MR. LARRY CHING  
Highway Construction Co., Ltd.  
720 Umi Street  
Honolulu, Hawaii 96819  

Dear Mr. Ching:  

RE: Subsurface Exploration for No-Joint Drain Pipe  
Along Kauhi Street Extension and Portion of  
Komohana Street  
Campbell Industrial Park Subdivision, Increment 4  

In accordance with your request, borings were made along a section of  
Komohana Street approximately between Stations 10+40 and 19+60, and  
along Kauhi Street Extension approximately between Stations 5+00 and  
23+70. This covers only a portion of the work and additional borings  
and recommendations for the remaining portion shall be submitted as  
the field work is completed.  

During the field exploration, cavities were noticed at the surface along  
Kauhi Street Extension in the general area of Boring Nos. 2, 3, 4 and 5.  
The surface along Komohana Street was disturbed or filled over and visual  
observations were not practicable in detecting cavities in these areas.  

In general, the site is an emerged coral reef with localized clayey or  
silty sand pockets (decomposed coral). Cavities should be anticipated  
at the site.  

RECOMMENDATIONS  

1. Trenches should be flooded to locate any cavities which may have  
been filled during the excavation work and cannot be located from  
visual observation.  

Where cavities are encountered near the bottom of the trench, it  
should be filled with fairly clean sand by jetting and water  
tamping. The sand should be well graded with less than 10% fines  
passing the No. 200 sieve.
2. If localized soft clayey sand pockets are encountered near the bottom of the trench, they should be excavated down to stiff material and backfilled with compacted select on-site material. Depending on field conditions, sidewalls of trenches may require replacement with select on-site materials.

A Boring Location Plan, boring logs and limitations are attached.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

Wallace Wakahiro
Professional Engineer
Hawaii No. 2016
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**: CAMPBELL INDUSTRIAL PARK  
**LOCATION**: EWA, OAHU, HAWAII  
**LOCATION**: TMK: 9-1-32:1  

**HAMMER**:  
- Weight: 140#  
- Drop: 20"  

**SAMPLER**: 2' STANDARD SPLIT SPOON

---

**UNIFIED SOIL CLASSIFICATION**

- **ELEV = 17' 2"**

  **WHITE, CORAL W/ SAND & GRAVEL**
  **DENSE**
  **LIGHT TAN & WHITE SILTY SAND & CORAL**

**WHITE CORAL W/ SAND.**

**END OF BORING @ 10.0'**

---

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Unconfined Comp.</th>
<th>Vane Shear</th>
<th>P.S.F.</th>
<th>Std. Penetration Test</th>
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<td>2-B</td>
<td>2-C</td>
<td>2-D</td>
<td>2-E</td>
<td>2-F</td>
<td>2-G</td>
<td>2-H</td>
<td>2-I</td>
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**H 2-C - NO RECOVERY**

**N (Blows per foot)**

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</table>

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.**
## Boring Log

**PROJECT**

4TH INCREMENT

**LOCATION**

EWA, OAHU, HAWAII

**TMK:** 9-1-32:1

**HAMMER:**

Weight 140*

Drop 30°

**SAMPLER:** 2" STANDARD SPLIT SPOON

---

### PENETRATION DATA

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<th>Sample No.</th>
<th>Plastic Limit</th>
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<th>Liquid Limit</th>
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<th>Standard Penetration Test</th>
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</tr>
</tbody>
</table>

### DESCRIPTION

- **ELEV. = 17'1"**

- WHITE, SILTY SAND, & CORAL FRAGMENTS

- WHITE CORAL W/SAND

- DENSE, TAN CORAL & SILTY SAND

- WHITE, CORAL W/SAND

- END OF BORING @ 12.0'

