Ms. Lenore Nakama  
State of Hawaii, Department of Land and Natural Resources  
Commission on Water Resource Management  
P.O. Box 621  
Honolulu, Hawaii 96809

Schofield Army Barracks RI/FS Well Information  
Permit Applications and Completion Reports  
Schofield Barracks, Hawaii

Dear Ms. Nakama:

As discussed during our telephone conversation on August 27, 1996, we have enclosed a copy of a USGS topographic map showing the locations of 12 monitoring wells installed for this project. The monitoring wells are identified on the map by their Army identification numbers. When we received your letter dated April 11, 1996, there seemed to be some confusion over which state well identification numbers were assigned to which of our monitoring wells. Your letter indicated that Wells 4-2 and 4-4 were assigned state well identification numbers 3-2900-01 and 3-3004-03, respectively. The actual geographic location of Well 4-2 does not correspond to well identification number 3-2900-01. Based on our records, the state well identification numbers should be assigned as follows:

<table>
<thead>
<tr>
<th>Project Well Number</th>
<th>Hawaii State Well ID Number</th>
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</thead>
<tbody>
<tr>
<td>1-1</td>
<td>3-2901-13</td>
</tr>
<tr>
<td>2-1</td>
<td>3-2900-02</td>
</tr>
<tr>
<td>2-2</td>
<td>3-2903-01</td>
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<tr>
<td>2-3</td>
<td>3-2902-03</td>
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<tr>
<td>2-4</td>
<td>3-2801-02</td>
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<td>2-5</td>
<td>3-2959-01</td>
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<td>2-6</td>
<td>3-2802-01</td>
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<tr>
<td>4-2</td>
<td>3-3004-02</td>
</tr>
<tr>
<td>4-2A</td>
<td>3-3004-05</td>
</tr>
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<td>4-3</td>
<td>3-3004-03</td>
</tr>
<tr>
<td>4-4</td>
<td>3-3004-04</td>
</tr>
</tbody>
</table>

We hope this table and the map will help clear up the confusion regarding the well numbers and locations.

As requested in your April 11, 1996 letter, we have enclosed the following information:

1. Well 1-1 (State Well ID No. 3-2901-13)  
   a. After-the-fact application for a well construction/pump installation permit  
   b. Well completion report
October 14, 1996
28339.06.01.12
0225AR
Ms. Lenore Nakama
State of Hawaii, DLNR
Page 2

2. Well 4-2 (State Well ID No. 3-3004-02)
   a. Well completion report
   b. Well completion diagram

Although 12 monitoring wells were installed over the lifetime of the project, only 11 are
functioning with submersible pumps. There were problems during the installation of
Well 4-2. The cable used to pull the pump out of the well broke. After numerous
unsuccessful attempts to retrieve the pump, the pump was abandoned and is not functional.
Thereafter, Well 4-2 was used only to measure groundwater levels. Thus, a pump installation
report and diagram were never included in the original permit application. Because Well 4-2
could not be used as a monitoring well, a new well was drilled within 15 feet of the old well.
We gave the new well the name 4-2A, and this may have led to additional confusion.

Your April 11 letter also requested information on State Wells 3-2900-01 and 3-3004-03. From
our records, State Well 3-3004-03 refers to Well 4-3 instead of 4-4, as listed in your letter. But
we are uncertain which wells are referred to by State Wells 3-2900-01 and 3-2900-02. At one
time, we did propose to install a monitoring well in a part of the East Range, but that idea was
rejected. It is possible, perhaps, that someone such as the drilling company may have
submitted a permit application in advance. If that is the case, that particular permit should be
withdrawn, as that well was never drilled. Because of the confusion, we have enclosed copies
of the well completion reports for both Wells 4-3 and 4-4.

In addition, we have enclosed survey data for all the wells, and the well completion report for
Well 2-6 with supporting boring log and well completion diagram information.

We hope that this information will help clarify the confusion between the two well
identification systems. I will be available to discuss these wells with you personally if you so
desire. If you have any questions, please feel free to call.

Sincerely yours,

HARDING LAWSON ASSOCIATES

Bruce S. Wedgeworth
Associate Geologist

Enclosures

cc: Mr. Jon Fukuda / U.S. Army, Department of Public Works
July 16, 1996

Harding Lawson Associates
235 Pearlridge Center, Phase I
98-1005 Moanalua Road
Aeia, Hawaii 96701

Attn: Mr. Bruce S. Wedgeworth

Subject: FIELD LOCATION OF MW 2-6
At Wheeler Army Airfield
Oahu, Hawaii

<table>
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<tr>
<th>Northing</th>
<th>Easting</th>
<th>Elevation</th>
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<th>Longitude</th>
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<tr>
<td>MW 2-6</td>
<td>111702.132</td>
<td>484685.053</td>
<td>691.57</td>
<td>21°28'27.04&quot;</td>
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<tr>
<td>BM#1</td>
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<td></td>
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<tr>
<td>BM#3</td>
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<td>689.46</td>
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</table>

Coordinates referred to Hawaii State Plane Coordinate System - Zone 3
Elevation Datum = Mean Sea Level (MSL)

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Engineers • Planners • Photogrammetrists • Surveyors

Construction Managers • Environmental Services
ELEVATION OF MONITORING WELLS AS SURVEYED ON 7/15/95 (WITH BRUCE & MARK OF HARDING AND LAWSON)

MW-4-2A = 946.87 feet — Black mark on top of tube

MW-4-2 = 947.11 feet — Black mark on top of tube

"+" cut near casing of MW-4-2A = 945.91 feet

MW-4-1 = 853.47 feet (as surveyed on 3/16/95)

"+" cut = 851.12 feet

Diff. = 2.35 feet (Bruce needs diff. in elev. only)

MW-4-3 = 884.15 feet (as surveyed on 3/16/95)

"+" cut = 882.52 feet

Diff. = 1.63 feet (Bruce needs diff. in elev. only)

MW-4-4 = 829.88 feet — Black mark

MW-2-2 = 864.34 feet — Black mark on top of tube

"+" cut = 862.90 feet

MWL-2-3 = 828.81 feet — Black mark on top of tube

"+" cut = 827.20 feet

MWL-2-4 = 829.70 feet — Black mark on top of tube

"+" cut = 828.00 feet

MWL-2-1 = 903.75 feet — Black mark on top of tube
### Coordinate Manager

Wednesday January 10, 1996 12:54 PM

Coordinate File Name: HARDING.CO

Lowest point #: 1 Highest point #: 6

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<table>
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</tbody>
</table>

**SP—HAWAII STATE PLANE COORDINATE SYSTEM, ZONE 3 (NAD 27)**

0-00-13.601 CONVERGENCE

0.9999900 SCALE FACTOR

0.9999464 GRID FACTOR
Mr. Jon Fukuda  
United States Army  
DPW, Attn: APVG-GWV, U.S. Army  
Schofield Barracks, Hawaii 96857-5000

Dear Mr. Fukuda:

Well Construction Permit  
MW 2-4 (Well No. 2801-02)

Enclosed are two (2) copies of your approved Well Construction Permit for the captioned well(s). As part of the Chairperson's approval, the following special conditions were added and are part of your permit under Standard Permit Condition 11:

Special Conditions

1. Standard Conditions 1, 2, and 9 are waived.

Please sign the permit copies and return one for our files. Also, copies of the aquifer pump test procedure and the well completion report form are enclosed for your use.

