**Hole No. 07-238**

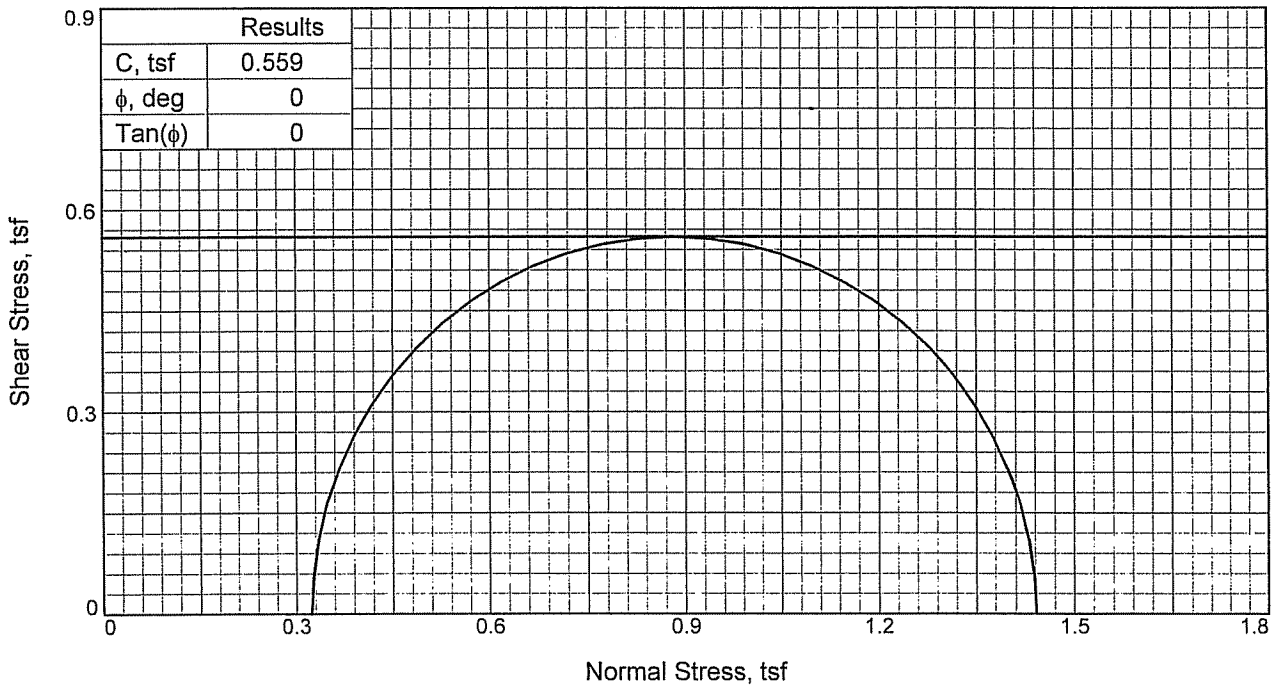
| BORING LOG | DISTRICT | INSTALLATION | SHEET 1 OF 1 SHEETS |
|---|---|---|---|

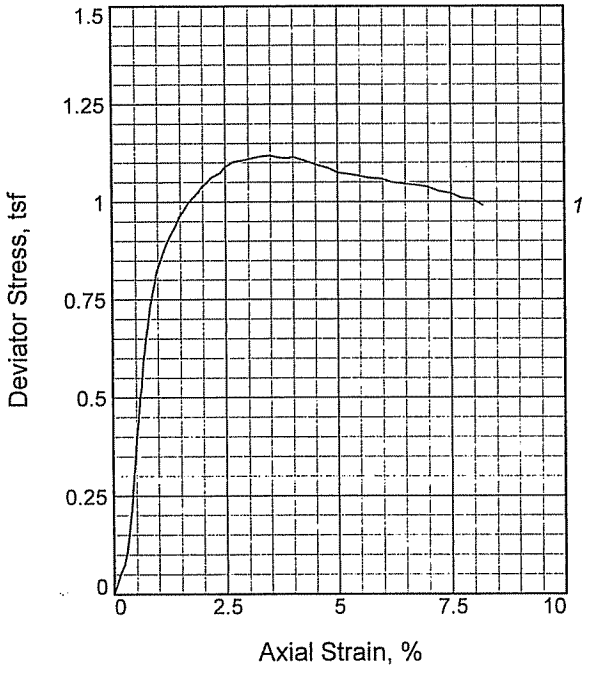
| | |
|---|---|
| 1. PROJECT<br>Galveston Channel and Pelican Island PA | 7. ELEVATION OF HOLE |
| 2. LOCATION (Coordinates or Station)<br>N=13684692 E=3306269 | 8. DATUM FOR ELEVATION |
| 3. DRILLING AGENCY<br>Dempsey (Geotest Engineering, Inc.) | 9. ELEVATION OF GROUNDWATER<br>▽ TOD: ▼ 24-HR: |
| 4. 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>35 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 soft to stiff, gray | | 1 | | WOP | | | | | | | |
| | | | | | 2 | | WOP | | | 116.6 | 118 | 29 | 89 | 98.1 |
| 5 | | | | | 3 | | 1 | | | 99.6 | | | | |
| | | | | | 4 | | 0 | | | 99.0 | | | | |
| | | | | | 5 | | | 2.00 | 95.7 | 28.4 | | | | |
| 10 | | | -tan & reddish brown w/ slickensides @ 10' - 12'<br>-w/ ferrous nodules @ 10' - 14' | | 6 | | | 1.50 | 89.1 | 31.7 | 72 | 22 | 50 | 99.4 |
| | | | | | 7 | | | 1.50 | 81.9 | 36.1 | | | | |
| 15 | | | | | 8 | | | 0.25 | 95.9 | 24.9 | 64 | 21 | 43 | 98.9 |
| | | | **SILTY CLAY WITH SAND(CL-ML)**, stiff to very stiff, gray, w/ silt seams & ferrous nodules | | 9 | | | 3.75 | 98.6 | 25.9 | | | | |
| | | | | | 10 | | | 2.50 | 96.6 | 27.7 | | | | |
| 20 | | | **LEAN CLAY(CL)**, soft, brown & gray w/ silt seams & ferrous nodules | | 11 | | | 0.50 | 86.0 | 28.4 | 31 | 16 | 15 | 99.4 |
| | | | **SILTY CLAY(CL-ML)**, soft, gray & tan, w/ sand pockets & silt seams | | 12 | | | 0.50 | 93.1 | 30.5 | | | | |
| 25 | | | **FAT CLAY(CH)**, firm to stiff, gray, w/ sand pockets<br>-w/ silt seams, ferrous & calcareous nodules @ 26' - 28' | | 13 | | | 1.00 | 94.2 | 29.9 | | | | |
| | | | | | 14 | | | 2.75 | 91.7 | 30.7 | | | | |
| | | | **LEAN CLAY(CL)**, stiff, gray, w/ slickensides, silt seams & ferrous nodules | | 15 | | | 1.75 | 94.3 | 27.0 | 33 | 16 | 17 | 99.1 |
| 30 | | | **FAT CLAY(CH)**, firm to stiff, gray, w/ silt seams | | 16 | | | 2.50 | 87.9 | 33.1 | | | | |
| | | | | | 17 | | | 0.75 | 83.8 | 38.8 | | | | |
| | | | | | 18 | | | 1.00 | 82.1 | 36.4 | | | | |

