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November 15, 2022

Jennifer Sloan Ziegler, P.E., Ph.D., ENV SP
Cypress Environment and Infrastructure
906 Desoto Street
Ocean Springs, Mississippi 39564

Report No. 220601

Preliminary Geotechnical Investigation
475-Acre Port Bienville Tract
Hancock County, Mississippi

Dear Mrs. Ziegler:

Submitted here is the report of our Preliminary Geotechnical Investigation for the above-captioned 475-Acre Port Bienville Tract. This exploration was authorized via execution of your contract agreement on October 5, 2022 and was generally performed in accordance with our Proposal No. 22001P-281 dated August 30, 2022.

We caution that this report merely presents the subsurface soil conditions encountered at the locations of the borings and preliminary geotechnical comments regarding how the soil conditions encountered may affect construction and foundations. Finalized geotechnical recommendations pertaining to site preparation, earthwork, and foundation and pavement design and construction are not provided in this report.

General

Burns Cooley Dennis, Inc. understands that Cypress Environment and Infrastructure is exploring future development of a 475-acre tract at Port Bienville in Hancock County near Pearlington, Mississippi. We understand Cypress is currently conducting a wetlands delineation. Specific plans regarding development of the site are not known at this time. BCD anticipates the development could consist of moderately to heavily loaded industrial facility buildings, pavements, and railroad tracks. We expect that shallow foundations could be used for relatively lightly-loaded buildings and other structures, but deep foundations or ground improvements with shallow foundations could be required for more heavily-loaded or critical structures. This investigation was conducted to make widely-spaced borings and provide preliminary recommendation guidance for possible earthwork, foundations, and pavements. The approximate location of the tract is shown on Figure 1A.

The site is heavily-wooded. Several unpaved roads and trails extend through the tract. The unpaved roads are generally grass-covered. Some segments of the road are exposed earth. Ditches extend along the edges of many of the roads. Culverts extend across several roads to aid drainage. The site is relatively level. We anticipate no more than 2 or 3 ft of fill could be required to address drainage.

Field Exploration

Subsurface soil conditions within the above referenced site were explored by means of ten (10) widely-spaced borings (one boring per 47.5 acres). The approximate locations of the borings are shown on Figure 1B. The borings were located in the field using GPS coordinates generated from a Google Earth areal image of the site boundaries.

All soils were classified in general accordance with the Unified Soil Classification System. A synopsis of the Unified Soil Classification System is presented on Figure 2 along with symbols and terminology typically utilized on graphical soil boring logs. Graphical logs of the borings are presented on Figures 3 through 12. Approximate GPS coordinates for the boring locations as determined by our drilling personnel using a hand-held device are shown at the bottom of the graphical logs within the “Comments” section.

The borings were made to exploration depths ranging from 20 ft to 100 ft using a truck-mounted drill rig. Borings 2, 3, 4, 6, 7, 8, and 9 were advanced full depth to 20 ft by dry augering. Borings 1, 5, and 10 were initially drilled by dry augering to depths of 10 ft to 15 ft and then were drilled to completion by rotary wash drilling method.

Disturbed split-spoon and auger samples and relatively undisturbed Shelby tube samples were obtained from the borings. Representative disturbed samples of the soils were obtained by driving a standard 2-in. OD split-spoon sampler 18 in. into the soil with a 140-lb hammer falling freely a distance of 30 in. The number of blows required to drive the split-spoon sampler each 6-inch increment (total of 18 in. of penetration) is recorded under the “Field SPT Data” column of the graphic boring logs. The number of blows required to penetrate the last foot (sum of the second and third blow count values) is considered the N_{60} value and is plotted as a small circled x in the data section of the logs. Samples were obtained directly from the auger directly beneath the ground surface in the borings. Relatively undisturbed samples were obtained from selected depths by pushing a 3-in. OD thin-wall Shelby tube sampler approximately 2 ft into the soil. The actual depths at which the split-spoon, auger, and Shelby tube samples were obtained are indicated by the crossed rectangular, small I-shaped, and shaded rectangular symbols, respectively, under the “Samples” column of the graphic boring logs.

All soils encountered during drilling were carefully examined and classified by a geotechnical engineering technician. Representative portions of the split-spoon and auger samples and additional portions of the Shelby tube samples were placed in jars to provide material for later visual examination, classification, and testing in the laboratory. Each Shelby tube sample was extruded from the sampling tube in the field. An approximate 6-in. long portion of each Shelby tube sample was sealed with melted paraffin in a cylindrical cardboard container to reduce the potential for moisture loss and structural disturbance. Unless other disposition is requested, we routinely discard soil samples after about six months of storage. In compliance with Mississippi Department of Environmental Quality (MDEQ) regulations, the 60-ft and 100-ft deep boreholes for Borings 1, 5 and 10 were filled with cement-bentonite grout after completion of drilling and sampling. The 20-ft boreholes were plugged with soil cuttings after the completion of drilling and sampling. Unless other disposition is requested, we routinely discard soil samples after about six months of storage.

Observations were made continuously during auger drilling to detect free water entering the open boreholes. Notes pertaining to groundwater observations are included at the bottom right corner of the graphic boring logs.

Laboratory Testing

An evaluation of the strength, compressibility, classification, and expansive properties of the subsurface soils encountered in the borings was considered to be of primary importance for this investigation. These properties were evaluated by visual examination and from results of the routine laboratory index tests described in the following paragraphs. The strength and compressibility characteristics of the soils encountered in the borings were estimated by means of laboratory strength tests, field classifications of consistency, and also from the results of standard penetration tests.

Strength Tests. The strength characteristics of the fine-grained soils encountered in the borings were investigated by means unconsolidated-undrained (UU) triaxial compression tests performed on selected undisturbed Shelby tube samples. The UU triaxial compression tests in terms of cohesion are plotted as small open triangles in the data section of the graphic logs. The water content and dry density were also determined for each compression test specimen. The water contents are plotted as small shaded circles in the data section of the logs. The dry densities are tabulated to the nearest lb per cu ft under the “Dry Density” column of the graphic logs.

Classification Tests. The classifications and volume change properties of fine-grained soils were investigated by means of Atterberg liquid and plastic limit tests. The results of the liquid and plastic limit tests are plotted as small crosses interconnected by dashed lines in the data section of the graphic boring logs. In accordance with the Unified Soil Classification System, fine-grained soils are classified as either clays or silts of low or high plasticity based on the results of Atterberg limit tests. The numerical difference between the liquid limit and plastic limit is defined as the plasticity index (PI). The magnitudes of the liquid limit and plasticity index and the proximity of the natural water content to the plastic limit are indicators of the potential for a fine-grained soil to shrink or swell upon changes in moisture content or to consolidate under loading. The proximity of the natural water content to the plastic limit is also an indicator of soil strength.

The classifications of soils consisting predominantly of sand were investigated by means of minus No. 200 sieve tests performed on selected samples. The percentages of fines resulting from the minus No. 200 sieve tests are tabulated at the appropriate depths under the "% Passing No. 200 Sieve" column of the graphic boring logs.

Water Content Tests. Water content tests were performed on all samples to corroborate field classifications and to extend the usefulness of the plasticity data. The results of the water content tests are plotted as small shaded circles in the data section of the graphic boring logs. The water content data have been interconnected on the logs to illustrate a continuous profile with depth.

General Subsurface Conditions

Geologically, the soils encountered at the site appear to represent coastal deposits of the Mississippi Gulf Coast. A general description of subsurface soil and groundwater conditions revealed by the borings made for this exploration is provided in the following paragraphs. The graphical logs shown on Figures 3 through 12 should be referred to for specific soil and groundwater conditions encountered at each boring location. Stick logs of the borings are shown in profile on Figure 13 to aid in visualizing subsurface soil conditions. Tabulated adjacent to the stick logs are Atterberg liquid and plastic limits, water contents, results of shear strength tests, percentages of fines passing the No. 200 sieve, and field SPT blow counts.

