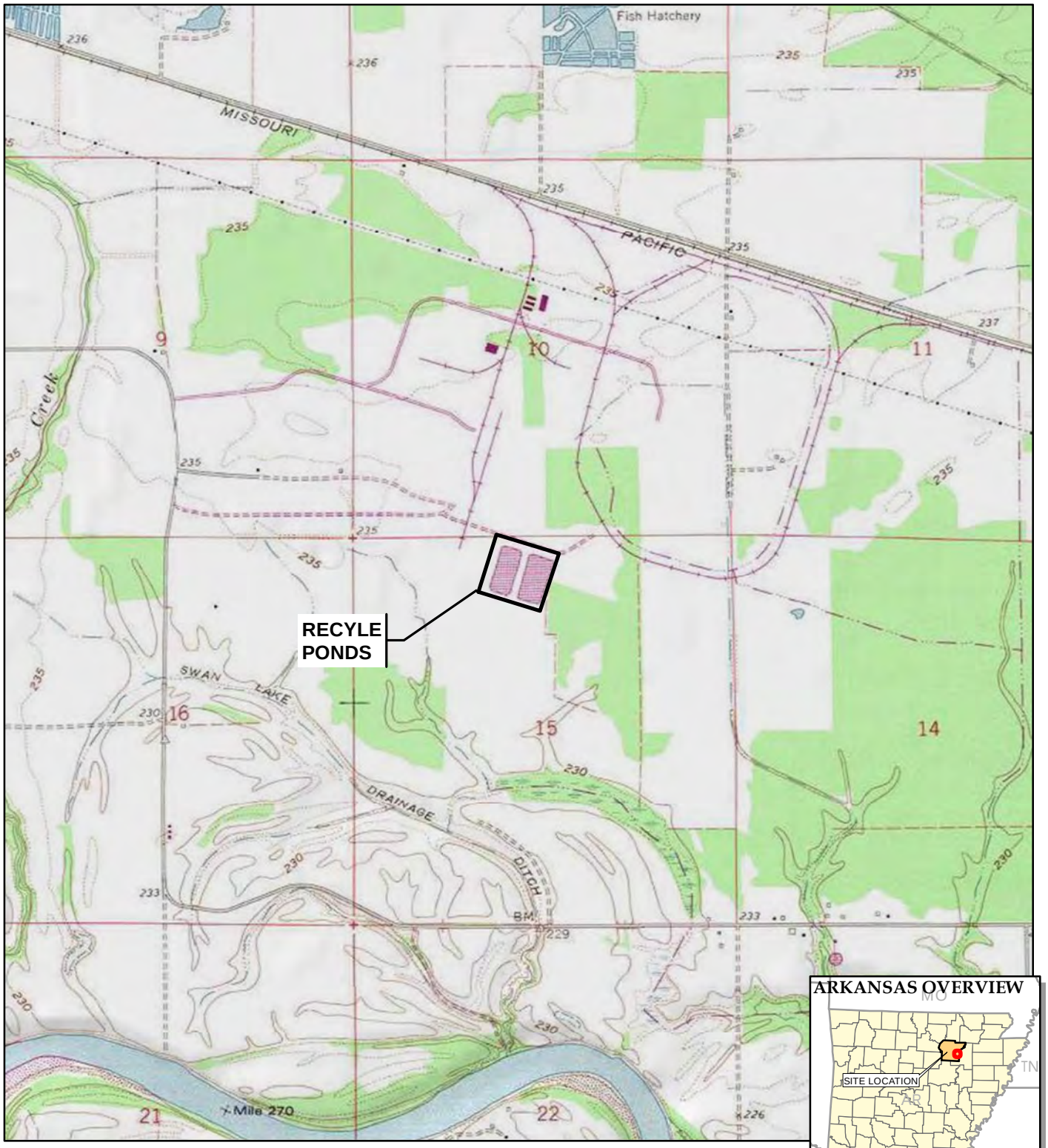
1.2 Site Characteristics

The Plant began commercial operation in 1983 with the start-up of Unit 1 and expanded to include Unit 2 in 1984. The Ponds were part of the original design for the Plant and have been in service since the start of initial commercial operation. During operations, the bottom ash from the boilers is removed from the hopper by a sluicing process and transported to four dewatering bins. After the water is drained from the bins, the bottom ash is unloaded into trucks and taken to the on-site landfill for disposal or sold as a product for beneficial reuse. The water drained from the dewatering bins is routed to the Ponds for intermediate storage prior to being returned to the bottom ash transport system for reuse in the sluicing operations.

1.3 Hydrogeologic Setting

There are two main subsurface stratigraphic horizons below the Ponds (boring locations, boring logs, and geotechnical data are included on Figure 2 and in Appendices A and B):

- **Upper Confining Unit**. An upper confining unit consisting of clays and silts is present at the ground surface down to 23 to 28 feet below ground surface (bgs). Vertical hydraulic conductivity of the upper confining unit is estimated to range from 4.0 x 10-9 to 7.8 x 10-7 centimeters per second (cm/s) based on flexible wall permeability tests (FTN Associates, Ltd. (FTN) 2001, FTN and Golder Associates Inc. 2017).
- **Alluvial Aquifer**. An alluvial aquifer consisting of fine to medium grained sandy sub rounded to sub angular chert gravel with varying amounts of silt and clay is present beneath the upper confining unit. The alluvial aquifer is the uppermost laterally continuous water bearing zone beneath the Ponds and represents the uppermost aquifer pursuant to the CCR Rule. The alluvial aquifer extends to depths of 85 to 90 feet bgs. Hydraulic conductivity of the alluvial aquifer is estimated to range from 2.1 x 10-2 to 6 x 10-2 cm/s (FTN 2015).



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 INDEPENDENCE PLANT
RECYCLE PONDS
NEWARK, INDEPENDENCE COUNTY, ARKANSAS

TITLE:

SITE LOCATION MAP

DRAWN BY:	R. WIXON
CHECKED BY:	C. ALONSO
APPROVED BY:	J. HOUSE
DATE:	JULY 2020
PROJ. NO.:	397572.0000.0000
FILE:	Fig01_397572-001slm.mxd

FIGURE 1

V:\1-PROJECTS\Entergy\Newark AR\397572\Fig01_397572-001slm.mxd -- Saved By: RWIXON on 7/22/2020, 11:48:07 AM

LEGEND

- Soil boring
- Monitoring well
- Piezometer

STATE OF ARKANSAS
REGISTERED PROFESSIONAL GEOLOGIST
No. 1952
TRENT WILLIAM McDANIEL
7-30-2020

NOTES

1. BASE MAP IMAGERY FROM ESRI/DIGITAL GLOBE, 2016.

N

0 300 600 Feet

1 " = 333 '
1:4,000

PROJECT:
ENTERGY INDEPENDENCE PLANT
RECYCLE PONDS
NEWARK, INDEPENDENCE COUNTY, ARKANSAS

TITLE:
RECYCLE PONDS BORING LOCATION MAP

DRAWN BY:	R. WIXON	PROJ. NO.:	397572.0000.0000
CHECKED BY:	C. ALONSO		
APPROVED BY:	J. HOUSE		**FIGURE 2**
DATE:	JULY 2020		

TRC
Two United Plaza
8550 United Plaza Blvd., Suite 502
Baton Rouge, LA
Phone: 225.216.7483

FILE NO.: Fig02_397572-002.mxd

Plot Date: 7/22/2020, 11:51:45 AM by RWIXON – LAYOUT: ANSI B (11"x17")
Path: V:\1-PROJECTS\Entergy\Newark AR\397572\Fig02_397572-002.mxd
Coordinate System: NAD 1983 StatePlane Arkansas North FIPS 0301 Feet (Foot US)
Map Rotation: 0

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Section 2
Closure Plan

2.1 Closure Description

The Ponds will be closed in accordance with 40 CFR § 257.102(c) through the removal of CCR such that no residual CCR remains visible plus over-excavation of approximately six (6) inches of subsoils. Certification of the closure will be provided by a registered Arkansas professional engineer and registered Arkansas professional geologist. Anticipated closure steps and estimated timing for each Pond are described below in Section 2.2.

Water flows to the Ponds have been discontinued or diverted and re-routed to a newly constructed and commissioned closed-loop bottom ash transport water system. The Ponds will be dewatered of surface and pore water and closed through the removal of CCR. The procedure proposed to remove the CCR and decontaminate the Ponds per 257.102(c) will consist of excavation and removal by mechanical dredging and/or excavation. As with previously approved pond sediment removal efforts, CCR sediments will be placed in the on-site CCR landfill (See Attachment C for documentation of the most recent Arkansas Department of Environmental Quality [ADEQ] approval for sediment removal from the Ponds). The facility's on-site CCR landfill permit (Permit Number 0200-S3N-R2) provides for disposal of removed materials as described in Condition 4 below:

> *This permit is for the disposal of solid waste generated by Entergy Arkansas, LLC. at the Independence plant. The authorized waste streams include coal ash wastes including additional constituents derived from air pollution control technology associated with compliance with the mercury and air toxics standards, cooling tower sediments, cooling water screenings, coal mill rejects, non-hazardous sand blast media, construction debris, waste coal, sump pit sediments, water treatment system sediments and resins, fire brick and refractory materials, and sediments from dredging operations of facility storm water ditches, and facility NPDES units, as indicated in the permit application documentation. a. Additional waste items not mentioned above may be authorized by the Department for disposal at the facility on a case-by-case basis when requested by the permittee. b. Regulated PCBs and PCB items as defined in 40 CFR 761 or "Hazardous waste" as defined by Regulation Number 23 are not authorized for disposal in the facility. All disposed materials or waste streams and their volumes shall be reported in the annual report that is to be submitted to the Solid Waste Division.*

The Ponds will be over-excavated by six inches (beyond visible CCR) to ensure removal of residual CCR. The Ponds will be backfilled with clean on-site borrow source material to adjacent ground elevations as

necessary. Final fill and grading may be determined as closure proceeds based on financial and timing considerations. The final grade will be designed to promote positive drainage.

Groundwater monitoring will continue to be performed as required by 40 CFR § 257, Subpart D. Upon completion of "clean" closure of the Ponds and placing the certification of completion of closure into the Plant's Facility Operating Record (FOR), per the CCR Rule, the existing groundwater monitoring system will be decommissioned, and "clean" closure will be deemed complete.

2.2 Closure Timeframe

Closure activities for the Ponds are anticipated to commence no later than August 4, 2020 for the West Pond. The East Pond will commence closure per the requirements of 40 CFR § 257.101(a)(1). Closure of both ponds is anticipated to be completed in August 2025. The table below provides estimated major milestone dates of closure activities.

Table 1
Closure Construction Summary

MILESTONE	APPROXIMATE ANTICIPATED START DATE	APPROXIMATE ANTICIPATED END DATE
Consultation/coordination with DEQ regarding necessary permits	August 2020 (West Pond)	February 2021
Cease discharge of CCR and non-CCR effluents into West Pond	August 4, 2020	N/A
Cease discharge of CCR and non-CCR effluents into East Pond	April 2021	N/A
Dewater West Pond	March 2023	June 2023
Remove CCR from and decontaminate West Pond	July 2023	September 2023
Backfill West Pond and implement stabilization and site grading	October 2023	June 2024
Dewater East Pond	March 2024	June 2024
Remove CCR from and decontaminate East Pond	July 2024	September 2024
Backfill East Pond and implement stabilization and site grading	October 2024	June 2025
Completion of construction closure activities for East and West Ponds	N/A	August 2025

2.3 CCR Removal Volume and Area Estimate

East Pond is approximately 6.5 acres (745' X 385') and has a capacity (volume) of 124,500 cubic yards (CY). West Pond is identical in size and capacity to East Pond. The total combined volume for the Ponds

is 249,000 CY and is the maximum potential volume on site at any time. Approximately 19 acres, including the pump station, is the largest area that will be affected by the closure operation.

2.4 Notifications

As required by 40 CFR § 257.102(h) and § 257.105(i), Entergy will post to the Plant's facility operating record (FOR) the Closure Plan and an Intent to Initiate Closure notice. The Intent to Initiate Closure notice will be posted prior to initiating closure activities. A Notification of Completion of Closure with registered Arkansas professional engineer's and registered Arkansas professional geologist's certification will be posted to the FOR within 30 days of completion of closure activities as required by 40 CFR § 257.102(h). In addition, the Director of the Arkansas Department of Energy and Environment, Division of Environmental Quality (DEQ) will be notified of closure-related actions and availability of documents as required by 40 CFR § 257.106(i). Notices and documents will be posted to Entergy's publicly accessible CCR website as required by 40 CFR § 257.107(i).

2.5 Amendment of the Closure Plan

This Closure Plan is being submitted to DEQ for approval prior to closure of the Ponds. In accordance with 40 CFR § 257.102(b)(3), Entergy may amend this closure plan at any time. Specifically, Entergy will amend the written closure plan whenever there is a change in the operation of the Ponds that would substantially affect the written closure plan in effect or after closure activities have commenced if unanticipated events necessitate a revision of the written closure plan. If unanticipated events during implementation of closure activities necessitate modification of this Plan, applicable Recordkeeping, Notification and Posting requirements of 40 CFR § 257.105, 257.106 and 257.107 will be followed.

Appendix A
Recycle Pond Area Boring Logs

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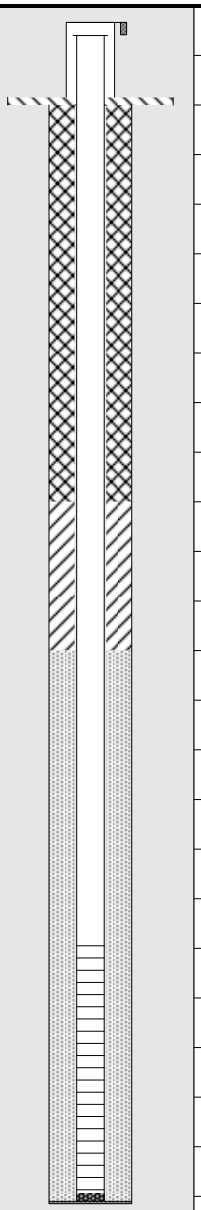
water resources / environmental consultants

PROJECT: **Monitoring Well Installations**	BORING ID: **RP-1**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-1**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488429.6**	EASTING: **1485240.8**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **307.7 ft SRE**	TOC ELEVATION: **310.54 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **47.0 ft below TOC**	DEPTH TO WATER: 7/23/2018 **31.71 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/22/2018**	DATE COMPLETED: **5/23/2018**

Depth (feet)	USCS	Description	% REC
0	ML	SILT, gray to tan, rootlets in upper 0.6 ft, very stiff, dry. @ 3.1 ft bgs color changes to tannish white.	80
4	CH	FAT CLAY, dark brown, very stiff, moist.	80
8	CH	FAT CLAY, dark brown, very stiff, moist.	80
12	CH	@ 18-17.8 ft bgs with orange mottles.	80
16	ML	SILT, tannish white, stiff, dry.	90
16	CH	FAT CLAY, dark brown with some orange mottles, very stiff, dry to moist.	90
20	SC	CLAYEY SAND, brown, loose, moist. @ 20-25 ft bgs increasing clay content and color changes to tan-brown.	90
24	SP	POORLY GRADED SAND, tan, loose, moist.	40
28	SP	POORLY GRADED SAND, tan, loose, moist.	40
32	SP	POORLY GRADED SAND, tan, loose, moist.	40
36	SP	POORLY GRADED SAND, tan, loose, moist.	60
40	GW	WELL GRADED GRAVEL with SAND, fine to coarse-grained (<2" dia), angular to subrounded, saturated.	60
44	GW	WELL GRADED GRAVEL with SAND, fine to coarse-grained (<2" dia), angular to subrounded, saturated.	60
48	GW	WELL GRADED GRAVEL with SAND, fine to coarse-grained (<2" dia), angular to subrounded, saturated.	60



Well Construction

- 4 to 0: Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
- 0 to 4: 36.7 ft of 2 in dia., Sch. 40 PVC solid riser, including 2.8 ft of stickup
- 0 to 12: Cement/bentonite grout from 0 ft bgs to 16.0 ft bgs
- 16 to 20: Bentonite pellet seal from 16.0 ft bgs to 22.0 ft bgs
- 28: Silica size 10/20 filter pack from 22.0 ft bgs to 44 ft bgs
- 32 to 36: 10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 40: 0.25 ft, 2 in dia., Sch. 40 PVC end cap
- 44: 44 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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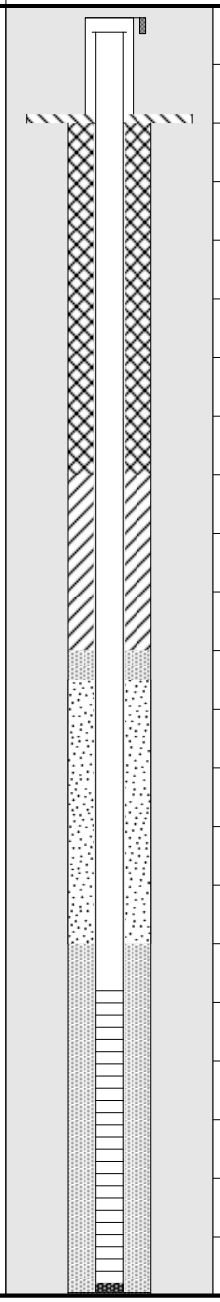
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-3**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-3**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **485631.3**	EASTING: **1486651.0**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **302.9 ft SRE**	TOC ELEVATION: **305.95 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **43.0 ft below TOC**	DEPTH TO WATER: 7/23/2018 **27.11 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **6/1/2018**	DATE COMPLETED: **6/2/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CH	FAT CLAY, tan, medium stiff to stiff, moist. @ 0-2 ft bgs rootlets.	
4	ML	SILT, tan, medium stiff to soft, moist. @ 4-5 ft bgs orange oxide staining.	100
8	CL / ML / CL / ML	LEAN CLAY, yellowish orange to tan, orange mottles, stiff, moist. / SILT, tan with some orange staining, medium stiff to soft, moist. / LEAN CLAY, yellowish orange to tan, orange mottles, stiff, moist. / SILT, tan, medium stiff to soft, moist.	
12	CH	FAT CLAY, tan to yellowish orange with orange and brown mottles, black to brown carbonaceous deposits, stiff, moist.	60
16		@ 17.7-18 ft bgs color changes to light gray with calcite nodule.	
20	SW/GW	WELL GRADED SAND and GRAVEL, fine to coarse-grained sand, gravels (<1.5" dia), subangular to subrounded sand and gravel.	
	GP	POORLY GRADED GRAVEL with sand, angular to subrounded coarse-grained sand, yellowish orange, very loose, saturated.	
24	SW	WELL GRADED SAND, with gravel and some clay, angular to subrounded sand, subangular to subrounded gravel, yellowish orange.	
	GC	CLAYEY GRAVEL with SAND, fine to coarse-grained, subrounded to rounded sand, subangular to rounded gravel (<1.5" dia), dense.	60
28	GP	POORLY GRADED GRAVEL, with minor sand and clay, fine to coarse-grained sand, angular to subrounded gravel (<1.5" dia) , very loose, saturated.	
32	GW	WELL GRADED GRAVEL with sand, medium to coarse-grained, angular to subangular sand; angular to subangular gravel (<1.5" dia) very loose, saturated.	
36		@ 35-40 ft bgs, gravel (<3" dia)	100
40			



Well Construction	
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
	32.8 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.1 ft of stickup
4	
8	
	Cement/bentonite grout from 0 ft bgs to 12.0 ft bgs
12	
	Bentonite pellet seal from 12.0 ft bgs to 18.0 ft bgs
16	
	Silica size 10/20 filter pack from 18.0 ft bgs to 19.0 ft bgs
20	
24	Collapse of native materials from 19.0 to 28.0 ft bgs
28	
	Silica size 10/20 filter pack from 28.0 ft bgs to 40.0 ft bgs
32	
	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
36	
	0.25 ft, 2 in dia., Sch. 40 PVC end cap
40	

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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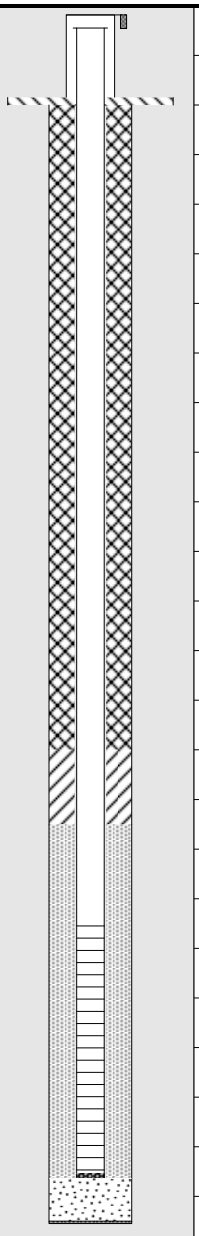
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-4**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-4**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488173.8**	EASTING: **1487765.3**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.0 ft SRE**	TOC ELEVATION: **312.12 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **46.4 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.19 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/21/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-4				
0	CL		LEAN CLAY, tan to yellowish brown with orange and brown mottles, upper 1.5 ft rootlets, very stiff, dry.	66
4	ML		SILT to CLAYEY SILT, light gray, increasing clay content with depth, moist to dry.	70
8			@ 7.9-10 ft bgs containing carbonaceous material.	
12	CL		LEAN CLAY, brown, stiff, moist.	
16	ML		CLAYEY SILT, tan with brown and orange staining, soft, moist.	70
20	CH		FAT CLAY, tan with brown and orange mottles, black carbonaceous material, moist.	
24			@ 20 ft bgs color changes to light gray with small amounts of brown mottles.	100
28	CL		@ 24 bgs 1 inch thick silt layer. @ 26.1 ft bgs 1 inch thick silt layer. @ 27 ft bgs color changes to brown, increasing sand content with depth.	
32	SP		SANDY CLAY, brown with clay content decreasing with depth, soft, wet.	
36	SW		POORLY GRADED SAND, fine-grained, tan to brown, very loose, saturated. @ 30 ft bgs fine to medium-grained.	100
40	GC GW SW/GW		WELL GRADED SAND and GRAVEL, fine to coarse-grained sand; fine to coarse-grained, angular to subrounded gravel, saturated. @ 34-34.5 ft bgs black coating on gravel. @ 35.6-36.2 ft bgs black coating on gravel.	
44	GW SW/GW		CLAYEY GRAVEL with sand, fine to medium-grained sand with fine-grained, subangular to rounded gravel. WELL GRADED GRAVEL, angular to rounded (<3.25" dia), very loose, saturated.	100
48			WELL GRADED SAND and GRAVEL, fine to coarse-grained sand; fine to coarse-grained, angular to subrounded gravel, saturated. WELL GRADED GRAVEL, angular to rounded (<3.25" dia), very loose, saturated. WELL GRADED SAND and GRAVEL, fine to coarse-grained sand; fine to coarse-grained, angular to subrounded gravel, saturated.	



Well Construction

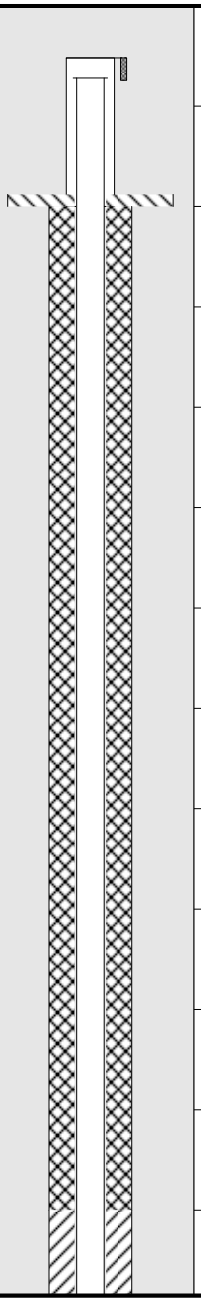
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
	36.2 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.1 ft of stickup
4	
8	
12	
16	Cement/bentonite grout from 0 ft bgs to 26.0 ft bgs
20	
24	
	Bentonite pellet seal from 26.0 ft bgs to 29.0 ft bgs
28	
	Silica size 10/20 filter pack from 29.0 ft bgs to 43.0 ft bgs
32	
36	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
40	
	0.25 ft, 2 in dia., Sch. 40 PVC end cap
44	Collapse of native material from 43.0 to 45.0 ft bgs
	45.0 ft bgs BOH
48	

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

ftn Associates Ltd.
water resources / environmental consultants

PROJECT: **Monitoring Well Installations**	BORING ID: **RP-4D**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-4D**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488178.6**	EASTING: **1487747.8**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.3 ft SRE**	TOC ELEVATION: **312.53 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **80.7 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.59 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/31/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
-5			
0	FILL	LIMESTONE GRAVEL FILL	
	CL	LEAN CLAY, tan to yellowish brown with orange and brown mottles, upper 1.5 ft rootlets, very stiff, dry.	40
5	ML	SILT to CLAYEY SILT, light gray with brown to tan upper 1 inch, increasing clay content with depth, moist to dry. @ 7.9-10 ft bgs containing carbonaceous material.	20
10	CL	LEAN CLAY, brown to tan, increasing silt content with depth, stiff, moist.	
15	ML	SILT, tan with brown and orange staining, soft, moist.	100
	CL	LEAN CLAY, brown with brown and orange mottles, decreasing silt content with depth, medium stiff, moist.	
20	CH	FAT CLAY, tan with brown and orange mottles, black carbonaceous material, moist. @ 25.9-26 ft bgs light gray silt. @ 26 ft bgs color change to brown with increasing sand content with depth. @ 28 ft bgs FAT SANDY CLAY, brown with fine-grained sand, sand content increases with depth, medium stiff, moist.	
25			100



Well Construction

- Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
- 70.4 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.2 ft of stickup
- Cement/bentonite grout from 0 ft bgs to 25.0 ft bgs
- Bentonite pellet seal from 25.0 ft bgs to 28.0 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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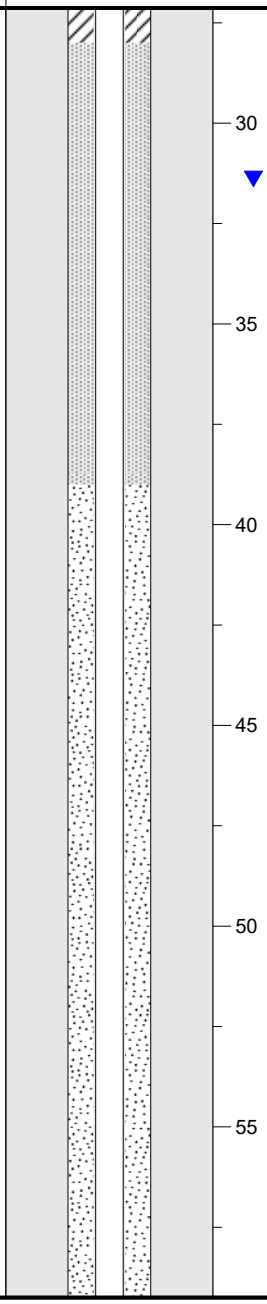
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-4D**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-4D**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488178.6**	EASTING: **1487747.8**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.3 ft SRE**	TOC ELEVATION: **312.53 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **80.7 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.59 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/31/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
30	SP	POORLY GRADED SAND, fine-grained, tan to brown, very loose, saturated. @ 30 ft bgs fine to medium-grained.	60
	SW/GW	WELL GRADED SAND and GRAVEL, fine to coarse-grained sand, fine to coarse-grained, angular to subrounded gravel, saturated. @ 35-35.6 ft bgs black coating on gravels.	
35			100
	GC	CLAYEY GRAVEL with sand, fine to medium-grained sand with fine-grained subangular to rounded gravel.	
40	GW	WELL GRADED GRAVEL, angular to rounded (<3.25" dia), very loose, saturated. @ 40 ft bgs with coarse-grained, angular to subrounded sand. @ 42 ft bgs coarse-grained subangular to subrounded sand.	50
45			63
50	SW/GW	WELL GRADED SAND and GRAVEL, angular to subrounded, orange, very loose, saturated.	50
	GW	WELL GRADED GRAVEL, subangular to rounded (<3" dia), light brown to orangish brown, very loose, saturated.	
55	SW/GW	WELL GRADED SAND and GRAVEL, angular to subrounded sand, subangular to subrounded gravel (<2" dia), very loose, saturated.	100
	GP	POORLY GRADED GRAVEL, subangular to subrounded (<1" dia), very loose, saturated.	
	CH		
	SW/GW	FAT SANDY CLAY, tan to brownish tan with fine to	

Well Construction



NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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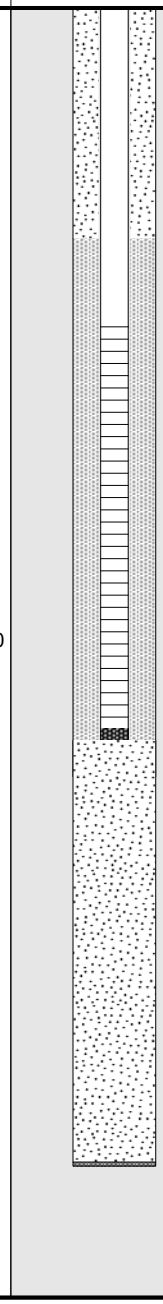
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-4D**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-4D**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488178.6**	EASTING: **1487747.8**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.3 ft SRE**	TOC ELEVATION: **312.53 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **80.7 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.59 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/31/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
		medium-grained sand and some fine-grained gravel, soft, saturated.	
60	GW	WELL GRADED SAND and GRAVEL, angular to subrounded sand, subangular to subrounded gravel (<2" dia), very loose, saturated.	50
	SP		
	GW	WELL GRADED GRAVEL, subangular to rounded (<1.5" dia), light brown to orangish brown, very loose, saturated.	
	SP	POORLY GRADED SAND, medium-gained to some fine-grained , tan to light brown.	
65		WELL GRADED GRAVEL, angular to subrounded (<2" dia), yellowish orange, very loose, saturated.	
		POORLY GRADED SAND, medium-grained to some fine-grained sand, tan to light brown.	88
	SW	WELL GRADED SAND, fine to coarse-grained subrounded to rounded, yellowish orange, saturated. @ 68.5 ft bgs with subrounded to rounded gravel. @ 68.7-69 ft SANDSTONE, well-rounded, fine-grained.	
	SP	POORLY GRADED SAND, fine to medium-grained, light gray with some rounded black and white gravel, very loose, saturated.	
70	GW		
	SW/GW	WELL GRADED GRAVEL, subangular to rounded (<3" dia), light brown to orangish brown, very loose, saturated.	50
	SC/SM	WELL GRADED SAND and GRAVEL , subangular to rounded gravel, greenish gray.	
	SW	CLAYEY SAND to SILTY SAND, fine to medium-grained, olive gray, soft, saturated.	
	SM	WELL GRADED SAND, fine to coarse-grained subrounded to well rounded, very loose, saturated. @ 73.5 ft bgs with gravel (<2" dia)	
75	SW		100
	GM	SILTY SAND, olive to dark gray, soft, saturated.	
		WELL GRADED SAND, fine to coarse-grained subrounded to well rounded, very loose, saturated.	
		WELL GRADED GRAVEL, with some silt and fine-grained sand, gravel (<2" dia), dark gray, very loose, saturated.	
		SILTY SAND, dark gray, loose, saturated. @ 80.5 ft bgs clayey.	
80	SM		
	CH	FAT SANDY CLAY, olive gray with lenses of fine-grained sand to silt.	
85		SILTY SAND, dark gray, loose, saturated. @ 85.5-88 ft bgs clayey.	
	SM		
90			



Well Construction

- Silica size 10/20 filter pack from 65.0 ft bgs to 78.0 ft bgs
- 10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 0.25 ft, 2 in dia., Sch. 40 PVC end cap
- Collapse of native materials from 78 to 88 ft bgs
- 88.0 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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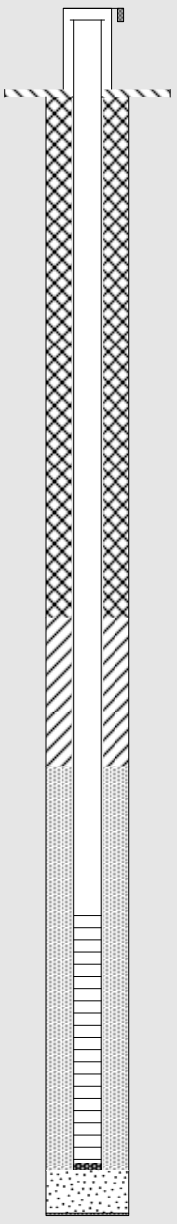
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-5**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-5**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488032.2**	EASTING: **1488225.5**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **310.5 ft SRE**	TOC ELEVATION: **313.56 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **46.4 ft below TOC**	DEPTH TO WATER: 7/23/2018 **35.68 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/24/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	FILL	LIMESTONE GRAVEL FILL	
		LEAN CLAY, light gray to tan with orange and black mottles, black carbonaceous material, medium stiff, moist.	
4			40
	CL		
8		@ 10 ft bgs color change to brown.	
12			
	CL/ML	LEAN CLAY to CLAYEY SILT, light gray with orange and brown mottles, stiff, moist.	100
16	ML	SILT, light gray, soft, moist.	
		FAT CLAY, brown with some black mottles, stiff, moist.	
20	CH	@ 20-24 ft bgs color alternating between brown and light gray.	
		@ 24-24.5 ft bgs FAT SANDY CLAY, brown to dark brown fine-grained sand, medium stiff, moist.	
24			
	SC	CLAYEY SAND, brown, decreasing clay content with depth, loose, moist to saturated.	100
28	SP	POORLY GRADED SAND, fine-grained sand, very loose, saturated.	
		WELL GRADED SAND with GRAVEL, fine to coarse-grained subangular to subrounded sand, subangular to subrounded gravel (<1.5" dia), very loose, saturated.	
32			
	SW		100
36			
40			
			100
44	GW	WELL GRADED GRAVEL, fine to coarse-grained, angular to rounded gravel (<3" dia), very loose, saturated.	
48			



Well Construction	
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
4	36.1 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.1 ft of stickup
8	
12	Cement/bentonite grout from 0 ft bgs to 21.0 ft bgs
16	
20	Bentonite pellet seal from 21.0 ft bgs to 27.0 ft bgs
24	
28	Silica size 10/20 filter pack from 27.0 ft bgs to 43.0 ft bgs
32	
36	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
40	0.25 ft, 2 in dia., Sch. 40 PVC end cap
44	Collapse of native materials from 43.3 to 45 ft bgs
48	45.0 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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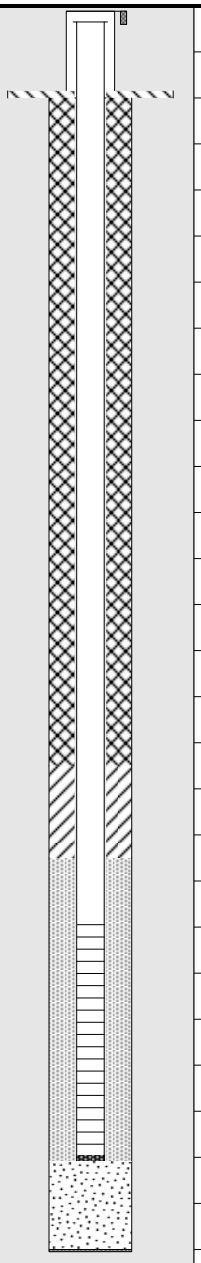
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-6**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-6**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **487610.0**	EASTING: **1488476.2**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.6 ft SRE**	TOC ELEVATION: **312.85 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL WELL DEPTH: **49.5 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.90 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/23/2018**	DATE COMPLETED: **6/2/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	SOIL	TOP SOIL	
	CL	LEAN CLAY, silty, light brown to tan, very stiff, moist to dry.	
	ML	SILT, tan, medium stiff, moist to dry.	100
4	CH	FAT CLAY, orange and brown mottles with black carbonaceous material, stiff, moist.	
	CL	LEAN CLAY, silty, yellowish orange to gray with brown and orange mottles, stiff, moist to dry.	
8		@ 7.5 ft bgs color change to brown with black carbonaceous deposits.	100
	CH	FAT CLAY, brown, stiff, moist.	
12		SILT, tan, soft, moist.	
	ML		30
16			
20			
	CH	FAT CLAY, tan with brown and orange mottles, stiff, moist. @ 24-25 ft bgs thin white silt lenses.	100
24			
	CL	LEAN CLAY, tan with silt content increasing with depth, soft, moist.	
28		@ 27-27.1 silt, tan with orange staining, soft.	100
	CH	FAT CLAY, light gray to tan, very soft, wet.	
32		@ 30 ft bgs color change to dark gray.	100
	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained sand; fine to coarse-grained, subangular to subrounded gravel, very loose, saturated.	
36	SP	@ 34.6-24.8 ft bgs clayey, light gray.	
		POORLY GRADED SAND, fine to medium-grained, very loose, saturated.	100
	SW		
40	SC	WELL GRADED SAND with GRAVEL, angular to subrounded gravel (<1" dia), very loose, saturated.	
	SW	CLAYEY SAND, with black well rounded gravel, soft, wet.	
	GC	WELL GRADED SAND with GRAVEL, angular to subrounded gravel (<1" dia), very loose, saturated.	100
44	GW	CLAYEY GRAVEL with sand, fine to coarse-grained, subangular to round sand; fine-grained, subangular to rounded gravel, dark gray.	
	SW		
48	GW	WELL GRADED GRAVEL with sand, fine-grained, subangular to rounded gravel, very loose, saturated.	100
		WELL GRADED SAND, fine to coarse-grained, saturated.	
52		WELL GRADED GRAVEL, fine to coarse-grained gravel with some small cobbles, very loose, saturated.	



Well Construction	
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
4	39.2 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.3 ft of stickup
8	
12	
16	Cement/bentonite grout from 0 ft bgs to 29.0 ft bgs
20	
24	
28	
32	Bentonite pellet seal from 29.0 ft bgs to 33.0 ft bgs
36	Silica size 10/20 filter pack from 33.0 ft bgs to 50.0 ft bgs
40	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
44	
	0.25 ft, 2 in dia., Sch. 40 PVC end cap
48	Collapse of native material from 46.2 to 50 ft bgs
52	50.0 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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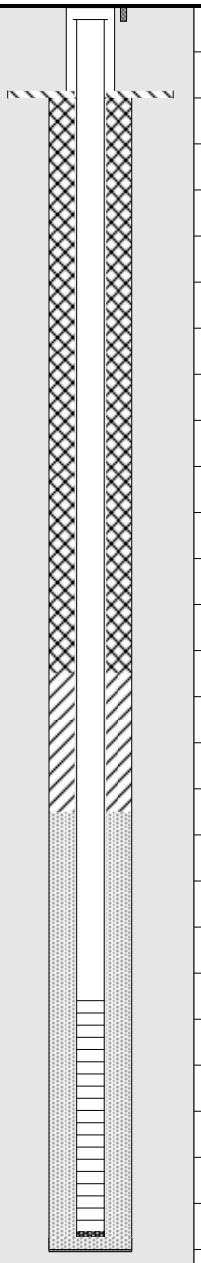
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-7**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-7**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **487319.3**	EASTING: **1488382.9**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.2 ft SRE**	TOC ELEVATION: **312.63 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **52.9 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.60 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/24/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	LEAN CLAY, brown to tan, medium stiff to stiff, moist. @ .5-.7 ft bgs subrounded to rounded gravel. @ 2.1-2.4 ft bgs subrounded to rounded gravel.	100
4	ML / CL	SILT with clayey fine-grained sand, light gray, rootlets, medium stiff, moist.	
	CH	LEAN CLAY, olive gray to light gray with heavy oxidation and carbonaceous material along silty fractures, stiff to medium stiff.	100
8		FAT CLAY, tan to yellowish orange with some orange mottles, stiff, moist.	
	CL	LEAN CLAY, tan with orange and brown mottles along with black carbonaceous material, medium stiff, moist.	100
12	ML	SILT, tan, soft, moist.	
16	CH	FAT CLAY, tan stiff, moist.	100
20		@ 21.8-22 ft bgs with silt lenses and brown and orange mottles.	100
24			
28	ML	CLAYEY SILT to SILT, light gray to tan alternating layers of clayey silt and silt, very soft, wet.	100
	CL	LEAN CLAY, olive gray, medium stiff, moist.	
32	CH	FAT CLAY, dark gray, very soft, wet.	
	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained, subangular to subrounded sand; fine to coarse-grained, angular to subrounded gravel, saturated.	100
36	CH	FAT SANDY CLAY, dark gray with fine-grained sand, sand content increases with depth, soft to very soft, saturated. @ 37.9-38 ft bgs with black gravel.	
40	SC	CLAYEY SAND with gravel, fine to coarse-grained gravel, decreasing clay with depth, loose to medium dense sand, saturated.	
44	GW	WELL GRADED GRAVEL, fine to coarse-grained, subangular to subrounded (<2.5" dia), very loose, saturated.	70
48	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained, subangular to subrounded sand; fine to coarse-grained, angular to subrounded gravel (<2.5" dia), saturated.	
52			



Well Construction	
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
4	42.6 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.4 ft of stickup
8	
12	
16	Cement/bentonite grout from 0 ft bgs to 25.0 ft bgs
20	
24	
28	Bentonite pellet seal from 25.0 ft bgs to 31.0 ft bgs
32	Silica size 10/20 filter pack from 31.0 ft bgs to 50.0 ft bgs
36	
40	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
44	
48	0.25 ft, 2 in dia., Sch. 40 PVC end cap Collapse of native materials from 43.3 to 45 ft bgs
52	50.0 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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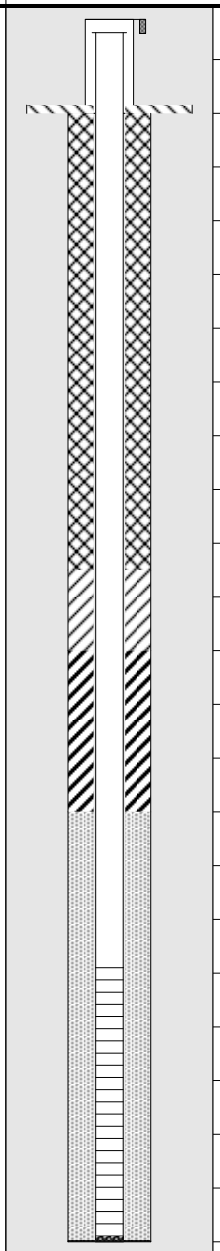
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-8**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-8**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **487126.0**	EASTING: **1488140.5**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.0 ft SRE**	TOC ELEVATION: **312.01 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **45.0 ft below TOC**	DEPTH TO WATER: 7/23/2018 **33.95 ft below TOC**	
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/20/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Graphic Log	Description	% REC
-4				
0			FAT CLAY, brown, medium stiff, moist.	
4	CH			70
8				
12			LEAN CLAY, silty, brown with some light grey, yellow, and orange mottles, soft to medium stiff, moist.	
16	CL			70
20			FAT CLAY, brown with some dark brown staining, stiff, moist.	
24	CH			
	ML		CLAYEY SILT, dark gray.	80
	SC		CLAYEY SAND, fine to medium-grained, soft to loose, moist.	
28	SW		WELL GRADED SAND, fine to coarse-grained, yellowish orange, with fine-grained, subangular to subrounded gravel (<1" dia), loose.	
	SP		POORLY GRADED SAND, fine-grained, yellowish orange, loose, saturated.	
32			@ 30-30.6 ft, clayey.	
	SW		WELL GRADED SAND, fine to coarse-grained, yellowish orange, with fine-grained, subangular to subrounded gravel (<1" dia), loose.	
	SP		POORLY GRADED SAND, fine-grained, yellowish orange, loose, saturated.	100
36				
	SW		WELL GRADED SAND, fine to coarse-grained, yellowish orange, with fine-grained, subangular to subrounded gravel (<3" dia), loose.	
40	SW/GW		WELL GRADED SAND and GRAVEL, yellowish orange, subangular to subrounded gravel (<1" dia), saturated.	0
44				



Well Construction	
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
4	34.8 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.0 ft of stickup
8	
	Cement/bentonite grout from 0 ft bgs to 17.0 ft bgs
12	
16	
	Bentonite pellet seal from 17.0 ft bgs to 20 ft bgs
20	
	Collapse of native material from 20 to 26 ft bgs
24	
	Silica size 10/20 filter pack from 26.0 ft bgs to 42.0 ft bgs
28	
32	
▼	
36	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
40	0.2 ft, 2 in dia., Sch. 40 PVC end cap
	42 ft bgs BOH
44	

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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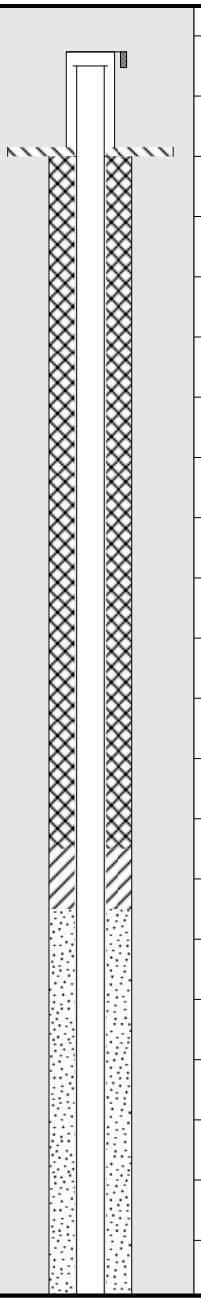
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-8D**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-8D**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **487119.5**	EASTING: **1488159.9**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.0 ft SRE**	TOC ELEVATION: **311.99 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **78.2 ft below TOC**	DEPTH TO WATER: 7/23/2018 **33.90 ft below TOC**	
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/19/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
-4			
0			
4	CH	FAT CLAY, brown, medium stiff, moist.	40
8			
12	CL	LEAN CLAY, silty, brown with some light grey, yellow, and orange mottles, soft to medium stiff, moist.	60
16			
20	CH	FAT CLAY, brown with some dark brown staining, stiff, moist.	
24			80
	SC	CLAYEY SAND, fine to medium-grained, soft to loose, moist.	
28	SW	WELL GRADED SAND, fine to coarse-grained, yellowish orange, with fine-grained, subangular to subrounded gravel (<1" dia), loose.	
	SP	POORLY GRADED SAND, fine-grained, yellowish orange, loose, saturated. @ 30-30.6 ft, clayey.	
32	SW	WELL GRADED SAND, fine to coarse-grained, yellowish orange, with fine-grained, subangular to subrounded gravel (<1" dia), loose.	
	SP	POORLY GRADED SAND, fine-grained, yellowish orange, loose, saturated. @ 30-30.6 ft, clayey.	80
36	SW	WELL GRADED SAND, fine to coarse-grained, yellowish	



Well Construction

- 4 — Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
- 0
- 4 — 68.0 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.0 ft of stickup
- 8
- 12
- 16 — Cement/bentonite grout from 0 ft bgs to 23.0 ft bgs
- 20
- 24 — Bentonite pellet seal from 23.0 ft bgs to 25.0 ft bgs
- 28
- ▼
- 32
- 36

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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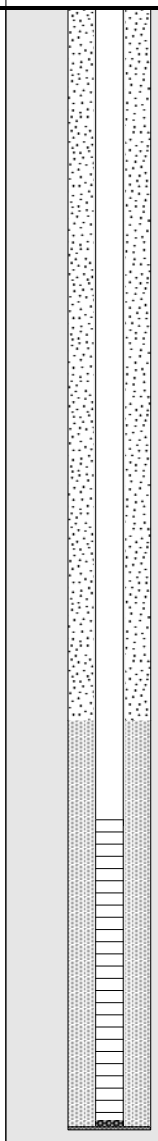
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-8D**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-8D**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **487119.5**	EASTING: **1488159.9**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **309.0 ft SRE**	TOC ELEVATION: **311.99 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **78.2 ft below TOC**	DEPTH TO WATER: 7/23/2018 **33.90 ft below TOC**	
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/19/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
40	SW/GW	orange, with fine-grained, subangular to subrounded gravel (<3" dia), loose. WELL GRADED SAND and GRAVEL, subangular to subrounded gravel (<1" dia), yellowish orange, saturated.	
44	GW	WELL GRADED GRAVEL with sand, medium to coarse-grained, subangular to subrounded gravel (<3" dia), yellowish orange; coarse-grained sand, loose, saturated.	60
48	SW/GW	WELL GRADED SAND and GRAVEL, subangular to subrounded gravel (<1" dia), yellowish orange, saturated.	
52	GW	WELL GRADED GRAVEL with sand, medium to coarse-grained, subangular to subrounded gravel (<3.5" dia), yellowish orange; coarse-grained sand, loose, saturated.	
56	SP	POORLY GRADED SAND with GRAVEL, medium-grained, medium dense, yellowish orange. Gravel is subangular to subrounded, increasing gravel content with depth. Saturated.	100
60		@ 60-62 ft bgs with gravel.	
64			100
68	GW	WELL GRADED GRAVEL with SAND, gravel (<3.5" dia), yellowish orange, saturated.	
72	SW	WELL GRADED SAND and GRAVEL, fine to coarse-grained; fine-grained, subangular to angular gravel (<1" dia), yellowish orange, saturated.	
76	GW	WELL GRADED GRAVEL with SAND, angular to rounded, yellowish orange; coarse-grained sand, saturated. @ 74.5-75 ft bgs greenish-gray silt, no odor.	100
80			

Well Construction



- 40: Formation collapse from 25.0 ft bgs to 61.5 ft bgs
- 60: Silica size 10/20 filter pack from 61.5 ft bgs to 75.0 ft bgs
- 60: 10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 68: 0.2 ft, 2 in dia., Sch. 40 PVC end cap
- 76: 75 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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PREPARED AT THE DIRECTION OF LEGAL COUNSEL

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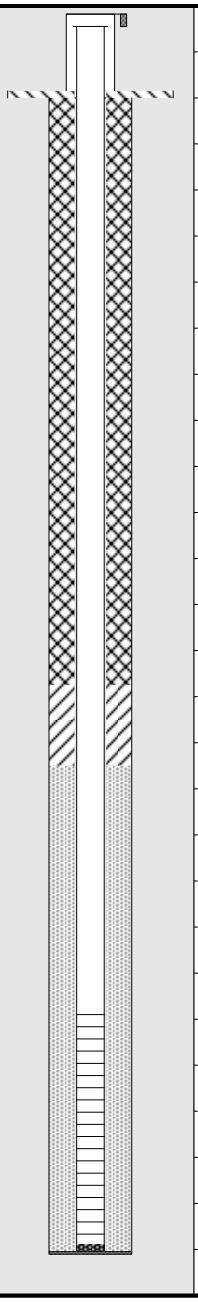
PROJECT: **Monitoring Well Installations**		BORING ID: **RP-9**	
LOCATION: **Entergy Independence Plant**		WELL ID: **RP-9**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **487691.6**	EASTING: **1487348.7**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **306.6 ft SRE**	TOC ELEVATION: **309.72 ft SRE**
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**		TOTAL WELL DEPTH: **53.5 ft below TOC**	DEPTH TO WATER: 7/23/2018 **31.55 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/21/2018**	DATE COMPLETED: **6/3/2018**

Depth (feet)	USCS	Description	% REC
0	SOIL	TOP SOIL	
	CL	LEAN CLAY, brown, stiff, moist to dry.	
4	ML	SILT, light gray with small amounts of orangish yellow staining, medium stiff, dry.	72
	CL	LEAN CLAY, light gray with some orange staining, rootlets, very stiff, dry.	
8	CH	@ 5 ft bgs color change to dark brown, soft, moist, increasing clay content with depth.	80
		FAT CLAY, dark brown with round black carbonaceous deposits, stiff, moist.	
12	CL	LEAN CLAY, dark brown with black round carbonaceous deposits, increasing silt content with depth, medium stiff, moist.	
16	ML	SILT, brownish gray with some oxide staining, very soft, moist.	50
	CH	FAT CLAY, brown to tan with brown and orange mottles, stiff, moist.	
20	CL/ML	LEAN CLAY to CLAYEY SILT, brown with light gray silt lenses within, very soft, moist.	
24			70
	CH	FAT CLAY, light gray with orange and dark brown mottles, some silt, medium stiff to stiff, moist.	
28	SM	SILTY SAND, brown to tan, fine to medium-grained, very loose, saturated.	
32	SW/GW	WELL GRADED SAND with GRAVEL, fine to coarse-grained, fine to medium rounded gravel (<1" dia), saturated.	
36	SP	POORLY GRADED SAND, tan to brownish orange, fine to medium-grained sand, very loose, saturated.	100
	SC	CLAYEY SAND, light to dark gray, very soft, saturated. @ 37.5-38.5 ft, contains dark subrounded gravel.	
40	SW	WELL GRADED SAND with gravel, fine to coarse-grained, fine to medium rounded gravel (<1" dia), saturated.	
44	GW	WELL GRADED GRAVEL, with coarse-grained sand, fine to coarse-grained rounded to subround gravel (<2" dia), yellowish orange, very loose, saturated.	80
48			
52			



Depth (feet)	Well Construction
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
4	43.2 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.1 ft of stickup
8	
12	Cement/bentonite grout from 0 ft bgs to 25.5 ft bgs
16	
20	
24	
28	Bentonite pellet seal from 25.5 ft bgs to 29.0 ft bgs
32	Silica size 10/20 filter pack from 29.0 ft bgs to 50.0 ft bgs
36	10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
40	
44	0.25 ft, 2 in dia., Sch. 40 PVC end cap
48	
52	50.0 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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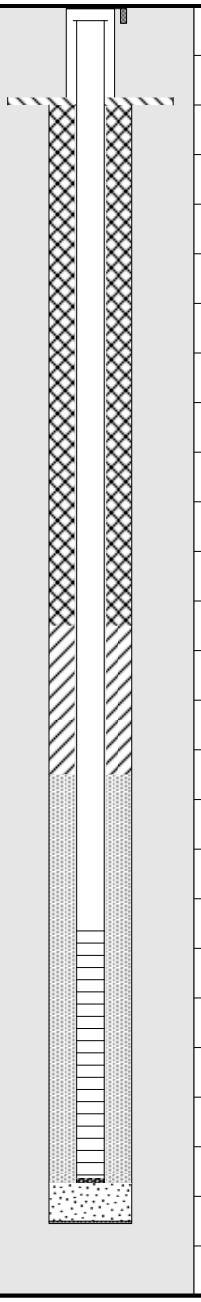
PROJECT: **Monitoring Well Installations**	BORING ID: **RP-10**		
LOCATION: **Entergy Independence Plant**	WELL ID: **RP-10**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **488087.8**	EASTING: **1487487.4**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **311.2 ft SRE**	TOC ELEVATION: **314.57 ft SRE**	
DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **46.9 ft below TOC**	DEPTH TO WATER: 7/23/2018 **36.55 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/23/2018**	DATE COMPLETED: **6/2/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	FILL	LIMESTONE GRAVEL FILL	
4	CL	LEAN CLAY, silty, brownish tan, stiff, moist.	40
8			40
12	ML	SILT, yellowish orange with orange and brown staining, medium stiff, moist.	
	CL	LEAN CLAY, silty, olive gray with some orange mottles, silt content increases with depth, moist.	100
16	ML	SILT, tan to light gray, moist, soft. @ 15 ft bgs increasing clay content with depth.	
20	CH	FAT CLAY, brown with dark brown mottles, moist. @ 20 ft bgs color change to tan to brown with orange mottles, medium stiff, moist. @ 22 ft bgs color changes to light gray to greenish gray.	80
24			100
28	ML CL	CLAYEY SILT, brown to tan, soft, moist. SANDY CLAY, fine-grained sand, brown, soft moist.	100
32	SP	POORLY GRADED SAND, fine to medium-grained sand, tan, very loose.	
36	GP	POORLY GRADED GRAVEL, subangular to subrounded gravel, brown, very loose, saturated. @ 33.8-34.8 ft bgs black coating on rock.	80
	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained, angular to subrounded, gravel (<2.5" dia), very loose, saturated.	
40	GC	CLAYEY GRAVEL with sand, subrounded to round, soft, wet.	
	GP	POORLY GRADED GRAVEL, subangular to subrounded,	
	GW	brown, very loose, saturated.	
		WELL GRADED GRAVEL, subrounded to rounded, very loose, saturated.	100
44	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained, angular to subrounded gravel (<2.5" dia), very loose, saturated.	
48			



Well Construction
Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
36.7 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.4 ft of stickup
Cement/bentonite grout from 0 ft bgs to 21.0 ft bgs
Bentonite pellet seal from 21.0 ft bgs to 27.0 ft bgs
Silica size 10/20 filter pack from 27.0 ft bgs to 42.5 ft bgs
10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
0.20 ft, 2 in dia., Sch. 40 PVC end cap
45 ft bgs BOH

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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PROJECT: **Monitoring Well Installations**		BORING ID: **B-1**	
LOCATION: **Entergy Independence Plant**		WELL ID: **B-1**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **487451.1**	EASTING: **1487413.6**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **237.3 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL DEPTH: **30.0 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/18/2018**	DATE COMPLETED: **5/18/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		FILL		FILL
	100			LEAN CLAY, dark brown, stiff, moist to dry. @ 5-10 ft bgs with fine-grain sand and silt.
	100			
5		CL		
	60			
10				
	100	ML		CLAYEY SILT, trace fine-grained sand, light brown to greyish brown, moist
		CL		LEAN CLAY, silty, light gray with brown and orange mottles, black carbonaceous deposits, medium stiff, moist.
15		ML		SILT, light gray to yellowish orange, very soft, moist.
	100			FAT CLAY, light gray and yellowish orange with black carbonaceous deposits, stiff, moist.
		CH		
20				
	100			
				LEAN CLAY, very silty, light gray with yellow and orange mottles, soft, moist.
25	100			
		CL		@ 26 ft bgs color changes to medium gray.
	100			
30				Drilling 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 grout to ground surface.

