**Hole No. 07-193**

| BORING LOG | DISTRICT | INSTALLATION | SHEET 1 OF 2 SHEETS |
|---|---|---|---|

| | |
|---|---|
| 1. PROJECT<br>Galveston Channel and Pelican Island PA | 7. ELEVATION OF HOLE |
| 2. LOCATION (Coordinates or Station)<br>N=13692854 E=3310430 | 8. DATUM FOR ELEVATION |
| 3. DRILLING AGENCY<br>Dempsey (Geotest Engineering, Inc.) | 9. ELEVATION OF GROUNDWATER<br>▽ TOD: ▼ 24-HR: |
| 4. LABORATORY TESTING AGENCY<br>Tolunay-Wong Engineers, Inc. | 10. DRILLING DATE and TIME<br>STARTED: COMPLETED: |
| 5. DEPTH OF WATER<br>▽ TOD: ▼ 24-HR: | 11. CLASSIFICATION REFERENCE |
| 6. DEPTH OF HOLE<br>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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **FAT CLAY(CH)**, very stiff to hard, gray -w/ ferrous nodules, roots & shell fragments @ 0' - 2' -brown & gray w/ sand seams @ 2' - 4' | | 1 | | | 4.50 | 105.5 | 15.7 | | | | |
| | | | | | 2 | | | 3.50 | 86.7 | 32.7 | | | | |
| 5 | | | **FAT CLAY WITH SAND(CH)**, soft, tan & gray, w/ ferrous nodules | | 3 | | | 0.50 | 80.1 | 29.0 | | | | |
| | | | **SANDY FAT CLAY(CH)**, very soft, brown & gray, w/ sand seams | | 4 | | | 0.25 | 84.5 | 28.3 | 69 | 23 | 46 | 58.6 |
| | | | **FAT CLAY WITH SAND(CH)**, firm, brown & gray, w/ calcareous nodules | | 5 | | | 1.25 | 86.3 | 35.0 | | | | |
| 10 | | | **FAT CLAY(CH)**, firm, tan & gray, w/ sand seams | | 6 | | | 0.75 | 80.1 | 38.5 | 75 | 24 | 51 | 94.3 |
| | | | **FAT CLAY WITH SAND(CH)**, soft, brown & gray, w/ calcareous nodules | | 7 | | | 0.50 | 81.8 | 35.7 | | | | |
| 15 | | | **FAT CLAY(CH)**, firm, brown & gray, w/ sand seams | | 8 | | | 1.00 | 83.4 | 34.8 | 72 | 24 | 48 | 90.6 |
| | | | **FAT CLAY WITH SAND(CH)**, firm, tan & gray | | 9 | | | 1.25 | 85.4 | 32.7 | | | | |
| | | | **FAT CLAY(CH)**, very soft to soft, brown & gray, w/ sand seams | | 10 | | | 0.50 | 75.8 | 47.5 | | | | |
| 20 | | | **FAT CLAY WITH SAND(CH)**, very soft, brown & gray | | 11 | | | 0.25 | 80.6 | 39.9 | 68 | 23 | 45 | 80.7 |
| | | | **SILTY SAND(SM)**, loose, gray & tan, w/ shell fragmenets | | 12 | | 9 | | | | | | | 13.6 |
| 25 | | | | | | | | | | | | | | |
| | | | **FAT CLAY(CH)**, soft to firm, gray, w/ sand seams -w/ ferrous nodules @ 26' - 28' -gray & tan @ 28' - 30' | | 13 | | | 0.50 | 77.6 | 33.1 | | | | |
| | | | | | 14 | | | 0.75 | 75.1 | 37.5 | 83 | 24 | 59 | 86.3 |
| 30 | | | **LEAN CLAY(CL)**, soft, gray, w/ sand pockets | | 15 | | | 0.50 | 64.3 | 54.8 | | | | |
| | | | **FAT CLAY(CH)**, soft, dark gray, w/ sand seams | | 16 | | | 0.50 | 64.4 | 56.2 | | | | |
| | | | **CLAYEY SAND(SC)**, medium dense, gray & | | | | | | | | | | | |

