



Ducks Unlimited, Inc.
Pierce Marsh Beneficial Use
Marsh Creation
Phase 1
North of West Bay Near Galveston Island
Galveston County, Texas

LOG OF BORING AND TEST RESULTS

Boring: B-9

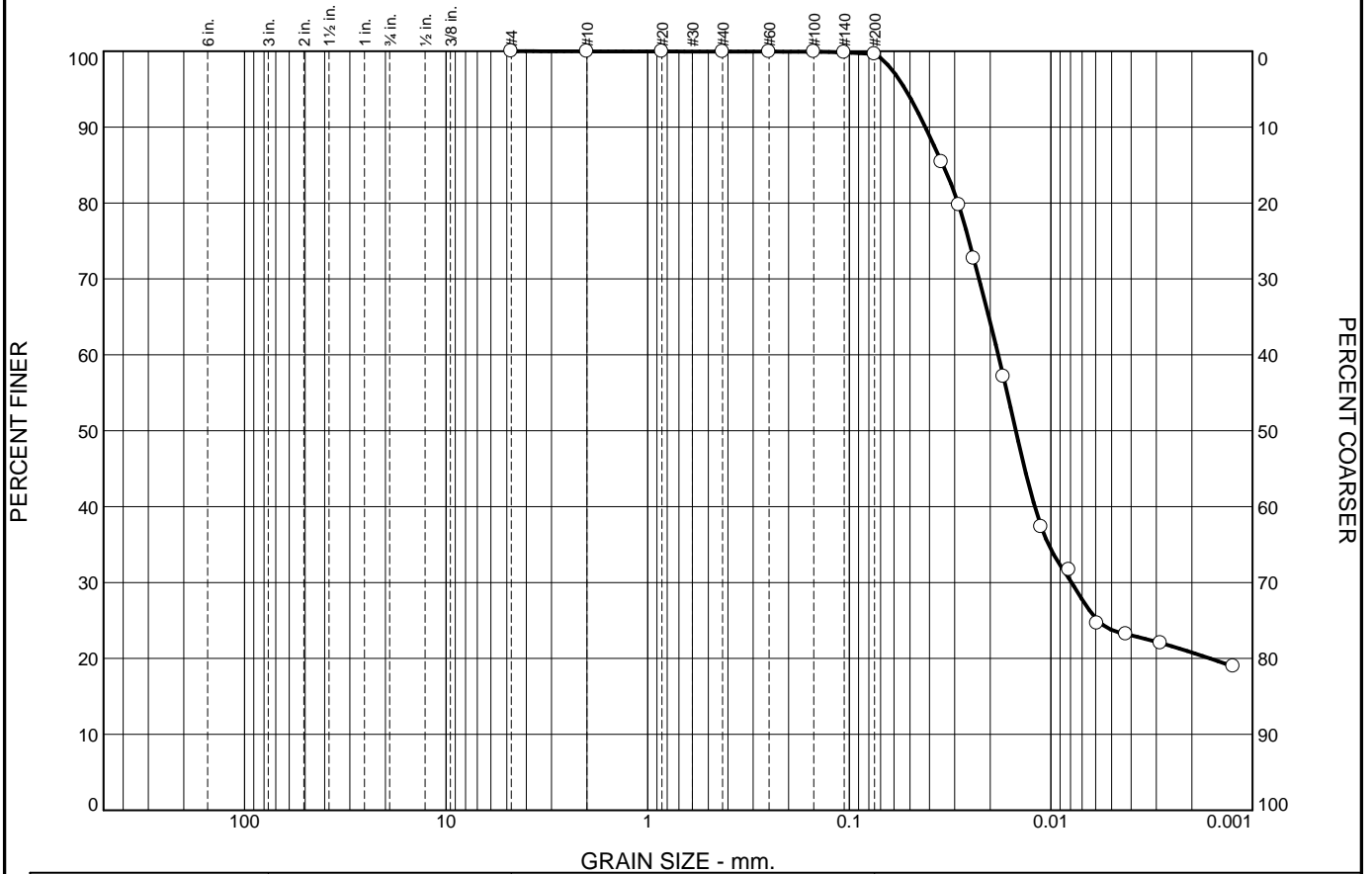
Project No: H0048
Date: 07/14/2022
Latitude: 29.31772°
Longitude: -94.96377°

