CHECKLIST

✓ Well Construction Permit
✓ Water Use Permit Required Also

Pump Installation Permit

Well Name & Number: Oakala Exploratory Well (6017-05) Island: Hawaii

Applicant: Dept. of Water Supply
Landowner: Hawaii County

Consultant: SSM Engineers
TMK: 3-9-11-24

Date application received: 10/28/94
✓ Date acknowledged receipt/request more info: NOV - 7 1994
Date filing fee deposited: Not required

✓ Application sent to following:
  ✓ Safe Drinking Water Branch
  ✓ Wastewater Branch
  ✓ Dept. of Health
  ✓ Office of Hawaiian Affairs
  ✓ Dept. of Hawaiian Home Lands
  ✓ State Historic Preservation Div.
  ✓ Sierra Club Legal Defense Fund
  ✓ Honolulu Board of Water Supply
  ✓ Maui Dept. of Water Supply
  ✓ Hawaii Dept. of Water Supply
  ✓ Hawaii Dept. of Public Works
  ✓ Koolauloa No. 28 (Gahu)
  ✓ Additional List (Molokai)
  ✓ Eric Hirano/Lyann Misuno
  ✓ DIV. OF AQUATIC RES.

Date sent
Comments received
NOV - 7 1994

Date agenda due: 2 wks prior mtg.
Date submittal due: 2 wks prior mtg.
Date submittal sent to applicant: 2 wks prior mtg.
Date application approved OR disapproved: Ist mtg. in Jan.
Date applicant notified of decision: 2 wks prior mtg.

Remarks:

Charlie
Map, assign well no. (Pencil in INDEX SUMMARY)

Log in logbook (manual)

Mitch
Log in computer (WELL PERMITS)
June 22, 2000

Ms. Linnel T. Nishioka, Deputy Director
ATTENTION: MR. RYAN IMATA
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

WELL COMPLETION REPORT
OOKALA WELL, WELL NO. [REDACTED]

Enclosed are the signed pump installation permit and the valid (permanent) pump installation report for the subject well for processing. Inadvertently, two pump installation reports were completed and we have retained the invalid one.

If you have any questions, please contact our Water Resources and Planning Branch at 961-8665.

Sincerely yours,

(accountant or manager signature)

GGA:gms

...Water brings progress...
PUMP INSTALLATION PERMIT

Ookala Well, Well No. 6017-05

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 Ookala Well (Well No. 6017-05) at Ookala, North Hilo, Hawaii, TMK 3-9-001:034, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

1. The Chairperson to the Commission on Water Resource Management (Commission), P.O. Box 821, Honokōwai, HI 96785, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and applications shall be allowed to inspect installation activities in accordance with §13-168-15, Hawaii Administrative Rules.

2. The pump installation permit shall be for installation of a 250 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, on forms provided by the Chairperson (attached).

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 authority 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 capacity permitted here or even some lesser amount is guaranteed in the future.

5. The permittee shall complete and submit as-built drawings and Part II - (Permanent) Pump Installation Report of the Well Completion Report (attached) to the Chairperson within sixty (60) days after completion of work.

6. The permittee shall comply with all applicable laws, rules, and ordinances, and non-compliance may be grounds for revocation of this permit.

7. The pump installation permit application is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97).

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 pump installation 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 Chairperson upon a showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Chairperson no later than three (3) months prior to the date the permit expires. If the commencement 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 permittee 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.

Date of Approval: March 7, 1997
Expiration Date: March 7, 1999

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. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day.

Permittee's Signature: [Signature]
Date: 5/25/00

Printed Name: Milton D. Pavao, P.E.
Firm or Title: Department of Water Supply Manager

Installer's Signature: [Signature]
Date: 6/1/2000

Printed Name: G. Dale Strengquist
Firm or Title: Wai`Ea Dewatering Inc.

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachments

USGS
Department of Health/ Safe Drinking Water & Wastewater Branches
20. Pump Installation Company: Wai'eli Drilling & Development
21. Name of person who performed work: Bob Richardson
22. Date Pump Installation Completed: 10/11/96
23. PUMP INSTALLATION
   Pump Type, Make, Serial No.: Crown 6MS
   Capacity: 250 gpm
   Motor type, H.P., Voltage, rpm: Franklin, 60 HP, 480V, 3450 rpm
   Depth of Pump Intake Setting: 662.75 ft. below o ground o well bench mark
   Depth to bottom of airline: 660.06 ft. below o ground o well bench mark
   Pumping Head is 700 ft. Type of flow meter: Turbine which measures in GPM
24. As-built drawings attached? X Yes _ No
25. Other remarks/comments: (see below)

<table>
<thead>
<tr>
<th>Pump Installation Contractor (print)</th>
<th>Wai'eli Drilling &amp; Development</th>
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<tr>
<td>Signature</td>
<td>C-57 Lic. No. C 16543</td>
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<td>Date</td>
<td>3/15/00</td>
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<td>Applicant (print)</td>
<td>Dept. of Water Supply, County of Hawaii</td>
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<td>Signature</td>
<td>Date 03/21/00</td>
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8. (cont'd) DRILLER'S LOG (cont'd):

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Mr. Milton D. Pavao, P.E., Manager  
County of Hawaii  
Department of Water Supply  
25 Aupuni Street  
Hilo, HI 96720

Dear Mr. Pavao:

Well Completion Report for Well No. 6017-05

Thank you for submitting the Well Completion Report Part II for the Ookala Well (Well No. 6017-05).  

We are unclear as to why you have submitted this Well Completion Report at this time. On our letter to you (attached as attachment A), we asked you to send in a signed permit.

For your reference, the following is attached (check copy):

Commission on Water Resource Management

(from: ___________ date: ___________  suspense date: ___________)

TO: BAUER, G.  
CHING, F.  
DANBARA, S.  
FUJII, N.  
HARDY, R.  
HIGA, D.  
HIRANO, E.  
ICE, C.  
IMATA, R.  
JINNAI, R.  
KUNIMURA, I.  

INIT: LUM, A.  
NAKAMA, L.  
NAKANO, D.  
NISHIOKA, L.  
OHYE, M.  
SAKODA, E.  
SUBIA, S.  
SWANSON, S.  
UYENO, D.  
YODA, K.  

PLEASE: See Me  
Review & Comment  
Take Action  
Type Draft  
Type Final  
File  
Xerox __ copies

Looks like they installed pump before permit issued.  
Pump replacement  
ATF?  
EMERGENCY USE FOR ALMOST 4 YEARS?  
1. Are that 10/11/96 date  
2. When pump data in well index came from.
1. **Pump Tests Check (special condition of PIP? Yes/No)**

   Glenn Bauer [initial if yes]

<table>
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<tr>
<th>Yes</th>
<th>No</th>
<th>If no, describe deficiency</th>
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   **Step-Drawdown Test:**
   - acceptable [ ] [ ]
   - followed WCPI Stds [ ] [ ]
   - analysis attached [ ] [ ]
   - proposed pump cap o.k. [ ] [ ]

   **Aquifer Pump Test:**
   - acceptable [ ] [ ]
   - followed WCPI Stds [ ] [ ]
   - T & S analysis attached [ ] [ ]

   **Well Interference:**
   - estimated Steady-State drawdown at 1-mile radius is ______ ft.
   - analysis attached [ ] [ ]

   **Stream Surface Water Impacted:** [ ] [ ] ← If yes, identify most probable stream

2. **Pump Installation Check**

   Mitch Ohye [initial]

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   - data complete [ ] [ ]
   - followed WCPI Stds [ ] [ ]
   - welphys.dbf updated [ ] [ ]
   - welaplic.dbf updated [ ] [ ]
PART II: PERMANENT PUMP INSTALLATION REPORT

20. Pump Installation Company: Wai'eli Drilling & Development

21. Name of person who performed work: Bob Richardson

22. Date Pump Installation Completed: 10/11/96

23. PUMP INSTALLATION

- Pump Type, Make, Serial No.: Crown 6MS
- Capacity: 250 gpm
- Motor type, H.P., Voltage, rpm: Franklin 60 HP, 480V, 3450 rpm
- Depth of Pump Intake Setting: 662.75 ft. below o ground o well bench mark
- Depth to bottom of airline: 660.06 ft. below o ground o well bench mark
- Pumping Head is: 700 ft. Type of flow meter: Turbine which measures in GPM

24. As-built drawings attached? Yes No

25. Other remarks/comments: (see below)

Pump Installation Contractor (print) Wai'eli Drilling & Development C-57 Lic. No. C 16543
Signature Date 3/15/00

Applicant (print) Dept. of Water Supply, County of Hawaii
Signature Date 03/21/00

8. (cont’d) DRILLER’S LOG (cont’d):

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19. & 25. Remarks:

WELL NO. 6017-05 DOKALA
**OOKALA DEEP WELL**

10/11/96 - (DATE INSTALLED BY WAIELE)

Discharge Head Elevation = +640.67 FT

**NOTE:**
- **Pump:**
  - Crown SCR. #4109
  - HP = 60
  - Stages = 15
  - Model = 6MS-250 STD.
  - 700 RT
  - GPM = 250

- **Motor:**
  - Franklin Electric
  - Model = 2366196025
  - RPM = 3450/2875
  - S.F. = 115/110
  - K.V.A. = Code H/F
  - S.F. Max Amps 91.0/96.0
  - Min. Flow Ft./Sec. = .05
  - H.P. = 60 Hz = 60/50 KW = 45
  - Volts = 460/380
  - Amps = 80.5/96
  - Phase = 3
  - Continuous Duty

- **Cable No. 2 Awg**

- **Distance:**
  - 633 FT

- **Airline Submergence:**
  - 27.06 ft.

- **PUMP (AIRLINE SUBMERGENCE = 29.75 ft.):**

- **CROWN 6MS - 15 STAGES**

- **PUMP**
  - 60 HP
  - FRANKLIN
  - MOTOR

- **Static Water Level**
  - EL. +10.6 FT

- **Total Assy. = 667.88 ft.**
  - To Intake = 661.94 ft.
  - To Airline = 660.06 ft.

- **Bottom of Well CASING = EL. -59.65 FT**
  - = EL. -59.65 FT
March 21, 2000

Ms. Linnel T. Nishioka, Deputy Director
ATTENTION: MR. RYAN IMATA
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

WELL CONSTRUCTION / PUMP INSTALLATION
PERMIT, OOKALA WELL NO. 6017-05

We appreciate your cooperation and understanding in expediting the application for the subject well.

If you have any questions, feel free to call Mr. Kenneth Ikemori of our staff at (808) 961-8665.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

KI:.gms
Enc.

...Water brings progress...
SITE NAME: OOKALA DEEPWELL

COMMON NAME: OOKALA DEEPWELL
DISTRICT (OP): HAMAKUA
DISTRICT (ENG): N.HILO
TAX MAP KEY:

MOTOR INFO:
MOTOR MAKE: FRANKLIN
MOTOR MODEL NUMBER: 2366196025
MOTOR SERIAL NUMBER:
HP: 60.0
AMPS: 80.5
VOLTS: 480
MOTOR RPM: 3450
SERVICE FACTOR:
FRAME NUMBER:
RATED EFFICIENCY: 90.00
MOTOR NOTES: S.F. AMPS 91.0

MOTOR UPDATED: 6/29/97

PUMP INFO:
PUMP MAKE: CROWN
PUMP MODEL: 6MS-250 STD
PUMP SERIAL NUMBER: 4190
PUMP RPM:
PUMP EFFICIENCY:
PUMP NOTES: TANK IS ABOUT 300,000 GALLONS

PUMP UPDATED: 6/29/97

Tuesday, June 22, 1999 3:04:14 PM
PUMP INSTALLATION PERMIT

Ookala Well, Well No. 6017-05

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 Ookala Well (Well No. 6017-05) at Ookala, North Hilo, Hawaii, TMK 3-9-001:034, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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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, on forms provided by the Chairperson (attached).

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7. The pump installation permit application is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97).

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9. If the well is not to be used it must be properly capped. If the well is to be abandoned then the permittee 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.

Date of Approval: March 7, 1997
Expiration Date: March 7, 1999

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. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day.

Permittee's Signature: __________________________ Date: 03/21/00

Firm or Title: Department of Water Supply

Printed Name: Milton D. Pavao, P.E., Manager

Installer's Signature: __________________________ Date: 3/15/00

Printed Name: C. Dale Stromquist

Firm or Title: Waie'eli Drilling & Development

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachments

C: USGS
Department of Health/ Safe Drinking Water & Wastewater Branches
DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

Ms. Linnel T. Nishioka, Deputy Director
ATTENTION: MR. RYAN IMATA
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

March 6, 2000

WELL CONSTRUCTION/PUMP INSTALLATION PERMIT
APPLICATION FOR MAKAPALA EXPLORATORY WELL

We appreciate your cooperation and understanding in expediting the application for the subject well. Presently, we are using a USGS observation well with a Department of Health conditional approval until June 30, 2000, to supplement our spring source that presently can barely keep up with current demands.

In answering your point-to-point requirements, the following is our understanding of the five items in your January 5, 2000, memorandum to us:

1. No action is required since the State DLNR has run out of funding and Honokaa Well A (Well No. 6428-01) remains incomplete.
2. Elevation survey of Hawn Well No. 2 (Well No. 7349-01) and its location is attached.
3. Attached is the signed permit for Waiaha Well (Well No. 3857-01).
4. Also attached is the signed permit for Waiaha Well (Well No. 3857-01) abandonment.
5. We have received the pump installation permit for Ookala Well (Well No. 006-145) and will be sending this permit and a well completion report shortly.

If you have any questions, please call Mr. Kenneth Ikemori at 961-8660.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

KI:dms

...Water brings progress...
Mr. Milton Pavao, Manager  
Department of Water Supply  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. Pavao:

Pump Installation Permit  
Ookala Well (Well No. 6017-05)

Enclosed are two (2) originals of your approved Pump Installation Permit for the captioned well(s) which authorizes permanent pump installation work for your well(s). As part of the Chairperson's approval, the following special conditions were added and are part of your permit under Permit Condition 10:

Special Conditions

1. No Special Conditions

The well owner is responsible for all conditions of the permit. This includes ensuring that the pump installation contractor, or other party who installs the pump, submits a completed Part II of the Well Completion Report form (enclosed) within sixty (60) days after the pump installation work is completed. Be advised that you may be subject to fines of up to $1000 per day for any violations of your permit conditions.

Please sign and have the contractor sign both enclosed permit originals and return one for our files.

A copy of the Well Completion Report (Part II) and a copy of your water use report form are enclosed for your use. Except for the monthly water use report form, please provide copies of all the information in this packet to your pump installation contractor.

Attached are comments provided by the Department of Health for your use.

Finally, this letter is notice that we have accepted your Well Completion Report - Part I as complete.

If you have any questions, please call Mr. Ryan Imata of Commission staff at 587-0255 or toll-free at 974-4000, extension 70255.

Aloha,

MICHAEL D. WILSON  
Chairperson

Enclosures
PUMP INSTALLATION PERMIT

Oookala Well, Well No. 6017-05

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Expiration Date: March 7, 1999

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Permittee's Signature: __________________________ Date: __________
Printed Name: __________________________ Firm or Title: __________________________
Installer's Signature: __________________________ Date: __________
Printed Name: __________________________ Firm or Title: __________________________

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachments:
C: USGS
Department of Health/ Safe Drinking Water & Wastewater Branches
DATE: 8/29  TIME: 7:55 PM

TO:

DATE: 8/29  TIME: 7:55 PM

WHILE YOU WERE OUT

Mary Kawasaki

M. WIS - Hawaii County

Phone: 961-8660 (Hilo)

TELEPHONED
PLEASE CALL
WILL CALL AGAIN
URGENT
RETURNED YOUR CALL

06/05 07

0 Kala Wall
<table>
<thead>
<tr>
<th>TO:</th>
<th>INIT.</th>
<th>TO:</th>
<th>INIT.</th>
<th>FOR:</th>
<th>PLEASE:</th>
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<td>CHING, F.</td>
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<td>NAKAMA, L.</td>
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<td>NAKANO, D.</td>
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<td>Information</td>
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<td>OHYE, M.</td>
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<td>SAKODA, E.</td>
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<td>SWANSON, S.</td>
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<td>UWAINE, J.</td>
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<td>JINNAI, R.</td>
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<td>YODA, K.</td>
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<td>KUNIMURA, I.</td>
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</table>

**Question:** 40 oz in cups (or, in ounces?)

**Note:** The text is incomplete and contains a question mark. It appears to be a request for clarification regarding the measurement of liquid volume.
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 Resource Management  

SUBJECT: Well Construction Permit Application  
Ookala Well (Well No. 6017-05)  

Transmitted for your review and comment is a copy of the captioned well application.  