---

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC."**

---

**BORING NO.** 3

**Date:** JULY 19, 1972

**Driller:** W. LUM ASSOC., INC.
# Boring Log

**LOCATION:** Ewa, Oahu, Hawaii  
**TMK:** 9-1-32:1

**PROJECT:** Campbell Industrial Park  
**INCREMENT:** 4th Increment

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

**SAMPLER:** 2" Standard Split Spoon

---

**LOCATION:**
- **Datum:**  
- **Elev.:** 17' + 0

**DESCRIPTION:**
- **Depth (ft):**  
- **Sampler:**  
- **Sample No.:**  
- **Penetration Test:**

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<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Undrained Comp. Mod.</th>
<th>Shear Strength</th>
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<td>HAMMER BOUNCES</td>
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<td>HAMMER BOUNCES</td>
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<td>Coral</td>
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</tr>
</tbody>
</table>

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*ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.*
**Boring Log**

**CAMPBELL INDUSTRIAL PARK**

**PROJECT** | 4th INCREDMENT
---|---
**LOCATION** | EWA, OAHU, HAWAII
**TMK:** | 9-1-321

**HAMMER:**
- **Weight:** 140#
- **Drop:** 30"

**SAMPLER:** 2" STANDARD SPLIT SPOON

| **DESCRIPTION** | **ELEV. = 19' 2"** *
|---|---
| WHITE, CORAL, SAND & GRAVEL | 1-A NO RECOVERY |
| (GC) TAN, CLAYET SAND & CORAL (DECOMPOSED CORAL) | 1-B - 20 - - - |
| (SW-ML) DENSE, WHITE SILTY SAND & CORAL FRAGMENTS | 1-C - 8 - - - |

**END OF BORING 29.5'**

---

*ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.*
**Boring Log**

**PROJECT:** CAMPBELL INDUSTRIAL PARK 4TH INCREMENT

**LOCATION:** EWA, OAHU, HAWAII

**TMK:** 9-1-32:1

**HAMMER:**
- **Weight:** 140 lbs
- **Drop:** 30'

**SAMPLER:** 2" STANDARD SPLIT SPOON

---

**UNITED SOIL CLASSIFICATION**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PENETRATION DATA</th>
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</thead>
<tbody>
<tr>
<td><strong>ELEV. = 18' + 2'</strong></td>
<td></td>
</tr>
<tr>
<td>WHITE CORAL</td>
<td></td>
</tr>
<tr>
<td>4&quot; SAND &amp; GRAVEL</td>
<td></td>
</tr>
<tr>
<td>TAN CORAL</td>
<td></td>
</tr>
<tr>
<td><strong>ELEV = 18' + 2'</strong></td>
<td></td>
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<tr>
<td>DENSE TAN</td>
<td></td>
</tr>
<tr>
<td>SILTY SAND W/ CORAL</td>
<td></td>
</tr>
<tr>
<td><strong>END OF BORING @ 9.5'</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ELEV = 18' + 2'</strong></td>
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<tr>
<td><strong>APPROX. INVERT</strong></td>
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<tr>
<td><strong>2-C</strong></td>
<td></td>
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<tr>
<td><strong>2-B NO RECOVERY</strong></td>
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<tr>
<td><strong>2-A</strong></td>
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**BARGING NO.:** 2

**DATE:** JULY 19, 1972

**FIELD PARTY:** MAKAULA, SEIJO, PANG

**PROJECT:**衡量

**LOCATION:** EWA, OAHU, HAWAII

**TMK:** 9-1-32:1

**SAMPLER:** 2" STANDARD SPLIT SPOON

---

**UNITED SOIL CLASSIFICATION**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PENETRATION DATA</th>
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<tr>
<td>WHITE CORAL</td>
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<tr>
<td>4&quot; SAND &amp; GRAVEL</td>
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<td>TAN CORAL</td>
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<tr>
<td><strong>ELEV = 18' + 2'</strong></td>
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<tr>
<td>DENSE TAN</td>
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<td>SILTY SAND W/ CORAL</td>
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<tr>
<td><strong>END OF BORING @ 9.5'</strong></td>
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<tr>
<td><strong>ELEV = 18' + 2'</strong></td>
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<td><strong>APPROX. INVERT</strong></td>
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<tr>
<td><strong>2-C</strong></td>
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<td><strong>2-B NO RECOVERY</strong></td>
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<tr>
<td><strong>2-A</strong></td>
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</tbody>
</table>

