

APPENDIX H: BORING LOGS

The complete geotechnical report can be found on our FTP site:

<ftp://ftp.coastal.la.gov/BA-68%20Grand%20Liard%20Marsh%20and%20Ridge%20Restoration/Plans%20and%20Specifications/Appendicies/Appendix%20H%20-%20Boring%20Logs/>

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES	
		SAND AND SANDY SOILS		SW	WELL-GRADED SANDS, GRAVELLY SANDS	
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND	
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		SM	SILTY SANDS, SAND - SILT MIXTURES	
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES	
				ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY	
	MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
					MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
HIGHLY ORGANIC SOILS			CH	INORGANIC CLAYS OF HIGH PLASTICITY		
			OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY		
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/Quarry Spalls
	TS	Topsoil/Forest Duff/Sod



Measured groundwater level in exploration, well, or piezometer



Groundwater observed at time of exploration



Perched water observed at time of exploration

Graphic Log Contact

	Distinct contact between soil strata or geologic units
	Approximate location of soil strata change within a geologic soil unit

Material Description Contact

	Distinct contact between soil strata or geologic units
	Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

KEY TO EXPLORATION LOGS

Drilled	<u>Start</u> 8/10/2010	<u>End</u> 8/10/2010	Total Depth (ft)	35.5	Logged By Checked By	DAS VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum			4.9		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Marsh Buggy	
Latitude Longitude			N29° 18' 18.90" W89° 28' 38.17"		System Datum		Geographic NAVD88		<u>Groundwater</u> <u>Date Measured</u> <u>Depth to Water (ft)</u> <u>Elevation (ft)</u>	
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.										

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																	
5																	
10																	
15																	
20																	
25																	
30																	
35																	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-1



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B2
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF), ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)
35																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-1 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B2
Sheet 2 of 2

Drilled	<u>Start</u> 8/17/2010	<u>End</u> 8/17/2010	Total Depth (ft)	35	Logged By Checked By	DAS VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum			4.0		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Marsh Buggy	
Latitude Longitude			N29° 17' 43.25" W89° 28' 19.04"		System Datum		Geographic NAVD88		<u>Groundwater</u> <u>Date Measured</u> <u>Depth to Water (ft)</u> <u>Elevation (ft)</u>	
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.										

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																	
5					1		▽	OH									
					2				177								
					3				201								
10		16			4			CL	94	46.6				99	68	0.14	
		9			5			CH	63	63.2	0.21	0.69	15	48	26		
15		15			6				52	65.2	0.12	0.81	15			0.16	
		10			7			CL	59	63.1	0.09	0.92	15	62	37	0.18	
		13			8			ML	54	68.9	0.07		15	38	16		99
20		10			9				44	69.5	0.36	1.15	3				82
		7			10				29								
25		16			11				66	65.2	0.18	1.38	15				94
		9			12				38	78.9	0.05	1.50	15			0.08	97
		17			13				79							0.11	98
30		2			14			CH								0.05	
		10			15				70					77	45	0.09	
35		7							74					78	49	0.08	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-2



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B3
Sheet 1 of 1

Drilled	<u>Start</u> 8/17/2010	<u>End</u> 8/17/2010	Total Depth (ft)	36	Logged By Checked By	DAS VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum			4.9		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Marsh Buggy	
Latitude Longitude			N29° 16' 56.53" W89° 28' 07.76"		System Datum		Geographic NAVD88		<u>Groundwater</u> <u>Date Measured</u>	
Notes:			See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.						<u>Depth to Water (ft)</u> <u>Elevation (ft)</u>	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Min/Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																	
5																	
10		18															
15		18															
20		17															
25		8															
30		13.5															
35		13															
		16															
		21															
		16															
		22															
		17															
		15															
		17															

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-3



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B4
Sheet 1 of 2

Baton Rouge, Louisiana: Date: 7/5/11 Path: P:\16715018\GINT1671501800_LOGS.GPJ DBT template\LD1 template\GEOENGINEERS\GDT\GE18_GEOTECH_LAB

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA										
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name		Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35																		
35																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-3 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Start Drilled 8/10/2010	End 8/10/2010	Total Depth (ft) 65.5	Logged By Checked By DAS VT	Driller Specialized Environmental Resources, LLC	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 6.9	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Marsh Buggy			
Latitude Longitude N29° 18' 32.19" W89° 28' 39.09"	System Datum Geographic NAVD88	Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)	
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
6																		
5																		
6																		
10																		
8																		
15																		
15																		
10																		
15																		
20																		
15																		
20																		
25																		
20																		
25																		
30																		
25																		
20																		
25																		
30																		
35																		
40																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-4



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B5
Sheet 1 of 2

Baton Rouge, Louisiana: Date: 7/5/11 Path: P:\1617150180\INT1671501800_LOGS.GPJ DBT template\LD7 template\GEOENGINEERS\GDT\GEI8_GEO TECH.LAB

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA										
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name		Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF), ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)
35																		
	20		15					CH	Soft gray clay with sand streaks and 3" sand layer (specific gravity = 2.64)	59					71	45		
36			16					CL	Soft gray slightly sandy clay with 4" sand layer and streaks	32					45	24		81
	17		17						Very soft gray silty clay with sand pockets and 3" sand layer	64	61.7	0.16		15				90
38			18						Very soft gray very sandy clay with 5" sand layer	37	86.4	0.23	2.42	15	34	14		
	19		19					ML	Gray sandy silt with clay streaks									61
40			20					CH	Soft gray clay with fine sand and silt streaks	49	68.8	0.43		11				
	18		21						Soft gray clay with sand streaks and lenses	41					67	41		94
45			22					SM	Gray silty fine sand with clay streaks								0.21	25
	5		23					CH	Soft gray clay	63					62	35	0.17	
50			24					SM	Gray silty fine sand with clay and shell traces	65								22
	8		25					CH	Soft gray clay with fine sand streaks	64	61.4	0.41		13	87	56	0.39	
55			26						Soft gray clay with sand streaks and pockets	63	60.6	0.15		2	99	62	0.36	
	19		27						Gray clay with silt and sand streaks	56					80	51		
60			28						Very soft gray clay with 1" sand layer and pockets	46	68.3	0.16		15				
	16		29						Medium gray clay with sand pockets and streaks	58								
65																		
	21																	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-4 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B5
 Sheet 2 of 2

Start Drilled 8/14/2010	End 8/14/2010	Total Depth (ft) 65	Logged By Checked By DAS VT	Driller Specialized Environmental Resources, LLC	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 6.8	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Marsh Buggy			
Latitude Longitude N29° 17' 30.50" W89° 28' 12.55"	System Datum Geographic NAVD88	Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)	
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																	
5	7				1			OH									
	4				2				106	40				129	91	0.1	
	10				3				94					137	98		
	8				4			CL	82	55.2	0.06	0.58	15	91	61	0.1	
	10				5				36	72.5	0.08	0.69	15	47	25		
	10				6				43	78.2	0.13	0.81	15				
	10				7				41	73.4	0.10	0.92	15	41	21		
	7				8			ML	37	81.5	0.55	1.04	13				53
	5				9				40								54
	13				10				41	77.7	0.38	1.27	15				
	8				11				50	74.5	0.08	1.38	15				52
	16				12				77								
	14				13				40	85.2	0.47	1.61	15	24	2		78
	9.5				14			CL-ML	40								92
	11				15			CH	66	56.1	0.08	1.84	14	81	57	0.13	
	9.5							ML	37	76.5	0.13	1.90	15			0.2	55

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-5



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B6
Sheet 1 of 2

Baton Rouge, Louisiana: Date: 7/5/11 Path: P:\161715018\GINT1671501800_LOGS.GPJ DBT template\Bdt template\GEOENGINEERS\GDT\GEIG_GEO TECH_LAB

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA								
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name		Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35		9				16	CH Very soft gray clay with sand streaks	62					82	55	0.18	
30		5				17	Gray clay with sand pockets	59							0.2	
		9				18	Soft gray clay	50	65.9	0.20	2.30	15			0.34	
40		4				19	Gray clay	57							0.23	
35		8				20	Very soft gray clay	62	62.5	0.13	2.53	13			0.2	
		10.5				21	Soft gray clay	70							0.27	
45		14				22	Soft gray clay with fine sandy silt lenses and streaks	49	68.4	0.41		6			0.32	
40		12				23	Soft gray clay with 2" clayey sand layer at bottom and sand pockets	55	64.7	0.17		11			0.24	
45		8				24	Soft gray clay	70								
						25	No sample recovered									
55		11				26	CH Soft gray clay with 2½" fine sand layer	70	63.1	0.13		15				99
50		16				27	Soft gray clay with silt streaks and lenses	68							0.47	
		12				28	Soft gray clay with silt lenses	60	64.7	0.23		15				
60		17				29	Soft gray clay with silt traces	60	64.4	0.17		15				
55		6				30	Soft gray clay with silt streaks	63								
65																

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-5 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B6
 Sheet 2 of 2

Drilled	<u>Start</u> 8/16/2010	<u>End</u> 8/16/2010	Total Depth (ft)	65	Logged By Checked By	DAS VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum			7.0		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Marsh Buggy	
Latitude Longitude			N29° 16' 46.16" W89° 28' 02.83"		System Datum		Geographic NAVD88		<u>Groundwater</u> <u>Date Measured</u> <u>Depth to Water (ft)</u> <u>Elevation (ft)</u>	
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.										