If you have any questions, please call Rae M. Loui, Deputy Director, at 587-0214 or 1-800-468-4644 extension 70214.

Aloha,

MICHAEL D. WILSON  
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT

MW 2-4 Well, Well No. 2801-02

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of MW 2-4 Well (Well No. 2801-02) at Schofield Barracks, Oahu, TMK 7-T-04, subject to the following conditions:

STANDARD PERMIT CONDITIONS

1. The Commission on Water Resource Management, P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work by this permit commences.

2. The well construction permit shall be for construction and testing of the well only. A minimum one-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Commission, to accurately record water levels. The permittee shall coordinate with the Commission and conduct a pumping test in accordance with the attached Aquifer Pump Testing Procedure (attached). The permittee shall submit to the Commission the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Commission.

3. The permittee shall incorporate mitigation measures to prevent construction debris from entering the aquatic environment, to schedule work to avoid periods of high rainfall, and to revegetate any cleared areas as soon as possible.

4. In the event that subsurface cultural remains such as artifacts, burials or concentrations of shells or charcoal are encountered during construction, the permittee shall stop work and contact the Department's Historic Preservation Division (587-0045) immediately.

5. The proposed well construction shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to construct the well shall not constitute a determination of correlative water rights.

6. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   b. Elevation (referred to mean sea level, msl) survey by a Hawaii-licensed surveyor.
   c. As-built sectional drawing of the well.
   d. Plot plan and map showing the exact location of the well.
   e. Complete pumping test records, including time, pumping rate, drawdown, chloride content, and other water quality data.

7. The permittee shall comply with all applicable laws, rules, and ordinances.

8. The well construction permit application is incorporated into the permit by reference.

9. The permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Commission upon a showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Commission no later than three (3) months prior to the date the permit expires. If the commencement or completion date is not met, the Commission may revoke the permit after giving the permittee notice of the proposed action and an opportunity to be heard.

10. If the well is not to be used it must be properly capped. If the well is to be abandoned then the applicant must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

11. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: 5/9/96
Expiration Date: 5/9/98

Michael D. Wilson, Chairperson
Commission on Water Resource Management

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed.

Applicant's Signature: __________________________ Date: ______________

Printed Name: __________________________ Firm or Title: __________________________

Please sign both copies and return one copy of this permit to the Commission and retain a copy for your record.

Attachment
cc: USGS
Department of Health/ Safe Drinking Water & Wastewater Branches
Honolulu Board of Water Supply
Mr. Jon Fukuda  
United States Army  
DPW, Attn: APVG-GWV, U.S. Army Garrison  
Schofield Barracks, Hawaii 06857-5000  

Dear Mr. Fukuda:

After-the-Fact Pump Installation Permit  
MW 2-4 (Well No. 2801-02)  

Enclosed are two (2) copies of your approved Pump Installation Permit for the captioned well(s). As part of the Commission’s approval, the following special conditions were added and are part of your permit under Standard Permit Condition 10:

Special Conditions

1. Standard Conditions 1 and 8 are waived.

2. The requirement to install a flowmeter (Standard Condition 3) is waived.

Please sign the permit copies and return one for our files.

If you have any questions, please call Rae M. Loui, Deputy Director, at 587-0214 or 1-800-468-4644 extension 70214.

Aloha,

MICHAEL D. WILSON  
Chairperson

Enclosures
AFTE•THE-FACT PUMP INSTALLATION PERMIT

MW 2-4 Well, Well No. 2801-02

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the pump installation for MW 2-4 Well (Well No. 2801-02) at Schofield Barracks, Oahu, TMK 7-7-01, subject to the following conditions:

STANDARD PERMIT CONDITIONS

1. The Commission on Water Resource Management, P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences.

2. The pump installation permit shall be for installation of a 25 gpm capacity, or less, pump in the well.

3. The permittee shall provide and maintain an approved meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or means for measuring chlorides and temperature. These data shall be measured monthly and reported to the Commission on a monthly basis.

4. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to pump water from a well shall not constitute a determination of correlative water rights. The permittee is notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

5. The applicant shall complete and submit as-built drawings and Part II - (Permanent) Pump Installation Report of the Well Completion Report (attached) to the Commission within thirty (30) days from the date of approval.

6. The applicant shall comply with all applicable laws, rules, and ordinances.

7. The pump installation permit application is incorporated into the permit by reference.

8. The permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Commission upon a showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Commission no later than three (3) months prior to the date the permit expires. If the commencement or completion date is not met, the Commission may revoke the permit after giving the permittee notice of the proposed action and an opportunity to be heard.

9. If the well is not to be used it must be properly capped. If the well is to be abandoned then the applicant must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

10. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

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Expiration Date: 5/9/98

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed.

Applicant's Signature: ___________________________ Date: ______________
Printed Name: ___________________________ Firm or Title: ___________________________

Please sign both copies and return one copy of this permit to the Commission and retain a copy for your record.
TO: Honorable Lawrence Miki, Director  
Department of Health  
Attention: Dennis Tulang, Wastewater Branch  
William Wong, Safe Drinking Water Branch  

FROM: Michael D. Wilson, Chairperson  
Commission on Water Resource Management  

SUBJECT: After-the-Fact Applications for Well Construction/Pump Installation Permits  
MW2-1 through 2-5, MW4-2A, & MW4-4 Wells  
Well Nos. 2900-02, 2903-01, 2902-03, 2801-02, 2959-01, 3004-05, & 3004-04  

Transmitted for your review and comment are copies of after-the-fact applications for well construction/pump installation permits.  

We would appreciate your comments on the captioned applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by April 29, 1996.  

Please find a map, attached, to locate the wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama at 587-0218.  