We would appreciate your comments on the captioned application for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by February 28, 1997.  

Please find a map, attached, to locate the proposed well. If you have any questions about this permit application, request additional information, or request additional review time, please contact Mr. Ryan Imata of the Commission staff at 587-0255.  

RESPONSE: (X) Comments attached (please specify relevant DOH rules/regulations and any recommendations on special conditions).  

Contact Person: Kai Kajiwara  
Phone: 586-4294  

Signed: Kai Kajiwara  
Date: 2/25/97
c. Low flow plumbing fixture units shall be required in all buildings.


DOH shall not recommend approval of any subdivision/development request unless the subdivision is for minor purposes such as readjusting lot lines, easements, or other dedicated purposes, will be connected to the public sewers, or will be connected to a private treatment works utilizing total effluent reuse.

B. DOH does not recommend the use of any non-public water well within 1000 feet of any IWS utilizing subsurface disposal systems.

2. Single Family Residential Lot

Section 11-62-31.1(b)(1) allows a single IWS to be utilized for two dwelling units provided that both dwelling units are located on the same single family residential lot. The provision is a modification of earlier provisions which allowed use of a single IWS for "Ohana" dwellings.

As the term "single family residential lot" is not consistent with any county zoning or land use designation, the following zoning designations will be allowed to use the provisions of Section 11-62-31.1(b)(1) provided that all other applicable provisions of Chapter 11-62 are met:

<table>
<thead>
<tr>
<th>County</th>
<th>Zoning</th>
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</thead>
<tbody>
<tr>
<td>Oahu</td>
<td>R20, R10, R7.5, R5, R3.5</td>
</tr>
<tr>
<td>Maui</td>
<td>R1, R2, R3</td>
</tr>
<tr>
<td>Hawaii</td>
<td>RS, RD</td>
</tr>
<tr>
<td>Kauai</td>
<td>R1, R2, R4, R6 - single family/ open/Ag</td>
</tr>
</tbody>
</table>

For property not zoned as listed above, the provisions of Section 11-62-31.1(a)(1) shall not be applicable.

3. Wastewater Disposal within the "No Pass Zone" on Oahu

In areas designated by the Honolulu Board of Water Supply as being the "No-Pass Zone", the Department will continue to uphold higher wastewater disposal requirements. In such areas the following shall apply:

A. Only a single treatment IWS shall be allowed per lot of record in unsewered areas. In sewered areas or areas that are to be sewered as part of the development, no restrictions will apply.
WASTEWATER MANAGEMENT POLICIES
(WMP 2)

INTRODUCTION

The purpose of this document is to provide general policies and guidelines to the Wastewater Branch, Sanitation Branch and District Health Offices (DHO). The document is a result of amendments to Chapter 11-62 becoming effective on August 30, 1991, and over two (2) years of implementation of the cesspool phase-out program.

This document is to be used in addition to the "Wastewater Management Policy (WMP 1)" dated November 5, 1991 and covers areas not specifically covered in Chapter 11-62, and areas in Chapter 11-62 that need further clarification.

GENERAL WASTEWATER STRATEGIES

1. Location of IWS from Drinking Water Wells

Section 11-62 requires a minimum horizontal distance between potable drinking water wells and cesspools, seepage pits or soil absorption systems to be at least 1,000 feet unless otherwise approved by the Director. This section of the rule prohibits construction of new dwellings within this area. However the section does not address existing dwellings or subdivisions within this area, nor does it address building modifications to existing dwellings within this area.

A. The following criteria shall apply to all areas within 1,000 feet of a public potable water well (public is defined as a well with 15 service connections or serving 25 persons) and not connected to a public sewer system:

   1. Lots Created and Recorded Prior to August 30, 1991.

      a. Only one (1) IWS shall be allowed per lot of record. The IWS shall consist of a minimum of an aerobic unit, chlorinator and horizontal soil absorption system, or surface disposal systems such as evapotranspiration systems. The IWS shall be located as far from the well as possible and down gradient of the well if possible;

      b. For existing dwellings and structures, Section 11-62-06(l) shall apply with the exception that for any building modification, the existing wastewater system must be upgraded to a system consisting of a minimum of an aerobic unit, chlorinator and horizontal soil absorption system; and
§11-62-32

§11-62-32 Spacing of individual wastewater systems. No individual wastewater system shall be located at any point having less than the minimum distances indicated in Table II unless otherwise approved by the director. The minimum distances indicated in Table II shall be measured from the outer edge of each item.


<table>
<thead>
<tr>
<th>Minimum Horizontal Distance From</th>
<th>Cesspool (ft)</th>
<th>Treatment Unit (ft)</th>
<th>Seepage Pit (ft)</th>
<th>Soil Absorption System (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall line of any structure or building</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Property line</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Stream, the ocean at the vegetation line, pond or lake</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Large trees</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Seepage pit</td>
<td>18</td>
<td>5</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>Cesspool</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potable Drinking Well</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>
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 Resource Management

SUBJECT: Well Construction Permit Application
         Ookala Well (Well No. 6017-05)

Transmitted for your review and comment is a copy of the captioned well application.

We would appreciate your comments on the captioned application for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by February 28, 1997.

Please find a map, attached, to locate the proposed well. If you have any questions about this permit application, request additional information, or request additional review time, please contact Mr. Ryan Imata of the Commission staff at 587-0255.

RI:ss
Attachment(s)

RESPONSE: ( ) Comments attached (please specify relevant DOH rules/regulations and any recommendations on special conditions)

Contact Person: Bill Wong
Phone: 5864258

Signed: Bill Wong
Date: 2/24/97
Mr. Milton D. Pavao, Manager  
County of Hawaii  
Department of Water Supply  
25 Aupuni Street  
Hilo, HI 96720  

Dear Mr. Pavao:  

Pump Installation Permit Application for Well No. 6017-05  

We acknowledge receipt, on February 12, 1997, of your completed well construction/pump installation permit application for the Ookala Well (Well No. 6017-05). You can expect your application to be processed within ninety (90) days from this date. 

If you have any questions about your permit application, please contact Mr. Ryan Imata of the Commission staff at 587-0255. 

Sincerely,  

RAE M. LOUI  
Deputy Director  

RI:ss
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 Resource Management

SUBJECT: Well Construction Permit Application  
Ookala Well (Well No. 6017-05)

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We would appreciate your comments on the captioned application for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by February 28, 1997.

Please find a map, attached, to locate the proposed well. If you have any questions about this permit application, request additional information, or request additional review time, please contact Mr. Ryan Imata of the Commission staff at 587-0255.

RI:ss  
Attachment(s)  

RESPONSE: ( ) Comments attached (please specify relevant DOH rules/regulations and any recommendations on special conditions)

Contact Person: _________________________  
Phone: _________________________

Signed: _________________________  
Date: _________________________
February 4, 1997

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

OOKALA WELL (WELL NO. 6017-05)
PUMP INSTALLATION PERMIT

To complete your files, we are enclosing the submit permit which has been signed by the well owner and the landowner. The previous permits for the well construction and pump installation were signed by the contractor, Wai'eli Drilling & Development.

The contract for the completion of the Ookala Production Well and supporting facilities was awarded by our Water Commission on January 28, 1997, to Island Contracting, Inc. Notice to proceed is anticipated to be issued within two months.

Milton D. Pavao, P.E.
Manager

GK:.gms

copy - SSFM Engineers, Inc.

...Water brings progress...
APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
       Firm/Name: Dept. of Water Supply, County of Hawaii
       Contact Person: Milton Pavao
       Ph: 961-8660
       Address: 25 Auapuni Street
       Hilo, Hawaii 96720
   (b) LANDOWNER
       Firm/Name: County of Hawaii
       Contact Person: Gary Kamesaka
       Ph: 961-8660
       Address: 25 Auapuni Street
       Hilo, Hawaii 96720

   (c) CONTRACTOR
       Firm/Name: Waiale Drilling & Development
       Contractor's C-57 License No: C-16543
       Address: ____________________________

2. WELL LOCATION/NAMESPACE: Ookala Production Well
   Island: Hawaii
   Address: Ookala, North Hilo
   Tax Map Key: 3-9-1: 34

   (Attach a USGS map, scale 1:2,000, and a property tax map showing well location referenced to established property boundaries.)

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

   (b) WELL TYPE:
       [ ] Dug
       [ ] Bored
       [ ] Driven
       [ ] Drilled
       [ ] Radial
       Is this well a 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: 250 gallons per minute
   Pump Type:
   [ ] Deep Well Turbine
   [ ] Submersible
   [ ] Rotary
   [ ] Rotary-Displacement
   [ ] Centrifugal
   [ ] Rotary-Gear
   Motor:
   [ ] Propeller
   [ ] Reciprocating
   [ ] Impulse
   [ ] Electric, rated horsepower of: 60 HP

5. PROPOSED USE:
   [ ] Municipal (including hotels, stores, etc.)
   [ ] Military
   [ ] Domestic (individual, noncommercial water sys.)
   [ ] Industrial
   [ ] Irrigation (crop)
   [ ] Other (explain)
   State Land Use District:
   [ ] Urban
   [ ] Agriculture
   [ ] Rural
   [ ] Conservation
   County Zoning (describe)
   (If more space is needed, continue below under remarks, explanations.)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: 33,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
       [ ] Flow-meter
       [ ] Open-pipe
       [ ] Office Plate
       [ ] Weir

7. PENDING ACTIONS:
   [ ] COUA
   [ ] SMA
   [ ] EIS
   [ ] EA
   [ ] NONE
   [ ] Other (explain)

8. REMARKS, EXPLANATIONS:
   (If more space is needed, continue on back)

Owner:
Dert. of Water Supply
County of Hawaii

Landowner:
County of Hawaii

Contractor:

Signature:

Date:

November 27, 1996

Requested Date:

[ ] Official Use Only:

Received: ______________________

Accepted: ______________________

Checked By: ______________________

Latitude: ______________________

Longitude: ______________________

Aquifer System Name: [

State Well No.: [621. Honolulu, Hawaii 96809.]

5/24/92 WCR For
As-Built Dimensions of the
Ookala Exploratory Well, State No. 6017-05

Source:
Pump test results for Ookala
Exploratory Well
State No. 6017-05
Tom Nance Water Resource Engineering
June 1995
Commission on Water Resource Management

From: [Redacted]  Date: 1/3/97  Suspense Date: [Redacted]

To: Bauer, G.  Init: [Redacted]  To: Loui, R.  Init: [Redacted]
   Ching, F.  Init: [Redacted]  To: Nakama, L.  Init: [Redacted]
   Fujii, N.  Init: [Redacted]  To: Nakano, D.  Init: [Redacted]
   Hardy, R.  Init: [Redacted]  To: Ohye, M.  Init: [Redacted]
   Higa, D.  Init: [Redacted]  To: Sakoda, E.  Init: [Redacted]
   Hirano, E.  Init: [Redacted]  To: Subia, S.  Init: [Redacted]
   Ice, C.  Init: [Redacted]  To: Swanson, S.  Init: [Redacted]
   Imata, R.  Init: [Redacted]  To: Uwaine, J.  Init: [Redacted]
   Jinnai, R.  Init: [Redacted]  To: Yoda, K.  Init: [Redacted]

Please: Approval  Signature  Information
         See Me  Review & Comment  Take Action  Type Draft  Type Final
         File  Xerox ___ copies

[Handwritten note: Ryan, typical soil engineering report for info & file. It should
suffice for our well completion report permit requirements. Unless noted, please check nothing missing.
2. We should request back of FIP has been issued yet.]

Vol. 40 No. 41
(HP, Suno)
January 24, 1997

The Honorable Michael D. Wilson  
Chairman of the Board  
ATTN: RAE LOUI  
Department of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, HI 96813

Dear Mr. Wilson:

SUBJECT: PROPOSED SOURCE OF POTABLE WATER

Enclosed for your review and comments is a copy of the engineering report for the following source:

Ookala Well  
State Well No. 8-6017-05  
Ookala, Hawaii

This report has been prepared pursuant to Hawaii Administrative Rules, Title 11, Chapter 20, Rules Relating to Potable Water Systems, section 11-20-29.

The Department of Health will use your comments in determining the potential impacts which may result by the proposed project.

Please submit your comments to the Safe Drinking Water Branch within 30 days from the date of this letter. You may also return the engineering report to this office if you do not need it for future reference.

If you should have any questions, please call the Safe Drinking Water Branch, Engineering Section at 586-4258.

Sincerely,

THOMAS E. ARIZUMI, P.E., Chief  
Environmental Management Division

OK:la

Enclosure
Mr. Milton D. Pavao, P.E., Manager
Department of Water Supply
25 Aupuni Street
Hilo, HI 96720

Dear Mr. Pavao:

Ookala Well, Well No. 6017-05

This is in response to your November 27, 1996 submission of 1) information on Part II of Well Completion Report Form; and 2) plans for permanent pump installation.

Regarding item 2) above, it is our understanding that the temporary pump that is currently installed will be left for permanent usage to supplement existing water sources.

By this letter, your submission fulfills our requested information with respect to the temporary pump installation. However, your pump installation permit application is incomplete, pending the landowner's signature. We are enclosing your application for completion.

If you have any questions, please contact Ryan Imata at 587-0255.

Sincerely,

RAE M. LOUI
Deputy Director

RI:ss
Attachment
PART II. \(\text{(PERMANENT) PUMP INSTALLATION REPORT}\)

20. Pump Installation Company: Wai'eli Drilling & Development

21. Name of person performing work: Dale Stromquist

22. Date Pump Installation Completed: October 11, 1996

23. PUMP INSTALLATION:
   - Submersible
   - Pump Type, Make, Serial No.: Crown 6M-250, 15 Stage, SN#4109
   - Capacity: 250 gpm
   - Motor type, H.P., Voltage, rpm: Franklin 60HP, 480 Volt 1770 RPM
   - Depth of Pump Intake Setting: 662.75 ft. below Surface, which elevation is -19.15 ft.
   - Depth to bottom of airline: 660.9 ft. below Surface, which elevation is -17.3 ft.
   - Pumping Head is 700 ft.
   - Type of flow meter: Turbine which measures in GPM

24. As-built drawings attached: Yes ___ No ___

25. Other remarks/comments: (See below)

8.(cont'd) DRILLER'S LOG (cont'd):

<table>
<thead>
<tr>
<th>Water Level</th>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
<th>Water Level</th>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
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19. & 25. Remarks:

\[\text{WAI 6017-09 OOKUN EXP.}\]
**WELL COMPLETION REPORT**

3/20/96 WCR Form

(Check Appropriate Box)  □ Well Construction  □ (Permanent) Pump Installation

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 621, Honolulu, Hawaii 96809. 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 1-800-468-4644 Extension 70225.

<table>
<thead>
<tr>
<th>WELL CONSTRUCTION REPORT</th>
</tr>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>1. State Well No.: 6017-05</td>
</tr>
<tr>
<td>2. Location/Address:</td>
</tr>
</tbody>
</table>

PART I.