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PROJECT: **Monitoring Well Installations**		BORING ID: **B-2**	
LOCATION: **Entergy Independence Plant**		WELL ID: **B-2**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **487904.5**	EASTING: **1487521.7**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **237.3 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL DEPTH: **10.0 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/18/2018**	DATE COMPLETED: **5/18/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		CL		TOP SOIL, brown, roots, moist to dry.
				LEAN CLAY, silty, brown with some dry sand like intervals that might be ash, stiff, moist.
	20			
		CL		
5				
				FAT CLAY, brown with yellowish orange mottles, some black carbonaceous deposits, medium stiff to stiff, moist.
	100			
		CH		
	100			
10				Drilling 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 grout to ground surface.

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PROJECT: **Monitoring Well Installations**		BORING ID: **B-3**	
LOCATION: **Entergy Independence Plant**		WELL ID: **B-3**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **488077.9**	EASTING: **1487971.8**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **239.0 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL DEPTH: **12.0 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/22/2018**	DATE COMPLETED: **5/22/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0	100	FILL		FILL, CCR material
5		FILL		FILL, gravel
	50	CL		LEAN CLAY, brown and orange with large round black carbonaceous deposits, medium stiff, moist.
10	100			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 grout to ground surface.

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PROJECT: **Monitoring Well Installations**		BORING ID: **B-4**	
LOCATION: **Entergy Independence Plant**		WELL ID: **B-4**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **487863.7**	EASTING: **1488421.3**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **207.5 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL DEPTH: **22.0 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/22/2018**	DATE COMPLETED: **5/22/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0				FILL
	100	FILL		
5				LEAN CLAY, brown and green with orange mottles, brown carbonaceous deposits, medium stiff, moist.
	100	CL		
		ML		CLAYEY SILT, light gray with fine concretions, medium stiff, moist.
10				FAT CLAY, brown to tan with orange and brown mottles and black carbonaceous deposits, stiff, moist.
	100	CH		
		ML		SILT, brownish tan with black and brown staining, stiff, moist to dry.
15				LEAN CLAY, silty, orange and brown staining, moist.
	40	CL		
20				
	100			Boring terminated at 22 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South.

Borehole backfilled with bentonite grout to ground surface.

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PROJECT: **Monitoring Well Installations**		BORING ID: **B-5**	
LOCATION: **Entergy Independence Plant**		WELL ID: **B-5**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **487249.2**	EASTING: **1488040.3**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **238.3 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL DEPTH: **10.0 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/18/2018**	DATE COMPLETED: **5/19/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		TOP		TOP SOIL
	100	CL		LEAN CLAY, silty, light brown, stiff, dry to moist.
				@ 2 ft bgs color changes to light gray with yellow and orange mottles.
	100			
5				
	60			
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 grout to ground surface.

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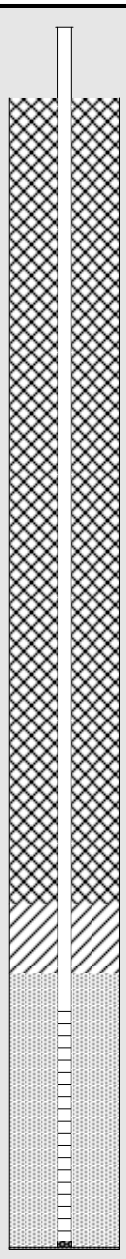
PROJECT: **Monitoring Well Installations**		BORING ID: **B-6**	
LOCATION: **Entergy Independence Plant**		WELL ID: **PZ-1**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **487518.1**	EASTING: **1487843.0**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **309.9 ft SRE**	TOC ELEVATION: **312.99 ft SRE**
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL WELL DEPTH: **52.9 ft below TOC**	DEPTH TO WATER: 7/23/2018 **34.92 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **5/20/2018**	DATE COMPLETED: **5/20/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	LEAN CLAY, silty, brown, very stiff, dry.	100
4	CH	FAT CLAY, light gray with brown bottles, very stiff, dry to moist.	100
8	CL	LEAN CLAY, silty, brown, very stiff, dry.	100
	CH	FAT CLAY, light gray with brown mottles, very stiff, dry to moist.	100
12	CL	LEAN CLAY, silty, light gray to dark brown with orange oxide staining, medium stiff, moist.	100
16			100
20	ML	CLAYEY SILT, brown to yellowish orange, very soft, saturated.	100
	CH	FAT CLAY, gray with brown and yellowish orange mottles, manganese staining and calcite gravels thought, stiff, moist.	
24	ML	SILT, clayey, light brown to yellowish orange, very soft, moist.	
28	CL	LEAN CLAY, silty, light brown to yellowish orange and some light gray mottles, stiff, to medium stiff, moist.	100
32	CH	FAT CLAY, gray, stiff, moist. @ 32-34 ft with orange mottles.	100
36	CL	LEAN CLAY, silty, gray, very moist, soft.	
40	GW	WELL GRADED GRAVEL with SAND, medium to coarse-grained sand, angular to subrounded gravel (<1.5" dia), yellowish orange, wet.	100
44			
48			
52			



Well Construction	
4	Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing
0	
4	42.6 ft of 1 in dia., Sch. 40 PVC solid riser, including 3.1 ft of stickup
8	
12	Cement/bentonite grout from 0 ft bgs to 35.0 ft bgs
16	
20	
24	
28	
32	▼
36	Bentonite pellet seal from 35 ft bgs to 38.0 ft bgs
40	Silica size 10/20 filter pack from 38 ft bgs to 49.8 ft bgs
44	10.0 ft of 1 in dia., 0.010 in slot, Sch. 40 PVC screen
48	0.25 ft, 1 in dia., Sch. 40 PVC end cap 50 ft bgs BOH
52	

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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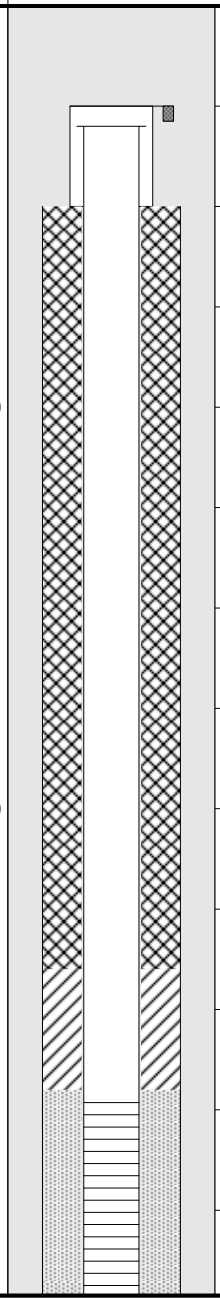
PROJECT: **Monitoring Well Installations**	BORING ID: **PW-2**		
LOCATION: **Entergy Independence Plant**	WELL ID: **PW-2**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **486116.9**	EASTING: **1489208.7**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **305.4 ft SRE**	TOC ELEVATION: **307.43 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL WELL DEPTH: **85.7 ft below TOC**	DEPTH TO WATER: 7/23/2018 **29.30 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **6/26/2018**	DATE COMPLETED: **6/29/2018**

Depth (feet)	USCS	Description	% REC
0	TOP	TOP SOIL	
	CH	FAT CLAY, olive gray, some gravel, rootlets, medium stiff, moist.	
	ML	SILT, light gray with orange and black staining, stiff, dry to moist.	
	CL	LEAN CLAY, orange, stiff moist.	
5			100
	CH	FAT CLAY, light gray, medium stiff. @7-8 ft bgs orange mottles. @9-10 ft bgs fine-grained gravel.	
10	ML	SILT, tan with orange staining, medium stiff, moist.	
	CH	FAT CLAY, brown to tan with some orange and brown mottles, stiff to medium stiff.	
15			100
	CL	LEAN CLAY, orange and brown mottles, stiff to medium stiff, moist.	
	CH	FAT CLAY, light gray, medium stiff, moist.	
	ML	SILT, light gray, soft, moist.	
20	CL	LEAN CLAY, brown, soft, moist.	
	CH	FAT CLAY, light gray with brown mottles, medium stiff, moist.	
	SC	CLAYEY SAND, fine-grained, soft, saturated.	
25	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained sand, gravel (<1" dia), subangular to subrounded sand, subangular to subrounded gravel, very loose, saturated.	85



Well Construction

- 5 to 0: Above ground completion including 4x4 ft concrete pad, four pipe bollards, and locking outer aluminum casing
- 0 to 5: 25.0 ft of 10 in dia., Sch. 40 PVC solid riser, including 2.0 ft of stickup
- 0 to 10: Cement/bentonite grout from 0 ft bgs to 19.0 ft bgs
- 19.0 to 22.0: Bentonite pellet seal from 19.0 ft bgs to 22.0 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

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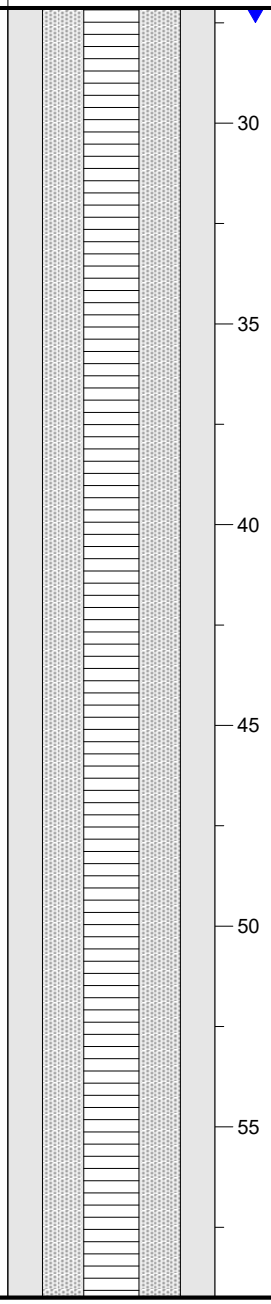
PROJECT: **Monitoring Well Installations**	BORING ID: **PW-2**		
LOCATION: **Entergy Independence Plant**	WELL ID: **PW-2**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **486116.9**	EASTING: **1489208.7**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **305.4 ft SRE**	TOC ELEVATION: **307.43 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL WELL DEPTH: **85.7 ft below TOC**	DEPTH TO WATER: 7/23/2018 **29.30 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **6/26/2018**	DATE COMPLETED: **6/29/2018**

Depth (feet)	USCS	Description
	SP	POORLY GRADED SAND, fine to medium-grained, saturated.
30	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained sand, gravel (<1" dia) subangular to subrounded sand, subangular to subrounded gravel, very loose, saturated. @30-32.5 ft fine to medium-grained sand, fine to coarse gravels (<2" dia.), subrounded to rounded sand and gravel.
35	SP	POORLY GRADED SAND, fine to medium grained, saturated.
	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained sand, gravel (<2" dia) subangular to subrounded sand, subangular to subrounded gravels, very loose, saturated.
40	GW	WELL GRADED GRAVEL, gravel (<2" dia), angular to rounded, very loose, saturated.
	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained sand, gravel (<1" dia), subangular to subrounded sand, subangular to subrounded gravel, very loose, saturated.
45	GW	WELL GRADED GRAVEL, gravel (<2" dia), angular to rounded, very loose, saturated.
	GC	CLAYEY GRAVEL with sand, fine to medium-grained sand, gravel (<1" dia), subangular to rounded sand and gravel, brown, soft, saturated.
	GW	WELL GRADED GRAVEL, gravels (<2" dia), angular to rounded, very loose, saturated.
50	SW	WELL GRADED SAND with GRAVEL, fine to coarse-grained sand, gravel (<1" dia) subangular to subrounded sand, subangular to subrounded gravels, very loose, saturated.
	SP	POORLY GRADED SAND, fine to medium-grained, brown, very loose, saturated.
55		WELL GRADED SAND, fine to medium-grained, subrounded to well rounded sand, very loose, saturated. @56.3-56.8 ft coarse-grained sand.

% REC
40
50
80



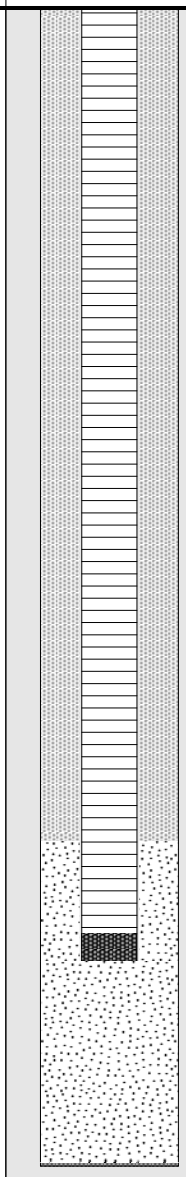
NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

ftn Associates Ltd.
water resources / environmental consultants

PROJECT: **Monitoring Well Installations**	BORING ID: **PW-2**		
LOCATION: **Entergy Independence Plant**	WELL ID: **PW-2**		
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **486116.9**	EASTING: **1489208.7**	
DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND SURFACE ELEV.: **305.4 ft SRE**	TOC ELEVATION: **307.43 ft SRE**	
DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL WELL DEPTH: **85.7 ft below TOC**	DEPTH TO WATER: 7/23/2018 **29.30 ft below TOC**	
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **6/26/2018**	DATE COMPLETED: **6/29/2018**

Depth (feet)	USCS	Description	% REC
60	SW		
65			80
	GM	SILTY to CLAYEY GRAVEL, coarse-grained sand, fine to coarse gravel, angular to subrounded gravel, very loose, saturated.	
70	GW	WELL GRADED GRAVEL, subangular to subrounded (<2" dia), yellowish orange, very loose, saturated.	
		POORLY GRADED SAND, fine-grained, tan, very loose, saturated.	
75	SP		10
		@79-80 ft subrounded to rounded gravel (<1/2" dia). @80-81 ft color changes to light gray.	
80	SW/GW	WELL GRADED SAND and GRAVELS, fine to course-grained sand , fine to coarse gravel, course to subrounded sand, subangular to rounded-well rounded gravel, tan, very loose, saturated.	
	SP	POORLY GRADED SAND, fine-grained, tan, very loose, saturated. @84.5 ft color changes to light gray.	100
85	SC	CLAYEY SAND, fine-grained, dark gray to almost green, soft, saturated.	
	SP	POORLY GRADED SAND, fine-grain, dark gray to almost green, dense, saturated.	
90			

Well Construction



NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 12, 2018 (site specific coordinate system).

Appendix B
Summary of Soil Data

JUNE 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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'										-	-	-	-	-	-	HOLD
B-1	UD	10.0-12.0'	ML	31.3	44	29	15	0.16	100.0	98.3	40.2	-	-	-	31.3	89.6	1.2E-08	-
B-1	UD	20.0-22.0'	CH	39.1	68	23	45	0.37	100.0	96.1	57.2	-	-	2.71	39.1	81.6	-	T-CU w/pp
B-1	UD	28.0-30.0'										-	-	-	-	-	-	-
B-2	UD	8.0-10.0'	CH	26.3	55	21	34	0.16	100.0	96.2	39.7	-	-	2.72	26.3	95.3	-	T-CU w/pp
B-5	UD	3.0-5.0'										-	-	-			-	T-CU w/pp
RP-8	UD	8.0-10.0'	CL	24.6	49	24	25	0.04	100.0	95.6	43.1	-	-	-	24.6	98.5	3.4E-08	-
PZ-1	UD	5.0-7.0'	CL	22.8	43	24	19	-0.04	100.0	95.1	51.0	-	-	-	22.8	102.9	3.0E-08	-
PZ-1	UD	10.0-12.0'										-	-	-			-	T-CU w/pp
PZ-1	UD	15.0-17.0'										-	-	-			-	T-CU w/pp

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

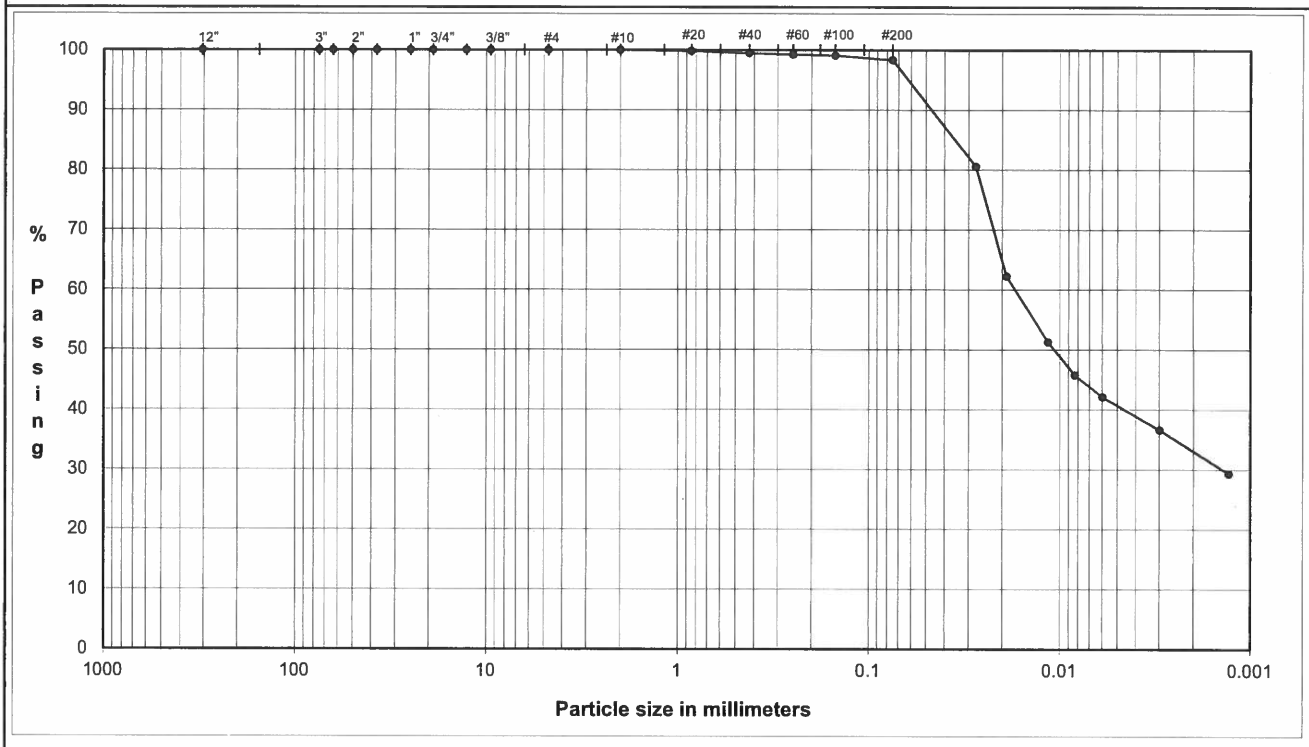
Golder Associates Inc.

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-1** Depth: **10.0-12.0'**
TYPE: **UD**



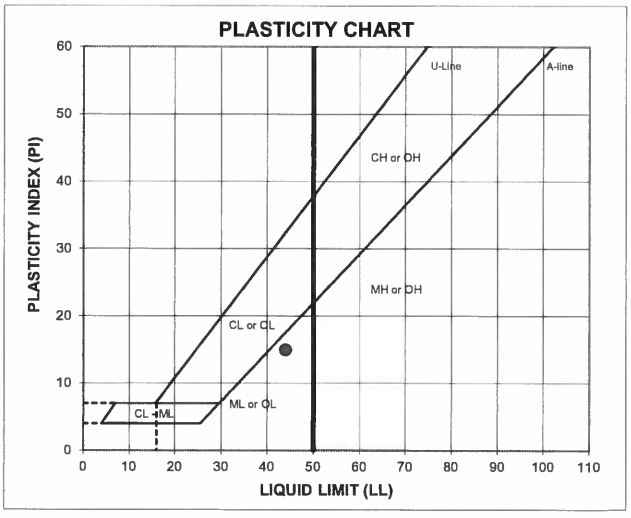
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**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	**99.8**		
#40	0.43	**99.5**	Medium Sand	**0.5**
#60	0.25	**99.2**		
#100	0.15	**99.0**		
#200	0.075	**98.3**	Fine Sand	**1.2**

Hydrometer Analysis

(mm)	%Finer		
0.027	**80.6**		
0.019	**62.3**		
0.012	**51.3**	Fines	
0.0083	**45.8**	Silt or Clay	**98.3**
0.0060	**42.1**		
0.0030	**36.6**		
0.0013	**29.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
31.3	**44**	**29**	**15**	**0.16**

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

DESCRIPTION: CLAYEY SILT, trace fine to medium sand; light grayish brown and dark brown.

USCS: ML

TECH	TJ
DATE	6/6/18
CHECK	
REVIEW	
APPROVE	

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

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	7	COMMENTS
PROJECT NUMBER	18103172		Flow Pump	2	
SAMPLE ID	B-1	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	3.001
Diameter, inches	2.871	Cell Pres.	88.0	Diameter, inches	2.873
Area, cm²	41.77	Bot. Pres.	80.0	Area, cm²	41.82
Volume, cm³	318.26	Top Pres.	80.0	Volume, cm³	318.81
Mass, g	599.69	Tot. B.P.	80.0	Mass, g	611.01
Moisture Content, %	31.28	Head, max.	166.00	Moisture Content, %	33.76
Dry Density, pcf	89.56	Head, min.	166.00	Dry Density, pcf	89.41
Spec. Gravity (assumed)	2.750	Max. Grad.	21.78	Volume Solids, cm³	166.11
Volume Solids, cm³	166.11	Min. Grad.	21.78	Volume Voids, cm³	152.70
Volume Voids, cm³	152.15			Void Ratio	0.92
Void Ratio	0.92			Saturation, %	100.0%
Saturation, %	93.9%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	599.69	692.85
Wt Soil & Tare, f	g	456.79	538.65
Wt Tare	g	0.00	81.92
Wt Moisture Lost	g	142.90	154.20
Wt Dry Soil	g	456.79	456.73
Water Content	%	31.28%	33.76%

DESCRIPTION: CLAYEY SILT, trace fine to medium sand; light grayish brown and dark brown.

Flow Pump Rate: 1.18E-05 cm³/sec

USCS: ML

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	30	21.6	0	0	0	0	2.36	166.00	21.78	1.2E-08
06/08/18	43259	13	35	21.6	5	5	300	300	2.36	166.00	21.78	1.2E-08
06/08/18	43259	13	40	21.6	5	10	300	600	2.36	166.00	21.78	1.2E-08
06/08/18	43259	13	45	21.6	5	15	300	900	2.36	166.00	21.78	1.2E-08 *
06/08/18	43259	13	50	21.6	5	20	300	1200	2.36	166.00	21.78	1.2E-08 *
06/08/18	43259	13	55	21.6	5	25	300	1500	2.36	166.00	21.78	1.2E-08 *
06/08/18	43259	14	0	21.6	5	30	300	1800	2.36	166.00	21.78	1.2E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.2E-08 cm/sec **

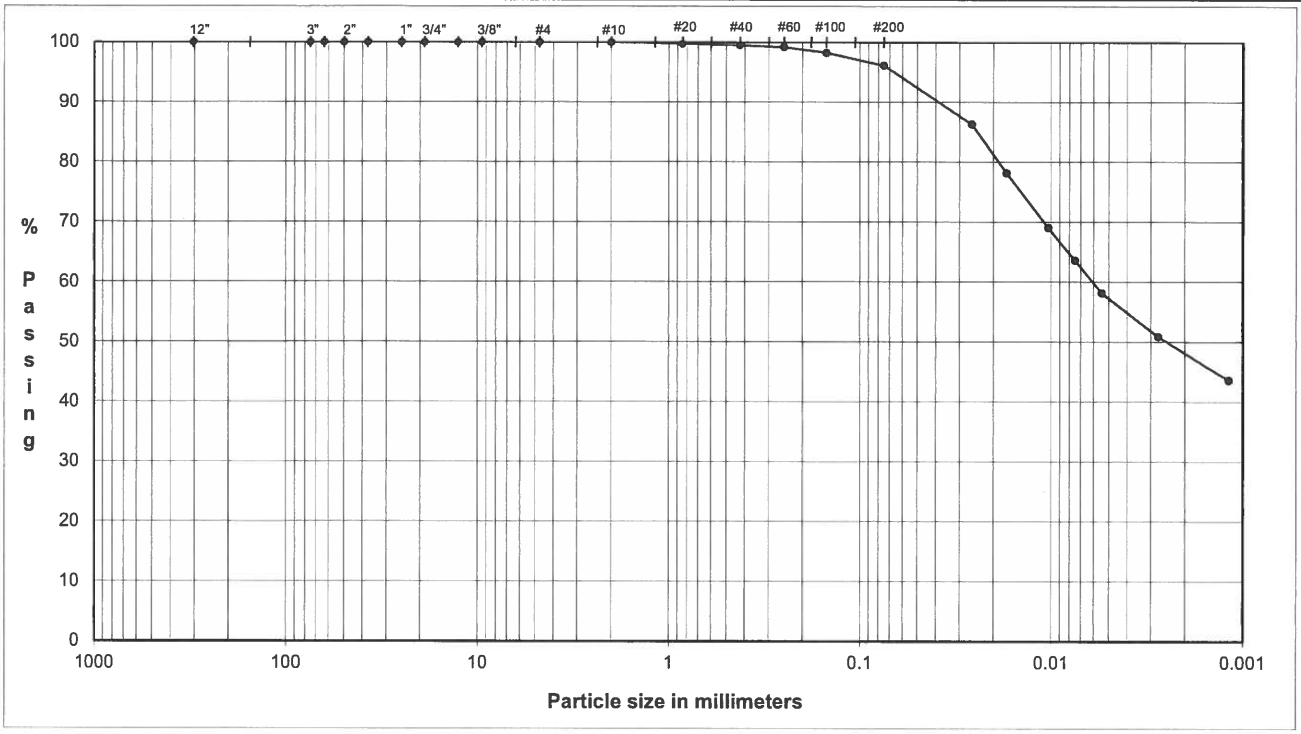
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-1** - Depth: **20.0-22.0'**
TYPE: **UD**



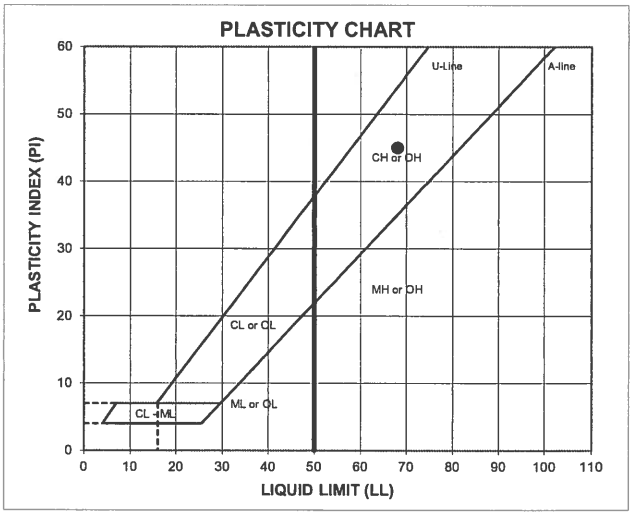
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	99.9	Coarse Sand	0.1
#20	0.85	99.7		
#40	0.43	99.4	Medium Sand	0.5
#60	0.25	99.2		
#100	0.15	98.2		
#200	0.075	96.1	Fine Sand	3.4

Hydrometer Analysis

(mm)	%Finer		
0.026	86.3		
0.017	78.1		
0.010	69.0	Fines	
0.0075	63.6	Silt or Clay	96.1
0.0054	58.1		
0.0027	50.9		
0.0012	43.6		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
39.1	68	23	45	0.37

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

DESCRIPTION: CLAY; grayish brown.

USCS: CH

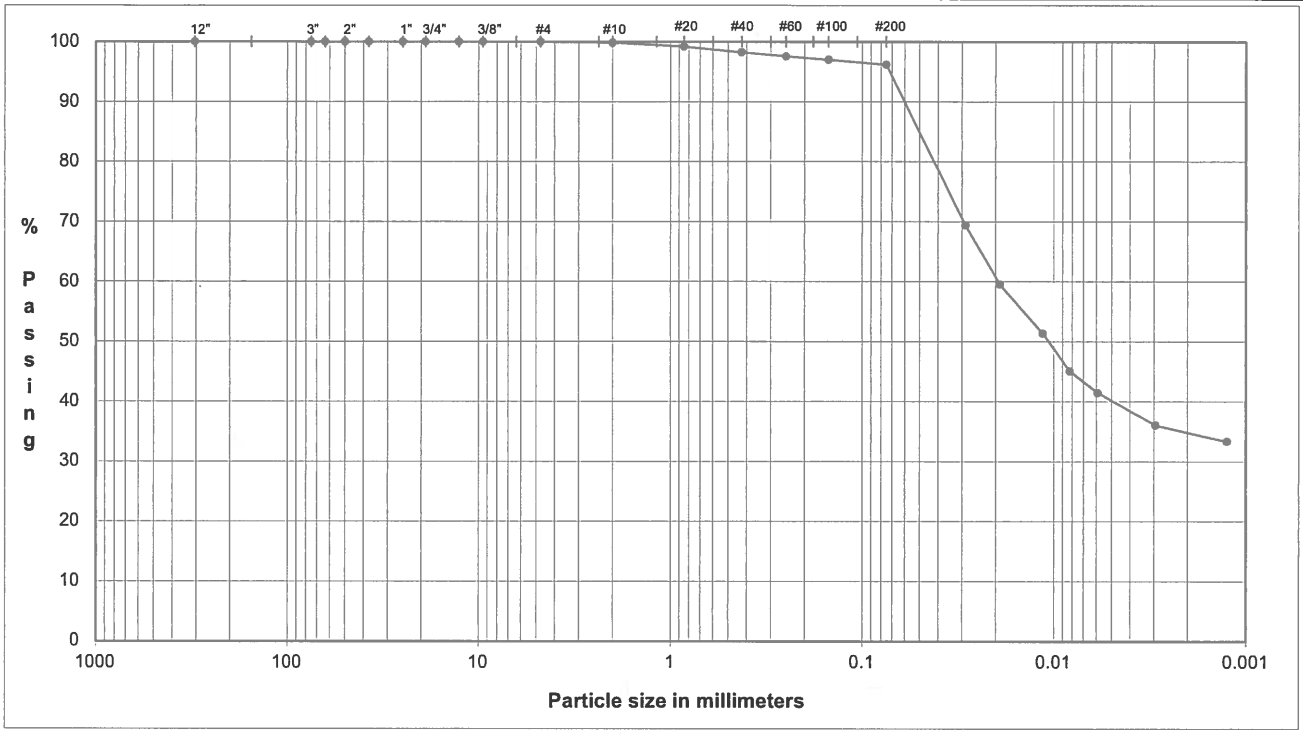
TECH	HH/PWM
DATE	6/1/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-2** - Depth: **8.0-10.0'**
TYPE: **UD**



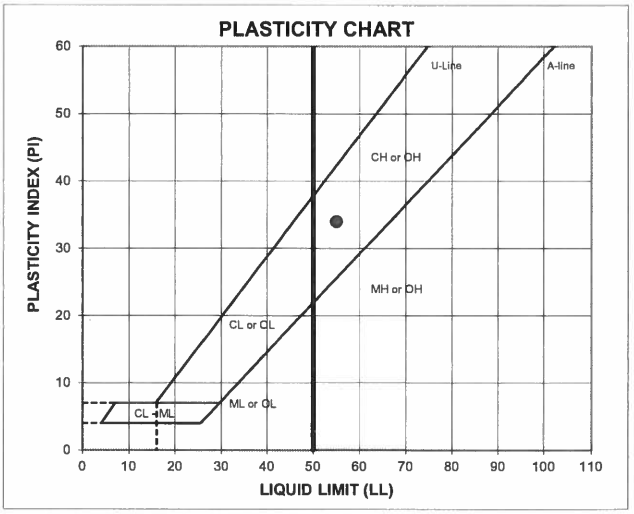
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

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	99.8	Coarse Sand	0.2
#20	0.85	99.2		
#40	0.43	98.3	Medium Sand	1.6
#60	0.25	97.5		
#100	0.15	97.0		
#200	0.075	96.2	Fine Sand	2.1

Hydrometer Analysis

(mm)	%Finer		
0.029	69.4		
0.019	59.5		
0.011	51.4	Fines	
0.0082	45.1	Silt or Clay	96.2
0.0059	41.5		
0.0030	36.1		
0.0013	33.4		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
26.3	55	21	34	0.16

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

DESCRIPTION: CLAY; dark brown, dark olive brown and brown.

USCS: CH

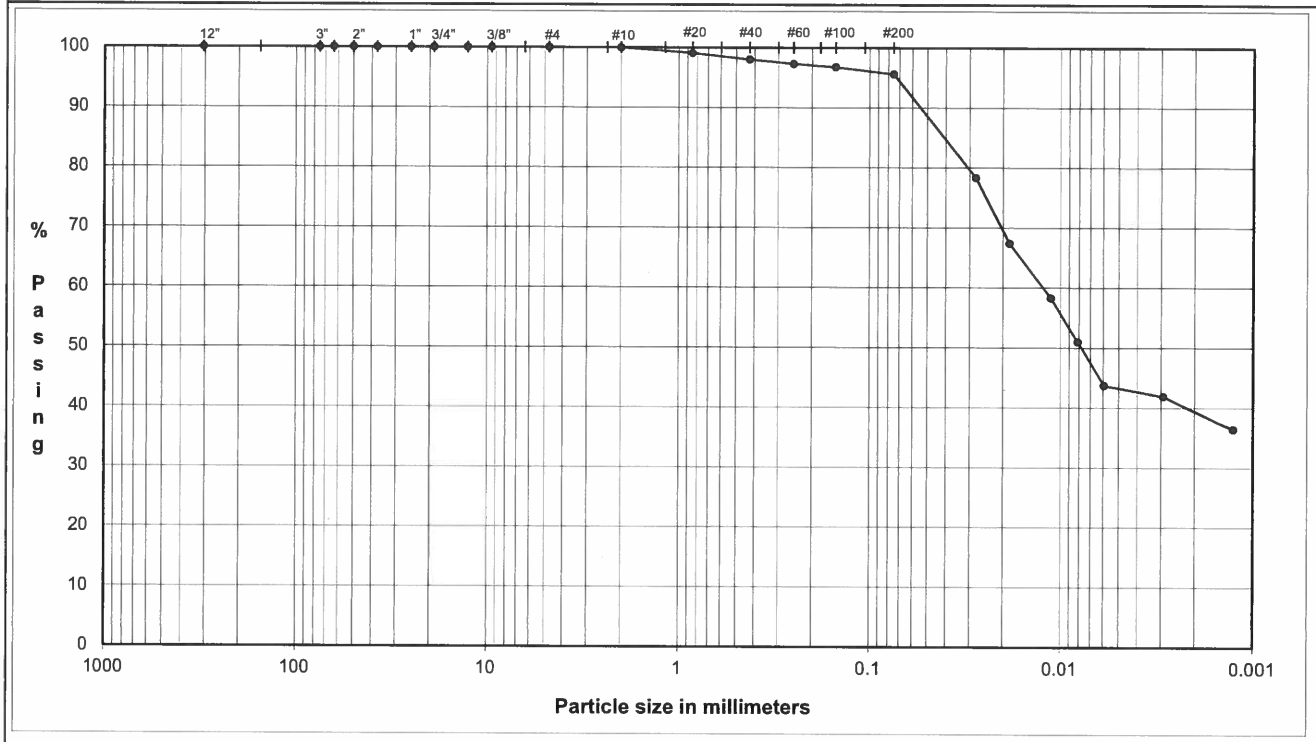
TECH	HEH
DATE	6/1/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-8** - Depth: **8.0-10.0'**
TYPE: **UD**



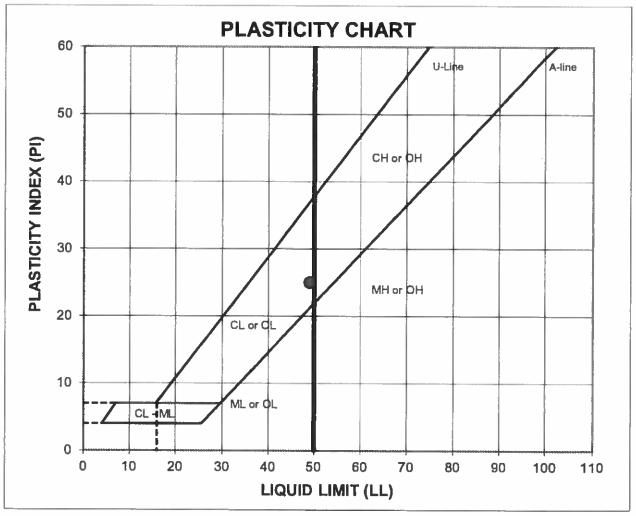
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

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	**100.0**	Coarse Sand	**0.0**
#20	0.85	**99.1**		
#40	0.43	**98.0**	Medium Sand	**2.0**
#60	0.25	**97.3**		
#100	0.15	**96.8**		
#200	0.075	**95.6**	Fine Sand	**2.4**

Hydrometer Analysis

(mm)	%Finer		
0.028	**78.3**		
0.019	**67.4**		
0.011	**58.3**	Fines	
0.0082	**51.0**	Silt or Clay	**95.6**
0.0059	**43.7**		
0.0029	**41.9**		
0.0013	**36.4**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
24.6	**49**	**24**	**25**	**0.04**

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

DESCRIPTION: SILTY CLAY, trace fine to coarse sand; dark yellowish brown.

USCS: CL

TECH	TJ/HEH
DATE	6/6/18
CHECK	
REVIEW	
APPROVE	

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

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	5	COMMENTS
PROJECT NUMBER	18103172		Flow Pump	2	
SAMPLE ID	RP-8	8.0-10.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.000	B-Value, f	0.99	Height, inches	3.001
Diameter, inches	2.877	Cell Pres.	88.0	Diameter, inches	2.885
Area, cm²	41.94	Bot. Pres.	80.0	Area, cm²	42.17
Volume, cm³	319.59	Top Pres.	80.0	Volume, cm³	321.48
Mass, g	628.15	Tot. B.P.	80.0	Mass, g	639.30
Moisture Content, %	24.58	Head, max.	116.06	Moisture Content, %	26.79
Dry Density, pcf	98.45	Head, min.	116.06	Dry Density, pcf	97.87
Spec. Gravity (assumed)	2.750	Max. Grad.	15.23	Volume Solids, cm³	183.36
Volume Solids, cm³	183.36	Min. Grad.	15.23	Volume Voids, cm³	138.12
Volume Voids, cm³	136.23			Void Ratio	0.75
Void Ratio	0.74			Saturation, %	97.8%
Saturation, %	91.0%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	628.15	721.53
Wt Soil & Tare, f	g	504.23	586.48
Wt Tare	g	0.00	82.33
Wt Moisture Lost	g	123.92	135.05
Wt Dry Soil	g	504.23	504.15
Water Content	%	24.58%	26.79%

Flow Pump Rate: 2.25E-05 cm³/sec

USCS: CL

DESCRIPTION: SILTY CLAY, trace fine to coarse sand; dark yellowish 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)
06/08/18	43259	14	0	21.4	0	0	0	0	1.65	116.06	15.23	3.4E-08
06/08/18	43259	14	5	21.4	5	5	300	300	1.65	116.06	15.23	3.4E-08
06/08/18	43259	14	10	21.4	5	10	300	600	1.65	116.06	15.23	3.4E-08
06/08/18	43259	14	15	21.4	5	15	300	900	1.65	116.06	15.23	3.4E-08 *
06/08/18	43259	14	20	21.4	5	20	300	1200	1.65	116.06	15.23	3.4E-08 *
06/08/18	43259	14	25	21.4	5	25	300	1500	1.65	116.06	15.23	3.4E-08 *
06/08/18	43259	14	30	21.4	5	30	300	1800	1.65	116.06	15.23	3.4E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.4E-08 cm/sec **

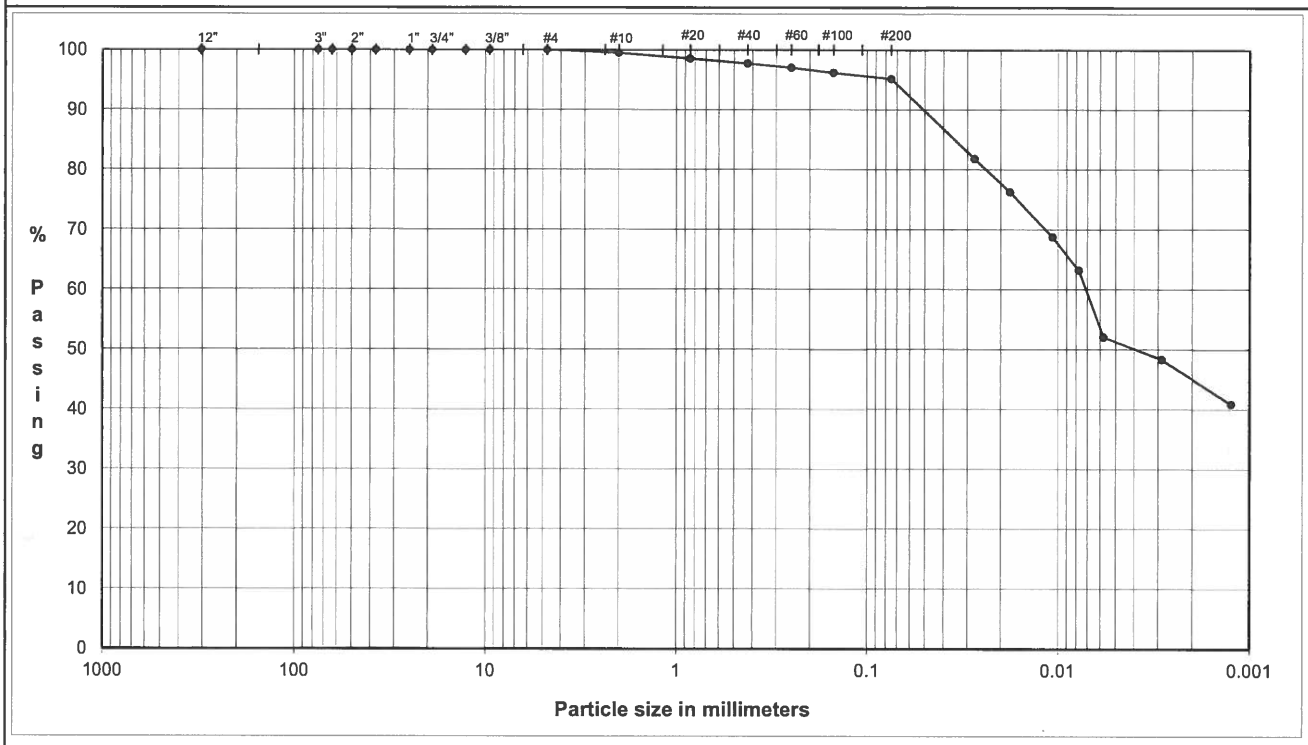
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **PZ-1** - Depth: **5.0-7.0'**
TYPE: **UD**



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

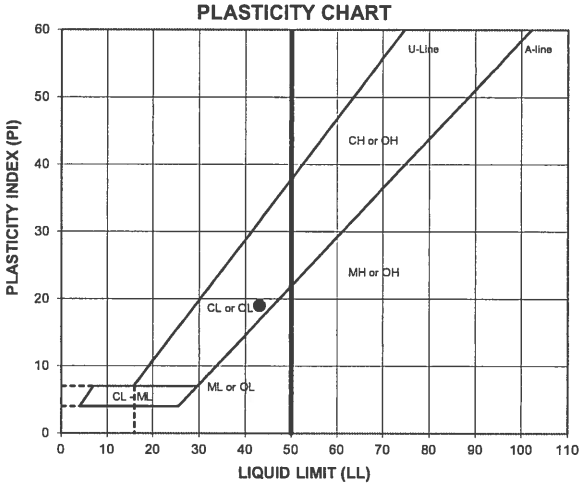
U.S. Standard Sieves Sizes and Numbers

	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	**99.5**	Coarse Sand	**0.5**
#20	0.85	**98.5**		
#40	0.43	**97.7**	Medium Sand	**1.8**
#60	0.25	**97.0**		
#100	0.15	**96.2**		
#200	0.075	**95.1**	Fine Sand	**2.5**

Hydrometer Analysis

(mm)	%Finer		
0.027	**81.8**		
0.018	**76.2**		
0.011	**68.8**	Fines	
0.0078	**63.2**	Silt or Clay	**95.1**
0.0058	**52.0**		
0.0029	**48.3**		
0.0012	**40.9**		

PLASTICITY CHART



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.8	**43**	**24**	**19**	**-0.04**

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

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

USCS: CL

TECH	TJ/HEH
DATE	6/5/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

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

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	2	COMMENTS
PROJECT NUMBER	18103172		Flow Pump	2	
SAMPLE ID	PZ-1	5.0-7.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.001	B-Value, f	0.98	Height, inches	3.002
Diameter, inches	2.865	Cell Pres.	88.0	Diameter, inches	2.872
Area, cm²	41.59	Bot. Pres.	80.0	Area, cm²	41.80
Volume, cm³	317.03	Top Pres.	80.0	Volume, cm³	318.69
Mass, g	642.10	Tot. B.P.	80.0	Mass, g	649.74
Moisture Content, %	22.79	Head, max.	132.24	Moisture Content, %	24.25
Dry Density, pcf	102.92	Head, min.	132.24	Dry Density, pcf	102.39
Spec. Gravity (assumed)	2.750	Max. Grad.	17.34	Volume Solids, cm³	190.16
Volume Solids, cm³	190.16	Min. Grad.	17.34	Volume Voids, cm³	128.54
Volume Voids, cm³	126.88			Void Ratio	0.68
Void Ratio	0.67			Saturation, %	98.7%
Saturation, %	93.9%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	642.10	732.03
Wt Soil & Tare, f	g	522.93	605.24
Wt Tare	g	0.00	82.40
Wt Moisture Lost	g	119.17	126.79
Wt Dry Soil	g	522.93	522.84
Water Content	%	22.79%	24.25%

DESCRIPTION: SILTY CLAY, trace fine to coarse sand; 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)
06/06/18	43257	13	0	20.8	0	0	0	0	1.88	132.24	17.34	3.0E-08
06/06/18	43257	13	5	20.8	5	5	300	300	1.88	132.24	17.34	3.0E-08
06/06/18	43257	13	10	20.8	5	10	300	600	1.88	132.24	17.34	3.0E-08
06/06/18	43257	13	15	20.8	5	15	300	900	1.88	132.24	17.34	3.0E-08 *
06/06/18	43257	13	20	20.8	5	20	300	1200	1.88	132.24	17.34	3.0E-08 *
06/06/18	43257	13	25	20.8	5	25	300	1500	1.88	132.24	17.34	3.0E-08 *
06/06/18	43257	13	30	20.8	5	30	300	1800	1.88	132.24	17.34	3.0E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.0E-08 cm/sec **

DATE	6/6/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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'	-	-	-	-	-	-	-	-	-	-	-	-				-
B-1	UD	10.0-12.0'	ML	31.3	44	29	15	0.16	100.0	98.3	40.2	-	-	-	31.3	89.6	1.2E-08	-
B-1	UD	20.0-22.0'	CH	39.1	68	23	45	0.37	100.0	96.1	57.2	-	-	2.71	39.1	81.6	-	T-CU w/pp
B-1	UD	28.0-30.0'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HOLD
B-2	UD	8.0-10.0'	CH	26.3	55	21	34	0.16	100.0	96.2	39.7	-	-	2.72	26.3	95.3	-	T-CU w/pp
B-3	UD	3.0-5.0'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HOLD
B-3	UD	10.0-12.0'	CL	30.1	45	20	25	0.41	98.2	97.2	30.9	-	-	-	30.1	91.4	1.1E-06	-
B-4	UD	5.0-7.0'	CL	23.2	35	15	20	0.40	100.0	96.5	45.0	-	-	-	23.2	103.1	4.9E-06	
B-4	UD	20.0-22.0'	CL	27.4	35	20	15	0.51	100.0	91.9	25.0	-	-	-	27.4	94.9	1.1E-06	
B-5	UD	3.0-5.0'	CL	19.0	38	16	22	0.13	98.6	89.6	34.0	-	-	2.69	19.0	108.7	-	T-CU w/pp
RP-8	UD	8.0-10.0'	CL	24.6	49	24	25	0.04	100.0	95.6	43.1	-	-	-	24.6	98.5	3.4E-08	-
PZ-1	UD	5.0-7.0'	CL	22.8	43	24	19	-0.04	100.0	95.1	51.0	-	-	-	22.8	102.9	3.0E-08	-
PZ-1	UD	10.0-12.0'	CL	30.9	46	19	27	0.45	100.0	97.1	42.0	-	-	2.72	30.9	91.1	-	T-CU w/pp
PZ-1	UD	15.0-17.0'	CL	28.9	38	17	21	0.56	100.0	97.0	35.0	-	-	2.78	28.9	95.2	-	T-CU w/pp

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

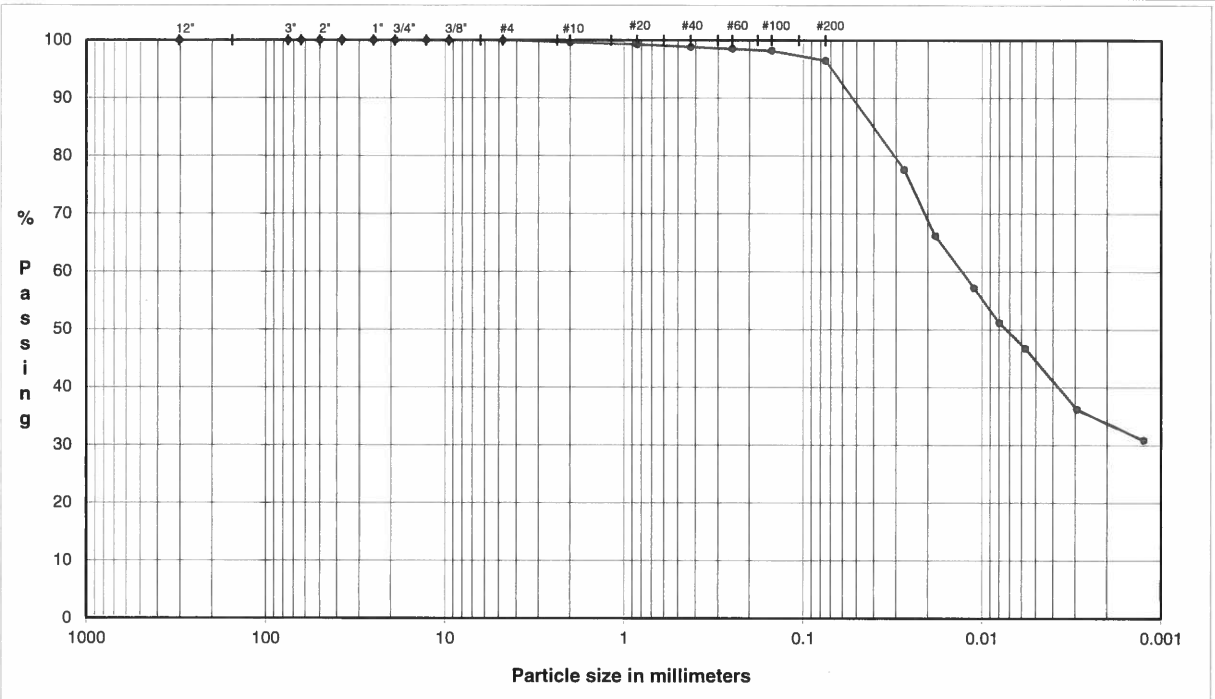
NOTES:
T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-4** - Depth: **5.0-7.0'**
TYPE: **UD**



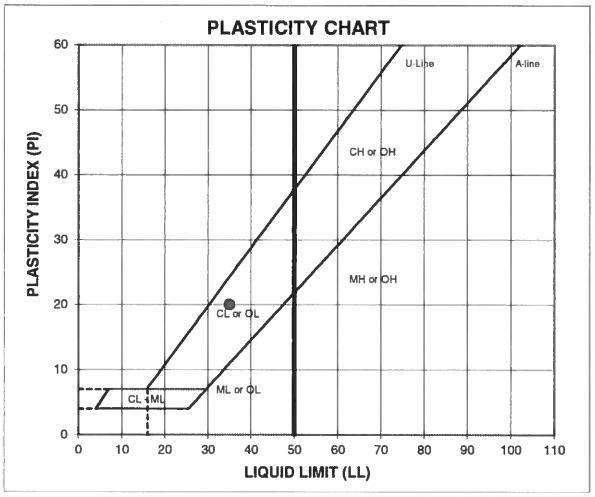
COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

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	**99.3**		
#40	0.43	**98.8**	Medium Sand	**0.8**
#60	0.25	**98.5**		
#100	0.15	**98.2**		
#200	0.075	**96.5**	Fine Sand	**2.3**

Hydrometer Analysis

(mm)	%Finer		
0.027	**77.6**		
0.018	**66.1**		
0.011	**57.1**	Fines	
0.0080	**51.1**	Silt or Clay	**96.5**
0.0057	**46.7**		
0.0029	**36.2**		
0.0013	**30.9**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
23.2	**35**	**15**	**20**	**0.40**

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

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

USCS: CL

TECH	HH/TB
DATE	7/10/18
CHECK	
REVIEW	
APPROVE	

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

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	10	COMMENTS
PROJECT NUMBER	18103172		Flow Pump	2	
SAMPLE ID	B-4	5.0-7.0'	Flow Pump Speed	5	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.085	B-Value, f	1.00	Height, inches	3.074
Diameter, inches	2.825	Cell Pres.	88.0	Diameter, inches	2.818
Area, cm²	40.44	Bot. Pres.	80.0	Area, cm²	40.24
Volume, cm³	316.87	Top Pres.	80.0	Volume, cm³	314.18
Mass, g	645.28	Tot. B.P.	80.0	Mass, g	647.52
Moisture Content, %	23.2	Head, max.	43.61	Moisture Content, %	23.66
Dry Density, pcf	103.1	Head, min.	43.61	Dry Density, pcf	104.00
Spec. Gravity(assumed)	2.750	Max. Grad.	5.59	Volume Solids, cm³	190.42
Volume Solids, cm³	190.42	Min. Grad.	5.59	Volume Voids, cm³	123.76
Volume Voids, cm³	126.46			Void Ratio	0.65
Void Ratio	0.66			Saturation, %	100.0%
Saturation, %	96.2%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	645.28	727.25
Wt Soil & Tare, f	g	523.64	603.40
Wt Tare	g	0.00	79.88
Wt Moisture Lost	g	121.64	123.85
Wt Dry Soil	g	523.64	523.52
Water Content	%	23.23%	23.66%