LN:ss  
Attachment(s)  

RESPONSE: ( ) We have no comments  
( ) Comments attached  

Contact Person: Bill Wong  
Phone: 586-0288  

Signed: Bill Wong  
Date: 4/15/96
TO: Honorable Lawrence Miike, Director
   Department of Health
   Attention: Dennis Tulang, Wastewater Branch
   William Wong, Safe Drinking Water Branch
FROM: Michael D. Wilson, Chairperson
       Commission on Water Resources Management
SUBJECT: After-the-Fact Applications for Well Construction/Pump Installation Permits
         MW2-1 through 2-5, MW4-2A, & MW4-4 Wells
         Well Nos. 2900-02, 2903-01, 2902-03, 2801-02, 2959-01, 3004-05, & 3004-04

Transmitted for your review and comment are copies of after-the-fact applications for well
construction/pump installation permits.

We would appreciate your comments on the captioned applications for any conflicts or
inconsistencies with the programs, plans, and objectives specific to your department. Please respond
by returning this cover memo form by April 29, 1996.

Please find a map, attached, to locate the wells. If you have any questions about these
permit applications, request additional information, or request additional review time, please contact
Lenore Nakama at 587-0218.

LN:ss
Attachment(s)

RESPONSE: ☑ We have no comments

☐ Comments attached

Contact Person: LORI N. KAJIWARA Phone: 587-0218

Signed: LORI N. KAJIWARA Date: 4/29/96
Mr. Jon Fukuda  
U.S. Army  
DPW, Attn: APVG-GWV, U.S. Army Garrison  
Schofield Barracks, HI  96857-5000  

Dear Mr. Fukuda:  

Permit Applications for MW2-1 through 2-5, MW4-2A, & MW4-4  
(Well Nos. 2900-02, 2903-01, 2902-03, 2801-02, 2959-01, 3004-05, & 3004-04)  

We accepted your after-the-fact well construction/pump installation permit applications on February 27, 1996, and hereby acknowledge that they are complete. You can expect your applications to be processed for action within ninety (90) days from that acceptance date.  

We are returning your check for $175.00 because government agencies are not subject to the payment of any fees (§13-171-12(c) HAR).  

Thank you for submitting the boring logs and well completion diagrams for Wells MW1-1, MW4-1, and MW4-3. We have reviewed the record for each of the monitor wells shown on your map. Listed below are the items that should be submitted to complete the record for the following wells:  

1. MW1-1 (Well No. 2901-13)  
   a. After-the-fact application for a well construction/pump installation permit.  
   b. Well completion report (Parts I and II, attached)  

2. MW4-2 (Well No. 3004-02)  
   a. Well completion report (Parts I and II, attached)  
   b. As-built sectional drawing of the well  
   c. As-built sectional drawing of the pump  

3. MW4-2 (Well No. 2900-01)  
   a. As-built sectional drawing of the pump  

4. MW4-4 (Well No. 3004-03)  
   a. Well completion report (Parts I and II, attached)  

In addition, documentation from a Hawaii-licensed surveyor should be submitted for all of your monitor wells.  

If you have any questions, please contact Lenore Nakama at 587-0218.  

Sincerely,  

[Signature]  
RAE M. LOUI  
Deputy Director  

Enclosure
TO: Honorable Lawrence Miike, Director  
Department of Health  
Attention: Dennis Tulang, Wastewater Branch  
William Wong, Safe Drinking Water Branch

FROM: Michael D. Wilson, Chairperson  
Commission on Water Resources Management

SUBJECT: After-the-Fact Applications for Well Construction/Pump Installation Permits  
MW2-1 through 2-5, MW4-2A, & MW4-4 Wells  
Well Nos. 2900-02, 2903-01, 2902-03, 2801-02, 2959-01, 3004-05, & 3004-04

Transmitted for your review and comment are copies of after-the-fact applications for well construction/pump installation permits.

We would appreciate your comments on the captioned applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by April 29, 1996.

Please find a map, attached, to locate the wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama at 587-0218.

LN:ss  
Attachment(s)

RESPONSE:  
( ) We have no comments  
( ) Comments attached

Contact Person: _____________________________ Phone: _____________________________

Signed: _____________________________ Date: _____________________________
Submitted for your review and approval are seven Applications for Permits and seven Well Completion Reports for monitoring wells MWs 2-1 through 2-5, MW4-2A, and MW4-4 that were installed for the Schofield Barracks Remedial Investigation/Feasibility Study (RI/FS) project. Also enclosed are boring logs and well completion diagrams for Wells MW1-1, MW4-1, and MW4-3, though they were previously permitted. We are conducting this project on behalf of the U.S. Army. Groundwater chemistry data for each of the wells are pending but will be published by the Army in the Final OU 2 RI Report. If requested, this data can be sent to you after release by the Army.

Also enclosed is a check for $175 (for seven well applications at $25 each).

If you have any questions, please contact me.

BSW/MWC/rmf

Enclosures: Applications for Permit, Wells MW2-1 through MW2-5, MW4-2A, and MW4-4
Well Completion Reports, Wells MW2-1 through MW2-5, MW4-2A, and MW4-4
Monitoring Well Location Map, USGS Quadrangles
Tax Map Key
Table 1. Water-Level Data
Table 2. Location Coordinates of Wells Drilled at Schofield Barracks
Boring Logs and Well Completion Diagrams (also includes MWs 4-1, 4-3, and 1-1)
$175 Check Payment, Harding Lawson Associates
### WELL COMPLETION REPORT

**Instructions:** Please print or type and submit completed report within 30 days after well completion to the Commission on Water Resource Management, P.O. Box 822, Honolulu, Hawaii 96826. An as-built drawing of the well and chemical analysis should also be submitted. For assistance call the Commission Regulation Branch at 587-0225, or 1-800-468-9894 Ext. 7-0225.

1. **STATE WELL NO.** 2801-02  
   **WELL NAME** MW2-4  
   **ISLAND** Oahu

2. **LOCATION:** Address Bunker Avenue, Wheeler AAF, HI 96786  
   **Tax Map Key** 7-7-01

3. **DRILLING OR PUMP INSTALLATION CONTRACTOR** Roscoe Moss Hawaii, Inc.

4. **CONTRACTOR'S C-57 LICENSE NUMBER** C-16437

5. **NAME OF DRILLER WHO PERFORMED WORK** Elmo Shepherd

6. **TYPE OF RIG/CONSTRUCTION** Air Rotary/Star 150K

7. **DATE OF WELL DRILLING COMPLETION** 11/28/94  
   **(NOTE: Report must be submitted within 30 days after the date)**

8. **GROUND ELEVATION (msl)** 828 ft.  
   **Top of Drilling Platform (msl)** 830 ft.  
   **Height of Drilling Platform above Ground surface** 2 ft.  
   **Bench Mark and Method Used to Determine Ground Elevation** +866.38 ft. (differential leveling)

9. **DRILLER'S LOG:**

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<td>To</td>
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<td>To</td>
</tr>
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<td>To</td>
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<td>ft. below ground</td>
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<tr>
<td>To</td>
<td>13</td>
<td>inch dia. from</td>
<td>To</td>
<td>739</td>
<td>ft. below ground</td>
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<td>To</td>
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<td>To</td>
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</tr>
<tr>
<td>To</td>
<td>0</td>
<td>ft. below R.P.</td>
<td>To</td>
<td>0</td>
<td>ft. below R.P.</td>
</tr>
<tr>
<td>To</td>
<td>739</td>
<td>ft. below ground</td>
<td>To</td>
<td>30</td>
<td>ft. below ground</td>
</tr>
</tbody>
</table>

10. **TOTAL DEPTH OF WELL BELOW GROUND** 739 ft.