SWG 1836 BOR 08.18.918.GPJ TOLUNAY-WONG ENGINEERS.GDT 10/2/08

ENG FORM: SWG 1836 BOR

**Hole No. 07-193**

| BORING LOG | DISTRICT | INSTALLATION | SHEET 2 OF 2 SHEETS |
|---|---|---|---|

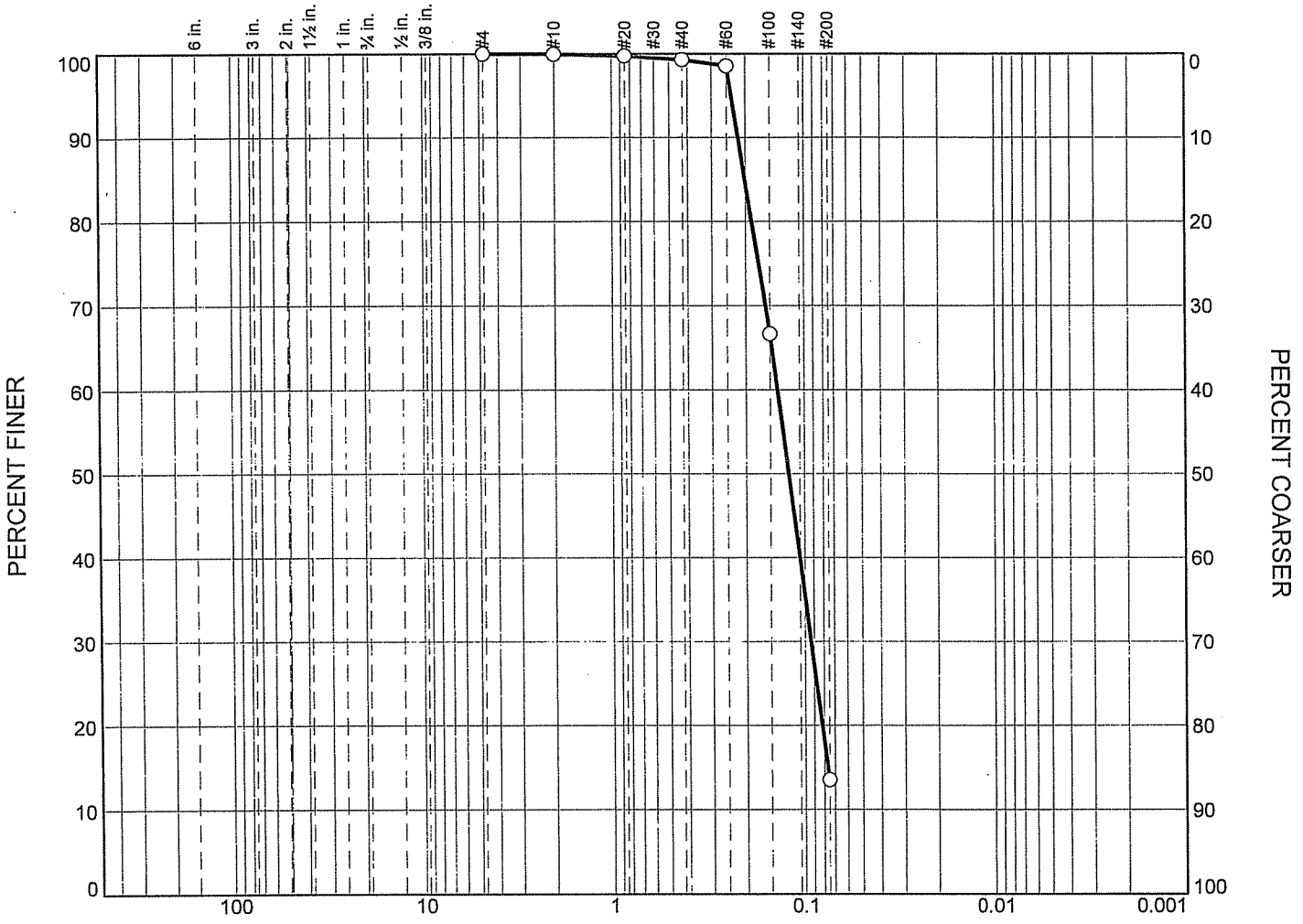
| | |
|---|---|
| 1. PROJECT<br>Galveston Channel and Pelican Island PA | 7. ELEVATION OF HOLE |
| 2. LOCATION (Coordinates or Station)<br>N=13692854 E=3310430 | 8. DATUM FOR ELEVATION |
| 3. DRILLING AGENCY<br>Dempsey (Geotest Engineering, Inc.) | 9. ELEVATION OF GROUNDWATER<br>▽ TOD: ▼ 24-HR: |
| 4. LABORATORY TESTING AGENCY<br>Tolunay-Wong Engineers, Inc. | 10. DRILLING DATE and TIME<br>STARTED: COMPLETED: |
| 5. DEPTH OF WATER<br>▽ TOD: ▼ 24-HR: | 11. CLASSIFICATION REFERENCE |
| 6. DEPTH OF HOLE<br>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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | tan, w/ shell fragments & clay seams | X | 17 | | 11 | | | 40.9 | | | | |
| | | | **LEAN CLAY(CL)**, soft, dark gray & tan, w/ sand pockets & seams | | 18 | | | 0.50 | 85.9 | 34.6 | | | | |
| | | | **FAT CLAY WITH SAND(CH)**, soft, gray, w/ shell fragments | | 19 | | | 0.50 | 77.4 | 40.7 | 67 | 24 | 43 | 77.5 |
| 40 | | | **SILTY CLAYEY SAND(SC-SM)**, gray, w/ shell fragments | | 20 | | | 0 | | 29.2 | | | | |
| | | | **SANDY FAT CLAY(CH)**, very soft, gray & tan | | 21 | | | 0 | | 44.2 | 52 | 20 | 32 | 61.1 |
| 45 | | | **CLAYEY SAND(SC)**, gray & tan | | 22 | | | 0.50 | 90.2 | 26.6 | | | | |
| | | | **SANDY LEAN CLAY(CL)**, very soft to soft, gray | | 23 | | | 0.50 | 75.3 | 39.4 | | | | |
| | | | -w/ shell fragments @ 48' - 50' | | 24 | | | 0 | | 37.3 | 42 | 20 | 22 | 61.4 |
| 50 | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | | | |

SWG 1836 BOR 08.18.918.GPJ TOLUNAY-WONG ENGINEERS.GDT 10/2/08

ENG FORM: SWG 1836 BOR

# Particle Size Analysis - ASTM D 422




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 85.7 | 13.6 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## SOIL DATA

| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | Material Description | USCS |
|---|---|---|---|---|---|
| ○ | 07-193 | 12 | 22-23.5 | Gray and tan SILTY SAND; shell fragments | 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

7/22/2008

**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:** 07-193
**Depth:** 22-23.5 **Sample Number:** 12
**Material Description:** Gray and tan SILTY SAND; shell fragments
**USCS:** SM

### Sieve Test Data

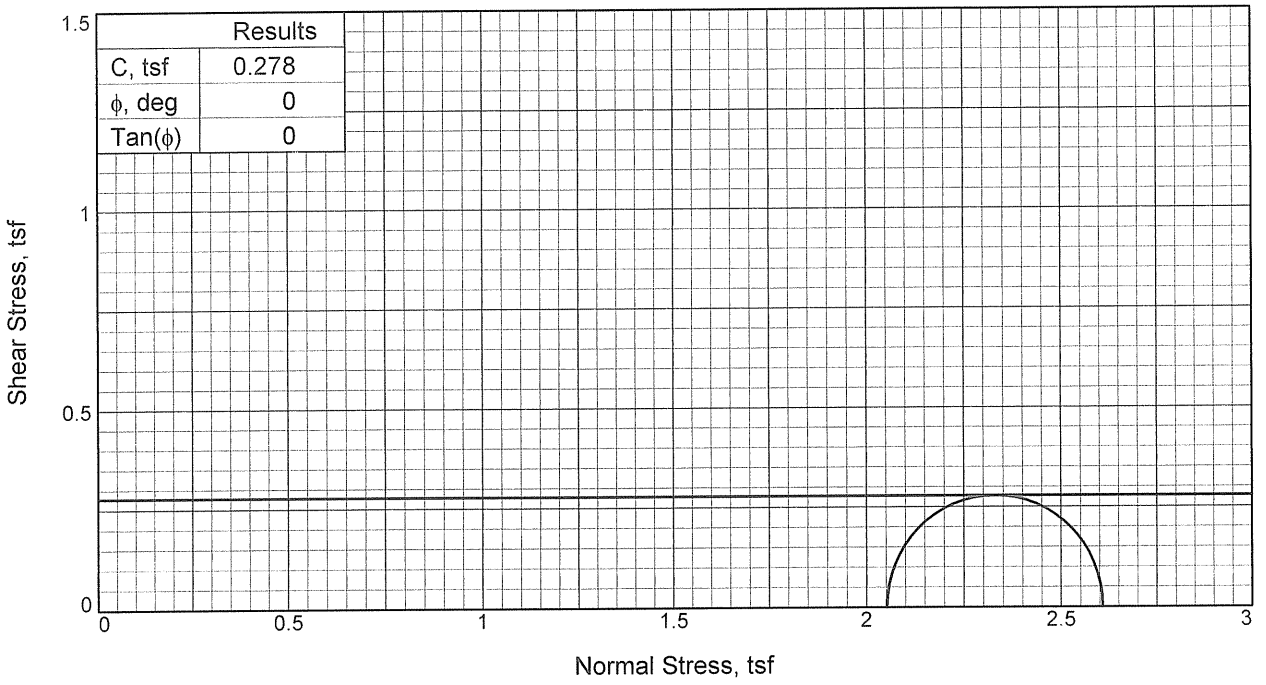
| Dry Sample and Tare (grams) | Tare (grams) | Cumulative Pan Tare Weight (grams) | Sieve Opening Size | Cumulative Weight Retained (grams) | Percent Finer |
|---|---|---|---|---|---|
| 267.78 | 181.61 | 181.61 | 3" | | |
| | | | 0.75" | | |
| | | | #4 | 181.61 | 100.0 |
| | | | #10 | 181.63 | 100.0 |
| | | | #20 | 181.84 | 99.7 |
| | | | #40 | 182.23 | 99.3 |
| | | | #60 | 182.84 | 98.6 |
| | | | #100 | 210.34 | 66.7 |
| | | | #200 | 256.10 | 13.6 |

