Aptim Environmental & Infrastructure, LLC
6401 Congress Avenue, Suite 140
Boca Raton, Florida 33487
Phone # 1-561-391-8102

Legend for Geotechnical Data

Grain Size Scale for Sediments

Unified Soil Classification System (USCS) (ASTM D2487/2488)		APTIM Standard Sieve Stack		
		Sieve Number	Size (phi)	Size (mm)
Gravel	Coarse Gravel	3/4	-4.25	19.03
	Fine Gravel	5/8	-4.00	16.00
		7/16	-3.50	11.20
		5/16	-3.00	8.00
		3 ½	-2.50	5.60
		4	-2.25	4.75
Sand	Coarse Sand	5	-2.00	4.00
		7	-1.50	2.80
		10	-1.00	2.00
	Medium Sand	14	-0.50	1.40
		18	0.00	1.00
		25	0.50	0.71
		35	1.00	0.50
	Fine Sand	45	1.50	0.36
		60	2.00	0.25
		80	2.50	0.18
		120	3.00	0.13
		170	3.50	0.09
		200	3.75	0.08
Fines	Silt/Clay	230	4.00	0.06

Proportional Definition of Descriptive Terms

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

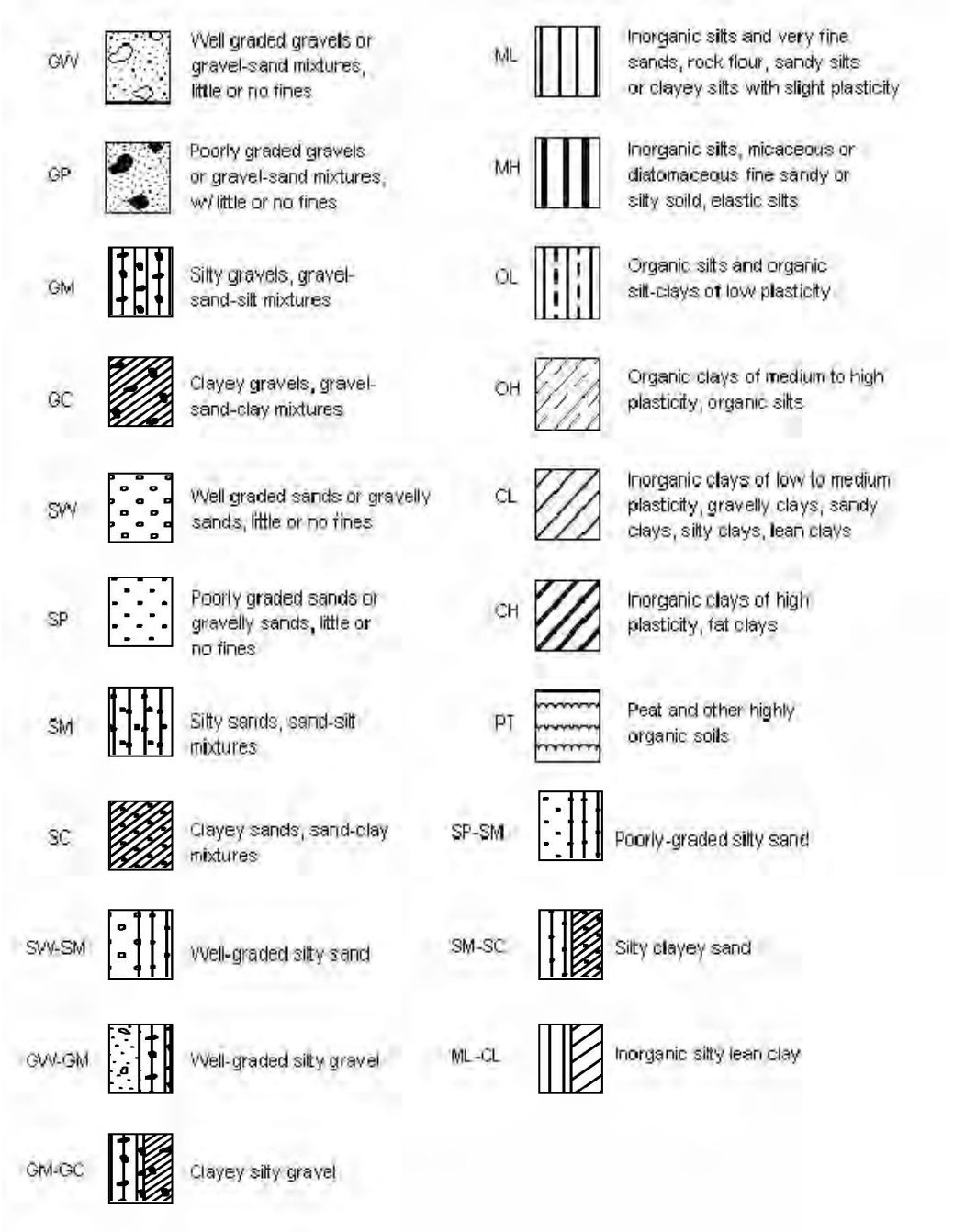
Consistency of Cohesive Soils

Description	Consistency Index	Approximate Undrained Shear Strength (kPa)	Field Identification
Hard		Over 300	Indented with difficulty by thumbnail, brittle.
Very Stiff	>1	150-300	Readily indented by thumbnail, still very tough.
Stiff	0.75-1	75-150	Readily indented by thumb but penetrated only with difficulty. Cannot be moulded in the fingers.
Firm	0.5-0.75	40-75	Can be penetrated several centimeters by thumb with moderate effort and moulded in fingers by strong pressure.
Soft	< 0.5	20-40	Easily penetrated several centimeters by thumb, easily moulded.
Very Soft		Less than 20	Easily penetrated several centimeters by fist, exudes between fingers when squeezed in fist.

Source: Engineering Properties of Soils and Rocks, Fourth Edition by Fred G. Bell

USCS Classifications

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.



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

Boring Designation TXGLO1-VC-23-066

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT
TX GLO Region 1 Recon Geotechnical Sand Search
Jefferson, Chambers, Galveston and Brazoria Co.

