### Step Drawdown Test

<table>
<thead>
<tr>
<th>Elapsed Time (min)</th>
<th>Drawdown (ft)</th>
<th>Pump Rates (gpm)</th>
<th>Elapsed Time at Specific Pumping Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4.6</td>
<td>560</td>
<td></td>
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<td>420</td>
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<td>690</td>
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<td>980</td>
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<td>560</td>
<td>16hr @ 560</td>
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<tr>
<td>1040</td>
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<td>700</td>
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<tr>
<td>1970</td>
<td>6.35</td>
<td>700</td>
<td>16.5hr @ 700</td>
</tr>
<tr>
<td>2150</td>
<td>8.08</td>
<td>900</td>
<td>3hr @ 900</td>
</tr>
</tbody>
</table>
Pump Test Analysis – Comments

Well ID: 6549-01
Date: 9/5/07
Geologist: Diane England

Pumping Test

1. Test was conducted 6-25-79.
2. Test was run for almost 36hr. 17hr at 560gpm, 15.5hr at 700gpm, 3hr at 900 and
3. Water levels taken at irregular intervals.
4. Chlorides constant at 56ppm.
5. Test shows decreasing drawdown with time at 560gpm, slowly increasing
drawdown with time at 700gpm, and a 2ft change in drawdown when the pump
rate was increased to 900gpm.

Well Interference & Stream Impacts

| Long Term Drawdown (700gpm rate only) |
| S = 0.001 | 0.1 |
| 50yr | 5.52 | 3.05 |
| 100yr | 5.89 | 3.42 |
| 500yr | 6.75 | 4.28 |

1. Numerous gulches are located within one mile, to the north and south, of the well.
2. Four wells are located within one mile of 6549-01. These wells are 6649-02.
649-01, 649-02, and 649-03. With the exception of 649-02, the wells are
significantly deeper than 649-01 and are not likely to be impacted by drawdown
from 649-01. 649-02 (Kohala Ranch 2) is located just across a road from 649-
01 (Kohala Ranch 1) and is of similar depth. Because of its significantly higher
pump rate, 649-02 is more likely to influence 649-01 than vice versa.
However, given their close proximity to one another, in terms of regional
hydrologic impact, drawdowns from the two wells will probably be similar to
drawdown from a single well pumping at a rate equal to or less than the combined
pumping rate for both wells.
3. No stream or well impacts are anticipated solely from 649-01.

Other

1. The total well depth (1550 ft) extends past the ¼-thickness depth of the
aquifer. At the current depth to water (5.9ft msl), the ¼-thickness depth is
1514.5ft msl. At the 1979 depth to water (6.9ft msl), the ¼-thickness depth is
1524ft msl.
1. **Pump Tests Check** *(special condition of PIP? Yes/No)* Glenn Bauer (initial if yes)

   **Step-Drawdown Test:**
   - followed WCPI Stds
   - analysis attached
   - proposed pump cap o.k.

   **Aquifer Pump Test:**
   - 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)

   - data complete
   - followed Special Cond & Elev.
   - well database updated

3. Charley/Lenore/Ryan (initial) take action based on above analysis

4. Roy ________ (initial) check

5. Subia ________ (initial) finalize

6. Dean ________ (initial) signature

7. Charley/Lenore/Ryan File
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
WELL COMPLETION REPORT - PART II
Pump Installation

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the
Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission
may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work.
For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the
Regulation Branch at 587-0225. For updates to this form or additional information, please visit our website at
http://www.state.hi.us/dlnr/cwrm/

1. State Well No.: 6549-01    Well Name: Kohala Ranch #1    Island: Hawaii
2. Address: Kohala Rd. Kamuela, HI    Tax Map Key: 5-9-10:57
3. Pump Installation Company: Wai'eli Drilling & Development
4. Date Pump Installed: 4/18/03
5. PERMANENT PUMP INFORMATION (Attach pump specifications and rating curve)
   Pump Type, Make, Serial No.: Sub., Reda S/N 2TB2L79725
   Rated Capacity: 550 gpm at head of: 1500 ft.
   Motor Type, H.P., Voltage, rpm: Sub. 300, 2480V, 3500 RPM
   Type of flow meter: Turbine which measures in GPM
   Model Number: Sparling  Serial Number: S/N 126142-1
   Pump type (check one):
     □ Deep Well Turbine     □ Rotary
     □ Submersible           □ Rotary-Displacement
     □ Centrifugal           □ Reciprocating
     □ □ Propeller           □ Impulse

6. Method of flow measurement:
   □ Flowmeter    Manufacturer: Sparling Make 126142-1 Size 6"
   □ Weir    □ Open Pipe    □ Office*    □ Other*, explain below
   *attach schematic
7. Fill in the as-built section on the other side of this sheet.
8. Attach photograph of well and concrete pad clearly showing benchmark on concrete pad.
9. Other remarks/comments:

Pump Installation Contractor (print) Wai'eli Drilling  C-57/C-57a/A  Lic. No. C-16543
Signature
Date 4/21/03