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

ENG FORM: SWG 1836 BOR




| Sample No. | | 1 |
|---|---|---|
| Initial | Water Content, % | 31.7 |
| | Dry Density, pcf | 89.2 |
| | Saturation, % | 96.0 |
| | Void Ratio | 0.8900 |
| | Diameter, in. | 2.77 |
| | Height, in. | 6.00 |
| At Test | Water Content, % | 31.2 |
| | Dry Density, pcf | 89.2 |
| | Saturation, % | 94.6 |
| | Void Ratio | 0.8900 |
| | Diameter, in. | 2.77 |
| | Height, in. | 6.00 |
| Strain rate, %/min. | | 1.00 |
| Back Pressure, tsf | | 0.00 |
| Cell Pressure, tsf | | 0.32 |
| Fail. Stress, tsf | | 1.12 |
| Ult. Stress, tsf | | |
| $\sigma_1$ Failure, tsf | | 1.44 |
| $\sigma_3$ Failure, tsf | | 0.32 |

**Type of Test:**
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Tan and reddish-brown FAT CLAY

**LL=** 72 **PL=** 22 **PI=** 50

**Assumed Specific Gravity=** 2.70

**Remarks:**
Test method: ASTM D 2850
Pocket pen; tsf: 2.25
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:** 07-238 **Depth:** 10-12

**Sample Number:** 6

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

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

# TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/25/2008
7:25 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:** 07-238
**Depth:** 10-12 **Sample Number:** 6
**Description:** Tan and reddish-brown FAT CLAY
**Remarks:**
Test method: ASTM D 2850
Pocket pen; tsf: 2.25
Failure type: Slickensided
**Type of Sample:** Undisturbed
**Assumed Specific Gravity=**2.70 **LL=**72 **PL=**22 **PI=**50
**Test Method:** ASTM D 2850

## Parameters for Specimen No. 1

| Specimen Parameter | Initial | Final |
|---|---|---|
| Moisture content: Moist soil+tare, gms. | 136.700 | 107.570 |
| Moisture content: Dry soil+tare, gms. | 111.420 | 89.370 |
| Moisture content: Tare, gms. | 31.550 | 31.000 |
| Moisture, % | 31.7 | 31.2 |
| Moist specimen weight, gms. | 1118.0 | |
| Diameter, in. | 2.77 | |
| Area, in.$^2$ | 6.05 | |
| Height, in. | 6.00 | |
| Wet Density, pcf | 117.4 | |
| Dry density, pcf | 89.2 | |
| Void ratio | 0.8900 | |
| Saturation, % | 96.0 | |

## Test Readings for Specimen No. 1

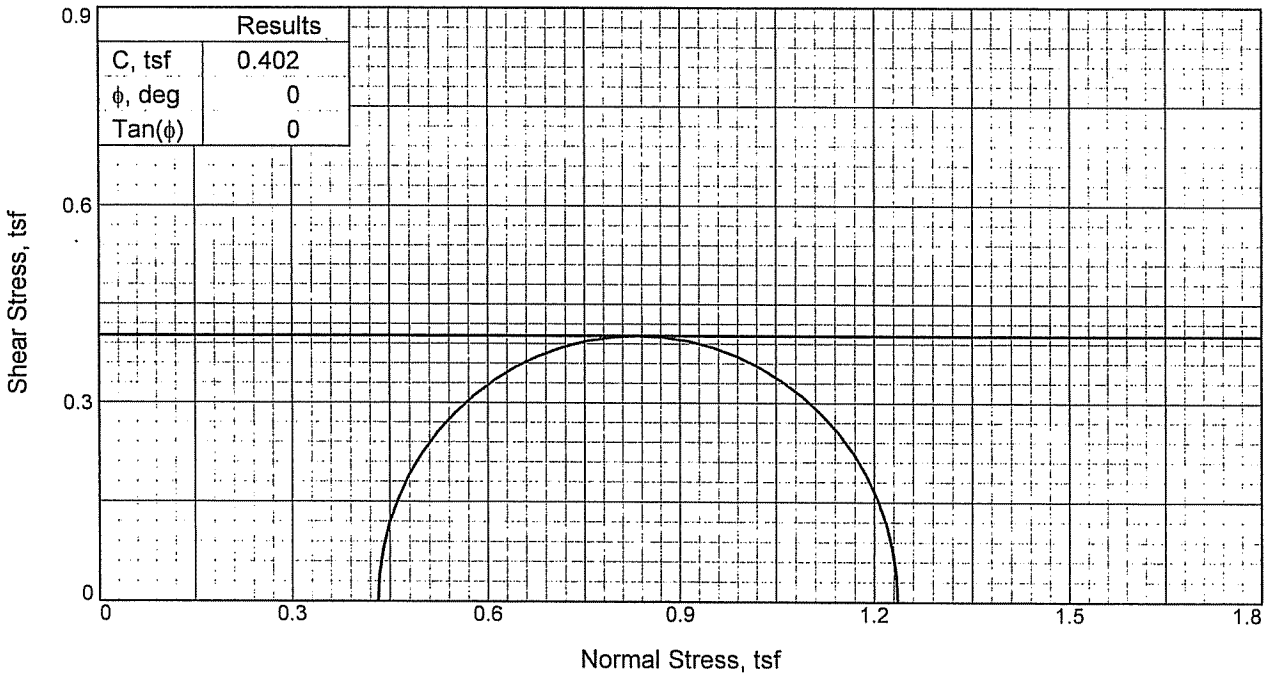
**Membrane modulus =** .130 kN/cm$^2$
**Membrane thickness =** .031 cm
**Cell pressure =** 4.50 psi (0.324 tsf)
**Back pressure =** 0.00 psi (0.000 tsf)
**Strain rate, %/min. =** 1.00
**Fail. Stress =** 1.118 tsf **at reading no.** 47

