M & H ASSOCIATES
C/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4-C
Waiekele, Ewa, Oahu, Hawaii

The above project was generally constructed with on-site and borrow material. The fill was placed and compacted in thin layers. A soil technician from our office was present at the site on an intermittent basis to observe grading progress and to take density tests. Whenever fill operations were on a continuous basis, a soil technician usually visited the site daily.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

A tabulation of the field density test results is attached. Where low tests were noted, the area was rerolled and in most cases retested. The density test results at the time and at the locations taken were, in our opinion, in general conformance with the density requirements of the Revised Ordinances of Honolulu, 1969 As Amended.

Even though, in our opinion, the field density tests by our office conform to the density requirements of the City's Ordinance, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.
2. Lot regrading by cutting, filling or altering the drainage pattern may cause ground instability in some situations. For this reason, lot regrading should be avoided or made under the guidance of a Soils Engineer.

Our work on this project does not include the following:

Swimming pools, retaining walls, finish grading of lots not observed and tested by our office, backfill of utility trenches, etc.

We have employed accepted engineering and testing procedures and our professional opinions and conclusions are made in accordance with generally accepted soil and foundation engineering principles and practices. However, we do not undertake to guarantee the construction nor do we relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By  

Wallace Wakahiro

WW:vl
November 21, 1980

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4C
Lots in Cut
Grading Plan Numbers

73, 74, 75, 76, 77

The above lots were generally constructed in cut.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

Even though, in our opinion, the lots were in cut, the passage of time may result in changes in soil conditions and we suggest the following precautions:

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Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By Wallace Wakahiro

cc: Community Planning, Inc.
    Haitsuka Brothers, Ltd.
TO: M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Re: WAIPAHU ESTATES - UNIT 4C
FIELD DENSITY TEST REPORT

We Are Sending You Herewith X

Prints
Location Plan
Field Density Test Results
Boring Logs
Laboratory Test Results
Soil Report

No. of Copies
Sets 2
Sheets

General Remarks:
For period ending December 12, 1980.

cc: Community Planning, Inc.
Haitsuka Brothers, Ltd.

Yours truly,
WALTER LUM ASSOCIATES, INC.

By W. Watahkin
# Field Density Test Report

**Waipahu Estates Unit 4-C**

Field Density Test Results as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Lot No.</th>
<th>Fill Layer*</th>
<th>Moisture Content</th>
<th>Dry Density**</th>
<th>Standard Density**</th>
<th>Relative Compaction***</th>
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<tbody>
<tr>
<td>11-14-80</td>
<td>52</td>
<td>0' +</td>
<td>23</td>
<td>96</td>
<td>99.5</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>0' +</td>
<td>22</td>
<td>87</td>
<td>94</td>
<td>87</td>
</tr>
<tr>
<td>11-21-80</td>
<td>27</td>
<td>4' +</td>
<td>23</td>
<td>98</td>
<td>99.5</td>
<td>98</td>
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<tr>
<td></td>
<td>30</td>
<td>4' +</td>
<td>23</td>
<td>95</td>
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<td>4' +</td>
<td>24</td>
<td>96</td>
<td>100</td>
<td>96</td>
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<tr>
<td>12-2-80</td>
<td>25</td>
<td>3' +</td>
<td>25</td>
<td>100</td>
<td>103.5</td>
<td>97</td>
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<tr>
<td></td>
<td>28</td>
<td>3' +</td>
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<td>92</td>
<td>99.5</td>
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<td></td>
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<td>90</td>
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<td>92</td>
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<tr>
<td></td>
<td>34</td>
<td>3' +</td>
<td>24</td>
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<tr>
<td>12-12-80</td>
<td>11</td>
<td>1' +</td>
<td>25</td>
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<td>103.5</td>
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<td>15</td>
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<td>22</td>
<td>0' +</td>
<td>24</td>
<td>98</td>
<td>98</td>
<td>94</td>
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</table>

* Approximate depth below finish grade.

** Density in pounds per cubic foot. Standard density refers to density as indicated by the ASTM Method, D-1557-70

*** Tests indicate the relative compaction of the soils only at the test locations.

Indicates Test #.1 taken in the Lot shown.