Permittee (print) Daniel K. Browne
Signature
Date 4/18/03
Bench mark elevation surveyed to nearest 0.01 ft. = 1459.90 ft. mean sea level

Elevation of top of chase tube = 1459.90 ft. mean sea level

@ 1492.93
Pump intake depth = ______ ft.
(referenced to bench mark)
-33.03

@ 1491.83
Chase tube depth = ______ ft.
(referenced to bench mark)
-31.93

@ 1491.83
If airline installed, bottom of airline elevation = -31.93 ft. mean sea level
Reda Pump Performance Curve
1 Stage — M520A — 60 Hz
M Series — 3500 RPM

Kokala Ranch

Type M520A
May 26, 1983

Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

ATTENTION: Mr. Bob Cunningham

Gentlemen:

SUBJECT: KOHALA ESTATES

We are attaching herewith:

1 print Showing Well #1 and #2 coordinates and elevations for the subject project.

This is transmitted for your use.

Very truly yours,

ENGINEERS SURVEYORS HAWAII, INC.

Jerry S. Nakagawa

cc: John White w/prints
TRUE NORTH

1" = 40' 

- Electric Poll Box 1457.90 Top
- Transformer 1459.66 FLR.
- BM 1459.92

- WG Pipe 146134
  - Elevation 146134

- WELL #1
  - S = 9803.50
  - W = 19878.10

- WELL #2
  - S = 9570.31
  - W = 19910.24

RECEIVED
MAY 26 1983
ENGINEERS SURVEYORS HAWAII, INC.

# 71-6 HILTON HEAD
WELL SITES
AT KOLALA ESTATES
Continuous Temperature Log

Kawaihao 6147-01 & Kohala Estates

Depth (ft)

Temperature in Degrees F°
October 18, 1982

Mr. Douglas B. Wilde  
P.O. Box 4351  
Kailua-Kona, Hawaii 96740

Dear Mr. Wilde:

As requested, enclosed you will find a list of wells and maps from Kawaihae to Upolu Point and the available data. I hope this data will be of help to you.

Very truly yours,

[Signature]

ROBERT T. CHUCK  
Manager-Chief Engineer

MO:ko

Enc.
### Wells Kawaihæ to Upoly Pt.

<table>
<thead>
<tr>
<th>Well Numbers</th>
<th>Elev. (ft.)</th>
<th>Static Head (ft.)</th>
<th>Chlorides (PPM)</th>
<th>Capacity (MGD)</th>
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<tbody>
<tr>
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<td>188</td>
<td>2.0</td>
<td>700</td>
<td>0.8</td>
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<tr>
<td>2. 6049-02</td>
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<td>2800</td>
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<tr>
<td>3. 6049-03</td>
<td></td>
<td></td>
<td>5250</td>
<td></td>
</tr>
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<td>4. 6049-04</td>
<td>82</td>
<td></td>
<td></td>
<td>0.7</td>
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<tr>
<td>5. 6249-01</td>
<td>25†</td>
<td>0.3</td>
<td>BEACKISH</td>
<td>0.01</td>
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<td>6. 6250-01</td>
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<td>8. 6250-03-05</td>
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<tr>
<td>9. 6451-01</td>
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<td>10. 6549-01</td>
<td>1462‡</td>
<td>7.5</td>
<td>56</td>
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<tr>
<td>11. 6549-02</td>
<td></td>
<td></td>
<td>82</td>
<td>0.86</td>
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<tr>
<td>12. 7154-01</td>
<td>25</td>
<td>0.5</td>
<td>SALT</td>
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<td>13. 7652-01</td>
<td>33</td>
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<td>SALT</td>
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<tr>
<td>14. 7650-01</td>
<td>52</td>
<td>2.0</td>
<td>875</td>
<td></td>
</tr>
</tbody>
</table>
DIVISION OF WATER AND LAND DEVELOPMENT

From: [Blank] Date: [Blank] File In: [Blank]

To: Initial

Robert T. Chuck
Takeo Fujii
James Yoshimoto
Manabu Tagomori
George Morimoto
Herbert Morimoto
George Miyashiro
Harold Sakai
Leslie Asari
Albert Ching
George Matsumoto
Daniel Lum
Paul Matsuo.
Noboru Kaneshiro
Edwin Sakoda

See Me

Take action by [Blank]
Route to your branch
Review & comment
Draft reply by

For information
Xerox distributed
Acknowledge receipt
File

Jane Sakai
Doris Hamada
Lorraine Nanbu
Jean Slarot
Elsie Yonamine

[Handwritten notes]

two wells 501400
saw and right 2.
Robert T. Chuck  
Division of Water and Land  
P.O. Box 373  
Honolulu, HI  96809

Dear Mr. Chuck:

I hope you can provide us with more information on water wells in Kohala on the Big Island. In February of this year you forwarded a list of wells, and their pertinent parameters, from Keahole Pt. to Kawaihae. That information was just what we wanted. However, a closer examination of the land raised doubts as to their suitability for brackish water aquaculture. Because of this, we have shifted our sights somewhat north.