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval Depth (feet)	Blows/foot Recovered (in)	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, pcf	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Min/Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																
5				1			PT									
6				2												
10	11			3			CH	109	42.5				93	58	0.12	
13				4			ML	36	80.7	0.66	0.69	15				73
15	5			5				27								86
11	12			6				31	91	0.39	0.92	14				84
11				7				32								98
20	11			8				35	86.9	0.16	1.15	15			0.12	67
11				9			SC	70								41
11				10			CH	77	56.5	0.13	1.38	15	98	68		
25	23			11				89					85	55		
19				12				88	54.2	0.11	1.61	14				
14				13			ML	31	87.8	0.26		10				88
12				14			SM	25	92.2	0.93	1.84	6				18
19				15				26								30

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-6



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B7
Sheet 1 of 2

Baton Rouge, Louisiana: Date: 7/5/11 Path: P:\161161801\BGIN11671501800_LOGS.GPJ DBT template\Bt template\GEOENGINEERS\GDT\GEIG_GEO TECH.LAB

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA								
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name		Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35		10.5				16	CH Soft gray clay with sand streaks and 1" fine sand layer	40	73.3	0.18		15	68	46	0.35	
30		18				17	Soft gray clay with sand streaks and 5" sand layer	60					70	41	0.3	
		16				18	Very soft gray clay with silt streaks	51								
40		20				19	Very soft gray clay with sand streaks	52	69.3	0.15		15			0.17	
35		21				20	Very soft gray clay with sand streaks	43								
		20				21	Very soft gray clay with sand streaks and 3" sand layer at top and 2" sand layer at bottom	36	79.1	0.10		14				
45		18				22	Soft gray clay with sand streaks	47								
40		21				23	CL Soft gray slightly sandy clay with 3" sandy silt layer	29	92.5	0.36		15				90
50		5				24	SM Firm gray silty sand	26								
45		18				25	CL Medium gray sandy clay with 3" clayey sand layer	26	94.3	0.58		14				63
55		18				26	ML Firm gray sandy silt with 6" clay layer	24								
50		14				27	CL Soft gray sandy clay with fine sand streaks and 4½" sandy silt layer	32								59
		11				28	Soft gray slightly sandy clay with 3" silt layer	47							0.27	
60		9				29	CH Soft gray clay with sand streaks	43	76.1	0.23		15			0.37	
55		21				30	Soft gray clay with sand streaks	52							0.43	
65																

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-6 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B7
 Sheet 2 of 2

Elevation (feet)	Depth (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA							
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name				Water Level	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %
30	35																
			6.5			16			Gray sandy silt with 1" clay layer	49							62
			10			17	◇	SM	Gray silty fine sand with clay streaks	40	74.3	0.11	2.30	2			48
	40		13			18	◇	CH	Soft gray clay with silt traces and streaks	63							
			15			19			Very soft gray clay with sand streaks	52	68	0.10		15	80	54	0.2
45		16			20		Very soft gray clay with silt streaks		52							0.23	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-7 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B8
 Sheet 2 of 2

Drilled	<u>Start</u> 8/15/2010	<u>End</u> 8/15/2010	Total Depth (ft)	47	Logged By Checked By	DAS VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary		
Surface Elevation (ft) Vertical Datum			4.3		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Marsh Buggy			
Latitude Longitude		N29° 17' 23.49" W89° 27' 58.30"			System Datum		Geographic NAVD88		<u>Groundwater</u>			
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.									<u>Date Measured</u>		<u>Depth to Water (ft)</u>	<u>Elevation (ft)</u>

Elevation (feet)	Depth (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA									
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level				Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %	
0									Zero (0) feet top of marsh buggy deck										
6																			
5																			
					</														

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-8



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B9
Sheet 1 of 2

Baton Rouge, Louisiana: Date: 7/5/11 Path: P:\16715\1671501800\LOGS.GPJ DBT template\LD7 template\GEOENGINEERS8.GDT\GEI8_GEO TECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
35	21				15				Very soft gray clay with trace organics	74							0.15	
	18.5				16				Very soft gray clay with trace organics	71	58.9	0.06		15			0.19	
	23				17				Very soft gray clay with trace organics	83							0.16	
40	18.5				18				Very soft gray clay with trace organics	83	54	0.03		15	85	53	0.21	
	23				19				Very soft gray clay with trace organics	87								
45	10				20				Soft gray clay with trace organics	77	57.8	0.10		15				0.27

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-8 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-00

Figure I-B9
Sheet 2 of 2

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16\16715018\GINT\1671501800 LOGS.GPJ DBTemplate\libTemplate:GEOENGINEERS8.GDT\GEI8 GEOTECH LAB

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

GEOENGINEERS

Figure I-B10
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA										
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35		9				15		◊	SM	Gray silty fine sand	24							38
30		7				16		◊	SP	Gray fine sand with silt traces	27							10
		12				17		◊		Gray fine sand with silt and clay traces	32	87.8	2.30	2.30	15			24
40		7				18		◊		Gray fine sand with silt traces	26							9
35		22				19		◊		Gray fine sand with silt pockets and clay layer	39	82.5	0.56	2.53	15		0.1	32
45		21				20		◊		Gray silty fine sand with 6" clay layer	34						0.22	
40								◊										

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-9 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B10
 Sheet 2 of 2



Coastal Planning & Engineering, Inc.
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Boca Raton, Florida 33431
Phone # 1-561-391-8102

Legend for Geotechnical Data

(SP), (SM), etc.

Refers to the Army Corps of Engineers Unified Soils Classification System. Class types are defined primarily by grain size, sorting and percent of material passing the 200 sieve. Classification of materials on the core logs based on visual field examinations are identified on the core logs under the Classification of Materials Description. Classifications based on laboratory sieve analyses are identified on the core logs in the Legend and under Remarks.

Grain Size Terms

Cobble –	retained on the 3.0” sieve
Gravel –	greater than the #4 sieve and less than the 3.0” sieve Coarse: greater than the ¾” sieve and less than the 3.0” sieve Fine – greater than the #4 sieve and less than the ¾” sieve
Sand -	greater than the #200 sieve and less than the #4 sieve Coarse - greater than the #10 sieve and less than the #4 sieve Medium - greater than the #40 sieve and less than the #10 sieve Fine - greater than the #230 sieve and less than the #40 sieve
Fines –	(silt or clay) passing the #230 sieve

Proportional definition of descriptive terms

<u>Descriptive Term</u>	<u>Range of Proportions</u>
Sandy, gravelly, etc.	35 % to 50 %
Some	20 % to 35 %
Little	10 % to 20 %
Trace	1 % to 10 %

Note: Information is after ACOE Atlantic Division Manual # 1110-1-1 titled *Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations*



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Legend for Geotechnical Data

GW		ML	
GP		MH	
GM		OL	
GC		OH	
SW		CL	
SP		CH	
SM		PT	
SC		SP-SM	
SW-SM		SM-SC	
GW-GM		ML-CL	
GM-GC			

Note: Information is after ACOE Atlantic Division Manual # 1110-1-1 titled *Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations*



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Phone # 1-561-391-8102

Legend for Geotechnical Data

The naming convention used by Coastal Planning and Engineering incorporates key information about the item in the title. The naming format uses the following information:

- Abbreviated area name (two letters that will be used throughout the project)
- Abbreviated data type: jet probe (JP), vibrocore (VC) or surface sample (SS)
- Collection year (YY)
- Identification number
- Sample or composite identification in the case of jet probes or vibrocores. Composite samples are indicated by COMP following the identification number. COMP represents a composite developed to characterize beach compatible material.

Format examples:

- A) GLVC-10-07
B) GLVC-10-13 S#1

Example A is vibrocore number 07, collected in the Grand Liard area in the year 2010.

Example B refers to sample number 1 taken from vibrocore number 13, which was collected in the Grand Liard area in 2010.

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-01				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Brian McCord				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -20.2 Ft.		17. TOTAL RECOVERY FOR BORING 14.5 Ft.	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR KD		19. DEPTH DRILLED INTO ROCK 0.0 Ft.	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				20. TOTAL DEPTH OF BORING 20.0 Ft.		21. SIGNATURE AND TITLE OF INSPECTOR KD	
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-20.2	0.0						
-21.1	0.9		CLAY, very soft clay, olive gray (5Y-4/2), (CL).		1	Sample #1, Depth = 0.7' Ave. Field Vane (tsf): 0.01	
-28.3	8.1		CLAY, trace shell hash, very soft clay, (1.0"x0.25") sandy pockets @ 4.2', 4.4', 5.0', 5.1' and 7.8', dark gray (5Y-4/1), (CL).		2	Sample #2, Depth = 4.4' Ave. Field Vane (tsf): 0.01	
-31.0	10.8		CLAY, trace sand, very soft clay, sand distributed in sandy pockets up to 1.0", (1.5"x1.0") silty pockets @ 10.2' and 10.4', dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 9.5' Ave. Field Vane (tsf): 0.04	
-32.9	12.7		Sandy SILT, trace clay, soft clay distributed in pockets up to 1.5", very dark gray (5Y-3/1), (ML).		4	Sample #4, Depth = 12.2' Mean (mm): 0.08, Phi Sorting: 0.31 Fines (230): 59.28% (ML)	
-34.7	14.5		CLAY, very soft clay, sandy laminae @ 12.8', 12.9' and 13.1', bit sample from 14.0' to 14.5', very dark gray (5Y-3/1), (CL).		5	Sample #5, Depth = 13.3' Ave. Field Vane (tsf): 0.04	
-40.2	20.0		No Recovery.				
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-02				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Brian McCord				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-30-10 10:30 COMPLETED 01-30-10 10:31	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -14.6 Ft.		17. TOTAL RECOVERY FOR BORING 11.8 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR PB			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.6	0.0						
-17.6	3.0		CLAY, very soft clay, sandy lamina @ 0.3', 1.0" sandy pockets with trace shell hash @ 0.7', 1.1' and 1.6', dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 1.8' Ave. Field Vane (tsf): 0.01	
-18.3	3.7		Silty SAND, fine grained, quartz, trace shell hash, 0.5" shell fragment @ 3.1', shell hash decreases with depth, dark gray (5Y-4/1), (ML).		2	Sample #2, Depth = 3.4' Mean (mm): 0.09, Phi Sorting: 0.33 Fines (230): 36.59% (ML)	
-19.6	5.0		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to (1.5"x1.0"), dark gray (2.5Y-4/1), (CL).		3	Sample #3, Depth = 4.6' Ave. Field Vane (tsf): 0.05	
-25.1	10.5		CLAY, trace shell hash, very soft clay, dark gray (2.5Y-4/1), (CL).		4	Sample #4, Depth = 7.0' Ave. Field Vane (tsf): 0.05	
-25.5	10.9		Sandy SILT, trace clay, dark gray (5Y-4/1), (ML).		5	Sample #5, Depth = 10.7' Mean (mm): 0.08, Phi Sorting: 0.30 Fines (230): 73.63% (ML)	
-26.4	11.8		CLAY, very soft clay, dark gray (2.5Y-4/1), (CL).		6	Sample #6, Depth = 11.3' Ave. Field Vane (tsf): 0.08	
			No Recovery.				
-34.6	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-02A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Brian McCord				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -14.6 Ft.		17. TOTAL RECOVERY FOR BORING 8.3 Ft.	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR PB		19. DEPTH DRILLED INTO ROCK 0.0 Ft.	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				20. TOTAL DEPTH OF BORING 20.0 Ft.		21. SIGNATURE AND TITLE OF INSPECTOR PB	
ELEV. (ft) -14.6		DEPTH (ft) 0.0		CLASSIFICATION OF MATERIALS Depths and elevations based on measured values		REMARKS	
-24.3		9.7		CLAY, very soft clay, dark grayish brown (2.5Y-4/2), (CL).		Sample #1, Depth = 10.3' Ave. Field Vane (tsf): 0.09	
-25.3		10.7		CLAY, very soft clay, (1.0"x3.0") sandy pockets @ 13.4' and 16.2', 0.5" light olive gray (5Y-6/2) clay pocket @ 14.6', (1.0"x1.5") sandy pockets @ 16.9' and 17.3', dark gray (5Y-4/1), (CL).		Sample #2, Depth = 15.0' Ave. Field Vane (tsf): 0.09	
-32.3		17.7		Sandy CLAY, some silt, soft clay, bit sample from 17.7' to 18.0', dark gray (5Y-4/1), (SM-SC).		No Recovery.	
-32.6		18.0		End of Boring			
-34.6		20.0					