11. **HOLE SIZE:**

<table>
<thead>
<tr>
<th>Diameter (in.)</th>
<th>Depth (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.28</td>
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<tr>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>513</td>
<td>499</td>
</tr>
</tbody>
</table>

12. **CASING INSTALLED:**

<table>
<thead>
<tr>
<th>Diameter (in.)</th>
<th>Depth (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.28</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>513</td>
<td>499</td>
</tr>
<tr>
<td>6</td>
<td>0.25</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>513</td>
<td>499</td>
</tr>
</tbody>
</table>

13. **ANNULUS:**

- Grouted from 0 to 499 ft. below ground
- Grouted from 739 to 499 ft. below ground
- Grouted from 739 to 499 ft. below ground
- Grouted from 739 to 499 ft. below ground

14. **INITIAL WATER LEVEL** 554.26 ft. below ground  
   **Date and time of measurement** 0818 hrs., 11/29/94

15. **INITIAL CHLORIDE** 19 ppm  
   **Date and time of sampling** 1533 hrs., 06/09/95

16. **INITIAL TEMPERATURE** 71.5°F  
   **Date and time of sampling** 1422 hrs., 06/09/95

17. **PUMPING TESTS:**

- **Reference Point (R.P.) used:**
- **Date:**
- **Start water level:**
- **End water level:**
- **Depth of well:**

18. **AQUIFER PUMP TEST PROCEDURES DATA & GRAPHS ATTACHED?** Yes  

### PUMP INSTALLATION REPORT

19. **DATE OF PUMP INSTALLATION** 6/7/95

20. **PUMP INSTALLATION:**

<table>
<thead>
<tr>
<th>Pump Type, Make, Serial No.</th>
<th>Capacity (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersible, Meyers,</td>
<td>25</td>
</tr>
<tr>
<td>Franklin Electric, 7.5 HP, 460V, 1760 RPM</td>
<td></td>
</tr>
<tr>
<td>Depth of Pump Intake Setting</td>
<td>763 ft. below R.P.</td>
</tr>
<tr>
<td>Depth of bottom of airline</td>
<td>578 ft. below R.P.</td>
</tr>
<tr>
<td>Pumping Head is</td>
<td>558 ft.</td>
</tr>
</tbody>
</table>

**Remarks:**

**Contractor (print):** Roscoe Moss Hawaii, Inc.

**Title:** Manager

**Signature:** [Signature]

**For Driller’s Use: Job Name:** ___________

**For Official Use: Well No.:** 2801-02

**Latitude:** 158° 01’ 50”  
**Longitude:** 121° 22’ 59”

**Date:** 2/13/96

---

[Image of well completion report]
## Table 1. Schofield Water-Level Data

<table>
<thead>
<tr>
<th>Permit Number</th>
<th>HLA Well Name</th>
<th>Date Measured</th>
<th>Time Measured</th>
<th>Top of Sounding Tube Elevation (ft)</th>
<th>Depth to Water (ft)</th>
<th>Vertical Displacement (ft)</th>
<th>Corrected Depth (ft)</th>
<th>Groundwater Elevation (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2901-13</td>
<td>1-1</td>
<td>10/10/95</td>
<td>1143</td>
<td>852.78</td>
<td>582.21</td>
<td>0.22</td>
<td>581.99</td>
<td>270.79</td>
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<tr>
<td></td>
<td>2-1</td>
<td>10/10/95</td>
<td>1126</td>
<td>903.75</td>
<td>632.40</td>
<td>0.01</td>
<td>632.39</td>
<td>271.39</td>
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<tr>
<td></td>
<td>2-2</td>
<td>10/10/95</td>
<td>1029</td>
<td>864.34</td>
<td>593.25</td>
<td>0.05</td>
<td>593.20</td>
<td>271.14</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>10/10/95</td>
<td>1330</td>
<td>828.81</td>
<td>557.59</td>
<td>0.04</td>
<td>557.55</td>
<td>271.26</td>
</tr>
<tr>
<td></td>
<td>2-4</td>
<td>10/10/95</td>
<td>1314</td>
<td>829.70</td>
<td>558.55</td>
<td>0.09</td>
<td>558.46</td>
<td>271.24</td>
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<tr>
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<td>2-5</td>
<td>10/10/95</td>
<td>1103</td>
<td>912.20</td>
<td>640.41</td>
<td>0.11</td>
<td>640.30</td>
<td>271.90</td>
</tr>
<tr>
<td>3004-01</td>
<td>4-1</td>
<td>10/10/95</td>
<td>0835</td>
<td>853.47</td>
<td>585.73</td>
<td>2.65</td>
<td>583.08</td>
<td>270.39</td>
</tr>
<tr>
<td>3004-02</td>
<td>4-2</td>
<td>10/10/95</td>
<td>0949</td>
<td>947.11</td>
<td>677.25</td>
<td>1.54</td>
<td>675.71</td>
<td>271.40</td>
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<tr>
<td></td>
<td>4-2A</td>
<td>10/10/95</td>
<td>1003</td>
<td>946.87</td>
<td>676.24</td>
<td>0.04</td>
<td>676.20</td>
<td>270.67</td>
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<tr>
<td>3004-03</td>
<td>4-3</td>
<td>10/10/95</td>
<td>0855</td>
<td>884.15</td>
<td>613.27</td>
<td>0.13</td>
<td>613.14</td>
<td>271.01</td>
</tr>
<tr>
<td></td>
<td>4-4</td>
<td>10/10/95</td>
<td>0925</td>
<td>829.88</td>
<td>559.28</td>
<td>0.0</td>
<td>559.28</td>
<td>270.60</td>
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Table 2. Location Coordinates of Wells Drilled at Schofield Barracks, Island of Oahu, Hawaii