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

Flow Pump Rate: 1.17E-03 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)
07/11/18	43292	13	30	22.8	0	0	0	0	0.62	43.61	5.59	4.9E-06
07/11/18	43292	13	32	22.8	2	2	120	120	0.62	43.61	5.59	4.9E-06
07/11/18	43292	13	34	22.8	2	4	120	240	0.62	43.61	5.59	4.9E-06
07/11/18	43292	13	36	22.8	2	6	120	360	0.62	43.61	5.59	4.9E-06 *
07/11/18	43292	13	38	22.8	2	8	120	480	0.62	43.61	5.59	4.9E-06 *
07/11/18	43292	13	40	22.8	2	10	120	600	0.62	43.61	5.59	4.9E-06 *
07/11/18	43292	13	42	22.8	2	12	120	720	0.62	43.61	5.59	4.9E-06 *

TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.9E-06 cm/sec **

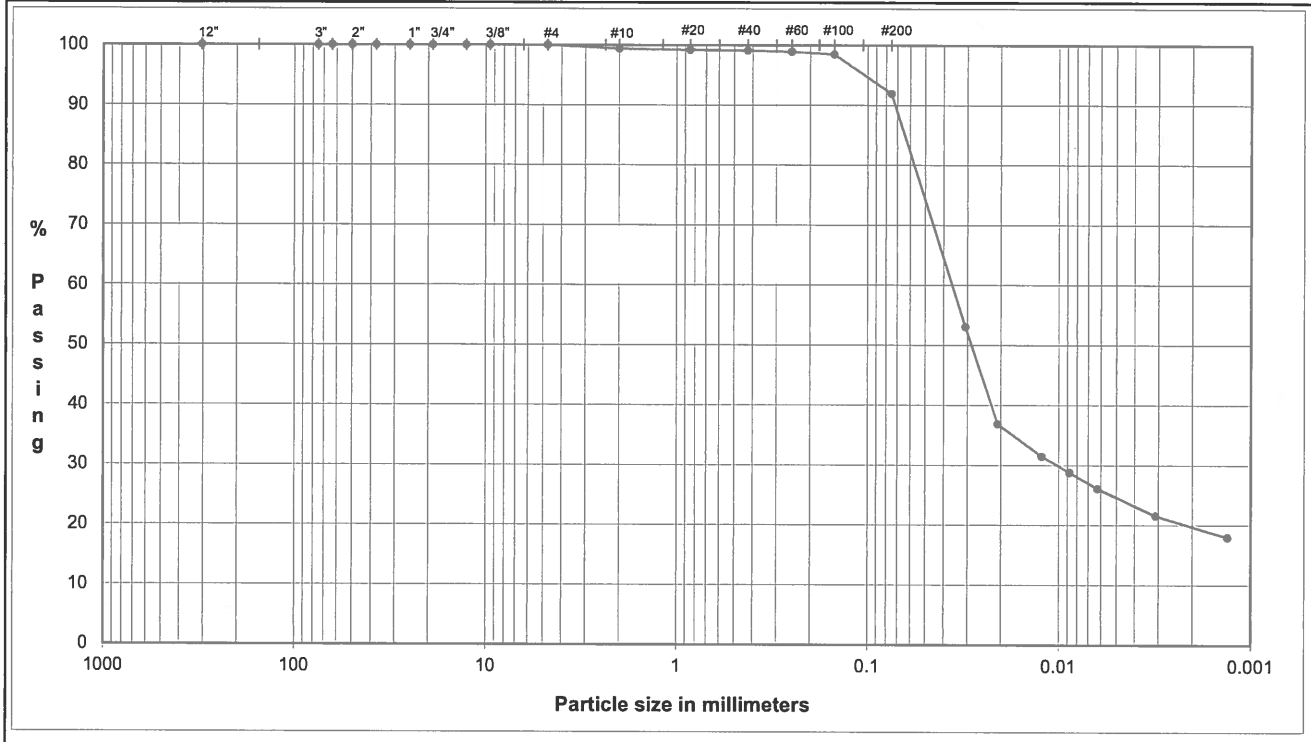
DATE	7/11/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 18103172

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-4** - Depth: **20.0-22.0'**
TYPE: **UD**



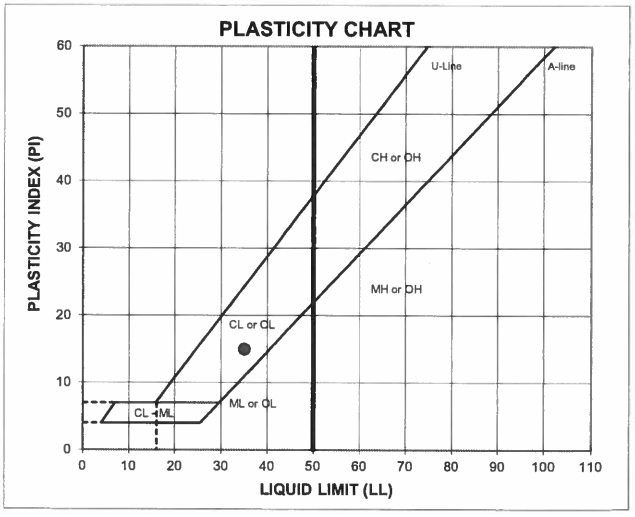
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**99.4**	Coarse Sand	**0.6**
#20	0.85	**99.2**		
#40	0.43	**99.1**	Medium Sand	**0.3**
#60	0.25	**98.9**		
#100	0.15	**98.5**		
#200	0.075	**91.9**	Fine Sand	**7.2**

Hydrometer Analysis

(mm)	%Finer		
0.031	**53.1**		
0.021	**36.9**		
0.012	**31.5**	Fines	
0.0088	**28.8**	Silt or Clay	**91.9**
0.0063	**26.1**		
0.0031	**21.6**		
0.0013	**18.0**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
27.4	**35**	**20**	**15**	**0.51**

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

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

USCS: CL

TECH	TB/HH
DATE	7/10/18
CHECK	
REVIEW	
APPROVE	

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

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	11	COMMENTS
PROJECT NUMBER	18103172		Flow Pump	2	
SAMPLE ID	B-4	20.0-22.0'	Flow Pump Speed	6	
SAMPLE TYPE	UD		Technician	FT/PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.133	B-Value, f	0.99	Height, inches	3.114
Diameter, inches	2.818	Cell Pres.	88.0	Diameter, inches	2.787
Area, cm²	40.24	Bot. Pres.	80.0	Area, cm²	39.36
Volume, cm³	320.21	Top Pres.	80.0	Volume, cm³	311.30
Mass, g	620.34	Tot. B.P.	80.0	Mass, g	622.49
Moisture Content, %	27.4	Head, max.	77.37	Moisture Content, %	27.87
Dry Density, pcf	94.9	Head, min.	77.37	Dry Density, pcf	97.58
Spec. Gravity(assumed)	2.750	Max. Grad.	9.78	Volume Solids, cm³	177.02
Volume Solids, cm³	177.02	Min. Grad.	9.78	Volume Voids, cm³	134.28
Volume Voids, cm³	143.18			Void Ratio	0.76
Void Ratio	0.81			Saturation, %	100.0%
Saturation, %	93.3%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	620.34	735.96
Wt Soil & Tare, f	g	486.82	600.38
Wt Tare	g	0.00	113.89
Wt Moisture Lost	g	133.52	135.58
Wt Dry Soil	g	486.82	486.49
Water Content	%	27.43%	27.87%

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

Flow Pump Rate: 4.70E-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)
07/11/18	43292	12	0	22.6	0	0	0	0	1.10	77.37	9.78	1.1E-06
07/11/18	43292	12	5	22.6	5	5	300	300	1.10	77.37	9.78	1.1E-06
07/11/18	43292	12	10	22.6	5	10	300	600	1.10	77.37	9.78	1.1E-06
07/11/18	43292	12	15	22.6	5	15	300	900	1.10	77.37	9.78	1.1E-06 *
07/11/18	43292	12	20	22.6	5	20	300	1200	1.10	77.37	9.78	1.1E-06 *
07/11/18	43292	12	25	22.6	5	25	300	1500	1.10	77.37	9.78	1.1E-06 *
07/11/18	43292	12	30	22.6	5	30	300	1800	1.10	77.37	9.78	1.1E-06 *

TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.1E-06 cm/sec **

DATE	7/11/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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'	-	-	-	-	-	-	-	-	-	-	-	-				-
B-1	UD	10.0-12.0'	ML	31.3	44	29	15	0.16	100.0	98.3	40.2	-	-	-	31.3	89.6	1.2E-08	-
B-1	UD	20.0-22.0'	CH	39.1	68	23	45	0.37	100.0	96.1	57.2	-	-	2.71	39.1	81.6	-	T-CU w/pp
B-1	UD	28.0-30.0'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HOLD
B-2	UD	8.0-10.0'	CH	26.3	55	21	34	0.16	100.0	96.2	39.7	-	-	2.72	26.3	95.3	-	T-CU w/pp
B-3	UD	3.0-5.0'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B-3	UD	10.0-12.0'	CL	30.1	45	20	25	0.41	98.2	97.2	30.9	-	-	-	30.1	91.4	1.1E-06	-
B-4	UD	5.0-7.0'	CL	23.2	35	15	20	0.40	100.0	96.5	45.0	-	-	-	23.2	103.1	4.9E-06	
B-4	UD	20.0-22.0'	CL	27.4	35	20	15	0.51	100.0	91.9	25.0	-	-	-	27.4	94.9	1.1E-06	
B-5	UD	3.0-5.0'	CL	19.0	38	16	22	0.13	98.6	89.6	34.0	-	-	2.69	19.0	108.7	-	T-CU w/pp
RP-8	UD	8.0-10.0'	CL	24.6	49	24	25	0.04	100.0	95.6	43.1	-	-	-	24.6	98.5	3.4E-08	-
PZ-1	UD	5.0-7.0'	CL	22.8	43	24	19	-0.04	100.0	95.1	51.0	-	-	-	22.8	102.9	3.0E-08	-
PZ-1	UD	10.0-12.0'	CL	30.9	46	19	27	0.45	100.0	97.1	42.0	-	-	2.72	30.9	91.1	-	T-CU w/pp
PZ-1	UD	15.0-17.0'	CL	28.9	38	17	21	0.56	100.0	97.0	35.0	-	-	2.78	28.9	95.2	-	T-CU w/pp

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.

Boring or Test Pit:	B-1		Boring or Test Pit:	B-1		Boring or Test Pit:	B-1	
Sample:	1		Sample:	1		Sample:	1	
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 =	6.005	in	Length =	6.006	in	Length =	6.009	in
Diameter =	2.859	in	Diameter =	2.865	in	Diameter =	2.869	in
Wet Mass =	2.602	lb	Wet Mass =	2.538	lb	Wet Mass =	2.466	lb
Area =	6.420	in^2	Area =	6.447	in^2	Area =	6.465	in^2
Volume =	38.551	in^3	Volume =	38.719	in^3	Volume =	38.847	in^3
Specific Gravity =	2.71	(ASTM D854)	Specific Gravity =	2.71	(ASTM D854)	Specific Gravity =	2.71	(ASTM D854)
Dry Mass of Solids =	1.988	lb	Dry Mass of Solids =	1.817	lb	Dry Mass of Solids =	1.680	lb
Moisture Content =	30.9%		Moisture Content =	39.7%		Moisture Content =	46.8%	
Wet Unit Weight =	116.6	pcf	Wet Unit Weight =	113.3	pcf	Wet Unit Weight =	109.7	pcf
Dry Unit Weight =	89.1	pcf	Dry Unit Weight =	81.1	pcf	Dry Unit Weight =	74.7	pcf
Void Ratio =	0.90		Void Ratio =	1.09		Void Ratio =	1.26	
Percent Saturation =	93%		Percent Saturation =	99%		Percent Saturation =	101%	
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	5.867	in	Length =	5.898	in	Length =	5.824	in
Diameter =	2.799	in	Diameter =	2.842	in	Diameter =	2.860	in
Area =	6.153	in^2 (Method B)	Area =	6.344	in^2 (Method B)	Area =	6.425	in^2 (Method B)
Volume =	36.098	in^3	Volume =	37.412	in^3	Volume =	37.419	in^3
Moisture Content =	28.6%		Moisture Content =	37.4%		Moisture Content =	43.5%	
Wet Unit Weight =	122.4	pcf	Wet Unit Weight =	115.3	pcf	Wet Unit Weight =	111.3	pcf
Dry Unit Weight =	95.2	pcf	Dry Unit Weight =	83.9	pcf	Dry Unit Weight =	77.6	pcf
Void Ratio =	0.78		Void Ratio =	1.02		Void Ratio =	1.18	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	1.00		B Parameter =	0.97		B Parameter =	1.00	
Shear Rate =	0.002%	/min.	Shear Rate =	0.003%	/min.	Shear Rate =	0.003%	/min.
t_{50} =	350.00	min.	t_{50} =	155.00	min.	t_{50} =	135.00	min.
Strain at Failure =	5.1%		Strain at Failure =	4.2%		Strain at Failure =	2.9%	
Cell Pressure =	68.0	psi	Cell Pressure =	76.0	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 =	26.0	psi	Confining Pressure =	54.0	psi

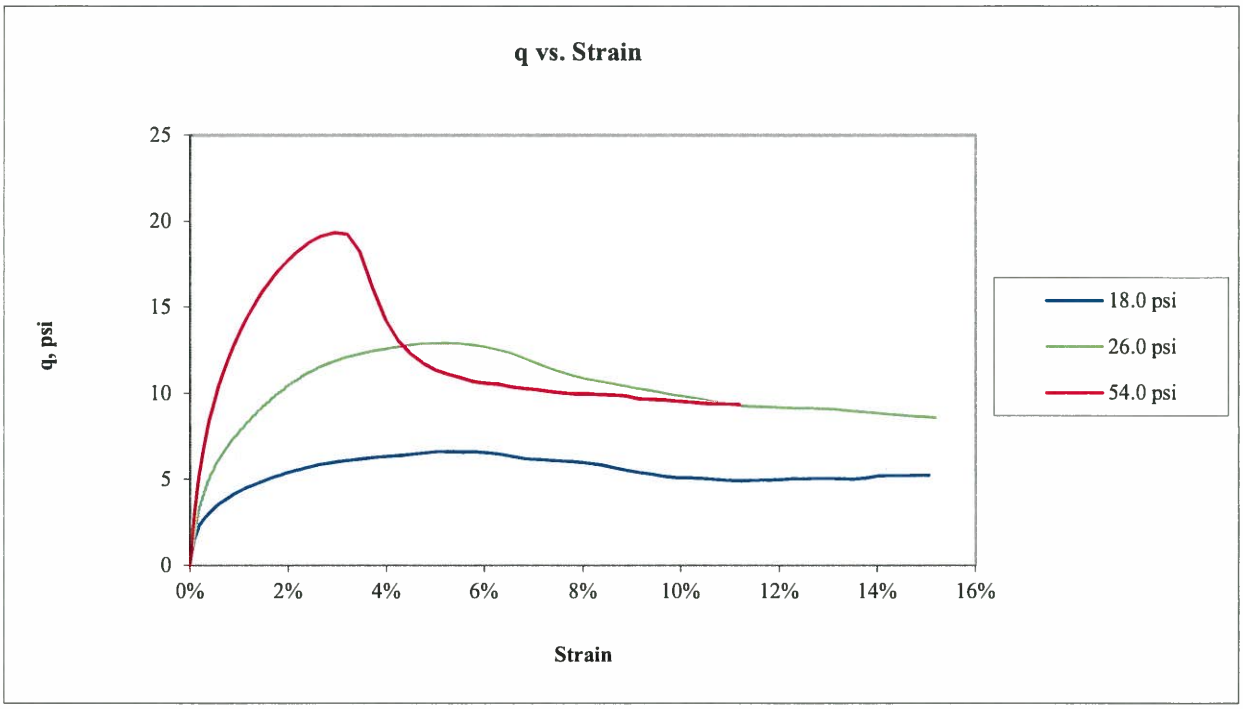
Notes: Sample description: (CH) CLAY; grayish brown.

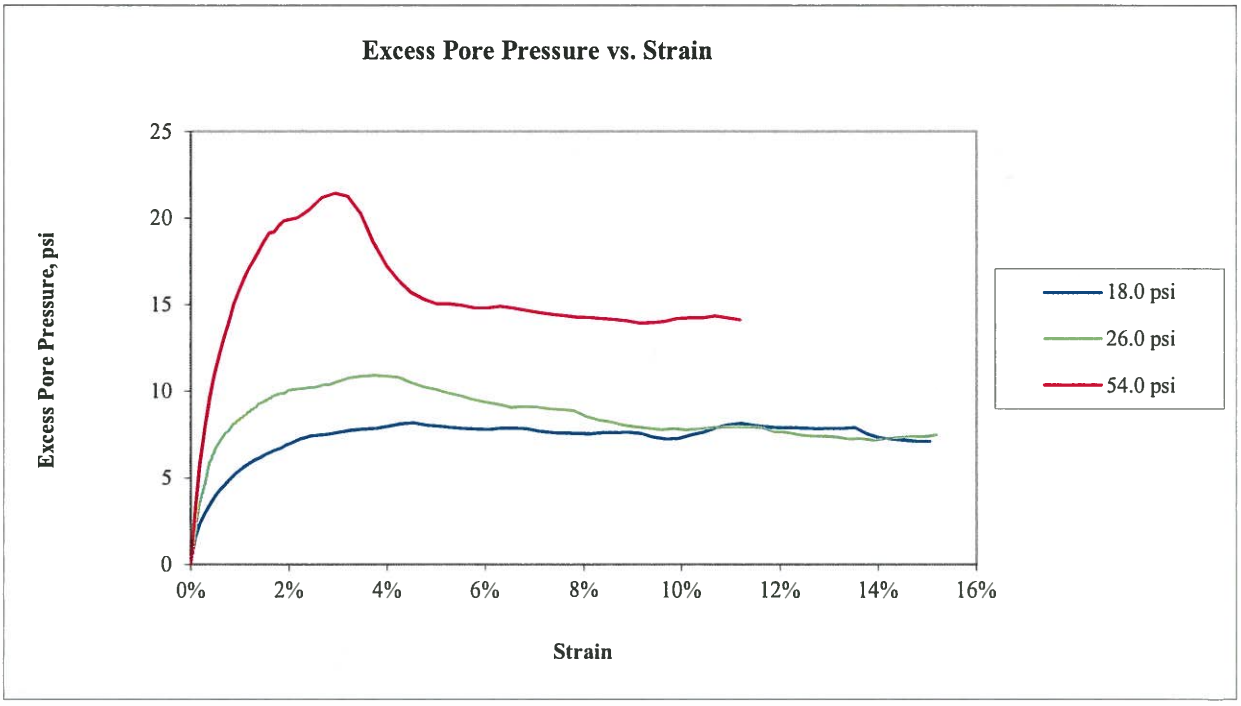
Atterberg limits: LL = 68 PL = 23 PI = 45 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 96% (ASTM D422, refer to separate report for gradation curve)

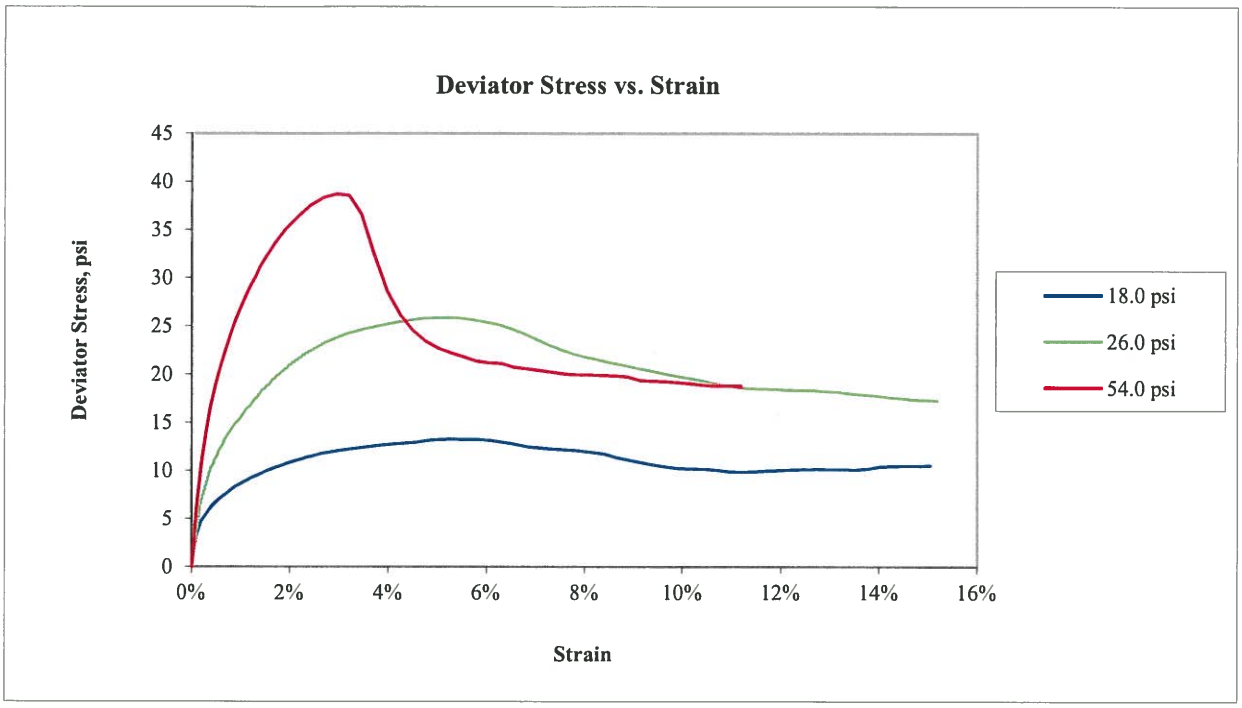
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

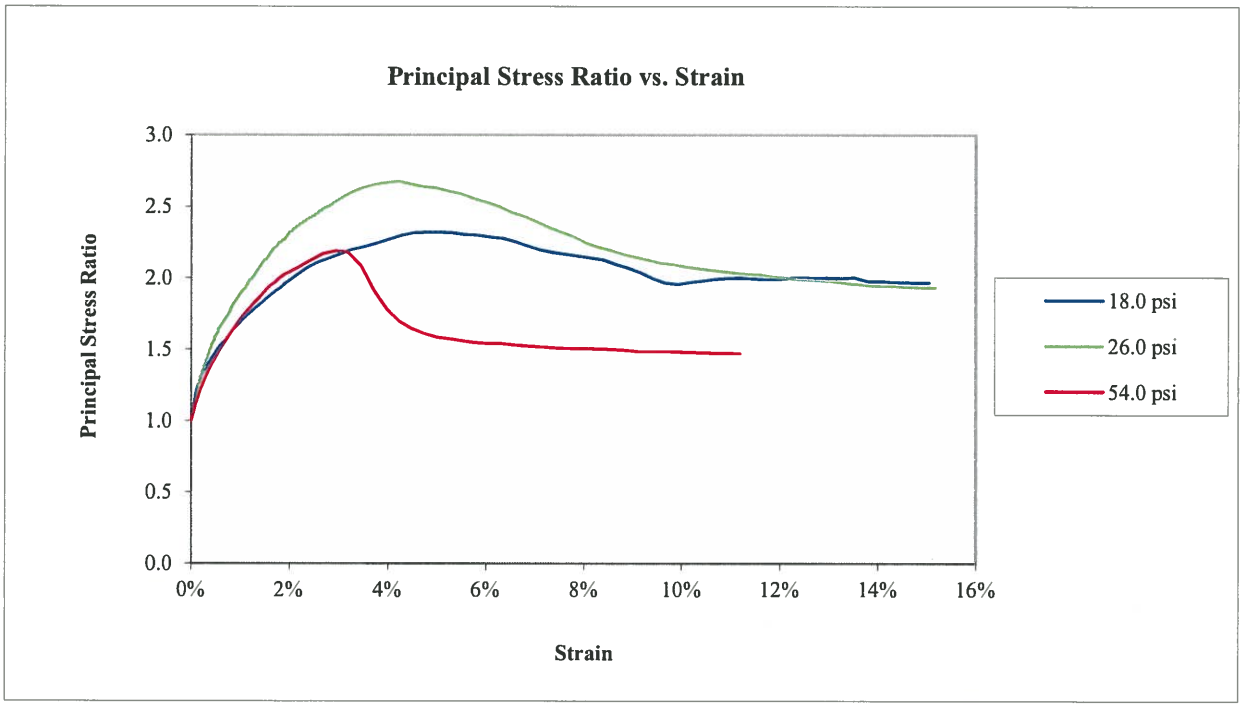
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-1 20.0-22.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/5/2018**	**Job Number:** **18103172**	**Figure:** **1**



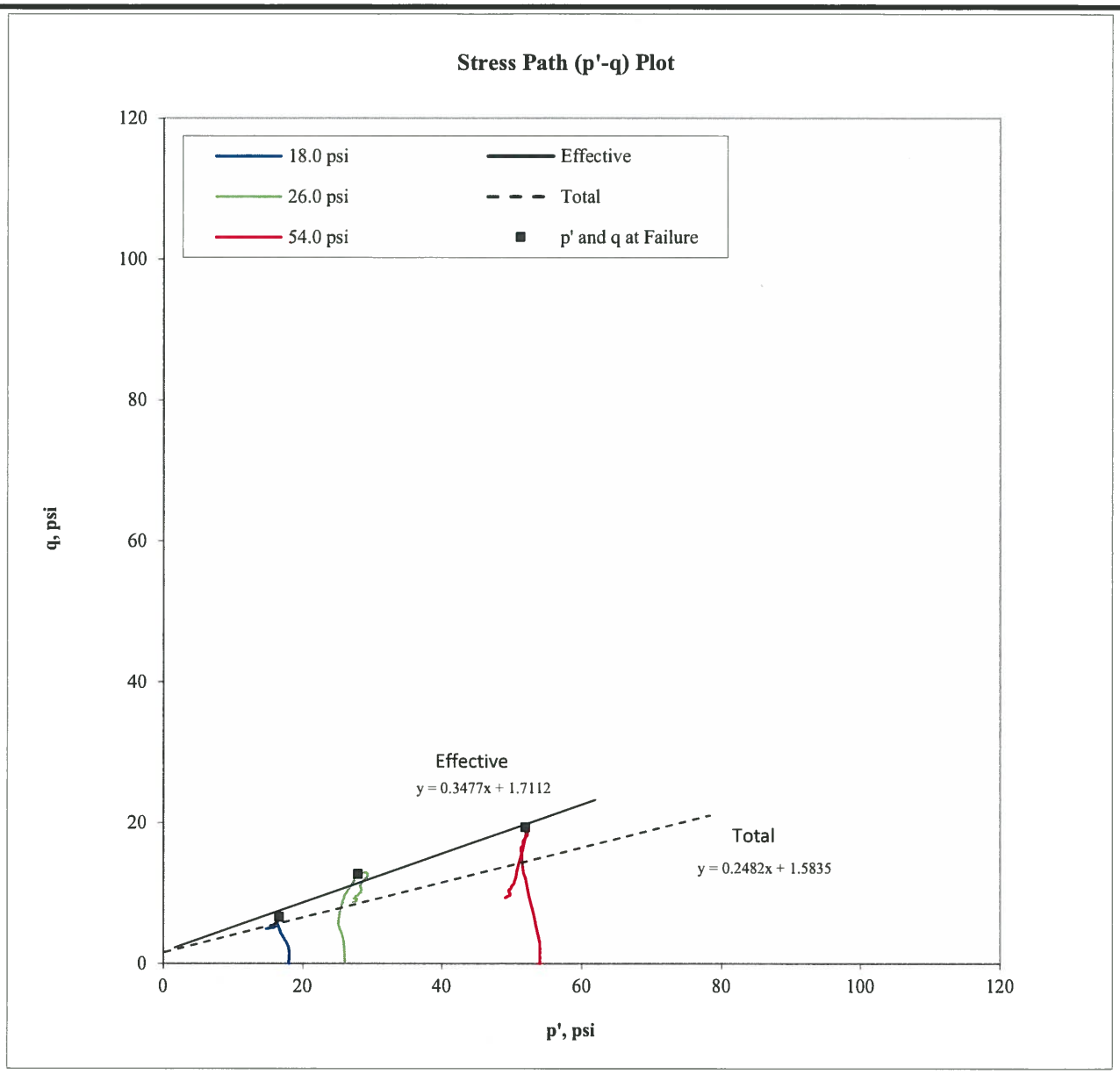


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-1 20.0-22.0'**	**Technician:** **FT/PWM** **Check:** **JWM**	**Reviewed:** **Approved:**	**Start Date:** **6/5/2018**	**Job Number:** **18103172**	**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 INDEPENDENCE/AR**					
Sample: **B-1 20.0-22.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/5/2018**	**Job Number:** **18103172**	**Figure:** **3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
18.0	24.6	16.6	6.6
26.0	38.7	27.9	12.7
54.0	73.4	51.9	19.4

Effective

α ' =	19.2	degree
a' =	1.7	psi

Total

α =	13.9	degree
a =	1.6	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.

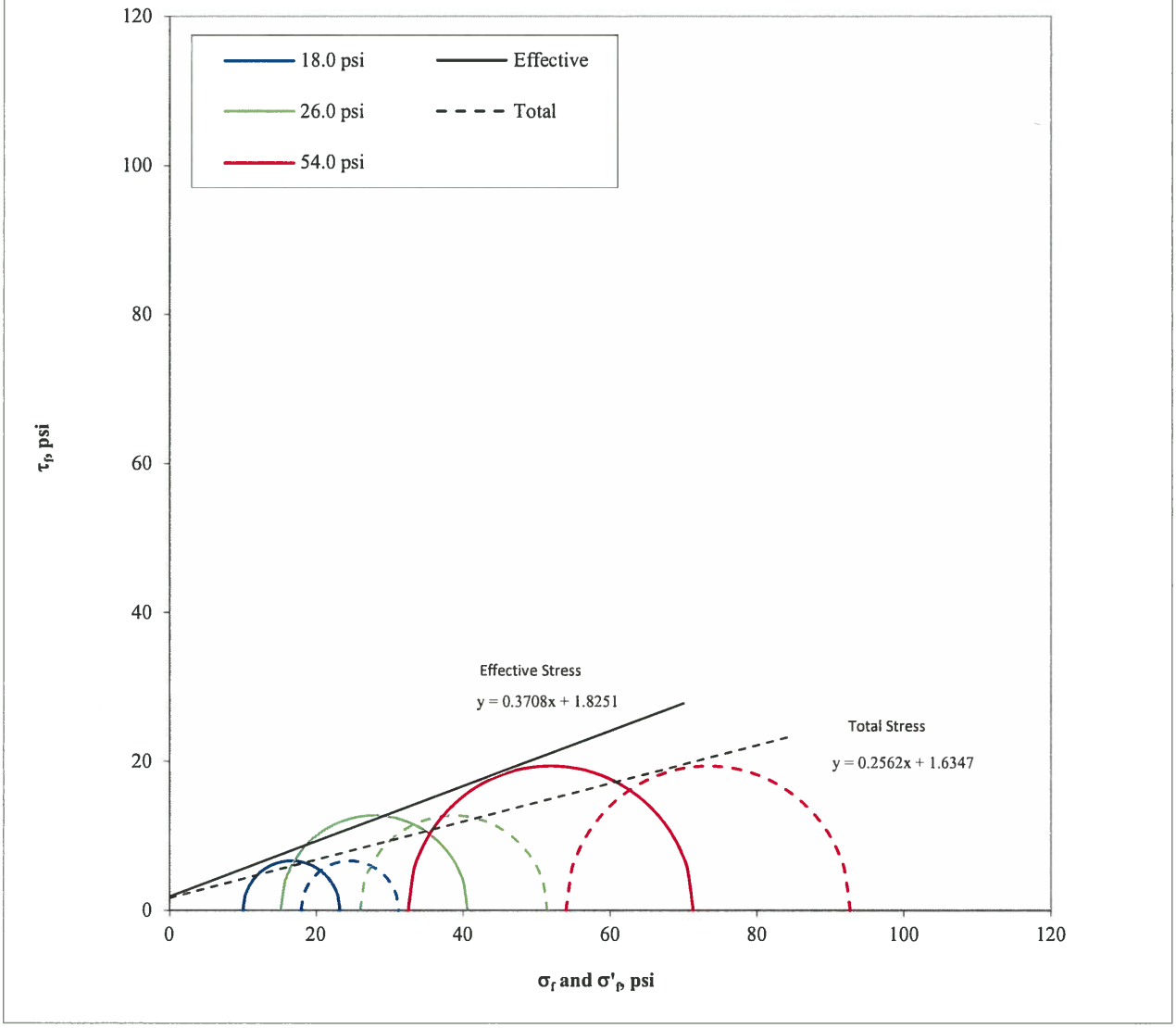
Golder Associates Inc.
Atlanta, Georgia

Title:
ASTM D4767
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT
STRESS PATH PLOT

Job Short Title: FTN/ENTERGY INDEPENDENCE/AR

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-1 20.0-22.0'	FT/PWM Check: JNL	Approved:	6/5/2018	18103172	4

Mohr's Circle Diagram



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	23.3	10.0	31.2	18.0
26.0	40.6	15.2	51.4	26.0
54.0	71.3	32.6	92.7	54.0

Effective

ϕ' =	20.3	degree
c' =	1.8	psi

Total

ϕ =	14.4	degree
c =	1.6	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 INDEPENDENCE/AR

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-1 20.0-22.0'	FT/PWM Check:	Approved:	6/5/2018	18103172	5

18.0 psi

26.0 psi

54.0 psi

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMENS PHOTOGRAPH - 18.0 / 26.0 / 54.0 psi**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-1 20.0-22.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/5/2018**	**Job Number:** **18103172**	**Figure:** **6**

Boring or Test Pit:	B-2		Boring or Test Pit:	B-2		Boring or Test Pit:	B-2	
Sample:	1		Sample:	1		Sample:	1	
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 =	6.019	in	Length =	5.999	in	Length =	6.020	in
Diameter =	2.901	in	Diameter =	2.856	in	Diameter =	2.906	in
Wet Mass =	2.750	lb	Wet Mass =	2.747	lb	Wet Mass =	2.734	lb
Area =	6.610	in^2	Area =	6.406	in^2	Area =	6.633	in^2
Volume =	39.784	in^3	Volume =	38.431	in^3	Volume =	39.928	in^3
Specific Gravity =	2.72	(ASTM D854)	Specific Gravity =	2.72	(ASTM D854)	Specific Gravity =	2.72	(ASTM D854)
Dry Mass of Solids =	2.166	lb	Dry Mass of Solids =	2.204	lb	Dry Mass of Solids =	2.146	lb
Moisture Content =	26.9%		Moisture Content =	24.6%		Moisture Content =	27.4%	
Wet Unit Weight =	119.4	pcf	Wet Unit Weight =	123.5	pcf	Wet Unit Weight =	118.3	pcf
Dry Unit Weight =	94.1	pcf	Dry Unit Weight =	99.1	pcf	Dry Unit Weight =	92.9	pcf
Void Ratio =	0.80		Void Ratio =	0.71		Void Ratio =	0.82	
Percent Saturation =	91%		Percent Saturation =	94%		Percent Saturation =	90%	
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	5.978	in	Length =	5.961	in	Length =	5.954	in
Diameter =	2.893	in	Diameter =	2.869	in	Diameter =	2.878	in
Area =	6.571	in^2 (Method B)	Area =	6.464	in^2 (Method B)	Area =	6.507	in^2 (Method B)
Volume =	39.284	in^3	Volume =	38.531	in^3	Volume =	38.745	in^3
Moisture Content =	28.6%		Moisture Content =	26.3%		Moisture Content =	28.3%	
Wet Unit Weight =	122.5	pcf	Wet Unit Weight =	124.8	pcf	Wet Unit Weight =	122.8	pcf
Dry Unit Weight =	95.3	pcf	Dry Unit Weight =	98.9	pcf	Dry Unit Weight =	95.7	pcf
Void Ratio =	0.78		Void Ratio =	0.71		Void Ratio =	0.77	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.98		B Parameter =	0.97		B Parameter =	0.99	
Shear Rate =	0.065%	/min.	Shear Rate =	0.008%	/min.	Shear Rate =	0.015%	/min.
t_{50} =	5.61	min.	t_{50} =	39.49	min.	t_{50} =	23.36	min.
Strain at Failure =	1.7%		Strain at Failure =	2.1%		Strain at Failure =	2.5%	
Cell Pressure =	78.0	psi	Cell Pressure =	86.0	psi	Cell Pressure =	94.0	psi
Back Pressure =	70.0	psi	Back Pressure =	70.0	psi	Back Pressure =	70.0	psi
Confining Pressure =	8.0	psi	Confining Pressure =	16.0	psi	Confining Pressure =	24.0	psi

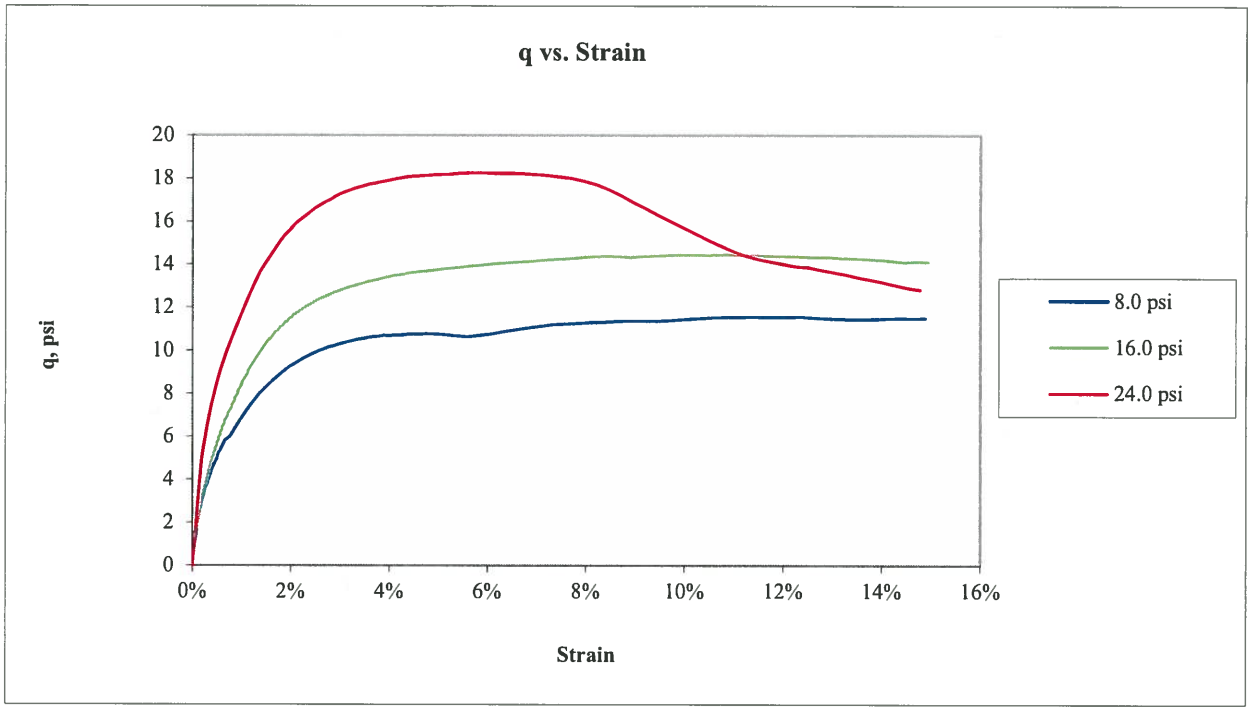
Notes: Sample description: (CH) CLAY, dark brown, dark olive brown and brown.

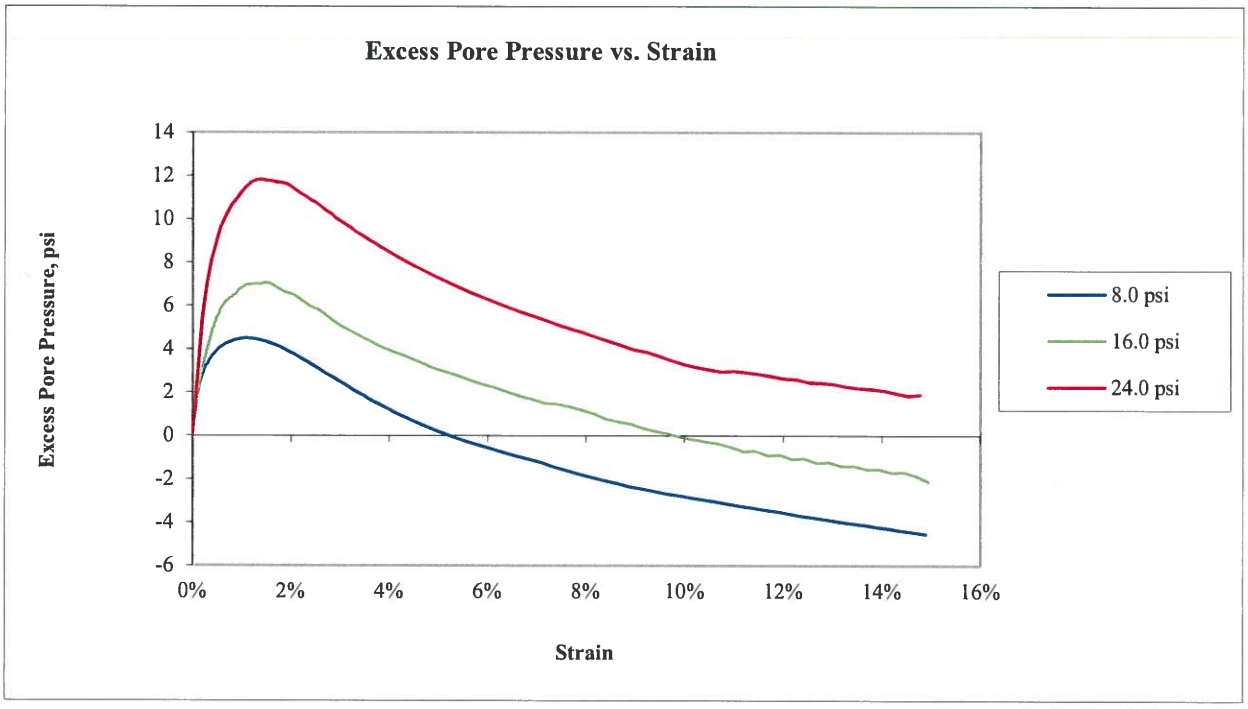
Atterberg limits: LL = 55 PL = 21 PI = 34 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 96% (ASTM D422, refer to separate report for gradation curve)

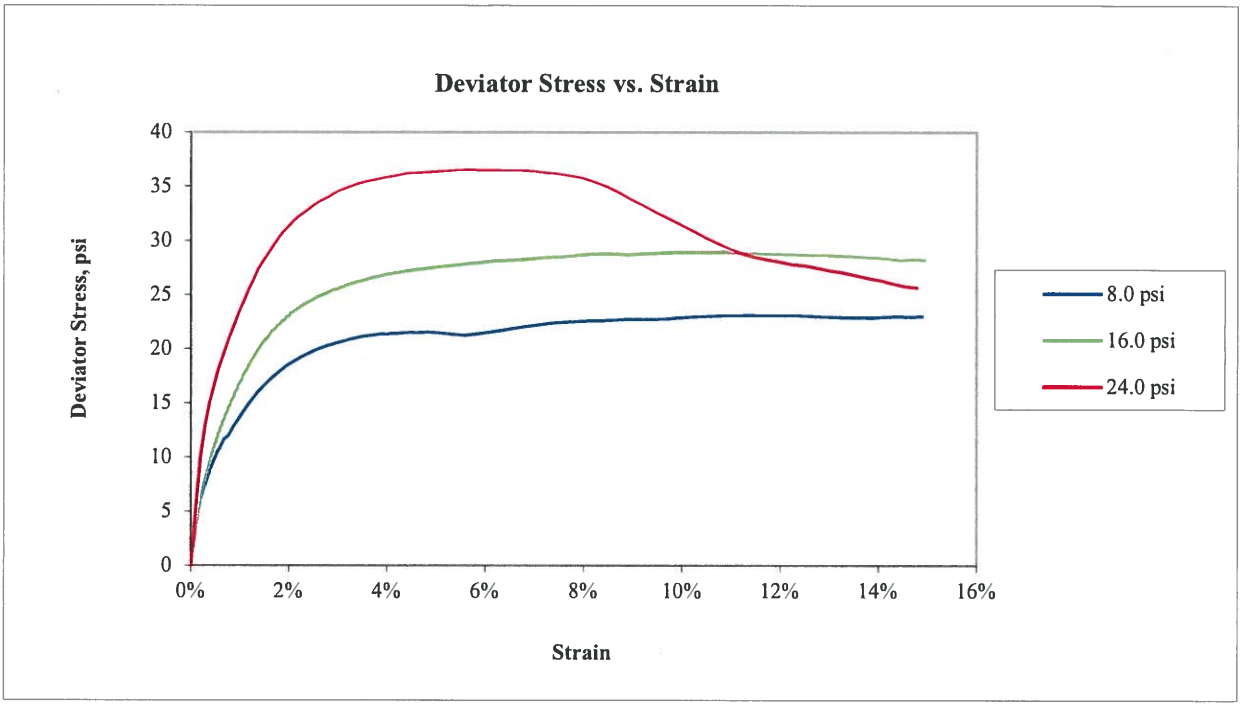
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ % strain
Membrane effect:	X	Corrected		Not Corrected

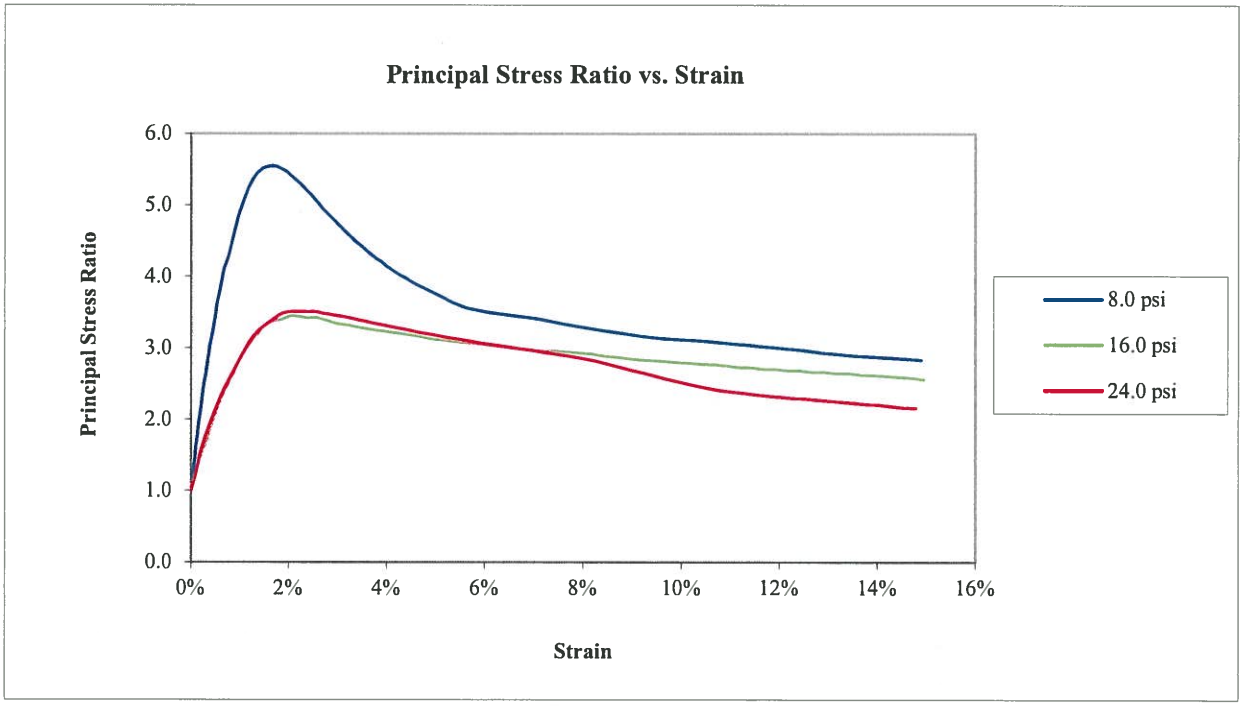
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-2 8.0-10.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/11/2018**	**Job Number:** **18103172**	**Figure:** **1**



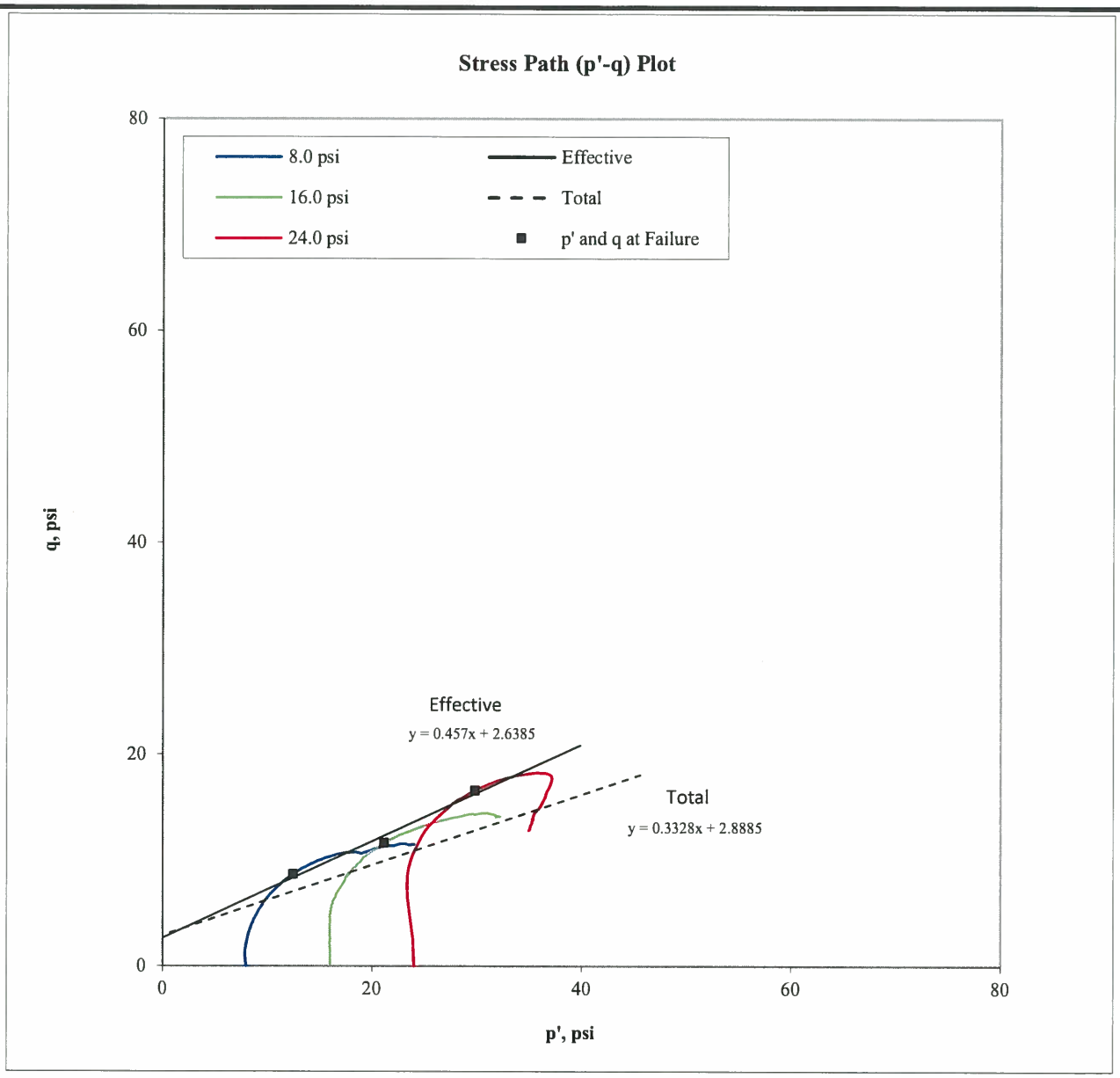


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-2 8.0-10.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/11/2018**	**Job Number:** **18103172**	**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 INDEPENDENCE/AR**					
Sample: **B-2 8.0-10.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/11/2018**	**Job Number:** **18103172**	**Figure:** **3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
8.0	16.7	12.5	8.7
16.0	27.7	21.2	11.7
24.0	40.6	29.8	16.6

Effective

α ' =	24.6	degree
a' =	2.6	psi

Total

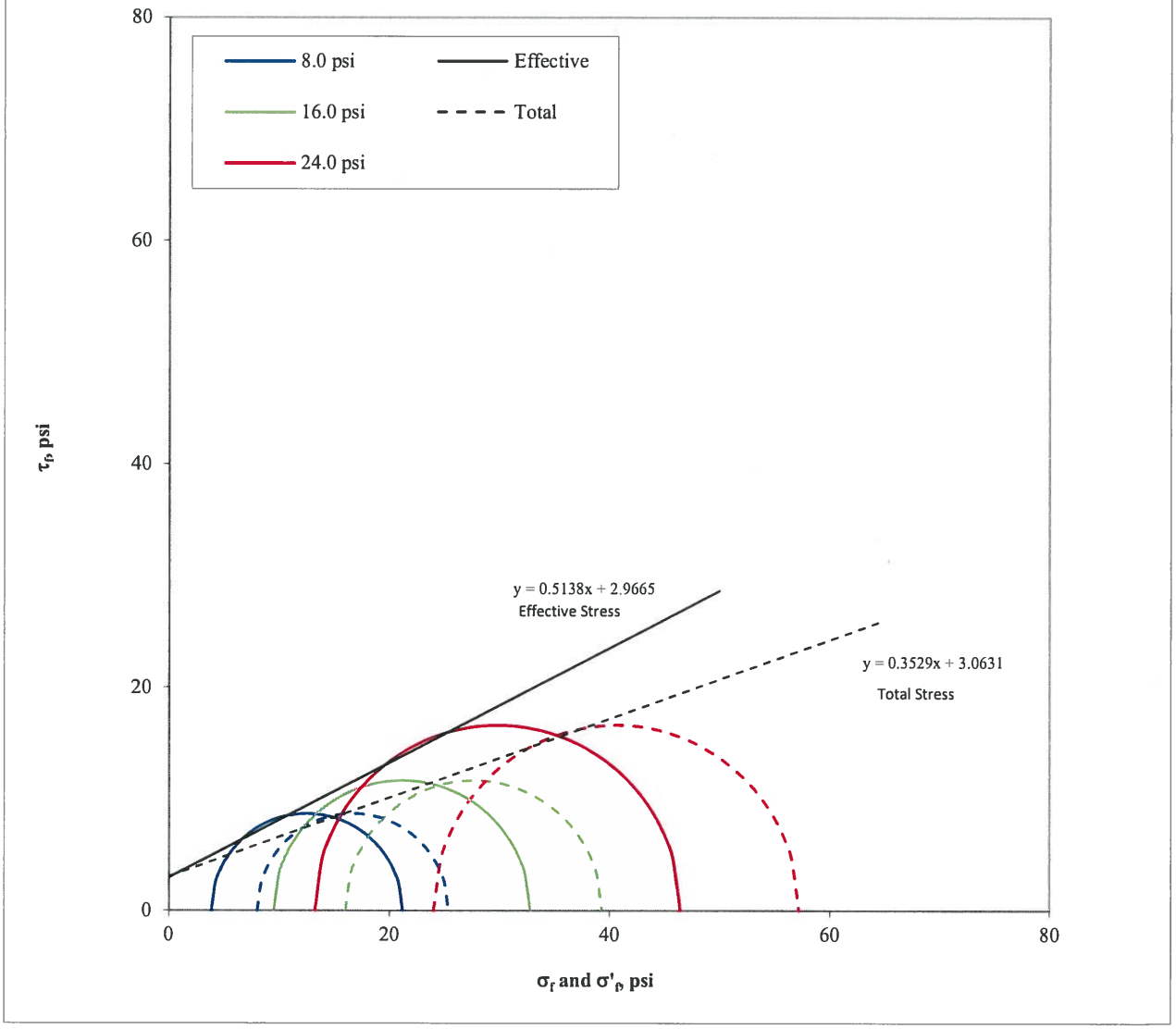
α =	18.4	degree
a =	2.9	psi

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 INDEPENDENCE/AR**	

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-2 8.0-10.0'	FT/PWM Check:	Approved:	6/11/2018	18103172	4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
8.0	21.2	3.8	25.4	8.0
16.0	32.8	9.5	39.3	16.0
24.0	46.4	13.2	57.2	24.0

