WAIPAHU - PROPOSED RECLAIMED AREA
SOUTH SIDE OF WAIKELE STREAM BETWEEN WAIPAHU STREET
AND FARRINGTON HIGHWAY, WAIPAHU, OAHU, HAWAII
TAX MAP KEY: 9-4-10
SOIL RECONNAISSANCE REPORT

FOR REFERENCE
not to be taken from this room

To:
COMMUNITY PLANNING, INCORPORATED

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

JANUARY 18, 1972
January 18, 1972

MR. GEORGE HOUGHTAILING
Community Planning, Inc.
700 Bishop Street, Suite 602
Honolulu, Hawaii 96813

Dear Mr. Houghtailing:

Subject: Waipahu - Proposed Reclaimed Area
South Side of Waikele Stream between
Waipahu Street and Farrington Highway
Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-10
Soil Reconnaissance Report

We are transmitting the boring logs and test data of 2 borings and 4 soundings made in the low-lying area adjacent to Waikele Stream in Waipahu.

The locations of these borings and soundings are shown on the attached Boring Location Plan.

The ground surface for most of the site varies from about elevation 10 to 20 ft. The site is fairly level except along the west and south boundaries where the ground rises abruptly.

The borings indicated a 2 to 5-ft thick surface crust underlain by soft peaty material to about 30 ft or more with water contents of 100% or more.

Water level was noted at about 6 to 9-ft depths in the drill holes.

Pools of standing water were noted on the surface of the ground at several locations in the central portion of the site during the field exploration.

The ground is about 5 ft above the normal water level along the bank of Waikele Stream.

Settlements under 10 ft of fill will be about a foot or more within the first year and about 3 ft or more over a period of 5 to 10 years.
Because of the soft underlying peaty soil, the construction of high fills or slopes over soft ground, particularly near the perimeter of the site, should be avoided.

Good subdrainage will be essential for development of the site.

Light equipment should be used over the site for the construction of fills.

Settlement gages should be used to monitor progressive settlements as fills are constructed.

Light residential construction over the fills should be delayed about a year after the settlement gage readings show relatively slow rates of settlement.

After a master plan of the area is developed, further explorations and borings should be made to obtain more soil information for the design of a particular development.

Our professional services were performed, findings obtained and recommendations prepared in accordance with generally accepted engineering practices. This warranty is in lieu of all other warranties expressed or implied.

Attached are a Boring Location Plan, the boring logs, laboratory test results and limitations.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

Ezra Koike
Professional Engineer
Hawaii No. 1450
BORING LOCATION PLAN
WAIPAHU - PROPOSED RECLAIMED AREA
SOUTH SIDE OF WAIKELLE STREAM
BETWEEN WAIPAHU ST. & FARRINGTON HWY.
WAIPAHU, OAHU, HAWAII
TAX MAP KEY: 9-4-10

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DECEMBER, 1971
BORING LOGS

The stratification lines shown on each of the boring logs represent the approximate boundary between soil types and the transition may be gradual.

Symbols

Symbols used generally are in accordance with the Unified Soil Classification System.

Where a parenthesis "(MH)" is used, the soil sample was classified by visual observation of the sample recovered.

Where no parenthesis "MH" is used, the soil sample was classified from either the Atterberg limit or sieve analysis test results.
Boring Log

PROJECT: WAIPAHU - PROPOSED RECLAIMED AREA
LOCATION: Waipahu, Oahu, Hawaii

Tax Map Key: 9-4-10

PROJECT

Field Party: MAEGURO, ASATO, COLLURA
Type of Boring: CONTINUOUS PENETRATION TEST
Diam. 2" Date 12-14-71
Elev. 17' Datum

HAMMER:
Weight 140#
Drop 30'

Hammer:

SAMPLER: 2" DIA. BLUNT POINT

Penetration Data

ELEV. = 17' 2"

*ELEVATION ESTIMATED FROM PHOTO CONTOUR MAP DATED 6-16-84
**Boring Log**

**PROJECT**  
WAIPAHU - PROPOSED RECLAIMED AREA

**LOCATION**  
Waipahu, Oahu, Hawaii

**Tax Map Key:**  
9-4-10

**HAMMER:**

- **Weight:** 140#  
- **Drop:** 60"