Would you send us a list of the wells from Kawaihae north to around Upolu Pt., generally makai the highway? As in our last request for well information, we are interested in location, elevation, static head, salinity, and capacity. Where possible, please enclose maps of each well; those provided previously were very helpful.

If you have any comments or suggestions regarding the water found in these areas, please send them along. Mahalo for your time and consideration.

Sincerely,

Douglas B. Wilde

Douglas B. Wilde, Ph.D.

DBU:mlj
June 3, 1981

The Hilton Head Co.
225 Queen Street
Honolulu, Hawaii 96813

Attention: Mr. John Michael White

Gentlemen:

Kohala Estates Well

On March 19, 1981, we logged the Kohala Estates Well (No. 6549-01) and obtained the following information:

- Depth to water (from top of casing) 1,454.75 ft.
- Depth of well (from top of casing) 1,556 ft.
- Temperature of water 69.4°F
- Chloride content of water 56 ppm

Based on our measurement of the depth to water and an elevation of 1,462 ft. for the top of the casing (we assume that the "1462" written on the top of casing is correct), the static water level or head of the ground water aquifer is 7.25 ft.

We appreciate your permission to check your well and hope the above information is of some value to you. The cover plate on the well casing was re-welded as originally found. Mahalo.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

DL:ko

cc: Hawaii DWS
May 19, 1981

Mr. Dan Lum
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. Box 373
Honolulu, HI 96809

RE: Kohala Estates Water Wells Report

Dear Dan:

This will confirm our telephone discussion last week with respect to the above. As I understand it, your on-site inspection of the well found it to be 1,556 feet deep, at an elevation of 1,462 feet, with a head measurement of 7.25 feet above sea level, a water temperature of 69.4 degrees, and a chloride count of 56 ppm.

I would appreciate it greatly if you could provide us with a written confirmation of the above, along with a copy of your report outlining any additional information which may have resulted from your inspection.

Thank you for your assistance.

Sincerely,

[Signature]

John Michael White for
THE HILTON HEAD COMPANY, INC.

JMW: dor
cc: Ed Craddick
Joseph Vierra, Belt, Collins & Assoc.
Temperature: 69.4°F

CPU: 8.5%

DTW (GSM 12) = 1454.75

Result: 71.25
February 24, 1981

Robert T. Chuck
Manager-Chief Engineer
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Water and Land Development
P. O. Box 373
Honolulu, HI 96809


Dear Bob:

Thank you for your letter confirming my discussion with Dan Lum with respect to the above.

This letter will authorize you and members of your staff to inspect and log our exploratory well during your two week survey of water wells on Hawaii. Please coordinate your inspection and research work with Messrs. Ed and Bill Craddick.

We will, of course, appreciate receiving a report on the results of your study when completed.

Kind regards,

John Michael White for
THE HILTON HEAD COMPANY, INC.

JMW: dor
cc: Ed Craddick
August 6, 1980

Mr. E. C. Craddock  
Water Resources International, Inc.  
Exploration and Development Specialists  
2828 Paa Street, Suite 2085  
Honolulu, Hawaii 96819

Dear Mr. Craddock:

Thank you for sending us the data for the Kohala Estate  
Well No. 6549-01, drilled for the Hilton Head Company in  
West Kohala, Hawaii.

We appreciate your continued cooperation.

Very truly yours,

ROBERT T. CHUCK  
Manager-Chief Engineer

ES:ai
Mr. Robert Chuck  
Manager-Chief Engineer  
Department of Land and Natural Resources  
Division of Water and Land Development  
P. O. Box 373  
Honolulu, Hawaii 96809  

Dear Bob:  

Re - Hilton Head Company  
Kohala Head Development  

Pursuant to a request made by Mr. John Michael White of Hilton Head Company, we are enclosing the data for the well we drilled and tested for them.  

Your kind assistance in confirming the adequacy of this source would be appreciated.  

Best regards,  

WATER RESOURCES INTERNATIONAL, INC.  

E. C. Craddick  
President  

ECC/sm  
Encl.  1 set - Well Test Data dated June 25, 1979  
1 set - Final Report letter dated October 15, 1979  
1 copy - Location Map  

cc: Mr. John Michael White - Hilton Head Co., Honolulu
November 6, 1979

MEMORANDUM

TO: Honorable John Farias, Jr.
FROM: Susumu Ono

SUBJECT: Kohala Ditch System, North Kohala, Island of Hawaii

Reference is made to your memorandum of August 24, 1979 inquiring into the status of DLNR's plan to acquire the Kohala Ditch System. As you may recall several years back, when the Governor's Kohala Task Force was deeply involved in restraining the collapse of agriculture in North Kohala following the demise of Kohala Sugar Company, the Department of Land and Natural Resources was seriously considering the purchase of the Kohala Ditch System. The intent of DLNR's move was to guarantee the provision of irrigation water supplies for agricultural projects that were then being initiated under government sponsorship and to accommodate other projects that were expected to follow.