Effective

ϕ' =	27.2	degree
c' =	3.0	psi

Total

ϕ =	19.4	degree
c =	3.1	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 MOHR'S CIRCLE DIAGRAM				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: B-2 8.0-10.0'	**Technician:** FT/PWM **Check:** IWM	**Reviewed:** **Approved:**	**Start Date:** 6/11/2018	**Job Number:** 18103172	**Figure:** 5

8.0 psi

16.0 psi

24.0 psi

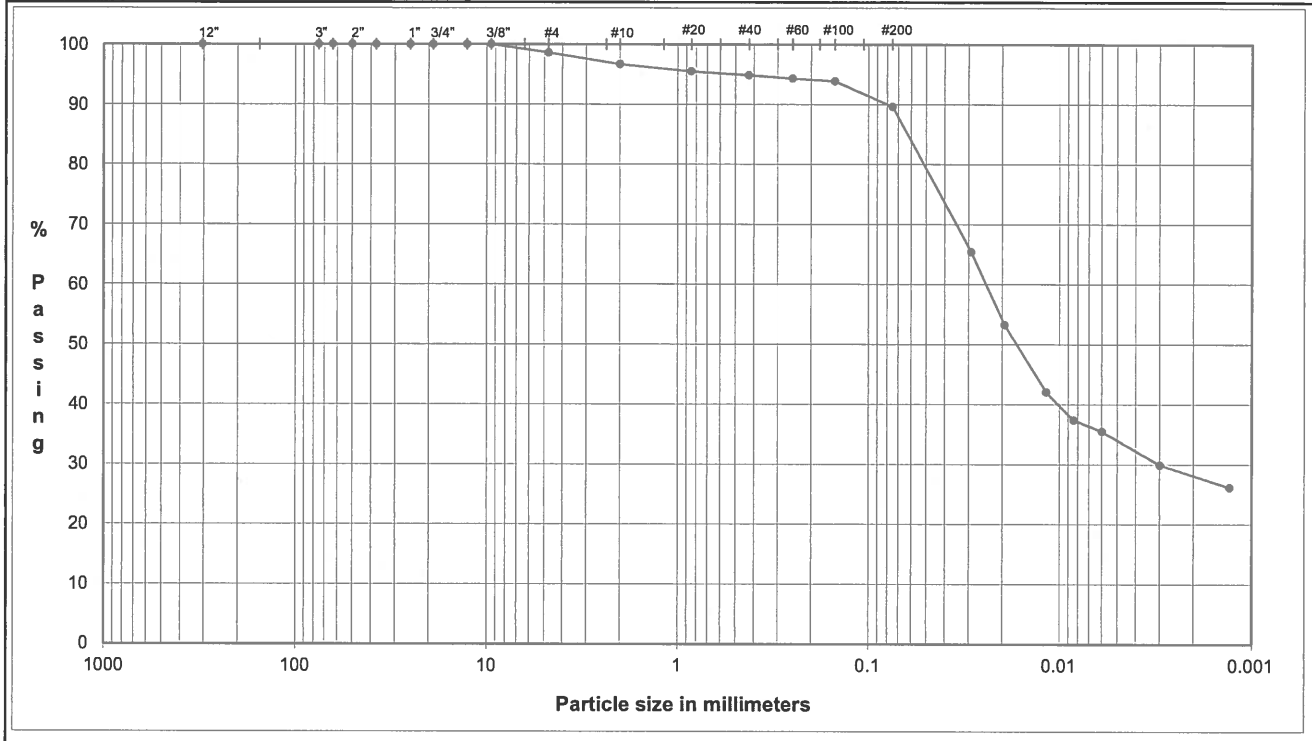
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMENS PHOTOGRAPH - 8.0 / 16.0 / 24.0 psi**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-2 8.0-10.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:**	**Start Date:** **6/11/2018**	**Job Number:** **18103172**	**Figure:** **6**

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

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



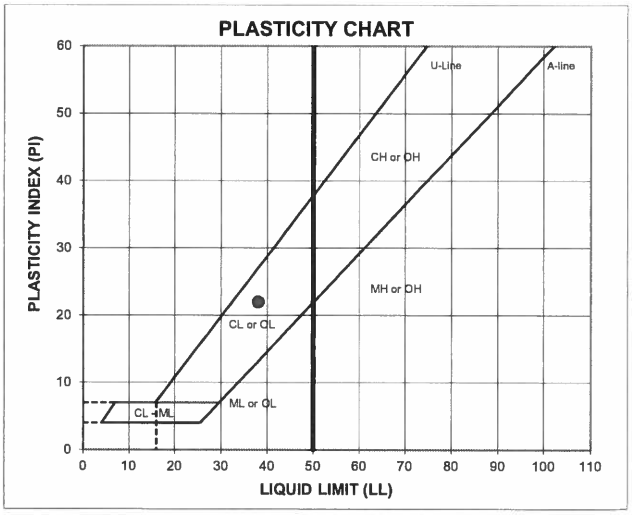
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	100.0		
#4	4.8	98.6	Fine Gravel	1.4
#10	2.00	96.7	Coarse Sand	1.9
#20	0.85	95.5		
#40	0.43	94.9	Medium Sand	1.8
#60	0.25	94.3		
#100	0.15	93.9		
#200	0.075	89.6	Fine Sand	5.3

Hydrometer Analysis

(mm)	%Finer		
0.029	65.4		
0.019	53.3		
0.012	42.1	Fines	
0.0084	37.4	Silt or Clay	89.6
0.0060	35.5		
0.0030	29.9		
0.0013	26.2		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
19.0	38	16	22	0.13

LL (oven-dried) / LL (not dried) = 0.75 ORGANIC (OL/OH)

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

USCS: CL

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

Boring or Test Pit:	B-5		Boring or Test Pit:			Boring or Test Pit:	B-5	
Sample:	UD		Sample:			Sample:	UD	
Depth:	3.0-5.0	ft	Depth:			Depth:	3.0-5.0	ft
Point No.:	1		Point No.:			Point No.:		
Initial								
Length =	6.067	in	Length =	6.048		Length =	5.989	
Diameter =	2.859	in	Diameter =	2.878		Diameter =	2.869	
Wet Mass =	2.898	lb	Wet Mass =			Wet Mass =	2.914	
Area =	6.420	in^2	Area =			Area =	6.465	
Volume =	38.949	in^3	Volume =			Volume =	38.717	
Specific Gravity =	2.69	(ASTM D854)	Specific Gravity =			Specific Gravity =	2.69	
Dry Mass of Solids =	2.426	lb	Dry Mass of Solids =			Dry Mass of Solids =	2.460	
Moisture Content =	19.5%		Moisture Content =			Moisture Content =	18.5%	
Wet Unit Weight =	128.6	pcf	Wet Unit Weight =			Wet Unit Weight =	130.1	
Dry Unit Weight =	107.6	pcf	Dry Unit Weight =			Dry Unit Weight =	109.8	
Void Ratio =	0.56		Void Ratio =			Void Ratio =	0.53	
Percent Saturation =	94%		Percent Saturation =			Percent Saturation =	94%	
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	6.048	in	Length =	5.912	in	Length =	5.970	in
Diameter =	2.878	in	Diameter =	2.911	in	Diameter =	2.875	in
Area =	6.505		Area =	6.655		Area =	6.491	in^2 (Method B)
Volume =	39.345		Volume =	39.345		Volume =	38.753	in^3
Moisture Content =			Moisture Content =	21.3%		Moisture Content =	19.6%	
Wet Unit Weight =			Wet Unit Weight =	129.3		Wet Unit Weight =	131.3	pcf
Dry Unit Weight =			Dry Unit Weight =	106.5		Dry Unit Weight =	109.7	pcf
Void Ratio =			Void Ratio =	0.57		Void Ratio =	0.53	
Percent Saturation =			Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.99		B Parameter =	--		B Parameter =	0.98	
Shear Rate =	0.090%	/min.	Shear Rate =	0.024%	/min.	Shear Rate =	0.015%	/min.
t_{50} =	0.5	min.	t_{50} =	15.3	min.	t_{50} =	5.8	min.
Strain at Failure =	1.8%		Strain at Failure =	3.4%		Strain at Failure =	2.4%	
Cell Pressure =	74.0	psi	Cell Pressure =	78.0	psi	Cell Pressure =	82.0	psi
Back Pressure =	70.0	psi	Back Pressure =	70.0	psi	Back Pressure =	70.0	psi
Confining Pressure =	4.0	psi	Confining Pressure =	8.0	psi	Confining Pressure =	12.0	psi

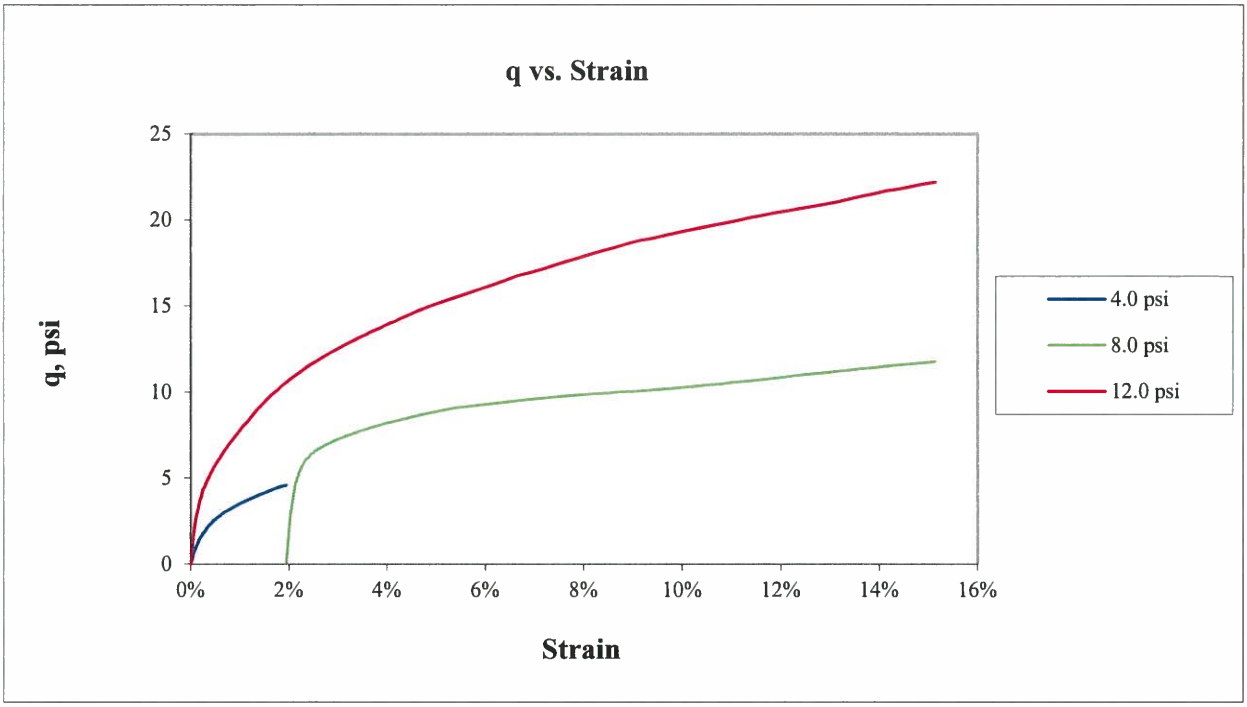
Notes: Sample description: (CL) SILTY CLAY, some fine to coarse sand, trace fine gravel; dark grayish brown.

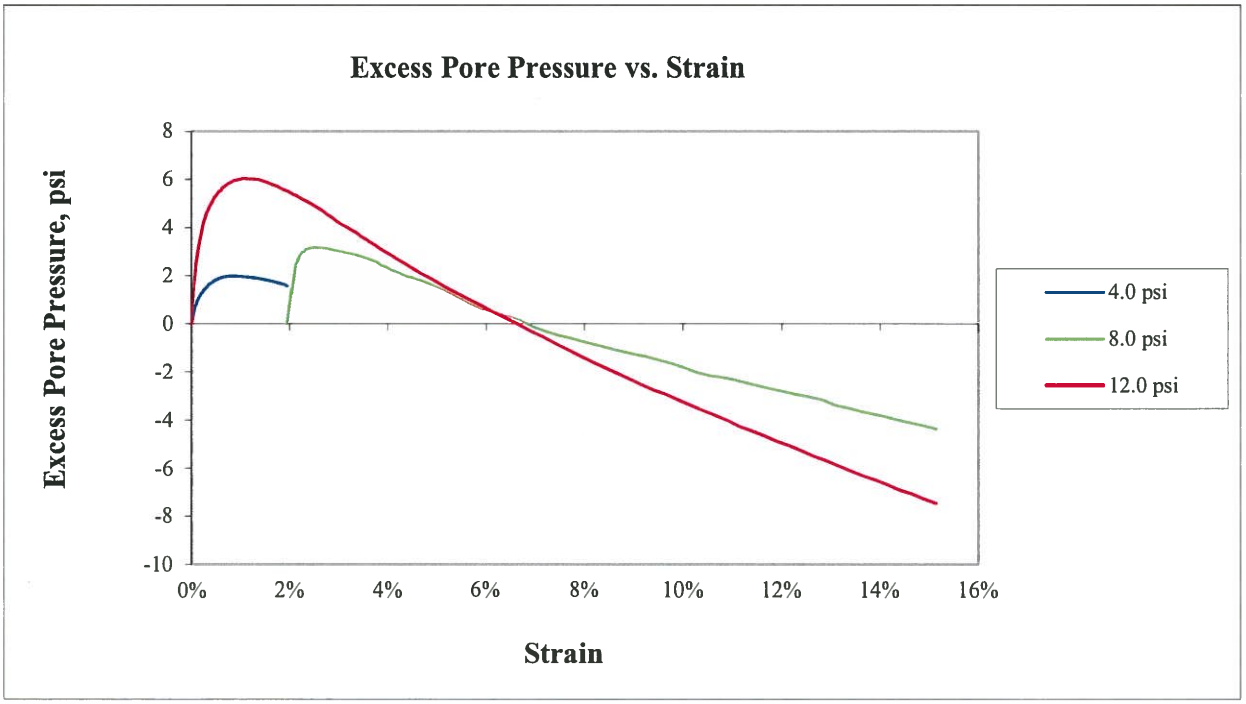
Atterberg limits: LL = 38 PL = 16 PI = 22 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 99% No. 200 = 90% (ASTM D422, refer to separate report for gradation curve)

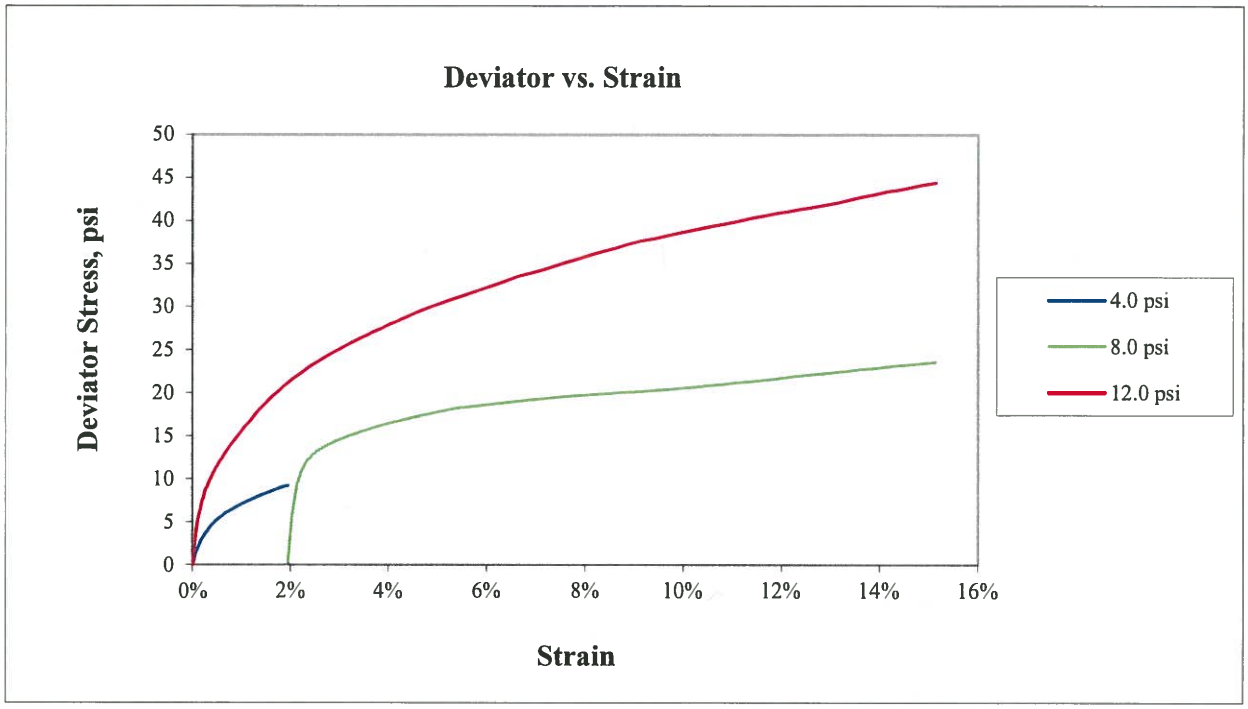
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

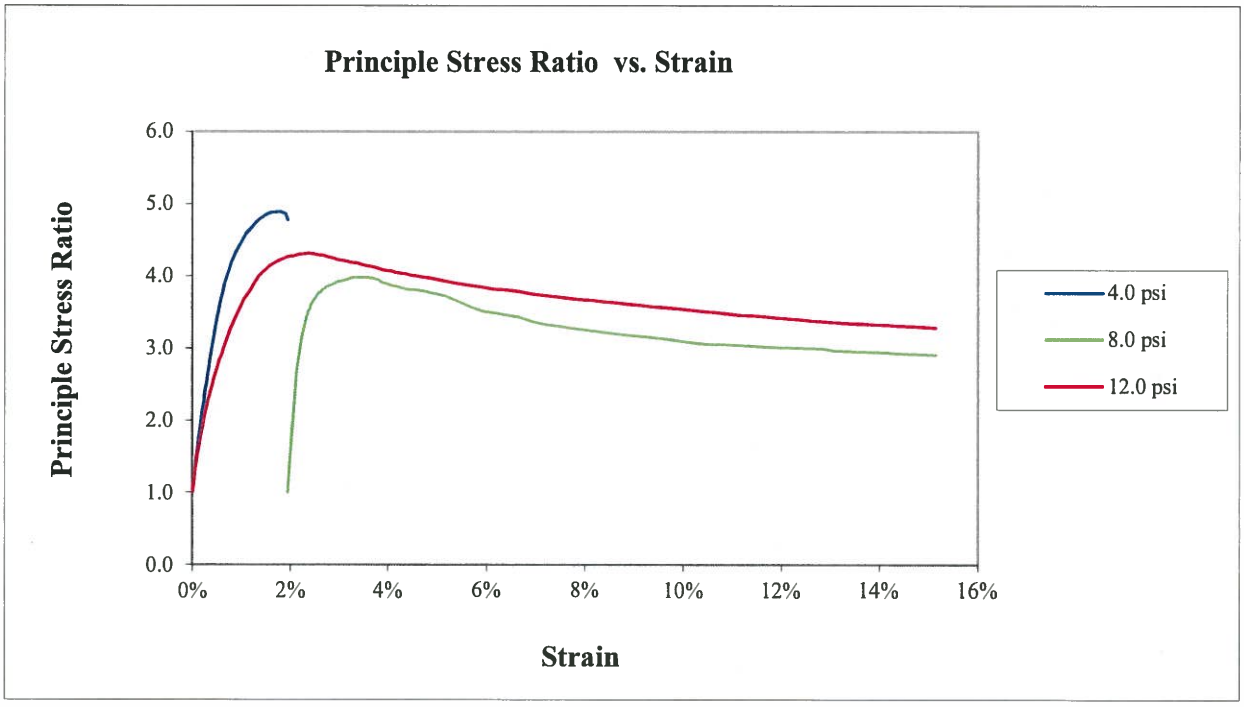
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/22/2018**	**Job Number:** **18103172**	**Figure:** **1**





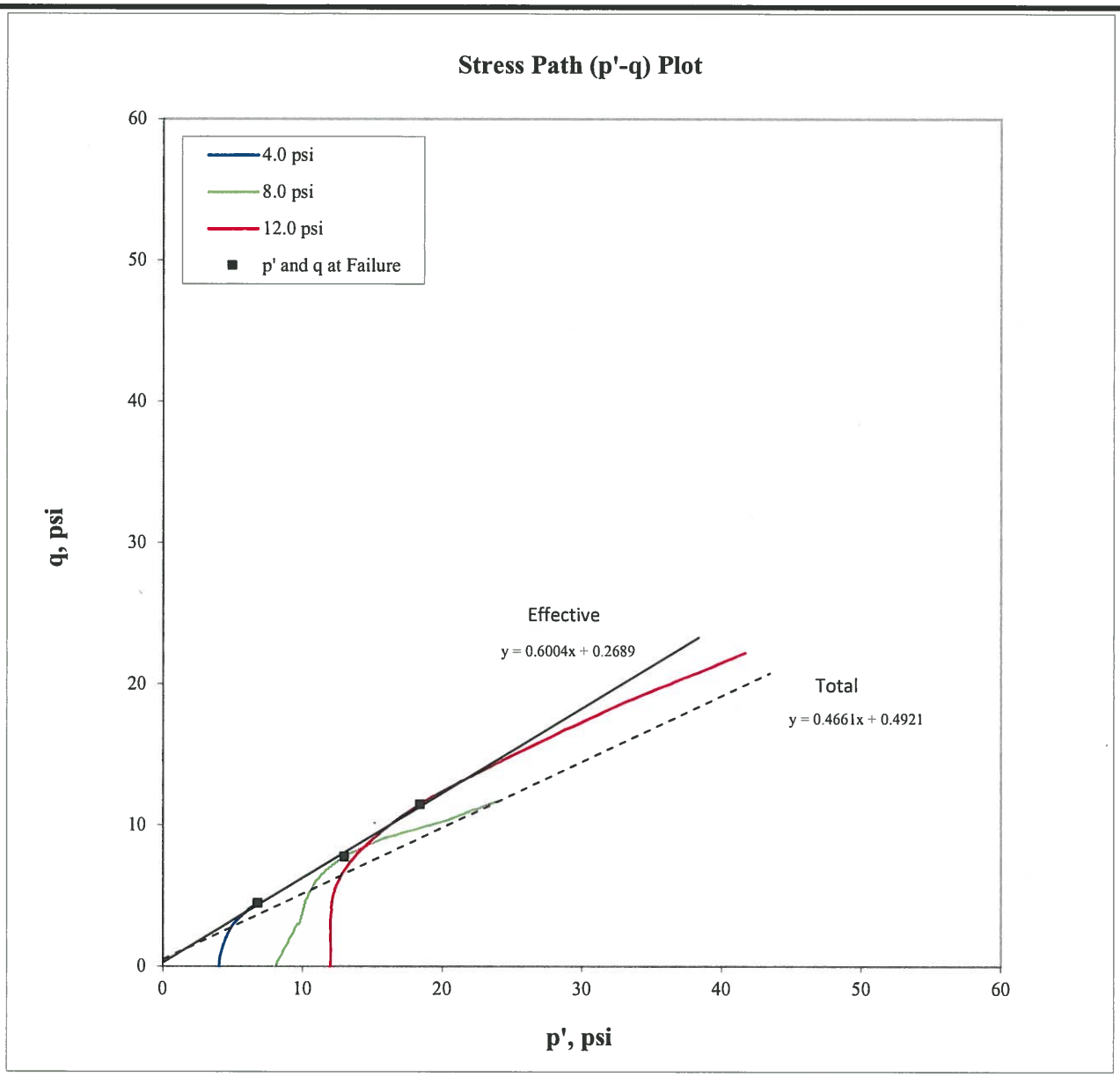
Golder Associates Inc. Atlanta, Georgia	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: B-5 UD 3.0-5.0'	**Technician: FT/PWM Check:**	**Reviewed: Approved:**	**Start Date: 6/22/2018**	**Job Number: 18103172**	**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 INDEPENDENCE/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/22/2018**	**Job Number:** **18103172**	**Figure:** **3**

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
4.0	8.5	6.8	4.5
8.0	15.8	13.0	7.8
12.0	23.5	18.4	11.5

Effective

α ' =	31.0	degree
a' =	0.3	psi

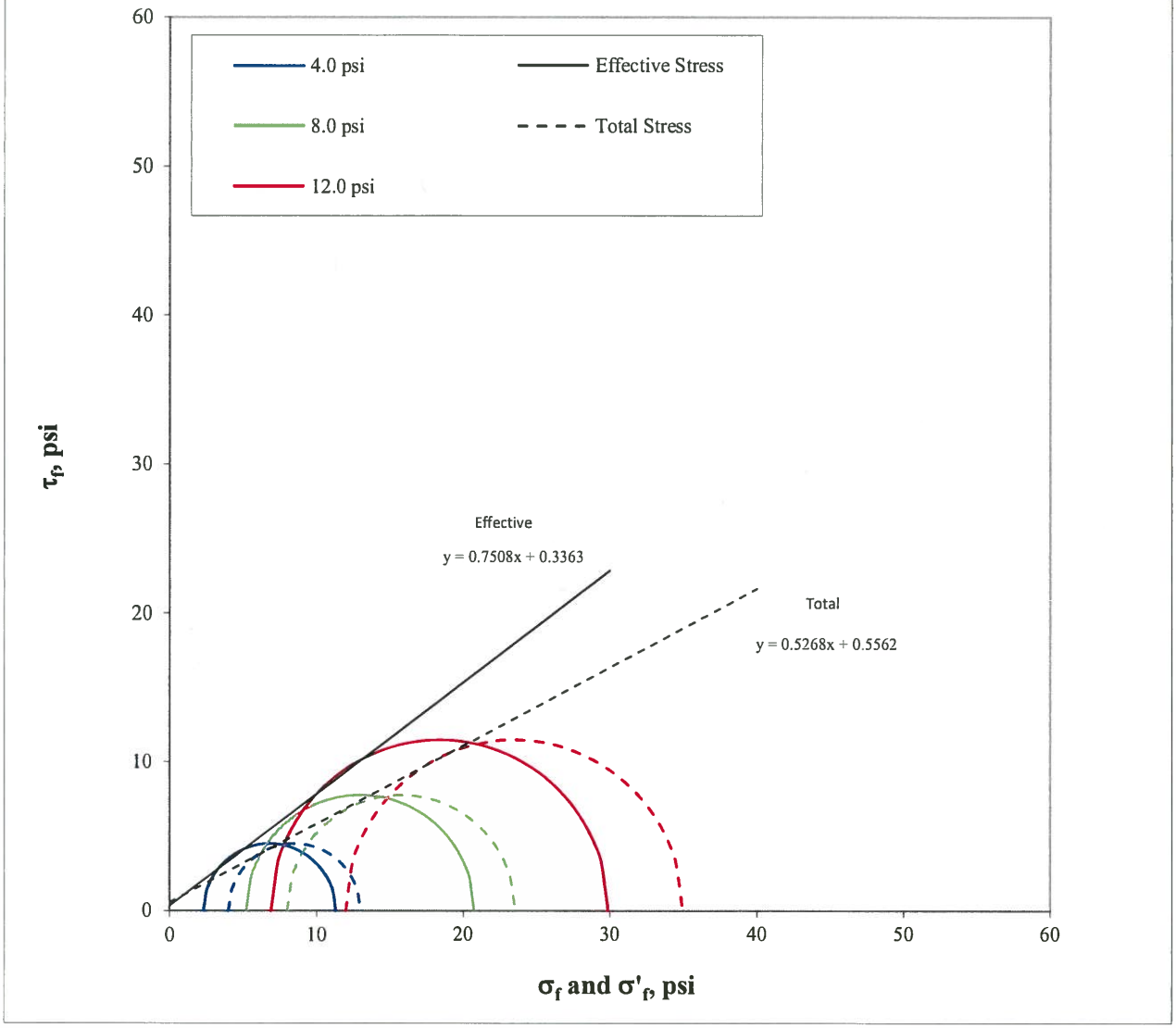
Total

α =	25.0	degree
a =	0.5	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 STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: B-5 UD 3.0-5.0'	**Technician:** FT/PWM **Check:**	**Reviewed:** **Approved:**	**Start Date:** 6/22/2018	**Job Number:** 18103172	**Figure:** 4

Mohr's Circle Diagram



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	11.3	2.3	13.0	4.0
8.0	20.7	5.2	23.5	8.0
12.0	29.9	6.9	34.9	12.0

Effective

ϕ' =	36.9	degree
c' =	0.3	psi

Total

ϕ =	27.8	degree
c =	0.6	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:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT MOHR'S CIRCLE DIAGRAM				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: B-5 UD 3.0-5.0'	**Technician:** FT/PWM **Check:**	**Reviewed:** **Approved:**	**Start Date:** 6/22/2018	**Job Number:** 18103172	**Figure:** 5

4 & 8 psi

12 psi

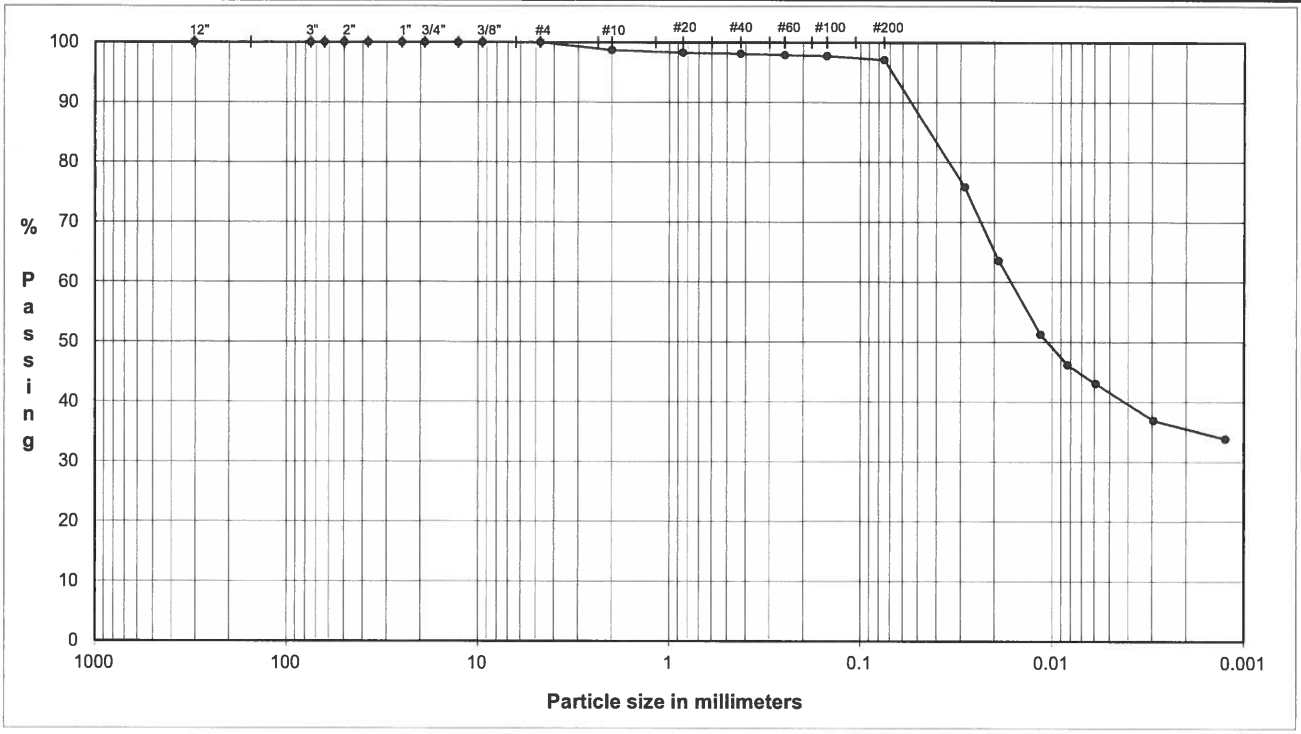
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMEN PHOTOGRAPH - Two Specimen**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/22/2018**	**Job Number:** **18103172**	**Figure:** **6**

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **PZ-1** Depth: **10.0-12.0'**
TYPE: **UD**



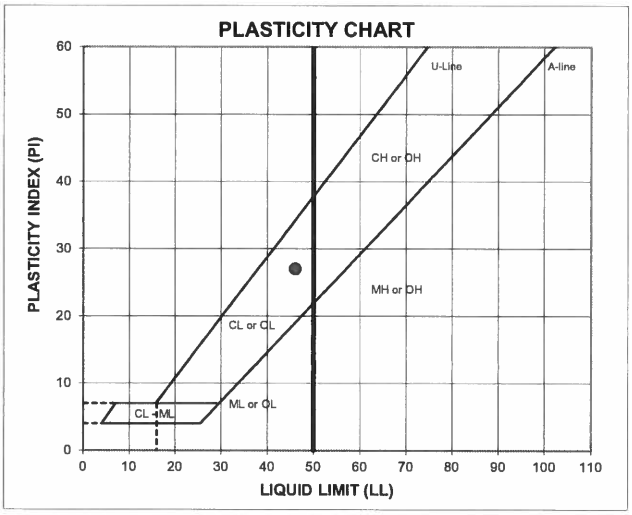
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

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	**98.7**	Coarse Sand	**1.3**
#20	0.85	**98.3**		
#40	0.43	**98.1**	Medium Sand	**0.6**
#60	0.25	**97.9**		
#100	0.15	**97.7**		
#200	0.075	**97.1**	Fine Sand	**1.0**

Hydrometer Analysis

(mm)	%Finer		
0.028	**75.9**		
0.019	**63.6**		
0.011	**51.3**	Fines	
0.0083	**46.1**	Silt or Clay	**97.1**
0.0059	**43.1**		
0.0030	**36.9**		
0.0012	**33.8**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
30.9	**46**	**19**	**27**	**0.45**

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

DESCRIPTION: SILTY CLAY, trace fine to coarse sand; dark olive and grayish brown.

USCS: CL

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

Golder Associates Inc.

	Boring or Test Pit: PZ-1 Sample: UD Depth: 10.0-12.0 ft Point No.: 1	Boring or Test Pit: PZ-1 Sample: UD Depth: 10.0-12.0 ft Point No.: 2	Boring or Test Pit: PZ-1 Sample: UD Depth: 10.0-12.0 ft Point No.: 3
Initial			
Length =	6.005 in	6.006 in	6.009 in
Diameter =	2.859 in	2.865 in	2.869 in
Wet Mass =	2.733 lb	2.617 lb	2.653 lb
Area =	6.420 in^2	6.447 in^2	6.465 in^2
Volume =	38.551 in^3	38.719 in^3	38.847 in^3
Specific Gravity =	2.72 (ASTM D854)	2.72 (ASTM D854)	2.72 (ASTM D854)
Dry Mass of Solids =	2.153 lb	1.964 lb	2.003 lb
Moisture Content =	26.9%	33.3%	32.5%
Wet Unit Weight =	122.5 pcf	116.8 pcf	118.0 pcf
Dry Unit Weight =	96.5 pcf	87.7 pcf	89.1 pcf
Void Ratio =	0.75	0.93	0.90
Percent Saturation =	97%	97%	98%
After Consolidation			
Length =	5.981 in	5.958 in	5.950 in
Diameter =	2.887 in	2.873 in	2.869 in
Area =	6.546 in^2 (Method B)	6.482 in^2 (Method B)	6.463 in^2 (Method B)
Volume =	39.149 in^3	38.622 in^3	38.453 in^3
Moisture Content =	28.7%	34.1%	32.4%
Wet Unit Weight =	122.4 pcf	117.8 pcf	119.2 pcf
Dry Unit Weight =	95.0 pcf	87.9 pcf	90.0 pcf
Void Ratio =	0.78	0.93	0.88
Percent Saturation =	100%	100%	100%
B Parameter =	0.98	0.98	0.99
Shear Rate =	0.090% /min.	0.090% /min.	0.051% /min.
t_{50} =	1.46 min.	3.03 min.	7.07 min.
Strain at Failure =	3.5%	2.2%	3.1%
Cell Pressure =	80.0 psi	90.0 psi	100.0 psi
Back Pressure =	70.0 psi	70.0 psi	70.0 psi
Confining Pressure =	10.0 psi	20.0 psi	30.0 psi

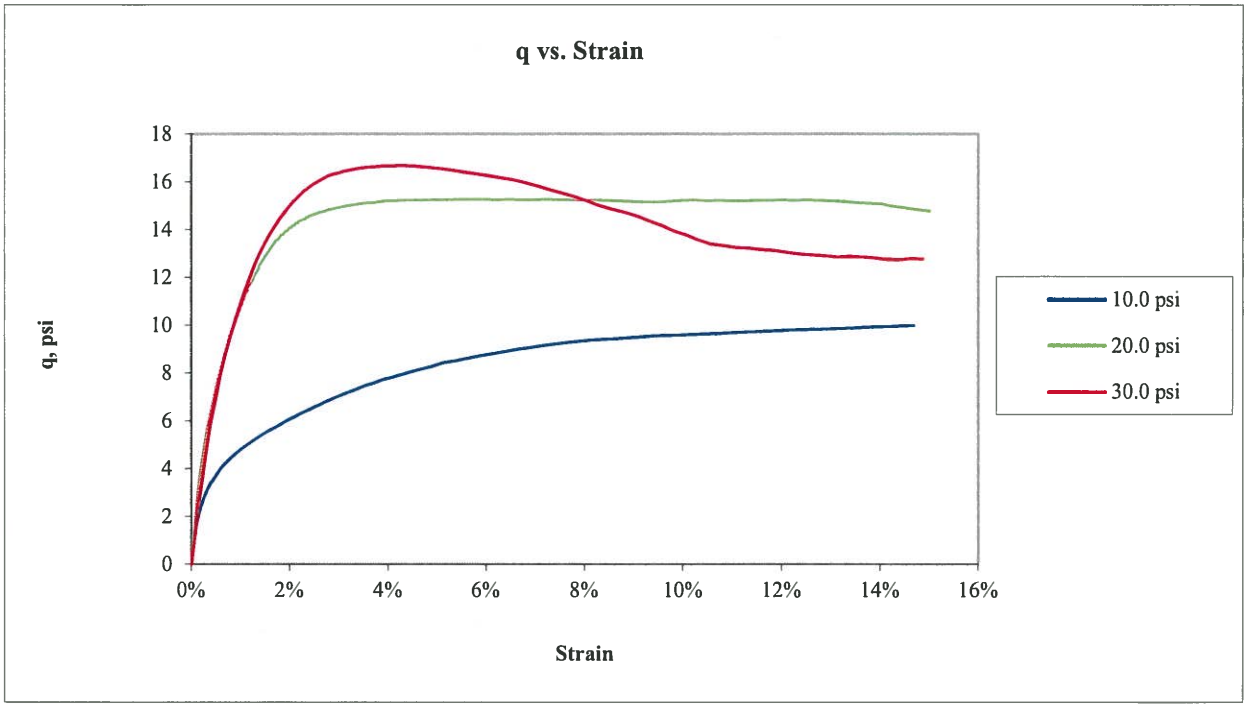
Notes: Sample description: (CL) SILTY CLAY, trace fine to coarse sand; dark olive and grayish brown.

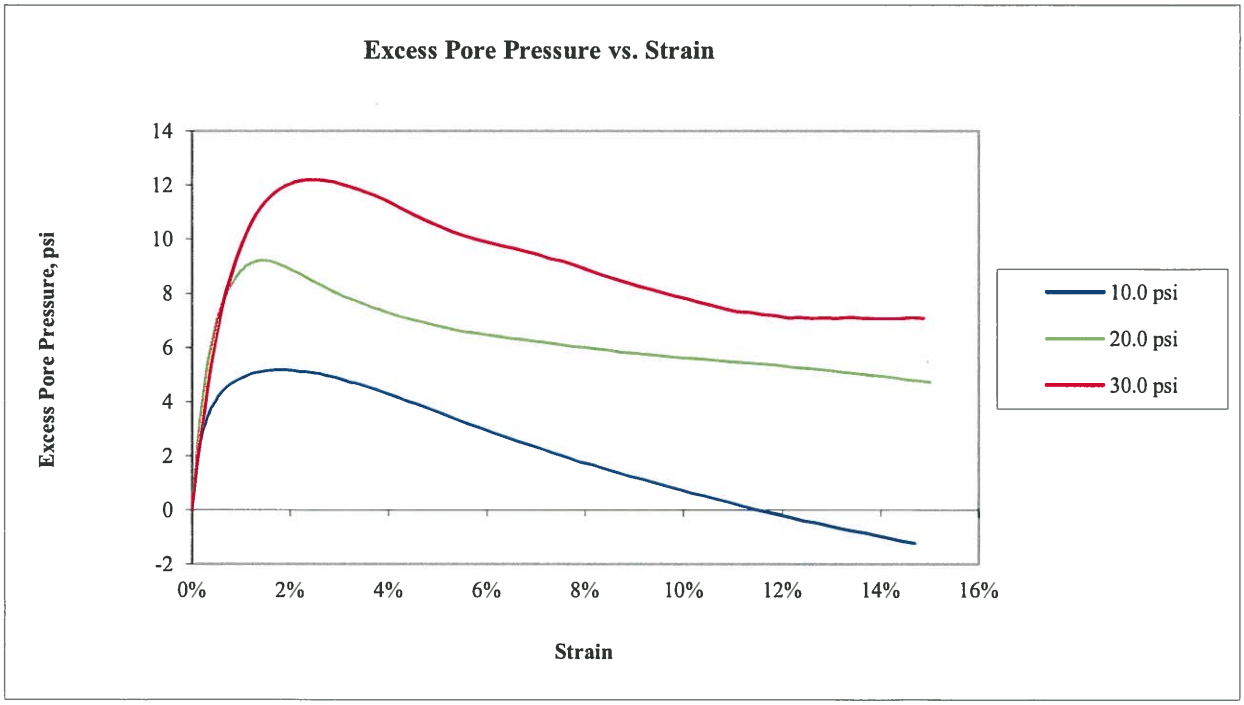
Atterberg limits: LL = 46 PL = 19 PI = 24 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 97% (ASTM D422, refer to separate report for gradation curve)

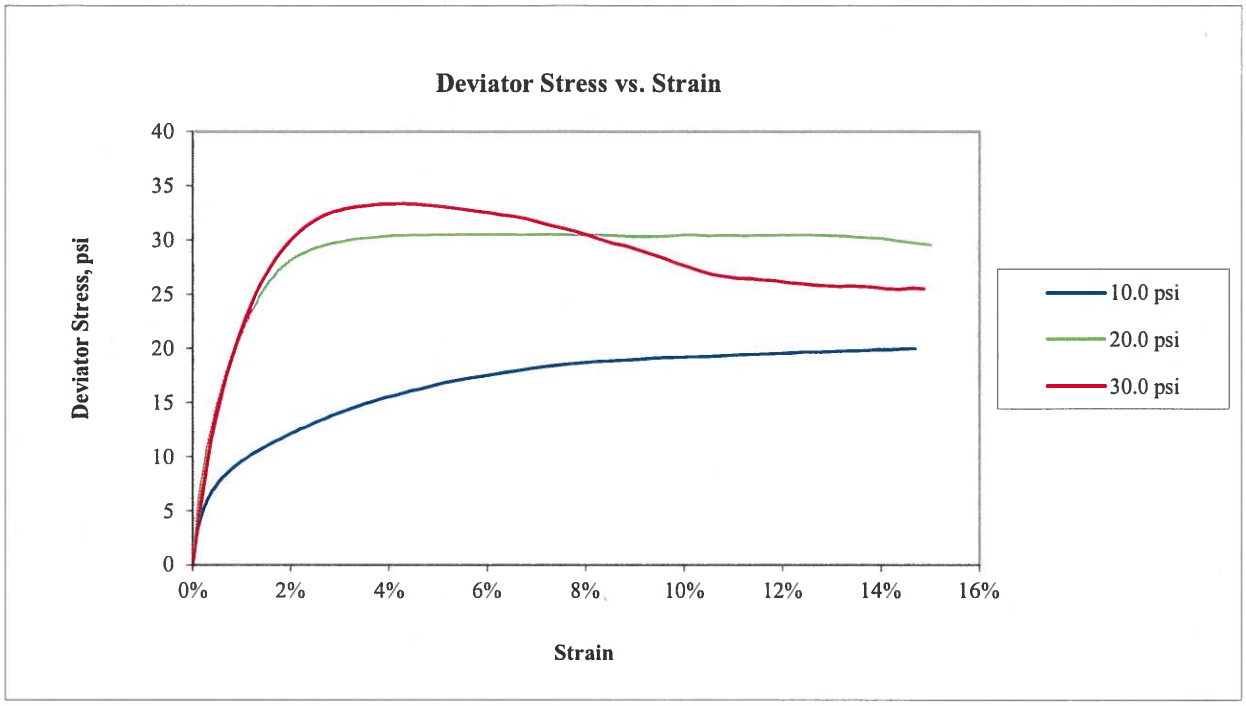
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ % strain
Membrane effect:	X	Corrected		Not Corrected

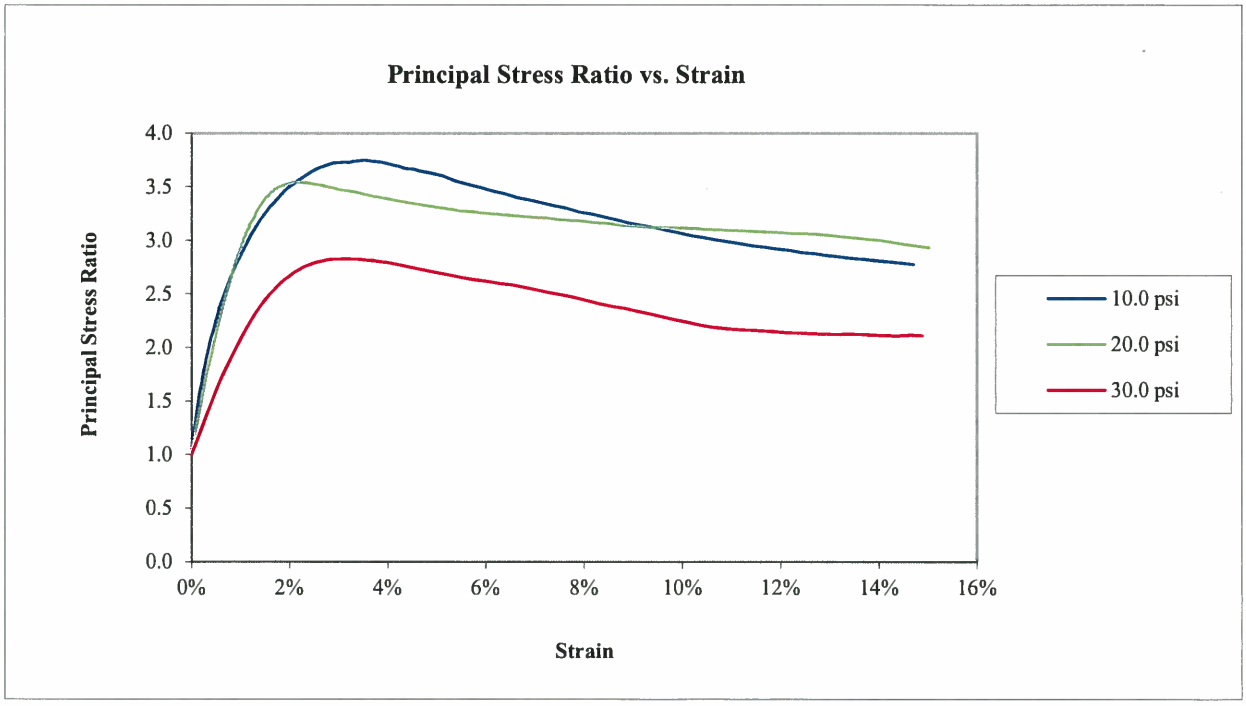
Golder Associates Inc. Atlanta, Georgia	**Title:** **ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **PZ-1 UD 10.0-12.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/25/2018**	**Job Number:** **18103172**	**Figure:** **1**



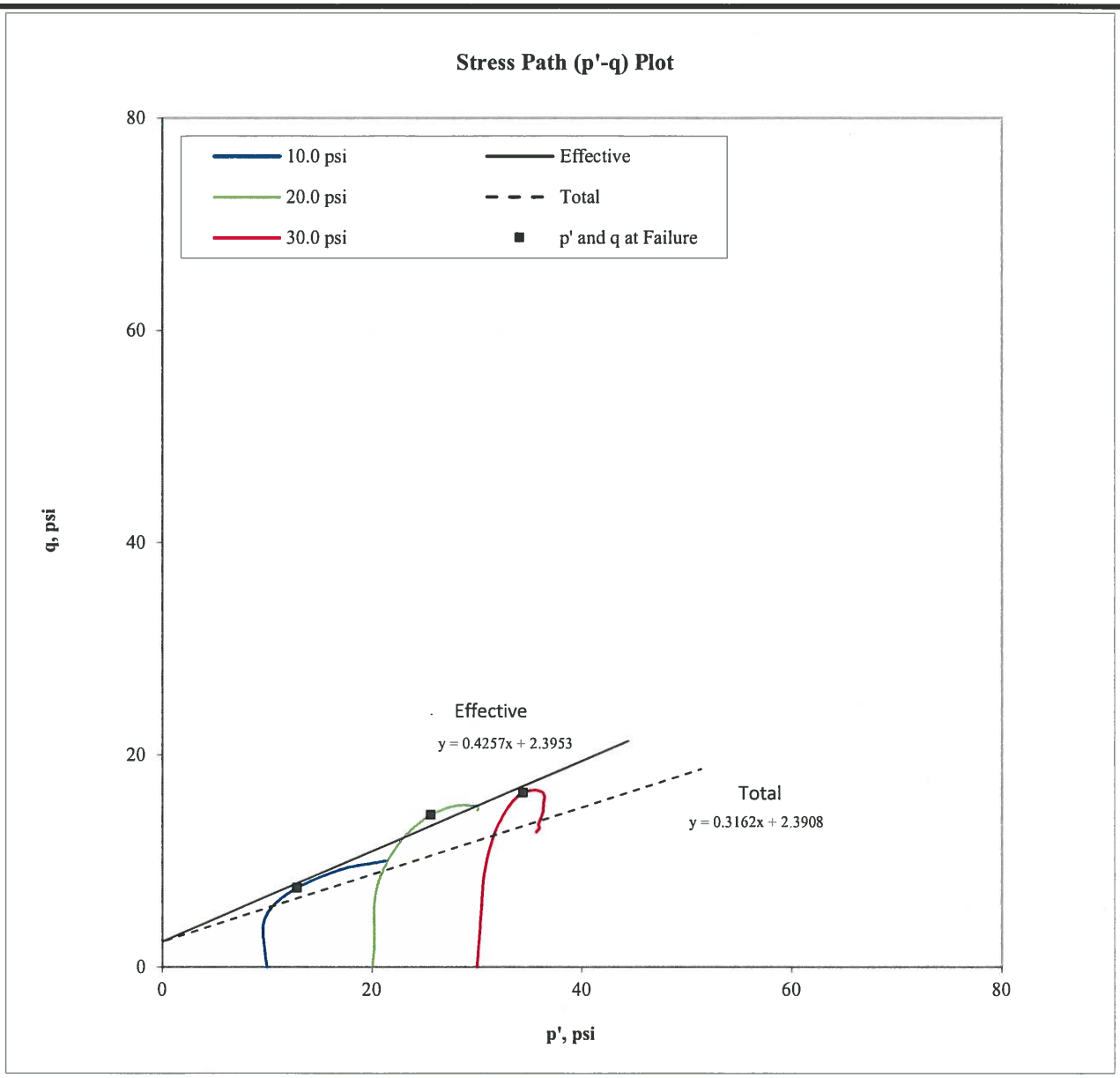


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **PZ-1 UD 10.0-12.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/25/2018**	**Job Number:** **18103172**	**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 INDEPENDENCE/AR**					
Sample:	**Technician:** **FT/PWM**	**Reviewed:**	**Start Date:**	**Job Number:**	**Figure:**
	Check:	**Approved:**			
PZ-1 UD 10.0-12.0'			**6/25/2018**	**18103172**	**3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
10.0	17.5	12.9	7.5
20.0	34.3	25.6	14.3
30.0	46.4	34.4	16.4

Effective

α ' =	23.1	degree
a' =	2.4	psi

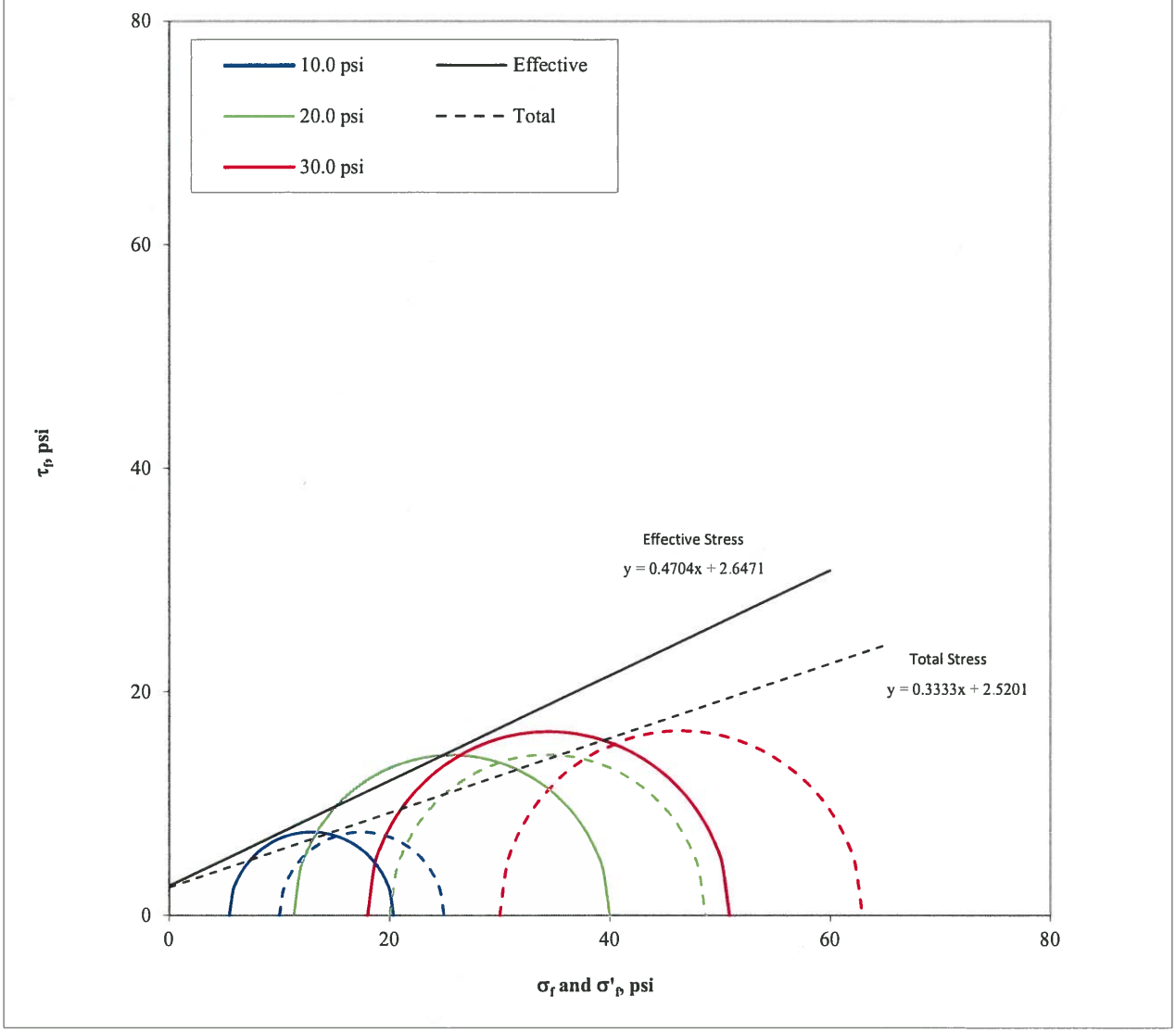
Total

α =	17.5	degree
a =	2.4	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:** ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: PZ-1 UD 10.0-12.0'	**Technician:** FT/PWM **Check:**	**Reviewed:** **Approved:**	**Start Date:** 6/25/2018	**Job Number:** 18103172	**Figure:** 4

Mohr's Circle Diagram



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	20.3	5.4	24.9	10.0
20.0	40.0	11.3	48.7	20.0
30.0	50.9	18.0	62.9	30.0

Effective

ϕ' =	25.2	degree
c' =	2.6	psi

Total

ϕ =	18.4	degree
c =	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 MOHR'S CIRCLE DIAGRAM				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: PZ-1 UD 10.0-12.0'	**Technician:** FT/PWM **Check:**	**Reviewed:** **Approved:**	**Start Date:** 6/25/2018	**Job Number:** 18103172	**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 INDEPENDENCE/AR**					
Sample: **PZ-1 UD 10.0-12.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/25/2018**	**Job Number:** **18103172**	**Figure:** **6**

	Boring or Test Pit: PZ-1 Sample: UD Depth: 15.0-17.0 ft Point No.: 1	Boring or Test Pit: PZ-1 Sample: UD Depth: 15.0-17.0 ft Point No.: 2	Boring or Test Pit: PZ-1 Sample: UD Depth: 15.0-17.0 ft Point No.: 3
Initial			
Length =	6.052 in	6.088 in	6.055 in
Diameter =	2.835 in	2.765 in	2.808 in
Wet Mass =	2.738 lb	2.599 lb	2.632 lb
Area =	6.312 in^2	6.005 in^2	6.193 in^2
Volume =	38.203 in^3	36.556 in^3	37.497 in^3
Specific Gravity =	2.78 (ASTM D854)	2.78 (ASTM D854)	2.78 (ASTM D854)
Dry Mass of Solids =	2.168 lb	2.010 lb	2.007 lb
Moisture Content =	26.3%	29.3%	31.1%
Wet Unit Weight =	123.8 pcf	122.9 pcf	121.3 pcf
Dry Unit Weight =	98.1 pcf	95.0 pcf	92.5 pcf
Void Ratio =	0.76	0.82	0.87
Percent Saturation =	96%	99%	99%
After Consolidation			
Length =	6.000 in	5.997 in	5.963 in
Diameter =	2.833 in	2.764 in	2.782 in
Area =	6.305 in^2 (Method B)	6.002 in^2 (Method B)	6.081 in^2 (Method B)
Volume =	37.830 in^3	35.993 in^3	36.259 in^3
Moisture Content =	26.9%	28.5%	29.1%
Wet Unit Weight =	125.7 pcf	124.0 pcf	123.5 pcf
Dry Unit Weight =	99.0 pcf	96.5 pcf	95.7 pcf
Void Ratio =	0.75	0.79	0.81
Percent Saturation =	100%	100%	100%
B Parameter =	0.99	1.00	0.98
Shear Rate =	0.030% /min.	0.091% /min.	0.091% /min.
t_{50} =	8.41 min.	0.23 min.	0.15 min.
Strain at Failure =	2.6%	6.7%	5.8%
Cell Pressure =	94.0 psi	108.0 psi	122.0 psi
Back Pressure =	80.0 psi	80.0 psi	80.0 psi
Confining Pressure =	14.0 psi	28.0 psi	42.0 psi

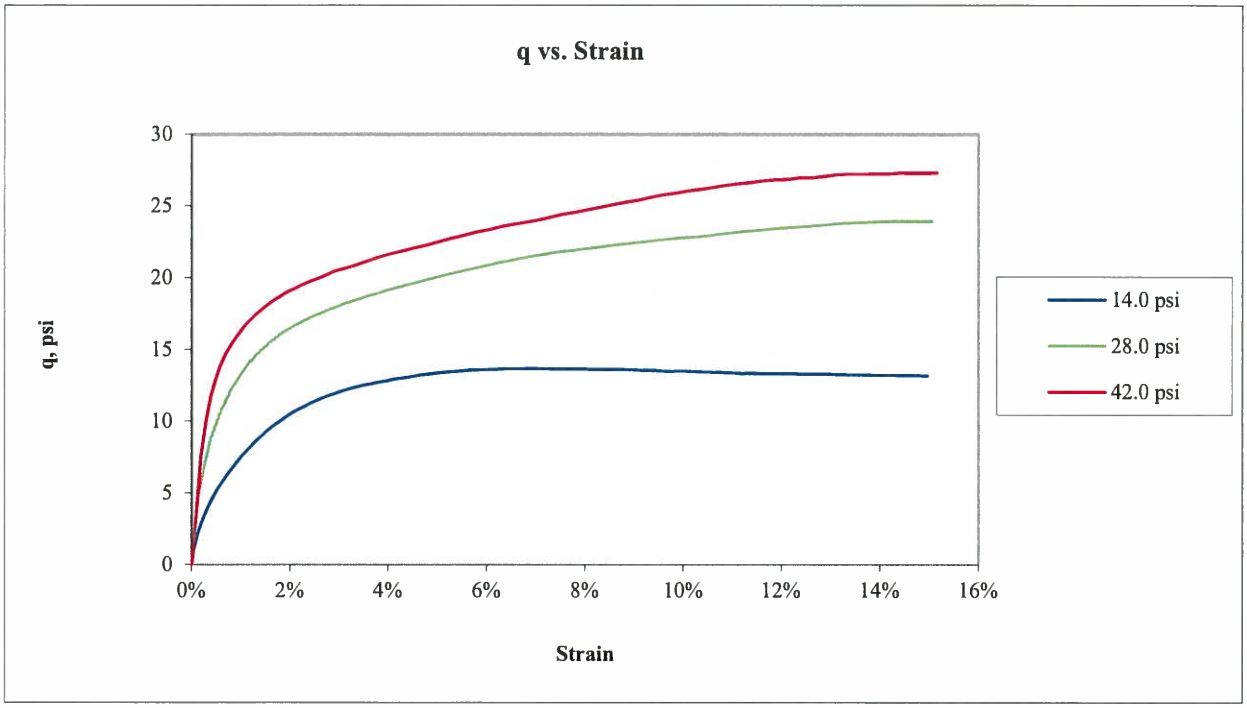
Notes: Sample description: (CL) SILTY CLAY, trace fine to coarse sand; yellowish gray.