BY Ronald S. Ishii
### TABLE I - SUMMARY OF LABORATORY TEST RESULTS

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>SAMPLE NO.</th>
<th>ORIGIN</th>
<th>ORIGIN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#1</td>
<td>#3</td>
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<tr>
<th>DEPTH BELOW SURFACE</th>
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<th>DESCRIPTION</th>
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<th>GRAIN-SIZE ANALYSIS</th>
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<tr>
<th>(% Passing)</th>
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<tbody>
<tr>
<td>1-1/2&quot;</td>
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<td>1&quot;</td>
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<tr>
<td>1/2&quot;</td>
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<td>#4</td>
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<td>#200</td>
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<td>Plastic Limit</td>
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<td>Plasticity Index</td>
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<td>Natural Water Content</td>
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<th>Dry Strength</th>
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<th>APPARENT SPECIFIC GRAVITY</th>
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<tr>
<th>(Surcharge - 51 P.S.F.)</th>
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<th>Molding Moisture, %</th>
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<th>Molding Dry Density, P.C.F.</th>
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<th>Swell upon saturation, %</th>
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<th>CBR at 0.1&quot; Penetration</th>
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<th>MOISTURE-DENSITY RELATIONS OF SOILS</th>
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<th>ORIGIN</th>
<th>ORIGIN</th>
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<tr>
<td>(ASTM D-1557-70, Method )</td>
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<th>A</th>
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<th>REMARKS</th>
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WALTER LUM ASSOCIATES, INC.  
STRUCTURAL & SOIL ENGINEERS
PLASTICITY CHART

PROJECT: WAIPAHU ESTATES - UNIT 4C
LOCATION: WAIKELE, EWA, OAHU, HAWAII

DATE 11-19-80  BY  R.H.
MOISTURE-DENSITY CURVE (ASTM D-1557-70, METHOD A)

PROJECT: WAIPAHU ESTATES - UNIT 4C
LOCATION: WAIEKЕLΕ, EWA, OAHU, HAWAII
SAMPLE NO.: 1
SAMPLE DESCRIPTION: BROWN SILTY CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4.0" x 4.0" x 12"
HAMMER: 10 LBS.
LAYERS: 5 LAYERS
BLOWS: 25/LAYER

ZERO AIR VOIDS CURVE
SPECIFIC GRAVITY ~ 2.83

100% COMPACT
MAXIMUM DRY DENSITY ~ 103.5 P.C.F.

95% COMPACT

90% COMPACT

OPTIMUM WATER CONTENT ~ 23.5%
W.C. @ 5% COMPACT ~ 27.0%
W.C. @ 90% COMPACT ~ 24.5%

WATER CONTENT (%)
DENSITY (P.C.F.)

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

DATE 12-1-80 BY GIS
NOTE:
1. INDICATES THE APPROXIMATE LOCATION OF TEST B1 TAKEN IN THE AREA SHOWN. FOR TEST RESULTS, SEE THE SUMMARY.

TEST LOCATION SKETCH
WAIPAHU ESTATES UNIT 6-C
WAIKIKI, OAHU, HAWAII

WALTER LUM ASSOCIATES, INC.
WAIKIKI, OAHU, HAWAII

TEST DATES FROM 4-14-80 TO 12-13-80
December 19, 1980

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii  96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4C
Lots in Cut
Grading Plan Numbers
65, 66, 67, 68, 69
70, 71, 72

The above lots were generally constructed in cut.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

Even though, in our opinion, the lots were in cut, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.

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Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By Wallace Wakahi

cc: Community Planning, Inc.
    Heitsuka Brothers, Ltd.
TO: M & H ASSOCIATES
   c/o Community Planning, Inc.
   Suite 608, 700 Bishop Street
   Honolulu, Hawaii 96813

Gentlemen:

Re: WAIKIKU ESTATES - UNIT 4C
    FIELD DENSITY TEST REPORT

We are sending you herewith [X]

- [ ] Review and comment
- [ ] Approval
- [ ] Signature
- [X] Your use and files

No. of Copies
   Sets 2
   Sheets

General Remarks:

For period ending December 19, 1980.

cc: Community Planning, Inc.
    Haitsuka Brothers, Ltd.

Yours truly,

WALTER LUM ASSOCIATES, INC.

By W. Wakahiro
# Field Density Test Report

**Waipahu Estates - Unit 4-C**

Field Density Test Results as follows:

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<thead>
<tr>
<th>Date</th>
<th>Lot No.</th>
<th>Fill Layer*</th>
<th>Moisture Content</th>
<th>Dry Density**</th>
<th>Standard Density**</th>
<th>Relative Compaction***</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-19-80</td>
<td>1</td>
<td>0''</td>
<td>23</td>
<td>93</td>
<td>103.5</td>
<td>90</td>
</tr>
<tr>
<td>Retest</td>
<td>55</td>
<td>0''</td>
<td>20</td>
<td>96</td>
<td></td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>0''</td>
<td>23</td>
<td>97</td>
<td></td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>0''</td>
<td>23</td>
<td>95</td>
<td></td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>0''</td>
<td>20</td>
<td>96</td>
<td></td>
<td>92</td>
</tr>
</tbody>
</table>

* Approximate depth below finish grade.

** Density in pounds per cubic foot. Standard density refers to density as indicated by the ASTM Method, D-1557-70

*** Tests indicate the relative compaction of the soils only at the test locations.

Indicates Test ** 1 ** taken in the Lot shown.

