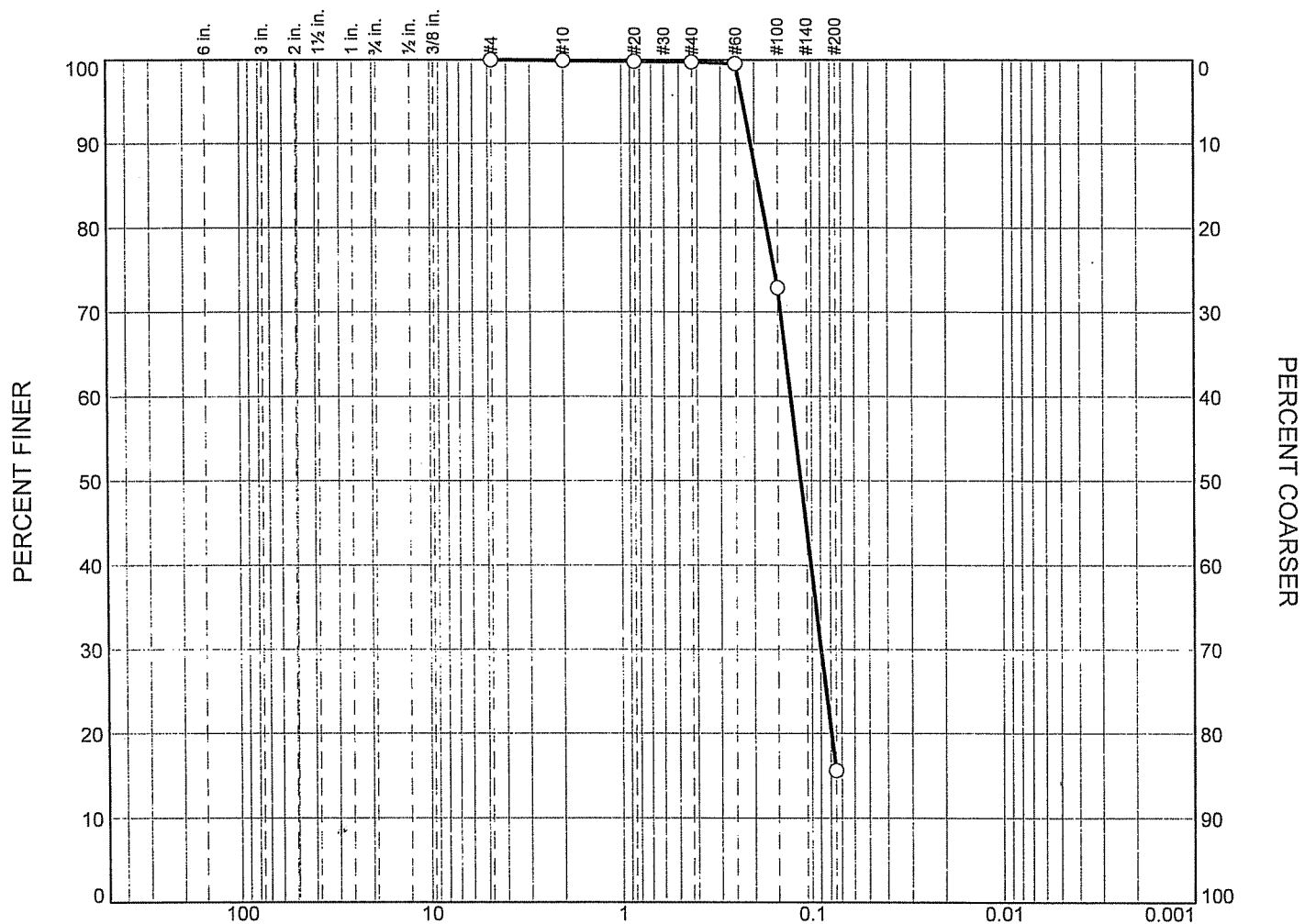


BORING LOG	DISTRICT	INSTALLATION	SHEET OF 2 SHEETS
1. PROJECT Galveston Channel and Pelican Island PA		7. ELEVATION OF HOLE	
2. LOCATION (Coordinates or Station) N=13687968 E=3313067		8. DATUM FOR ELEVATION	
3. DRILLING AGENCY Dempsey (Geotest Engineering, Inc.)		9. ELEVATION OF GROUNDWATER ▽ TOD: ▼ 24-HR:	
4. LABORATORY TESTING AGENCY Tolunay-Wong Engineers, Inc.		10. DRILLING DATE and TIME STARTED: COMPLETED:	
5. DEPTH OF WATER ▽ TOD: ▼ 24-HR:		11. CLASSIFICATION REFERENCE	
6. DEPTH OF HOLE 50 ft		12. ENGINEER	

[illegible]

BORING LOG			DISTRICT	INSTALLATION		SHEET 2 OF 2 SHEETS								
1. PROJECT Galveston Channel and Pelican Island PA				7. ELEVATION OF HOLE										
2. LOCATION (Coordinates or Station) N=13687968 E=3313067				8. DATUM FOR ELEVATION										
3. DRILLING AGENCY Dempsey (Geotest Engineering, Inc.)				9. ELEVATION OF GROUNDWATER ▽ TOD: ▼ 24-HR:										
4. LABORATORY TESTING AGENCY Tolunay-Wong Engineers, Inc.				10. DRILLING DATE and TIME STARTED: COMPLETED:										
5. DEPTH OF WATER ▽ TOD: ▼ 24-HR:				11. CLASSIFICATION REFERENCE										
6. DEPTH OF HOLE 50 ft				12. ENGINEER										
DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER	RECOVERY (%)	SPT (N)	PENETROMETER (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	FINES CONTENT (% <200)
			& gray, w/ silt seams & ferrous nodules		17			2.50	104.5	23.3				
					18			1.00	94.6	26.0				
40			SANDY LEAN CLAY(CL) , soft to firm, tan, w/ silt seams & ferrous nodules -tan & gray below 40'		19			0.50		25.0	32	16	16	97.8
					20			1.00	95.8	24.5				
					21			1.25	93.4	28.9				
45			SANDY SILT CLAY(CL-ML) , stiff, tan & gray, w/ silt seams & ferrous nodules		22			2.00	95.9	26.3				
			FAT CLAY(CH) , firm to stiff, gray & tan, w/ sand & silt seams		23			1.00	88.8	35.1				
50					24			1.50	90.8	34.5				
55														
60														
65														

Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.1	84.2	15.6	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-235	8	14-15.5	Gray SILTY SAND	SM

**Tolunay-Wong
Engineers, Inc.
Houston, Texas**

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Project No.: 08.18.918

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2008

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Project Number: 08.18.918

Location: 07-235

Depth: 14-15.5

Sample Number: 8

Material Description: Gray SILTY SAND

USCS: SM

Material specification: (no specification envelope)

Sieve Test Data

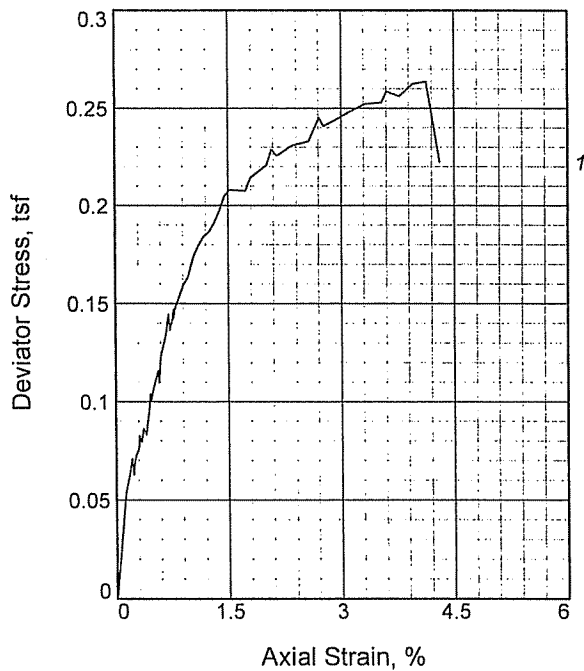
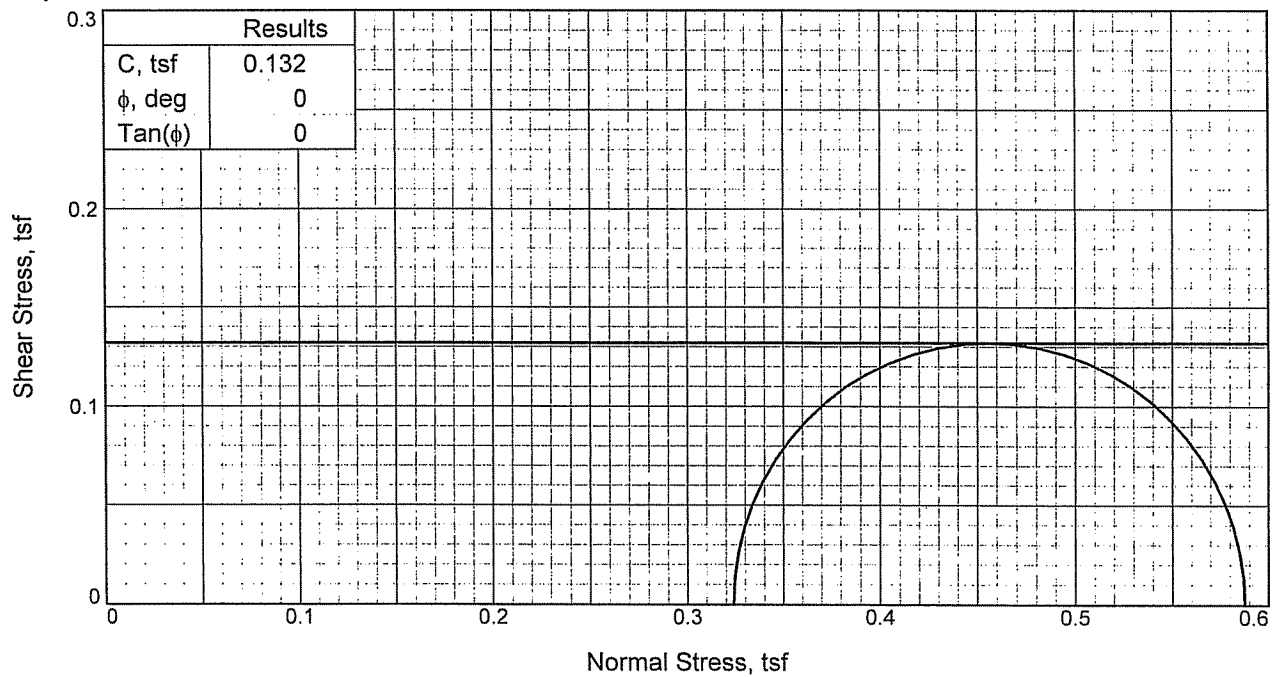
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
328.56	215.40	215.40	3"					
			0.75"					
			#4	215.40	100.0			
			#10	215.49	99.9			
			#20	215.59	99.8			
			#40	215.67	99.8			
			#60	215.87	99.6			
			#100	246.10	72.9			
			#200	310.89	15.6			

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.1	84.2	84.4			15.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0791	0.0893	0.1137	0.1284	0.1719	0.1892	0.2081	0.2290

Fineness Modulus
0.28



Sample No.		1
Initial	Water Content, %	65.5
	Dry Density, pcf	61.2
	Saturation, %	99.9
	Void Ratio	1.8043
	Diameter, in.	2.83
	Height, in.	5.98
At Test	Water Content, %	63.4
	Dry Density, pcf	61.2
	Saturation, %	96.6
	Void Ratio	1.8043
	Diameter, in.	2.83
	Height, in.	5.98
Strain rate, %/min.		1.00
Back Pressure, tsf		0.00
Cell Pressure, tsf		0.32
Fail. Stress, tsf		0.26
Ult. Stress, tsf		
σ_1 Failure, tsf		0.59
σ_3 Failure, tsf		0.32

