

September 18, 2014

**Gulf Interstate Engineering**  
16010 Barkers Point Lane  
Houston, Texas 77079

Attention: Mr. Mark Schilling  
Facilities Group Manager

RE: Report  
Preliminary Geotechnical Services  
Sabal Trail Project  
Compressor Station No. 3  
Albany, Georgia  
PSI Project No. 07571055

Dear Mr. Schilling:

Professional Service Industries, Inc. (PSI) has provided preliminary geotechnical engineering services in connection with the noted project in Albany, Dougherty County, Georgia. This report summarizes of the field work completed by us in connection with the project.

### **PROJECT CONSIDERATIONS**

The project under consideration herein is the proposed Compressor Station No. 3 (Option 7) that will be built as part of the Sabal Trail Pipeline project. The station is located on the southwest side of Albany in Dougherty County, Georgia, on the west side of Newton Road. A site vicinity map indicating the general location of the proposed compressor station is included on **Figure 1**.

We understand that this compressor station is not required in the initial phase of the pipeline project but will rather be brought online when capacity increases. Construction associated with the compressor station will include compressor buildings, blowers, gas coolers, miscellaneous equipment buildings and pipe supports as required. The facility will also include pavements (access roads, drives and parking) plus stormwater management areas. No detailed plan layout exists for the facility at this time. We were however provided a conceptual plan for use in completing this preliminary geotechnical study. The conceptual layout plan is included on **Sheet 1**.

We were not provided with site grading information but we assume the construction will be as near as practical to the existing grades and that where grade changes are necessary, they will be planned in a way to attempt to balance cut and fill quantities.

Maximum vertical foundation loads for building columns and equipment supports are 115 kips and 17.1 kips respectively. Pad/pedestal foundations will generally have contact pressures of 384

pounds per square foot or less. Foundations are also required to carry shear forces as well as dynamic forces from equipment.

**SITE CONDITIONS**

**General**

The site is accessed by a gate on Lily Pond Road. A dirt road runs from Lily Pond Road to the proposed location of the compressor station. The site is currently a pecan orchard with minimal underbrush present. The site appeared to be relatively flat except in the northeast corner of the site where a wetland area is present.

**USGS Quadrangle Map**

The topographic survey map published by the (USGS) entitled “Albany West, Georgia” was reviewed for ground surface features in the area of the proposed development. Based on this review, the natural ground surface elevation is between about +180 feet and +190 feet National Geodetic Vertical Datum of 1929 (NGVD 29) in the general project vicinity (see **Figure 1**). We were not provided with any site-specific topographic information to compare with the published data.

**Soil Survey**

The "Soil Survey of Dougherty County, Georgia", published by the USDA SCS, was reviewed for general near-surface soil information within the project vicinity (see **Figure 2**). The SCS indicates four (4) soil mapping units in the area of the project. The mapped soil units are summarized in the following table.

Soil Series	Depth (inches)	Unified Classification	USDA Seasonal High Groundwater Table
			Depth (feet)
AdA – Albany sand, 0 to 2 percent slopes	0 to 88	SP	1 to 2 ½
EqB – Eustis loamy sand, 0 to 5 percent slopes	0 to 98	SP-SM	>6.0
Grd – Grady soils*	0 to 62	CL	0
WeA – Wagram loamy sand, 0 to 2 percent slopes	0 to 75	SM	>6.0

\*Indicated as present in the wetland area.

### Regional Geology

Regional geologic publications indicate the limestone underlying the site is part of the Ocala Group which is part of the Floridian Aquifer. The Ocala Group limestone is a porous, sandy silty rock that is weakly to locally well-cemented. We understand that wells are installed within this formation to irrigate the pecan groves that are present throughout the area.

### Potentiometric Surface

The map *Potentiometric Surface of the Upper Floridan Aquifer in Florida, and Parts of Georgia, South Carolina, and Alabama*, dated June 2010 by the USGS was reviewed in the vicinity of the site. The potentiometric surface elevation at the project is between about +160 and +170 feet NGVD. According to the topographic map, the existing ground surface elevation is between about +180 and +190 feet NGVD.

