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REPORT ON

WAIMANALO RESIDENCE LOTS

*TAK 4-1-08:1*

FIFTH SERIES, UNIT 2

*4244 GP*

WAIMANALO, KOOLAUPOKO, OAHU, HAWAII

*# 330*

for

DEPARTMENT OF HAWAIIAN HOMELANDS

HONOLULU, HAWAII

October 17, 1969

ARTHUR AKINAKA

HONOLULU, HAWAII

by

K. B. Hirashima  
Ahsing, Mills and Associates, Inc.  
P. O. Box 206  
Aiea, Hawaii 96701

MUNICIPAL REFERENCE & RECORDS CENTER

City & County of Honolulu  
City Hall, 15th St. King Street  
Honolulu, Hawaii 96813



**AHSING, MILLS and ASSOCIATES, INC.**

Robert W. H. Ahsing - William K. Mills - Lawrence K. Ahsing - K. B. Hirashima - Francis K. Y. Mau  
99-110 KAUAHALE STREET • P. O. BOX 206 • AIEA, HAWAII 96701 • PHONE 462-400

October 17, 1969

Arthur Akinaka  
Room 201  
1339 North School Street  
Honolulu, Hawaii 96817

Re: Waimanalo Residence Lots  
Fifth Series, Unit 2  
Waimanalo, Koolauapoko, Oahu, Hawaii


Dear Mr. Akinaka:

Forwarded herewith are four (4) copies of our soils investigation report for the proposed roadway for the above project.

Based on the test results, it is suggested that the darkened area, as shown on Plate B, be excavated two (2) feet and back-filled with non-expansive material. The light area, where sand or coral is encountered, a six (6) to nine (9) inch base course could be used.

Very truly yours,

AHSING, MILLS AND ASSOCIATES, INC.

By:   
K. B. Hirashima

KBH:na

## INTRODUCTION

It is proposed to construct an access road for vehicular traffic in the Waimanalo Residence, 5th Series, Unit 2.

The purpose of this investigation was to determine the nature of the soils on the proposed route and their suitability when used for embankment as subgrade purposes.

## FIELD INVESTIGATION

The field investigation included borings, identification of materials, sampling and recording. The borings were made by Nat Whiton Drilling Company. In all cases, the borings were made at centerline of roadway and to subgrade. The materials were identified and recorded. Samples were taken and tested. Plate A and B show a record of the borings made.