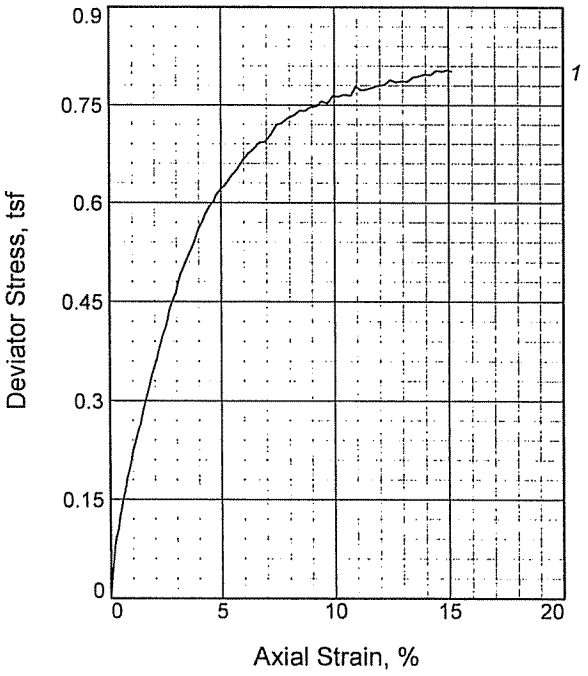
## Test Readings for Specimen No. 1

| 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 | 0.0514 | 0.000 | 0.0 | 0.0 | 0.000 | 0.324 | 0.324 | 1.00 | 0.324 | 0.000 |
| 1 | 0.0608 | 4.598 | 4.6 | 0.2 | 0.055 | 0.324 | 0.379 | 1.17 | 0.351 | 0.027 |
| 2 | 0.0651 | 6.068 | 6.1 | 0.2 | 0.072 | 0.324 | 0.396 | 1.22 | 0.360 | 0.036 |
| 3 | 0.0684 | 8.665 | 8.7 | 0.3 | 0.103 | 0.324 | 0.427 | 1.32 | 0.375 | 0.051 |
| 4 | 0.0716 | 12.805 | 12.8 | 0.3 | 0.152 | 0.324 | 0.476 | 1.47 | 0.400 | 0.076 |
| 5 | 0.0729 | 15.271 | 15.3 | 0.4 | 0.181 | 0.324 | 0.505 | 1.56 | 0.415 | 0.091 |
| 6 | 0.0749 | 18.101 | 18.1 | 0.4 | 0.215 | 0.324 | 0.539 | 1.66 | 0.431 | 0.107 |
| 7 | 0.0762 | 20.878 | 20.9 | 0.4 | 0.248 | 0.324 | 0.572 | 1.76 | 0.448 | 0.124 |
| 8 | 0.0775 | 24.001 | 24.0 | 0.4 | 0.284 | 0.324 | 0.608 | 1.88 | 0.466 | 0.142 |
| 9 | 0.0795 | 27.335 | 27.3 | 0.5 | 0.324 | 0.324 | 0.648 | 2.00 | 0.486 | 0.162 |
| 10 | 0.0808 | 30.236 | 30.2 | 0.5 | 0.358 | 0.324 | 0.682 | 2.11 | 0.503 | 0.179 |
| 11 | 0.0821 | 33.605 | 33.6 | 0.5 | 0.398 | 0.324 | 0.722 | 2.23 | 0.523 | 0.199 |
| 12 | 0.0841 | 36.737 | 36.7 | 0.5 | 0.435 | 0.324 | 0.759 | 2.34 | 0.541 | 0.217 |
| 13 | 0.0854 | 39.172 | 39.2 | 0.6 | 0.464 | 0.324 | 0.788 | 2.43 | 0.556 | 0.232 |
| 14 | 0.0867 | 41.922 | 41.9 | 0.6 | 0.496 | 0.324 | 0.820 | 2.53 | 0.572 | 0.248 |
| 15 | 0.0887 | 44.327 | 44.3 | 0.6 | 0.524 | 0.324 | 0.848 | 2.62 | 0.586 | 0.262 |
| 16 | 0.0900 | 47.323 | 47.3 | 0.6 | 0.560 | 0.324 | 0.884 | 2.73 | 0.604 | 0.280 |
| 17 | 0.0913 | 49.976 | 50.0 | 0.7 | 0.591 | 0.324 | 0.915 | 2.82 | 0.619 | 0.295 |
| 18 | 0.0933 | 52.496 | 52.5 | 0.7 | 0.621 | 0.324 | 0.945 | 2.92 | 0.634 | 0.310 |
| 19 | 0.0946 | 54.860 | 54.9 | 0.7 | 0.648 | 0.324 | 0.972 | 3.00 | 0.648 | 0.324 |
| 20 | 0.0959 | 55.896 | 55.9 | 0.7 | 0.660 | 0.324 | 0.984 | 3.04 | 0.654 | 0.330 |
| 21 | 0.0979 | 58.136 | 58.1 | 0.8 | 0.687 | 0.324 | 1.011 | 3.12 | 0.667 | 0.343 |
| 22 | 0.0992 | 60.018 | 60.0 | 0.8 | 0.709 | 0.324 | 1.033 | 3.19 | 0.678 | 0.354 |