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-03				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Brian McCord				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-30-10 12:14 COMPLETED 01-30-10 12:16	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -14.0 Ft.		17. TOTAL RECOVERY FOR BORING 12.6 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.0	0.0						
-15.0	1.0		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0", very dark gray (2.5Y-3/1), (CL).		1	Sample #1, Depth = 0.5' Ave. Field Vane (tsf): 0.00	
-17.0	3.0		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0" and laminae, 2.0" shell hash pocket @ 1.2', very dark grayish brown (2.5Y-3/2), (CL).		2	Sample #2, Depth = 2.5' Ave. Field Vane (tsf): 0.02	
-17.6	3.6		Clayey SAND, trace shell hash, very dark gray (5Y-3/1), (SC).		3	Sample #3, Depth = 3.3' Mean (mm): 0.13, Phi Sorting: 0.99 Fines (230): 31.81% (SC)	
-18.4	4.4		CLAY, trace shell hash, very soft clay, very dark grayish brown (2.5Y-3/2), (CL).		2		
-19.0	5.0		Clayey SAND, trace shell hash, very dark gray (5Y-3/1), (SC).		3		
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.5" and laminae, very dark grayish brown (2.5Y-3/2), (CL).		4	Sample #4, Depth = 6.8' Ave. Field Vane (tsf): 0.10	
-26.6	12.6						
			No Recovery.				
-34.0	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-03A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983 VERTICAL NAVD 88	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		☐ AUTO HAMMER ☐ MANUAL HAMMER	
4. NAME OF DRILLER Brian McCord				12. TOTAL SAMPLES		DISTURBED UNDISTURBED (UD)	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-30-10 12:45 COMPLETED 01-30-10 12:46	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -13.9 Ft.		17. TOTAL RECOVERY FOR BORING 6.7 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-13.9	0.0						
			Jetted to 10.0'.				
-23.9	10.0						
-29.5	15.6		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0" and laminae, 1.0" rock fragment @ 11.8', 0.5" organic pockets @ 14.6' and 14.9', 2.0" sandy pocket @ 15.4', very dark grayish brown (2.5Y-3/2), (CL).		VC-03 #4		
-30.6	16.7		Sandy CLAY, soft clay, sand distributed in pockets up to 1.0" and laminae, bit sample from 16.4' to 16.7', dark olive gray (5Y-3/2), (SC).			Sample #1, Depth = 16.0'	
			No Recovery.				
-33.9	20.0						
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-04				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Brian McCord				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-30-10 14:30 COMPLETED 01-30-10 14:32	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -12.8 Ft.		17. TOTAL RECOVERY FOR BORING 7.3 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-12.8	0.0						
-17.9	5.1		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0", color is mottled olive brown (2.5Y-4/3) and, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 2.5' Ave. Field Vane (tsf): 0.03	
-19.5	6.7		Sandy CLAY, trace shell hash, soft clay, sand distributed in pockets up to 2.0", 0.5" organic pocket @ 6.4', very dark grayish brown (2.5Y-3/2), (SC).				
-20.1	7.3		CLAY, soft clay, (0.75"x0.25") rock fragment in bit sample, bit sample from 6.7' to 7.3', dark olive gray (5Y-3/2), (CL).				
			No Recovery.				
-32.8	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-05				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Brian McCord				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -16.5 Ft.		17. TOTAL RECOVERY FOR BORING 13.5 Ft.	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR KD		19. DEPTH DRILLED INTO ROCK 0.0 Ft.	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				20. TOTAL DEPTH OF BORING 20.0 Ft.		21. SIGNATURE AND TITLE OF INSPECTOR KD	
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-16.5	0.0						
-17.4	0.9		CLAY, very soft clay, olive gray (5Y-4/2), (CL).		1	Sample #1, Depth = 0.6' Ave. Field Vane (tsf): 0.01	
-22.2	5.7		CLAY, trace organics, trace shell hash, very soft clay, (1.0"x0.5") organic pocket @ 2.3', dark gray (5Y-4/1), (CL).		2	Sample #2, Depth = 3.8' Ave. Field Vane (tsf): 0.04	
-23.0	6.5		CLAY, soft clay, trace very soft clay pockets up to 1.5", 1.0" light gray (5Y-7/1) clay pocket @ 6.2', dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 5.9' Ave. Field Vane (tsf): 0.20	
-26.7	10.2		SAND, fine grained, quartz, some clay, some silt, clay distributed in pockets up to 2.0" and laminae, olive gray (5Y-4/2), (SM-SC).		4	Sample #4, Depth = 8.8' Mean (mm): 0.09, Phi Sorting: 0.32 Fines (230): 29.65% (SM-SC)	
-27.3	10.8		CLAY, trace sand, very soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 10.5' Ave. Field Vane (tsf): 0.12	
-30.0	13.5		CLAY, very soft clay, trace soft clay distributed in laminae, 1.0" wood fragment @ 12.1', dark olive gray (5Y-3/2), (CL).		6	Sample #6, Depth = 12.2' Ave. Field Vane (tsf): 0.16	
-36.5	20.0		No Recovery.				
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS																																																																																												
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.																																																																																														
2. BORING DESIGNATION GLVC-10-05A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore																																																																																												
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES																																																																																												
4. NAME OF DRILLER Sean Kemnuir				14. ELEVATION GROUND WATER		15. DATE BORING																																																																																												
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -16.5 Ft.		17. TOTAL RECOVERY FOR BORING 9.7 Ft.																																																																																												
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR KD		19. DEPTH DRILLED INTO ROCK 0.0 Ft.																																																																																												
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				20. TOTAL DEPTH OF BORING 20.0 Ft.		21. SIGNATURE AND TITLE OF INSPECTOR KD																																																																																												
<table border="1"> <thead> <tr> <th>ELEV. (ft)</th> <th>DEPTH (ft)</th> <th>LEGEND</th> <th>CLASSIFICATION OF MATERIALS Depths and elevations based on measured values</th> <th>% REC.</th> <th>BOX OR SAMPLE</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>-16.5</td> <td>0.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Jetted to 10.0'.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>-26.5</td> <td>10.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>-27.7</td> <td>11.2</td> <td></td> <td>CLAY, trace organics, very soft clay, dark gray (5Y-4/1), (CL).</td> <td></td> <td>1</td> <td>Sample #1, Depth = 10.5' Ave. Field Vane (tsf): 0.02</td> </tr> <tr> <td>-28.8</td> <td>12.3</td> <td></td> <td>CLAY, some sand, very soft clay, 0.5" light gray (5Y-7/1) lithified clay pocket @ 11.3', very dark gray (5Y-3/1), (CL).</td> <td></td> <td>2</td> <td>Sample #2, Depth = 11.8' Ave. Field Vane (tsf): 0.10</td> </tr> <tr> <td>-30.0</td> <td>13.5</td> <td></td> <td>CLAY, some sand, soft clay, olive gray (5Y-4/2), (CL).</td> <td></td> <td>3</td> <td>Sample #3, Depth = 12.8' Mean (mm): 0.10, Phi Sorting: 0.45 Fines (230): 75.31% (CL)</td> </tr> <tr> <td>-31.2</td> <td>14.7</td> <td></td> <td>SAND, fine grained, quartz, some silt, (2.0"x2.5") clay pocket @ 14.3', olive gray (5Y-4/2), (SM).</td> <td></td> <td>4</td> <td>Sample #4, Depth = 13.9' Mean (mm): 0.09, Phi Sorting: 0.29 Fines (230): 30.51% (SM)</td> </tr> <tr> <td>-32.8</td> <td>16.3</td> <td></td> <td>CLAY, some sand, trace organics, soft clay, olive gray (5Y-4/2), (CL).</td> <td></td> <td>3</td> <td></td> </tr> <tr> <td>-35.2</td> <td>18.7</td> <td></td> <td>CLAY, little sand, very soft clay, dark olive gray (5Y-3/2), (CL).</td> <td></td> <td>5</td> <td>Sample #5, Depth = 17.8' Ave. Field Vane (tsf): 0.18</td> </tr> <tr> <td>-36.2</td> <td>19.7</td> <td></td> <td>CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).</td> <td></td> <td>6</td> <td>Sample #6, Depth = 19.1' Ave. Field Vane (tsf): 0.10</td> </tr> <tr> <td>-36.5</td> <td>20.0</td> <td></td> <td>No Recovery.</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>End of Boring</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>								ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	-16.5	0.0									Jetted to 10.0'.				-26.5	10.0						-27.7	11.2		CLAY, trace organics, very soft clay, dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 10.5' Ave. Field Vane (tsf): 0.02	-28.8	12.3		CLAY, some sand, very soft clay, 0.5" light gray (5Y-7/1) lithified clay pocket @ 11.3', very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 11.8' Ave. Field Vane (tsf): 0.10	-30.0	13.5		CLAY, some sand, soft clay, olive gray (5Y-4/2), (CL).		3	Sample #3, Depth = 12.8' Mean (mm): 0.10, Phi Sorting: 0.45 Fines (230): 75.31% (CL)	-31.2	14.7		SAND, fine grained, quartz, some silt, (2.0"x2.5") clay pocket @ 14.3', olive gray (5Y-4/2), (SM).		4	Sample #4, Depth = 13.9' Mean (mm): 0.09, Phi Sorting: 0.29 Fines (230): 30.51% (SM)	-32.8	16.3		CLAY, some sand, trace organics, soft clay, olive gray (5Y-4/2), (CL).		3		-35.2	18.7		CLAY, little sand, very soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 17.8' Ave. Field Vane (tsf): 0.18	-36.2	19.7		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		6	Sample #6, Depth = 19.1' Ave. Field Vane (tsf): 0.10	-36.5	20.0		No Recovery.							End of Boring			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS																																																																																												
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LOUISIANA GRAND LIARD 2010 VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-06				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-31-10 09:26 COMPLETED 01-31-10 09:29	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -17.0 Ft.		17. TOTAL RECOVERY FOR BORING 17 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-17.0	0.0						
			CLAY, trace organics, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0", organics distributed in pockets up to 0.5", (1.0"x0.5") rock fragment @ 5.4', sand increases with depth, very dark gray (2.5Y-3/1), (CL).		1	Sample #1, Depth = 3.1' Ave. Field Vane (tsf): 0.04	
					2	Sample #2, Depth = 6.0' Ave. Field Vane (tsf): 0.06	
-26.0	9.0		CLAY, little sand, trace shell hash, soft clay, very dark grayish brown (2.5Y-3/2), (CL).		3	Sample #3, Depth = 9.9' Mean (mm): 0.09, Phi Sorting: 0.38 Fines (230): 86.82% (CL)	
-27.6	10.6		CLAY, some sand, very soft clay, sand distributed in pockets up to 2.0", very dark gray (2.5Y-3/1), (SC).		4	Sample #4, Depth = 10.8' Ave. Field Vane (tsf): 0.09	
-30.0	13.0		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (CL).		5	Sample #5, Depth = 13.4' Ave. Field Vane (tsf): 0.02	
-31.0	14.0		Clayey SAND, fine grained, quartz, trace silt, clay distributed in pockets up to 1.0", bit sample from 16.6' to 17.0', very dark grayish brown (2.5Y-3/2), (CL).		6	Sample #6, Depth = 15.0' Mean (mm): 0.11, Phi Sorting: 0.48 Fines (230): 43.45% (CL)	
-34.0	17.0						
			No Recovery.				
-37.0	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-07				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-31-10 10:04 COMPLETED 01-31-10 10:05	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -14.7 Ft.		17. TOTAL RECOVERY FOR BORING 14.3 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.7	0.0						
-15.9	1.2		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets typically up to 0.5", 1.0" sand pocket @ 0.5", very dark grayish brown (2.5Y-3/2), (CL).		1	Sample #1, Depth = 0.9' Ave. Field Vane (tsf): 0.03	
-18.4	3.7		CLAY, little sand, trace organics, trace shell hash, very soft clay, sand distributed in pockets up to 0.5", organics distributed in laminae, very dark gray (2.5Y-3/1), (CL).		2	Sample #2, Depth = 2.6' Ave. Field Vane (tsf): 0.03	
-23.7	9.0		CLAY, trace organics, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 0.25", organics distributed in laminae, very dark gray (2.5Y-3/1), (CL).		3	Sample #3, Depth = 5.0' Ave. Field Vane (tsf): 0.04	
-24.3	9.6		CLAY, soft clay, 2.0" sand pocket @ 9.4', very dark gray (2.5Y-3/1), (CL).		4	Sample #4, Depth = 9.3' Ave. Field Vane (tsf): 0.19	
-27.6	12.9		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (CL).		5	Sample #5, Depth = 11.0' Ave. Field Vane (tsf): 0.05	
-28.4	13.7		Clayey SAND, trace shell hash, trace silt, olive brown (2.5Y-4/3), (CL).		6	Sample #6, Depth = 13.4' Mean (mm): 0.09, Phi Sorting: 0.29 Fines (230): 45.30% (CL)	
-29.0	14.3		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (CL).		5		
-34.7	20.0		No Recovery.				
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana		9. SIZE AND TYPE OF BIT 3.0 In.		
2. BORING DESIGNATION GLVC-10-07A		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane HORIZONTAL NAD 1983 VERTICAL NAVD 88		
3. DRILLING AGENCY American Vibracore Services, Inc.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER Alpine Pneumatic Vibracore ☐ MANUAL HAMMER		
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		13. TOTAL NUMBER CORE BOXES		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		15. DATE BORING STARTED 01-31-10 10:40 COMPLETED 01-31-10 10:41		
8. TOTAL DEPTH OF BORING 21.9 Ft.		16. ELEVATION TOP OF BORING -14.7 Ft.		
		17. TOTAL RECOVERY FOR BORING 11.9 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR BF		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.7	0.0					
			Jetted to 10.0'.			
-24.7	10.0					
					1	Sample #1, Depth = 12.5' Ave. Field Vane (tsf): 0.03
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets typically up to 0.5", (1.0"x0.5") shell fragment @ 13.5', 2.0" sandy pocket @ 16.6', 1.0" sand pocket @ 17.6', dark gray (2.5Y-4/1), (CL).		2	Sample #2, Depth = 15.5' Ave. Field Vane (tsf): 0.03
-32.5	17.8					
-33.2	18.5		SILT, some clay, trace sand, clay distributed in pockets up to 1.0", very dark gray (5Y-3/1), (ML-CL).		3	Sample #3, Depth = 18.3' Mean (mm): 0.10, Phi Sorting: 1.22 Fines (230): 96.62% (ML-CL)
-34.3	19.6		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		1	
-36.0	21.3		SAND, fine grained, quartz, some clay, some silt, 1.0" clay pocket @ 20.5', very dark gray (5Y-3/1), (ML-CL).		4	Sample #4, Depth = 20.3' Mean (mm): 0.08, Phi Sorting: 0.27 Fines (230): 42.83% (ML-CL)
-36.6	21.9		CLAY, little sand, very soft clay, sand distributed in pockets up to 0.25", bit sample from 21.6' to 21.9', dark gray (2.5Y-4/1), (CL).		5	Sample #5, Depth = 21.5' Ave. Field Vane (tsf): 0.04