---

**HARMER BOUNCES**

---

*ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.*
**Boring Log**

**PROJECT:** CAMPBELL INDUSTRIAL PARK  
**LOCATION:** EWA, OAHU, HAWAII  
**TMK:** 9-1-92:1  
**HAMMER:**
- **Weight:** 140 lbs.  
- **Drop:** 30"  
**SAMPLER:**
- **2.5" x 2" O.D. THIN WALL TUBE**  
- **2.55" x 2" STANDARD SPLIT SPOON**

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Cont.</th>
<th>Liquid Limit</th>
<th>Unconfined Compressibility</th>
<th>Penetration Test</th>
<th>N (Blows per foot)</th>
<th>2&quot; O.D. THIN WALL TUBE SAMPONER</th>
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<tbody>
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<td>4/1.5</td>
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<td></td>
<td>3/0.5</td>
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</table>

**DESCRIPTION**

- **ELEV. 11.5' 2:** DENSE, WHITE CORAL W/ SAND & GRAVEL
- **(MH) APPROX. INSERT 5':** BROWN SANDY SILT W/CORAL & ORGANIC MATERIAL (CAVITY OR FILL)
- **(MH) 10':** MEDIUM, BROWN SILTY CLAY W/SAND & CORAL
- **WHITE CORAL 15':** DENSE, WHITE & TAN CLAYET CORAL W/ TRACES OF ORGANIC MATERIAL
  - END OF BORING 0.17'

**NOTES:**
- ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.
- HAMMER BOUNCES
- 30/0.5
- 1/0.5 5/0.5

**PROJECT:** A-1114  
**DATE:** JULY 19, 1972  
**LOCATION:** EWA, OAHU, HAWAII  
**TMK:** 9-1-92:1  
**HAMMER:**
- **Weight:** 140 lbs.  
- **Drop:** 30"  
**SAMPLER:**
- **2.5" x 2" O.D. THIN WALL TUBE**  
- **2.55" x 2" STANDARD SPLIT SPOON**

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Cont.</th>
<th>Liquid Limit</th>
<th>Unconfined Compressibility</th>
<th>Penetration Test</th>
<th>N (Blows per foot)</th>
<th>2&quot; O.D. THIN WALL TUBE SAMPONER</th>
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<tbody>
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<tr>
<td>10</td>
<td>2.55 3:1 B</td>
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<td>2/1.0</td>
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<tr>
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**NOTES:**
- ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.
- HAMMER BOUNCES
- 30/0.5
- 1/0.5 5/0.5
### Boring Log

**Project:** Campbell Industrial Park 4th Increment  
**Location:** Ewa, Oahu, Hawaii  
**TMK:** 9-1-3211

**Hammer:**  
- **Weight:** 140 lb  
- **Drop:** 30"  
**Sampler:** 2" Standard Split Spoon

---

#### Penetration Data

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<th>Description</th>
<th>Elevation</th>
<th>Depth (ft)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Vane Shear P.S.E.</th>
<th>Penetration Test</th>
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<tbody>
<tr>
<td>WHITE CORAL W/SAND</td>
<td></td>
<td>0</td>
<td>4-A</td>
<td>11</td>
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<td></td>
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<td></td>
<td>32/0.5'</td>
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<tr>
<td>LOOSE TAN &amp; WHITE SANDY SILT W/CORAL</td>
<td>4-B</td>
<td>39</td>
<td>11/0.5</td>
<td>5/0.5'</td>
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<tr>
<td>STIFF, TAN SANDY CLAY W/CORAL (DECOMPOSED CORAL)</td>
<td>4-C</td>
<td>34</td>
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<tr>
<td>TAN &amp; WHITE SILTY SAND &amp; CORAL (DECOMPOSED CORAL)</td>
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<td>14</td>
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* Elevation estimated from plan & profile by Donald Wolbrink & Associates, Inc.