Soil Conditions. Subsurface soils encountered in the borings for this investigation include silty and clayey sands (SM, SC, SC-SM), sands (SP and SP-SM), sandy clays (CL), and clays (CH). We attempted to group the site soils into a single representative profile. The resulting generalized profile and approximate depths at which the soils were encountered are tabulated below:

STRATUM	TYPICAL BOTTOM ELEVATION	MATERIAL DESCRIPTION	DENSITY/ CONSISTENCY
1	8 ft	Silty Sands (SM), Clayey Sands (SC), Sandy Clays (CL), and Slightly Silty Clayey Sands (SC-SM)	Very Loose to Dense. Stiff
2	45 ft	Sands (SP) and Slightly Silty Sands (SP-SM)	Very Loose to Very Dense
3	60 ft	Silty Sands (SM)	Loose to Dense
4	100 ft (Termination Depth)	Clays (CH)	Stiff to Very Stiff

Layers of sandy clays (CL) are contained within the Stratum 1 sands (SM, SC, and SC-SM). With the exception of the very loose and loose silty sands (SM), slightly silty clayey sands (SC-SM), and slightly silty sands (SP-SM), the soils are considered to have moderate to high strength and moderate to low compressibility. The sands (SM, SP, SP-SM, SC, and SC-SM) have no potential for shrinking and swelling.

The stiff to very stiff sandy clays (CL) and clays (CH) are considered to have moderate to high strength and moderate to low compressibility. The sandy clays (CL) have low shrink/swell potential and the clays (CH) have high shrink/swell potential.

Groundwater. As indicated previously, observations were made continuously during auger drilling to detect groundwater seepage entering the open boreholes. Groundwater seepage was noted while auger drilling the borings to depths of 6 ft, 10 ft, or 20 ft. Groundwater levels are shown in the table below:

	Water Levels			Water Levels	
Boring No.	**Initial**	**After 15 minutes**	**Boring No.**	**Initial**	**After 15 minutes**
1	13 ft	11.7 ft	6	13 ft	11.3 ft
2	10 ft	9.3 ft	7	14 ft	12.8 ft
3	15 ft	14.6 ft	8	8.5 ft	8.5 ft
4	15 ft	15 ft	9	17 ft	17 ft
5	12 ft	5 ft	10	8.5 ft	8.5 ft

It should be recognized that groundwater conditions at the site will be influenced by rainfall, surface drainage conditions and the rise and fall in the level of the nearby Pearl River, and any other nearby bodies of water. Surficial soils can also become saturated and weak to relatively shallow depths during periods of prolonged and heavy rainfall. Be aware that the fine-grained site soils may produce some water seepage over time in open excavations due to the saturated or near saturated condition of some of the site soils.

Discussion and Preliminary Recommendations

Summary. Based on the subsurface soil conditions encountered at this site, we consider that conditions are generally suitable for support of relatively lightly-loaded and moderately-loaded buildings and associated structures on shallow foundations with earthwork to address any weak soil conditions. Heavier building structures may require additional ground improvement or deep foundations. The expansive clays (CH) are deep enough below the ground surface that their presence should not adversely affect foundation performance. It should be noted that this investigation is preliminary in nature and should be considered only as adequate to provide an indication of the general soil conditions within the portion of the tract of land investigated. A detailed geotechnical investigation should be performed after the design details have been developed for the planned construction.

General. The soils encountered in our borings were generally found to be stable at the locations explored and under the ground and weather conditions at the time of the study.

However, instability should be expected as a possibility at the time of construction. The removal of trees and root systems will tend to disturb the shallow sands and create loosened areas where groundwater and surface water can collect. Any unstable soils encountered during site preparation would need to be undercut to expose more stable soils or other methods would need to be employed to address them. Shallow groundwater levels should be anticipated. Site soil conditions were evaluated in a preliminary manner with limited borings and our observations will need to be confirmed with additional borings once the plans are finalized. Discussions on preliminary design and construction recommendations are provided in the following subsections.

Site Preparation and Earthwork. The initial step in site preparation in structure, pavement, and rail track areas would consist of removing trees and root systems and stripping the site of grass and other vegetation. The stability of the exposed soils would then be evaluated by compacting the exposed surface following stripping to a minimum **95 percent** standard Proctor (ASTM D 698) maximum dry density with stability present. As an alternative, stability could be evaluated by proofrolling the exposed soil with heavy, rubber-tired equipment, such as a loaded dump truck. Stability is defined as the absence of significant pumping or yielding of soils under normal fill compaction. Any unstable soils could be undercut or otherwise improved as needed with guidance from the geotechnical engineer.

Any planned rail track embankments should be sufficiently elevated to allow drainage of the sub-ballast materials. Drainage should be provided along the side of the tracks with bottom elevations at least 2 ft where feasible below the base of the sub-ballast.

Attention should be given during planning and construction to the possible presence of shallow groundwater seepage as noted on the boring logs, especially in the vicinity of Boring 5 where groundwater was encountered as shallow as about 5 ft below the ground surface. Excavations made to undercut unstable soils or to dig shallow foundations or below-grade structures are likely to encounter groundwater. The contractor will have to be prepared to control groundwater seepage during construction and foundations will likely have to be designed to resist uplift associated with buoyant conditions.

It should be recognized that our evaluations are based on the conditions encountered at boring locations at the time of our field investigation. The actual conditions at the time of construction will be strongly influenced by the season of the year and the rainfall conditions preceding and during construction. During a wetter season of the year, the surficial soils at the boring locations may be wetter and weaker. Conversely, if the earthwork can be performed during a dry season of the year, the surficial soils may be drier and stronger.

After proper site preparation, normal backfilling and/or filling could proceed. Silty clays (CL), sandy clays (CL), and clayey sands (SC) could be used as backfill. The select fill materials would likely require compaction to **95 percent** of standard Proctor maximum dry density. Higher degrees of compaction may be necessary in areas of the site where more than 2 or 3 ft of fill material would be added.

Some of the sands encountered at the site did not meet the classification typically utilized as select fill. The sands encountered directly beneath the ground surface in most of the borings are suitable for reuse as fill with the understanding they may not achieve "select fill" classification. The contractor should be aware that some of the sands are especially susceptible to instability at higher water contents or may be difficult to place.

Foundation Design. With proper site preparation and earthwork, the building and associated structure loads could likely be supported on strip and spot footings with a separate slab on grade provided the structures are not heavily loaded. The grade beams or strip footings could probably be proportioned for critical loading conditions using a net allowable soil bearing pressure on the order of 1,000 to 1,500 lbs per sq ft. Spot footings or widened portions of grade beams supporting column loads could probably be proportioned using a net allowable soil bearing pressure on the order of 1,500 to 2,000 lbs per sq ft. These allowable bearing pressures are preliminary based on the limited soil boring data gathered and are appropriate providing the foundations are supported by strong, competent existing site soils or properly prepared select fill materials.

More heavily loaded and/or settlement sensitive buildings and structures likely would require the support of deep foundations. A deep foundation system could consist of driven precast concrete, timber, steel pipe or H-piles, or auger-cast piles. Alternatively, shallow foundations may be acceptable for heavy buildings if some form of ground improvement is utilized, such as aggregate piers.

Considerations for Pavement Design. In our opinion, either flexible asphalt concrete or rigid Portland cement concrete pavement can be utilized for drives and parking lots at the site. The performance of pavements ultimately depends on the subgrade. Grades within and adjacent to paved areas should be established which will provide for rapid drainage away from the pavement area, and will prevent ponding of water that can cause saturation of the subgrade and subbase materials and a reduction in strength and supporting capacity.