End of Boring

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-08				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 01-31-10 10:55 COMPLETED 01-31-10 10:56	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -22.4 Ft.		17. TOTAL RECOVERY FOR BORING 18.7 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-22.4	0.0						
			CLAY, trace shell hash, very soft clay, 1.0" pocket of wood fragments @ 0.7', 0.25" whole shell @ 0.1', dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 2.3' Ave. Field Vane (tsf): 0.04	
-27.0	4.6		CLAY, little sand, very soft clay, sand distributed in pockets up to 1.0", dark gray (2.5Y-4/1), (CL).		2	Sample #2, Depth = 5.4' Ave. Field Vane (tsf): 0.08	
-29.4	7.0		Clayey SAND, fine grained, quartz, soft clay, dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 7.3' Mean (mm): 0.09, Phi Sorting: 0.36 Fines (230): 44.54% (CL)	
-30.0	7.6		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		4	Sample #4, Depth = 8.0' Ave. Field Vane (tsf): 0.08	
-31.6	9.2		CLAY, little sand, very soft clay, sand distributed in pockets up to 1.0", 1.0" pocket of gray (2.5Y-6/1) lithified clay @ 10.6', dark gray (2.5Y-4/1), (CL).		2		
-34.0	11.6		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		5	Sample #5, Depth = 13.2' Ave. Field Vane (tsf): 0.06	
-39.2	16.8		CLAY, very soft clay, bit sample from 18.3' to 18.7', dark gray (2.5Y-4/1), (CL).		6	Sample #6, Depth = 17.5' Ave. Field Vane (tsf): 0.06	
-41.1	18.7		No Recovery.				
-42.4	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-09				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 08:58 COMPLETED 02-10-10 08:59	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -13.6 Ft.		17. TOTAL RECOVERY FOR BORING 10 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-13.6	0.0						
-13.8	0.2		CLAY, trace organics, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 0.1' Ave. Field Vane (tsf): 0.00	
-14.8	1.2		CLAY, little organics, very soft clay, organics distributed in pockets up to 0.5", 0.5" wood fragment @ 0.7", dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 1.0' Ave. Field Vane (tsf): 0.03	
-17.9	4.3		CLAY, some organics, very soft clay, organics distributed in pockets typically up to 1.0", (2.0"x1.0") organic pocket @ 2.3', (3.0"x2.0") organic pocket @ 3.8', dark olive gray (5Y-3/2), (CL).		3	Sample #3, Depth = 4.0' Ave. Field Vane (tsf): 0.05	
-20.2	6.6		CLAY, trace organics, very soft clay, organics distributed in pockets typically up to 0.5", 1.0" organic pocket @ 4.3', dark olive gray (5Y-3/2), (CL).		4	Sample #4, Depth = 5.4' Ave. Field Vane (tsf): 0.07	
-21.1	7.5		Clayey SILT, very soft clay, very dark grayish brown (2.5Y-3/2), (ML-CL).		5	Sample #5, Depth = 7.0' Ave. Field Vane (tsf): 0.03	
-23.6	10.0		SAND, fine grained, quartz, some clay, (1.0"x2.0") clay pocket @ 7.6', (3.0"x0.5") clay pocket @ 7.8', very dark grayish brown (2.5Y-3/2), (SC).		6	Sample #6, Depth = 9.0' Mean (mm): 0.12, Phi Sorting: 0.42 Fines (230): 32.32% (SC)	
			No Recovery.				
-33.6	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-09A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983 VERTICAL NAVD 88	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER ☐ MANUAL HAMMER			
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)			
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES			
6. THICKNESS OF OVERBURDEN 0.0 Ft.				14. ELEVATION GROUND WATER			
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				15. DATE BORING STARTED 02-10-10 09:54 COMPLETED 02-10-10 09:57			
8. TOTAL DEPTH OF BORING 20.0 Ft.				16. ELEVATION TOP OF BORING -13.5 Ft.			
				17. TOTAL RECOVERY FOR BORING 10.8 Ft.			
				18. SIGNATURE AND TITLE OF INSPECTOR KD			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-13.5	0.0		Jetted to 4.0'.				0
-17.5	4.0						
-20.2	6.7		CLAY, very soft clay, 1.5" sandy pocket @ 4.1', dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 5.7' Ave. Field Vane (tsf): 0.05	5
-20.6	7.1		Sandy CLAY, very soft clay, 1.0" light gray (5Y-7/1) clay pocket @ 4.1', very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 6.8' Ave. Field Vane (tsf): 0.02	
-21.4	7.9		Clayey SILT, dark olive gray (5Y-3/2), (ML-CL).		2		
-22.5	9.0		Sandy CLAY, very soft clay, very dark gray (5Y-3/1), (CL).		3	Sample #3, Depth = 9.4' Mean (mm): 0.09, Phi Sorting: 0.42 Fines (230): 69.91% (CL)	10
-23.8	10.3		CLAY, some sand, soft clay, 1.0" organic pocket @ 9.6', dark olive gray (5Y-3/2), (CL).		4	Sample #4, Depth = 10.6' Mean (mm): 0.11, Phi Sorting: 0.42 Fines (230): 41.08% (SC)	
-24.3	10.8		Clayey SAND, fine grained, quartz, dark olive gray (5Y-3/2), (SC).		3		
-25.2	11.7		CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).		2		
-25.8	12.3		CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).		3		
-26.5	13.0		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		2		
-27.0	13.5		CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).		3		
-28.3	14.8		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).				15
			CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).				
			No Recovery.				
-33.5	20.0						20
			End of Boring				25