## SUBSURFACE CONDITIONS

### General

Subsurface conditions at the site were evaluated in a preliminary manner by drilling and sampling two engineering borings and six hand auger borings. The engineering borings were completed using rotary wash techniques and sampled following Standard Penetration Test (SPT) procedures after ASTM D-1586. Additionally, the SPT borings were completed in the potential building/equipment areas as shown on **Sheet 1**. The SPT borings were extended to depths of 100 feet below existing grade. SPT samples were recovered at 5 foot centers.

The hand auger borings were drilled at the approximate locations shown on **Sheet 1**. These borings were advanced to depths in the range 3 to 10 feet below grade. Select samples were recovered during augering for visual stratification and select testing.

Samples recovered from the borings have been returned to our Orlando laboratory for visual stratification and select testing. Subsoils were visually stratified following guidelines contained in the Unified Soil Classification System (USCS). Records of the materials encountered in the borings are presented as soil profiles on the attached boring logs. The USCS symbol is provided after each soil description on the boring logs.

Preliminary geophysical testing has recently been completed and will be reported under a separate cover once the data has been reviewed and a report prepared.

### **Stratigraphy**

The results of the two deep borings indicate an overburden of predominantly sands and clays atop the regionally continuous limestone formation. The upper few feet of sand is generally slightly silty becoming more silty and clayey with depth. The sands grade from being very loose to medium dense. There are also sandy clay zones in the upper soil column with these materials typically grading from being very soft to medium stiff based on SPT blow counts. As may be noted from the boring logs, there are zones in the overburden soils where the drill rods fell under their own weight or under the weight of the hammer. Very loose to very soft conditions were observed in both borings just above the limestone interface.

SPT blow counts in the limestone ranged from essentially zero blows per foot (weight of rod material) to 50 blows for six inches of sample spoon penetration. There were some small voids observed in the limestone formation plus in Boring B-1, the drill rods fell under their own weight from approximately 93 to 98.5 feet below grade. The drilling contractor started using casing in each boring after 70 feet (up to that point, a hollow stem auger was used). Losses in circulation of drilling fluid in borings B-1 and B-2 were noted, typically between about 70 and 95 feet below the surface. All of these conditions are indicative of porous rock, which is typical for the Floridan Aquifer and can also signify solution activity within the limestone formation and potential for sinkhole development.

The shallow auger borings disclosed a varying sequence of sands and clays in the upper 3 to 10 feet. This is consistent with USDA Soil Survey for Dougherty County, which maps the site as being mantled by surficial soil groups Eustis loamy sand, 0 to 5 percent slopes, Wagram loamy sand, 0 to 2 percent slopes and Albany sand, 0 to 2 percent slopes. The wetland area in the east, which will not be developed, is mapped as Grady soils.

### **Groundwater**

Groundwater was observed in the borings at depths ranging from 1 ½ feet to 18 feet below grade at the time they were performed (May 13 and 14, 2014).

## **REPORT LIMITATIONS**

Our professional services have been performed and our findings obtained in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the investigation was intended to evaluate soil conditions within the influence of the proposed structure foundations. If any subsoil variations become evident during the course of this project, a re-evaluation of the data contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed construction.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or



beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

**CLOSURE**

We appreciate the opportunity to be of service on this project and we trust that the foregoing and accompanying attachment is of assistance to you at this time. In the event that you have any questions or if you require additional information, please call.