APTIM

9. SIZE AND TYPE OF BIT 3.0 In.

10. COORDINATE SYSTEM/DATUM: Texas State Plane South | HORIZONTAL: NAD 1983 | VERTICAL: NAVD88

2. BORING DESIGNATION: TXGLO1-VC-23-066 | LOCATION COORDINATES (ft): X = 3,281,829 Y = 13,618,660

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 3

4. NAME OF DRILLER: APTIM

13. TOTAL NUMBER CORE BOXES

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

14. ELEVATION GROUND WATER

15. DATE BORING: STARTED 10-15-23 | COMPLETED 10-15-23

6. THICKNESS OF OVERBURDEN 0.0 Ft.

16. ELEVATION TOP OF BORING -47.2 Ft.

7. DEPTH DRILLED INTO ROCK 0.0 Ft.

17. TOTAL RECOVERY FOR BORING 17.2 Ft.

8. TOTAL DEPTH OF BORING 19.0 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 The USCS classification system defines silt as the percent passing the No.200 (0.075 mm) sieve
-47.2	0.0					
-48.3	1.1		LEAN CLAY, soft, trace sand, fine grained, quartz, trace shell hash, sand distributed in pockets up to 1.0", shell hash distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		T1	Sample #T1, Depth = 0.5' Ave. Field Vane (tsf): 0.03
-52.9	5.7		FAT CLAY, stiff, some sand, fine grained, quartz, little shell hash, trace shell fragments, trace whole shell, shell fragments are bivalve fragments up to 0.5", whole shells are whole bivalves up to 1.0", 3.0" shell hash pockets @ 1.1', 5.1' and 5.5', (1.0" x 3.0") bivalve fragment pocket @ 3.4', dark gray (2.5Y-4/1), (CH).		T2	Sample #T2, Depth = 3.1' Ave. Field Vane (tsf): 0.15
-59.7	12.5		Clayey SAND, fine grained, quartz, trace organics, trace rock fragments, trace shell hash, trace silt, organics distributed in pockets up to 0.25", rock fragments are fragments of lithified clay typically up to 0.25", 1.0" rock fragment @ 7.3', 3.0" pocket of rock fragments @ 5.7', brown (7.5YR-4/4), (SC).		1	Sample #1, Depth = 9.5' Mean (mm): 0.10, Phi Sorting: 0.33 Fines (230): 48.22% Fines (200): 59.03% (CL)
-63.2	16.0		Sandy FAT CLAY, hard, sand component is fine grained quartz, wavy bedding towards base of layer, color is mottled brown (7.5YR-4/3), grayish brown (2.5Y-5/2) and brown (7.5YR-5/3), (CH).		T3	Sample #T3, Depth = 13.0' Ave. Field Vane (tsf): 0.56
-64.4	17.2		SAND, fine grained, quartz, trace clay, trace silt, clay distributed in pockets up to 1.0", flaser bedding throughout layer, Bit sample from 17.0' to 17.2', pale brown (10YR-6/3), (SM).		2	Sample #2, Depth = 16.6' Mean (mm): 0.11, Phi Sorting: 0.29 Fines (230): 18.81% Fines (200): 23.80% (SM)