| 23 | 0.1005 | 62.064 | 62.1 | 0.8 | 0.733 | 0.324 | 1.057 | 3.26 | 0.690 | 0.366 |
| 24 | 0.1025 | 63.494 | 63.5 | 0.9 | 0.749 | 0.324 | 1.073 | 3.31 | 0.699 | 0.375 |
| 25 | 0.1038 | 64.858 | 64.9 | 0.9 | 0.765 | 0.324 | 1.089 | 3.36 | 0.707 | 0.383 |
| 26 | 0.1071 | 66.990 | 67.0 | 0.9 | 0.790 | 0.324 | 1.114 | 3.44 | 0.719 | 0.395 |
| 27 | 0.1097 | 69.516 | 69.5 | 1.0 | 0.820 | 0.324 | 1.144 | 3.53 | 0.734 | 0.410 |
| 28 | 0.1130 | 71.066 | 71.1 | 1.0 | 0.837 | 0.324 | 1.161 | 3.58 | 0.743 | 0.419 |
| 29 | 0.1163 | 72.676 | 72.7 | 1.1 | 0.856 | 0.324 | 1.180 | 3.64 | 0.752 | 0.428 |
| 30 | 0.1189 | 74.000 | 74.0 | 1.1 | 0.871 | 0.324 | 1.195 | 3.69 | 0.760 | 0.436 |
| 31 | 0.1222 | 75.526 | 75.5 | 1.2 | 0.889 | 0.324 | 1.213 | 3.74 | 0.768 | 0.444 |
| 32 | 0.1280 | 77.627 | 77.6 | 1.3 | 0.912 | 0.324 | 1.236 | 3.82 | 0.780 | 0.456 |
| 33 | 0.1345 | 79.742 | 79.7 | 1.4 | 0.936 | 0.324 | 1.260 | 3.89 | 0.792 | 0.468 |
| 34 | 0.1402 | 81.958 | 82.0 | 1.5 | 0.961 | 0.324 | 1.285 | 3.97 | 0.805 | 0.481 |
| 35 | 0.1466 | 83.511 | 83.5 | 1.6 | 0.978 | 0.324 | 1.302 | 4.02 | 0.813 | 0.489 |
| 36 | 0.1524 | 85.240 | 85.2 | 1.7 | 0.998 | 0.324 | 1.322 | 4.08 | 0.823 | 0.499 |
| 37 | 0.1647 | 87.599 | 87.6 | 1.9 | 1.023 | 0.324 | 1.347 | 4.16 | 0.836 | 0.512 |
| 38 | 0.1705 | 88.987 | 89.0 | 2.0 | 1.038 | 0.324 | 1.362 | 4.20 | 0.843 | 0.519 |
| 39 | 0.1769 | 89.977 | 90.0 | 2.1 | 1.049 | 0.324 | 1.373 | 4.24 | 0.848 | 0.524 |
| 40 | 0.1827 | 91.136 | 91.1 | 2.2 | 1.061 | 0.324 | 1.385 | 4.28 | 0.855 | 0.531 |
| 41 | 0.1950 | 92.465 | 92.5 | 2.4 | 1.074 | 0.324 | 1.398 | 4.32 | 0.861 | 0.537 |
| 42 | 0.2007 | 93.773 | 93.8 | 2.5 | 1.089 | 0.324 | 1.413 | 4.36 | 0.868 | 0.544 |
| 43 | 0.2131 | 95.193 | 95.2 | 2.7 | 1.103 | 0.324 | 1.427 | 4.40 | 0.875 | 0.551 |
| 44 | 0.2252 | 95.698 | 95.7 | 2.9 | 1.106 | 0.324 | 1.430 | 4.41 | 0.877 | 0.553 |
| 45 | 0.2374 | 96.400 | 96.4 | 3.1 | 1.112 | 0.324 | 1.436 | 4.43 | 0.880 | 0.556 |
| 46 | 0.2496 | 97.014 | 97.0 | 3.3 | 1.117 | 0.324 | 1.441 | 4.45 | 0.882 | 0.558 |