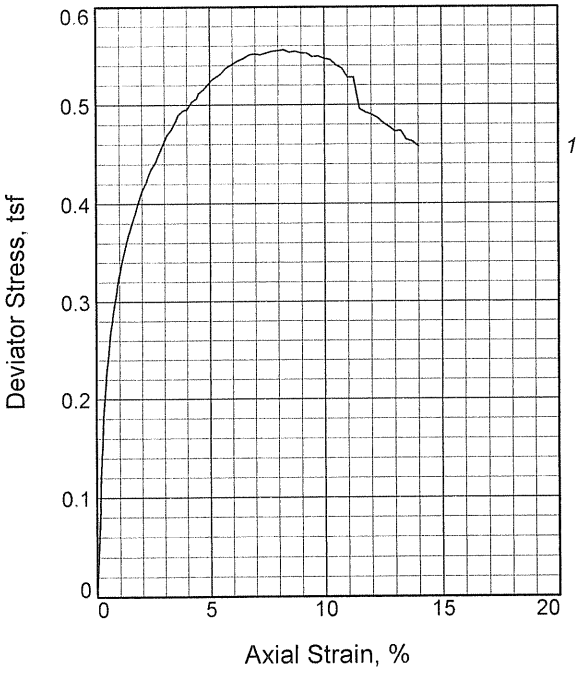
### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 85.7 | 86.4 | | | 13.6 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | 0.0764 | 0.0816 | 0.0930 | 0.1207 | 0.1375 | 0.1857 | 0.2012 | 0.2179 | 0.2361 |

| Fineness Modulus |
|---|
| 0.35 |




| | | |
|---|---|---|
| Sample No. | | 1 |
| Initial | Water Content, % | 39.4 |
| | Dry Density, pcf | 75.3 |
| | Saturation, % | 85.9 |
| | Void Ratio | 1.2382 |
| | Diameter, in. | 2.85 |
| | Height, in. | 6.00 |
| At Test | Water Content, % | 41.7 |
| | Dry Density, pcf | 75.3 |
| | Saturation, % | 90.9 |
| | Void Ratio | 1.2382 |
| | Diameter, in. | 2.85 |
| | Height, in. | 6.00 |
| Strain rate, %/min. | | 1.00 |
| Back Pressure, tsf | | 0.00 |
| Cell Pressure, tsf | | 2.05 |
| Fail. Stress, tsf | | 0.56 |
| Ult. Stress, tsf | | |
| $\sigma_1$ Failure, tsf | | 2.61 |
| $\sigma_3$ Failure, tsf | | 2.05 |

**Type of Test:**
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Gray SANDY LEAN CLAY

**Assumed Specific Gravity=** 2.70

**Remarks:**
Test method: ASTM D 2850
Pocket pen; tsf: 0.25
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:** 07-193 **Depth:** 46-48

**Sample Number:** 23

**Proj. No.:** 08.18.918 **Date Sampled:** 7/18/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

# TRIAXIAL COMPRESSION TEST
Unconsolidated Undrained

10/17/2008
9:49 AM

**Date:** 7/18/08
**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:** 07-193
**Depth:** 46-48 **Sample Number:** 23
**Description:** Gray SANDY LEAN CLAY
**Remarks:**
Test method: ASTM D 2850
Pocket pen; tsf: 0.25
Failure type: Bulge
**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. | 125.970 | 99.630 |
| Moisture content: Dry soil+tare, gms. | 99.310 | 79.600 |
| Moisture content: Tare, gms. | 31.660 | 31.550 |
| Moisture, % | 39.4 | 41.7 |
| Moist specimen weight, gms. | 1054.8 | |
| Diameter, in. | 2.85 | |
| Area, in.$^2$ | 6.38 | |
| Height, in. | 6.00 | |
| Wet Density, pcf | 105.0 | |
| Dry density, pcf | 75.3 | |
| Void ratio | 1.2382 | |
| Saturation, % | 85.9 | |

## Test Readings for Specimen No. 1

**Membrane modulus =** .130 kN/cm$^2$
**Membrane thickness =** .031 cm
**Cell pressure =** 28.50 psi (2.052 tsf)
**Back pressure =** 0.00 psi (0.000 tsf)
**Strain rate, %/min. =** 1.00
**Fail. Stress =** 0.556 tsf **at reading no.** 63