Best Regards,

**PROFESSIONAL SERVICE INDUSTRIES, INC.**  
**Certificate of Authorization No. PEF000143**



Jonathan K. Thrasher  
Project Manager

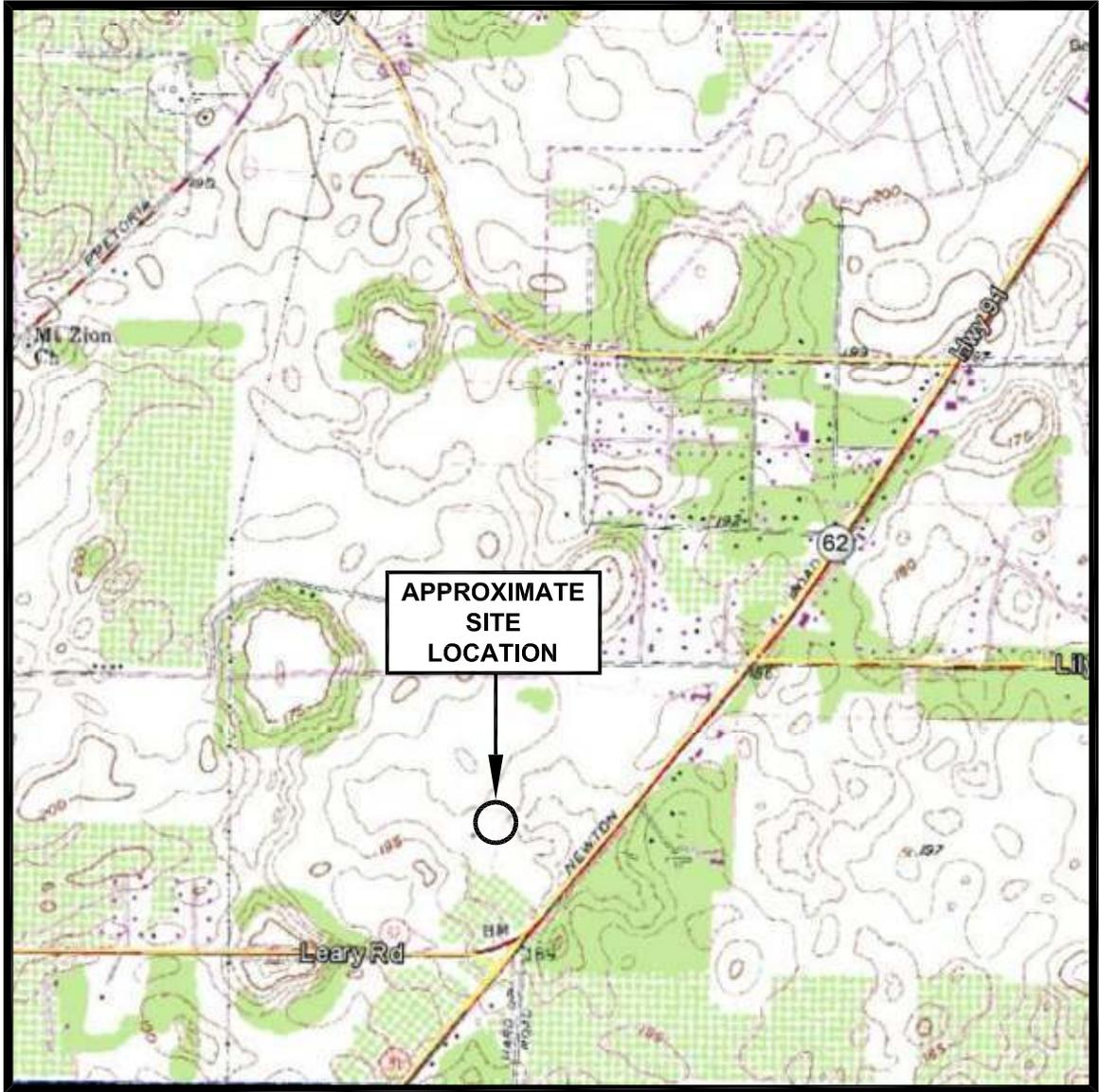


Lloyd Lasher  
Principal Consultant

07571055 (Compressor Station 3, Albany, GA)

**Attachments**

- Figure 1 – Vicinity Map
- Figure 2 – SCS Soils Map
- Figure 3 – Potentiometric Map
- Sheet 1 - Location Plan
- Boring Logs