-66.2	19.0		No recovery.			
			End of Boring			

0 5 10 15 20 25

REGION1_RECON_GEOTECH.GPJ 3/25/24

SAJ FORM 1836
JUN 04

Texas General Land Office

Texas GLO Region 1 Geotechnical Reconnaissance Survey

TXGLO1-VC-23-066

Date Collected: 10/15/23
Top Elev. (ft NAVD88): -47.2
Bottom Elev. (ft NAVD88): -64.4
Core Length (ft): 17.2

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Granularmetric Report

Depths and elevations based on measured values

Project Name: TX GLO Region 1 Recon Geotechnical Sand Search

Sample Name: TXGLO1-VC-23-066 #1

Analysis Date: 02-06-24

Analyzed By: MS

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6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
3,281,829	13,618,660	Texas State Plane South	-56.7 NAVD88

USCS:	Munsell:	Comments:
CL	Wet - 7.5YR-4/1 Dry - 7.5YR-4/4 Washed - 7.5YR-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
104.46	63.29	9.16	0.05	#200 - 59.03 #230 - 48.22			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.01	0.01	0.01	0.01
25	0.50	0.71	0.01	0.01	0.02	0.02
35	1.00	0.50	0.01	0.01	0.03	0.03
45	1.50	0.35	0.02	0.02	0.05	0.05
60	2.00	0.25	0.02	0.02	0.07	0.07
80	2.50	0.18	0.05	0.05	0.12	0.12
120	3.00	0.13	4.09	3.92	4.21	4.04
170	3.50	0.09	30.90	29.58	35.11	33.62
200	3.75	0.07	7.68	7.35	42.79	40.97
230	4.00	0.06	11.29	10.81	54.08	51.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			3.96	3.35	3.20	3.02

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	3.39	0.10	0.33	-0.59	8.18

Granularmetric Report

Depths and elevations based on measured values

Project Name: TX GLO Region 1 Recon Geotechnical Sand Search

Sample Name: TXGLO1-VC-23-066 #2

Analysis Date: 02-06-24

Analyzed By: MS

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ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
3,281,829	13,618,660	Texas State Plane South	-63.8 NAVD88

USCS:	Munsell:	Comments:
SM	Wet - 10YR-6/3 Dry - 10YR-7/4 Washed - 10YR-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.24	95.23	4.89	0.02	#200 - 23.80 #230 - 18.81			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.01	0.01	0.01	0.01
25	0.50	0.71	0.00	0.00	0.01	0.01
35	1.00	0.50	0.01	0.01	0.02	0.02
45	1.50	0.35	0.01	0.01	0.03	0.03
60	2.00	0.25	0.00	0.00	0.03	0.03
80	2.50	0.18	0.09	0.08	0.12	0.11
120	3.00	0.13	15.36	13.81	15.48	13.92
170	3.50	0.09	58.45	52.54	73.93	66.46
200	3.75	0.07	10.84	9.74	84.77	76.20
230	4.00	0.06	5.55	4.99	90.32	81.19