## 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 | 0.1170 | 0.000 | 0.0 | 0.0 | 0.000 | 2.052 | 2.052 | 1.00 | 2.052 | 0.000 |
| 1 | 0.1263 | 7.751 | 7.8 | 0.2 | 0.087 | 2.052 | 2.139 | 1.04 | 2.096 | 0.044 |
| 2 | 0.1274 | 9.947 | 9.9 | 0.2 | 0.112 | 2.052 | 2.164 | 1.05 | 2.108 | 0.056 |
| 3 | 0.1294 | 11.395 | 11.4 | 0.2 | 0.128 | 2.052 | 2.180 | 1.06 | 2.116 | 0.064 |
| 4 | 0.1308 | 12.605 | 12.6 | 0.2 | 0.142 | 2.052 | 2.194 | 1.07 | 2.123 | 0.071 |
| 5 | 0.1320 | 13.505 | 13.5 | 0.3 | 0.152 | 2.052 | 2.204 | 1.07 | 2.128 | 0.076 |
| 6 | 0.1340 | 15.115 | 15.1 | 0.3 | 0.170 | 2.052 | 2.222 | 1.08 | 2.137 | 0.085 |
| 7 | 0.1353 | 16.054 | 16.1 | 0.3 | 0.181 | 2.052 | 2.233 | 1.09 | 2.142 | 0.090 |
| 8 | 0.1366 | 16.993 | 17.0 | 0.3 | 0.191 | 2.052 | 2.243 | 1.09 | 2.148 | 0.096 |
| 9 | 0.1386 | 17.673 | 17.7 | 0.4 | 0.199 | 2.052 | 2.251 | 1.10 | 2.151 | 0.099 |
| 10 | 0.1399 | 18.396 | 18.4 | 0.4 | 0.207 | 2.052 | 2.259 | 1.10 | 2.155 | 0.103 |
| 11 | 0.1412 | 19.162 | 19.2 | 0.4 | 0.215 | 2.052 | 2.267 | 1.10 | 2.160 | 0.108 |
| 12 | 0.1432 | 20.216 | 20.2 | 0.4 | 0.227 | 2.052 | 2.279 | 1.11 | 2.166 | 0.114 |
| 13 | 0.1445 | 20.777 | 20.8 | 0.5 | 0.233 | 2.052 | 2.285 | 1.11 | 2.169 | 0.117 |
| 14 | 0.1478 | 21.615 | 21.6 | 0.5 | 0.243 | 2.052 | 2.295 | 1.12 | 2.173 | 0.121 |
| 15 | 0.1491 | 22.193 | 22.2 | 0.5 | 0.249 | 2.052 | 2.301 | 1.12 | 2.177 | 0.125 |
| 16 | 0.1504 | 22.826 | 22.8 | 0.6 | 0.256 | 2.052 | 2.308 | 1.12 | 2.180 | 0.128 |
| 17 | 0.1537 | 24.108 | 24.1 | 0.6 | 0.270 | 2.052 | 2.322 | 1.13 | 2.187 | 0.135 |
| 18 | 0.1583 | 24.866 | 24.9 | 0.7 | 0.279 | 2.052 | 2.331 | 1.14 | 2.191 | 0.139 |
| 19 | 0.1596 | 25.613 | 25.6 | 0.7 | 0.287 | 2.052 | 2.339 | 1.14 | 2.196 | 0.144 |
| 20 | 0.1629 | 26.380 | 26.4 | 0.8 | 0.295 | 2.052 | 2.347 | 1.14 | 2.200 | 0.148 |
| 21 | 0.1662 | 26.977 | 27.0 | 0.8 | 0.302 | 2.052 | 2.354 | 1.15 | 2.203 | 0.151 |
| 22 | 0.1694 | 27.744 | 27.7 | 0.9 | 0.310 | 2.052 | 2.362 | 1.15 | 2.207 | 0.155 |