By W. W.
NOTE:

1. Indicates the approximate location of test pit taken in the area shown. For test results, see the summary.

TEST LOCATION SKETCH
WAIKIKI ESTATES UNIT 4-C
HALEIWA, OAHU, HAWAII

WALTER LUM ASSOCIATES, INC.
CIVIL ENGINEERS

TEST DATES FROM 12/19 TO 12/19
December 22, 1980

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4C
Lots in Fill
Grading Plan Numbers
1, 2
62, 63, 64

The above lots were generally constructed in fill with on-site material. The fill was placed and compacted in thin layers. A soil technician from our office was present at the site on an intermittent basis to observe grading progress and to take density tests. Whenever fill operations were on a continuous basis, a soil technician usually visited the site daily.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

The density test results at the time and at the locations taken were, in our opinion, in general conformance with the density requirements of the Revised Ordinances of Honolulu, 1969 As Amended.

Even though, in our opinion, the field density tests by our office conform to the density requirements of the City's Ordinance, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.

2. Lot regrading by cutting, filling or altering the drainage pattern may cause ground instability in some situations. For this reason, lot regrading should be avoided or made under the guidance of a Soils Engineer.
Our work on this project does not include the following:

Swimming pools, retaining walls, finish grading of lots not observed and tested by our office, backfill of utility trenches, etc.

We have employed accepted engineering and testing procedures and our professional opinions and conclusions are made in accordance with generally accepted soil and foundation engineering principles and practices. However, we do not undertake to guarantee the construction nor do we relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By  
Wallace Wakahiro

cc: Community Planning, Inc.
Haitsuka Brothers, Ltd.
December 22, 1980

M & H ASSOCIATES
C/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4C
Lots in Cut
Grading Plan Numbers
3, 4, 5, 6

The above lots were generally constructed in cut.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

Even though, in our opinion, the lots were in cut, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.

2. Lot regrading by cutting, filling or altering the drainage pattern may cause ground instability in some situations. For this reason, lot regrading should be avoided or made under the guidance of a Soils Engineer.

Our work on this project does not include the following:

Swimming pools, retaining walls, finish grading of lots not observed and tested by our office, backfill of utility trenches, etc.
We have employed accepted engineering and testing procedures and our professional opinions and conclusions are made in accordance with generally accepted soil and foundation engineering principles and practices. However, we do not undertake to guarantee the construction nor do we relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By

Wallace Wakahiro

cc: Community Planning, Inc.
    Haitsuka Brothers, Ltd.
TO: M & H ASSOCIATES

c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Re: WAIPAHU ESTATES - UNIT 4-C

FIELD DENSITY TEST REPORT

We Are Sending You Herewith X

- Prints
- Location Plan
- Field Density Test Results
- Boring Logs
- Laboratory Test Results
- Soil Report

No. of Copies
Sets 2
Sheets

General Remarks:

For period ending January 21, 1981

cc: Community Planning, Inc.
Haitsuka Brothers, Ltd.

Yours truly,
WALTER LUM ASSOCIATES, INC.

By W. Wakahiro
# FIELD DENSITY TEST REPORT

**WAIPAHU ESTATES - 4C**

Field Density Test Results as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Lot No.</th>
<th>Fill Layer*</th>
<th>Moisture Content</th>
<th>Dry Density**</th>
<th>Standard Density**</th>
<th>Relative Compaction***</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-30-80</td>
<td>13</td>
<td>0' ±</td>
<td>23</td>
<td>99</td>
<td>103.5</td>
<td>96</td>
</tr>
<tr>
<td>1-8-81</td>
<td>26</td>
<td>1' ±</td>
<td>25</td>
<td>96</td>
<td>100</td>
<td>96</td>
</tr>
<tr>
<td>1-15-81</td>
<td>34</td>
<td>0' ±</td>
<td>22</td>
<td>102</td>
<td>103.5</td>
<td>98</td>
</tr>
<tr>
<td>1-16-81</td>
<td>28</td>
<td>0' ±</td>
<td>23</td>
<td>102</td>
<td>103.5</td>
<td>99</td>
</tr>
<tr>
<td>1-17-81</td>
<td>25</td>
<td>0' ±</td>
<td>23</td>
<td>105</td>
<td>103.5</td>
<td>&gt;100</td>
</tr>
<tr>
<td>1-21-81</td>
<td>8</td>
<td>0' ±</td>
<td>23</td>
<td>108</td>
<td>103.5</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

* Approximate depth below finish grade.

** Density in pounds per cubic foot. Standard density refers to density as indicated by the ASTM Method, D-1557-70

*** Tests indicate the relative compaction of the soils only at the test locations.

Indicates Test ± taken in the LOT shown.