Type of Test:

Unconsolidated Undrained

Sample Type: Undisturbed

Description: Gray FAT CLAY with SAND

LL= 76

PL= 24

PI= 52

Assumed Specific Gravity= 2.75

Remarks:

Test method: ASTM D 2850

Torvane; tsf: 0.125

Failure type: Bulge

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-235

Depth: 10-12

Sample Number: 6

Proj. No.: 08.18.918

Date Sampled: 7/17/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

TRIAxIAL COMPRESSION TEST

Unconsolidated Undrained

7/25/2008

10:38 AM

Date: 7/17/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-235
Depth: 10-12 **Sample Number:** 6
Description: Gray FAT CLAY with SAND
Remarks:

Test method: ASTM D 2850

Torvane; tsf: 0.125

Failure type: Bulge

Type of Sample: Undisturbed**Assumed Specific Gravity**=2.75 **LL**=76 **PL**=24 **PI**=52**Test Method:** ASTM D 2850**Parameters for Specimen No. 1**

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	132.380	93.640
Moisture content: Dry soil+tare, gms.	92.540	69.560
Moisture content: Tare, gms.	31.750	31.550
Moisture, %	65.5	63.4
Moist specimen weight, gms.	997.6	
Diameter, in.	2.83	
Area, in. ²	6.27	
Height, in.	5.98	
Wet Density, pcf	101.3	
Dry density, pcf	61.2	
Void ratio	1.8043	
Saturation, %	99.9	

Test Readings for Specimen No. 1Membrane modulus = .130 kN/cm²

Membrane thickness = .031 cm

Cell pressure = 4.50 psi (0.324 tsf)

Back pressure = 0.00 psi (0.000 tsf)

Strain rate, %/min. = 1.00

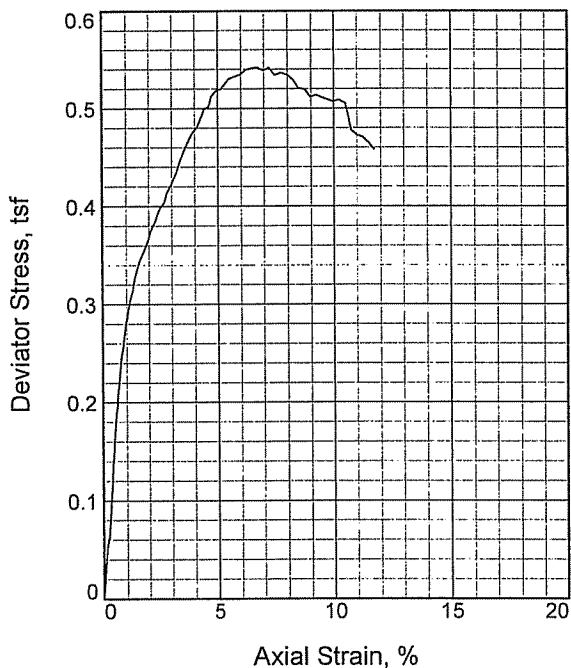
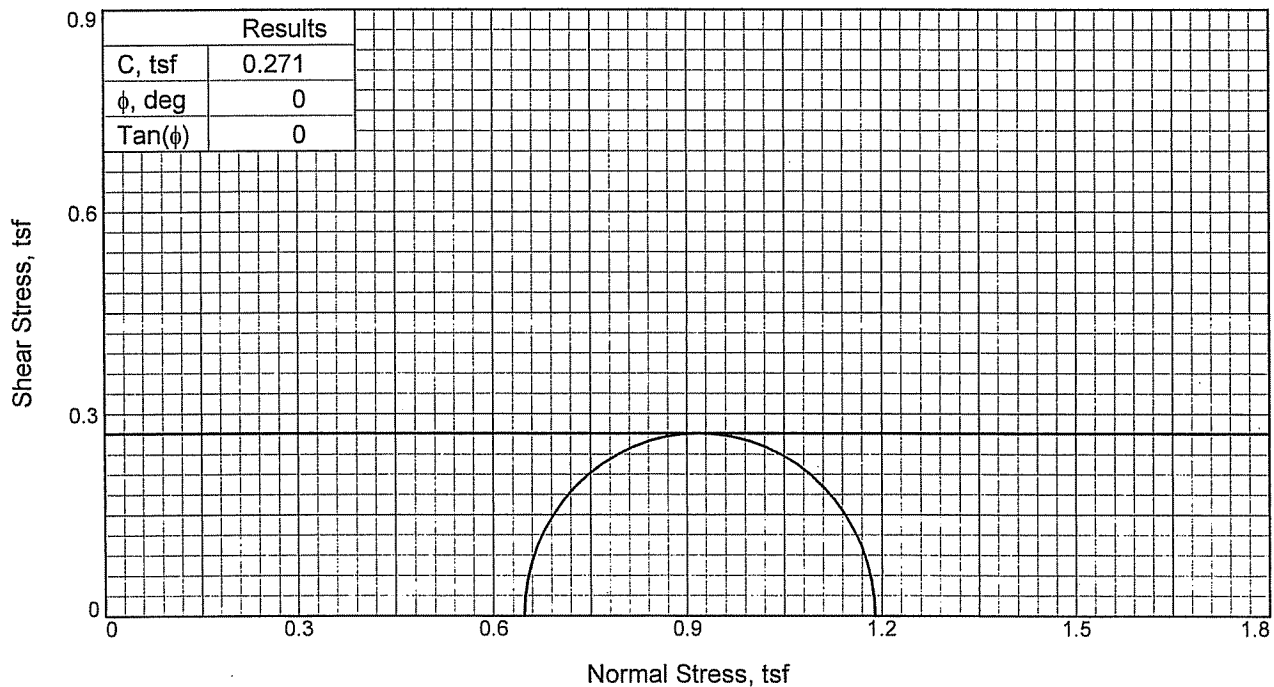
Fail. Stress = 0.264 tsf at reading no. 53

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0669	0.000	0.0	0.0	0.000	0.324	0.324	1.00	0.324	0.000
1	0.0745	4.705	4.7	0.1	0.054	0.324	0.378	1.17	0.351	0.027
2	0.0773	5.434	5.4	0.2	0.062	0.324	0.386	1.19	0.355	0.031
3	0.0795	6.172	6.2	0.2	0.071	0.324	0.395	1.22	0.359	0.035
4	0.0808	5.482	5.5	0.2	0.063	0.324	0.387	1.19	0.355	0.031
5	0.0817	5.987	6.0	0.2	0.069	0.324	0.393	1.21	0.358	0.034
6	0.0826	6.303	6.3	0.3	0.072	0.324	0.396	1.22	0.360	0.036
7	0.0849	6.606	6.6	0.3	0.076	0.324	0.400	1.23	0.362	0.038
8	0.0858	7.203	7.2	0.3	0.082	0.324	0.406	1.25	0.365	0.041
9	0.0871	6.934	6.9	0.3	0.079	0.324	0.403	1.24	0.364	0.040
10	0.0889	7.521	7.5	0.4	0.086	0.324	0.410	1.27	0.367	0.043
11	0.0912	7.260	7.3	0.4	0.083	0.324	0.407	1.26	0.366	0.042
12	0.0921	7.785	7.8	0.4	0.089	0.324	0.413	1.27	0.369	0.045
13	0.0934	8.308	8.3	0.4	0.095	0.324	0.419	1.29	0.372	0.048
14	0.0943	9.070	9.1	0.5	0.104	0.324	0.428	1.32	0.376	0.052
15	0.0952	8.754	8.8	0.5	0.100	0.324	0.424	1.31	0.374	0.050
16	0.0966	9.246	9.2	0.5	0.106	0.324	0.430	1.33	0.377	0.053
17	0.1006	10.128	10.1	0.6	0.116	0.324	0.440	1.36	0.382	0.058
18	0.1015	9.601	9.6	0.6	0.110	0.324	0.434	1.34	0.379	0.055
19	0.1029	10.759	10.8	0.6	0.123	0.324	0.447	1.38	0.385	0.061
20	0.1070	11.726	11.7	0.7	0.134	0.324	0.458	1.41	0.391	0.067
21	0.1092	12.673	12.7	0.7	0.145	0.324	0.469	1.45	0.396	0.072
22	0.1101	11.967	12.0	0.7	0.136	0.324	0.460	1.42	0.392	0.068
23	0.1124	12.506	12.5	0.8	0.143	0.324	0.467	1.44	0.395	0.071
24	0.1132	12.884	12.9	0.8	0.147	0.324	0.471	1.45	0.397	0.073
25	0.1132	12.497	12.5	0.8	0.142	0.324	0.466	1.44	0.395	0.071
26	0.1141	12.909	12.9	0.8	0.147	0.324	0.471	1.45	0.398	0.074
27	0.1208	13.980	14.0	0.9	0.159	0.324	0.483	1.49	0.404	0.080
28	0.1247	14.357	14.4	1.0	0.163	0.324	0.487	1.50	0.406	0.082
29	0.1291	15.275	15.3	1.0	0.174	0.324	0.498	1.54	0.411	0.087
30	0.1331	15.791	15.8	1.1	0.179	0.324	0.503	1.55	0.414	0.090
31	0.1370	16.177	16.2	1.2	0.184	0.324	0.508	1.57	0.416	0.092
32	0.1415	16.436	16.4	1.2	0.186	0.324	0.510	1.58	0.417	0.093
33	0.1454	16.814	16.8	1.3	0.191	0.324	0.515	1.59	0.419	0.095
34	0.1498	17.407	17.4	1.4	0.197	0.324	0.521	1.61	0.423	0.099
35	0.1538	18.090	18.1	1.5	0.205	0.324	0.529	1.63	0.426	0.102
36	0.1582	18.384	18.4	1.5	0.208	0.324	0.532	1.64	0.428	0.104
37	0.1705	18.376	18.4	1.7	0.207	0.324	0.531	1.64	0.428	0.104
38	0.1745	18.982	19.0	1.8	0.214	0.324	0.538	1.66	0.431	0.107
39	0.1873	19.611	19.6	2.0	0.221	0.324	0.545	1.68	0.434	0.110
40	0.1913	20.335	20.3	2.1	0.229	0.324	0.553	1.71	0.438	0.114
41	0.1956	20.069	20.1	2.2	0.226	0.324	0.550	1.70	0.437	0.113
42	0.2079	20.583	20.6	2.4	0.231	0.324	0.555	1.71	0.439	0.115
43	0.2206	20.832	20.8	2.6	0.233	0.324	0.557	1.72	0.441	0.117
44	0.2290	21.930	21.9	2.7	0.245	0.324	0.569	1.76	0.447	0.123
45	0.2330	21.569	21.6	2.8	0.241	0.324	0.565	1.74	0.444	0.120
46	0.2413	21.863	21.9	2.9	0.244	0.324	0.568	1.75	0.446	0.122

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
47	0.2537	22.298	22.3	3.1	0.248	0.324	0.572	1.77	0.448	0.124
48	0.2661	22.715	22.7	3.3	0.252	0.324	0.576	1.78	0.450	0.126
49	0.2789	22.825	22.8	3.5	0.253	0.324	0.577	1.78	0.450	0.126
50	0.2828	23.360	23.4	3.6	0.259	0.324	0.583	1.80	0.453	0.129
51	0.2934	23.192	23.2	3.8	0.256	0.324	0.580	1.79	0.452	0.128
52	0.3035	23.796	23.8	4.0	0.263	0.324	0.587	1.81	0.455	0.131
53	0.3140	23.948	23.9	4.1	0.264	0.324	0.588	1.81	0.456	0.132
54	0.3245	20.241	20.2	4.3	0.222	0.324	0.546	1.69	0.435	0.111