## 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 | 0.2612 | 97.317 | 97.3 | 3.5 | 1.118 | 0.324 | 1.442 | 4.45 | 0.883 | 0.559 |
| 48 | 0.2735 | 97.141 | 97.1 | 3.7 | 1.114 | 0.324 | 1.438 | 4.44 | 0.881 | 0.557 |
| 49 | 0.2858 | 97.160 | 97.2 | 3.9 | 1.111 | 0.324 | 1.435 | 4.43 | 0.880 | 0.556 |
| 50 | 0.2916 | 97.572 | 97.6 | 4.0 | 1.115 | 0.324 | 1.439 | 4.44 | 0.882 | 0.558 |
| 51 | 0.3038 | 97.061 | 97.1 | 4.2 | 1.107 | 0.324 | 1.431 | 4.42 | 0.877 | 0.553 |
| 52 | 0.3160 | 96.632 | 96.6 | 4.4 | 1.100 | 0.324 | 1.424 | 4.39 | 0.874 | 0.550 |
| 53 | 0.3282 | 96.208 | 96.2 | 4.6 | 1.092 | 0.324 | 1.416 | 4.37 | 0.870 | 0.546 |
| 54 | 0.3404 | 95.817 | 95.8 | 4.8 | 1.086 | 0.324 | 1.410 | 4.35 | 0.867 | 0.543 |
| 55 | 0.3526 | 95.000 | 95.0 | 5.0 | 1.074 | 0.324 | 1.398 | 4.32 | 0.861 | 0.537 |
| 56 | 0.3642 | 94.984 | 95.0 | 5.2 | 1.072 | 0.324 | 1.396 | 4.31 | 0.860 | 0.536 |
| 57 | 0.3797 | 94.803 | 94.8 | 5.5 | 1.067 | 0.324 | 1.391 | 4.29 | 0.857 | 0.533 |
| 58 | 0.3945 | 94.487 | 94.5 | 5.7 | 1.060 | 0.324 | 1.384 | 4.27 | 0.854 | 0.530 |
| 59 | 0.4099 | 94.667 | 94.7 | 6.0 | 1.060 | 0.324 | 1.384 | 4.27 | 0.854 | 0.530 |
| 60 | 0.4246 | 94.023 | 94.0 | 6.2 | 1.050 | 0.324 | 1.374 | 4.24 | 0.849 | 0.525 |
| 61 | 0.4400 | 93.978 | 94.0 | 6.5 | 1.046 | 0.324 | 1.370 | 4.23 | 0.847 | 0.523 |
| 62 | 0.4547 | 93.886 | 93.9 | 6.7 | 1.043 | 0.324 | 1.367 | 4.22 | 0.845 | 0.521 |
| 63 | 0.4701 | 93.769 | 93.8 | 7.0 | 1.038 | 0.324 | 1.362 | 4.20 | 0.843 | 0.519 |
| 64 | 0.4849 | 93.032 | 93.0 | 7.2 | 1.027 | 0.324 | 1.351 | 4.17 | 0.838 | 0.514 |
| 65 | 0.5002 | 92.821 | 92.8 | 7.5 | 1.022 | 0.324 | 1.346 | 4.16 | 0.835 | 0.511 |
| 66 | 0.5150 | 91.959 | 92.0 | 7.7 | 1.010 | 0.324 | 1.334 | 4.12 | 0.829 | 0.505 |
| 67 | 0.5304 | 91.891 | 91.9 | 8.0 | 1.007 | 0.324 | 1.331 | 4.11 | 0.827 | 0.503 |
| 68 | 0.5432 | 90.663 | 90.7 | 8.2 | 0.991 | 0.324 | 1.315 | 4.06 | 0.819 | 0.495 |




| | | |
|---|---|---|
| Sample No. | | 1 |
| Initial | Water Content, % | 24.9 |
| | Dry Density, pcf | 95.9 |
| | Saturation, % | 88.8 |
| | Void Ratio | 0.7571 |
| | Diameter, in. | 2.78 |
| | Height, in. | 5.99 |
| At Test | Water Content, % | 26.2 |
| | Dry Density, pcf | 95.9 |
| | Saturation, % | 93.5 |
| | Void Ratio | 0.7571 |
| | Diameter, in. | 2.78 |
| | Height, in. | 5.99 |
| Strain rate, %/min. | | 1.00 |
| Back Pressure, tsf | | 0.00 |
| Cell Pressure, tsf | | 0.43 |
| Fail. Stress, tsf | | 0.80 |
| Ult. Stress, tsf | | |
| $\sigma_1$ Failure, tsf | | 1.24 |
| $\sigma_3$ Failure, tsf | | 0.43 |

**Type of Test:**
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Gray FAT CLAY

**LL=** 64 **PL=** 21 **PI=** 43

**Assumed Specific Gravity=** 2.70

**Remarks:**
Test method: ASTM D 2850
Pocket pen; tsf: 0.75
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:** 07-238 **Depth:** 14-16

**Sample Number:** 8

**Proj. No.:** 08.18.918 **Date Sampled:** 7/24/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

# TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/25/2008
11:01 AM

**Date:** 7/24/08
**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:** 07-238
**Depth:** 14-16 **Sample Number:** 8
**Description:** Gray FAT CLAY
**Remarks:**
Test method: ASTM D 2850
Pocket pen; tsf: 0.75
Failure type: Bulge
**Type of Sample:** Undisturbed
**Assumed Specific Gravity**=2.70 **LL**=64 **PL**=21 **PI**=43
**Test Method:** ASTM D 2850

## Parameters for Specimen No. 1

| Specimen Parameter | Initial | Final |
|---|---|---|
| Moisture content: Moist soil+tare, gms. | 151.140 | 126.250 |
| Moisture content: Dry soil+tare, gms. | 127.170 | 106.600 |
| Moisture content: Tare, gms. | 30.910 | 31.660 |
| Moisture, % | 24.9 | 26.2 |
| Moist specimen weight, gms. | 1143.0 | |
| Diameter, in. | 2.78 | |
| Area, in.$^2$ | 6.07 | |
| Height, in. | 5.99 | |
| Wet Density, pcf | 119.8 | |
| Dry density, pcf | 95.9 | |
| Void ratio | 0.7571 | |
| Saturation, % | 88.8 | |

## Test Readings for Specimen No. 1

**Membrane modulus** = .130 kN/cm$^2$
**Membrane thickness** = .031 cm
**Cell pressure** = 6.00 psi (0.432 tsf)
**Back pressure** = 0.00 psi (0.000 tsf)
**Strain rate, %/min.** = 1.00
**Fail. Stress** = 0.804 tsf **at reading no.** 82