**BY** W.W.
**TABLE I — SUMMARY OF LABORATORY TEST RESULTS**

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>SAMPLE NO.</th>
<th>DESCRIPTION</th>
<th>OFF-SITE BORROW</th>
<th>OFF-SITE BORROW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>BROWN</td>
<td>REDDISH BROWN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SILTY CLAY</td>
<td>SILTY CLAY</td>
</tr>
</tbody>
</table>

**GRAIN-SIZE ANALYSIS**

| Sieve | (% Passing) | | | |
|-------|-------------| | | |
| 1-1/2" | | | | |
| 1" | | | | |
| 1/2" | | | | |
| #4 | | | | |
| #10 | | | | |
| #20 | | | | |
| #40 | | | | |
| #100 | | | | |
| #200 | | | | |

**ATTERBERG LIMITS**

| Property | Value | | |
|----------|-------| | |
| Air Dried or Natural | | | |
| Liquid Limit | 51 | | 57 |
| Plastic Limit | 28 | | 27 |
| Plasticity Index | 23 | | 30 |
| Natural Water Content, % | | | |
| Dilatancy | SLOW | | SLOW |
| Toughness | MED.-STIFF | | MED.-STIFF |
| Dry Strength | MED. | | MED. |

**UNIFIED SOIL CLASSIFICATION**

<table>
<thead>
<tr>
<th>Classification</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M-H-CH</td>
<td></td>
<td>CH</td>
</tr>
</tbody>
</table>

**APPARENT SPECIFIC GRAVITY**

<table>
<thead>
<tr>
<th>Value</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.89</td>
<td></td>
<td>2.88</td>
</tr>
</tbody>
</table>

**CBR TEST**

| Property | Value | | |
|----------|-------| | |
| (Surcharge - 51 P.S.F.) | | | |
| Molding Moisture, % | | | 24 |
| Molding Dry Density, P.C.F. | | | 100 |
| Swell upon saturation, % | | | 
| CBR at 0.1" Penetration | | | 17.3 |

**MOISTURE-DENSITY RELATIONS OF SOILS**

| Property | Value | | |
|----------|-------| | |
| (ASTM D-1557-70, Method ) | | | |
| Dry to Wet or Wet to Dry | | | 100 |
| Max. Dry Density (P.C.F.) | | | 101.9 |
| Optimum Moisture (%) | | | 27.0 |

**REMARKS:**

Date ________ By _________
PLASTICITY CHART

PROJECT: WAI'IPAHU ESTATES UNIT 4C
LOCATION: WAI'IPAHU

DATE 1-27-81 BY W.W.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS
MOISTURE-DENSITY CURVE (ASTM D-1557-70, METHOD A)

PROJECT: Waipahu Estates - 4C
LOCATION: Waipahu, Oahu, Hawaii
SAMPLE NO.: #1
SAMPLE DESCRIPTION: Brown Silty Clay

DATE: 1-8-81  BY  BI

WATER CONTENT (%)

DENSITY (P.C.F.)

130
120
110
100
90
80
70
60

0  10  20  30  40  50  60

ZERO AIR NULL CURVE
SPECIFIC GR AVITY ~ 2.89

100% COMPACTION

95% COMPACTION

90% COMPACTION

WATER CONTENT (%)

OPTIMUM W.C. ~ 27.0%
W.C. @ 95% COMPACTION ~ 30.0%
W.C. @ 90% COMPACTION ~ 32.9%

MAXIMUM DRY DENSITY ~ 100 P.C.F.

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4.0" x 4.584"
HAMMER: 10 lbs.
LAYERS: 5 LAYER
BLOWS: 25/LAYER
MOISTURE-DENSITY CURVE (ASTM D-1557-70, METHOD A)

PROJECT: WAIPAHU ESTATES 4C
LOCATION: WAIPAHU, OAHU, HAWAII
SAMPLE NO.: # 2
SAMPLE DESCRIPTION: REDDISH BROWN SILTY CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4" X 4.5" MOLD
HAMMER: 10 LBS
LAYERS: 5 LAYERS
BLOWS: 25/LAYER

ZERO AIR VOIDS CURVE
SPECIFIC GRAVITY = 2.80

100% COMPACTION
MAXIMUM DRY DENSITY ~ 101.5 P.C.F.

95% COMPACTION

90% COMPACTION

OPTIMUM W:C ~ 2.5:0.2
W:C @ 15% COMPACTION ~ 2.0:0.2
W:C @ 90% COMPACTION ~ 3.0:0.2

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

DATE: 1-19-81  BY: LL
EXISTS UNIT 4-8

NOTE:

1. INDICATES THE APPROXIMATE LOCATION OF TEST RUN TAKEN IN THE AREA SHOWN. FOR TEST RESULTS, SEE THE SUMMARY.

TEST LOCATION SKETCH
WAIPAHU ESTATES UNIT 4-C
WAIMELE, KAAHOULI, HAWAII
WALTER LUM ASSOCIATES, INC.
 riders 900,KAAHOLLE AVE.
CIVIL ENGINEERS
PHONE 13-11-11-11

TEST DATES FROM 12-30-80 TO 1-21-81
February 10, 1981

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii  96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4-C
Lots in Fill
Grading Plan Numbers

52, 53, 54, 55, 56, 57, 58, 59
60, 61

The above lots were generally constructed in fill with on-site material. The fill was placed and compacted in thin layers. A soil technician from our office was present at the site on an intermittent basis to observe grading progress and to take density tests. Whenever fill operations were on a continuous basis, a soil technician usually visited the site daily.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

The density test results at the time and at the locations taken were, in our opinion, in general conformance with the density requirements of the Revised Ordinances of Honolulu, 1969 As Amended.