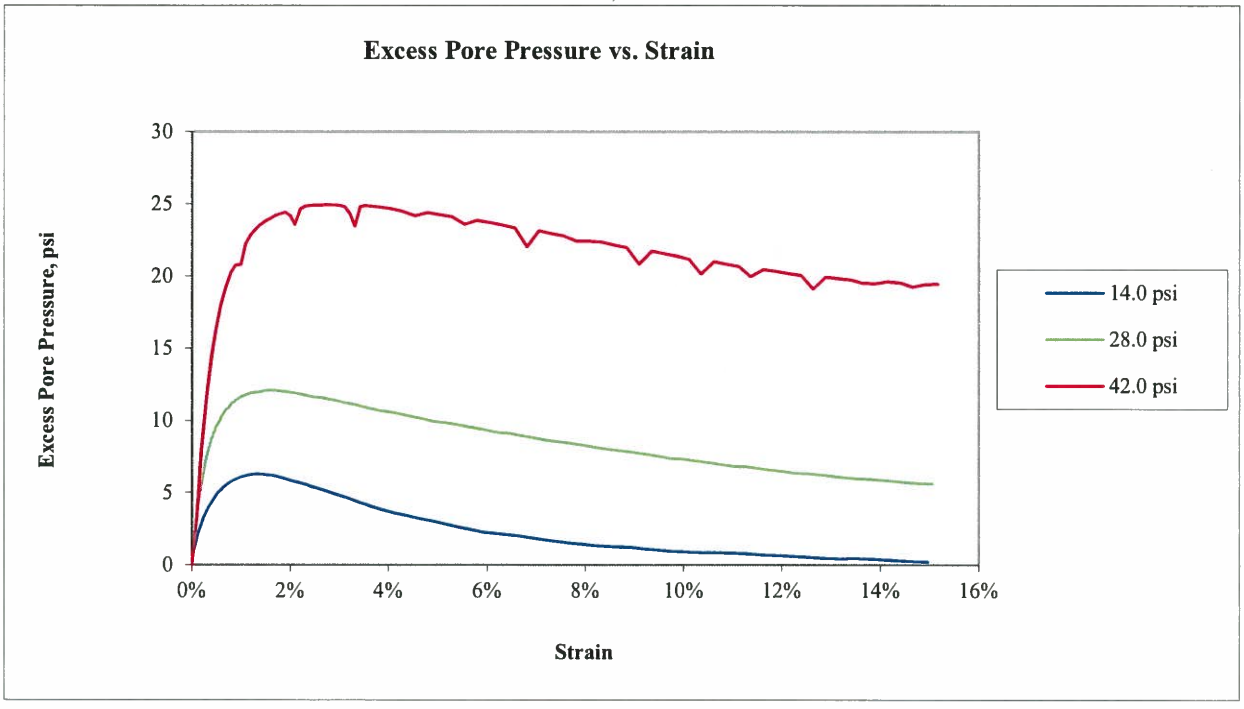
Atterberg limits: LL = 38 PL = 17 PI = 21 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 97% (ASTM D422, refer to separate report for gradation curve)

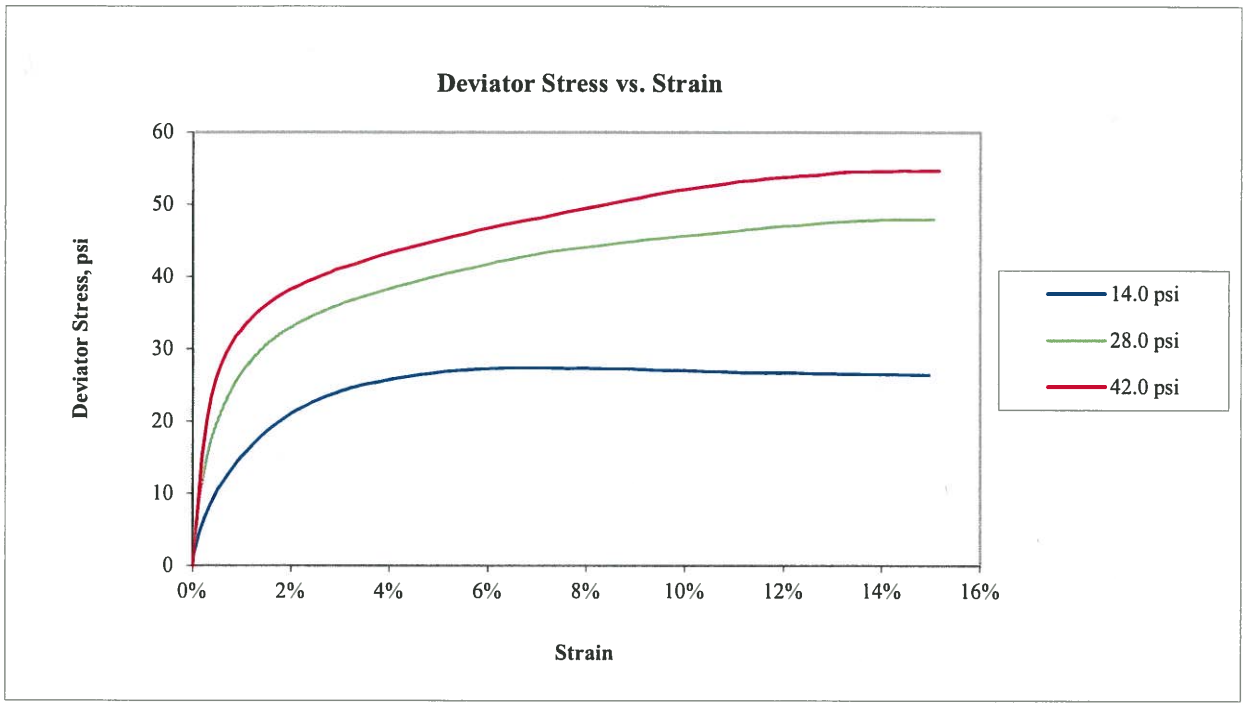
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

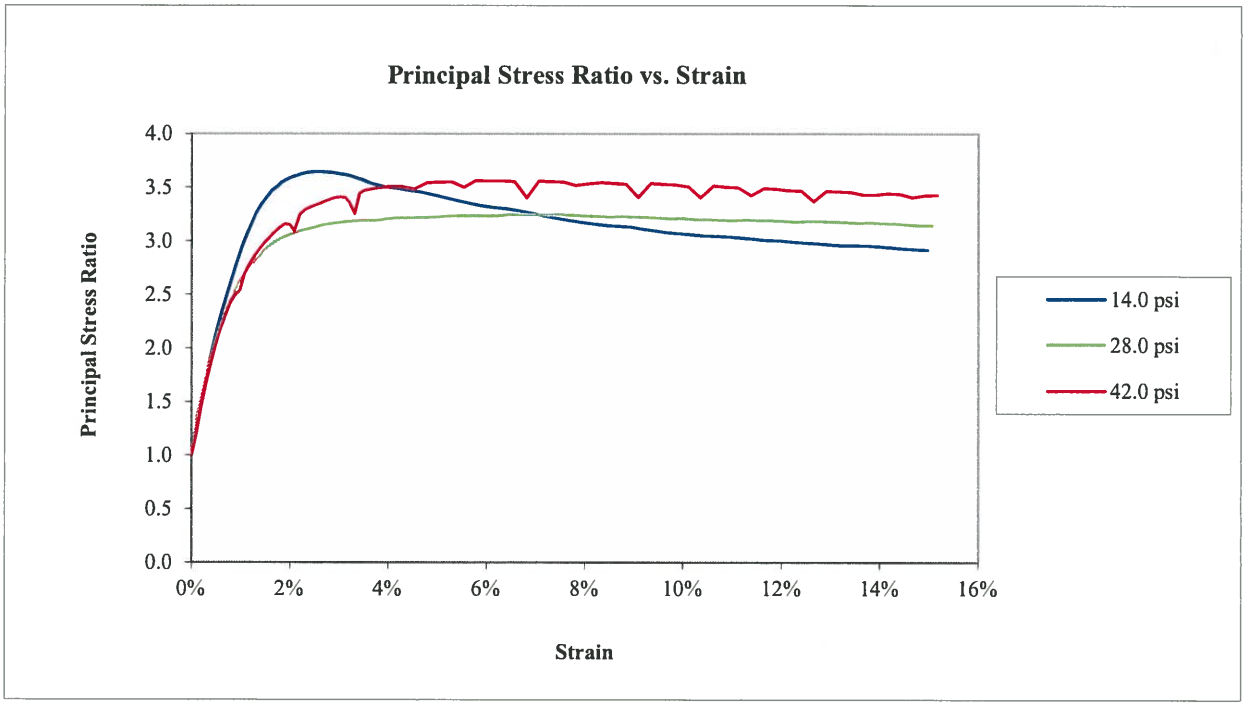
Golder Associates Inc. Atlanta, Georgia	**Title:** **ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **PZ-1 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Checked:**	**Reviewed:** **Approved:**	**Start Date:** **6/29/2018**	**Job Number:** **18103172**	**Figure:** **1**



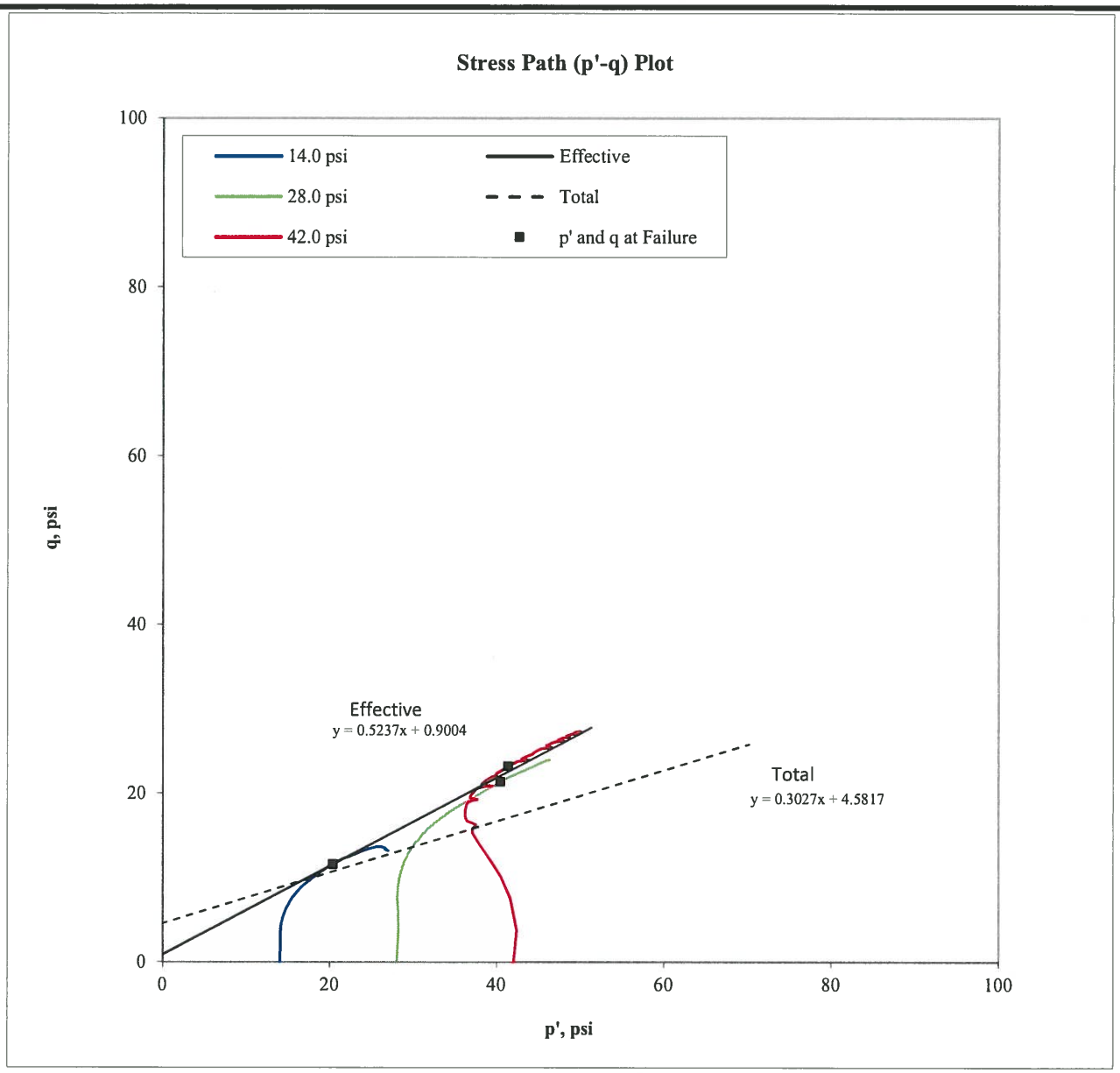


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **PZ-1 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/29/2018**	**Job Number:** **18103172**	**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 INDEPENDENCE/AR**					
Sample:	**Technician:** **FT/PWM**	**Reviewed:**	**Start Date:**	**Job Number:**	**Figure:**
	Check:	**Approved:**			
PZ-1 UD 15.0-17.0'			**6/29/2018**	**18103172**	**3**



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
14.0	25.6	20.4	11.6
28.0	49.4	40.4	21.4
42.0	65.2	41.3	23.2

Effective

α ' =	27.6	degree
a' =	0.9	psi

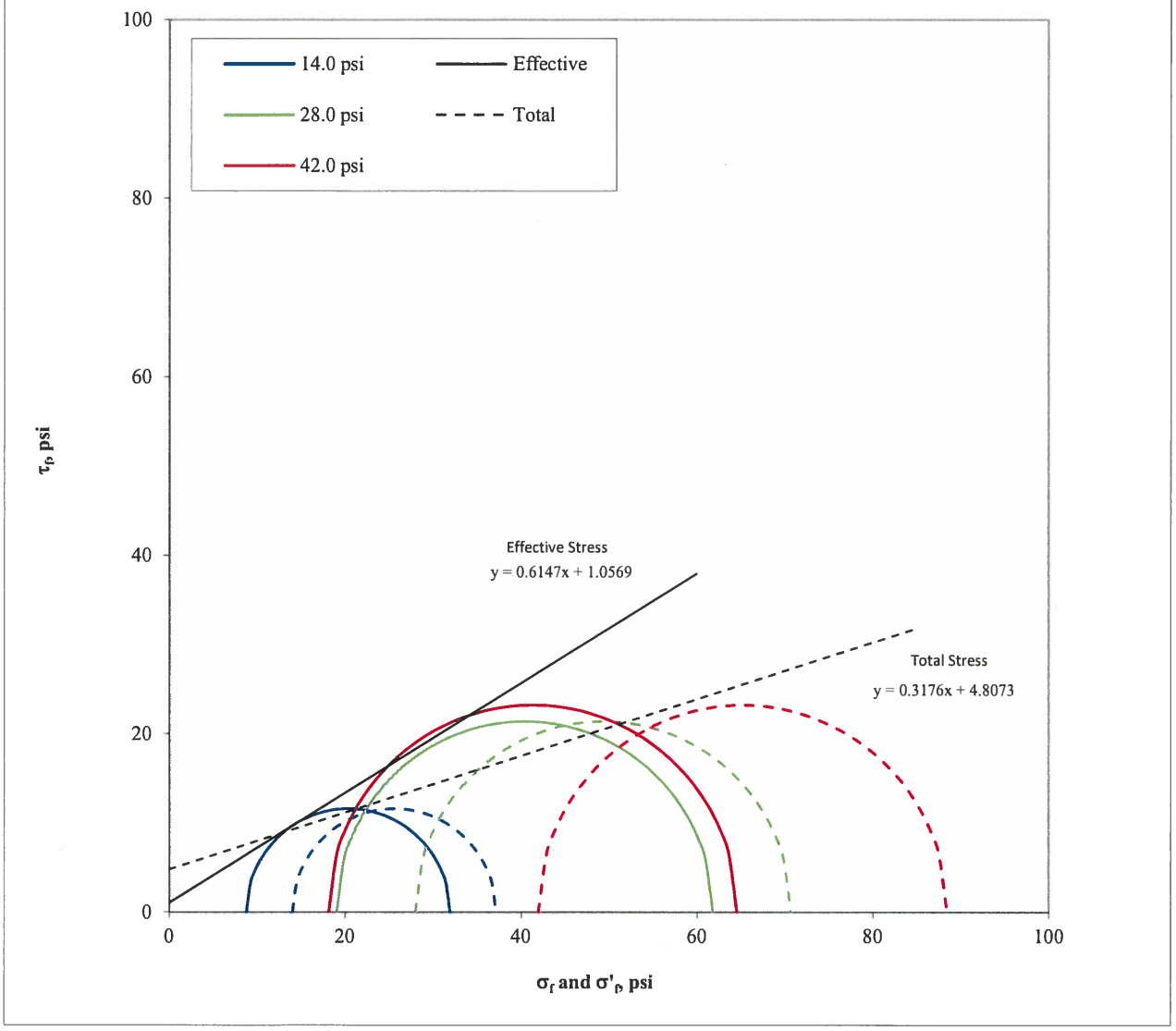
Total

α =	16.8	degree
a =	4.6	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 STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY INDEPENDENCE/AR					
Sample: PZ-1 UD 15.0-17.0'	**Technician:** FT/PWM **Check:** AWM	**Reviewed:** **Approved:**	**Start Date:** 6/29/2018	**Job Number:** 18103172	**Figure:** 4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'1 at failure (psi)	σ'3 at failure (psi)	σ1 at failure (psi)	σ3 at failure (psi)
14.0	31.9	8.8	37.2	14.0
28.0	61.8	19.1	70.8	28.0
42.0	64.6	18.1	88.4	42.0

Effective

ϕ' =	31.6	degree
c' =	1.1	psi

Total

ϕ =	17.6	degree
c =	4.8	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 INDEPENDENCE/AR

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
PZ-1 UD 15.0-17.0'	FT/PWM Check:	Approved:	6/29/2018	18103172	5

14.0 psi

28.0 psi

42.0 psi

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMENS PHOTOGRAPH - 14.0 / 28.0 / 42.0 psi**				
Job Short Title: **FTN/ENTERGY INDEPENDENCE/AR**					
Sample: **PZ-1 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **6/29/2018**	**Job Number:** **18103172**	**Figure:** **6**

JUNE 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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'										-	-	-				-
B-1	UD	10.0-12.0'	ML	31.3	44	29	15	0.16	100.0	98.3	40.2	-	-	-	31.3	89.6	1.2E-08	-
B-1	UD	20.0-22.0'	CH	39.1	68	23	45	0.37	100.0	96.1	57.2	-	-	2.71	39.1	81.6	-	T-CU w/pp
B-1	UD	28.0-30.0'										-	-	-	-	-	-	HOLD
B-2	UD	8.0-10.0'	CH	26.3	55	21	34	0.16	100.0	96.2	39.7	-	-	2.72	26.3	95.3	-	T-CU w/pp
B-3	UD	3.0-5.0'										-	-				-	T-CU w/pp
B-3	UD	10.0-12.0'	CL	30.1	45	20	25	0.41	98.2	97.2	30.9	-	-	-	30.1	91.4	1.1E-06	-
B-5	UD	3.0-5.0'	CL	19.0	38	16	22	0.13	98.6	89.6	34.0	-	-	2.69	19.0	108.7	-	T-CU w/pp
RP-8	UD	8.0-10.0'	CL	24.6	49	24	25	0.04	100.0	95.6	43.1	-	-	-	24.6	98.5	3.4E-08	-
PZ-1	UD	5.0-7.0'	CL	22.8	43	24	19	-0.04	100.0	95.1	51.0	-	-	-	22.8	102.9	3.0E-08	-
PZ-1	UD	10.0-12.0'	CL	30.9	46	19	27	0.45	100.0	97.1	42.0	-	-	2.72	30.9	91.1	-	T-CU w/pp
PZ-1	UD	15.0-17.0'	CL	28.9	38	17	21	0.56	100.0	97.0	35.0	-	-	2.78	28.9	95.2	-	T-CU w/pp

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

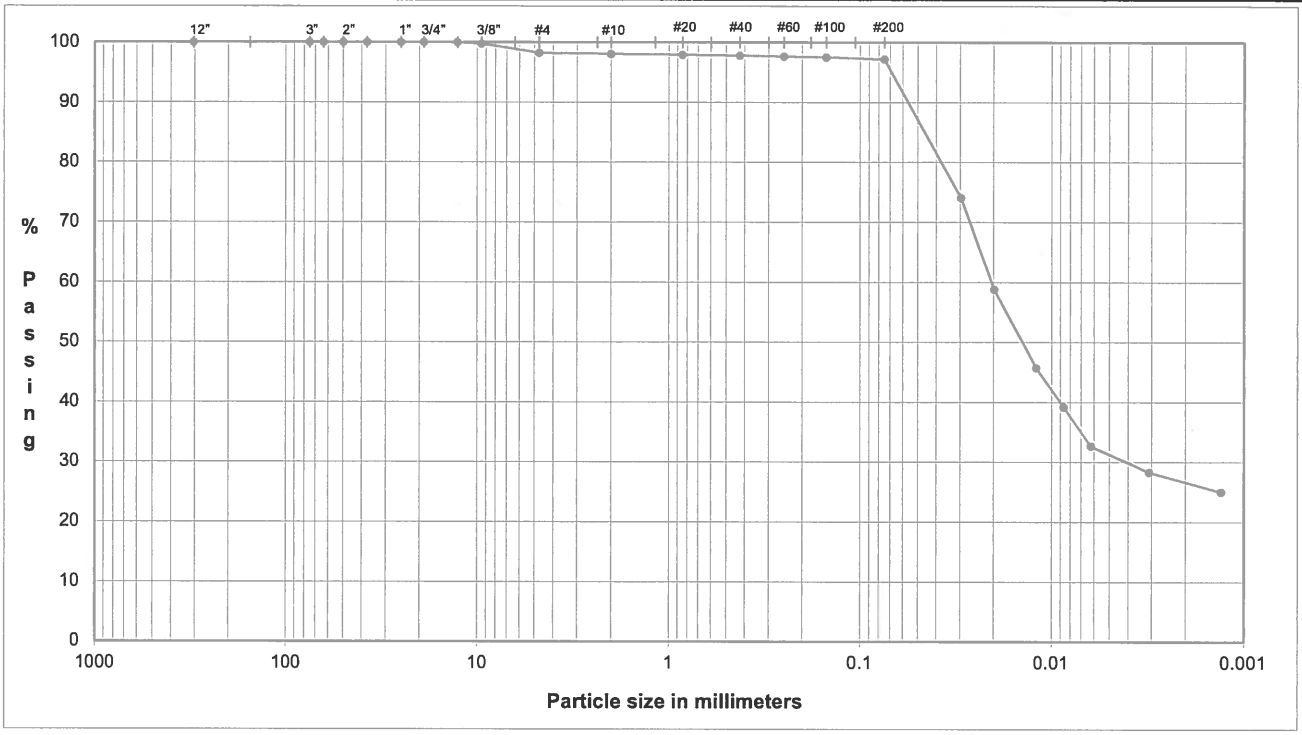
Golder Associates Inc.

JUNE 2018 | 18103172

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

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



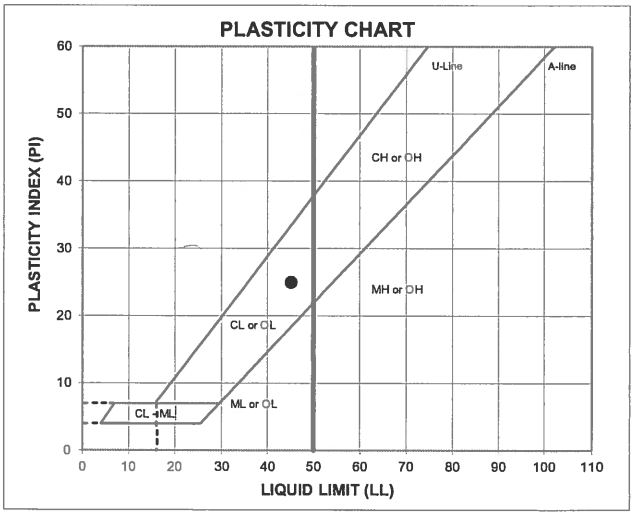
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

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	99.7		
#4	4.8	98.2	Fine Gravel	1.8
#10	2.00	98.1	Coarse Sand	0.2
#20	0.85	97.9		
#40	0.43	97.8	Medium Sand	0.3
#60	0.25	97.7		
#100	0.15	97.5		
#200	0.075	97.2	Fine Sand	0.6

Hydrometer Analysis

(mm)	%Finer		
0.030	74.0		
0.020	58.8		
0.012	45.7	Fines	
0.0087	39.2	Silt or Clay	97.2
0.0063	32.7		
0.0031	28.3		
0.0013	25.0		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
30.1	45	20	25	0.41

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

DESCRIPTION: SILTY CLAY, trace fine to coarse sand, trace fine gravel; dark brown, dark olive brown and brown.

USCS: CL

TECH	HEH/HH/TJ
DATE	6/27/18
CHECK	
REVIEW	
APPROVE	

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

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	3	COMMENTS
PROJECT NUMBER	18103172		Flow Pump	2	
SAMPLE ID	B-3	10.0-12.0'	Flow Pump Speed	6	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.000	B-Value, f	0.99	Height, inches	2.995
Diameter, inches	2.867	Cell Pres.	88.0	Diameter, inches	2.848
Area, cm²	41.65	Bot. Pres.	80.0	Area, cm²	41.10
Volume, cm³	317.37	Top Pres.	80.0	Volume, cm³	312.66
Mass, g	605.25	Tot. B.P.	80.0	Mass, g	609.01
Moisture Content, %	30.1	Head, max.	79.48	Moisture Content, %	30.95
Dry Density, pcf	91.4	Head, min.	79.48	Dry Density, pcf	92.82
Spec. Gravity(assumed)	2.750	Max. Grad.	10.45	Volume Solids, cm³	169.12
Volume Solids, cm³	169.12	Min. Grad.	10.45	Volume Voids, cm³	143.54
Volume Voids, cm³	148.25			Void Ratio	0.85
Void Ratio	0.88			Saturation, %	100.0%
Saturation, %	94.5%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	605.25	691.29
Wt Soil & Tare, f	g	465.08	547.39
Wt Tare	g	0.00	82.41
Wt Moisture Lost	g	140.17	143.90
Wt Dry Soil	g	465.08	464.98
Water Content	%	30.14%	30.95%

DESCRIPTION: SILTY CLAY, trace fine to coarse sand, trace fine gravel; dark brown, dark olive brown and brown.

Flow Pump Rate: 4.70E-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)
06/28/18	43279	8	15	20.6	0	0	0	0	1.13	79.48	10.45	1.1E-06
06/28/18	43279	8	20	20.6	5	5	300	300	1.13	79.48	10.45	1.1E-06
06/28/18	43279	8	25	20.6	5	10	300	600	1.13	79.48	10.45	1.1E-06
06/28/18	43279	8	30	20.6	5	15	300	900	1.13	79.48	10.45	1.1E-06 *
06/28/18	43279	8	35	20.6	5	20	300	1200	1.13	79.48	10.45	1.1E-06 *
06/28/18	43279	8	40	20.6	5	25	300	1500	1.13	79.48	10.45	1.1E-06 *
06/28/18	43279	8	45	20.6	5	30	300	1800	1.13	79.48	10.45	1.1E-06 *

TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.1E-06 cm/sec **

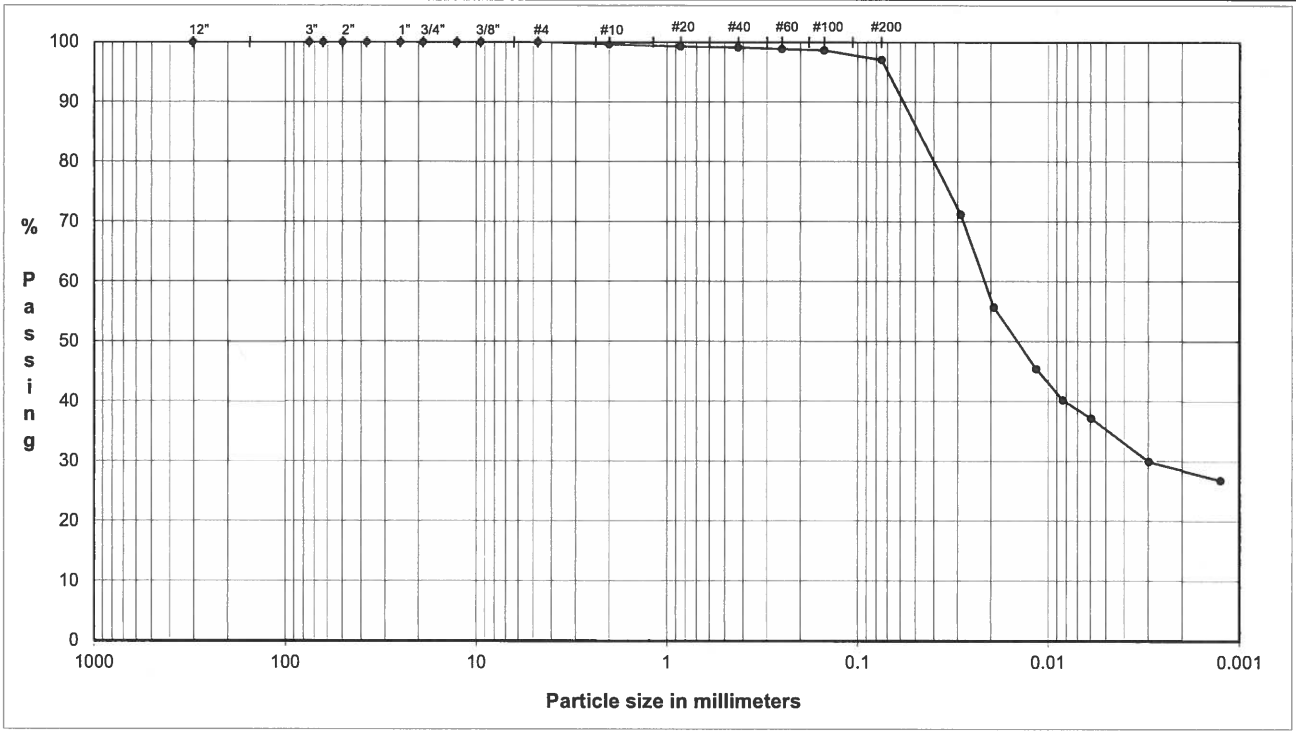
DATE	6/28/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **PZ-1** Depth: **15.0-17.0'**
TYPE: **UD**



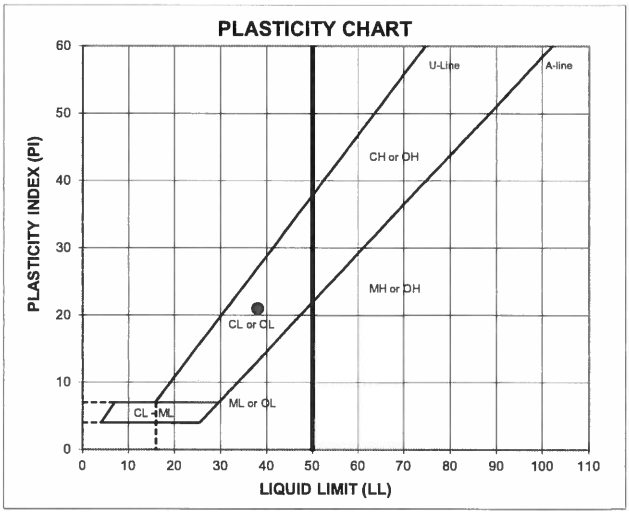
COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

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	**99.1**	Medium Sand	**0.5**
#60	0.25	**98.8**		
#100	0.15	**98.6**		
#200	0.075	**97.0**	Fine Sand	**2.1**

Hydrometer Analysis

(mm)	%Finer		
0.029	**71.2**		
0.019	**55.7**		
0.012	**45.4**	Fines	
0.0083	**40.2**	Silt or Clay	**97.0**
0.0060	**37.1**		
0.0030	**29.9**		
0.0013	**26.8**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
28.9	**38**	**17**	**21**	**0.56**

LL (oven-dried) / LL (not dried) < 0.75 = ORGANIC (OL/OH)

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

USCS: CL

TECH	TB/HH
DATE	6/28/18
CHECK	
REVIEW	
APPROVE	

JULY 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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)		
PZ-1	Bag	45.0-47.0'	GW	7.6	NP	NP	NP	NP	31.3	1.3	1.1	-	-	-	-	-	-	-
RP-6	Bag	30.0-33.0'	CH	46.5	67	30	37	0.45	100.0	97.5	65.0	-	-	-	-	-	-	-
RP-7	Bag	36.0-38.0'	CL	23.2	29	15	14	0.56	96.9	80.0	31.0	-	-	-	-	-	-	-
RP-8D	Bag	27.0-30.0'	SP-SM	10.2	NP	NP	NP	NP	59.8	11.0	3.5	-	-	-	-	-	-	-
RP-8D	Bag	42.0-50.0'	GW	3.9	NP	NP	NP	NP	23.6	0.6	0.4	-	-	-	-	-	-	-
RP-8D	Bag	68.0-70.0'	GW	7.2	-	-	-	-	15.8	2.3	1.5	-	-	-	-	-	-	-
RP-9	Bag	24.0-26.0'	CH	37.5	74	33	41	0.10	100.0	98.4	78.0	-	-	-	-	-	-	-
RP-9	Bag	45.0-46.0'	GW	7.8	NP	NP	NP	NP	16.0	1.5	0.8	-	-	-	-	-	-	-
RP-10	Bag	24.0-25.0'	CH	32.9	66	31	35	0.06	100.0	99.2	74.0	-	-	-	-	-	-	-
RP-10	Bag	33.0-35.0'	GP	6.6	NP	NP	NP	NP	18.6	0.6	0.3	-	-	-	-	-	-	-

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

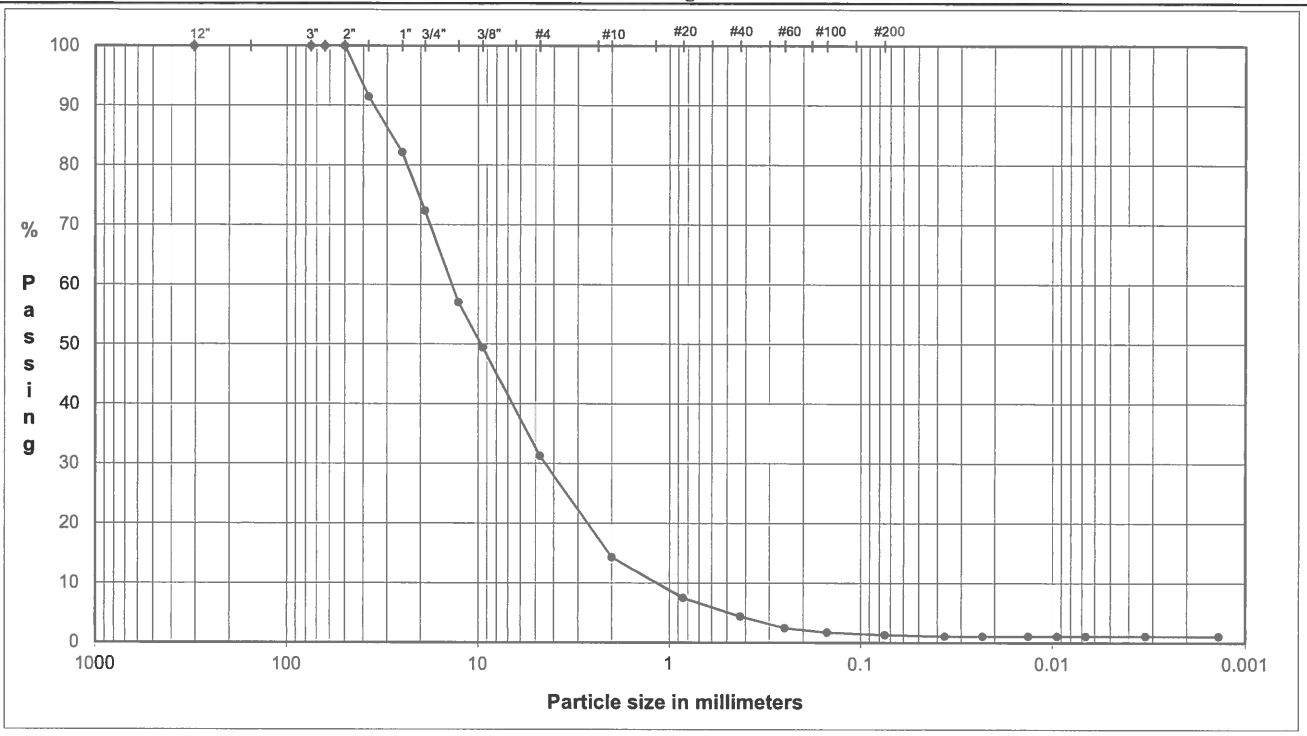
Golder Associates Inc.

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **PZ-1** - Depth: **45.0-47.0'**
TYPE: **Bag**



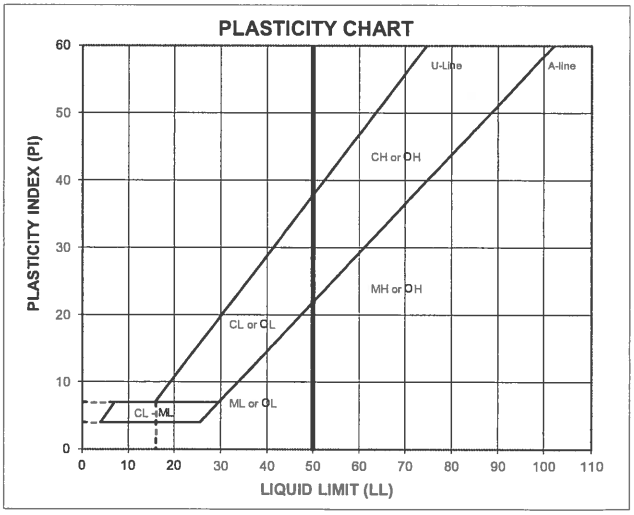
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**91.5**		
1.0"	25.0	**82.2**		
0.75"	19.0	**72.3**	Coarse Gravel	**27.7**
0.50"	12.7	**57.0**		
0.375"	9.5	**49.4**		
#4	4.8	**31.3**	Fine Gravel	**41.1**
#10	2.00	**14.3**	Coarse Sand	**17.0**
#20	0.85	**7.5**		
#40	0.43	**4.4**	Medium Sand	**9.9**
#60	0.25	**2.4**		
#100	0.15	**1.7**		
#200	0.075	**1.3**	Fine Sand	**3.0**

Hydrometer Analysis

(mm)	%Finer		
0.037	**1.1**		
0.023	**1.1**		
0.013	**1.1**	Fines	
0.0095	**1.1**	Silt or Clay	**1.3**
0.0067	**1.1**		
0.0033	**1.1**		
0.0014	**1.1**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.6	NP	NP	NP	NP

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

DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; yellowish brown.

USCS: GW

TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

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

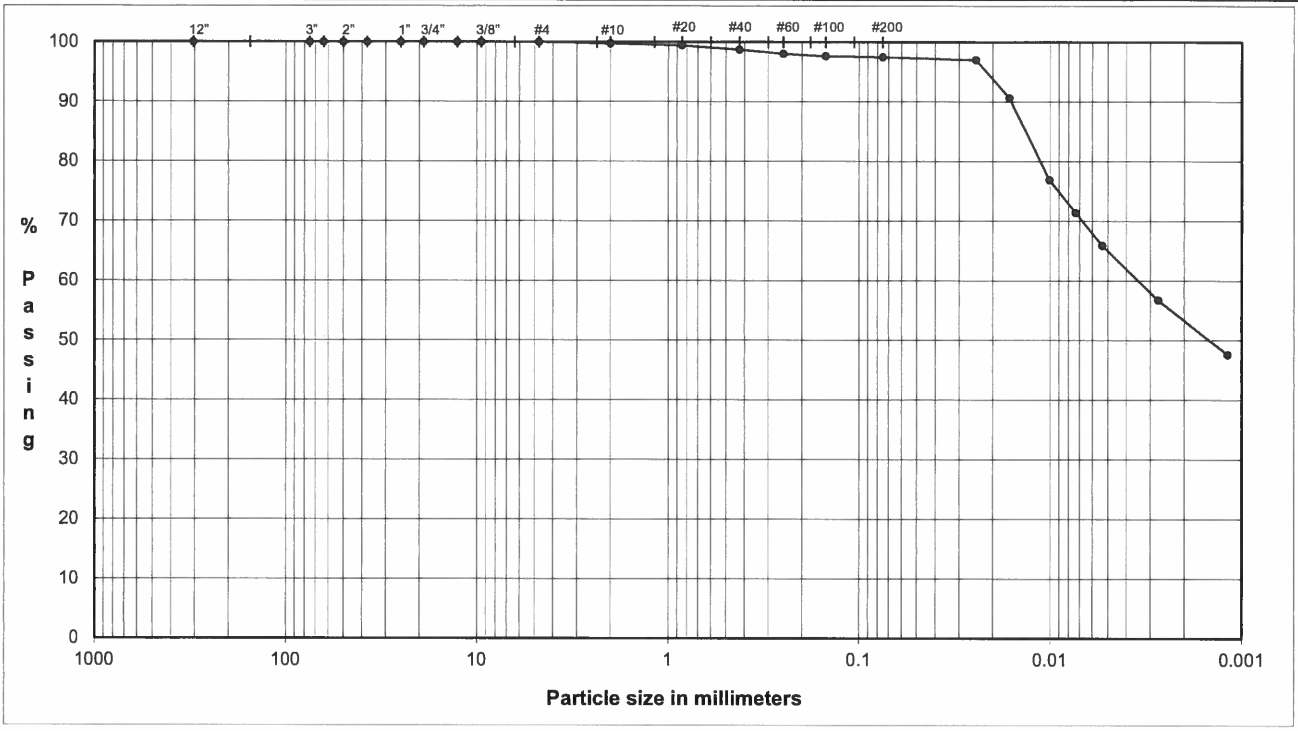
Golder Associates Inc.

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-6** - Depth: **30.0-33.0'**
TYPE: **Bag**



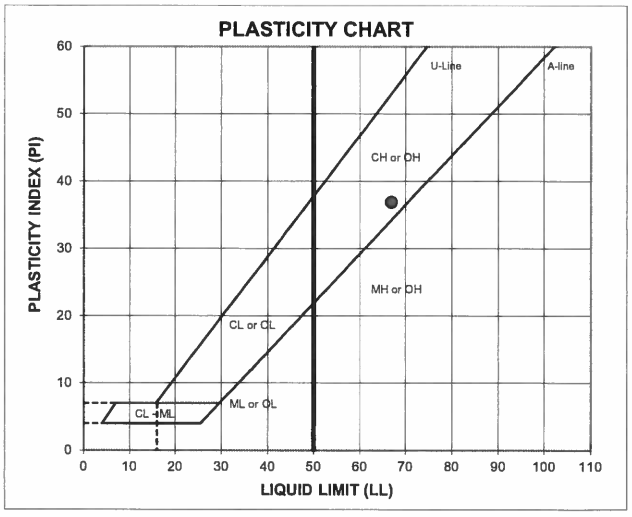
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**99.7**	Coarse Sand	**0.3**
#20	0.85	**99.5**		
#40	0.43	**98.7**	Medium Sand	**1.0**
#60	0.25	**98.0**		
#100	0.15	**97.7**		
#200	0.075	**97.5**	Fine Sand	**1.3**

Hydrometer Analysis

(mm)	%Finer		
0.025	**97.0**		
0.016	**90.6**		
0.010	**76.9**	Fines	
0.0074	**71.4**	Silt or Clay	**97.5**
0.0053	**65.9**		
0.0027	**56.7**		
0.0012	**47.6**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
46.5	**67**	**30**	**37**	**0.45**

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

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

USCS: CH

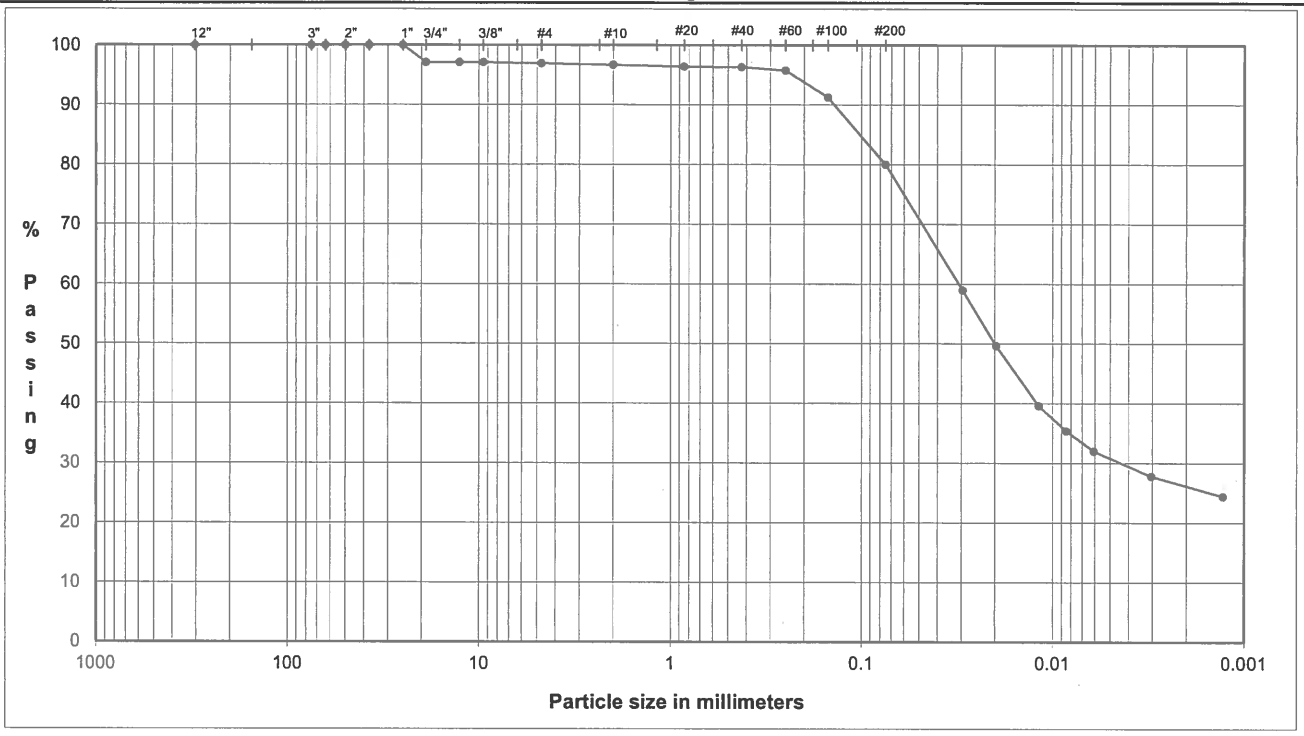
TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 | 18103172

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-7** - Depth: **36.0-38.0'**
TYPE: **Bag**



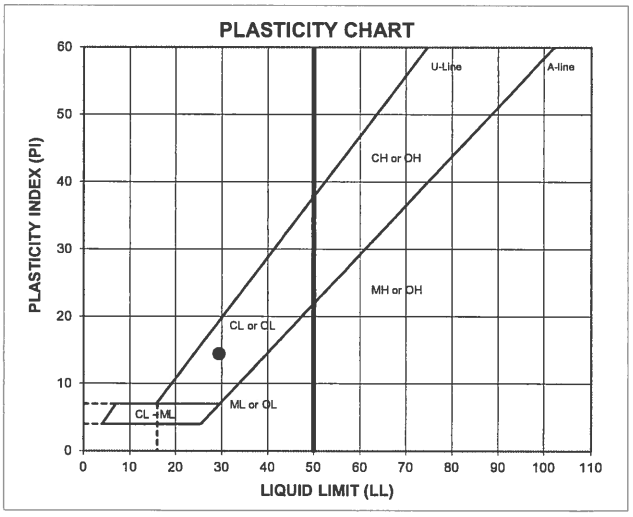
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	97.1	Coarse Gravel	2.9
0.50"	12.7	97.1		
0.375"	9.5	97.1		
#4	4.8	96.9	Fine Gravel	0.2
#10	2.00	96.7	Coarse Sand	0.2
#20	0.85	96.4		
#40	0.43	96.3	Medium Sand	0.4
#60	0.25	95.8		
#100	0.15	91.3		
#200	0.075	80.0	Fine Sand	16.3

Hydrometer Analysis

(mm)	%Finer		
0.030	58.9		
0.020	49.7		
0.012	39.6	Fines	
0.0085	35.4	Silt or Clay	80.0
0.0061	32.0		
0.0030	27.8		
0.0013	24.4		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
23.2	29	15	14	0.56

LL (oven-dried) / LL (not dried) = 0.75 = ORGANIC (OL/OH)

DESCRIPTION: sandy SILTY CLAY, fine to coarse, trace fine to coarse gravel; grayish brown.