REFERENCE: U.S.G.S. "ALBANY WEST, GEORGIA" QUADRANGLE MAP

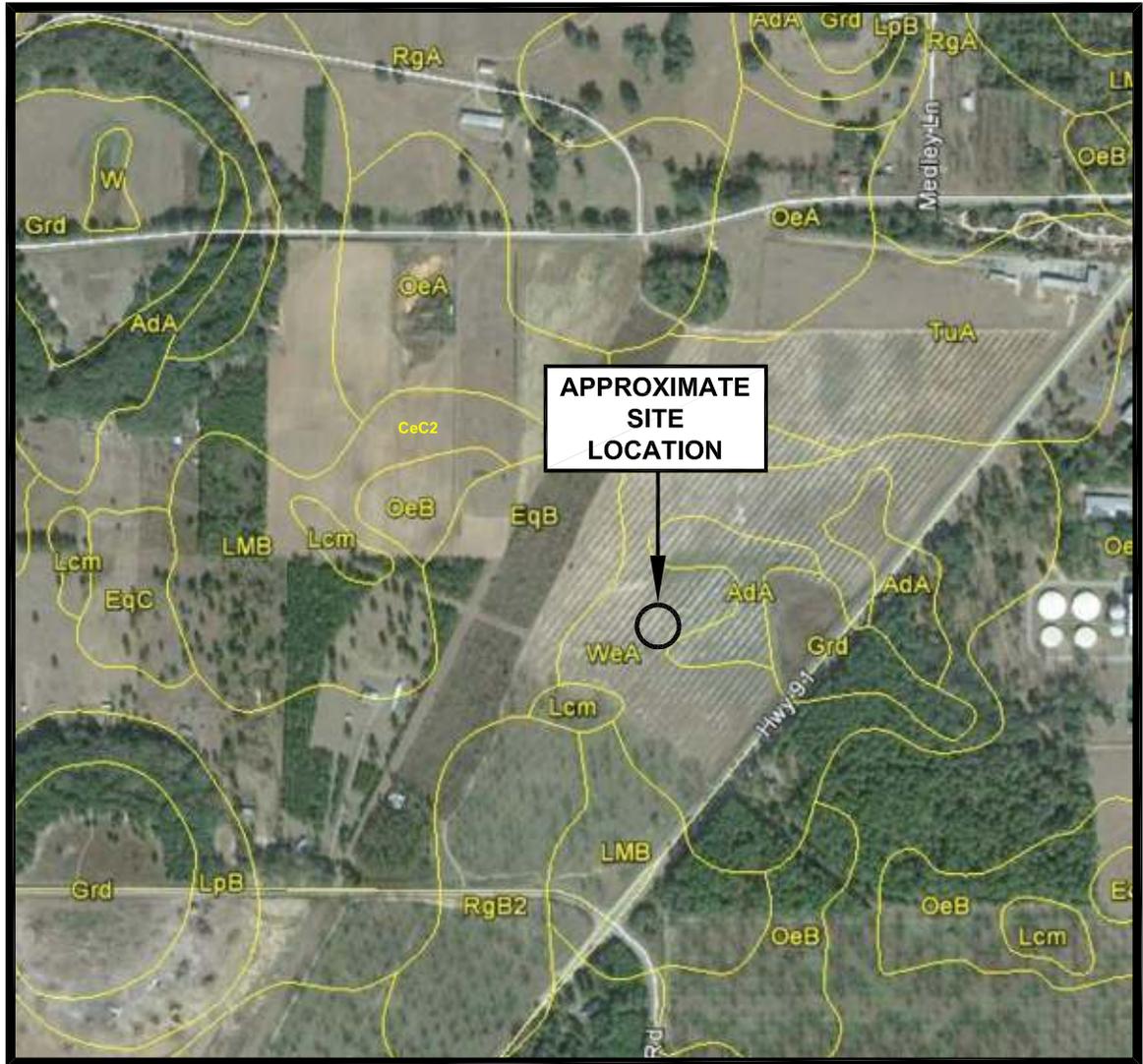
PARCEL: 00312/00001/01S

ISSUED: 1956  
PHOTOREVISED: 1988  
SCALE: 1"=2000'

VICINITY MAP  
**COMPRESSOR STATION 3**  
**SABAL TRAIL TRANSMISSION**  
ALBANY, GEORGIA

**psi** Information  
To Build On  
Engineering • Consulting • Testing

DRAWN: DJW	SCALE: NOTED	PROJ. NO: 07571055
CHKD: JKT	DATE: 9-10-14	FIGURE: 1



REFERENCE: U.S.D.A.-S.C.S. "DOUGHERTY COUNTY, GEORGIA" SOILS MAP

PARCEL: 00312/00001/01S

ISSUED: N/A  
SCALE: 1"=2000'