Even though, in our opinion, the field density tests by our office conform to the density requirements of the City's Ordinance, the passage of time may result in changes in soil conditions and we suggest the following precautions:

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We have employed accepted engineering and testing procedures and our professional opinions and conclusions are made in accordance with generally accepted soil and foundation engineering principles and practices. However, we do not undertake to guarantee the construction nor do we relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By

Wallace Wakahiru

WW:lw

cc: Community Planning, Inc.
     Haitsuka Brothers, Ltd.
TO: M & H ASSOCIATES
   c/o Community Planning, Inc.
   Suite 608, 700 Bishop Street
   Honolulu, Hawaii 96813

Gentlemen:

Re: WAIPAHU ESTATES - UNIT 4-C
   FIELD DENSITY TEST REPORT

We are sending you herewith __________

- Prints
- [X] Location Plan
- [X] Field Density Test Results
- Boring Logs
- [X] Laboratory Test Results
- Soil Report

No. of Copies
   Sets __2__
   Sheets __________

General Remarks:

For period ending February 9, 1981.

cc: Community Planning, Inc.
    Haitsuka Brothers, Ltd.

DATE: February 11, 1981

Under Separate Cover

Yours truly,

WALTER LUM ASSOCIATES, INC.

By W. Wakahiro
FIELD DENSITY TEST REPORT

WAIPAHU ESTATES - UNIT 4-C

Field Density Test Results as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Lot No.</th>
<th>Fill Layer*</th>
<th>Moisture Content</th>
<th>Dry Density**</th>
<th>Standard Density**</th>
<th>Relative Compaction***</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-22-81</td>
<td>7</td>
<td>7.5' +</td>
<td>24</td>
<td>114</td>
<td>103.5</td>
<td>&gt;100</td>
</tr>
<tr>
<td>1-23-81</td>
<td>7</td>
<td>7.7' +</td>
<td>23</td>
<td>102</td>
<td>103.5</td>
<td>99</td>
</tr>
<tr>
<td>2-3-81</td>
<td>5</td>
<td>3' +</td>
<td>22</td>
<td>87</td>
<td>103.5</td>
<td>84</td>
</tr>
<tr>
<td>2-3-81</td>
<td>5</td>
<td>3' +</td>
<td>23</td>
<td>100</td>
<td>103.5</td>
<td>96</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>5.7' +</td>
<td>26</td>
<td>95</td>
<td>103.5</td>
<td>92</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>8.7' +</td>
<td>26</td>
<td>96</td>
<td>103.5</td>
<td>93</td>
</tr>
<tr>
<td>2-4-81</td>
<td>5</td>
<td>2.7' +</td>
<td>25</td>
<td>93</td>
<td>103.5</td>
<td>90</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>7.7' +</td>
<td>23</td>
<td>102</td>
<td>103.5</td>
<td>98</td>
</tr>
<tr>
<td>2-6-81</td>
<td>6</td>
<td>3.7' +</td>
<td>23</td>
<td>101</td>
<td>103.5</td>
<td>97</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>6.7' +</td>
<td>24</td>
<td>97</td>
<td>103.5</td>
<td>93</td>
</tr>
<tr>
<td>2-9-81</td>
<td>9</td>
<td>2.7' +</td>
<td>24</td>
<td>98</td>
<td>103.5</td>
<td>94</td>
</tr>
<tr>
<td>2-9-81</td>
<td>5</td>
<td>1.7' +</td>
<td>23</td>
<td>93</td>
<td>103.5</td>
<td>90</td>
</tr>
</tbody>
</table>

* Approximate depth below finish grade.
** Density in pounds per cubic foot. Standard density refers to density as indicated by the ASTM Method, D-1557-70
*** Tests indicate the relative compaction of the soils only at the test locations.
1 Indicates Test #1... taken in the LOT shown.

BY ________________________________
TABLE I - SUMMARY OF LABORATORY TEST RESULTS

<table>
<thead>
<tr>
<th>BORING NO</th>
<th>OFF-SITE BORROW</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMPLE NO</td>
<td>(UNIT 4D-STOCKPILE)</td>
</tr>
<tr>
<td>DEPTH BELOW SURFACE</td>
<td>MOTTLED</td>
</tr>
<tr>
<td></td>
<td>REDDISH</td>
</tr>
<tr>
<td></td>
<td>BROWN</td>
</tr>
<tr>
<td></td>
<td>SILTY CLAY</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