**SAMPLE:**

- 2-3/8" - 2" O.D. THIN WALL TUBE  
- 2"x6" - 2" STANDARD SPLIT SPONG  
- 2" DIA. BUNNY FOOT

**Penetration Data**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(MH)</td>
<td>MEDIUM, REDDISH BROWN CLAYET SILT</td>
<td>2'A</td>
<td>0</td>
<td>2'A</td>
<td>-</td>
<td>35</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3 BLOWS PER FT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MH)</td>
<td>SOFT, MOTTLED BROWN CLAYET SILT</td>
<td>2'B</td>
<td>5</td>
<td>2'B</td>
<td>-</td>
<td>71</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MH)</td>
<td>SOFT, DARK GRAY BROWN ORGANIC SILT W/ROOTS (PLATY)</td>
<td>2'C</td>
<td>10</td>
<td>2'C</td>
<td>72</td>
<td>139</td>
<td>30</td>
<td>520</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MH)</td>
<td></td>
<td>2'D</td>
<td>15</td>
<td>2'D</td>
<td>160</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2 BLOWS PER FT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MH)</td>
<td></td>
<td>2'E</td>
<td>20</td>
<td>2'E</td>
<td>149</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>CONTINUOUS PENETRATION TEST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MH)</td>
<td></td>
<td>2F</td>
<td>25</td>
<td>2F</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1 BLOW PER FT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MH)</td>
<td></td>
<td>2G</td>
<td>30</td>
<td>2G</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.5 BLOWS PER FT.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**END OF BORING 8:40**

*ELEVATION ESTIMATED FROM PHOTO CONTOUR MAP DATED 6-16-59*
**Boring Log**

**PROJECT**  
WAIPAHU - PROPOSED RECLAIMED AREA

**LOCATION**  
Waipahu, Oahu, Hawaii

Tax Map Key: 9-4-10

**HAMMER:**

- Weight: 140 lbs
- Drop: 30"  
2" S. - T. O.D. THIN WALL TUBE
- 2" S. - 2 STANDARD SPLIT SPOND
- 2" DIA. BLUNT POINT

**FIELD PARTY:**

- Hamer: HAISHIRO, ASATO, COLLURA
- Drill Bit: FINGER TYPE

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Wet Content</th>
<th>Dry Content</th>
<th>Unconfined Compressibility</th>
<th>Shear</th>
<th>P.S.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3-A</td>
<td>51</td>
<td>68</td>
<td>120</td>
<td>1000</td>
<td>1300</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3-B</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>3-C</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td>3-D</td>
<td>251</td>
<td>105</td>
<td>105</td>
<td>24</td>
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<tr>
<td>20</td>
<td>3-E</td>
<td>269</td>
<td>269</td>
<td>269</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**END OF BORING 8.34.5"**

---

*ELEVATION ESTIMATED FROM PHOTO CONTOUR MAP DATED 6-16-59*
Boring Log

PROJECT: WAIPAHU - PROPOSED RECLAIMED AREA
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-10

HAMMER:
Weight: 140 lbs
Drop: 30"

SAMPLER: 2" DIA. BLUNT POINT

---

ELEV. | P.C.F. | Water Cont. | Dry Den. | P.S.F. | Unconf. Comp. | Vane Shear | N (Blows per ft)
---|---|---|---|---|---|---|---
18' 2" | | | | | | | 3 BLOWS PER FT.
20' | | | | | | | 2 BLOWS PER FT.
25' | | | | | | | 1 BLOW PER FT.
30' | | | | | | | 3 BLOWS PER FT.
35' | | | | | | | 2 BLOWS PER FT.
40' | | | | | | | 1 BLOW PER FT.

---

END OF PENETRATION AT 40'

*ELEVATION ESTIMATED FROM PHOTO CONTOUR MAP DATED 6-16-59
# Boring Log

**PROJECT:** WAIPAHU - PROPOSED RECLAIMED AREA  
**LOCATION:** Waipahu, Oahu, Hawaii  
**Tax Map Key:** 9-4-10

**HAMMER:**  
- **Weight:** 140*  
- **Drop:** 50°

**SAMPLER:** 2" DIA. BLUNT POINT

---

**BORING NO.** 5  
**Driller:** W. LUM ASSOC., INC.  
**Date:** DEC. 15, 1971  
**Field Party:** MAECHIRO, ASATO, COLLURA