## 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 | 0.0490 | 0.000 | 0.0 | 0.0 | 0.000 | 0.432 | 0.432 | 1.00 | 0.432 | 0.000 |
| 1 | 0.0565 | 4.692 | 4.7 | 0.1 | 0.056 | 0.432 | 0.488 | 1.13 | 0.460 | 0.028 |
| 2 | 0.0595 | 5.982 | 6.0 | 0.2 | 0.071 | 0.432 | 0.503 | 1.16 | 0.467 | 0.035 |
| 3 | 0.0608 | 6.803 | 6.8 | 0.2 | 0.081 | 0.432 | 0.513 | 1.19 | 0.472 | 0.040 |
| 4 | 0.0654 | 7.904 | 7.9 | 0.3 | 0.094 | 0.432 | 0.526 | 1.22 | 0.479 | 0.047 |
| 5 | 0.0700 | 8.764 | 8.8 | 0.4 | 0.104 | 0.432 | 0.536 | 1.24 | 0.484 | 0.052 |
| 6 | 0.0733 | 10.171 | 10.2 | 0.4 | 0.120 | 0.432 | 0.552 | 1.28 | 0.492 | 0.060 |
| 7 | 0.0779 | 11.216 | 11.2 | 0.5 | 0.132 | 0.432 | 0.564 | 1.31 | 0.498 | 0.066 |
| 8 | 0.0811 | 12.181 | 12.2 | 0.5 | 0.144 | 0.432 | 0.576 | 1.33 | 0.504 | 0.072 |
| 9 | 0.0856 | 13.177 | 13.2 | 0.6 | 0.155 | 0.432 | 0.587 | 1.36 | 0.510 | 0.078 |
| 10 | 0.0902 | 14.396 | 14.4 | 0.7 | 0.170 | 0.432 | 0.602 | 1.39 | 0.517 | 0.085 |
| 11 | 0.0948 | 15.630 | 15.6 | 0.8 | 0.184 | 0.432 | 0.616 | 1.43 | 0.524 | 0.092 |
| 12 | 0.1007 | 16.749 | 16.7 | 0.9 | 0.197 | 0.432 | 0.629 | 1.46 | 0.530 | 0.098 |
| 13 | 0.1053 | 17.718 | 17.7 | 0.9 | 0.208 | 0.432 | 0.640 | 1.48 | 0.536 | 0.104 |
| 14 | 0.1073 | 18.683 | 18.7 | 1.0 | 0.219 | 0.432 | 0.651 | 1.51 | 0.542 | 0.110 |
| 15 | 0.1145 | 19.818 | 19.8 | 1.1 | 0.233 | 0.432 | 0.665 | 1.54 | 0.548 | 0.116 |
| 16 | 0.1235 | 21.724 | 21.7 | 1.2 | 0.254 | 0.432 | 0.686 | 1.59 | 0.559 | 0.127 |
| 17 | 0.1301 | 22.543 | 22.5 | 1.4 | 0.264 | 0.432 | 0.696 | 1.61 | 0.564 | 0.132 |
| 18 | 0.1359 | 24.097 | 24.1 | 1.5 | 0.282 | 0.432 | 0.714 | 1.65 | 0.573 | 0.141 |
| 19 | 0.1416 | 25.251 | 25.3 | 1.5 | 0.295 | 0.432 | 0.727 | 1.68 | 0.579 | 0.147 |
| 20 | 0.1539 | 27.711 | 27.7 | 1.8 | 0.323 | 0.432 | 0.755 | 1.75 | 0.593 | 0.161 |
| 21 | 0.1603 | 29.088 | 29.1 | 1.9 | 0.339 | 0.432 | 0.771 | 1.78 | 0.601 | 0.169 |
| 22 | 0.1724 | 30.906 | 30.9 | 2.1 | 0.359 | 0.432 | 0.791 | 1.83 | 0.612 | 0.180 |
| 23 | 0.1781 | 32.216 | 32.2 | 2.2 | 0.374 | 0.432 | 0.806 | 1.87 | 0.619 | 0.187 |
| 24 | 0.1903 | 34.404 | 34.4 | 2.4 | 0.398 | 0.432 | 0.830 | 1.92 | 0.631 | 0.199 |
| 25 | 0.1967 | 35.336 | 35.3 | 2.5 | 0.409 | 0.432 | 0.841 | 1.95 | 0.636 | 0.204 |
| 26 | 0.2024 | 36.375 | 36.4 | 2.6 | 0.420 | 0.432 | 0.852 | 1.97 | 0.642 | 0.210 |
| 27 | 0.2082 | 37.657 | 37.7 | 2.7 | 0.435 | 0.432 | 0.867 | 2.01 | 0.649 | 0.217 |
| 28 | 0.2147 | 38.735 | 38.7 | 2.8 | 0.447 | 0.432 | 0.879 | 2.03 | 0.655 | 0.223 |
| 29 | 0.2268 | 40.263 | 40.3 | 3.0 | 0.463 | 0.432 | 0.895 | 2.07 | 0.664 | 0.232 |
| 30 | 0.2325 | 41.618 | 41.6 | 3.1 | 0.479 | 0.432 | 0.911 | 2.11 | 0.671 | 0.239 |
| 31 | 0.2383 | 42.707 | 42.7 | 3.2 | 0.491 | 0.432 | 0.923 | 2.14 | 0.677 | 0.245 |
| 32 | 0.2506 | 44.222 | 44.2 | 3.4 | 0.507 | 0.432 | 0.939 | 2.17 | 0.685 | 0.253 |
| 33 | 0.2628 | 45.788 | 45.8 | 3.6 | 0.524 | 0.432 | 0.956 | 2.21 | 0.694 | 0.262 |
| 34 | 0.2750 | 47.094 | 47.1 | 3.8 | 0.538 | 0.432 | 0.970 | 2.24 | 0.701 | 0.269 |
| 35 | 0.2808 | 47.992 | 48.0 | 3.9 | 0.547 | 0.432 | 0.979 | 2.27 | 0.706 | 0.274 |
| 36 | 0.2872 | 49.045 | 49.0 | 4.0 | 0.559 | 0.432 | 0.991 | 2.29 | 0.711 | 0.279 |
| 37 | 0.2987 | 50.265 | 50.3 | 4.2 | 0.571 | 0.432 | 1.003 | 2.32 | 0.718 | 0.286 |
| 38 | 0.3052 | 51.173 | 51.2 | 4.3 | 0.581 | 0.432 | 1.013 | 2.34 | 0.723 | 0.291 |
| 39 | 0.3173 | 52.437 | 52.4 | 4.5 | 0.594 | 0.432 | 1.026 | 2.38 | 0.729 | 0.297 |
| 40 | 0.3295 | 53.279 | 53.3 | 4.7 | 0.602 | 0.432 | 1.034 | 2.39 | 0.733 | 0.301 |
| 41 | 0.3353 | 54.126 | 54.1 | 4.8 | 0.611 | 0.432 | 1.043 | 2.42 | 0.738 | 0.306 |
| 42 | 0.3476 | 55.109 | 55.1 | 5.0 | 0.621 | 0.432 | 1.053 | 2.44 | 0.743 | 0.311 |
| 43 | 0.3598 | 55.783 | 55.8 | 5.2 | 0.627 | 0.432 | 1.059 | 2.45 | 0.746 | 0.314 |
| 44 | 0.3745 | 57.055 | 57.1 | 5.4 | 0.640 | 0.432 | 1.072 | 2.48 | 0.752 | 0.320 |
| 45 | 0.3898 | 58.113 | 58.1 | 5.7 | 0.650 | 0.432 | 1.082 | 2.50 | 0.757 | 0.325 |
| 46 | 0.4046 | 59.509 | 59.5 | 5.9 | 0.664 | 0.432 | 1.096 | 2.54 | 0.764 | 0.332 |