**GRAIN-SIZE ANALYSIS**

<table>
<thead>
<tr>
<th>Sieve</th>
<th>% Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>#4</td>
<td></td>
</tr>
<tr>
<td>#10</td>
<td></td>
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<tr>
<td>#20</td>
<td></td>
</tr>
<tr>
<td>#40</td>
<td></td>
</tr>
<tr>
<td>#100</td>
<td></td>
</tr>
<tr>
<td>#200</td>
<td></td>
</tr>
</tbody>
</table>

**ATTERBERG LIMITS**

<table>
<thead>
<tr>
<th>Property</th>
<th>Natural Water Content, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Dried or Natural</td>
<td></td>
</tr>
<tr>
<td>Liquid Limit</td>
<td>54</td>
</tr>
<tr>
<td>Plastic Limit</td>
<td>27</td>
</tr>
<tr>
<td>Plasticity Index</td>
<td>27</td>
</tr>
<tr>
<td>Dilatancy</td>
<td>SLOW-MEDIUM</td>
</tr>
<tr>
<td>Toughness</td>
<td>MED. STIFF</td>
</tr>
<tr>
<td>Dry Strength</td>
<td></td>
</tr>
</tbody>
</table>

**UNIFIED SOIL CLASSIFICATION**

<table>
<thead>
<tr>
<th>Property</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPARENT SPECIFIC GRAVITY</td>
<td>2.81</td>
</tr>
</tbody>
</table>

**CBR TEST**

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Surcharge - 51 P.S.F.)</td>
<td>22</td>
</tr>
<tr>
<td>Molding Moisture, %</td>
<td></td>
</tr>
<tr>
<td>Molding Dry Density, P.C.F.</td>
<td>104</td>
</tr>
<tr>
<td>Swell upon saturation, %</td>
<td>1.3</td>
</tr>
<tr>
<td>CBR at 0.1&quot; Penetration</td>
<td>14.2</td>
</tr>
</tbody>
</table>

**MOISTURE-DENSITY RELATIONS OF SOILS**

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ASTM D-1557-70, Method)</td>
<td>A</td>
</tr>
<tr>
<td>Dry to Wet or Wet to Dry</td>
<td>DRY TO WET</td>
</tr>
<tr>
<td>Max. Dry Density (P.C.F.)</td>
<td>104.5</td>
</tr>
<tr>
<td>Optimum Moisture (%)</td>
<td>22.0</td>
</tr>
</tbody>
</table>

**REMARKS**

WALTER LUM ASSOCIATES, INC.
STRUCTURAL & SOIL ENGINEERS

Date: 2-11-81  By: [Sign]
MOISTURE-DENSITY CURVE (ASTM D-1557-70, METHOD A)

PROJECT: WAIPAHU ESTATES - UNIT 4C
LOCATION: WAIPAHU, OAHU, HAWAII
SAMPLE NO.: OFF-SITE BORROW #2
SAMPLE DESCRIPTION: REDDISH BROWN SILTY CLAY

DATE 2-6-81  BY B1
NOTE:
1. INDICATES THE APPROXIMATE LOCATION OF TESTS TAKEN IN THE AREA SHOWN. FOR TEST RESULTS, SEE THE SUMMARY.

TEST LOCATION SKETCH
WAIPAHU ESTATES UNIT 4-6
WALTER LUM ASSOCIATES, INC.
3030 KAHALAE AVE.
CIVIL ENGINEERS
PHONE 837-2511

TEST DATES FROM 1-22-81 TO 2-9-81
TO: M & H ASSOCIATES
   c/o Community Planning, Inc.
   Suite 608, 700 Bishop Street
   Honolulu, Hawaii 96813

Gentlemen:

Re: WAIPAHU ESTATES - UNIT 4-C
   FIELD DENSITY TEST REPORT

We Are Sending You Herewith [X] Under Separate Cover [ ]

Prints
Location Plan
Field Density Test Results
Boring Logs
Laboratory Test Results
Soil Report

No. of Copies
Sets 2
Sheets

General Remarks:

For period ending February 19, 1981.

cc: Community Planning, Inc.
    Haitsuka Bros., Ltd.

Yours truly,

WALTER LUM ASSOCIATES, INC.

By W. Wakahiro
### Field Density Test Report

**Wyipahu Estates - Unit 4C**

Field Density Test Results as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Lot No.</th>
<th>Fill Layer*</th>
<th>Moisture Content</th>
<th>Dry Density**</th>
<th>Standard Density**</th>
<th>Relative Compaction***</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-10-81</td>
<td>4</td>
<td>1</td>
<td>0.5'</td>
<td>23</td>
<td>102</td>
<td>103.5</td>
</tr>
<tr>
<td>2-11-81</td>
<td>10</td>
<td>1</td>
<td>4'</td>
<td>24</td>
<td>101</td>
<td>103.5</td>
</tr>
<tr>
<td>2-17-81</td>
<td>8</td>
<td>1</td>
<td>2'</td>
<td>21</td>
<td>108</td>
<td>103.5</td>
</tr>
<tr>
<td>2-19-81</td>
<td>10</td>
<td>2</td>
<td>0'</td>
<td>24</td>
<td>102</td>
<td>103.5</td>
</tr>
</tbody>
</table>

*Approximate depth below finish grade.