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.72	3.34	3.11	3.02	2.68

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	3.25	0.11	0.29	-0.29	6.09

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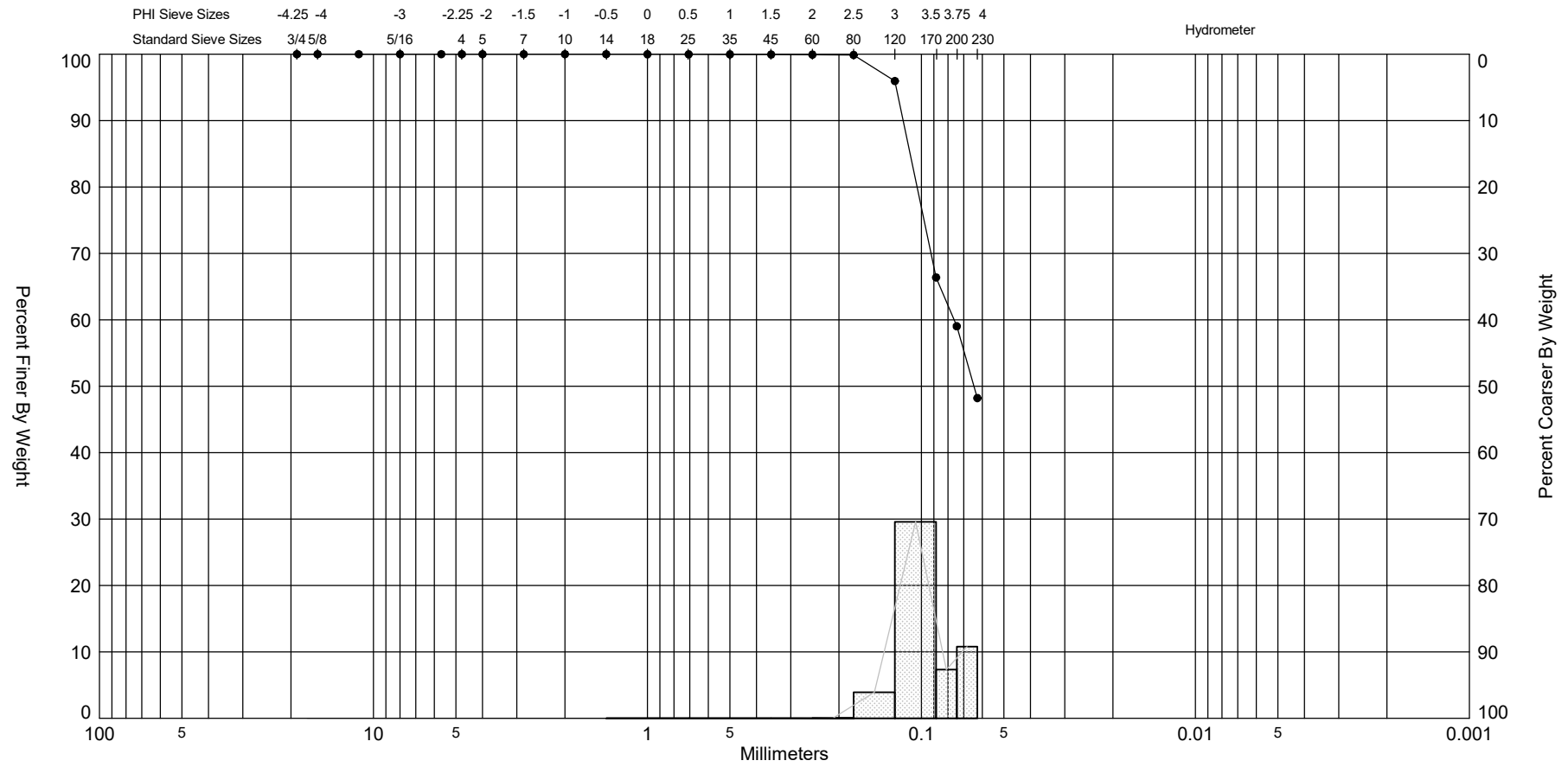