3. Drilling Company: ____________________________

4. Name of driller who performed work: ____________________________

5. Type of rig/construction: ____________________________

6. Date(s) Well Construction and pump tests (if any) completed: ____________________________

7. GROUND ELEVATION (referenced to mean sea level, msl): _______ ft.
   
   Well Bench Mark (description/location): ______________
   
   Elevation(msl): _______ ft.

8. DRILLER'S LOG: Please attach geologic log (if available or if required by permit)
   
   Depths (ft.) Rock Description, Water Level, Dates, etc. ____________________________
   
   Depths (ft.) Rock Description, Water Level, Dates, etc. ____________________________
   
   (If more space is needed, continue on back.)

9. Total depth of well below ground: _______ ft.

10. Hole size: _______ inch dia. from _______ ft. to _______ ft. below ground

    _______ inch dia. from _______ ft. to _______ ft. below ground

    _______ inch dia. from _______ ft. to _______ ft. below ground

11. Casing installed: _______ in. I.D. x _______ in. wall solid section to _______ ft. below ground

    _______ in. I.D. x _______ in. wall perforated section to _______ ft. below ground

    Casing Material/Slot Size: ____________________________

12. Annulus: Grouted from _______ ft. below ground to _______ ft. below ground

    Gravel packed from _______ ft. below ground to _______ ft. below ground

13. Initial water level: _______ ft. below ground. Date and time of measurement: ____________________________

14. Initial chloride: _______ ppm Date and time of sampling: ____________________________

15. Initial temperature: _______ °F Date and time of measurement: ____________________________

16. PUMPING TESTS: Reference Point (R.P.) used: ____________________________, which elevation is _______ ft.

   (1) Step-Drawdown Test Date ____________________________

   Start water level _______ ft. below R.P.

   End water level _______ ft. below R.P.

   (2) Long-term Aquifer Test Date ____________________________

   Start water level _______ ft. below R.P.

   End water level _______ ft. below R.P.

17. Aquifer Pump Test Procedures data & graphs (1/9/96 LTAT Form) attached? _ Yes _ No

18. As-built drawings attached attached? _ Yes _ No

19. Other remarks/comments: (On back of this form)

   ____________________________

   Well Drilling Contractor (print)

   C-57 Lic. No. ____________________________

   Signature ____________________________

   Date ____________________________

   Surveyor (print) ____________________________

   Lic. No. ____________________________

   Signature ____________________________

   Date ____________________________

   Applicant (print) ____________________________

   Signature ____________________________

   Date ____________________________
APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
      Firm/Name: Dept. of Water Supply, County of HI
      Contact Person: Milton Poon
      Phone: 961-8660
      Address: 25 Aupuni Street
              Hilo, Hawaii 96720
   (b) LANDOWNER
      Firm/Name: County of Hawaii
      Contact Person: Cary Kawasaki
      Phone: 961-8660
      Address: 25 Aupuni Street
              Hilo, Hawaii 96720
   (c) CONTRACTOR
      Firm/Name: Waiakea Drilling & Development
      Contractor’s C-67 License No.: C-16543

2. WELL LOCATION/NAME: Ookala Production Well
   Address: Ookala, North Hilo
   Tax Map Key: 3-9-1: 34

3. (a) PROPOSED WORK:
      (1) Drill New Well
      (2) Modify Existing Well
      (3) Install New Pump
      (4) Replace Pump
      (5) Modify Pump
      (b) WELL TYPE:
      (1) Dug
      (2) Bored
      (3) Driven
      (4) Dilled
      (5) Radial

4. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: 250 gallons per minute
   Pump Type:
   (1) Deep Well Turbine
   (2) Submersible
   (3) Centrifugal
   Motor:
   (1) Diesel
   (2) Gas
   (3) Electric, rated horsepower of 60 HP

5. PROPOSED USE:
   (1) Municipal (including hotels, stores, etc.)
   (2) Domestic (individual, noncommercial water use)
   (3) Irrigation (crop)
   State Land Use District:
   (1) Urban
   (2) Agriculture
   (3) Rural
   (4) Conservation
   County Zoning (describe):

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: 33,000 gallons per day
    (b) METHOD OF FLOW MEASUREMENT:
    (1) Flow-meter
    (2) Open-pipe
    (3) Office Plate
    (4) Weir

7. PENDING ACTIONS:
   (1) CDUA
   (2) SMA
   (3) EIS
   (4) EA
   (5) NONE
   (6) Other (explain)

8. REMARKS, EXPLANATIONS:

   (If more space is needed, continue below under remarks, explanations.)

   (If more space is needed, continue on back)

   Owner: Dept. of Water Supply
   County of Hawaii

   Landowner: County of Hawaii

   Contractor: County of Hawaii

   Date: November 27, 1996

   Signature

   Date

   Signature

   Date

   (If Official Use Only:)
   Date Received
   Date Accepted
   Field Checked By
   Date
   Longitude
   Latitude
   Aquifer System Name
   State Well No.
As-Built Dimensions of the
Ookala Exploratory Well, State No. 6017-05

Source:
Pump test results for Ookala Exploratory Well
State No. 6017-05
Tom Nance Water Resource Engineering
June 1995
November 27, 1996

Ms. Rae M. Loui, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

OOKALA WELL (EMERGENCY USE)
WELL NO. 6017-05

We had written to your office earlier regarding the emergency source situation for our Ookala Water System. We appreciate receiving, on short notice, the conditional approvals for the use of the Ookala Well.

We are aware that our request for the preactivation of this Ookala Well still requires our department to file the required documents. We are enclosing the following simultaneous documents for your favorable approval:

1) Well Completion Report
   (a) We have completed the Part II portion for the (Permanent) Pump Installation Report.
   (b) This deepwell pump unit, which was installed by Wai'eli Drilling & Development, is being operated by us on a temporary basis. This pump unit will be left in place and used for our permanent production well project. We will be advertising for bids right away.

2) Application for Permit (Pump Installation)

   In summarizing our previous discussion for the previous document (Well Completion Report), the deepwell pump unit which has already been installed and operating temporarily will be used for the permanent production well project.

We thank you for your time and effort to support this emergency project. If there are any questions, please contact Mr. Gary Kawasaka at 961-8660 or by fax at 961-8657.

Milton D. Pavao, P.E.
Manager

GK:dms
Encs.

copy - Mr. Ed Iida, SSFM Engineers, Inc.

...Water brings progress...
Mr. Milton Pavao, P.E., Manager  
Department of Water Supply  
County of Maui  
25 Aupuni St.  
Hilo, HI  96720  

Dear Mr. Pavao:

Emergency Pump Installation for Ookala Well (Well No. 6017-05)

Thank you, again, for your second notification of the emergency need to install a 250 gpm, rather than the previously specified 300 gpm, pump to relieve the situation caused by the breakdown of the Ookala Shaft (Well No. 6117-01) source. This letter reiterates our September 4, 1996 response to you.

We understand that the deep well pump to be installed is temporary and is an emergency that is not provided for under our current administrative rules. Given these circumstances, a pump installation permit is not required but we request that:

1. You provide the completed emergency work information on Part II of the attached Well Completion Report Form.

2. Provide us with your plans, including any timelines, for installing a permanent pump in Well No. 6017-05 which will require a pump installation permit.

If you have any questions, please contact Roy Hardy at 587-0274 or toll-free at 984-2400, extension 70274.

Sincerely,

RAE M. LOUI  
Deputy Director

RH:ss  
Attachment
October 8, 1996

Ms. Rae M. Loui, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

OOKALA WELL (WELL NO. 6017-05)

The sole water source (Ookala Shaft) serving the Ookala residents has been deemed inoperable. We are pursuing, under emergency provision, the installation of a temporary diesel driven deepwell pump unit for our existing Ookala Well. The pump size is 250 GPM and the estimated pumpage is 60,000 GPD.

We are requesting for your immediate concurrence to install the deepwell pump unit and to operate the Ookala Well under temporary emergency status.

If there are any questions, please call Mr. Gary Kawasaka at (808) 961-8660 or by fax at (808) 961-8657.

Milton D. Pavao, P.E.
Manager

GK: cmk

...Water brings progress...
TO

DATE  09/09/96  TIME

WHILE YOU WERE OUT

M  

of  

Phone

<table>
<thead>
<tr>
<th>TELEPHONED</th>
<th>PLEASE CALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALLED TO SEE YOU</td>
<td>WILL CALL AGAIN</td>
</tr>
<tr>
<td>WANTS TO SEE YOU</td>
<td>URGENT</td>
</tr>
<tr>
<td>RETURNED YOUR CALL</td>
<td></td>
</tr>
</tbody>
</table>

Message

[Handwritten text]

Operator
To: Ms. Rae M. Loui, Deputy Director
   Commission on Water Resource Mgmt.

Date: October 8, 1996
Subject: Ookala Well

ATTENTION: ____________________________

We are transmitting 2 pages including this cover sheet.

X The original to follow through U.S. Postal Service.

___ The original to be provided upon your request.

Remarks: __________________________________________________________

_________________________________________________________________

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL US (808) 961-8660

**********************************************************************

...Water brings progress...
August 30, 1996

Ms. Rae M. Loui, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
1151 Punchbowl Street
Honolulu, HI 96813

OOKALA WELL (WELL NO. 6017-05)
OOKALA, NORTH HILO, HAWAII
TAX MAP KEY 3-9-1:34

We are preparing to utilize the existing Ookala Well on an emergency basis. The shaft pumping unit at the sole source (Ookala Shaft) has malfunctioned. The cause of this breakdown is under investigation.

On a temporary basis, we have been hauling water to service the area residents. It appears that we will need to immediately activate our existing Ookala Well through the installation of a temporary deepwell pumping unit. This will be done through procurement of services under emergency provisions.

We are looking for a pumping unit of 300 GPM. If required by your office, we will submit, when the information is available, Part II of the Application for Pump Installation Permit.

Your expeditious concurrence is requested. If there are any questions, please call Mr. Gary Kawasaka. For your information, effective July 31, 1996, our new telephone number is 961-8660 and fax number is 961-8657.

Milton D. Pavao, P.E.
Manager

GK: cmk

...Water brings progress...
WELL COMPLETION REPORT

1. STATE WELL NO: 6017-05  
   WELL NAME OOKALA EXPLORATORY ISLAND HAWAII

2. LOCATION: Address NORTH HILO, COUNTY OF HAWAIITax Map Key 3-9-01:34

3. DRILLING OR PUMP INSTALLATION CONTRACTOR WAI'ELLI DRILLING & DEVELOPMENT

4. CONTRACTOR'S C-67 LICENSE NUMBER C-16543

5. NAME OF DRILLER WHO PERFORMED WORK JACK LINDEBERG

6. TYPE OF RIG/CONSTRUCTION ROTARY

7. DATE OF WELL DRILLING COMPLETION 10/31/95

(NOTE: Report must be submitted within 30 days after this date)

8. GROUND ELEVATION (msl) 640.67' ft.

   Top of Drilling Platform (msl) 646.67 ft.

   Height of Drilling Platform above Ground surface 6 ft.

   Bench Mark and Method Used to Determine Ground Elevation

9. DRILLER'S LOG:

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
<th>Water Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 107</td>
<td>hard</td>
<td>644 to 700 mixed soft/hard</td>
</tr>
<tr>
<td>107 to 184</td>
<td>mostly soft</td>
<td></td>
</tr>
<tr>
<td>184 to 256</td>
<td>soft/hard</td>
<td></td>
</tr>
<tr>
<td>256 to 390</td>
<td>mixed soft/hard</td>
<td></td>
</tr>
<tr>
<td>390 to 633</td>
<td>mixed soft/hard</td>
<td></td>
</tr>
<tr>
<td>633 to 664</td>
<td>hard</td>
<td></td>
</tr>
</tbody>
</table>

(If more space is needed, continue on back.)

10. TOTAL DEPTH OF WELL BELOW GROUND 700.32 ft.

11. HOLE SIZE: 18 inch dia. from 0 ft. to 700.32 ft. below ground

   Inch dia. from 700.32 ft. to 700.32 ft. below ground

   Inch dia. from 700.32 ft. to 700.32 ft. below ground

12. CASING INSTALLED:

   12 in. I.D. x 312 in. well solid section to 636.66 ft. below ground

   12 in. I.D. x 312 in. well perforated section to 669.66 ft. below ground

   Type of Perforation 1/2" std flo pattern

13. ANNULUS:

   Groufed from 600' ft. below ground to surface ft. below ground

   Gravel packed from 625' ft. below ground to 700.32' ft. below ground

14. INITIAL WATER LEVEL 633 ft. below ground. Date and time of measurement 5/17/95 2pm

15. INITIAL CHLORIDE 10 ppm Date and time of sampling 6/16/95 9am

16. INITIAL TEMPERATURE 168°F Date and time of sampling 6/16/95 9am

17. DATE OF PUMP INSTALLATION N/A

18. PUMP INSTALLATION:

   Pump Type, Make, Serial No. Capacity gpm

   Motor type, H.P., Voltage, rpm

   Depth of Pump Intake Setting ft. below which elevation is ft.

   Depth of bottom of airline ft. below which elevation is ft.

   Pumping Head is ft.

19. PUMPING TESTS:

   Reference Point (R.P.) used: mark on casing which elevation is 640.67 ft.

   Date 6/12/95

   Start water level 635.72 ft. below R.P. Start water level ft. below R.P.

   End water level 636.73 ft. below R.P. End water level ft. below R.P.

   Depth of well 700.32 ft. below R.P. Depth of well ft. below R.P.

   Elapsed Time (hours) Rate (gpm) Draw-down (ft.) Temp. °F
   1 120 500 1.61 10 68
   2 120 500 1.61 10 68
   3 120 500 1.61 10 68
   4 120 500 1.61 10 68
   5 120 500 1.61 10 68
   6 120 500 1.61 10 68
   7 120 500 1.61 10 68
   8 120 500 1.61 10 68
   9 120 500 1.61 10 68
   10 120 500 1.61 10 68

   (If more space is needed, continue on back.)

   Remarks:

   (If more space is needed, continue on back.)

Contractor (print) Wrap'elli Drilling & Development Title Managing Partner

Signature Dale Stickmogist Date November 7, 1995

For Official Use

Job Name 6017-05

Well No 6017-05

Longitude 155 17 14

Latitude 20 00 48
November 15, 1995

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

DWS JOB NO. 93-580, OOKALA EXPLORATORY WELL
STATE WELL NO. 6017-05, WELL COMPLETION REPORT

Enclosed is the Well Completion Report for the subject project.

Please call our Engineering Division at (808) 969-1421 if you have any questions.