**Density in pounds per cubic foot. Standard density refers to density as indicated by the ASTM Method, D-1557-70

***Tests indicate the relative compaction of the soils only at the test locations.

Indicates Test taken in the shown.
NOTE:
1. INDICATES THE APPROXIMATE LOCATION OF TEST PIT TAKEN IN THE AREA SHOWN. FOR TEST RESULTS, SEE THE SUMMARY.

TEST LOCATION SKETCH
WAIPAHU ESTATES UNIT 4-C
WALEA, EWA, OAHU, HAWAII
WALTER LUM ASSOCIATES, INC.,
CIVIL ENGINEERS
PHONE 737-7131

TEST DATES FROM 2-10-81 TO 2-19-81
March 13, 1981

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4-C
Lots in Fill
Grading Plan Numbers

14, 15, 16, 17, 18, 19
20, 21, 22, 23, 24, 25
26, 27, 28, 29
30, 31, 32, 33, 34, 35
36, 37, 38, 39
50, 51

The above lots were generally constructed in fill with on-site material. The fill was placed and compacted in thin layers. A soil technician from our office was present at the site on an intermittent basis to observe grading progress and to take density tests. Whenever fill operations were on a continuous basis, a soil technician usually visited the site daily.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

The density test results at the time and at the locations taken were, in our opinion, in general conformance with the density requirements of the Revised Ordinances of Honolulu, 1969 As Amended.

Even though, in our opinion, the field density tests by our office conform to the density requirements of the City's Ordinance, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.
2. Lot regrading by cutting, filling or altering the drainage pattern may cause ground instability in some situations. For this reason, lot regrading should be avoided or made under the guidance of a Soils Engineer.

Our work on this project does not include the following:

Swimming pools, retaining walls, finish grading of lots not observed and tested by our office, backfill of utility trenches, etc.

We have employed accepted engineering and testing procedures and our professional opinions and conclusions are made in accordance with generally accepted soil and foundation engineering principles and practices. However, we do not undertake to guarantee the construction nor do we relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By   Wallace Wakahiro

cc: Community Planning, Inc.
    Haitsuka Brothers, Ltd.
March 13, 1981

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4C
Lots in Cut
Grading Plan Numbers

40, 41, 42, 43, 44, 45
46, 47, 48, 49

The above lots were generally constructed in cut.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

Even though, in our opinion, the lots were in cut, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.

2. Lot regrading by cutting, filling or altering the drainage pattern may cause ground instability in some situations. For this reason, lot regrading should be avoided or made under the guidance of a Soils Engineer.

Our work on this project does not include the following:

Swimming pools, retaining walls, finish grading of lots not observed and tested by our office, backfill of utility trenches, etc.
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Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By

Wallace Wakahiro

cc: Community Planning, Inc.
Haitsuka Brothers, Ltd.
TO: M & H ASSOCIATES  
c/o Community Planning, Inc.  
Suite 608, 700 Bishop Street  
Honolulu, Hawaii  96813

Gentlemen:

Re: WAIPAHU ESTATES - UNIT 4-C  
FIELD DENSITY TEST REPORT

We Are Sending You Herewith X  
Under Separate Cover

___ Prints.  
X Location Plan  
X Field Density Test Results  
___ Boring Logs  
___ Laboratory Test Results  
___ Soil Report

No. of Copies

Sets 2
Sheets

General Remarks:

For March 26, 1981.

cc: Community Planning, Inc.  
Haitsuka Bros., Ltd.

DATE: March 27, 1981

Under Separate Cover

Review and comment
Approval
Signature
X Your use and files

Yours truly,

WALTER LUM ASSOCIATES, INC.

By W. Wakahiro
FIELD DENSITY TEST REPORT

WAIPAHU ESTATES 4C

Field Density Test Results as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Lot No.</th>
<th>Fill Layer</th>
<th>Moisture Content</th>
<th>Dry Density**</th>
<th>Standard Density**</th>
<th>Relative Compaction***</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-26-81</td>
<td>10 1</td>
<td>0' 1</td>
<td>22</td>
<td>93</td>
<td>103.5</td>
<td>90</td>
</tr>
</tbody>
</table>

* Approximate depth below finish grade.

** Density in pounds per cubic foot. Standard density refers to density as indicated by the ASTM Method, D-1557-70

*** Tests indicate the relative compaction of the soils only at the test locations.

1 Indications Test was taken in the lot shown.

BY WW

19-81
NOTE:
O INDICATES THE APPROXIMATE LOCATION OF TEST IN TAKEN IN THE AREA SHOWN. FOR TEST RESULTS, SEE THE SUMMARY.