It is our opinion that chemical treatment of the subgrade soils with cement would provide the best performing pavement system during construction and would extend the service life of the pavement. We likely would recommend cement treatment for the top 12 in. of the subgrade utilizing 6 percent cement by dry weight of soil compacted to not less than **98 percent** of standard Proctor maximum dry density (ASTM D 698).

For relatively light passenger car and pickup truck traffic, a flexible pavement structure would typically consist of full-depth asphalt concrete including about 4 in of bituminous base overlain by a 2-in. thick asphalt surface course. A thicker flexible pavement structure would be required for the driveways where the pavement is subjected to heavy truck traffic. Five (5) in. of concrete pavement can often be used for parking areas for automobiles and pickup trucks, and thicker pavement sections would be required for pavements subjected to truck traffic. Rail yard concrete support for items such as gantry cranes may require significantly greater thickness of concrete and stacked containers support (dolly pads) may need reinforced concrete sections. We also consider that a regular and routine maintenance program is critical to the life of a pavement.

Seismic. The site at Port Bienville in Hancock County, Mississippi lies within a relatively low seismic activity region according to the seismic zone mapping referenced in the International

Building Code. Given the site soil profile as revealed by the borings and anticipated for the area based on our experience, a site class D could be used in a seismic load evaluation.

Report Limitations

The preliminary guideline recommendations discussed in this report are based on conditions as they existed at the time of our field investigation and further on the assumption that the exploratory borings are representative of subsurface conditions throughout the entire site. It should be noted that actual subsurface conditions between and beyond the widely-spaced borings might differ from those encountered at the boring locations.

This preliminary report has been prepared for the exclusive use of the Cypress Environment and Infrastructure for specific application to the geotechnical aspects of the site of 475-Acre Port Bienville Tract in Hancock County, Mississippi. The only warranty made by us in connection with the services provided is that we have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No other warranty, express or implied, is made or intended.

We appreciate the opportunity to be of service. If you should have any questions concerning this report, please do not hesitate to call us.

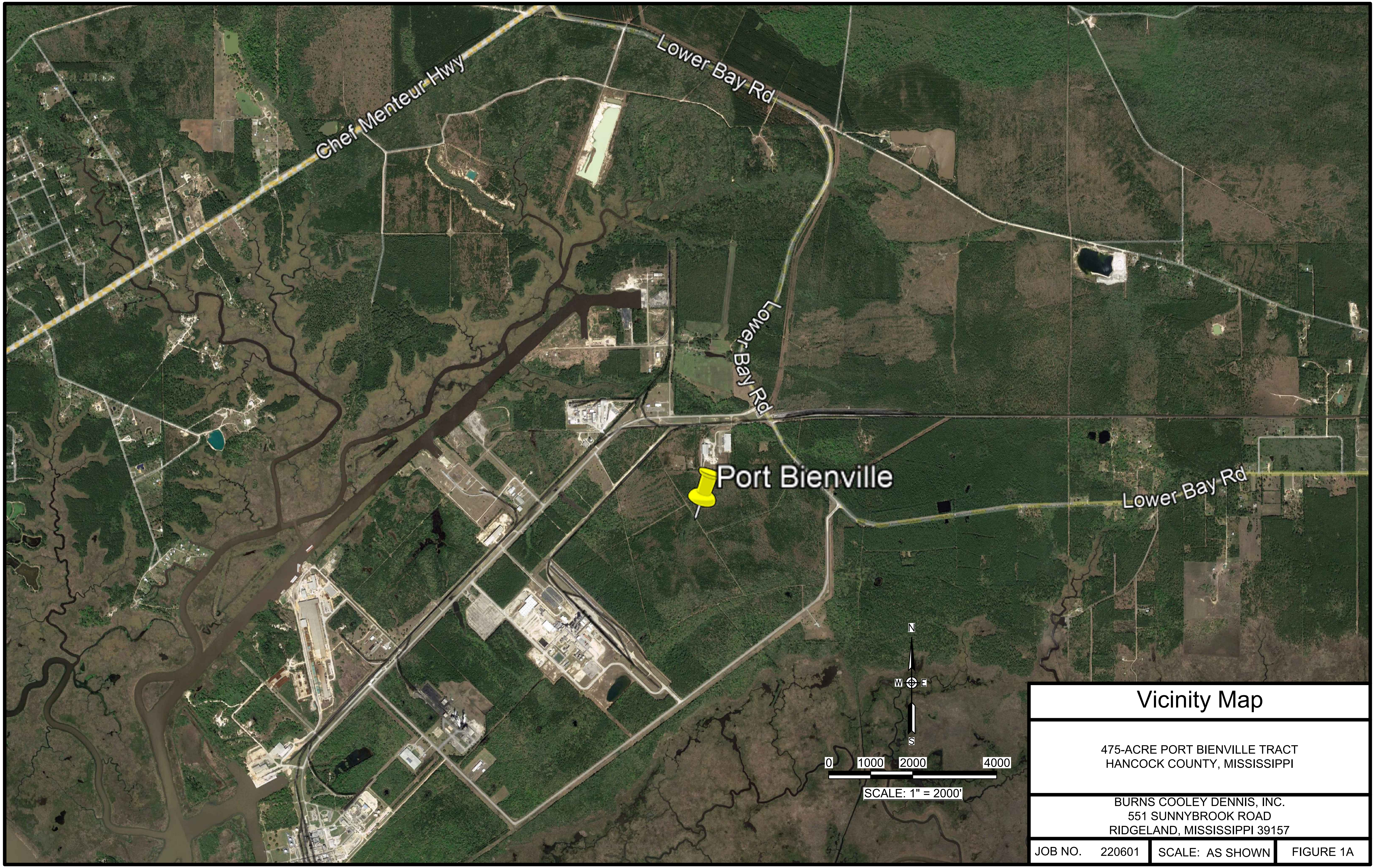
Very truly yours,

BURNS COOLEY DENNIS, INC.

G. Thomas Dunlap, P.E.

Jeffrey W. Williams, P.E.

GTD/JWW/khb
Copy Submitted: (via email)