Milton D. Pavao, P.E.
Manager

Enc.

copy - (w/o enc.) Wai'eli Drilling & Development
"THEIS DRAWDOWN CALCULATION" by Glenn Bauer & Roy Hardy with numerical approximations by Huntoon (1980)

FILE NAME = Ookala Well No. 6017-05
TEST NAME = Long Term Test
DATE = June 12-17, 1995

INPUT PARAMETERS GREEN VALUES

| Transmissivity | T = 474,239.00 ft.^2/day |
| Storage Coeff. | S = 0.100 dimensionless |
| Time | t = 5 days |
| Pumping Rate | Q = 90,481.28 cubic ft/day |

Aquifer thickness b = 400 ft.
Hydraulic Conductivity K = 1,185.6 ft/day
Pumping rate Q = 470 gpm

PARAMETERS GREEN VALUES

<table>
<thead>
<tr>
<th>R from well r ft.</th>
<th>u</th>
<th>W(u)</th>
<th>Drawdown s</th>
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<tr>
<td>1</td>
<td>0.000000</td>
<td>17.791</td>
<td>0.270</td>
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<tr>
<td>10</td>
<td>0.000001</td>
<td>13.185</td>
<td>0.200</td>
</tr>
<tr>
<td>50</td>
<td>0.000026</td>
<td>9.967</td>
<td>0.151</td>
</tr>
<tr>
<td>100</td>
<td>0.000105</td>
<td>8.580</td>
<td>0.130</td>
</tr>
<tr>
<td>250</td>
<td>0.000659</td>
<td>6.748</td>
<td>0.102</td>
</tr>
<tr>
<td>500</td>
<td>0.002636</td>
<td>5.364</td>
<td>0.081</td>
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<tr>
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<td>0.010543</td>
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<tr>
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<tr>
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<td>2.630</td>
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<tr>
<td>2500</td>
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<td>2.207</td>
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<tr>
<td>3000</td>
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<td>1.871</td>
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<tr>
<td>5000</td>
<td>0.263580</td>
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<tr>
<td>10000</td>
<td>1.054321</td>
<td>0.200</td>
<td>0.003</td>
</tr>
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</table>

OBSERVATION WELL
Radial distance r from pumping well 1000 ft. (Well No. 6017-04)

<table>
<thead>
<tr>
<th>Time, t (days)</th>
<th>year</th>
<th>u</th>
<th>W(u)</th>
<th>Drawdown s</th>
</tr>
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<tbody>
<tr>
<td>0.1</td>
<td>0.00</td>
<td>0.527160</td>
<td>0.528</td>
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<td>1</td>
<td>0.00</td>
<td>0.052716</td>
<td>2.418</td>
<td>0.037</td>
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<tr>
<td>2</td>
<td>0.01</td>
<td>0.026358</td>
<td>3.085</td>
<td>0.047</td>
</tr>
<tr>
<td>3</td>
<td>0.01</td>
<td>0.017572</td>
<td>3.482</td>
<td>0.053</td>
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<tr>
<td>4</td>
<td>0.01</td>
<td>0.013179</td>
<td>3.765</td>
<td>0.057</td>
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<tr>
<td>5</td>
<td>0.01</td>
<td>0.010543</td>
<td>3.986</td>
<td>0.061</td>
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<td>6</td>
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<tr>
<td>7</td>
<td>0.02</td>
<td>0.007531</td>
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<tr>
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<td>2.74</td>
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<td>200,000</td>
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<td>14.572</td>
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</table>

Theoretical drawdown a mile (5,280 ft) from the pumping well when u <= 0.01

T = 474,239 ft^2/day
Sp. yield = 0.1
T = 1000 days
s = 0.09 ft.
STEP-DRAWDOWN ANALYSIS

By Glenn Bauer

NAME OF WELL: Ookala Well No. 6017-05
DATE OF TEST: June 7, 1995
DATE OF ANALYSIS: March 4, 1995

<table>
<thead>
<tr>
<th>s (ft)</th>
<th>GPM</th>
<th>s/Q</th>
<th>Regression Output:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.58</td>
<td>255</td>
<td>0.0023</td>
<td>Constant 0.001592 = b</td>
</tr>
<tr>
<td>0.85</td>
<td>342</td>
<td>0.0025</td>
<td>Std Err of Y Est 4.1E-05</td>
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<tr>
<td>1.23</td>
<td>438</td>
<td>0.0028</td>
<td>R Squared 0.982228</td>
</tr>
<tr>
<td>1.31</td>
<td>460</td>
<td>0.0028</td>
<td>No. of Observations 5</td>
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<tr>
<td>1.43</td>
<td>497</td>
<td>0.0029</td>
<td>Degrees of Freedom 3</td>
</tr>
</tbody>
</table>

x Coefficient(s) 2.7E-06
Std Err of Coef. 2.1E-07

Drawdown(tot) = Drawdown(aq.) + Drawdown(well)

s = bQ + cQ^2

if Q = 497 gpm
bQ = 0.791 calc. s = 1.453 ft.
cQ^2 = 0.062
L = 54.46 PERCENT OF HEAD LOSS = LAMINAR FLOW

adjusted drawdown using L @ 497 gpm 0.79 ft.

Polubarinova-Kochina Eq.

Adjusted "s" using constant "b"

K = Qln(1.6L/r)/(2piLs) = 1,542 ft/d
L = length of open interval in well = 67 ft
r = radius of well in ft. = 0.50 ft
s = drawdown in well adjusted for well loss = 0.79 ft
Q = pumping rate in cu. ft./d = 95,679 cu. ft./d
h = water level = 8
b = thickness of aquifer (41*h) = 308 ft
T = transmissivity = k*b = 474,239 ft^2/d

SPECIFIC CAPACITY Q/s = FOR ANY Q

Q = 497 gpm
Q/s = 585 GAL/FT OF DD

Notes: Thickness of aquifer is assumed to be: 308 ft.
Mr. Michael D. Wilson, Chairperson  
Commission of Water Resource Management  
State of Hawaii  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

OOKALA EXPLORATORY WELL CONSTRUCTION PERMIT (WELL NO. 6017-05)  
OOKALA, NORTH HILO, HAWAII

Enclosed is a signed copy of the Well Construction Permit for the subject well.

Milton D. Pavao, P.E.  
Manager  
KYI  
Enclosure

...Water brings progress...
TO: Hawaii Department of Water Supply
25 Aupuni Street
Hilo, HI 96720

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to construct and test Ookala Exploratory Well (Well No. 6017-05) is approved subject to the following conditions:

STANDARD WELL CONSTRUCTION PERMIT CONDITIONS

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

2. The well construction permit shall be for construction and testing of the well only. The applicant shall coordinate with the Commission and conduct a pumping test in accordance with the attached protocol. A one-inch diameter (minimum) galvanized pipe shall be permanently installed, in a manner acceptable to the Commission, to accurately record water levels. No permanent pump may be installed and no water used from the well without first obtaining a pump installation permit from the Commission.

3. 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 and test the well shall not constitute a determination of correlative water rights.

4. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   a. Well completion report.
   b) Elevation (referenced 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.
5. The applicant shall comply with all applicable laws, rules, and ordinances.

6. The well construction permit application and staff submittal approved by the Commission at its January 25, 1995 meeting are incorporated into the permit by reference.

7. The permit may be revoked if work is not started within six (6) months after the date of issuance 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.

Michael D. Wilson, Chairperson
Commission on Water Resource Management
MAR 16 1995
Date of Issuance

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: 3/21/95

Printed Name: Milton D. Pavao

Firm or Title: Manager

Please sign 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 Branch
Ground Water Protection Program
Wastewater Branch
WELL CONSTRUCTION PERMIT

for

Ookala Exploratory Well
(Well No. 6017-05)
Ookala, North Hilo, Hawaii

TO: Hawaii Department of Water Supply
25 Aupuni Street
Hilo, HI 96720

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to construct and test Ookala Exploratory Well (Well No. 6017-05) is approved subject to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. The applicant shall coordinate with the Commission and conduct a pumping test in accordance with the attached protocol. A one-inch diameter (minimum) galvanized pipe shall be permanently installed, in a manner acceptable to the Commission, to accurately record water levels. No permanent pump may be installed and no water used from the well without first obtaining a pump installation permit from the Commission.

3. 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 and test the well shall not constitute a determination of correlative water rights.

4. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   a. Well completion report.
   b. Elevation (referenced 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.
5. The applicant shall comply with all applicable laws, rules, and ordinances.

6. The well construction permit application and staff submittal approved by the Commission at its January 25, 1995 meeting are incorporated into the permit by reference.

7. The permit may be revoked if work is not started within six (6) months after the date of issuance 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.

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management
MAR 16 1995
Date of Issuance

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 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 Branch
    Ground Water Protection Program
    Wastewater Branch
MEMORANDUM

TO: Rae M. Loui, Deputy Director
Commission on Water Resource Management

FROM: Don Hibbard, Administrator
State Historic Preservation Division

SUBJECT: Ookala Exploratory Well
Ookala, North Hilo, Island of Hawaii
TMK: 3-9-1:34

We have no records of historic sites on this parcel. The probability of significant historic sites existing on this property is extremely low because it is old sugarcane cropland. We thus believe that the proposed exploratory well will have "no effect" on significant historic sites.

PM: amk
Ms. Donna Fay K. Kiyosaki
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Ms. Kiyosaki:

Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by November 22, 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI
Deputy Director

---

Response:

- ( ) We have no objections
- ( ) Not subject to our regulatory authority and permit
- ( ) Comments attached
- ( ) Additional information requested
- ( ) Extended review period requested

Contact Person: Ed Yoshida
Phone: 961-8327

Signed: [Signature]
Date: 11/15/94
TO: Dr. Don Hibbard, Director
Historic Preservation Program

Mr. Henry M. Sakuda, Administrator
Division of Aquatic Resources

FROM: Rae M. Loui, Deputy Director
Commission on Water Resource Management

SUBJECT: Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by NOV 22 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Response:

( ) We have no objections
( ) Not subject to our regulatory authority and permit
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: ___________________________ Phone: _____________
Signed: ___________________________ Date: 11/14/94
MEMORANDUM

TO: Rae M. Loui, Deputy Director
    Commission on Water Resource Management

FROM: Henry Sakuda, Administrator
       Division of Aquatic Resources

SUBJECT: Comments on Well Construction and Pump Installation Permit Applications for Kapaa-Peralta Well No. 0519-03, Kauai, Well and Pump; Kapaa-Sams Well No. 0519-02, Kauai, Well and Pump; Ookala Exploratory Well No. 6017-05, Hawaii, Well Construction

Kapaa-Peralta Well No. 0519-03

The application by Ray M. Peralta is for an approximately 120-foot deep well located above Kapaa near the origin of the Moikeha Canal. Between 1,500 and 2,000 gallons of water will be pumped per day for domestic use. We have no objections.

Kapaa-Sams Well No. 0519-02

The application by Neil Sams is for an approximately 120-foot deep well located above Kapaa near the origin of the Moikeha Canal. Between 500 and 1,000 gallons of water will be pumped per day for domestic use. We have no objections.

Ookala Exploratory Well No. 6017-05

The application by the Hawaii County Department of Water Supply is for an exploratory well adjacent to Kaula Gulch immediately makai of the Belt Highway. Total depth will be determined in the field, depending upon the quality and quantity of available water, but is likely to exceed 650 feet. If the exploratory well is successful, a permanent production well will be constructed to service the surrounding area. We have no objections.
TO: Honorable Hoaliku L. Drake, Director
Department of Hawaiian Home Lands

Mr. Clayton H.W. Hee, Chairman and Trustee At Large
Office of Hawaiian Affairs

FROM: Keith W. Ahue, Chairperson
Commission on Water Resource Management

SUBJECT: Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by NOV 22 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Enc.

Response:
- [X] We have no objections
- () Not subject to our regulatory authority and permit
- () Comments attached
- () Additional information requested
- () Extended review period requested

Contact Person: Luis A. Manrique
Phone: 594-1935

Signed: Luis A. Manrique
Mr. Thomas Arizumi, Chief  
Environmental Management Division  
State Department of Health  
919 Ala Moana Blvd., 3rd Floor  
Honolulu, Hawaii 96814  

Attn: Mr. William Wong  

Dear Mr. Arizumi:

Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by __NOV 22__ 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI  
Deputy Director

ES:ss  
Enc.

Response:

- [ ] We have no objections
- ( ) Not subject to our regulatory authority and permit
- ( ) Comments attached
- ( ) Additional information requested
- ( ) Extended review period requested

Contact Person: Bill Wong  
Signed: Bill Wong  
Phone: 586-4258  
Date: 11/7/94
Mr. Milton Pavao
County of Hawaii
Department of Water Supply
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Pavao:

We have received your application for a permit to construct a well in Ookala Exploratory Well (Well No. 6017-05) at Ookala, North Hilo, Hawaii, (TMK: 3-9-1:34). We are reviewing the application for completeness.

Should you have any questions, please call the Commission on Water Resource Management staff at 587-0225.

Sincerely,

[Signature]

RAE M. LOUI
Deputy Director
Mr. Thomas Arizumi, Chief
Environmental Management Division
State Department of Health
919 Ala Moana Blvd., 3rd Floor
Honolulu, Hawaii 96814

Attn: Mr. Dennis Tulang

Dear Mr. Arizumi:

Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by NOV 22 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI
Deputy Director

Response:

( ) We have no objections
( ) Not subject to our regulatory authority and permit
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: _____________________________ Phone: _____________________________
Signed: _____________________________ Date: _____________________________

ES:ss
Enc.
Mr. Thomas Arizumi, Chief  
Environmental Management Division  
State Department of Health  
919 Ala Moana Blvd., 3rd Floor  
Honolulu, Hawaii 96814

Attn: Mr. William Wong

Dear Mr. Arizumi:

Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by ____ NOV 22 1994 ____.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI  
Deputy Director

Response:

( ) We have no objections
( ) Not subject to our regulatory authority and permit
( ) Comments attached
( ) Additional information requested
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Contact Person: ___________________________ Phone: ___________________

Signed: ___________________________ Date: ___________________
TO: Honorable Hoaliku L. Drake, Director  
Department of Hawaiian Home Lands

Mr. Clayton H.W. Hee, Chairman and Trustee At Large  
Office of Hawaiian Affairs

FROM: Keith W. Ahue, Chairperson  
Commission on Water Resource Management

SUBJECT: Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by Nov 22, 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Enc.

Response:

( ) We have no objections
( ) Not subject to our regulatory authority and permit
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: ________________________________  Phone: ________________
Signed: ________________________________  Date: ________________
TO: Dr. Don Hibbard, Director  
Historic Preservation Program  
Mr. Henry M. Sakuda, Administrator  
Division of Aquatic Resources  
FROM: Rae M. Loui, Deputy Director  
Commission on Water Resource Management  
SUBJECT: Well Construction and Pump Installation Permit Applications  

Please review the following permit applications pursuant to your area of concern and submit your comments to us by NOV 22 1994.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

ES:ss  
Enc.

Response:

( ) We have no objections  
( ) Not subject to our regulatory authority and permit  
( ) Comments attached  
( ) Additional information requested  
( ) Extended review period requested  

Contact Person: ___________________________ Phone: ____________

Signed: ___________________________ Date: ____________
Mr. Murl T. Nielsen  
Department of Water  
County of Kauai  
4398 Pualoke Street  
Lihue, Hawaii 96766  

Dear Mr. Nielsen:

Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by **NOV 22 1994**.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

 Rae M. Loui  
Deputy Director

---

Response:

- ( ) We have no objections
- ( ) Not subject to our regulatory authority and permit
- ( ) Comments attached
- ( ) Additional information requested
- ( ) Extended review period requested

Contact Person: __________________________ Phone: ______________

Signed: __________________________ Date: __________
Mr. William Sewake, Manager  
Department of Water Supply  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720  

Dear Mr. Sewake:  

Well Construction and Pump Installation Permit Applications  

Please review the following permit applications pursuant to your area of concern and submit your comments to us by NOV 22 1994.  

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.  

Sincerely,  

RAE M. LOUI  
Deputy Director  

Response:  
( ) We have no objections  
( ) Not subject to our regulatory authority and permit  
( ) Comments attached  
( ) Additional information requested  
( ) Extended review period requested  

Contact Person: ____________________________  
Phone: ____________________________  
Signed: ____________________________  
Date: ____________________________
Ms. Donna Fay K. Kiyosaki  
Chief Engineer  
Department of Public Works  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii  96720

Dear Ms. Kiyosaki:

Well Construction and Pump Installation Permit Applications

Please review the following permit applications pursuant to your area of concern and submit your comments to us by __________.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI  
Deputy Director

Response:  
( ) We have no objections  
( ) Not subject to our regulatory authority and permit  
( ) Comments attached  
( ) Additional information requested  
( ) Extended review period requested

Contact Person: ___________________________  Phone: ________________

Signed: ___________________________  Date: ________________
Ms. Marjorie Ziegler  
Sierra Club Legal Defense Fund, Inc.  
223 South King Street, Suite 400  
Honolulu, Hawaii 96813  

Dear Ms. Ziegler:  

Well Construction and Pump Installation Permit Applications  

Please review the following permit applications pursuant to your area of concern and submit your comments to us by Nov 22, 1994.  

