Project No.: 03.14.859.054

Client: United States Army Corps of Engineers

Project: Beltway 8 PA Lab Testing
Contract No. DACW64-03-D-0008, Delivery Order No. 0054

| Boring No. | Sample No. | Soil Description | USCS | Water Content (%) | Dry Density (pcf) | Liquid Limit | Plastic Limit | Plast. Index | Finer than #200 Sieve (%) | Uc/UU. Compr. (tsf) | Cell Press. (psi) | Failure Strain (%) | Failure Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06-10 | | | | | | | | | | | | | |
| | 2 | Gray and tan FAT CLAY with SAND; traces of ferrous nodules and roots | CH | 22.3 | | 58 | 21 | 37 | 78.6 | | | | |
| | 4 | Gray and tan FAT CLAY; some calcareous nodules and few ferrous nodules | CH | 14.1 | | | | | | | | | |
| | 6 | Gray and tan FAT CLAY; traces of ferrous and calcareous nodules | CH | 22.7 | | | | | | | | | |
| | 8 | Gray and tan FAT CLAY; traces of ferrous and calcareous nodules | CH | 30.9 | | 83 | 25 | 58 | 99.8 | | | | |
| | 10 | Gray and tan FAT CLAY; few ferrous and calcareous nodules | CH | 35.4 | | | | | | | | | |
| 06-11 | | | | | | | | | | | | | |
| | 2 | Gray and tan FAT CLAY; traces of ferrous nodules | CH | 21.0 | | | | | | | | | |
| | 3 | Gray and tan LEAN CLAY with SAND; traces of ferrous and calcareous nodules | CL | 14.1 | | 41 | 19 | 22 | 71.4 | | | | |
| | 4 | Gray and tan LEAN CLAY; traces of ferrous and calcareous nodules | CL | 18.2 | | | | | | | | | |
| | 5 | Gray and tan FAT CLAY; few ferrous and calcareous nodules | CH | 25.8 | | | | | | | | | |
| 06-12 | | | | | | | | | | | | | |
| | 2 | Brown and gray SANDY LEAN CLAY; sand pockets and traces of ferrous nodules | CL | 14.6 | 112.7 | 36 | 16 | 20 | 68.0 | 2.22 | 21 | 3.4 | 60 Degree shear |
| | 3 | Tan SANDY LEAN CLAY | CL | 15.7 | 110.3 | 42 | 20 | 22 | 64.7 | | | | |
| | 5 | Gray and tan FAT CLAY; traces of ferrous nodules and few calcareous nodules | CH | 23.1 | | | | | | | | | |
| | 7 | Gray and tan FAT CLAY; traces of ferrous nodules | CH | 28.2 | | | | | | | | | |
| | 9 | Gray and tan FAT CLAY; traces of ferrous nodules | CH | 33.4 | | | | | | | | | |
| | 11 | Gray and tan FAT CLAY; traces of ferrous and calcareous nodules | CH | 35.1 | | | | | | | | | |
| | 13 | Gray and reddish-brown FAT CLAY; traces of ferrous and calcareous nodules | CH | 27.5 | | | | | | | | | |
| 06-13 | | | | | | | | | | | | | |
| | 1 | Gray and reddish-brown FAT CLAY; traces of ferrous and calcareous nodules | CH | 27.7 | | | | | | | | | |
| | 2 | Gray and brown SANDY LEAN CLAY; sand pockets, traces of ferrous nodules | CL | 14.2 | | | | | | | | | |
| | 3 | Gray and tan SANDY FAT CLAY; traces of ferrous nodules | CH | 15.8 | | | | | | | | | |
| | 4 | Gray and tan FAT CLAY; traces of ferrous and calcareous nodules, sand seams | CH | 31.1 | | 79 | 35 | 44 | 88.5 | | | | |
| | 5 | Gray and tan FAT CLAY; vertical sand seams, traces of ferrous and calcareous nodules | CH | 24.9 | | | | | | | | | |

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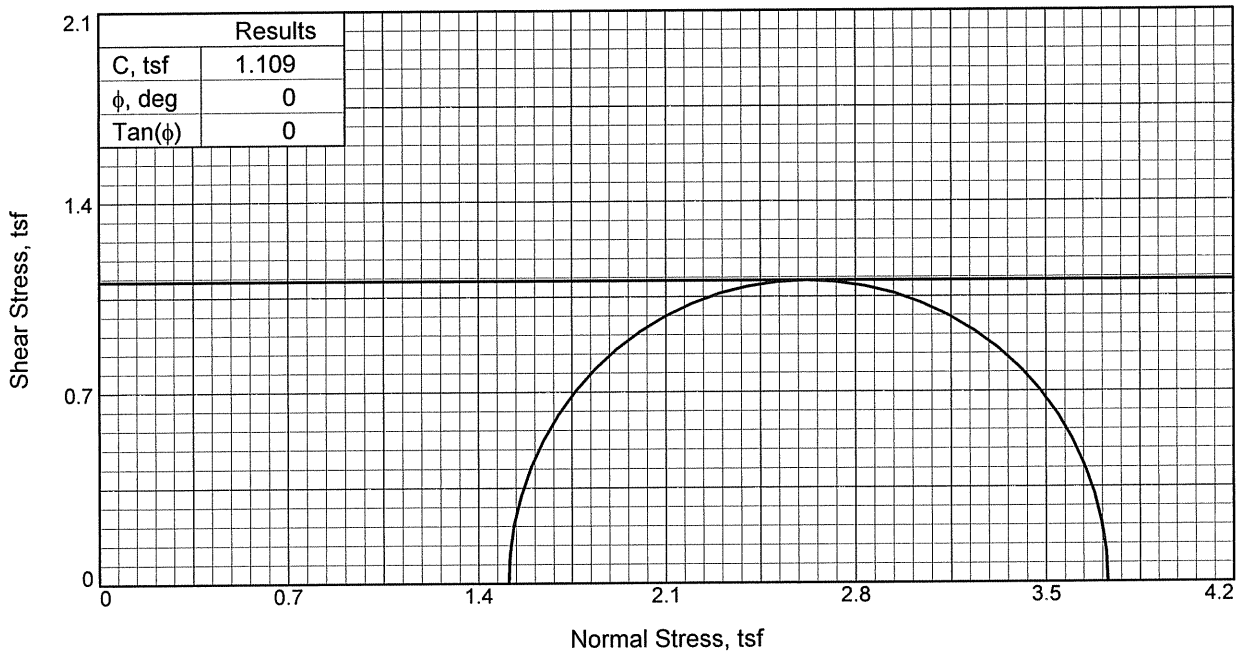
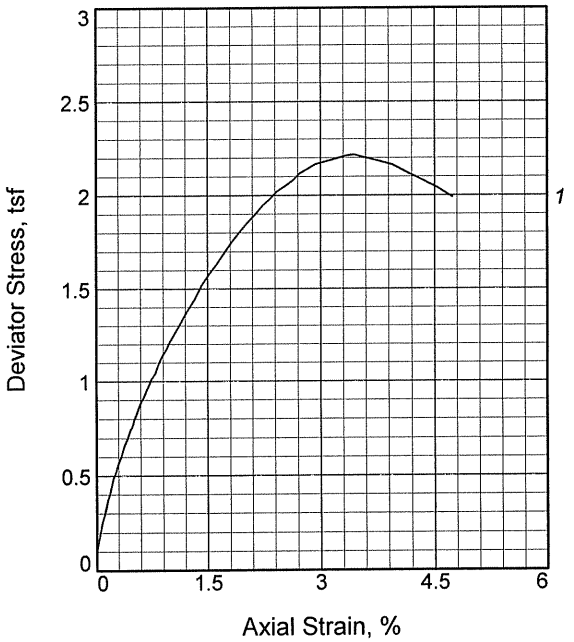



| Sample No. | | 1 |
|---|---|---|
| Initial | Water Content, % | 14.6 |
| | Dry Density, pcf | 112.7 |
| | Saturation, % | 79.6 |
| | Void Ratio | 0.4958 |
| | Diameter, in. | 2.85 |
| | Height, in. | 5.92 |
| At Test | Water Content, % | 14.6 |
| | Dry Density, pcf | 112.7 |
| | Saturation, % | 79.6 |
| | Void Ratio | 0.4958 |
| | Diameter, in. | 2.85 |
| | Height, in. | 5.92 |
| Strain rate, %/min. | | 1.00 |
| Back Pressure, psi | | 0.00 |
| Cell Pressure, psi | | 21.00 |
| Fail. Stress, tsf | | 2.22 |
| Strain, % | | 3.4 |
| Ult. Stress, tsf | | 1.99 |
| Strain, % | | |
| $\sigma_1$ Failure, tsf | | 3.73 |
| $\sigma_3$ Failure, tsf | | 1.51 |

**Type of Test:**
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Brown and gray SANDY LEAN CLAY; sand pockets and traces of ferrous nodules

**LL=** 36 **PL=** 16 **PI=** 20

**Assumed Specific Gravity=** 2.70

**Remarks:**
Failure Type: 60 Degree shear
Test Method: ASTM D 2850

**Client:** United States Army Corps of Engineers

**Project:** Beltway 8 PA Lab Testing
Contract No. DACW64-03-D-0008, Delivery Order No. 0054

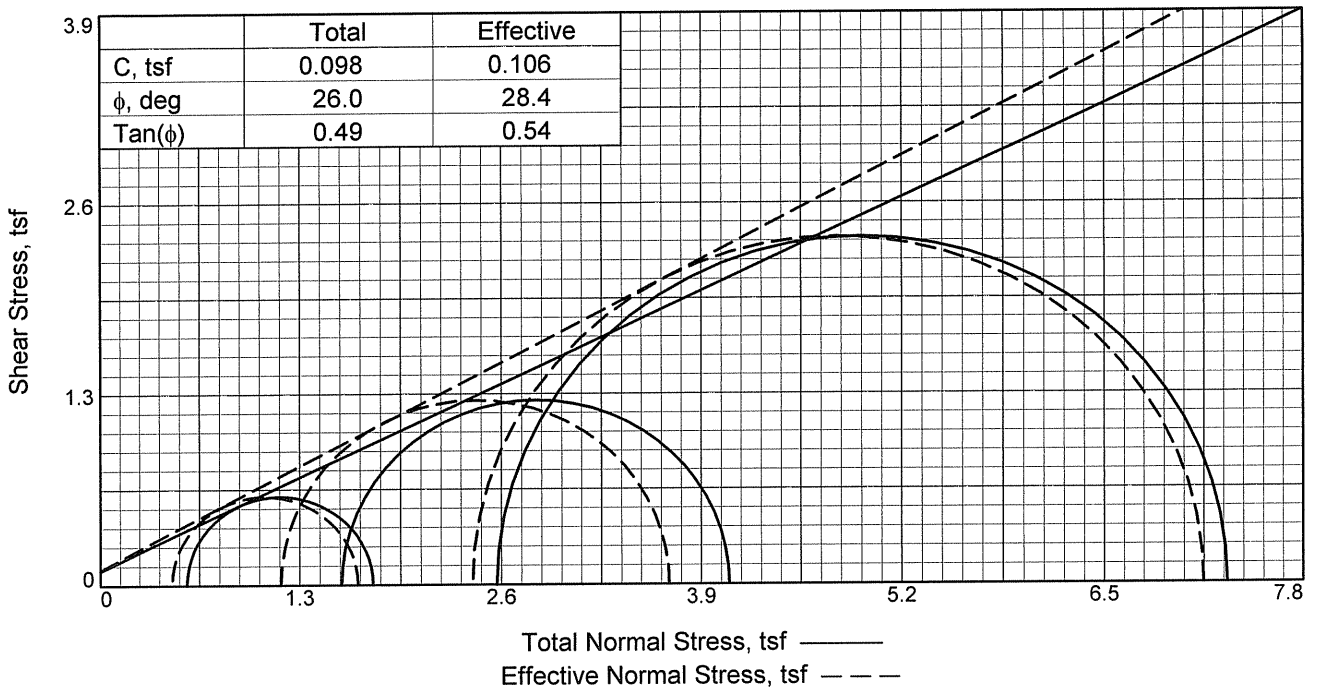
**Source of Sample:** 06-12

**Sample Number:** 2

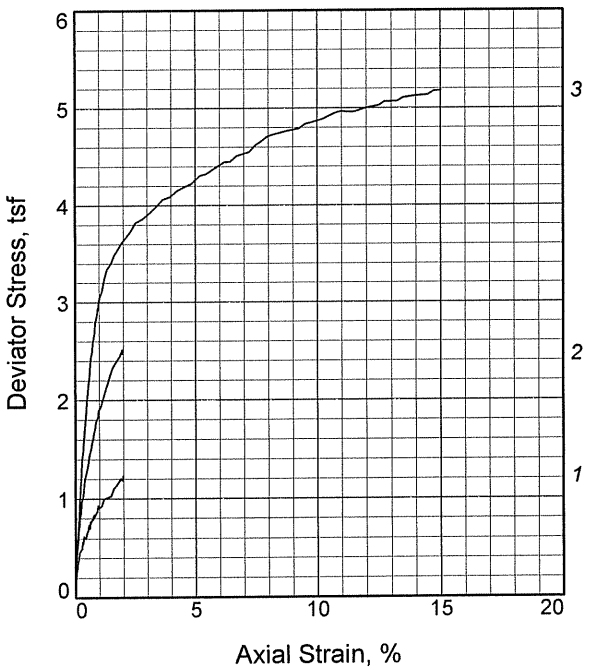
**Proj. No.:** 03.14.859.054 **Date Sampled:** 10/5/06

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.




| | Total | Effective |
|---|---|---|
| C, tsf | 0.098 | 0.106 |
| $\phi$, deg | 26.0 | 28.4 |
| Tan($\phi$) | 0.49 | 0.54 |




| Sample No. | | 1 | 2 | 3 |
|---|---|---|---|---|
| Initial | Water Content, % | 15.7 | 15.7 | 15.7 |
| | Dry Density, pcf | 110.3 | 110.3 | 110.3 |
| | Saturation, % | 81.9 | 81.9 | 81.9 |
| | Void Ratio | 0.5110 | 0.5110 | 0.5110 |
| | Diameter, in. | 2.00 | 2.00 | 2.00 |
| | Height, in. | 4.19 | 4.19 | 4.19 |
| At Test | Water Content, % | 17.1 | 17.1 | 17.1 |
| | Dry Density, pcf | 114.4 | 114.4 | 114.4 |
| | Saturation, % | 100.0 | 100.0 | 100.0 |
| | Void Ratio | 0.4569 | 0.4569 | 0.4569 |
| | Diameter, in. | 1.97 | 1.98 | 1.99 |
| | Height, in. | 4.17 | 4.12 | 4.08 |
| Strain rate, %/min. | | 0.02 | 0.02 | 0.02 |
| Eff. Cell Pressure, psi | | 7.90 | 21.80 | 35.70 |
| Fail. Stress, tsf | | 1.20 | 2.51 | 4.73 |
| Excess Pore Pr., tsf | | 0.10 | 0.39 | 0.16 |
| Strain, % | | 1.9 | 1.9 | 8.2 |
| Ult. Stress, tsf | | 1.23 | 2.51 | 5.18 |
| Excess Pore Pr., tsf | | 0.08 | 0.39 | -0.15 |
| Strain, % | | 2.0 | 1.9 | 15.0 |
| $\bar{\sigma}_1$ Failure, tsf | | 1.67 | 3.69 | 7.15 |
| $\bar{\sigma}_3$ Failure, tsf | | 0.47 | 1.18 | 2.41 |

**Type of Test:**
CU with Pore Pressures

**Sample Type:** Undisturbed

**Description:** Tan and light gray SANDY LEAN CLAY

**LL=** 42 **PL=** 20 **PI=** 22

**Specific Gravity=** 2.67

**Remarks:**

Test method: ASTM D 4767

Failure type: Bulge

**Client:** United States Army Corps of Engineers

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Contract No. DACW64-03-D-0008, Delivery Order No. 0054

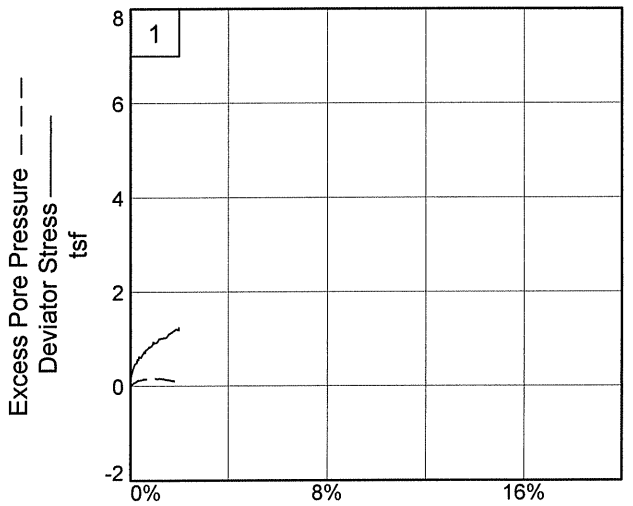
**Source of Sample:** 06-12

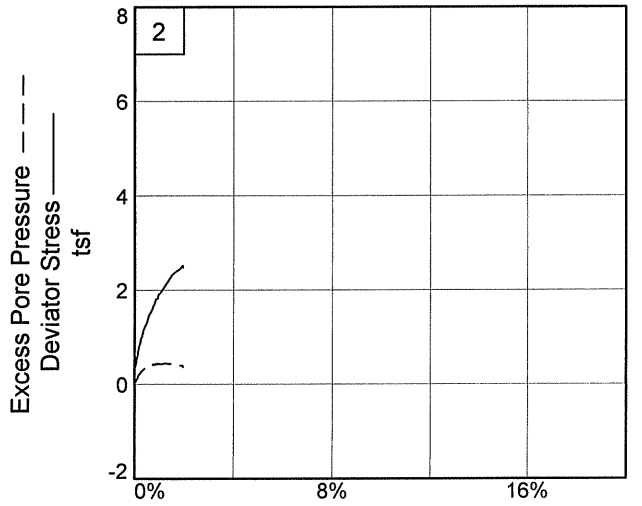
**Sample Number:** 3

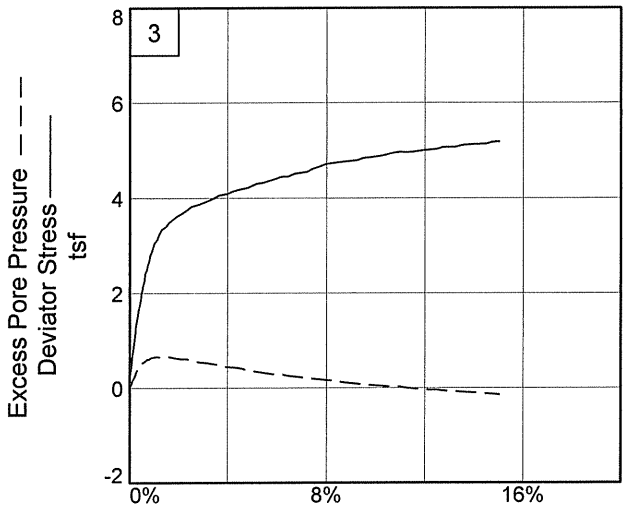
**Proj. No.:** 03.14.859.054 **Date Sampled:** 10/9/06