| 23 | 0.1720 | 28.491 | 28.5 | 0.9 | 0.319 | 2.052 | 2.371 | 1.16 | 2.211 | 0.159 |
| 24 | 0.1753 | 29.048 | 29.0 | 1.0 | 0.325 | 2.052 | 2.377 | 1.16 | 2.214 | 0.162 |
| 25 | 0.1785 | 29.657 | 29.7 | 1.0 | 0.331 | 2.052 | 2.383 | 1.16 | 2.218 | 0.166 |
| 26 | 0.1831 | 30.474 | 30.5 | 1.1 | 0.340 | 2.052 | 2.392 | 1.17 | 2.222 | 0.170 |
| 27 | 0.1941 | 32.074 | 32.1 | 1.3 | 0.357 | 2.052 | 2.409 | 1.17 | 2.231 | 0.179 |
| 28 | 0.1999 | 32.895 | 32.9 | 1.4 | 0.366 | 2.052 | 2.418 | 1.18 | 2.235 | 0.183 |
| 29 | 0.2063 | 33.672 | 33.7 | 1.5 | 0.374 | 2.052 | 2.426 | 1.18 | 2.239 | 0.187 |
| 30 | 0.2121 | 34.337 | 34.3 | 1.6 | 0.381 | 2.052 | 2.433 | 1.19 | 2.243 | 0.191 |
| 31 | 0.2185 | 35.109 | 35.1 | 1.7 | 0.390 | 2.052 | 2.442 | 1.19 | 2.247 | 0.195 |
| 32 | 0.2243 | 35.861 | 35.9 | 1.8 | 0.398 | 2.052 | 2.450 | 1.19 | 2.251 | 0.199 |
| 33 | 0.2366 | 37.242 | 37.2 | 2.0 | 0.412 | 2.052 | 2.464 | 1.20 | 2.258 | 0.206 |
| 34 | 0.2488 | 38.226 | 38.2 | 2.2 | 0.422 | 2.052 | 2.474 | 1.21 | 2.263 | 0.211 |
| 35 | 0.2546 | 38.887 | 38.9 | 2.3 | 0.429 | 2.052 | 2.481 | 1.21 | 2.266 | 0.214 |
| 36 | 0.2610 | 39.458 | 39.5 | 2.4 | 0.435 | 2.052 | 2.487 | 1.21 | 2.269 | 0.217 |
| 37 | 0.2726 | 40.194 | 40.2 | 2.6 | 0.442 | 2.052 | 2.494 | 1.22 | 2.273 | 0.221 |
| 38 | 0.2791 | 40.835 | 40.8 | 2.7 | 0.448 | 2.052 | 2.500 | 1.22 | 2.276 | 0.224 |
| 39 | 0.2907 | 41.782 | 41.8 | 2.9 | 0.458 | 2.052 | 2.510 | 1.22 | 2.281 | 0.229 |
| 40 | 0.3030 | 42.827 | 42.8 | 3.1 | 0.468 | 2.052 | 2.520 | 1.23 | 2.286 | 0.234 |
| 41 | 0.3152 | 43.493 | 43.5 | 3.3 | 0.475 | 2.052 | 2.527 | 1.23 | 2.289 | 0.237 |
| 42 | 0.3273 | 44.432 | 44.4 | 3.5 | 0.484 | 2.052 | 2.536 | 1.24 | 2.294 | 0.242 |
| 43 | 0.3331 | 45.004 | 45.0 | 3.6 | 0.490 | 2.052 | 2.542 | 1.24 | 2.297 | 0.245 |
| 44 | 0.3454 | 45.477 | 45.5 | 3.8 | 0.494 | 2.052 | 2.546 | 1.24 | 2.299 | 0.247 |
| 45 | 0.3577 | 45.723 | 45.7 | 4.0 | 0.495 | 2.052 | 2.547 | 1.24 | 2.300 | 0.248 |
| 46 | 0.3699 | 46.539 | 46.5 | 4.2 | 0.503 | 2.052 | 2.555 | 1.25 | 2.304 | 0.252 |