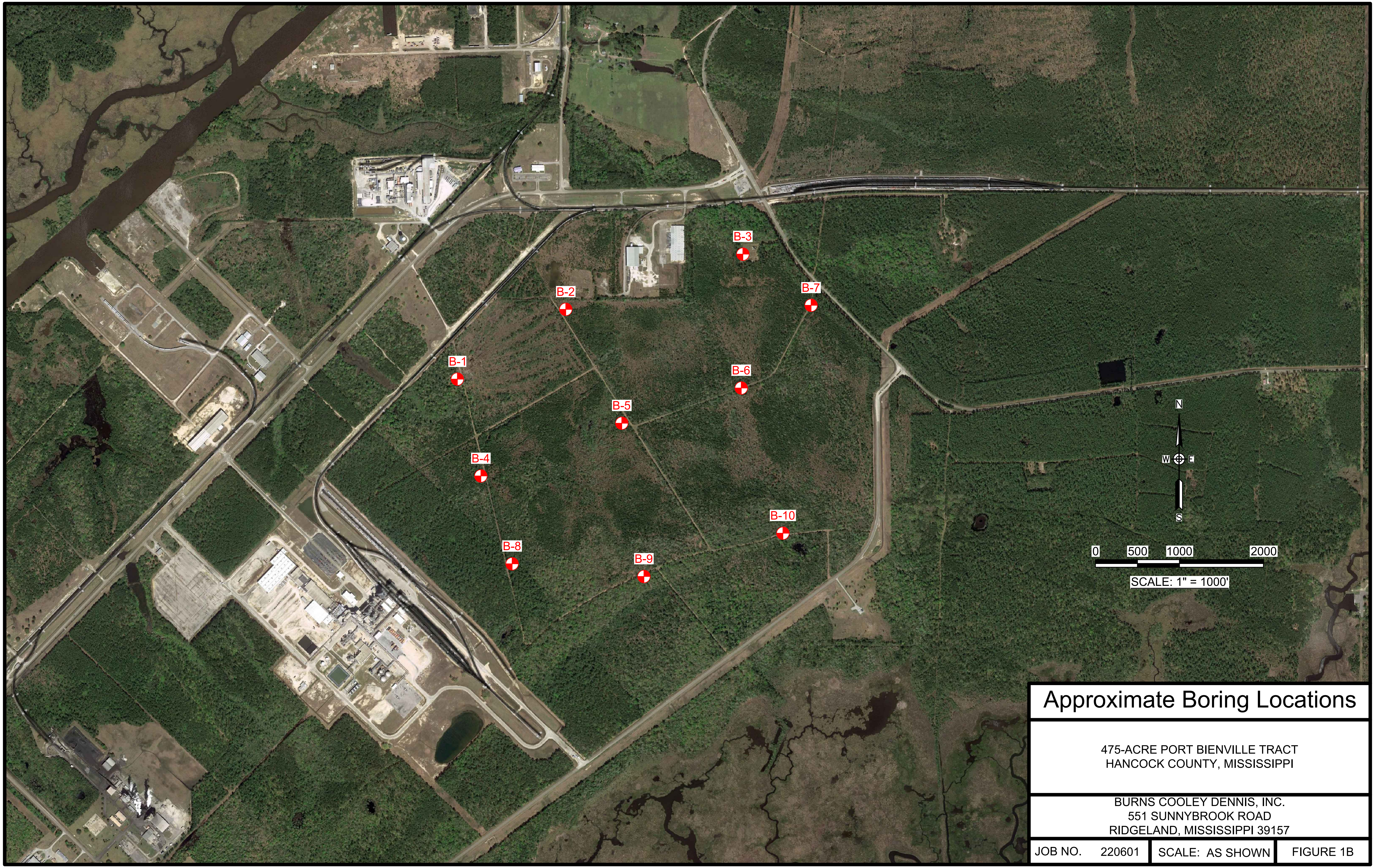


Vicinity Map

475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

BURNS COOLEY DENNIS, INC.
551 SUNNYBROOK ROAD
RIDGELAND, MISSISSIPPI 39157

JOB NO. 220601	SCALE: AS SHOWN	FIGURE 1A



Approximate Boring Locations

475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

BURNS COOLEY DENNIS, INC.
551 SUNNYBROOK ROAD
RIDGELAND, MISSISSIPPI 39157

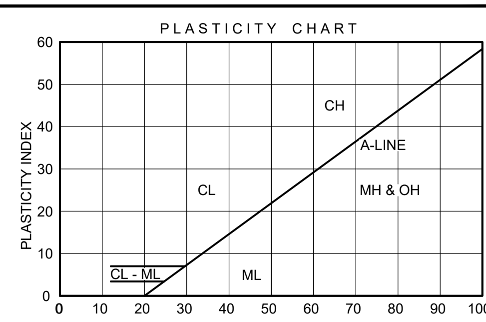
JOB NO. 220601	SCALE: AS SHOWN	FIGURE 1B

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL & LETTER	DESCRIPTION
COARSE-GRAINED SOILS More than half of material larger than No. 200 sieve size	GRAVELS More than half of coarse fraction larger than No.4 sieve size	Clean Gravels (Little or no fines)	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURE
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURE
		Gravels with fines (Appreciable amount of fines)	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE
			GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURE
	SANDS More than half of coarse fraction smaller than No.4 sieve size	Clean Sands (Little or no fines)	SW	WELL GRADED SAND, GRAVELLY SAND
			SP	POORLY GRADED SAND, GRAVELLY SAND
		Sands with fines (Appreciable amount of fines)	SM	SILTY SAND, SAND-SILT MIXTURE
			SP-SM	SLIGHTLY SILTY SAND
			SC	CLAYEY SAND, SAND-CLAY MIXTURE
FINE-GRAINED SOILS More than half of material smaller than No. 200 sieve size	SILTS AND CLAYS	Liquid limit less than 50	ML	SILT WITH LITTLE OR NO PLASTICITY
			ML	CLAYEY SILT, SILT WITH SLIGHT TO MEDIUM PLASTICITY
			ML	SANDY SILT
			CL	SILTY CLAY, LOW TO MEDIUM PLASTICITY
			CL	SANDY CLAY, LOW TO MEDIUM PLASTICITY (30% TO 50% SAND)
	SILTS AND CLAYS	Liquid limit greater than 50	MH	SILT, FINE SANDY OR SILTY SOIL WITH HIGH PLASTICITY
			CH	CLAY, HIGH PLASTICITY
			OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOIL
SEDEMENTARY ROCK TYPES:			LS	LIMESTONE
			MARL	MARL

TERMS CHARACTERIZING SOIL STRUCTURE

Slickensided	- Clays with polished and striated planes created as a result of volume changes related to shrinking, swelling and/or changes in overburden pressure.
Fissured	- Clays with a blocky or jointed structure generally created by seasonal shrinking and swelling.
Laminated	- Composed of thin alternating layers of varying color and texture.
Calcareous	- Containing appreciable quantities of calcium carbonate.
Parting	- Paper thin (less than 1/8 inch).
Seam	- 1/8 inch to 3 inch thickness.
Layer	- Greater than 3 inches in thickness.



FOR CLASSIFICATION OF FINE GRAINED SOILS

DENSITY AND CONSISTENCY

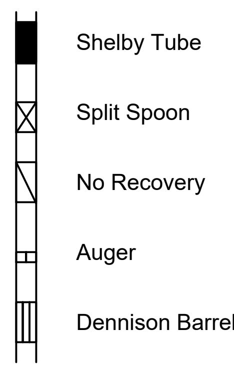
COARSE-GRAINED SOILS

DENSITY	PENETRATION RESISTANCE, N Blows per Foot
Very loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	>50

FINE-GRAINED SOILS

CONSISTENCY	COHESION Kips/Sq. Ft	PENETRATION RESISTANCE, N Blows per Foot
Very Soft	<0.25	0 - 1
Soft	0.25 - 0.50	2 - 4
Medium Stiff	0.50 - 1.00	5 - 8
Stiff	1.00 - 2.00	9 - 15
Very Stiff	2.00 - 4.00	16 - 30
Hard	>4.00	>30

SAMPLE TYPES
(Shown in Sample Column)



PARTICLE SIZE IDENTIFICATION

Cobbles	- Greater than 3 inches
Gravel	- Coarse - 3/4 inch to 3 inches
	Fine - 4.76 mm to 3/4 inch
Sand	- Coarse - 2 mm to 4.76 mm
	Medium - 0.42 mm to 2 mm
	Fine - 0.074 mm to 0.42 mm
Silt & Clay	- Less than 0.074 mm