USCS: CL

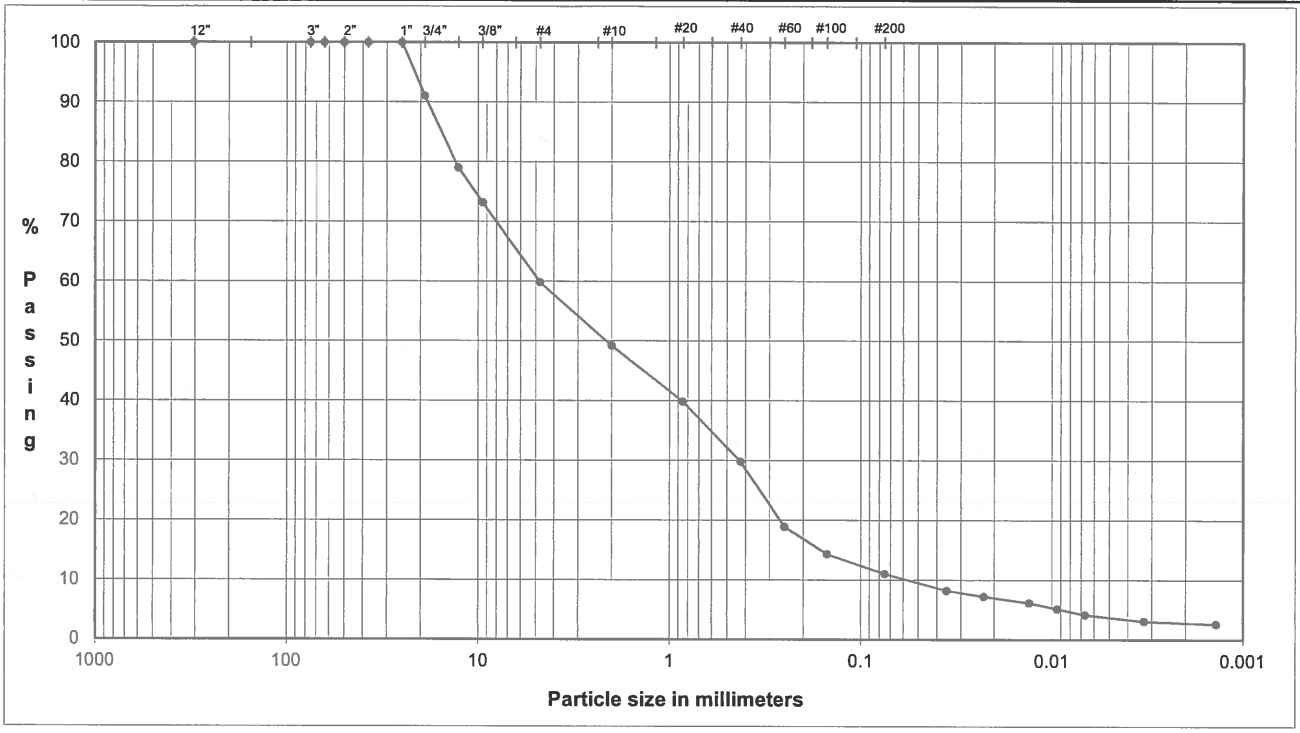
TECH	TJ/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-8D** - Depth: **27.0-30.0'**
TYPE: **Bag**



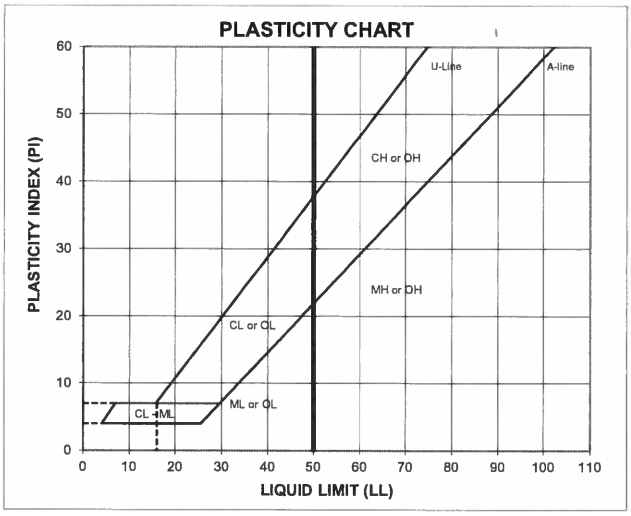
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**91.0**	Coarse Gravel	**9.0**
0.50"	12.7	**79.0**		
0.375"	9.5	**73.2**		
#4	4.8	**59.8**	Fine Gravel	**31.2**
#10	2.00	**49.2**	Coarse Sand	**10.6**
#20	0.85	**39.8**		
#40	0.43	**29.7**	Medium Sand	**19.4**
#60	0.25	**18.9**		
#100	0.15	**14.3**		
#200	0.075	**11.0**	Fine Sand	**18.8**

Hydrometer Analysis

(mm)	%Finer		
0.036	**8.2**		
0.023	**7.2**		
0.013	**6.2**	Fines	
0.0094	**5.1**	Silt or Clay	**11.0**
0.0067	**4.1**		
0.0033	**3.1**		
0.0014	**2.6**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
10.2	**NP**	**NP**	**NP**	**NP**

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

DESCRIPTION: SAND and GRAVEL, fine to coarse, fine to coarse gravel; yellowish brown.

USCS: SP-SM

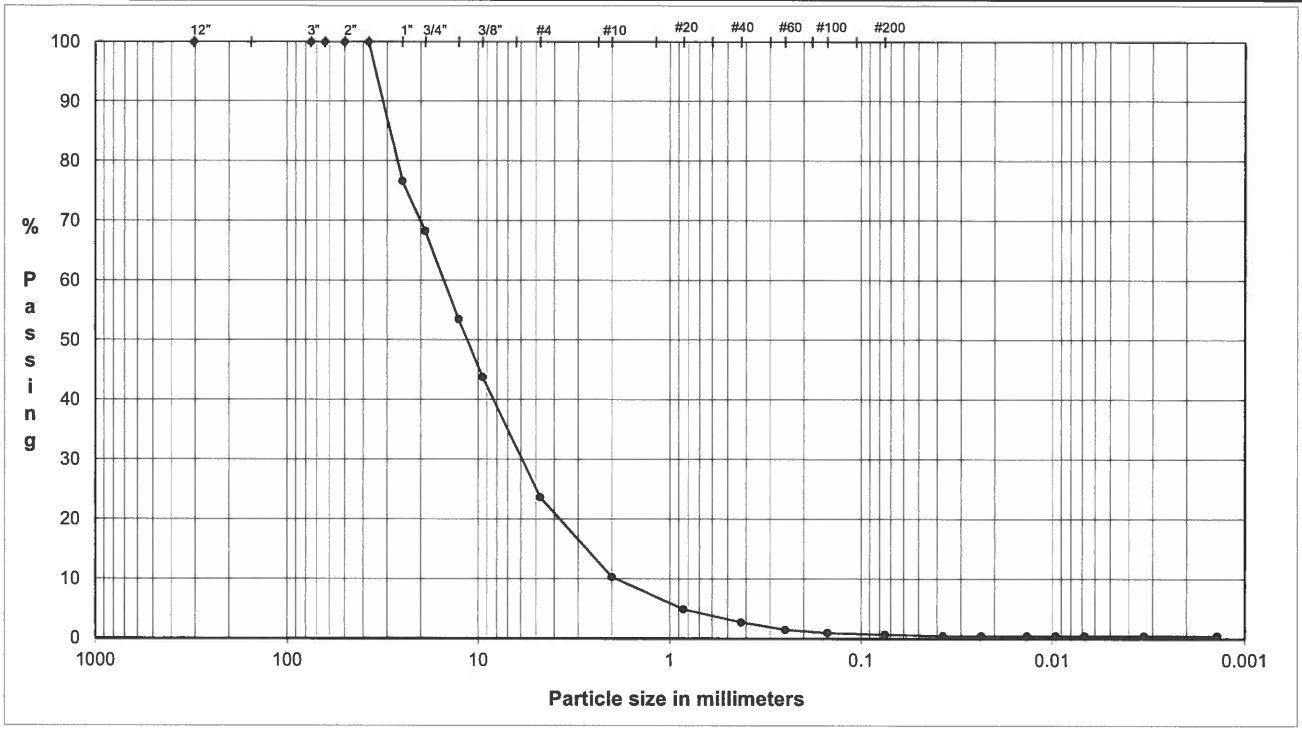
TECH	TJ/BA/HH
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-8D** - Depth: **42.0-50.0'**
TYPE: **Bag**



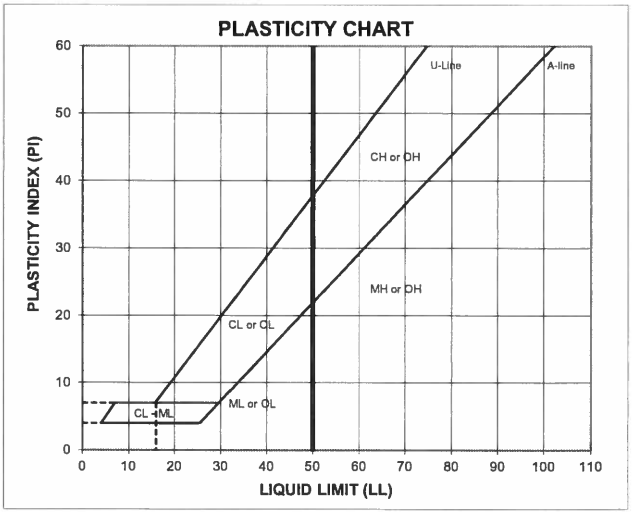
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**76.6**		
0.75"	19.0	**68.2**	Coarse Gravel	**31.8**
0.50"	12.7	**53.5**		
0.375"	9.5	**43.8**		
#4	4.8	**23.6**	Fine Gravel	**44.6**
#10	2.00	**10.3**	Coarse Sand	**13.4**
#20	0.85	**4.8**		
#40	0.43	**2.6**	Medium Sand	**7.6**
#60	0.25	**1.5**		
#100	0.15	**0.9**		
#200	0.075	**0.6**	Fine Sand	**2.0**

Hydrometer Analysis

(mm)	%Finer		
0.037	**0.4**		
0.024	**0.4**		
0.014	**0.4**	Fines	
0.0096	**0.4**	Silt or Clay	**0.6**
0.0068	**0.4**		
0.0033	**0.4**		
0.0014	**0.4**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
3.9	**NP**	**NP**	**NP**	**NP**

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

DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; dark yellowish brown.

USCS: GW

TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

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

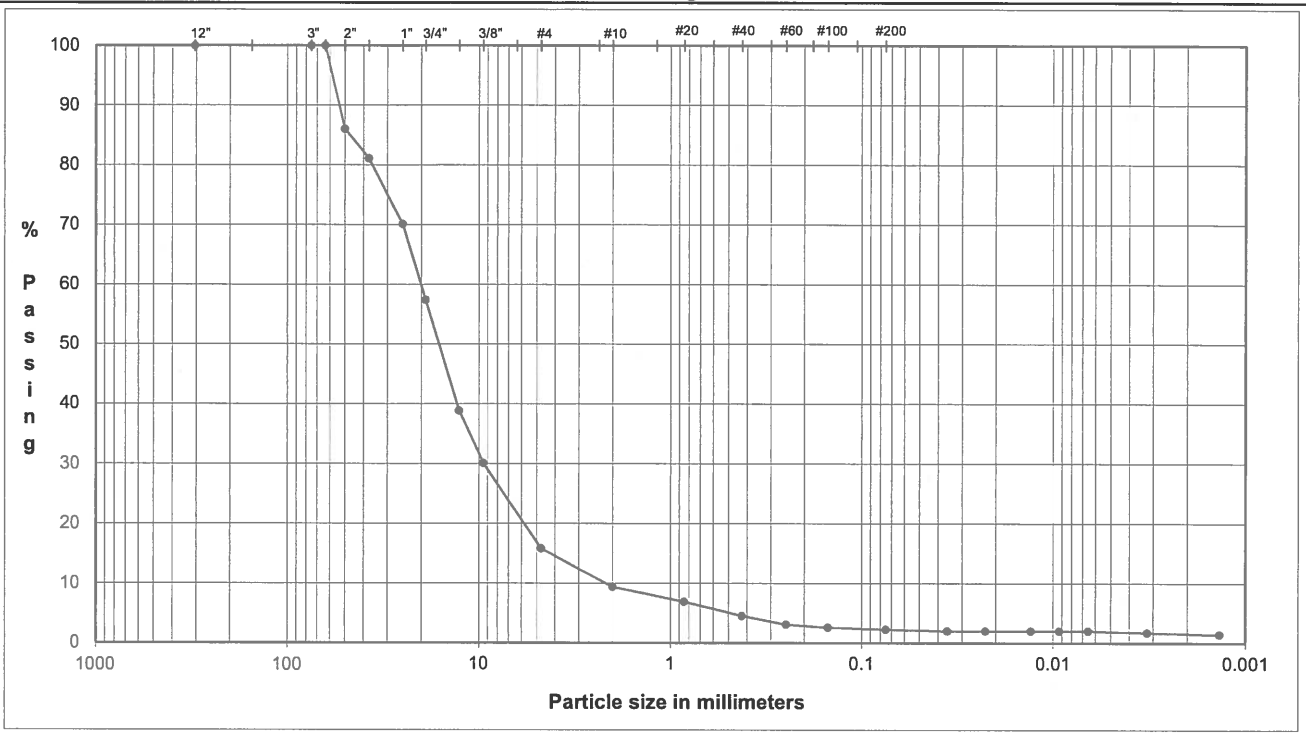
Golder Associates Inc.

JULY 2018 | 18103172

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-8D** - Depth: **68.0-70.0'**
TYPE: **Bag**



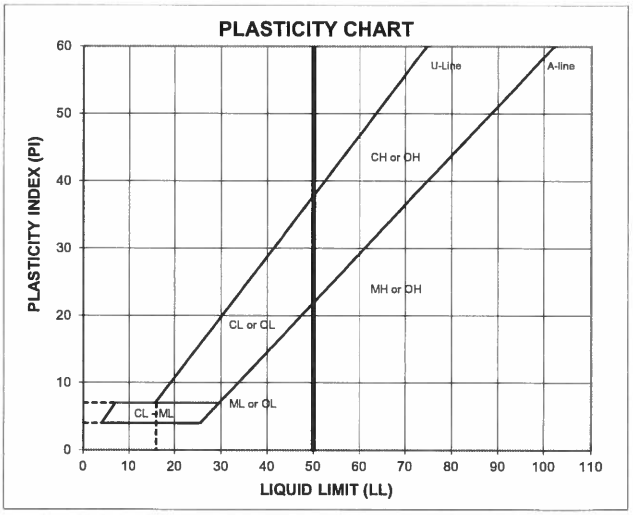
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	86.0		
1.5"	37.5	81.1		
1.0"	25.0	70.1		
0.75"	19.0	57.4	Coarse Gravel	42.6
0.50"	12.7	38.9		
0.375"	9.5	30.1		
#4	4.8	15.8	Fine Gravel	41.6
#10	2.00	9.4	Coarse Sand	6.4
#20	0.85	6.9		
#40	0.43	4.5	Medium Sand	4.9
#60	0.25	3.1		
#100	0.15	2.6		
#200	0.075	2.3	Fine Sand	2.2

Hydrometer Analysis

(mm)	%Finer		
0.036	2.0		
0.023	2.0		
0.013	2.0	Fines	
0.0093	2.0	Silt or Clay	2.3
0.0066	2.0		
0.0032	1.7		
0.0014	1.4		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.2	-	-	-	-

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

DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; brown.

USCS: GW

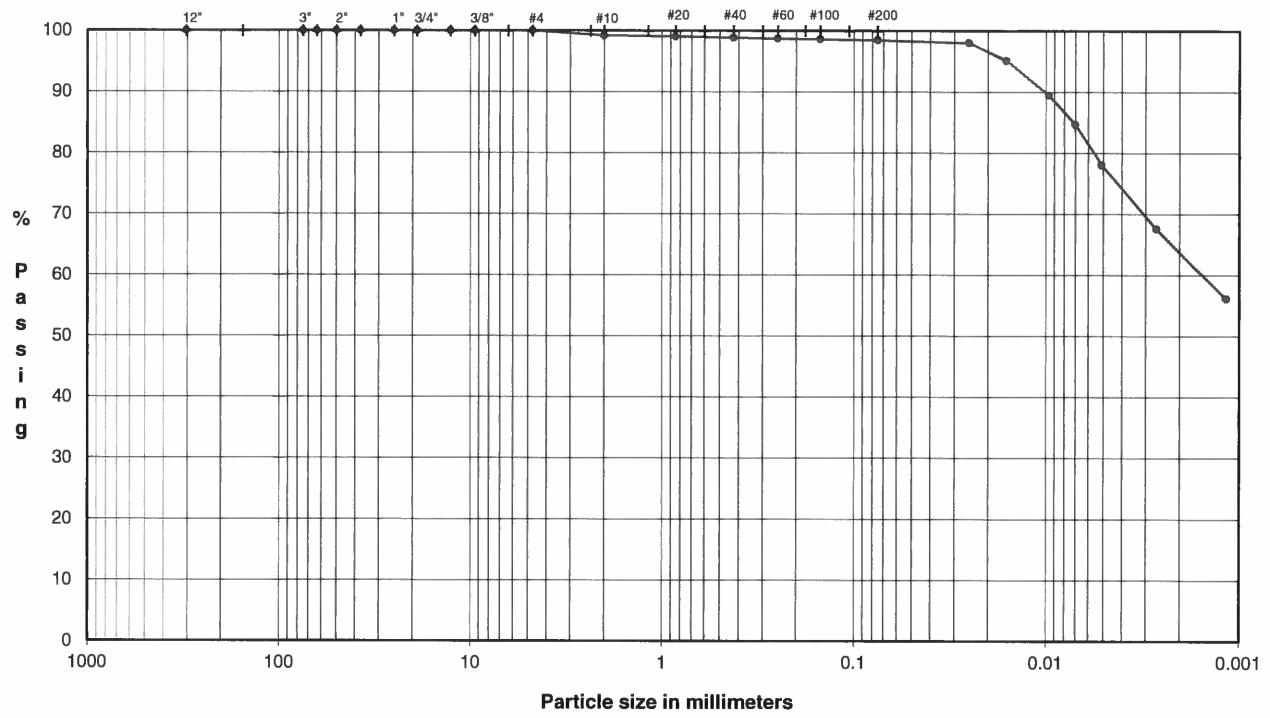
TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

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

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-9** - Depth: **24.0-26.0'**
TYPE: **Bag**



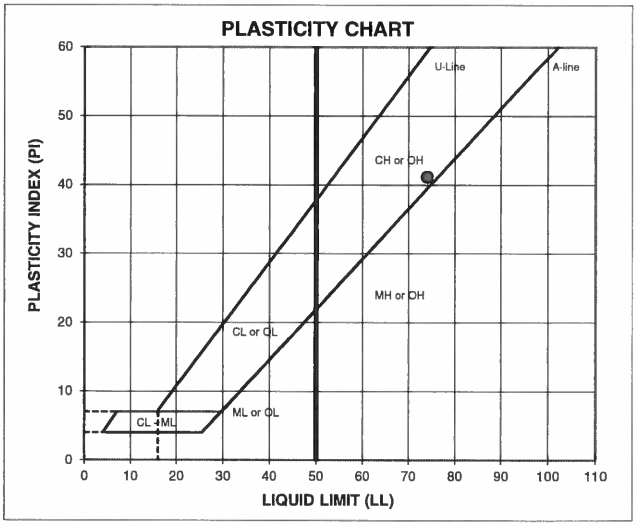
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**99.2**	Coarse Sand	**0.8**
#20	0.85	**99.1**		
#40	0.43	**98.9**	Medium Sand	**0.4**
#60	0.25	**98.7**		
#100	0.15	**98.6**		
#200	0.075	**98.4**	Fine Sand	**0.4**

Hydrometer Analysis

(mm)	%Finer		
0.025	**98.0**		
0.016	**95.2**		
0.010	**89.5**	Fines	
0.0070	**84.7**	Silt or Clay	**98.4**
0.0051	**78.0**		
0.0026	**67.6**		
0.0012	**56.1**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_r	LL	PL	PI	LI
37.5	**74**	**33**	**41**	**0.10**

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

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

USCS: CH

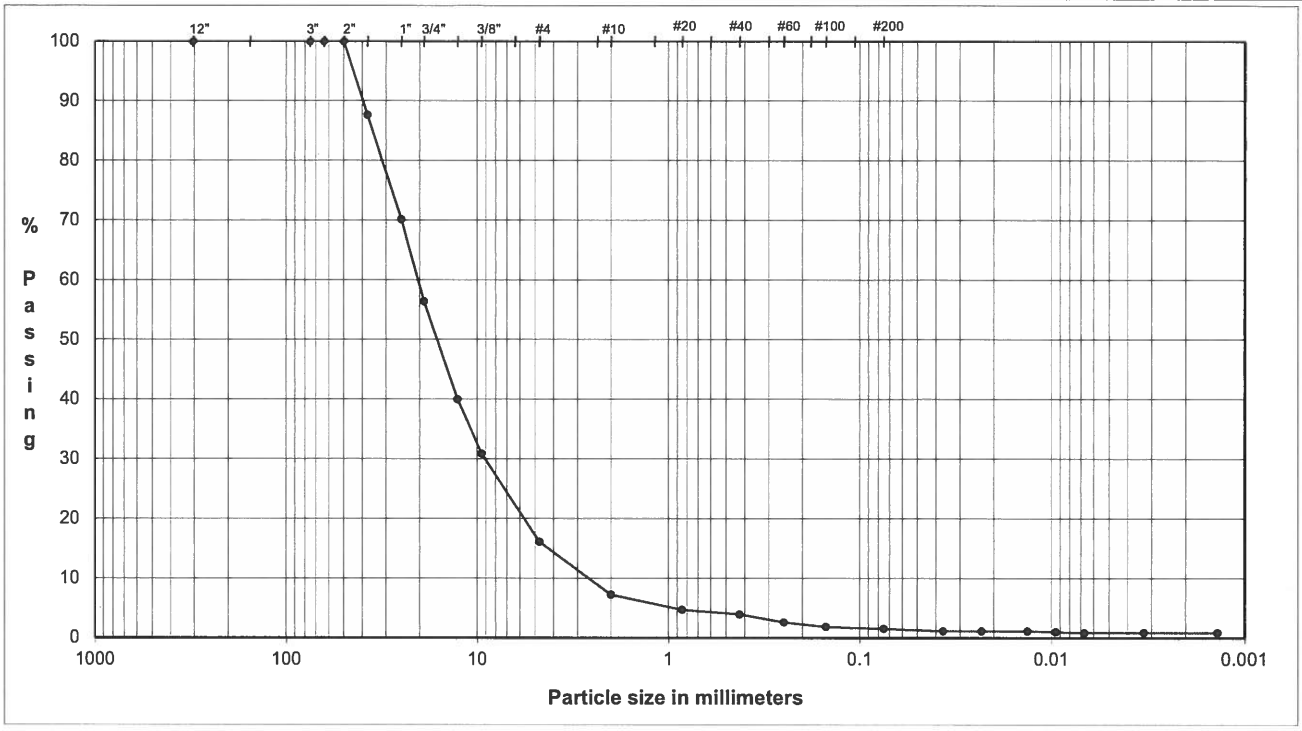
TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-9** - Depth: **45.0-46.0'**
TYPE: **Bag**



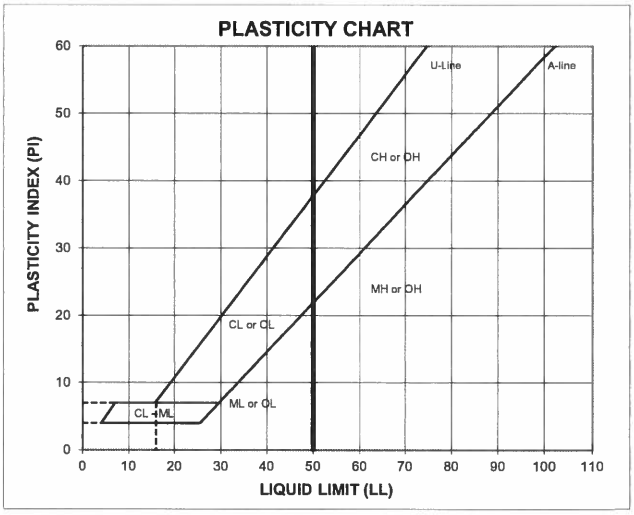
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	87.6		
1.0"	25.0	70.1		
0.75"	19.0	56.4	Coarse Gravel	43.6
0.50"	12.7	39.9		
0.375"	9.5	30.8		
#4	4.8	16.0	Fine Gravel	40.4
#10	2.00	7.2	Coarse Sand	8.8
#20	0.85	4.7		
#40	0.43	3.9	Medium Sand	3.3
#60	0.25	2.6		
#100	0.15	1.8		
#200	0.075	1.5	Fine Sand	2.4

Hydrometer Analysis

(mm)	%Finer		
0.037	1.1		
0.023	1.1		
0.013	1.1	Fines	
0.0095	1.0	Silt or Clay	1.5
0.0067	0.8		
0.0033	0.8		
0.0014	0.8		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.8	NP	NP	NP	NP

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

DESCRIPTION: sandy GRAVEL; fine to coarse, fine to coarse sand, trace fines; dark yellowish brown.

USCS: GW

TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

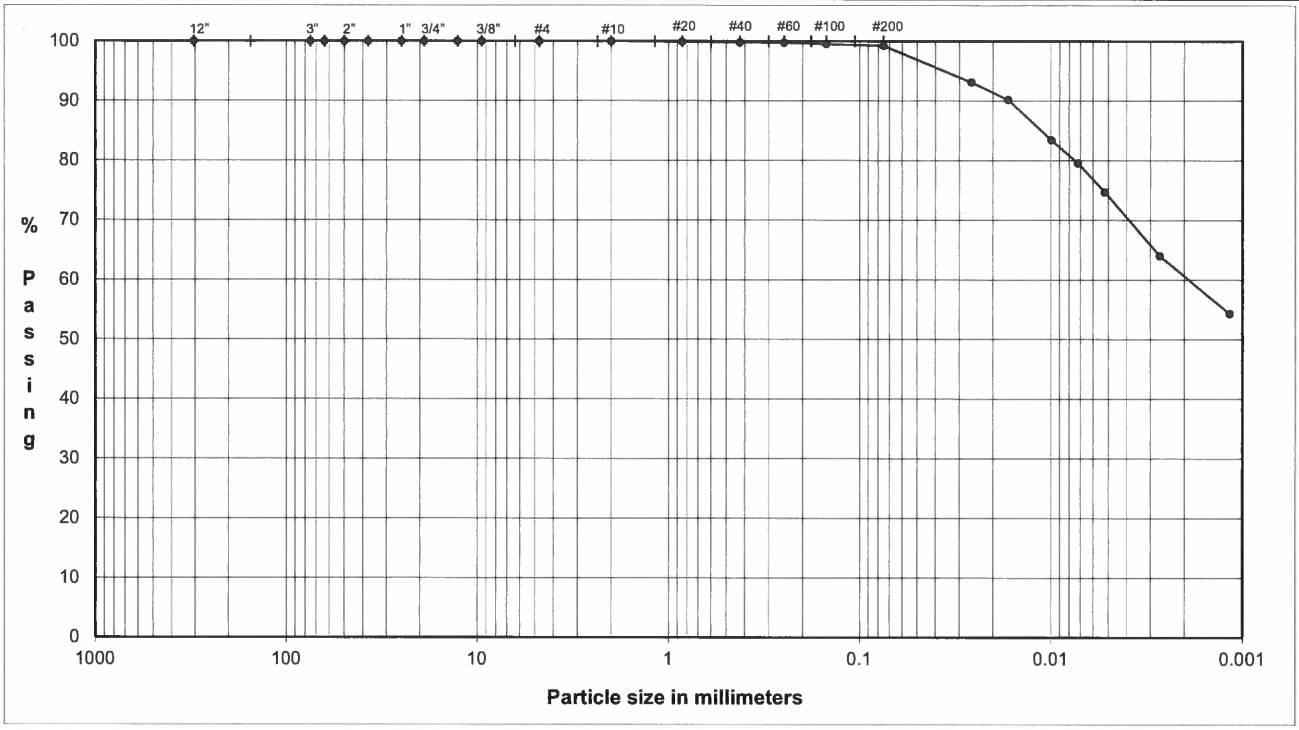
NOTE: Insufficient sample received to perform in accordance with ASTM Standards

JULY 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-10** - Depth: **24.0-25.0'**
TYPE: **Bag**



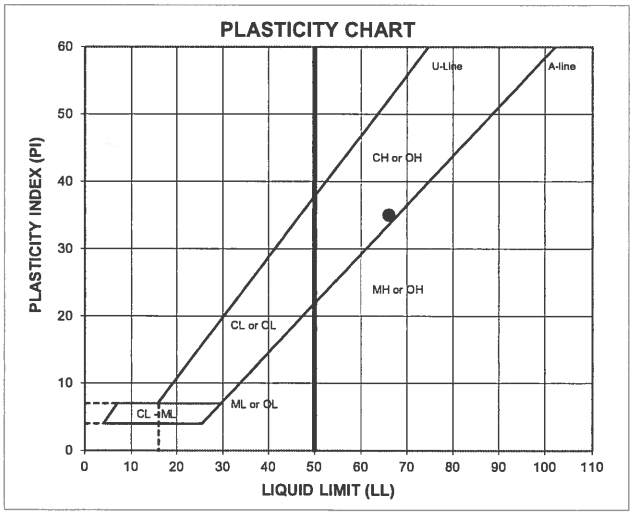
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	**100.0**	Coarse Sand	**0.0**
#20	0.85	**99.9**		
#40	0.43	**99.8**	Medium Sand	**0.2**
#60	0.25	**99.7**		
#100	0.15	**99.5**		
#200	0.075	**99.2**	Fine Sand	**0.6**

Hydrometer Analysis

(mm)	%Finer		
0.026	**93.1**		
0.017	**90.2**		
0.010	**83.4**	Fines	
0.0072	**79.5**	Silt or Clay	**99.2**
0.0052	**74.7**		
0.0027	**64.0**		
0.0012	**54.3**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
32.9	**66**	**31**	**35**	**0.06**

LL (oven-dried) / LL (not dried) < 0.75 ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine to medium sand; grayish brown.

USCS: CH

TECH	TJ/BA/HH
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

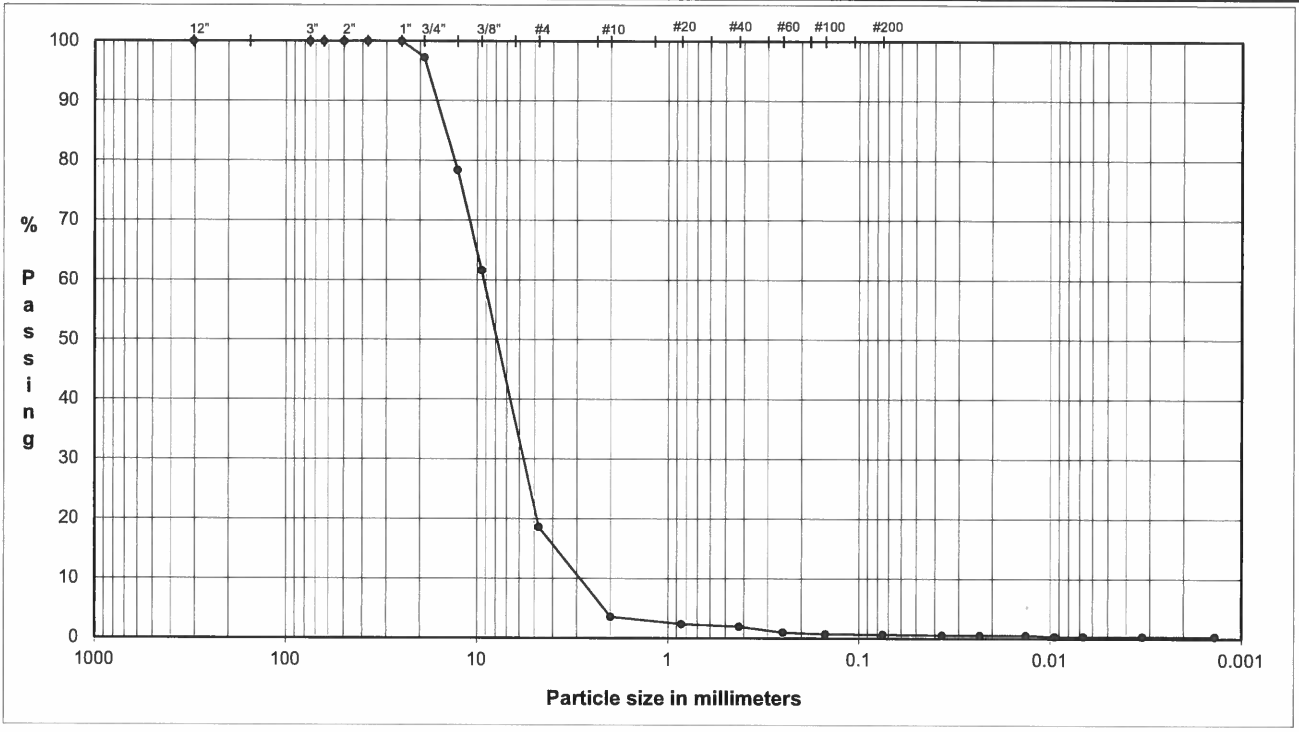
Golder Associates Inc.

AUGUST 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **RP-10** - Depth: **33.0-35.0'**
TYPE: **Bag**



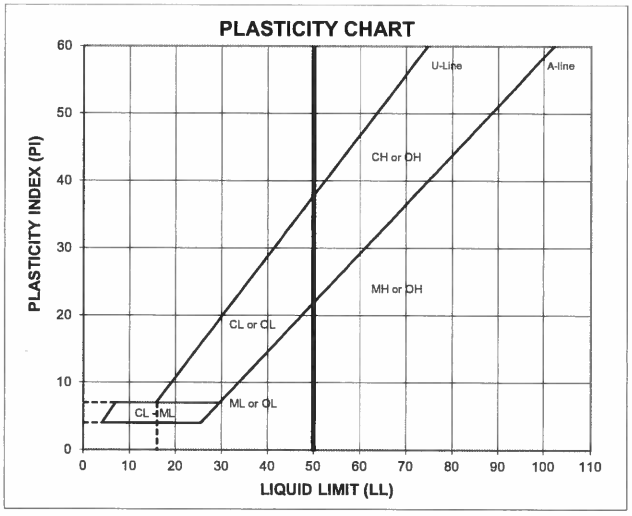
COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

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	**97.2**	Coarse Gravel	**2.8**
0.50"	12.7	**78.4**		
0.375"	9.5	**61.6**		
#4	4.8	**18.6**	Fine Gravel	**78.7**
#10	2.00	**3.5**	Coarse Sand	**15.0**
#20	0.85	**2.3**		
#40	0.43	**1.9**	Medium Sand	**1.6**
#60	0.25	**1.0**		
#100	0.15	**0.7**		
#200	0.075	**0.6**	Fine Sand	**1.3**

Hydrometer Analysis

(mm)	%Finer		
0.037	**0.5**		
0.023	**0.5**		
0.013	**0.5**	Fines	
0.0095	**0.3**	Silt or Clay	**0.6**
0.0067	**0.3**		
0.0033	**0.3**		
0.0014	**0.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
6.6	NP	NP	NP	NP

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

DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; reddish brown.

USCS: GP

TECH	TJ/HH/BA
DATE	7/30/18
CHECK	
REVIEW	
APPROVE	

GOLDER

Boring or Test Pit: --	Boring or Test Pit: --	Boring or Test Pit: --
Sample: RP-4D	Sample: RP-4D	Sample: RP-4D
Depth: 38-39 ft.	Depth: 38-39 ft.	Depth: 38-39 ft.
Point No.: 1	Point No.: 2	Point No.: 3

Initial			**Initial**			**Initial**		
Thickness =	1.188	in	Thickness =	1.183	in	Thickness =	1.189	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Wet Mass =	0.423	lb	Wet Mass =	0.423	lb	Wet Mass =	0.424	lb
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.83	in^3	Volume =	5.81	in^3	Volume =	5.84	in^3
Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
Dry Mass of Solids =	0.404	lb	Dry Mass of Solids =	0.402	lb	Dry Mass of Solids =	0.403	lb
Moisture Content =	4.7%		Moisture Content =	5.2%		Moisture Content =	5.0%	
Wet Unit Weight =	125.4	pcf	Wet Unit Weight =	125.9	pcf	Wet Unit Weight =	125.4	pcf
Dry Unit Weight =	119.7	pcf	Dry Unit Weight =	119.7	pcf	Dry Unit Weight =	119.4	pcf
Void Ratio =	0.41		Void Ratio =	0.41		Void Ratio =	0.41	
Percent Saturation =	31%		Percent Saturation =	35%		Percent Saturation =	33%	

Pre-Shear			**Pre-Shear**			**Pre-Shear**		
Thickness =	1.174	in	Thickness =	1.163	in	Thickness =	1.170	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.76	in^3	Volume =	5.71	in^3	Volume =	5.74	in^3
Moisture Content =	11.1%		Moisture Content =	11.2%		Moisture Content =	11.4%	
Wet Unit Weight =	134.7	pcf	Wet Unit Weight =	135.4	pcf	Wet Unit Weight =	135.2	pcf
Dry Unit Weight =	121.2	pcf	Dry Unit Weight =	121.8	pcf	Dry Unit Weight =	121.4	pcf
Void Ratio =	0.39		Void Ratio =	0.38		Void Ratio =	0.39	
Percent Saturation =	77%		Percent Saturation =	79%		Percent Saturation =	80%	

Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min
Normal Stress =	4,752	psf	Normal Stress =	9,504	psf	Normal Stress =	14,256	psf

Notes:

USCS description (ASTM D2487): Poorly graded gravel with silt and sand, brown, moist

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

Percent finer: 3/4 in. = 78% No. 4 = 31% No. 200 = 5% (ASTM D422, refer to separate report)

Specimen type: [ ] Intact [X] Reconstituted

Inundation: At seating load

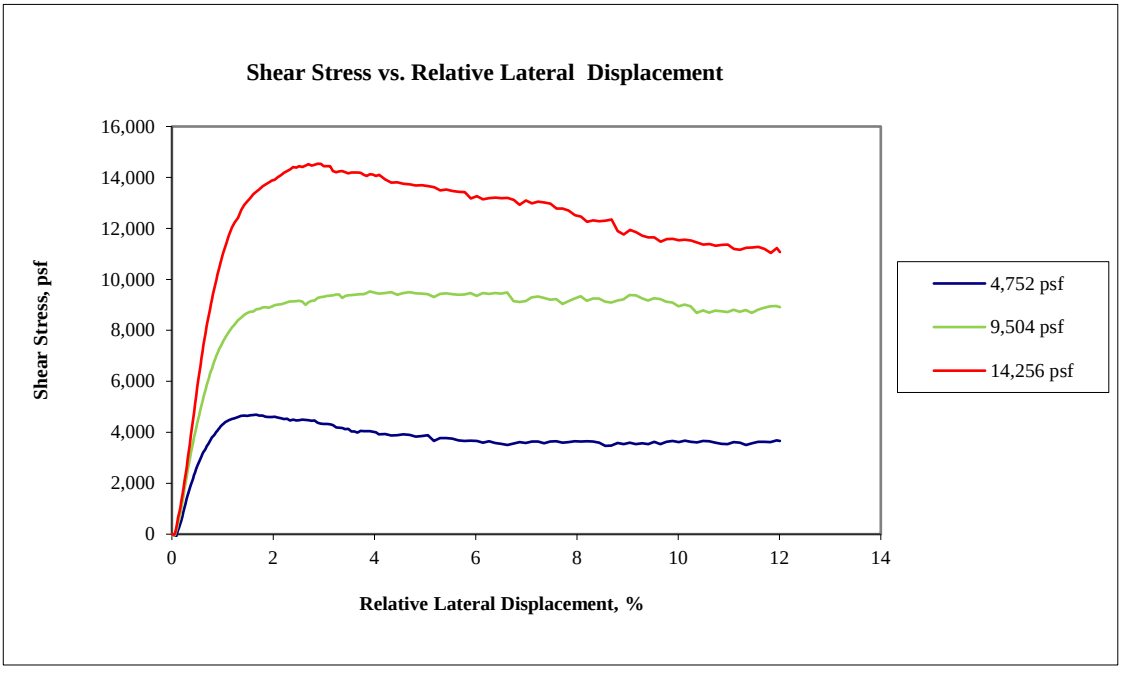
Apparatus: 2.5 -inch nominal diameter box, GeoTac automated test system, GeoJac loading system

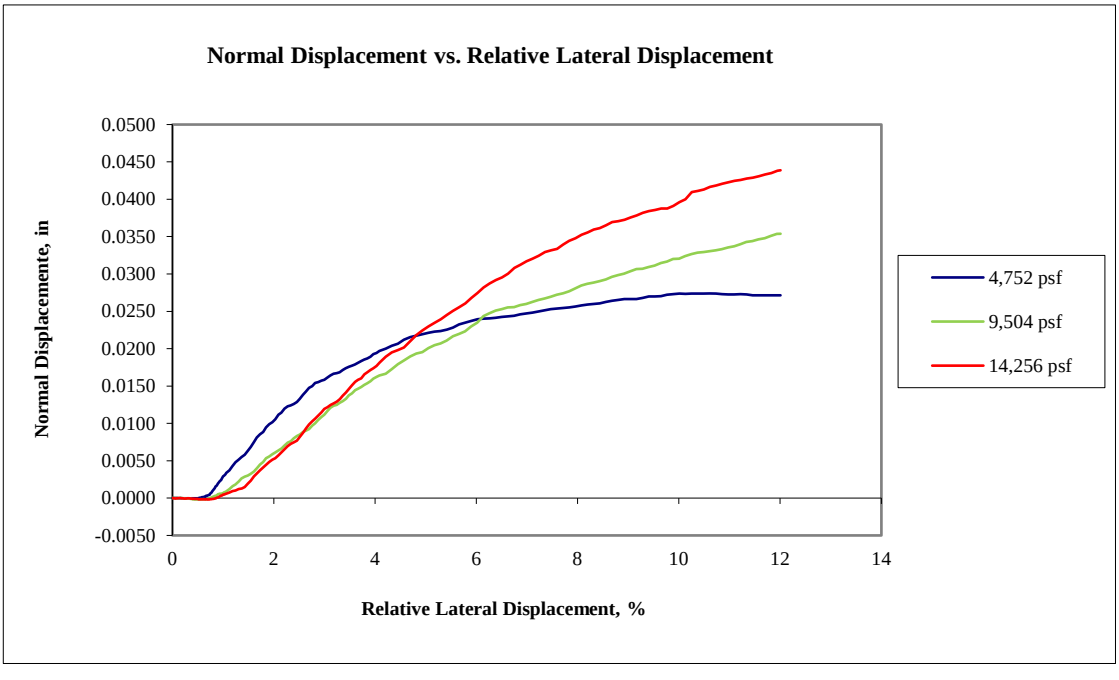
Gravel retained on the #4 sieve removed from sample prior to testing

Specimens were reconstituted at near estimated optimum moisture content using heavy compactive effort

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SAMPLE AND TEST DATA				
Project Number: 18103172.01					
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 1

GOLDER

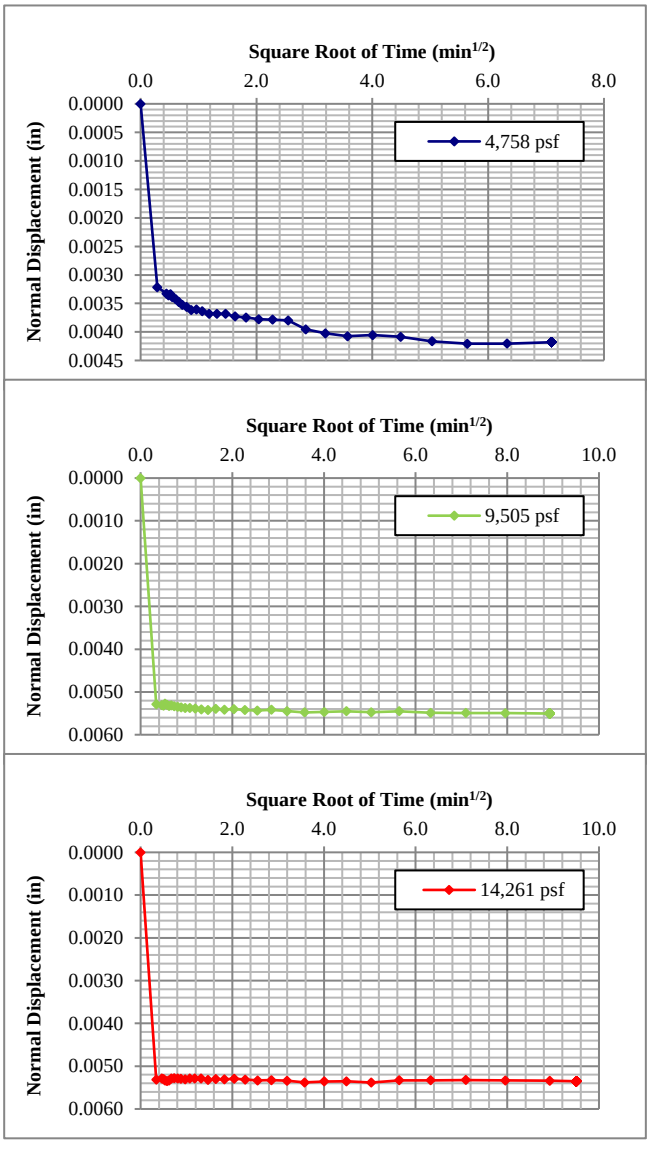




Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS				
Project Number: 18103172.01					
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 2

GOLDER

Consolidation Data Used to Determine Shear Rate



Normal Stress, psf	Normal Displacement, in	Load Duration, min
Point No. 1		
137	0.0000	1
2,381	0.0103	15
4,758	0.0042	50
Point No. 2		
134	0.0000	1
4,753	0.0146	41
9,505	0.0055	80
Point No. 3		
106	0.0000	1
7,137	0.0136	6
14,261	0.0053	90

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT CONSOLIDATION DATA				
Project Number: 18103172.01					
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 3

GOLDER

Point No.:	1	
Normal Stress =	4,752	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
-109	0.1	0.0000
528	0.2	0.0000
1,362	0.3	0.0000
2,054	0.4	0.0000
2,659	0.5	0.0000
3,053	0.6	0.0001
3,438	0.7	0.0003
3,790	0.8	0.0009
4,060	0.9	0.0020
4,261	1.0	0.0026
4,647	1.5	0.0063
4,596	2.0	0.0101
4,457	2.5	0.0129
4,331	3.0	0.0158
4,137	3.5	0.0176
4,019	4.0	0.0193
3,887	4.5	0.0206
3,854	4.9	0.0219
3,767	5.4	0.0225
3,665	5.9	0.0237
3,585	6.4	0.0241
3,581	7.0	0.0247
3,637	7.5	0.0253
3,650	8.0	0.0256
3,587	8.4	0.0261
3,538	8.9	0.0266
3,536	9.4	0.0270
3,659	9.9	0.0273

Point No.:	2	
Normal Stress =	9,504	psf
Shear Rate =	0.0033	in/min

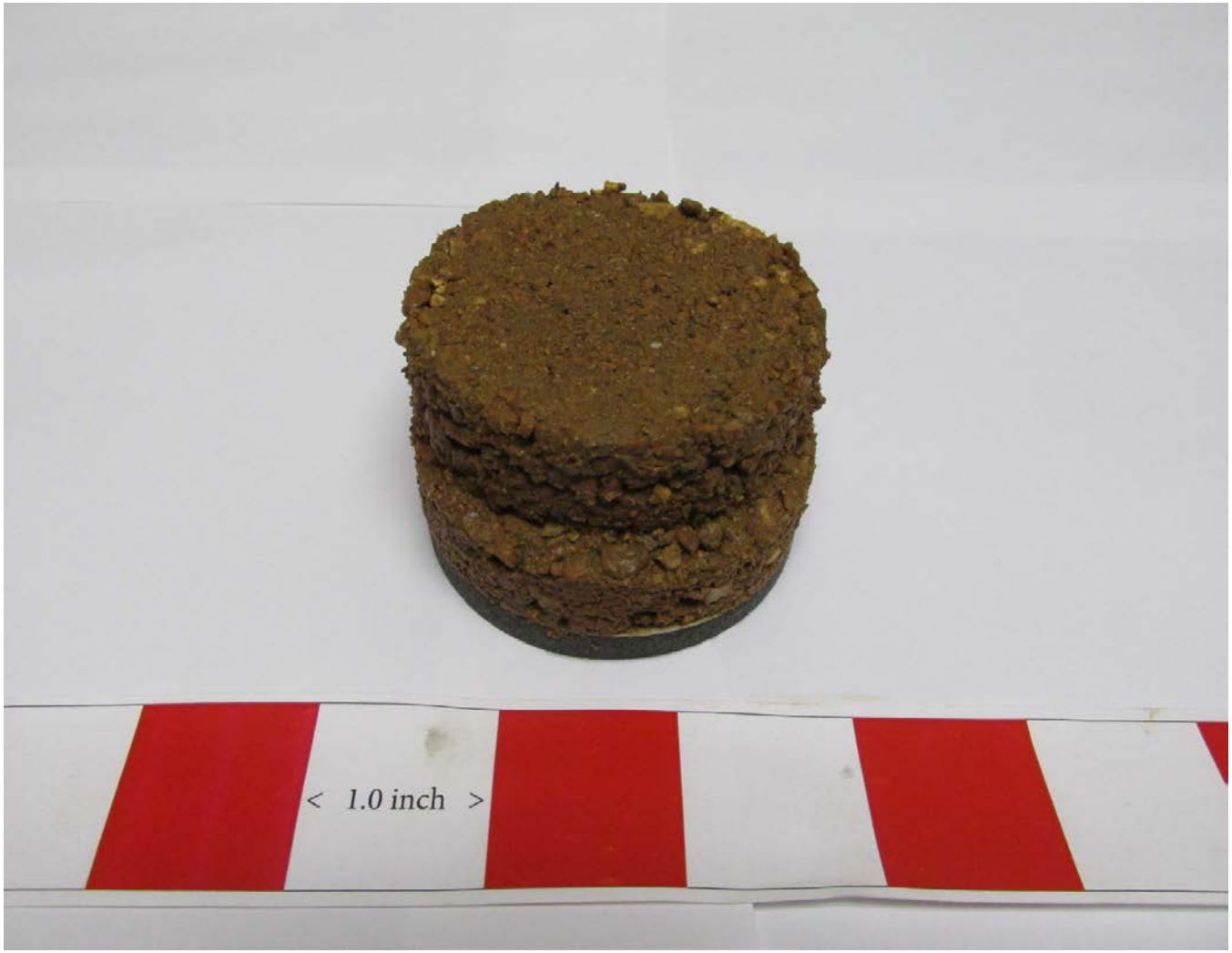
Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
109	0.1	0.0000
1,011	0.2	0.0000
2,262	0.3	-0.0001
3,378	0.4	-0.0001
4,347	0.5	-0.0002
5,048	0.6	-0.0002
5,839	0.7	-0.0002
6,503	0.8	0.0002
7,088	0.9	0.0005
7,440	1.0	0.0006
8,687	1.5	0.0030
8,928	2.0	0.0059
9,150	2.5	0.0083
9,302	2.9	0.0109
9,371	3.5	0.0137
9,501	4.0	0.0160
9,400	4.5	0.0179
9,442	4.9	0.0195
9,451	5.4	0.0211
9,463	5.9	0.0230
9,465	6.4	0.0251
9,147	7.0	0.0260
9,205	7.5	0.0269
9,244	8.0	0.0281
9,245	8.4	0.0290
9,220	8.9	0.0301
9,173	9.4	0.0309
9,096	9.9	0.0320

Point No.:	3	
Normal Stress =	14,256	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
213	0.1	0.0000
1,282	0.2	0.0000
2,623	0.3	0.0000
4,184	0.4	-0.0001
5,432	0.5	-0.0001
6,907	0.6	-0.0001
8,174	0.7	-0.0002
9,234	0.8	-0.0001
10,161	0.9	0.0001
10,809	1.0	0.0004
13,066	1.5	0.0019
13,883	2.0	0.0051
14,392	2.5	0.0077
14,532	2.9	0.0115
14,159	3.5	0.0146
14,114	4.0	0.0174
13,813	4.5	0.0198
13,693	4.9	0.0224
13,522	5.4	0.0245
13,180	5.9	0.0268
13,213	6.4	0.0292
13,091	7.0	0.0317
12,969	7.5	0.0331
12,517	8.0	0.0348
12,284	8.4	0.0361
11,758	8.9	0.0372
11,647	9.4	0.0384
11,595	9.9	0.0391

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR DATA				
Project Number: 18103172.01					
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 4

GOLDER



Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 4,752 psf				
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 5

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 9,504 psf				
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 6

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 14,256 psf				
Sample ID: RP-4D @ 38 - 39 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 7

GOLDER

	Boring or Test Pit: --	Sample: RP-4D	Depth: 64.5-67.4 ft.	Point No.: 1
	Boring or Test Pit: --	Sample: RP-4D	Depth: 64.5-67.4 ft.	Point No.: 2
	Boring or Test Pit: --	Sample: RP-4D	Depth: 64.5-67.4 ft.	Point No.: 3

Initial			Initial			Initial		
Thickness =	1.187	in	Thickness =	1.193	in	Thickness =	1.189	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Wet Mass =	0.394	lb	Wet Mass =	0.396	lb	Wet Mass =	0.395	lb
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.83	in^3	Volume =	5.86	in^3	Volume =	5.84	in^3
Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
Dry Mass of Solids =	0.379	lb	Dry Mass of Solids =	0.381	lb	Dry Mass of Solids =	0.381	lb
Moisture Content =	3.8%		Moisture Content =	3.8%		Moisture Content =	3.8%	
Wet Unit Weight =	116.8	pcf	Wet Unit Weight =	116.7	pcf	Wet Unit Weight =	117.0	pcf
Dry Unit Weight =	112.5	pcf	Dry Unit Weight =	112.5	pcf	Dry Unit Weight =	112.7	pcf
Void Ratio =	0.50		Void Ratio =	0.50		Void Ratio =	0.49	
Percent Saturation =	21%		Percent Saturation =	21%		Percent Saturation =	21%	

Pre-Shear			Pre-Shear			Pre-Shear		
Thickness =	1.165	in	Thickness =	1.168	in	Thickness =	1.161	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.72	in^3	Volume =	5.73	in^3	Volume =	5.70	in^3
Moisture Content =	13.4%		Moisture Content =	13.9%		Moisture Content =	13.0%	
Wet Unit Weight =	130.0	pcf	Wet Unit Weight =	130.8	pcf	Wet Unit Weight =	130.5	pcf
Dry Unit Weight =	114.6	pcf	Dry Unit Weight =	114.9	pcf	Dry Unit Weight =	115.5	pcf
Void Ratio =	0.47		Void Ratio =	0.46		Void Ratio =	0.46	
Percent Saturation =	77%		Percent Saturation =	81%		Percent Saturation =	77%	

Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min
Normal Stress =	8,208	psf	Normal Stress =	16,416	psf	Normal Stress =	24,624	psf

Notes:

USCS description (ASTM D2487): Poorly graded sand, reddish yellow, moist

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

Percent finer: 3/4 in. = 100% No. 4 = 97% No. 200 = 5% (ASTM D422, refer to separate report)

Specimen type: [ ] Intact [X] Reconstituted

Inundation: At seating load

Apparatus: 2.5 -inch nominal diameter box, GeoTac automated test system, GeoJac loading system