Water Depth: See Text
Total Depth: 40.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density		Shear Tests			Atterberg Limits			Other Tests
										Dry pcf	Wet pcf	Type	φ	C psf	LL	PL	PI	
0					Moist, soft gray FAT CLAY	CH	1A	0	52									
	0.25						1B	1	61									
							2A	2	61									
	0.25				Moist, very soft gray & tan FAT CLAY	CH	2B	3	60	64	103	OB	0	229				
5					Moist, very soft gray & tan FAT CLAY	CH	3A	4	56									
	0.50						3B	5	58	67	105	OB	0	102				
					w/silt pockets		4A	6	54									
	1.00				Moist, stiff red, gray, & tan FAT CLAY w/trace of organic matter	CH	4B	7	31						56	17	39	
	1.00						5A	8	37									
10							5B	9	33									
	0.25				Moist, very soft tan & gray LEAN CLAY	CL	6A	10	42	80	113	OB	0	240				
							6B	11	58									
	1.00				Moist, stiff reddish-brown & gray FAT CLAY	CH	7A	12	24									
							7B	13	25									
15							8A	14	36									
	1.00				Moist, soft gray & tan FAT CLAY w/few silt pockets	CH	8B	15	24	102	127	OB	0	442				
							9A	16	29									
	1.00				Moist, stiff tan & brown LEAN CLAY w/trace of organic matter	CL	9B	17	27						37	20	17	
							10A	18	27									
20					Moist, medium compact brown SILT w/little clay	ML	10B	19	28									PD
	1.00				Moist, medium stiff to stiff brown LEAN CLAY	CL	11A	23	28									
25							11B	24	29									
	1.00				Moist, stiff brown & gray FAT CLAY w/trace of organic matter	CH	12A	28	32	91	120	OB	0	1440				
30							12B	29	33									
	1.00				Moist, very stiff brown & gray LEAN CLAY	CL	13A	33	36									
35							13B	34	35									
	1.00				Moist, medium stiff tan & gray FAT CLAY	CH	14A	38	40	77	110	OB	0	994				
40							14B	39	42									
45																		
50																		

NOTES: Boring B-9 was drilled in 6 in. of water.


Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	0.3	75.8	23.8

×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.0343	0.0182	0.0149	0.0079				

Material Description							USCS	AASHTO
○ Moist, medium compact brown SILT w/ little clay							ML	

Project No. H0048 Client: DUCKS UNLIMITED, INC., RICHMOND, TEXAS Project: DUCKS UNLIMITED, INC. - PIERCE MARSH BENEFICIAL USE MARSH CREATION, PHASES 1 AND 2, <input type="radio"/> Source of Sample: B-9 Depth: 19 Sample Number: 10B			Remarks: <input type="radio"/> Soil Specific Gravity was Estimated ASTM D422 was Performed
<div><div>EUSTIS ENGINEERING SINCE 1946</div></div>			

Tested By: BH & KP Checked By: CD

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2022

Client: DUCKS UNLIMITED, INC., RICHMOND, TEXAS**Project:** DUCKS UNLIMITED, INC. - PIERCE MARSH BENEFICIAL USE MARSH CREATION, PHASES 1 AND 2,
NORTH OF WEST BAY NEAR GALVESTON ISLAND, GALVESTON COUNTY, TEXAS.
DU CONTRACT NO. TX-0-2. DU PROJECT NO. TX-194-4. DU TASK ORDER NO. 1**Project Number:** H0048**Location:** B-9**Depth:** 19**Sample Number:** 10B**Material Description:** Moist, medium compact brown SILT w/ little clay**USCS Classification:** ML**Testing Remarks:** Soil Specific Gravity was Estimated
ASTM D422 was Performed**Tested by:** BH & KP**Checked by:** CD**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 0.27

Tare Wt. = 0.00

Minus #200 from wash = 99.6%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
69.92	0.00	0.00	#4	0.00	100.0	0.0
			#10	0.02	100.0	0.0
			#20	0.03	100.0	0.0
			#40	0.04	99.9	0.1
			#60	0.04	99.9	0.1
			#100	0.06	99.9	0.1
			#140	0.12	99.8	0.2
			#200	0.27	99.6	0.4