---

**BOERING NO:** 4  
**Sheet No:** of  
**Driller:** WALTER LUM, ASSOCIATES, INC.  
**Date:** JULY 19, 1977  
**Field Party:** MAKALUA, SEBO, PANG  
**Type of Boring:** AUGER ("MOULDS")  
**Diam.** 4"  
**Elev.:** 18'  
**Datum:**  
**Time:** 1:30 PM  
**Date:** 7-19-72  
**Water Level:** NOT NOTICED
## Boring Log

**Project:** CAMPBELL INDUSTRIAL PARK  
**Location:** EWA, OAHU, HAWAII  
**TMK:** 9-1-32:1

### Hammer:
- **Weight:** 140#  
- **Drop:** 30°

### Sampler:
- **2" STANDARD SPLIT SPOON**

### Penetration Data

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<th>Penetration Test</th>
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<td>5</td>
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<td>15/0.0  HAMMER BOUNCES</td>
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<td>15/0.1 HAMMER BOUNCES</td>
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<td>END OF BORING, 0.13'</td>
<td></td>
<td>20/0.0 HAMMER BOUNCES</td>
</tr>
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</table>

*Elevation estimated from plan & profile by Donald Wolbrink & Associates, Inc.*
**Boring Log**

**PROJECT**

**LOCATION**

**LOCATION**

**HAMMER:**
- Weight: 140 lbs.
- Drop: 30".

**SAMPLER:**
- 2" STANDARD SPLIT SPOON

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Soil Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ELEV = 18'-2&quot;</td>
<td>LOOSE &amp; CORAL FRAGMENTS</td>
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<tr>
<td>5</td>
<td>MH</td>
<td>LOOSE &amp; CORAL W/BROWN, SILTY SAND</td>
</tr>
<tr>
<td>10</td>
<td>MH</td>
<td>BROWN SILTY CLAY (RECOMPOSED CORAL)</td>
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<tr>
<td>14.4</td>
<td>MH</td>
<td>CORAL &amp; CLAY W/TRACE © ORGANIC MATERIAL</td>
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<tr>
<td>15</td>
<td>MH</td>
<td>DENSE, TAN &amp; WHITE CORAL &amp; SILTY SAND</td>
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</tbody>
</table>

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Penetration Test</th>
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<tbody>
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<td>0</td>
<td>0</td>
<td>15/0.3'</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>25/0.2'</td>
</tr>
<tr>
<td>14.4</td>
<td>3</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>125/0.4'</td>
</tr>
</tbody>
</table>

* ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC, INC.
**Boring Log**

**PROJECT:** Campbell Industrial Park

**LOCATION:** Ewa, Oahu, Hawaii

**TMK:** 9-1-32:1

**HAMMER:**
- **Weight:** 140#
- **Drop:** 90"

**SAMPLER:** 2" Standard Split Spoon

---

### Penetration Data

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Plastic Limit</th>
<th>Standard Penetration Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION:**
- **LOOSE, CORAL**
- **DENSE, WHITE CORAL & SILTY SAND**
- **END OF BORING @ 15.5'**

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLDRINK & ASSOC., INC.**
Boring Log

**CAMPBELL INDUSTRIAL PARK**

**PROJECT** 4TH INCREMENT

**LOCATION** EWA, OAHU, HAWAII

**TMK:** 9-1-32:1

**HAMMER:**

- **Weight:** 140#.
- **Drop:** 30".

**SAMPLE:** 2" STANDARD SPLIT SPOON

---

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLDRINK & ASSOC., INC.**

---

**LOCATION**

- **Location:** EWA, OAHU, HAWAII
- **TMK:** 9-1-32:1

**HAMMER:**

- **Weight:** 140#.
- **Drop:** 30"