## 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 | 0.4199 | 60.622 | 60.6 | 6.2 | 0.675 | 0.432 | 1.107 | 2.56 | 0.769 | 0.337 |
| 48 | 0.4346 | 61.482 | 61.5 | 6.4 | 0.682 | 0.432 | 1.114 | 2.58 | 0.773 | 0.341 |
| 49 | 0.4493 | 62.518 | 62.5 | 6.7 | 0.692 | 0.432 | 1.124 | 2.60 | 0.778 | 0.346 |
| 50 | 0.4649 | 62.834 | 62.8 | 6.9 | 0.694 | 0.432 | 1.126 | 2.61 | 0.779 | 0.347 |
| 51 | 0.4796 | 63.956 | 64.0 | 7.2 | 0.704 | 0.432 | 1.136 | 2.63 | 0.784 | 0.352 |
| 52 | 0.4950 | 65.519 | 65.5 | 7.4 | 0.719 | 0.432 | 1.151 | 2.67 | 0.792 | 0.360 |
| 53 | 0.5097 | 65.974 | 66.0 | 7.7 | 0.722 | 0.432 | 1.154 | 2.67 | 0.793 | 0.361 |
| 54 | 0.5250 | 66.829 | 66.8 | 8.0 | 0.730 | 0.432 | 1.162 | 2.69 | 0.797 | 0.365 |
| 55 | 0.5397 | 67.444 | 67.4 | 8.2 | 0.734 | 0.432 | 1.166 | 2.70 | 0.799 | 0.367 |
| 56 | 0.5551 | 68.283 | 68.3 | 8.5 | 0.741 | 0.432 | 1.173 | 2.72 | 0.803 | 0.371 |
| 57 | 0.5698 | 68.384 | 68.4 | 8.7 | 0.741 | 0.432 | 1.173 | 2.71 | 0.802 | 0.370 |
| 58 | 0.5851 | 69.178 | 69.2 | 9.0 | 0.747 | 0.432 | 1.179 | 2.73 | 0.806 | 0.374 |
| 59 | 0.5999 | 69.406 | 69.4 | 9.2 | 0.748 | 0.432 | 1.180 | 2.73 | 0.806 | 0.374 |
| 60 | 0.6146 | 70.393 | 70.4 | 9.4 | 0.756 | 0.432 | 1.188 | 2.75 | 0.810 | 0.378 |
| 61 | 0.6301 | 70.266 | 70.3 | 9.7 | 0.753 | 0.432 | 1.185 | 2.74 | 0.808 | 0.376 |
| 62 | 0.6448 | 71.577 | 71.6 | 10.0 | 0.765 | 0.432 | 1.197 | 2.77 | 0.814 | 0.382 |
| 63 | 0.6602 | 71.606 | 71.6 | 10.2 | 0.763 | 0.432 | 1.195 | 2.77 | 0.813 | 0.381 |
| 64 | 0.6749 | 72.150 | 72.1 | 10.5 | 0.766 | 0.432 | 1.198 | 2.77 | 0.815 | 0.383 |
| 65 | 0.6903 | 72.170 | 72.2 | 10.7 | 0.764 | 0.432 | 1.196 | 2.77 | 0.814 | 0.382 |
| 66 | 0.7050 | 73.704 | 73.7 | 11.0 | 0.778 | 0.432 | 1.210 | 2.80 | 0.821 | 0.389 |
| 67 | 0.7204 | 73.379 | 73.4 | 11.2 | 0.773 | 0.432 | 1.205 | 2.79 | 0.818 | 0.386 |
| 68 | 0.7351 | 73.710 | 73.7 | 11.5 | 0.774 | 0.432 | 1.206 | 2.79 | 0.819 | 0.387 |
| 69 | 0.7504 | 74.192 | 74.2 | 11.7 | 0.777 | 0.432 | 1.209 | 2.80 | 0.820 | 0.388 |
| 70 | 0.7651 | 74.679 | 74.7 | 12.0 | 0.780 | 0.432 | 1.212 | 2.81 | 0.822 | 0.390 |
| 71 | 0.7805 | 75.008 | 75.0 | 12.2 | 0.781 | 0.432 | 1.213 | 2.81 | 0.823 | 0.391 |
| 72 | 0.7952 | 75.973 | 76.0 | 12.5 | 0.789 | 0.432 | 1.221 | 2.83 | 0.826 | 0.394 |
| 73 | 0.8105 | 75.811 | 75.8 | 12.7 | 0.785 | 0.432 | 1.217 | 2.82 | 0.824 | 0.392 |
| 74 | 0.8252 | 76.248 | 76.2 | 13.0 | 0.787 | 0.432 | 1.219 | 2.82 | 0.826 | 0.394 |
| 75 | 0.8405 | 76.372 | 76.4 | 13.2 | 0.786 | 0.432 | 1.218 | 2.82 | 0.825 | 0.393 |
| 76 | 0.8552 | 77.224 | 77.2 | 13.5 | 0.793 | 0.432 | 1.225 | 2.83 | 0.828 | 0.396 |
| 77 | 0.8706 | 77.626 | 77.6 | 13.7 | 0.794 | 0.432 | 1.226 | 2.84 | 0.829 | 0.397 |
| 78 | 0.8853 | 78.148 | 78.1 | 14.0 | 0.797 | 0.432 | 1.229 | 2.85 | 0.831 | 0.399 |
| 79 | 0.9007 | 78.245 | 78.2 | 14.2 | 0.796 | 0.432 | 1.228 | 2.84 | 0.830 | 0.398 |
| 80 | 0.9154 | 79.184 | 79.2 | 14.5 | 0.803 | 0.432 | 1.235 | 2.86 | 0.834 | 0.402 |
| 81 | 0.9307 | 79.268 | 79.3 | 14.7 | 0.802 | 0.432 | 1.234 | 2.86 | 0.833 | 0.401 |
| 82 | 0.9454 | 79.741 | 79.7 | 15.0 | 0.804 | 0.432 | 1.236 | 2.86 | 0.834 | 0.402 |
| 83 | 0.9557 | 79.698 | 79.7 | 15.1 | 0.802 | 0.432 | 1.234 | 2.86 | 0.833 | 0.401 |