<table>
<thead>
<tr>
<th>DLA Well No.</th>
<th>Hawaii State Well LD. No.</th>
<th>Hawaii State Plane (Pt) Northing</th>
<th>Hawaii State Plane (Pt) Easting</th>
<th>Top of Sounding Tube (ft)</th>
<th>UTM Coordinates (Meters) Northing</th>
<th>UTM Coordinates (Meters) Easting</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>3-2901-13</td>
<td>117515.94</td>
<td>490579.06</td>
<td>852.78</td>
<td>2376770</td>
<td>600760</td>
<td>21° 29' 24.680&quot;</td>
<td>158° 01' 39.755&quot;</td>
</tr>
<tr>
<td>2-1</td>
<td>NA</td>
<td>117736.41</td>
<td>495036.81</td>
<td>903.75</td>
<td>2376800</td>
<td>602280</td>
<td>21° 29' 26.871&quot;</td>
<td>158° 00' 52.554&quot;</td>
</tr>
<tr>
<td>2-2</td>
<td>NA</td>
<td>121016.10</td>
<td>481183.95</td>
<td>864.34</td>
<td>2377760</td>
<td>597830</td>
<td>21° 29' 59.344&quot;</td>
<td>158° 03' 19.250&quot;</td>
</tr>
<tr>
<td>2-3</td>
<td>NA</td>
<td>115456.52</td>
<td>483851.56</td>
<td>828.81</td>
<td>2376100</td>
<td>598640</td>
<td>21° 29' 04.253&quot;</td>
<td>158° 02' 50.984&quot;</td>
</tr>
<tr>
<td>2-4</td>
<td>NA</td>
<td>114890.40</td>
<td>489648.08</td>
<td>829.70</td>
<td>2375930</td>
<td>600435</td>
<td>21° 28' 58.657&quot;</td>
<td>158° 01' 49.608&quot;</td>
</tr>
<tr>
<td>2-5</td>
<td>NA</td>
<td>118439.36</td>
<td>503505.78</td>
<td>912.20</td>
<td>2377050</td>
<td>604675</td>
<td>21° 29' 33.838&quot;</td>
<td>157° 59' 22.878&quot;</td>
</tr>
<tr>
<td>4-1</td>
<td>3-3004-01</td>
<td>123512.01</td>
<td>474076.13</td>
<td>853.47</td>
<td>2378530</td>
<td>595840</td>
<td>21° 30' 24.055&quot;</td>
<td>158° 04' 28.178&quot;</td>
</tr>
<tr>
<td>4-2</td>
<td>3-3004-02</td>
<td>124621.32</td>
<td>472744.17</td>
<td>947.11</td>
<td>2378880</td>
<td>595300</td>
<td>21° 30' 35.038&quot;</td>
<td>158° 04' 48.642&quot;</td>
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<tr>
<td>4-2A</td>
<td>NA</td>
<td>124606.63</td>
<td>472746.61</td>
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<td>2378875</td>
<td>595300</td>
<td>21° 30' 34.892&quot;</td>
<td>158° 04' 48.616&quot;</td>
</tr>
<tr>
<td>4-3</td>
<td>3-3004-03</td>
<td>122896.38</td>
<td>474006.88</td>
<td>884.15</td>
<td>2378340</td>
<td>595660</td>
<td>21° 30' 17.949&quot;</td>
<td>158° 04' 35.261&quot;</td>
</tr>
<tr>
<td>4-4</td>
<td>NA</td>
<td>124474.82</td>
<td>474375.30</td>
<td>829.88</td>
<td>2378815</td>
<td>595825</td>
<td>21° 30' 33.594&quot;</td>
<td>158° 04' 31.367&quot;</td>
</tr>
</tbody>
</table>

NA = Not assigned yet by the DLNR.
Pump Installation Diagram for Monitoring Well 2-4

Harding Lawson Associates
Engineering and Environmental Services

Schofield Barracks
Island of Oahu, Hawaii

*DATUM: MEAN SEA LEVEL (NOT TO SCALE)

DEPTH (FT)  ELEVATION (FT)
515   313
558.46  271.24 (10/10/95)  (ELEVATION OF GROUNDWATER)
563   265
667   161
673   155
676   152
694   134
700   128
739   89

1" DIA. SCH 80 PVC SOUNDING TUBE
1.5" DIA. STEEL DISCHARGE PIPE
JACKETED SUBMERSIBLE ELECTRICAL PUMP CABLE
STAINLESS STEEL SAFETY CABLE
CHECK VALVE
STAINLESS STEEL ELECTRICAL CABLE WIRE GUARD
RUBBER TORQUE ARRESTOR
3.75" DIA. MYERS PUMP
PUMP INTAKE
3.75" DIA. FRANKLIN 7.5 HORSEPOWER ELECTRIC MOTOR
SILICA SAND FILTER PACK
6" DIA. STAINLESS STEEL LOUVERED SCREEN
10" DIA. HOLE DRILLED WITH AIR ROTARY
SAND

DATUM: MEAN SEA LEVEL
<table>
<thead>
<tr>
<th>Sample Interval (feet)</th>
<th>Drilling Rate (min./5 feet)</th>
<th>Breathing Space Measurement (ppm)</th>
<th>Sample Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2-14</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>25-29</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>29-40</td>
<td>10</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>40-50</td>
<td>10</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>50-60</td>
<td>7</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

- **Equipment**
  - **Air Rotary/Star 150K**
  - **Ground Elevation** 828 ft
  - **Date** 11/28/94

- **Log of Monitoring Well 2-4**
  - **Sheet 1 of 12**

- **Description**
  - *DARK REDDISH BROWN ELASTIC SILT (MH) (2.5YR,3/4), dry, firm.*
    - Moist below 5 feet.
  - Increased drilling resistance between 14 and 15 feet (decomposed rock)
  - Mottled dark reddish brown (2.5YR,3/4) and very dark gray (2.5YR,N3/) below 25 feet. (Driller switched from Kelley bar and auger to air rotary at 30 feet. Set 14-inch surface casing to 30 feet.)
  - Reddish brown (5YR,4/4) with basalt sand below 40 feet.
  - Red (2.5YR,4/4) below 50 feet.
  - Mottled dark gray (10YR,4/1) and red (10YR,5/8) below 60 feet.
<table>
<thead>
<tr>
<th>Sample Interval (feet)</th>
<th>Drilling Rate (min./5 feet)</th>
<th>Breathing Space Measurement (ppm)</th>
<th>Sample Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-70</td>
<td>6</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>70-80</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>80-90</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>90-100</td>
<td>5</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>100-110</td>
<td>2</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>110-120</td>
<td>2</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

- **60-70 feet**: Mottled red (10R.4/8), and yellow (2.5Y,8/8) below 70 feet.
- **70-80 feet**: Red (10R.4/8) with medium gray (N5) basalt below 80 feet.
- **80-90 feet**: Mottled dark grayish red (10R,4/1) and yellowish red (5YR,5/8) below 100 feet (saprolite).
- **100-110 feet**: Increased drilling resistance at 120 feet. MODERATE REDDISH ORANGE (10R,6/8) AND LIGHT OLIVE GRAY (5Y,5/2) BASALT, low hardness, weak, deeply weathered, with inclusions of elastic silt.