**SAMPLE:** 2" STANDARD SPLIT SPOON

---

** Enter Table Data Here:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Depth (ft)</th>
<th>Sample</th>
<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Vane Shear (P.S.F.)</th>
<th>Standard Penetration Test (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOOSE CORAL</td>
<td></td>
<td>B-A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10/0.6 HAMMER BOUNCES</td>
</tr>
<tr>
<td>DENSE TAN SILT SAND</td>
<td>2-5</td>
<td>B-B</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>20/0.5 HAMMER BOUNCES</td>
</tr>
<tr>
<td>CORAL</td>
<td>3-8</td>
<td>B-C</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>20/0.1 HAMMER BOUNCES</td>
</tr>
<tr>
<td>END OF BORING 6' 12&quot;</td>
<td>9-10</td>
<td>B-D</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td>20/0.2 HAMMER BOUNCES</td>
</tr>
</tbody>
</table>

---

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLDRINK & ASSOC., INC.**
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.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes, plan changes, or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the recommendations considering the time lapse and the changed conditions.

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.
August 9, 1972

MR. LARRY CHING
Highway Construction Co., Ltd.
720 Umi Street
Honolulu, Hawaii 96819

Dear Mr. Ching:

RE: Subsurface Exploration for No-Joint Drain Pipe
Along "A" Street and "B" Street
Campbell Industrial Park Subdivision, Increment 4

In accordance with your request, borings were made along a section of
"A" Street approximately between Stations 5+00 and 14+50 and along "B" Street
approximately between Stations 9+50 and 14+50. A log of the side
of the excavation for catch basin No. 2 at Station 11+60+ on Komohana Street is also attached. This covers the remaining portion of the field work.

In general, the site is an emerged coral reef with localized clayey or
silty sand pockets (decomposed coral). Cavities should be anticipated
at the site.

RECOMMENDATIONS

1. Trenches should be flooded to locate any cavities which may have
been filled during the excavation work and cannot be located from
visual observations.

2. Where cavities are encountered near the bottom of the trench, it
should be filled with fairly clean sand by jetting and water tamping.
The sand should be well graded with less than 10% fines passing the
No. 200 sieve.

2. If localized soft clayey sand pockets are encountered near the bottom
of the trench, they should be excavated down to stiff material and
backfilled with compacted select on-site material. Depending on
field conditions, sidewalls of trenches may require replacement with
select on-site materials.
3. Where it becomes difficult to shape the bottom of trenches for no-joint pipe, compacted on-site coral or untreated base course material may be used to shape the bottom.

A Boring Location Plan, boring logs and limitations are attached.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

Wallace Wakahiro
Professional Engineer
Hawaii No. 2016
BORING LOCATION PLAN
CAMPBELL INDUSTRIAL PARK
4TH INCREMENT
EWAO, OAHU, HAWAII
TMK: 9-1-32:1
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 "MR" is used, the soil sample was classified from either the Atterberg limit or sieve analysis test results.
# Boring Log

**PROJECT**: Campbell Industrial Park

**LOCATION**: Ewa, Oahu, Hawaii

**TMK**: 9-1-32:1

---

**HAMMER**:

- **Weight**: 
- **Drop**: 

**SAMPLER**: 

---

**DESCRIPTION**:

- **ELEV. = 16' ± 2**: Reddish brown clayey silt
- **Light brown & white coral & silty sand**
- **Brown, silty sand**
- **Bottom of Excav. B.E.**

---

**PENETRATION DATA**

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

---

*Elevation estimated from plan & profile by Donald Wolbrink & Assoc., Inc.*
**Boring Log**

**PROJECT**
CAMPBELL INDUSTRIAL PARK

**LOCATION**
EWA, OAHU, HAWAII

**Boring Log**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Depth (ft)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
<th>Unit Comp.</th>
<th>Penetration Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense, White</td>
<td>1.5 - 2</td>
<td>1-A</td>
<td>10</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>10/1.5</td>
</tr>
<tr>
<td>Coral, light brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
</tr>
<tr>
<td>Silty Sand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
</tr>
<tr>
<td>Cavity (4.2' - 4.5')</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
</tr>
<tr>
<td>Dense, White</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
</tr>
<tr>
<td>Coral, light brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
</tr>
<tr>
<td>Silty Sand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
</tr>
<tr>
<td>End of Boring @ 7.8'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8/0.2</td>
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</tbody>
</table>