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-10				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Sean Kemnuir				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -14.9 Ft.		17. TOTAL RECOVERY FOR BORING 15.6 Ft.	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF		19. DEPTH DRILLED INTO ROCK 0.0 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.							
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.9	0.0						
-15.8	0.9		CLAY, trace sand, trace shell hash, very soft clay, very dark grayish brown (2.5Y-3/2), (CL).				
-19.1	4.2		CLAY, trace sand, trace shell hash, trace wood, very soft clay, wood fragments typically up to 0.5", sand distributed in pockets up to 1.0", 1.0" organic pocket @ 0.9', 1.0" wood fragment @ 1.2', dark gray (2.5Y-4/1), (CL).		1		Sample #1, Depth = 2.4' Ave. Field Vane (tsf): 0.07
-19.7	4.8		SILT, some clay, clay distributed in pockets up to 2.0", very dark gray (2.5Y-3/1), (ML-CL).		2		Sample #2, Depth = 4.5' Mean (mm): 0.09, Phi Sorting: 0.34 Fines (230): 70.99% (ML-CL)
			CLAY, trace sand, very soft clay, sand distributed in pockets typically up to 0.5", (1.0"x0.5") whole shell @ 6.3', 1.0" sand pocket @ 9.2', sand increases with depth, dark gray (2.5Y-4/1), (CL).		3		Sample #3, Depth = 8.4' Ave. Field Vane (tsf): 0.05
-26.8	11.9						
-27.3	12.4		SAND, fine grained, quartz, some clay, some silt, very dark gray (2.5Y-3/1), (ML-CL).		4		Sample #4, Depth = 12.1' Mean (mm): 0.12, Phi Sorting: 0.39 Fines (230): 47.21% (ML-CL)
-28.1	13.2		CLAY, trace sand, soft clay, very dark gray (5Y-3/1), (CL).				
-29.9	15.0		CLAY, some sand, trace shell hash, soft clay, dark olive gray (5Y-3/2), (CL).		5		Sample #5, Depth = 14.0' Mean (mm): 0.09, Phi Sorting: 0.60 Fines (230): 75.15% (CL)
-30.5	15.6		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", bit sample from 15.2' to 15.6', dark olive gray (5Y-3/2), (CL).				
			No Recovery.				
-34.9	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana			9. SIZE AND TYPE OF BIT 3.0 In.	
2. BORING DESIGNATION GLVC-10-10A			10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88	
3. DRILLING AGENCY American Vibracore Services, Inc.			11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER ☐ MANUAL HAMMER	
4. NAME OF DRILLER Sean Kemnuir			12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED			13. TOTAL NUMBER CORE BOXES	
6. THICKNESS OF OVERBURDEN 0.0 Ft.			14. ELEVATION GROUND WATER	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.			15. DATE BORING STARTED 02-10-10 10:31 COMPLETED 02-10-10 10:33	
8. TOTAL DEPTH OF BORING 20.0 Ft.			16. ELEVATION TOP OF BORING -14.9 Ft.	
			17. TOTAL RECOVERY FOR BORING 7.1 Ft.	
			18. SIGNATURE AND TITLE OF INSPECTOR BF	

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.9	0.0					
			Jettied to 10.0'.			
-24.9	10.0					
-27.9	13.0		CLAY, trace sand, very soft clay, sand distributed in pockets typically up to 0.5", (2.0"x3.0") sand pocket @ 12.4', (1.0"x0.5") wood fragment @ 12.6', dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 11.1' Ave. Field Vane (tsf): 0.01
-28.6	13.7		Sandy SILT, very dark gray (2.5Y-3/1), (ML).		2	Sample #2, Depth = 13.4' Mean (mm): 0.10, Phi Sorting: 0.43 Fines (230): 52.91% (ML)
-29.0	14.1		CLAY, little sand, trace shell hash, soft clay, sand distributed in pockets up to 1.0", very dark gray (2.5Y-3/1), (SC).			
-32.0	17.1		CLAY, trace sand, very soft clay, sand distributed in pockets up to 1.0", very dark gray (2.5Y-3/1), (CL).		3	Sample #3, Depth = 14.2' Ave. Field Vane (tsf): 0.02
-34.9	20.0		No Recovery.			
			End of Boring			

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-11				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Sean Kemnuir				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		DEG. FROM VERTICAL		BEARING		STARTED 02-10-10 11:05 COMPLETED 02-10-10 11:06	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				16. ELEVATION TOP OF BORING -13.5 Ft.			
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. TOTAL RECOVERY FOR BORING 15 Ft.			
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-13.5	0.0						
-13.8	0.3		CLAY, little sand, trace shell hash, very soft clay, very dark gray (2.5Y-3/1), (CL).		1	Sample #1, Depth = 0.2' Ave. Field Vane (tsf): 0.03	
			CLAY, trace organics, very soft clay, organics distributed in pockets up to 1.0", dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 1.2' Ave. Field Vane (tsf): 0.02	
-15.9	2.4		CLAY, little organics, very soft clay, organics distributed in pockets typically up to 1.0", 2 (2.0"x1.0") pockets of organics @ 3.2', very dark gray (2.5Y-3/1), (CL).		3	Sample #3, Depth = 3.0' Ave. Field Vane (tsf): 0.03	
-17.5	4.0		CLAY, trace organics, very soft clay, organics distributed in pockets up to 0.5", 0.5" rock fragment @ 5.6', very dark gray (2.5Y-3/1), (CL).		4	Sample #4, Depth = 6.0' Ave. Field Vane (tsf): 0.03	
-22.0	8.5		CLAY, some sand, very soft clay, very dark grayish brown (2.5Y-3/2), (SC).		5	Sample #5, Depth = 8.9' Ave. Field Vane (tsf): 0.05	
-22.5	9.0		Sandy CLAY, very soft clay, sand distributed in pockets up to 3.0", (0.5"x1.0") rock fragment @ 9.6', very dark grayish brown (2.5Y-3/2), (SC).		6	Sample #6, Depth = 12.0' Ave. Field Vane (tsf): 0.05	
-27.5	14.0		SILT, trace clay, trace sand, trace shell hash, clay distributed in pockets up to 1.0", 1.0" wood fragment @ 14.4', dark olive gray (5Y-3/2), (ML-CL).		7	Sample #7, Depth = 14.4' Mean (mm): 0.08, Phi Sorting: 0.35 Fines (230): 85.06% (ML-CL)	
-28.3	14.8		SILT, some clay, trace shell hash, dark olive gray (5Y-3/2), (ML-CL).		8	Sample #8, Depth = 15.0' Mean (mm): 0.10, Phi Sorting: 0.78 Fines (230): 93.06% (ML-CL)	
-28.5	15.0		No Recovery.				
-33.5	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-12				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983 VERTICAL NAVD 88	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		☐ AUTO HAMMER ☐ MANUAL HAMMER	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		DISTURBED UNDISTURBED (UD)	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 11:10 COMPLETED 02-10-10 11:11	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -13.5 Ft.		17. TOTAL RECOVERY FOR BORING 16.9 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-13.5	0.0						
-13.9	0.4		CLAY, very soft clay, dark olive brown (2.5Y-3/3), (CL).		1	Sample #1, Depth = 0.2'	
-14.3	0.8		CLAY, some sand, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (SC).		2	Ave. Field Vane (tsf): 0.02	
-15.4	1.9		Clayey SILT, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		3	Sample #2, Depth = 0.6'	
-17.0	3.5		SILT, little clay, trace organics, trace shell hash, organics distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (ML-CL).		4	Ave. Field Vane (tsf): 0.05	
-17.6	4.1		CLAY, little organics, trace sand, very soft clay, sand distributed in pockets up to 0.5", (2.0"x0.5") wood fragment @ 3.6", dark olive gray (5Y-3/2), (CL).		5	Sample #3, Depth = 1.5'	
-18.4	4.9		Clayey SILT, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		3	Ave. Field Vane (tsf): 0.05	
-22.6	9.1		CLAY, little organics, very soft clay, organics distributed in pockets up to 0.5" and laminae, (0.5"x0.25") rock fragment @ 6.9", 2.0" sandy pocket @ 8.0", very dark gray (5Y-3/1), (CL).		6	Sample #4, Depth = 2.5'	
-24.4	10.9		Sandy CLAY, trace organics, very soft clay, very dark gray (2.5Y-3/1), (SC).		7	Mean (mm): 0.09, Phi Sorting: 0.82	
-27.5	14.0		Clayey SILT, trace shell hash, very soft clay, very dark grayish brown (2.5Y-3/2), (ML-CL).		8	Fines (230): 93.30% (ML-CL)	
-30.0	16.5		CLAY, some sand, soft clay, sand distributed in pockets up to 2.0", (1.0"x0.5") rock fragment @ 13.9", very dark grayish brown (2.5Y-3/2), (SC).			Sample #5, Depth = 3.9'	
-30.4	16.9		SAND, fine grained, quartz, little clay, very dark grayish brown (2.5Y-3/2), (SC).			Ave. Field Vane (tsf): 0.02	
-33.5	20.0		No Recovery.			Sample #6, Depth = 7.5'	
			End of Boring			Ave. Field Vane (tsf): 0.08	
						Sample #7, Depth = 10.5'	
						Ave. Field Vane (tsf): 0.01	
						Sample #8, Depth = 13.5'	
						Ave. Field Vane (tsf): 0.03	