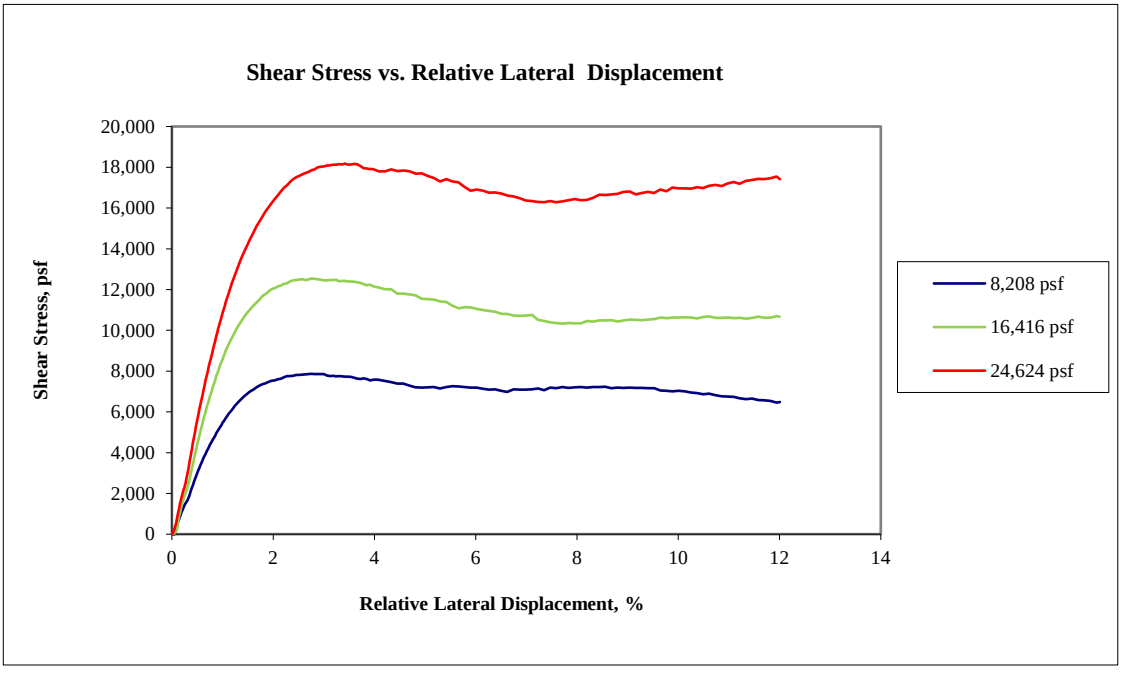
Gravel retained on the #4 sieve removed from sample prior to testing

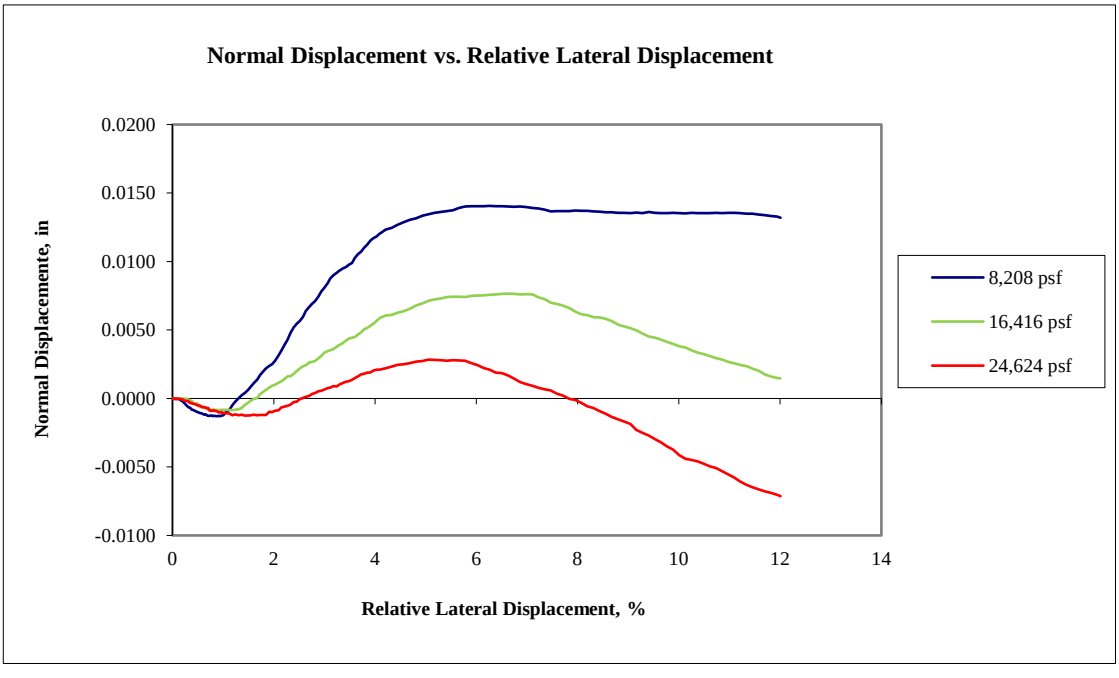
Specimens were reconstituted at near estimated optimum moisture content using heavy compactive effort

No photo available for Point 3 specimen

Project Name: FTN/Entergy Independence/AR	ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SAMPLE AND TEST DATA				
Project Number: 18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 64.5 - 67.4 ft.	**MAB**	**PRH**	**MK**	**15-Aug-2018**	**1**

GOLDER

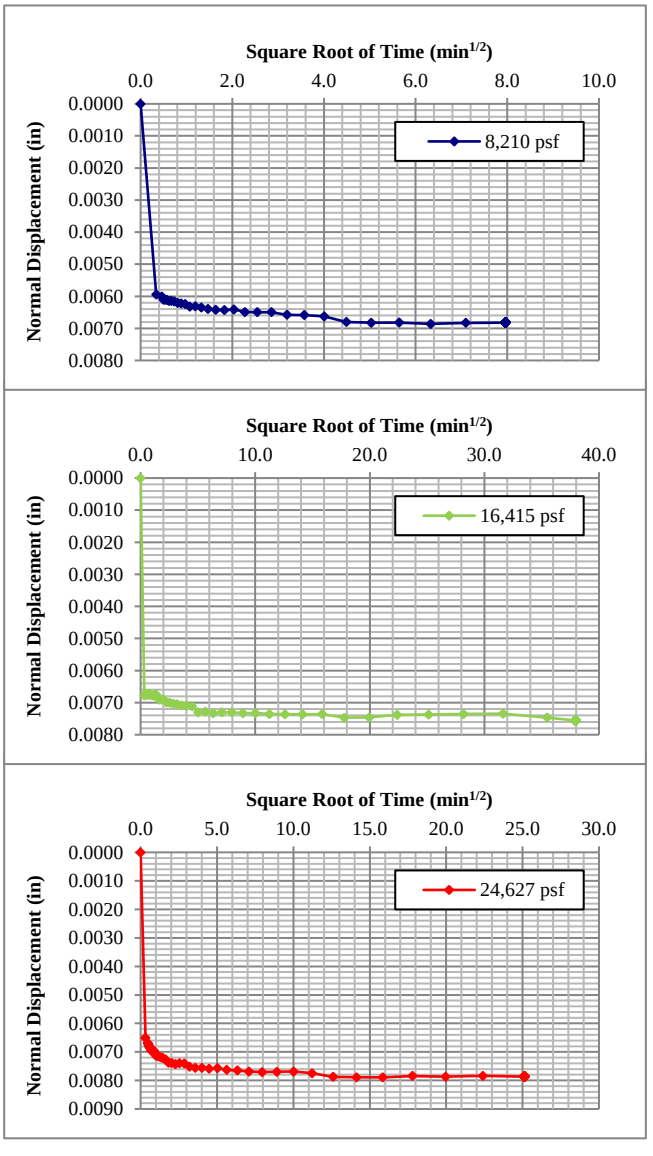




Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS				
Project Number: 18103172.01					
Sample ID: RP-4D @ 64.5 - 67.4 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 2

GOLDER

Consolidation Data Used to Determine Shear Rate



Normal Stress, psf	Normal Displacement, in	Load Duration, min
Point No. 1		
103	0.0001	4
4,114	0.0152	15
8,210	0.0068	63
Point No. 2		
118	0.0001	2
8,206	0.0173	90
16,415	0.0075	1,440
Point No. 3		
97	0.0000	9
12,313	0.0206	90
24,627	0.0079	631

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT CONSOLIDATION DATA				
Project Number: 18103172.01					
Sample ID: RP-4D @ 64.5 - 67.4 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 3

GOLDER

Point No.:	1	
Normal Stress =	8,208	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
235	0.1	0.0000
1,048	0.2	-0.0002
1,596	0.3	-0.0006
2,277	0.4	-0.0008
2,995	0.5	-0.0010
3,504	0.6	-0.0011
4,059	0.7	-0.0012
4,568	0.8	-0.0013
5,034	0.9	-0.0013
5,372	1.0	-0.0012
6,891	1.5	0.0006
7,534	2.0	0.0025
7,808	2.5	0.0055
7,856	2.9	0.0078
7,727	3.5	0.0098
7,577	4.0	0.0117
7,389	4.5	0.0127
7,195	4.9	0.0133
7,225	5.4	0.0137
7,193	5.9	0.0140
7,107	6.4	0.0140
7,095	7.0	0.0140
7,194	7.5	0.0137
7,205	8.0	0.0137
7,221	8.4	0.0136
7,177	8.9	0.0136
7,164	9.4	0.0136
7,012	9.9	0.0136

Point No.:	2	
Normal Stress =	16,416	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
120	0.1	0.0000
1,364	0.2	0.0000
2,154	0.3	0.0000
3,224	0.4	-0.0002
4,151	0.5	-0.0004
5,243	0.6	-0.0006
6,229	0.7	-0.0008
7,078	0.8	-0.0008
7,890	0.9	-0.0009
8,468	1.0	-0.0009
10,865	1.5	-0.0003
12,034	2.0	0.0009
12,460	2.5	0.0020
12,481	2.9	0.0031
12,401	3.5	0.0044
12,165	4.0	0.0054
11,796	4.5	0.0063
11,553	4.9	0.0069
11,397	5.4	0.0074
11,123	5.9	0.0075
10,912	6.4	0.0076
10,722	7.0	0.0076
10,392	7.5	0.0070
10,349	8.0	0.0063
10,486	8.4	0.0059
10,486	8.9	0.0053
10,526	9.4	0.0045
10,627	9.9	0.0040

Point No.:	3	
Normal Stress =	24,624	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
528	0.1	0.0000
1,739	0.2	-0.0001
2,741	0.3	-0.0002
4,173	0.4	-0.0004
5,576	0.5	-0.0005
6,576	0.6	-0.0006
7,756	0.7	-0.0007
8,859	0.8	-0.0009
9,893	0.9	-0.0010
10,663	1.0	-0.0010
14,181	1.5	-0.0012
16,255	2.0	-0.0010
17,511	2.5	-0.0002
18,047	3.0	0.0006
18,120	3.5	0.0013
17,917	4.0	0.0020
17,815	4.5	0.0025
17,699	4.9	0.0027
17,421	5.4	0.0028
16,854	5.9	0.0026
16,772	6.4	0.0019
16,376	7.0	0.0010
16,339	7.5	0.0006
16,436	8.0	-0.0001
16,652	8.4	-0.0009
16,792	8.9	-0.0017
16,796	9.4	-0.0027
17,001	9.9	-0.0037

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	SHEAR DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 64.5 - 67.4 ft.	MAB	PRH	MK	15-Aug-2018	4

GOLDER

Project Name:					
FTN/Entergy Independence/AR	**ASTM D3080**				
Project Number:	**CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT**				
18103172.01	**SPECIMEN PHOTOGRAPH - 8,208 psf**				
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 64.5 - 67.4 ft.	MAB	PRH	MK	15-Aug-2018	5

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 16,416 psf				
Sample ID: RP-4D @ 64.5 - 67.4 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 6

GOLDER

Boring or Test Pit: --	Boring or Test Pit: --	Boring or Test Pit: --
Sample: RP-4D	Sample: RP-4D	Sample: RP-4D
Depth: 76.2-78 ft.	Depth: 76.2-78 ft.	Depth: 76.2-78 ft.
Point No.: 1	Point No.: 2	Point No.: 3

Initial			Initial			Initial		
Thickness =	1.187	in	Thickness =	1.191	in	Thickness =	1.188	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Wet Mass =	0.394	lb	Wet Mass =	0.393	lb	Wet Mass =	0.394	lb
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.83	in^3	Volume =	5.85	in^3	Volume =	5.83	in^3
Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
Dry Mass of Solids =	0.362	lb	Dry Mass of Solids =	0.361	lb	Dry Mass of Solids =	0.362	lb
Moisture Content =	8.7%		Moisture Content =	8.9%		Moisture Content =	9.1%	
Wet Unit Weight =	116.7	pcf	Wet Unit Weight =	116.2	pcf	Wet Unit Weight =	116.9	pcf
Dry Unit Weight =	107.4	pcf	Dry Unit Weight =	106.7	pcf	Dry Unit Weight =	107.1	pcf
Void Ratio =	0.57		Void Ratio =	0.58		Void Ratio =	0.57	
Percent Saturation =	41%		Percent Saturation =	42%		Percent Saturation =	43%	

Pre-Shear			Pre-Shear			Pre-Shear		
Thickness =	1.168	in	Thickness =	1.158	in	Thickness =	1.162	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.73	in^3	Volume =	5.68	in^3	Volume =	5.71	in^3
Moisture Content =	19.9%		Moisture Content =	20.3%		Moisture Content =	19.6%	
Wet Unit Weight =	130.8	pcf	Wet Unit Weight =	132.1	pcf	Wet Unit Weight =	131.0	pcf
Dry Unit Weight =	109.1	pcf	Dry Unit Weight =	109.8	pcf	Dry Unit Weight =	109.5	pcf
Void Ratio =	0.54		Void Ratio =	0.53		Void Ratio =	0.54	
Percent Saturation =	99%		Percent Saturation =	103%		Percent Saturation =	99%	

Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min
Normal Stress =	9,360	psf	Normal Stress =	18,720	psf	Normal Stress =	28,080	psf

Notes:

USCS description (ASTM D2487): Silty sand, dark grayish brown, moist

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

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 15% (ASTM D422, refer to separate report)

Specimen type: [ ] Intact [X] Reconstituted

Inundation: At seating load

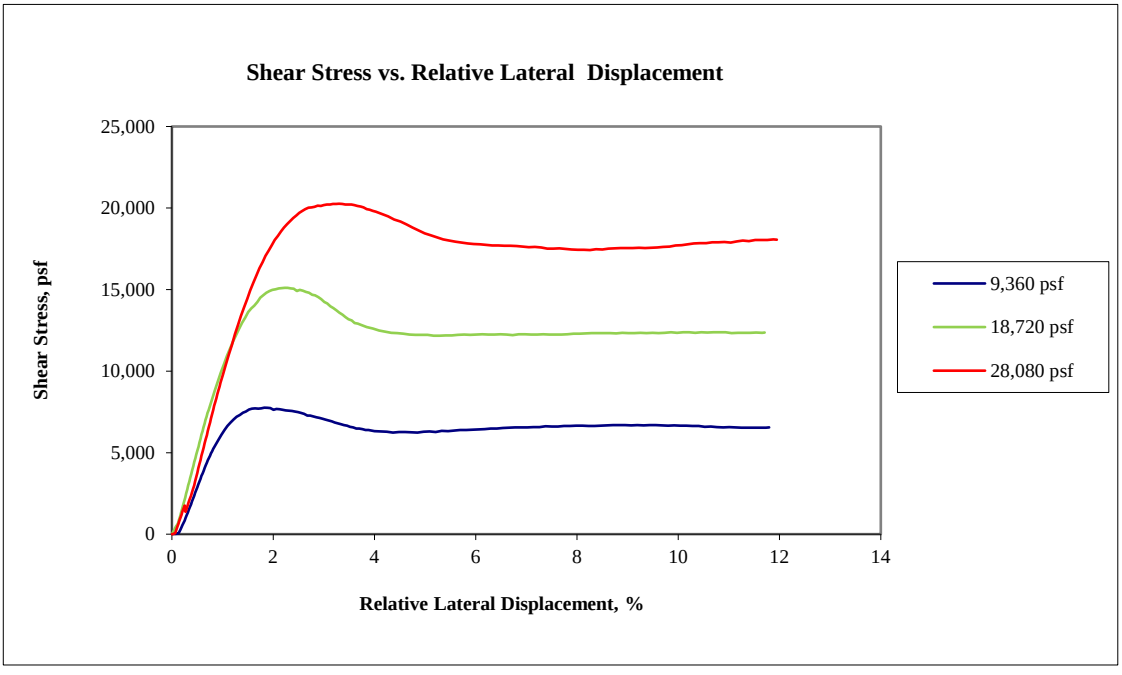
Apparatus: 2.5 -inch nominal diameter box, GeoTac automated test system, GeoJac loading system

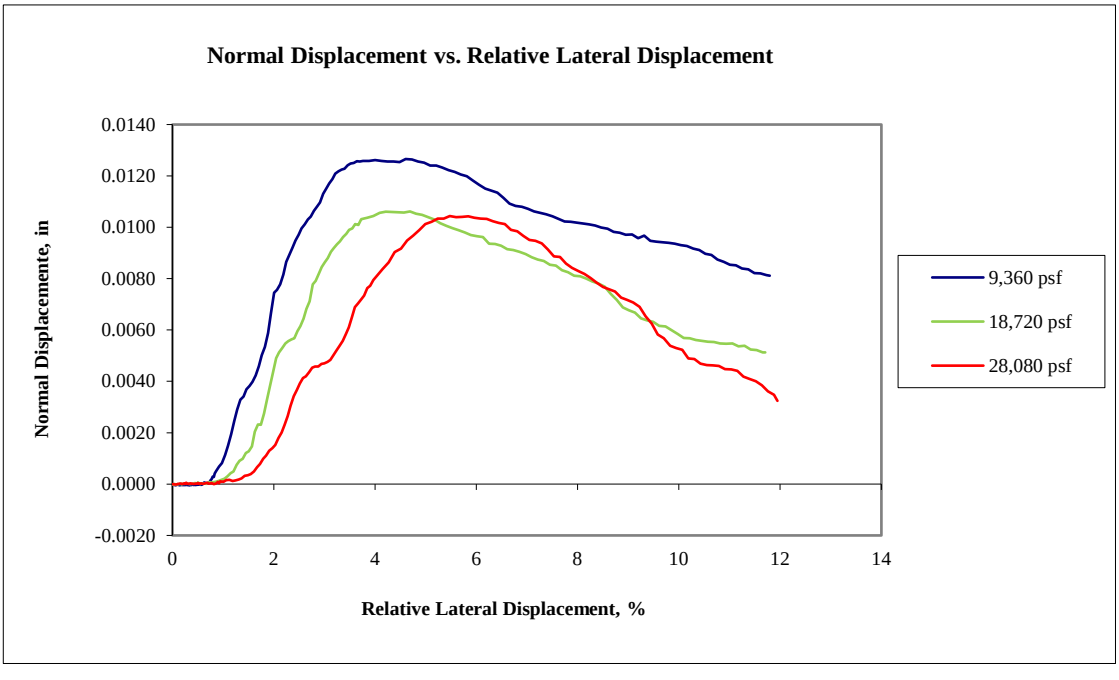
Gravel retained on the #4 sieve removed from sample prior to testing

Specimens were reconstituted at near estimated optimum moisture content using heavy compactive effort

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	SAMPLE AND TEST DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 76.2 - 78 ft.	MAB	PRH	MK	15-Aug-2018	1

GOLDER

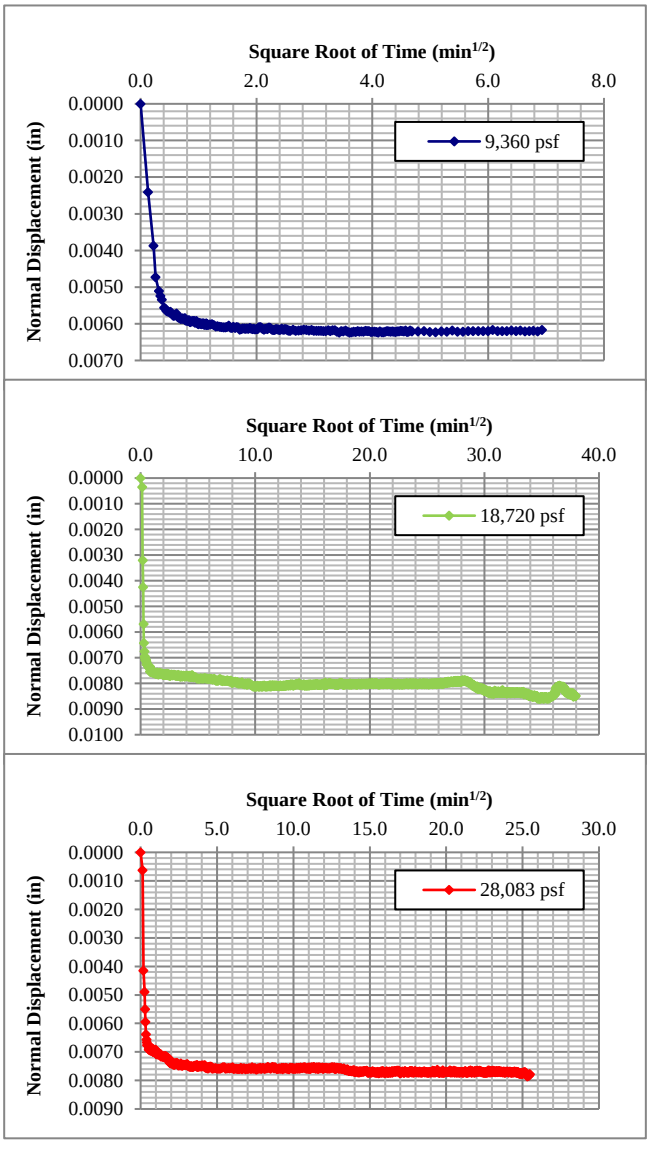




Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS					
Project Number: 18103172.01						
Sample ID: RP-4D @ 76.2 - 78 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 2	

GOLDER

Consolidation Data Used to Determine Shear Rate



Normal Stress, psf	Normal Displacement, in	Load Duration, min
Point No. 1		
101	-0.0001	5
2,161	0.0092	3
4,322	0.0037	3
9,360	0.0062	48
Point No. 2		
112	0.0001	3
4,325	0.0195	90
8,640	0.0052	90
18,720	0.0085	1,440
Point No. 3		
99	-0.0006	38
3,598	0.0088	90
7,202	0.0041	90
14,394	0.0056	90
28,083	0.0078	649

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	CONSOLIDATION DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 76.2 - 78 ft.	MAB	PRH	MK	15-Aug-2018	3

GOLDER

Point No.:	1	
Normal Stress =	9,360	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
30	0.1	0.0000
423	0.2	0.0000
1,164	0.3	0.0000
2,012	0.4	0.0000
2,707	0.5	0.0000
3,574	0.6	0.0000
4,388	0.7	0.0000
5,083	0.8	0.0003
5,448	0.9	0.0005
6,087	1.0	0.0008
7,523	1.5	0.0037
7,726	1.9	0.0067
7,490	2.5	0.0097
7,070	3.0	0.0113
6,649	3.5	0.0124
6,383	3.9	0.0126
6,260	4.5	0.0125
6,275	5.0	0.0125
6,324	5.5	0.0122
6,407	5.9	0.0118
6,478	6.4	0.0113
6,547	6.9	0.0108
6,617	7.4	0.0105
6,649	8.0	0.0102
6,653	8.5	0.0100
6,691	9.0	0.0097
6,695	9.4	0.0095
6,667	9.9	0.0094

Point No.:	2	
Normal Stress =	18,720	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
491	0.1	0.0000
1,303	0.2	0.0000
2,502	0.3	0.0000
3,695	0.4	0.0000
4,892	0.5	0.0000
6,098	0.6	0.0000
7,215	0.7	0.0000
8,222	0.8	0.0001
8,796	0.8	0.0001
9,913	1.0	0.0002
13,285	1.4	0.0012
14,980	2.0	0.0043
14,916	2.5	0.0060
14,419	2.9	0.0084
13,177	3.5	0.0099
12,604	4.0	0.0104
12,336	4.4	0.0106
12,226	4.9	0.0105
12,189	5.4	0.0101
12,222	5.9	0.0097
12,252	6.5	0.0093
12,266	7.0	0.0090
12,240	7.5	0.0085
12,287	7.9	0.0081
12,330	8.4	0.0078
12,349	8.9	0.0069
12,347	9.5	0.0063
12,353	10.0	0.0058

Point No.:	3	
Normal Stress =	28,080	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
223	0.1	0.0000
1,186	0.2	0.0000
1,584	0.3	0.0000
2,554	0.4	0.0000
3,507	0.5	0.0000
4,809	0.6	0.0000
6,072	0.7	0.0001
7,358	0.8	0.0000
8,582	0.9	0.0001
9,512	1.0	0.0001
14,438	1.5	0.0003
17,731	2.0	0.0014
19,548	2.5	0.0037
20,126	2.9	0.0047
20,217	3.5	0.0061
19,831	4.0	0.0080
19,296	4.4	0.0090
18,451	5.0	0.0101
18,006	5.5	0.0104
17,791	6.0	0.0104
17,711	6.4	0.0102
17,640	6.9	0.0097
17,504	7.4	0.0091
17,453	7.9	0.0084
17,463	8.5	0.0077
17,546	9.0	0.0072
17,570	9.5	0.0063
17,701	9.9	0.0053

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	SHEAR DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 76.2 - 78 ft.	MAB	PRH	MK	15-Aug-2018	4

GOLDER

Project Name:					
FTN/Entergy Independence/AR	**ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **SPECIMEN PHOTOGRAPH - 9,360 psf**				
Project Number:					
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-4D @ 76.2 - 78 ft.	MAB	PRH	MK	15-Aug-2018	5

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 18,720 psf				
Sample ID: RP-4D @ 76.2 - 78 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 6

GOLDER

Project Name: FTN/Entergy Independence/AR	ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SPECIMEN PHOTOGRAPH - 28,080 psf				
Project Number: 18103172.01					
Sample ID: RP-4D @ 76.2 - 78 ft.	Technician: MAB	Checked: PRH	Reviewed: MK	Date: 15-Aug-2018	Figure: 7

GOLDER

Boring or Test Pit: --	Boring or Test Pit: --	Boring or Test Pit: --
Sample: RP-5	Sample: RP-5	Sample: RP-5
Depth: 27-28 ft.	Depth: 27-28 ft.	Depth: 27-28 ft.
Point No.: 1	Point No.: 2	Point No.: 3

Initial			Initial			Initial		
Thickness =	1.169	in	Thickness =	1.170	in	Thickness =	1.185	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Wet Mass =	0.390	lb	Wet Mass =	0.390	lb	Wet Mass =	0.395	lb
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.74	in^3	Volume =	5.74	in^3	Volume =	5.82	in^3
Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
Dry Mass of Solids =	0.369	lb	Dry Mass of Solids =	0.369	lb	Dry Mass of Solids =	0.373	lb
Moisture Content =	5.6%		Moisture Content =	5.7%		Moisture Content =	5.7%	
Wet Unit Weight =	117.4	pcf	Wet Unit Weight =	117.3	pcf	Wet Unit Weight =	117.2	pcf
Dry Unit Weight =	111.1	pcf	Dry Unit Weight =	111.0	pcf	Dry Unit Weight =	110.9	pcf
Void Ratio =	0.51		Void Ratio =	0.52		Void Ratio =	0.52	
Percent Saturation =	29%		Percent Saturation =	30%		Percent Saturation =	30%	

Pre-Shear			Pre-Shear			Pre-Shear		
Thickness =	1.156	in	Thickness =	1.155	in	Thickness =	1.172	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.68	in^3	Volume =	5.67	in^3	Volume =	5.75	in^3
Moisture Content =	16.7%		Moisture Content =	17.9%		Moisture Content =	16.9%	
Wet Unit Weight =	131.1	pcf	Wet Unit Weight =	132.5	pcf	Wet Unit Weight =	131.1	pcf
Dry Unit Weight =	112.4	pcf	Dry Unit Weight =	112.4	pcf	Dry Unit Weight =	112.2	pcf
Void Ratio =	0.50		Void Ratio =	0.50		Void Ratio =	0.50	
Percent Saturation =	91%		Percent Saturation =	97%		Percent Saturation =	91%	

Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min
Normal Stress =	3,312	psf	Normal Stress =	6,624	psf	Normal Stress =	9,936	psf

Notes:

USCS description (ASTM D2487): Poorly graded sand with silt and gravel, dark yellowish brown, moist

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

Percent finer: 3/4 in. = 100% No. 4 = 79% No. 200 = 8% (ASTM D422, refer to separate report)

Specimen type: [ ] Intact [X] Reconstituted

Inundation: At seating load

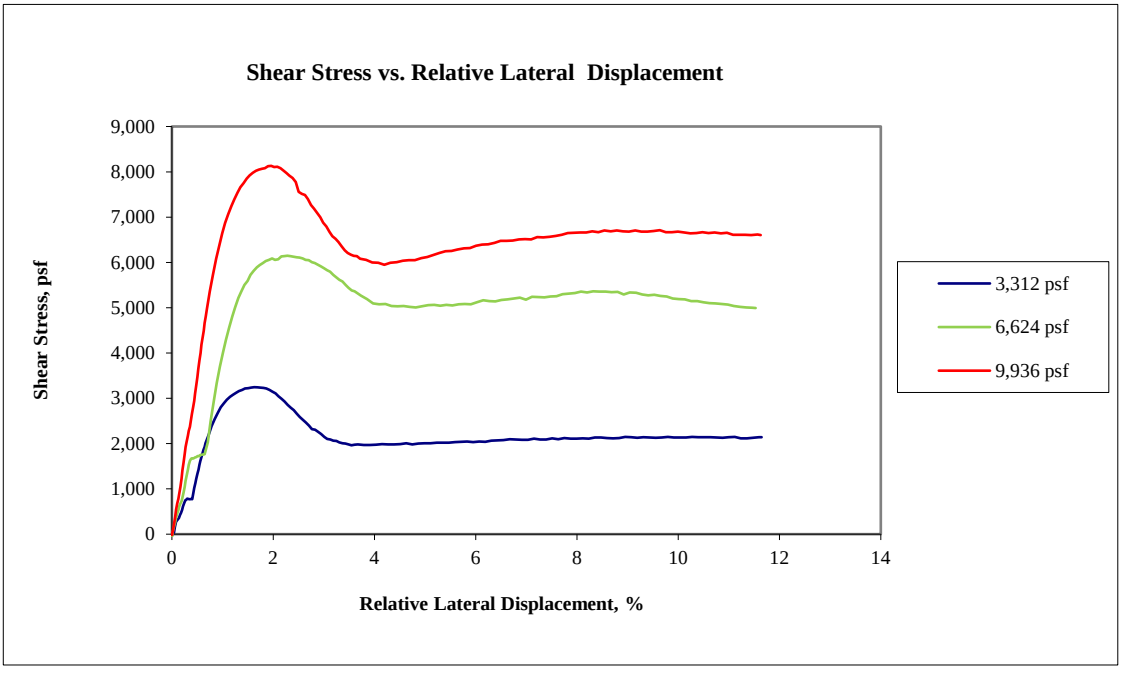
Apparatus: 2.5 -inch nominal diameter box, GeoTac automated test system, GeoJac loading system

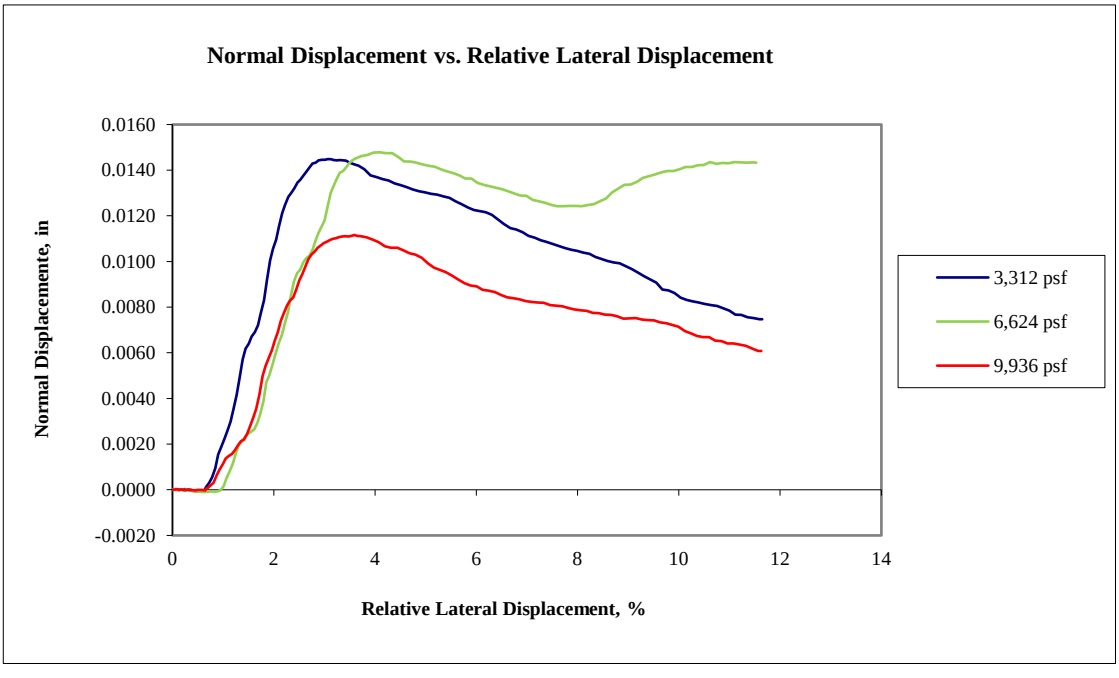
Gravel retained on the #4 sieve removed from sample prior to testing

Specimens were reconstituted at near estimated optimum moisture content using heavy compactive effort

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	SAMPLE AND TEST DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-5 @ 27 - 28 ft.	MAB	PRH	MK	15-Aug-2018	1

GOLDER

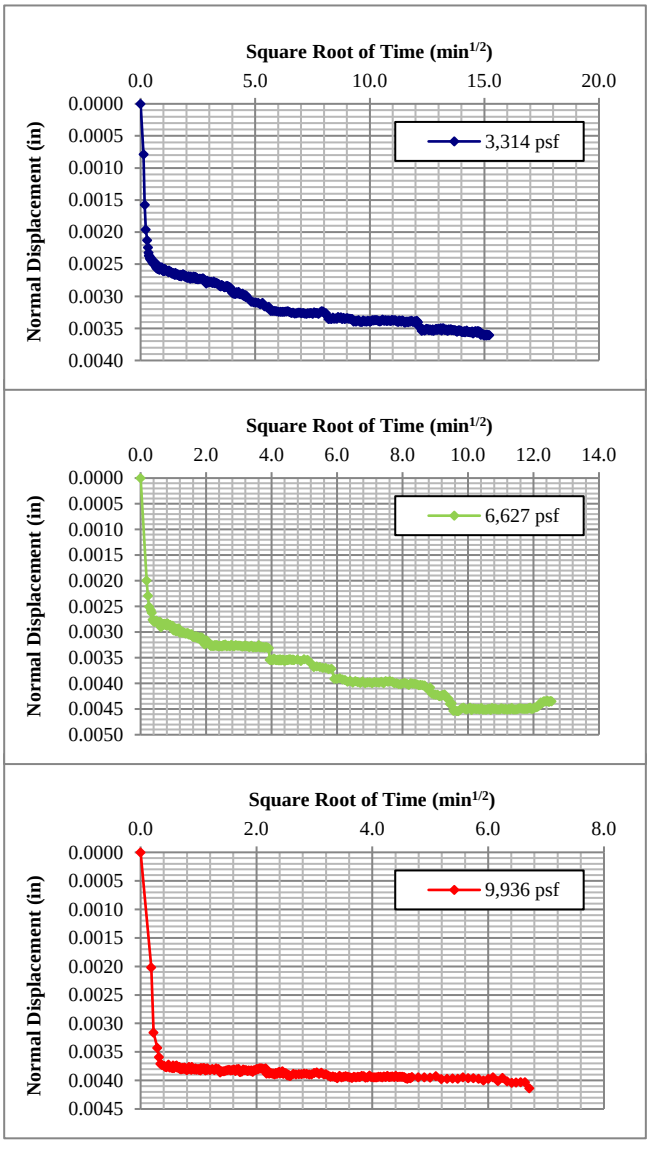




Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS				
Project Number: 18103172.01					
Sample ID: RP-5 @ 27 - 28 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 2

GOLDER

Consolidation Data Used to Determine Shear Rate



Normal Stress, psf	Normal Displacement, in	Load Duration, min
Point No. 1		
124	0.0000	2
1,653	0.0091	7
3,314	0.0036	231
Point No. 2		
103	0.0002	1
3,311	0.0102	5
6,627	0.0043	158
Point No. 3		
97	0.0001	2
4,969	0.0089	8
9,936	0.0041	45

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT CONSOLIDATION DATA				
Project Number: 18103172.01					
Sample ID: RP-5 @ 27 - 28 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 3

GOLDER

Point No.:	1	
Normal Stress =	3,312	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
275	0.1	0.0000
468	0.2	0.0000
762	0.3	0.0000
777	0.4	0.0000
1,226	0.5	-0.0001
1,704	0.6	-0.0001
2,007	0.7	0.0001
2,381	0.8	0.0005
2,541	0.8	0.0009
2,803	1.0	0.0019
3,216	1.4	0.0062
3,144	2.0	0.0106
2,654	2.5	0.0135
2,211	2.9	0.0145
1,981	3.5	0.0143
1,969	3.9	0.0138
1,983	4.4	0.0134
2,007	5.0	0.0130
2,022	5.5	0.0128
2,035	6.0	0.0123
2,073	6.4	0.0118
2,083	6.9	0.0113
2,090	7.4	0.0109
2,111	8.0	0.0105
2,137	8.5	0.0101
2,144	9.0	0.0098
2,134	9.4	0.0092
2,137	9.9	0.0086

Point No.:	2	
Normal Stress =	6,624	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
364	0.1	0.0000
729	0.2	0.0000
1,303	0.3	0.0000
1,676	0.4	-0.0001
1,699	0.5	-0.0001
1,752	0.6	-0.0001
1,768	0.6	-0.0001
2,501	0.8	-0.0001
3,335	0.9	-0.0001
3,701	0.9	0.0000
5,593	1.5	0.0025
6,086	2.0	0.0055
6,113	2.5	0.0095
5,907	2.9	0.0115
5,435	3.5	0.0143
5,093	4.0	0.0148
5,028	4.5	0.0146
5,033	4.9	0.0143
5,062	5.4	0.0140
5,074	5.9	0.0136
5,141	6.4	0.0132
5,178	7.0	0.0129
5,244	7.5	0.0125
5,322	8.0	0.0124
5,356	8.4	0.0126
5,293	8.9	0.0134
5,272	9.4	0.0137
5,202	9.9	0.0140

Point No.:	3	
Normal Stress =	9,936	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
540	0.1	0.0000
1,224	0.2	0.0000
2,053	0.3	0.0000
2,658	0.4	0.0000
3,286	0.5	0.0000
4,183	0.6	0.0000
4,971	0.7	0.0001
5,360	0.8	0.0002
6,084	0.9	0.0006
6,641	1.0	0.0011
7,848	1.5	0.0025
8,131	2.0	0.0061
7,772	2.4	0.0088
6,877	3.0	0.0108
6,206	3.5	0.0111
5,996	4.0	0.0110
6,001	4.4	0.0106
6,094	4.9	0.0102
6,243	5.4	0.0095
6,317	5.9	0.0089
6,472	6.5	0.0085
6,513	7.0	0.0083
6,563	7.5	0.0081
6,652	7.9	0.0079
6,668	8.4	0.0077
6,685	8.9	0.0075
6,677	9.4	0.0074
6,677	10.0	0.0071

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	SHEAR DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-5 @ 27 - 28 ft.	MAB	PRH	MK	15-Aug-2018	4

GOLDER

Project Name:		ASTM D3080				
FTN/Entergy Independence/AR		CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:						
18103172.01		SPECIMEN PHOTOGRAPH - 3,312 psf				
Sample ID:	Technician:	Checked:	Reviewed:	Date:	Figure:	
RP-5 @ 27 - 28 ft.	MAB	PRH	MK	15-Aug-2018	5	

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 6,624 psf				
Sample ID: RP-5 @ 27 - 28 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 6

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 9,936 psf				
Sample ID: RP-5 @ 27 - 28 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 7

GOLDER

Boring or Test Pit: --	Boring or Test Pit: --	Boring or Test Pit: --
Sample: RP-8D	Sample: RP-8D	Sample: RP-8D
Depth: 53-60 ft.	Depth: 53-60 ft.	Depth: 53-60 ft.
Point No.: 1	Point No.: 2	Point No.: 3

Initial			**Initial**			**Initial**		
Thickness =	1.191	in	Thickness =	1.189	in	Thickness =	1.186	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Wet Mass =	0.410	lb	Wet Mass =	0.409	lb	Wet Mass =	0.409	lb
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.85	in^3	Volume =	5.84	in^3	Volume =	5.82	in^3
Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
Dry Mass of Solids =	0.395	lb	Dry Mass of Solids =	0.394	lb	Dry Mass of Solids =	0.394	lb
Moisture Content =	3.7%		Moisture Content =	3.9%		Moisture Content =	3.8%	
Wet Unit Weight =	121.2	pcf	Wet Unit Weight =	121.2	pcf	Wet Unit Weight =	121.3	pcf
Dry Unit Weight =	116.9	pcf	Dry Unit Weight =	116.6	pcf	Dry Unit Weight =	116.9	pcf
Void Ratio =	0.44		Void Ratio =	0.44		Void Ratio =	0.44	
Percent Saturation =	23%		Percent Saturation =	24%		Percent Saturation =	23%	

Pre-Shear			**Pre-Shear**			**Pre-Shear**		
Thickness =	1.173	in	Thickness =	1.170	in	Thickness =	1.162	in
Diameter =	2.50	in	Diameter =	2.50	in	Diameter =	2.50	in
Area =	4.91	in^2	Area =	4.91	in^2	Area =	4.91	in^2
Volume =	5.76	in^3	Volume =	5.74	in^3	Volume =	5.71	in^3
Moisture Content =	12.9%		Moisture Content =	12.0%		Moisture Content =	12.9%	
Wet Unit Weight =	134.0	pcf	Wet Unit Weight =	132.8	pcf	Wet Unit Weight =	134.6	pcf
Dry Unit Weight =	118.7	pcf	Dry Unit Weight =	118.5	pcf	Dry Unit Weight =	119.3	pcf
Void Ratio =	0.42		Void Ratio =	0.42		Void Ratio =	0.41	
Percent Saturation =	83%		Percent Saturation =	77%		Percent Saturation =	85%	

Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min	Shear Rate =	0.0033	in/min
Normal Stress =	7,200	psf	Normal Stress =	14,400	psf	Normal Stress =	21,600	psf

Notes:

USCS description (ASTM D2487): Poorly graded sand with silt, brownish yellow, moist

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

Percent finer: 3/4 in. = 98% No. 4 = 91% No. 200 = 7% (ASTM D422, refer to separate report)

Specimen type: [ ] Intact [X] Reconstituted

Inundation: At seating load

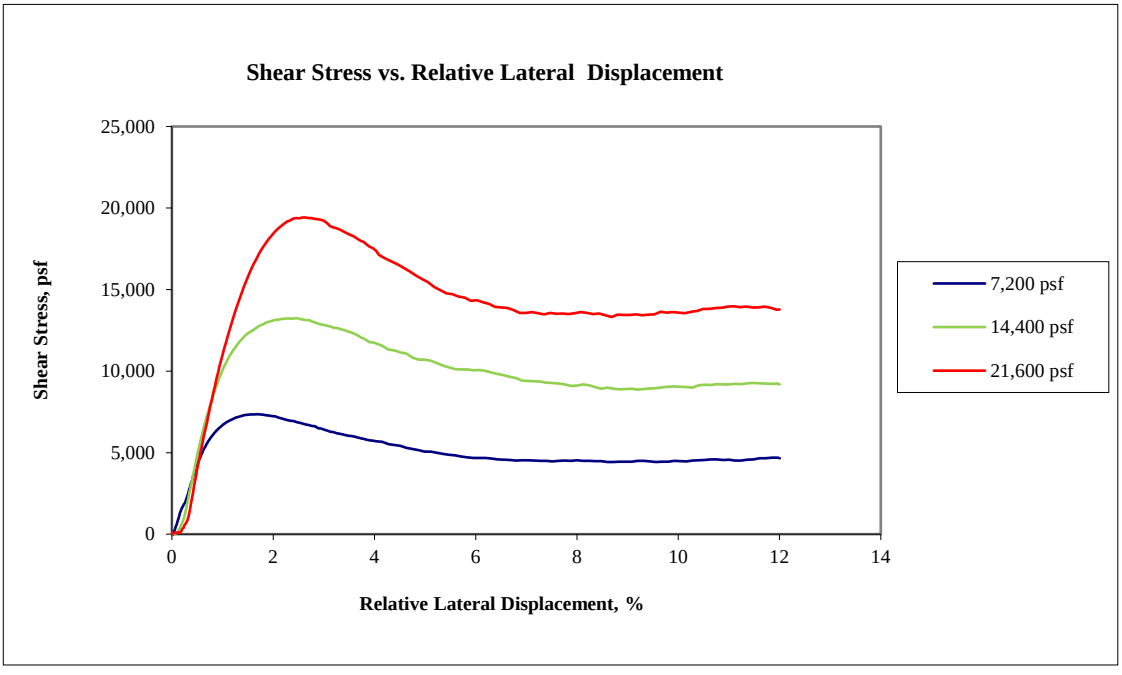
Apparatus: 2.5 -inch nominal diameter box, GeoTac automated test system, GeoJac loading system

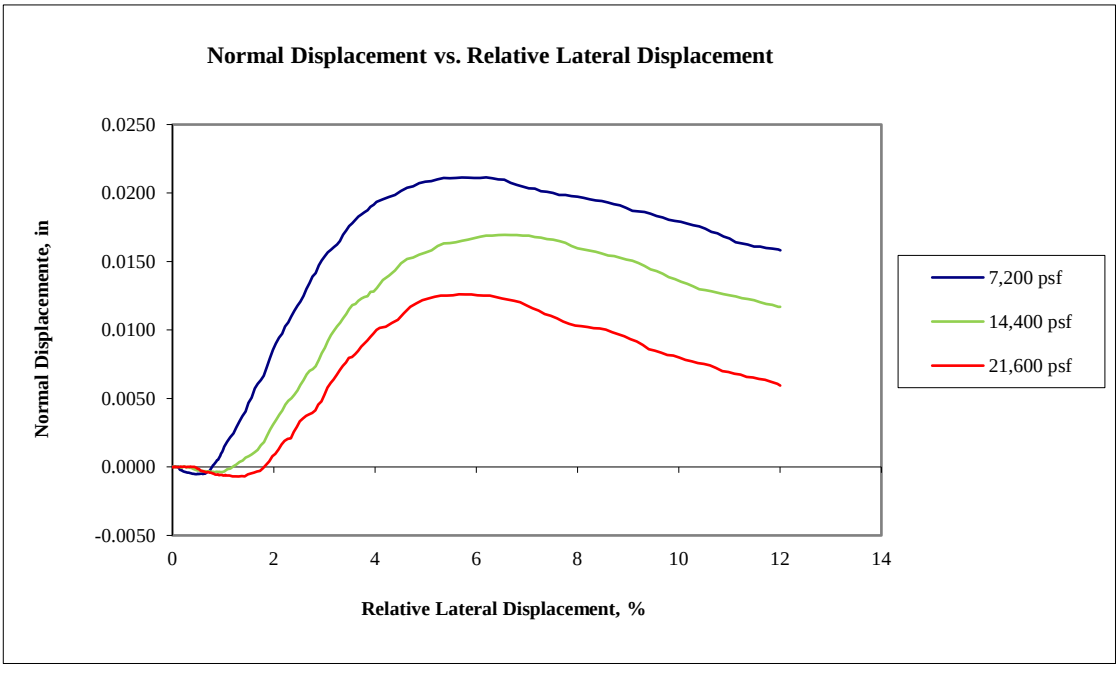
Gravel retained on the #4 sieve removed from sample prior to testing

Specimens were reconstituted at near estimated optimum moisture content using heavy compactive effort

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SAMPLE AND TEST DATA				
Project Number: 18103172.01					
Sample ID: RP-8D @ 53 - 60 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 1

GOLDER

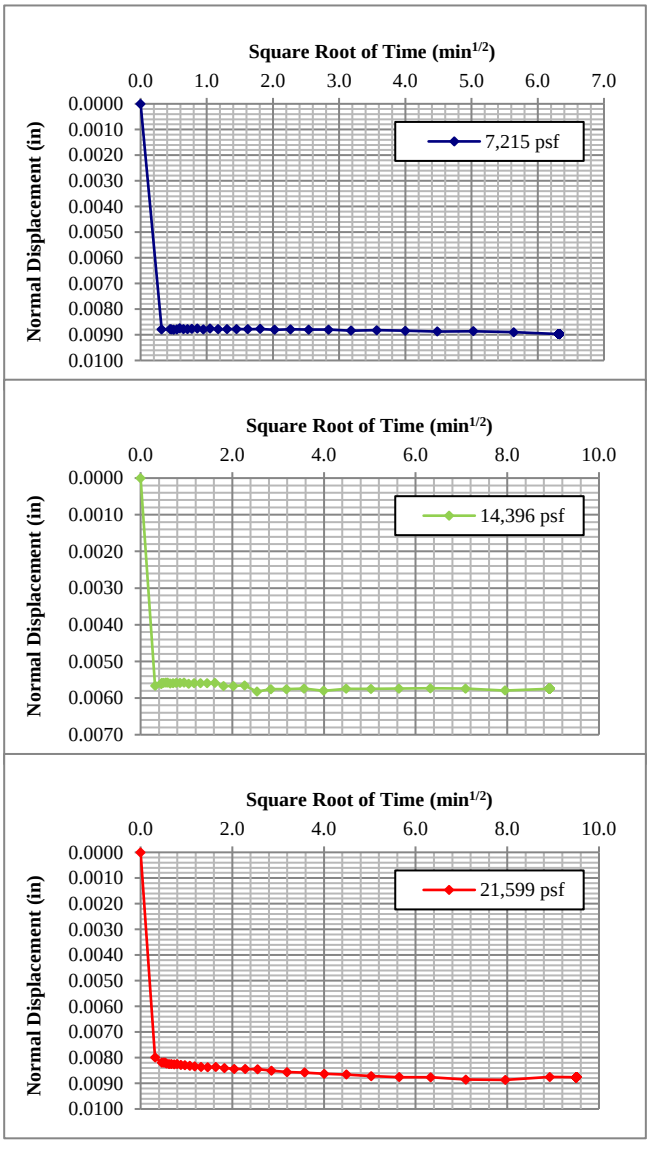




Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS				
Project Number: 18103172.01					
Sample ID: RP-8D @ 53 - 60 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 2

GOLDER

Consolidation Data Used to Determine Shear Rate



Normal Stress, psf	Normal Displacement, in	Load Duration, min
Point No. 1		
108	0.0003	4
1,447	0.0090	15
7,215	0.0090	40
Point No. 2		
116	0.0000	1
1,439	0.0046	2
7,197	0.0086	15
14,396	0.0057	80
Point No. 3		
105	0.0000	1
10,805	0.0148	2
21,599	0.0088	90

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT CONSOLIDATION DATA				
Project Number: 18103172.01					
Sample ID: RP-8D @ 53 - 60 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 3

GOLDER

Point No.:	1	
Normal Stress =	7,200	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
638	0.1	0.0000
1,592	0.2	-0.0003
2,291	0.3	-0.0004
3,332	0.4	-0.0005
4,079	0.5	-0.0005
4,860	0.6	-0.0005
5,505	0.7	-0.0004
5,980	0.8	0.0000
6,346	0.9	0.0005
6,636	1.0	0.0011
7,316	1.4	0.0041
7,238	2.0	0.0086
6,871	2.5	0.0118
6,480	2.9	0.0151
6,037	3.5	0.0176
5,729	4.0	0.0192
5,469	4.4	0.0199
5,059	5.0	0.0208
4,870	5.5	0.0211
4,666	6.0	0.0211
4,589	6.4	0.0210
4,538	6.9	0.0205
4,493	7.4	0.0201
4,530	8.0	0.0197
4,477	8.5	0.0194
4,438	9.0	0.0189
4,470	9.4	0.0185
4,491	9.9	0.0180

Point No.:	2	
Normal Stress =	14,400	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
60	0.1	0.0000
683	0.2	0.0000
1,540	0.3	0.0000
3,330	0.4	-0.0001
4,533	0.5	-0.0002
5,943	0.6	-0.0003
7,154	0.7	-0.0004
8,196	0.8	-0.0004
9,104	0.9	-0.0003
9,939	1.0	-0.0004
12,176	1.4	0.0007
13,085	2.0	0.0031
13,247	2.5	0.0056
12,865	2.9	0.0083
12,418	3.5	0.0115
11,763	4.0	0.0128
11,264	4.4	0.0143
10,710	5.0	0.0156
10,229	5.5	0.0163
10,043	6.0	0.0167
9,819	6.4	0.0169
9,417	6.9	0.0169
9,284	7.4	0.0166
9,115	8.0	0.0160
8,924	8.5	0.0156
8,893	9.0	0.0151
8,929	9.4	0.0144
9,053	9.9	0.0137

Point No.:	3	
Normal Stress =	21,600	psf
Shear Rate =	0.0033	in/min

Shear Stress	Relative Lateral Displacement	Normal Displacement
psf	%	in
100	0.1	0.0000
177	0.2	0.0000
771	0.3	0.0000
2,172	0.4	0.0000
3,625	0.5	-0.0001
5,295	0.6	-0.0003
6,825	0.7	-0.0004
8,301	0.8	-0.0005
9,731	0.9	-0.0005
10,784	1.0	-0.0006
15,681	1.5	-0.0005
18,319	2.0	0.0008
19,377	2.5	0.0029
19,284	2.9	0.0048
18,414	3.5	0.0080
17,547	4.0	0.0097
16,563	4.5	0.0107
15,651	4.9	0.0122
14,773	5.4	0.0125
14,313	5.9	0.0126
13,941	6.4	0.0124
13,567	7.0	0.0118
13,561	7.5	0.0110
13,548	8.0	0.0103
13,536	8.4	0.0101
13,451	8.9	0.0095
13,462	9.4	0.0086
13,618	9.9	0.0081

Project Name:	ASTM D3080				
FTN/Entergy Independence/AR	CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number:	SHEAR DATA				
18103172.01					
Sample ID:	**Technician:**	**Checked:**	**Reviewed:**	**Date:**	**Figure:**
RP-8D @ 53 - 60 ft.	MAB	PRH	MK	15-Aug-2018	4

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 7,200 psf				
Sample ID: RP-8D @ 53 - 60 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 5

GOLDER

Project Name: FTN/Entergy Independence/AR	**ASTM D3080** CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT				
Project Number: 18103172.01	SPECIMEN PHOTOGRAPH - 14,400 psf				
Sample ID: RP-8D @ 53 - 60 ft.	**Technician:** MAB	**Checked:** PRH	**Reviewed:** MK	**Date:** 15-Aug-2018	**Figure:** 6

GOLDER

Project Name: FTN/Entergy Independence/AR	ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SPECIMEN PHOTOGRAPH - 21,600 psf				
Project Number: 18103172.01					
Sample ID: RP-8D @ 53 - 60 ft.	Technician: MAB	Checked: PRH	Reviewed: MK	Date: 15-Aug-2018	Figure: 7

JUNE 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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'	SC-SM	10.8	19	13	6	-0.31	96.7	35.5	19.0	-	-	-	-	-	-	-
B-1	UD	10.0-12.0'	ML	31.3	44	29	15	0.16	100.0	98.3	40.2	-	-	-	31.3	89.6	1.2E-08	-
B-1	UD	20.0-22.0'	CH	39.1	68	23	45	0.37	100.0	96.1	57.2	-	-	2.71	39.1	81.6	-	T-CU w/pp
B-1	UD	28.0-30.0'	CH		50	27	23		100.0	99.7	49.8	-	-					T-CU w/pp
B-2	UD	8.0-10.0'	CH	26.3	55	21	34	0.16	100.0	96.2	39.7	-	-	2.72	26.3	95.3	-	T-CU w/pp
B-3	UD	3.0-5.0'	ML	42.9	NP	NP	NP	NP	100.0	52.8	16.5	-	-	-	-	-	-	-
B-3	UD	10.0-12.0'	CL	30.1	45	20	25	0.41	98.2	97.2	30.9	-	-	-	30.1	91.4	1.1E-06	-
B-4	UD	5.0-7.0'	CL	23.2	35	15	20	0.40	100.0	96.5	45.0	-	-	-	23.2	103.1	4.9E-06	
B-4	UD	20.0-22.0'	CL	27.4	35	20	15	0.51	100.0	91.9	25.0	-	-	-	27.4	94.9	1.1E-06	
B-5	UD	3.0-5.0'	CL	19.0	38	16	22	0.13	98.6	89.6	34.0	-	-	2.69	19.0	108.7	-	T-CU w/pp
RP-8	UD	8.0-10.0'	CL	24.6	49	24	25	0.04	100.0	95.6	43.1	-	-	-	24.6	98.5	3.4E-08	-
PZ-1	UD	5.0-7.0'	CL	22.8	43	24	19	-0.04	100.0	95.1	51.0	-	-	-	22.8	102.9	3.0E-08	-
PZ-1	UD	10.0-12.0'	CL	30.9	46	19	27	0.45	100.0	97.1	42.0	-	-	2.72	30.9	91.1	-	T-CU w/pp
PZ-1	UD	15.0-17.0'	CL	28.9	38	17	21	0.56	100.0	97.0	35.0	-	-	2.78	28.9	95.2	-	T-CU w/pp

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

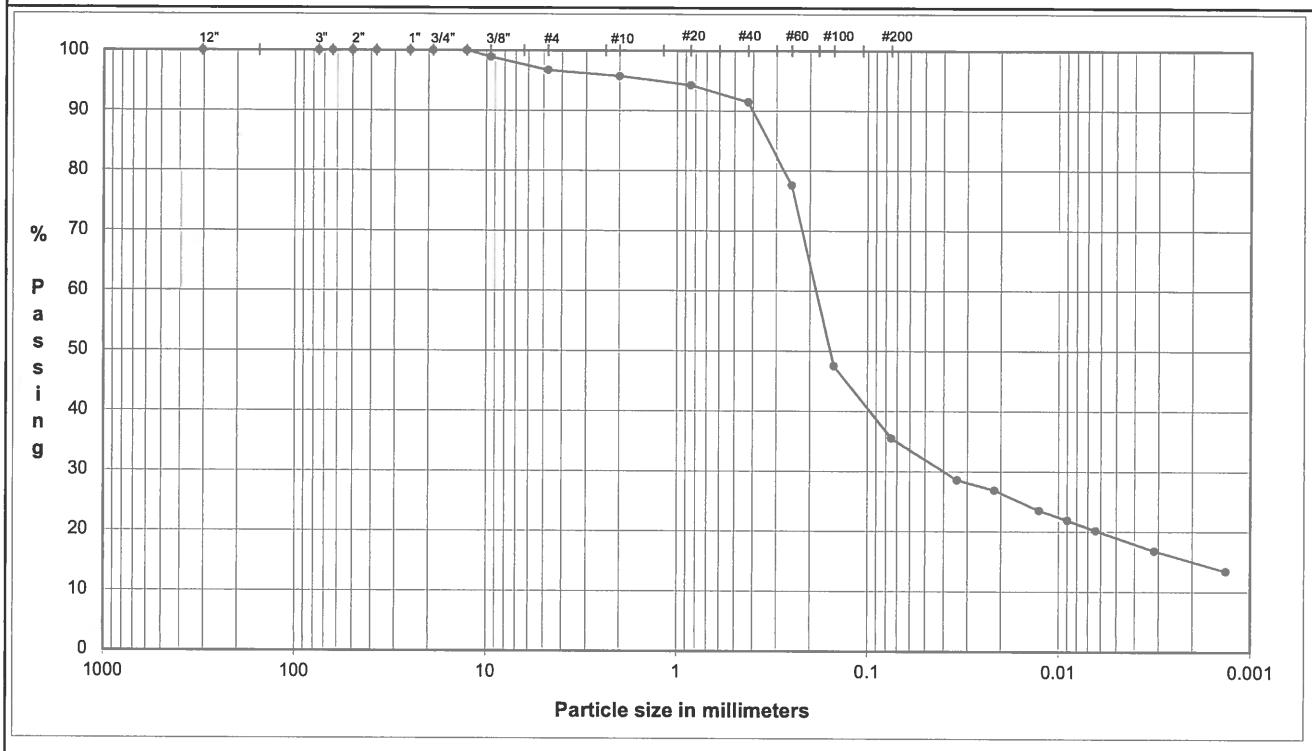
NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

AUGUST 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

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



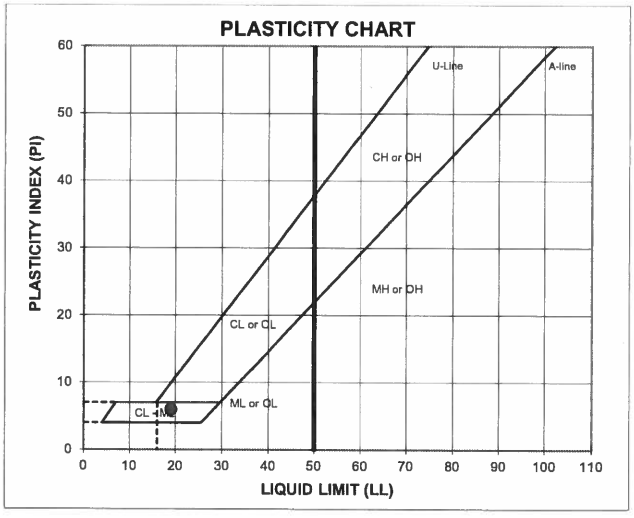
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

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	98.9		
#4	4.8	96.7	Fine Gravel	3.3
#10	2.00	95.7	Coarse Sand	1.0
#20	0.85	94.3		
#40	0.43	91.4	Medium Sand	4.3
#60	0.25	77.6		
#100	0.15	47.6		
#200	0.075	35.5	Fine Sand	55.9

Hydrometer Analysis

(mm)	%Finer		
0.034	28.6		
0.022	26.9		
0.013	23.5	Fines	
0.0090	21.9	Silt or Clay	35.5
0.0064	20.2		
0.0032	16.8		
0.0013	13.5		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
10.8	19	13	6	-0.31

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

DESCRIPTION: SILTY CLAYEY to CLAYEY SILT and SAND, fine to coarse, trace fine gravel; grayish brown.