**Type of Boring:** CONTINUOUS  
**Diam.:** 2"

**Datum:** __

**Waipahu, Oahu, Hawaii**  
**Field Party:** W. LUM ASSOC., INC.

**ELEVATION TEST**  
**Penetration Data**

<table>
<thead>
<tr>
<th>Penetration Test</th>
<th>N (Blows per foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

**END OF PENETRATION @ 40'**

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*ELEVATION ESTIMATED FROM PHOTO CONTOUR MAP DATED 6-16-59*
# Boring Log

**PROJECT:** WAIPAHU - PROPOSED RECLAIMED AREA

**LOCATION:** Waipahu, Oahu, Hawaii

**Tax Map Key:** 9-4-10

**PROJECT SHOW:**
- **LOCATION:** WAIPAHU - PROPOSED RECLAIMED AREA
- **LOCATION:** Tax Map Key: 9-4-10

**HAMMER:**
- **Weight:** 10 ft SLEDGE HAMMER
- **Drop:**

**SAMPLER:**
- **2" DIA. BLUNT POINT**

---

<table>
<thead>
<tr>
<th>Driller’s Classification</th>
<th>ELEV. = 19 ± 2</th>
<th>Depth (ft)</th>
<th>Sampler</th>
</tr>
</thead>
<tbody>
<tr>
<td>STIFF, MOTTLED BROWN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SILTY CLAY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 DECOMPOSED ROCK</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UNABLE TO PENETRATE**

**THRU CRUST**

**PROBINGS**
- MOVED 30% TOWARD STREAM,
- PUSH TO 7 ft.
- MOVED TO EDGE OF STANDING WATER,
- PUSH TO 16 ft.

---

**ELEVATION ESTIMATED FROM PHOTO CONTOUR**

**MAPPED DATED 6-16-59**
TABLE I.A - SUMMARY OF LABORATORY TEST RESULTS

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>SAMPLE NO.</th>
<th>DEPTH BELOW SURFACE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5.0'-6.5'</td>
<td>MOTTLED BROWN CLAYEY SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0'-21.5'</td>
<td>REDDISH BROWN CLAYEY SILT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SURFACE</td>
<td>PEAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SURFACE</td>
<td>REDDISH BROWN CLAYEY SILT</td>
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</tbody>
</table>

GRAN-SIZE ANALYSIS (% Passing)

<table>
<thead>
<tr>
<th>Sieve</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>114</td>
<td>110</td>
<td>120</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>1/20</td>
<td>1/100</td>
<td>1/100</td>
</tr>
<tr>
<td>#4</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>#10</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>#20</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>#40</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>#100</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>#200</td>
<td>96</td>
<td>96</td>
<td>96</td>
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ATTERBERG LIMITS

<table>
<thead>
<tr>
<th>Air Dried or Natural</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
<th>Plasticity Index</th>
<th>Dilatancy</th>
<th>Toughness</th>
<th>Dry Strength</th>
<th>UNIFIED SOIL CLASSIFICATION</th>
<th>APARENT SPECIFIC GRAVITY</th>
<th>EXPANSION AND CBR TESTS</th>
<th>MOISTURE-DENSITY RELATIONS OF SOILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>94</td>
<td>46</td>
<td>48</td>
<td>Quick</td>
<td>Medium</td>
<td>Slight-Med</td>
<td>MH</td>
<td></td>
<td></td>
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<tr>
<td>Natural</td>
<td>54</td>
<td>86</td>
<td>18</td>
<td>Quick</td>
<td>Medium</td>
<td>Slight-Med</td>
<td>MH</td>
<td></td>
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<tr>
<td>Natural</td>
<td>564</td>
<td>281</td>
<td>283</td>
<td>Quick</td>
<td>Slight</td>
<td>High</td>
<td>PT</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Natural</td>
<td>51</td>
<td>31</td>
<td>20</td>
<td>Medium</td>
<td>Medium-High</td>
<td>Slight-Med</td>
<td>MH</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REMARKS:
PLASTICITY CHART

PROJECT: WAIPAHU - PROPOSED RECLAIMED AREA
SOUTH SIDE OF WAIKELE STREAM
BETWEEN WAIPAHU STREET AND FARRINGTON HIGHWAY
WAIPAHU, OAHU, HAWAII

LOCATION:

PLASTICITY INDEX

0 10 20 30 40 50 60 70 80 90 100 110 120 130

LIQUID LIMIT

0 50 100 150 200 250 300 350 400

CL-ML
ML

CH

MH & OH

CL

"A" LINE

4 SURFACE

2-B SURFACE

GL

DATE 1-10-71 BY P.O.T.
CBR TEST
PROJECT: WAIPAHU - PROPOSED RECLAIMED AREA
SOUTH SIDE OF WAIKEL Stream BETW. WAIPAHU ST. AND FARRINGTON HWY.
LOCATION: WAIPAHU, OAHU, HAWAII
SAMPLE NO: 3 SURFACE
SAMPLE DESCRIPTION: REDDISH-BROWN CLAYEY SILT

![CBR Test Diagram]

CBR PENETRATION DATA

<table>
<thead>
<tr>
<th>PENETRATION (INCHES)</th>
<th>LOAD (LBS)</th>
<th>LOAD (PSI)</th>
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<tbody>
<tr>
<td>0.025</td>
<td>110</td>
<td>37</td>
</tr>
<tr>
<td>0.050</td>
<td>180</td>
<td>60</td>
</tr>
<tr>
<td>0.075</td>
<td>205</td>
<td>80</td>
</tr>
<tr>
<td>0.100</td>
<td>245</td>
<td>115</td>
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<td>0.125</td>
<td>430</td>
<td>143</td>
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<tr>
<td>0.150</td>
<td>510</td>
<td>170</td>
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<tr>
<td>0.175</td>
<td>580</td>
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<td>0.300</td>
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<td>280</td>
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<td>307</td>
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<td>0.400</td>
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<td>0.450</td>
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<td>353</td>
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<tr>
<td>0.500</td>
<td>1120</td>
<td>375</td>
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</table>

AGGREGATE 3/8" MINUS
HAMMER WEIGHT 10 LBS.
HAMMER DROP 18"
No. OF BLOWS E6"LAYER
No. OF LAYERS 5

TEST RESULTS:
MOLDING MOISTURE, %: 27.7
MOLDING DRY DENSITY, P.C.F. 94.9
CBR @ 0.1" PENETRATION: 11.6
DAYS SOAKED: 7

DATE 12-20-71 BY MO
DATE 12-20-71 BY OK

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS
CBR TEST

PROJECT: WAIPAHU - PROPOSED RECLAIMED AREA
SOUTH SIDE OF WAIKEL STREAM BETWEEN WAIPAHU ST. AND FARRINGTON HWY.

LOCATION: WAIPAHU, OAHU, HAWAII

SAMPLE NO: 4 SURFACE
SAMPLE DESCRIPTION: REDDISH-BROWN CLAYEY SILT

CBR PENETRATION DATA

<table>
<thead>
<tr>
<th>PENETRATION (INCHES)</th>
<th>LOAD (LBS)</th>
<th>LOAD (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.025</td>
<td>180</td>
<td>60</td>
</tr>
<tr>
<td>0.050</td>
<td>210</td>
<td>70</td>
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<tr>
<td>0.075</td>
<td>430</td>
<td>143</td>
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<td>180</td>
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<td>0.125</td>
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<td>0.150</td>
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<td>300</td>
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<tr>
<td>0.500</td>
<td>1870</td>
<td>625</td>
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</table>

AGGREGATE 3/4" MINUS
HAMMER WEIGHT 10 LBS
HAMMER DROP 15" IN
NO. OF BLOWS 5 LAYERS
NO. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %: 24.3
MOLDING DRY DENSITY, P.C.F: 103.4
CBR @ 0.1" PENETRATION: 135

DAYS SOAKED: 7

DATE 12-20-71 BY WALTER LUM ASSOCIATES, INC.
DATE 12-28-71 BY WALTER LUM ASSOCIATES, INC.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS
LIMITATIONS

In general, soil formations are commonly erratic and rarely uniform or regular. The boring logs indicate the approximate subsurface soil conditions encountered only at the drill holes where the borings were made at the times designated on the logs and may not represent conditions at other locations or at other dates. Soil conditions and water levels may change with the passage of time and construction methods or improvements at the site.

During construction, should subsurface conditions much different from those in the borings be observed, encountered, or otherwise indicated, we should be advised immediately to review or reconsider our recommendations in light of the new developments.

Our professional services were performed, findings obtained and recommendations prepared in accordance with generally accepted engineering practices. This warranty is in lieu of all other warranties expressed or implied.