TEST LOCATION SKETCH
WAIPAHU ESTATES UNIT 4-G
WAIALUA, OAHU, HAWAII
WALTER LUM ASSOCIATES, INC.
2080 WAIKIKI AVE
CIVIL ENGINEERS
PHONE 237-1181

TEST DATES FROM TO 9-30-81
April 1, 1981

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4C
Lots in Cut
Grading Plan Numbers

7, 8, 9

The above lots were generally constructed in cut.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

Even though, in our opinion, the lots were in cut, the passage of time may result in changes in soil conditions and we suggest the following precautions:

1. Some creep or settlements may occur near the tops of slopes. Foundations near tops of slopes or over sloping ground should be avoided or designed under the guidance of an Engineer.

2. Lot regrading by cutting, filling or altering the drainage pattern may cause ground instability in some situations. For this reason, lot regrading should be avoided or made under the guidance of a Soils Engineer.

Our work on this project does not include the following:

Swimming pools, retaining walls, finish grading of lots not observed and tested by our office, backfill of utility trenches, etc.
We have employed accepted engineering and testing procedures and our professional opinions and conclusions are made in accordance with generally accepted soil and foundation engineering principles and practices. However, we do not undertake to guarantee the construction nor do we relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By Wallace Wakahiro

cc: Community Planning, Inc.
    Hayatsuka Brothers, Ltd.
April 1, 1981

M & H ASSOCIATES
c/o Community Planning, Inc.
Suite 608, 700 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Grading Memorandum
Waipahu Estates - Unit 4-C
Lots in Fill
Grading Plan Numbers

10, 11, 12, 13

The above lots were generally constructed in fill with on-site and borrow material. The fill was placed and compacted in thin layers. A soil technician from our office was present at the site on an intermittent basis to observe grading progress and to take density tests. Whenever fill operations were on a continuous basis, a soil technician usually visited the site daily.

Grading Plan dated June 3, 1980 by Community Planning, Inc. was used as a guide for soil testing purposes.

The density test results at the time and at the locations taken were, in our opinion, in general conformance with the density requirements of the Revised Ordinances of Honolulu, 1969 As Amended.

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Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By [Signature]

Wallace Wakahiro

cc: Community Planning, Inc.
    Haitsuka Brothers, Ltd.
April 7, 1981

SR-51

Dr. Michael J. Chun
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
Honolulu, Hawaii

Dear Dr. Chun:

Subject: Waipahu Estates Unit 4C
Waipahu, Ewa, Oahu

This letter is to certify that grading for the subject project has been completed in substantial conformance with the approved grading plans dated June 3, 1980.

Very truly yours,

COMMUNITY PLANNING, INC.

Bernard P. Kea

BPK:RS:Cl

cc: H. J. Young
M & H Associates
Haitsuka Brothers, Ltd.
APPLICATION AND PERMIT FOR
GRADING

Application is hereby made to do grading work in conformity with Chapter 23, R. O. 1969, as Amended, as follows:

<table>
<thead>
<tr>
<th>TAX MAP KEY</th>
<th>ENG. SOILS REPORT</th>
<th>EST. QUANTITY</th>
<th>PERMIT FEE</th>
<th>FEE RECEIVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZONE 9</td>
<td>SEC. 4</td>
<td>PLAT 02</td>
<td>PAR. 7F</td>
<td>LOT</td>
</tr>
<tr>
<td>16,248</td>
<td>19,372</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Located at Waipahu Estates Unit 4 C

Lot Area: _______ Sq. Ft. 12.8 Acres

Fill Material: Brown Dirt

Existing Ground: Brown Dirt

Estimated Starting Date: Oct. 10 1980 Estimated Completion Date: Oct. 9 1981

Remarks/Purpose of Work: To grade site for Unit 4-C

Owner: M & H Associates
Address: 33 S. King St. # 227
Phone: 536-8666

Engineer: Community Planning Inc.
Address: 700 Bishop St. # 608
Phone: 521-1749

Contractor: Haitsuka Brothers Jr.
Address: 46-201 Kahului St.
Phone: 247-0752

Date of Application: Oct 9 1980 Permittee: Metzysuko Kado
Title: General Partner

Application Reviewed By: SERVICE ENGINEER Date: October 9, 1980

Permission is hereby given to do the above work according to the conditions hereon and according to the approved plans and specifications pertaining thereto, subject to compliance with Chapter 23, R. O. 1969, as Amended.

Remarks:

Date: Oct 9 1980

Issued By:

To the Applicant:

Contractor shall notify this office two working days before commencing any work and arrange for necessary inspectional services.

This permit will expire unless work is started within 90 days from date of issue; or if work is suspended or abandoned for 60 days or more after work is begun; or one year from date of issue.

I hereby certify that all work as requested above has been completed in conformity with Chapter 23, R. O. 1969, as Amended and in accordance with the approved plans and specifications.

Date: __________ 19______ Permitee: __________

Date: __________ 19______ Approved By: __________

Final Soils Report: Date Filed: ________ 19______