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI  
Deputy Director  

Response:  

- We have no objections  
- Not subject to our regulatory authority and permit  
- Comments attached  
- Additional information requested  
- Extended review period requested

Contact Person: ____________________________  
Phone: ____________________________

Signed: ____________________________
Date: ____________________________
October 26, 1994

Ms. Rae M. Loui, Deputy Director
Commission on Water Resources Management
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Ms. Loui:

Subject: Ookala Exploratory Well Drilling
Ookala, North Hilo, Hawaii
TMK: 3-9-1:34

On behalf of the Department of Water Supply, County of Hawaii, submitted herewith are Application for Permit, Well Construction and Environmental Assessment for Ookala Exploratory Well. The exploratory well is proposed to be drilled in Ookala, North Hilo, Hawaii.

Your expeditious review of this application is requested since the Department of Water Supply wants to develop a source of water to replace Hamakua Sugar Company's inclined shaft. DWS does not want to operate the inclined shaft after Hamakua Sugar ceases operations for an extended period.

Should you have any questions, please call us.

Very truly yours,

SSFM ENGINEERS, INC.

Edward H. Iida, P. E.
Project Manager

EHI:ems

Encl. - 2

cc: Milton Pavao, Department of Water Supply, County of Hawaii w/Enclosure
**State of Hawaii**  
**COMMISSION ON WATER RESOURCE MANAGEMENT**  
**Department of Land and Natural Resources**

**APPLICATION FOR PERMIT**

- **Well Construction**  
- **Pump Installation**

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 751, Honolulu, Hawaii 96820. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-2225.

1. **APPLICANT:** (may be a, b, or c, but all must be filled in)
   - **WELL OWNER**
     - Firm/Name
     - Dpt. of Water Supply, Hawaii County
     - Contact Person: Milton Pavao
     - Ph.: 969-1421
   - **LANDOWNER**
     - County of Hawaii
     - Firm/Name: Water Conservation Company
     - Address: 25 Aumuali St., HI 96720
   - **CONTRACTOR**
     - Firm/Name
     - Address

2. **WELL LOCATION/NAME:**
   - Ookala Exploratory Well
   - Address: Ookala, North Hilo
   - Tax Map Key: 3-9-1:34
   - (Attach a USGS map, scale 1"=2000', and a property tax map showing well location referenced to established property boundaries.)

3. **PROPOSED WORK:**
   - **(a) Drill New Well**
   - **(b) Modify Existing Well**
   - **(c) Install New Pump**
   - **(d) Replace Pump**
   - **(e) Alter Location**
   - **(f) Redrill**
   - **(g) Deepen**
   - **(h) Abandon/Seal**
   - **(i) Modify Pump**
   - **(j) Be sure to complete and submit well abandonment report upon completion of work.**

4. **WELL TYPE:**
   - **(a) Dug**
   - **(b) Bored**
   - **(c) Driven**
   - **(d) Drilled**
   - **(e) Radial**
   - Is this well a part of a battery of wells? **(f) Yes**
   - **(g) No**
   - (Briefly describe and fill in the diagram on the back of this form.)

5. **PROPOSED PUMP INFORMATION:**
   - Rated Pump Capacity: **500 gallons per minute**
   - **(a) Deep Well Turbine**
   - **(b) Submersible**
   - **(c) Centrifugal**
   - **(d) Rotary**
   - **(e) Rotary-Displacement**
   - **(f) Reciprocating**
   - **(g) Rotary-Gear**
   - **(h) Impulse**
   - **(i) Motor:**
     - **(a) Diesel**
     - **(b) Gas**
     - **(c) Electric, rated horsepower of**

6. **PROPOSED USE:**
   - **(a) Municipal (including hotels, stores, etc.)**
   - **(b) Domestic (individual, noncommercial water sys.)**
   - **(c) Irrigation (prop)**
   - **(d) Other (explain)**
   - State Land Use District: **(e) Urban**
   - **(f) Agriculture**
   - **(g) Rural**
   - **(h) Conservation**
   - County Zoning (describe) (If more space is needed, continue below under remarks, explain.)

7. **PROPOSED AMOUNT OF WITHDRAWAL:**
   - **720,000 gallons per day**
   - **METHOD OF FLOW MEASUREMENT:**
     - **(a) Flow-meter**
     - **(b) Open-pipe**
     - **(c) Office Plan**

8. **PENDING ACTIONS:**
   - **(a) CDUA**
   - **(b) SMA**
   - **(c) EIS**
   - **(d) EA**
   - **(e) NONE**
   - **(f) Other (explain)**

9. **REMARKS, EXPLANATIONS:** The purpose of this well is to explore the quality and location of water at the proposed site. Should the exploratory well prove to be a permanent production well, it will be constructed to serve the surrounding area.

   (If more space is needed, continue on back)

**NOTE:** Signing below indicates that the applicant understands that if the permit is requested, the permit applicant is required to submit the required documentation, including a completed application, to the Commission on Water Resource Management, P.O. Box 751, Honolulu, Hawaii 96820. The application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-2225.

---

**Signature:**

**Date:**

**Well Owner**

**Date:**

**Landowner**

**Date:**

**Contractor**

**Date:**

For Official Use Only:

**Date Received**

**Date Accepted**

**Field Checked By**

**Date:**

---

**Aquifer System Name**

**State Well No.:**
APPLICATION FOR PERMIT

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96820. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-0225.

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
      Firm/Name: Dept. of Water Supply, Hawaii County
      Contact Person: Milton Pazoo
      Address: 25 Aupuni St., Hilo, HI 96720
   (b) LANDOWNER
      Firm/Name: Hawaiian Gas Co.
      Contact Person: Ph: 123
      Address: P.O. Box 287, Hilo, HI 96726
   (c) CONTRACTOR
      Firm/Name: ____________________________________________________________________________
      Contact Person: ________________________________________________________________________
      Contractor's C-57 License No. __________________________________________________________________

2. WELL LOCATION/NAME: __________________________________________________________________
   Island: Hawaiian
   Address: ____________________________________________________________________________
   Tax Map Key: ____________________________________________________________________________
   (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
      Redrill
      Install New Pump
      Replace Pump
      Modify Pump
      * Be sure to complete and submit well abandonment report upon completion of work.
   (b) WELL TYPE: _______________________________________________________________________
      Dug
      Bored
      Driven
      Drilled
      Radial
      (Briefly describe and fill in the diagram on the back of this form.)

4. PROPOSED PUMP INFORMATION: Rated Pump Capacity: ___________________ gallons per minute
   Pump Type: __________________________________________________________________________
      Deep Well Turbine
      Submersible
      Centrifugal
   Motor: ________________________________________________________________________________
      Propeller
      Reciprocating
      Impulse
      Diesel
      Gas
      Electric; rated horsepower of __________________
      Other

5. PROPOSED USE: ___________________________________________________________________
      Municipal (Including hotels, stores, etc.)
      Domestic (Individual, non-commercial water sys.)
      Irrigation (crop)
      State Land Use District: __________________________________________________________________
      County Zoning (describe) __________________________________________________________________
      Military
      Industrial
      Other (explain)
      Urban
      Agriculture
      Rural
      Conservation

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

7. PENDING ACTIONS: ______________________________________________________________________
      CDUA
      SMA
      EIS
      EA
      NONE
      Other (explain)

8. REMARKS, EXPLANATIONS: The purpose of this well is to explore the quality and quantity of water at the proposed site.
   ______________________________________________________________________________________
   (If more space is needed, continue on back)

9. ______________________________________________________________________________________
   ______________________________________________________________________________________
   ______________________________________________________________________________________
   ______________________________________________________________________________________
   ______________________________________________________________________________________

Below indicates that the applicant understands that, if the permit requested is granted by the Commission on Water Resource Management, the proposed work is to be completed within 120 days of the approved date. The applicant will submit to the Commission a well completion report, well abandonment report, or both, within 30 days after completion of work. The applicant also understands that monthly water use data shall be submitted to the Commission. The applicant further understands that any permit shall not constitute a determination of irreversibility of water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

[Signature] [Date]
Hawaii County
Dept. of Water Supply
Landowner: __________________________________________________________________________
Contractor: __________________________________________________________________________

[Signature] [Date]
Hawaiian Gas Co.
Contractor: __________________________________________________________________________

(Attach diagram showing well location)
9. PROPOSED WELL SECTION

- Elevation at top of casing: 649 ft., msl.
- Ground Elevation: 648± ft., msl
- Cement Grout: 553 ft.
- Rock Packing: 100 ft.
- Hole Diameter: 18 in.
- Total Depth: ** ft.
- Solid Casing:
  - Material: copper bearing steel
  - Length: 623 ft.
  - Diameter: 12 in.
  - Wall thickness: 5/16 in.
- Casing:
  - Perforated: ☑
  - Screen: ☑
  - Material: copper bearing steel
  - Length: ** ft.
  - Diameter: 12 in.
  - Wall thickness: 5/16 in.
  - Openings: 21.3 sq. in./L.F.
- Open Hole:
  - Length: ** ft.
  - Diameter: 10 in.

*All dimensions in the field*

*At time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at final elevations of well components shall be submitted in the well completion/well abandonment reports.*
rate will vary from 100 - 500 gpm during testing over a period of 1 day. The withdrawal of 20,000 gpd under item 6 (a) is based on the maximum pump rate of 70 gpm.

9. PROPOSED WELL SECTION

- Elevaton at top of casing: 649 ft, msl
- Cement Grout: 553 ft
- Rock Packing: 100 ft
- Hole Diameter: 18 in
- Total Depth: ** ft
- Ground Elevation: 648± ft, msl
- Solid Casing: Material = copper bearing steel
  - Length: 623 ft
  - Diameter: 12 in
  - Wall thickness: 5/16 in
- Casing: □ Perforated, □ Screen
  - Material = copper bearing steel
  - Length: 30 ft
  - Diameter: 12 in
  - Wall thickness: 5/16 in
  - Openings: 21.3 sq. in./L.F.
- Open Hole:
  - Length: ** ft
  - Diameter: 10 in

*Terminated in the field

ion at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at Final elevations of well components shall be submitted in the well completion/well abandonment reports.
MEETING NOTICE AND AGENDA

MOLOKAI IRRIGATION SYSTEM WATER USERS ADVISORY BOARD

DATE: Friday, November 4, 1994
TIME: 1:00 P.M.
PLACE: Molokai Irrigation System Conference Room
        Puu Ka Peelua Avenue
        Hoolehua, Molokai, Hawaii

I. Call to Order
II. Approval of Agenda
III. Approval of Minutes
IV. Old Business
   a. Status of Waikolu Stream Study
   b. Status of Molokai Ranch Use Agreement
   c. Status of Request on Water Rate Increase
   d. Status of Emergency Use of the M.I.S.
   e. M.I.S. Manager’s Report

V. Next Meeting: Date, Time, Place, Agenda
VI. Announcements
To: Ms. Rae M. Loui, Deputy Director   Date: October 8, 1996
Commission on Water Resource Mgmt.   Subject: Ookala Well

ATTENTION: ___________________________ ___________________________

We are transmitting 2 pages including this cover sheet.

X The original to follow through U.S. Postal Service.

___ The original to be provided upon your request.

Remarks: __________________________________________________________

_________________________________________________________________

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL US (808) 961-8660

...Water brings progress...
FACSIMILE TRANSMITTAL PAGE

Please deliver the following pages:

To:  Mr. Michael Pavar

Company:  Hawaii County DWS

From:  Rae Lowi

Message:  Emergency Pump Installation - see attached. Hard copy in mail.

Total number of pages (including Transmittal Page)  2

Please call back if not legible:  (808) 587-0216

Sending Facsimile No.:  (808) 587-0219

Receiving Facsimile No.:  961-8657
Mr. Milton Pavao, P.E.
Manager
Department of Water Supply
County of Maui
25 Aupuni St.
Hilo, HI 96720

Dear Mr. Pavao:

Emergency Pump Installation for Ookala Well (Well No. 6017-05)

Thank you for your notification of the emergency need to install a 300 gpm pump to relieve the situation caused by the breakdown of the Ookala Shaft (Well No. 6117-01) source.

We understand that the deep well pump to be installed is temporary and is an emergency that is not provided for under our current administrative rules. Given these circumstances, a pump installation permit is not required but we request that:

1. You provide the completed emergency work information on Part II of the attached Well Completion Report Form.

2. Provide us with your plans, including any timelines, for installing a permanant pump in Well No. 6017-05 which will require a pump installation permit.

If you have any questions, please contact Roy Hardy at 587-0274.

Sincerely,

[Signature]

RAE M. LOUI
Deputy Director

RH:fc
Attach.
To: Ms. Rae M. Loui, Deputy Director  Date: August 30, 1996

Department of Land and Natural Resources

Subject: Ookala Well

Commission on Water Resource Management

ATTENTION:

We are transmitting 2 pages including this cover sheet.

_x_ The original to follow through U.S. Postal Service.

____ The original to be provided upon your request.

Remarks:


IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL US (808) 961-8660

... Water brings progress....
August 30, 1996

Ms. Rae M. Loui, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
1151 Punchbowl Street
Honolulu, HI 96813

OOKALA WELL (WELL NO. 6017-05)
OOKALA, NORTH HILo, HAWAII
TAX MAP KEY 3-9-1:34

We are preparing to utilize the existing Ookala Well on an emergency basis. The shaft pumping unit at the sole source (Ookala Shaft) has malfunctioned. The cause of this breakdown is under investigation.

On a temporary basis, we have been hauling water to service the area residents. It appears that we will need to immediately activate our existing Ookala Well through the installation of a temporary deepwell pumping unit. This will be done through procurement of services under emergency provisions.

We are looking for a pumping unit of 300 GPM. If required by your office, we will submit, when the information is available, Part II of the Application for Pump Installation Permit.

Your expeditious concurrence is requested. If there are any questions, please call Mr. Gary Kawasaka. For your information, effective July 31, 1996, our new telephone number is 961-8660 and fax number is 961-8657.

Milton D. Pavao, P.E.
Manager
GK:cmk
August 30, 1996

Ms. Rae M. Loui, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
1151 Punchbowl Street
Honolulu, HI 96813

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OOKALA, NORTH HILO, HAWAII
TAX MAP KEY 3-9-1:34

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Milton D. Pavao, P.E.
Manager

GK:cmk

...Water brings progress...
SOURCE USE APPLICATION

for

OOKALA WELL #6017-05

OOKALA, HAWAII

DEPARTMENT OF WATER SUPPLY
COUNTY of HAWAII

Consulting Engineers
SSFM ENGINEERS, INC.
October 1995
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I. GENERAL INFORMATION

A. Introduction

The New Ookala Well is proposed to replace the deteriorated existing inclined shaft, water tunnel and pump system. The intent of the project is to find a new water source to provide water service and fire flow to the Old Dispensary area, the Boarding House area, the Store Camp area, the Ookala Skilled area, the Kukui Village, the Nui Village and the Milo Village. The process required drilling, casing and testing of the well for ground water quality and yield. The quality and quantity of groundwater tested in June 1995, are included in the Appendices. Upon approval of the State Health Department, the test well will be converted into a production well.

The new production well will be owned and operated by the Department of Water Supply, County of Hawaii. The well is located southwest of the Kaula Gulch, north of the Hawaii Belt Road and east of the existing rectangular concrete reservoir in Ookala. The water, drawn from the New Ookala Well, will be pumped to the existing rectangular concrete reservoir then distributed to the villages through existing pipe network.

The New Ookala Exploratory Well consists of 640 linear feet of 12 inches well casing and approximately 60 linear feet of 12 inches standard perforated casing. The well was continuously pump tested from June 12 to 15, 1995 at a rate of nearly 500 gpm.

The construction cost for the New Ookala Exploratory Well was approximately $425,000.