RELATIVE COMPOSITION

Slightly	5 - 15%
With	16 - 29%
Sandy (or gravelly)	30 - 50%

CLASSIFICATION, SYMBOLS AND TERMS USED ON GRAPHICAL BORING LOGS

LOG OF BORING NO. 1

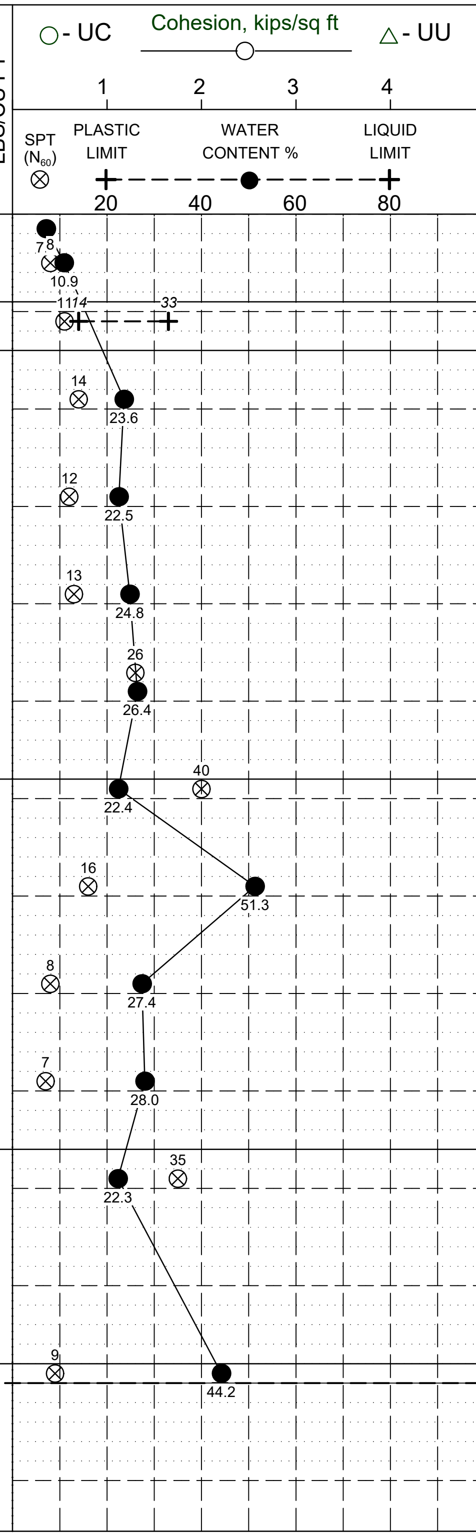
475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger to 15', then rotary wash to completion.

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	% PASSING NO. 200 SIEVE
0	Loose gray silty fine sand (SM)			
2.5		4-4-4		
5	Stiff tan and light gray sandy clay (CL)	2-4-7		
7	Medium dense tan and light gray fine sand (SP)			
10		4-6-8		
15		4-6-6		4.6
18.5	- light gray below 18.5'			
20		4-4-9		
25		6-12-14		
29	Dense light gray fine sand (SP-SM), slightly silty	18-20-20		6.0
33	- medium dense 33' - 38.5' - with clay pockets 33.5' - 34' - trace of wood below 34'			
35		6-8-8		
38.5	- loose below 38.5' - trace of shell fragments below 39.5'			
40		3-3-5		
43	- slightly clayey below 43'			
45		3-3-4		
48	Dense light gray silty fine sand (SM)	12-15-20		13.5
59	Stiff gray clay (CH) with shell fragments	3-4-5		



Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 60 ft

DATE: 10/26/22

COMMENTS:
GPS Coordinates
N 30° 14' 08.9"
W 89° 33' 13"

GROUNDWATER DATA: Free water encountered at an approximate depth of 13' during auger drilling. Water level at an approximate depth of 11.7' after about 15 minutes.

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FIGURE 3

LOG OF BORING NO. 2
475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	SPT (N_{60})	WATER CONTENT %	% PASSING NO. 200 SIEVE
0–5	Medium dense gray silty fine sand (SM) with trace of shell fragments				6.2	
		12-12-14		26	7.2	36.0
5–8	Loose tan and light gray clayey fine sand (SC) with clay seams	4-4-5		9	14.2	
8–20	Medium dense tan fine sand (SP-SM), slightly silty	7-8-9		17	21.4	
		3-8-7		15	23.2	5.9
		3-5-8		13	23.2	

Cohesion, kips/sq ft: ○ - UC, △ - UU (1, 2, 3, 4); PLASTIC LIMIT, WATER CONTENT %, LIQUID LIMIT (20, 40, 60, 80)

Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/25/22

COMMENTS:
GPS Coordinates
N 30° 14' 16.8"
W 89° 32' 58.9"

GROUNDWATER DATA: Free water encountered at an approximate depth of 10' during auger drilling. Water level at an approximate depth of 9.3' after about 15 minutes.

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FIGURE 4

LOG OF BORING NO. 3

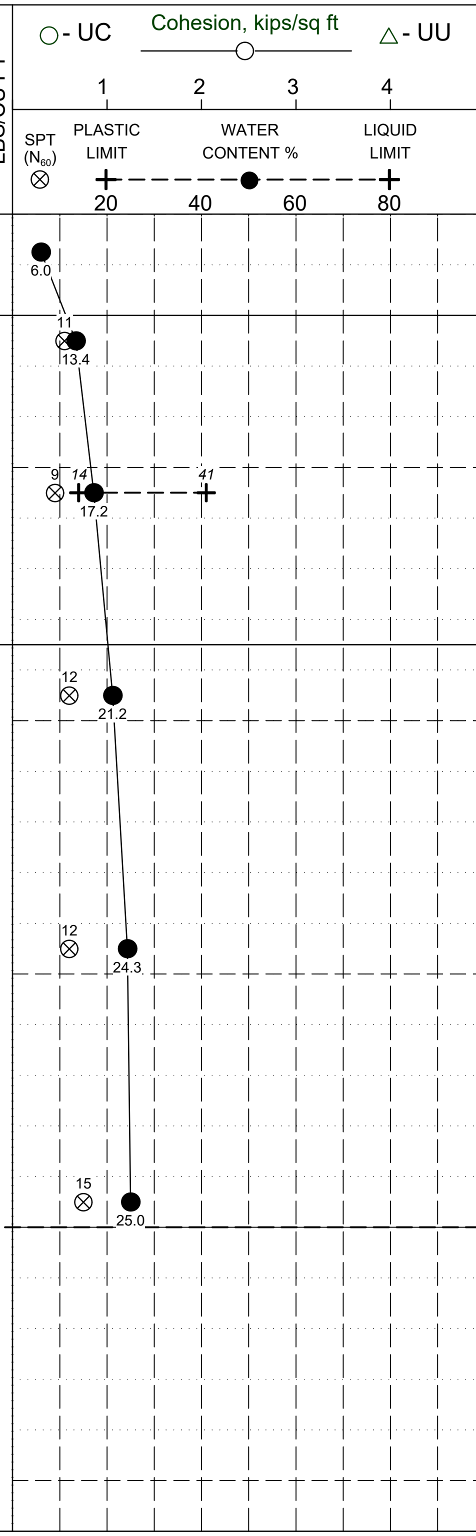
475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	SPT (N_{60})	PLASTIC LIMIT	WATER CONTENT %	LIQUID LIMIT	% PASSING NO. 200 SIEVE
0–2	Loose red fine to coarse sand (SP) with gravel				6.0		
2–8.5	Medium dense tan clayey fine sand (SC)	5-5-6	11		13.4		
	- loose below 5'	2-3-6	9	14	17.2	41	46.7
8.5–20	Medium dense tan and light gray fine sand (SP-SM), slightly silty	5-5-7	12		21.2		
	- light gray below 13'	2-4-8	12		24.3		
		5-7-8	15		25.0		6.1



Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/26/22

COMMENTS:
GPS Coordinates
N 30° 14' 23.7"
W 89° 32' 34.5"

GROUNDWATER DATA: Free water encountered at an approximate depth of 15' during auger drilling. Water level at an approximate depth of 14.6' after about 15 minutes.

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LOG OF BORING NO. 4

475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	SPT (N_{60})	PLASTIC LIMIT	WATER CONTENT %	LIQUID LIMIT	% PASSING NO. 200 SIEVE
0–2	Medium dense gray silty fine sand (SM)					7.5		
2–9	Medium dense light gray and tan clayey fine sand (SC)	7-8-7		15		9.1		30.3
	- loose with clay seams below 5'	3-3-3		6	13	17.1	24	
9–20	Medium dense tan and white fine sand (SP-SM), slightly silty	6-8-11		19		22.7		5.1
	- gray below 14'	4-6-9		15		22.9		
		3-5-12		17		21.3		

Cohesion, kips/sq ft: ○ - UC, △ - UU

Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/24/22

COMMENTS:
GPS Coordinates
N 30° 13' 58.5"
W 89° 33' 9.1"

GROUNDWATER DATA: Free water encountered at an approximate depth of 15' during auger drilling. Water level at an approximate depth of 15' after about 15 minutes.