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-13				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 11:32 COMPLETED 02-10-10 11:33	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -14.7 Ft.		17. TOTAL RECOVERY FOR BORING 17.8 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.7	0.0						
-15.6	0.9		CLAY, trace shell hash, very soft clay, (1.0"x2.0") sand pocket @ 0.2', (2.0"x1.0") organic pocket @ 0.7', black (2.5Y-2.5/1), (CL).		1	Sample #1, Depth = 0.5' Ave. Field Vane (tsf): 0.00	
			CLAY, trace organics, trace sand, trace shell hash, very soft clay, sand distributed in pockets typically up to 1.0", 3.0" sand pocket @ 1.1', organics distributed in pockets up to 0.5" and laminae, 0.25" rock fragment @ 3.4', (0.5"x1.0") wood fragment @ 7.5', 0.25" shell fragment @ 7.6', sand and organics increase with depth, very dark gray (2.5Y-3/1), (CL).		2	Sample #2, Depth = 3.0' Ave. Field Vane (tsf): 0.05	
					3	Sample #3, Depth = 6.0' Ave. Field Vane (tsf): 0.05	
-23.5	8.8		Sandy CLAY, very soft clay, very dark grayish brown (2.5Y-3/2), (SC).		4	Sample #4, Depth = 9.0' Ave. Field Vane (tsf): 0.03	
-24.3	9.6		CLAY, very soft clay, (2.0"x1.0") rock fragment @ 10.7', very dark gray (2.5Y-3/1), (CL).		2		
-24.9	10.2		Clayey SAND, fine grained, quartz, very dark grayish brown (2.5Y-3/2), (SC).				
-25.6	10.9		CLAY, little sand, very soft clay, sand distributed in pockets up to 2.0", (0.25"x0.5") wood fragment @ 12.6', very dark grayish brown (2.5Y-3/2), (CL).		5	Sample #5, Depth = 12.0' Ave. Field Vane (tsf): 0.03	
-32.0	17.3		Sandy CLAY, very soft clay, 0.5" wood fragment @ 17.8', very dark grayish brown (2.5Y-3/2), (SC).		6	Sample #6, Depth = 15.0' Ave. Field Vane (tsf): 0.05	
-32.5	17.8		No Recovery.				
-34.7	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-14				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 12:09 COMPLETED 02-10-10 12:10	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -14.0 Ft.		17. TOTAL RECOVERY FOR BORING 15.3 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR KD			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.0	0.0						
			CLAY, trace organics, trace sand, very soft clay, sand distributed in sandy pockets up to 0.5", very dark gray (5Y-3/1), (CL).		1	Sample #1, Depth = 3.2' Ave. Field Vane (tsf): 0.05	
					2	Sample #2, Depth = 6.2' Ave. Field Vane (tsf): 0.08	
-23.5	9.5						
			Clayey SILT, very soft clay, 0.5" pocket of lithified light gray (5Y-7/1) clay @ 12.7', very dark gray (5Y-3/1), (ML-CL).		3	Sample #3, Depth = 12.2' Ave. Field Vane (tsf): 0.03	
-29.3	15.3						
			No Recovery.				
-34.0	20.0						
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-15				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
LOCATION COORDINATES X = 3,855,919 Y = 266,837				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		☐ AUTO HAMMER ☐ MANUAL HAMMER	
3. DRILLING AGENCY American Vibracore Services, Inc.				CONTRACTOR FILE NO.		12. TOTAL SAMPLES	
4. NAME OF DRILLER Sean Kemnuir				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG. FROM VERTICAL		BEARING	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 12:28	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -13.9 Ft.		COMPLETED 02-10-10 12:30	
8. TOTAL DEPTH OF BORING 20.0 Ft.				17. TOTAL RECOVERY FOR BORING 17 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD	
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-13.9	0.0						
-16.9	3.0		CLAY, trace shell hash, very soft clay, color is mottled olive gray (5Y-4/2) and, black (5Y-2.5/1), (CL).		1	Sample #1, Depth = 2.0' Ave. Field Vane (tsf): 0.02	
-18.1	4.2		Sandy CLAY, trace shell hash, soft clay, dark olive gray (5Y-3/2), (CL).				
-19.3	5.4		CLAY, very soft clay, 2.5" sandy pocket @ 5.0', color is mottled olive gray (5Y-4/2) and, black (5Y-2.5/1), (CL).		1		
-24.6	10.7		Clayey SILT, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		2	Sample #2, Depth = 8.0' Ave. Field Vane (tsf): 0.05	
-25.5	11.6		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		3	Sample #3, Depth = 11.0' Ave. Field Vane (tsf): 0.05	
-26.4	12.5		Clayey SILT, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		2		
-27.7	13.8		Sandy CLAY, dark olive gray (5Y-3/2), (CL).		4	Sample #4, Depth = 13.2' Mean (mm): 0.09, Phi Sorting: 0.31 Fines (230): 63.36% (CL)	
-28.6	14.7		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 14.0' Ave. Field Vane (tsf): 0.05	
-29.3	15.4		Sandy CLAY, dark olive gray (5Y-3/2), (CL).		4		
-30.9	17.0		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		5		
-33.9	20.0		No Recovery.				
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-16				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
LOCATION COORDINATES X = 3,848,463 Y = 266,592				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		☐ AUTO HAMMER ☐ MANUAL HAMMER	
3. DRILLING AGENCY American Vibracore Services, Inc.				CONTRACTOR FILE NO.		12. TOTAL SAMPLES	
4. NAME OF DRILLER Sean Kemnuir				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG. FROM VERTICAL		BEARING	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 12:55	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -17.6 Ft.		COMPLETED 02-10-10 12:56	
8. TOTAL DEPTH OF BORING 20.0 Ft.				17. TOTAL RECOVERY FOR BORING 20.3 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD	
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-17.6	0.0						
					1	Sample #1, Depth = 5.0' Ave. Field Vane (tsf): 0.05	0
			CLAY, trace sand, trace shell hash, very soft clay, (1.25"x0.25") wood fragment @ 0.7', 0.25" pocket of light gray (5Y-7/2) lithified clay @ 11.7', sand distributed in sandy pockets up to (2.0"x0.25"), bit sample from 20.0' to 20.3', expansion from 20.0' to 20.3', color is mottled olive gray (5Y-4/1) and, very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 17.0' Ave. Field Vane (tsf): 0.10	5
							10
							15
							20
-37.9	20.3		End of Boring				25