B. Background and Funding

The project is authorized and being funded by the Department of Water Supply, County of Hawaii, JOB NO. 93-580 OOKALA EXPLORATORY WELL DRILLING. The project location and vicinity maps are shown on Figures I and II, respectively.

C. Project Description

The project involves drilling, testing and constructing a new production well, in accordance with Department of Water Supply, County of Hawaii standards. The water, drawn from the new well will be pumped to the existing concrete reservoir. The New Ookala Well will be designed to handle the demands of the villages and its fire flow of 500 GPM for 2 hours.
The existing inclined shaft water supply source will remain in service during the construction period and will probably be abandoned after completion of a successful production well and pumping system.

II. PHYSICAL AND HYDROLOGICAL CHARACTERISTICS OF AREA

A. Climate

The climate in this area is moderately wet, which is typical of the Hamakua coast with rainfall of over 100 inches per year, and as much as 194 inches in two recent, previous years.

B. Topography, Geology and Foundation Conditions

The site is an abandoned sugar cane field with a gentle average slope of approximately 20%. This area is on the eastern slopes of Mauna Kea. The geological formation appears to be the Hamakua Volcanic Series capped by Pahala ash. It appears very stable since the immediately adjacent highway deep cut section is nearly vertical.

The existing reinforced concrete storage tank was built adjacent to the highway right-of-way. The existing water storage tank apparently was designed to withstand Zone III earthquakes. Likewise, the small control building shall be designed to meet this requirement.

C. Groundwater Conditions

The groundwater (basal lens) was found to be at approximate elevation 7.5 ft. above mean sea level, with a low salinity of 11 mg/l. The drawdown at 500 gpm indicated only about 1.5 feet, with excellent recovery within 20 minutes.

D. Flood Problems

The well site is at elevation 640 ft. above msl and is over 3000 feet from the coastline. The topography is such that no ponding or flooding can occur on this site due to the natural slope toward the coastline.

E. Conformance with Land Use and Zoning Regulations

The Ookala Well site is located in a Hawaii County Planning Department designated RS-10. The State Land Use Commission has designated the Ookala Well site for urban use. This well site is consistent with the existing zoning and land use.
Figure 2

Water Resource Engineering

State No. 6017-05
Ockeha Exploatory Well
Location of the

Figure 2
1/4 IN STEEL PLATE WELDED TO CASING

EXISTING GROUND ELEV. 640.7 FT

620 FT OF GROUTED ANNULAR SPACE

12 IN ID x 5/16 IN WALL THICKNESS CASING

18 IN DIAMETER BORE HOLE

AVERAGE WATER LEVEL ELEV. = ± 7.5 FT (MSL)

ELEV. = -57.9 FT (MSL)

CASING SHOE

WELL SECTION

SSFM ENGR'S INC.
AS-BUILT, JUNE 1995

OOKALA WELL
FIGURE 4
F. Water Development and Future Use

The development of this new well is to replace the hazardous existing water tunnel source. Projection for the future will allow a possible second well on the site as a backup.

III. DESIGN CONSIDERATIONS

A. Exploratory Well

The New Ookala Exploratory Well consists of 640 linear feet of 12 inches well casing, 60 linear feet of 12 inches standard perforated casing, 620 linear feet of grouted annulus, 5 linear feet of grout seal, 75 linear feet of gravel pack. As-Built well section is shown on Figure 4.

The exploratory well was continuously pump tested for 5 days at a rate of approximately 500 gpm to determine the drawdown of the water table surface. The exploratory well will be converted into a production well after approval by the State Health Department, in compliance with Water Quality Standard, Chapter 11-20.

The proposed design pumping capacity for the deepwell pumping unit shall be at least 100 GPM.

B. Site Work

Site grading involves minimizing excavation and embankment and maintaining the existing drainage patterns of the site. Proposed improvements result in maximum excavation and embankment of less than 2 feet.

The New Ookala Exploratory Well site improvements will not significantly impact the existing drainage pattern. The existing drainage pattern naturally sheet flows across the site from south to north. No significant change to the rainfall runoff will be made.

C. Environmental Issues

Careful monitoring of adjacent structures was required during the pump testing of the well. The Contractor adhered to all erosion control and NPDES permit requirements for construction.

Other environmental considerations have been addressed in the Environmental Assessment (EA) for this project.
IV. POTENTIAL SOURCES OF CONTAMINATION

A. Potential Manmade Sources of Contamination

The most probable manmade sources of contamination of the Ookala Well are the past agricultural activities. However, the depth of the well and the laboratory tests of the well water do not indicate a problem of contamination.

B. Potential Natural Sources of Contamination

The Ookala Well is not in a flood plain and is above the elevation of the highway. Therefore, there is little potential for contamination of this well by natural sources.

V. COST OF CONSTRUCTION AND SCHEDULING

A. Cost of Construction

1. Exploratory Well

   $425,000.00

B. Scheduling

1. Exploratory Well

   Started Construction: March 1995
   Completed Construction: June 1995

VI. TREATMENT

Water from the Ookala Well will be chlorinated and stored in the existing reinforced concrete tank. No other treatment will be necessary.
**Step-Drawdown Pump Test**  
**June 7, 1995**  
Ookala Exploratory Well, State No. 6017-05

### Pumpage Data:

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<th>Flowrate</th>
<th>Airline</th>
<th>Electric Sounder</th>
<th>Chloride Concentration (MG/L)</th>
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### Recovery Data:

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<th>DTW (Feet)</th>
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* Residual drawdown values do not account for tidal variation during the test.

Table 1

Ref: Tom Nance Water Resource Engineering
APPENDICES
FIVE-DAY PUMPING TESTS
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6/17/95
8:45 AM shut down
LABORATORY
TEST
ANALYSES
CLIENT: WAI'ELI DRILLING
P.O. BOX 5685
KAILUA-KONA, HI 96745

Date/Time Sampled: 06/15/95 @ 15:00
Date/Time Received: 06/16/95 @ 09:00

Matrix: WATER
Client ID#: OOKALA WELL #1
(BIG ISLAND)
Lab Sample ID: N1

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Note: (AC = Action Level)

BRL = Below Reporting Limit

Analyses performed at a BEL affiliate facility.
CLIENT: WAI’ELI DRILLING  
P.O. BOX 5685  
kailua-kona, hi 96745

PROJECT NAME:  

Date/Time Sampled: 06/15/95 @ 15:00  
Date/Time Received: 06/16/95 @ 09:00

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BRL = Below Reporting Limit  

Analyses performed at a BEL affiliate facility.
## LABORATORY ANALYSIS REPORT

**Environmental Laboratories Division**

**CLIENT:** WAI'ELI DRILLING  
P.O. BOX 5685  
KAILUA-KONA, HI 96745

### Project Name:

- **Date/Time Sampled:** 06/15/95 @ 15:00  
- **Date/Time Received:** 06/16/95 @ 09:00

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**BRL = Below Reporting Limit**

Analyses performed at a BEL affiliate facility.

Approved by: [Signature]
BASIS OF DESIGN

for

OOKALA PRODUCTION WELL AND SUPPORTING FACILITIES

STATE NO. 6017-05

Ookala, North Hilo, Hawaii

Tax Map Key: 3-9-1:34

Proposing Agency

Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Prepared by

SSFM Engineers, Inc.
501 Sumner Street, Suite 502
Honolulu, Hawaii 96817

November 1996
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   b. Water Reservoir
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<th>Description</th>
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<td>Site Plan</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Control Room Plan</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Piping Plan</td>
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I. GENERAL

1. Purpose

The purpose of the project is to replace the deteriorated existing inclined shaft, Well Number 9117-01, with a new production well, Well Number 6017-05 and supporting facilities. The proposed well will be servicing the Old Dispensary area, the Boarding House area, the Store Camp area, the Ookala Skilled area, the Kukui Village, the Nui Village and the Milo Village. With the exception of Milo Village, the other noted villages or camps will be serviced through main line master meters.

2. Scope of Work

The project involves constructing a new production well and supporting facilities, in accordance with Department of Water Supply, County of Hawaii standards. The water, drawn from the well, will be pumped to the existing concrete reservoir. The production well will be designed to handle the demands of the villages and its fire flow of at least 500 gpm for 2 hours.

The existing inclined shaft and 16-inch diameter transmission line will remain in service during the construction period and will probably be abandoned after completion of the production well.

3. Project Funding

The project is authorized and being funded by the Department of Water Supply, County of Hawaii, JOB NO. 93-581, OOKALA PRODUCTION WELL AND SUPPORTING FACILITIES.

4. References


c. Environmental Assessment for Exploratory Well, Ookala, Hamakua, Hawaii, TMK: 3-9-1:34, dated September, 1994

d. Topographic Surveys of the project areas, performed by Island Survey,
II. PROJECT AREA

1. Location

The project area is located south-west of the Kaula Gulch, north of the Hawaii Belt Road and east of the existing rectangular concrete reservoir in Ookala. Site Plan is shown on Figure I.

2. Existing Conditions

The proposed site varies in elevation from 652 feet along the Hawaii Belt Road to 640 feet to the north of the Hawaii Belt Road. The site is overgrown with grass. To the east stands a utility pole with overhead lines and Well Number 6017-05. To the north-east are water valve boxes, water meters and fence posts. To the west of the proposed site is an existing concrete water reservoir.

a. Well Number 6017-05

Well Number 6017-05 was constructed and successfully pumped tested in June of 1995. It is located approximately 60 feet north of the Hawaii Belt Road and approximately 163 feet east of the existing concrete water reservoir. The ground elevation of the well is approximately at 640.7 feet.

The well consists of 640 feet of solid casing and 60 feet of louvered casing. Both casing are 12-inch inside diameter and 5/16-inch thick. The solid casing extends seven to eight feet into water.

b. Water Reservoir

The existing rectangular concrete reservoir was constructed in 1983. It is located to the south-west of the Kaula Gulch and to the north of Hawaii Belt Road. Access is an existing dirt road off of a paved road from Ookala town. The reservoir is 92 feet long, 32 feet wide and 16 feet high with a capacity of approximately 350,000 gallons. It lies at 642 feet elevation. The reservoir stores water for the villages.

3. Siting
Siting of the Control Room and Well Number 6017-05 as shown on Figure I and II. As indicated, the building is sited with its long axis oriented in an east to west direction. The chlorinator room on the east side of the building. The building is located 20 feet east of the existing concrete water reservoir. The finish floor elevation of the building will be at 466.5 feet. Section of an existing 8 feet wide dirt road will be extended for access between Control Room and the new well.

III. DESIGN CONSIDERATIONS

1. Estimated Water Demand

According to the Department of Water Supply, County of Hawaii, there are 83 existing service lateral connections. The following is a break down of the service lateral connections:

<table>
<thead>
<tr>
<th>Village Name</th>
<th>No. of laterals</th>
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<td>Old Dispensary Area</td>
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</tr>
<tr>
<td>Boarding House Area</td>
<td>2</td>
</tr>
<tr>
<td>Store Camp Area</td>
<td>2</td>
</tr>
<tr>
<td>Ookala Skilled Area</td>
<td>8</td>
</tr>
<tr>
<td>Kukui Village</td>
<td>22</td>
</tr>
<tr>
<td>Nui Village</td>
<td>17</td>
</tr>
<tr>
<td>Milo Village</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>83</strong></td>
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Based on the Water System Standards, State of Hawaii, 1985, Volume 1, average daily demand is 23 gpm, maximum daily demand is 35 gpm and peak hour demand is 115 gpm. The fire flow minimum requirement specified by the Department's standards shall be for 500 gpm for a duration of 2 hours.

The Department of Water Supply, County of Hawaii, does not foresee significant future water demand will be added.

2. Production Well System
a. Control Room

Figure II illustrates the preliminary layout of the Control Room.

A 20 feet long, 12 feet wide and 8 feet 8 inches high concrete masonry unit structure will be built to house the electrical control panel, flow recorder, chlorinator system, booster pumps and air compressor. The rooms will be naturally vented. The chlorinator room will be separated into two with a fire wall door. Each room will consists of a chlorine cylinder and a chlorine alarm sensor. The chlorinator room will be designed to meet the Fire Code of the County of Hawaii. An emergency shower and eye wash will be located just outside of the chlorinator room.

b. Pumping System

The pumping system is proposed to consist of a 100 gpm, 680 feet TDH, 25 HP and 12 stages submersible pump and motor and approximately 800 feet of 4 inch ductile iron pipe. The submersible pump will be piped to the existing concrete water reservoir. Piping Plan is shown on Figure III.

An air bubbler system will monitor the well water level and record it on a strip chart in the control room.

3. Electrical Power and Controls

Electrical service will be from a nearby power pole #5 which is approximately 85 feet east of the control room and 45 feet west of the Well Number 6017-05. Electrical power will be provided for lighting of the control room, control panel, pumps, air compressor and telemetering equipment. Standby generator will not be provided since the existing storage reservoir can hold up to two days supply.

The following telemetering facilities shall be provided for the production well system. A provision will be made in the future to transmit the telemetering signals to the central station at Hilo base yard.

Telemeter for:

a. Flow

b. Status of pump

c. HECO power failure alarm
IV. SITE IMPROVEMENTS

1. Site Work

Site grading involves minimizing excavation and embankment and maintaining the existing drainage patterns of the site. Proposed improvements result in maximum excavation and embankment of less than 2 feet.

The site improvements will not significantly impact the existing drainage pattern. The existing drainage pattern of the site is, storm water runoff sheetflows across the site from south to north.

2. Environmental Issues

Careful monitoring of adjacent structures will be required during construction. The Contractor shall be required to adhere to all erosion control and NPDES permit requirements for construction.

Other environmental considerations have been addressed in the Environmental Assessment (EA) for this project.
DIRECTION OF PREVAILING WIND

A WELL
NO. 6017-05
640.7

FIGURE I
MATERIAL LIST

1. 4" DI PIPE LENGTH TO SUIT
2. 4" x 3" TEE
3. 3" x 3" TEE
4. 3" BALL VALVE
5. 3" AIR AND VACUUM VALVE WITH AIR RELEASE VALVE
6. 3" DI PIPE LENGTH TO SUIT
7. 3" PRESSURE RELIEF VALVE
8. 3" x 3" 90° ELBOW
9. 4" CENTER GUIDED CHECK VALVE
10. 4" DI PIPE
11. UNIVERSAL VENTURI TUBE, FLOW METER
12. 4" DI PIPE
13. 1/2" FLOW SWITCH
14. 4" TEE WITH BLIND FLANGE
15. 4" BUTTERFLY VALVE
16. 4" DI PIPE
17. 1" COMBINATION AIR VALVE
18. 4" 45° BEND
19. 4" DI PIPE
20. 1 1/2" CHLORINE SOLUTION LINE
21. 1 1/2" CHLORINE SOLUTION SUCTION LINE
22. PRESSURE GAUGE ASSEMBLY
23. 3/8" AIR LINE STRAPPED TO PUMP COLUMN W/ 5 ST STRAPS

FIGURE III
ENVIRONMENTAL ASSESSMENT

for

EXPLORATORY WELL

Ookala, North Hilo, Hawaii

Tax Map Key: 3-9-1:34

Proposing Agency

Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii

Prepared by

SSFM Engineers, Inc.
501 Sumner Street, Suite 502
Honolulu, Hawaii 96817

October, 1994
B. Funding

The project is authorized and funded by the Department of Water Supply, County of Hawaii, Job No. 93-580, "Ookala Exploratory Well Drilling", and Job No. 93-581, "Ookala Production Well and Supporting Facilities".

C. Purpose of Work

This exploratory well drilling is intended to develop groundwater resource. Should the exploratory well produce an adequate quality and quantity of water, a production well and supporting facilities will be constructed to replace the existing inclined shaft which is owned and operated by Hamakua Sugar Company. A separate environmental assessment will be prepared for the production well and supporting facilities. Should the exploratory well not produce an adequate quality and quantity of water, the well will be sealed and the site restored to its existing condition.