Hydrometer Test Data**Hydrometer test uses material passing #10****Percent passing #10 based upon complete sample = 100.0****Weight of hydrometer sample = 69.92****Automatic temperature correction****Composite correction (fluid density and meniscus height) at 20 deg. C = -6.00****Meniscus correction only = 1.0****Specific gravity of solids = 2.70****Hydrometer type = 152H****Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
0.75	22.0	66.0	60.4	0.0131	67.0	5.3	0.0349	85.4	14.6
1.25	22.0	62.0	56.4	0.0131	63.0	6.0	0.0286	79.8	20.2
2.00	22.0	57.0	51.4	0.0131	58.0	6.8	0.0242	72.7	27.3
5.00	22.0	46.0	40.4	0.0131	47.0	8.6	0.0172	57.1	42.9
15.00	22.0	32.0	26.4	0.0131	33.0	10.9	0.0112	37.3	62.7
30.00	22.0	28.0	22.4	0.0131	29.0	11.5	0.0081	31.7	68.3
60.00	22.0	23.0	17.4	0.0131	24.0	12.4	0.0060	24.6	75.4

Eustis Engineering L.L.C.

Hydrometer Test Data (continued)

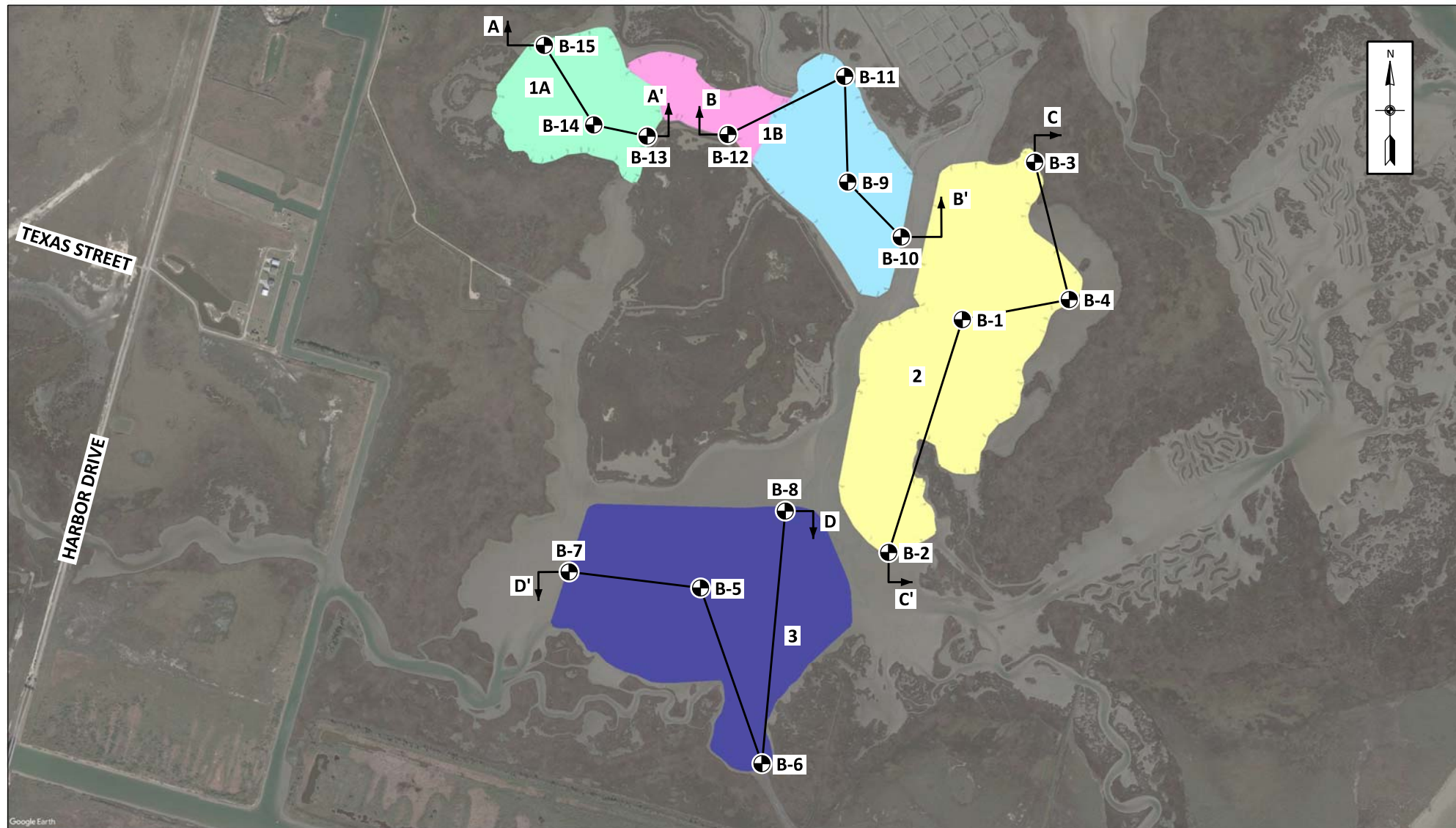
Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
120.00	22.0	22.0	16.4	0.0131	23.0	12.5	0.0042	23.2	76.8
262.50	22.7	21.0	15.6	0.0130	22.0	12.7	0.0029	22.0	78.0
1440.00	22.0	19.0	13.4	0.0131	20.0	13.0	0.0012	19.0	81.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	75.8	23.8	99.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0016	0.0079	0.0120	0.0149	0.0182	0.0288	0.0343	0.0420	0.0528