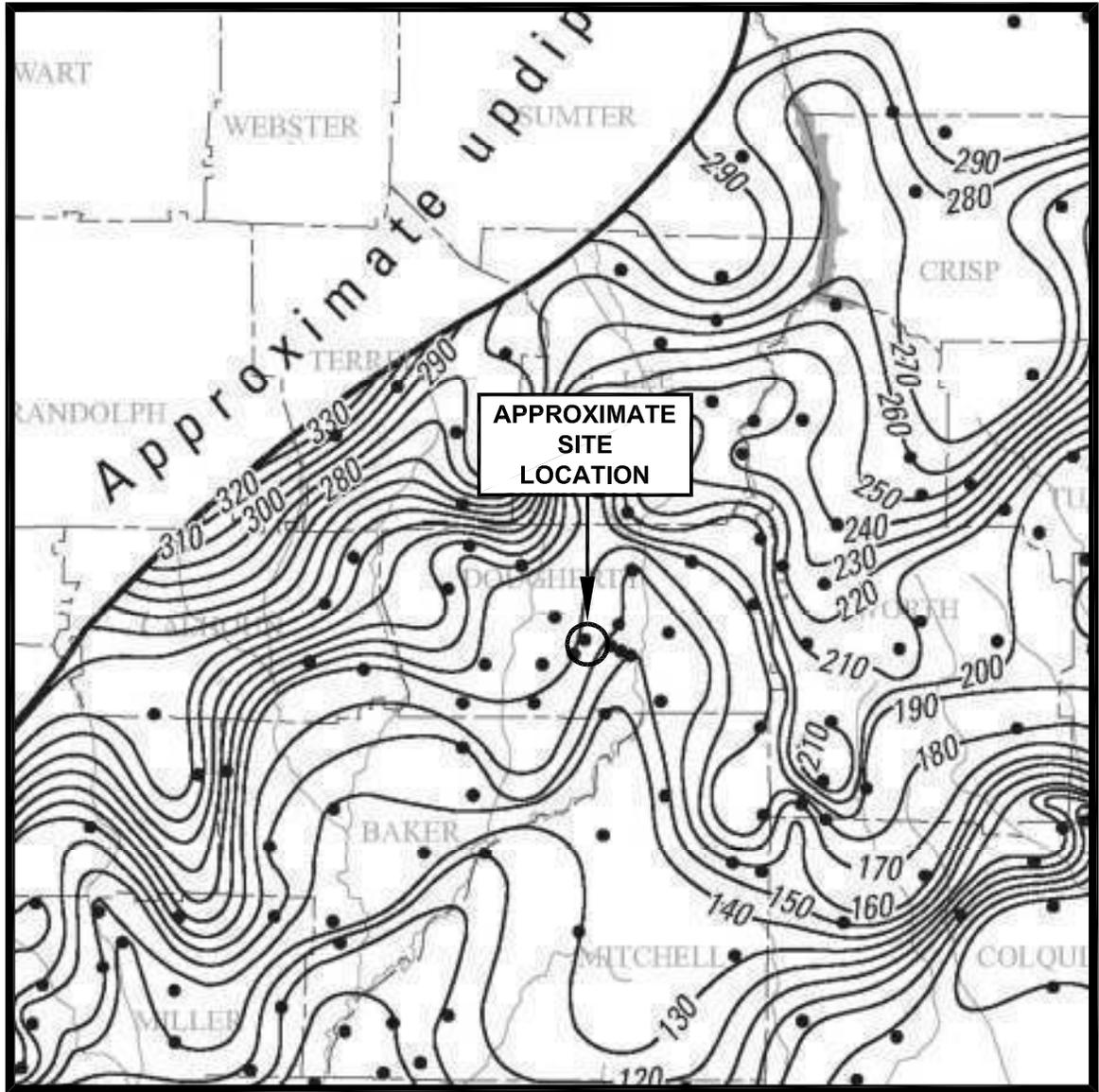
**SOILS LEGEND**

- WeA* WAGRAM LOAMY SAND, 0 TO 2 PERCENT SLOPES
- AdA* ALBANY SAND, 0 TO 2 PERCENT SLOPES

SOILS MAP  
**COMPRESSOR STATION 3**  
**SABAL TRAIL TRANSMISSION**  
ALBANY, GEORGIA



DRAWN: DJW	SCALE: NOTED	PROJ. NO: 07571055
CHKD: JKT	DATE: 9-10-14	FIGURE: 2



REFERENCE: POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER IN THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT AND VICINITY, FLORIDA, MAY-JUNE 2010

PARCEL: 00312/00001/01S

**LEGEND**

— 60 — POTENTIOMETRIC CONTOUR— Shows altitude at which water level would have stood in tightly cased wells. Contour intervals is 10 feet. Datum is sea level.