Toward this end, we delegated to the Department of Agriculture funds appropriated to our department to contract for and to engage the services of a consortium of consultants...Stephen P. Bowles and John F. Mink, geologists; Akinaka and Associates, engineers; and Charles S. May, financial analyst...to explore for water and to conduct a water study. A sum of $236,500 was expended by the Department of Agriculture to drill and test for high level groundwater in the Honokane Valley and to prepare a water resources and management and development plan for North Kohala.

The increased demand for irrigation water, as you know, did not materialize and there was no indication that the demand for irrigation water would expand much beyond what was then being furnished the few Kohala Ditch Company customers. This lack of interest for new agriculture in the area was, to an extent, reflected in the Department of Agriculture's decision to stop further work on its proposed Kahei Agricultural Park. Under the
Memorandum to
Hon. John Farias, Jr.  -2-  November 6, 1979

circumstances, DLNR felt at that time that it was not in the
public interest to pursue the ditch acquisition matter, particularly
in appreciation of Kohala Ditch Company's capability to provide
the service to the existing users and the probable high cost to
government to buy the ditch system and subsequently operate and
maintain that system.

Unless the future agricultural outlook for North Kohala
changes from what it is today, DLNR does not plan to actively
pursue the acquisition of the Kohala Ditch System under todays
climate of tight fiscal policies and expenditure ceilings. We
are, though, willing to re-assess our priorities should there be
plans for new agricultural enterprises requiring agricultural
water.

What is DOA's agricultural plan for North Kohala? What
types of agricultural enterprises are planned, where, how many
acres, and most importantly, what is their estimated requirements
for water? These information are necessary in order to develop a
water plan and assure adequate water for agriculture.

I would be happy to meet with you to further pursue this
matter should you so desire.

SUSUMU ONO
Chairman of the Board

RTC:JYY:jes
November 6, 1979

Honorable Jean King
Lieutenant Governor
State of Hawaii
State Capitol
Honolulu, Hawaii 96813

Dear Lt. Governor King:

Status of DLNR's Plan to Acquire Kohala Ditch System, North Kohala, Island of Hawaii

Several years back, when the Governor's Kohala Task Force was deeply involved in restraining the collapse of agriculture in North Kohala following the demise of Kohala Sugar Company, the Department of Land and Natural Resources was seriously considering the purchase of the Kohala Ditch System. The intent of DLNR's move was to guarantee the provision of irrigation water supplies for agricultural projects that were then being initiated under government sponsorship and to accommodate other projects that were expected to follow.

Toward this end, the Department of Agriculture with funds delegated to them from our department engaged the services of a consortium of consultants...Stephen P. Bowles and John F. Mink, geologists; Akinaka and Associates, engineers; and Charles S. May, financial analyst...to prepare a water resource management and development plan for North Kohala. A copy of this report is enclosed for your information.

The increased demand for irrigation water, as you know, did not materialize and there was no indication that the demand for irrigation water would expand much beyond what was then being furnished the few Kohala Ditch Company customers. This lack of interest for new agriculture in the area was, to an extent, reflected in the Department of Agriculture's decision to stop further work on its proposed Kaheia Agricultural Park. Under the circumstances, DLNR felt that it was not in the public interest
to pursue the ditch acquisition matter, particularly in appreciation of Kohala Ditch Company's capability to provide the service to the existing users and the probable high cost to government to buy the ditch system and subsequently operate and maintain that system.

We are now reviewing the situation to see if government intervention is necessary to control the water and to preserve the Kohala Ditch System and the surrounding areas.

With regard to your inquiry on the Kehena Ditch project, work on the project has proceeded on an increment-by-increment basis, as funds were appropriated and allotted. When the project is completed, it would serve the Mahukona-Kawaihae lands quite distant from those North Kohala lands serviced by the Kohala Ditch system. The availability of this source of water for the Mahukona-Kawaihae area would help deter pressures to export the Kohala Ditch water to other lands to the south. Under today's climate of tight fiscal policies and expenditure ceilings, the Kehena Ditch project has a very low priority in our department's capital improvements program.

We appreciate your interest in this matter.

Very truly yours,

SUSUMU ONO

SUSUMU ONO
Chairman of the Board

RTC:GSM:ak
Enc.
FOR YOUR INFORMATION

FROM

JOHN MICHAEL WHITE

The Hilton Head Company
225 Queen Street
Honolulu, Hawaii 96813

Attention: Mr. John Michael White

Gentlemen:

FINAL REPORT ON GROUND WATER DEVELOPMENT
KOHALA ESTATES, HAWAII # 6544-01

This report will confirm our preliminary findings that a high grade source of ground water is available for continued development of the Kohala Estates subdivision.

Your effort to develop a fresh ground water source in the Kohala Estates area is an excellent example of successfully planned pioneering in an unproven area. Our decision on site selection was based upon our general understanding of the geology and ground water origin and movement in the Kohala area, and our on-site, in depth analysis of your project location.

The final site selection was made at the 1,462 foot elevation, as this was the best compromise between hydrology, accessibility, economics and future development. Our procedure on this project followed our established concept of "water development phase progress" to minimize your risk and maximize the information available at each phase of the water development before your commitment was necessary to proceed with a subsequent phase.