Fineness Modulus
0.00



SATELLITE IMAGERY DATED: JANUARY 2022

NOT TO SCALE

⊙ DENOTES APPROXIMATE LOCATIONS OF SOIL BORINGS DRILLED BETWEEN 11 AND 18 JULY 2022

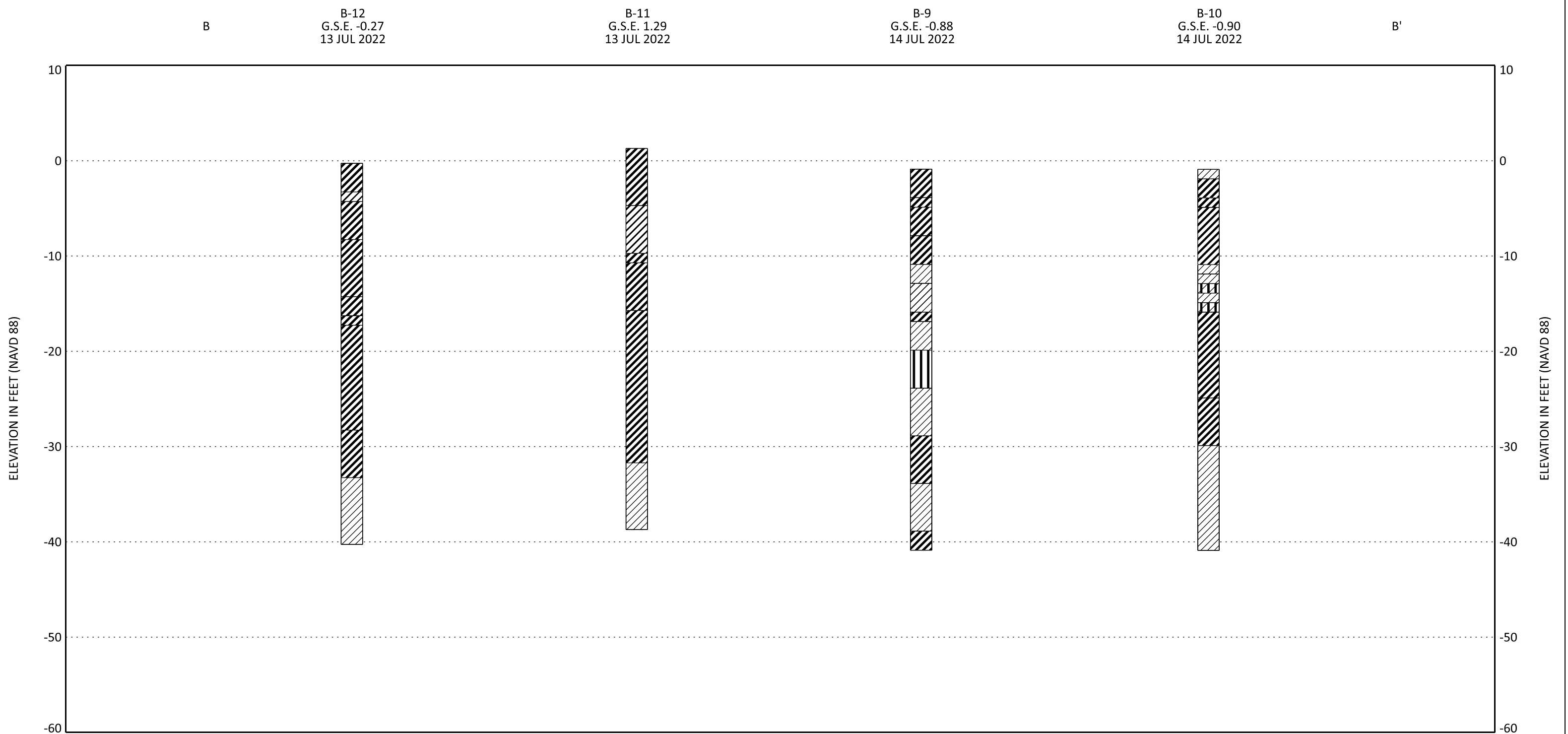
BORING LOCATION PLAN

PHASE 1
DUCKS UNLIMITED, INC.
PIERCE MARSH BENEFICIAL USE MARSH CREATION
NORTH OF WEST BAY NEAR GALVESTON ISLAND
GALVESTON COUNTY, TEXAS
DU CONTRACT NO. TX-0-2
DU PROJECT NO. TX-194-4
DU TASK ORDER NO. 1

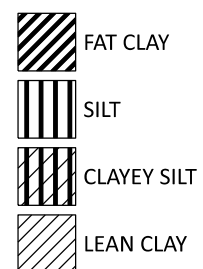


DRAWN BY: S.T.S.
CHECKED BY: H.C.W.
CADD FILE:
LOCATION PLAN.DGN

JOB NO.: H0048
DATE: 15 AUG 2022
FIGURE 2



BORING MATERIAL GRAPHICS



NOTE:

1. G.S.E. = GROUND SURFACE ELEVATION

SUBSURFACE SOIL PROFILE
MCA-1B
PHASE 1
DUCKS UNLIMITED, INC.
PIERCE MARSH BENEFICIAL USE MARSH CREATION
NORTH OF WEST BAY NEAR GALVESTON ISLAND
GALVESTON COUNTY, TEXAS
DU CONTRACT NO. TX-0-2
DU PROJECT NO. TX-194-4
DU TASK ORDER NO. 1



DRAWN BY: S.T.S.

JOB NO.: H0048

CHECKED BY: H.C.W.

DATE: 23 AUG 2022







CADD FILE:
PROFILE.DGN

FIGURE 3
(SHEET 2 OF 4)

PP Pocket penetrometer: Resistance in tons per square foot