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FIGURE 6

LOG OF BORING NO. 5

475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger to 15', then rotary wash to completion.

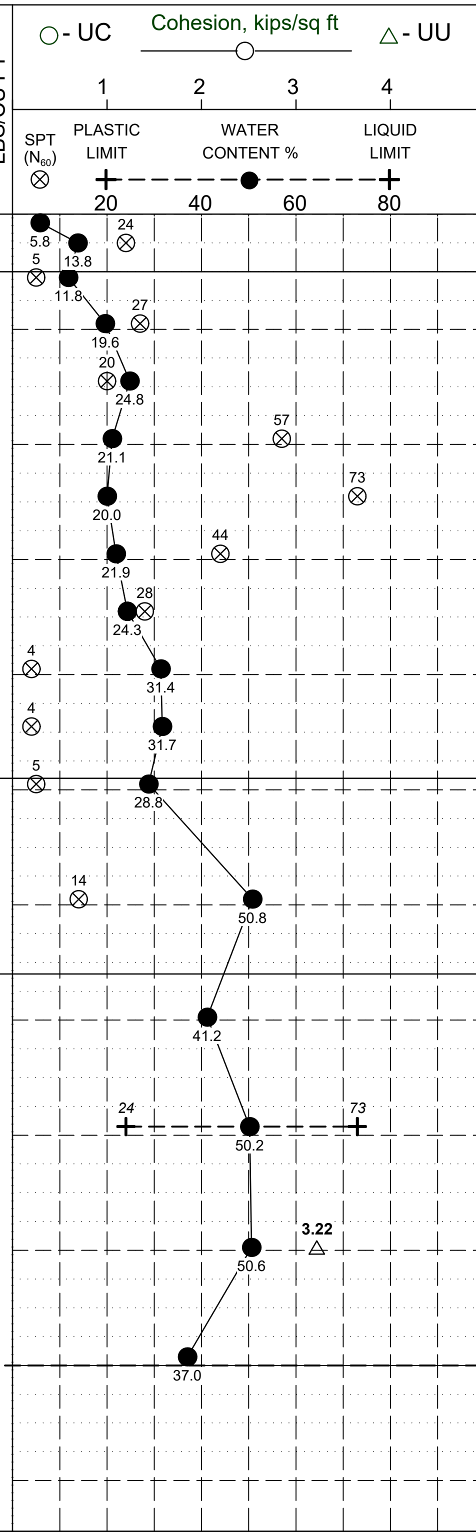
LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DESCRIPTION OF MATERIAL

- Medium dense light gray silty fine sand (SM) with trace of gravel
  - with trace of organics below 2'
- Loose light gray fine sand (SP-SM), slightly silty
  - medium dense 8' - 19'
  - very dense 19' - 28'
  - dense 28' - 33'
  - medium dense 33' - 38.5'
  - with wood 37' - 39'
  - very loose below 38.5'
  - with trace of wood below 44'
- Loose light gray silty fine sand (SM)
  - medium dense below 58'
  - with trace of shell fragments 59' - 60'
- Stiff blue clay (CH) with shell fragments
  - very stiff with fine sand lens below 89'

DEPTH, ft (approx.)	FIELD SPT DATA	DRY DENSITY LBS/CU FT	SPT (N_{60})	WATER CONTENT %	% PASSING NO. 200 SIEVE
0 - 2	10-10-14		24	5.8, 13.8	
4	4-2-3		5	11.8	
9	7-12-15		27	19.6	7.3
14	5-10-10		20	24.8	
19	12-27-30		57	21.1	
24	19-32-41		73	20.0	5.5
29	11-19-25		44	21.9	
34	12-18-10		28	24.3	
39	2-2-2		4	31.4	11.7
44	1-2-2		4	31.7	
49	2-2-3		5	28.8	14.4
59	0-7-7		14	50.8	
69				41.2	
79				50.2 (PL 24, LL 73)	
89		71		50.6 (UU 3.22)	
99				37.0	



Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 100 ft

DATE: 10/27/22

COMMENTS:
GPS Coordinates
N 30° 14' 04.2"
W 89° 32' 50.9"

GROUNDWATER DATA: Free water encountered at an approximate depth of 12' during auger drilling. Water level at an approximate depth of 5' after about 15 minutes.

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FIGURE 7

LOG OF BORING NO. 6

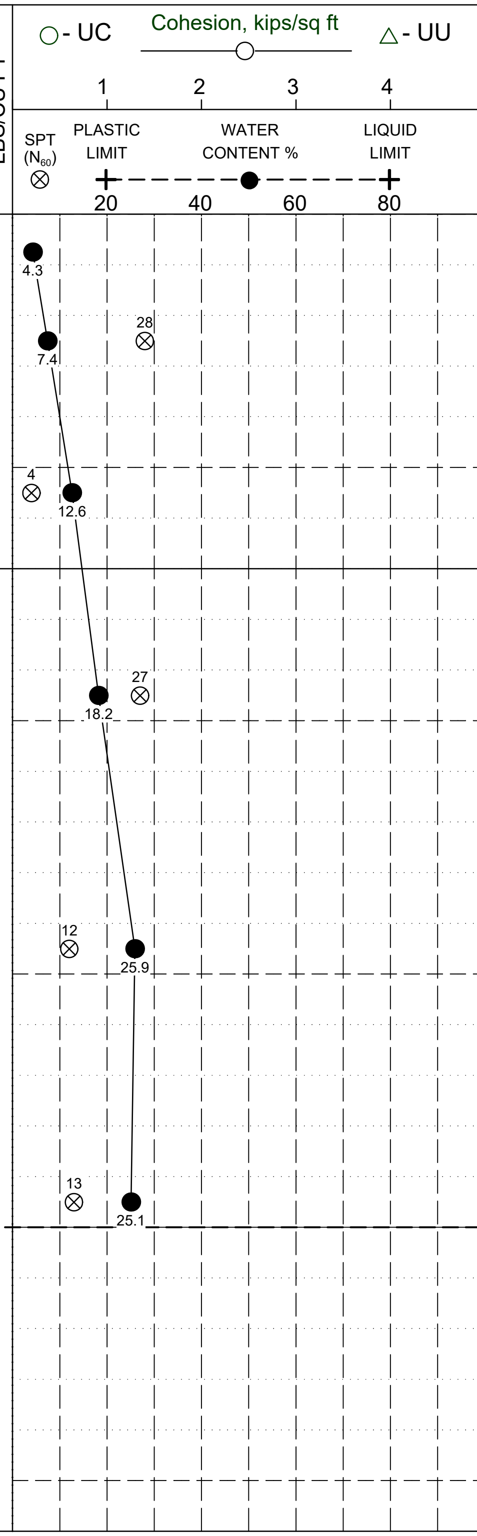
475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	SPT (N_{60})	WATER CONTENT %	% PASSING NO. 200 SIEVE
0–7	Medium dense gray silty fine sand (SM) with trace of gravel				4.3	23.9
		7-14-14		28	7.4	
5	- very loose below 5.5'	2-2-2		4	12.6	
7–20	Medium dense tan fine sand (SP)					
10		12-11-16		27	18.2	4.4
15	- light gray below 14'	11-4-8		12	25.9	
20		4-4-9		13	25.1	



Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/25/22

COMMENTS:
GPS Coordinates
N 30° 14' 08.2"
W 89° 32' 34.8"

GROUNDWATER DATA: Free water encountered at an approximate depth of 13' during auger drilling. Water level at an approximate depth of 11.3' after about 15 minutes.