D. Existing Inclined Shaft

The existing inclined shaft, Well Number 6117-012 is located adjacent to Kaula Gulch and southwest of the abandoned sugar mill in Ookala. The inclined shaft, constructed in the late 1930's, is approximately 600 feet long with a slope of approximately 30%. A copy of the Well Registration is included in Appendix 1. The entrance to the shaft is at an elevation of 300 feet mean sea level (MSL). There are two pump houses located at the end of the shaft. Figure D shows a plan of the inclined shaft. The pump houses are accessed via a cable car which travels on rails through the shaft. One pump is for domestic water and the other pumped water to the sugar mill. The estimated water level is +6 feet above MSL. The County of Hawaii Department of Water Supply has indicated that they will not operate the inclined shaft on a long term basis should Hamakua Sugar cease operations due to its dilapidated condition.

E. Proposed Exploratory Well

The exploratory well will be located adjacent to the existing water reservoir and Mamalahoa Highway. The well will be drilled and a 12" diameter casing installed. The annular space will be packed with filter material, grouted, and the well flushed clean of drill cuttings. Then the well is tested by pumping continuously for a maximum of 5 days.

2 Commission on Water Resource Management

3 Commission on Water Resource Management
1. Technical Characteristics (See Figure E, Exploratory Well Section)

- Ground Elevation: 648 feet MSL
- Casing Diameter: 12 inches
- Length of Solid Casing: 623 feet
- Length of Perforated Casing: 30 feet
- Length of Open Hole: To be determined in the field
- Total Depth: To be determined in the field
- Duration of Pump Test: 5 days maximum, 24 hrs per day
- Proposed Pump Test Range: 100-500 gpm, avg = 300 gpm
- Estimated Length of Project: 220 Days
- Estimated Construction Cost: $645,000.

2. Economic Characteristics

The exploratory well will not generate revenue. If the exploratory well produces an adequate quality and quantity of water, a production well will be constructed. This production well is not expected to be profitable as it is anticipated that expenses will exceed revenues. The existing service area includes Akasaki Camp, Milo Village and Kukui Village. A total of 83 households will be served with anticipated annual revenues of approximately $14,310. The anticipated construction cost for the production well and appurtenances is $500,000.

3. Social Characteristics

The population served by the existing inclined shaft will continue to require potable water after Hamakua Sugar Company ceases operations. The Department of Water Supply is obligated to provide water to existing customers in Milo Village. If the exploratory well produces adequate quality and quantity of potable water, a permanent production well will be constructed to replace the existing inclined shaft. The community may experience a negative impact if the production well is not constructed. If the inclined shaft is not operational and no replacement well is constructed, the Department of Water Supply will have to haul water to supply the community.

4. Environmental Characteristics

During drilling and testing, noise levels may exceed allowable levels. Water discharged during testing may impact the environment. Proposed mitigation measures are outlined in the "Proposed Mitigation Measures" section below.

---

4 Department of Water Supply
VI. Description of the Environment

A. North Hilo District

The North Hilo District extends along the Hamakua Coast of the Island of Hawaii. The proposed exploratory well will be drilled in Ookala Town, North Hilo District. Ookala Town was formerly a plantation town whose residents worked in the sugar plantations along the Hamakua Coast. Since the closing of Hamakua Sugar, the resident population has diminished. The residential population of the district in 1990 was 1,541, down from 1,679 in 1980 and 1,881 in 1970. The water service area, located makai of Mamalahoa Highway, includes Akasaki Camp, Milo Village and Kukui Village.

B. Project Site

The proposed well site is adjacent to Hamakua Sugar's existing 350,000 gallon potable water storage reservoir, located makai of Mamalahoa Highway and east of Kaula Gulch on the lower slopes of Mauna Kea, near the coastline. Milo Village is makai of the well site and the nearest residence is approximately 400 feet from the well site.

1. Geology and Soils

Soil type in the surrounding area is classified as Ookala silty clay loam, 12 to 20 percent slopes (Ood). The Ookala series consists of well-drained silty clay loams that formed in volcanic ash. The fertile topsoil supports vegetation which intercepts runoff. The porous layers of lava beneath permit a high rate of infiltration. Runoff is slow and erosion hazard is slight.

The soil surface layer is dark reddish-brown silty clay loam about 12 inches thick. The subsoil is dark-brown to dark yellowish-brown silty clay loam about 43 inches thick. This is underlain by very dark grayish-brown, partly weathered Aa lava fragments. Mean annual soil temperature is between 72 to 74 F. This soil has a very strongly acid surface layer and a slightly acid to medium acid subsoil.


2. Climate

The project site is located on the Hamakua Coast on the windward side of the Island of Hawaii. The island lies within the tropics. Winter storms move eastward across the Pacific Ocean north of Hawaii bringing widespread, heavy rains. Trade wind showers bring the greatest amount of rainfall over the windward slopes of the island. Orographic, or mountain caused, showers occur along the Hamakua Coast as moist air cools as it rises up the slopes of Mauna Kea. Annual rainfall in Ookala varies from 100 to 190 inches\(^7\). Mean monthly temperatures range between 65° and 85° F\(^8\). Prevailing winds blow from the east, or makai.

3. Flora and Fauna

No unique flora or fauna were observed on the site. Vegetation consists primarily of hilograss, guava, norfolk pine trees, and California grass. Photographs of the site are included in Appendix 2. Wildlife inhabiting the area are those associated with canefields, such as mongoose and other rodents. No threatened or endangered species are known to inhabit the project site or environs.

4. Archaeology

It is unlikely that there are any historic sites onsite or nearby\(^9\). The Contractor will be required to contact the Historic Preservation Division if any historic remains are discovered.

5. Zoning

The land is zoned RS-10 by Hawaii County Planning Department. RS-10 zoning allows for residential use with a minimum lot area of 10,000 square feet. The land is designed for Urban use by the State Land Use Commission. The proposed well is consistent with the existing zoning and land use.

---

\(^7\) "Climatological Data, Annual Summary, Hawaii and Pacific", U.S. Department of Commerce, National Climatic Data Center, (1992)


\(^9\) Historic Preservation Division, Department of Land and Natural Resources
VII. Probable Impacts

A. Short-term Impacts

Anticipated impacts of the project will occur during site preparation, well drilling, and test pumping the well. Affected flora and fauna are common to the area and the project's temporary effect will not be significant. There will be minimal dust impact since only a minor amount of grading and clearing is proposed.

1. Noise

Temporary and unavoidable construction noise will occur during the drilling of the exploratory well with generator and pump noise occurring during the five day test pumping of the well. Noise during drilling and test pumping may be in excess of allowable level. The closest residential lot is 400 ft from project. After the well has been drilled and cased, a temporary pump will be installed in the well to test the groundwater aquifer for yield and water quality. The test pumping will be performed 24 hours per day for a maximum of 5 days. Electricity for the test pumps will be provided by a portable generator or Hawaii Electric Light Company. If a generator is used, it may be heard at night.

2. Water Discharge

Water will be discharged during the well flushing and test pumping. The rate of discharge during testing will vary from 100 to 500 gallons per minute (GPM), averaging 300 GPM.

B. Long-term Impacts

No long-term impacts are anticipated from the construction and testing of this exploratory water well.

VIII. Proposed Mitigation Measures

A. Noise

Drilling will be restricted to daylight hours and weekdays, 8 hours per day maximum. The Contractor will utilize mufflers as necessary to comply with Chapters 42 and 43 of Title 11, Administrative Rules, State Department of Health. Mufflers and soundproofing will be used to lower noise generated by the pump motor and electric generator during the test pumping.
B. Water Discharge

Erosion and sediment control provisions will be included in the contract specifications to mitigate dust and erosion due to storm runoff over ground surfaces disturbed by construction activities. Water to flush the well will be piped to retention basins. The retention basins will retain flushed material and allow water to percolate into the ground. After the well is tested, the retention basins will be backfilled and area regraded and revegetated.

Water pumped during testing of the well will be piped to the rock stream bed of Kaula Gulch. The flow rate of the water discharged from the test well (1.1 cubic feet per second) is a fraction of the flow capacity of Kaula Gulch. The water from the well should be of potable quality. Piping the water to the stream bed will avoid erosion caused by water flowing over the ground. The environmental impact of discharging ground water into Kaula Gulch is insignificant.

IX. Alternatives

No alternative sites were considered. This site was selected for its proximity to the existing reservoir and the high probability of successfully developing the necessary groundwater resource.

X. Determination

There are no significant adverse impacts from this project.
FIGURES
FIGURE A
Island of Hawaii Map

REF: READERS DIGEST
WIDE WORLD ATLAS 1979
SCALE 1:1,500,000
FIGURE B
Vicinity Map

REFERENCE: USGS 1982
SCALE 1:24,000
EXPLORATORY WELL SITE

WATER TANK

FIGURE C
Site Map

Ref.: Island Survey, Inc.
Scale: 1" = 40'
FIGURE D
Plan View
Inclined Shaft

REF: D.L.N.R.
APPENDIX 1

Registration of Well

and

Declaration of Water Use
REGISTRATION OF WELL
AND
DECLARATION OF WATER USE

INSTRUCTIONS: Please type or print. If information is not available or not applicable, indicate as N/A. Fill out as completely as possible. Sign, and file form with the Division of Water Resource Management, P.O. Box 73, Honolulu, Hawaii 96809. Phone 548-3948 or 548-7543 for assistance.

BATTERY OF WELLS: For a battery of wells, on the surface, in a tunnel, or in a shaft, submit a registration form for each well together with a single map or plot plan showing layout of wells.

STATE WELL NO.: 6117-01
ISLAND: HAWAII
WELL NAME OR DESIGNATION: OOKALO SHARP
SOURCE OR STATION NAME (For a battery of wells): 

A. WELL OPERATOR
Firm name: HAMAKUA SUGAR CO, INC
Contact person: Patricia Poppe
Address: P.O. Box 250

PAULU, HI
Zip: 96779 Phone: 776-1521

B. OWNER OF WELL SITE
Firm name: HAMAKUA SUGAR CO, INC
Contact person: Patricia Poppe
Address: P.O. Box 250

PAULU, HI
Zip: 96779 Phone: 776-1521

C. WELL LOCATION
Tax Map Key: 3-19-114 Town, Place, District: OOKALO, NORTH Hilo
Attach USGS "Quad" map (scale 1:24,000), tax map, or other map showing the well location.

D. WELL DATA
For Drilled Wells, submit "as-built" drawing, driller's log, and pump test results, and complete items below. For Tunnels and Shafts, submit construction drawings, plot plan, or sketch map.

Ground elevation (Mean sea level): 300 ft.
Reference point (Used to measure depth to water): 
Elevation: 
Description: 

Depth to water (below reference point): 
Maximum recorded chloride: 
Minimum recorded chloride: 
Maximum chloride in 1987: 

Casing diameter: in.
Solid casing depth (below ground): ft.
Perforated casing depth (below ground): ft.
Total depth of well: ft.
Minimum chloride in 1987: ppm

E. INSTALLED PUMP DATA
Pump type: Vertical shaft Submersible Centrifugal Other (specify):
Power: Diesel, HP Gas, HP Electric, HP Other (specify):
Pump capacity: gallons per minute
Pump installation contractor:

... (continued over)

For Official Use Only:
Date received: Date accepted: 
Field checked by: Date: Latitude: Hydrologic Unit: 
Comments: Longitude: State Well No.: 

References: Hawaii Revised Statutes, Chapter 174;
Hawaii Administrative Rules, Chapters 13-167 to 13-171.
F. DECLARATION OF WATER USE

NOTE: The purpose of the Declaration of Water Use is to obtain information necessary for the management of the State’s water resources. The Declaration does not confer a legal right to water or its use.

Water use data are recorded: ☐ Daily ☐ Weekly ☐ Monthly
☐ Other (Describe):

Method of measurement: ☐ Flow Meter ☐ Orifice
☐ Other (Describe): WATER SOLD TO COUNTY WAS METERED BUT FACTORY USAGE WAS ESTIMATED

Quantity of Use (Report metered or estimated monthly water use from the well described on the reverse side of this form, for the calendar years 1983 through 1987. For a battery of wells which are not individually metered, but which are connected to a single meter or other measuring device, report total use from the battery):

WATER USE, IN GALLONS x 1000

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Minimum day’s use: 300,000 gallons
Maximum day’s use: 7,000,000 gallons
Typical times of usage: 24 hrs/day

Type of Use (Check all category boxes that apply and provide additional information as indicated):

☐ Municipal (including resorts, hotels, businesses)
☐ Domestic (systems serving 25 people or less)
☐ Irrigation
☐ Industrial
☐ Military
☐ Other

Additional Information

Oceanea, Mio Kururu, & Mio Villages, Alcasaki Camp

Number of service connections: ____________

Acres Irrigated:
Crop(s): ☐ Sugar ☐ Pineapple
☐ Other (specify): ____________
Non-Crop: ☐ Landscape ☐ Golf Course
☐ Other (specify): ____________
Method: ☐ Drip ☐ Furrow ☐ Sprinkler
☐ Cooling ☐ Manufacturing ☐ Mill
☐ Other (specify): ____________

Specify (livestock, aquaculture, etc.): ____________

I declare that the contents of the above Declaration of Water Use are, to the best of my knowledge and belief, true, correct, and complete.

Water User’s Signature: __________________________ Date: ___________
Printed Name: __________________________
Firm or Title (Well Operator, etc.): __________________________
APPENDIX 2

Site Photographs
SITE PHOTOGRAPH

Proposed Exploratory Well Site

Existing Water Tank
SITE PHOTOGRAPH

Proposed Exploratory Well Site
ENVIRONMENTAL ASSESSMENT

for

EXPLORATORY WELL

Ookala, North Hilo, Hawaii

Tax Map Key: 3-9-1:34

Proposing Agency

Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii

Prepared by

SSFM Engineers, Inc.
501 Sumner Street, Suite 502
Honolulu, Hawaii 96817

October, 1994
SUMMARY INFORMATION

PROJECT: Exploratory Well, Ookala, North Hilo, Hawaii

PROPOSING AGENCY: Department of Water Supply, County of Hawaii

LOCATION: Ookala Town, North Hilo District, Island of Hawaii

TAX MAP KEY: 3-9-1:34

LANDOWNER: Property being Conveyed from Hamakua Sugar Company to County of Hawaii

EXISTING USE: Potable Water Storage Reservoir

STATE LAND USE DESIGNATION: Urban

EXISTING ZONING: RS-10

CONTACT PERSON: Mr. Milton Pavao, P.E.
Department of Water Supply
County of Hawaii
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FIGURES

A  Island of Hawaii Map
B  Vicinity Map
C  Site Map
D  Inclined Shaft Plan
E  Exploratory Well Section

APPENDICES

1  Registration of Well and Declaration of Water Use - Inclined Shaft
2  Site Photographs
EXECUTIVE SUMMARY

This Environmental Assessment is prepared to accompany the well drilling permit application submitted for review by the State of Hawaii, Department of Land and Natural Resources.

This report evaluates the impacts of constructing and testing an exploratory water well in Oookala, Hawaii. The existing source of water for the community is an inclined shaft operated by the Hamakua Sugar Company. It is expected that the sugar company will cease operations in late 1994. The Department of Water Supply does not intend to operate the existing shaft due to unsafe conditions. A replacement water source will be required to serve existing customers, all residents were not DWS customers. If this exploratory well produces adequate quality and quantity of potable water, a production well will be constructed under separate contract. An Environmental Assessment will be prepared for that project.

The exploratory well will be located adjacent to the existing water reservoir. The proposed land use is consistent with the existing and past land uses. The local environment will be temporarily impacted by noise during drilling and pump testing and the discharge of water during the pump test.

The immediate adjacent properties are:

* Hawaii Belt (Mamalahoa) Highway along the Mauka (southwest) property line and in a deep cut section of about 30 feet to 40 feet below the Hamakua Sugar Company reservoir.