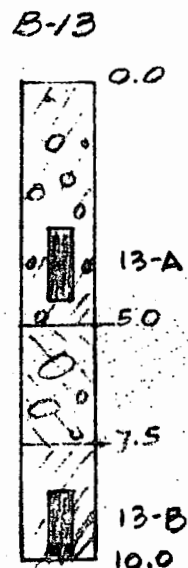
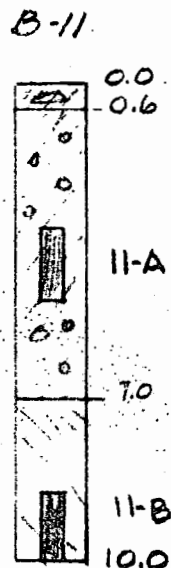
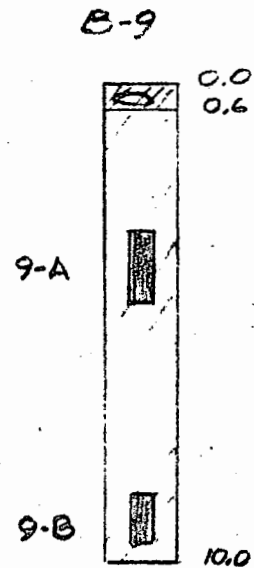
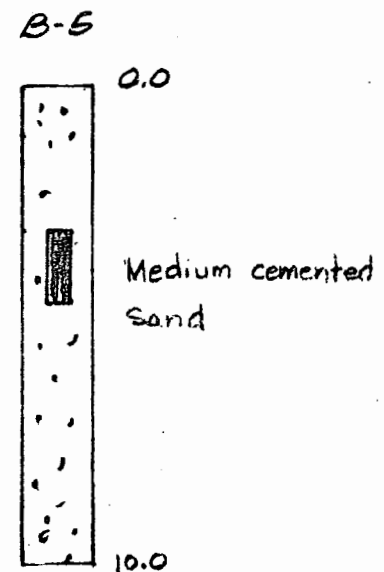
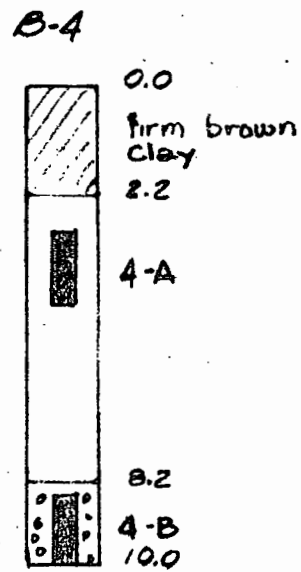
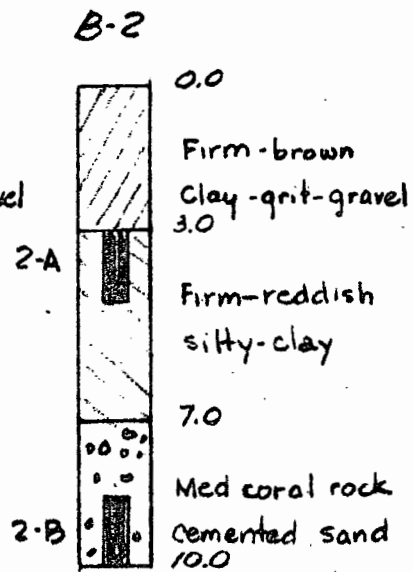
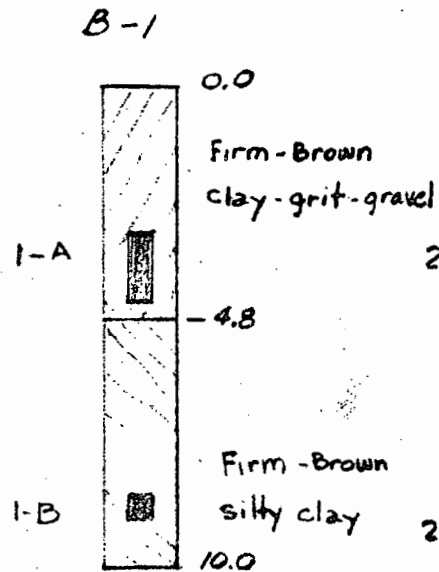
## LABORATORY INVESTIGATION

Samples from the field were tested for suitability for roadway construction. All samples were undisturbed and disturbed as indicated in Table 1.

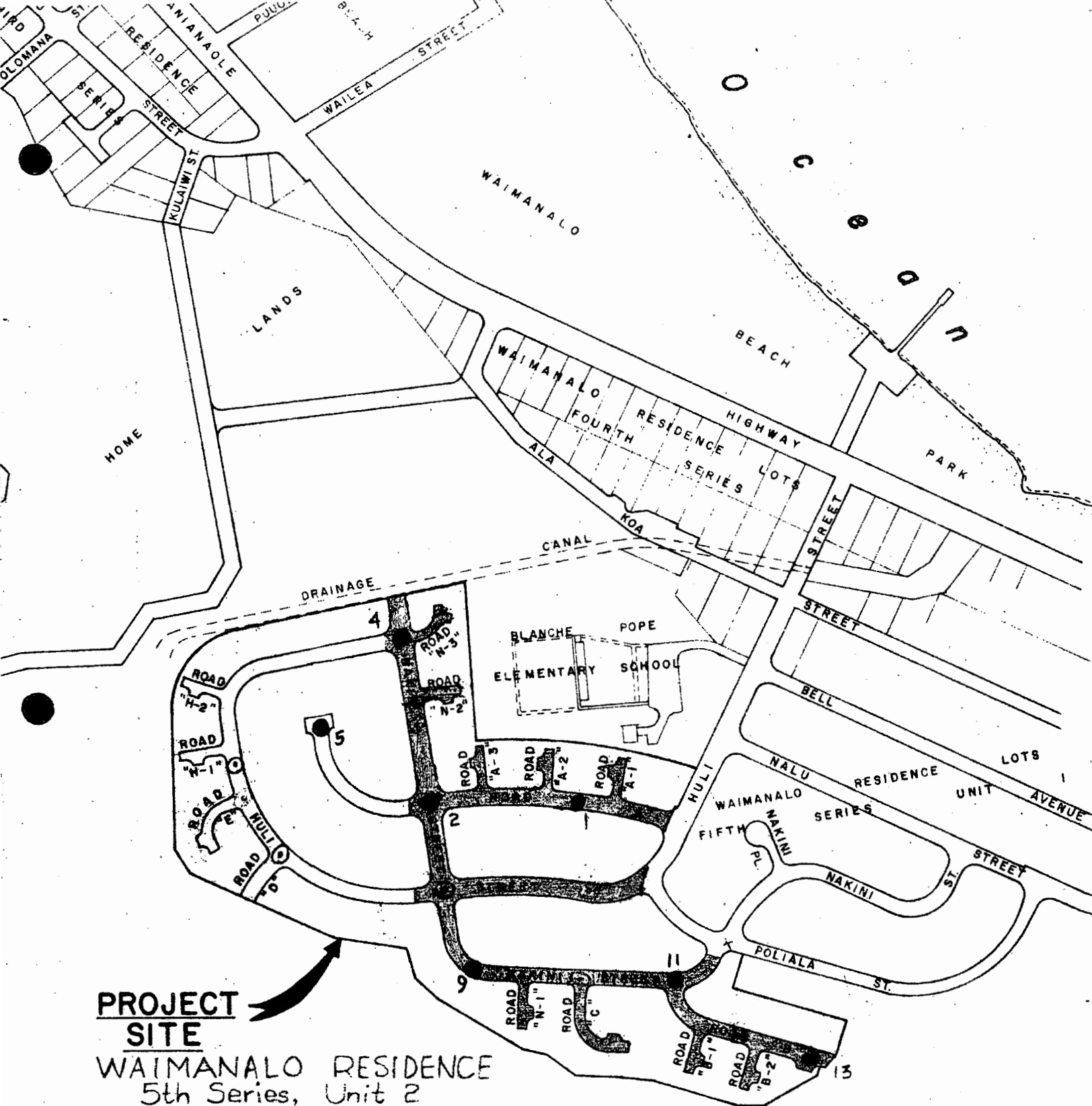
The following is a list of tests performed:

- a. Atterberg Limits
- b. Moisture-Density Relation (AASHO T-180-57)
- c. Grading Analysis (Hydrometer)
- d. California Bearing Ratio
- e. Natural Moisture Content
- f. Specific Gravity

The results of the laboratory tests are shown on Table 1.



WAIMANALO HOMES  
FIFTH SERIES  
BORING LOGS  
AMA



**PROJECT SITE**

WAIMANALO RESIDENCE  
5th Series, Unit 2

DEPARTMENT OF HAWAIIAN HOME LANDS

**KEY MAP**

Scale: 1 in. = 400 ft.

PLATE B

SUMMARY OF LABORATORY TEST RESULTS

WAIMANALO HOMES  
 Table I PAGE 1

Boring No.	1	2	4	5
Sample No.	1A	2A	4A	5A
Depth (ft.)				
DESCRIPTION	CLAY	SILTY CLAY	CLAY	SAND
IN-PLACE DENSITIES				
Wet Density (lb/c.f.)	99.9	107.4	104.2	129.2
Moist. Content, %	18.1	22.6	20.9	12.9
Dry Density (lb/c.f.)	84.6	87.6	86.2	114.4
DIRECT SHEAR TEST				
Cohesion (lb/s.f.)				
UNCONFINED COMP. TEST				
Yield Point (lb/s.f.)				
Ultimate Load (lb/s.f.)	4250	4100	4600	
EXPANSION TEST				
Swell upon Saturation, %	5.5	1.9	2.1	NIL
ATTERBURG LIMITS				
Liquid Limit		21.0	22	
Plasticity Index		9.1	10	
SPECIFIC GRAVITY				
GRADING ANALYSIS				
(% Passing)				
Sieve				
#4	75		69	
#10	73		61	
#20	69		50	
#40	62		43	
#80	57		37	
#100	56		36	
#200	51		33	
COMPACTION TEST				
(AASHTO Method T180-57)				
Max. Dry Density (lb/c.f.)		91.5		105.7
Optimum Moist., %		21.0		19.5
CBR TEST				
CBR at 0.1" Penetration		5.4		20.7
CLASSIFICATION				
Textural*				
Highway Research Board				
Casagrande Airfield				