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LOG OF BORING NO. 7

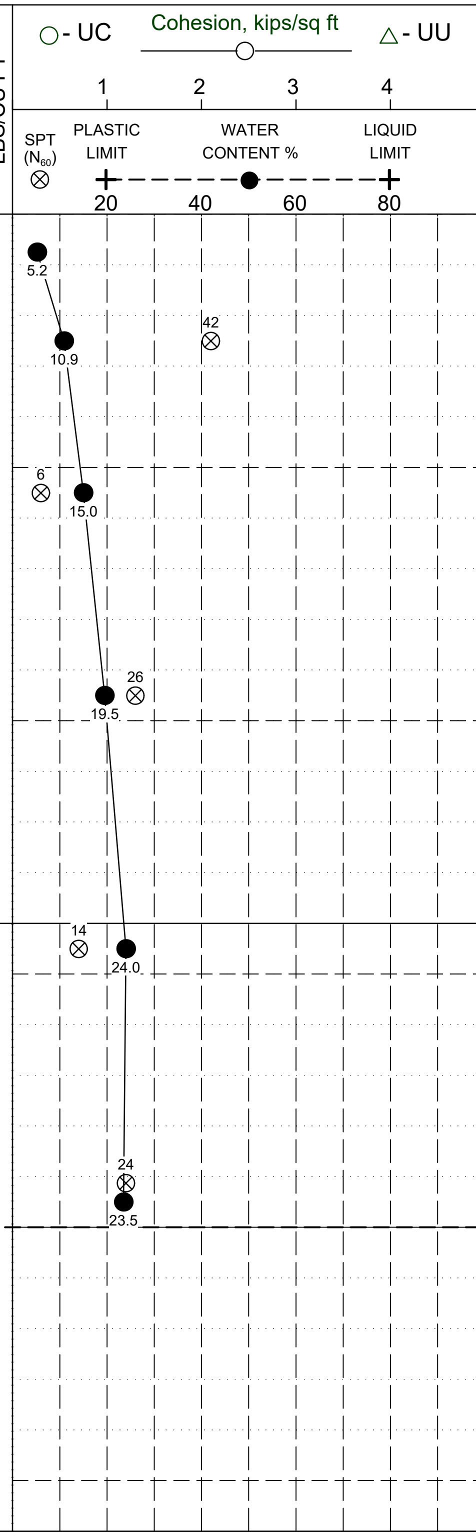
475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	% PASSING NO. 200 SIEVE
0	Dense light gray silty fine sand (SM), with shell fragments			
2.5		15-15-27		30.6
5	- loose with clay seams 5' - 9'	2-2-4		
9	- medium dense, tan below 9'	10-12-14		
14	Medium dense tan fine sand (SP)	5-7-7		2.5
19.5		9-11-13		



Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/25/22

COMMENTS:
GPS Coordinates
N 30° 14' 17.8"
W 89° 32' 25.4"

GROUNDWATER DATA: Free water encountered at an approximate depth of 14' during auger drilling. Water level at an approximate depth of 12.8' after about 15 minutes.

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LOG OF BORING NO. 8

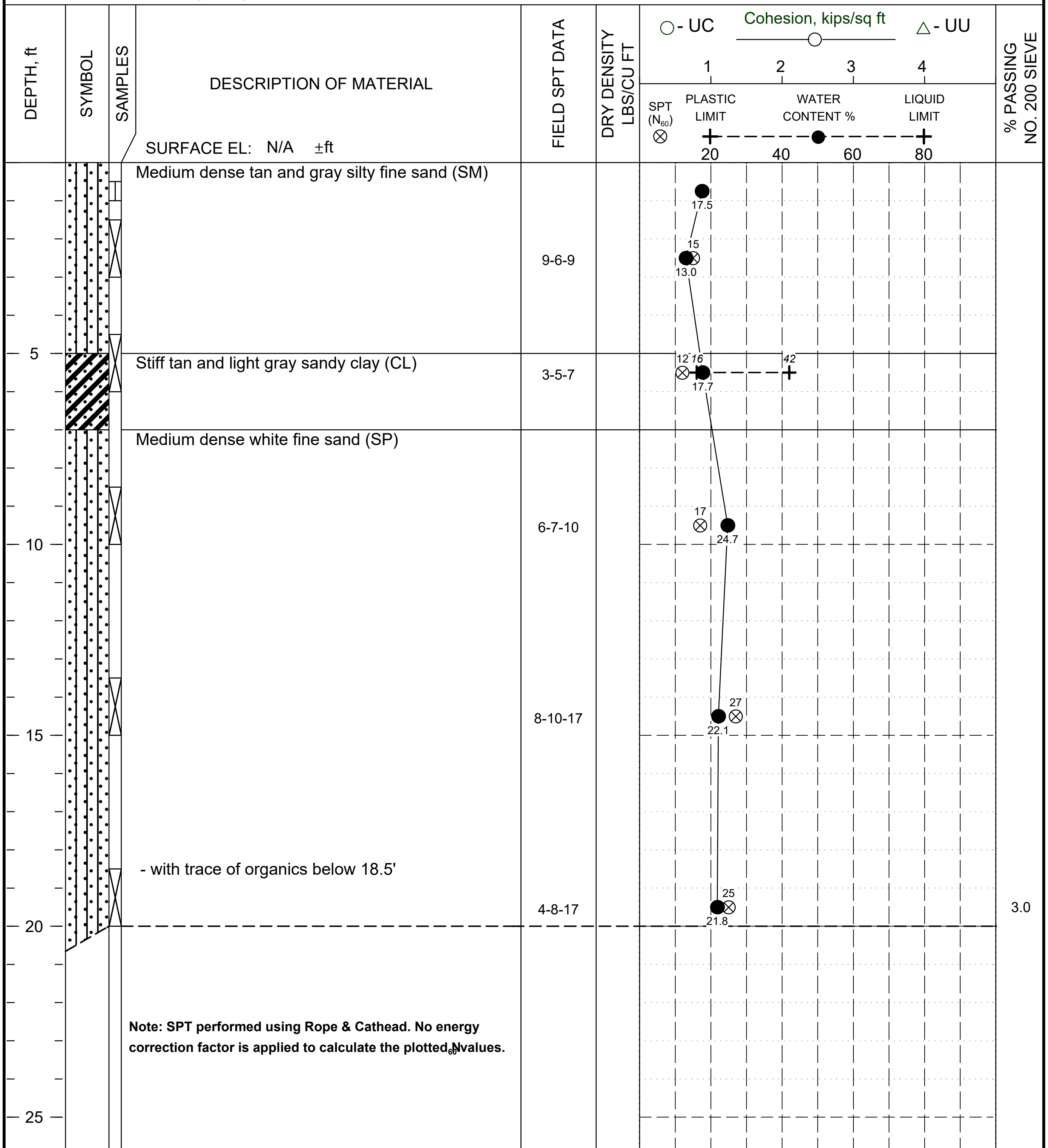
475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	SPT (N_{60})	WATER CONTENT %	PLASTIC LIMIT	LIQUID LIMIT	% PASSING NO. 200 SIEVE
0–5	Medium dense tan and gray silty fine sand (SM)			17.5			
		9-6-9	15	13.0			
5–7	Stiff tan and light gray sandy clay (CL)	3-5-7	12	17.7	16	42	
7–20	Medium dense white fine sand (SP)	6-7-10	17	24.7			
		8-10-17	27	22.1			
	- with trace of organics below 18.5'	4-8-17	25	21.8			3.0



Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/24/22

COMMENTS:
GPS Coordinates
N 30° 13' 47.8"
W 89° 33' 6.3"

GROUNDWATER DATA: Free water encountered at an approximate depth of 8.5' during auger drilling. Water level at an approximate depth of 8.5' after about 15 minutes.