Sample No. 1	
Initial	Water Content, %
	Dry Density, pcf
	Saturation, %
	Void Ratio
	Diameter, in.
At Test	Height, in.
	Water Content, %
	Dry Density, pcf
	Saturation, %
	Void Ratio
	Diameter, in.
	Height, in.
Strain rate, %/min.	
Back Pressure, tsf	
Cell Pressure, tsf	
Fail. Stress, tsf	
Ult. Stress, tsf	
σ_1 Failure, tsf	
σ_3 Failure, tsf	

Type of Test:

Unconsolidated Undrained

Sample Type:

Undisturbed

Description: Gray FAT CLAY; sand seams and shell fragments

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D 2850

Pocket pen; tsf: 0.25

Failure type: 60 degree

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-235

Depth: 22-24

Sample Number: 11

Proj. No.: 08.18.918

Date Sampled: 7/17/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/24/2008

1:01 PM

Date: 7/17/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-235
Depth: 22-24 **Sample Number:** 11
Description: Gray FAT CLAY; sand seams and shell fragments
Remarks:

Test method: ASTM D 2850

Pocket pen; tsf: 0.25

Failure type: 60 degree

Type of Sample: Undisturbed**Assumed Specific Gravity**=2.70**LL**=**PL**=**PI**=**Test Method:** ASTM D 2850**Parameters for Specimen No. 1**

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	134.450	98.230
Moisture content: Dry soil+tare, gms.	104.590	78.440
Moisture content: Tare, gms.	31.860	31.730
Moisture, %	41.1	42.4
Moist specimen weight, gms.	1088.1	
Diameter, in.	2.80	
Area, in. ²	6.16	
Height, in.	6.00	
Wet Density, pcf	112.3	
Dry density, pcf	79.6	
Void ratio	1.1180	
Saturation, %	99.1	

Test Readings for Specimen No. 1Membrane modulus = .130 kN/cm²

Membrane thickness = .031 cm

Cell pressure = 9.00 psi (0.648 tsf)

Back pressure = 0.00 psi (0.000 tsf)

Strain rate, %/min. = 1.00

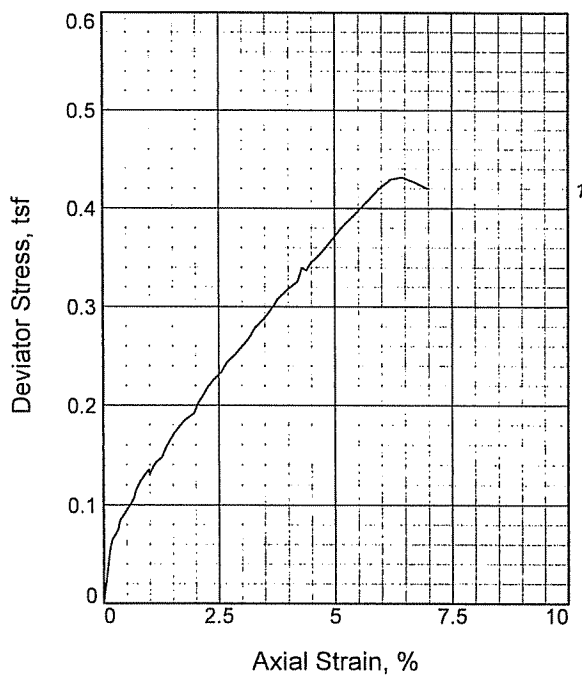
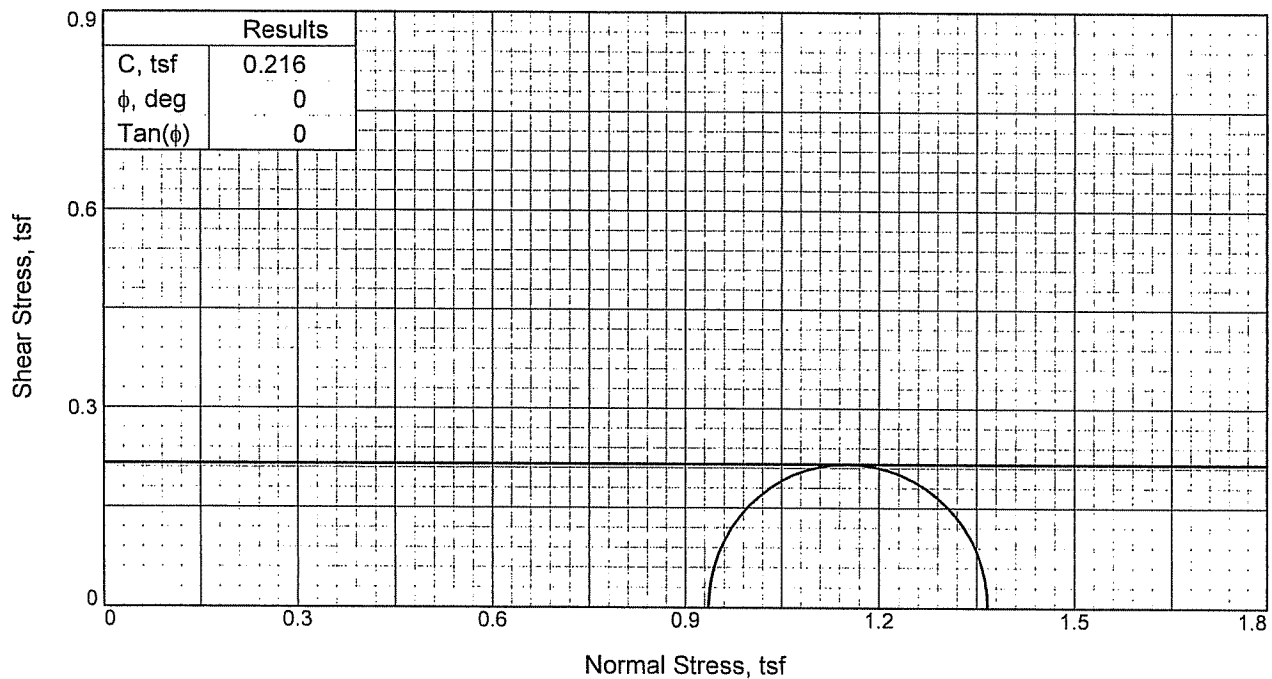
Fail. Stress = 0.542 tsf at reading no. 60

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0300	0.000	0.0	0.0	0.000	0.648	0.648	1.00	0.648	0.000
1	0.0392	4.582	4.6	0.2	0.053	0.648	0.701	1.08	0.675	0.027
2	0.0436	5.330	5.3	0.2	0.062	0.648	0.710	1.10	0.679	0.031
3	0.0449	5.933	5.9	0.2	0.069	0.648	0.717	1.11	0.683	0.035
4	0.0469	7.100	7.1	0.3	0.083	0.648	0.731	1.13	0.689	0.041
5	0.0482	7.714	7.7	0.3	0.090	0.648	0.738	1.14	0.693	0.045
6	0.0495	8.644	8.6	0.3	0.101	0.648	0.749	1.16	0.698	0.050
7	0.0515	9.657	9.7	0.4	0.113	0.648	0.761	1.17	0.704	0.056
8	0.0528	10.368	10.4	0.4	0.121	0.648	0.769	1.19	0.708	0.060
9	0.0541	11.715	11.7	0.4	0.136	0.648	0.784	1.21	0.716	0.068
10	0.0561	12.240	12.2	0.4	0.143	0.648	0.791	1.22	0.719	0.071
11	0.0574	13.487	13.5	0.5	0.157	0.648	0.805	1.24	0.726	0.078
12	0.0607	14.895	14.9	0.5	0.173	0.648	0.821	1.27	0.735	0.087
13	0.0620	15.663	15.7	0.5	0.182	0.648	0.830	1.28	0.739	0.091
14	0.0632	16.210	16.2	0.6	0.188	0.648	0.836	1.29	0.742	0.094
15	0.0653	16.747	16.7	0.6	0.195	0.648	0.843	1.30	0.745	0.097
16	0.0679	18.171	18.2	0.6	0.211	0.648	0.859	1.33	0.754	0.106
17	0.0712	19.032	19.0	0.7	0.221	0.648	0.869	1.34	0.759	0.111
18	0.0724	19.650	19.6	0.7	0.228	0.648	0.876	1.35	0.762	0.114
19	0.0745	20.366	20.4	0.7	0.236	0.648	0.884	1.36	0.766	0.118
20	0.0770	21.344	21.3	0.8	0.248	0.648	0.896	1.38	0.772	0.124
21	0.0804	21.865	21.9	0.8	0.254	0.648	0.902	1.39	0.775	0.127
22	0.0817	22.370	22.4	0.9	0.259	0.648	0.907	1.40	0.778	0.130
23	0.0837	22.892	22.9	0.9	0.265	0.648	0.913	1.41	0.781	0.133
24	0.0863	23.538	23.5	0.9	0.273	0.648	0.921	1.42	0.784	0.136
25	0.0896	24.290	24.3	1.0	0.281	0.648	0.929	1.43	0.789	0.141
26	0.0929	24.844	24.8	1.0	0.287	0.648	0.935	1.44	0.792	0.144
27	0.0942	25.357	25.4	1.1	0.293	0.648	0.941	1.45	0.795	0.147
28	0.1001	26.336	26.3	1.2	0.304	0.648	0.952	1.47	0.800	0.152
29	0.1065	27.143	27.1	1.3	0.313	0.648	0.961	1.48	0.805	0.157
30	0.1123	28.328	28.3	1.4	0.327	0.648	0.975	1.50	0.811	0.163
31	0.1247	29.858	29.9	1.6	0.344	0.648	0.992	1.53	0.820	0.172
32	0.1368	30.785	30.8	1.8	0.354	0.648	1.002	1.55	0.825	0.177
33	0.1490	31.921	31.9	2.0	0.366	0.648	1.014	1.56	0.831	0.183
34	0.1548	32.719	32.7	2.1	0.375	0.648	1.023	1.58	0.835	0.187
35	0.1669	33.666	33.7	2.3	0.385	0.648	1.033	1.59	0.840	0.192
36	0.1727	34.339	34.3	2.4	0.392	0.648	1.040	1.60	0.844	0.196
37	0.1793	34.839	34.8	2.5	0.397	0.648	1.045	1.61	0.847	0.199
38	0.1908	35.470	35.5	2.7	0.404	0.648	1.052	1.62	0.850	0.202
39	0.1973	36.341	36.3	2.8	0.413	0.648	1.061	1.64	0.855	0.207
40	0.2095	37.207	37.2	3.0	0.422	0.648	1.070	1.65	0.859	0.211
41	0.2153	37.730	37.7	3.1	0.428	0.648	1.076	1.66	0.862	0.214
42	0.2217	38.280	38.3	3.2	0.433	0.648	1.081	1.67	0.865	0.217
43	0.2338	39.579	39.6	3.4	0.447	0.648	1.095	1.69	0.872	0.224
44	0.2454	40.678	40.7	3.6	0.459	0.648	1.107	1.71	0.877	0.229
45	0.2577	41.713	41.7	3.8	0.469	0.648	1.117	1.72	0.883	0.235
46	0.2641	42.237	42.2	3.9	0.475	0.648	1.123	1.73	0.885	0.237