SPT Standard Penetration Test: Number of blows of a 140-lb hammer dropped 30 inches required to drive 2-in. O.D., 1.4-in. I.D. sampler a distance of 1 foot into the soil after first seating it 6 inches. Values shown have not been corrected.

SPLR Type of Sampling  Shelby  SPT  Auger  Vibracore  Geoprobe  No sample

SYMBOL Clay  Silt  Sand  Peat/Humus  Shells  Stone/Gravel 
Predominant type shown heavy; modifying type shown light

USC Unified Soil Classification

DENSITY Unit weight in pounds per cubic foot

SHEAR TESTS

TYPE

UC Unconfined compression shear

OB Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure

UU Unconsolidated undrained triaxial compression shear

ϕ Angle of internal friction in degrees

c Cohesion in pounds per square foot

ATTERBERG LIMITS

LL Liquid Limit

PL Plastic Limit

PI Plasticity Index

OTHER TESTS

CON Consolidation

-#200 Percent passing a U.S. No. 200 sieve

SV Particle size distribution (sieve only)

PD Particle size distribution (sieve and hydrometer)

k Coefficient of permeability in centimeters per second

SP Swelling pressure in pounds per square foot

Other laboratory test results reported on separate figures

GENERAL NOTES

- (1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.
- (2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.