Time was of the essence, and, therefore, a heavy duty rotary rig was used. We worked around the clock in an effort to meet your timetable. A brief outline of the procedural steps taken by us to accomplish your objective follows:

Water Source Exploration:

A. Drill 9-7/8" pilot hole to -50' for a total depth of 1,515'.

B. Bail through drill stem and obtain a static water level and water sample. This was considered as being sufficiently accurate to base a decision for proceeding to the water source development phase, as results showed a head of water of +9 feet and a very low chloride
reading of approximately 50 PPM. This was a positive indication of an excellent potential water source. To provide further assurance for capacity, it was decided to deepen the well to 1,550' (-88' elevation) during the water source development program which followed.

Water Source Development:

A. The 9-7/8" was reamed to 17-1/2".

B. A 12-3/4" O.D. casing x 5/16" wall was set to the bottom, the lower 120' being louvered.

C. The top 120' of annular was grouted with a total of 18 yds. of 1:1 slurry.

D. We set the deep well vertical turbine Johnston 25 stage pump (test pump), driven by a 16v. GMC diesel. The total depth of setting was 1,505' to suction, with air line at 1,455.5'.

E. We ran the pump test, the results of which are shown on the separate data sheet included as an exhibit to this report.

Conclusions:

The pump test confirmed that there is an excellent high grade source of ground water in the area explored. Based upon our information available, a well field at this location should yield 2 to 3 million gallons per day to serve your proposed development. As the Hilton Head lands in this area cover a vast acreage, it is felt that other well fields could be developed within the total acreage to meet any additional water demands for future development.

Suggestions for Future Water Development of this Source:

Given the foregoing conclusions, we recommend the following program:

1. Install a 1 mgd pump in the existing well, with necessary power, equipment, storage and transmission lines. This should accommodate the anticipated water needs of your Phases I and II. For additional development or increased future water demand, this same well field could be expanded in the following manner.

2. Drill a similar "step-out" production well approximately 300' laterally from the present well, and equip as above.
3. The location of both wells, as outlined above, in the same well field, would permit certain economics through the common use of power lines and control systems. It is also possible that long term observation during the operation of these two wells may indicate that a third well could, in the future, be added to this well field to meet possible future increased demand in the area.

4. Estimated costs for constructing an additional well would be based on the same cost of the first well, except that a percentage factor would be added to the overall cost for inflationary increases in labor and materials.

Our final report concludes that your effort to find a suitable water source for the Kohala Estates project, and future development, has been outstandingly successful. This is particularly gratifying in view of the high degree of risk involved due to the fact that this water source has been developed in an area heretofore unexplored.

Your development of this exploratory water well project has certainly added tremendously to the geological knowledge of ground water in this region. Additionally, it is notable that your well project will be the deepest fresh water production well operating in the State of Hawaii, with the deepest set pump of its type in the State.

We appreciate having had the opportunity to work with you on this project and we are proud to be a part of your pioneering effort to develop a water source for this area.

Very truly yours,

WATER RESOURCES INTERNATIONAL, INC.

E. C. Craddick, President

ECC/sm

Enclosures: Pump test reports dated June 25, 1979
Area Map
**WELL TEST**

**JOB NO. J-211**

**DATE** June 25, 1979

**Il No.** One  
**Location** Hilton  
**Depth** 1550  
**Dia.** 12

**Casing** 1450  
**Screen** 120 ft.  
**Open Hole** 17-1/2 in. + 1462 mls.  
**Reference Point**

**Pump Setting** 1505 ft. to Suction  
**Air Line** 1485.5 ft. from Top of concrete base

**Water Resources International, Inc.**  
**Mfg'r.** Johnston, 25 Stage 10 LMC  
**Driver** 16 V GMC  
**Mfg'r.** GMC

**Present for Test** D. O. Craddock

**Water Resources International, Inc.**

---

**Flow Test Results**

<table>
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<tr>
<th>Time</th>
<th>Q/Sec.</th>
<th>GPM</th>
<th>Air PSI</th>
<th>Drawdown (ft)</th>
<th>Temp</th>
<th>AG No.</th>
<th>CI's</th>
<th>Sample No.</th>
<th>Remarks</th>
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<tr>
<td>12/25/79 6:10 pm</td>
<td></td>
<td>560</td>
<td>12</td>
<td>4.6</td>
<td></td>
<td>5 ml</td>
<td>56 ppm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6:17</td>
<td></td>
<td>560</td>
<td>12</td>
<td>4.6</td>
<td></td>
<td>5 ml</td>
<td>56 ppm</td>
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<td></td>
</tr>
<tr>
<td>6:35</td>
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<td></td>
<td>5 ml</td>
<td>56 ppm</td>
<td>3</td>
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<tr>
<td>8:00</td>
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<td>560</td>
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<td>4.6</td>
<td></td>
<td>5 ml</td>
<td>56 ppm</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>9:00</td>
<td></td>
<td>560</td>
<td>12</td>
<td>4.6</td>
<td></td>
<td>5 ml</td>
<td>56 ppm</td>
<td>4</td>
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<td>TIME</td>
<td>Q/SEC</td>
<td>GPM</td>
<td>AIR PSI</td>
<td>DRAWDOWN</td>
<td>TEMP</td>
<td>AG NO.</td>
<td>CI'S</td>
<td>SAMPLE NO.</td>
</tr>
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<tr>
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<td>3:00</td>
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<td>5.75 ft.</td>
<td>5 ml</td>
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<td></td>
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<td>11.50</td>
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<td>5 ml</td>
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<td></td>
<td>9:00</td>
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<td>3:00 a.m</td>
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Stop Test