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-17				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 13:15 COMPLETED 02-10-10 13:16	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -19.6 Ft.		17. TOTAL RECOVERY FOR BORING 19.9 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR ML			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-19.6	0.0						
			CLAY, trace organics, very soft clay, 2.0" sandy pocket @ 3.8', dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 5.0' Ave. Field Vane (tsf): 0.02	
-27.4	7.8		CLAY, very soft clay, color alternating with dark grayish brown (10YR-4/2) and, dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 11.0' Ave. Field Vane (tsf): 0.05	
-33.9	14.3		CLAY, very soft clay, bit sample from 19.7' to 19.9', dark olive gray (5Y-3/2), (CL).		3	Sample #3, Depth = 17.0' Ave. Field Vane (tsf): 0.07	
-39.5	19.9		No Recovery.				
-39.6	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-18				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
LOCATION COORDINATES X = 3,848,849 Y = 265,732				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		☐ AUTO HAMMER ☐ MANUAL HAMMER	
3. DRILLING AGENCY American Vibracore Services, Inc.				CONTRACTOR FILE NO.		12. TOTAL SAMPLES	
4. NAME OF DRILLER Sean Kemnuir				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG. FROM VERTICAL		BEARING	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 13:41	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -18.4 Ft.		COMPLETED 02-10-10 13:42	
8. TOTAL DEPTH OF BORING 20.0 Ft.				17. TOTAL RECOVERY FOR BORING 19 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD	
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-18.4	0.0						
-19.1	0.7		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).				
					1	Sample #1, Depth = 6.8' Ave. Field Vane (tsf): 0.03	
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in sandy pockets up to (2.0"x0.5"), 0.5" shell fragment @ 8.9', (1.0"x0.5") light gray (5Y-7/1) clay pocket @ 10.5', bit sample from 17.4' to 17.8', color is mottled dark gray (5Y-4/1) and, dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 15.8' Ave. Field Vane (tsf): 0.04	
-37.4	19.0						
-38.4	20.0		No Recovery.				
			End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-19				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Sean Kemnuir				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -18.8 Ft.		17. TOTAL RECOVERY FOR BORING 17.8 Ft.	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR KD		19. DEPTH DRILLED INTO ROCK 0.0 Ft.	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				20. TOTAL DEPTH OF BORING 20.0 Ft.		21. LOCATION COORDINATES X = 3,847,954 Y = 265,731	
22. DRILLING AGENCY American Vibracore Services, Inc.				23. CONTRACTOR FILE NO.		24. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER ☐ MANUAL HAMMER	
25. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				26. DEG. FROM VERTICAL		27. BEARING	
28. THICKNESS OF OVERBURDEN 0.0 Ft.				29. ELEVATION TOP OF BORING -18.8 Ft.		30. TOTAL RECOVERY FOR BORING 17.8 Ft.	
31. DEPTH DRILLED INTO ROCK 0.0 Ft.				32. TOTAL DEPTH OF BORING 20.0 Ft.		33. SIGNATURE AND TITLE OF INSPECTOR KD	
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-18.8	0.0						
-19.2	0.4		CLAY, little sand, trace shell hash, soft clay, very dark gray (5Y-3/1), (CL).				
					1	Sample #1, Depth = 5.3' Ave. Field Vane (tsf): 0.05	
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed sandy in pockets up to (2.5"x1.0"), (1.0"x0.5") whole shell @ 0.7', 0.75" shell fragment @ 3.6', colors alternating with dark grayish brown (10YR-4/2) from 9.2' to 14.0', color is mottled dark gray (5Y-4/1) and, black (5Y-2.5/1), (CL).		2	Sample #2, Depth = 14.3' Ave. Field Vane (tsf): 0.04	
-36.6	17.8						
-38.8	20.0		No Recovery.				
			End of Boring				

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-20				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 14:16 COMPLETED 02-10-10 14:17	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -19.8 Ft.		17. TOTAL RECOVERY FOR BORING 16.7 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR KD			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-19.8	0.0						
			CLAY, trace sand, very soft clay, sand distributed in sandy pockets up to (1.0"x0.25"), colors alternating with dark grayish brown (10YR-4/2) from 7.4' to 15.0', color is mottled dark gray (5Y-4/1) and, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 4.7' Ave. Field Vane (tsf): 0.02	
					2	Sample #2, Depth = 13.7' Ave. Field Vane (tsf): 0.05	
-36.5	16.7		No Recovery.				
-39.8	20.0		End of Boring				

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-21				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 14:35 COMPLETED 02-10-10 14:36	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -19.3 Ft.		17. TOTAL RECOVERY FOR BORING 16.9 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-19.3	0.0						
-20.3	1.0		CLAY, trace organics, trace shell hash, very soft clay, organics distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 0.5' Ave. Field Vane (tsf): 0.03	
			CLAY, very soft clay, 0.5" whole shell @ 2.6', dark gray (2.5Y-4/1), (CL).		2	Sample #2, Depth = 1.5' Ave. Field Vane (tsf): 0.05	
-27.3	8.0				3	Sample #3, Depth = 7.5' Ave. Field Vane (tsf): 0.06	
-28.3	9.0		CLAY, very soft clay, (2.5"x1.0") sand pocket @ 8.0', very dark gray (5Y-3/1), (CL).		4	Sample #4, Depth = 8.5' Ave. Field Vane (tsf): 0.03	
-36.2	16.9		CLAY, trace shell hash, very soft clay, (2.0"x1.0") sand pocket @ 12.0', bit sample from 16.5' to 16.9', dark gray (2.5Y-4/1), (CL).		2		
-39.3	20.0		No Recovery.				
			End of Boring				

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-22				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
3. DRILLING AGENCY American Vibracore Services, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		☐ AUTO HAMMER ☐ MANUAL HAMMER	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				13. TOTAL NUMBER CORE BOXES		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 02-10-10 14:51 COMPLETED 02-10-10 14:52	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -18.1 Ft.		17. TOTAL RECOVERY FOR BORING 16.1 Ft.	
8. TOTAL DEPTH OF BORING 20.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-18.1	0.0						
-18.8	0.7		CLAY, very soft clay, very dark gray (5Y-3/1), (CL).		1	Sample #1, Depth = 0.4' Ave. Field Vane (tsf): 0.03	
					2	Sample #2, Depth = 3.8' Ave. Field Vane (tsf): 0.02	
					3	Sample #3, Depth = 6.8' Ave. Field Vane (tsf): 0.02	
					4	Sample #4, Depth = 12.8' Ave. Field Vane (tsf): 0.05	
-34.2	16.1		CLAY, trace sand, very soft clay, sand distributed in pockets typically up to 0.5", 2.0" sand pocket @ 5.5', 0.25" whole shell @ 5.6', 1.0" sand pockets @ 9.7' and 9.9', 2.0" pocket of slightly firmer clay @ 13.1', bit sample from 15.8' to 16.1', very dark gray (5Y-3/1), (CL).				
			No Recovery.				
-38.1	20.0		End of Boring				

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DRILLING LOG			DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana 					9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-23					10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	VERTICAL NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.					CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER ☐ MANUAL HAMMER	
4. NAME OF DRILLER Sean Kemnuir					12. TOTAL SAMPLES		DISTURBED	UNDISTURBED (UD)
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED					DEG. FROM VERTICAL	BEARING		
6. THICKNESS OF OVERBURDEN 0.0 Ft.					13. TOTAL NUMBER CORE BOXES			
7. DEPTH DRILLED INTO ROCK 0.0 Ft.					14. ELEVATION GROUND WATER			
8. TOTAL DEPTH OF BORING 20.0 Ft.					15. DATE BORING		STARTED 02-10-10 15:10	COMPLETED 02-10-10 15:11
					16. ELEVATION TOP OF BORING -20.3 Ft.			
					17. TOTAL RECOVERY FOR BORING 18.8 Ft.			
					18. SIGNATURE AND TITLE OF INSPECTOR KD			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS		
-20.3	0.0							
					1	Sample #1, Depth = 6.7' Ave. Field Vane (tsf): 0.02	0	
			CLAY, trace sand, very soft clay, sand distributed in sandy pockets up to 2.0", 1.0" light gray (5Y-7/2) clay pocket @ 5.2', bit sample from 18.5' to 18.8', color is mottled dark grayish brown (10YR-4/2) and, dark gray (5Y-4/1), (CL).		2	Sample #2, Depth = 15.7' Ave. Field Vane (tsf): 0.07	5	
							10	
							15	
-39.1	18.8						20	
-40.3	20.0		No Recovery.				25	
			End of Boring					

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

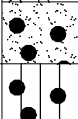
DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-24				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore	
3. DRILLING AGENCY American Vibracore Services, Inc.				12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES	
4. NAME OF DRILLER Sean Kemnuir				14. ELEVATION GROUND WATER		15. DATE BORING	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				16. ELEVATION TOP OF BORING -19.8 Ft.		17. TOTAL RECOVERY FOR BORING 19.2 Ft.	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR BF		19. DEPTH DRILLED INTO ROCK 0.0 Ft.	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				20. TOTAL DEPTH OF BORING 20.0 Ft.		21. SIGNATURE AND TITLE OF INSPECTOR BF	
ELEV. (ft) -19.8		DEPTH (ft) 0.0		CLASSIFICATION OF MATERIALS Depths and elevations based on measured values		REMARKS	
-32.8		13.0		CLAY, trace shell hash, very soft clay, 0.25" whole shell @ 1.8', 1.0" sand pocket @ 6.3', (0.25"x1.0") sand pocket @ 9.1', (1.0"x2.0") sand pocket @ 9.6', very dark gray (5Y-3/1), (CL).		Sample #1, Depth = 3.6' Ave. Field Vane (tsf): 0.03	
-36.8		17.0		CLAY, very soft clay, (1.0"x0.25") sand pocket @ 14.1', very dark gray (5Y-3/1), (CL).		Sample #2, Depth = 8.5' Ave. Field Vane (tsf): 0.02	
-39.0		19.2		CLAY, soft clay, bit sample from 18.8' to 19.2', very dark gray (5Y-3/1), (CL).		Sample #3, Depth = 15.6' Ave. Field Vane (tsf): 0.07	
-39.8		20.0		No Recovery.		End of Boring	

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.			
2. BORING DESIGNATION GLVC-10-25				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane		HORIZONTAL NAD 1983	
LOCATION COORDINATES X = 3,846,609 Y = 266,533				11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88	
3. DRILLING AGENCY American Vibracore Services, Inc.				CONTRACTOR FILE NO.		☐ AUTO HAMMER ☐ MANUAL HAMMER	
4. NAME OF DRILLER Sean Kemnuir				12. TOTAL SAMPLES		DISTURBED UNDISTURBED (UD)	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED				DEG. FROM VERTICAL		BEARING	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				13. TOTAL NUMBER CORE BOXES			
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				14. ELEVATION GROUND WATER			
8. TOTAL DEPTH OF BORING 20.0 Ft.				15. DATE BORING		STARTED 02-10-10 15:44 COMPLETED 02-10-10 15:45	
				16. ELEVATION TOP OF BORING -18.7 Ft.			
				17. TOTAL RECOVERY FOR BORING 16.5 Ft.			
				18. SIGNATURE AND TITLE OF INSPECTOR BF			
ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-18.7	0.0						
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 0.25", dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 1.0' Ave. Field Vane (tsf): 0.02	
					2	Sample #2, Depth = 7.0' Ave. Field Vane (tsf): 0.03	
-26.5	7.8		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).				
-27.7	9.0		CLAY, some sand, soft clay, sand distributed in pockets up to 2.0", dark olive gray (5Y-3/2), (SC).				
-28.3	9.6		CLAY, trace shell hash, very soft clay, (0.5"x3.0") sand pocket @ 11.6', dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 13.0' Ave. Field Vane (tsf): 0.07	
-33.5	14.8		CLAY, soft clay, bit sample from 16.2' to 16.5', very dark grayish brown (2.5Y-3/2), (CL).				
-35.2	16.5		No Recovery.				
-38.7	20.0		End of Boring				