**Information**

- *Elevation estimated from plan & profile by Donald Wolbrink & Assoc., Inc.*
**Boring Log**

**Campbell Industrial Park**

**Project:** 4th Increment

**Location:** Ewa, Oahu, Hawaii

**TMK:** 9-1-32:1

**Hammer:**
- **Weight:** 140 lbs
- **Drop:** 80"

**Sampler:** 2" Standard Split Spoon

---

### PENETRATION DATA

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Description</th>
<th>Depth (ft.)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Unconfined Compressibility</th>
<th>Versus Shear P.S.I.</th>
<th>Standard Penetration Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>15' ± 2&quot;</td>
<td>Dense, White, Coral, Silty Sand &amp; Coral</td>
<td>2-A - 9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>White, Coral</td>
<td>2-B - No Recovery</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Dense, Tan Silty Sand &amp; Coral</td>
<td>2-C - 14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

**End of Boring @ 15'**

---

*Elevation estimated from Plan & Profile by Donald Wolbrick & Associates, Inc.*
**Boring Log**

**PROJECT**: CAMPBELL INDUSTRIAL PARK

**LOCATION**: EWA, OAHU, HAWAII

**TMK**: 9-1-32:1

---

**HAMMER:**
- **Weight**: 140 lbs
- **Drop**: 30"

**SAMPLER**: 2" STANDARD SPLIT SPOON

---


**ELEV.**: 14 ± 2'

---

**UNIFIED CLASSIFICATION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Depth (ft)</th>
<th>Sample</th>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
<th>Unconfined Compress. P.S.F.</th>
<th>Standard Penetration Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENSE, WHITE CORAL &amp; BROWN SANDY SILT &amp; ROOTS</td>
<td>10</td>
<td>3-A</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>44</td>
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<tr>
<td>DENSE, TAN SILTY SAND &amp; CORAL</td>
<td>10</td>
<td>3-B</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>63</td>
</tr>
<tr>
<td>END OF BORING &amp; 9'5'</td>
<td>10</td>
<td>3-C</td>
<td>7</td>
<td>-</td>
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**PENETRATION DATA**

<table>
<thead>
<tr>
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<th>20</th>
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<th>40</th>
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<tbody>
<tr>
<td>HAMMER BOUNCES</td>
<td></td>
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</tbody>
</table>

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**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.**
**Boring Log**

**PROJECT**
4TH INCREMENT

**LOCATION**
EWA, OAHU, HAWAII

**TMK:** 9-1-32:1

---

**HAMMER:**
- **Weight:** 140#
- **Drop:** 30"

**SAMPLER:** 2" STANDARD SPLIT SPOON

---

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
<th>Unconfined Comp.</th>
<th>Shear Strength</th>
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<tbody>
<tr>
<td>0</td>
<td>4-A</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10/0.5</td>
</tr>
<tr>
<td>5</td>
<td>4-B</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>34/2.4</td>
</tr>
<tr>
<td>10</td>
<td>4-C</td>
<td>NO RECOVERY</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>HAMMER BOUNCES</td>
</tr>
</tbody>
</table>

*ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.*
**Boring Log**

**CAMPBELL INDUSTRIAL PARK**

**PROJECT**
4TH INCENTMENT

**LOCATION**
EWA, OAHU, HAWAII

**T.M.K:** 9:1 32:1

**HAMILER:**
- **Weight:** 140 lb
- **Drop:** 90°

**SAMPLER:** 2" STANDARD SPLIT SPOON

---

**DESCRIPTION**

<table>
<thead>
<tr>
<th>Unified Soil Classification</th>
<th>Description</th>
<th>Depth (ft)</th>
<th>Sampler</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Cont.</th>
<th>Liquid Limit</th>
<th>Unconfined Comp.</th>
<th>Vacuum P.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENSE WHITE</td>
<td>CORAL W/SANDY SILT &amp; ROOTS</td>
<td>0</td>
<td>S-A</td>
<td>5</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>S-B</td>
<td>9</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WHITE, CORAL W/GILTY SAND</td>
<td></td>
<td>S-C</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</table>