## 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 | 0.3821 | 46.934 | 46.9 | 4.4 | 0.506 | 2.052 | 2.558 | 1.25 | 2.305 | 0.253 |
| 48 | 0.3879 | 47.478 | 47.5 | 4.5 | 0.512 | 2.052 | 2.564 | 1.25 | 2.308 | 0.256 |
| 49 | 0.4001 | 47.890 | 47.9 | 4.7 | 0.515 | 2.052 | 2.567 | 1.25 | 2.310 | 0.258 |
| 50 | 0.4122 | 48.512 | 48.5 | 4.9 | 0.521 | 2.052 | 2.573 | 1.25 | 2.312 | 0.260 |
| 51 | 0.4244 | 49.114 | 49.1 | 5.1 | 0.526 | 2.052 | 2.578 | 1.26 | 2.315 | 0.263 |
| 52 | 0.4457 | 49.811 | 49.8 | 5.5 | 0.531 | 2.052 | 2.583 | 1.26 | 2.318 | 0.266 |
| 53 | 0.4605 | 50.511 | 50.5 | 5.7 | 0.537 | 2.052 | 2.589 | 1.26 | 2.321 | 0.269 |
| 54 | 0.4758 | 51.000 | 51.0 | 6.0 | 0.541 | 2.052 | 2.593 | 1.26 | 2.323 | 0.271 |
| 55 | 0.4906 | 51.463 | 51.5 | 6.2 | 0.545 | 2.052 | 2.597 | 1.27 | 2.324 | 0.272 |
| 56 | 0.5060 | 51.865 | 51.9 | 6.5 | 0.547 | 2.052 | 2.599 | 1.27 | 2.326 | 0.274 |
| 57 | 0.5207 | 52.339 | 52.3 | 6.7 | 0.551 | 2.052 | 2.603 | 1.27 | 2.327 | 0.275 |
| 58 | 0.5355 | 52.566 | 52.6 | 7.0 | 0.552 | 2.052 | 2.604 | 1.27 | 2.328 | 0.276 |
| 59 | 0.5510 | 52.633 | 52.6 | 7.2 | 0.551 | 2.052 | 2.603 | 1.27 | 2.328 | 0.276 |
| 60 | 0.5658 | 52.947 | 52.9 | 7.5 | 0.553 | 2.052 | 2.605 | 1.27 | 2.328 | 0.276 |
| 61 | 0.5812 | 53.251 | 53.3 | 7.7 | 0.555 | 2.052 | 2.607 | 1.27 | 2.329 | 0.277 |
| 62 | 0.5959 | 53.457 | 53.5 | 8.0 | 0.555 | 2.052 | 2.607 | 1.27 | 2.330 | 0.278 |
| 63 | 0.6113 | 53.707 | 53.7 | 8.2 | 0.556 | 2.052 | 2.608 | 1.27 | 2.330 | 0.278 |
| 64 | 0.6261 | 53.588 | 53.6 | 8.5 | 0.553 | 2.052 | 2.605 | 1.27 | 2.329 | 0.277 |
| 65 | 0.6415 | 53.829 | 53.8 | 8.7 | 0.554 | 2.052 | 2.606 | 1.27 | 2.329 | 0.277 |
| 66 | 0.6562 | 53.832 | 53.8 | 9.0 | 0.553 | 2.052 | 2.605 | 1.27 | 2.328 | 0.276 |
| 67 | 0.6716 | 53.956 | 54.0 | 9.2 | 0.553 | 2.052 | 2.605 | 1.27 | 2.328 | 0.276 |
| 68 | 0.6864 | 53.729 | 53.7 | 9.5 | 0.549 | 2.052 | 2.601 | 1.27 | 2.326 | 0.274 |
| 69 | 0.7018 | 53.948 | 53.9 | 9.7 | 0.550 | 2.052 | 2.602 | 1.27 | 2.327 | 0.275 |
| 70 | 0.7165 | 53.874 | 53.9 | 10.0 | 0.547 | 2.052 | 2.599 | 1.27 | 2.326 | 0.274 |
| 71 | 0.7319 | 53.899 | 53.9 | 10.2 | 0.546 | 2.052 | 2.598 | 1.27 | 2.325 | 0.273 |
| 72 | 0.7466 | 53.492 | 53.5 | 10.5 | 0.540 | 2.052 | 2.592 | 1.26 | 2.322 | 0.270 |
| 73 | 0.7620 | 53.328 | 53.3 | 10.8 | 0.537 | 2.052 | 2.589 | 1.26 | 2.321 | 0.269 |
| 74 | 0.7768 | 52.549 | 52.5 | 11.0 | 0.528 | 2.052 | 2.580 | 1.26 | 2.316 | 0.264 |
| 75 | 0.7922 | 52.697 | 52.7 | 11.3 | 0.528 | 2.052 | 2.580 | 1.26 | 2.316 | 0.264 |
| 76 | 0.8069 | 52.307 | 52.3 | 11.5 | 0.496 | 2.052 | 2.548 | 1.24 | 2.300 | 0.248 |
| 77 | 0.8223 | 52.168 | 52.2 | 11.8 | 0.492 | 2.052 | 2.544 | 1.24 | 2.298 | 0.246 |
| 78 | 0.8371 | 52.159 | 52.2 | 12.0 | 0.490 | 2.052 | 2.542 | 1.24 | 2.297 | 0.245 |
| 79 | 0.8525 | 52.049 | 52.0 | 12.3 | 0.487 | 2.052 | 2.539 | 1.24 | 2.295 | 0.243 |
| 80 | 0.8672 | 51.716 | 51.7 | 12.5 | 0.482 | 2.052 | 2.534 | 1.23 | 2.293 | 0.241 |
| 81 | 0.8826 | 51.539 | 51.5 | 12.8 | 0.478 | 2.052 | 2.530 | 1.23 | 2.291 | 0.239 |
| 82 | 0.8974 | 51.267 | 51.3 | 13.0 | 0.473 | 2.052 | 2.525 | 1.23 | 2.289 | 0.237 |
| 83 | 0.9127 | 51.514 | 51.5 | 13.3 | 0.473 | 2.052 | 2.525 | 1.23 | 2.289 | 0.237 |
| 84 | 0.9275 | 50.825 | 50.8 | 13.5 | 0.465 | 2.052 | 2.517 | 1.23 | 2.284 | 0.232 |
| 85 | 0.9429 | 50.825 | 50.8 | 13.8 | 0.463 | 2.052 | 2.515 | 1.23 | 2.283 | 0.231 |
| 86 | 0.9576 | 50.531 | 50.5 | 14.0 | 0.458 | 2.052 | 2.510 | 1.22 | 2.281 | 0.229 |