POTENTIOMETRIC MAP  
**COMPRESSOR STATION 3**  
**SABAL TRAIL TRANSMISSION**  
 ALBANY, GEORGIA



Note: Elevations Shown on Map are in feet, NGVD

DRAWN: DJW	SCALE: NOTED	PROJ. NO: 07571055
CHKD: JKT	DATE: 9-10-14	FIGURE: 3



**LOCATION PLAN**

SCALE: 1"=400'

**LEGEND**



APPROXIMATE LOCATION OF  
STANDARD PENETRATION  
TEST BORING



APPROXIMATE LOCATION OF  
AUGER BORING

VICINITY MAP

**SABAL TRAIL PIPELINE PROJECT  
COMPRESSOR STATION 3**

ALBANY, DOUGHERTY COUNTY, GEORGIA

**psi** Information  
To Build On

Engineering • Consulting • Testing

DRAWN:	DJW	SCALE:	NOTED	PROJ. NO:	07571055
CHKD:	IK	DATE:	5-15-14	FIGURE:	1

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055  
JOB NAME SABAL TRAIL PIPELINE CS-3  
JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

DRILLER DAVID & MIKE (S&ME) LOGGED BY SCOTT (PSI)  
STARTED 5-13-14 FINISHED 5-13-14  
GROUND ELEV. - CASING LENGTH 95.0 FT.  
GROUNDWATER TABLE 11.0 FT.

SAMPLE FEET	SYMBOL	DESCRIPTION OF SOIL	STANDARD PENETRATION TEST										BLOWS ON SAMPLER	N VALUE			
			2	3	4	5	7	10	20	30	40	50			70	100	
		BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)														1,1,2	3
5		ORANGE-BROWN SLIGHTLY CLAYEY FINE SAND, (SP-SC)														5,6,3	9
10		ORANGE-BROWN CLAYEY FINE SAND, (SC)														2,3,3	6
15		ORANGE-BROWN CLAYEY FINE SAND, (SC)														WH,1,2	3
20		ORANGE-BROWN CLAYEY FINE SAND, (SC)														WH,1,1	2
25		LIGHT GRAY SILTY AND CLAYEY FINE SAND WTH ORANGE MOTTILING, (SM), (SC)														WH,WH,WH	WH
30		LIGHT GRAY SILTY AND CLAYEY FINE SAND WTH ORANGE MOTTILING, (SM), (SC)														WR,WH,WH	WH
35		LIGHT GRAY SILTY AND CLAYEY FINE SAND WTH ORANGE MOTTILING, (SM), (SC)														9,10,11	21
40		LIGHT GRAY SILTY AND CLAYEY FINE SAND WTH ORANGE MOTTILING, (SM), (SC)														WR,8,21	29
45		TAN SANDY SILTY LIMESTONE														19,18,25	43
50		TAN SANDY SILTY LIMESTONE														9,12,18	30
55		(POSSIBLE SMALL VOID AT 55.0 FT.)														12,1,WR	1
60		TAN SANDY SILTY LIMESTONE														9,12,11	23
65		(WEIGHT OF ROD FOR 15.5 IN., WEIGHT OF HAMMER FOR 2.5 IN.)														WR,WR,WH	WH
70		TAN SANDY SILTY LIMESTONE														3,5,9	14
75		TAN SANDY SILTY LIMESTONE														10,11,6	17

REMARKS WR = FELL UNDER WEIGHT OF ROD, WH = FELL UNDER WEIGHT OF ROD AND HAMMER

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

JOB NAME SABAL TRAIL PIPELINE CS-3

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

DRILLER DAVID & MIKE (S&ME) LOGGED BY SCOTT (PSI)

STARTED 5-13-14 FINISHED 5-13-14

GROUND ELEV. - CASING LENGTH 95.0 FT.

GROUNDWATER TABLE 11.0 FT.

SAMPLE FEET	SYMBOL	DESCRIPTION OF SOIL	STANDARD PENETRATION TEST										BLOWS ON SAMPLER	N VALUE				
			2	3	4	5	7	10	20	30	40	50			70	100		
75																		
80																	8,9,11	20
85		TAN SANDY SILTY LIMESTONE															9,11,8	19
90																	8,4,5	9
95		95.0' NW (WEIGHT OF ROD FROM 93.0 FT. TO 98.5 FT.)															WR,WR,WR	WR
100		TAN SANDY SILTY LIMESTONE															3,5,5	10

BORING TERMINATED AND GROUTED AT 100.0'

AUTOMATIC HAMMER USED FOR SAMPLING

REMARKS WR = FELL UNDER WEIGHT OF ROD

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055  
JOB NAME SABAL TRAIL PIPELINE CS-3  
JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

DRILLER DAVID & MIKE (S&ME) LOGGED BY SCOTT (PSI)  
STARTED 5-13-14 FINISHED 5-14-14  
GROUND ELEV. - CASING LENGTH 95.0 FT.  
GROUNDWATER TABLE 18.0 FT.

SAMPLE FEET	SYMBOL	DESCRIPTION OF SOIL	STANDARD PENETRATION TEST										BLOWS ON SAMPLER	N VALUE			
			2	3	4	5	7	10	20	30	40	50			70	100	
		BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)														1,1,2	3
5																1,2,7	9
10		RED-GRAY SANDY CLAY, (CL)														3,6,7	13
15																1,4,6	10
20		ORANGE-GRAY CLAYEY FINE SAND, (SC)														2,3,5	8
25		RED-BROWN CLAY, (CL), (CH)														1,3,5	8
30		LIGHT BROWN SANDY CLAY TO CLAYEY SAND, (SC), (CL)														1,1,1	2
35																WH,WH,WH	WH
40																6,11,23	34
45																12,14,22	36
50																14,24,25	49
55																13,22,23	45
60		TAN SANDY SILTY LIMESTONE														2,2,9	11
65																9,7,12	19
70																11,9,11	20
75																2,12,6	18

REMARKS WH = FELL UNDER WEIGHT OF ROD AND HAMMER

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055  
JOB NAME SABAL TRAIL PIPELINE CS-3  
JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

DRILLER DAVID & MIKE (S&ME) LOGGED BY SCOTT (PSI)  
STARTED 5-13-14 FINISHED 5-13-14  
GROUND ELEV. - CASING LENGTH 95.0' FT.  
GROUNDWATER TABLE 18.0 FT.

SAMPLE FEET	SYMBOL	DESCRIPTION OF SOIL	STANDARD PENETRATION TEST										BLOWS ON SAMPLER	N VALUE							
			2	3	4	5	7	10	20	30	40	50			70	100					
75		TAN SANDY SILTY LIMESTONE																			
80																			15,9,8	17	
85																				5,6,8	14
90																				5,9,11	20
95																				6,4,8	12
100																				50/6"	50/6"

BORING TERMINATED AND GROUTED AT 100.0'  
AUTOMATIC HAMMER USED FOR SAMPLING

REMARKS 50/6" = NUMBER OF BLOWS REQUIRED (50) TO DRIVE SAMPLING SPOON 6 INCHES

BORING NO. HA-1 SHEET 1 OF 1

BORING LOC. SEE SHEET 1

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

DRILLER SCOTT (PSI) LOGGED BY SCOTT (PSI)

JOB NAME SABAL TRAIL PIPELINE CS-3

STARTED 5-13-14 FINISHED 5-13-14

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

GROUND ELEV. - CASING LENGTH -

GROUNDWATER TABLE GNE

SAMPLE		DESCRIPTION OF SOIL
FEET	SYMBOL	
0		BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)
5		RED-ORANGE SILTY FINE SAND, (SM)
10		RED-ORANGE CLAYEY FINE SAND, (SC)

BORING TERMINATED AT 10.0'

GNE = GROUNDWATER NOT EVIDENT IN UPPER 10 FEET OF BORING

REMARKS \_\_\_\_\_

BORING NO. HA-2 SHEET 1 OF 1

BORING LOC. SEE SHEET 1

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

JOB NAME SABAL TRAIL PIPELINE CS-3

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

DRILLER SCOTT (PSI) LOGGED BY SCOTT (PSI)

STARTED 5-13-14 FINISHED 5-13-14

GROUND ELEV. - CASING LENGTH -

GROUNDWATER TABLE 6.5 FT.