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
TXGLO1-VC-23-066 #1	—●—	-56.7	CL	#200 - 59.03 #230 - 48.22			3.96	3.39	-0.59	8.18	0.33

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	TX GLO Region 1 Recon Geotechnical Sand Search
Analysis Date:	02-06-24
Analyzed By:	MS
Easting (X, ft):	3,281,829
Northing (Y, ft):	13,618,660
Horizontal Datum:	NAD 1983
Vertical Datum:	NAVD88

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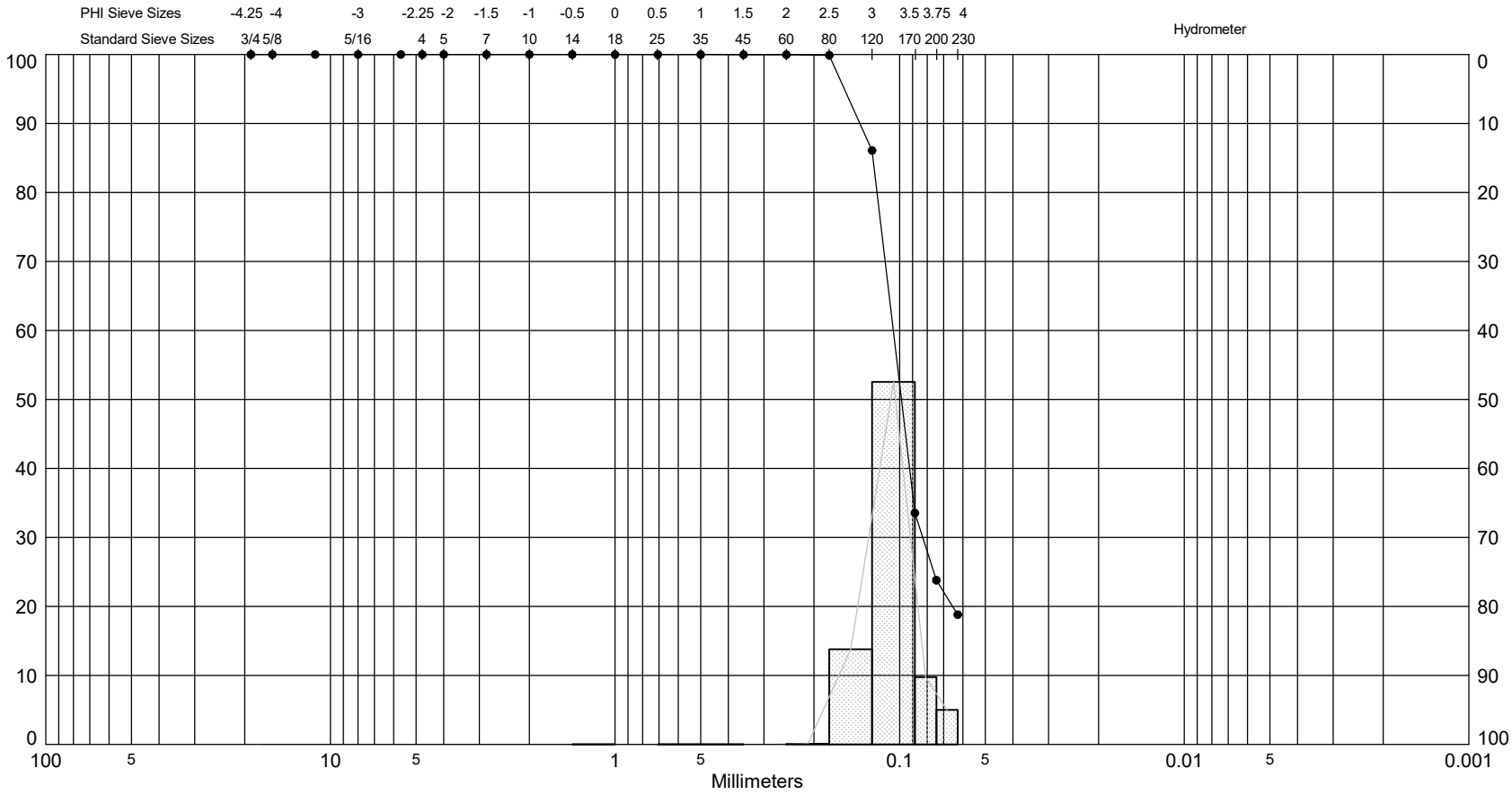