LOUISIANA GRAND LIARD 2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/Quarry Spalls
	TS	Topsoil/Forest Duff/Sod



Measured groundwater level at time noted on log



Initial groundwater level observed at time of exploration



Perched water observed at time of exploration

Graphic Log Contact

	Distinct contact between soil strata or geologic units
	Approximate location of soil strata change within a geologic soil unit

Material Description Contact

	Distinct contact between soil strata or geologic units
	Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
UU	Triaxial compression
UC	Unconfined compression
VS	Vane shear

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

Drilled	<u>Start</u> 8/18/2011	<u>End</u> 8/18/2011	Total Depth (ft)	80	Logged By Checked By	DAS VT	Driller	Geoengineers, Inc.	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum			1.0		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment	Marsh Buggy-Mounted Drill Rig
Latitude Longitude		N29° 18' 21.4" W89° 28' 14.9"		System Datum		Geographic NAD83 (feet)		<u>Groundwater</u>	<u>Depth to Water (ft)</u>	<u>Elevation (ft)</u>
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.								<u>Date Measured</u> 8/18/2011	0.0	1.0

[illegible]

Figure B-3
Sheet 1 of 3

Baton Rouge: Date: 10/4/11 Path: P:\167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\Lib Template\GEOENGINEERS\GDT\GEI8_GEO TECH_LAB

80

Elevation (feet)

FIELD DATA								LABORATORY DATA																						
Depth (feet)		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION												Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
80		23				22			CL	Very soft gray silty clay with silt, 5" clayey silt layer and 4" fine sand layer at bottom												44	80.9	0.19	4.55	15	40	19		

¹Sample disturbed during extrusion.

¹Sample disturbed during extrusion.

Log of Boring B-12 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure B-3
Sheet 3 of 3

[illegible]¹Sample disturbed during extrusion.

Log of Boring B-13 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure
Sheet 2

Figure B-4
Sheet 2 of 3

Baton Rouge: Date :10/4/11 Path:P:\1616715018\01GIN\T\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBTemplate\LibTemplate\GEOENGINEERS\GDT\GEI8 GEOTECH LAB

Baton Rouge: Date :10/4/11 Path:P:\1616715018\01GIN\T\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBTemplate\LibTemplate\GEOENGINEERS\GDT\GEI8 GEOTECH LAB

GEOENGINEERS

Figure B-5
Sheet 1 of 3

Elevation (feet)	FIELD DATA						Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA								
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level				Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35		23			10				Very soft gray clay with 1" and 3" clayey silt layers and shell fragments	43	72.7	0.19	1.96	5	82	56	0.117	
40		23			11				Very soft gray clay with wood	85	53.3	0.16	2.25	13			0.142	
45		22			12				Very soft gray clay	88	51.4	0.12	2.53	14	92	65	0.171	
50		22			13				Very soft gray clay with 2½" clayey silt layer	65	60.7	0.15	2.82	12	74	50	0.153	
55		23			14				Very soft gray clay with silt lenses	66	59.5	0.13	3.11	15	77	50	0.149	
60		22			15				Very soft gray clay	85	52	0.21	3.40	13			0.119	
65		22			16				Soft gray clay with 2" fine sand layer	68	60.7	0.39	3.69	8			0.214	
70		23			17				Soft gray clay with 1½" fine sand layer	68				74	47	0.205		
75		22			18				Very soft gray clay with 1" fine sand layer at bottom	76				93	60			

¹Sample disturbed during extrusion.

Log of Boring B-14 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure
Sheet 2

Figure B-5
Sheet 2 of 3

Baton Rouge: Date: '10/4/11 Path: P:\16\167150\18\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBTemplate\LibTemplate\GEOENGINEERS\GDT\GEI8 GEOTECH LAB

Baton Rouge: Date: '10/4/11 Path: P:\16\167150\18\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBTemplate\LibTemplate\GEOENGINEERS\GDT\GEI8 GEOTECH LAB

GEOENGINEERS

Figure B-6
Sheet 1 of 3

Elevation (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name				Water Level	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35																		
39	10.5							Very soft gray very silty clay with three ½" clay layers	39	84.6	0.31	1.32	14	32	12			
40							CH											
45	18							Soft gray clay	76	60	0.39	1.61	8	74	46	0.383		
48																		
50	17							Soft gray clay	59	60.9	0.29	1.90	13	74	40	0.273		
53																		
55	9.5							Soft gray clay	57	68.1	0.35	2.19	15	74	45	0.455		
58																		
60	9							Soft gray clay	56				78	51	0.334			
63																		
65	20							Soft gray clay	53	68	0.34	2.76	15	76	52	0.352		
68																		
70	10.5							Medium gray clay	50	69.1	0.63	3.05	11	80	52	0.536		
73																		
75	20							Medium gray clay	56				81	57				

¹Sample disturbed during extrusion.

Log of Boring B-15 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure
Sheet 2

Figure B-6
Sheet 2 of 3

Start Drilled 8/23/2011	End 8/23/2011	Total Depth (ft) 80	Logged By Checked By DAS VT	Driller Geoengineers, Inc.	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 1.0	Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment	Pontoon-Mounted Drill Rig	
Latitude Longitude N29° 17' 41.6" W89° 28' 15.5"	System Datum	Geographic NAD83 (feet)	Groundwater Date Measured 8/23/2011	Depth to Water (ft) 0.0	Elevation (ft) 1.0
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																
5																
10	16						CH	65	61.9	0.20	0.06	14	62	40	0.183	
15	15							65	60.6	0.12	0.17	15	72	46	0.133	
20	9.5						CL	37	85.9	0.22	0.29	12	32	12	0.068	
25	10.5							40	88.3	0.21	0.40	15	37	16	0.092	
30	10							46	87.7	0.20	0.52	15	30	11	0.054	
35	8							36	79.4	0.19	0.81	14	40	23		
40	12						CH	69	60.7	0.36	0.92	13	79	53	0.205	
45	16							66	60.8	0.27	1.39	14	82	51	0.201	

¹Sample disturbed during extrusion.

Log of Boring B-16



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure B-7
Sheet 1 of 3

Baton Rouge: Date: 10/4/11 Path: P:\167150\1801\101\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEI8_GEO TECH_LAB

Elevation (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA							
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name				Water Level	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %
35																
		10						Very soft gray clay with silt lenses	71	63.1	0.20	1.67	15	79	53	0.261
40																
		11						Soft gray clay	58	68.7	0.38	1.96	12	82	52	
45																
		15						Soft gray clay	44	74.1	0.31	2.25	15	79	55	0.288
50																
		18						Soft gray clay	53	68.4	0.37	2.53	14	79	56	0.214
55																
		18						Soft gray clay	59	64.8	0.31	2.82	15	79	51	0.198
60																
		17						Soft gray clay with silt lenses	66	61.7	0.31	3.11	15			0.291
65																
		18						Soft gray clay	65					85	53	0.527
70																
		15						Soft gray clay with silt lenses	60					82	52	0.433
75																

¹Sample disturbed during extrusion.

¹Sample disturbed during extrusion.

Log of Boring B-16 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-7
 Sheet 2 of 3

Baton Rouge: Date: 10/4/11 Path: P:\167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS.GDT\GEB_GEO TECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35																		
		11			7				70	62.2	0.23	1.10	11	64	40	0.119		
40																		
		13			8				59	63.8	0.30	1.39	12	73	45	0.221		
45																		
		11			9				61	65.4	0.27	1.67	14	59	34	0.288		
50																		
		15			10				60					77	49	0.297		
55																		
		15			11				65	64	0.33	2.25	12	83	59	0.331		
60																		
		13			12				59	69.2	0.55	2.53	14	76	51	0.401		
65																		
		17			13				52					67	41	0.352		
70																		
		13			14				59	65.2	0.60	3.11	7	87	56			
75																		

¹Sample disturbed during extrusion.

¹Sample disturbed during extrusion.

Log of Boring B-17 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-8
 Sheet 2 of 3

Baton Rouge: Date: 10/4/11 Path: P:\167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\Lib Template\GEOENGINEERS\GDT\GE18_GEO TECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
80	16			15				Medium gray clay with silt lenses	60					84	51		

¹Sample disturbed during extrusion.

¹Sample disturbed during extrusion.

Log of Boring B-17 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure B-8
Sheet 3 of 3

Baton Rouge: Date: 10/4/11 Path: P:\1671501801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS.GDT\GEOE_LAB

Elevation (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA								
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name				Water Level	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35							CH										
37	17			8				Soft gray clay with silt pockets	61	61.1	0.27	1.32	13	82	51	0.238	
40																	
43	22			9				Soft gray clay	60	61.9	0.27	1.61	15	83	56	0.318	
45																	
49	19			10				Soft gray clay	50	72.2	0.40	1.90	15	72	48	0.428	
50																	
53	23			11				Soft gray clay	49	70.1	0.49	2.19	15			0.354	
55																	
59	22			12				Soft gray clay	48					73	48	0.385	
60																	
64	22			13				Soft gray clay	51					69	44	0.444	
65																	
69	19			14				Soft gray clay	65	63.5	0.31	3.05	15	67	40	0.282	
70																	
74	23			15			Medium gray clay	55	67.1	0.64	3.34	10	73	43	0.778		
75																	

¹Sample disturbed during extrusion.

¹Sample disturbed during extrusion.

Log of Boring B-18 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-9
 Sheet 2 of 3

Baton Rouge: Date: 10/4/11 Path: P:\167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\Lib Template\GEOENGINEERS\GDT\GEI8_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
80	23			16				Medium gray clay with sand pockets	56					86	57	0.615	

¹Sample disturbed during extrusion.

¹Sample disturbed during extrusion.

Log of Boring B-18 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
Project Location: Plaquemines Parish, Louisiana
Project Number: 16715-018-01

Figure B-9
Sheet 3 of 3