**Log of Monitoring Well 2-4** (Sheet 2 of 12)
<table>
<thead>
<tr>
<th>Sample Interval (feet)</th>
<th>Drilling Rate (min./5 feet)</th>
<th>Breathing Space Measurement (ppm)</th>
<th>Sample Number</th>
<th>Depth (ft)</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-130</td>
<td>1</td>
<td>0</td>
<td>13</td>
<td>130</td>
<td>Dark grey (N3) and greenish grey (5Y,6/1), low to moderate hardness, weak to moderately strong, moderate to deeply weathered, with inclusions of elastic silt, vesicles up to 2 cm in diameter, iron oxide staining below 130 feet.</td>
</tr>
<tr>
<td>130-140</td>
<td>2</td>
<td>0</td>
<td>14</td>
<td>135</td>
<td>Increased drilling resistance from 141 to 143 feet.</td>
</tr>
<tr>
<td>140-150</td>
<td>15</td>
<td>0</td>
<td>15</td>
<td>150</td>
<td>Olive black (5Y,2/1) and olive grey (5Y,4/1), low to moderate hardness, weak to moderately strong, vesicles up to 6 cm in diameter below 150 feet. Increased drilling resistance from 154 to 163 feet.</td>
</tr>
<tr>
<td>150-160</td>
<td>25</td>
<td>0</td>
<td>16</td>
<td>160</td>
<td>Greyish black (N2) and olive grey (5Y,4/1), deeply weathered, vesicles up to 4 cm in diameter below 160 feet.</td>
</tr>
<tr>
<td>160-170</td>
<td>2</td>
<td>0</td>
<td>17</td>
<td>170</td>
<td>Olive black (5Y,2/7), moderately weathered, with inclusions of reddish brown (2.5YR,4/4) elastic silt, iron oxide staining, vesicles up to 1 cm in diameter below 170 feet. Increased drilling resistance from 176 to 178 feet.</td>
</tr>
<tr>
<td>170-180</td>
<td>11</td>
<td>0</td>
<td>18</td>
<td>180</td>
<td>Dark grey (N3) and dark greenish grey (5Y,4/1), low hardness, weak, moderate to deeply weathered below 180 feet. Increased drilling resistance from 188 to 189 feet.</td>
</tr>
<tr>
<td>180-190</td>
<td>29</td>
<td>0</td>
<td>19</td>
<td>190</td>
<td>Dark greenish grey (5Y,4/1), olive grey (5Y,4/1) and moderate brown (5YR,4/4), low to moderate hardness, weak to moderately strong, vesicles up to 4 cm in diameter below 190 feet.</td>
</tr>
</tbody>
</table>
Grayish black (N2), moderately hard, moderately strong, moderately weathered below 200 feet. Increased drilling resistance from 201 to 212 feet.

Olive gray basalt (5Y,4/1), moderately hard to hard, moderate to deeply weathered, with inclusions of reddish brown elastic silt (MH) (2.5YR,5/4), trace olivine crystals below 210 feet.

Dark gray (N3), hard, moderately weathered, vesicular, (some with dark reddish brown staining) below 220 feet. Increased drilling resistance from 220 to 233.5 feet.

Brownish gray (5YR,4/1), moderately hard, weak to moderately strong, moderate to deeply weathered, trace inclusions of red (2.5YR,4/8) elastic silt below 230 feet. Possible void from 233 to 233.5 feet. Decreased drilling resistance at 233.5 feet.

Decreased drilling resistance at 238 feet.

Olive gray (5Y,4/1), medium dark gray (N4), pale reddish brown (10R,4/6) and grayish red (10R,4/2), low to moderate hardness below 240 feet. Increased drilling resistance from 245 to 256 feet.

Medium dark gray (N4) and grayish brown (5YR,3/2) below 250 feet.

Decreased drilling resistance from 258 to 259 feet.
<table>
<thead>
<tr>
<th>Sample Interval (feet)</th>
<th>Drilling Rate (min./5 feet)</th>
<th>Breathing Space Measurement (ppm)</th>
<th>Sample Number</th>
<th>Equipment</th>
<th>Air Rotary/Star 150K</th>
</tr>
</thead>
<tbody>
<tr>
<td>250-260</td>
<td>6</td>
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<td>26</td>
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<td></td>
</tr>
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<tr>
<td>260-270</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>270-280</td>
<td>9</td>
<td>0</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>280-290</td>
<td>11</td>
<td>0</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>290-300</td>
<td>11</td>
<td>0</td>
<td>30</td>
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</tr>
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<td>13</td>
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<tr>
<td>300-310</td>
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<td>31</td>
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<tr>
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<td>10</td>
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<tr>
<td>310-320</td>
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<tr>
<td></td>
<td>325</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dark grey (N3) and medium dark grey (N4), moderately hard to hard, moderately strong below 260 feet. Increased drilling resistance from 259 to 261 feet.

Medium dark grey (N4), greyish brown (5YR,3/2) and dark reddish brown (10R,3/4), weak to moderately strong, highly vesicular below 270 feet.

Medium dark grey (N4) and olive grey (5Y,4/1), moderately hard, moderately strong, minor inclusions of reddish brown (5YR,4/4) elastic silt below 280 feet.

Olive grey (5Y,4/1) and moderate brown (5YR,4/4), moderately hard to hard below 290 feet.

(Loss of drilling foam circulation between 298 and 306 feet.)

Dark grey (N3) and olive grey (5Y,4/1), hard, strong below 310 feet.