SAMPLE		DESCRIPTION OF SOIL
FEET	SYMBOL	
0		GRAY-BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)
5		ORANGE-GRAY SANDY CLAY, (CL)
10		RED-GRAY CLAY, (CL)

BORING TERMINATED AT 8.5'

REMARKS \_\_\_\_\_

BORING NO. HA-3 SHEET 1 OF 1

BORING LOC. SEE SHEET 1

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

DRILLER SCOTT (PSI) LOGGED BY SCOTT (PSI)

JOB NAME SABAL TRAIL PIPELINE CS-3

STARTED 5-13-14 FINISHED 5-13-14

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

GROUND ELEV. - CASING LENGTH -

GROUNDWATER TABLE GNE

SAMPLE		DESCRIPTION OF SOIL
FEET	SYMBOL	
		BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)
		ORANGE SILTY FINE SAND, (SM)
5		LIGHT ORANGE-GRAY CLAYEY FINE SAND, (SC)
		RED ORANGE-GRAY SANDY CLAY, (CL)
10		RED ORANGE-GRAY SILTY FINE SAND, (SM)

BORING TERMINATED AT 10.0'

GNE = GROUNDWATER NOT EVIDENT IN UPPER 10 FEET OF BORING

REMARKS \_\_\_\_\_

BORING NO. HA-4 SHEET 1 OF 1

BORING LOC. SEE SHEET 1

**BORING LOG**

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

JOB NAME SABAL TRAIL PIPELINE CS-3

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

DRILLER SCOTT (PSI) LOGGED BY SCOTT (PSI)

STARTED 5-13-14 FINISHED 5-13-14

GROUND ELEV. - CASING LENGTH -

GROUNDWATER TABLE 1.5 FT.

SAMPLE FEET	SYMBOL	DESCRIPTION OF SOIL
0 - 1	[Symbol: Dotted pattern]	DARK BROWN ORGANIC SILTY FINE SAND, (SM)
1 - 2	[Symbol: Dotted pattern]	GRAY SILTY FINE SAND, (SM)
2 - 3	[Symbol: Diagonal lines]	ORANGE-GRAY SANDY CLAY, (CL)
3 - 4		
4 - 5		
5 - 6		
6 - 7		
7 - 8		
8 - 9		
9 - 10		

BORING TERMINATED AT 3.0'

REMARKS \_\_\_\_\_

BORING NO. HA-5 SHEET 1 OF 1

BORING LOC. SEE SHEET 1

**BORING LOG**

DRILLER SCOTT (PSI) LOGGED BY SCOTT (PSI)

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

STARTED 5-14-14 FINISHED 5-14-14

JOB NAME SABAL TRAIL PIPELINE CS-3

GROUND ELEV. - CASING LENGTH -

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

GROUNDWATER TABLE 8.5 FT.

SAMPLE		DESCRIPTION OF SOIL
FEET	SYMBOL	
0		BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)
5		ORANGE SILTY FINE SAND, (SM)
10		LIGHT GRAY-BROWN FINE SAND, (SP)

BORING TERMINATED AT 10.0'

REMARKS \_\_\_\_\_

BORING NO. HA-6 SHEET 1 OF 1

BORING LOC. SEE SHEET 1

**BORING LOG**

DRILLER SCOTT (PSI) LOGGED BY SCOTT (PSI)

CLIENT GULF INTERSTATE ENGINEERING JOB NO. 07571055

STARTED 5-14-14 FINISHED 5-14-14

JOB NAME SABAL TRAIL PIPELINE CS-3

GROUND ELEV. - CASING LENGTH -

JOB LOC. ALBANY, DOUGHERTY COUNTY, GEORGIA

GROUNDWATER TABLE 8.0 FT.

SAMPLE		DESCRIPTION OF SOIL
FEET	SYMBOL	
0		LIGHT GRAY-BROWN SLIGHTLY SILTY FINE SAND, (SP-SM)
1		
2		ORANGE-CLAYEY FINE SAND, (SC)
3		
4		RED ORANGE-GRAY SANDY CLAY, (CL)
5		
6		RED GRAY TO ORANGE SILTY FINE SAND, (SM)
7		
8		
9		
10		

BORING TERMINATED AT 8.5.'

REMARKS \_\_\_\_\_