\*Abbreviations used: G=Gravel, S=Sand, Si=Silt, C=Clay, L=Loam

SUMMARY OF LABORATORY TEST RESULTS

WAINIANA LL HOMES

Table I PAGE 2

	9	11	13
Boring No.	9	11	13
Sample No.	9A	11A	13A
Depth (ft.)			
DESCRIPTION	CLAY	CLAY	CLAY
IN-PLACE DENSITIES			
Wet Density (lb/c.f.)	104.1	104.2	104.6
Moist. Content, %	20.6	21.1	23.0
Dry Density (lb/c.f.)	86.3	86.2	89.1
DIRECT SHEAR TEST			
Cohesion (lb/s.f.)			
UNCONFINED COMP. TEST			
Yield Point (lb/s.f.)			
Ultimate Load (lb/s.f.)	3590	4350	3900
EXPANSION TEST			
Swell upon Saturation, %	3.1	4.7	6.3
ATTERBURG LIMITS			
Liquid Limit	54		44
Plasticity Index	23		21
SPECIFIC GRAVITY			
GRADING ANALYSIS (% Passing)			
Sieve			
#4	95		96
#10	94		94
#20	93		88
#40	92		79
#80	89		69
#100	85		64
#200	80		58
COMPACTION TEST (AASHTO Method T180-57)			
Max. Dry Density (lb/c.f.)		94.2	93.2
Optimum Moist., %		27.0	26.3
CBR TEST			
CBR at 0.1" Penetration		9.8	9.5
CLASSIFICATION			
Textural*			
Highway Research Board			
Casagrande Airfield			

\*Abbreviations used: G=Gravel, S=Sand, Si=Silt, C=Clay, L=Loam

BORING NO. 1

0.0-----4.8 (4.0) Firm to stiff brown clay with grit and gravel  
4.8-----10.0 (5.2) Firm brown silty clay

Sample Data: Shelby Tube Samples

<u>No.</u>	<u>Depth</u>	<u>Blows/0.5'</u>
1.	3.0 - 4.5 (1.5)	10, 34, 50
2.	8.5 - 9.0 (1.5)	12, 12, 7

BORING NO. 2

0.0-----3.0 (3.0) Firm light brown clay with grit and gravel  
3.0-----7.0 (4.0) Firm reddish silty clay  
7.0-----10.0 (3.0) Medium coral rock or slightly cemented fine sand

Sample Data: Shelby Tube Samples

<u>No.</u>	<u>Depth</u>	<u>Blows/0.5'</u>
1.	3.0 - 4.5 (1.5)	9, 13, 22
2.	8.5 - 10.0 (1.5)	10, 17, 23



BORING NO. 4

0.0-----2.2 (2.2) Stiff brown clay  
 2.2-----8.2 (6.0) Firm mottled clay  
 8.2-----10.0 (1.8) Medium slightly cemented sand

## Sample Data: Shelby Tube Samples

<u>No.</u>	<u>Depth</u>	<u>Blows/0.5'</u>
1.	3.0 - 4.5 (1.5)	6, 17, 15
2.	8.5 - 10.0 (1.5)	7, 12, 1

BORING NO. 5

0.0-----10.0 (10.0) Medium cemented sand

## Sample Data: Shelby Tube Samples

<u>No.</u>	<u>Depth</u>	<u>Blows/0.5'</u>
1.	3.0 - 4.5 (1.5)	7, 16, 23

BORING NO. 9

0.0-----0.6 (0.6) Firm dark gray clay with boulders  
 0.6-----10.0 (9.4) Firm to stiff light brown clay with silt,  
 gravel and small boulders

## Sample Data: Shelby Tube Samples

1.	3.0 - 4.5 (1.5)	22, 35, 40
2.	8.5 - 9.5 (1.0)	9, 60 --

Arthur A. Moore

Hawaiian Islands

BORING NO. 11

0.0-----0.6	(0.6)	Firm dark gray soil
0.6-----7.0	(6.4)	Firm to stiff light brown clay gravel and boulders
7.0-----10.0	(3.0)	Stiff mottled clay with grit

Sample Data: Shelby Tube Samples

<u>No.</u>	<u>Depth</u>
1.	3.0 - 4.5
2.	8.5 - 10.0

BORING NO. 13

0.0-----5.0	(5.0)	Firm light brown clay with gravel and boulders
5.0-----7.5	(2.5)	Soft clay and clay
7.5-----10.0	(2.5)	Firm brown clay with gravel and boulders

Sample Data:

<u>No.</u>	<u>Depth</u>	<u>Flow (P.S.F.)</u>	<u>Notes</u>
1.	3.0 - 4.5 (1.5)	11, 12, 14	
2.	8.5 - 10.0 (1.5)	8, 10, 11	