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
47	0.2763	42.901	42.9	4.1	0.481	0.648	1.129	1.74	0.889	0.241
48	0.2820	43.428	43.4	4.2	0.486	0.648	1.134	1.75	0.891	0.243
49	0.2885	43.994	44.0	4.3	0.492	0.648	1.140	1.76	0.894	0.246
50	0.2942	44.603	44.6	4.4	0.499	0.648	1.147	1.77	0.897	0.249
51	0.3066	45.043	45.0	4.6	0.502	0.648	1.150	1.78	0.899	0.251
52	0.3124	45.920	45.9	4.7	0.512	0.648	1.160	1.79	0.904	0.256
53	0.3245	46.548	46.5	4.9	0.518	0.648	1.166	1.80	0.907	0.259
54	0.3369	46.815	46.8	5.1	0.519	0.648	1.167	1.80	0.908	0.260
55	0.3580	47.951	48.0	5.5	0.530	0.648	1.178	1.82	0.913	0.265
56	0.3728	48.275	48.3	5.7	0.532	0.648	1.180	1.82	0.914	0.266
57	0.3882	48.608	48.6	6.0	0.534	0.648	1.182	1.82	0.915	0.267
58	0.4030	49.197	49.2	6.2	0.539	0.648	1.187	1.83	0.918	0.270
59	0.4183	49.478	49.5	6.5	0.541	0.648	1.189	1.84	0.919	0.271
60	0.4331	49.701	49.7	6.7	0.542	0.648	1.190	1.84	0.919	0.271
61	0.4485	49.496	49.5	7.0	0.538	0.648	1.186	1.83	0.917	0.269
62	0.4633	49.937	49.9	7.2	0.542	0.648	1.190	1.84	0.919	0.271
63	0.4786	49.333	49.3	7.5	0.534	0.648	1.182	1.82	0.915	0.267
64	0.4934	49.706	49.7	7.7	0.536	0.648	1.184	1.83	0.916	0.268
65	0.5088	49.673	49.7	8.0	0.534	0.648	1.182	1.82	0.915	0.267
66	0.5235	49.337	49.3	8.2	0.529	0.648	1.177	1.82	0.913	0.265
67	0.5389	48.665	48.7	8.5	0.521	0.648	1.169	1.80	0.908	0.260
68	0.5536	48.693	48.7	8.7	0.520	0.648	1.168	1.80	0.908	0.260
69	0.5690	48.052	48.1	9.0	0.511	0.648	1.159	1.79	0.904	0.256
70	0.5838	48.402	48.4	9.2	0.514	0.648	1.162	1.79	0.905	0.257
71	0.5992	48.302	48.3	9.5	0.511	0.648	1.159	1.79	0.904	0.256
72	0.6139	48.244	48.2	9.7	0.509	0.648	1.157	1.79	0.903	0.255
73	0.6293	48.149	48.1	10.0	0.507	0.648	1.155	1.78	0.901	0.253
74	0.6440	48.474	48.5	10.2	0.509	0.648	1.157	1.79	0.902	0.254
75	0.6594	48.279	48.3	10.5	0.505	0.648	1.153	1.78	0.901	0.253
76	0.6742	48.187	48.2	10.7	0.478	0.648	1.126	1.74	0.887	0.239
77	0.6895	47.912	47.9	11.0	0.473	0.648	1.121	1.73	0.884	0.236
78	0.7042	47.899	47.9	11.2	0.471	0.648	1.119	1.73	0.883	0.235
79	0.7196	47.503	47.5	11.5	0.464	0.648	1.112	1.72	0.880	0.232
80	0.7331	47.061	47.1	11.7	0.458	0.648	1.106	1.71	0.877	0.229



Sample No.		1
Initial	Water Content, %	24.0
	Dry Density, pcf	101.9
	Saturation, %	99.1
	Void Ratio	0.6533
	Diameter, in.	2.78
	Height, in.	6.00
At Test	Water Content, %	21.9
	Dry Density, pcf	101.9
	Saturation, %	90.6
	Void Ratio	0.6533
	Diameter, in.	2.78
	Height, in.	6.00
Strain rate, %/min.		1.00
Back Pressure, tsf		0.00
Cell Pressure, tsf		0.94
Fail. Stress, tsf		0.43
Ult. Stress, tsf		
σ_1 Failure, tsf		1.37
σ_3 Failure, tsf		0.94

Type of Test:

Unconsolidated Undrained

Sample Type: Undisturbed

Description: Tan and gray LEAN CLAY

LL= 32 PL= 16 PI= 16

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D 2850

Pocket pen; tsf: 1.50

Failure type: Bulge

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-235

Depth: 32-34

Sample Number: 16

Proj. No.: 08.18.918

Date Sampled: 7/17/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/25/2008

10:49 AM

Date: 7/17/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-235
Depth: 32-34 **Sample Number:** 16
Description: Tan and gray LEAN CLAY
Remarks:
Test method: ASTM D 2850
Pocket pen; tsf: 1.50
Failure type: Bulge
Type of Sample: Undisturbed
Assumed Specific Gravity=2.70 **LL**=32 **PL**=16 **PI**=16
Test Method: ASTM D 2850

Parameters for Specimen No. 1

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	146.840	116.920
Moisture content: Dry soil+tare, gms.	124.440	101.620
Moisture content: Tare, gms.	31.000	31.860
Moisture, %	24.0	21.9
Moist specimen weight, gms.	1203.9	
Diameter, in.	2.78	
Area, in. ²	6.05	
Height, in.	6.00	
Wet Density, pcf	126.4	
Dry density, pcf	101.9	
Void ratio	0.6533	
Saturation, %	99.1	

Test Readings for Specimen No. 1

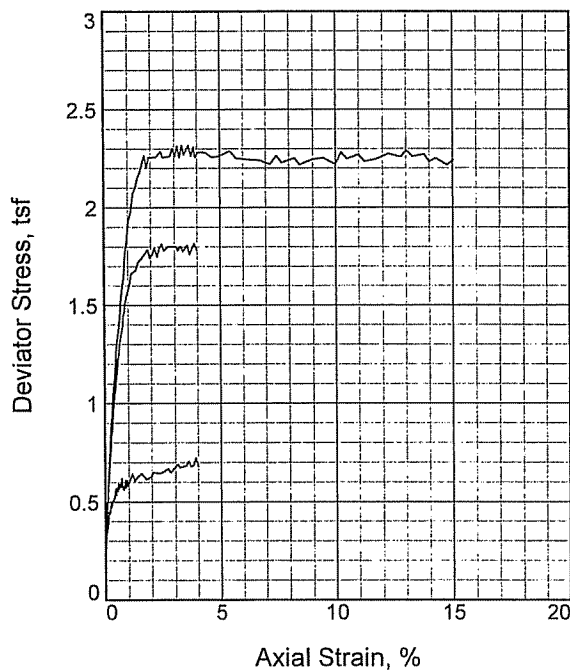
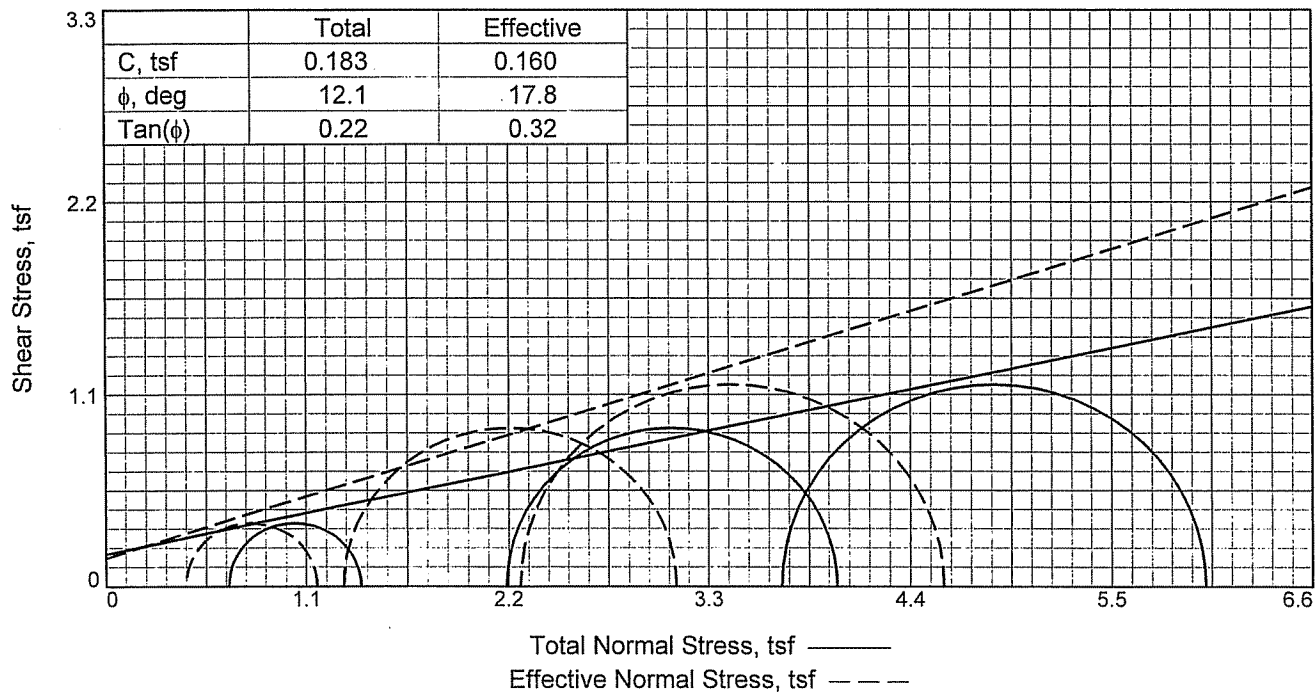
Membrane modulus = .130 kN/cm²
Membrane thickness = .031 cm
Cell pressure = 13.00 psi (0.936 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 1.00
Fail. Stress = 0.431 tsf at reading no. 53

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0340	0.000	0.0	0.0	0.000	0.936	0.936	1.00	0.936	0.000
1	0.0420	4.480	4.5	0.1	0.053	0.936	0.989	1.06	0.963	0.027
2	0.0436	5.016	5.0	0.2	0.060	0.936	0.996	1.06	0.966	0.030
3	0.0449	5.407	5.4	0.2	0.064	0.936	1.000	1.07	0.968	0.032
4	0.0495	5.889	5.9	0.3	0.070	0.936	1.006	1.07	0.971	0.035
5	0.0527	6.314	6.3	0.3	0.075	0.936	1.011	1.08	0.973	0.037
6	0.0540	6.801	6.8	0.3	0.081	0.936	1.017	1.09	0.976	0.040
7	0.0560	7.205	7.2	0.4	0.085	0.936	1.021	1.09	0.979	0.043
8	0.0605	7.631	7.6	0.4	0.090	0.936	1.026	1.10	0.981	0.045
9	0.0664	8.209	8.2	0.5	0.097	0.936	1.033	1.10	0.985	0.049
10	0.0710	8.706	8.7	0.6	0.103	0.936	1.039	1.11	0.988	0.052
11	0.0743	9.144	9.1	0.7	0.108	0.936	1.044	1.12	0.990	0.054
12	0.0756	9.584	9.6	0.7	0.113	0.936	1.049	1.12	0.993	0.057
13	0.0822	10.486	10.5	0.8	0.124	0.936	1.060	1.13	0.998	0.062
14	0.0881	11.049	11.0	0.9	0.130	0.936	1.066	1.14	1.001	0.065
15	0.0927	11.486	11.5	1.0	0.135	0.936	1.071	1.14	1.004	0.068
16	0.0940	11.058	11.1	1.0	0.130	0.936	1.066	1.14	1.001	0.065
17	0.0973	11.561	11.6	1.1	0.136	0.936	1.072	1.15	1.004	0.068
18	0.1019	12.075	12.1	1.1	0.142	0.936	1.078	1.15	1.007	0.071
19	0.1097	12.544	12.5	1.3	0.147	0.936	1.083	1.16	1.010	0.074
20	0.1155	13.465	13.5	1.4	0.158	0.936	1.094	1.17	1.015	0.079
21	0.1213	14.145	14.1	1.5	0.166	0.936	1.102	1.18	1.019	0.083
22	0.1278	14.799	14.8	1.6	0.173	0.936	1.109	1.19	1.023	0.087
23	0.1394	15.790	15.8	1.8	0.185	0.936	1.121	1.20	1.028	0.092
24	0.1517	16.441	16.4	2.0	0.192	0.936	1.128	1.20	1.032	0.096
25	0.1575	17.371	17.4	2.1	0.203	0.936	1.139	1.22	1.037	0.101
26	0.1640	18.055	18.1	2.2	0.210	0.936	1.146	1.22	1.041	0.105
27	0.1698	18.735	18.7	2.3	0.218	0.936	1.154	1.23	1.045	0.109
28	0.1762	19.367	19.4	2.4	0.225	0.936	1.161	1.24	1.049	0.113
29	0.1878	20.177	20.2	2.6	0.234	0.936	1.170	1.25	1.053	0.117
30	0.1943	20.990	21.0	2.7	0.243	0.936	1.179	1.26	1.058	0.122
31	0.2065	21.839	21.8	2.9	0.253	0.936	1.189	1.27	1.062	0.126
32	0.2181	22.792	22.8	3.1	0.263	0.936	1.199	1.28	1.068	0.132
33	0.2246	23.403	23.4	3.2	0.270	0.936	1.206	1.29	1.071	0.135
34	0.2304	24.117	24.1	3.3	0.278	0.936	1.214	1.30	1.075	0.139
35	0.2427	25.038	25.0	3.5	0.288	0.936	1.224	1.31	1.080	0.144
36	0.2485	25.552	25.6	3.6	0.293	0.936	1.229	1.31	1.083	0.147
37	0.2549	26.188	26.2	3.7	0.300	0.936	1.236	1.32	1.086	0.150
38	0.2607	26.898	26.9	3.8	0.308	0.936	1.244	1.33	1.090	0.154
39	0.2730	27.746	27.7	4.0	0.317	0.936	1.253	1.34	1.095	0.159
40	0.2852	28.527	28.5	4.2	0.325	0.936	1.261	1.35	1.099	0.163
41	0.2910	29.785	29.8	4.3	0.339	0.936	1.275	1.36	1.106	0.170
42	0.2974	29.610	29.6	4.4	0.337	0.936	1.273	1.36	1.105	0.169
43	0.3032	30.285	30.3	4.5	0.344	0.936	1.280	1.37	1.108	0.172
44	0.3096	30.711	30.7	4.6	0.349	0.936	1.285	1.37	1.110	0.174
45	0.3218	31.667	31.7	4.8	0.359	0.936	1.295	1.38	1.115	0.179
46	0.3340	32.816	32.8	5.0	0.371	0.936	1.307	1.40	1.122	0.186

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
47	0.3398	33.383	33.4	5.1	0.377	0.936	1.313	1.40	1.125	0.189
48	0.3462	33.930	33.9	5.2	0.383	0.936	1.319	1.41	1.127	0.191
49	0.3610	35.045	35.0	5.4	0.394	0.936	1.330	1.42	1.133	0.197
50	0.3758	36.247	36.2	5.7	0.407	0.936	1.343	1.43	1.139	0.203
51	0.3913	37.485	37.5	6.0	0.420	0.936	1.356	1.45	1.146	0.210
52	0.4060	38.418	38.4	6.2	0.429	0.936	1.365	1.46	1.150	0.214
53	0.4207	38.725	38.7	6.4	0.431	0.936	1.367	1.46	1.152	0.216
54	0.4364	38.407	38.4	6.7	0.427	0.936	1.363	1.46	1.149	0.213
55	0.4519	37.949	37.9	7.0	0.420	0.936	1.356	1.45	1.146	0.210



Sample No.		1	2	3
Initial	Water Content, %	29.7	29.7	29.7
	Dry Density, pcf	92.6	92.6	92.6
	Saturation, %	97.7	97.7	97.7
	Void Ratio	0.8193	0.8193	0.8193
	Diameter, in.	1.99	1.99	1.99
	Height, in.	4.14	4.14	4.14
At Test	Water Content, %	30.2	30.2	30.2
	Dry Density, pcf	92.9	92.9	92.9
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.8142	0.8142	0.8142
	Diameter, in.	1.97	2.03	2.16
	Height, in.	4.22	3.96	3.52
Strain rate, %/min.		0.05	0.02	0.02
Back Pressure, tsf		2.16	2.17	2.17
Cell Pressure, tsf		2.84	4.36	5.88
Fail. Stress, tsf		0.72	1.82	2.32
Excess Pore Pr., tsf		0.24	0.88	1.44
Ult. Stress, tsf		0.68	1.79	2.24
Excess Pore Pr., tsf		0.23	0.88	1.35
$\bar{\sigma}_1$ Failure, tsf		1.16	3.12	4.58
$\bar{\sigma}_3$ Failure, tsf		0.44	1.30	2.27

Type of Test:

CU with Pore Pressures

Sample Type: Undisturbed

Description: Gray and tan FAT CLAY

LL= 66 PL= 21 PI= 45

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D 4767

Pocket pen; tsf: 3.50

Failure type: Slickensided

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-235

Depth: 24-26

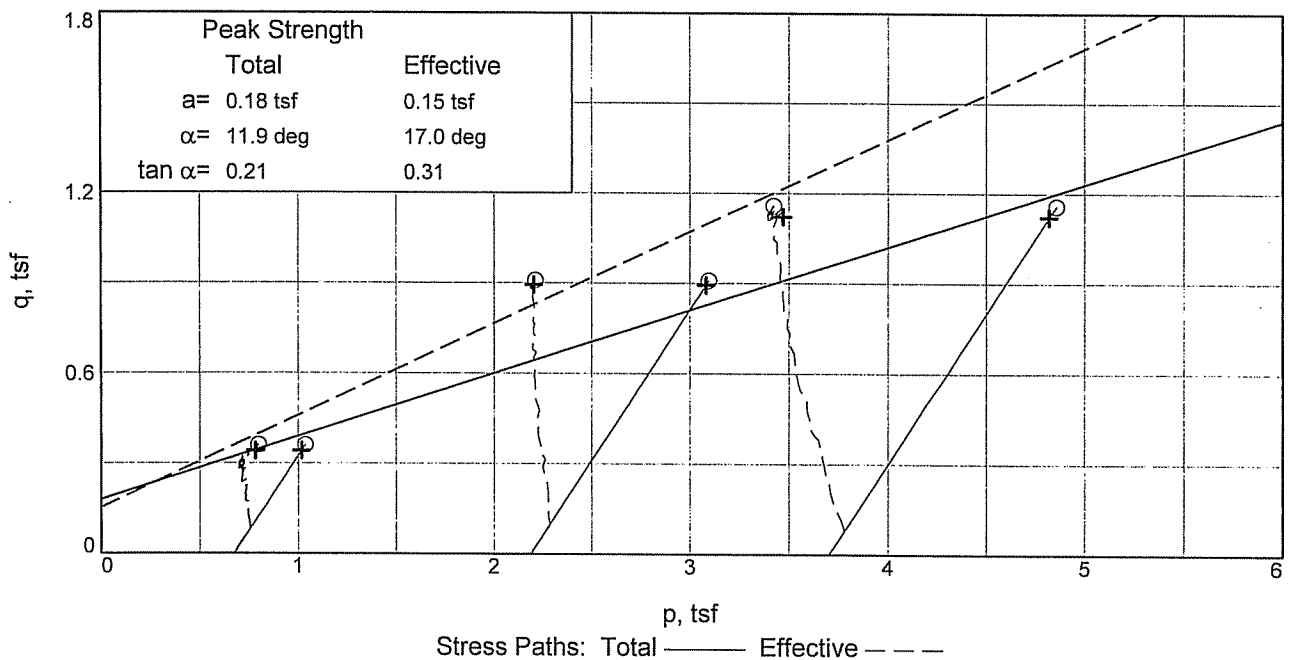
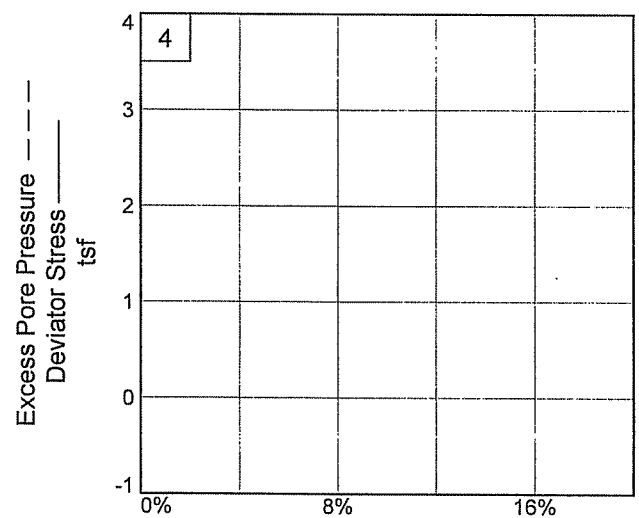
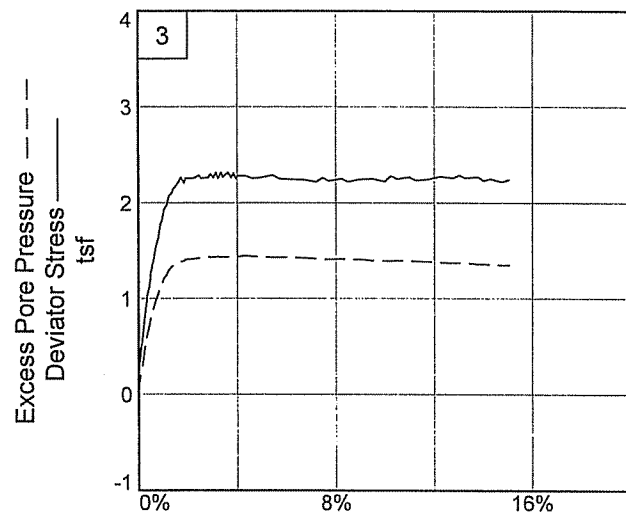
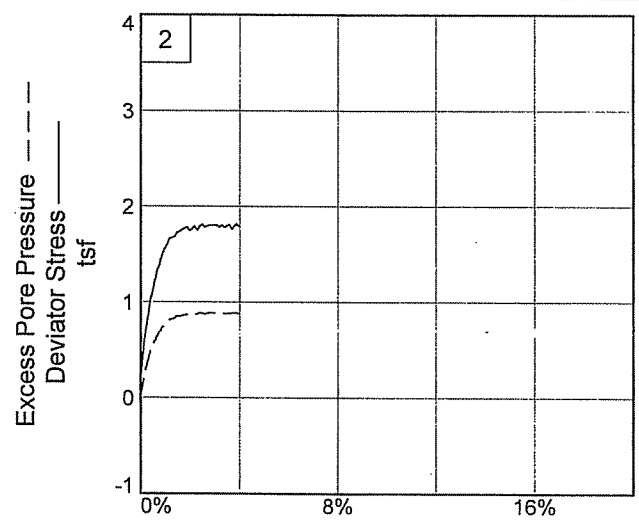
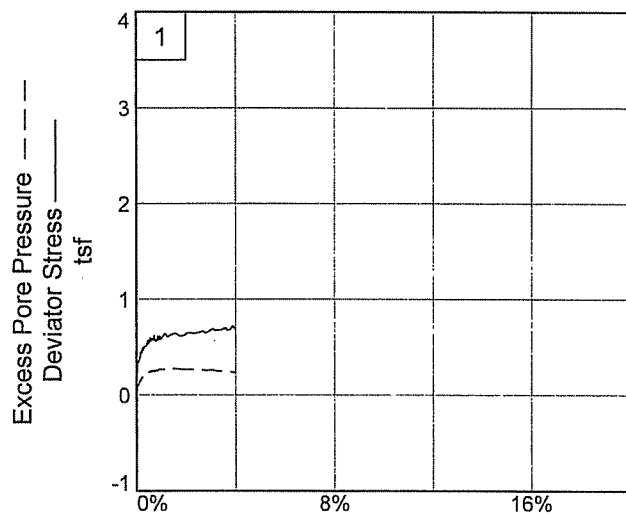
Sample Number: 12

Proj. No.: 08.18.918

Date Sampled: 7/28/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.



Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Source of Sample: 07-235

Depth: 24-26

Sample Number: 12

Project No.: 08.18.918

TOLUNAY-WONG ENGINEERS, INC.

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

8/4/2008

1:07 PM

Date: 7/28/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-235
Depth: 24-26 **Sample Number:** 12
Description: Gray and tan FAT CLAY
Remarks:
Test method: ASTM D 4767
Pocket pen; tsf: 3.50
Failure type: Slickensided
Type of Sample: Undisturbed
Assumed Specific Gravity=2.70 **LL**=66 **PL**=21 **PI**=45
Test Method: ASTM D 4767 Method B

Parameters for Specimen No. 1				
Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	100.940			116.540
Moisture content: Dry soil+tare, gms.	84.780			96.650
Moisture content: Tare, gms.	30.290			30.690
Moisture, %	29.7	31.4	30.2	30.2
Moist specimen weight, gms.	406.6			
Diameter, in.	1.99	1.98	1.97	
Area, in. ²	3.12	3.08	3.05	
Height, in.	4.14	4.25	4.22	
Net decrease in height, in.		-0.11	0.03	
Net decrease in water volume, cc.			3.80	
Wet Density, pcf	120.1	119.9	120.9	
Dry density, pcf	92.6	91.3	92.9	
Void ratio	0.8193	0.8469	0.8142	
Saturation, %	97.7	100.0	100.0	

Test Readings for Specimen No. 1	
Membrane modulus = .130 kN/cm ²	
Membrane thickness = .031 cm	
Filter paper coefficient = 0.0019 kN/cm	
Filter paper coverage = 50%	
Consolidation cell pressure = 39.40 psi (2.837 tsf)	
Consolidation back pressure = 30.00 psi (2.160 tsf)	
Consolidation effective confining stress = 0.677 tsf	
Strain rate, %/min. = 0.05	
Fail. Stress = 0.721 tsf at reading no. 56	
Ult. Stress = 0.683 tsf at reading no. 57	

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0009	0.000	0.0	0.0	0.000	0.677	0.677	1.00	30.00	0.677	0.000
1	0.0011	6.942	6.9	0.0	0.164	0.677	0.841	1.24	30.00	0.759	0.082
2	0.0013	9.013	9.0	0.0	0.213	0.649	0.862	1.33	30.38	0.756	0.106
3	0.0016	11.051	11.1	0.0	0.261	0.618	0.878	1.42	30.82	0.748	0.130
4	0.0021	13.387	13.4	0.0	0.316	0.588	0.904	1.54	31.23	0.746	0.158
5	0.0034	14.477	14.5	0.1	0.342	0.583	0.925	1.59	31.30	0.754	0.171
6	0.0045	14.913	14.9	0.1	0.352	0.558	0.910	1.63	31.64	0.734	0.176
7	0.0059	16.203	16.2	0.1	0.382	0.546	0.928	1.70	31.81	0.737	0.191
8	0.0067	16.757	16.8	0.1	0.395	0.535	0.930	1.74	31.96	0.733	0.198
9	0.0075	18.071	18.1	0.2	0.426	0.524	0.950	1.81	32.12	0.737	0.213
10	0.0085	19.105	19.1	0.2	0.450	0.516	0.966	1.87	32.23	0.741	0.225
11	0.0096	18.643	18.6	0.2	0.439	0.504	0.943	1.87	32.40	0.724	0.220
12	0.0108	19.936	19.9	0.2	0.470	0.491	0.960	1.96	32.58	0.726	0.235
13	0.0119	20.760	20.8	0.3	0.489	0.491	0.980	2.00	32.58	0.735	0.244
14	0.0123	20.077	20.1	0.3	0.473	0.481	0.954	1.98	32.72	0.717	0.236
15	0.0139	21.262	21.3	0.3	0.500	0.467	0.968	2.07	32.91	0.718	0.250
16	0.0171	21.771	21.8	0.4	0.512	0.463	0.975	2.11	32.97	0.719	0.256
17	0.0187	22.936	22.9	0.4	0.539	0.451	0.990	2.20	33.14	0.720	0.270
18	0.0199	24.031	24.0	0.5	0.565	0.450	1.014	2.26	33.15	0.732	0.282
19	0.0212	22.739	22.7	0.5	0.534	0.444	0.978	2.20	33.24	0.711	0.267
20	0.0215	24.218	24.2	0.5	0.569	0.438	1.007	2.30	33.31	0.723	0.284
21	0.0233	23.552	23.6	0.5	0.553	0.440	0.993	2.26	33.29	0.717	0.277
22	0.0246	25.222	25.2	0.6	0.592	0.431	1.023	2.37	33.42	0.727	0.296
23	0.0258	24.132	24.1	0.6	0.566	0.436	1.002	2.30	33.35	0.719	0.283
24	0.0277	24.779	24.8	0.6	0.581	0.424	1.005	2.37	33.51	0.714	0.291
25	0.0288	25.347	25.3	0.7	0.595	0.429	1.023	2.39	33.44	0.726	0.297
26	0.0295	24.523	24.5	0.7	0.575	0.424	0.999	2.36	33.51	0.712	0.288
27	0.0303	25.147	25.1	0.7	0.590	0.419	1.009	2.41	33.58	0.714	0.295
28	0.0308	26.330	26.3	0.7	0.617	0.421	1.039	2.47	33.55	0.730	0.309
29	0.0329	25.444	25.4	0.8	0.566	0.432	0.998	2.31	33.40	0.715	0.283
30	0.0338	25.928	25.9	0.8	0.576	0.423	0.999	2.36	33.53	0.711	0.288
31	0.0347	25.379	25.4	0.8	0.562	0.421	0.983	2.34	33.55	0.702	0.281
32	0.0369	27.502	27.5	0.9	0.610	0.423	1.032	2.44	33.53	0.728	0.305
33	0.0379	25.966	26.0	0.9	0.572	0.418	0.990	2.37	33.60	0.704	0.286
34	0.0392	26.847	26.8	0.9	0.592	0.408	0.999	2.45	33.74	0.703	0.296
35	0.0404	27.649	27.6	0.9	0.609	0.410	1.019	2.49	33.71	0.714	0.305
36	0.0415	26.466	26.5	1.0	0.580	0.411	0.991	2.41	33.70	0.701	0.290
37	0.0494	29.459	29.5	1.2	0.641	0.411	1.053	2.56	33.69	0.732	0.321
38	0.0541	28.197	28.2	1.3	0.607	0.400	1.007	2.52	33.84	0.704	0.303
39	0.0582	29.067	29.1	1.4	0.623	0.406	1.028	2.53	33.76	0.717	0.311
40	0.0666	30.397	30.4	1.6	0.644	0.399	1.043	2.62	33.86	0.721	0.322
41	0.0760	29.522	29.5	1.8	0.613	0.407	1.020	2.51	33.75	0.713	0.307
42	0.0799	29.981	30.0	1.9	0.620	0.410	1.030	2.51	33.70	0.720	0.310
43	0.0841	30.542	30.5	2.0	0.628	0.410	1.038	2.53	33.71	0.724	0.314
44	0.0880	31.546	31.5	2.1	0.649	0.409	1.058	2.59	33.72	0.733	0.325
45	0.1009	31.430	31.4	2.4	0.644	0.409	1.053	2.58	33.72	0.731	0.322
46	0.1097	32.078	32.1	2.6	0.658	0.417	1.075	2.58	33.61	0.746	0.329

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
47	0.1143	32.571	32.6	2.7	0.668	0.413	1.081	2.62	33.67	0.747	0.334
48	0.1187	31.740	31.7	2.8	0.648	0.421	1.070	2.54	33.55	0.745	0.324
49	0.1272	32.936	32.9	3.0	0.674	0.418	1.093	2.61	33.59	0.755	0.337
50	0.1315	33.756	33.8	3.1	0.692	0.415	1.107	2.67	33.64	0.761	0.346
51	0.1357	33.015	33.0	3.2	0.674	0.425	1.099	2.59	33.50	0.762	0.337
52	0.1482	33.533	33.5	3.5	0.684	0.432	1.116	2.58	33.40	0.774	0.342
53	0.1523	34.470	34.5	3.6	0.704	0.431	1.136	2.63	33.41	0.784	0.352
54	0.1566	33.336	33.3	3.7	0.678	0.433	1.111	2.56	33.38	0.772	0.339
55	0.1608	33.675	33.7	3.8	0.685	0.434	1.119	2.58	33.37	0.777	0.342
56	0.1653	35.325	35.3	3.9	0.721	0.439	1.160	2.64	33.31	0.799	0.361
57	0.1694	33.648	33.6	4.0	0.683	0.443	1.126	2.54	33.25	0.784	0.341

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	100.940			116.540
Moisture content: Dry soil+tare, gms.	84.780			96.650
Moisture content: Tare, gms.	30.290			30.690
Moisture, %	29.7	33.4	30.2	30.2
Moist specimen weight, gms.	406.6			
Diameter, in.	1.99	2.01	2.03	
Area, in. ²	3.12	3.17	3.25	
Height, in.	4.14	4.25	3.96	
Net decrease in height, in.		-0.11	0.28	
Net decrease in water volume, cc.			10.10	
Wet Density, pcf	120.1	118.3	120.9	
Dry density, pcf	92.6	88.7	92.9	
Void ratio	0.8193	0.9011	0.8142	
Saturation, %	97.7	100.0	100.0	

Test Readings for Specimen No. 2

Membrane modulus = .130 kN/cm²
 Membrane thickness = .031 cm
 Filter paper coefficient = 0.0019 kN/cm
 Filter paper coverage = 50%
 Consolidation cell pressure = 60.60 psi (4.363 tsf)
 Consolidation back pressure = 30.20 psi (2.174 tsf)
 Consolidation effective confining stress = 2.189 tsf
 Strain rate, %/min. = 0.02
 Fail. Stress = 1.816 tsf at reading no. 56
 Ult. Stress = 1.786 tsf at reading no. 57

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0001	0.000	0.0	0.0	0.000	2.190	2.190	1.00	30.18	2.190	0.000
1	0.0003	8.784	8.8	0.0	0.195	2.190	2.385	1.09	30.18	2.288	0.097
2	0.0004	11.459	11.5	0.0	0.254	2.151	2.405	1.12	30.73	2.278	0.127
3	0.0014	15.271	15.3	0.0	0.339	2.109	2.448	1.16	31.31	2.278	0.169
4	0.0023	18.221	18.2	0.1	0.404	2.076	2.480	1.19	31.77	2.278	0.202
5	0.0035	20.991	21.0	0.1	0.465	2.041	2.506	1.23	32.25	2.274	0.233

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
6	0.0047	23.367	23.4	0.1	0.518	2.005	2.523	1.26	32.75	2.264	0.259
7	0.0052	25.991	26.0	0.1	0.576	1.962	2.538	1.29	33.36	2.250	0.288
8	0.0063	28.454	28.5	0.2	0.630	1.949	2.579	1.32	33.53	2.264	0.315
9	0.0072	29.924	29.9	0.2	0.663	1.914	2.577	1.35	34.02	2.245	0.331
10	0.0080	31.531	31.5	0.2	0.698	1.896	2.595	1.37	34.26	2.246	0.349
11	0.0093	33.650	33.6	0.2	0.745	1.862	2.607	1.40	34.74	2.234	0.372
12	0.0104	35.385	35.4	0.3	0.783	1.837	2.620	1.43	35.09	2.228	0.392
13	0.0110	37.605	37.6	0.3	0.832	1.811	2.643	1.46	35.45	2.227	0.416
14	0.0124	38.871	38.9	0.3	0.860	1.800	2.660	1.48	35.60	2.230	0.430
15	0.0129	40.358	40.4	0.3	0.893	1.774	2.667	1.50	35.96	2.220	0.446
16	0.0136	43.058	43.1	0.3	0.952	1.756	2.708	1.54	36.21	2.232	0.476
17	0.0156	45.261	45.3	0.4	1.000	1.721	2.722	1.58	36.69	2.222	0.500
18	0.0163	47.259	47.3	0.4	1.044	1.687	2.731	1.62	37.17	2.209	0.522
19	0.0180	48.114	48.1	0.5	1.063	1.682	2.745	1.63	37.23	2.214	0.531
20	0.0186	49.411	49.4	0.5	1.091	1.668	2.759	1.65	37.44	2.213	0.546
21	0.0198	50.965	51.0	0.5	1.125	1.648	2.773	1.68	37.71	2.211	0.563
22	0.0209	52.293	52.3	0.5	1.154	1.634	2.788	1.71	37.90	2.211	0.577
23	0.0215	53.311	53.3	0.5	1.176	1.619	2.795	1.73	38.12	2.207	0.588
24	0.0222	55.308	55.3	0.6	1.220	1.601	2.821	1.76	38.37	2.211	0.610
25	0.0238	56.305	56.3	0.6	1.242	1.594	2.836	1.78	38.46	2.215	0.621
26	0.0253	59.006	59.0	0.6	1.301	1.553	2.853	1.84	39.04	2.203	0.650
27	0.0266	60.716	60.7	0.7	1.338	1.548	2.886	1.86	39.10	2.217	0.669
28	0.0282	61.637	61.6	0.7	1.358	1.520	2.878	1.89	39.49	2.199	0.679
29	0.0304	63.426	63.4	0.8	1.397	1.501	2.898	1.93	39.75	2.200	0.698
30	0.0314	65.549	65.5	0.8	1.443	1.497	2.939	1.96	39.81	2.218	0.721
31	0.0333	66.471	66.5	0.8	1.462	1.471	2.934	1.99	40.17	2.202	0.731
32	0.0342	68.174	68.2	0.9	1.500	1.454	2.954	2.03	40.41	2.204	0.750
33	0.0361	69.379	69.4	0.9	1.525	1.447	2.973	2.05	40.50	2.210	0.763
34	0.0372	70.251	70.3	0.9	1.544	1.428	2.972	2.08	40.77	2.200	0.772
35	0.0424	73.094	73.1	1.1	1.604	1.405	3.010	2.14	41.08	2.207	0.802
36	0.0456	75.617	75.6	1.1	1.659	1.376	3.034	2.21	41.49	2.205	0.829
37	0.0541	76.923	76.9	1.4	1.683	1.360	3.044	2.24	41.71	2.202	0.842
38	0.0575	78.609	78.6	1.4	1.719	1.338	3.057	2.28	42.01	2.198	0.859
39	0.0624	79.495	79.5	1.6	1.736	1.339	3.075	2.30	42.01	2.207	0.868
40	0.0743	82.008	82.0	1.9	1.786	1.321	3.106	2.35	42.26	2.214	0.893
41	0.0783	80.196	80.2	2.0	1.744	1.329	3.073	2.31	42.14	2.201	0.872
42	0.0824	81.161	81.2	2.1	1.763	1.309	3.073	2.35	42.42	2.191	0.882
43	0.0856	82.562	82.6	2.2	1.792	1.323	3.115	2.35	42.23	2.219	0.896
44	0.0902	80.704	80.7	2.3	1.750	1.316	3.066	2.33	42.32	2.191	0.875
45	0.0937	82.563	82.6	2.4	1.789	1.305	3.093	2.37	42.48	2.199	0.894
46	0.0982	83.744	83.7	2.5	1.812	1.308	3.120	2.39	42.44	2.214	0.906
47	0.1019	82.333	82.3	2.6	1.780	1.316	3.096	2.35	42.32	2.206	0.890
48	0.1094	83.456	83.5	2.8	1.801	1.305	3.105	2.38	42.48	2.205	0.900
49	0.1221	83.788	83.8	3.1	1.802	1.305	3.107	2.38	42.47	2.206	0.901
50	0.1254	82.894	82.9	3.2	1.781	1.298	3.079	2.37	42.57	2.189	0.891
51	0.1298	84.026	84.0	3.3	1.803	1.297	3.100	2.39	42.59	2.198	0.902
52	0.1337	82.896	82.9	3.4	1.777	1.312	3.089	2.35	42.38	2.200	0.889

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
53	0.1415	84.414	84.4	3.6	1.806	1.306	3.112	2.38	42.46	2.209	0.903
54	0.1456	82.394	82.4	3.7	1.761	1.305	3.066	2.35	42.47	2.186	0.880
55	0.1494	83.773	83.8	3.8	1.789	1.302	3.090	2.37	42.52	2.196	0.894
56	0.1535	85.137	85.1	3.9	1.816	1.305	3.120	2.39	42.48	2.213	0.908
57	0.1577	83.821	83.8	4.0	1.786	1.313	3.098	2.36	42.37	2.205	0.893

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	100.940			116.540
Moisture content: Dry soil+tare, gms.	84.780			96.650
Moisture content: Tare, gms.	30.290			30.690
Moisture, %	29.7	34.3	30.2	30.2
Moist specimen weight, gms.	406.6			
Diameter, in.	1.99	2.02	2.16	
Area, in. ²	3.12	3.22	3.65	
Height, in.	4.14	4.25	3.52	
Net decrease in height, in.		-0.11	0.72	
Net decrease in water volume, cc.			13.10	
Wet Density, pcf	120.1	117.5	120.9	
Dry density, pcf	92.6	87.5	92.9	
Void ratio	0.8193	0.9270	0.8142	
Saturation, %	97.7	100.0	100.0	

Test Readings for Specimen No. 3

Membrane modulus = .130 kN/cm²

Membrane thickness = .031 cm

Filter paper coefficient = 0.0019 kN/cm

Filter paper coverage = 50%

Consolidation cell pressure = 81.60 psi (5.875 tsf)

Consolidation back pressure = 30.20 psi (2.174 tsf)

Consolidation effective confining stress = 3.701 tsf

Strain rate, %/min. = 0.02

Fail. Stress = 2.316 tsf at reading no. 57

Ult. Stress = 2.242 tsf at reading no. 90

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0007	0.000	0.0	0.0	0.000	3.702	3.702	1.00	30.19	3.702	0.000
1	0.0009	8.072	8.1	0.0	0.159	3.701	3.860	1.04	30.19	3.781	0.080
2	0.0010	11.746	11.7	0.0	0.232	3.644	3.876	1.06	30.99	3.760	0.116
3	0.0015	14.630	14.6	0.0	0.289	3.596	3.884	1.08	31.66	3.740	0.144
4	0.0025	17.560	17.6	0.0	0.346	3.549	3.896	1.10	32.31	3.722	0.173
5	0.0033	20.653	20.7	0.1	0.407	3.506	3.913	1.12	32.91	3.709	0.204
6	0.0038	24.224	24.2	0.1	0.478	3.462	3.940	1.14	33.51	3.701	0.239
7	0.0050	27.096	27.1	0.1	0.534	3.419	3.953	1.16	34.11	3.686	0.267
8	0.0060	30.191	30.2	0.2	0.595	3.379	3.974	1.18	34.67	3.677	0.297
9	0.0069	33.008	33.0	0.2	0.650	3.342	3.992	1.19	35.19	3.667	0.325
10	0.0073	35.600	35.6	0.2	0.701	3.309	4.010	1.21	35.64	3.660	0.351
11	0.0086	38.706	38.7	0.2	0.762	3.268	4.030	1.23	36.20	3.649	0.381

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
12	0.0090	40.247	40.2	0.2	0.792	3.231	4.023	1.25	36.72	3.627	0.396
13	0.0096	41.891	41.9	0.3	0.824	3.199	4.024	1.26	37.17	3.611	0.412
14	0.0104	45.294	45.3	0.3	0.891	3.159	4.051	1.28	37.72	3.605	0.446
15	0.0116	47.378	47.4	0.3	0.932	3.128	4.060	1.30	38.15	3.594	0.466
16	0.0122	49.798	49.8	0.3	0.979	3.099	4.078	1.32	38.56	3.589	0.490
17	0.0129	52.607	52.6	0.3	1.034	3.072	4.106	1.34	38.93	3.589	0.517
18	0.0148	55.500	55.5	0.4	1.091	3.012	4.103	1.36	39.77	3.557	0.545
19	0.0161	57.450	57.5	0.4	1.128	2.984	4.113	1.38	40.15	3.549	0.564
20	0.0169	59.689	59.7	0.5	1.172	2.956	4.128	1.40	40.54	3.542	0.586
21	0.0174	61.219	61.2	0.5	1.202	2.934	4.136	1.41	40.86	3.535	0.601
22	0.0178	64.236	64.2	0.5	1.261	2.900	4.161	1.43	41.33	3.530	0.631
23	0.0193	66.592	66.6	0.5	1.307	2.875	4.182	1.45	41.67	3.529	0.653
24	0.0201	68.045	68.0	0.6	1.335	2.859	4.194	1.47	41.90	3.526	0.668
25	0.0218	70.790	70.8	0.6	1.388	2.811	4.199	1.49	42.56	3.505	0.694
26	0.0229	72.362	72.4	0.6	1.419	2.789	4.207	1.51	42.87	3.498	0.709
27	0.0238	74.549	74.5	0.7	1.461	2.775	4.237	1.53	43.05	3.506	0.731
28	0.0244	76.512	76.5	0.7	1.499	2.741	4.241	1.55	43.52	3.491	0.750
29	0.0254	78.534	78.5	0.7	1.539	2.721	4.260	1.57	43.81	3.490	0.769
30	0.0263	79.913	79.9	0.7	1.565	2.712	4.277	1.58	43.94	3.494	0.783
31	0.0281	81.985	82.0	0.8	1.605	2.668	4.273	1.60	44.54	3.471	0.802
32	0.0292	83.614	83.6	0.8	1.636	2.655	4.291	1.62	44.73	3.473	0.818
33	0.0297	85.340	85.3	0.8	1.670	2.637	4.306	1.63	44.98	3.472	0.835
34	0.0305	87.657	87.7	0.8	1.715	2.612	4.326	1.66	45.33	3.469	0.857
35	0.0313	89.273	89.3	0.9	1.746	2.595	4.341	1.67	45.56	3.468	0.873
36	0.0321	90.842	90.8	0.9	1.776	2.577	4.354	1.69	45.80	3.466	0.888
37	0.0338	92.196	92.2	0.9	1.802	2.555	4.357	1.71	46.12	3.456	0.901
38	0.0371	98.749	98.7	1.0	1.928	2.492	4.420	1.77	46.99	3.456	0.964
39	0.0409	101.266	101.3	1.1	1.975	2.451	4.426	1.81	47.56	3.439	0.988
40	0.0442	106.288	106.3	1.2	2.071	2.404	4.475	1.86	48.21	3.439	1.036
41	0.0478	107.678	107.7	1.3	2.096	2.372	4.468	1.88	48.65	3.420	1.048
42	0.0510	110.325	110.3	1.4	2.146	2.358	4.504	1.91	48.85	3.431	1.073
43	0.0546	111.931	111.9	1.5	2.175	2.333	4.508	1.93	49.19	3.421	1.087
44	0.0620	116.745	116.7	1.7	2.263	2.317	4.580	1.98	49.42	3.448	1.132
45	0.0659	113.846	113.8	1.9	2.205	2.309	4.514	1.95	49.53	3.412	1.102
46	0.0685	116.519	116.5	1.9	2.255	2.294	4.549	1.98	49.74	3.422	1.127
47	0.0796	116.958	117.0	2.2	2.256	2.285	4.541	1.99	49.86	3.413	1.128
48	0.0872	118.722	118.7	2.5	2.285	2.281	4.566	2.00	49.92	3.423	1.142
49	0.0902	117.246	117.2	2.5	2.254	2.276	4.530	1.99	49.99	3.403	1.127
50	0.1007	117.941	117.9	2.8	2.261	2.266	4.527	2.00	50.13	3.396	1.130
51	0.1043	120.093	120.1	2.9	2.300	2.270	4.569	2.01	50.08	3.420	1.150
52	0.1080	118.326	118.3	3.0	2.263	2.269	4.532	2.00	50.09	3.400	1.132
53	0.1116	121.018	121.0	3.1	2.312	2.266	4.578	2.02	50.13	3.422	1.156
54	0.1147	118.185	118.2	3.2	2.256	2.264	4.520	2.00	50.16	3.392	1.128
55	0.1190	121.452	121.5	3.4	2.316	2.265	4.581	2.02	50.14	3.423	1.158
56	0.1218	119.111	119.1	3.4	2.269	2.267	4.536	2.00	50.12	3.401	1.135
57	0.1291	121.823	121.8	3.6	2.316	2.265	4.581	2.02	50.14	3.423	1.158
58	0.1330	119.216	119.2	3.8	2.264	2.264	4.528	2.00	50.16	3.396	1.132

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
59	0.1366	121.639	121.6	3.9	2.307	2.264	4.572	2.02	50.15	3.418	1.154
60	0.1394	119.062	119.1	3.9	2.257	2.263	4.519	2.00	50.18	3.391	1.128
61	0.1440	120.535	120.5	4.1	2.281	2.262	4.544	2.01	50.18	3.403	1.141
62	0.1543	120.880	120.9	4.4	2.281	2.252	4.533	2.01	50.32	3.393	1.140
63	0.1650	119.981	120.0	4.7	2.257	2.259	4.516	2.00	50.22	3.388	1.128
64	0.1755	120.577	120.6	5.0	2.261	2.263	4.524	2.00	50.17	3.393	1.130
65	0.1926	122.652	122.7	5.4	2.288	2.270	4.558	2.01	50.08	3.414	1.144
66	0.2024	121.034	121.0	5.7	2.251	2.269	4.520	1.99	50.09	3.394	1.126
67	0.2199	121.357	121.4	6.2	2.245	2.271	4.516	1.99	50.06	3.394	1.123
68	0.2377	121.786	121.8	6.7	2.241	2.277	4.518	1.98	49.98	3.397	1.121
69	0.2546	121.249	121.2	7.2	2.220	2.284	4.504	1.97	49.88	3.394	1.110
70	0.2640	123.984	124.0	7.5	2.263	2.290	4.554	1.99	49.79	3.422	1.132
71	0.2726	122.416	122.4	7.7	2.229	2.291	4.520	1.97	49.78	3.406	1.114
72	0.2911	124.375	124.4	8.2	2.252	2.287	4.538	1.98	49.84	3.413	1.126
73	0.2997	122.887	122.9	8.5	2.219	2.294	4.513	1.97	49.74	3.404	1.109
74	0.3169	125.004	125.0	9.0	2.245	2.291	4.536	1.98	49.78	3.413	1.122
75	0.3353	126.224	126.2	9.5	2.254	2.302	4.555	1.98	49.63	3.428	1.127
76	0.3529	125.054	125.1	10.0	2.221	2.305	4.526	1.96	49.58	3.416	1.110
77	0.3618	128.869	128.9	10.2	2.282	2.306	4.588	1.99	49.58	3.447	1.141
78	0.3705	127.274	127.3	10.5	2.247	2.304	4.552	1.98	49.60	3.428	1.124
79	0.3879	129.200	129.2	11.0	2.269	2.308	4.577	1.98	49.54	3.443	1.134
80	0.3971	127.629	127.6	11.3	2.235	2.310	4.545	1.97	49.51	3.428	1.117
81	0.4147	129.024	129.0	11.8	2.246	2.312	4.559	1.97	49.48	3.436	1.123
82	0.4327	131.413	131.4	12.3	2.275	2.322	4.597	1.98	49.35	3.459	1.137
83	0.4515	131.216	131.2	12.8	2.258	2.326	4.583	1.97	49.30	3.454	1.129
84	0.4598	133.513	133.5	13.0	2.291	2.327	4.618	1.98	49.28	3.473	1.145
85	0.4686	132.080	132.1	13.3	2.260	2.327	4.587	1.97	49.28	3.457	1.130
86	0.4865	133.539	133.5	13.8	2.271	2.340	4.611	1.97	49.11	3.475	1.136
87	0.4945	131.660	131.7	14.0	2.233	2.340	4.574	1.95	49.10	3.457	1.117
88	0.5037	133.154	133.2	14.3	2.252	2.344	4.596	1.96	49.04	3.470	1.126
89	0.5212	131.876	131.9	14.8	2.217	2.350	4.568	1.94	48.96	3.459	1.109
90	0.5305	133.755	133.8	15.0	2.242	2.349	4.591	1.95	48.98	3.470	1.121

SUMMARY OF LABORATORY TESTS

Project No. 08.18.918

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Boring No.	Sample No.	Depth (ft)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	Lab Vane (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
	12	35-36.5	Gray SILTY SAND; shell fragments	SM						19.2					
	13	38.5-40	Gray CLAYEY SAND; shell fragments	SC											
07-233															
	2	2.5-4	Gray FAT CLAY	CH	157.0										
	3	4.5-6	Gray FAT CLAY	CH	146.2		115	30	85	93.5					
	4	6.5-8	Gray FAT CLAY	CH	139.9										
	5	8.5-10	Gray FAT CLAY	CH	125.0										
	6	10.5-12	Gray FAT CLAY	CH	136.0		119	30	89	95.4					
	7	12.5-14	Gray FAT CLAY	CH	121.0										
	8	14.5-16	Gray FAT CLAY	CH	120.3										
	9	16.5-18	Gray FAT CLAY	CH	105.5		114	28	86	90.9					
	10	18-20	Gray SANDY LEAN CLAY	CL	23.2	96.7						0.78	10.6		Bulge
	11	20-22	Gray LEAN CLAY	CL	26.1	98.5	33	16	17	96.3					Multiple shear
	12	22-24	Tan and light gray LEAN CLAY	CL	27.3	96.2						0.48	9.8		
	13	24-26	Gray LEAN CLAY	CL	28.0	92.0	33	16	17	97.3		0.40	5.8	9.5	Bulge
	14	26-28	Tan and gray SANDY SILT; clay seams	ML	27.3	93.6									
	15	28-30	Tan and gray LEAN CLAY	CL			30	16	14	98.2					
	16	30-32	Tan and gray SANDY SILT; clay seams	ML	27.1	93.8									
	17	32-34	Tan and brown LEAN CLAY	CL	36.5	85.3	43	18	25	99.5		0.81	15.0	13.0	Bulge
	18	34-35	Gray FAT CLAY; sand seams	CH	33.0	87.4									
07-234															
	2	2.5-4	Gray SANDY LEAN CLAY; shell fragments	CL	51.0										
	3	4.5-6	Gray CLAYEY SAND; shell fragments	SC	40.7		42	17	25	24.0					
	4	6.5-8	Gray SANDY LEAN CLAY; shell fragments	CL	46.5										
	5	8-10	Tan and gray FAT CLAY	CH	30.9	88.0	75	24	51	98.4		1.08	2.0	3.5	Slickensided
	6	10-12	Gray FAT CLAY; sand seams	CH	20.6	102.5									
	7	12-14	Tan and gray SANDY SILT; clay seams	ML	24.6	98.2						0.66	5.5		Vertical shear
	8	14-16	Tan and gray LEAN CLAY	CL	25.7	97.7	26	15	11	98.0					
	9	16-18	Gray and tan FAT CLAY; sand seams	CH	30.3	92.2									
	10	18-20	Brown and gray SILTY CLAY with SAND	CL-ML	24.9	103.6						0.49	5.8	7.5	Bulge
	11	20-22	Tan and brown SILTY SAND; clay pockets	SM	25.6	96.8									
	12	22-24	Gray and tan FAT CLAY; sand seams	CH	27.2	93.8						0.81	3.3		Vertical shear
	13	24-26	Tan and brown FAT CLAY	CH	34.6	85.3	52	20	32	99.6		0.77	9.7	9.5	Bulge
	14	26-28	Gray FAT CLAY; sand seams	CH	32.4	86.3									
	15	28-30	Gray FAT CLAY	CH	31.2	86.7						0.98	8.1		Vertical shear
07-235															
	2	2.5-4	Gray FAT CLAY	CH	84.9										

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TOLUNAY-WONG



ENGINEERS, INC.

SUMMARY OF LABORATORY TESTS

Project No. 08.18.918

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Boring No.	Sample No.	Depth (ft)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	Lab Vane (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
	3	4.5-6	Gray FAT CLAY	CH	95.0		95	26	69	92.9					
	4	6.5-8	Gray FAT CLAY	CH	75.1										
	5	8.5-10	Gray FAT CLAY	CH	84.8										
	6	10-12	Gray FAT CLAY with SAND	CH	65.5	61.2	76	24	52	77.6		0.26	4.1	4.5	Bulge
	7	12-13.5	Gray SANDY LEAN CLAY	CL	48.3										
	8	14-15.5	Gray SILTY SAND	SM						15.6					
	9	18-20	Gray FAT CLAY	CH	52.5	65.2	105	28	77	89.0		0.46	8.2		Vertical shear
	10	20-22	Gray FAT CLAY with SAND; shell fragments	CH	60.7	65.9									
	11	22-24	Gray FAT CLAY; sand seams and shell fragments	CH	41.1	79.6	61	21	40	88.5		0.54	6.7	9.0	60 degree
	12	24-26	Gray and tan FAT CLAY	CH	29.7	92.6	66	21	45	99.1					
	13	26-28	Reddish-brown and gray FAT CLAY	CH	33.1	89.4									
	14	28-30	Reddish-brown and gray FAT CLAY	CH	29.0	87.1						1.12	4.1		Slickensided
	15	30-32	Gray FAT CLAY; sand seams	CH	33.1	87.0									
	16	32-34	Tan and gray LEAN CLAY	CL	24.0	101.9	32	16	16	98.2		0.43	6.4	13.0	Bulge
	17	34-36	Tan and gray SANDY SILTY CLAY	CL-ML	23.3	104.5									
	18	36-38	Tan and gray SANDY SILTY CLAY	CL-ML	26.0	94.6									
	19	38-40	Tan LEAN CLAY	CL	25.0		32	16	16	97.8					
	20	40-42	Tan and gray SANDY LEAN CLAY	CL	24.5	95.8									
	21	42-44	Tan and gray SANDY LEAN CLAY	CL	28.9	93.4						0.97	6.1		Vertical shear
	22	44-46	Tan and gray SANDY SILTY CLAY	CL-ML	26.3	95.9									
	23	46-48	Gray and tan FAT CLAY; sand seams	CH	35.1	88.8									
	24	48-50	Gray and tan FAT CLAY; sand seams	CH	34.5	90.8									
07-236															
	2	2.5-4	Gray FAT CLAY	CH	112.7										
	3	4.5-6	Gray FAT CLAY with SAND	CH	115.2		105	28	77	84.7					
	4	6.5-8	Gray FAT CLAY	CH	107.9										
	5	8.5-10	Gray FAT CLAY	CH	110.6										
	6	10.5-12	Gray FAT CLAY	CH	112.1		107	28	79	95.9					
	7	12.5-14	Gray FAT CLAY	CH	109.0										
	8	14.5-16	Gray FAT CLAY	CH	106.2										
	9	16-18	Gray FAT CLAY	CH	111.5		110	29	81	97.9					
	10	18-20	Gray and tan SANDY LEAN CLAY	CL	27.2	86.8									
	11	20-22	Tan and gray LEAN CLAY	CL	27.0	98.6	38	17	21	99.1		0.71	14.7	8.0	Vertical shear
	12	22-24	Tan and gray SANDY LEAN CLAY	CL	20.2	101.2									
	13	24-26	Tan and gray SANDY LEAN CLAY	CL	26.3	95.1									
	14	26-28	Tan and gray LEAN CLAY	CL	28.2	94.3	39	17	22	99.3		0.70	7.0	10.5	60 degree
	15	28-30	Tan and gray SANDY SILTY CLAY	CL-ML	29.0										

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