LOG OF BORING NO. 9

475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	SPT (N_{60})	PLASTIC LIMIT	WATER CONTENT %	LIQUID LIMIT	% PASSING NO. 200 SIEVE
0–2	Loose tan silty fine sand (SM)					6.9		
2–4.5	Loose tan clayey fine sand (SC-SM), slightly silty	9-3-5		8	11	12.4	18	
4.5–9	Medium dense tan silty fine sand (SM)	5-6-10		16		6.2		
9–20	Dense tan fine sand (SP)	5-13-25		38		18.4		
	- medium dense below 14'	2-6-11		17		24.4		4.9
		10-14-16		30		23.3		

Cohesion, kips/sq ft: ○ - UC, △ - UU (scale 1, 2, 3, 4)

Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 20 ft

DATE: 10/24/22

COMMENTS:
GPS Coordinates
N 30° 14' 16.7"
W 89° 32' 48.0"

GROUNDWATER DATA: Free water encountered at an approximate depth of 17' during auger drilling. Water level at an approximate depth of 17' after about 15 minutes.

LOG OF BORING NO. 10

475-ACRE PORT BIENVILLE TRACT
HANCOCK COUNTY, MISSISSIPPI

TYPE: 4" Short-flight auger to 10', then rotary wash to completion.

LOCATION: See Figure 1B

SURFACE EL: N/A ±ft

DEPTH, ft	DESCRIPTION OF MATERIAL	FIELD SPT DATA	DRY DENSITY LBS/CU FT	WATER CONTENT %	SPT (N_{60})	% PASSING NO. 200 SIEVE
0	Loose tan and gray silty fine sand (SM)			7.1		
3		3-5-5		11.6	10	32.9
5	- medium dense below 5'	6-8-11		7.2	19	
9	Dense tan and gray fine sand (SP-SM), slightly silty	11-14-21		21.8	35	
14	- medium dense below 14'	7-8-12		21.1	20	5.5
18	Very dense tan and light gray fine sand (SP)	11-21-31		23.0	52	
23	- dense below 23'	14-17-22		26.9	39	4.1
29		9-11-24		30.7	35	
33	Dense tan and light gray fine sand (SP-SM), slightly silty	12-17-30		24.6	47	
39		14-14-30		25.5	44	5.6
40	Medium dense gray and light gray silty fine sand (SM)					
44		4-7-6		27.7	13	
46	- with clay pockets and seams 46' - 53.5'	3-7-9		28.7	16	15.1
53.5	- with fine sand 53.5' - 58.5'	4-7-7		31.4	14	
58.5	- light gray, with mica below 58.5'	5-5-6		33.7	11	

Legend: ○ - UC; △ - UU; Cohesion, kips/sq ft (1, 2, 3, 4); SPT (N_{60}) ⊗; PLASTIC LIMIT, WATER CONTENT %, LIQUID LIMIT (20, 40, 60, 80)

Note: SPT performed using Rope & Cathead. No energy correction factor is applied to calculate the plotted N_{60} values.

BORING DEPTH: 60 ft

DATE: 10/25/22

COMMENTS:
GPS Coordinates
N 30° 13' 51.6"
W 89° 32' 29.4"

GROUNDWATER DATA: Free water encountered at an approximate depth of 8.5' during auger drilling. Water level at an approximate depth of 8.5' after about 15 minutes.

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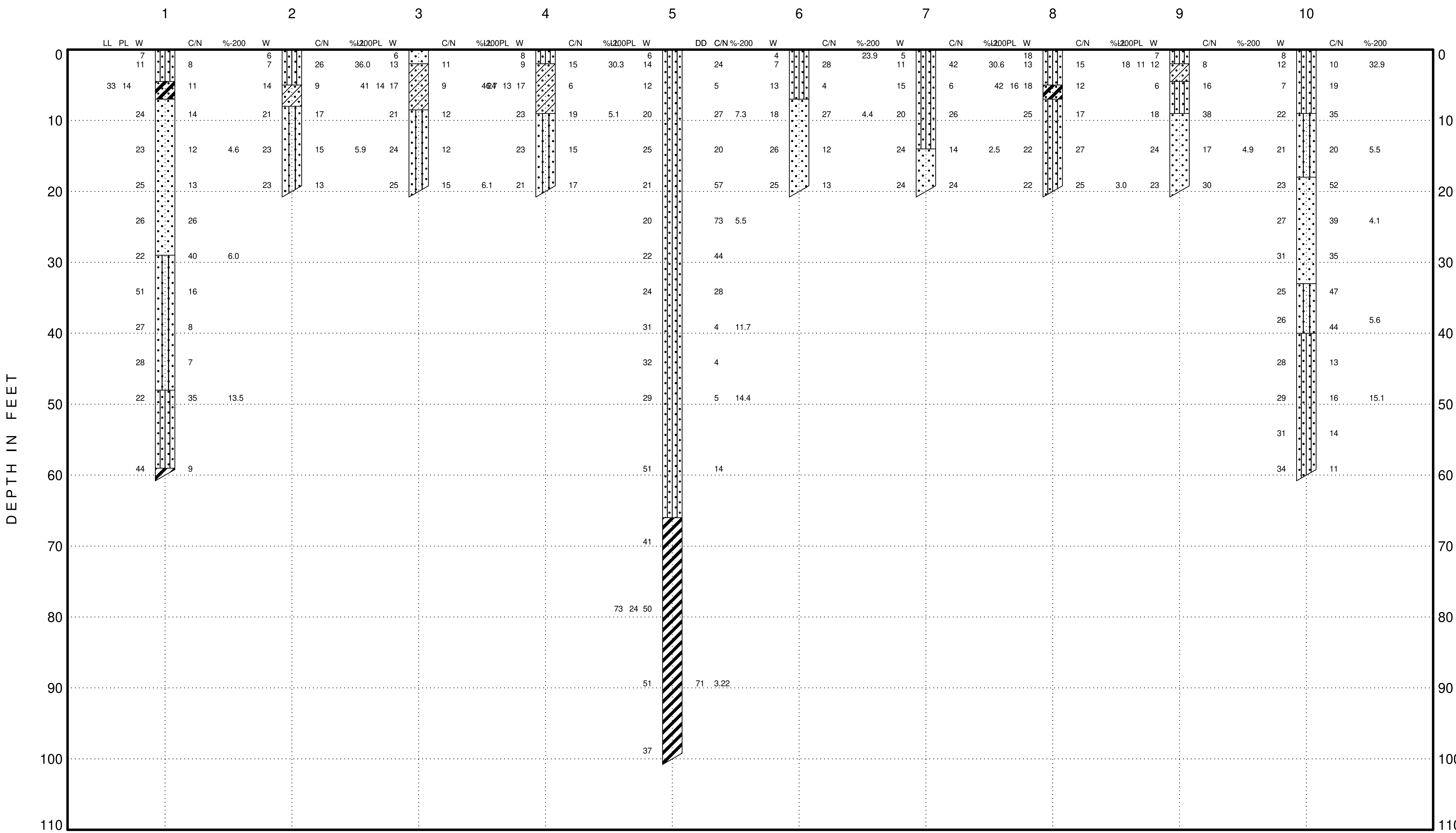
FIGURE 12



LEGEND:
LL = Liquid Limit
PL = Plastic Limit
W = Water Content
DD = Dry Density (pcf)
C/N = Cohesion (ksf)/Penetration
Resistance, N (blows per ft)
in the same column
% -200 = % Passing No. 200 Sieve

NOTE: See Figure 2 for boring log legend.

SUBSURFACE SOIL PROFILE					
475-ACRE PORT BIENVILLE TRACT HANCOCK COUNTY, MISSISSIPPI					
Job No.	220601	Date	11/10/22	Figure	13

GENERIC FENCE BIG (NEW 12-6-21)

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