USCS: SC-SM

TECH	TJ/HH
DATE	8/9/18
CHECK	
REVIEW	
APPROVE	

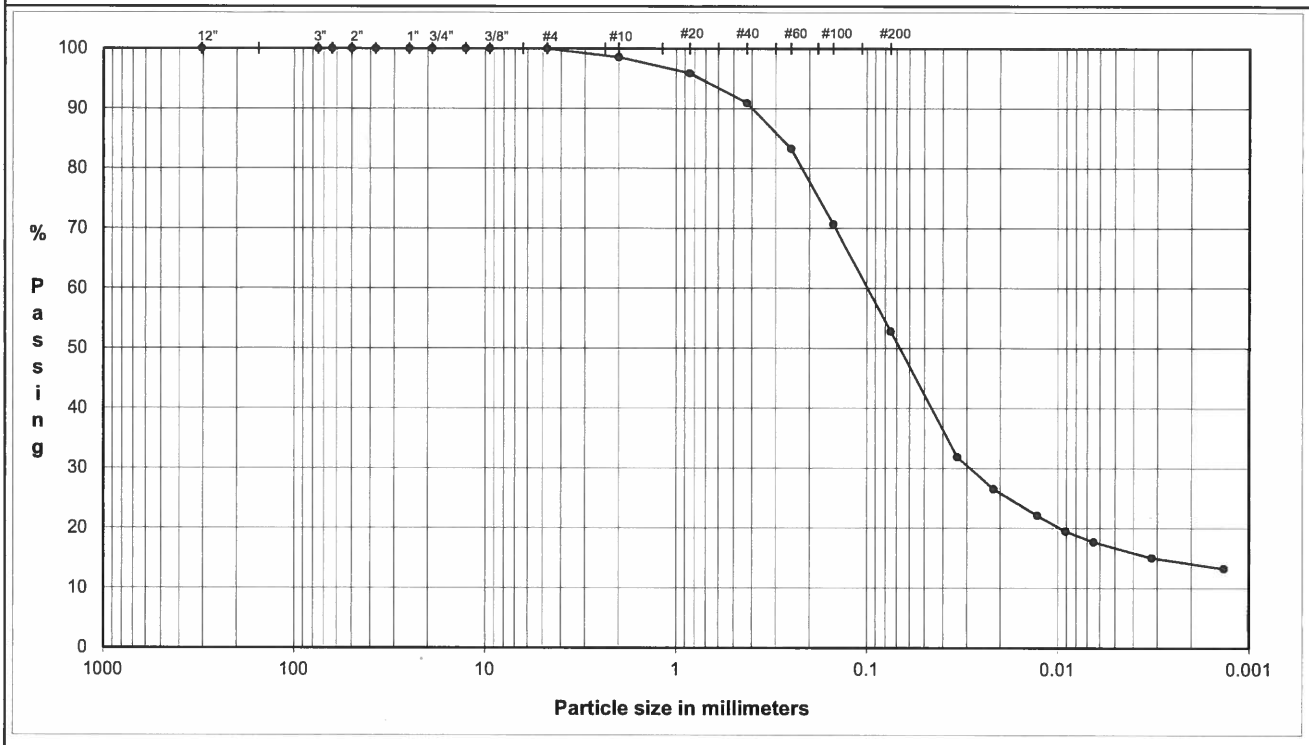
Golder Associates Inc.

AUGUST 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-3** - Depth: **3.0-5.0'**
TYPE: **UD**



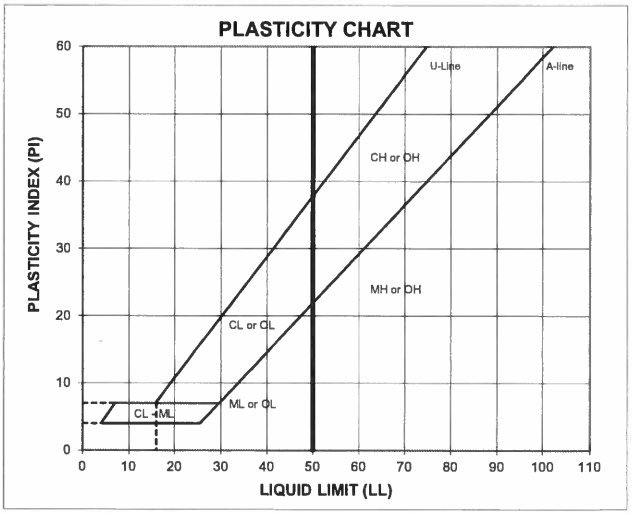
COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

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	**98.5**	Coarse Sand	**1.5**
#20	0.85	**95.9**		
#40	0.43	**90.9**	Medium Sand	**7.6**
#60	0.25	**83.3**		
#100	0.15	**70.7**		
#200	0.075	**52.8**	Fine Sand	**38.1**

Hydrometer Analysis

(mm)	%Finer		
0.034	**31.8**		
0.022	**26.5**		
0.013	**22.1**	Fines	
0.0091	**19.5**	Silt or Clay	**52.8**
0.0065	**17.7**		
0.0032	**15.0**		
0.0013	**13.3**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
42.9	**NP**	**NP**	**NP**	**NP**

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

DESCRIPTION: SILT and SAND, fine to coarse; grayish brown.

USCS: ML

TECH	TJ/HH/BA
DATE	8/9/18
CHECK	DA
REVIEW	Tcurl
APPROVE	

GOLDER

08 August 2018 Project No. 18103172

Dana Derrington, PE, PG
FTN Associates, Ltd.
13990 Olive Blvd.
Suite 203
Chesterfield, MO 63017

LABORATORY TEST RESULTS FOR FTN ASSOCIATES, LTD PROJECT – ENERGY INDEPENDENCE

Dear Ms. Derrington,

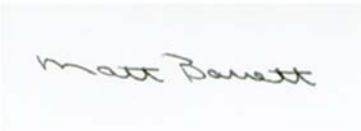
Golder Associates Inc. (Golder) has prepared this report to present the results of geotechnical laboratory testing conducted on samples submitted by FTN Associates, LTD. for the Energy Independence project. The samples were tested at Golder's Geotechnical Laboratory in Lakewood, Colorado. This report presents a summary table and the results of index testing (USCS soil classification, Atterberg Limits, and grain size distribution) on the following Samples:

- "RP-4D @ 38-39 ft."
- "RP-4D @ 64.5-67.4 ft."
- "RP-4D @ 76.2-78 ft."
- "RP-5 @ 27-28 ft."
- "RP-8D @ 53-60 ft."

All pending test results will be sent when completed. Thank you for the opportunity to provide these laboratory testing services and we look forward to assisting you on any future projects.

Should you have any questions or comments, please do not hesitate to call.

Golder Associates Inc.



Matt Barrett
Geotechnical Lab Manager

MJB/mjb

CC: file

Attachments (6 Pages)

ATTACHMENTS

TABLE 1
FTN/ENERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

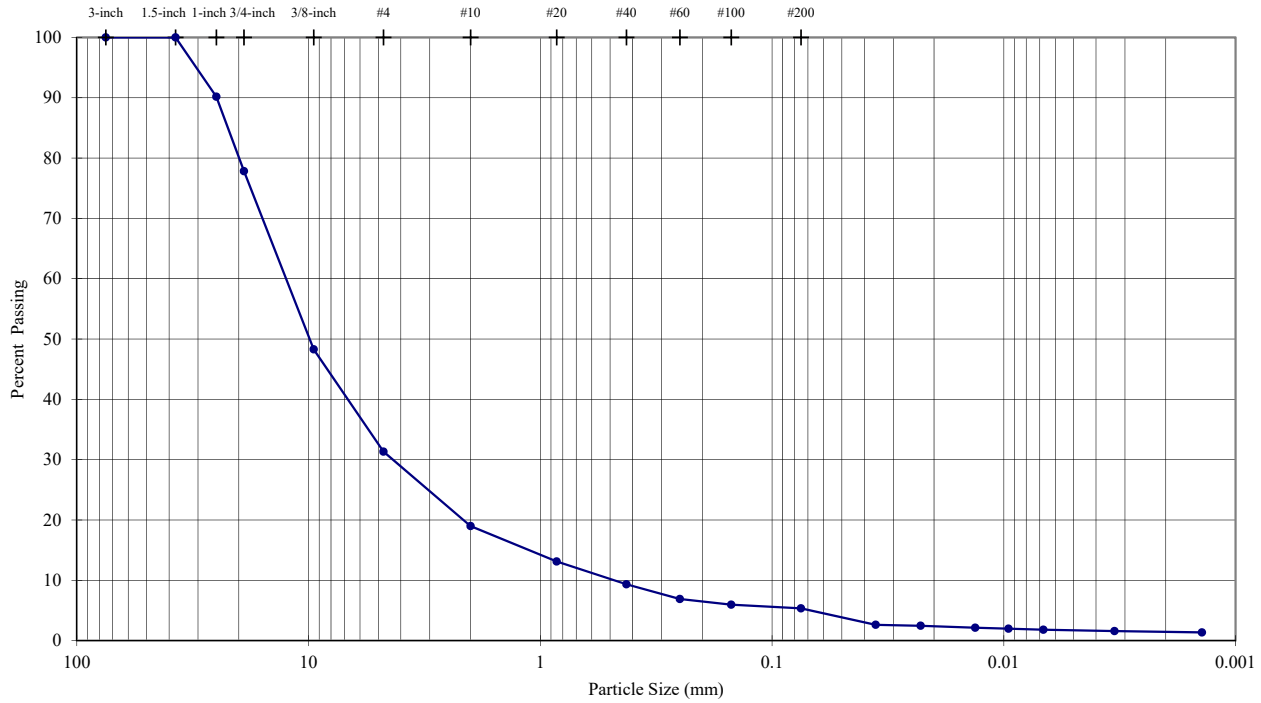
Sample Type	Sample Identification	Sample Depth (ft.)	USCS Soil Classification	Delivered Moisture (%)	Atterberg Limits			Grain Size Distribution			Specific Gravity	Moisture/Density Relationship Standard Proctor		Additional Tests Comments (See Notes)
					LL	PL	PI	% Finer 3/4"	% Finer #4	% Finer #200		Dry Density (pcf)	Moisture (%)	
B	RP-4D	38-39	GP-GM	--	NP	NP	NP	78	31	5	--	--	--	DS
B	RP-4D	64.5-67.4	SP	--	NP	NP	NP	100	97	4	--	--	--	DS
B	RP-4D	76.2-78	SM	--	NP	NP	NP	100	100	15	--	--	--	DS
B	RP-5	27-28	SP-SM	--	NP	NP	NP	100	79	8	--	--	--	DS
B	RP-8D	53-60	SP-SM	--	NP	NP	NP	98	91	7	--	--	--	DS

NOTES:
LL= LIQUID LIMIT
PL= PLASTIC LIMIT
PI= PLASTIC INDEX
SL= SHRINKAGE LIMIT
UW= UNIT WEIGHT
T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
PERM = PERMEABILITY

August-18 **18103172**

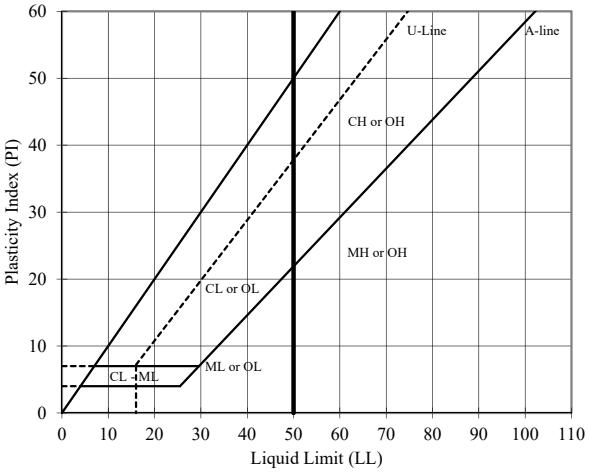
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS
ASTM D421, D422, D4318

PROJECT NAME: **FTN/Entergy Independence/AR**
SAMPLE ID: **RP-4D** DEPTH (ft): **38-39**
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing	Description	Percentage
3-inch	75.0	**100.0**		
1.5-inch	37.5	**100.0**		
1-inch	25.0	**90.2**	Coarse Gravel	**22.17**
3/4-inch	19.0	**77.8**		
3/8-inch	9.5	**48.3**		
#4	4.75	**31.3**	Fine Gravel	**46.50**
#10	2.00	**19.0**	Coarse Sand	**12.34**
#20	0.850	**13.1**		
#40	0.425	**9.3**	Medium Sand	**9.66**
#60	0.250	**6.9**		
#100	0.150	**6.0**	Fine Sand	**3.98**
#200	0.075	**5.4**		
	0.036	**2.6**		
	0.023	**2.5**		
	0.013	**2.1**		
	0.010	**2.0**	Silt or Clay Fines	**5.36**
	0.007	**1.8**		
	0.003	**1.6**		
	0.001	**1.4**		

Sieve Analysis (Initial Separation on No. 4 Sieve)
Hydrometer Analysis



USCS Description (ASTM D 2487):

Poorly graded gravel with silt and sand, brown, moist

LL	PL	PI	SpG
NP	**NP**	**NP**	--

As-Received Moisture Content (%): --

USCS Group Symbol: GP-GM

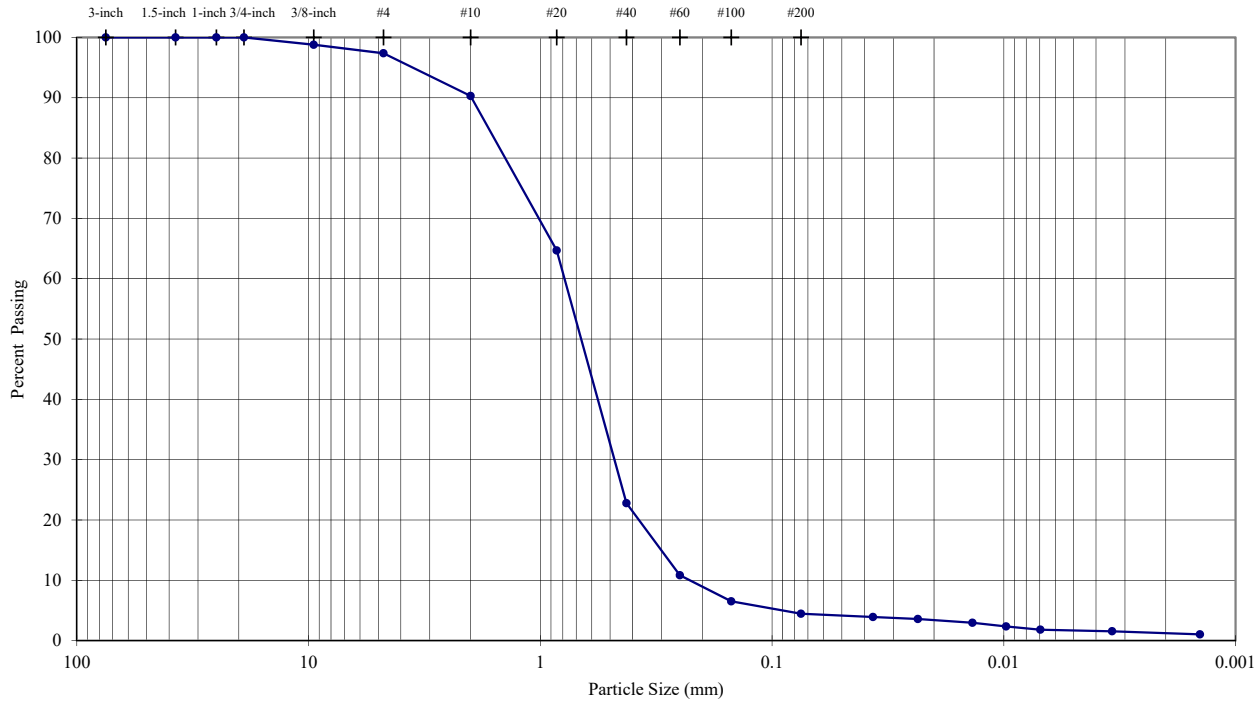
Notes: 0 g of particles up to 37.5 mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample mechanically dispersed using Stirring Apparatus A for about 1 minute
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	MB/AR
DATE	31-Jul-2018
REVIEW	MB

August-18 **18103172**

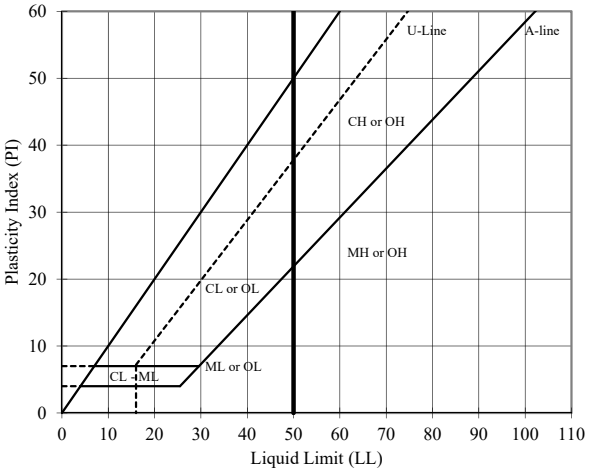
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS
ASTM D421, D422, D4318

PROJECT NAME: **FTN/Entergy Independence/AR**
SAMPLE ID: **RP-4D** DEPTH (ft): **64.5-67.4**
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing	Description	Percentage
3-inch	75.0	**100.0**		
1.5-inch	37.5	**100.0**	Coarse Gravel	**0.00**
1-inch	25.0	**100.0**		
3/4-inch	19.0	**100.0**		
3/8-inch	9.5	**98.8**	Fine Gravel	**2.62**
#4	4.75	**97.4**		
#10	2.00	**90.3**	Coarse Sand	**7.07**
#20	0.850	**64.7**	Medium Sand	**67.51**
#40	0.425	**22.8**		
#60	0.250	**10.8**	Fine Sand	**18.33**
#100	0.150	**6.5**		
#200	0.075	**4.5**		
	0.037	**3.9**	Silt or Clay Fines	**4.47**
	0.023	**3.6**		
	0.014	**3.0**		
	0.010	**2.4**		
	0.007	**1.8**		
	0.003	**1.6**		
	0.001	**1.0**		

Sieve Analysis (Initial Separation on No. 4 Sieve)
Hydrometer Analysis



USCS Description (ASTM D 2487):
Poorly graded sand, reddish yellow, moist

LL	PL	PI	SpG
NP	**NP**	**NP**	--

As-Received Moisture Content (%): --

USCS Group Symbol: SP

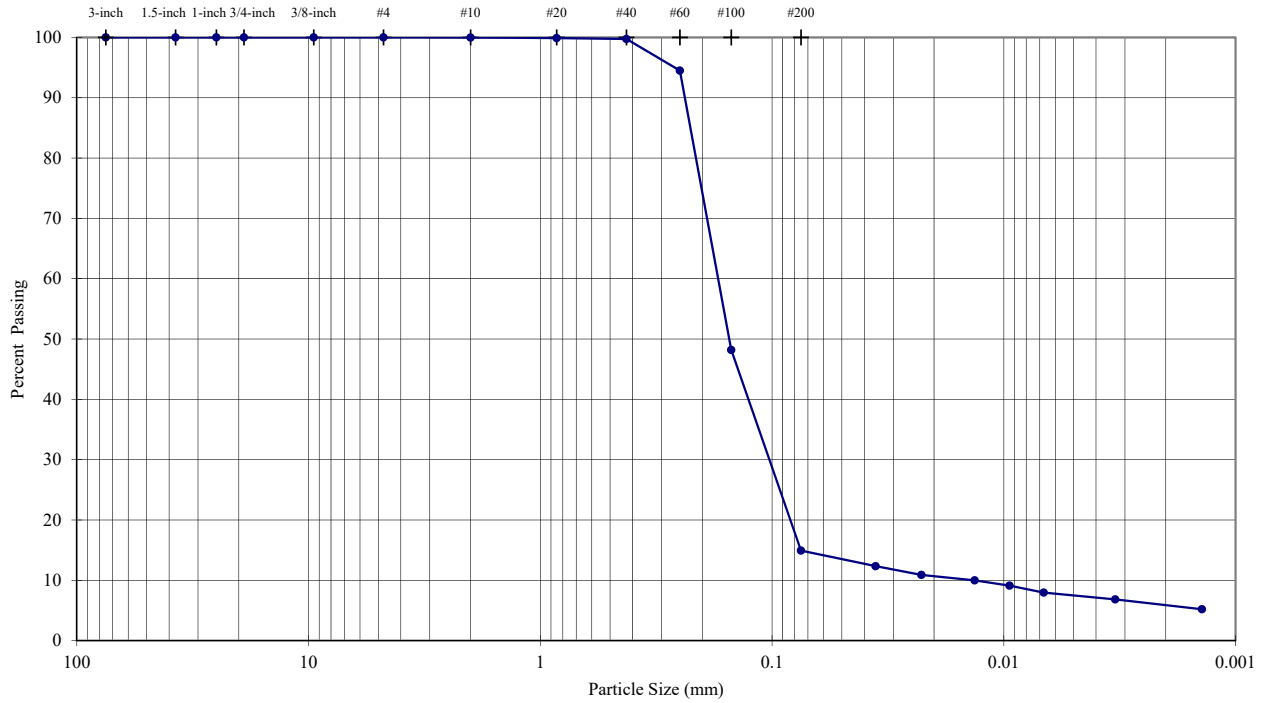
Notes: 0 g of particles up to 19.0 mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample mechanically dispersed using Stirring Apparatus A for about 1 minute
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	AR
DATE	31-Jul-2018
REVIEW	MB

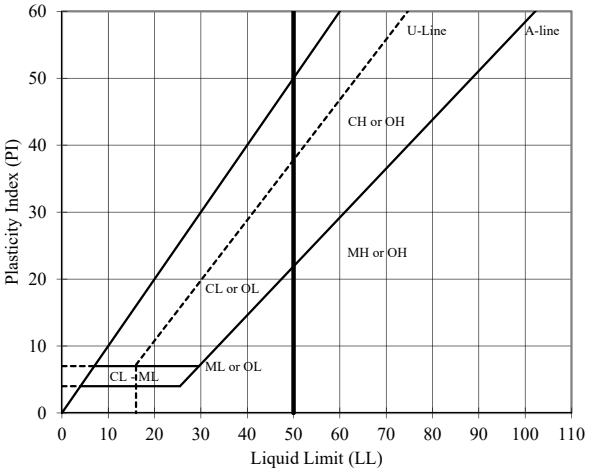
August-18 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS
ASTM D421, D422, D4318

PROJECT NAME: **FTN/Entergy Independence/AR**
SAMPLE ID: **RP-4D** DEPTH (ft): **76.2-78**
TYPE: **Bag**



	Sieve	Particle Size (mm)	% Passing	Description	Percentage
Sieve Analysis (Initial Separation on No. 4 Sieve)	3-inch	75.0	**100.0**		
	1.5-inch	37.5	**100.0**	Coarse Gravel	**0.00**
	1-inch	25.0	**100.0**		
	3/4-inch	19.0	**100.0**		
	3/8-inch	9.5	**100.0**	Fine Gravel	**0.00**
	#4	4.75	**100.0**		
	#10	2.00	**100.0**	Coarse Sand	**0.02**
	#20	0.850	**99.9**	Medium Sand	**0.24**
	#40	0.425	**99.7**		
	#60	0.250	**94.5**	Fine Sand	**84.82**
	#100	0.150	**48.2**		
	#200	0.075	**14.9**		
Hydrometer Analysis		0.036	**12.3**	Silt or Clay Fines	**14.92**
		0.023	**10.9**		
		0.013	**10.0**		
		0.009	**9.1**		
		0.007	**8.0**		
		0.003	**6.8**		
		0.001	**5.2**		



USCS Description (ASTM D 2487):

Silty sand, dark grayish brown, moist

LL	PL	PI	SpG
NP	**NP**	**NP**	--

As-Received Moisture Content (%): --

USCS Group Symbol: SM

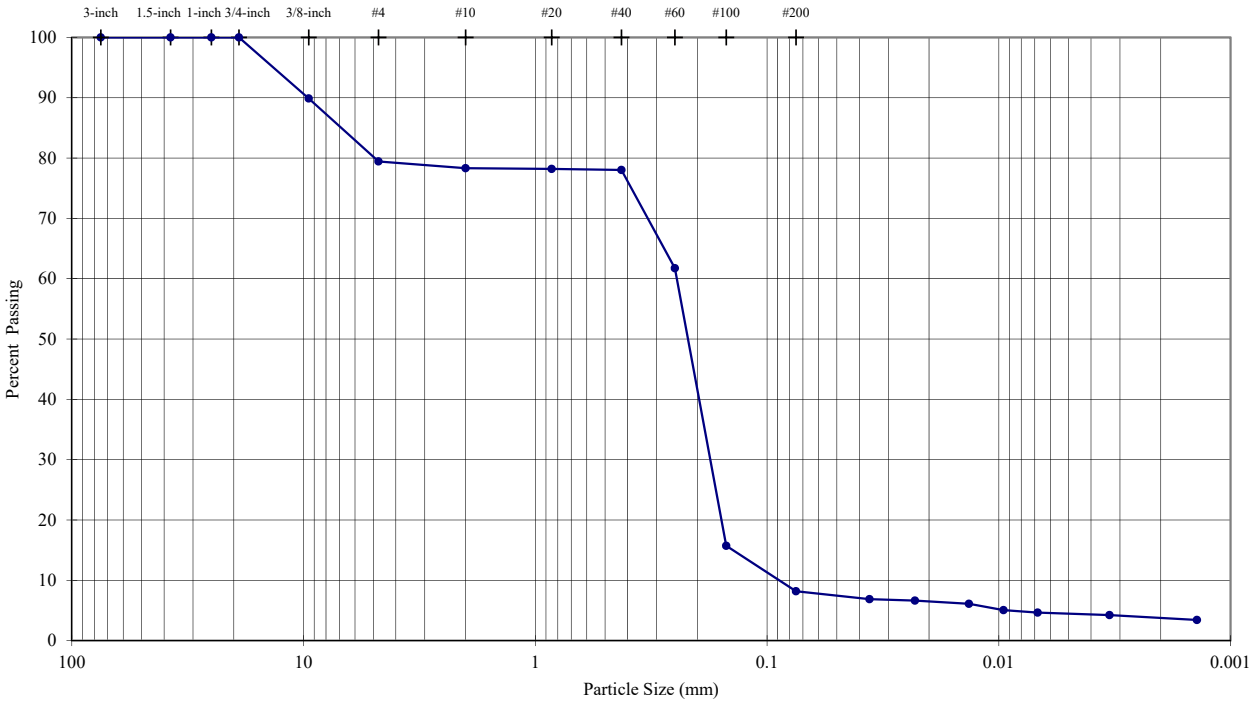
Notes: 0 g of particles up to 4.75 mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample mechanically dispersed using Stirring Apparatus A for about 1 minute
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	AR
DATE	31-Jul-2018
REVIEW	MB

August-18 **18103172**

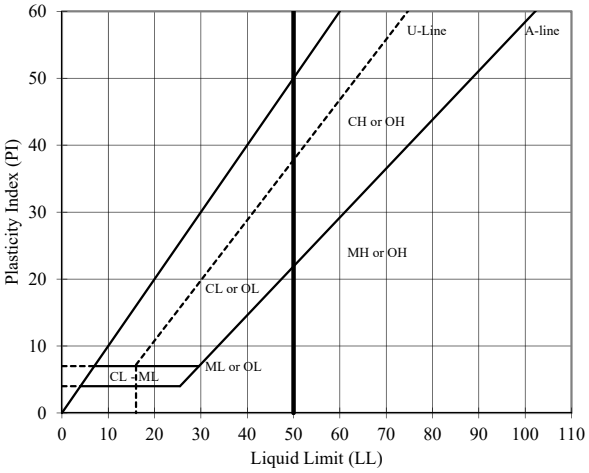
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS
ASTM D421, D422, D4318

PROJECT NAME: **FTN/Entergy Independence/AR**
SAMPLE ID: **RP-5** DEPTH (ft): **27-28**
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing	Description	Percentage
3-inch	75.0	**100.0**		
1.5-inch	37.5	**100.0**	Coarse Gravel	**0.00**
1-inch	25.0	**100.0**		
3/4-inch	19.0	**100.0**		
3/8-inch	9.5	**89.9**	Fine Gravel	**20.56**
#4	4.75	**79.4**		
#10	2.00	**78.3**	Coarse Sand	**1.12**
#20	0.850	**78.2**	Medium Sand	**0.29**
#40	0.425	**78.0**		
#60	0.250	**61.7**		
#100	0.150	**15.7**	Fine Sand	**69.84**
#200	0.075	**8.2**		
	0.036	**6.9**		
	0.023	**6.6**		
	0.013	**6.1**		
	0.010	**5.1**	Silt or Clay Fines	**8.20**
	0.007	**4.7**		
	0.003	**4.2**		
	0.001	**3.4**		

Sieve Analysis (Initial Separation on No. 4 Sieve)
Hydrometer Analysis



USCS Description (ASTM D 2487):

Poorly graded sand with silt and gravel, dark yellowish brown, moist

LL	PL	PI	SpG
NP	**NP**	**NP**	--

As-Received Moisture Content (%): --

USCS Group Symbol: SP-SM

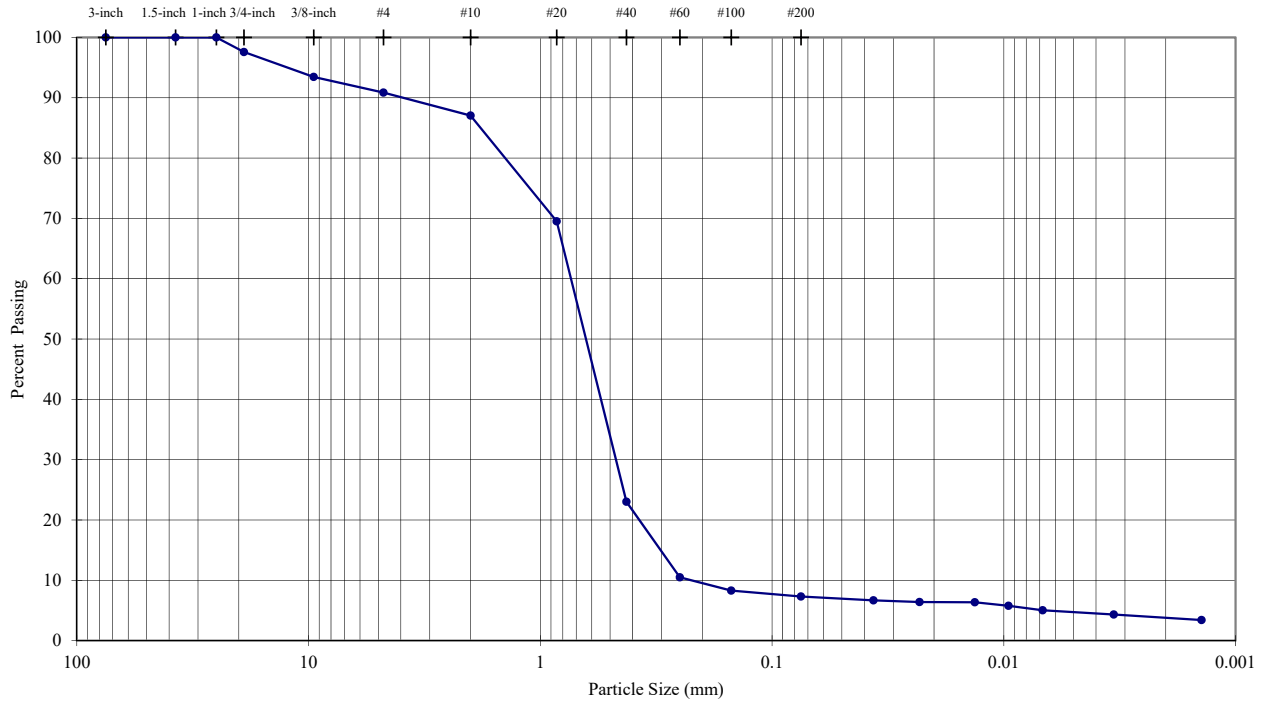
Notes: 0 g of particles up to 19.0 mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample mechanically dispersed using Stirring Apparatus A for about 1 minute
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	TE/AR
DATE	1-Aug-2018
REVIEW	MB

August-18 **18103172**

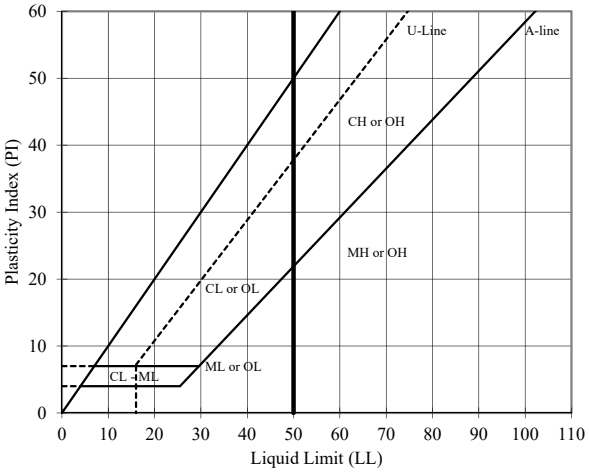
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS
ASTM D421, D422, D4318

PROJECT NAME: **FTN/Entergy Independence/AR**
SAMPLE ID: **RP-8D** DEPTH (ft): **53-60**
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing	Description	Percentage
3-inch	75.0	**100.0**		
1.5-inch	37.5	**100.0**		
1-inch	25.0	**100.0**	Coarse Gravel	**2.42**
3/4-inch	19.0	**97.6**		
3/8-inch	9.5	**93.5**		
#4	4.75	**90.8**	Fine Gravel	**6.74**
#10	2.00	**87.0**	Coarse Sand	**3.80**
#20	0.850	**69.5**		
#40	0.425	**23.0**	Medium Sand	**64.02**
#60	0.250	**10.5**		
#100	0.150	**8.3**	Fine Sand	**15.71**
#200	0.075	**7.3**		
	0.037	**6.7**		
	0.023	**6.4**		
	0.013	**6.4**		
	0.010	**5.8**	Silt or Clay Fines	**7.31**
	0.007	**5.0**		
	0.003	**4.3**		
	0.001	**3.4**		

Sieve Analysis (Initial Separation on No. 4 Sieve)
Hydrometer Analysis



USCS Description (ASTM D 2487):

Poorly graded sand with silt, brownish yellow, moist

LL	PL	PI	SpG
NP	**NP**	**NP**	--

As-Received Moisture Content (%): --

USCS Group Symbol: SP-SM

Notes: 0 g of particles up to 25.0 mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample mechanically dispersed using Stirring Apparatus A for about 1 minute
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	AR
DATE	1-Aug-2018
REVIEW	MB

JUNE 2018

18103172
7920-1844-001

FTN/ENTERGY INDEPENDENCE/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	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'	SC-SM	10.8	19	13	6	-0.31	96.7	35.5	19.0	-	-	-	-	-	-	-
B-1	UD	10.0-12.0'	ML	31.3	44	29	15	0.16	100.0	98.3	40.2	-	-	-	31.3	89.6	1.2E-08	-
B-1	UD	20.0-22.0'	CH	39.1	68	23	45	0.37	100.0	96.1	57.2	-	-	2.71	39.1	81.6	-	T-CU w/pp
B-1	UD	28.0-30.0'	CH	51.6	50	27	23	1.04	100.0	99.7	50.5	-	-	2.67	51.6	71.4	-	T-CU w/pp
B-2	UD	8.0-10.0'	CH	26.3	55	21	34	0.16	100.0	96.2	39.7	-	-	2.72	26.3	95.3	-	T-CU w/pp
B-3	UD	3.0-5.0'	ML	42.9	NP	NP	NP	NP	100.0	52.8	16.5	-	-	-	-	-	-	-
B-3	UD	10.0-12.0'	CL	30.1	45	20	25	0.41	98.2	97.2	30.9	-	-	-	30.1	91.4	1.1E-06	-
B-4	UD	5.0-7.0'	CL	23.2	35	15	20	0.40	100.0	96.5	45.0	-	-	-	23.2	103.1	4.9E-06	-
B-4	UD	15.0-17.0'	CH	34.1	50	26	24	0.36	100.0	96.1	40.5	-	-	2.67	34.1	86.1	-	C
B-4	UD	20.0-22.0'	CL	27.4	35	20	15	0.51	100.0	91.9	25.0	-	-	-	27.4	94.9	1.1E-06	-
B-5	UD	3.0-5.0'	CL	19.0	38	16	22	0.13	98.6	89.6	34.0	-	-	2.69	19.0	108.7	-	T-CU w/pp
RP-8	UD	8.0-10.0'	CL	24.6	49	24	25	0.04	100.0	95.6	43.1	-	-	-	24.6	98.5	3.4E-08	-
PZ-1	UD	5.0-7.0'	CL	22.8	43	24	19	-0.04	100.0	95.1	51.0	-	-	-	22.8	102.9	3.0E-08	-
PZ-1	UD	10.0-12.0'	CL	30.9	46	19	27	0.45	100.0	97.1	42.0	-	-	2.72	30.9	91.1	-	T-CU w/pp
PZ-1	UD	15.0-17.0'	CL	28.9	38	17	21	0.56	100.0	97.0	35.0	-	-	2.78	28.9	95.2	-	T-CU w/pp

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

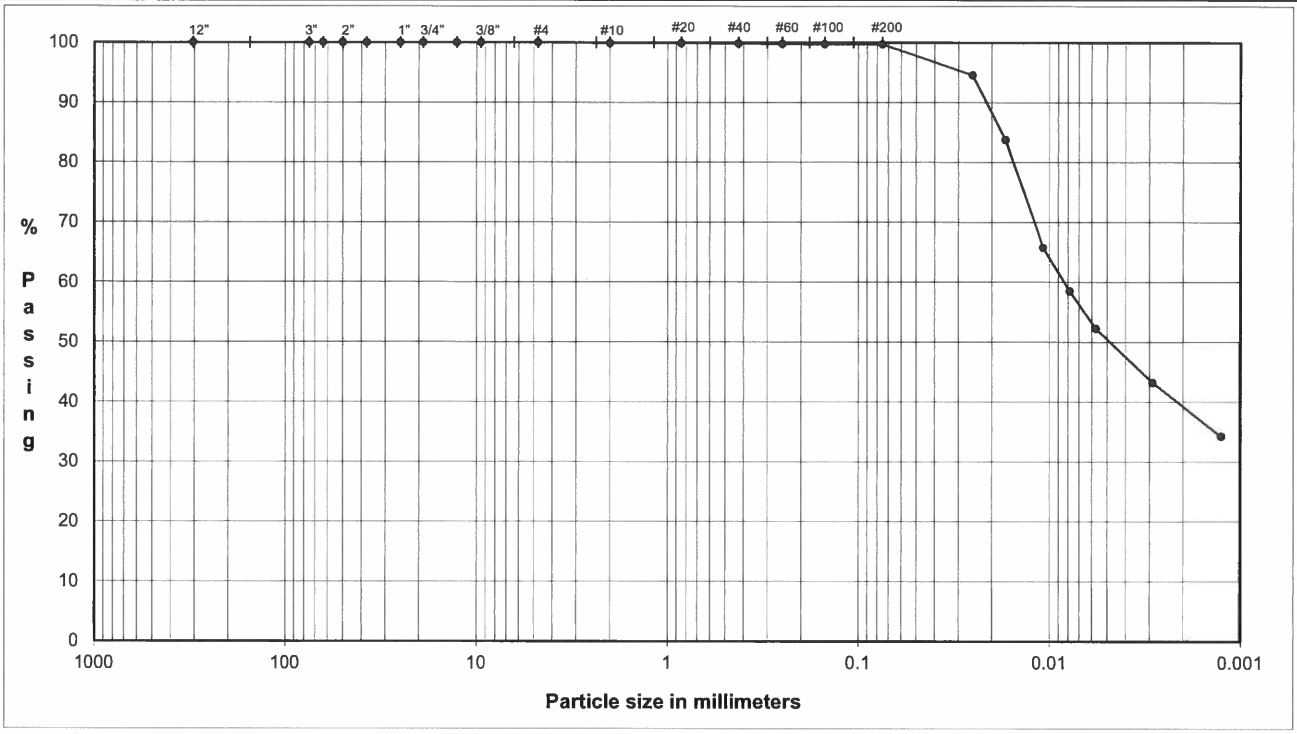
Golder Associates Inc.

AUGUST 2018 **18103172**

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-1** Depth: **28.0-30.0'**
TYPE: **UD**



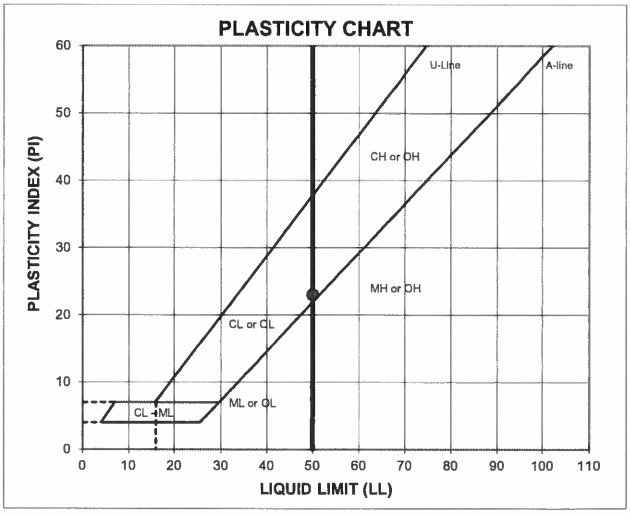
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

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	**99.9**	Coarse Sand	**0.1**
#20	0.85	**99.9**		
#40	0.43	**99.8**	Medium Sand	**0.1**
#60	0.25	**99.8**		
#100	0.15	**99.7**		
#200	0.075	**99.7**	Fine Sand	**0.1**

Hydrometer Analysis

(mm)	%Finer		
0.025	**94.5**		
0.017	**83.7**		
0.011	**65.7**	Fines	
0.0079	**58.5**	Silt or Clay	**99.7**
0.0057	**52.2**		
0.0029	**43.2**		
0.0013	**34.2**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
51.6	**50**	**27**	**23**	**1.04**

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

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

USCS: CH

TECH	TJ/HH/BA
DATE	8/9/18
CHECK	
REVIEW	
APPROVE	

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY INDEPENDENCE/AR**		
PROJECT NUMBER	**18103172**	**SAMPLE ID**	**B-1**
		SAMPLE TYPE	**UD**
TESTED FOR	**Gs**	**SAMPLE DEPTH**	**28.0-30.0'**

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	**84.00**
Weight Soil and Tare, Final (gm)	**82.79**
Weight Of Tare (gm)	**51.68**
Weight Of Moisture (gm)	**1.21**
Weight Of Dry Soil (gm)	**31.11**
Hygroscopic Moisture In (%)	**3.9%**

Test Method		**Method - B**
Pycnometer Number		**13**
Weight Pycnometer Empty (gm)		177.87
Volume of Pycnometer (gm)		499.40
Weight Pycnometer and Water (gm)		676.24
Mass of Pycnometer and Water at the test Temperture	(A)	676.17
Observed Temperature (Tb), for (Mb) In Degrees C		21.90
Weight of Soil, Water & Pycnometer (gm)	(B)	**706.30**
Temperature, C		**21.9**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**48.19**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	48.19
Temperature Coefficient		0.9996

SPECIFIC GRAVITY (G) **2.668**

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

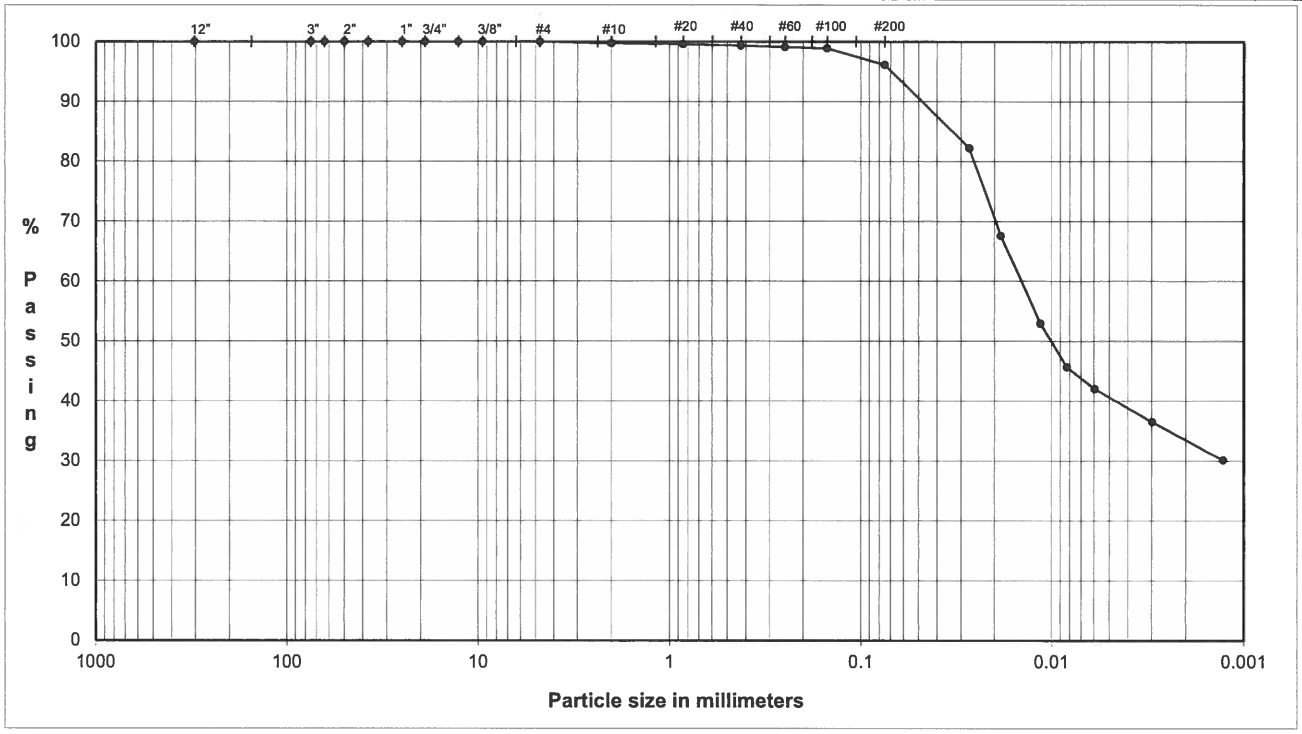
Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	FT
DATE	8/16/18
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **B-4** - Depth: **15.0-17.0'**
TYPE: **UD**



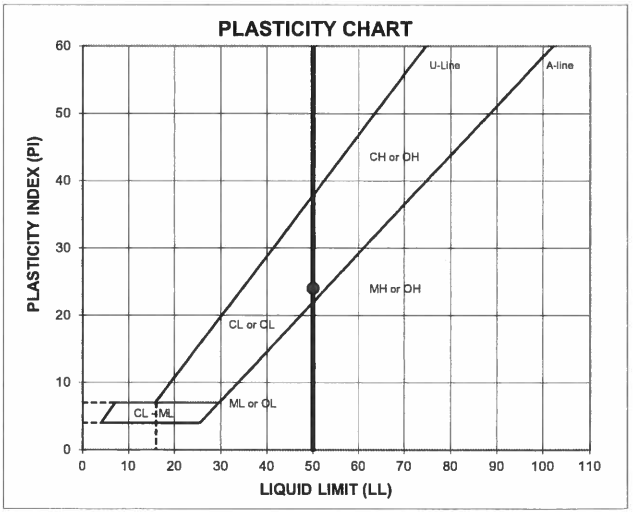
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

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	99.7	Coarse Sand	0.3
#20	0.85	99.5		
#40	0.43	99.3	Medium Sand	0.4
#60	0.25	99.1		
#100	0.15	98.8		
#200	0.075	96.1	Fine Sand	3.2

Hydrometer Analysis

(mm)	%Finer		
0.027	82.2		
0.018	67.6		
0.011	53.0	Fines	
0.0083	45.7	Silt or Clay	96.1
0.0060	42.0		
0.0030	36.5		
0.0013	30.1		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
34.1	50	26	24	0.36

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

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

USCS: CH

TECH	TJ/BA
DATE	8/29/18
CHECK	
REVIEW	
APPROVE	

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY INDEPENDENCE/AR**		
PROJECT NUMBER	**18103172**	**SAMPLE ID**	**B-4**
		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)	**147.69**
Weight Soil and Tare, Final (gm)	**145.02**
Weight Of Tare (gm)	**51.54**
Weight Of Moisture (gm)	**2.67**
Weight Of Dry Soil (gm)	**93.48**
Hygroscopic Moisture In (%)	**2.9%**

Test Method		**Method - B**
Pycnometer Number		**13**
Weight Pycnometer Empty (gm)		177.87
Volume of Pycnometer (gm)		499.40
Weight Pycnometer and Water (gm)		676.24
Mass of Pycnometer and Water at the test Temperture	(A)	676.10
Observed Temperature (Tb), for (Mb) In Degrees C		22.50
Weight of Soil, Water & Pycnometer (gm)	(B)	**706.51**
Temperature, C		**22.5**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**48.66**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	48.66
Temperature Coefficient		0.9995

SPECIFIC GRAVITY (G) **2.665**

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

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	9/4/18
CHECK	
REVIEW	
APPROVE	