# 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 16 | 30-32 | Brown SILT; clay seams | ML | 29.2 | 100.4 | | | | | | | | | |
| | 17 | 32-34 | Gray and tan LEAN CLAY | CL | 29.4 | 90.4 | | | | | | | | | |
| | 18 | 34-35 | Gray and tan LEAN CLAY with SAND | CL | 26.5 | 106.3 | | | | | | | | | |
| 07-237 | | | | | | | | | | | | | | | |
| | 1 | 0-2 | Gray FAT CLAY | CH | 104.4 | | | | | | | | | | |
| | 2 | 2-4 | Reddish-brown and gray FAT CLAY | CH | 33.4 | 87.9 | 79 | 24 | 55 | 99.0 | | 0.65 | 15.0 | | 60 degree |
| | 3 | 4-6 | Tan and gray SANDY LEAN CLAY | CL | 20.8 | | | | | | | | | | |
| | 4 | 6-8 | Tan and gray LEAN CLAY | CL | 21.5 | 104.0 | 33 | 16 | 17 | 98.1 | | 0.84 | 6.2 | 2.5 | Vertical shear |
| | 5 | 8-10 | Tan and gray SANDY SILTY CLAY | CL-ML | 21.3 | 103.7 | | | | | | | | | |
| | 6 | 10-12 | Tan and brown SANDY SILTY CLAY | CL-ML | 26.4 | 98.1 | | | | | | 0.80 | 5.4 | | Vertical shear |
| | 7 | 12-14 | Tan and gray LEAN CLAY | CL | 26.6 | 98.7 | 34 | 16 | 18 | 97.6 | | | | | |
| | 8 | 14-16 | Light gray and tan SILTY CLAY with SAND | CL-ML | 32.9 | 87.4 | | | | | | 0.40 | 3.9 | | |
| | 9 | 16-18 | Tan and gray SILT with SAND; clay pockets | ML | 25.1 | 90.5 | | | | | | | | | |
| | 10 | 18-20 | Gray FAT CLAY; sand seams | CH | 30.4 | 90.5 | | | | | | | | | |
| | 11 | 20-22 | Tan, brown and gray LEAN CLAY | CL | 32.1 | 90.2 | 31 | 16 | 15 | 99.6 | | 0.79 | 7.7 | 8.0 | Vertical shear |
| | 12 | 22-24 | Gray SILTY CLAY; sand seams | CL-ML | 29.4 | 92.0 | | | | | | | | | |
| | 13 | 24-26 | Gray FAT CLAY; sand seams | CH | 33.4 | 85.6 | | | | | | | | | |
| | 14 | 26-28 | Gray LEAN CLAY | CL | 36.3 | 84.4 | 44 | 17 | 27 | 99.8 | | 1.98 | 4.2 | | Vertical shear |
| | 15 | 28-30 | Gray FAT CLAY | CH | 35.5 | 82.7 | | | | | | | | | |
| 07-238 | | | | | | | | | | | | | | | |
| | 2 | 2-4 | Gray FAT CLAY | CH | 116.6 | | 118 | 29 | 89 | 98.1 | | | | | |
| | 3 | 4-6 | Gray FAT CLAY | CH | 99.6 | | | | | | | | | | |
| | 4 | 6-8 | Gray FAT CLAY | CH | 99.0 | | | | | | | | | | |
| | 5 | 8-10 | Gray FAT CLAY | CH | 28.4 | 95.7 | | | | | | | | | |
| | 6 | 10-12 | Tan and reddish-brown FAT CLAY | CH | 31.7 | 89.1 | 72 | 22 | 50 | 99.4 | | 1.12 | 3.5 | 4.5 | Slickensided |
| | 7 | 12-14 | Gray FAT CLAY | CH | 36.1 | 81.9 | | | | | | | | | |
| | 8 | 14-16 | Gray FAT CLAY | CH | 24.9 | 95.9 | 64 | 21 | 43 | 98.9 | | 0.80 | 15.0 | 6.0 | Bulge |
| | 9 | 16-18 | Gray SILTY CLAY with SAND | CL-ML | 25.9 | 98.6 | | | | | | | | | |
| | 10 | 18-20 | Gray SILTY CLAY with SAND | CL-ML | 27.7 | 96.6 | | | | | | | | | |
| | 11 | 20-22 | Brown and gray LEAN CLAY | CL | 28.4 | 86.0 | 31 | 16 | 15 | 99.4 | | | | | |
| | 12 | 22-24 | Gray and tan SILTY CLAY; sand pockets | CL-ML | 30.5 | 93.1 | | | | | | | | | |
| | 13 | 24-26 | Gray FAT CLAY; sand pockets | CH | 29.9 | 94.2 | | | | | | | | | |
| | 14 | 26-28 | Gray FAT CLAY; sand pockets and calcareous nodules | CH | 30.7 | 91.7 | | | | | | | | | |
| | 15 | 28-30 | Gray LEAN CLAY | CL | 27.0 | 94.3 | 33 | 16 | 17 | 99.1 | | 1.17 | 4.0 | | Slickensided |
| | 16 | 30-32 | Gray FAT CLAY | CH | 33.1 | 87.9 | | | | | | | | | |
| | 17 | 32-34 | Gray FAT CLAY | CH | 38.8 | 83.8 | | | | | | | | | |
| | 18 | 34-35 | Gray FAT CLAY | CH | 36.4 | 82.1 | | | | | | | | | |