# 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13 | 24-26 | Tan and gray FAT CLAY; organics | CH | 56.6 | 62.9 | | | | | | | | | |
| | 14 | 26-28 | Gray and tan LEAN CLAY | CL | 34.7 | 82.0 | | | | | | | | | |
| | 15 | 28-30 | Dark gray and gray FAT CLAY | CH | 34.0 | 88.0 | 115 | 32 | 83 | 99.9 | | 0.70 | 10.2 | | Vertical shear |
| | 16 | 30-32 | Gray and tan SANDY LEAN CLAY | CL | 23.0 | 93.5 | | | | | | | | | |
| | 17 | 32-33.5 | Gray and tan SILTY SAND; shell fragments | SM | | | | | | | | | | | |
| | 18 | 34.5-36 | Gray and tan CLAYEY SAND; shell fragments | SC | 30.1 | | 42 | 19 | 23 | 48.4 | | | | | |
| | 19 | 36-38 | Gray and tan CLAYEY SAND; shell fragments | SC | 24.1 | 101.0 | | | | | | | | | |
| | 20 | 38.5-40 | Gray and tan CLAYEY SAND; shell fragments | SC | | | | | | 19.8 | | | | | |
| | 21 | 43-45 | Gray and tan CLAYEY SAND; shell fragments | SC | | | | | | 16.7 | | | | | |
| | 22 | 46-48 | Gray LEAN CLAY with SAND | CL | 46.8 | 73.5 | 46 | 22 | 24 | | | | | | |
| | 23 | 48-50 | Gray and tan SANDY LEAN CLAY | CL | 33.8 | | 46 | 19 | 27 | 69.4 | | | | | |
| 07-193 | | | | | | | | | | | | | | | |
| | 1 | 0-2 | Brown FAT CLAY; ferrous nodules and grass roots | CH | 15.7 | 105.5 | | | | | | | | | |
| | 2 | 2-4 | Brown and gray FAT CLAY; sand seams | CH | 32.7 | 86.7 | | | | | | | | | |
| | 3 | 4-6 | Tan and gray FAT CLAY with SAND; ferrous nodules | CH | 29.0 | | | | | | | | | | |
| | 4 | 6-8 | Brown and gray SANDY FAT CLAY | CH | 28.3 | 84.5 | 69 | 23 | 46 | 58.6 | | 0.44 | 5.6 | | Multiple shear |
| | 5 | 8-10 | Brown and gray FAT CLAY with SAND; calcareous nodules | CH | 35.0 | 86.3 | | | | | | | | | |
| | 6 | 10-12 | Tan and gray FAT CLAY | CH | 38.5 | 80.1 | 75 | 24 | 51 | 94.3 | | 0.45 | 5.6 | | Multiple shear |
| | 7 | 12-14 | Brown and gray FAT CLAY with SAND; calcareous nodules | CH | 35.7 | 81.8 | | | | | | | | | |
| | 8 | 14-16 | Brown and gray FAT CLAY; sand seams | CH | 34.8 | 83.4 | 72 | 24 | 48 | 90.6 | | 0.33 | 6.2 | | 60 degree |
| | 9 | 16-18 | Gray and tan FAT CLAY with SAND | CH | 32.7 | 85.4 | | | | | | | | | |
| | 10 | 18-20 | Brown and gray FAT CLAY; sand seams | CH | 47.5 | 75.8 | | | | | | | | | |
| | 11 | 20-22 | Gray and brown FAT CLAY with SAND | CH | 39.9 | 80.6 | 68 | 23 | 45 | 80.7 | 0.00 | 0.37 | 10.7 | | Multiple shear |
| | 12 | 22-23.5 | Gray and tan SILTY SAND; shell fragments | SM | | | | | | 13.6 | | | | | |
| | 13 | 26-28 | Gray FAT CLAY; sand seams and ferrous nodules | CH | 33.1 | 77.6 | | | | | | | | | |
| | 14 | 28-30 | Gray and tan FAT CLAY; sand seams | CH | 37.5 | 75.1 | 83 | 24 | 59 | 86.3 | | 0.48 | 5.7 | | Bulge |
| | 15 | 30-32 | Gray LEAN CLAY; sand pockets | CL | 54.8 | 64.3 | | | | | | | | | |
| | 16 | 32-34 | Dark gray FAT CLAY; sand seams | CH | 56.2 | 64.4 | | | | | | | | | |
| | 17 | 34.5-36 | Tan and gray CLAYEY SAND; shell fragments | SC | 40.9 | | | | | | | | | | |
| | 18 | 36-38 | Dark gray and tan LEAN CLAY; sand pockets | CL | 34.6 | 85.9 | | | | | | | | | |
| | 19 | 38-40 | Gray FAT CLAY with SAND | CH | 40.7 | 77.4 | 67 | 24 | 43 | 77.5 | | 0.62 | 9.1 | | Bulge |
| | 20 | 40-42 | Gray SILTY CLAYEY SAND; shell fragments | SC-SM | 29.2 | | | | | | | | | | |
| | 21 | 42-44 | Gray and tan SANDY FAT CLAY | CH | 44.2 | | 52 | 20 | 32 | 61.1 | | | | | |
| | 22 | 44-46 | Gray CLAYEY SAND | SC | 26.6 | 90.2 | | | | | | | | | |
| | 23 | 46-48 | Gray SANDY LEAN CLAY | CL | 39.4 | 75.3 | | | | | | 0.56 | 8.2 | 28.5 | Bulge |
| | 24 | 48-50 | Gray SANDY LEAN CLAY; shell fragments | CL | 37.3 | | 42 | 20 | 22 | 61.4 | | | | | |
| 07-194 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |