# APPENDIX A

# GEOTECHNICAL LABORATORY TEST RESULTS

# APPENDIX A
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# SUMMARY OF GEOTECHNICAL LABORATORY TEST RESULTS

# LABORATORY DATA SUMMARY
## LIGO 93B107C

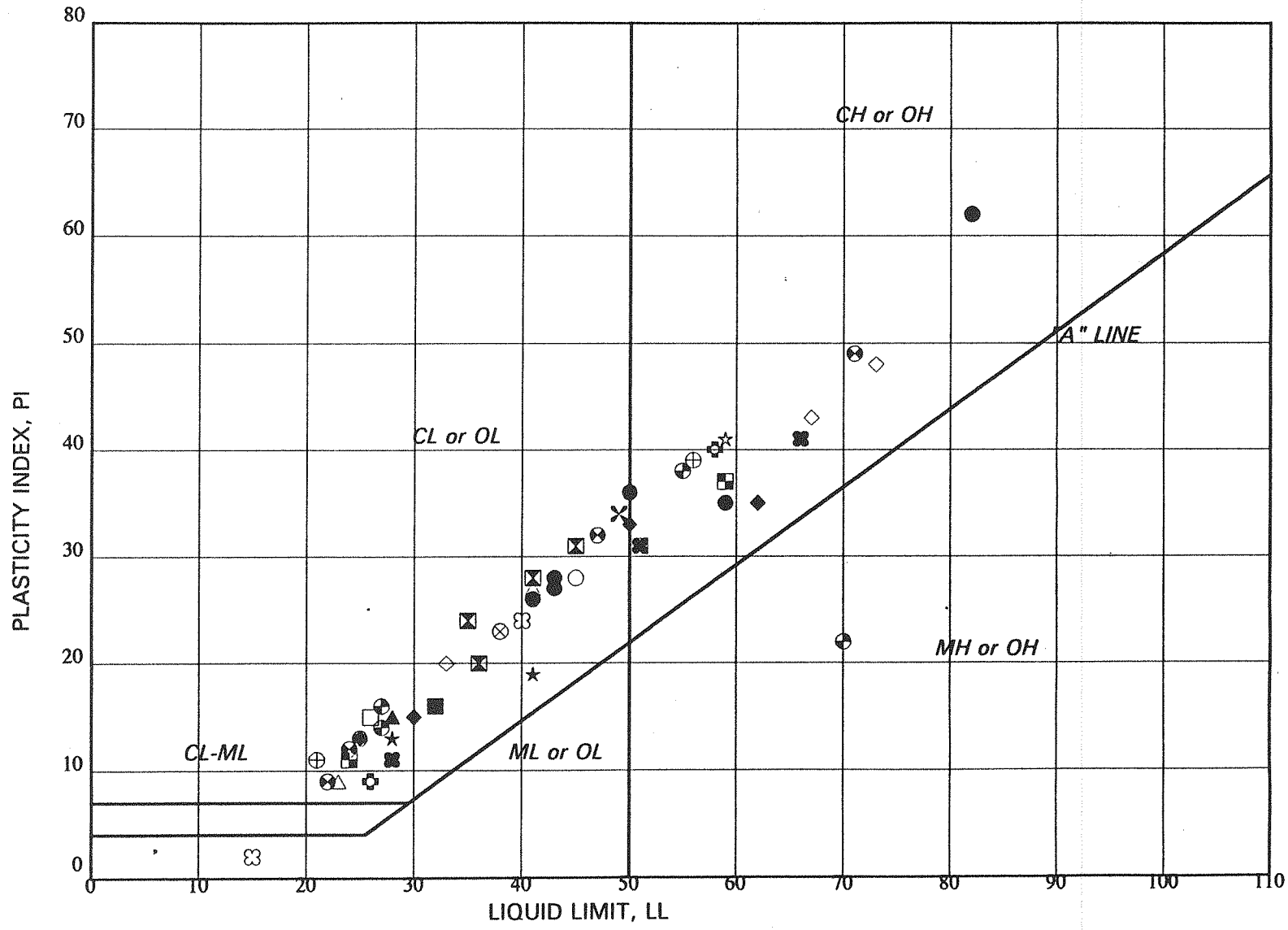
| PT.ID | DEPTH | COMPRESS. | M% | WET DN | LL | PL | PI | SIEVE |
|---|---|---|---|---|---|---|---|---|
| B-SE-1-GT | 0.5 | | 16 | | | | | 70.9 |
| B-SE-1-GT | 2.0 | | 19 | | 43 | 15 | 28 | |
| B-SE-1-GT | 8.0 | 2.49* | 24 | 125.3 | 43 | 16 | 27 | |
| B-SE-1-GT | 18.0 | | 38 | | | | | |
| B-SE-1-GT | 28.0 | | 25 | | 41 | 15 | 26 | |
| B-SE-1-GT | 33.0 | 0.96 | 38 | 112.2 | 82 | 20 | 62 | |
| B-SE-1-GT | 38.0 | | 24 | | 50 | 14 | 36 | |
| B-SE-1-GT | 48.0 | | 30 | | 59 | 24 | 35 | |
| B-SE-2-GT | 4.0 | 1.53* | 15 | 131.7 | 35 | 11 | 24 | 39.7 |
| B-SE-2-GT | 8.0 | | 15 | | 41 | 13 | 28 | |
| B-SE-2-GT | 14.5 | | 21 | | | | | 9.2 |
| B-SE-2-GT | 28.0 | 1.95* | 23 | 125.4 | 45 | 14 | 31 | |
| B-SE-2-GT | 38.0 | | 31 | | | | | |
| B-SE-2-GT | 43.0 | 2.11 | 20 | 126.2 | 36 | 16 | 20 | |
| B-SE-6-GT | 4.0 | | 17 | | 28 | 13 | 15 | |
| B-SE-6-GT | 13.5 | | 19 | | | | | 5.0 |
| B-SE-6-GT | 18.0 | | 24 | | | | | |
| B-SE-6-GT | 22.5 | | 29 | | | | | |
| B-SE-10-GT | 2.0 | | 21 | | | | | |
| B-SE-10-GT | 8.0 | | 21 | | 28 | 15 | 13 | |
| B-SE-10-GT | 18.0 | 1.91* | 23 | 123.0 | | | | |
| B-SE-10-GT | 22.5 | 1.74 | | | | | | |
| B-SE-10-GT | 23.0 | | 31 | 122.6 | 41 | 22 | 19 | |
| B-SE-14-GT | 6.0 | | 19 | | | | | |
| B-SE-14-GT | 13.0 | 2.23 | 23 | 124.6 | 49 | 15 | 34 | |
| B-SE-14-GT | 22.5 | | 29 | | | | | |
| B-SE-17-GT | 4.0 | | 14 | | | | | |
| B-SE-17-GT | 8.0 | | 20 | | 26 | 17 | 9 | |
| B-SE-17-GT | 18.0 | 2.32* | 25 | 122.6 | 58 | 18 | 40 | |
| B-SE-20-GT | 2.0 | | 21 | | | | | |
| B-SE-20-GT | 6.0 | | 14 | | | | | |
| B-SE-20-GT | 8.0 | 1.30 | 16 | 129.2 | 45 | 17 | 28 | |
| B-SE-20-GT | 13.0 | | 23 | | | | | |
| B-SE-20-GT | 18.0 | | 23 | | | | | |
| B-SE-24-GT | 0.5 | | 24 | | | | | |
| B-SE-24-GT | 2.0 | | 22 | | | | | |
| B-SE-24-GT | 8.0 | | 19 | | 23 | 14 | 9 | |
| B-SE-24-GT | 18.0 | 1.85* | 20 | 123.6 | 41 | 14 | 27 | |
| B-SE-28-GT | 0.5 | | 22 | | | | | |
| B-SE-28-GT | 4.0 | | 15 | | | | | |
| B-SE-28-GT | 8.0 | | 23 | | | | | |
| B-SE-28-GT | 13.0 | 1.82 | 22 | 126.8 | 38 | 15 | 23 | |
| B-SE-28-GT | 22.5 | | 25 | | | | | |

* denotes UU

LABORATORY DATA SUMMARY
LIGO 93B107C

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| B-SE-30-GT | 4.0 | 1.06 | 14 | 134.9 | 21 | 10 | 11 | |
| B-SE-30-GT | 8.0 | | 22 | | | | | |
| B-SE-30-GT | 13.0 | 2.36* | 23 | 126.4 | 56 | 17 | 39 | |
| B-SE-30-GT | 22.5 | | 37 | | | | | |
| B-SE-33-GT | 6.0 | 1.29 | 14 | 133.9 | 26 | 11 | 15 | |
| B-SE-33-GT | 18.0 | 0.97 | 30 | 119.4 | 51 | 20 | 31 | |
| B-SW-2-GT | 4.0 | | 17 | | 25 | 12 | 13 | |
| B-SW-2-GT | 6.0 | 1.77 | 19 | 123.5 | 47 | 15 | 32 | |
| B-SW-2-GT | 13.0 | 1.43* | 15 | 130.4 | 22 | 13 | 9 | |
| B-SW-2-GT | 18.0 | | 35 | | 71 | 22 | 49 | |
| B-SW-2-GT | 28.0 | | 27 | | | | | |
| B-SW-2-GT | 38.0 | 0.74* | 16 | 126.4 | 24 | 12 | 12 | |
| B-SW-5-GT | 6.0 | | 18 | | 27 | 13 | 14 | 72.3 |
| B-SW-5-GT | 8.0 | 2.74 | 15 | 134.0 | 27 | 11 | 16 | |
| B-SW-5-GT | 13.0 | | 29 | | 70 | 48 | 22 | 98.7 |
| B-SW-5-GT | 18.0 | 1.90 | 24 | 124.1 | 55 | 17 | 38 | |
| B-SW-9-GT | 2.0 | | 20 | | | | | |
| B-SW-9-GT | 8.0 | 1.81* | 20 | 123.6 | | | | 11.3 |
| B-SW-9-GT | 13.0 | | 14 | | | | | 52.4 |
| B-SW-9-GT | 22.5 | 2.44 | 32 | 122.3 | 59 | 18 | 41 | |
| B-SW-13-GT | 8.0 | 1.89* | 14 | 133.8 | | | | |
| B-SW-13-GT | 13.0 | | 13 | | 15 | 13 | 2 | |
| B-SW-13-GT | 22.5 | | 20 | | 40 | 16 | 24 | |
| B-SW-17-GT | 8.0 | 2.24* | 18 | 126.7 | 32 | 16 | 16 | |
| B-SW-17-GT | 22.5 | | 37 | | | | | 98.2 |
| B-SW-21-GT | 4.0 | | 17 | | | | | |
| B-SW-21-GT | 8.0 | 1.72* | 15 | 131.8 | 25 | 12 | 13 | |
| B-SW-21-GT | 13.0 | | 19 | | 30 | 15 | 15 | |
| B-SW-21-GT | 18.0 | 0.72* | 34 | 114.4 | 50 | 17 | 33 | |
| B-SW-21-GT | 22.5 | 0.81 | 43 | 115.4 | 62 | 27 | 35 | |
| B-SW-25-GT | 4.0 | | 20 | | 33 | 13 | 20 | |
| B-SW-25-GT | 10.5 | | 19 | | | | | 8.9 |
| B-SW-25-GT | 13.0 | 0.37 | 56 | 100.9 | 73 | 25 | 48 | |
| B-SW-25-GT | 18.0 | 0.43 | 42 | 106.1 | 67 | 24 | 43 | |
| B-SW-29-GT | 4.0 | 1.06 | 19 | 127.0 | 24 | 13 | 11 | |
| B-SW-29-GT | 8.0 | | 19 | | | | | |
| B-SW-29-GT | 15.5 | | 20 | | | | | 8.8 |
| B-SW-29-GT | 22.5 | | 34 | | 59 | 22 | 37 | |
| B-SW-33-GT | 4.5 | | 16 | | | | | 16.8 |
| B-SW-33-GT | 10.5 | | 23 | | | | | 9.5 |
| B-SW-33-GT | 18.0 | 0.88* | 51 | 104.9 | 66 | 25 | 41 | |
| B-SW-33-GT | 23.0 | | 24 | | 28 | 17 | 11 | |
| B-SW-33-GT | 33.0 | | 28 | | | | | |
| B-SW-33-GT | 43.0 | | 22 | | 51 | 20 | 31 | |

* denotes UU




**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-6-GT | ▲ |
| B-SE-10-GT | ★ |
| B-SE-14-GT | ✕ |
| B-SE-17-GT | ✿ |
| B-SE-20-GT | ○ |
| B-SE-24-GT | △ |
| B-SE-28-GT | ⊗ |
| B-SE-30-GT | ⊕ |
| B-SE-33-GT | □ |
| B-SW-2-GT | ◍ |
| B-SW-5-GT | ◒ |
| B-SW-9-GT | ☆ |
| B-SW-13-GT | ⊠ |
| B-SW-17-GT | ■ |
| B-SW-21-GT | ◆ |
| B-SW-25-GT | ◇ |
| B-SW-29-GT | ◘ |
| B-SW-33-GT | ✖ |

**Project:** *LIGO*
**Project Number:** *93B107C*

PLASTICITY CHART

11/21/94 sanaatt3 3B107

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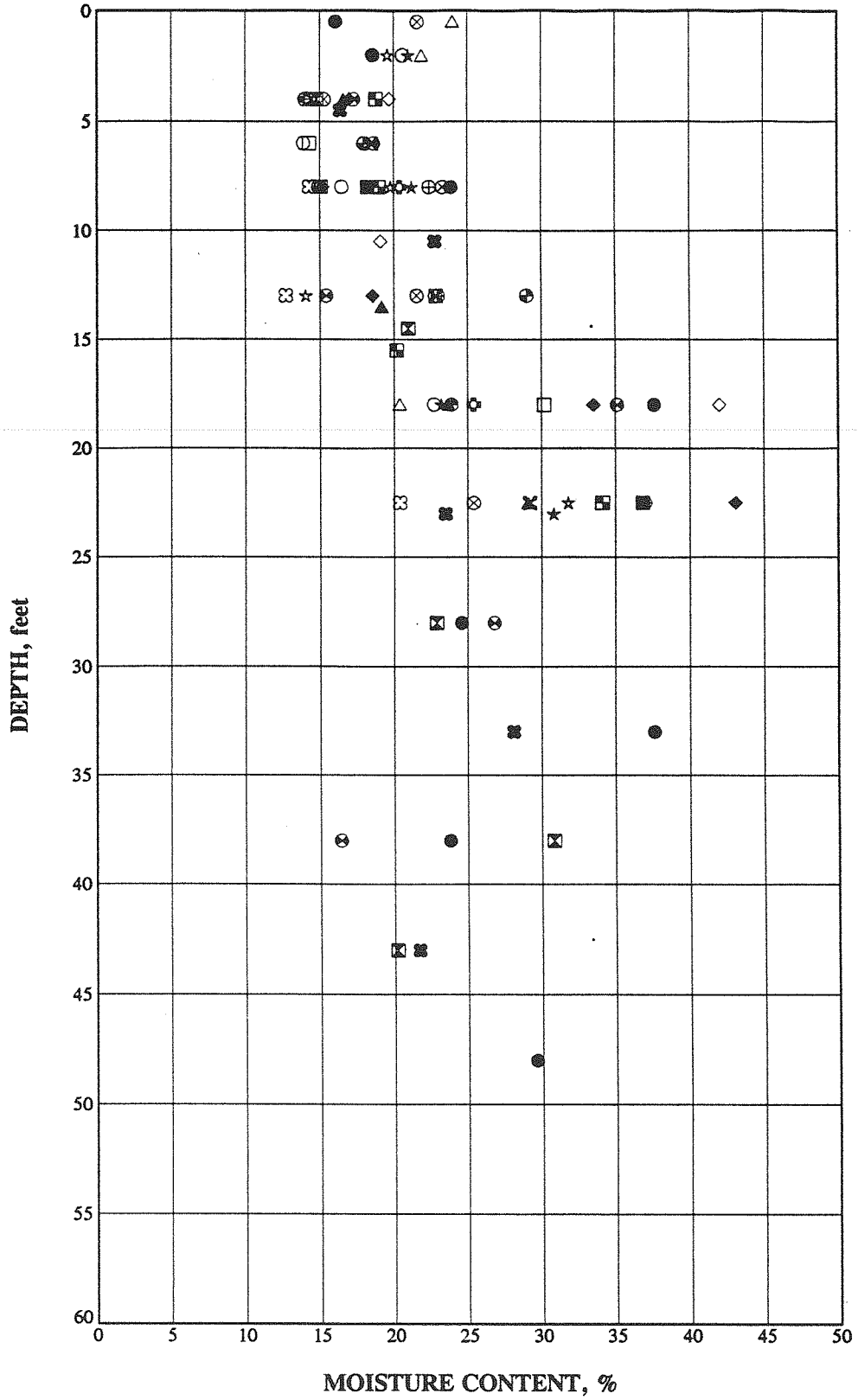


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-6-GT | ▲ |
| B-SE-10-GT | ★ |
| B-SE-14-GT | ✕ |
| B-SE-17-GT | ✿ |
| B-SE-20-GT | ○ |
| B-SE-24-GT | △ |
| B-SE-28-GT | ⊗ |
| B-SE-30-GT | ⊕ |
| B-SE-33-GT | □ |
| B-SW-2-GT | ⊛ |
| B-SW-5-GT | ◒ |
| B-SW-9-GT | ☆ |
| B-SW-13-GT | ⊠ |
| B-SW-17-GT | ■ |
| B-SW-21-GT | ◆ |
| B-SW-25-GT | ◇ |
| B-SW-29-GT | ◪ |
| B-SW-33-GT | ✖ |

Project: LIGO
Project Number: 93B107C

# MOISTURE CONTENT vs DEPTH



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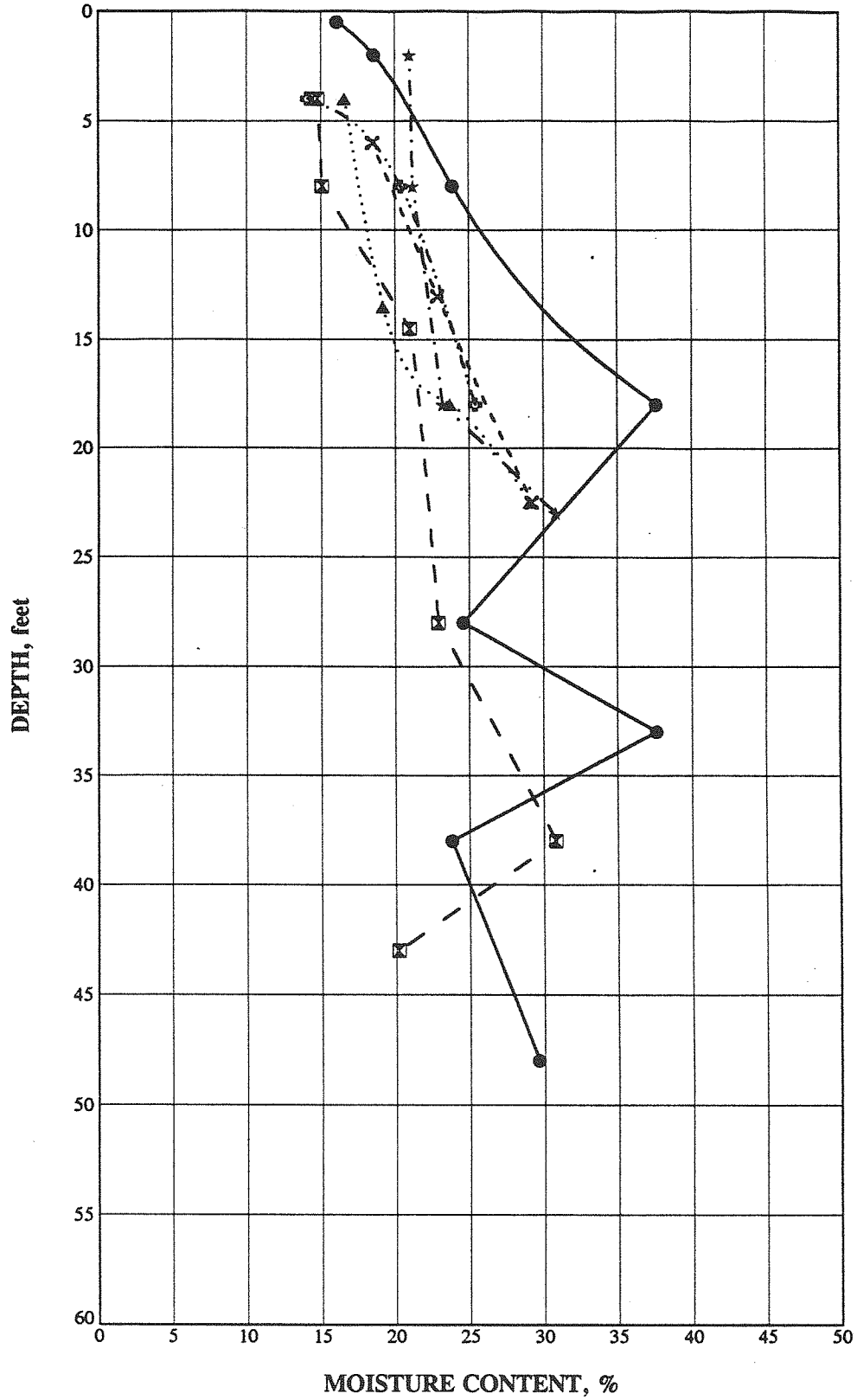



**LEGEND**

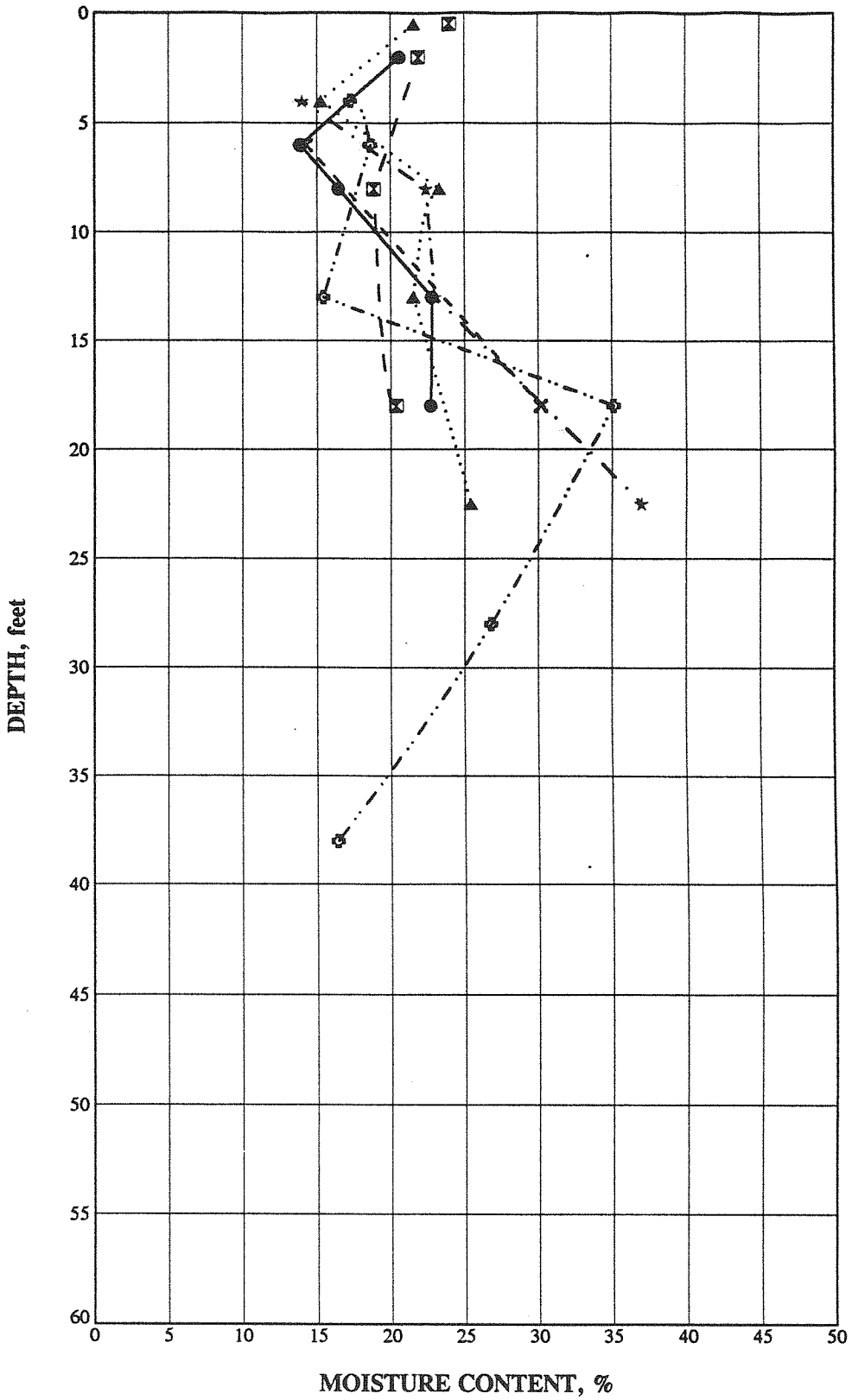
| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-6-GT | ▲ |
| B-SE-10-GT | ★ |
| B-SE-14-GT | ✕ |
| B-SE-17-GT | ✿ |

Project: LIGO
Project Number: 93B107C

**MOISTURE CONTENT vs DEPTH**

11/21/94 MCVSDPT 3B107

Woodward-Clyde Consultants




**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-20-GT | ● |
| B-SE-24-GT | ⊠ |
| B-SE-28-GT | ▲ |
| B-SE-30-GT | ★ |
| B-SE-33-GT | ✕ |
| B-SW-2-GT | ✿ |

Project: LIGO
Project Number: 93B107C

**MOISTURE CONTENT vs DEPTH**

11/21/94 MCVSDPT 3B107

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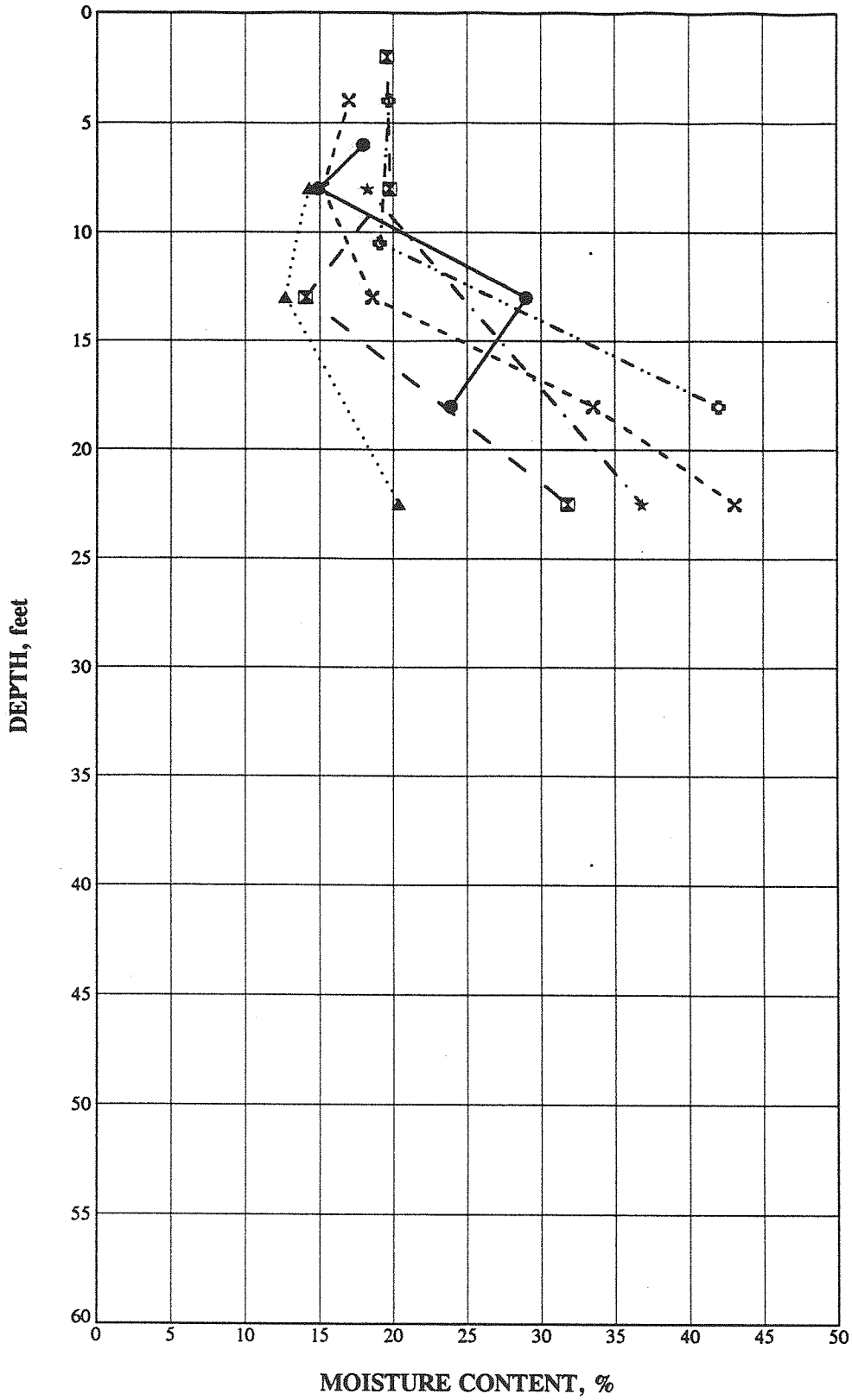


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SW-5-GT | ● |
| B-SW-9-GT | ⊠ |
| B-SW-13-GT | ▲ |
| B-SW-17-GT | ★ |
| B-SW-21-GT | × |
| B-SW-25-GT | ✿ |

Project: LIGO
Project Number: 93B107C

# MOISTURE CONTENT vs DEPTH

11/21/94 MCVSDPT 3B107

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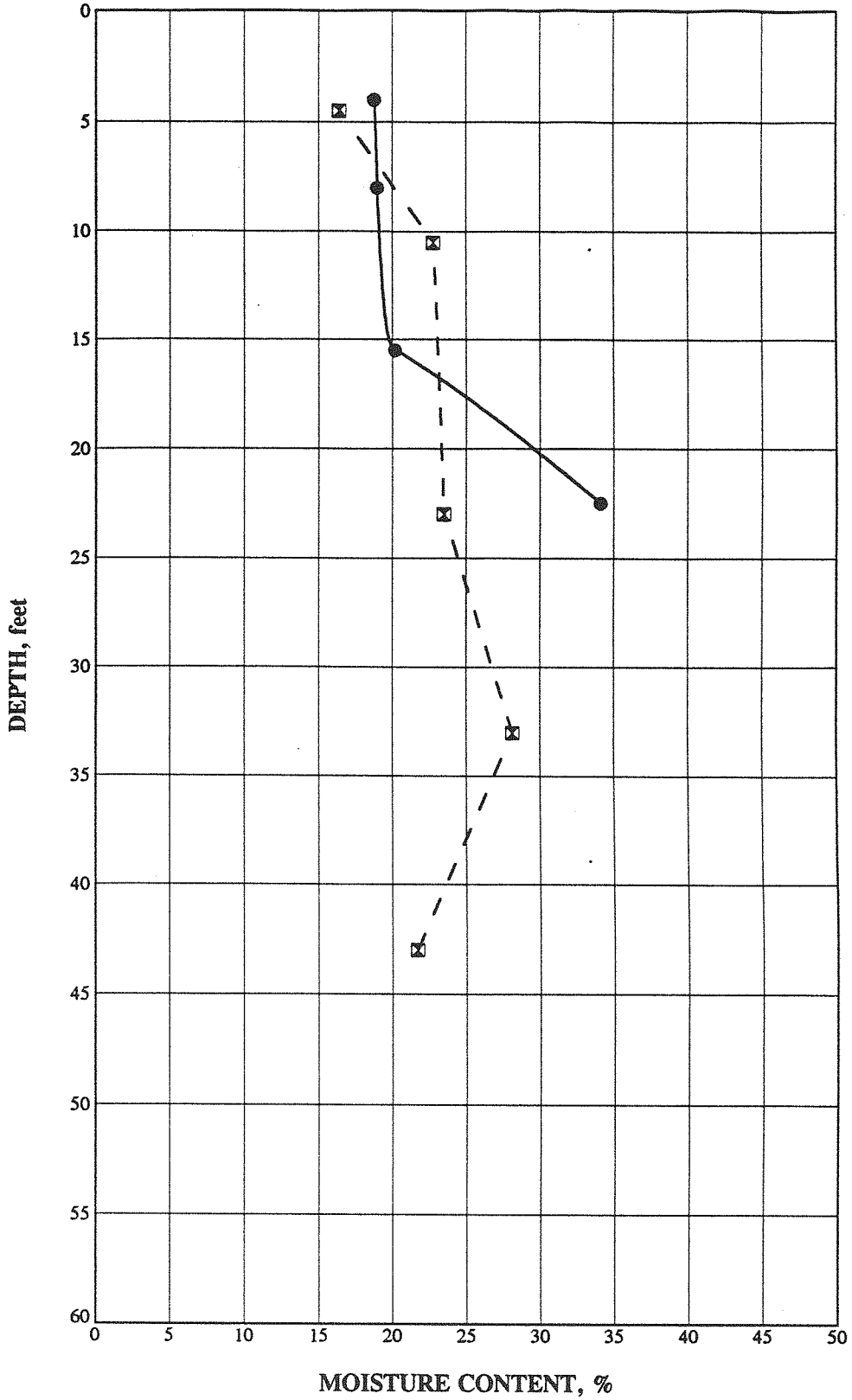


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SW-29-GT | ● |
| B-SW-33-GT | ⊠ |

Project: LIGO
Project Number: 93B107C

# MOISTURE CONTENT vs DEPTH

11/21/94 MCVSDPT 3B107

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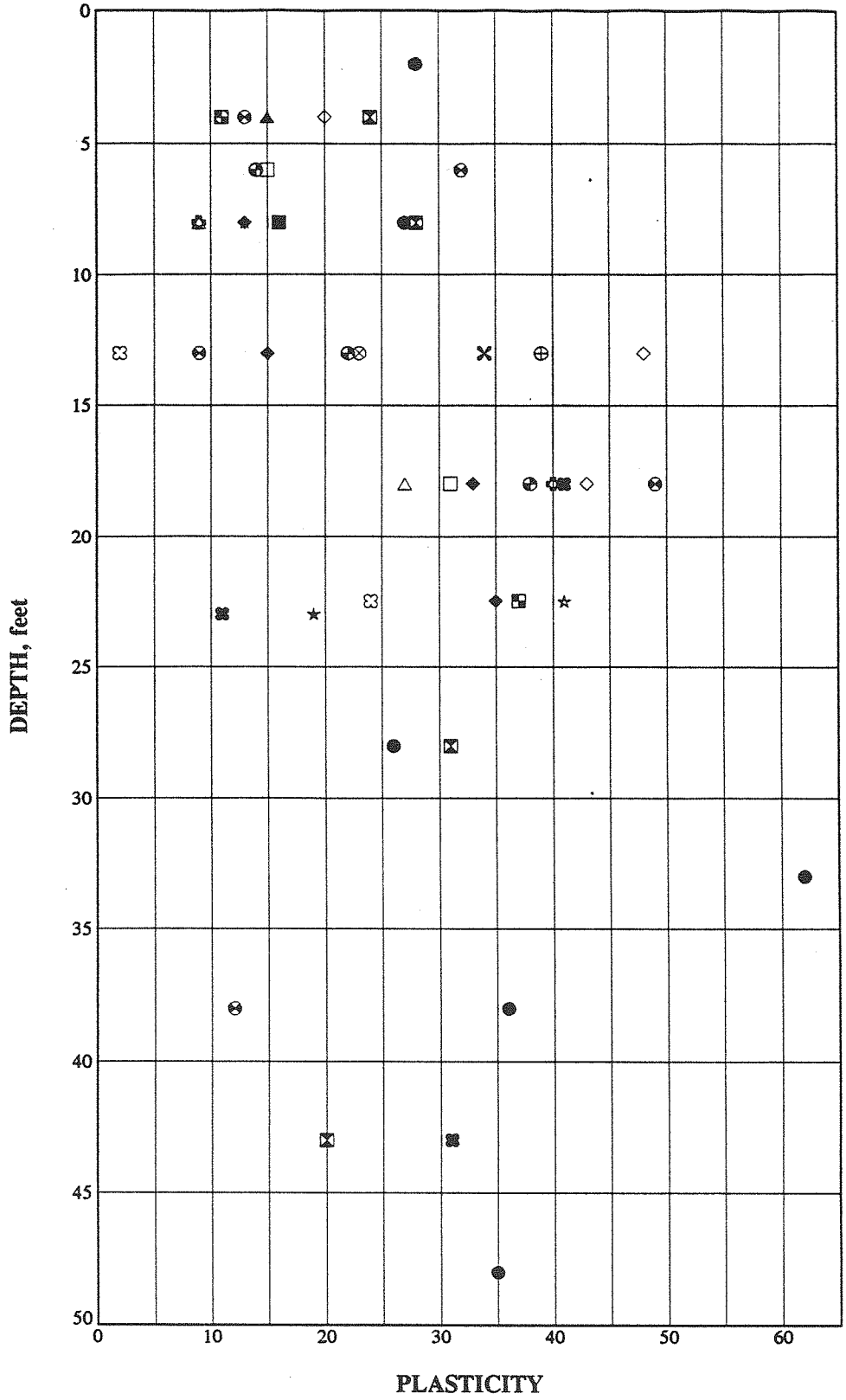


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-6-GT | ▲ |
| B-SE-10-GT | ★ |
| B-SE-14-GT | ✕ |
| B-SE-17-GT | ✿ |
| B-SE-20-GT | ○ |
| B-SE-24-GT | △ |
| B-SE-28-GT | ⊗ |
| B-SE-30-GT | ⊕ |
| B-SE-33-GT | □ |
| B-SW-2-GT | ⊛ |
| B-SW-5-GT | ⊕ |
| B-SW-9-GT | ☆ |
| B-SW-13-GT | ⊠ |
| B-SW-17-GT | ■ |
| B-SW-21-GT | ◆ |
| B-SW-25-GT | ◇ |
| B-SW-29-GT | ⊡ |
| B-SW-33-GT | ✖ |

Project: LIGO
Project Number: 93B107C

# PLASTICITY INDEX vs DEPTH

11/21/94 PIVSDPT 3B107

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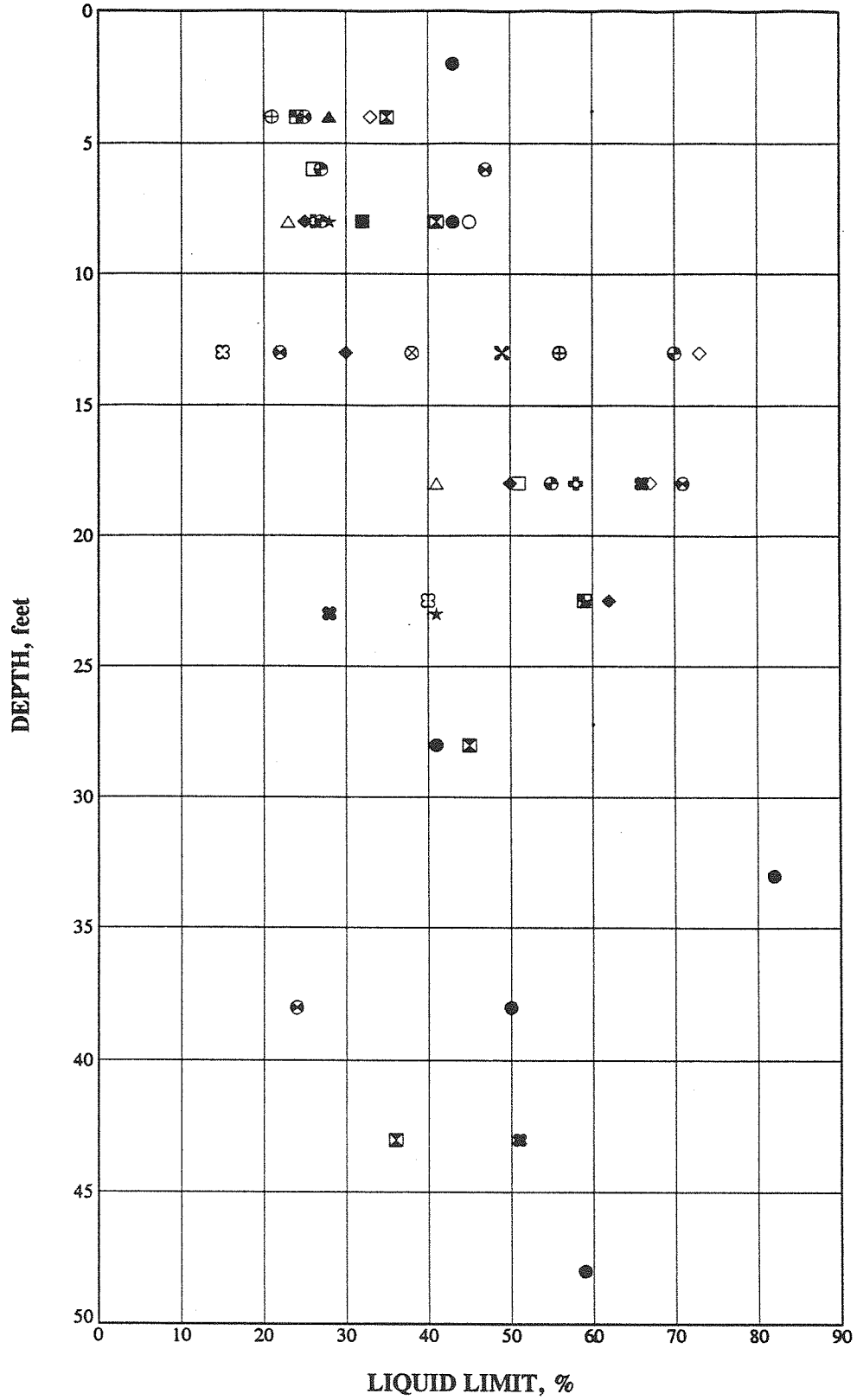


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-6-GT | ▲ |
| B-SE-10-GT | ★ |
| B-SE-14-GT | ✕ |
| B-SE-17-GT | ✿ |
| B-SE-20-GT | ○ |
| B-SE-24-GT | △ |
| B-SE-28-GT | ⊗ |
| B-SE-30-GT | ⊕ |
| B-SE-33-GT | □ |
| B-SW-2-GT | ⊗ |
| B-SW-5-GT | ◍ |
| B-SW-9-GT | ☆ |
| B-SW-13-GT | ⊠ |
| B-SW-17-GT | ■ |
| B-SW-21-GT | ◆ |
| B-SW-25-GT | ◇ |
| B-SW-29-GT | ◪ |
| B-SW-33-GT | ✖ |

Project: **LIGO**
Project Number: **93B107C**

# LIQUID LIMIT vs DEPTH

11/21/94 LLVSDPT 3B107

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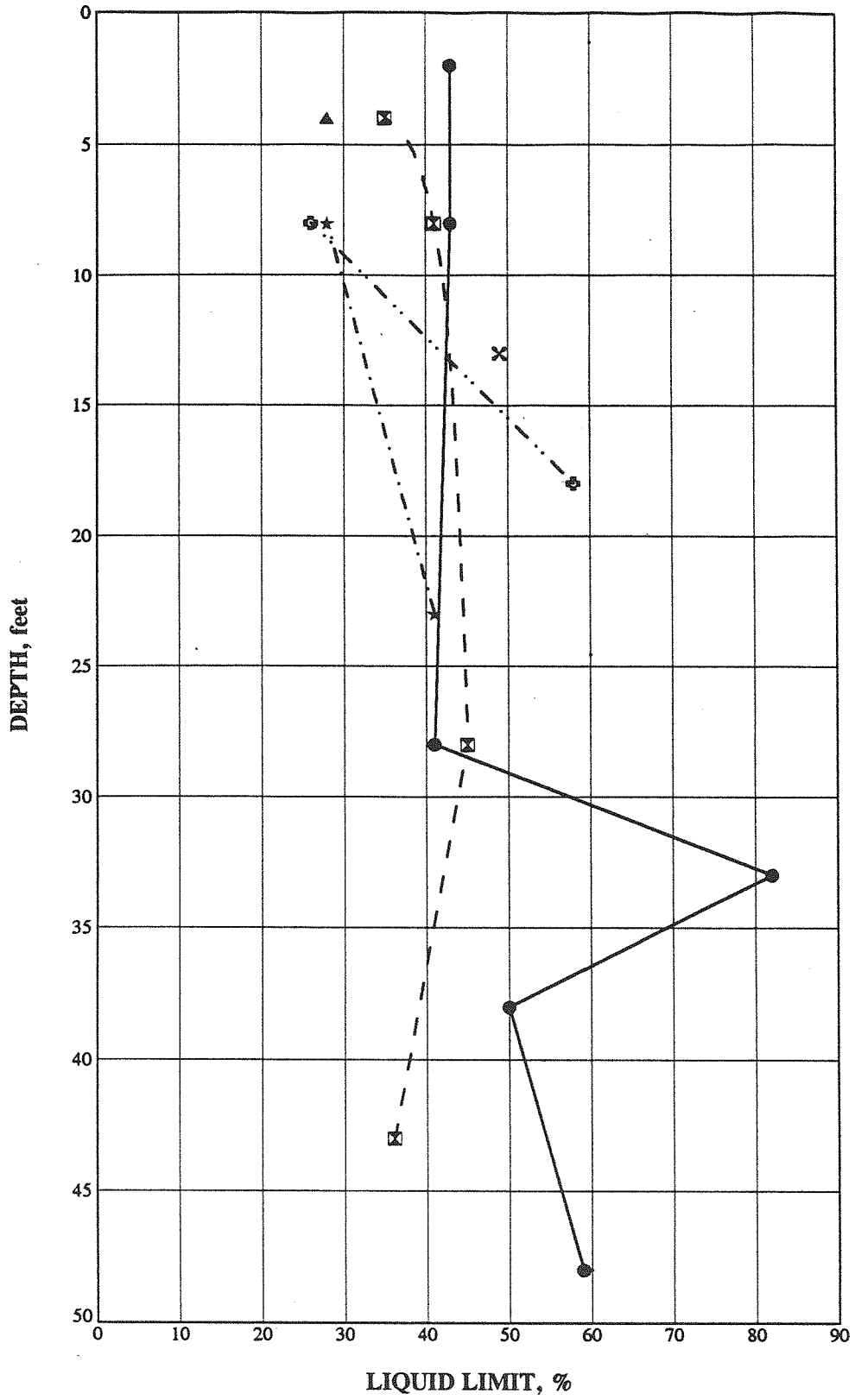


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-6-GT | ▲ |
| B-SE-10-GT | ★ |
| B-SE-14-GT | ✕ |
| B-SE-17-GT | ✪ |

Project: LIGO
Project Number: 93B107C

# LIQUID LIMIT vs DEPTH

11/21/94 LLVSDPT 3B107

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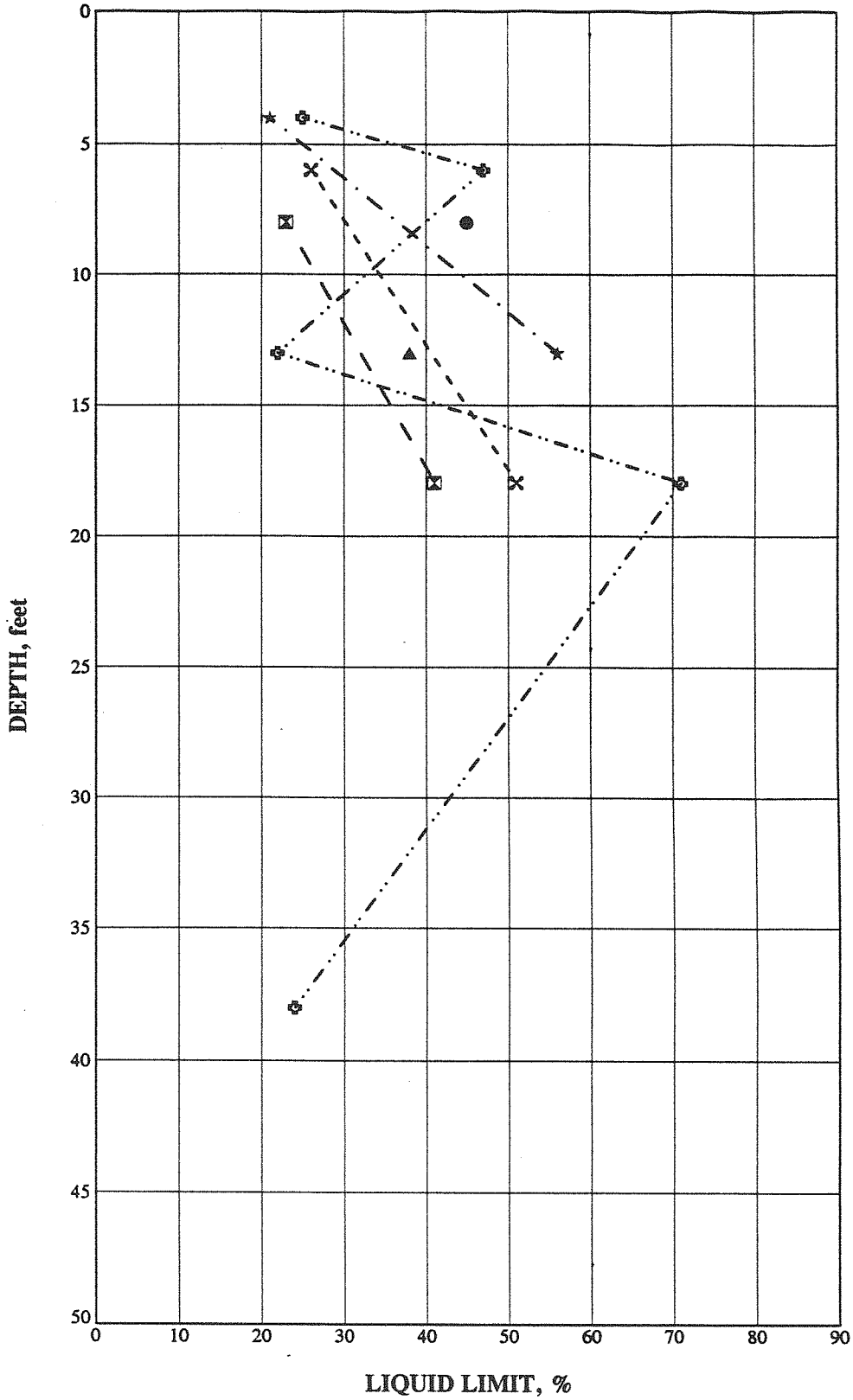


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-20-GT | ● |
| B-SE-24-GT | ⊠ |
| B-SE-28-GT | ▲ |
| B-SE-30-GT | ★ |
| B-SE-33-GT | ✕ |
| B-SW-2-GT | ✿ |

Project: **LIGO**
Project Number: **93B107C**

# LIQUID LIMIT vs DEPTH

11/21/94 LLVSDPT 3B107

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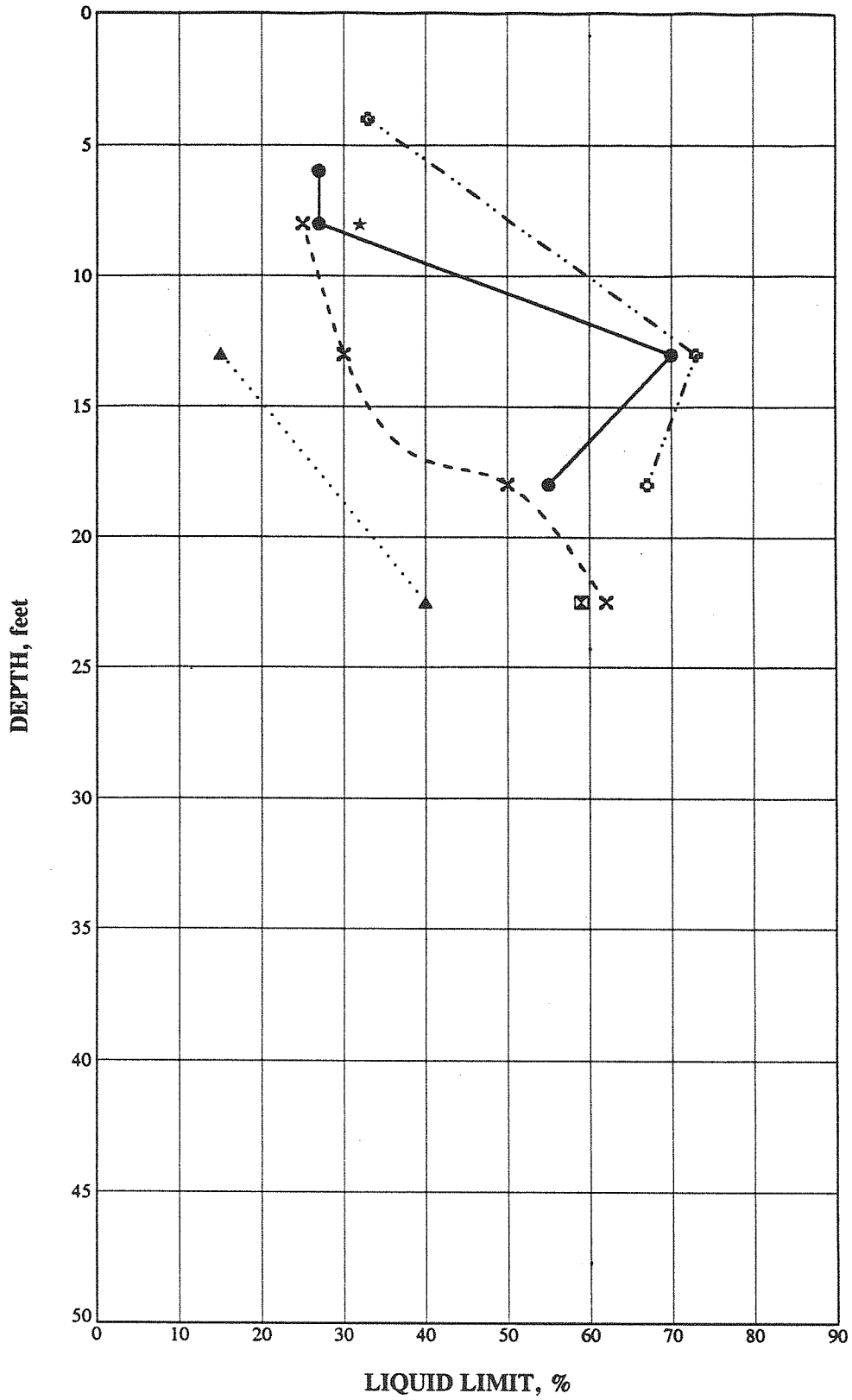


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SW-5-GT | ● |
| B-SW-9-GT | ⊠ |
| B-SW-13-GT | ▲ |
| B-SW-17-GT | ★ |
| B-SW-21-GT | ✕ |
| B-SW-25-GT | ✿ |

Project: **LIGO**
Project Number: **93B107C**

**LIQUID LIMIT vs DEPTH**

11/21/94 LLVSDPT 3B107

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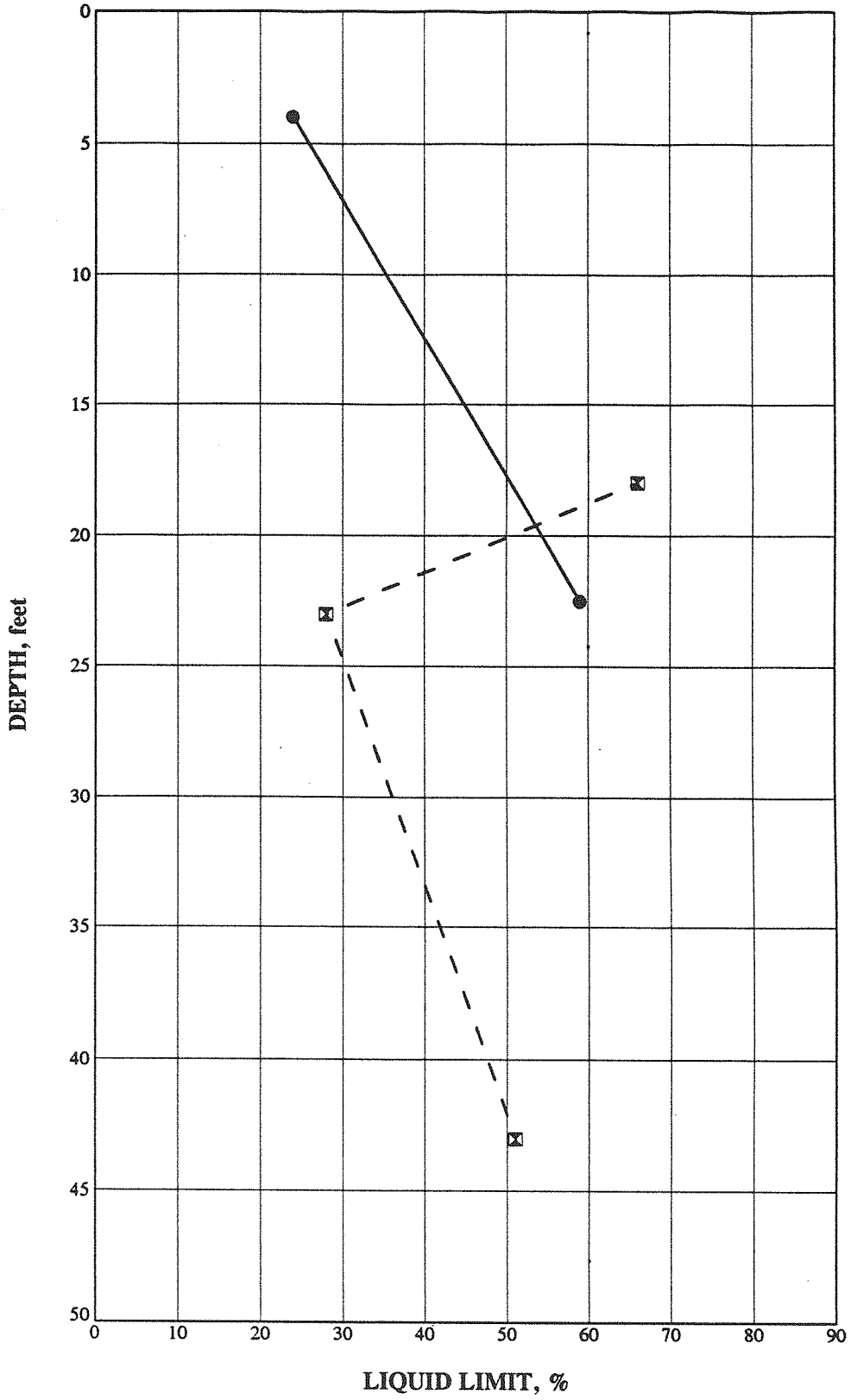


**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SW-29-GT | ● |
| B-SW-33-GT | ⊠ |

Project: **LIGO**
Project Number: **93B107C**

**LIQUID LIMIT vs DEPTH**

11/21/94 LLVSDPT 3B107

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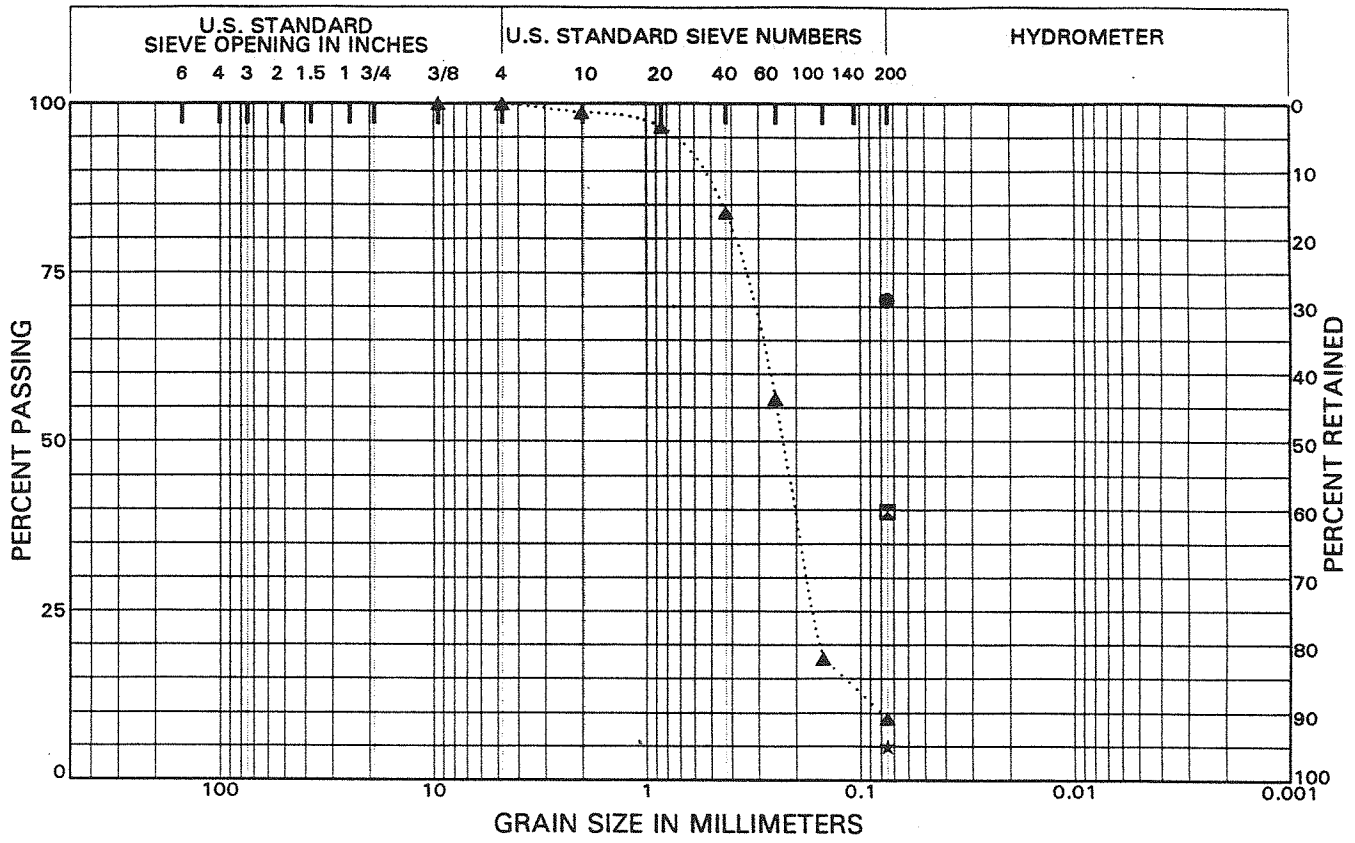
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |




| Boring Number | Depth (feet) | Symbol | Classification |
|---|---|---|---|
| B-SE-1-GT | 0.5 | ● | (ML to CL) |
| B-SE-2-GT | 4.0 | ⊠ | (SC) |
| B-SE-2-GT | 14.5 | ▲ | (SP) |
| B-SE-6-GT | 13.5 | ★ | (SP) |

Project: LIGO
Project Number: 93B107C

# GRAIN SIZE DISTRIBUTION CURVES

11/21/94 SVANLS7 3B107

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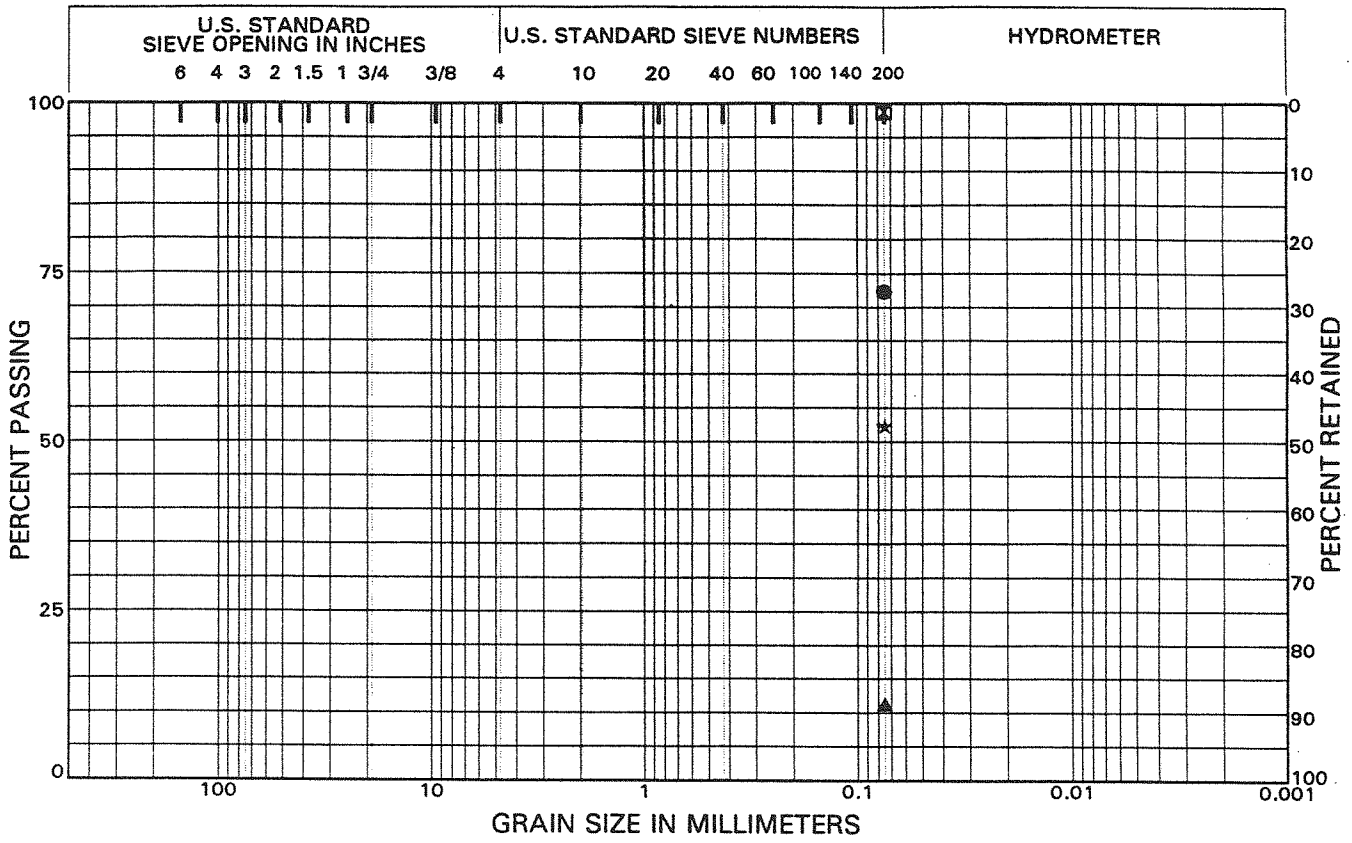
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |




| Boring Number | Depth (feet) | Symbol | Classification |
|---|---|---|---|
| B-SW-5-GT | 6.0 | ● | (CL) |
| B-SW-5-GT | 13.0 | ⧓ | (CH) |
| B-SW-9-GT | 8.0 | ▲ | (SP-SM) |
| B-SW-9-GT | 13.0 | ★ | (SM-ML) |

Project: LIGO
Project Number: 93B107C

# GRAIN SIZE DISTRIBUTION CURVES

11/21/94 SVANLS7 3B107

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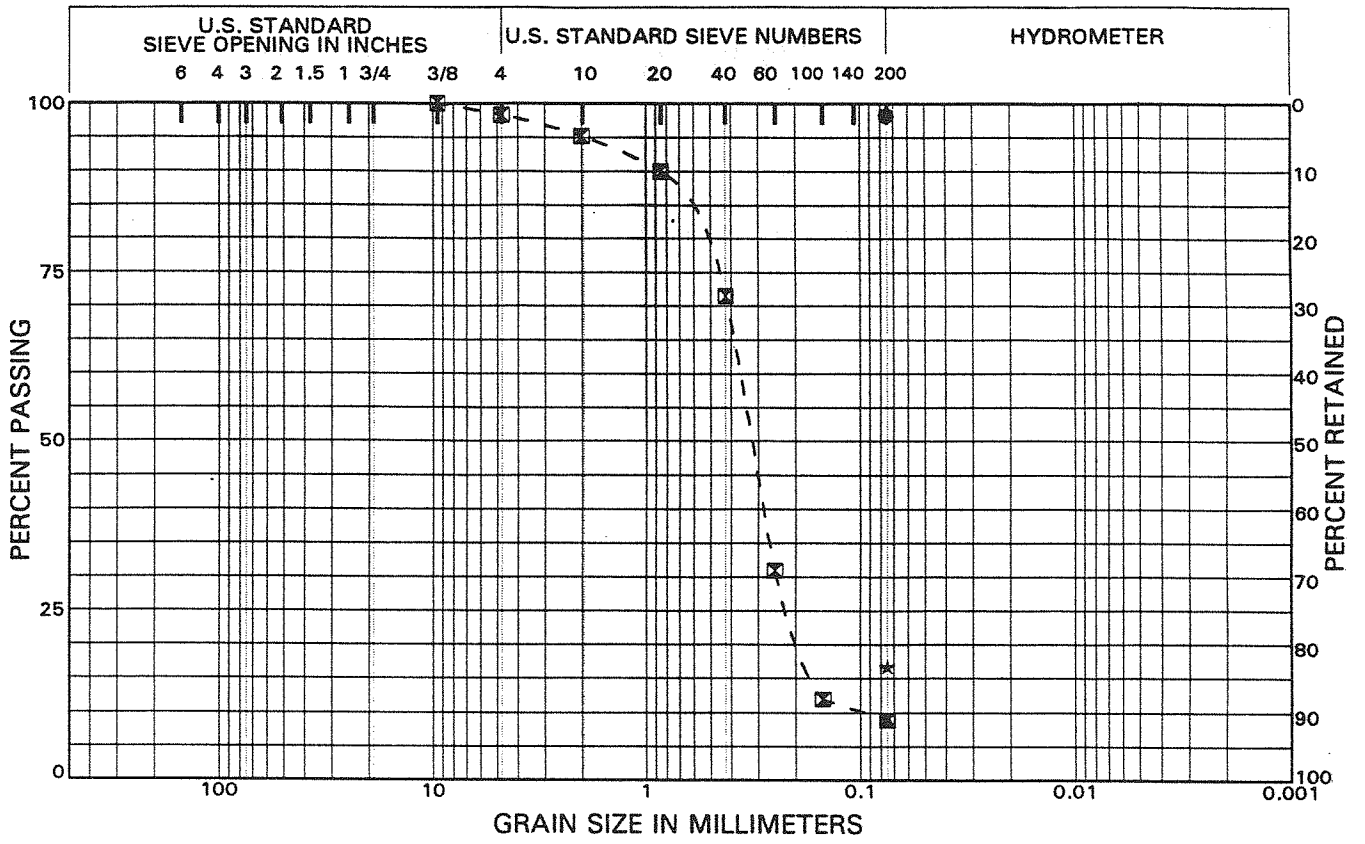
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |




| Boring Number | Depth (feet) | Symbol | Classification |
|---|---|---|---|
| B-SW-17-GT | 22.5 | ● | (CL) |
| B-SW-25-GT | 10.5 | ⊠ | (SP) |
| B-SW-29-GT | 15.5 | ▲ | (SP-SM) |
| B-SW-33-GT | 4.5 | ★ | (SM) |

Project: LIGO
Project Number: 93B107C

# GRAIN SIZE DISTRIBUTION CURVES

11/21/94 SVANLS7 3B107

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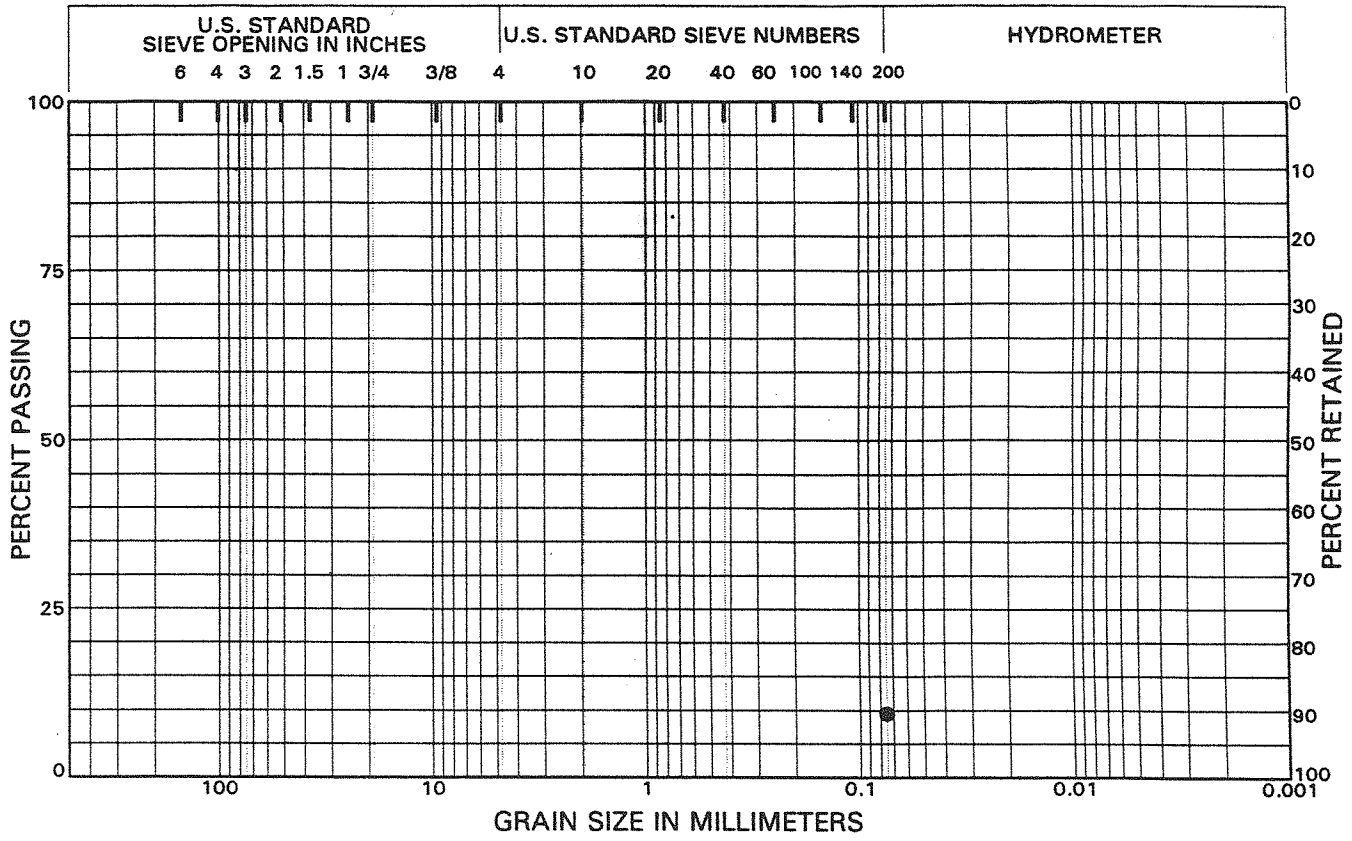
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |




| Boring Number | Depth (feet) | Symbol | Classification |
|---|---|---|---|
| B-SW-33-GT | 10.5 | ● | (SP-SM) |
| | | | |
| | | | |
| | | | |

Project: LIGO
Project Number: 93B107C

# GRAIN SIZE DISTRIBUTION CURVES

11/21/94 SVANLS7 3B107

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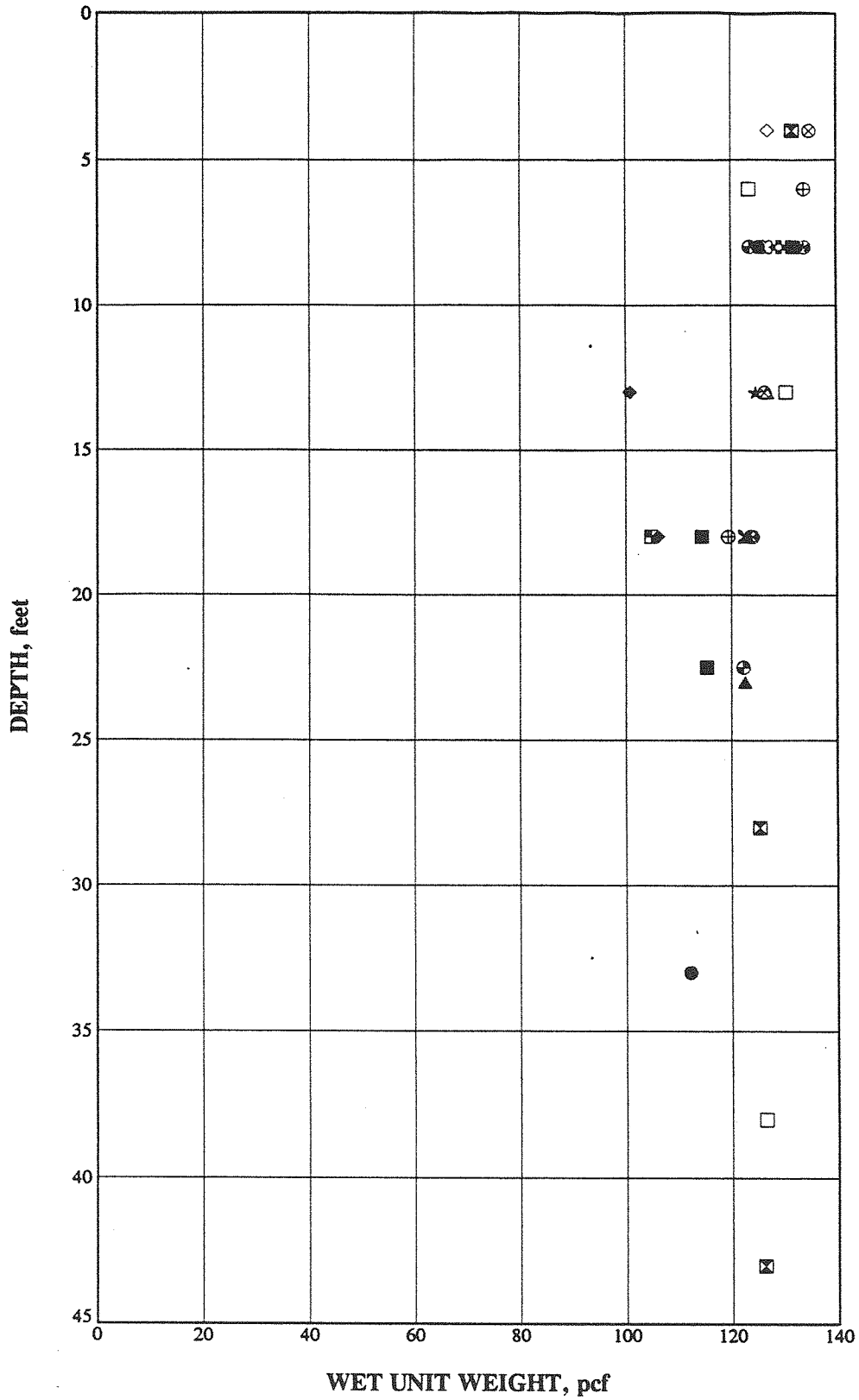



**LEGEND**

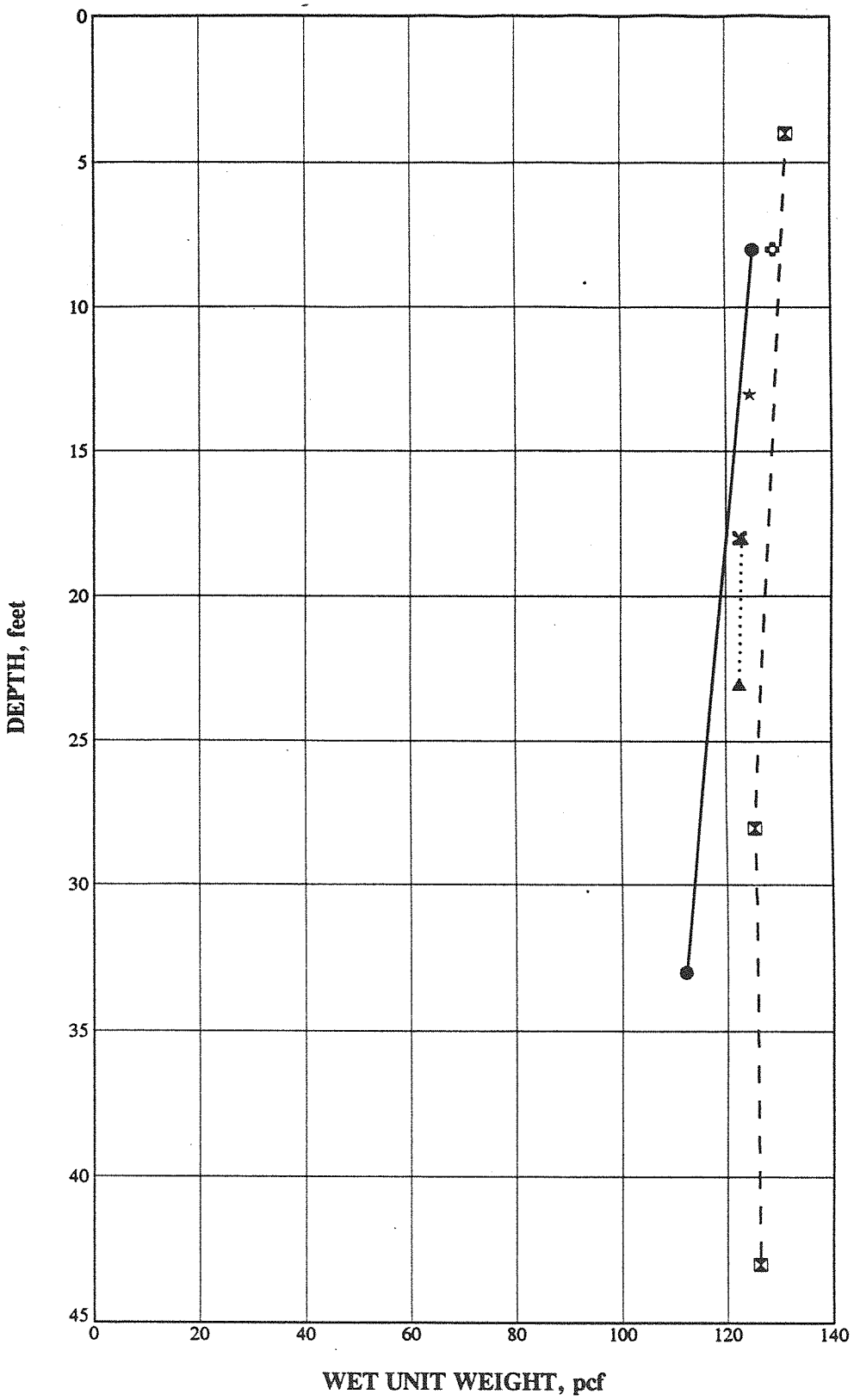
| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-10-GT | ▲ |
| B-SE-14-GT | ★ |
| B-SE-17-GT | ✕ |
| B-SE-20-GT | ✪ |
| B-SE-24-GT | ○ |
| B-SE-28-GT | △ |
| B-SE-30-GT | ⊗ |
| B-SE-33-GT | ⊕ |
| B-SW-2-GT | □ |
| B-SW-5-GT | ⊗ |
| B-SW-9-GT | ◍ |
| B-SW-13-GT | ☆ |
| B-SW-17-GT | ⊠ |
| B-SW-21-GT | ■ |
| B-SW-25-GT | ◆ |
| B-SW-29-GT | ◇ |
| B-SW-33-GT | ◪ |

Project: **LIGO**
Project Number: **93B107C**

# WET UNIT WEIGHT vs DEPTH

11/21/94 WTVDPT 3B107

Woodward-Clyde Consultants




**LEGEND**

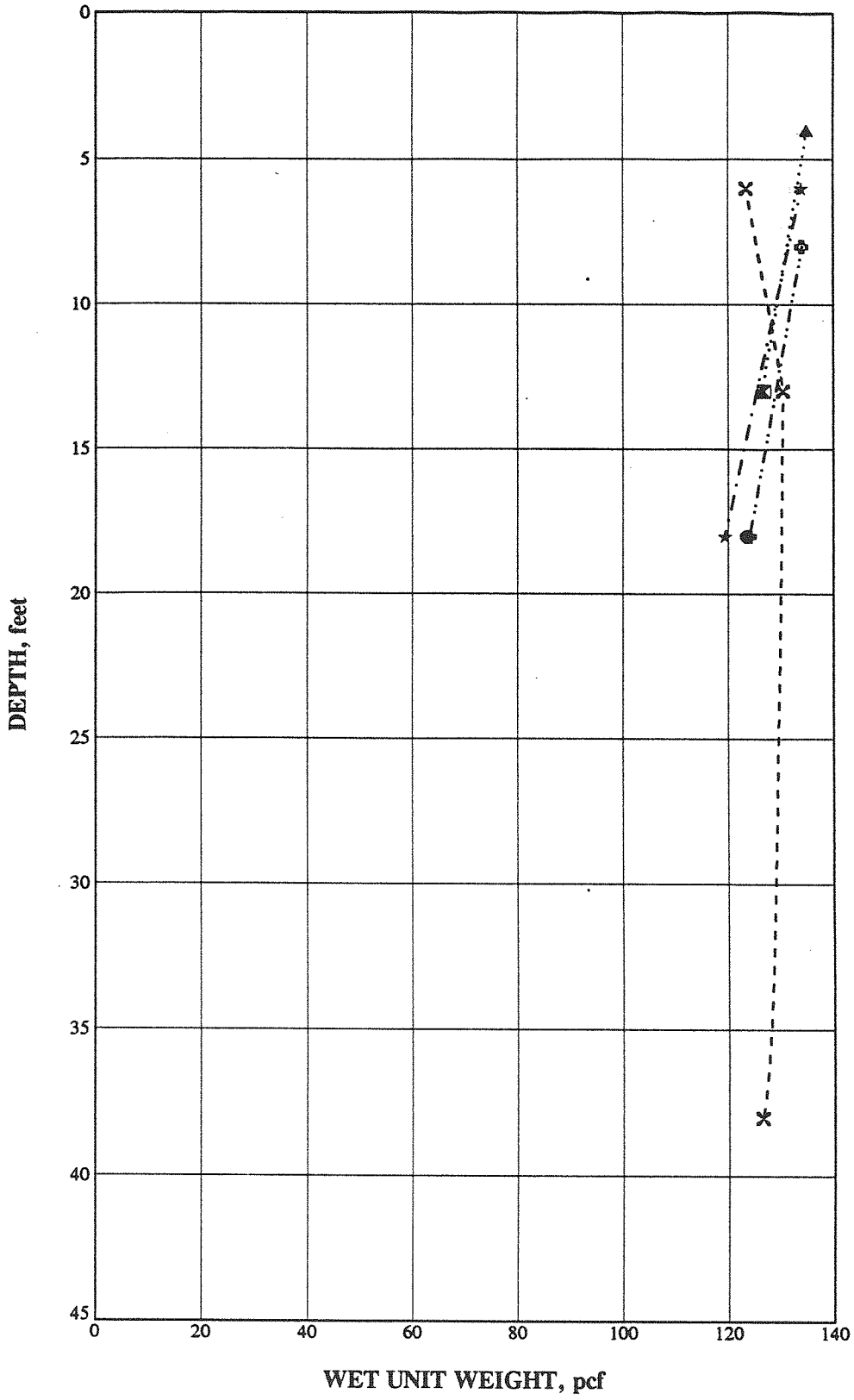
| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-10-GT | ▲ |
| B-SE-14-GT | ★ |
| B-SE-17-GT | ✕ |
| B-SE-20-GT | ✿ |

Project: **LIGO**
Project Number: **93B107C**

# WET UNIT WEIGHT vs DEPTH

11/21/94 WTVDPT 3B107

**Woodward-Clyde Consultants**




**LEGEND**

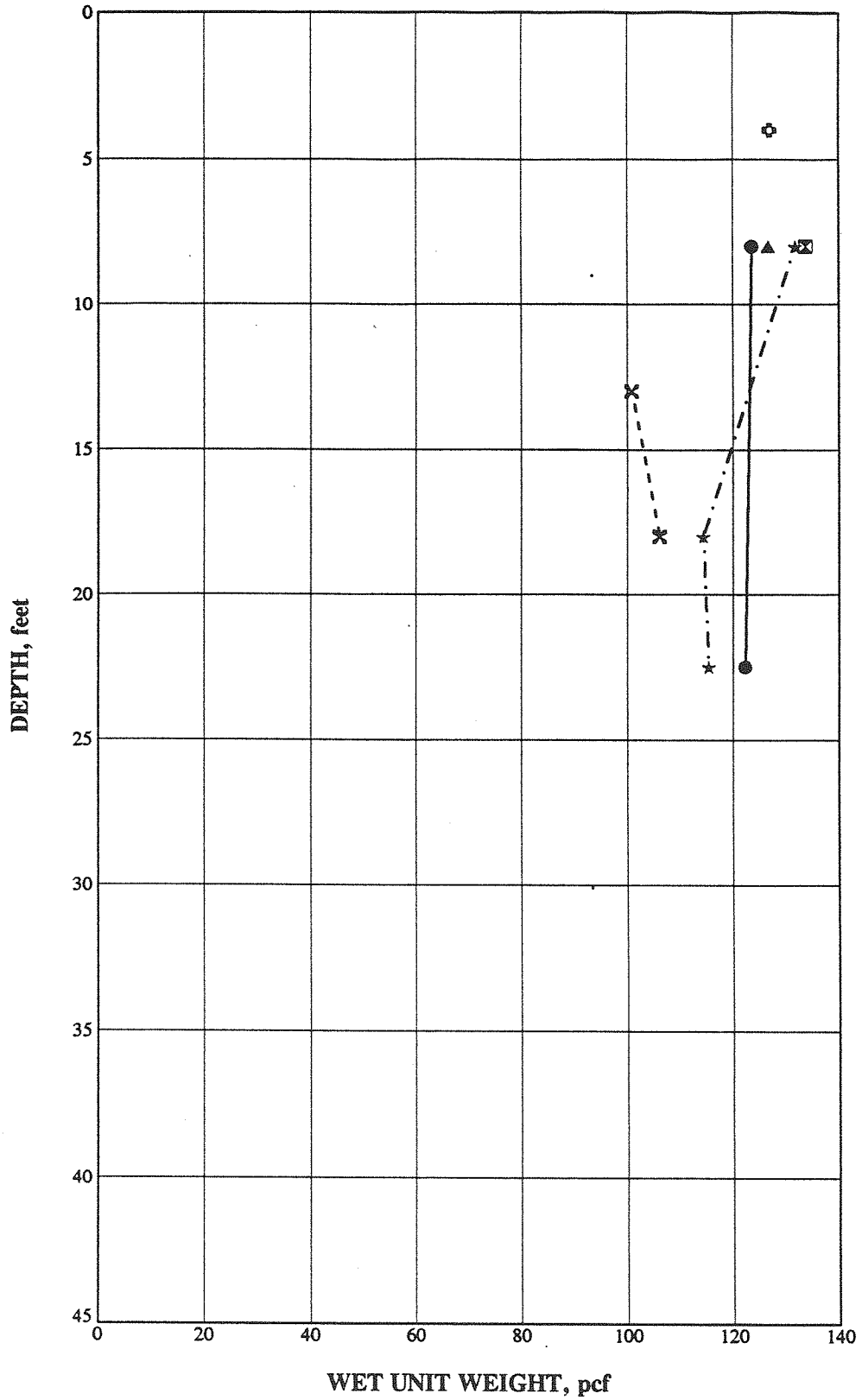
| Boring Number | Test Symbol |
|---|---|
| B-SE-24-GT | ● |
| B-SE-28-GT | ⊠ |
| B-SE-30-GT | ▲ |
| B-SE-33-GT | ★ |
| B-SW-2-GT | ✕ |
| B-SW-5-GT | ✿ |

Project: **LIGO**
Project Number: **93B107C**

# WET UNIT WEIGHT vs DEPTH

11/21/94 WTVDPT 3B107

Woodward-Clyde Consultants




**LEGEND**

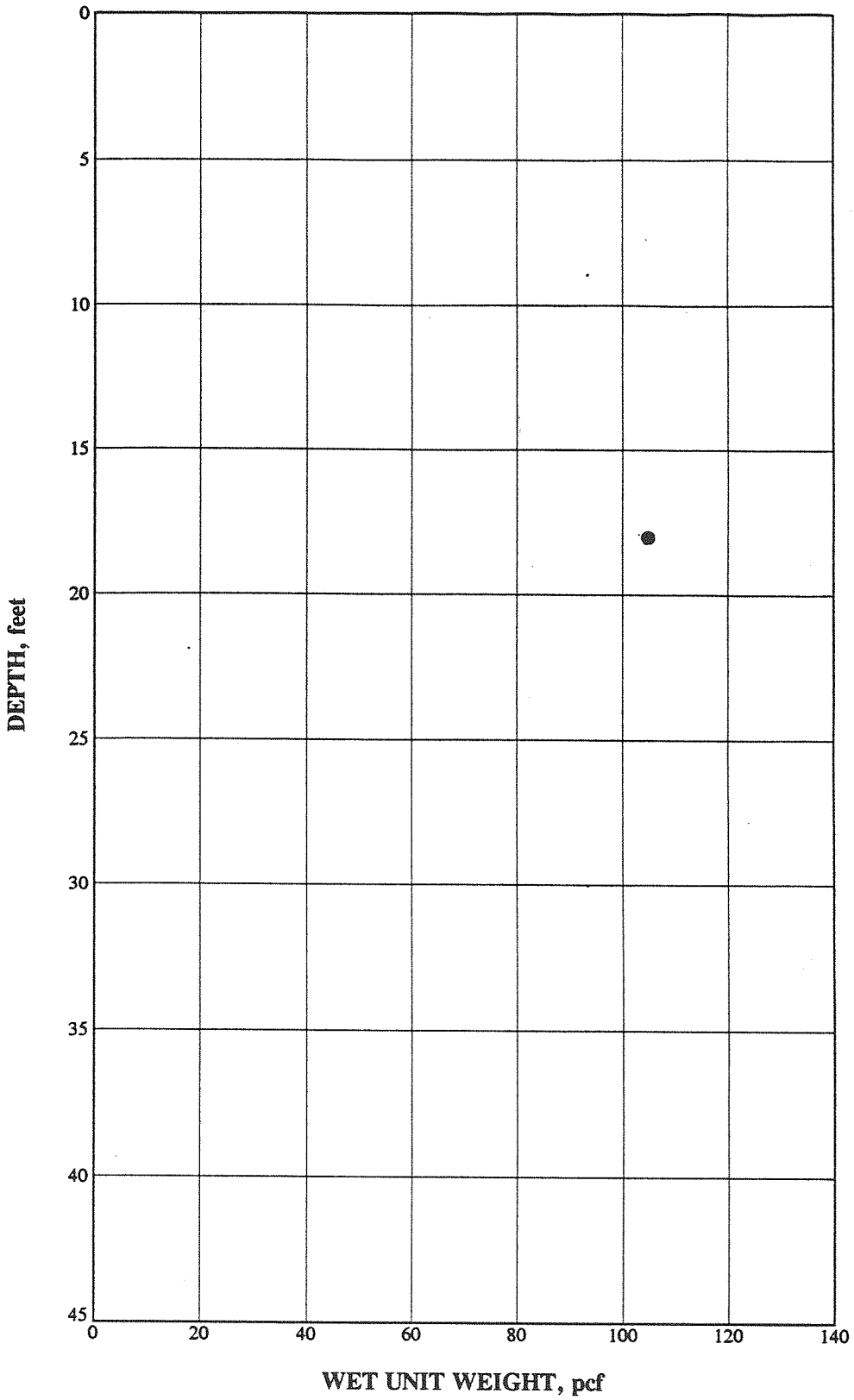
| Boring Number | Test Symbol |
|---|---|
| B-SW-9-GT | ● |
| B-SW-13-GT | ⊠ |
| B-SW-17-GT | ▲ |
| B-SW-21-GT | ★ |
| B-SW-25-GT | ✕ |
| B-SW-29-GT | ✿ |

Project: LIGO
Project Number: 93B107C

# WET UNIT WEIGHT vs DEPTH

11/21/94 WTVDPT 3B107

Woodward-Clyde Consultants




**LEGEND**

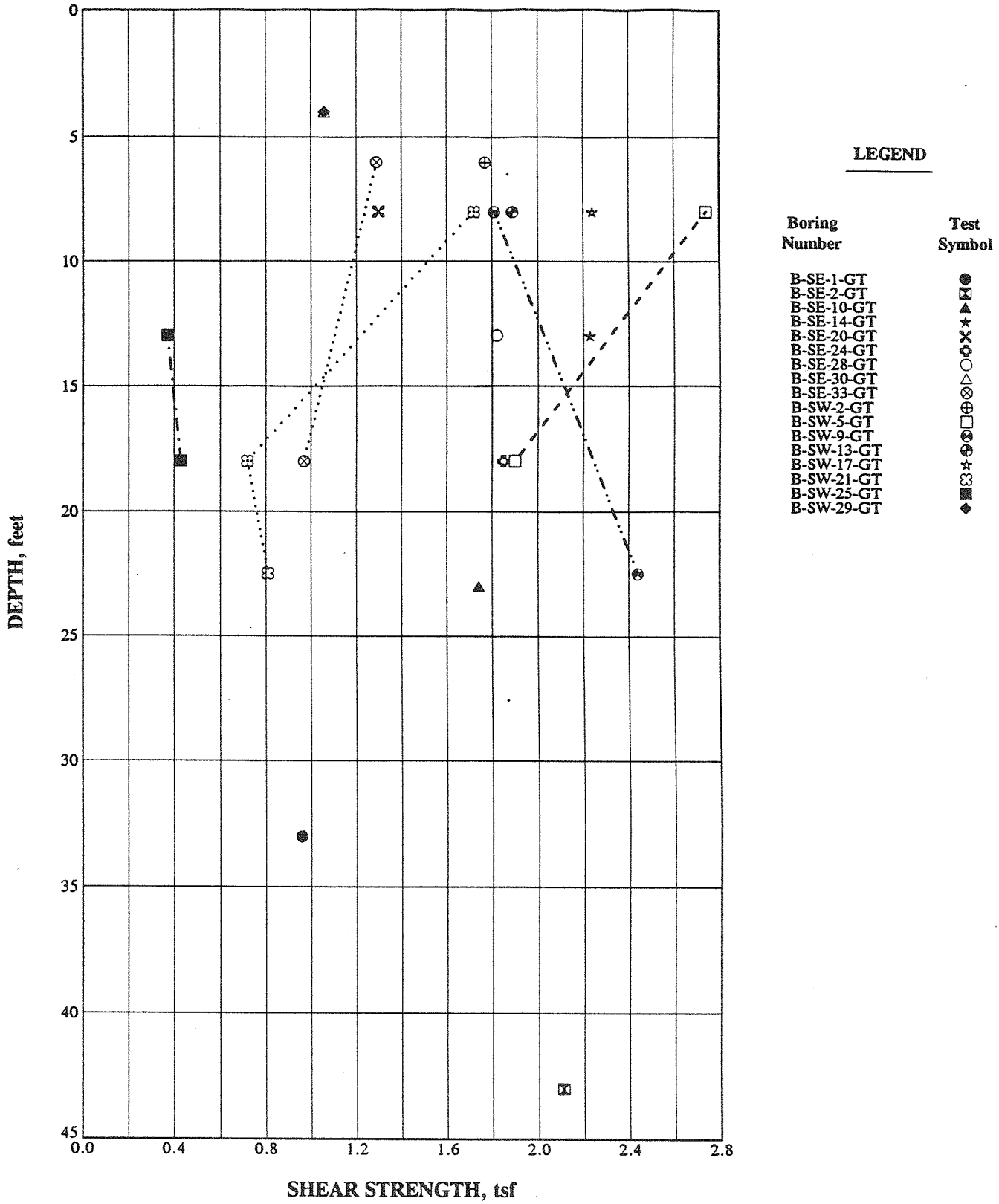
| Boring Number | Test Symbol |
|---|---|
| B-SW-33-GT | ● |

Project: LIGO
Project Number: 93B107C

**WET UNIT WEIGHT vs DEPTH**

11/21/94 WTVDPT 3B107

Woodward-Clyde Consultants

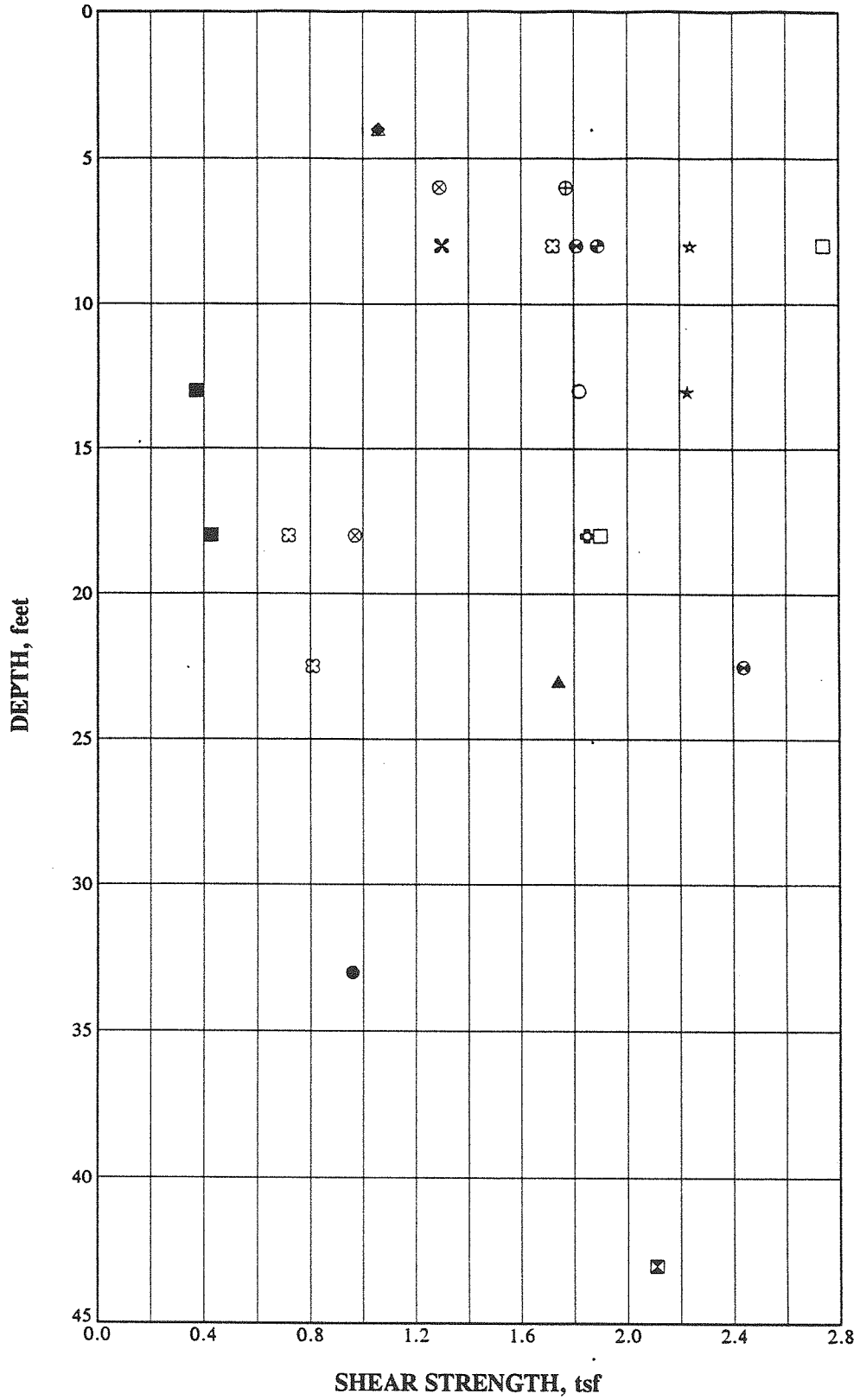



Project: LIGO
Project Number: 93B107C

**SHEAR STRENGTH vs DEPTH**

11/21/94 SHVDPT 3B107

Woodward-Clyde Consultants




**LEGEND**

| Boring Number | Test Symbol |
|---|---|
| B-SE-1-GT | ● |
| B-SE-2-GT | ⊠ |
| B-SE-10-GT | ▲ |
| B-SE-14-GT | ★ |
| B-SE-20-GT | ✕ |
| B-SE-24-GT | ✿ |
| B-SE-28-GT | ○ |
| B-SE-30-GT | △ |
| B-SE-33-GT | ⊗ |
| B-SW-2-GT | ⊕ |
| B-SW-5-GT | □ |
| B-SW-9-GT | ⊠ |
| B-SW-13-GT | ◍ |
| B-SW-17-GT | ☆ |
| B-SW-21-GT | ⊠ |
| B-SW-25-GT | ■ |
| B-SW-29-GT | ◆ |

Project: **LIGO**
Project Number: **93B107C**

**SHEAR STRENGTH vs DEPTH**

11/21/94 SHVDPT 3B107

**Woodward-Clyde Consultants**

# IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

# IMPORTANT INFORMATION
## ABOUT YOUR
# GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

## A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

*Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.*

## MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their geotechnical consultants through the construction stage,* to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

## SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

## GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.*

## A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

## BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. *These logs should not under any circumstances be redrawn* for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, *give contractors ready access to the complete geotechnical engineering report* prepared or authorized for their use. Those who do not provide such access may proceed under the *mistaken* impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

## READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are *not* exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. Your geotechnical engineer will be pleased to give full and frank answers to your questions.

## OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition, ASFE has developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

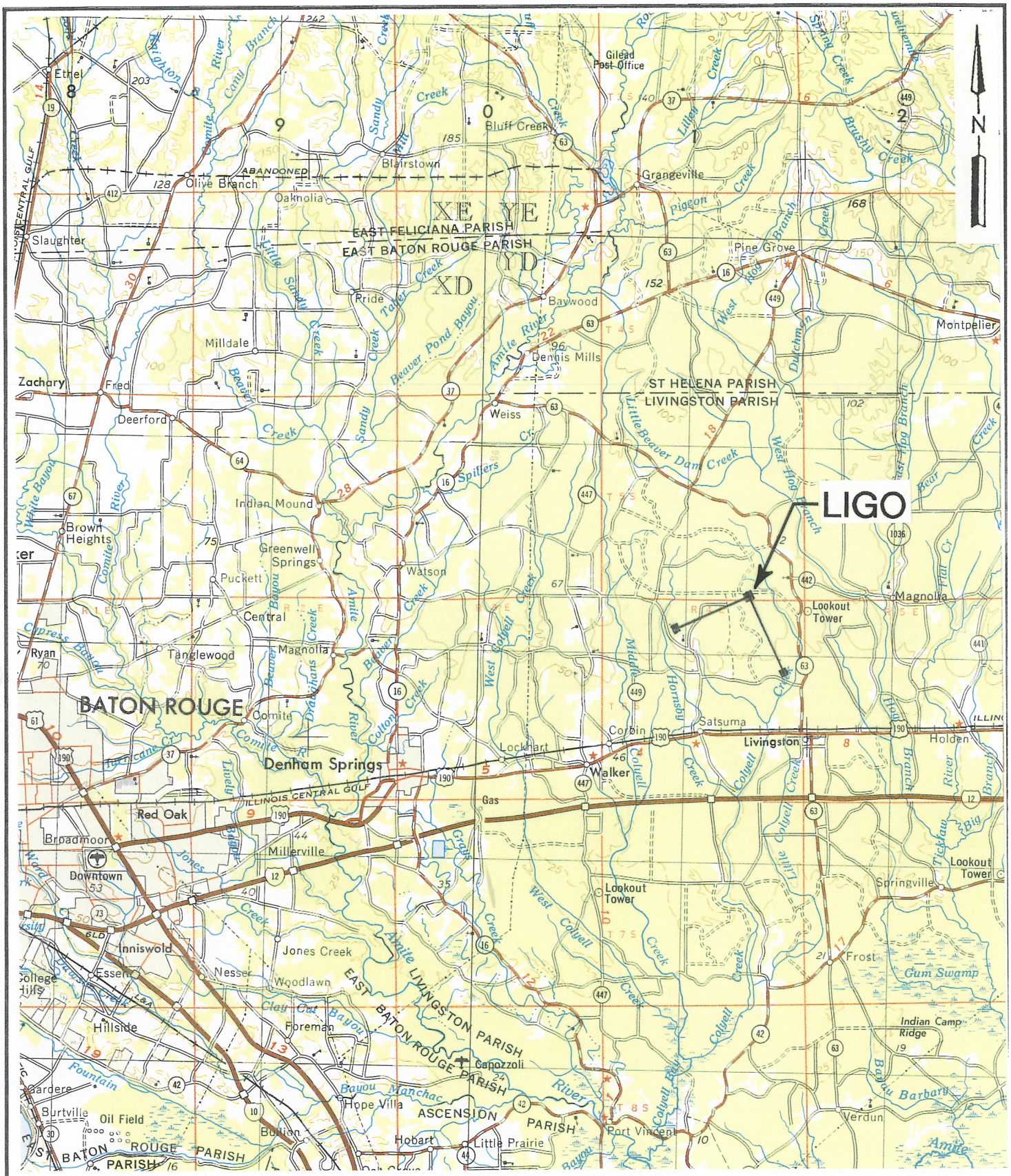
*Published by*

ASFE THE ASSOCIATION OF ENGINEERING FIRMS PRACTICING IN THE GEOSCIENCES

8811 Colesville Road/Suite G106/Silver Spring, Maryland 20910/(301) 565-2733

# SITE LOCATION AND LOCATION OF BORINGS AND CPT TESTS

NOTE: THIS SCANNED COPY IS MISSING FIGURE A-2, AN E-SIZED DRAWING ENTITLED "BORING LOCATION DIAGRAM" SEE THE ORIGINAL COPY FILED IN THE DOCUMENT CONTROL CENTER




REFERENCE: U.S.G.S. NH 156 BATON ROUGE, LA. AND MISSISSIPPI PHOTOREVISED 1982.

| | | | |
|---|---|---|---|
| LIGO<br>CALIFORNIA INSTITUTE OF TECHNOLOGY<br>PASADENA, CALIFORNIA | Woodward-Clyde Consultants<br>Consulting Engineers, Geologists and Environmental Scientists<br>Baton Rouge, Louisiana | SITE LOCATION MAP | FILE NO. 93B107C<br>FIG. NO. A-1 |
| SCALE: 1:250,000 | DRAWN BY: PCG DATE: 11/94<br>CHKD. BY: Sanders DATE: 16 Nov 94 | | |

# BORING IDENTIFICATION - TABLES A-1 AND A-2

# TABLE A-1

## BORING IDENTIFICATION, TYPE, DEPTH, AND STATION LOCATION

| Boring | Leg | Boring Number | Type of Boring | Depth in Feet | Station |
|---|---|---|---|---|---|
| B | SW | 01 | SC | 50 | 132+00 |
| | | 02 | GT | 50 | 131+50 |
| | | 03 | CP | 50 | 131+00 |
| | | 04 | CP | 25 | 126+45 |
| | | 05 | GT | 25 | 121+90 |
| | | 06 | CP | 25 | 117+35 |
| | | 07 | CP | 25 | 112+80 |
| | | 08 | CP | 25 | 108+25 |
| | | 09 | GT | 25 | 103+70 |
| B | SW | 10 | CP | 25 | 99+15 |
| | | 11 | CP | 25 | 94+60 |
| | | 12 | CP | 25 | 90+05 |
| | | 13 | GT | 25 | 85+50 |
| | | 14 | CP | 25 | 80+95 |
| | | 15 | CP | 25 | 76+40 |
| | | 16 | CP | 25 | 71+85 |
| | | 17 | GT | 25 | 66+50 |
| B | SW | 18 | CP | 25 | 66+00 |
| | | 19 | CP | 25 | 65+50 |
| | | 20 | CP | 25 | 61+15 |
| B | SW | 21 | GT | 25 | 56+60 |
| | | 22 | CP | 25 | 52+05 |
| | | 23 | CP | 25 | 47+50 |
| | | 24 | CP | 25 | 42+95 |
| | | 25 | GT | 25 | 38+40 |
| | | 26 | CP | 25 | 33+85 |
| | | 27 | CP | 25 | 29+30 |
| | | 28 | CP | 25 | 24+75 |
| | | 29 | GT | 25 | 20+20 |
| B | SW | 30 | CP | 25 | 15+65 |
| | | 31 | CP | 25 | 11+10 |
| | | 32 | CP | 25 | 6+55 |
| | | 33 | GT | 50 | 2+00 |
| | | 34 | CP | 50 | 0+00 |
| B | SW | 35 | SC | 50 | -2+00 |

SW - Southwest Leg
SE - Southeast Leg
25 foot borings to be 24.5 to 24.5 feet

GT - Geotechnical Soil Boring
CP - Standard Cone Penetrometer Test
SC - Seismic Cone Penetrometer Test

# TABLE A-2

## BORING IDENTIFICATION, TYPE, DEPTH, AND STATION LOCATION

| Boring | Leg | Boring Number | Type of Boring | Depth in Feet | Station |
|---|---|---|---|---|---|
| B | SE | 01 | GT | 50 | -2+00 |
| | | 02 | GT | 50 | 2+00 |
| | | 03 | CP | 25 | 6+55 |
| | | 04 | CP | 25 | 11+10 |
| | | 05 | CP | 25 | 15+65 |
| | | 06 | GT | 25 | 20+20 |
| | | 07 | CP | 25 | 24+75 |
| | | 08 | CP | 25 | 29+30 |
| | | 09 | CP | 25 | 33+85 |
| B | SE | 10 | GT | 25 | 38+40 |
| | | 11 | CP | 25 | 42+95 |
| | | 12 | CP | 25 | 47+50 |
| | | 13 | CP | 25 | 52+05 |
| | | 14 | GT | 25 | 56+60 |
| | | 15 | CP | 25 | 61+15 |
| | | 16 | CP | 25 | 65+50 |
| B | SE | 17 | GT | 25 | 66+00 |
| | | 18 | CP | 25 | 66+50 |
| | | 19 | CP | 25 | 71+85 |
| B | SE | 20 | GT | 25 | 76+40 |
| | | 21 | CP | 25 | 80+95 |
| | | 22 | CP | 25 | 85+50 |
| | | 23 | CP | 25 | 90+05 |
| | | 24 | GT | 25 | 94+60 |
| | | 25 | CP | 25 | 99+15 |
| | | 26 | CP | 25 | 103+70 |
| | | 27 | CP | 25 | 108+25 |
| | | 28 | GT | 25 | 112+80 |
| | | 29 | CP | 25 | 117+35 |
| B | SE | 30 | GT | 25 | 121+90 |
| | | 31 | CP | 25 | 126+45 |
| | | 32 | CP | 50 | 131+00 |
| | | 33 | GT | 50 | 131+50 |
| B | SE | 34 | SC | 50 | 132+00 |

SW - Southwest Leg
SE - Southeast Leg
25 foot borings to be 24.5 to 24.5 feet

GT - Geotechnical Soil Boring
CP - Standard Cone Penetrometer Test
SC - Seismic Cone Penetrometer Test

# LOGS OF BORINGS AND CPTS

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/9/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 2

Dry Augered: 0' - 30' Wash Bored: 30' - 50'

**Free water was encountered at a depth of 30' during dry augering. The water level rose to and remained at a depth of 27' after observation periods of 5 and 10 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | (1) | | 16 | | | | Firm, light gray and reddish tan SILTS with some sand, a trace of clay and clay pockets to stiff, light gray and reddish tan Silty CLAYS (ML/CL) |
| | | | | | 19 | | 43 | 28 | Very stiff, light gray and reddish tan Silty CLAYS with a trace of sand and ferrous nodules (CL) |
| 5 | | | | 2.49 (2) | 24 | 125 | 43 | 27 | |
| 10 | | | | | | | | | Very stiff, light gray and tan CLAYS (CH) |
| 15 | | | | | | | | | |
| | | | | | 38 | | | | —light gray and gray, 18'- 20' |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| | | | (3) | | 25 | | 41 | 26 | Stiff, light gray and tan CLAYS with large silt pockets and streaks (CH/CL) |
| 30 | | | | | | | | | |
| | | | | 0.96 | 38 | 112 | 82 | 62 | Stiff, light gray and tannish gray CLAYS with silt pockets and streaks (CH) |
| 35 | | | | | | | | | |
| | | | | | 24 | | 50 | 36 | —very stiff, greenish gray, with silt pockets and calcareous nodules, 38'- 40' |
| 40 | | | | | | | | | |

Continued Next Page

(1) 70.9% passing the #200 sieve.
(2) Unconsolidated, undrained triaxial compression test run at 7.5 psi confining pressure.
(3) Atterberg from more clayey portion.

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: [illegible]
FILE: 93B107C
DATE: 8/9/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 2 of 2

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | Very stiff, greenish gray CLAYS with silt pockets and calcareous nodules (CH) |
| 45 | | | | | 30 | | 59 | 35 | —tan and light gray, jointed, with silt pockets below 48' |
| 50 | | | | | | | | | Bottom of boring at 50'. Borehole grouted full depth. |

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/8/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 2

Dry Augered: 0' - 10' Wash Bored: 10' - 50'

**Free water was encountered at a depth of 9' during dry augering. The water level rose to and remained at a depth of 2.5' after observation periods of 3 and 5 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Stiff, tan, reddish tan and light gray Silty CLAYS with fine sand and ferrous nodules (CL) |
| 5 | | | (1) | 1.53 (2) | 15 | 132 | 35 | 24 | Firm, tan, reddish tan and light gray Clayey SANDS with a trace of fine gravel, clay streaks to more sandy (SC) |
| | | | | | | | | | —becoming firm sandy silt with clay, 6'- 8' |
| | | | | | 15 | | 41 | 28 | Very stiff, tan, red and light gray Silty CLAYS with some fine sand (CL) |
| 10 | | | 31 b/ft | | | | | | |
| 15 | | | 65 b/8" | (3) | 21 | | | | Very dense, tan and light gray fine SANDS with a trace of coarse and medium sand (SP) |
| | | | | | | | | | —very dense, white and tan, with silt and clay, 18'- 20' |
| 20 | | | 50 b/8" | | | | | | |
| | | | | | | | | | Stiff, bluish gray CLAYS with light gray silt streaks and pockets (CH/CL) |
| 25 | | | | | | | | | |
| | | | | 1.95 (4) | 23 | 125 | 45 | 31 | —very stiff below 28' |
| 30 | | | | | | | | | —bluish gray and tan, 28'- 38' |
| 35 | | | | | 31 | | | | —tan, 38'- 42' |
| 40 | | | | | | | | | |

Continued Next Page

(1) 39.7% passing the #200 sieve.
(2) Unconsolidated, undrained triaxial compression test run at 2.9 psi confining pressure.
(3) 9.2% passing the #200 sieve.
(4) Unconsolidated, undrained triaxial compression test run at 12.5 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/8/94
TECHNICIAN: M. Savoy
APPROVED:


| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | Very stiff, tan CLAYS (CH) |
| | | | | 2.11 | 20 | 126 | 36 | 20 | Very stiff, tan, light gray and greenish gray Silty CLAYS with fine sand (CL) |
| 45 | | | | | | | | | Very stiff, tan and light gray CLAYS (CH) |
| 50 | | | | | | | | | Bottom of boring at 50'. Borehole grouted full depth. |

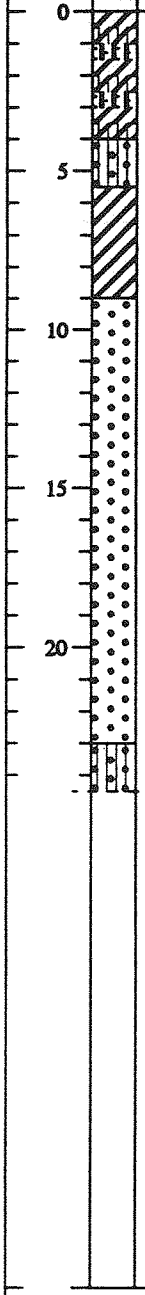
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



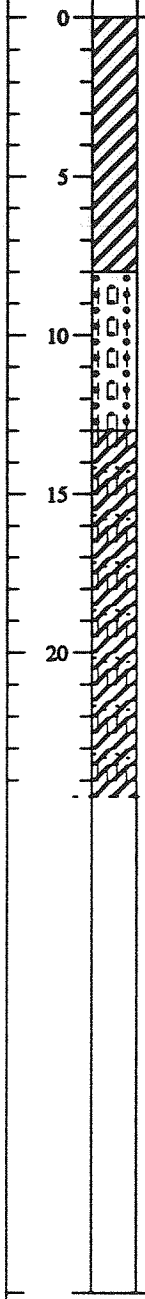

| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | LAYERED CLAY, SILTY CLAY AND SANDY SILT |
| | | | | | | SILTY SAND |
| | | | | | | CLAY |
| | | | | | | SAND |
| | | | | | | SANDY SILT |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

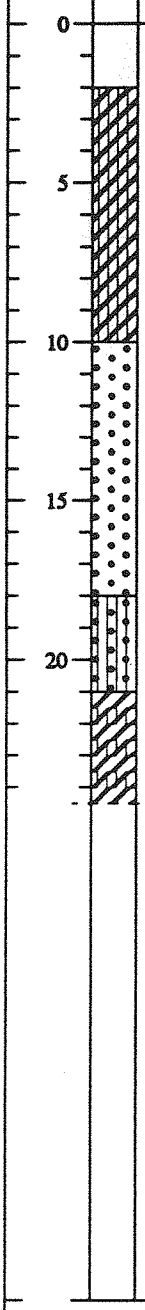
BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY AND SANDY SILT LAYERS |
| | | | | | | SAND AND SILTY SAND |
| | | | | | | ALTERNATING LAYERS OF SILTY CLAY, CLAY AND SANDY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



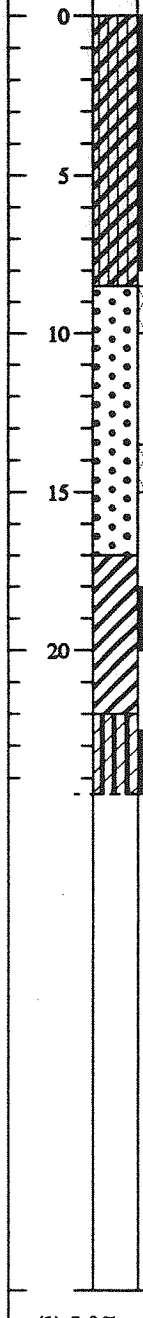

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | SILTY CLAY WITH CLAY AND CLAYEY SILT LAYERS |
| | | | | | | SAND |
| | | | | | | SILTY SAND WITH SILTY CLAY LAYERS |
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/10/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 8' Wash Bored: 8' - 24.5'

**Free water was encountered at a depth of 8' during dry augering. The water level rose to and remained at a depth of 4.7' after observation periods of 5 and 10 minutes, respectively.**




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | 17 | | 28 | 15 | Very stiff, light gray, brown and tan Silty CLAYS with sand streaks and pockets (CL) |
| 31 b/ft | | | | | | Dense, light gray and tan SANDS (SP) |
| 54 b/10" | (1) | 19 | | | | ---very dense, white and tan below 13' |
| | | 24 | | | | Very stiff, light gray, greenish gray and tan CLAYS with silt pockets and streaks (CH) |
| | | 29 | | | | Firm, greenish gray and tan Clayey SILTS with clay pockets and a trace of fine sand (CL) |
| | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) 5.0% passing the #200 sieve.

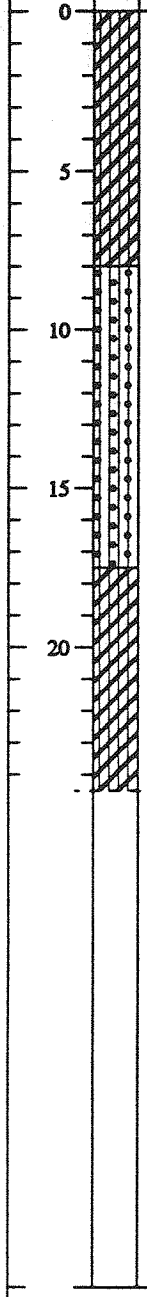
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

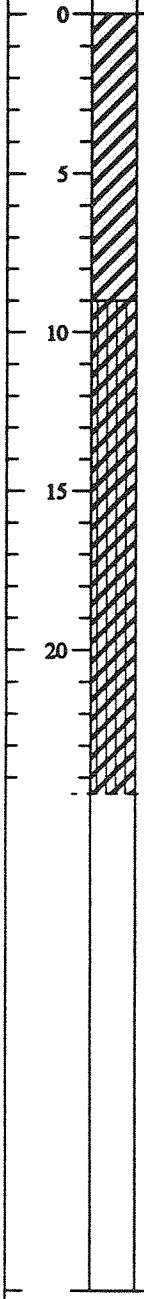
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY WITH CLAY AND SILTY SAND LAYERS |
| | | | | | | SILTY SAND WITH SAND AND SILTY CLAY LAYERS |
| | | | | | | SILTY CLAY WITH SILTY SAND LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

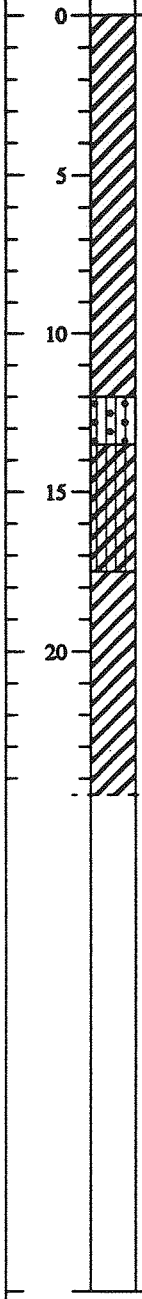
BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SILTY CLAY WITH CLAY AND SANDY SILT LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SILTY SAND |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/10/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 13' Wash Bored: 13' - 24.5'

Free water was encountered at a depth of 13' during dry augering.

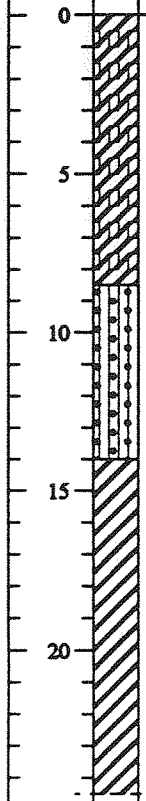
| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Light gray, white and tan SILTS or Clayey SILTS with a trace of fine sand (ML-CL) |
| | | | | | 21 | | | | Stiff, light gray and tan Silty CLAYS with clay pockets (CL) |
| 5 | | | | | | | | | Stiff, light gray and tan CLAYS (CH) |
| | | | | | 21 | | 28 | 13 | Stiff, light gray and tan Silty CLAYS with large light gray sandy silt streaks and pockets (CL) |
| 10 | | | | | | | | | |
| | | | | | | | | | Very stiff, tan and light gray CLAYS with silt pockets and streaks (CH/CL) |
| 15 | | | | | | | | | |
| | | | | 1.91 (1) | 23 | 123 | | | —stiff below 18' —light gray, tan and white, with silty sand streaks and pockets, 18'-20' |
| 20 | | | | | | | | | |
| | | | | 1.74 | 31 | 123 | 41 | 19 | —reddish brown, tan and light gray, with silt streaks and pockets, slickensides and silt lenses |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 11.9 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

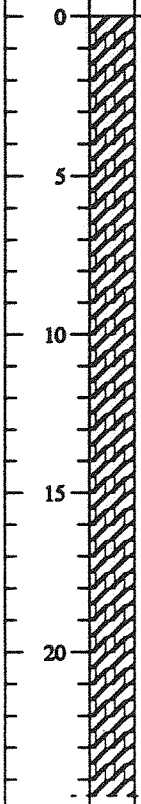
BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | SILTY SAND WITH SILTY CLAY AND SANDY SILT LAYERS |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



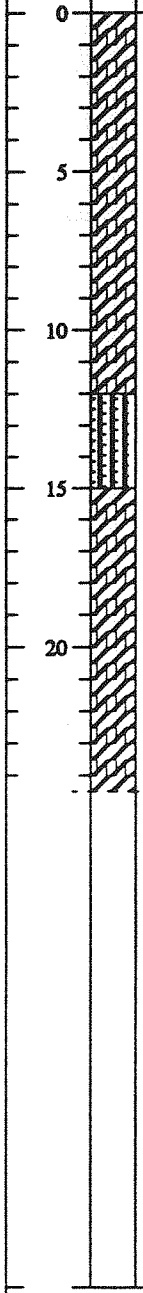

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | SANDY SILT |
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/10/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: Full Depth
No free water was encountered during dry augering.

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Tan and light gray Silty CLAYS (CL) |
| 5 | | | | | | | | | Stiff, light gray and tan CLAYS with sand streaks, pockets and some silt (CH) |
| | | | | | 19 | | | | Stiff, light gray and tan Silty CLAYS with silt and sand streaks and pockets (CL) |
| 10 | | | | | | | | | Very stiff, tan and light gray Silty CLAYS (CL) |
| 15 | | | | 2.23 | 23 | 125 | 49 | 34 | Very stiff, light gray, tan and greenish gray CLAYS with silt streaks and pockets (CH/CL) |
| 20 | | | | | 29 | | | | —light gray and tan below 22.5' |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

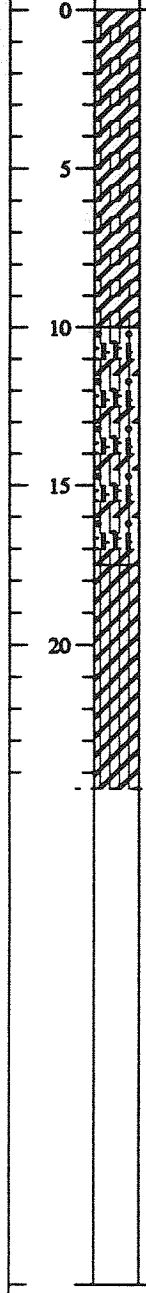
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

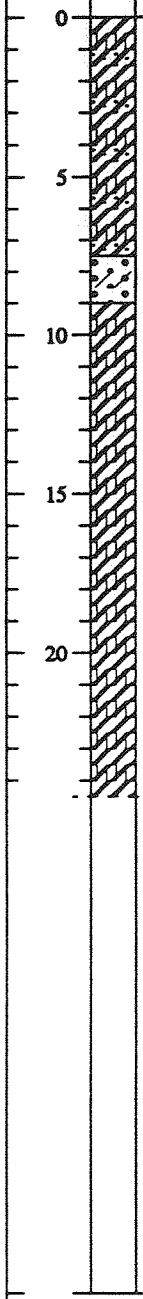
BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | ALTERNATING LAYERS OF SILTY SAND, SANDY SILT AND SILTY CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY, SILTY CLAY AND SANDY CLAY |
| | | | | | | SAND AND CLAYEY SAND |
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: B1-17-GT
FILE: 93B107C
DATE: 8/11/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 13' Wash Bored: 13' - 24.5'

**Free water was encountered at a depth of 13' during dry augering. The water level rose to depths of 13.2', 13.0' and 12.8' after observation periods of 5, 10 and 15 minutes, respectively.**

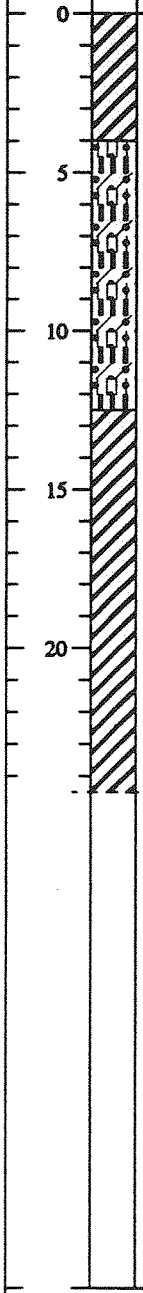
| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Medium, light gray and tan Sandy CLAYS becoming very stiff, with some silt (CL) |
| 5 | | | | | 14 | | | | Firm, light gray and tan Clayey SANDS with some silt and clay pockets (SC) —with fine gravel, 6'- 8' |
| 10 | | | | | 20 | | 26 | 9 | Firm, tan, light gray and brown SILTS with clay streaks, pockets and sand (ML/CL) |
| 15 | | | | | | | | | |
| 20 | | | | 2.32 (1) | 25 | 123 | 58 | 40 | Very stiff, light gray, greenish gray and tan CLAYS with silty sand streaks and pockets (CH) —with silt streaks below 22.5' |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 12.8 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: [illegible]
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



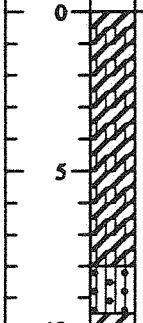

| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | ALTERNATING LAYERS OF SILTY SAND, SILT AND CLAYEY SAND |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



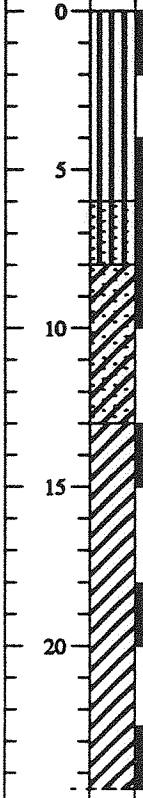

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | SILTY SAND |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/11/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 10' Wash Bored: 10' - 24.5'

**Free water was encountered at a depth of 10' during dry augering. The water level rose to depths of 9.5', 9.3' and 9.1' after observation periods of 5, 10 and 15 minutes, respectively.**




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | 21 | | | | Firm, tanish brown and light gray SILTS with clay pockets, a trace of sand and ferrous nodules (CL-ML) |
| | | 14 | | | | Firm, light gray and tan Sandy SILTS with clay pockets (SM) |
| | 1.30 | 16 | 129 | 45 | 28 | Stiff to very stiff, light gray and tan CLAYS with sand pockets and streaks to Sandy CLAYS (CH/CL) |
| | | 23 | | | | Stiff, light gray and greenish gray CLAYS with silt and sand streaks (CH) |
| | | 23 | | | | —very stiff, tan, light gray and greenish gray, with silt pockets, streaks and fine sand below 18' |
| | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

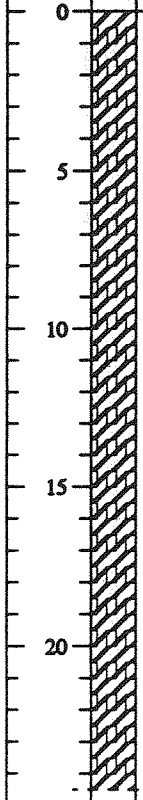
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

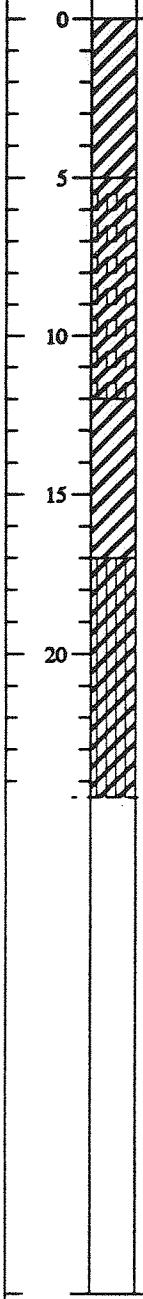
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

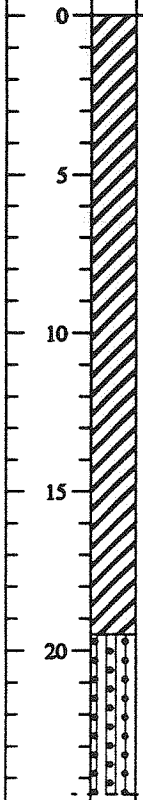
BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY WITH CLAY AND SILTY SAND LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | SILTY SAND WITH SAND LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: 8/11/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 13' Wash Bored: 13' - 24.5'

**Free water was encountered at a depth of 13' during dry augering. The water level rose to depths of 10.6', 10.4' and 9.9' after observation periods of 5, 10 and 15 minutes, respectively.**

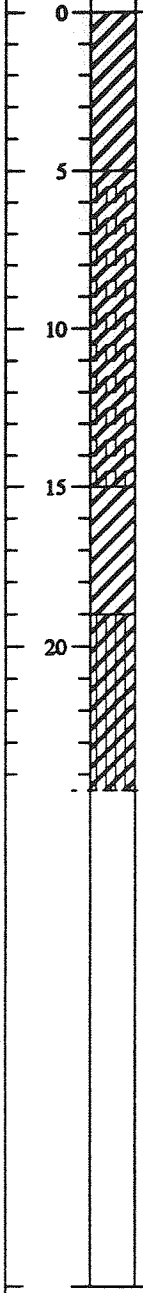
| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 24<br>22 | | | | Soft to medium, light gray and tan Silty CLAYS, wet, with clay pockets, ferrous nodules becoming very soft to soft (CL)<br>—medium, with sand, 2'- 4'<br>—medium to stiff, 4'- 10'<br>—with fine sand streaks and pockets, clay pockets and ferrous nodules, 4'- 6' |
| 5 | | | | | | | | | |
| 10 | | | | | 19 | | 23 | 9 | Medium to stiff, light gray and tan SILTS with silty sand streaks (ML/CL) |
| 15 | | | | | | | | | |
| 20 | | | (1) | 1.85 | 20 | 124 | 41 | 27 | Stiff to very stiff, light gray and tan CLAYS with silty sand streaks and pockets to more sandy (CH/CL) |
| | | | | | | | | | Bottom of boring at 24.5'.<br>Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 13.2 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY WITH CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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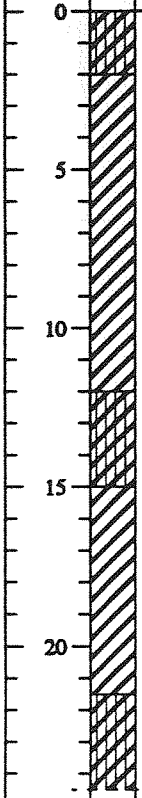


| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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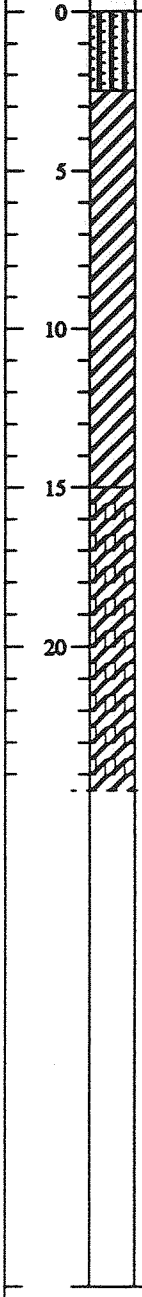



| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SANDY SILT |
| | | | | | | CLAY |
| | | | | | | LAYERED CLAY AND SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/11/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 15' Wash Bored: 15' - 24.5'

**Free water was encountered at a depth of 15' during dry augering. The water level rose to a depth of 13.3' after an observation period of 15 minutes.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 22 | | | | Medium to stiff, light gray and tan Silty CLAYS with clay pockets, ferrous nodules and a trace of fine sand (CL) |
| 5 | | | | | 15 | | | | Light gray, red and tan Clayey SANDS, Sandy CLAYS with a trace of medium sand (CL/SC) |
| 10 | | | | | 23 | | | | Very stiff, yellow, tan and light gray CLAYS with silt streaks, pockets and a trace of fine sand (CH) |
| 15 | | | | 1.82 | 22 | 127 | 38 | 23 | —gray and tan below 18' |
| 20 | | | | | 25 | | | | —with silt and sand streaks and pockets, trace of roots and organics below 22.5' |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

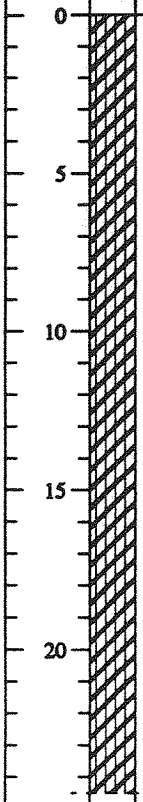
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY WITH CLAY AND CLAYEY SAND LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

JAN 6 95 WCSGBR8 3B107 BSE29CP

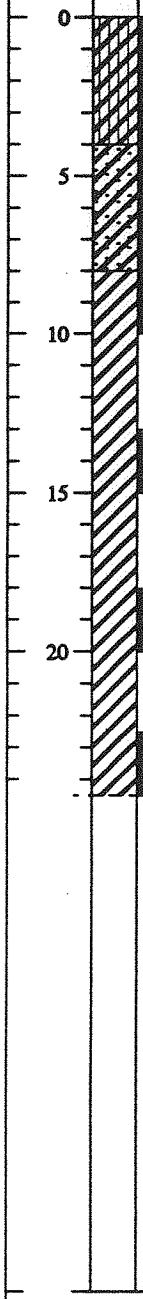
Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: B 32-30-S1
FILE: 93B107C
DATE: 8/12/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 10' Wash Bored: 10' - 24.5'

Free water was encountered at a depth of 10' during dry augering. The water level rose to depths of 9.5', 9.3' and 9.2' after observation periods of 5, 10 and 15 minutes, respectively.




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | Gray Silty CLAYS with roots, a trace of fine sand, organics, to light gray and brown with ferrous nodules and clay pockets (CL) |
| | | | | | | —tan, 2'- 4' |
| | 1.06 | 14 | 135 | 21 | 11 | Stiff, light gray, tan and yellow Sandy CLAYS with silty sand streaks (SC) |
| | | 22 | | | | Very stiff, brown, tan and light gray CLAYS with silt streaks and pockets (CH) |
| | 2.36 (1) | 23 | 126 | 56 | 39 | —light gray and tan, with silt streaks, pockets and a trace of fine sand, 13'- 15' |
| | | | | | | —with silt pockets below 18' |
| | | 37 | | | | —stiff to very stiff, with sandy silt streaks, pockets and layers below 23' |
| | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 10.4 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
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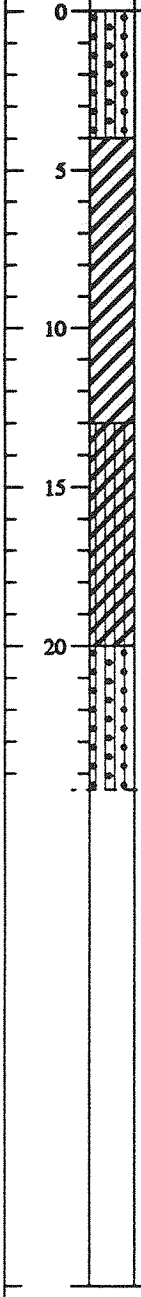


| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY SAND |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SILTY CLAY |
| | | | | | | SILTY SAND |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 2

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | ALTERNATING LAYERS OF SILTY CLAY AND CLAY |
| 5 | | | | | | | | | |
| 10 | | | | | | | | | SAND |
| 15 | | | | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | SILTY CLAY |
| 30 | | | | | | | | | SILTY SAND |
| 35 | | | | | | | | | ALTERNATING LAYERS OF SILTY CLAY AND CLAY |
| 40 | | | | | | | | | |

Continued Next Page

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:


| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | ALTERNATING LAYERS OF SILTY CLAY AND CLAY |
| | | | | | | | | | SILTY CLAY |
| 45 | | | | | | | | | |
| 50 | | | | | | | | | Bottom of sounding at 50'.<br>Sounding grouted full depth. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/12/94
TECHNICIAN: M. Savoy
APPROVED:


Dry Augered: 0' - 10' Wash Bored: 10' - 50'

**Free water was encountered at a depth of 10' during dry augering. The water level rose to depths of 10.3', 10.1' and 9.7' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Soft to medium, brown, light gray and tan Silty CLAYS with small roots, clay pockets and ferrous nodules (CL)<br>—with sand layer at 2' |
| 5 | | | | 1.29 | 14 | 134 | 26 | 15 | Firm, tan and light gray Clayey SANDS with clay pockets and streaks becoming Sandy CLAYS (SC/CL) |
| 10 | | | | | | | | | |
| 15 | | | | 0.97 | 30 | 119 | 51 | 31 | Very stiff, light gray and tan slickensided CLAYS with a trace of silt streaks and pockets (CH) |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | Very stiff, light gray and tan Sandy CLAYS (CL) |
| 30 | | | | | | | | | Light gray and tan Silty CLAYS (CL) |
| 35 | | | | | | | | | —gray and tan, 38'- 43' |
| 40 | | | | | | | | | |

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Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/12/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 2 of 2

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | Hard, gray and tan Silty CLAYS (CL) |
| | | | | | | | | | —tan and light gray below 43' |
| 45 | | | | | | | | | |
| 50 | | | | | | | | | Bottom of boring at 50'. Borehole grouted full depth. |

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:


| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | CLAY |
| 5 | | | | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | CLAY |
| 20 | | | | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | SILTY SAND AND SANDY SILT |
| 35 | | | | | | | | | SILTY CLAY WITH CLAY LAYERS |
| 40 | | | | | | | | | |

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PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:


| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | SILTY CLAY WITH CLAY LAYERS |
| 45 | | | | | | | | | |
| | | | | | | | | | Bottom of sounding at 49'. Sounding grouted full depth. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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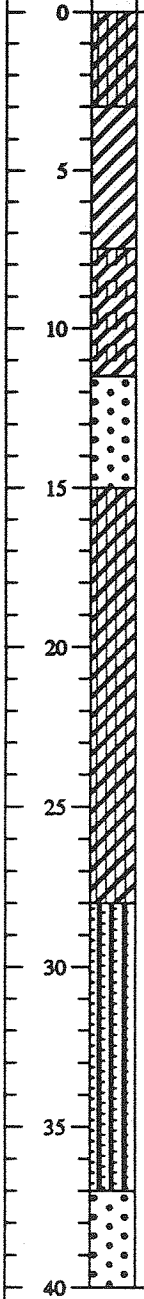


| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | LAYERS OF SILTY CLAY AND CLAY |
| | | | | | | SAND |
| | | | | | | SILTY CLAY WITH CLAY AND SANDY SILT LAYERS |
| | | | | | | SANDY SILT TO SILTY SAND |
| | | | | | | SAND |

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PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:


| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | SAND |
| 45 | | | | | | | | | Bottom of sounding at 45'.<br>Sounding grouted full depth. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/14/94
TECHNICIAN: M. Savoy
APPROVED:


Dry Augered: 0' - 6' Wash Bored: 6' - 50'

**Free water was encountered at a depth of 6' during dry augering. Borehole caved in at 3', no water reading.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Firm, brown and light gray Clayey SILTS with clay streaks, pockets and small roots (CL-ML) |
| | | | | | | | | | Medium to stiff, light gray and tan Silty CLAYS with clay pockets, sand streaks and pockets and ferrous nodules (CL) |
| 5 | | | | | 17 | | 25 | 13 | |
| | | | | 1.77 | 19 | 123 | 47 | 32 | Medium, tannish brown and light gray Sandy CLAYS with sand pockets becoming white silty sand (CL/SM) |
| | | | | | | | | | Stiff, light gray, gray, brown and tan CLAYS with silt and sand streaks, pockets and ferrous nodules (CH/CL) |
| 10 | | | | | | | | | |
| | | | | 1.43 (1) | 15 | 130 | 22 | 9 | Firm, white, gray, light gray and tan Clayey SANDS with clay pockets and sand (SC) |
| 15 | | | | | | | | | |
| | | | | | 35 | | 71 | 49 | Very stiff, gray, tan and light gray CLAYS with silt lenses and streaks (CH) |
| 20 | | | | | | | | | |
| | | | | | | | | | Very stiff, light gray and tan Silty CLAYS (CL) |
| 25 | | | | | | | | | |
| | | | | | 27 | | | | Stiff, gray CLAYS with sandy silt streaks and pockets (CH) |
| 30 | | | | | | | | | |
| | | | | | | | | | Medium, light gray Silty CLAYS with some fine sand and clayey sand layers (CL-SC) |
| 35 | | | | 0.74 (2) | 16 | 126 | 24 | 12 | |
| 40 | | | | | | | | | |

Continued Next Page

(1) Unconsolidated, undrained triaxial compression test run at 8.2 psi confining pressure.
(2) Unconsolidated, undrained triaxial compression test run at 18.2 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/14/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 2 of 2

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | Medium, light gray Silty CLAYS with some fine sand and clayey sand layers (CL-SC) |
| 45 | | | 48 b/ft | | | | | | Dense, tan SANDS (SP) |
| 50 | | | 50 b/6" | | | | | | —very dense, with a trace of gravel below 48' |
| | | | | | | | | | Bottom of boring at 50'. Borehole grouted full depth. |

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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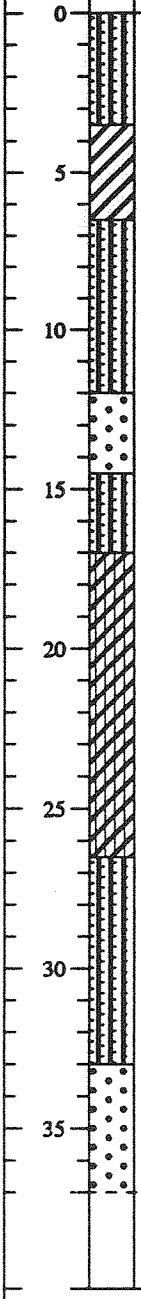


| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SANDY SILT WITH SILTY CLAY LAYERS |
| | | | | | | CLAY |
| | | | | | | SANDY SILT |
| | | | | | | SAND |
| | | | | | | SANDY SILT |
| | | | | | | SILTY CLAY WITH SANDY SILT LAYERS |
| | | | | | | SANDY SILT WITH SAND LAYERS |
| | | | | | | SAND |
| | | | | | | Bottom of sounding at 37'.<br>Sounding grouted full depth. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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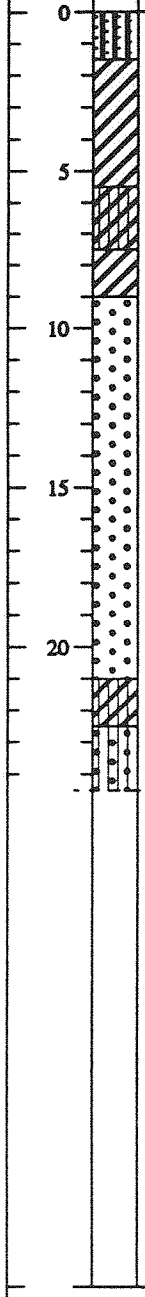


| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SANDY SILT |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SAND WITH SANDY SILT LAYERS |
| | | | | | | SILTY CLAY |
| | | | | | | SILTY SAND |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/13/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 13' Wash Bored: 13' - 24.5'

**Free water was encountered at a depth of 13' during dry augering. The water level rose to depths of 5.8', 5.1' and 4.4' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Soft to medium, light gray and tan Silty CLAYS with clay pockets and silty sand pockets and streaks (CL) |
| | | | | | | | | | —medium, brown, light gray and tan, 2'- 4' |
| 5 | | | (1) | | 18 | | 27 | 14 | |
| | | | | 2.74 | 15 | 134 | 27 | 16 | —very stiff, gray, light gray and tan, with some fine sand and ferrous nodules, 8'- 10' |
| 10 | | | | | | | | | |
| | | | (2) | | 29 | | 70 | 22 | Stiff to very stiff, tan and light gray CLAYS with silty sand streaks and pockets and a trace of ferrous nodules (CH) |
| 15 | | | | | | | | | |
| | | | | 1.90 | 24 | 124 | 55 | 38 | |
| 20 | | | | | | | | | |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) 72.3% passing the #200 sieve.
(2) 98.7% passing the #200 sieve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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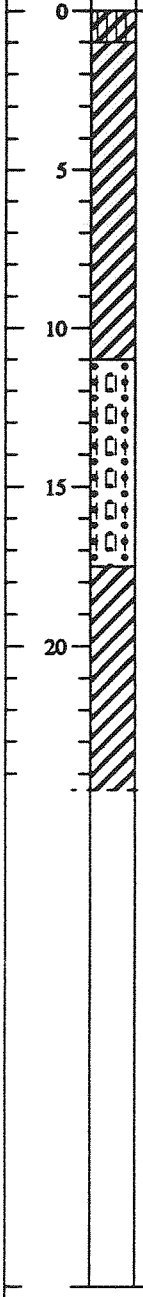
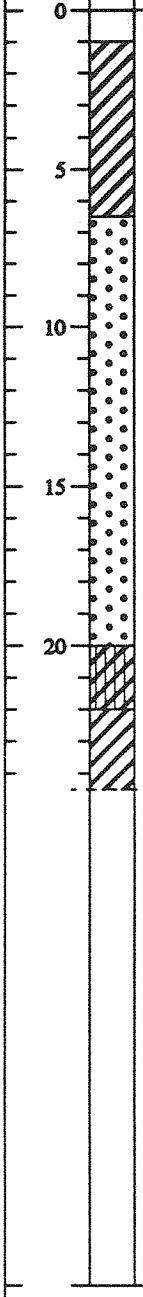



| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SAND AND SILTY SAND TO SANDY SILT |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



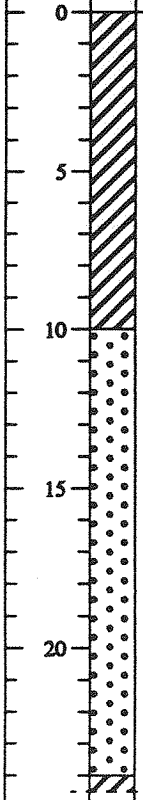

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SAND WITH SILTY SAND TO SANDY SILT LAYERS |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SAND |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/13/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 8' Wash Bored: 8' - 24.5'

**Free water was encountered at a depth of 8' during dry augering. The water level rose to depths of 8.0', 7.0' and 6.1' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 20 | | | | Soft, brown and tan Silty CLAYS with ferrous nodules (CL) |
| 5 | | | | | | | | | |
| | | | (1) (2) | 1.81 | 20 | 124 | | | Reddish brown and tan fine SANDS with some silt and a trace of clay (SP-SM) |
| 10 | | | | | | | | | |
| | | | (3) | | 14 | | | | Soft, light gray and tan Sandy SILTS or Silty SANDS with ferrous nodules and a trace of clay (SM-ML) |
| 15 | | | | | | | | | |
| | | | | | | | | | Very stiff, tan, light gray and bluish gray CLAYS with a trace of silt pockets (CH) |
| 20 | | | | 2.44 | 32 | 122 | 59 | 41 | |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) 11.3% passing the #200 sieve.
(2) Unconsolidated, undrained triaxial compression test run at 7.1 psi confining pressure.
(3) 52.4% passing the #200 sieve.

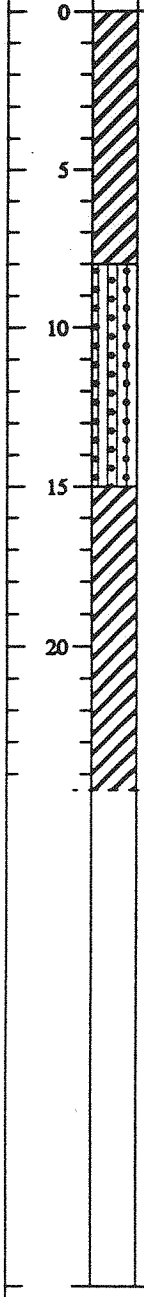
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

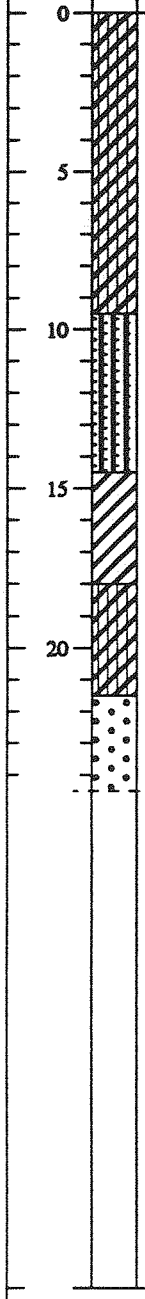
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SILTY SAND |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

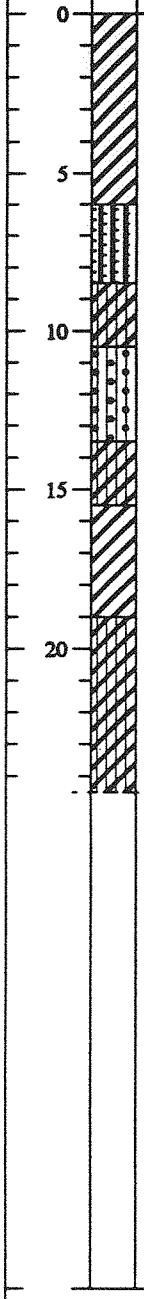
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY WITH CLAY LAYERS |
| | | | | | | SANDY SILT |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | SAND WITH SANDY SILT LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SANDY SILT |
| | | | | | | SILTY CLAY |
| | | | | | | SILTY SAND |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY WITH SILTY SAND LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/14/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 10' Wash Bored: 10' - 24.5'

**Free water was encountered at a depth of 10' during dry augering. The water level remained at a depth of 10' after observation periods of 5 and 10 minutes.**

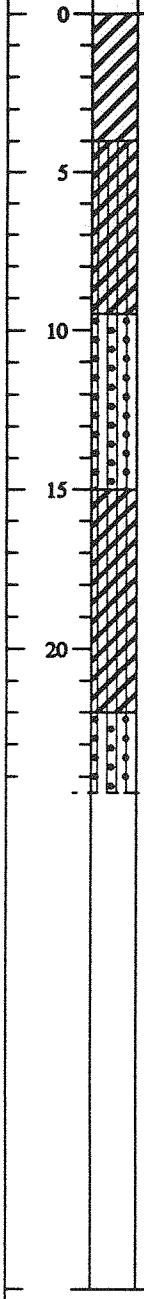
| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Very soft to soft, light gray, gray and tan Silty CLAYS with ferrous nodules, clay pockets and trace of fine sand (CL) |
| 5 | | | | | | | | | Very stiff, tan and light gray CLAYS with silt pockets (CH) |
| 10 | | | (1) | 1.89 | 14 | 134 | | | Stiff, tan and light gray Sandy CLAYS with clay pockets (CL) |
| 15 | | | | | 13 | | 15 | 2 | Firm, tan and light gray Sandy SILTS with a trace of clay (ML/SM) |
| 20 | | | | | | | | | Stiff to very stiff, tan, yellow, gray and light gray CLAYS with a trace of silt pockets and streaks (CH/CL) |
| | | | | | 20 | | 40 | 24 | —very stiff, gray and light gray, with silt and sandy silt pockets and streaks below 22.5' |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 7.5 psi confining pressure.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



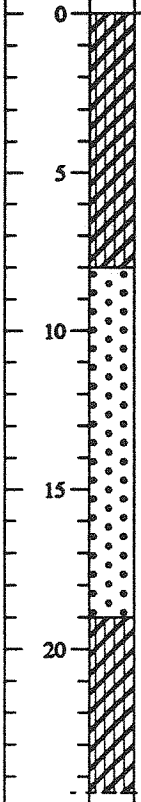

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | SILTY CLAY WITH SANDY SILT LAYERS |
| | | | | | | SILTY SAND WITH SANDY SILT AND SILTY CLAY LAYERS |
| | | | | | | SILTY CLAY WITH CLAY LAYERS |
| | | | | | | SILTY SAND |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

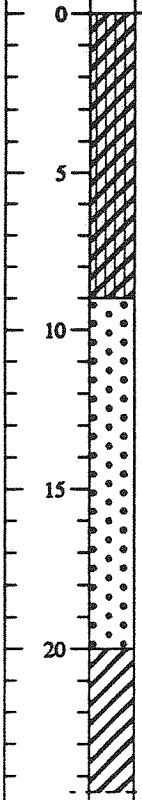
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY |
| | | | | | | SAND WITH SANDY SILT LAYERS |
| | | | | | | SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY WITH CLAY LAYERS |
| | | | | | | SAND WITH SANDY SILT LAYERS |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/14/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 10' Wash Bored: 10' - 24.5'

**Free water was encountered at a depth of 10' during dry augering. The water level rose to depths of 5.7', 5.5' and 5.1' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Very stiff, gray Silty CLAYS with ferrous nodules, small roots, becoming light gray and tan (CL) |
| | | | | | | | | | —with sand, 2'- 4' |
| 5 | | | | | | | | | Very stiff, tan and red Sandy CLAYS (CL) |
| | | | (1) | 2.24 | 18 | 127 | 32 | 16 | Medium, tan and light gray Silty CLAYS with clay pockets and a trace of fine sand (CL) |
| 10 | | | | | | | | | |
| | | | | | | | | | Very dense, tan Clayey SANDS (SC) |
| 15 | | | 50 b/10" | | | | | | Dense, tan SANDS with clay layers (SP) |
| | | | 19 b/ft | | | | | | —with a trace of gravel, 18'- 20' |
| 20 | | | | | | | | | |
| | | | (2) | | 37 | | | | Medium, gray CLAYS with a trace of wood and organics, some silt (CH) |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 7.5 psi confining pressure.
(2) 98.2% passing the #200 sieve.

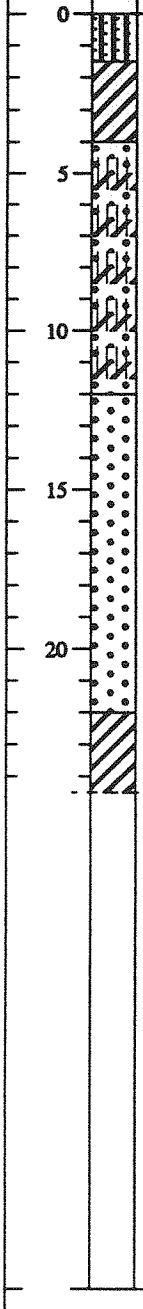
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SANDY SILT |
| | | | | | | CLAY |
| | | | | | | ALTERNATING LAYERS OF SAND, SILTY SAND AND SILTY CLAY |
| | | | | | | SAND WITH SANDY SILT LAYERS |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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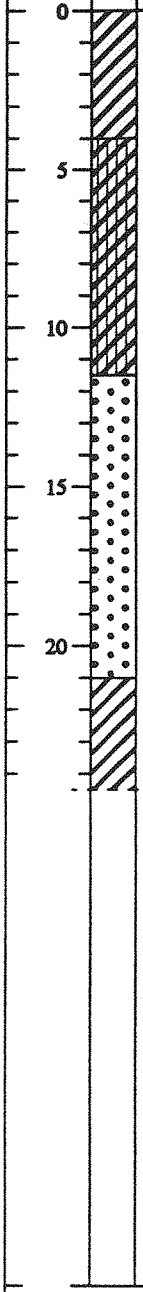


| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | SAND WITH SILTY SAND LAYERS |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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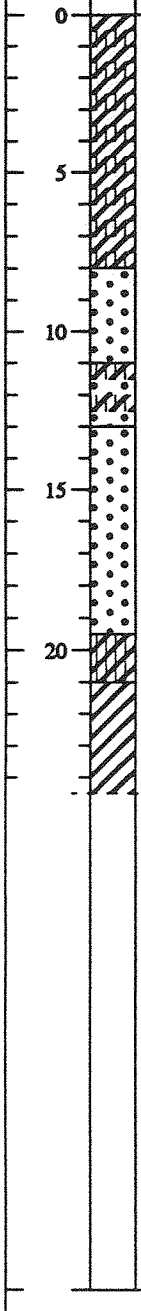



| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | ALTERNATING LAYERS OF CLAY AND SILTY CLAY |
| | | | | | | SAND WITH SILTY SAND LAYERS |
| | | | | | | ALTERNATING LAYERS OF SILTY CLAY AND SAND |
| | | | | | | SAND |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE:
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 10' Wash Bored: 10' - 24.5'

**Free water was encountered at a depth of 10' during dry augering. The water level rose to depths of 9.7', 8.9' and 8.7' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Soft to medium, tan, yellow and light gray Silty CLAYS with a trace of fine sand streaks and pockets and ferrous nodules (CL) |
| 5 | | | | | 17 | | | | —stiff, 4'- 6' |
| 10 | | | (1) | 1.72 | 15 | 132 | 25 | 13 | Stiff, light gray and tan Sandy CLAYS with some fine sand streaks and pockets (CL) —with clay pockets and silty sand pockets and streaks, 8'- 10' |
| 15 | | | (2) | | 19 | | 30 | 15 | Very stiff, light gray and tan Sandy SILTS with some clay pockets to yellow and tan jointed Silty CLAYS (SM/CL) |
| | | | (3) | 0.72 | 34 | 114 | 50 | 33 | |
| 20 | | | | 0.81 | 43 | 115 | 62 | 35 | Medium to stiff, gray CLAYS with silt pockets and streaks and a trace of organics (CL/CH) |
| | | | | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) Unconsolidated, undrained triaxial compression test run at 7.5 psi confining pressure.
(2) Atterberg limits performed on more clayey portion of sample.
(3) Unconsolidated, undrained triaxial compression test run at 12.1 psi confining pressure.

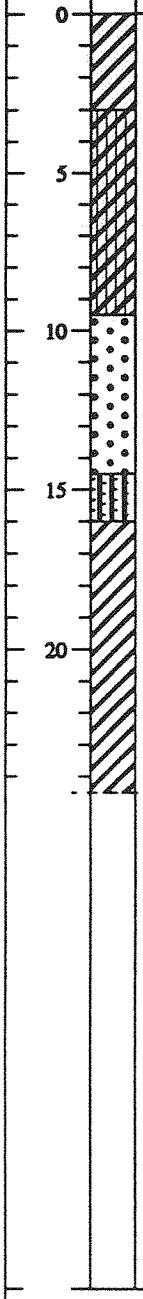
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



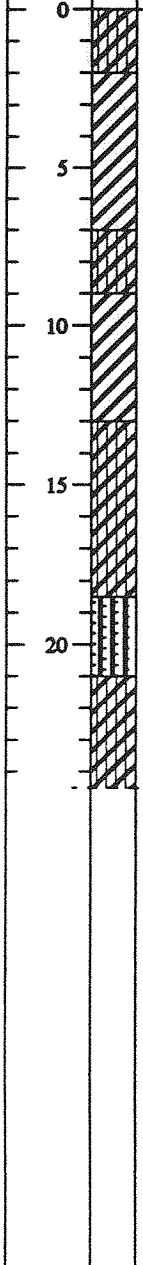

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | SILTY CLAY WITH CLAY AND CLAYEY SILT LAYERS |
| | | | | | | SAND |
| | | | | | | SANDY SILT |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY CLAY WITH CLAY AND SANDY SILT LAYERS |
| | | | | | | SANDY SILT |
| | | | | | | SILTY CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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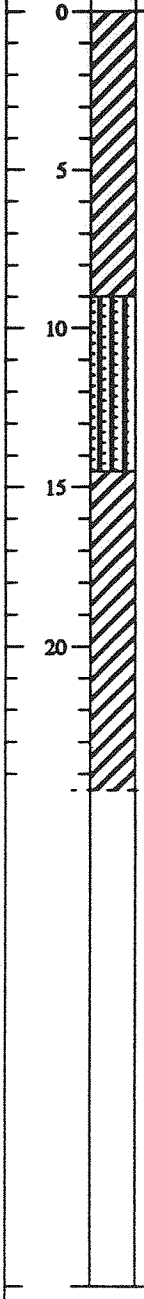


| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SANDY SILT |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/15/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 8' Wash Bored: 8' - 24.5'

**Free water was encountered at a depth of 8' during dry augering. The water level rose to depths of 3.6', 3.4' and 3.1' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Gray Silty CLAYS, wet, with roots, fine sand, trace of organics and ferrous nodules, becoming light gray and tan (CL) |
| 5 | | | | | 20 | | 33 | 20 | —soft to medium, tan, light gray and greenish gray, with clay pockets, and silty sand streaks and pockets, 4'- 6' |
| 10 | | | 32 b/ft<br>50 b/10" | (1) | 19 | | | | Dense to very dense, tan fine SANDS with some silt and a trace of medium to coarse grained sand (SP) |
| 15 | | | | 0.37 | 56 | 101 | 73 | 48 | Medium, jointed gray and light gray slickensided CLAYS (CH) |
| 20 | | | | 0.43 | 42 | 106 | 67 | 43 | |
| | | | | | | | | | Stiff, greenish gray Silty CLAYS (CL) |
| | | | | | | | | | Bottom of boring at 24.5'.<br>Borehole grouted full depth. |

(1) 8.9% passing the #200 sieve.

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
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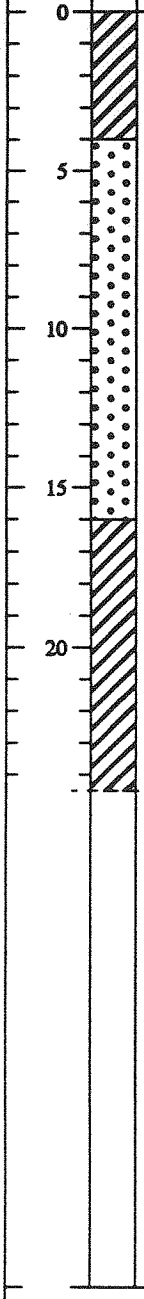


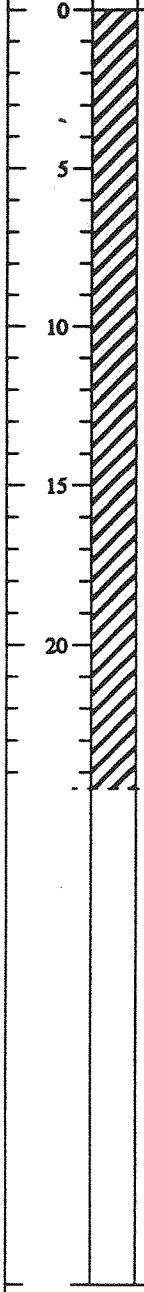

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | SAND |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



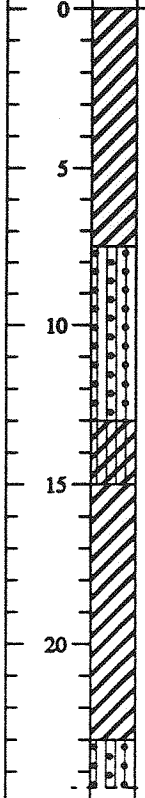

| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO

LOCATION: Livingston, Louisiana

CLIENT: California Institute of Technology

FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1



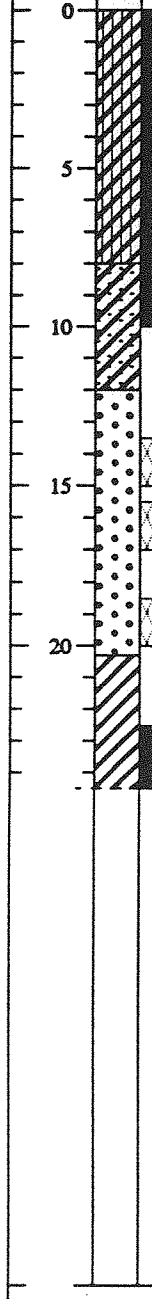

| S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY AND SANDY SILT LAYERS |
| | | | | | | SILTY SAND WITH THIN SILTY CLAY LAYERS |
| | | | | | | SILTY CLAY |
| | | | | | | CLAY |
| | | | | | | SILTY SAND |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

FILE: 93B107C
DATE: 8/15/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 1

Dry Augered: 0' - 10' Wash Bored: 10' - 24.5'

**Free water was encountered at a depth of 10' during dry augering. The water level rose to depths of 5.6', 5.4' and 5.4' after observation periods of 5, 10 and 15 minutes, respectively.**




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | Stiff, tan, gray and light gray Silty CLAYS with fine sand and small roots becoming Clayey SILTS (CL) |
| | 1.06 | 19 | 127 | 24 | 11 | —stiff, with some fine sand and clay pockets, silty sand streaks and pockets, 4'- 6' |
| | | 19 | | | | Stiff, tan and light gray Sandy CLAYS or Clayey SANDS becoming Silty SANDS (CL/SM) |
| 56 b/8" | | | | | | Very dense, white and light gray fine SANDS with traces of silt, clay, coarse and medium grained sands and fine gravel (SP-SM) |
| 52 b/8" | (1) | 20 | | | | |
| 30 b/ft | | | | | | —dense, 18'- 20' |
| | | 34 | | 59 | 37 | Very stiff, tan and greenish gray CLAYS with a trace of silt and ferrous nodules (CH) |
| | | | | | | Bottom of boring at 24.5'. Borehole grouted full depth. |

(1) 8.8% passing the #200 sieve.

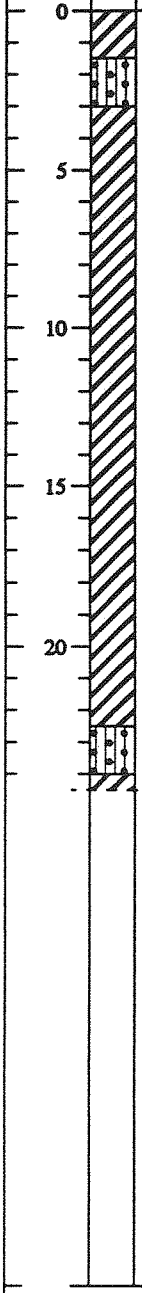
Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY |
| | | | | | | SILTY SAND |
| | | | | | | CLAY WITH SILTY CLAY LAYERS |
| | | | | | | SILTY SAND |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |



Woodward-Clyde Consultants

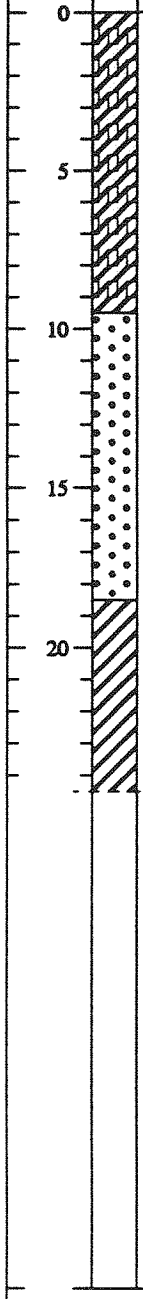
PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: BSW-31CP
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | CLAY WITH SILTY CLAY AND SANDY SILT LAYERS |
| 5 | | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| | | | | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 1




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | LAYERED CLAY AND SILTY CLAY |
| | | | | | | SAND WITH SILTY SAND LAYERS |
| | | | | | | CLAY |
| | | | | | | Bottom of sounding at 24.5'. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: [illegible]
FILE: 93B107C
DATE: 8/9/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 1 of 2

Dry Augered: 0' - 4' Wash Bored: 4' - 50'

**Free water was encountered at a depth of 4' during dry augering. The water level rose to depths of 2.5', 1.8' and 1.5' after observation periods of 5, 10 and 15 minutes, respectively.**

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | Tan and light gray Silty CLAYS (CL) |
| | | | | | | | | | Tan and light gray Sandy SILTS (ML) |
| 5 | | | 58 b/ft | (1) | 16 | | | | Very dense, white and tan fine SANDS with trace of silt (SP-SM) |
| | | | 50 b/8" | | | | | | —with 4" clayey sand layer at 6' |
| | | | 56 b/ft | | | | | | —with a trace of gravel, 8'- 12' |
| 10 | | | 34 b/ft | (2) | 23 | | | | —dense at 10.5' |
| 15 | | | 50 b/9" | | | | | | —very dense at 14.5' |
| | | | | 0.88 (3) | 51 | 105 | 66 | 41 | Medium, gray and brown slickensided CLAYS with some organics (CH) |
| 20 | | | | | | | | | |
| | | | | | 24 | | 28 | 11 | Firm, light gray and white Clayey SILTS with some fine sand and clay pockets (CL) |
| 25 | | | | | | | | | |
| | | | | | | | | | Very stiff, light gray, greenish gray, tan and yellow Silty CLAYS with sandy silt pockets and streaks (CL) |
| 30 | | | (4) | | 28 | | | | |
| 35 | | | | | | | | | |
| 40 | | | | | | | | | |

Continued Next Page

(1) 17.8% passing the #200 sieve.
(2) 9.5% passing the #200 sieve.
(3) Unconsolidated, undrained triaxial compression test run at 8.4 psi confining pressure.
(4) Tests from clayey portion of sample.

Unified Soil Classifications based on limited laboratory test data and visual observations.



Woodward-Clyde Consultants

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: BSW-33-GT
FILE: 93B107C
DATE: 8/9/94
TECHNICIAN: M. Savoy
APPROVED:
PAGE: 2 of 2

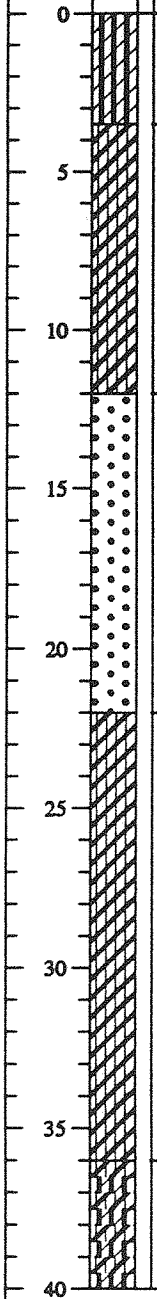
| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | Very stiff, light gray, greenish gray, tan and yellow Silty CLAYS with sandy silt pockets and streaks (CL) |
| 45 | | | (5) | | 22 | | 51 | 31 | Very stiff, light gray and greenish gray CLAYS with a trace of sand and silt becoming light gray Clayey SANDS (CH/CL) |
| 50 | | | | | | | | | Bottom of boring at 50'. Borehole grouted full depth. |

(5) Tests from silty clay with sand portion of sample.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 2




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAYEY SILT |
| | | | | | | SILTY CLAY WITH SANDY SILT LAYERS |
| | | | | | | SAND |
| | | | | | | SILTY CLAY WITH SILTY SAND AND SANDY SILT LAYERS |
| | | | | | | ALTERNATING LAYERS OF SILTY CLAY AND CLAYEY SILT |

Continued Next Page

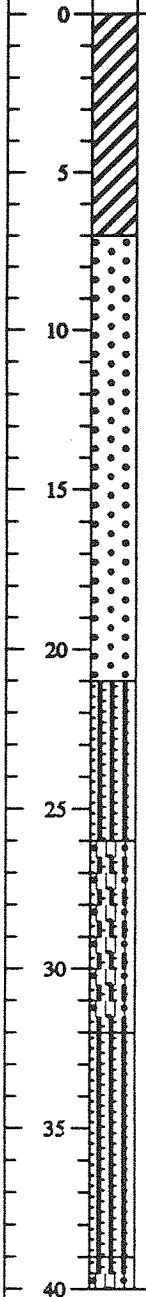
PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: BSW-34CP
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:


| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (taf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | ALTERNATING LAYERS OF SILTY CLAY AND CLAYEY SILT |
| 45 | | | | | | | | | SILTY CLAY |
| 50 | | | | | | | | | Bottom of sounding at 50'.<br>Sounding grouted full depth. |

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING: B-SW-3S-SC
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 1 of 2




| S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|
| | | | | | | CLAY WITH SILTY CLAY AND CLAYEY SILT LAYERS |
| | | | | | | SAND WITH SANDY SILT LAYERS |
| | | | | | | SANDY SILT |
| | | | | | | LAYERS OF SILTY SAND AND SANDY SILT |
| | | | | | | SANDY SILT |
| | | | | | | SANDY SILT, SILTY SAND AND SILTY CLAY |

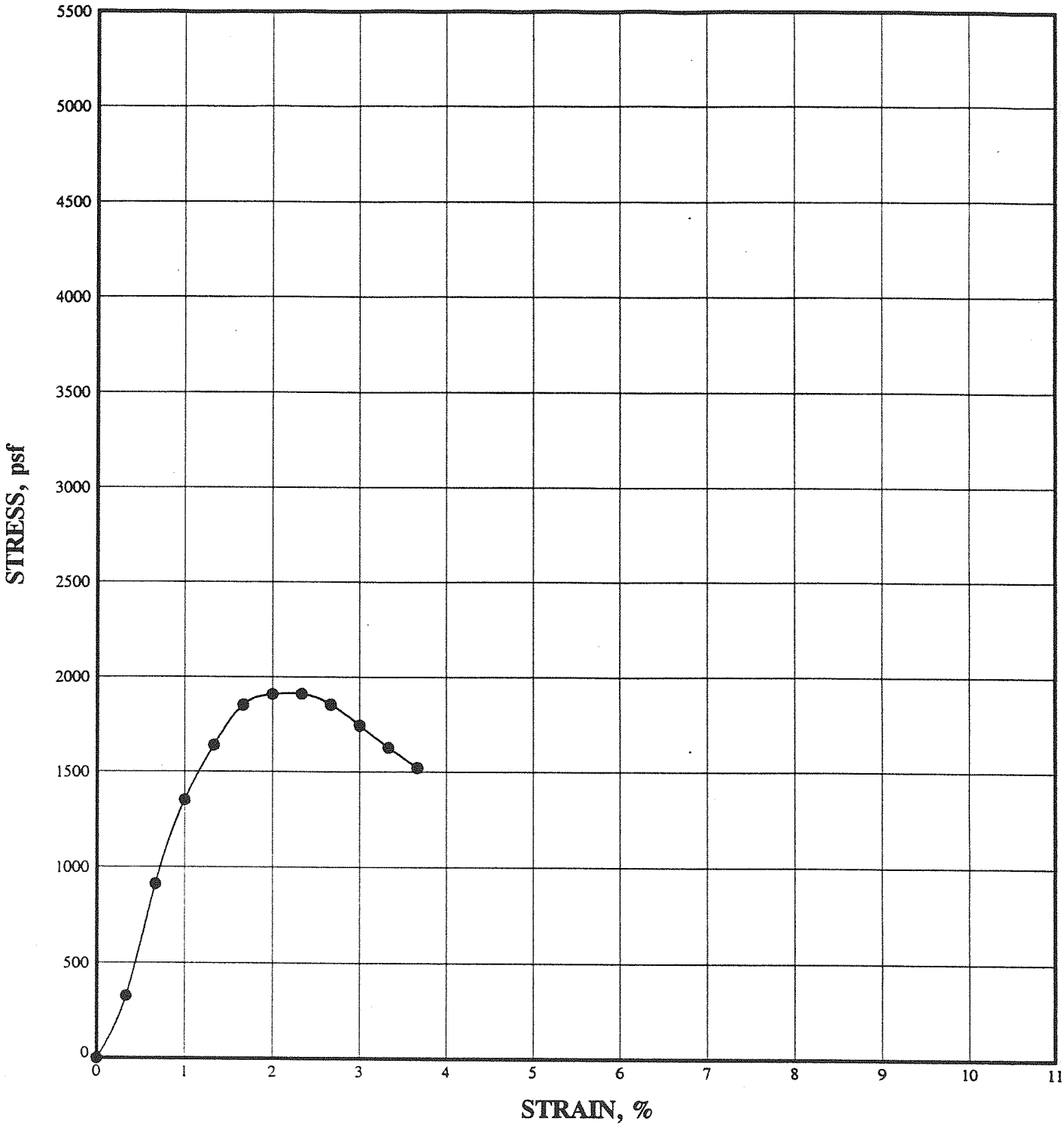
Continued Next Page

PROJECT: LIGO
LOCATION: Livingston, Louisiana
CLIENT: California Institute of Technology

BORING:
FILE: 93B107C
DATE: Sept. 1994
DRILLER: FUGRO
APPROVED:
PAGE: 2 of 2

| DEPTH (FEET) | SYMBOL | SAMPLE | S.P.T. | Compress. Stress (tsf) | Moist. Content (%) | Wet Unit Weight (pcf) | L.L. (%) | P.I. (%) | Description of Stratum |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | SANDY SILT, SILTY SAND AND SILTY CLAY |
| 45 | | | | | | | | | Bottom of sounding at 49'.<br>Sounding grouted full depth. |

# UNCONFINED COMPRESSION TEST




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SE-1-GT | 33' - 35' | 38 | 82.1 | 94 | 1910 psf | 2.3 % | 82 | 20 | 62 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

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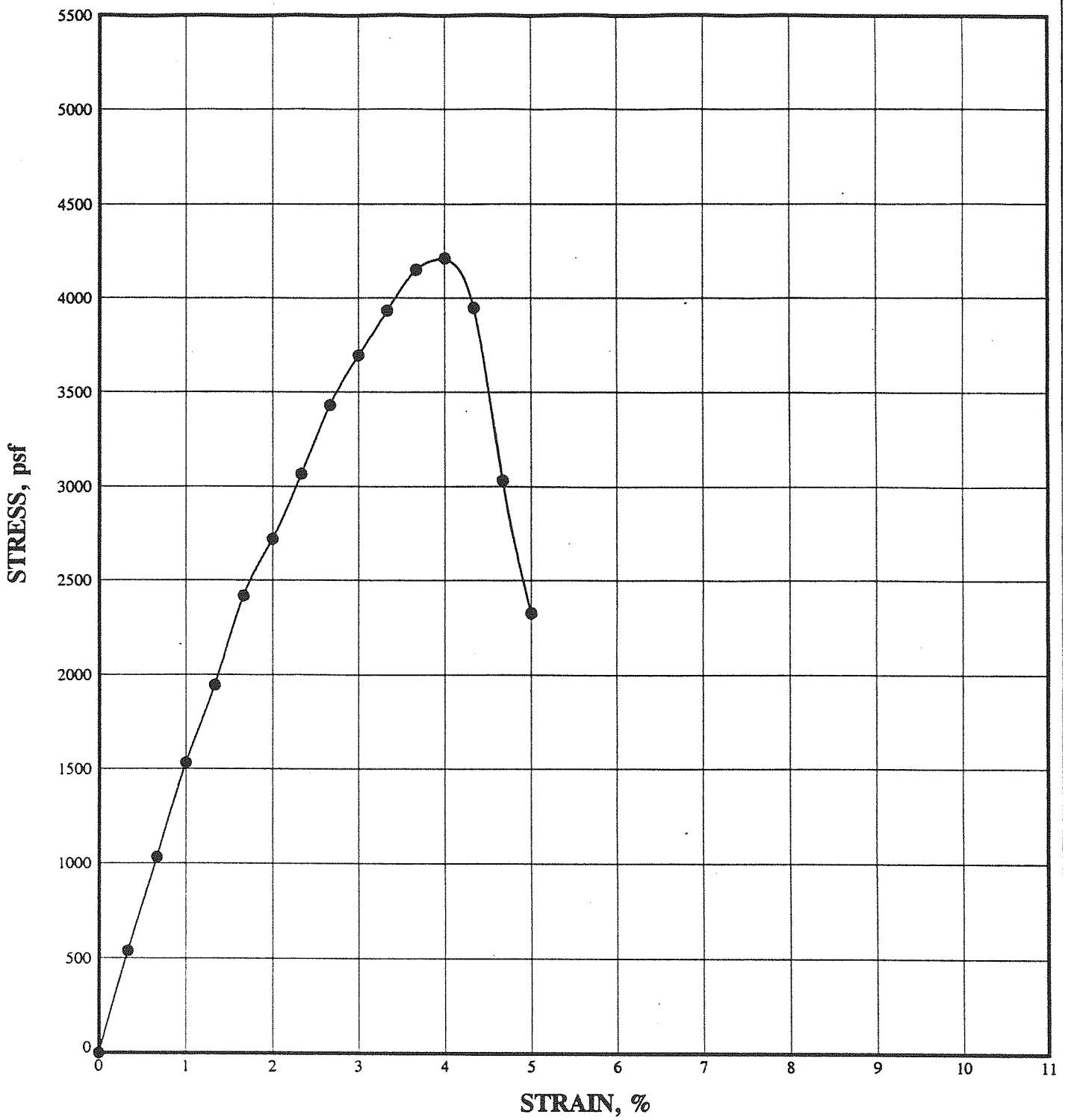


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-2-GT | 43' - 45' | 20 | 105.7 | 88 | 4211 psf | 4.0 % | 36 | 16 | 20 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

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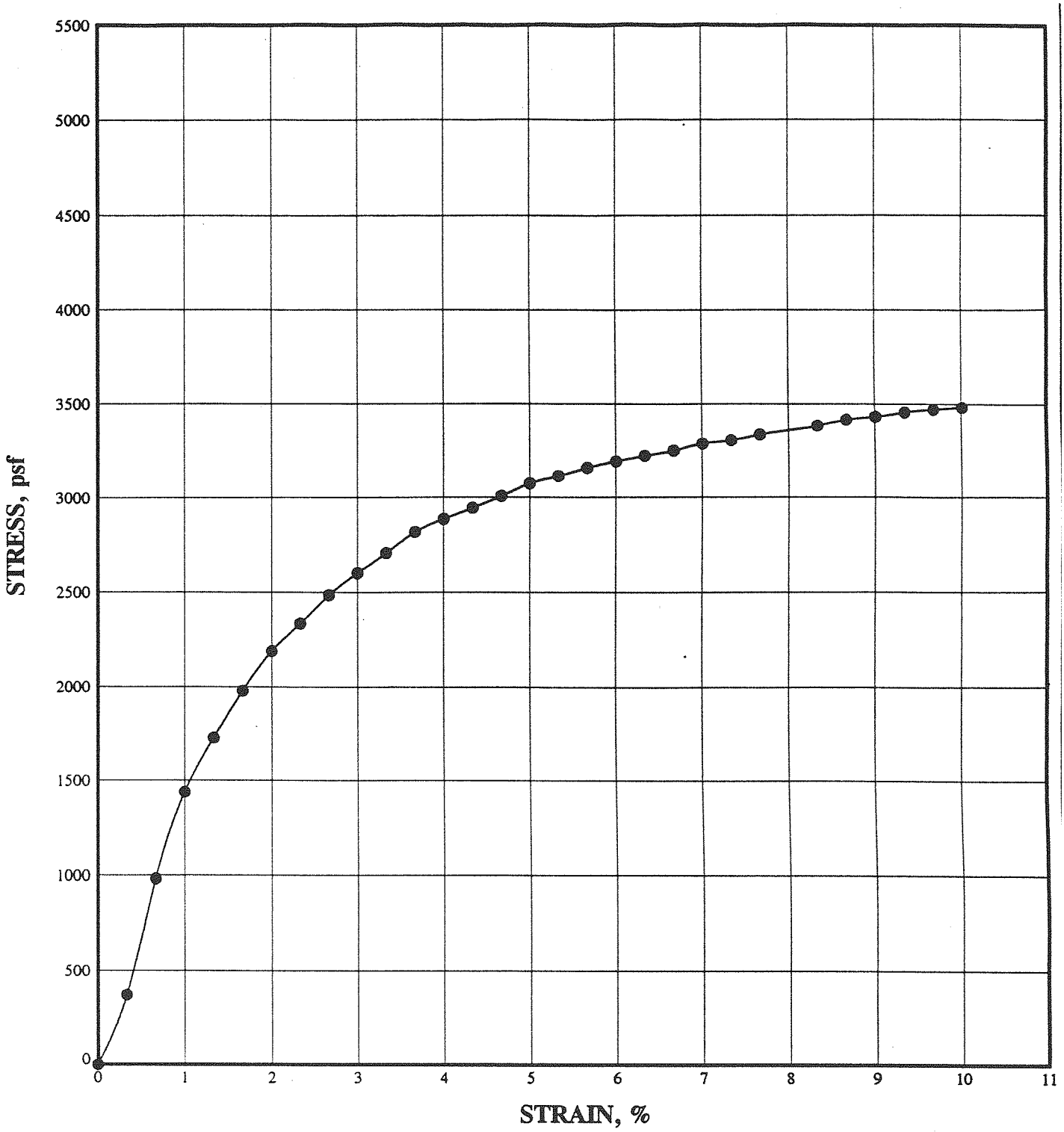


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SE-10-GT | 23' - 25' | 31 | 94.3 | 103 | 3481 psf | 10.0 % | | | |

# LIGO

**UNCONFINED COMPRESSION TEST**
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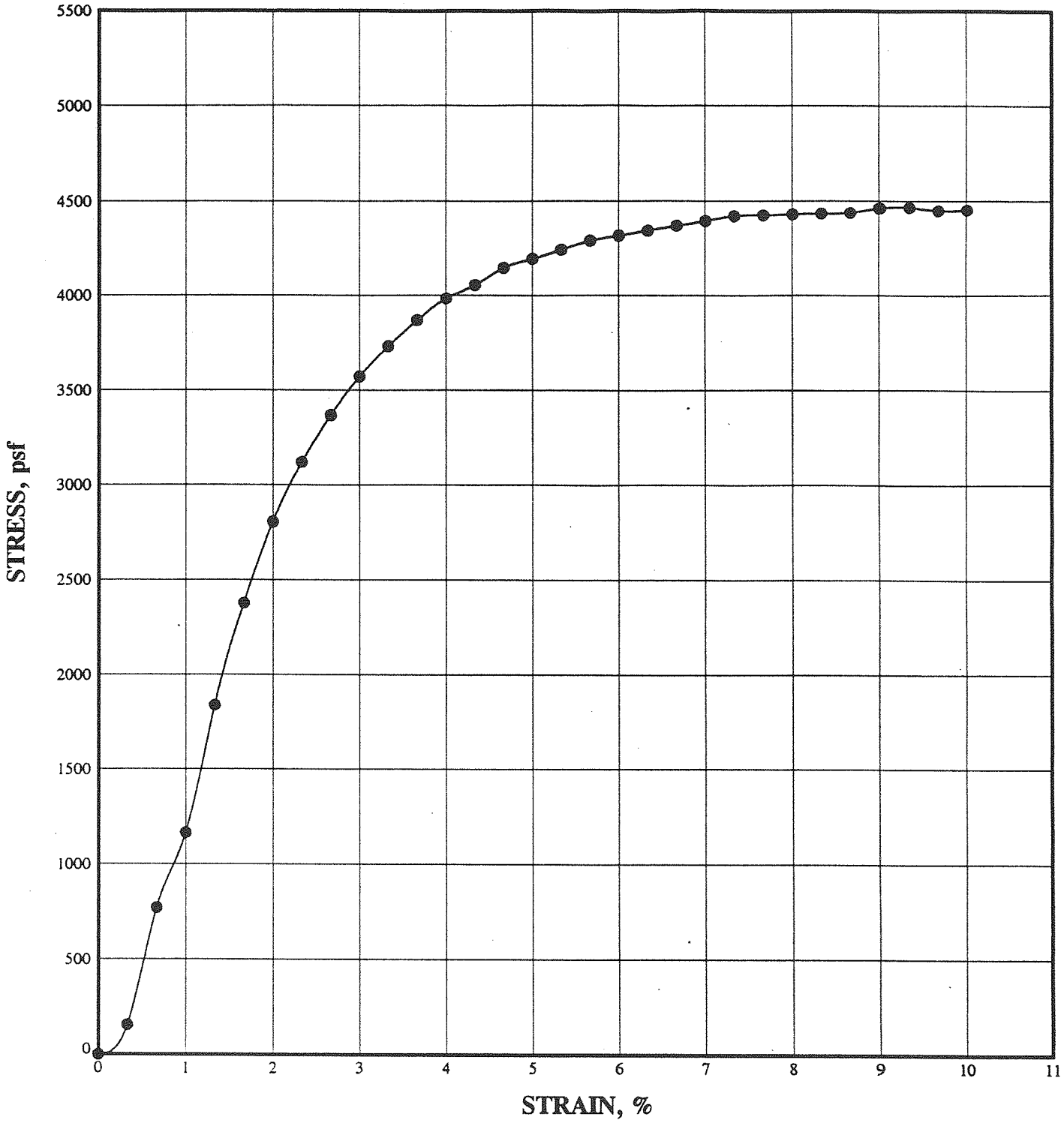
**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-14-GT | 13' - 15' | 23 | 102.1 | 92 | 4464 psf | 9.3 % | 49 | 15 | 34 |

# LIGO

**UNCONFINED COMPRESSION TEST**
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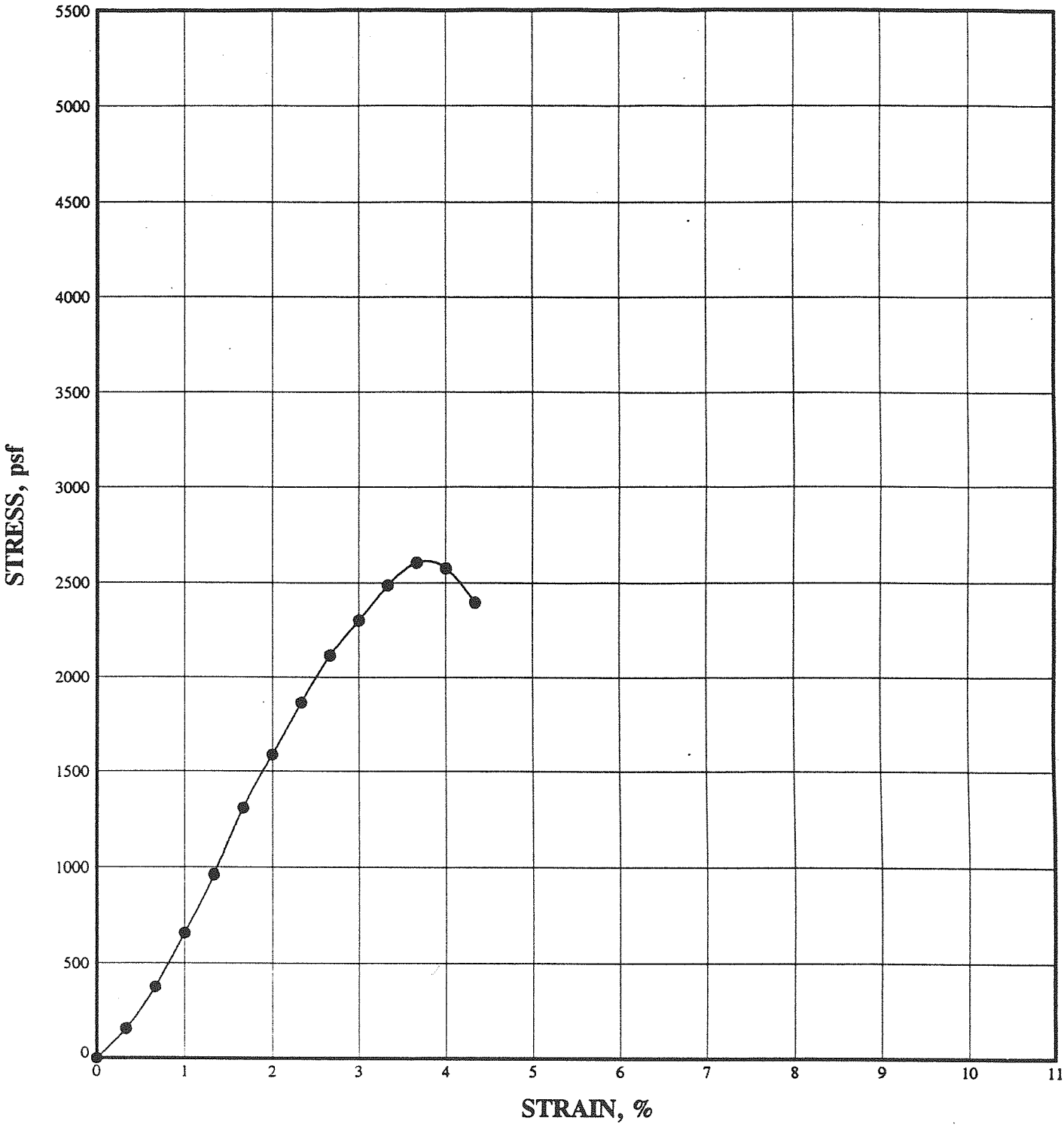
**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-20-GT | 8' - 10' | 16 | 111.7 | 84 | 2607 psf | 3.7 % | 45 | 17 | 28 |

# LIGO

**UNCONFINED COMPRESSION TEST**
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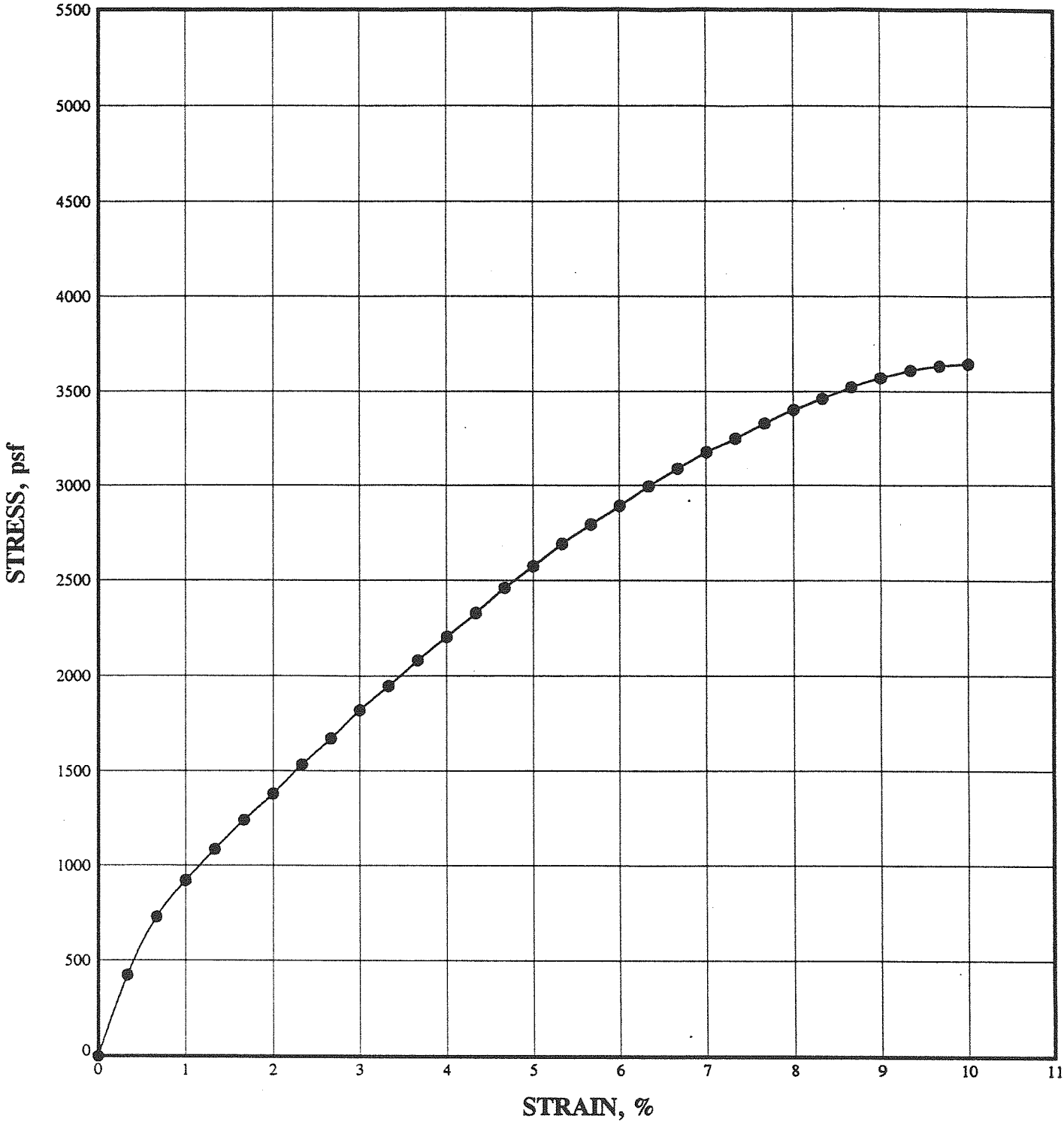


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-28-GT | 13' - 15' | 22 | 105.1 | 93 | 3643 psf | 10.0 % | 38 | 15 | 23 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

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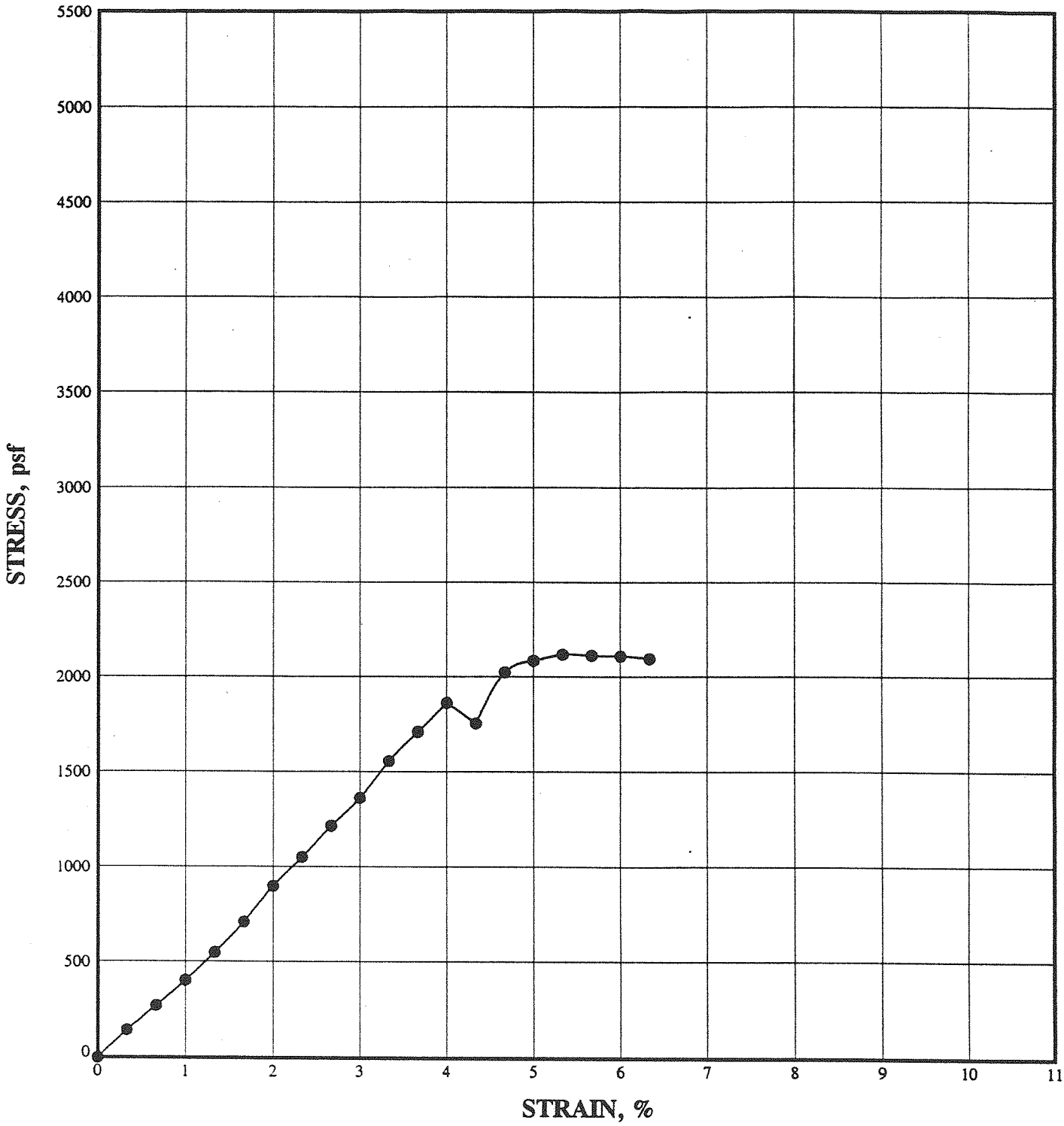


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-30-GT | 4' - 6' | 14 | 119.2 | 87 | 2118 psf | 5.3 % | 21 | 10 | 11 |

# LIGO

**UNCONFINED COMPRESSION TEST**
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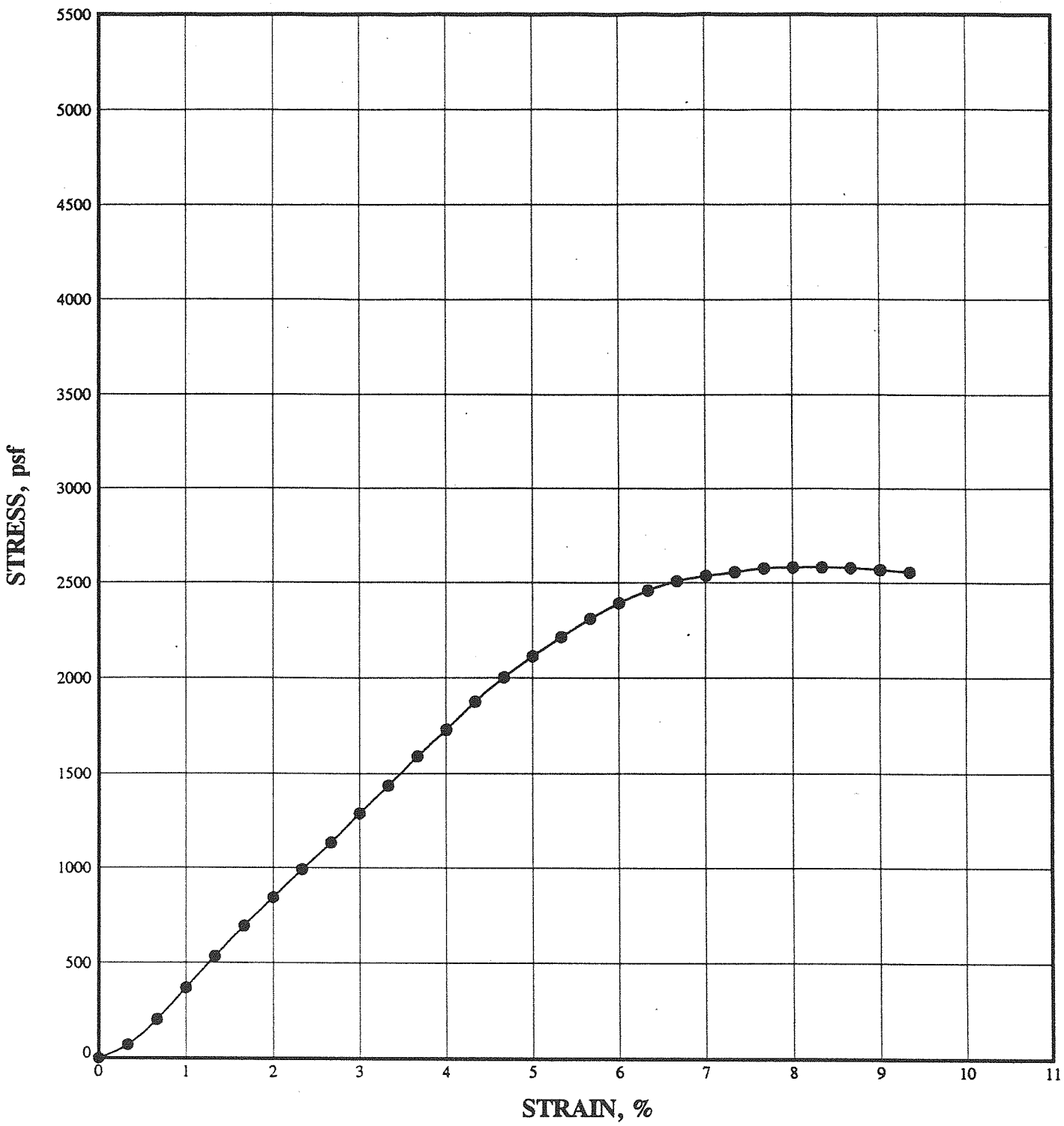
**Woodward-Clyde Consultants**



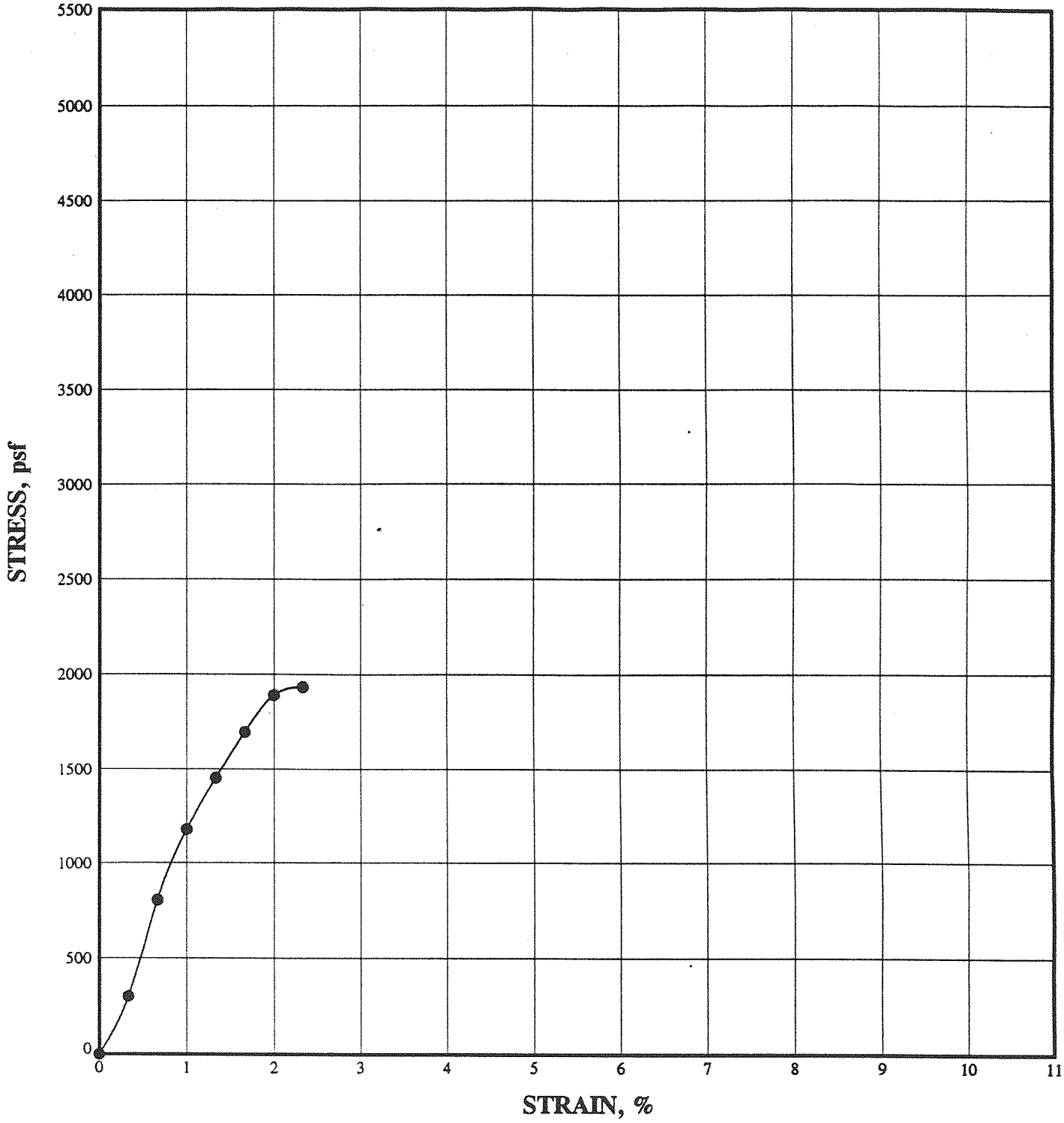

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-33-GT | 6' - 8' | 14 | 118.0 | 86 | 2582 psf | 8.3 % | 26 | 11 | 15 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-33-GT | 18' - 20' | 30 | 92.3 | 96 | 1932 psf | 2.3 % | 51 | 20 | 31 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

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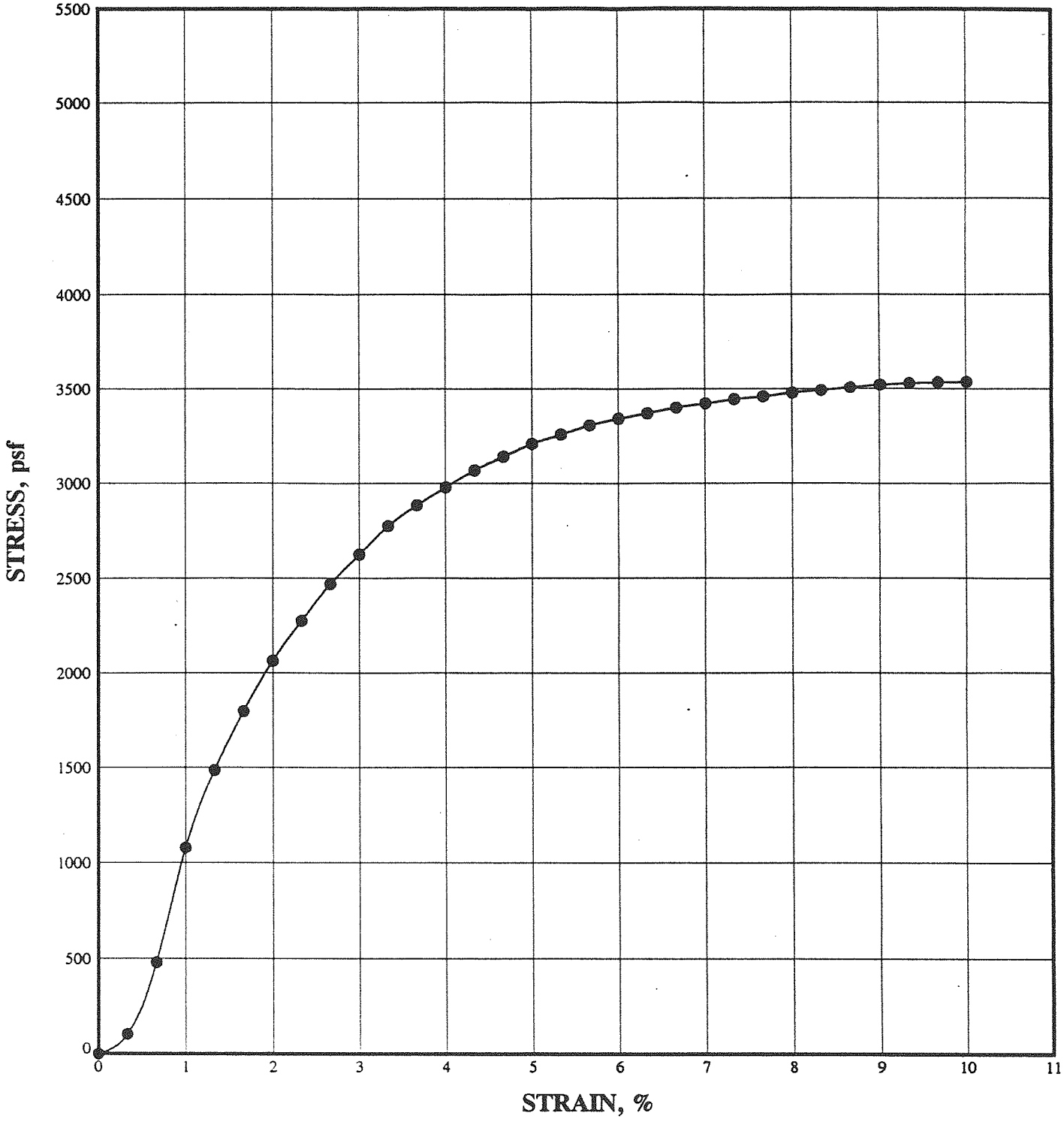


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SW-2-GT | 6' - 8' | 19 | 104.8 | 80 | 3537 psf | 10.0 % | 47 | 15 | 32 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

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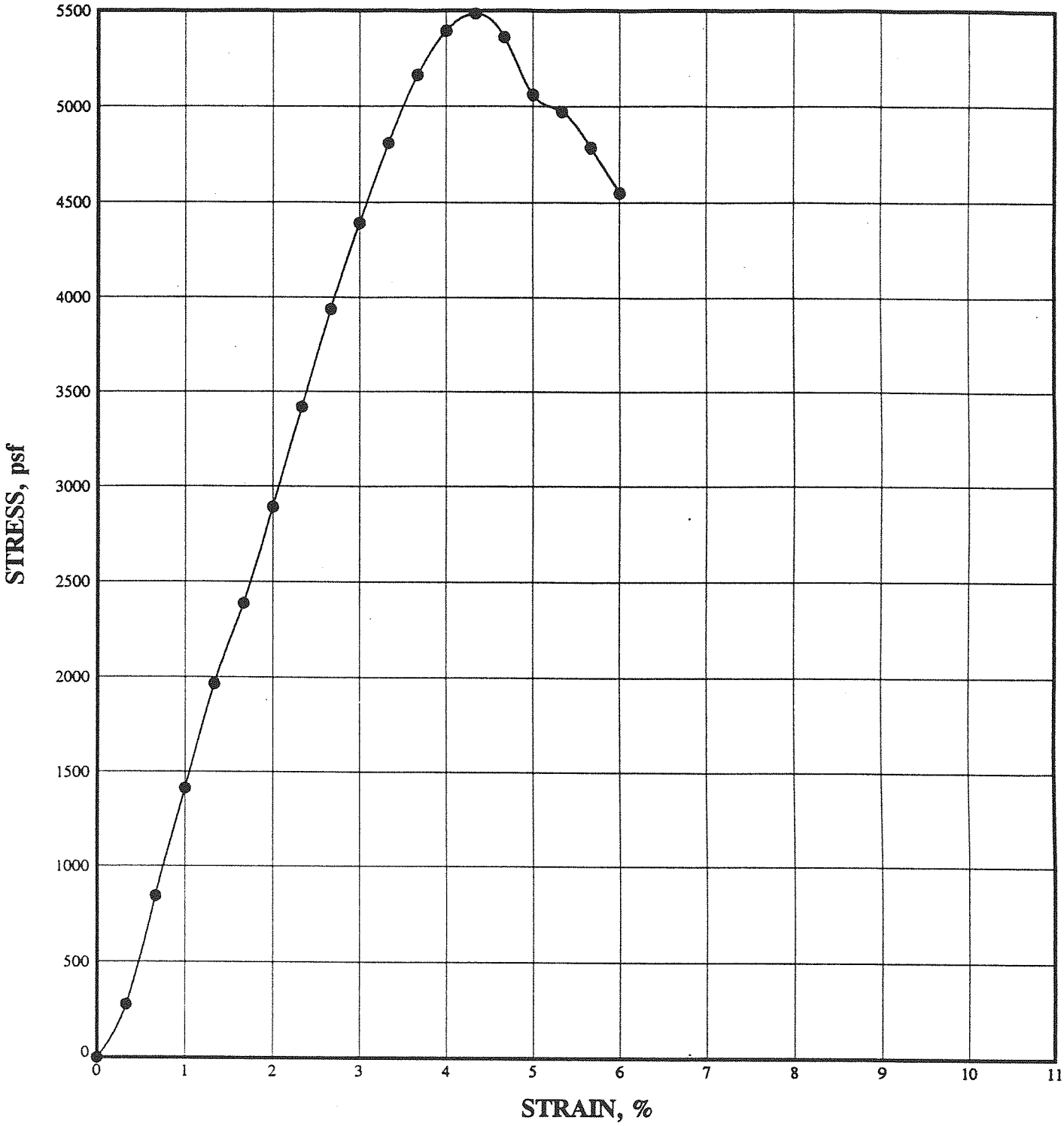


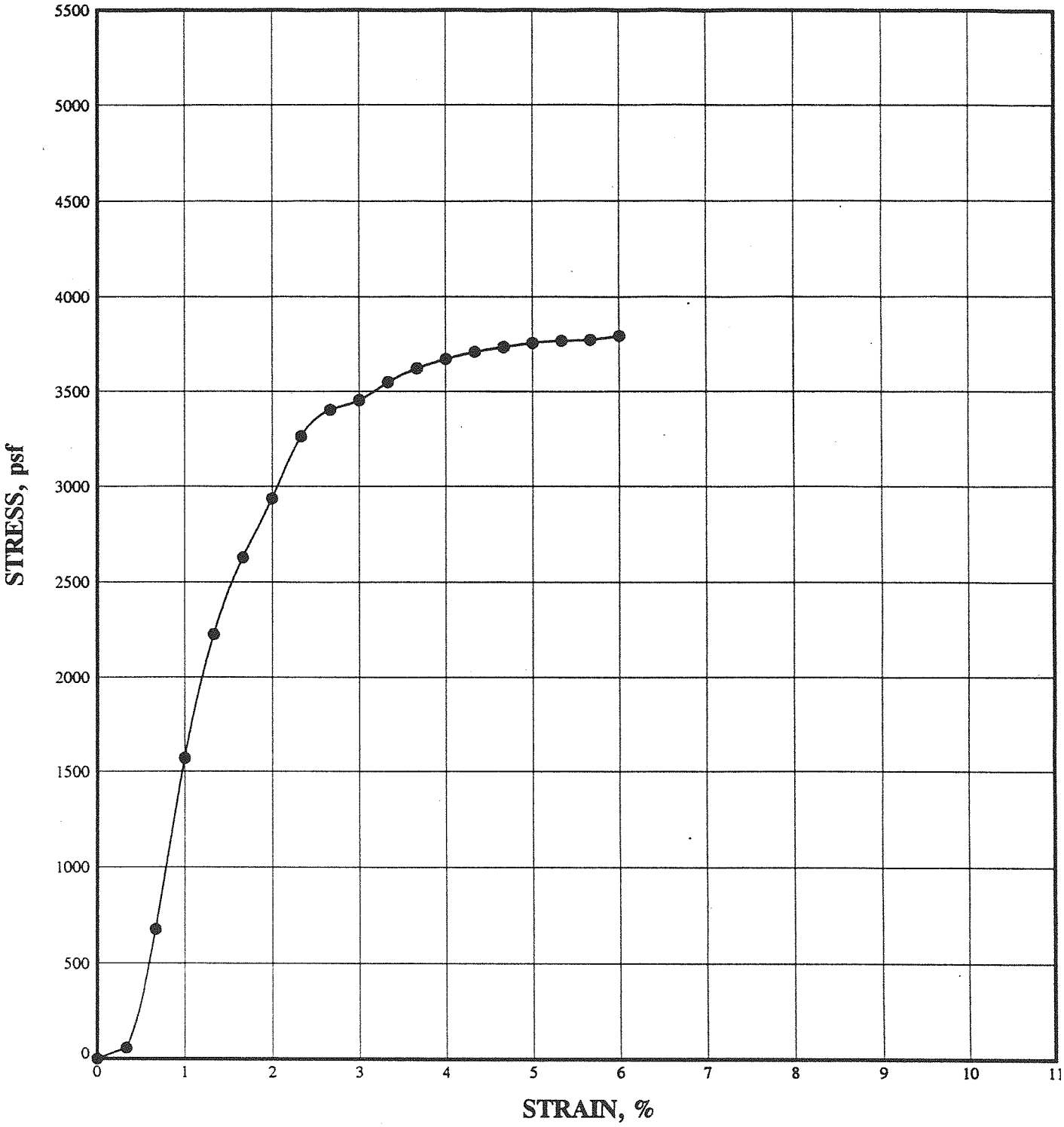

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-5-GT | 8' - 10' | 15 | 117.4 | 88 | 5482 psf | 4.3 % | 27 | 11 | 16 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SW-5-GT | 18' - 20' | 24 | 100.9 | 93 | 3792 psf | 6.0 % | 55 | 17 | 38 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

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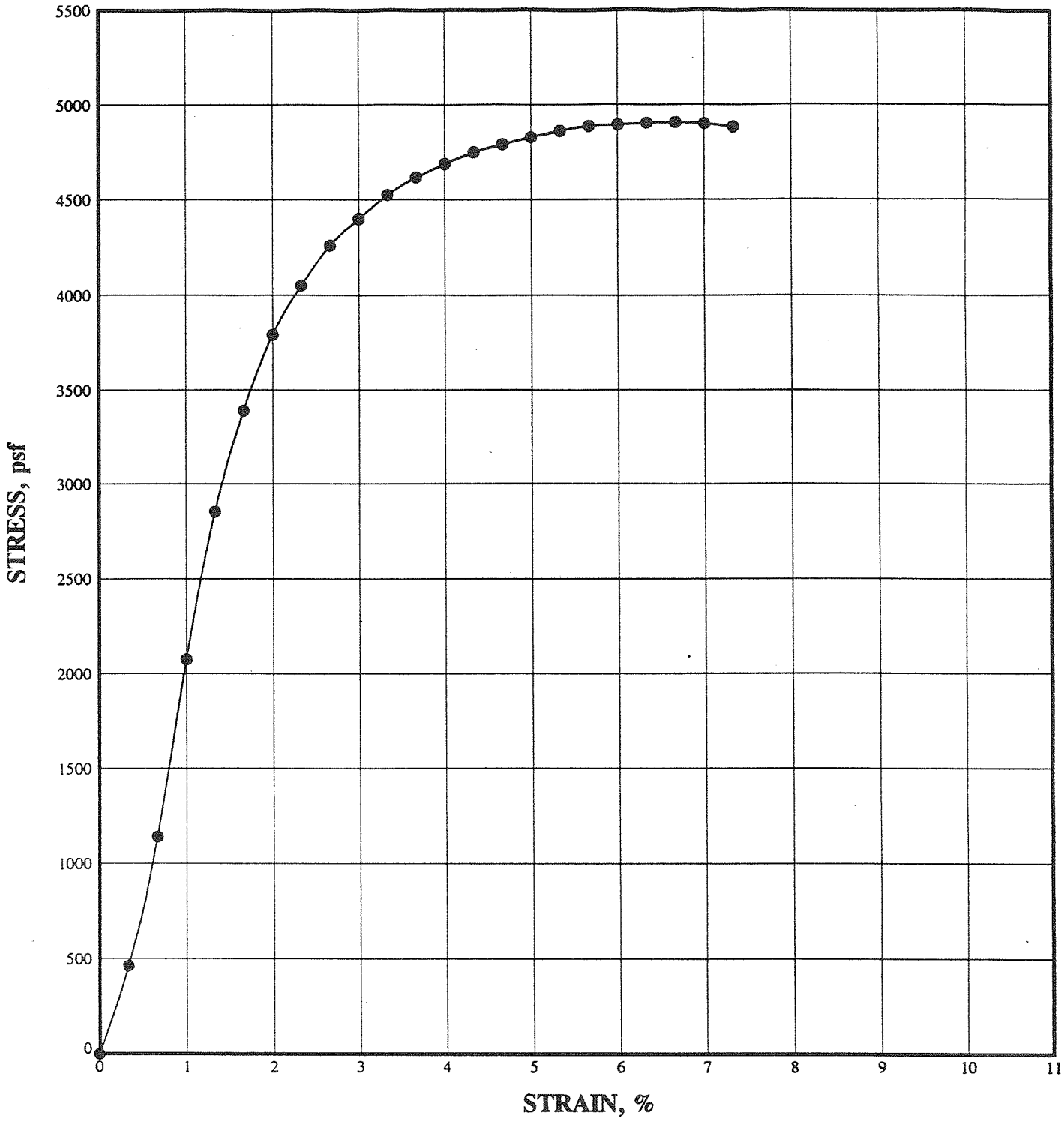



LEGEND:

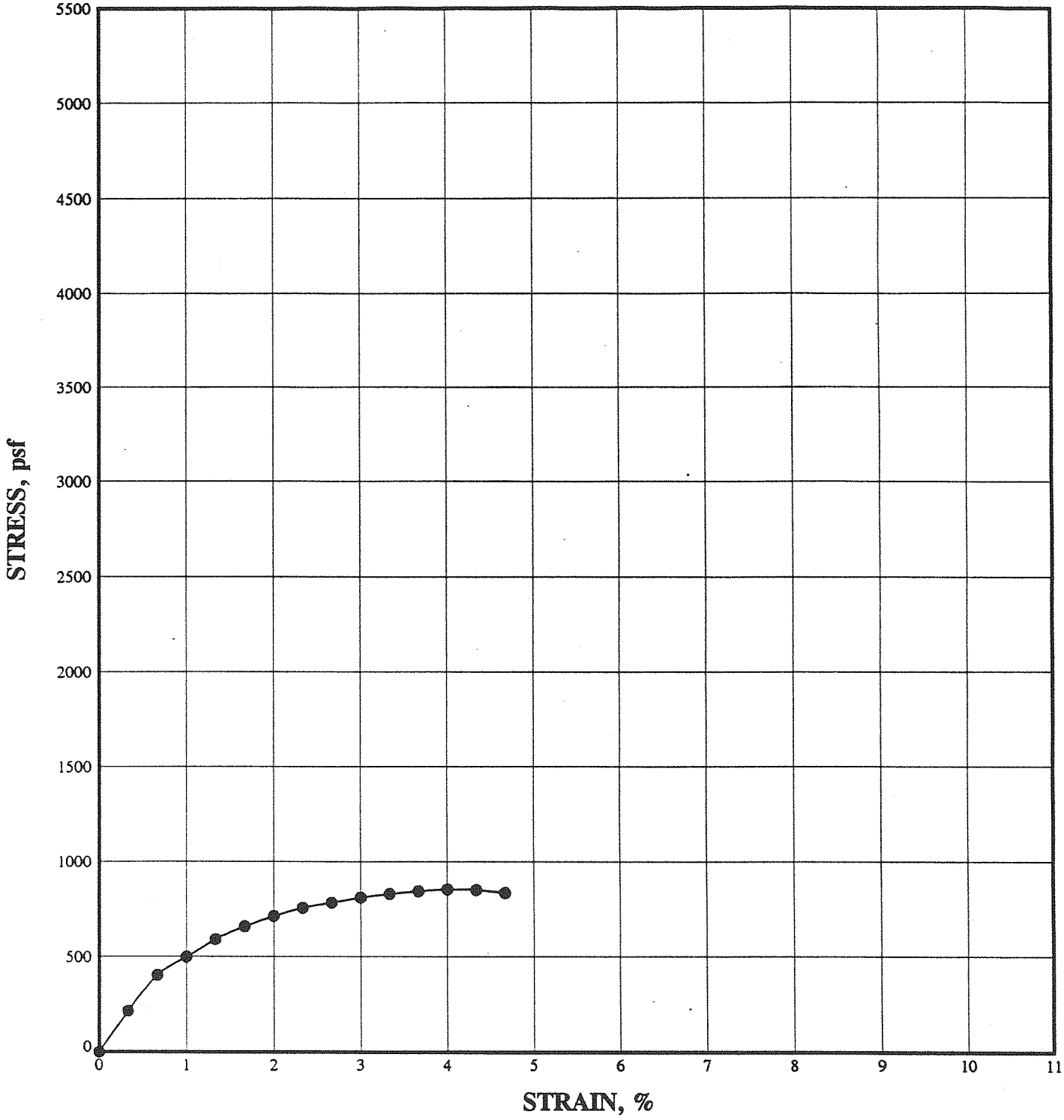
| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-9-GT | 23' - 25' | 32 | 93.4 | 104 | 4906 psf | 6.7 % | 59 | 18 | 41 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

OCT 30 94 UNCONF3B 3B107




LEGEND:

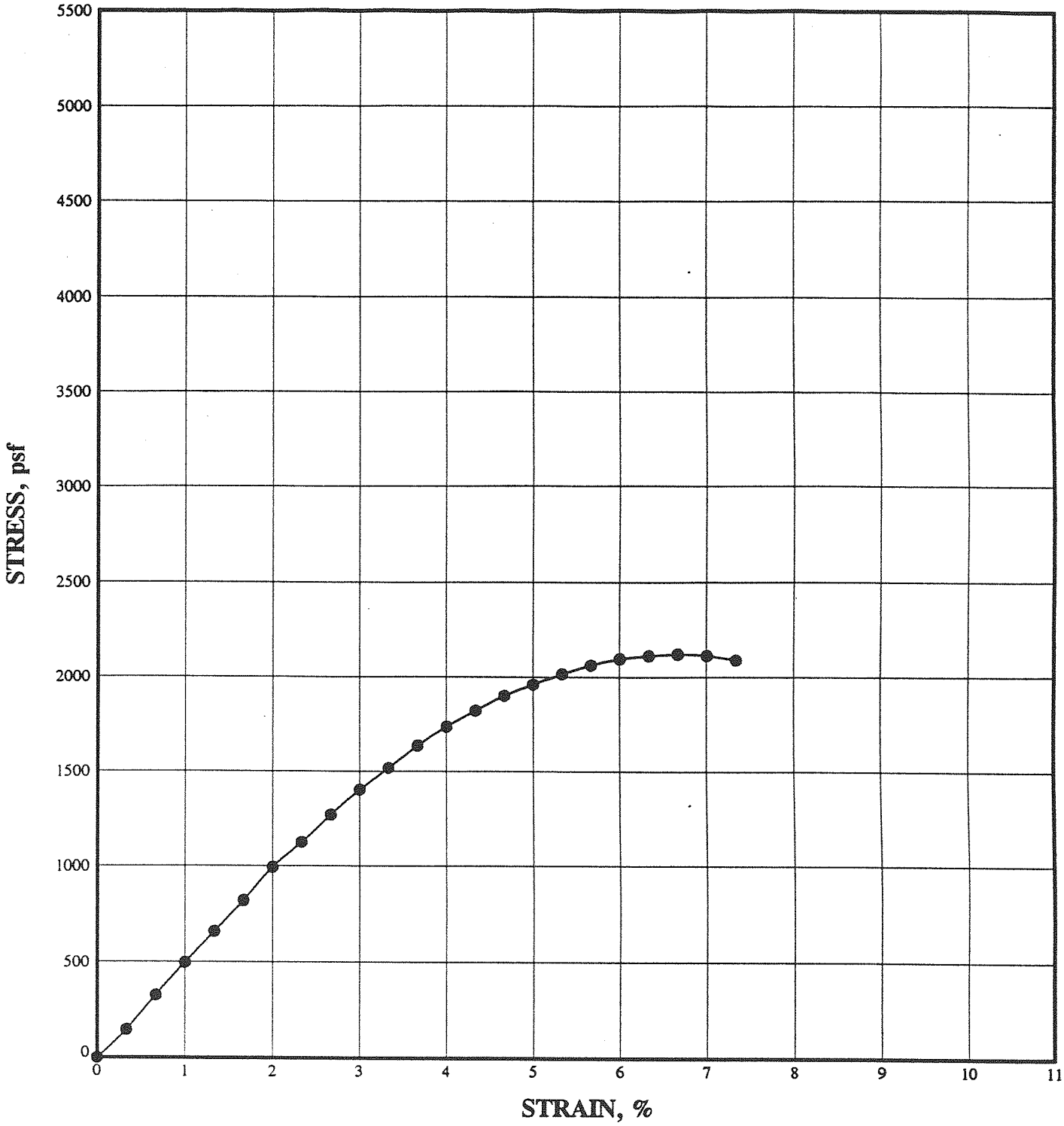
| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SW-25-GT | 18' - 20' | 42 | 75.3 | 90 | 854 psf | 4.0 % | 67 | 24 | 43 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

OCT 30 94 UNCONF3B 3B107




LEGEND:

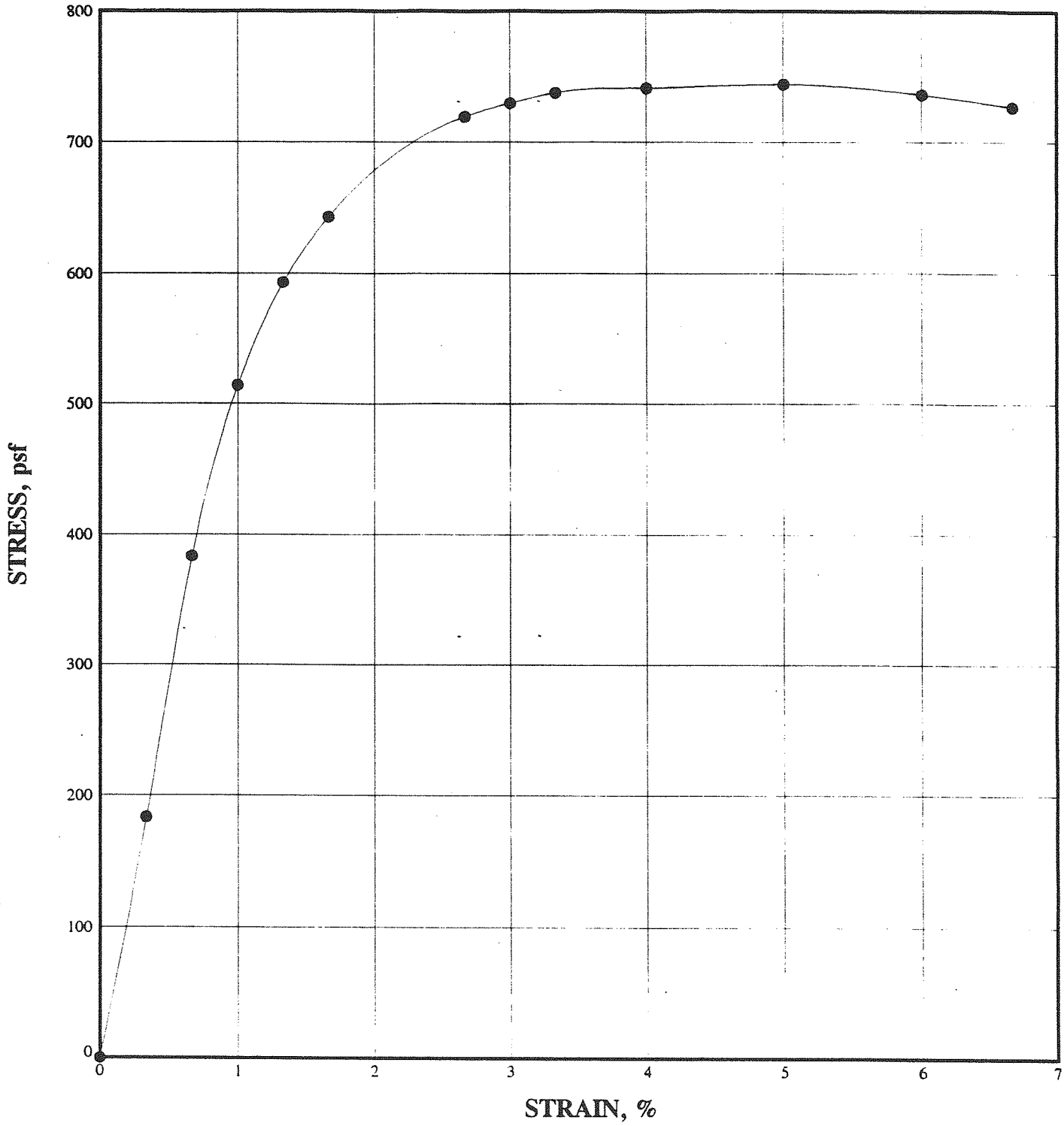
| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SW-29-GT | 4' - 6' | 19 | 107.7 | 86 | 2122 psf | 6.7 % | 24 | 13 | 11 |

# LIGO

**UNCONFINED COMPRESSION TEST**
**ASTM D 2166-91**

**Woodward-Clyde Consultants**

OCT 30 94 UNCONF3B 3B107




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | BSW25GT | 13' - 15' | 56 | 64.6 | 93 | 744 psf | 5.0 % | 73 | 25 | 48 |

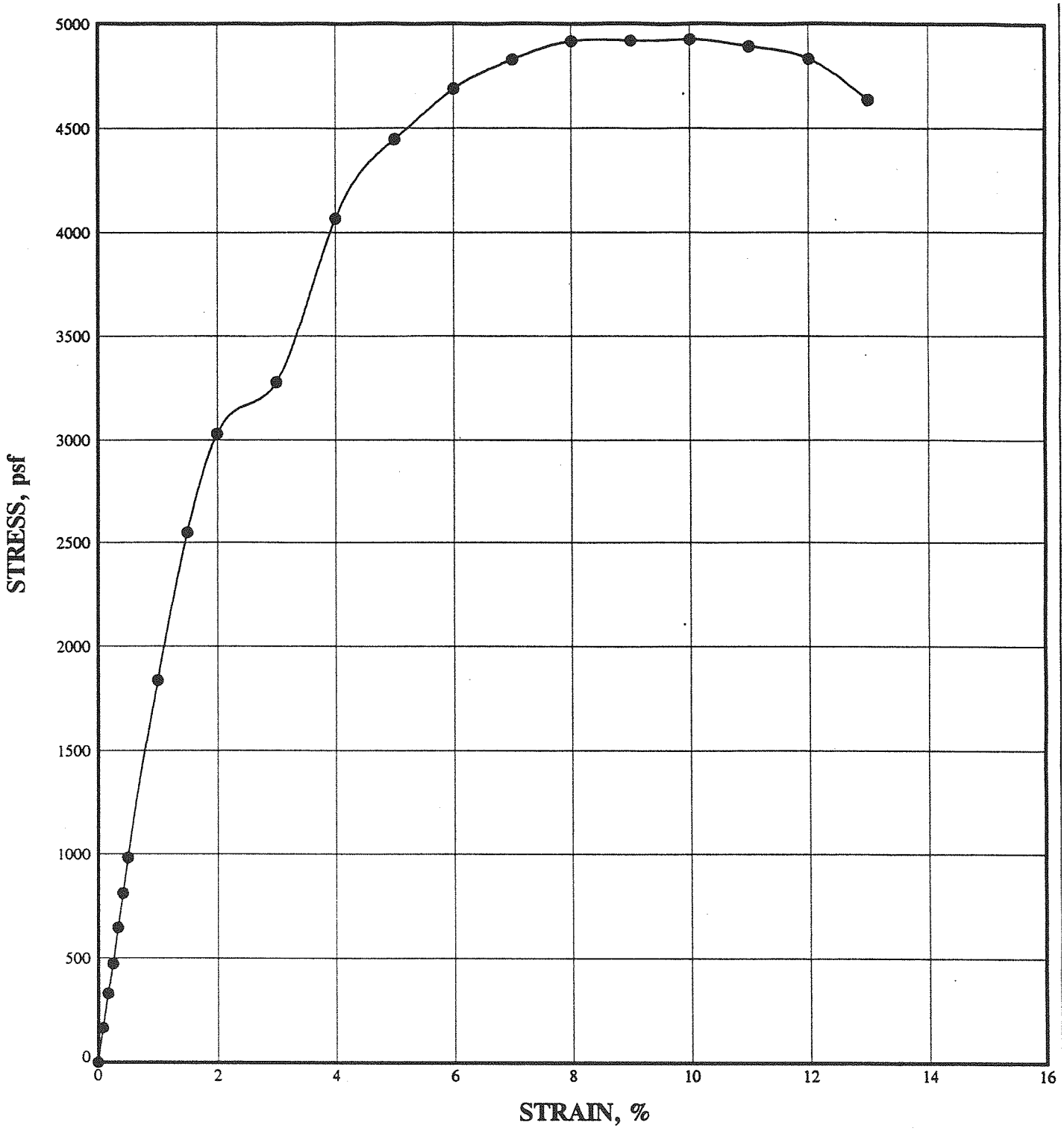
# LIGO

UNCONFINED COMPRESSION TEST
ASTM D 2166-91

**Woodward-Clyde Consultants**

OCT 24 94 UNCONF1B 3B107

# UNDRAINED TRIAXIAL TEST




LEGEND:

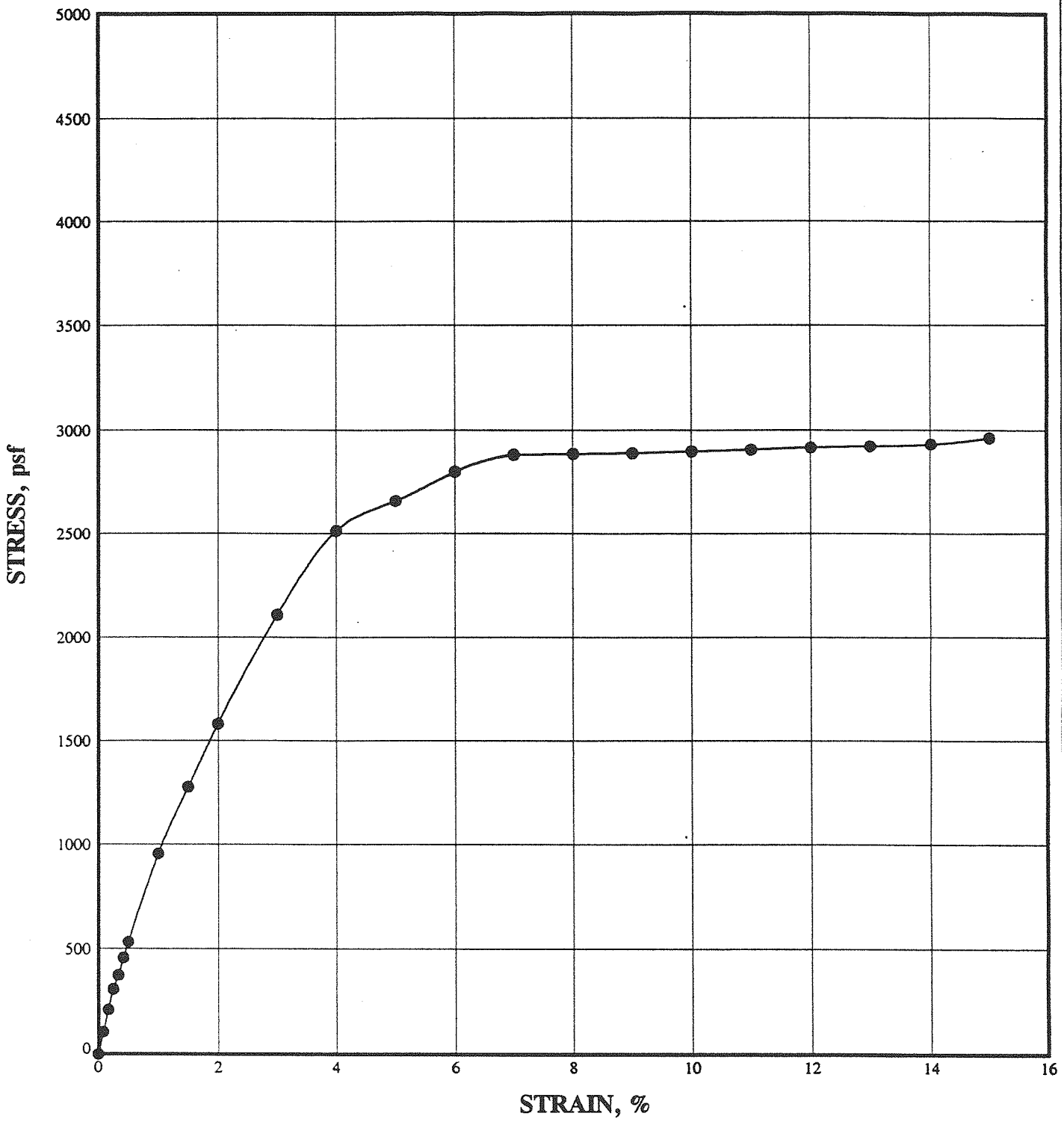
| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-1-GT | 8' - 10' | 24 | 102 | 95 | 4923 psf | 10.0 % | 43 | 16 | 27 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

OCT 30 94 UNCONF3U 3B107



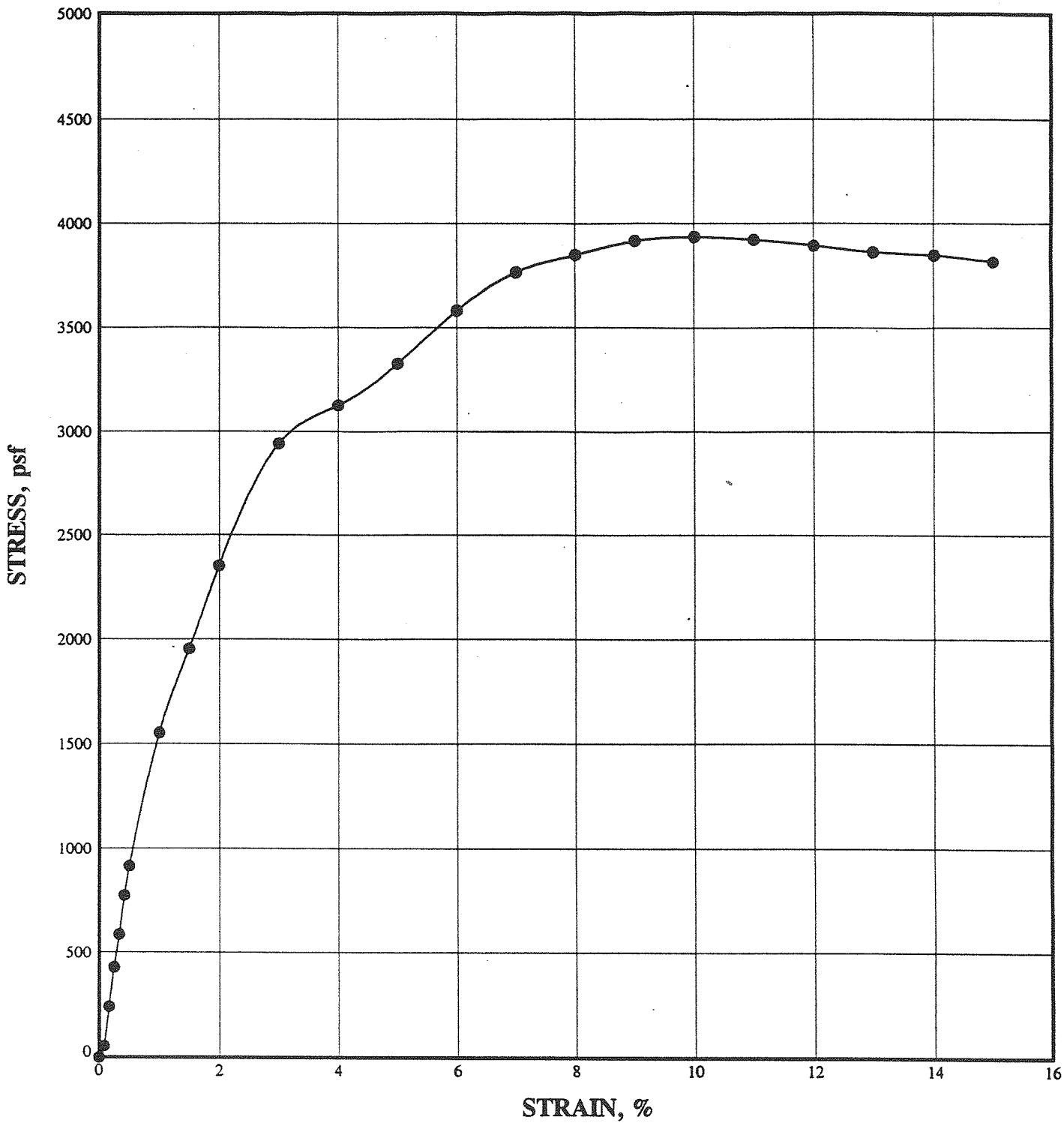

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SE-2-GT | 4' - 6' | 15 | 115 | 83 | 2963 psf | 15.0 % | 35 | 11 | 24 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**



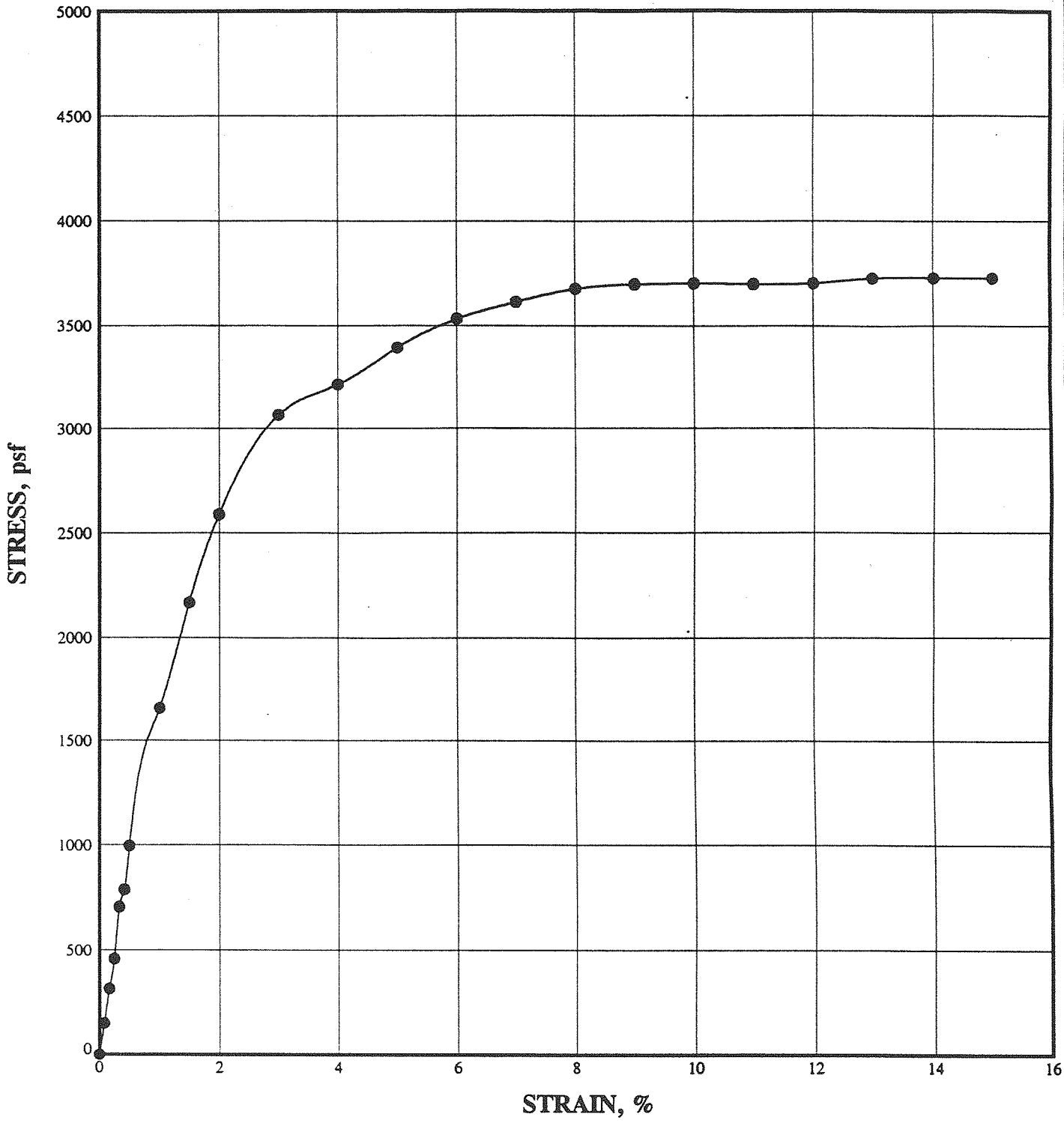

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-2-GT | 28' - 30' | 23 | 103 | 93 | 3934 psf | 10.0 % | 45 | 14 | 31 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**



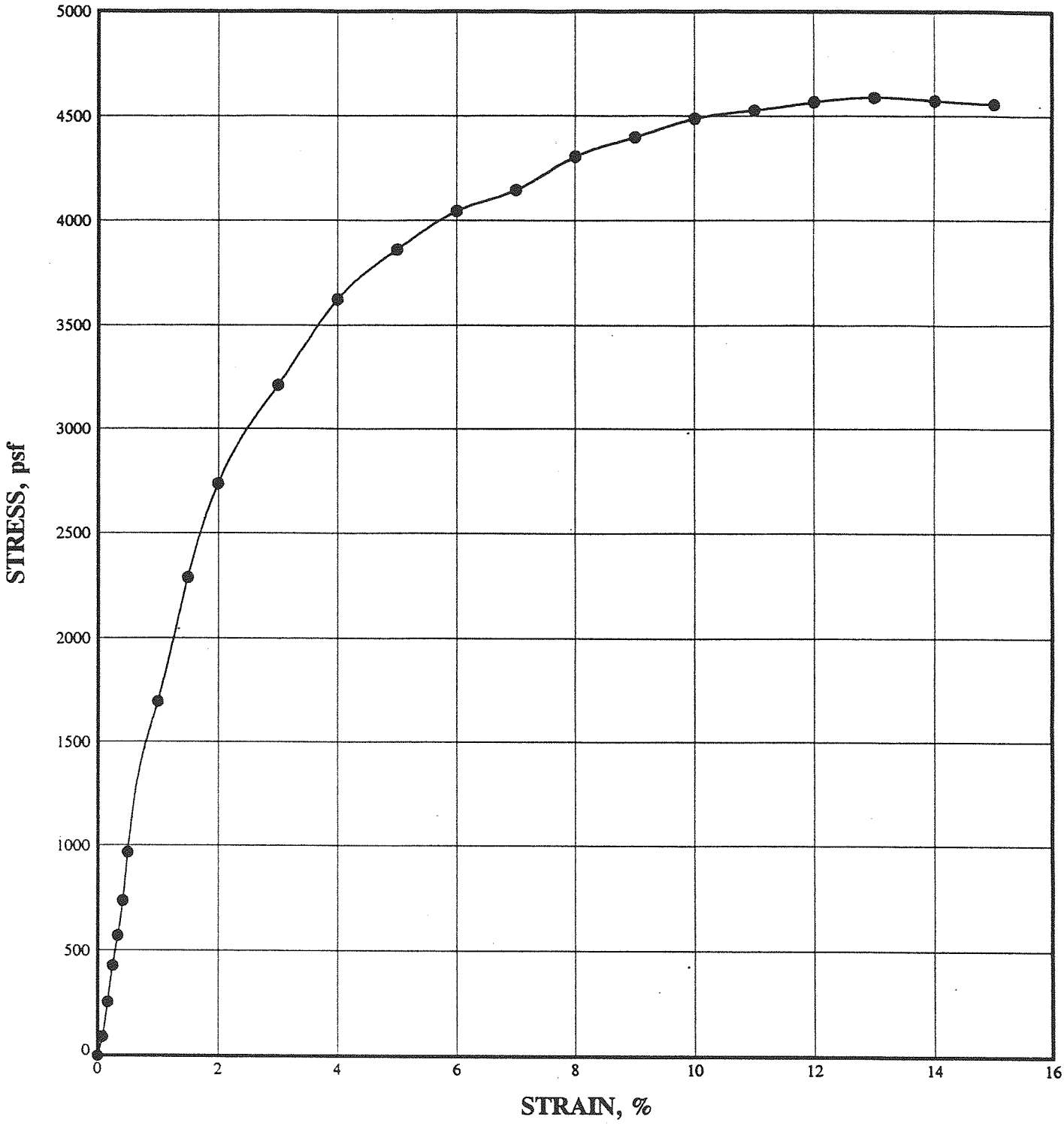

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-10-GT | 18' - 20' | 23 | 100 | 90 | 3730 psf | 15.0 % | | | |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SE-17-GT | 18' - 20' | 25 | 98 | 93 | 4588 psf | 13.0 % | 58 | 18 | 40 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

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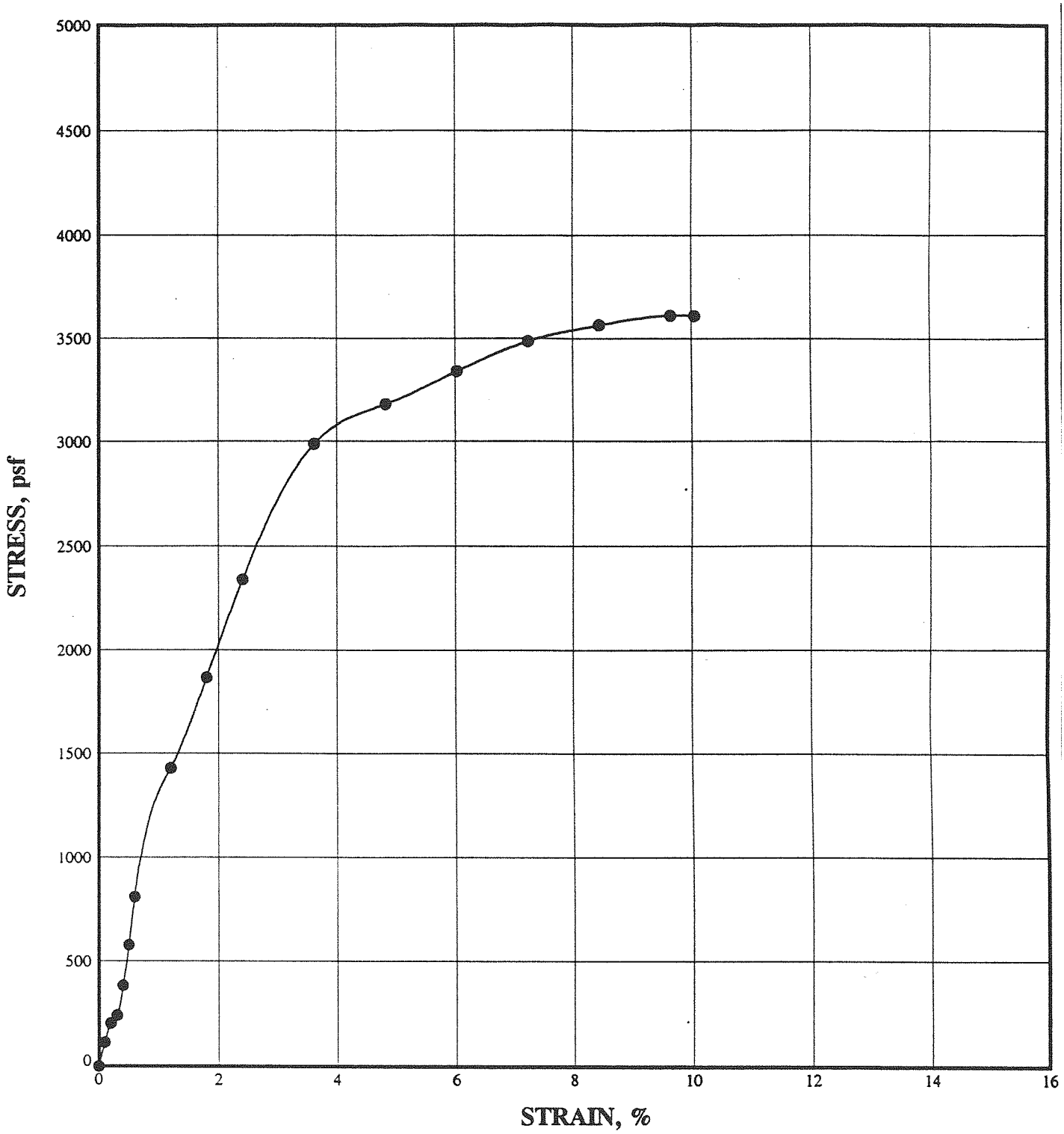


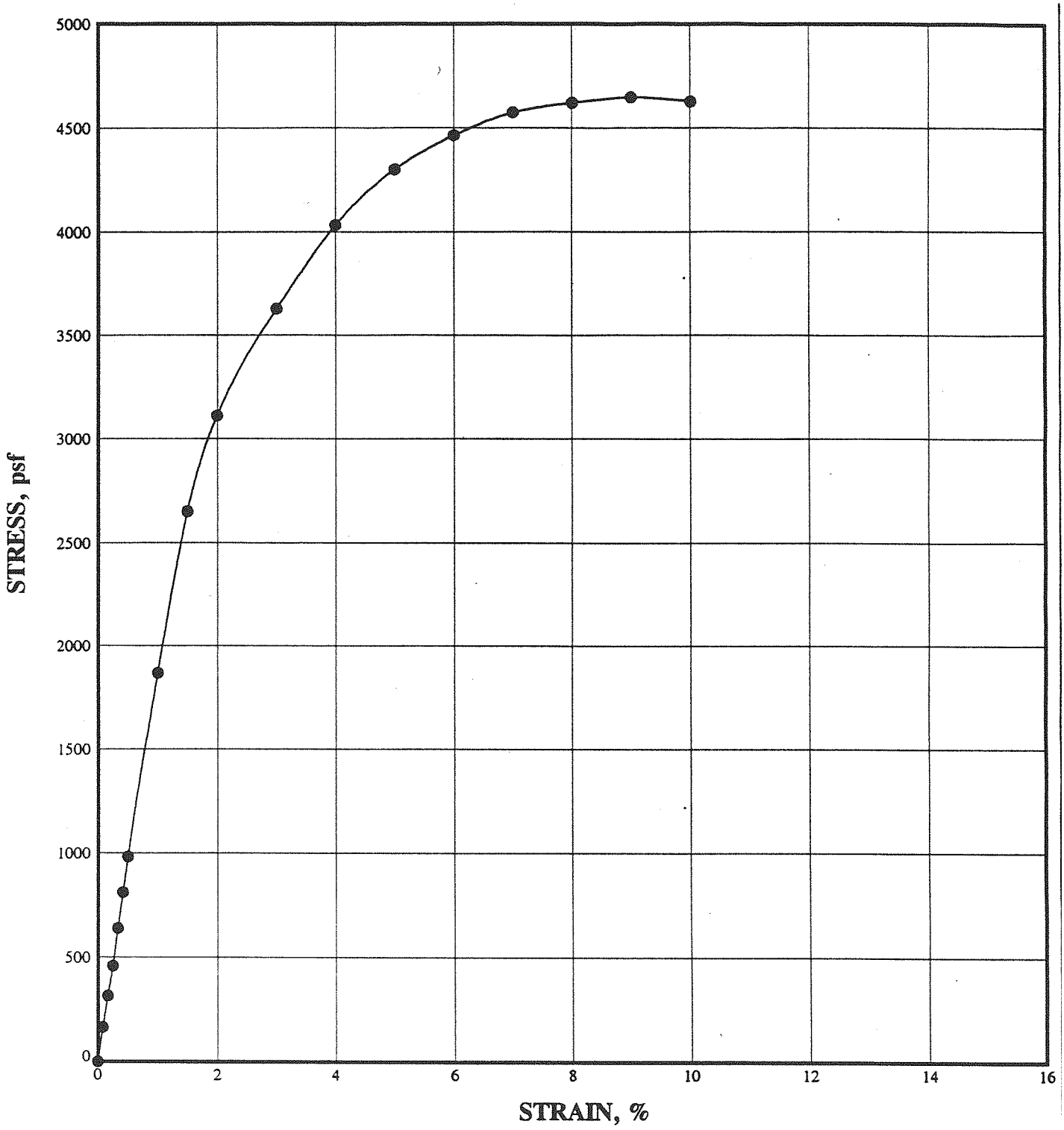

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SE-24-GT | 18' - 20' | 20 | 103 | 83 | 3611 psf | 9.7 % | 41 | 14 | 27 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**



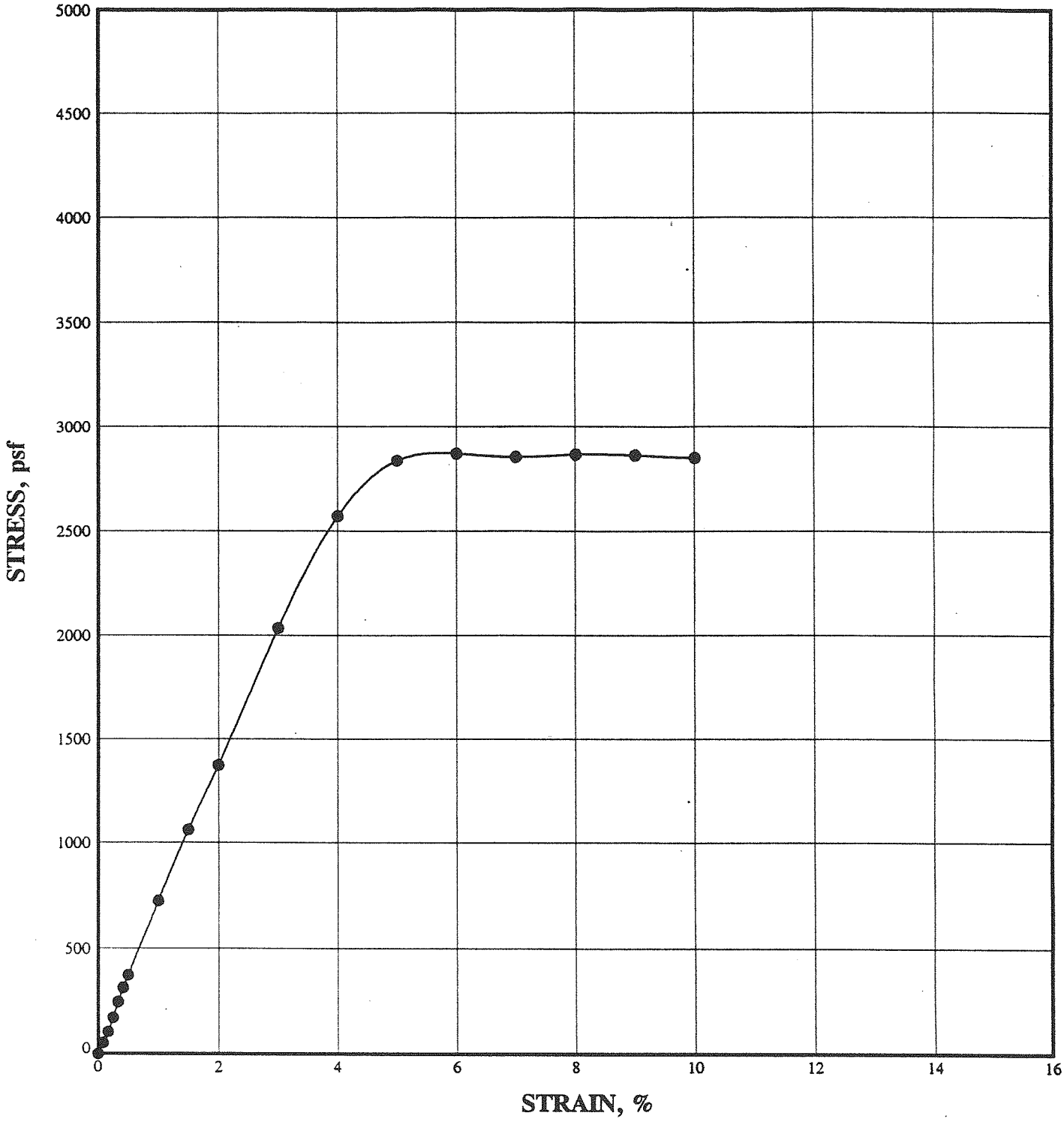

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SE-30-GT | 13' - 15' | 23 | 103 | 95 | 4644 psf | 9.0 % | 56 | 17 | 39 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-2-GT | 13' - 15' | 15 | 114 | 83 | 2871 psf | 6.0 % | 22 | 13 | 9 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

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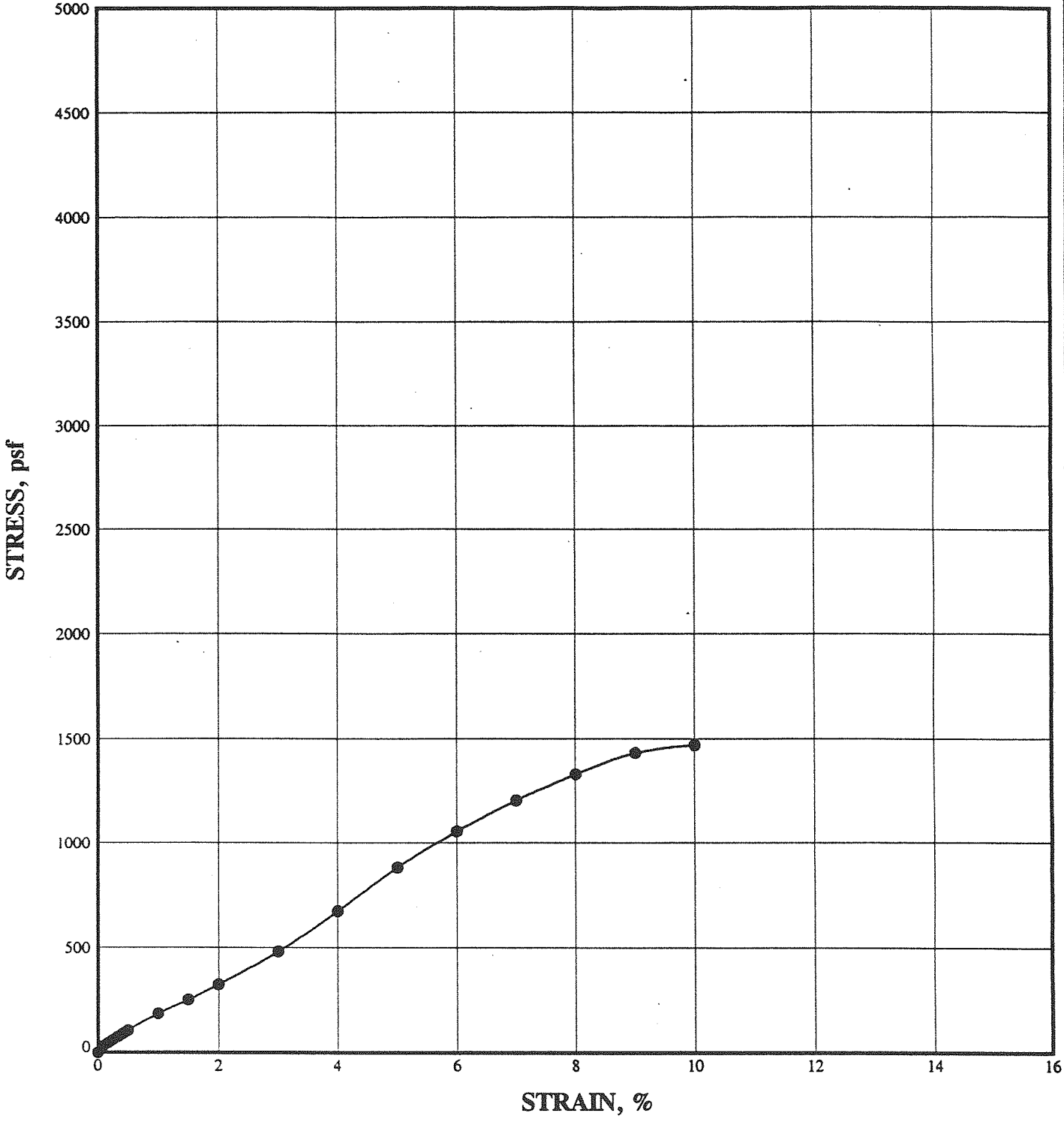


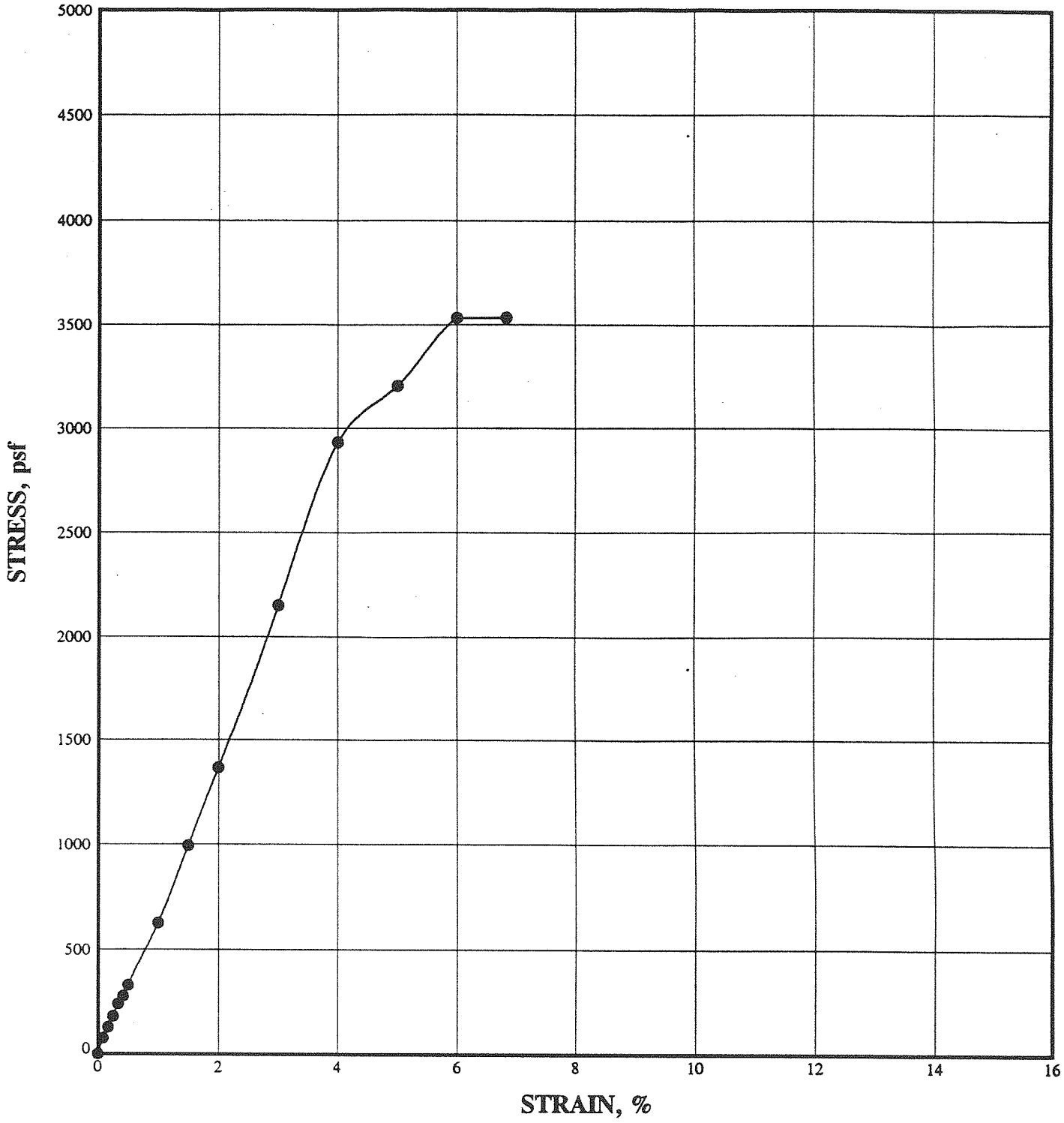

LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-2-GT | 38' - 40' | 16 | 109 | 79 | 1473 psf | 10.0 % | 24 | 12 | 12 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-9-GT | 8' - 10' | 20 | 98 | 72 | 3533 psf | 6.8 % | | | |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

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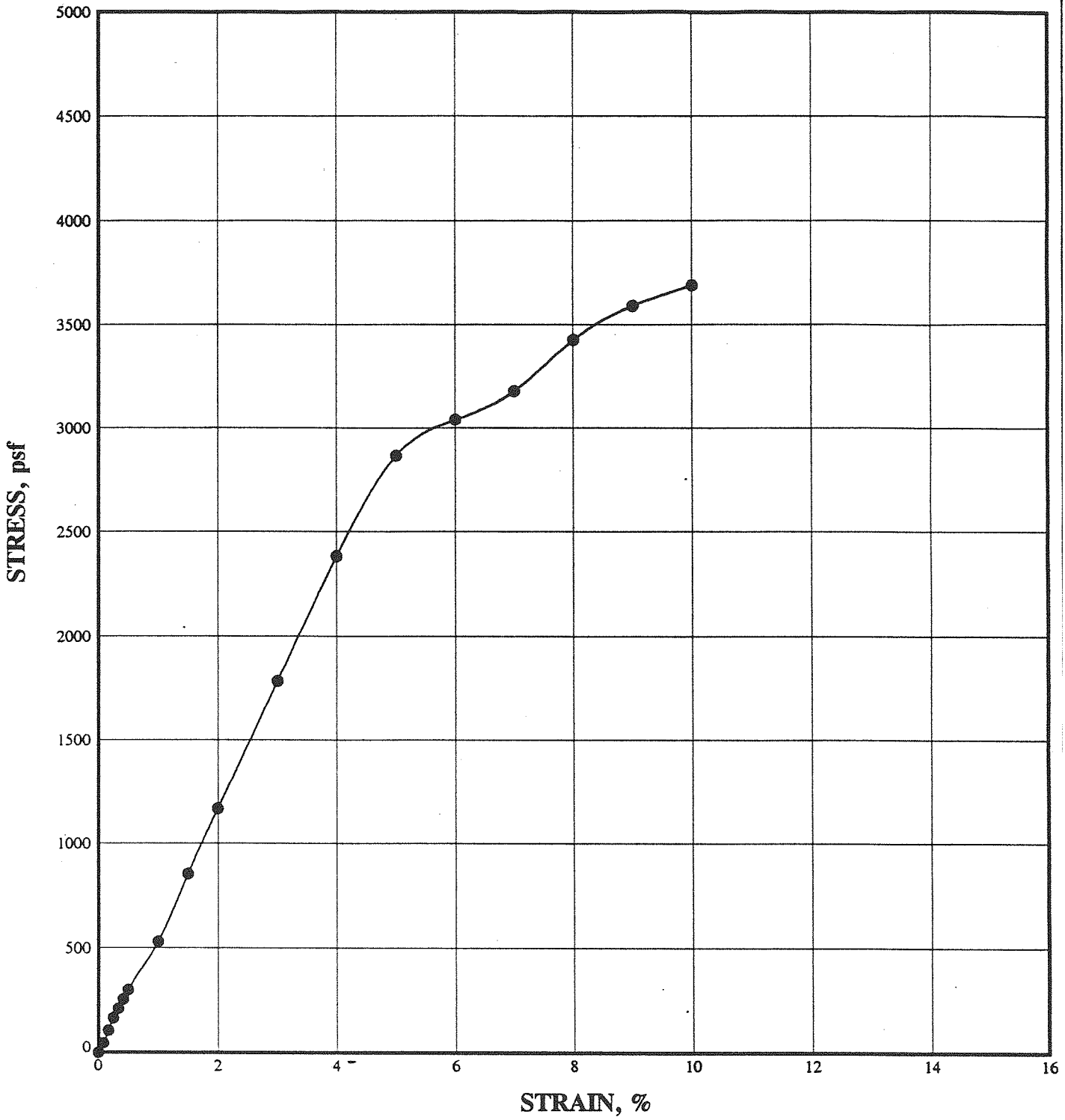


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-13-GT | 8' - 10' | 14 | 118 | 86 | 3689 psf | 10.0 % | | | |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

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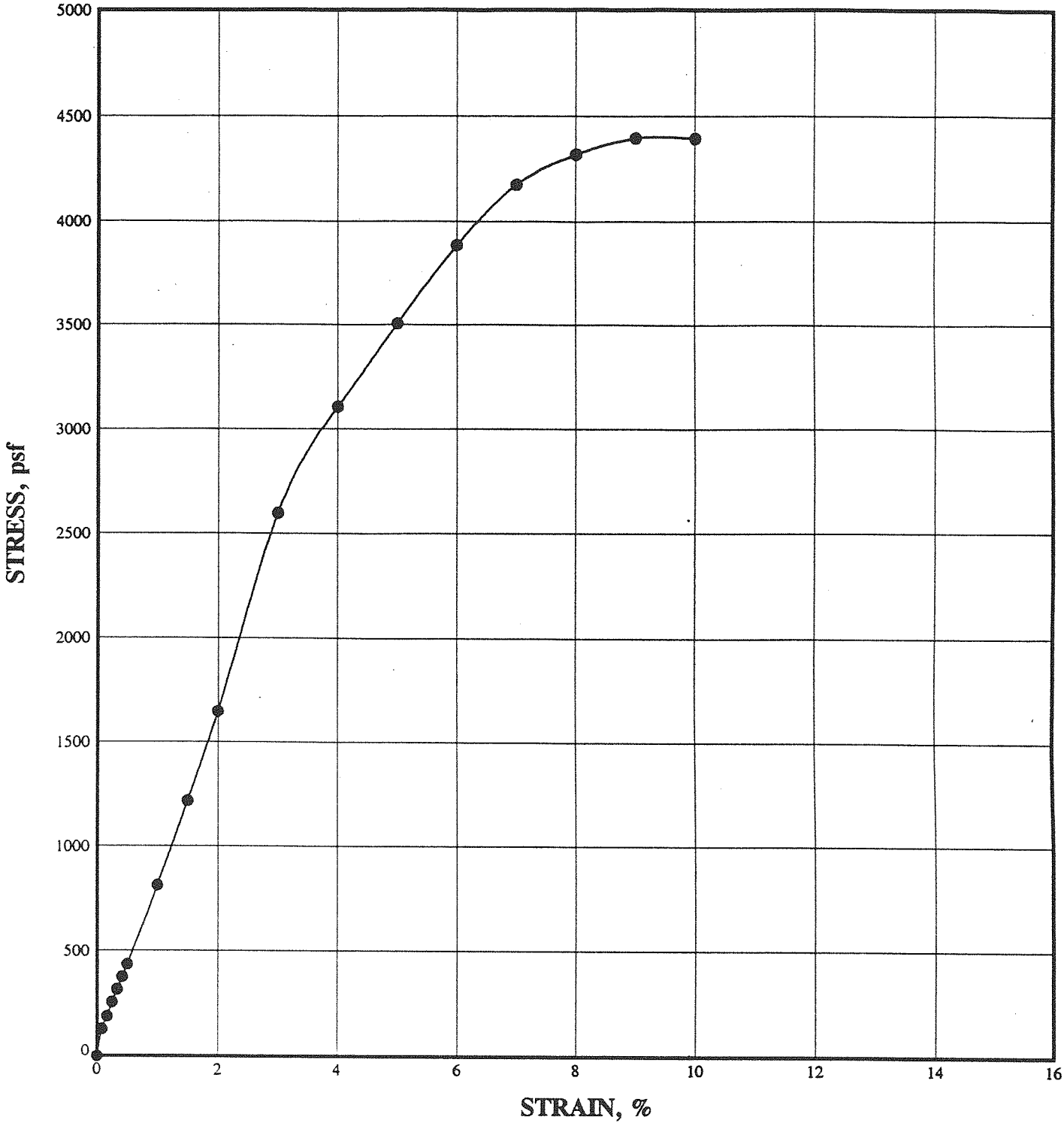


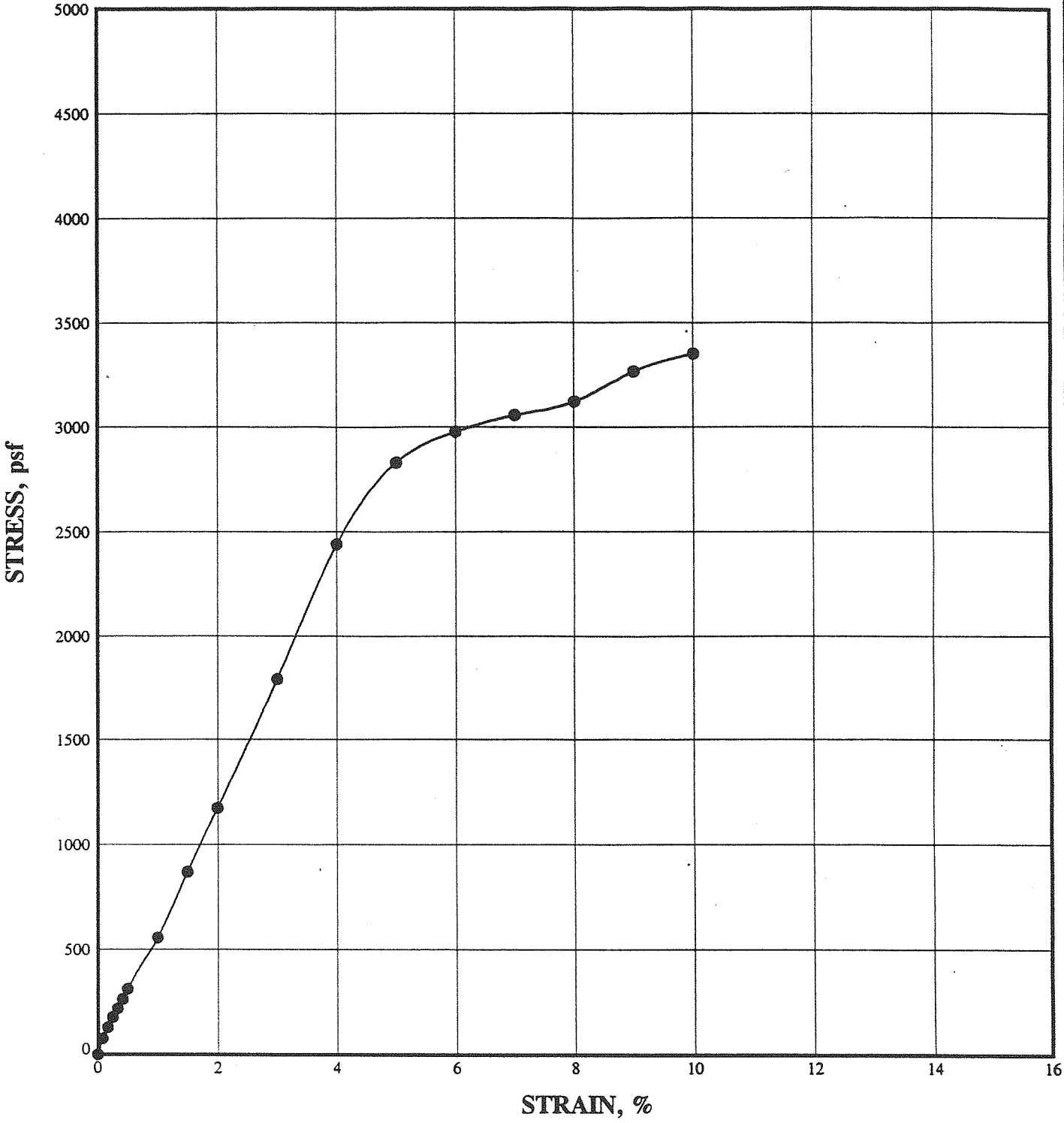

LEGEND:

| Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|
| ● B-SW-17-GT | 8' - 10' | 18 | 108 | 85 | 4396 psf | 9.0 % | 32 | 16 | 16 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**




LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SW-21-GT | 8' - 10' | 15 | 115 | 85 | 3352 psf | 10.0 % | 25 | 12 | 13 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

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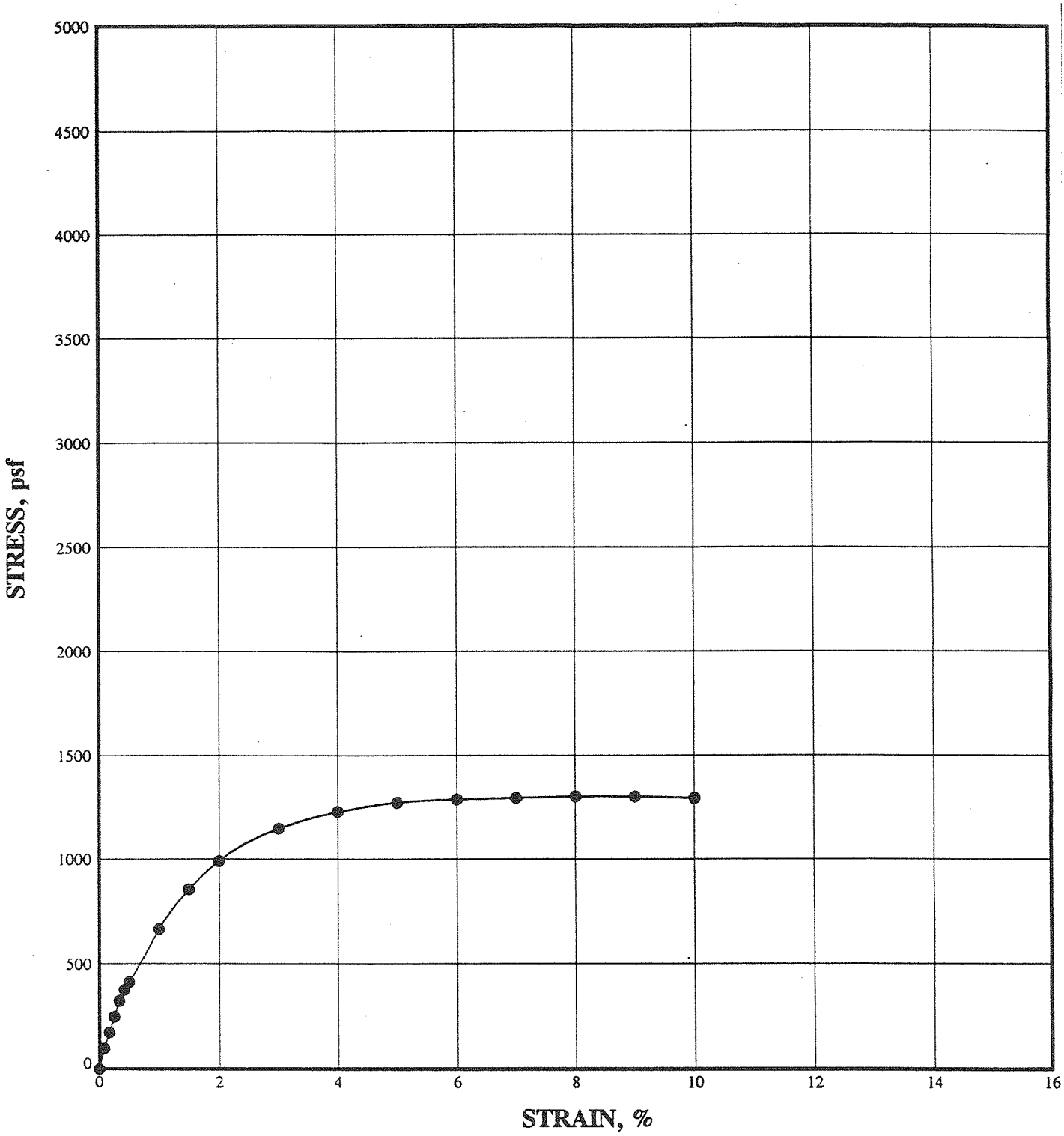


LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | B-SW-21-GT | 19' - 19' | 33 | 86 | 93 | 1304 psf | 8.0 % | 50 | 17 | 33 |

# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

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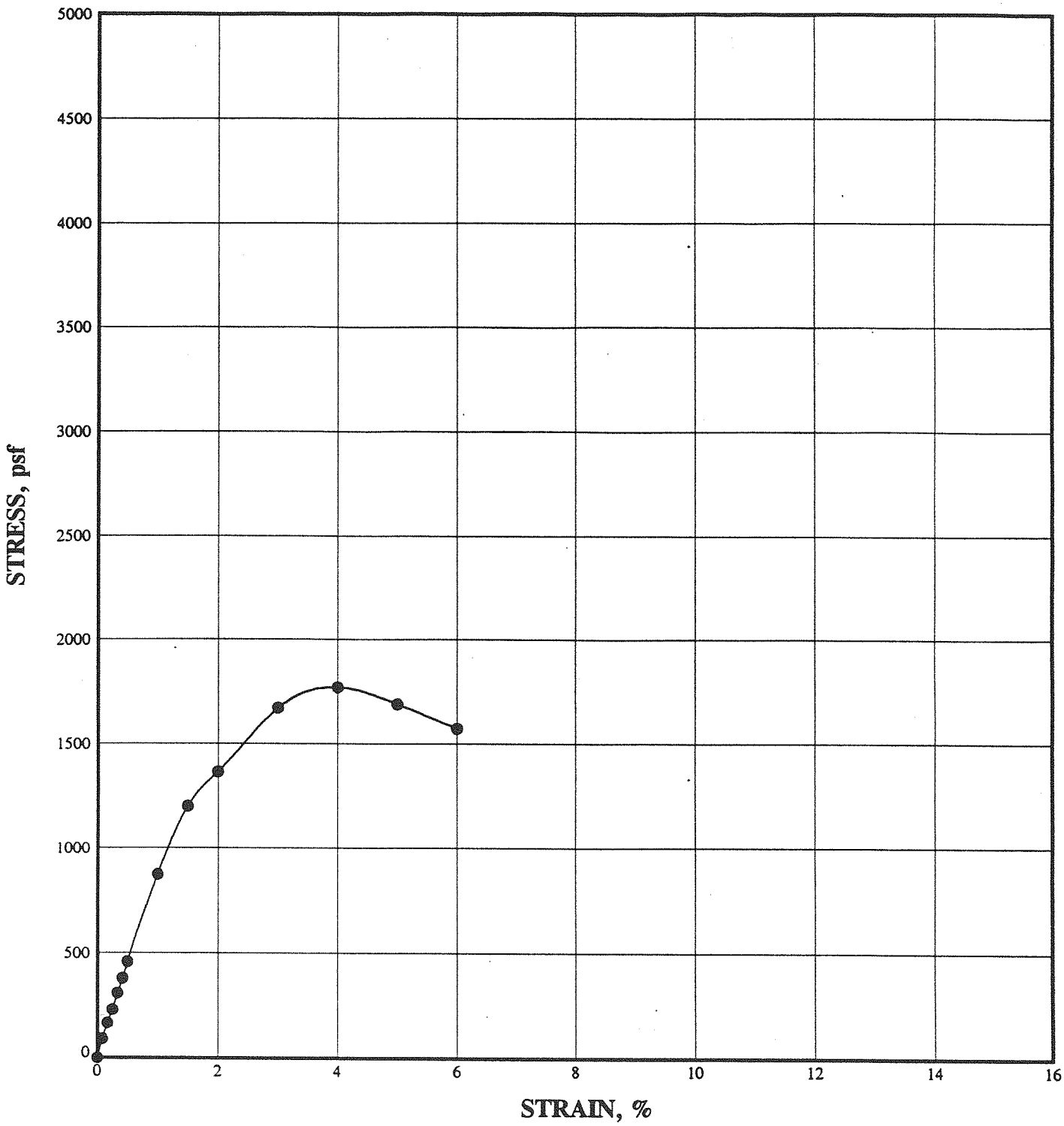



LEGEND:

| | Point ID | Depth | Moisture Content % | Dry Density | Degree of Saturation | Peak Stress | Strain | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|---|---|
| • | B-SW-33-GT | 18' - 20' | 51 | 70 | 96 | 1770 psf | 4.0 % | 66 | 25 | 41 |

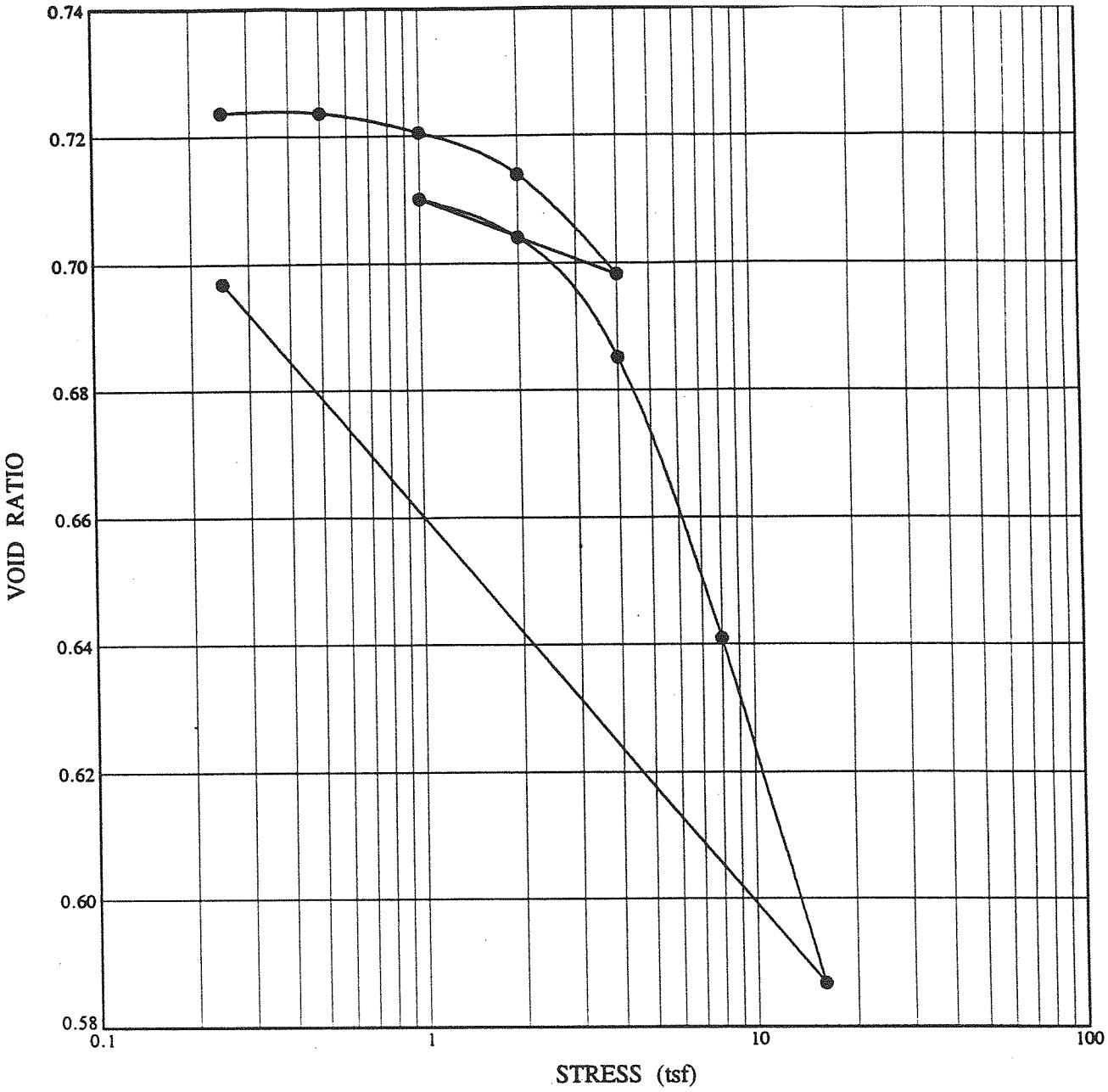
# LIGO

**UNCONSOLIDATED UNDRAINED TRIAXIAL TEST**
**ASTM D 2850-87**

**Woodward-Clyde Consultants**

OCT 30 94 UNCONF3U 3B107

# CONSOLIDATION TEST




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-1-GT
DEPTH: 8' - 10'
DESCRIPTION: (CL)
SPECIFIC GRAVITY: 2.75
INITIAL MOISTURE CONTENT (%): 25
INITIAL DRY UNIT WEIGHT (pcf): 100
LL = 43 PL = 16 PI = 27
INUNDATION AT START

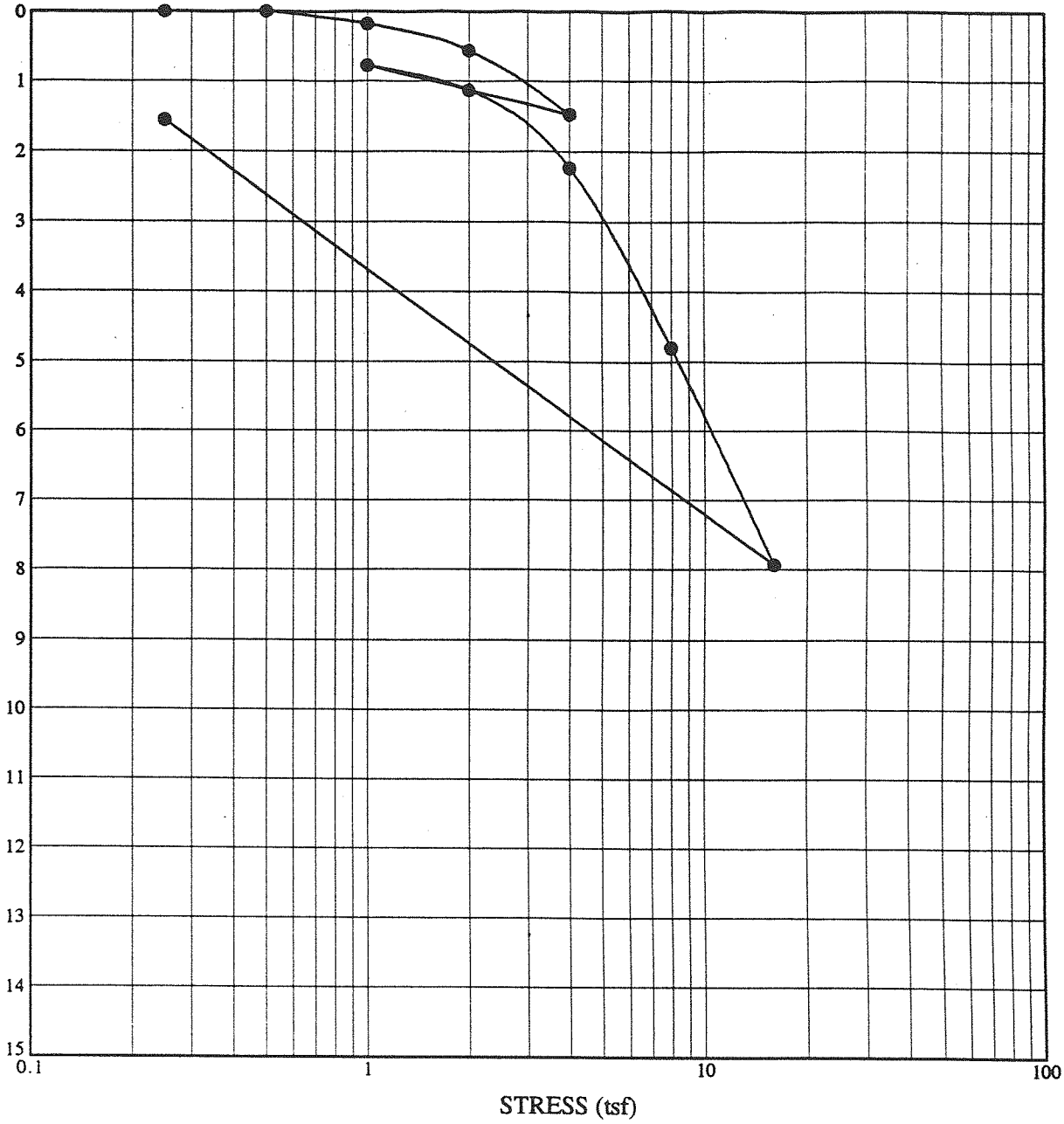
FINAL MOISTURE CONTENT (%): 27
FINAL DRY UNIT WEIGHT (pcf): 98

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: **93B107C**
BORING: **B-SE-1-GT**
DEPTH: **8' - 10'**
DESCRIPTION: **(CL)**

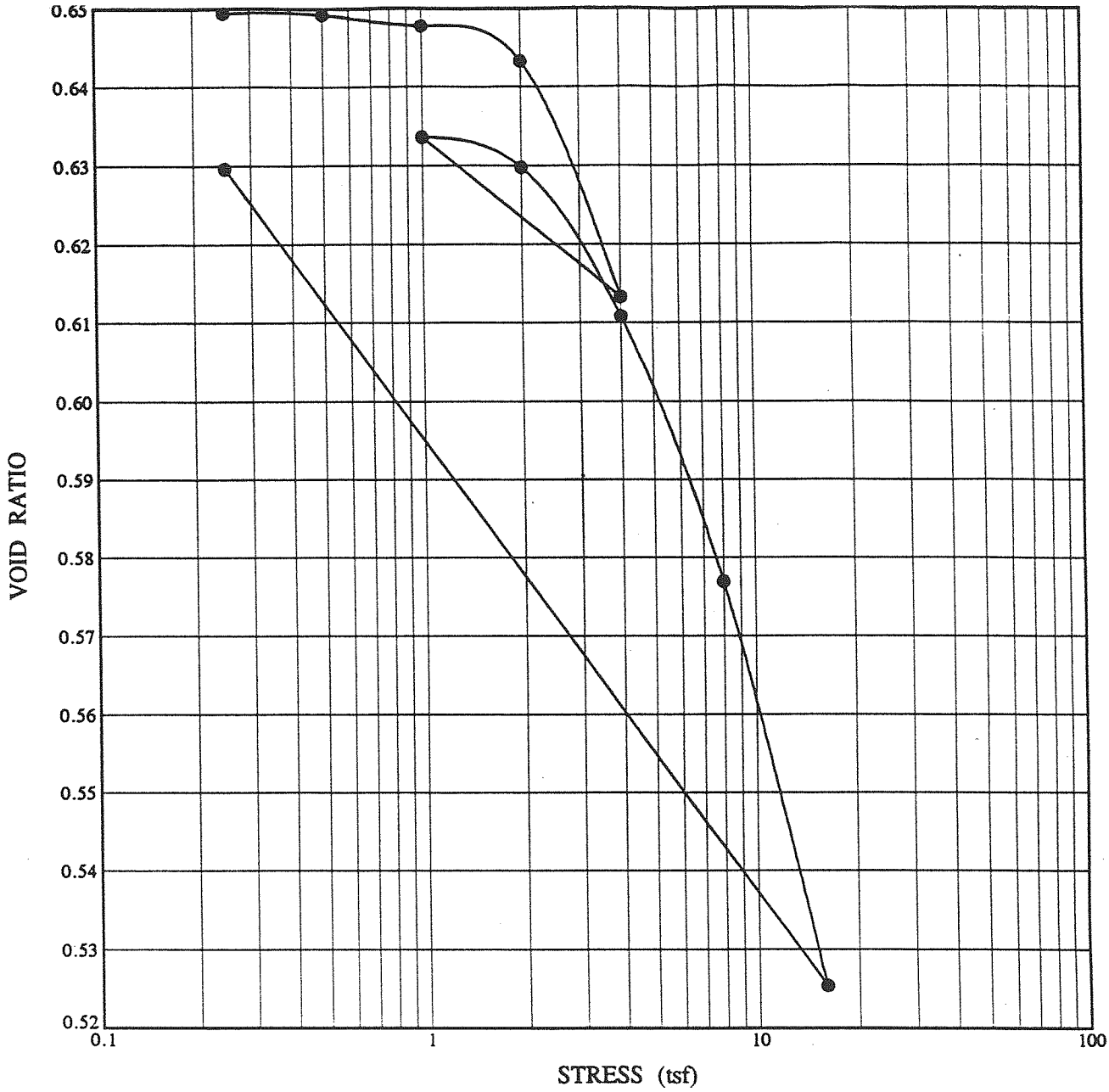
SPECIFIC GRAVITY: **2.75 (assumed)**
INITIAL MOISTURE CONTENT (%): **25**
INITIAL DRY UNIT WEIGHT (pcf): **100**
LL = **43** PL = **16** PI = **27**
INUNDATION AT START

FINAL MOISTURE CONTENT (%): **27**
FINAL DRY UNIT WEIGHT (pcf): **98**

# LIGO

**CONSOLIDATION TEST**
**ASTM D 2435-80**

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

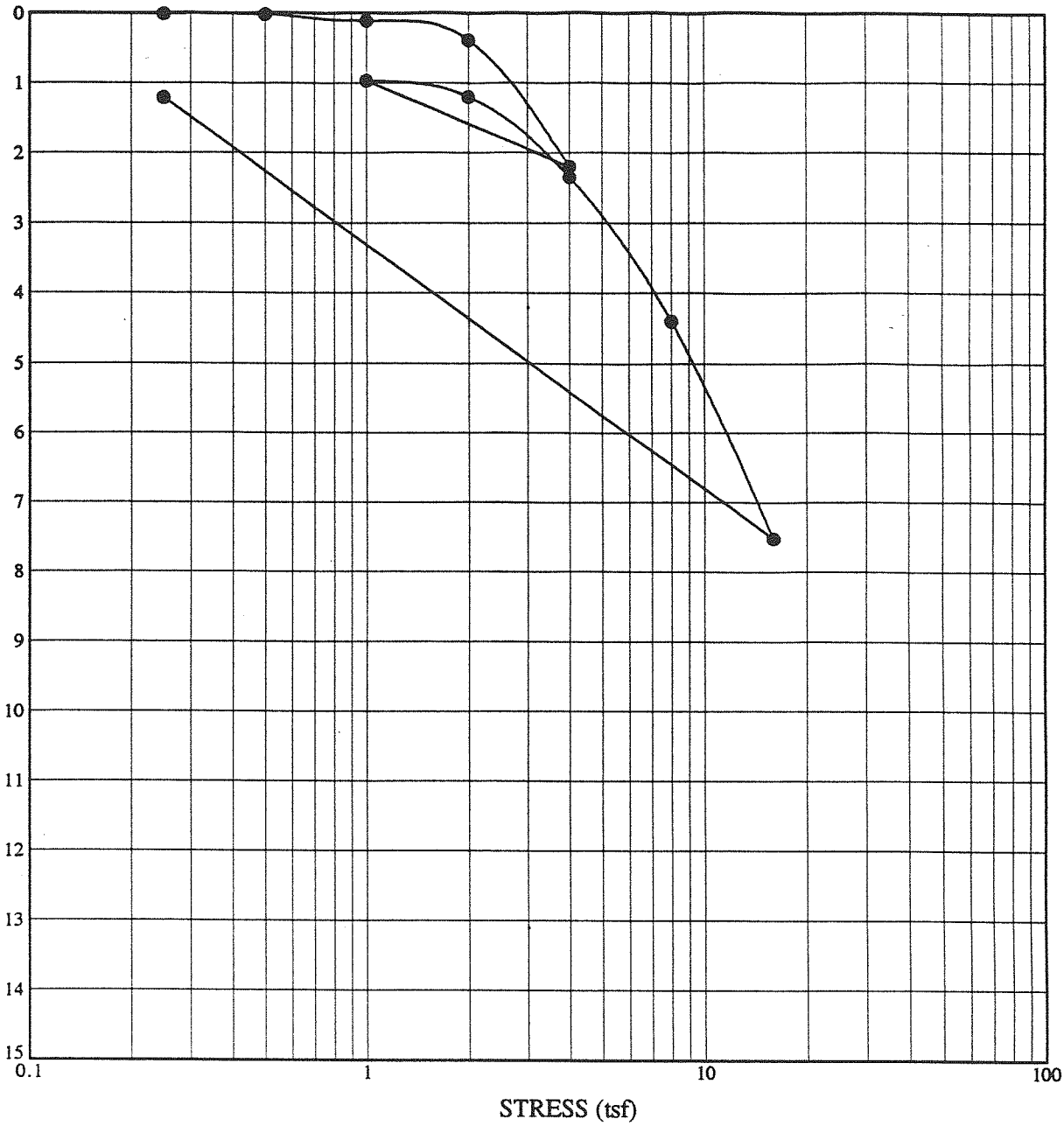
FILE: 93B107C
BORING: B-SE-1-GT
DEPTH: 38' - 40'
DESCRIPTION: (CL-CH)
SPECIFIC GRAVITY: 2.76
INITIAL MOISTURE CONTENT (%): 23
INITIAL DRY UNIT WEIGHT (pcf): 104
LL = 50 PL = 14 PI = 36
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 24
FINAL DRY UNIT WEIGHT (pcf): 106

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-1-GT
DEPTH: 38' - 40'
DESCRIPTION: (CL-CH)

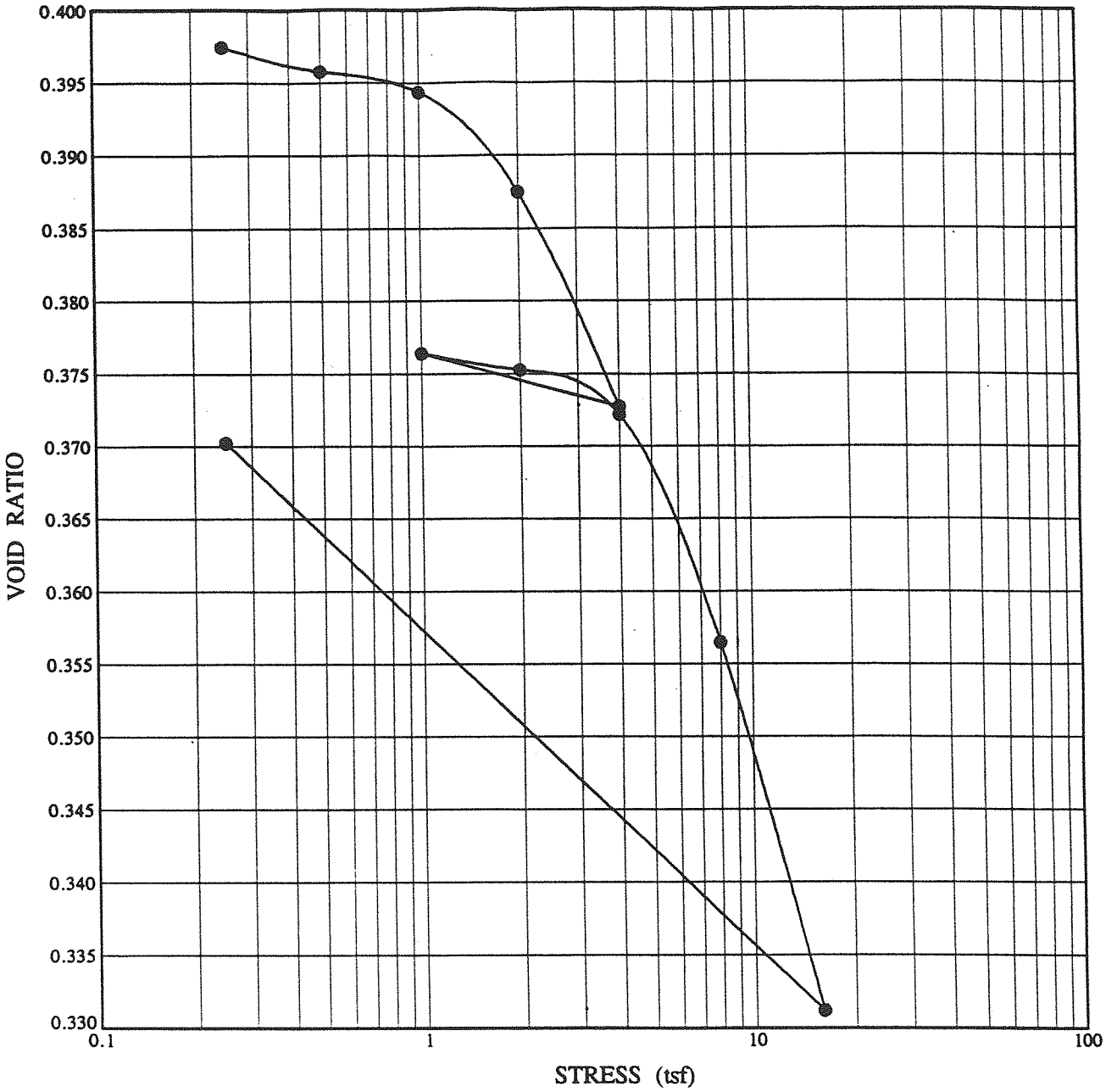
SPECIFIC GRAVITY: 2.76 (assumed)
INITIAL MOISTURE CONTENT (%): 23
INITIAL DRY UNIT WEIGHT (pcf): 104
LL = 50 PL = 14 PI = 36
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 24
FINAL DRY UNIT WEIGHT (pcf): 106

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-2-GT
DEPTH: 8' - 10'
DESCRIPTION: (CL)
SPECIFIC GRAVITY: 2.68
INITIAL MOISTURE CONTENT (%): 14
INITIAL DRY UNIT WEIGHT (pcf): 120
LL = 41 PL = 13 PI = 28
INUNDATION AT START

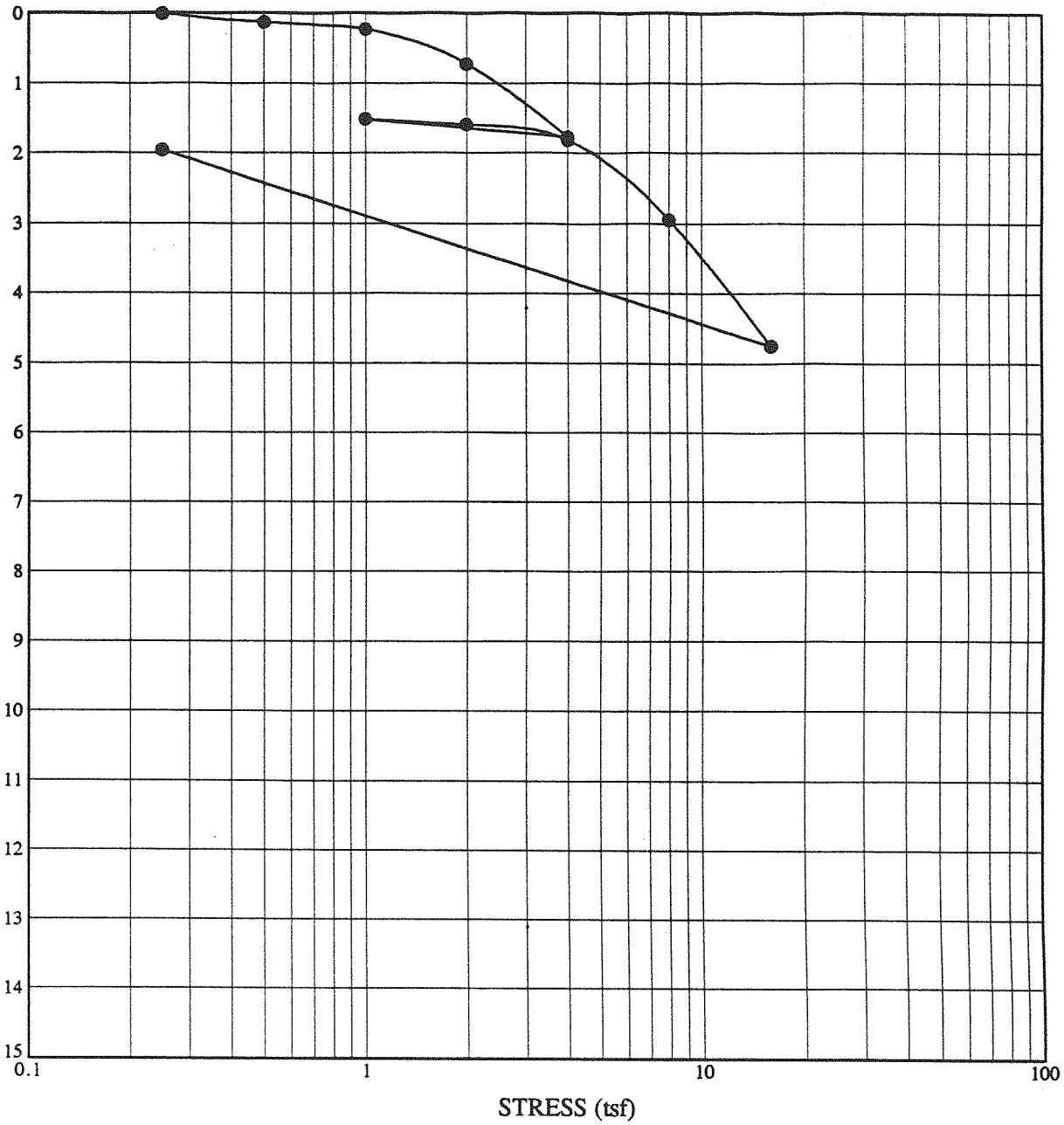
FINAL MOISTURE CONTENT (%): 14
FINAL DRY UNIT WEIGHT (pcf): 121

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: **93B107C**
BORING: **B-SE-2-GT**
DEPTH: **8' - 10'**
DESCRIPTION: **(CL)**

SPECIFIC GRAVITY: **2.68 (assumed)**
INITIAL MOISTURE CONTENT (%): **14**
INITIAL DRY UNIT WEIGHT (pcf): **120**
LL = **41** PL = **13** PI = **28**
INUNDATION AT START

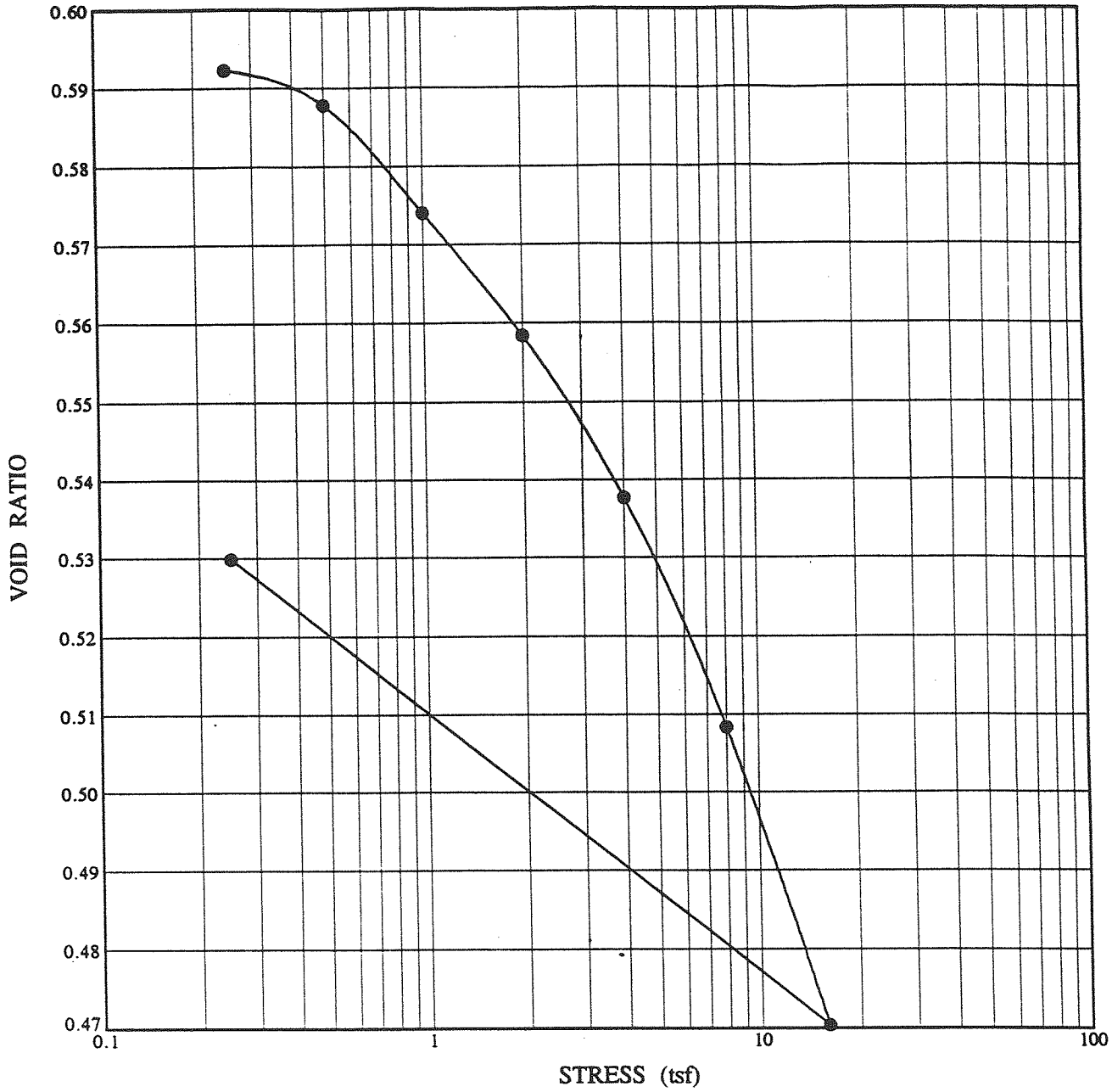
FINAL MOISTURE CONTENT (%): **14**
FINAL DRY UNIT WEIGHT (pcf): **121**

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD2 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-28-GT
DEPTH: 13' - 15'
DESCRIPTION: (CL)
SPECIFIC GRAVITY: 2.70
INITIAL MOISTURE CONTENT (%): 21
INITIAL DRY UNIT WEIGHT (pcf): 106
LL = 38 PL = 15 PI = 23
INUNDATION AT START

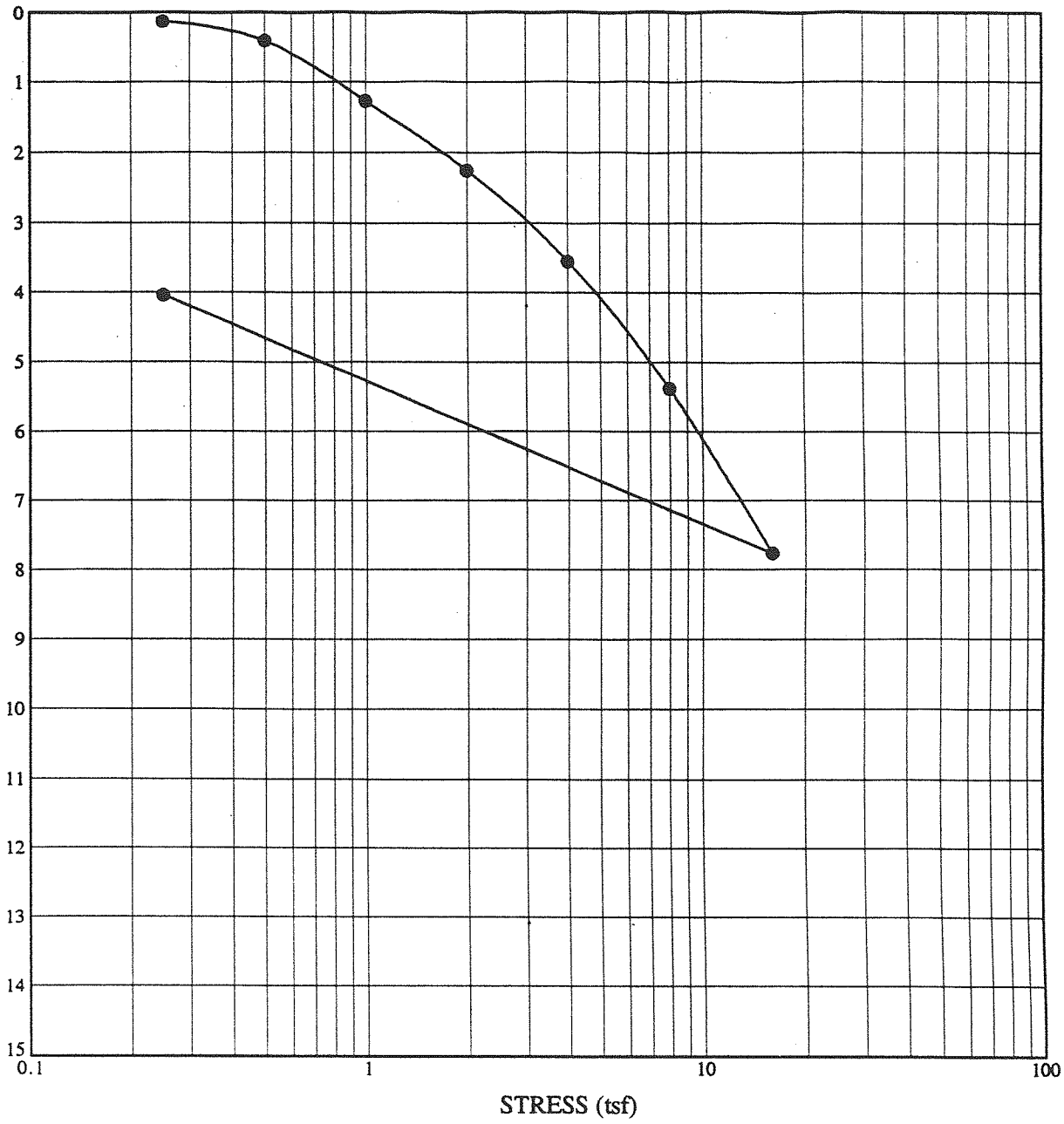
FINAL MOISTURE CONTENT (%): 20
FINAL DRY UNIT WEIGHT (pcf): 110

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: **93B107C**
BORING: **B-SE-28-GT**
DEPTH: **13' - 15'**
DESCRIPTION: **(CL)**

SPECIFIC GRAVITY: **2.70 (assumed)**
INITIAL MOISTURE CONTENT (%): **21**
INITIAL DRY UNIT WEIGHT (pcf): **106**
LL = **38** PL = **15** PI = **23**
INUNDATION AT START

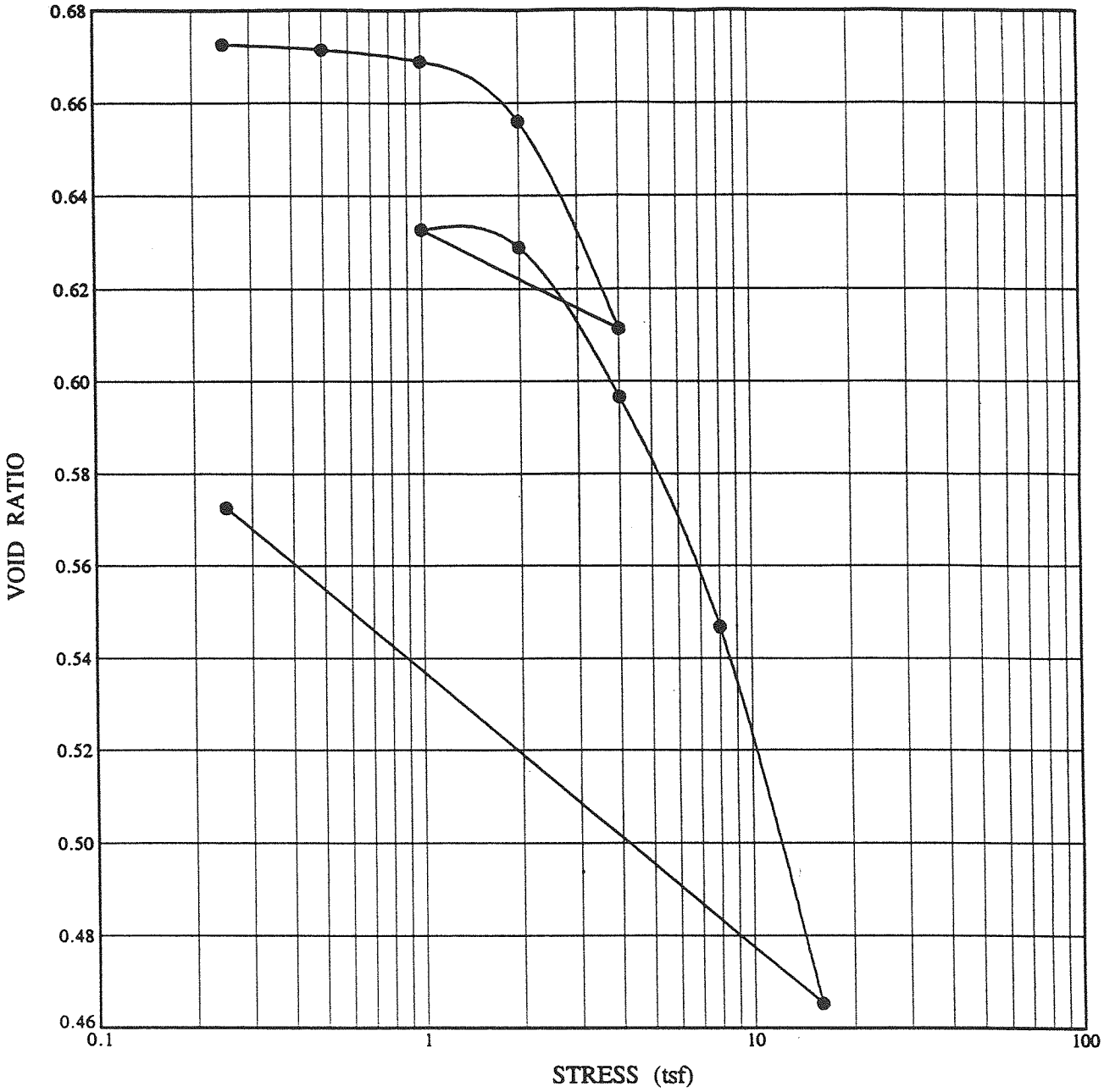
FINAL MOISTURE CONTENT (%): **20**
FINAL DRY UNIT WEIGHT (pcf): **110**

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD2 3B107




● STRAIN READINGS

Sample Data:

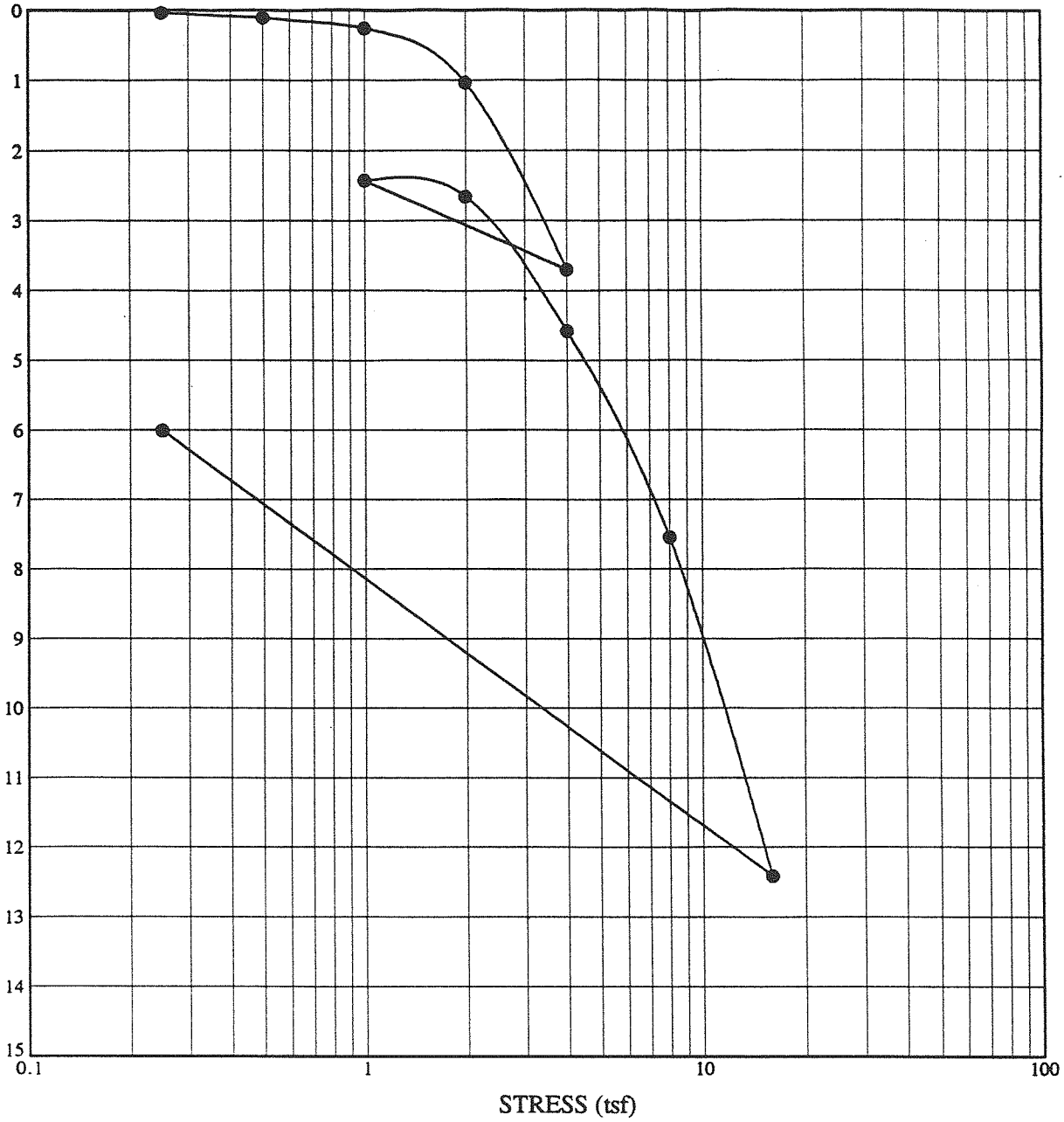
FILE: 93B107C
BORING: B-SE-30-GT
DEPTH: 13' - 15'
DESCRIPTION: (CH)
SPECIFIC GRAVITY: 2.75
INITIAL MOISTURE CONTENT (%): 24
INITIAL DRY UNIT WEIGHT (pcf): 103
LL = 56 PL = 17 PI = 39
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 25
FINAL DRY UNIT WEIGHT (pcf): 106

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-30-GT
DEPTH: 13' - 15'
DESCRIPTION: (CH)

SPECIFIC GRAVITY: 2.75 (assumed)
INITIAL MOISTURE CONTENT (%): 24
INITIAL DRY UNIT WEIGHT (pcf): 103
LL = 56 PL = 17 PI = 39
INUNDATION AT START

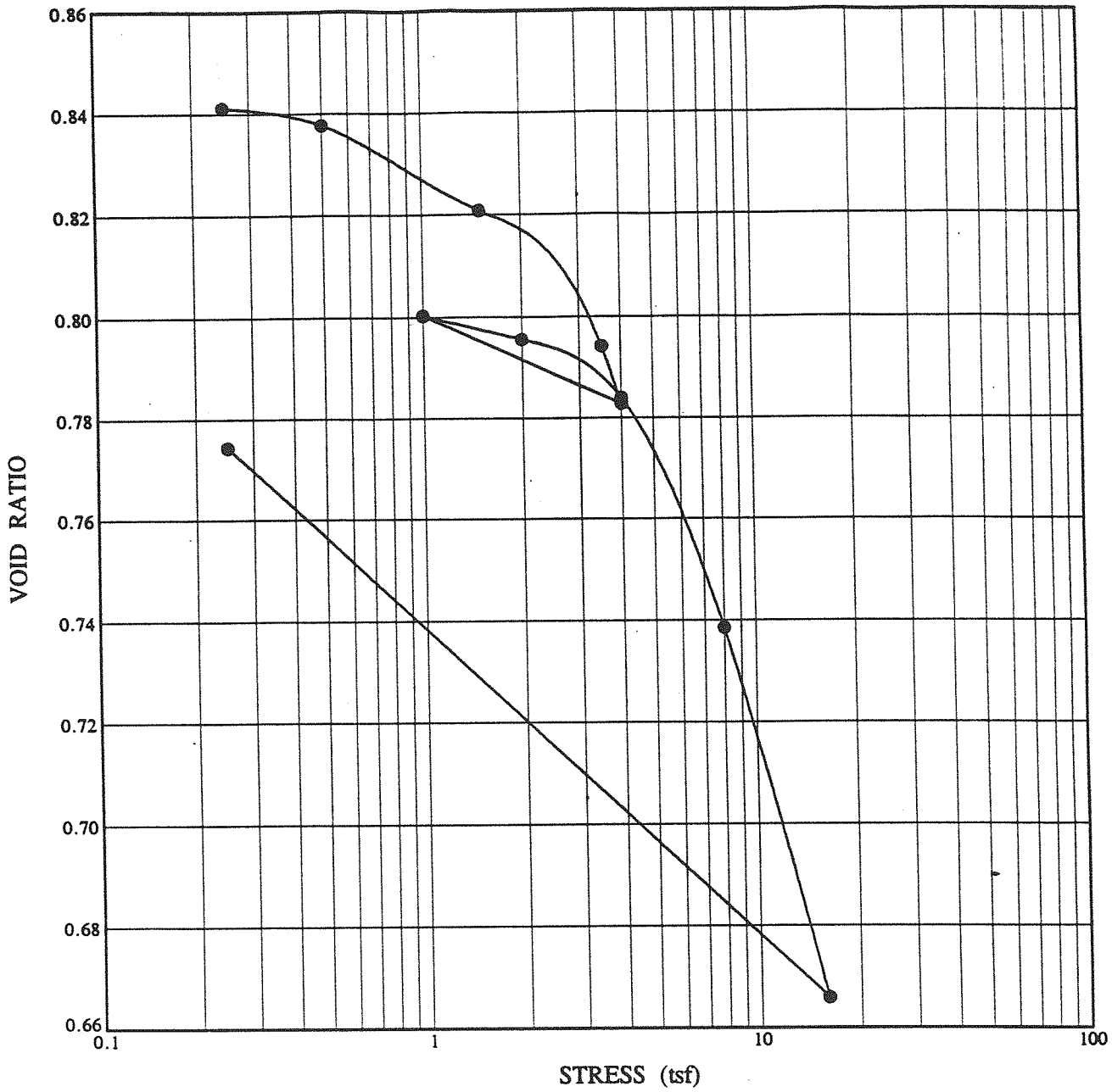
FINAL MOISTURE CONTENT (%): 25
FINAL DRY UNIT WEIGHT (pcf): 106

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD2 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-33-GT
DEPTH: 18' - 20'
DESCRIPTION: (CH)
SPECIFIC GRAVITY: 2.72
INITIAL MOISTURE CONTENT (%): 28
INITIAL DRY UNIT WEIGHT (pcf): 92
LL = 51 PL = 20 PI = 31
INUNDATION AT START

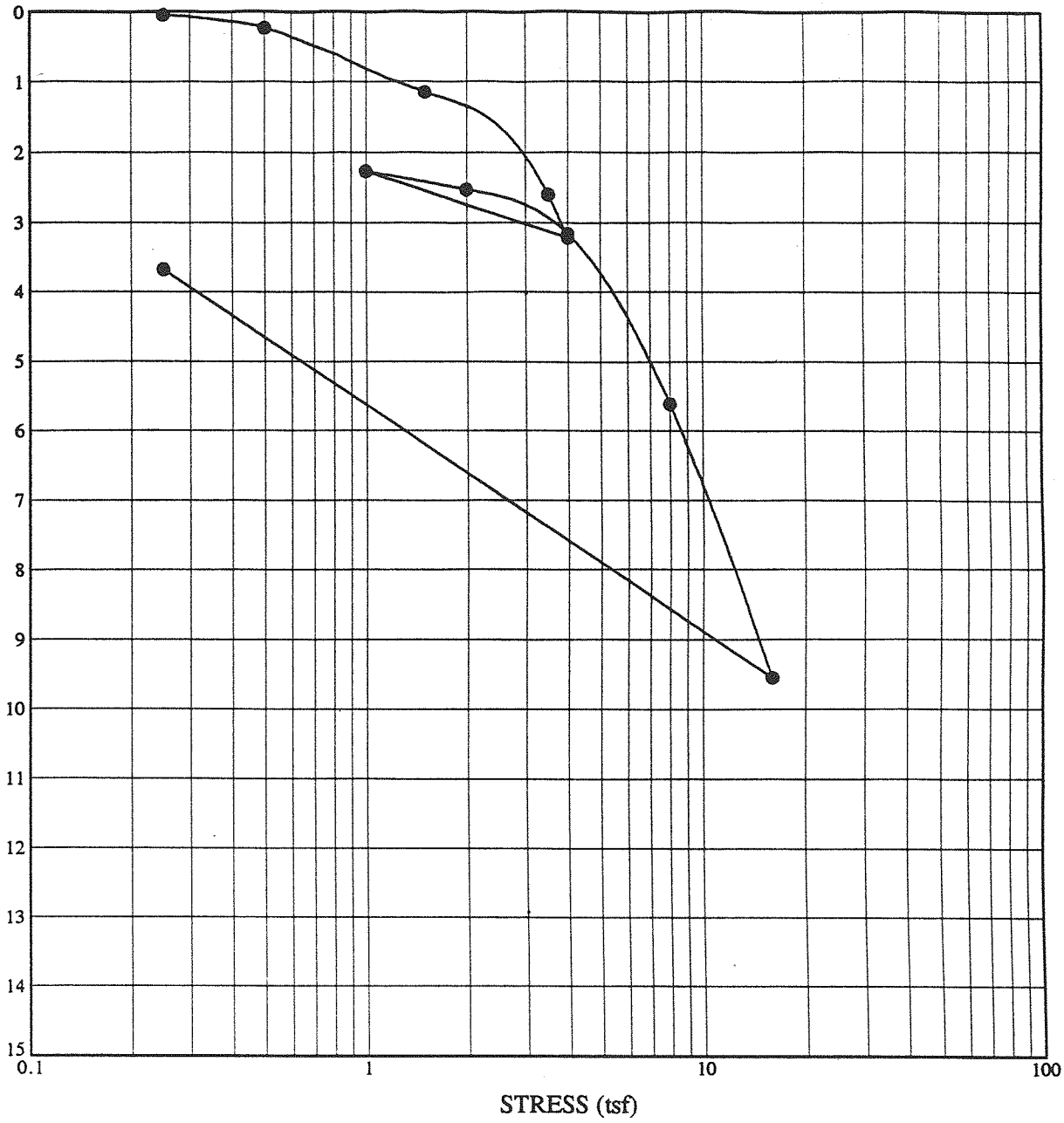
FINAL MOISTURE CONTENT (%): 29
FINAL DRY UNIT WEIGHT (pcf): 94

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SE-33-GT
DEPTH: 18' - 20'
DESCRIPTION: (CH)

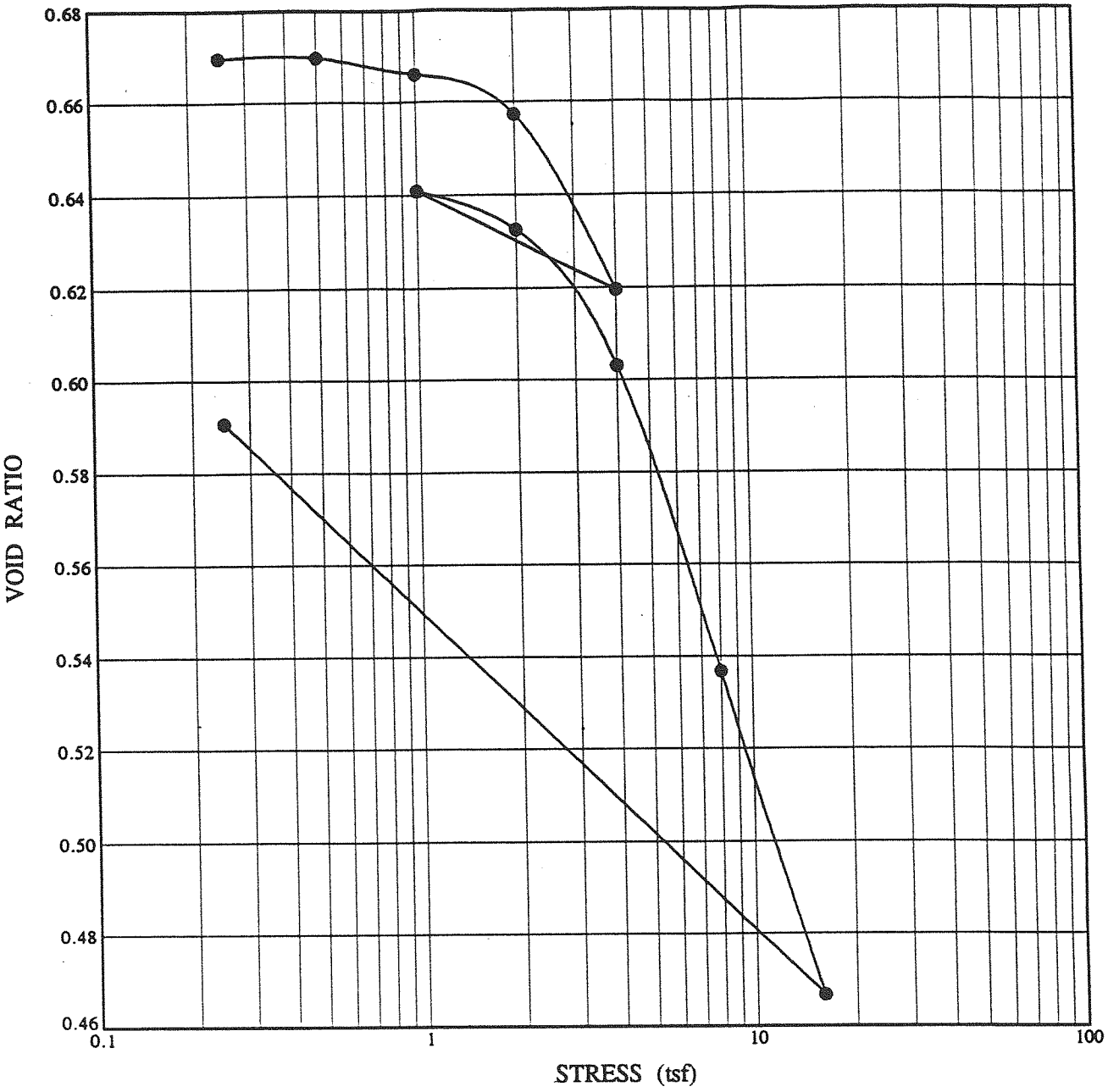
SPECIFIC GRAVITY: 2.72 (assumed)
INITIAL MOISTURE CONTENT (%): 28
INITIAL DRY UNIT WEIGHT (pcf): 92
LL = 51 PL = 20 PI = 31
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 29
FINAL DRY UNIT WEIGHT (pcf): 94

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-2-GT
DEPTH: 6' - 8'
DESCRIPTION: (CH)
SPECIFIC GRAVITY: 2.75
INITIAL MOISTURE CONTENT (%): 23
INITIAL DRY UNIT WEIGHT (pcf): 103
LL = 47 PL = 15 PI = 32
INUNDATION AT START

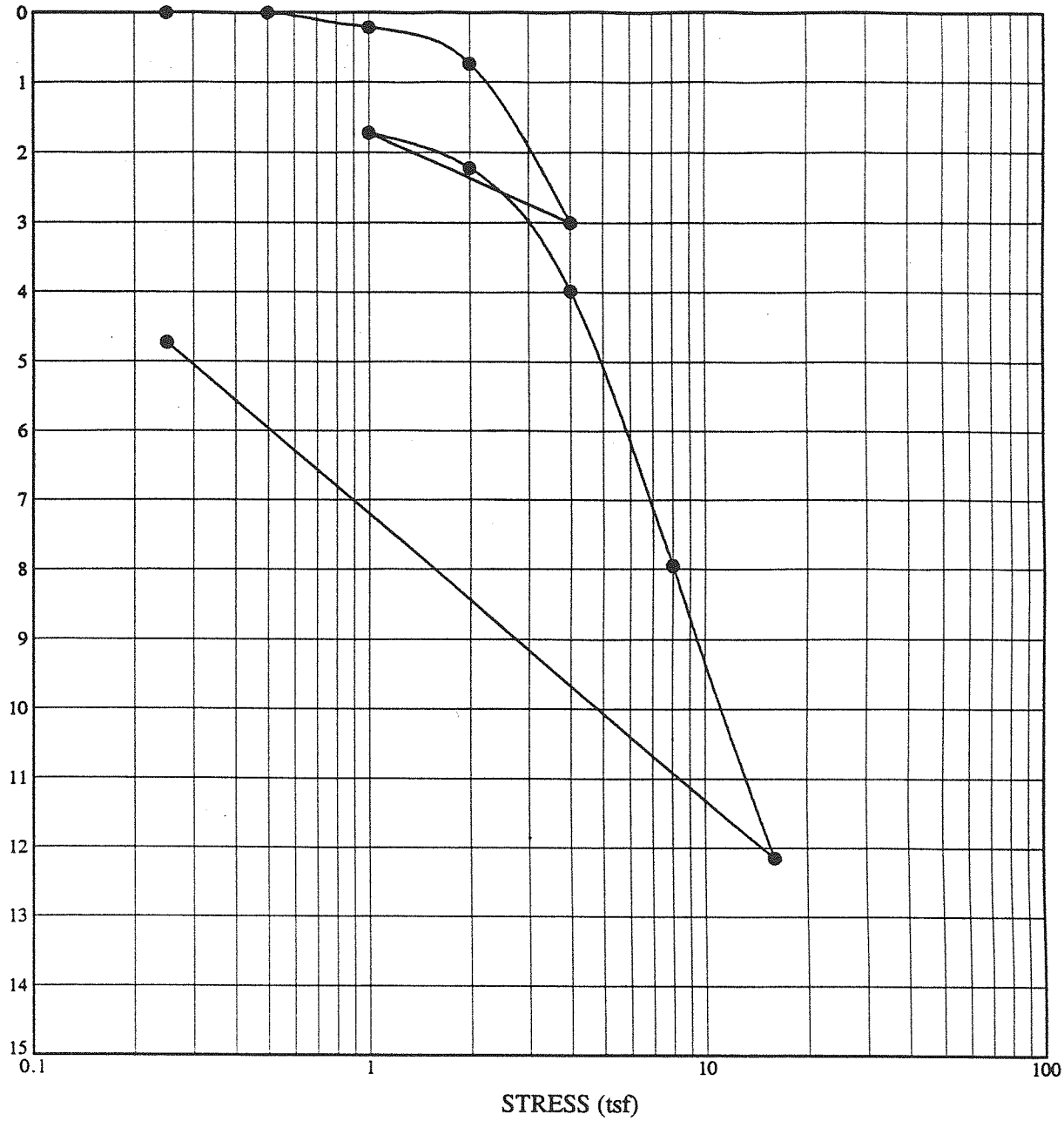
FINAL MOISTURE CONTENT (%): 26
FINAL DRY UNIT WEIGHT (pcf): 103

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-2-GT
DEPTH: 6' - 8'
DESCRIPTION: (CH)

SPECIFIC GRAVITY: 2.75 (assumed)
INITIAL MOISTURE CONTENT (%): 23
INITIAL DRY UNIT WEIGHT (pcf): 103
LL = 47 PL = 15 PI = 32
INUNDATION AT START

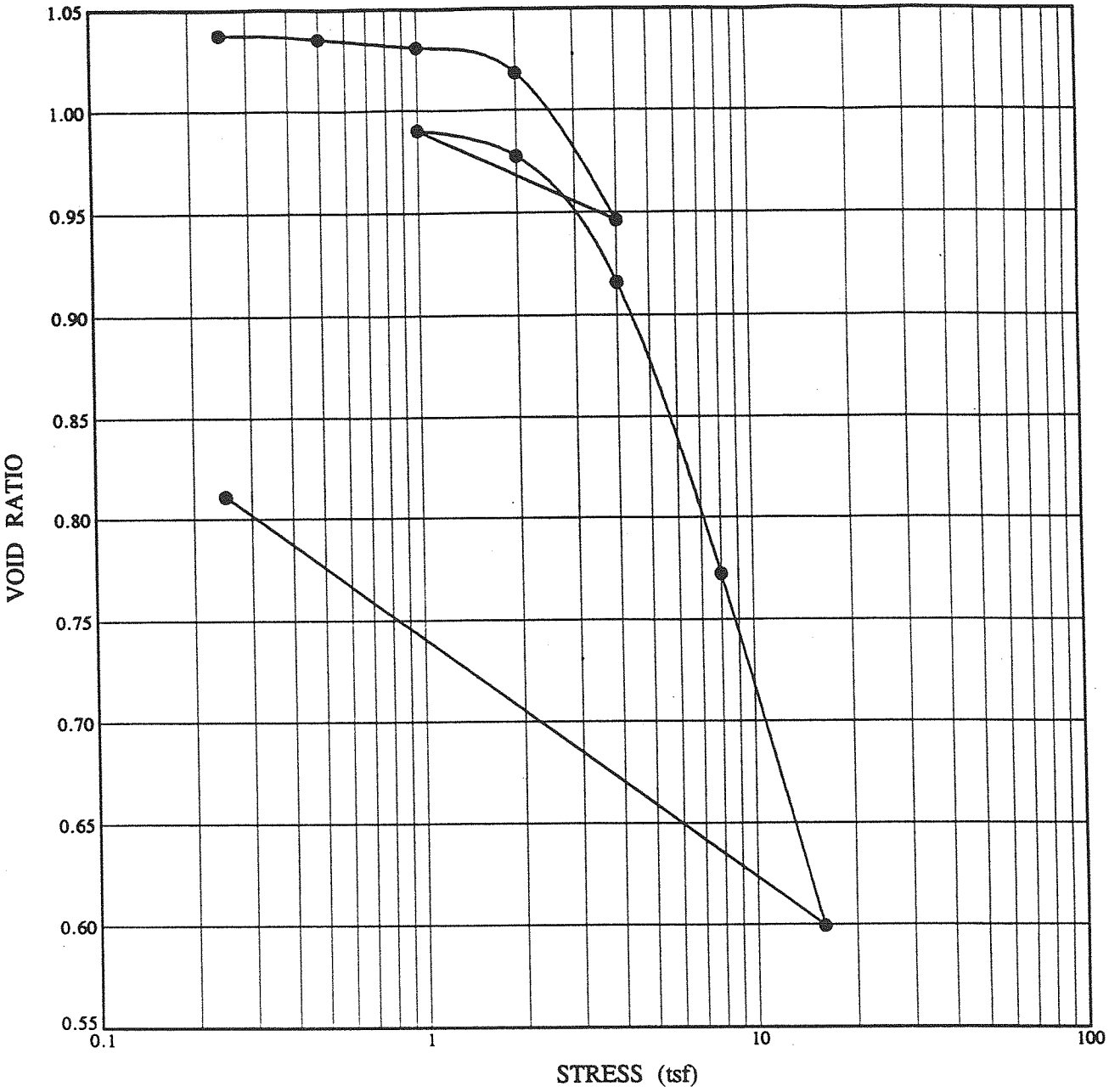
FINAL MOISTURE CONTENT (%): 26
FINAL DRY UNIT WEIGHT (pcf): 103

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD2 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-2-GT
DEPTH: 18' - 20'
DESCRIPTION: (CH)
SPECIFIC GRAVITY: 2.78
INITIAL MOISTURE CONTENT (%): 37
INITIAL DRY UNIT WEIGHT (pcf): 85
LL = 71 PL = 22 PI = 49
INUNDATION AT START

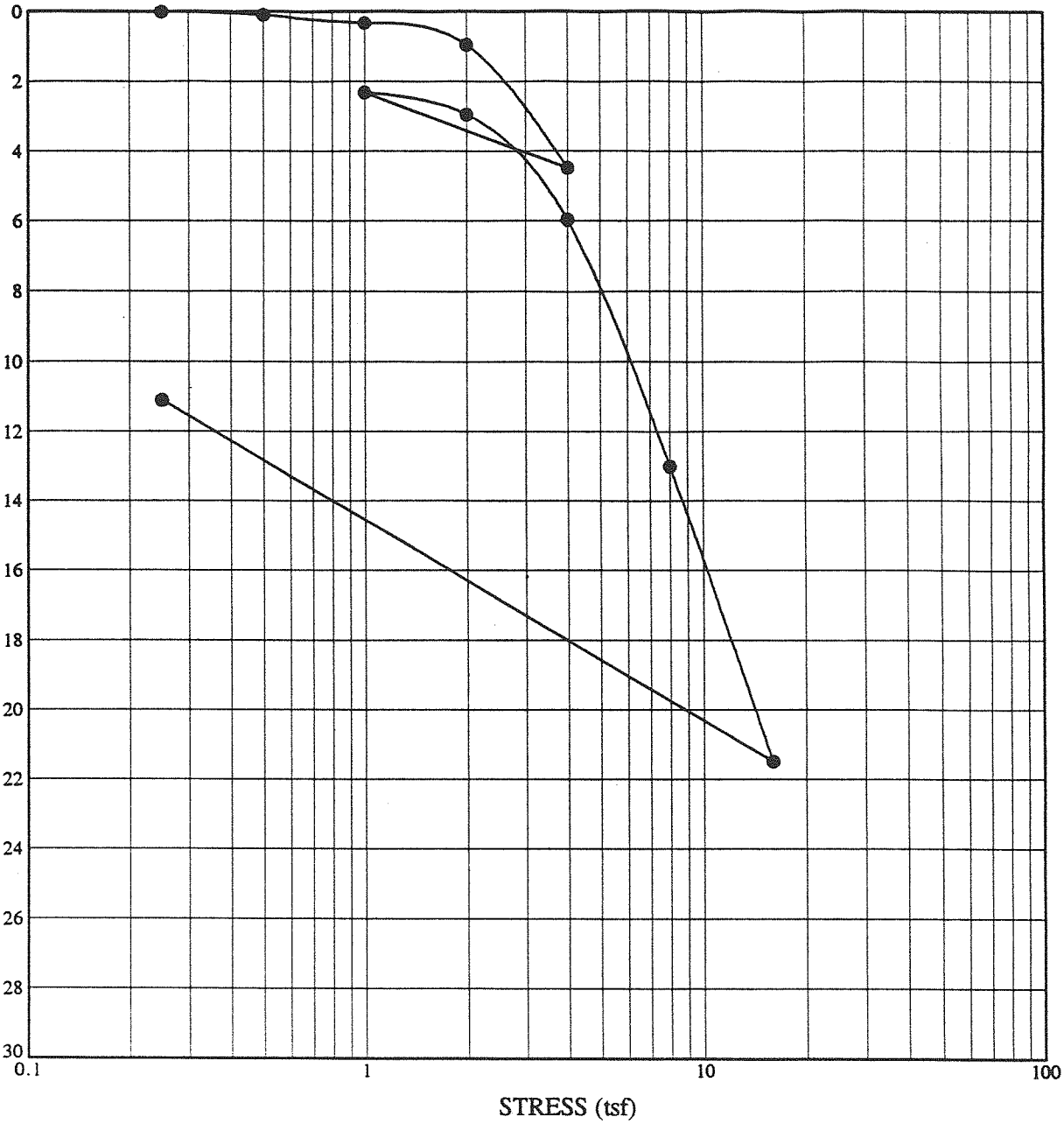
FINAL MOISTURE CONTENT (%): 38
FINAL DRY UNIT WEIGHT (pcf): 86

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-2-GT
DEPTH: 18' - 20'
DESCRIPTION: (CH)

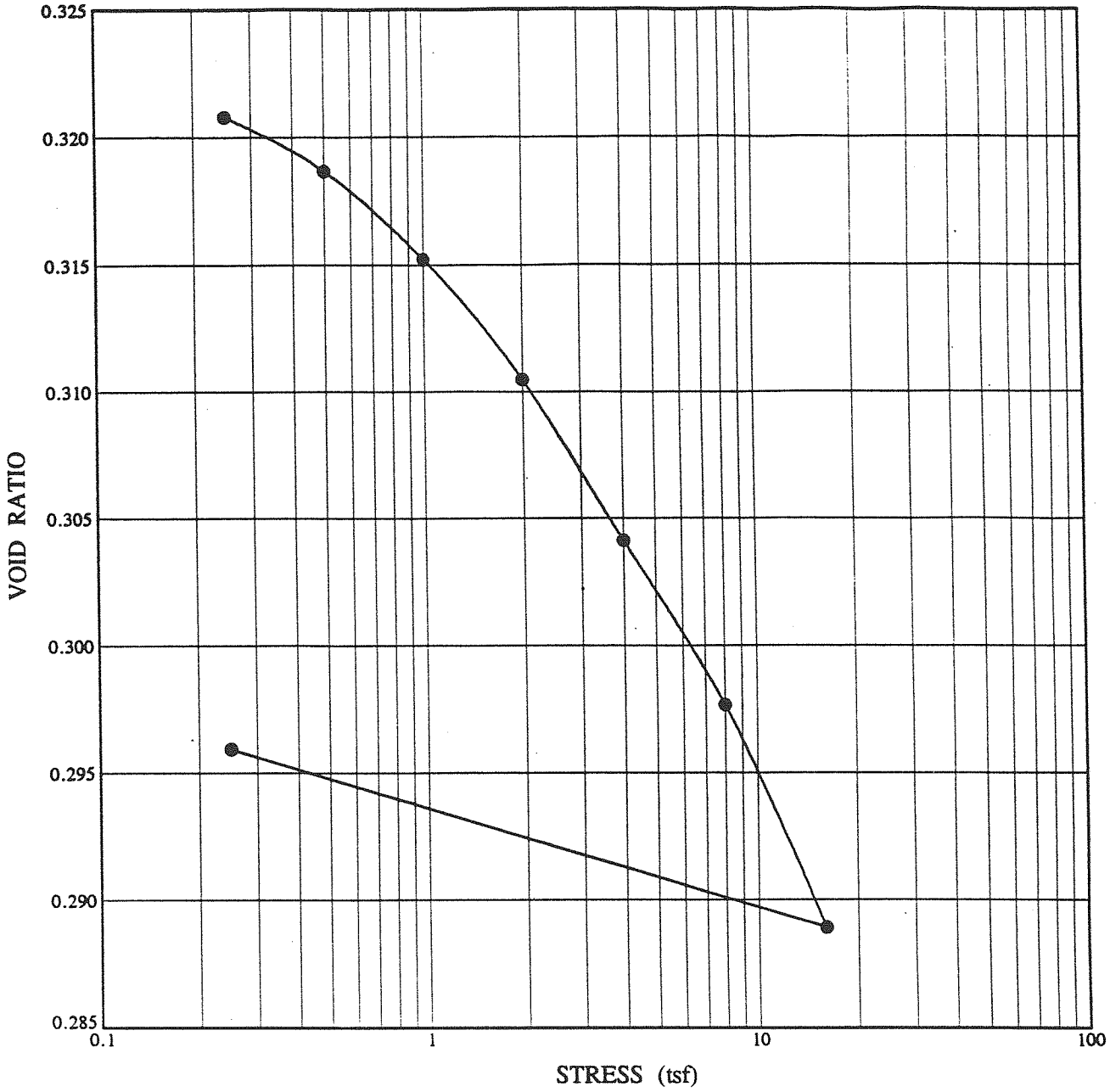
SPECIFIC GRAVITY: 2.78 (assumed)
INITIAL MOISTURE CONTENT (%): 37
INITIAL DRY UNIT WEIGHT (pcf): 85
LL = 71 PL = 22 PI = 49
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 38
FINAL DRY UNIT WEIGHT (pcf): 86

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-13-GT
DEPTH: 13' - 15'
DESCRIPTION: (ML/SM)
SPECIFIC GRAVITY: 2.62
INITIAL MOISTURE CONTENT (%): 12
INITIAL DRY UNIT WEIGHT (pcf): 124
LL = 15 PL = 13 PI = 2
INUNDATION AT START

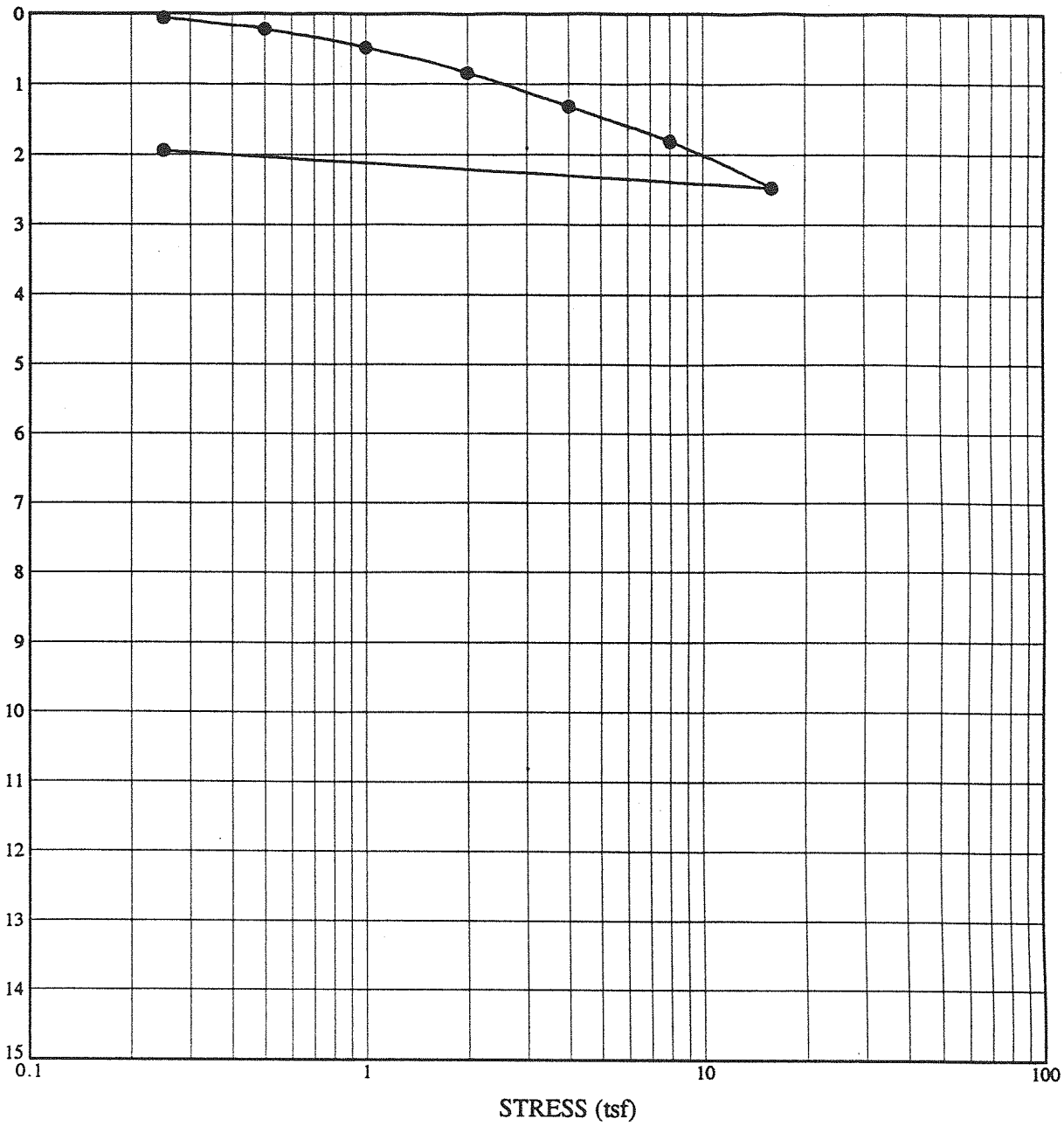
FINAL MOISTURE CONTENT (%): 13
FINAL DRY UNIT WEIGHT (pcf): 124

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

Woodward-Clyde Consultants

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: **93B107C**
BORING: **B-SW-13-GT**
DEPTH: **13' - 15'**
DESCRIPTION: **(ML/SM)**

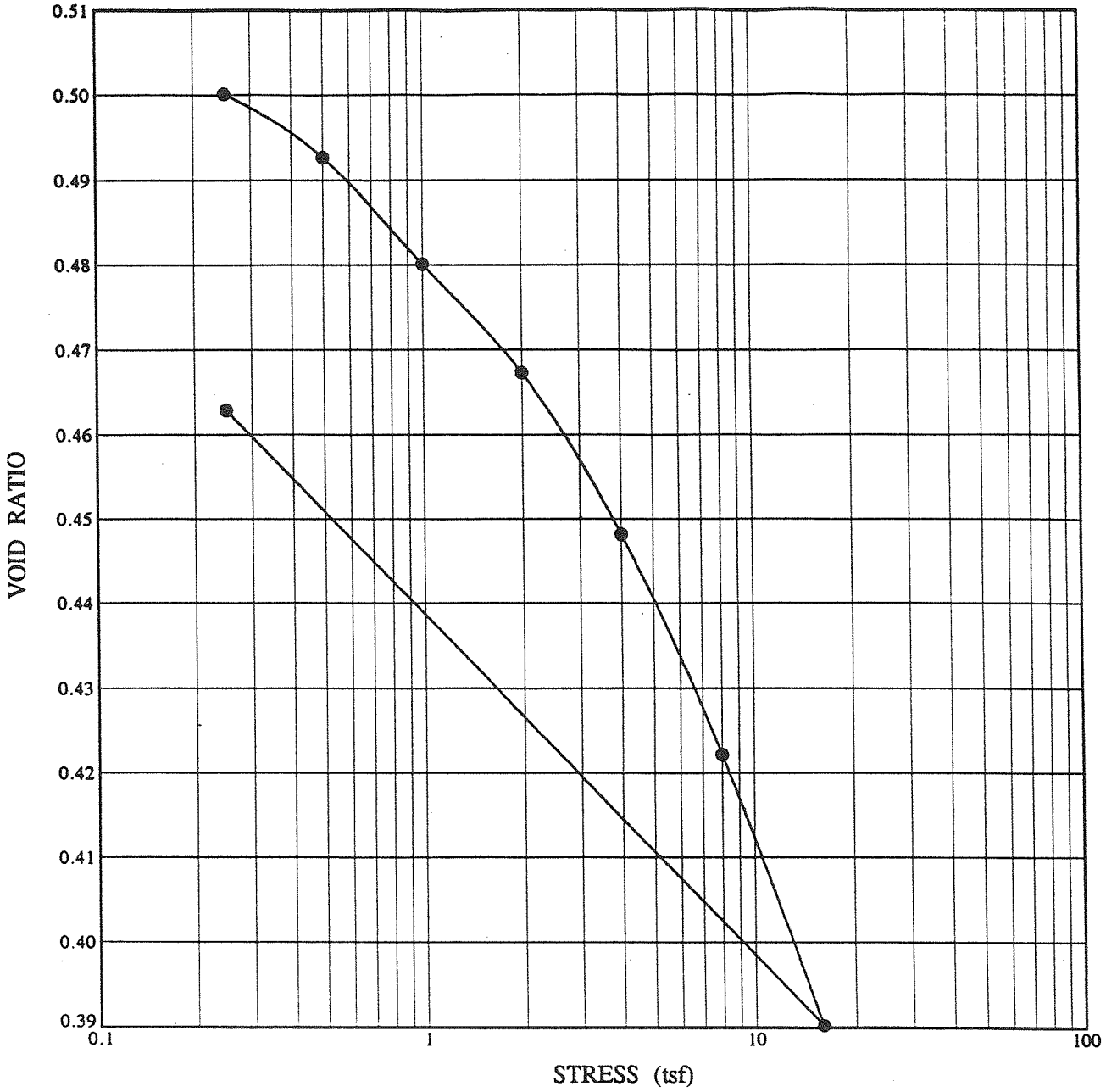
SPECIFIC GRAVITY: **2.62 (assumed)**
INITIAL MOISTURE CONTENT (%): **12**
INITIAL DRY UNIT WEIGHT (pcf): **124**
LL = **15** PL = **13** PI = **2**
INUNDATION AT START

FINAL MOISTURE CONTENT (%): **13**
FINAL DRY UNIT WEIGHT (pcf): **124**

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**




● STRAIN READINGS

Sample Data:

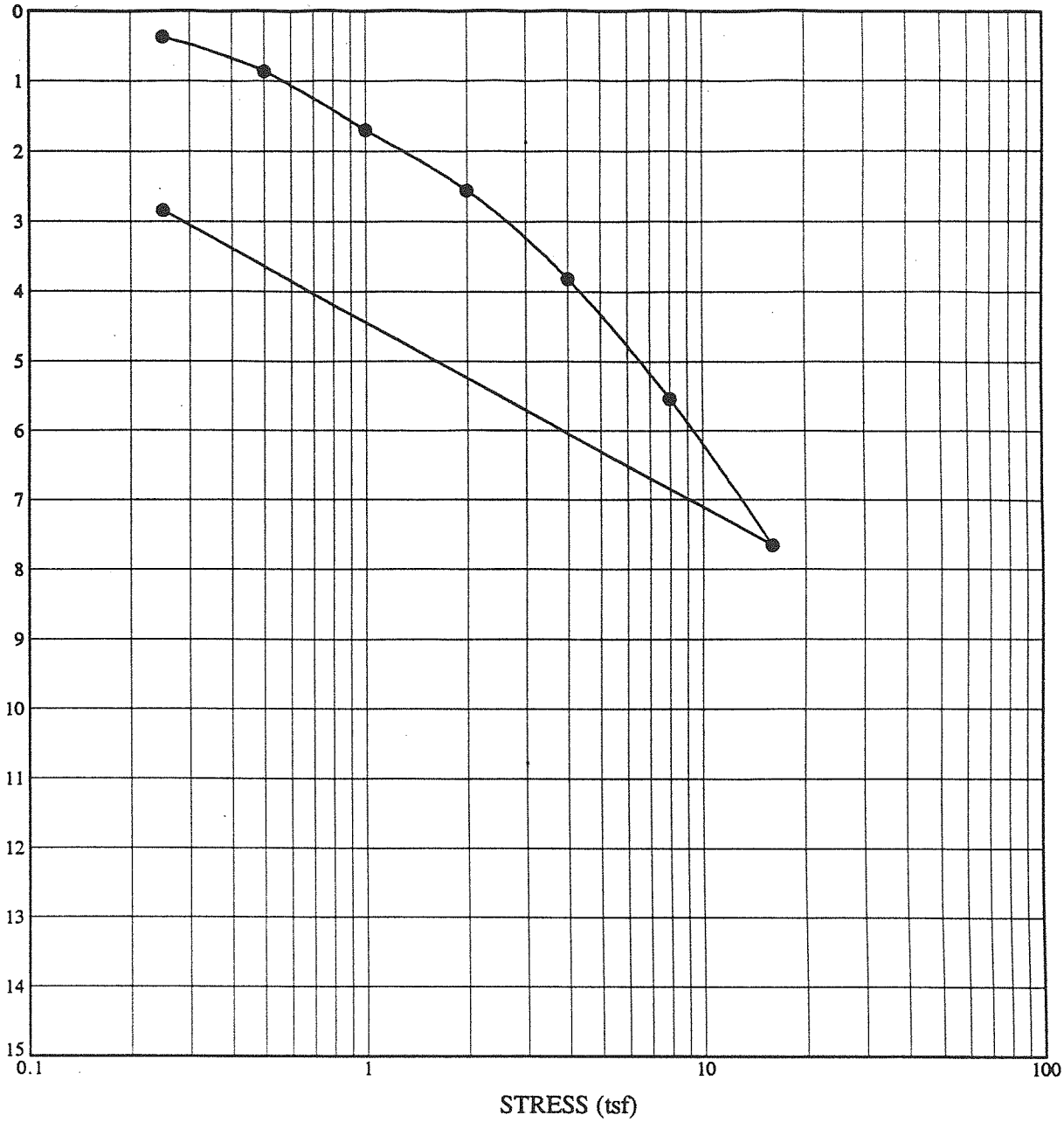
FILE: 93B107C
BORING: B-SW-21-GT
DEPTH: 8' - 10'
DESCRIPTION: (CL-SC)
SPECIFIC GRAVITY: 2.68
INITIAL MOISTURE CONTENT (%): 18
INITIAL DRY UNIT WEIGHT (pcf): 111
FINAL MOISTURE CONTENT (%): 17
FINAL DRY UNIT WEIGHT (pcf): 113
LL = 25 PL = 12 PI = 13
INUNDATION AT START

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

Woodward-Clyde Consultants

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-21-GT
DEPTH: 8' - 10'
DESCRIPTION: (CL-SC)

SPECIFIC GRAVITY: 2.68 (assumed)
INITIAL MOISTURE CONTENT (%): 18
INITIAL DRY UNIT WEIGHT (pcf): 111
LL = 25 PL = 12 PI = 13
INUNDATION AT START

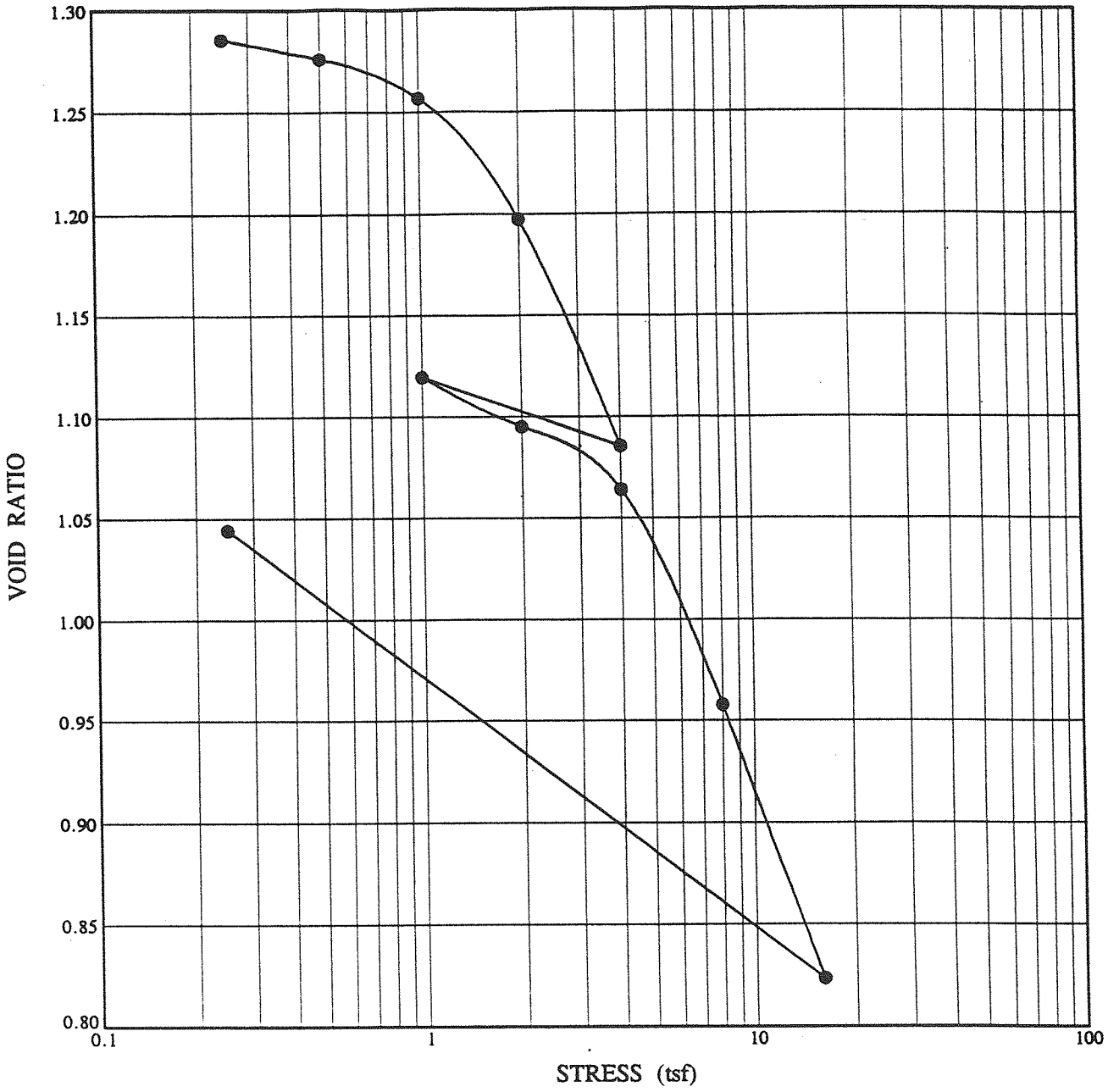
FINAL MOISTURE CONTENT (%): 17
FINAL DRY UNIT WEIGHT (pcf): 113

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD2 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-25-GT
DEPTH: 18' - 20'
DESCRIPTION: (CH)
SPECIFIC GRAVITY: 2.75
INITIAL MOISTURE CONTENT (%): 46
INITIAL DRY UNIT WEIGHT (pcf): 75
LL = 67 PL = 24 PI = 43
INUNDATION AT START

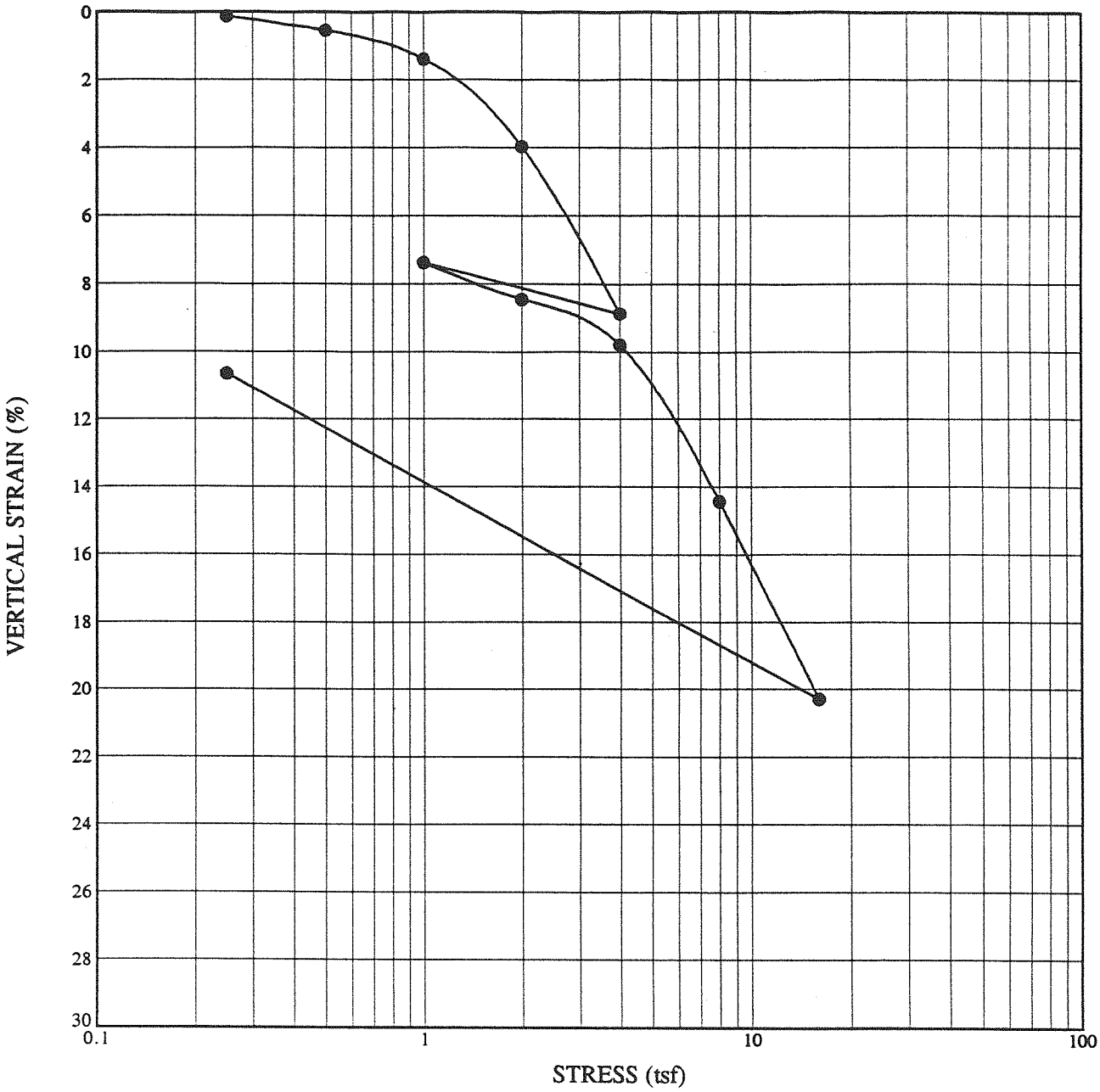
FINAL MOISTURE CONTENT (%): 38
FINAL DRY UNIT WEIGHT (pcf): 84

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-25-GT
DEPTH: 18' - 20'
DESCRIPTION: (CH)

SPECIFIC GRAVITY: 2.75 (assumed)
INITIAL MOISTURE CONTENT (%): 46
INITIAL DRY UNIT WEIGHT (pcf): 75
LL = 67 PL = 24 PI = 43
INUNDATION AT START

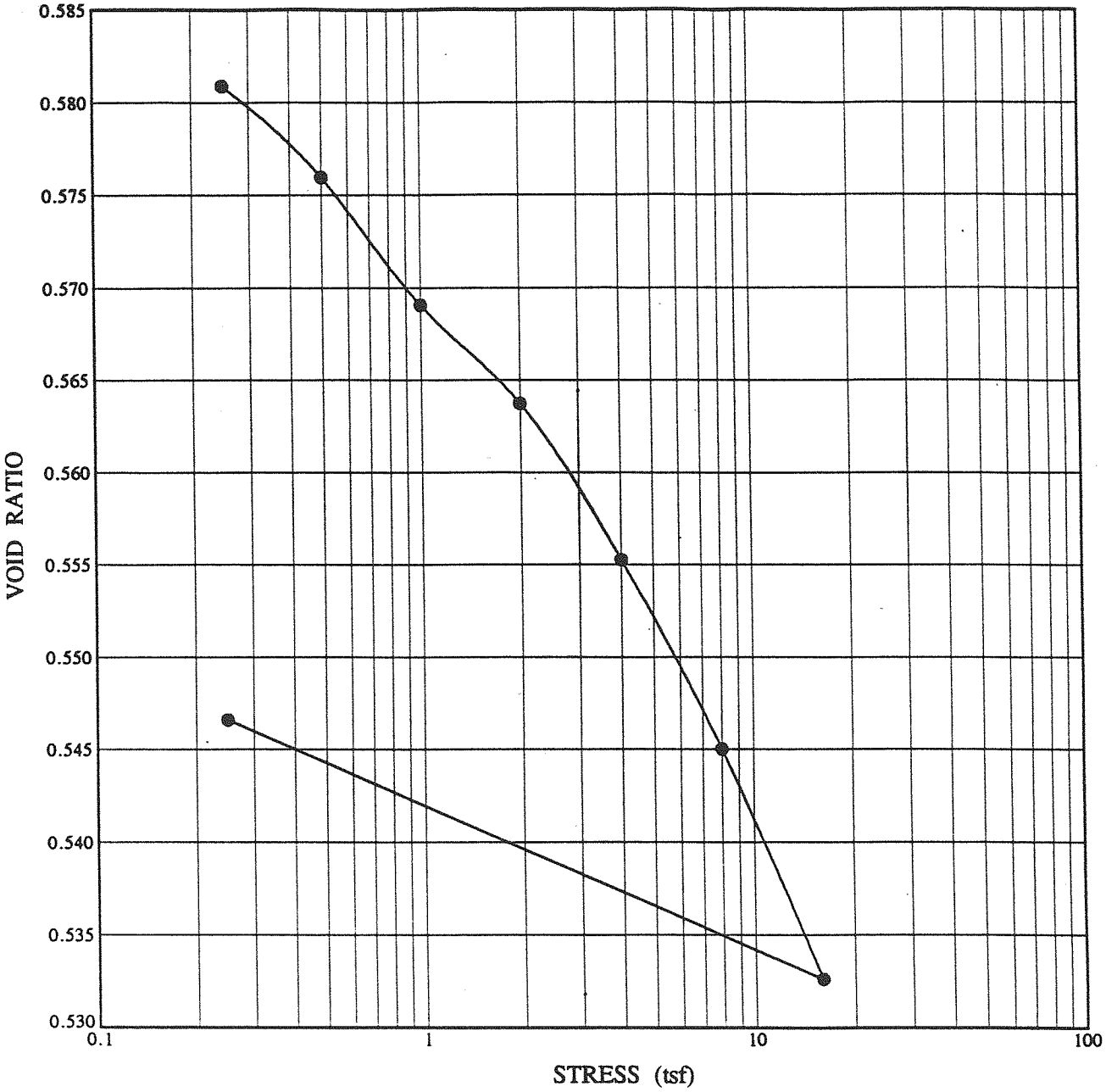
FINAL MOISTURE CONTENT (%): 38
FINAL DRY UNIT WEIGHT (pcf): 84

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD3 3B107




● STRAIN READINGS

Sample Data:

FILE: 93B107C
BORING: B-SW-33-GT
DEPTH: 23' - 25'
DESCRIPTION: (CL)
SPECIFIC GRAVITY: 2.68
INITIAL MOISTURE CONTENT (%): 22
INITIAL DRY UNIT WEIGHT (pcf): 105
LL = 28 PL = 17 PI = 11
INUNDATION AT START

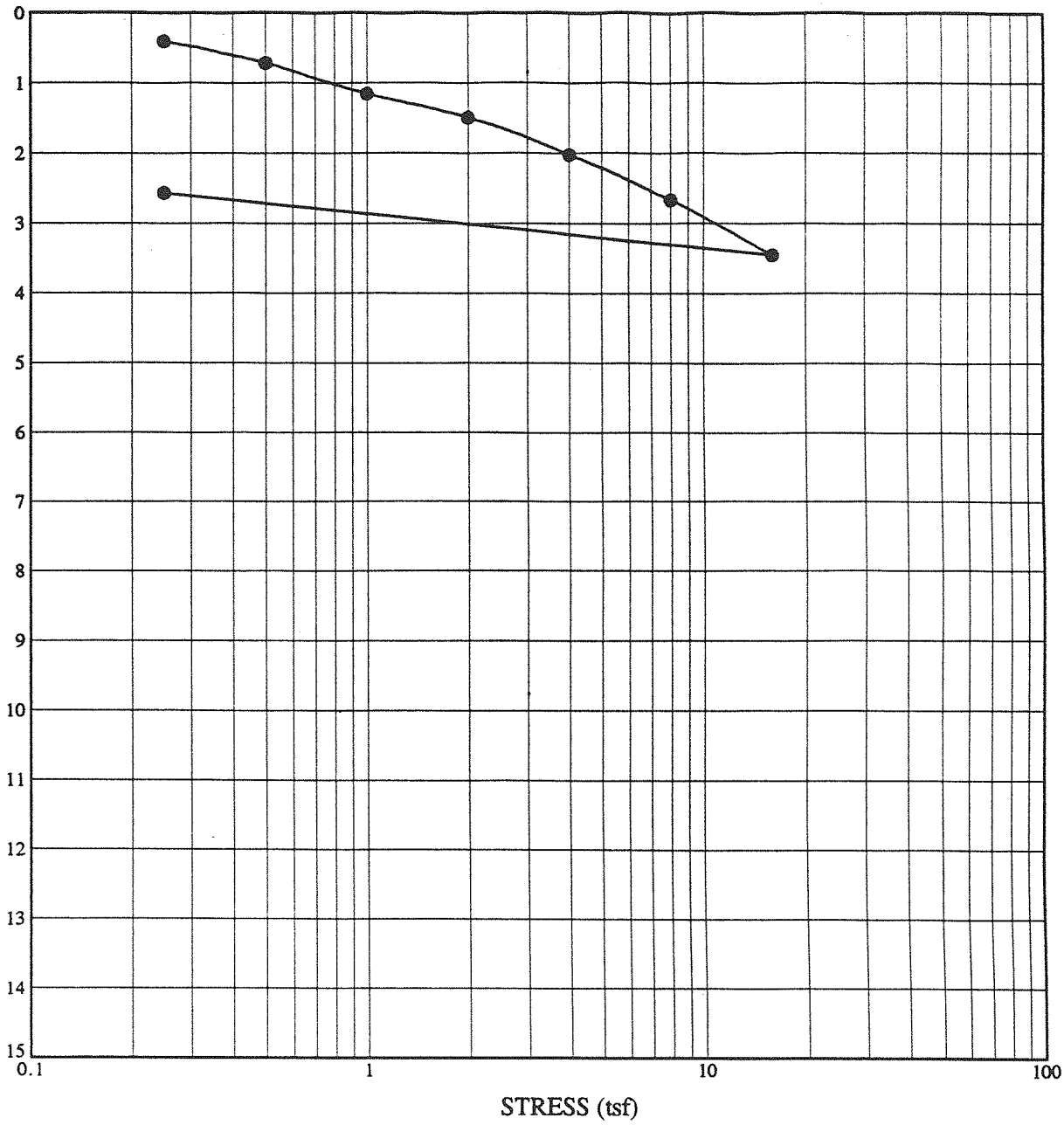
FINAL MOISTURE CONTENT (%): 20
FINAL DRY UNIT WEIGHT (pcf): 109

# LIGO

## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 7 94 CONSLV1 3B107




● STRAIN READINGS

Sample Data:

FILE: **93B107C**
BORING: **B-SW-33-GT**
DEPTH: **23' - 25'**
DESCRIPTION: **(CL)**

SPECIFIC GRAVITY: **2.68 (assumed)**
INITIAL MOISTURE CONTENT (%): **22**
INITIAL DRY UNIT WEIGHT (pcf): **105**
LL = **28** PL = **17** PI = **11**
INUNDATION AT START

FINAL MOISTURE CONTENT (%): **20**
FINAL DRY UNIT WEIGHT (pcf): **109**

# LIGO

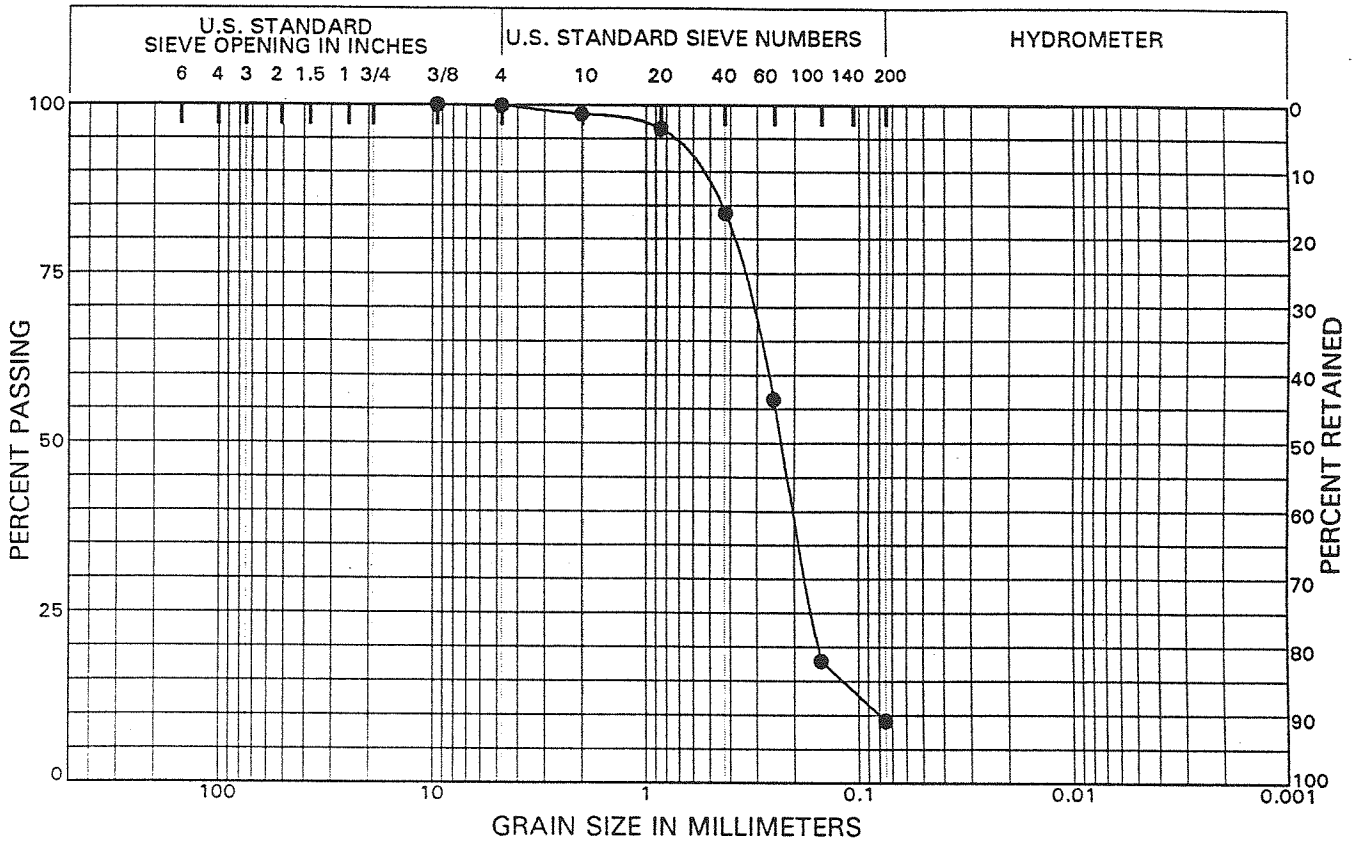
## CONSOLIDATION TEST
## ASTM D 2435-80

**Woodward-Clyde Consultants**

NOV 21 94 CONSLD2 3B107

# SIEVE ANALYSIS

| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |




| Boring Number | Depth (feet) | Symbol | Classification |
|---|---|---|---|
| BSE2GT | 14.5 | ● | (SP) |
| | | | |
| | | | |
| | | | |

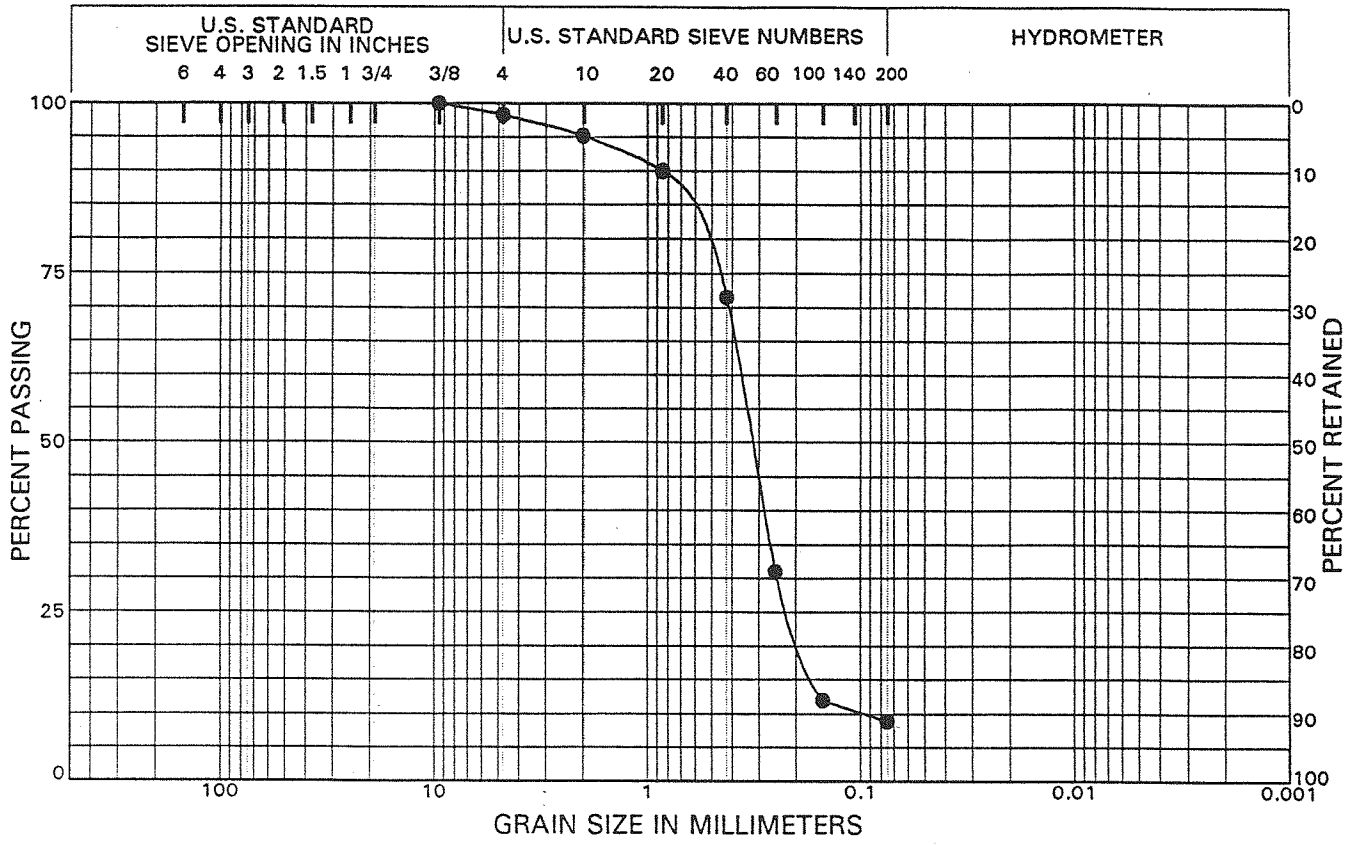
Project: LIGO
Project Number: 93B107C

# GRAIN SIZE DISTRIBUTION CURVES

9/2/94 SVANLS6B 3B107

Woodward-Clyde Consultants

| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |




| Boring Number | Depth (feet) | Symbol | Classification |
|---|---|---|---|
| BSW25GT | 10.5 | ● | (SP) |
| | | | |
| | | | |
| | | | |

Project: LIGO
Project Number: 93B107C

# GRAIN SIZE DISTRIBUTION CURVES

9/2/94 SVANLS6B 3B107

Woodward-Clyde Consultants