6:05 Recovery
The Hilton Head Company  
225 Queen Street  
Honolulu, Hawaii  96813  

Attention: Mr. John Michael White  

Gentlemen:  

FINAL REPORT ON GROUND WATER DEVELOPMENT  
KOHALA ESTATES, HAWAII  

This report will confirm our preliminary findings that a high grade source of ground water is available for continued development of the Kohala Estates subdivision.  

Your effort to develop a fresh ground water source in the Kohala Estates area is an excellent example of successfully planned pioneering in an unproven area. Our decision on site selection was based upon our general understanding of the geology and ground water origin and movement in the Kohala area, and our on-site, in depth analysis of your project location.  

The final site selection was made at the 1,462 foot elevation, as this was the best compromise between hydrology, accessibility, economics and future development. Our procedure on this project followed our established concept of "water development phase progress" to minimize your risk and maximize the information available at each phase of the water development before your commitment was necessary to proceed with a subsequent phase.  

Time was of the essence, and, therefore, a heavy duty rotary rig was used. We worked around the clock in an effort to meet your timetable. A brief outline of the procedural steps taken by us to accomplish your objective follows:  

Water Source Exploration:  

A. Drill 9-7/8" pilot hole to -50' for a total depth of 1,515'.  

B. Bail through drill stem and obtain a static water level and water sample. This was considered as being sufficiently accurate to base a decision for proceeding to the water source development phase, as results showed a head of water of +9 feet and a very low chloride
reading of approximately 50 PPM. This was a positive indication of
an excellent potential water source. To provide further assurance
for capacity, it was decided to deepen the well to 1,550' (-88'
elevation) during the water source development program which followed.

Water Source Development:

A. The 9-7/8" was reamed to 17-1/2".

B. A 12-3/4" O.D. casing x 5/16" wall was set to the bottom, the lower
120' being louvered.

C. The top 120' of annular was grouted with a total of 18 yds. of 1:1
slurry.

D. We set the deep well vertical turbine Johnston 25 stage pump (test
pump), driven by a 16v. GMC diesel. The total depth of setting was
1,505' to suction, with air line at 1,455.5'.

E. We ran the pump test, the results of which are shown on the separate
data sheet included as an exhibit to this report.

Conclusions:

The pump test confirmed that there is an excellent high grade source
of ground water in the area explored. Based upon our information
available, a well field at this location should yield 2 to 3 million
gallons per day to serve your proposed development. As the Hilton
Head lands in this area cover a vast acreage, it is felt that other
well fields could be developed within the total acreage to meet any
additional water demands for future development.

Suggestions for Future Water Development of this Source:

Given the foregoing conclusions, we recommend the following program:

1. Install a 1 mgd pump in the existing well, with necessary power,
equipment, storage and transmission lines. This should accommodate
the anticipated water needs of your Phases I and II. For additional
development or increased future water demand, this same well field
could be expanded in the following manner.

2. Drill a similar "step-out" production well approximately 300'
laterally from the present well, and equip as above.
3. The location of both wells, as outlined above, in the same well field, would permit certain economics through the common use of power lines and control systems. It is also possible that long term observation during the operation of these two wells may indicate that a third well could, in the future, be added to this well field to meet possible future increased demand in the area.

4. Estimated costs for constructing an additional well would be based on the same cost of the first well, except that a percentage factor would be added to the overall cost for inflationary increases in labor and materials.

Our final report concludes that your effort to find a suitable water source for the Kohala Estates project, and future development, has been outstandingly successful. This is particularly gratifying in view of the high degree of risk involved due to the fact that this water source has been developed in an area heretofore unexplored.

Your development of this exploratory water well project has certainly added tremendously to the geological knowledge of ground water in this region. Additionally, it is notable that your well project will be the deepest fresh water production well operating in the State of Hawaii, with the deepest set pump of its type in the State.

We appreciate having had the opportunity to work with you on this project and we are proud to be a part of your pioneering effort to develop a water source for this area.

Very truly yours,

WATER RESOURCES INTERNATIONAL, INC.