* Abandoned sugar cane fields to the east.
* A deep gully (Kaula Gulch) to the northeast.

* Heavy bushes and large trees Makai (north) concealing one dwelling which appears to be about 400 feet makai and not visible from the reservoir site.

The combination of topography, soil type and climatic conditions in Ookala are favorable for developing a potable water well. The alternative to constructing a new well is to haul water to the community.

No significant impacts are expected from the exploratory well construction and testing. There will be negative impacts to the community if a potable water source is not developed in this area.
I. Proposing Agency

Department of Water Supply, County of Hawaii

II. Approving Agency

Department of Land and Natural Resources, State of Hawaii

III. Parties Consulted in Making the Assessment

Commission on Water Resource Management, DLNR
Planning Department, County of Hawaii
Safe Drinking Water Branch, Department of Health, State of Hawaii
State Historic Preservation Division, Archaeological Section, State of Hawaii

IV. The Assessment Process

This environmental assessment will be reviewed by the Department of Land and Natural Resources. A review by the Office of Environmental Quality Control is not required since exploratory wells are exempt from the EA process\(^1\).

V. Project Description

A. General Description of Work

This project involves the drilling, casing and testing of a 12-inch diameter exploratory well on the lower slopes of Mauna Kea, in Ookala Town, North Hilo District, Island of Hawaii (Island of Hawaii Map, Figure A). The project location is shown on the Vicinity Map, Figure B. The proposed well site is located on TMK 3-9-1:34, adjacent to Mamalahoa Highway and an existing water reservoir (Site Map, Figure C). The parcel is owned by the County of Hawaii.

\(^1\) "Comprehensive Exemption List for the County of Hawaii", Department of Water Supply, as approved by Environmental Quality Commission, August 1979
B. Funding

The project is authorized and funded by the Department of Water Supply, County of Hawaii, Job. No. 93-580, "Ookala Exploratory Well Drilling", and Job No. 93-581, "Ookala Production Well and Supporting Facilities".

C. Purpose of Work

This exploratory well drilling is intended to develop groundwater resource. Should the exploratory well produce an adequate quality and quantity of water, a production well and supporting facilities will be constructed to replace the existing inclined shaft which is owned and operated by Hamakua Sugar Company. A separate environmental assessment will be prepared for the production well and supporting facilities. Should the exploratory well not produce an adequate quality and quantity of water, the well will be sealed and the site restored to its existing condition.

D. Existing Inclined Shaft

The existing inclined shaft, Well Number 6117-01\(^2\) is located adjacent to Kaula Gulch and southwest of the abandoned sugar mill in Ookala. The inclined shaft, constructed in the late 1930's, is approximately 600 feet long with a slope of approximately 30\%. A copy of the Well Registration is included in Appendix 1. The entrance to the shaft is at an elevation of 300 feet mean sea level (MSL). There are two pump houses located at the end of the shaft. Figure D shows a plan of the inclined shaft. The pump houses are accessed via a cable car which travels on rails through the shaft. One pump is for domestic water and the other pumped water to the sugar mill. The estimated water level is +6 feet above MSL\(^3\). The County of Hawaii Department of Water Supply has indicated that they will not operate the inclined shaft on a long term basis should Hamakua Sugar cease operations due to its dilapidated condition.

E. Proposed Exploratory Well

The exploratory well will be located adjacent to the existing water reservoir and Mamalahoa Highway. The well will be drilled and a 12" diameter casing installed. The annular space will be packed with filter material, grouted, and the well flushed clean of drill cuttings. Then the well is tested by pumping continuously for a maximum of 5 days.

\(^2\) Commission on Water Resource Management

\(^3\) Commission on Water Resource Management
1. Technical Characteristics (See Figure E, Exploratory Well Section)

   Ground Elevation: 648 feet MSL
   Casing Diameter: 12 inches
   Length of Solid Casing: 623 feet
   Length of Perforated Casing: 30 feet
   Length of Open Hole: To be determined in the field
   Total Depth: To be determined in the field
   Duration of Pump Test: 5 days maximum, 24 hrs per day
   Proposed Pump Test Range: 100-500 gpm, avg = 300 gpm
   Estimated Length of Project: 220 Days
   Estimated Construction Cost: $645,000.

2. Economic Characteristics

   The exploratory well will not generate revenue. If the exploratory well produces an adequate quality and quantity of water, a production well will be constructed. This production well is not expected to be profitable as it is anticipated that expenses will exceed revenues. The existing service area includes Akasaki Camp, Milo Village and Kukui Village. A total of 83 households will be served with anticipated annual revenues of approximately $14,310. The anticipated construction cost for the production well and appurtenances is $500,000.

3. Social Characteristics

   The population served by the existing inclined shaft will continue to require potable water after Hamakua Sugar Company ceases operations. The Department of Water Supply is obligated to provide water to existing customers in Milo Village. If the exploratory well produces adequate quality and quantity of potable water, a permanent production well will be constructed to replace the existing inclined shaft. The community may experience a negative impact if the production well is not constructed. If the inclined shaft is not operational and no replacement well is constructed, the Department of Water Supply will have to haul water to supply the community.

4. Environmental Characteristics

   During drilling and testing, noise levels may exceed allowable levels. Water discharged during testing may impact the environment. Proposed mitigation measures are outlined in the "Proposed Mitigation Measures" section below.

---

4 Department of Water Supply
VI. Description of the Environment

A. North Hilo District

The North Hilo District extends along the Hamakua Coast of the Island of Hawaii. The proposed exploratory well will be drilled in Ookala Town, North Hilo District. Ookala Town was formerly a plantation town whose residents worked in the sugar plantations along the Hamakua Coast. Since the closing of Hamakua Sugar, the resident population has diminished. The residential population of the district in 1990 was 1,541, down from 1,679 in 1980 and 1,881 in 1970. The water service area, located makai of Mamalahoa Highway, includes Akasaki Camp, Milo Village and Kukui Village.

B. Project Site

The proposed well site is adjacent to Hamakua Sugar's existing 350,000 gallon potable water storage reservoir, located makai of Mamalahoa Highway and east of Kaula Gulch on the lower slopes of Mauna Kea, near the coastline. Milo Village is makai of the well site and the nearest residence is approximately 400 feet from the well site.

1. Geology and Soils

Soil type in the surrounding area is classified as Ookala silty clay loam, 12 to 20 percent slopes (Ood). The Ookala series consists of well-drained silty clay loams that formed in volcanic ash. The fertile topsoil supports vegetation which intercepts runoff. The porous layers of lava beneath permit a high rate of infiltration. Runoff is slow and erosion hazard is slight.

The soil surface layer is dark reddish-brown silty clay loam about 12 inches thick. The subsoil is dark-brown to dark yellowish-brown silty clay loam about 43 inches thick. This is underlain by very dark grayish-brown, partly weathered Aa lava fragments. Mean annual soil temperature is between 72 to 74 F. This soil has a very strongly acid surface layer and a slightly acid to medium acid subsoil.


2. Climate

The project site is located on the Hamakua Coast on the windward side of the Island of Hawaii. The island lies within the tropics. Winter storms move eastward across the Pacific Ocean north of Hawaii bringing widespread, heavy rains. Trade wind showers bring the greatest amount of rainfall over the windward slopes of the island. Orographic, or mountain caused, showers occur along the Hamakua Coast as moist air cools as it rises up the slopes of Mauna Kea. Annual rainfall in Ookala varies from 100 to 190 inches\(^7\). Mean monthly temperatures range between 65\(^\circ\) and 85\(^\circ\) F\(^8\). Prevailing winds blow from the east, or makai.

3. Flora and Fauna

No unique flora or fauna were observed on the site. Vegetation consists primarily of hilograss, guava, norfolk pine trees, and California grass. Photographs of the site are included in Appendix 2. Wildlife inhabiting the area are those associated with canefields, such as mongoose and other rodents. No threatened or endangered species are known to inhabit the project site or environs.

4. Archaeology

It is unlikely that there are any historic sites onsite or nearby\(^9\). The Contractor will be required to contact the Historic Preservation Division if any historic remains are discovered.

5. Zoning

The land is zoned RS-10 by Hawaii County Planning Department. RS-10 zoning allows for residential use with a minimum lot area of 10,000 square feet. The land is designed for Urban use by the State Land Use Commission. The proposed well is consistent with the existing zoning and land use.

---

\(^7\) "Climatological Data, Annual Summary, Hawaii and Pacific", U.S. Department of Commerce, National Climatic Data Center, (1992)


\(^9\) Historic Preservation Division, Department of Land and Natural Resources
VII. Probable Impacts

A. Short-term Impacts

Anticipated impacts of the project will occur during site preparation, well drilling, and test pumping the well. Affected flora and fauna are common to the area and the project's temporary effect will not be significant. There will be minimal dust impact since only a minor amount of grading and clearing is proposed.

1. Noise

Temporary and unavoidable construction noise will occur during the drilling of the exploratory well with generator and pump noise occurring during the five day test pumping of the well. Noise during drilling and test pumping may be in excess of allowable level. The closest residential lot is 400 ft from project. After the well has been drilled and cased, a temporary pump will be installed in the well to test the groundwater aquifer for yield and water quality. The test pumping will be performed 24 hours per day for a maximum of 5 days. Electricity for the test pumps will be provided by a portable generator or Hawaii Electric Light Company. If a generator is used, it may be heard at night.

2. Water Discharge

Water will be discharged during the well flushing and test pumping. The rate of discharge during testing will vary from 100 to 500 gallons per minute (GPM), averaging 300 GPM.

B. Long-term Impacts

No long-term impacts are anticipated from the construction and testing of this exploratory water well.

VIII. Proposed Mitigation Measures

A. Noise

Drilling will be restricted to daylight hours and weekdays, 8 hours per day maximum. The Contractor will utilize mufflers as necessary to comply with Chapters 42 and 43 of Title 11, Administrative Rules, State Department of Health. Mufflers and soundproofing will be used to lower noise generated by the pump motor and electric generator during the test pumping.
B. Water Discharge

Erosion and sediment control provisions will be included in the contract specifications to mitigate dust and erosion due to storm runoff over ground surfaces disturbed by construction activities. Water to flush the well will be piped to retention basins. The retention basins will retain flushed material and allow water to percolate into the ground. After the well is tested, the retention basins will be backfilled and area regraded and revegetated.

Water pumped during testing of the well will be piped to the rock stream bed of Kaula Gulch. The flow rate of the water discharged from the test well (1.1 cubic feet per second) is a fraction of the flow capacity of Kaula Gulch. The water from the well should be of potable quality. Piping the water to the stream bed will avoid erosion caused by water flowing over the ground. The environmental impact of discharging ground water into Kaula Gulch is insignificant.

IX. Alternatives

No alternative sites were considered. This site was selected for its proximity to the existing reservoir and the high probability of successfully developing the necessary groundwater resource.

X. Determination

There are no significant adverse impacts from this project.
FIGURES
FIGURE A
Island of Hawaii Map

REF: READERS DIGEST
WIDE WORLD ATLAS 1979
SCALE 1:1,500,000
Exploratory Well Site
Inclined Shaft Site

Papaaloa Pt

Akakiki Camp Site

Tank

Ookala

Milo Village

Kula Village Cemetery

Kala Village

FIGURE B
Vicinity Map

REFERENCE: USGS 1982
SCALE 1:24,000
FIGURE C
Site Map

Ref.: Island Survey, Inc.
Scale: 1" = 40'
FIGURE D
Plan View
Inclined Shaft

Winch House
Water Tunnel Entrance
Rail Track
16" Diameter Water Pipe
Transformer

Mill Water Pump House

Domestic Water Pump House

Graphic Scale

REF: D.L.N.R.
APPENDIX 1

Registration of Well

and

Declaration of Water Use
STATE WELL NO.: 6117-01
WELL NAME OR DESIGNATION: O'Kauila Sugar

A. WELL OPERATOR
Firm name: Hanakua Sugar Co., Inc.
Contact person: Patricia Pope
Address: P.O. Box 250
Parakeet, HI
Zip: 96773 Phone: 776-1521

B. OWNER OF WELL SITE
Firm name: Hanakua Sugar Co., Inc.
Contact person: Patricia Pope
Address: P.O. Box 250
Parakeet, HI
Zip: 96773 Phone: 776-1521

C. WELL LOCATION
Tax Map Key: 2-9-114 Town, Place, District: O'Kauila, North Kilo
Attach USGS "Quad" map (scale 1:24,000), tax map, or other map showing the well location.

D. WELL DATA
For Drilled Wells, submit "as-built" drawing, driller's log, and pump test results, and complete items below.
For Tunnels and Shafts, submit construction drawings, plot plan, or sketch map.
Ground elevation (mean sea level): 300 ft.
Reference point (used to measure depth to water):
Elevation: ____________ ft.
Description: ____________
Depth to water (below reference point): ____________ ft.
Maximum recorded chloride: ____________ ppm
Minimum recorded chloride: ____________ ppm
Maximum chloride in 1987: ____________ ppm
Year drilled or constructed: late 1930's
Well contractor: ____________
Casing diameter: ____________ in.
Solid casing depth (below ground): ____________ ft.
Perforated casing depth (below ground): ____________ ft.
Total depth of well: ____________ ft.
Minimum chloride in 1987: ____________ ppm

E. INSTALLED PUMP DATA
Pump type: □ Vertical shaft □ Submersible □ Centrifugal □ Other (specify): ____________
Power: □ Diesel, __ HP □ Gas, __ HP □ Electric, __ HP □ Other (specify): ____________
Pump capacity: ____________ gallons per minute
Pump installation contractor: ____________

For Official Use Only:
Date received: ____________ Date accepted: ____________
Field checked by: ____________ Date: ____________ Latitude: ____________ Hydrologic Unit: ____________
Comments: ____________ Longitude: ____________ State Well No.: ____________

References: Hawaii Revised Statutes, Chapter 174C.
Hawaii Administrative Rules, Chapters 13-167 to 13-171.
DECLARATION OF WATER USE

NOTE: The purpose of the Declaration of Water Use is to obtain information necessary for the management of the State's water resources. This declaration does not confer a legal right to water or its use.

Water use data are recorded: ☐ Daily ☐ Weekly ☐ Monthly
☐ Other (Describe):

Method of measurement: ☐ Flow Meter ☐ Orifice ☐ Other (Describe): WATER SOLD TO COUNTY WAS METERED BUT FACTORY USAGE WAS ESTIMATED

Quantity of Use (Report metered or estimated monthly water use from the well described on the reverse side of this form, for the calendar years 1983 through 1987. For a battery of wells which are not individually metered, but which are connected to a single meter or other measuring device, report total use from the battery):

WATER USE, IN GALLONS x 1000

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ANNUAL

Minimum day's use: 300,000 gallons Maximum day's use: 7,000,000 gallons

Typical times of usage: 24 hrs/day

Type of Use (Check all category boxes that apply and provide additional information as indicated):

☐ Municipal (including resorts, hotels, businesses)
☐ Domestic (systems serving 25 people or less)
☐ Irrigation
☐ Industrial
☐ Military
☐ Other

Crop(s): ☐ Sugar ☐ Pineapple
☐ Other (specify): non-crop

Non-Crop: ☐ Landscape ☐ Golf Course
☐ Other (specify): non-crop

Method: ☐ Drip ☐ Furrow ☐ Sprinkler
☐ Cooling ☐ Manufacturing ☐ Mill
☐ Other (specify): non-crop

Specify (livestock, aquaculture, etc.):

I declare that the contents of the above Declaration of Water Use are, to the best of my knowledge and belief, true, correct, and complete.

Water User's Signature: ___________________________ Date: 1/25/97
Printed Name: ___________________________ Firm or Title (Well Operator, etc.): ___________________________
APPENDIX 2

Site Photographs
SITE PHOTOGRAPH

Proposed Exploratory Well Site