**END OF BORING 7.8'**

---

**PENETRATION DATA**

<table>
<thead>
<tr>
<th>Penetration Test</th>
<th>Standard Penetration Test</th>
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<tbody>
<tr>
<td>N (Blows per foot)</td>
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<table>
<thead>
<tr>
<th>ELEV = 16' 2°</th>
<th>30/0.3'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMMER BOUNCES</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELEV = 16' 2°</th>
<th>35/0.1'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMMER BOUNCES</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELEV = 16' 2°</th>
<th>35/0.3'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMMER BOUNCES</td>
<td></td>
</tr>
</tbody>
</table>

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*ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOCS., INC.*
**Boring Log**  
**CAMPBELL INDUSTRIAL PARK**  
**PROJECT** 4TH INCREMENT  
**LOCATION** EWA, OAHU, HAWAII  
**T.M.K.** : 9-1-32:1  
**HAMMER:**  
- **Weight:** 140 lb  
- **Drop:** 30"  
**SAMPLER:** 2" STANDARD SPLIT SPOON  

<table>
<thead>
<tr>
<th>Unit Weight</th>
<th>Classification</th>
<th>Description</th>
<th>Depth (ft)</th>
<th>Plastic Limit</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Unconfined Comp.</th>
<th>Vane Shear</th>
<th>Penetration Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WHITE, CORAL W/BROWN, SANDY SILT</td>
<td>12'</td>
<td>2'</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Standard Penetration Test</td>
</tr>
<tr>
<td></td>
<td>DENSE-LOOSE WHITE CORAL FRAGMENTS W/SILTY SAND</td>
<td>16'</td>
<td>2'</td>
<td>26</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20/0.5'</td>
</tr>
<tr>
<td></td>
<td>END OF BORING @ 8.5'</td>
<td>18'</td>
<td>2'</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.**
**Boring Log**

**CAMPBELL INDUSTRIAL PARK**

**4TH INCREMENT**

**PROJECT**

**EWA, OAHU, HAWAII**

**LOCATION**

**TMK.: 9-1-52:1**

**HAMMER:**

- **Weight:** 40#
- **Drop:** 30'

**SAMPLER:** 2" STANDARD SPLIT SPOON

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2-A</td>
<td>NO RECOVERY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2-B</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35/0.5</td>
</tr>
<tr>
<td>6</td>
<td>2-C</td>
<td>NO RECOVERY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35/0.5</td>
</tr>
</tbody>
</table>

---

**DESCRIPTION:**

- Dense, Coral, Sand
- Dense, White Coral, Silty Sand
- End of Boring @ 6'

---

**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.**

---

**PENETRATION DATA**

- **Standard Penetration Test:**
  - N (Blows per foot)
## Boring Log

**CAMPBELL INDUSTRIAL PARK**

**PROJECT:** 4TH INCREMENT  

**LOCATION:** EWA, OAHU, HAWAII

**T.M.K.:** 9-1-32:1

**BORED NO.** 3  

**PROJECT:** 4TH INCREMENT

**LOCATION:** EWA, OAHU, HAWAII

**T.M.K.:** 9-1-32:1

**HAMMER:**  

- **Weight:** 140#  
- **Drop:** 30"  

**SAMPLER:** 2" STAND. SPLIT SPOON  

---

### PENETRATION DATA

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample No.</th>
<th>Plastic Limit</th>
<th>Water Cont.</th>
<th>Liquid Limit</th>
<th>Unusual Comp.</th>
<th>Type of Boring</th>
<th>Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3-A</td>
<td>G</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.5</td>
<td>3-B</td>
<td>24</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>5.1</td>
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<tr>
<td>15.1</td>
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**ELEVATION ESTIMATED FROM PLAN & PROFILE BY DONALD WOLBRINK & ASSOC., INC.**
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.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes, plan changes, or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the recommendations considering the time lapse and the changed conditions.

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.