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
TXGLO1-VC-23-066 #2	—●—	-63.8	SM	#200 - 23.80 #230 - 18.81			3.34	3.25	-0.29	6.09	0.29

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	TX GLO Region 1 Recon Geotechnical Sand Search
Analysis Date:	02-06-24
Analyzed By:	MS
Easting (X, ft):	3,281,829
Northing (Y, ft):	13,618,660
Horizontal Datum:	NAD 1983
Vertical Datum:	NAVD88

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REGION1_RECON_GEOTECH.GPJ 3/6/24

Mini Vane Shear Test Results

CORE ID	SAMPLE DEPTH (ft)	TORVANE (kg/cm²)	TORVANE (tsf)	TORVANE (kpa)	DESCRIPTION[1]
TXGLO1-VC-23-059	1.6	1.5	0.15	147.10	Stiff
	2.3	2.5	0.26	245.17	Very Stiff
	3.5	2.0	0.20	196.13	Very Stiff
	5.2	4.0	0.41	392.27	Hard
	10.0	7.0	0.72	686.47	Hard
TXGLO1-VC-23-060	2.4	6.5	0.67	637.43	Hard
	11.1	1.5	0.15	147.10	Stiff
	13.1	6.0	0.61	588.40	Hard
	17.0	6.0	0.61	588.40	Hard
TXGLO1-VC-23-061	No Torvane Conducted				
TXGLO1-VC-23-062	1.0	0.3	0.03	24.52	Soft
	2.6	1.0	0.10	98.07	Stiff
	5.0	4.0	0.41	392.27	Hard
TXGLO1-VC-23-063	1.5	4.5	0.46	441.30	Hard
	5.0	2.5	0.26	245.17	Very Stiff
	11.0	2.8	0.28	269.68	Very Stiff
	15.0	2.5	0.26	245.17	Very Stiff
TXGLO1-VC-23-064	0.3	0.0	0.00	0.00	Very Soft
	0.7	0.5	0.05	49.03	Firm
	13.1	2.5	0.26	245.17	Very Stiff
TXGLO1-VC-23-065	1.8	2.0	0.20	196.13	Very Stiff
	6.1	1.3	0.13	122.58	Stiff
TXGLO1-VC-23-066	0.5	0.3	0.03	24.52	Soft
	3.1	1.5	0.15	147.10	Stiff
	13.0	5.5	0.56	539.37	Hard
TXGLO1-VC-23-067	0.1	0.0	0.00	0.00	Very Soft
	3.0	0.5	0.05	49.03	Firm
TXGLO1-VC-23-068	0.3	0.3	0.03	24.52	Soft
	3.5	1.5	0.15	147.10	Stiff
	7.4	3.0	0.31	294.20	Very Stiff
	11.2	7.8	0.79	760.02	Hard
	15.0	8.0	0.82	784.53	Hard
TXGLO1-VC-23-069	0.4	0.0	0.00	0.00	Very Soft
	3.5	0.8	0.08	73.55	Firm
TXGLO1-VC-23-070	0.7	0.3	0.03	24.52	Soft
	1.9	2.0	0.20	196.13	Very Stiff
	3.3	2.0	0.20	196.13	Very Stiff
	5.5	3.5	0.36	343.23	Hard
	11.9	0.0	0.00	0.00	Very Soft