E. C. Craddick, President

ECC/sm

Enclosures: Pump test reports dated June 25, 1979
Area Map
FIGURE 1
LOCATION MAP
THE HILTON HEAD COMPANY
MEMORANDUM

FROM  John Michael White

DATE  July 23, 1980

SUBJECT Kohala Estates deepwater well / Bowles report

TO  Mr. Bob Chuck
DEPARTMENT OF LAND AND NATURAL RESOURCES
1151 Punchbowl Street, Suite 227
P.O. Box 373
Honolulu, Hawaii  96809

Dear Bob:

Pursuant to our discussion today with regard to the above, I have enclosed an extra copy of the Bowles water report. Additionally, I have asked Ed Craddick to supply you with a duplicate of all information on the water well which has been previously submitted to you over the past year.

I would greatly appreciate it if, after reviewing the enclosed, you could write a brief letter to Mr. Quirino Antonio of the Department of Water Supply in Hilo, advising him that this water well is an adequate source for domestic purposes for our Kohala Estates development.

I also spoke with Bill Wong at Tom Arizumi's office at the Department of Health today, per your suggestion, and have provided him with a duplicate of the information which we are sending to you.

Thank you very much for your assistance. Please call me if you have any questions.

Kind regards,

John Michael White
Encls.

cc: Mr. Quirino Antonio
JMW:cjr
A WATER RESOURCE REVIEW
OF KOHALA ESTATES AND VICINITY

Groundwater resources between Kawaihae and Mahukona have
largely been ignored and undeveloped until 1979. The primary
water supply activities to date, have focused on the diversion
and storage of stream flow in the upper elevations of the Kohala
Mountain. Successful groundwater developments at Waikoloa
(elevation 1200 feet), Lalamilo (elevation 1200 feet) and, now,
Kohala Estates (elevation 1460 feet), have clearly demonstrated
the viability of developing fresh groundwater along the leeward
areas of North and South Kohala. These groundwater resources,
while energy intensive to operate, are reliable and require virtually
no treatment for domestic service.

The geology and hydrology of the Kohala Mountain has been
extensively described by Stearns and Macdonald (1946) and more
recently reviewed by Bowles, et al (1973). A manuscript report by
Bowles (1973) dealt specifically with irrigation water development
for Kohala Estates Phase I. The hydrogeologic studies to date
have generally concluded the following:

1. that substantial quantities of groundwater
   occur on the leeward coast of the Kohala
   Mountain in the form of a basal lens

2. that within a mile or so of the shore line,
   the groundwater in the lens is brackish
   containing from 500 to 2000 mg/l of chlorides

3. that the primary area of recharge is in the
   summit of the Kohala Mountain above elevation
   3000 feet

4. that secondary (seasonal) recharge occurs on
   the leeward slopes during winter storms and
   by stream losses
LABORATORY ANALYSIS REPORT

TO: Mr. Steve Bowles
ADDRESS: 4988 Maunalani Circle
SAMPLES OF: Well water - KOHALA ESTATES EXPLORATION WELL
SAMPLE COLLECTED BY MEANS OF "THIEF" SAMPLER @ ELEVATION - 40'

SAMPLING DATE: 11/15/79
TIME: 13:00
RECEIPT DATE: 11/16/79
TIME: 2:55 pm

| DATE SAMPLE ANALYZED | 11/17/79 |
| TIME SAMPLE ANALYZED | 10:00am |
| SAMPLE TYPE          | Discrete |

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<tr>
<th>SAMPLE DESCRIPTION</th>
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<tr>
<td>Alkalinity</td>
<td>mg/l</td>
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<td>Sulfates</td>
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<td>Silica</td>
<td>mg/l</td>
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<td>Total Phosphorus</td>
<td>mg/l</td>
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<td>Barium</td>
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<td>Cadmium</td>
<td>mg/l</td>
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<td>Chromium</td>
<td>mg/l</td>
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<tr>
<td>Silver</td>
<td>mg/l</td>
<td>&lt; 0.01</td>
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<tr>
<td>Arsenic</td>
<td>mg/l</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Selenium</td>
<td>mg/l</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Mercury</td>
<td>µg/l</td>
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<td>Sodium</td>
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<td>Calcium</td>
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<td>Magnesium</td>
<td>mg/l</td>
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</tr>
<tr>
<td>Potassium</td>
<td>mg/l</td>
<td>4.47</td>
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</table>

LABORATORY REMARKS: * µg/l is the same as parts per billion. Alkalinity is expressed in mg/l as CaCO₃.

APPENDIX 2

cc: J. Michael White, THE HILTON HEAD CORP.

*(signature)*
FOR YOUR INFORMATION
FROM
JOHN MICHAEL WHITE

The Hilton Head Company
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Honolulu, Hawaii 96813

Attention: Mr. John Michael White

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The Hilton Head Company  
October 15, 1979  
Page Two
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Very truly yours,

WATER RESOURCES INTERNATIONAL, INC.