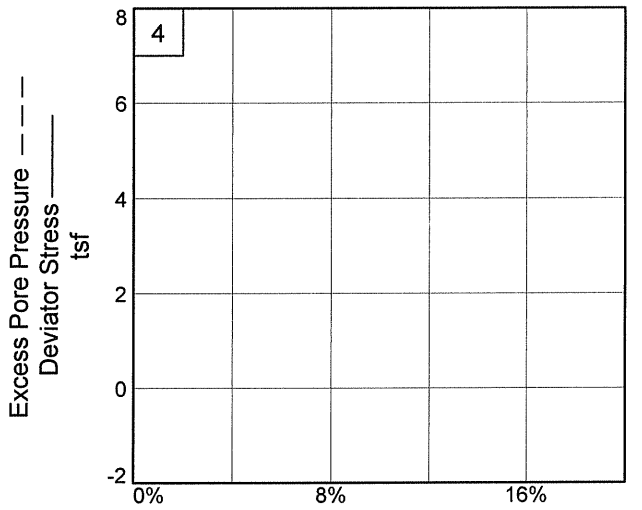
TRIAXIAL SHEAR TEST REPORT

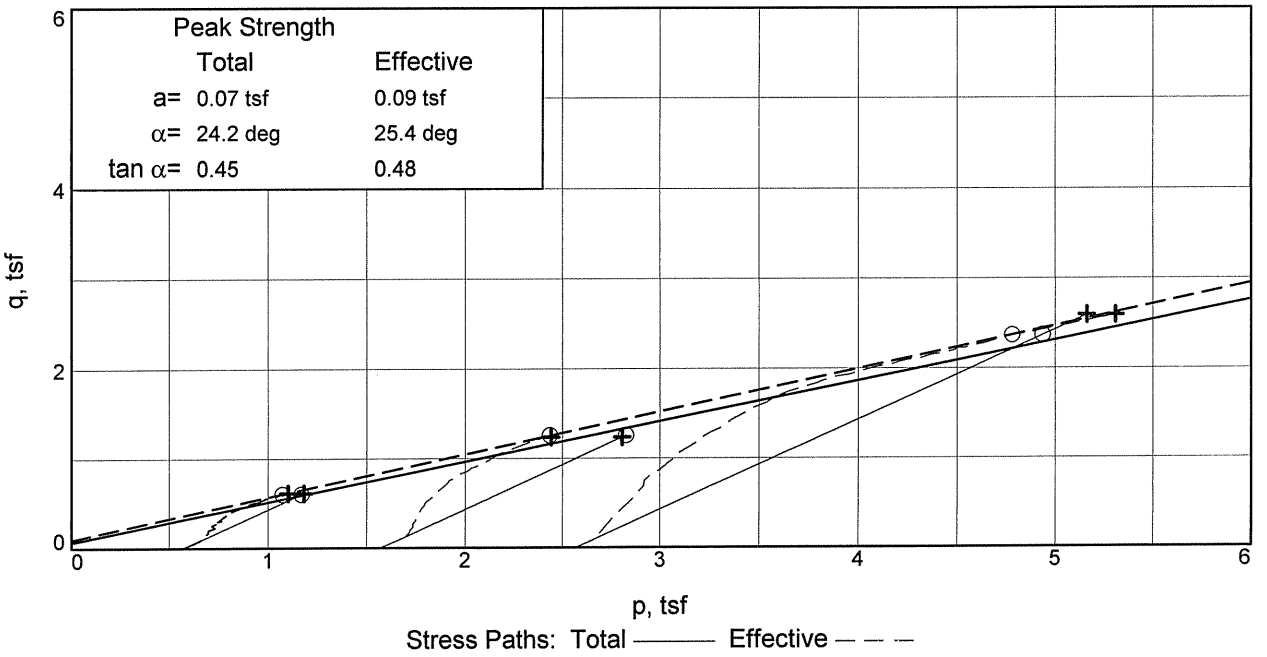
Tolunay-Wong Engineers, Inc.




**Client:** United States Army Corps of Engineers
**Project:** Beltway 8 PA Lab Testing
**Source of Sample:** 06-12 **Sample Number:** 3
**Project No.:** 03.14.859.054

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