Medium dark grey (N4) and olive grey (5Y,4/1), moderately strong, moderately weathered, with inclusions of red (10R,4/8) elastic silt, vesicular below 320 feet.
<table>
<thead>
<tr>
<th>Sample Interval (feet)</th>
<th>Drilling Rate (min./3 feet)</th>
<th>Breathing Space Measurement (ppm)</th>
<th>Sample Number</th>
<th>Depth (ft)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>320-330</td>
<td>11</td>
<td>0</td>
<td>33</td>
<td>330</td>
<td>Medium dark gray (N4) and moderate red (5R.4/6), moderate to deeply weathered below 330 feet.</td>
</tr>
<tr>
<td>330-340</td>
<td>18</td>
<td>0</td>
<td>34</td>
<td>340</td>
<td>Dark grey (N3), moderately weathered below 340 feet.</td>
</tr>
<tr>
<td>340-350</td>
<td>17</td>
<td>0</td>
<td>35</td>
<td>350</td>
<td>Decreased drilling resistance at 349 feet.</td>
</tr>
<tr>
<td>350-360</td>
<td>7</td>
<td>0</td>
<td>36</td>
<td>360</td>
<td>Dark grey (N3), moderately hard, weak to moderately strong below 360 feet.</td>
</tr>
<tr>
<td>360-370</td>
<td>13</td>
<td>0</td>
<td>37</td>
<td>370</td>
<td>Dark grey (N3) and moderate reddish brown (10R.5/4), hard, moderately strong, trace olivine crystals below 370 feet.</td>
</tr>
<tr>
<td>370-380</td>
<td>16</td>
<td>0</td>
<td>38</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>Sample Interval (feet)</td>
<td>Drilling Rate (min./2 feet)</td>
<td>Breathing Space Measurement (ppm)</td>
<td>Sample Number</td>
<td>Depth (ft)</td>
<td>Log of Monitoring Well 2-4</td>
</tr>
<tr>
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</tr>
<tr>
<td>380-390</td>
<td>9</td>
<td>0</td>
<td>39</td>
<td>390</td>
<td>Grayish black (N2), little to moderately weathered below 390 feet.</td>
</tr>
<tr>
<td>390-400</td>
<td>11</td>
<td>0</td>
<td>40</td>
<td>395</td>
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</tr>
<tr>
<td>400-410</td>
<td>10</td>
<td>0</td>
<td>41</td>
<td>400</td>
<td>Olive black (5Y,4/1) and grayish black (N2), hard, with inclusions of reddish brown (2.5YR,4/4) elastic silt below 410 feet.</td>
</tr>
<tr>
<td>410-420</td>
<td>13</td>
<td>0</td>
<td>42</td>
<td>405</td>
<td>Olive black (5Y,4/1) and dusky brown (5YR,2/2), moderately hard to hard, moderate to deeply weathered, trace olivine crystals below 420 feet.</td>
</tr>
<tr>
<td>420-430</td>
<td>9</td>
<td>0</td>
<td>43</td>
<td>415</td>
<td>No olivine crystals below 431 feet.</td>
</tr>
<tr>
<td>430-440</td>
<td>10</td>
<td>0</td>
<td>44</td>
<td>425</td>
<td></td>
</tr>
<tr>
<td>440-450</td>
<td>10</td>
<td>0</td>
<td>45</td>
<td>435</td>
<td>Olive black (5Y,2/1) and grayish brown (5YR,3/2), moderately hard below 450 feet.</td>
</tr>
<tr>
<td>Sample Interval (feet)</td>
<td>Drilling Rate (min./5 feet)</td>
<td>Breathing Space Measurement (ppm)</td>
<td>Sample Number</td>
<td>Depth (ft)</td>
<td>Equipment (Ground) Elevation</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------</td>
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<td>---------------</td>
<td>-----------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>450-460</td>
<td>9</td>
<td>0</td>
<td>46</td>
<td>450-460</td>
<td>828 ft 11/28/94</td>
</tr>
<tr>
<td>460-470</td>
<td>10</td>
<td>0</td>
<td>47</td>
<td>460-470</td>
<td></td>
</tr>
<tr>
<td>470-480</td>
<td>3</td>
<td>0</td>
<td>48</td>
<td>470-480</td>
<td></td>
</tr>
<tr>
<td>480-490</td>
<td>4</td>
<td>0</td>
<td>49</td>
<td>480-490</td>
<td></td>
</tr>
<tr>
<td>490-500</td>
<td>6</td>
<td>0</td>
<td>49</td>
<td>490-500</td>
<td></td>
</tr>
<tr>
<td>500-510</td>
<td>26</td>
<td>0</td>
<td>50</td>
<td>500-510</td>
<td></td>
</tr>
</tbody>
</table>

- Olive black (5Y.2/1), hard, moderately weathered below 470 feet.
- Increased drilling resistance from 474 to 476 feet.
- Decreased drilling resistance from 481 to 486 feet.
- (Loss of drilling foam circulation from 482 to 490 feet; possible cinder/clinker zone.)
- Increased drilling resistance from 490 to 498 feet.
- Olive gray (5Y.4/1) and medium gray (N5), little to moderately weathered, highly vesicular below 500 feet.
- Increased drilling resistance from 503 to 517 feet.
- Greyish black (N2) and greenish black (5GY.2/1), moderately strong to strong, olivine crystals, vesicular below 510 feet.

Log of Monitoring Well 2-4 (Sheet 8 of 12)

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well 2-4
Schofield DA03
Schofield Barracks
Island of Oahu, Hawaii

<table>
<thead>
<tr>
<th>DRAWN</th>
<th>JOB NUMBER</th>
<th>APPROVED</th>
<th>FILE</th>
<th>DATE</th>
<th>REVISED DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>kar</td>
<td>28339.06.01.12</td>
<td>SDA03</td>
<td>4/95</td>
<td></td>
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</tr>
</tbody>
</table>
Increased drilling resistance from 519 to 530 feet. Trace olivine crystals.

Medium dark grey (N4) and dark reddish brown (10R.3/4), moderate to deeply weathered, some olivine crystals below 530 feet.

Increased drilling resistance from 536 to 565 feet.

Trace olivine crystals.

Water table measured at 554.26 feet below ground surface November 29, 1994, 08:18.

Dark grey (N3), black (N1) and dark reddish brown (10R.3/4), moderately hard to hard, weak to moderately strong, highly vesicular below 560 feet.

Increased drilling resistance from 565 to 567 feet.

Dark grey (N3) and dark reddish brown (10R.3/4), hard, moderately strong, little to moderately weathered, some olivine crystals below 570 feet.

Dark grey (N3), olive grey (5Y.4/1) and moderate reddish brown (10R.4/6), strong below 580 feet.
**Sample Interval** (feet) | **Drilling Rate** (min./5 feet) | **Breathing Space Measurement** (ppm) | **Sample Number** | **Depth** (ft) **Sample**
---|---|---|---|---
580-590 | 38 | 0 | 58 | 590-
 | | | | 595-

590-600 | 46 | 0 | 59 | 600-
 | | | | 605-

600-610 | 25 | 0 | 60 | 610-
 | | | | 615-

610-620 | 8 | 0 | 61 | 620-
 | | | | 625-

620-630 | 16 | 0 | 62 | 630-
 | | | | 635-

630-640 | 15 | 0 | 63 | 640-
 | | | | 645-

---

**Equipment**

**Air Rotary/Star 150K**

**Ground**

**Elevation**

**828 ft** **Date** **11/28/94**

**Log of Monitoring Well 2-4** (Sheet 10 of 12) **FIGURE**

**Harding Lawson Associates**

**Engineering and Environmental Services**

**Schofield DA03**

**Schofield Barracks**

**Island of Oahu, Hawaii**

**DRAWN**

**JOB NUMBER**

**APPROVED**

**FILE**

**DATE**

**REvised DATE**

kar | 28339.06.01.12 | SDA03 | 4/95
<table>
<thead>
<tr>
<th>Sample Interval (feet)</th>
<th>Drilling Rate (min./5 feet)</th>
<th>Breathing Space Measurement (gpm)</th>
<th>Sample Number</th>
<th>Depth (ft)</th>
<th>Equipment (Ground) Elevation</th>
<th>Air Rotary/Star 150K</th>
<th>Date 11/28/94</th>
</tr>
</thead>
<tbody>
<tr>
<td>640-650</td>
<td>4</td>
<td>0</td>
<td>64</td>
<td>650</td>
<td>828 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Olive black (5Y,2/1), moderate reddish brown (10R,4/8) and dark reddish brown (10R,3/4), weak to moderately strong below 650 feet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Decreased drilling resistance at 658 feet.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Moderately hard to hard, and moderately strong, below 660 feet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>650-660</td>
<td>14</td>
<td>0</td>
<td>65</td>
<td>660</td>
<td>Decreased drilling resistance from 674 to 692 feet.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grayish black (N2) and moderate red (5R,4/6), trace calcite crystals, highly vesicular, below 690 feet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>660-670</td>
<td>13</td>
<td>0</td>
<td>66</td>
<td>670</td>
<td>(Loss of drilling foam circulation from 700 to bottom of boring.)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Dark grey (N3) and dark yellowish orange (10YR,6/6), little to moderately weathered, vesicular, below 700 feet.</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>Decreased drilling resistance from 702 to 718 feet.</td>
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<tr>
<td>670-680</td>
<td>4</td>
<td>0</td>
<td>67</td>
<td>680</td>
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<td>680-690</td>
<td>8</td>
<td>0</td>
<td>68</td>
<td>690</td>
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<td>690-700</td>
<td>28</td>
<td>0</td>
<td>69</td>
<td>700</td>
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</tr>
<tr>
<td>700-710</td>
<td>4</td>
<td>0</td>
<td>70</td>
<td>710</td>
<td></td>
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</tr>
<tr>
<td>Sample Interval (feet)</td>
<td>Drilling Rate (min. 15 feet)</td>
<td>Breathing Space Measurement (ppm)</td>
<td>Sample Number</td>
<td>Depth (ft)</td>
<td></td>
<td></td>
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<td>------------------------</td>
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<tr>
<td>720-730</td>
<td>29</td>
<td>0</td>
<td></td>
<td>715</td>
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<tr>
<td>730-740</td>
<td>5</td>
<td>0</td>
<td></td>
<td>720</td>
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<td>9</td>
<td></td>
<td></td>
<td>725</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total depth = 744 feet.
Water table was measured at 554.26 feet below ground surface, 11/29/94, 08:18.
APPLICATION FOR PERMIT

1. APPLICANT: (circle primary contact a, b, or c) Primary Fax: 656-1039
   (a) WELL OWNER
   Firm Name: U.S. Army
   Contact Person: Jon Fukuda
   Ph: 656-2878
   Address: Schofield Barracks, Garrison, Honolulu, Hawaii 96857-5000
   (b) LANDOWNER
   Firm Name: SAME AS WELL OWNER
   Contact Person: Ph:
   Address:
   (c) CONTRACTOR
   Firm Name: Roscoe Moss Hawaii, Inc.
   Ph: 682-5856
   Contractor's C-57 License No. C-16437
   Contact Person: Tracy Runnels
   Address: 92-159A Alai St., Kapolei, Hawaii 96707

2. WELL LOCATION/NAME: Wheeler Army Air Field/MWZ-4
   Island: Oahu
   Address: Bunker Avenue, Wheeler AAF, HI 96786
   Tax Map Key: 7-7-01
   (Attach a USGS map, scale 1"=2000', and a property tax map showing well location referenced to established property boundaries.)

3. (a) PROPOSED WORK:
   - Drill New Well
   - Modify Existing Well
   - Abandon/Seal
   - Install New Pump
   - Modify Pump
   - Replace Pump
   * Be sure to complete and submit well abandonment report upon completion of work.

   (b) WELL TYPE:
   - Drilled
   - Radial
   Is this well part of a battery of wells? Yes No
   (Briefly describe and fill in the diagram on the back of this form.)

4. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: 25 gallons per minute
   Pump Type:
   - Deep Well Turbine
   - Submersible
   - Centrifugal
   Motor:
   - Propeller
   - Reciprocating
   - Gas
   - Impulse
   - Electric, rated horsepower: 7.5
   If Pump Replacement, Existing Pump Capacity: gallons per minute

5. PROPOSED USE:
   - Municipal (including hotels, stores, etc.)
   - Industrial
   - Irrigation (crop)
   - Other (explain)
   - Military
   - Noncommercial water (including hotels, stores, etc.)
   - Other (explain)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: 6 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
   - Flow-meter
   - Open-pipe
   - Office Plate
   - Weir

7. PENDING ACTIONS:
   - CDUA
   - SMA
   - EIS
   - EA
   - NONE
   - Other(explain)
   Completion Date:

8. REMARKS, EXPLANATIONS:
   Well shall be used for monitoring of groundwater quality and for collecting groundwater elevation data.

I understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date, 2) the contractor shall submit to the Commission a well completion/abandonment report within 30 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner
Signature:
Date:
Landowner
Signature:
Date:
Contractor
Signature:
Date:

For Official Use Only:
Date Received:
Date Accepted:
Field Checked By:
Date:
Longitude:
Latitude:
State Well No.:

State of Hawaii
Commission on Water Resource Management
Department of Land and Natural Resources

11/09/95 WCP Form
9. PROPOSED WELL SECTION

Elevation at top of casing: **830 ft., mast.**

Cement Grout: **499 ft.**

Bentonite Seal: **14 ft.**

Rock Packing: **226 ft.**

Hole Diameter: **13 in.**

Total Depth: **739 ft.**

Ground Elevation: **828 ft., mast**

Solid Casing:
- Material: **carbon steel**
- Length: **544 ft.**
- Diameter: **6 in.**
- Wall thickness: **0.28 in.**

Casing: □ Perforated  □ Screen (louvered)
- Material: **stainless steel**
- Length: **150 ft.**
- Diameter: **6 in.**
- Wall thickness: **0.25 in.**
- Openings: **2.4 sq. in/F.**

Open Hole:
- Length: **0 ft.**
- Diameter: **in.**

*Approximate elevation at time of filing application. Ground elevation above mean sea level (masl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.*