E. C. Craddick, President

ECC/sm

Enclosures: Pump test reports dated June 25, 1979
Area Map
### WELL TEST

**JOB NO. J-211**

**DATE** June 25, 1979

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<th>Pump Setting</th>
<th>Air Line</th>
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<tr>
<td>1505 ft. to Suction</td>
<td>1485.5 ft. from Top of concrete base</td>
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<th>System</th>
<th>Water Resources International, Inc.</th>
<th>Mfg'r.</th>
<th>Johnston, 25 Stage 10 LMG</th>
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<tr>
<td>Q</td>
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<td>Driver</td>
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</tr>
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**Start 6:00 p.m.**

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<th>AIR PSI</th>
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FIGURE 1
LOCATION MAP
5. that much of the groundwater flow beneath the summit area is diverted to the North and South by dike and fault systems located within the mountains.

The pumping test results of the Kohala Estates test well (Appendix 1) clearly demonstrates that there is a significant amount of recharge within, and/or dike leakage towards, the leeward coast to sustain a rather thick fresh water lens. A water level measurement (via air line) of +9 feet was reported during the pumping test. A series of wire line measurements made in late November 1979, with a corrected elevation datum, show that the water level stands at +6.5' ± .25'. Recalculation of the original air line measurement using the new datum shows a water level of +7'. Both measurements clearly substantiate the existence of a rather thick fresh water lens.

The salinity of the well during the pumping test of 6/25-27/79 and from "thief" samples taken in November of 1979, show that the well will produce water of domestic quality with chlorides of 60 mg/l. Complete inorganic chemical analysis (Appendix 2) show that the water meets the quality standards as set forth by the State Department of Health Rules and Regulations, Chapter 49.

The total quantity of fresh groundwater which might ultimately be developed by judiciously spaced wells at about the 1500 foot elevation in Kohala Estates cannot be accurately determined at this time. The pumping test conducted on the K.E. well has demonstrated that a pumping rate of 700 gpm (1 mgd) is practical for a single well unit. There is adequate hydrologic evidence that a well field capable of pumping 3 mgd can be constructed.

A second well is presently under construction on Phase I by an individual lot owner. This well, located at an elevation of about 400 feet, will provide valuable data on the extent of the fresh basal lens and additional data on water table gradient. While this well is expected to be slightly brackish, the data it provides will be important to future hydrologic interpretation.

Total domestic water demand for the Kohala Estates Phases I and II has not been established, however, there are to be a total
of 207 lots. A 1 mgd source can supply about 4800 gpd per lot. Normal domestic consumption (household) will probably not exceed 1000 gpd/lot, thus a substantial surplus will be available.

In summary, the recently completed Kohala Estates test well has clearly demonstrated the existence of a substantial and reliable fresh groundwater resource. The total amount of water which can ultimately be developed by properly spaced wells is unknown, but a development of up to 3 mgd can be expected. Water quality of this resource is excellent and well within any quality standards set forth for domestic supply.
SELECTED REFERENCES


FOR YOUR INFORMATION
FROM
JOHN MICHAEL WHITE

The Hilton Head Company
225 Queen Street
Honolulu, Hawaii 96813

Attention: Mr. John Michael White

Gentlemen:

FINAL REPORT ON GROUND WATER DEVELOPMENT
KOHALA ESTATES, HAWAII

This report will confirm our preliminary findings that a high grade source of ground water is available for continued development of the Kohala Estates subdivision.

Your effort to develop a fresh ground water source in the Kohala Estates area is an excellent example of successfully planned pioneering in an unproven area. Our decision on site selection was based upon our general understanding of the geology and ground water origin and movement in the Kohala area, and our on-site, in-depth analysis of your project location.

The final site selection was made at the 1,462 foot elevation, as this was the best compromise between hydrology, accessibility, economics and future development. Our procedure on this project followed our established concept of "water development phase progress" to minimize your risk and maximize the information available at each phase of the water development before your commitment was necessary to proceed with a subsequent phase.

Time was of the essence, and, therefore, a heavy duty rotary rig was used. We worked around the clock in an effort to meet your timetable. A brief outline of the procedural steps taken by us to accomplish your objective follows:

Water Source Exploration:

A. Drill 9-7/8" pilot hole to -50' for a total depth of 1,515'.

B. Bail through drill stem and obtain a static water level and water sample. This was considered as being sufficiently accurate to base a decision for proceeding to the water source development phase, as results showed a head of water of +9 feet and a very low chloride...
reading of approximately 50 PPM. This was a positive indication of an excellent potential water source. To provide further assurance for capacity, it was decided to deepen the well to 1,550' (-88' elevation) during the water source development program which followed.

Water Source Development:

A. The 9-7/8" was reamed to 17-1/2".

B. A 12-3/4" O.D. casing x 5/16" wall was set to the bottom, the lower 120' being louvered.

C. The top 120' of annular was grouted with a total of 18 yds. of 1:1 slurry.

D. We set the deep well vertical turbine Johnston 25 stage pump (test pump), driven by a 16v. GMC diesel. The total depth of setting was 1,505' to suction, with air line at 1,455.5'.

E. We ran the pump test, the results of which are shown on the separate data sheet included as an exhibit to this report.

Conclusions:

The pump test confirmed that there is an excellent high grade source of ground water in the area explored. Based upon our information available, a well field at this location should yield 2 to 3 million gallons per day to serve your proposed development. As the Hilton Head lands in this area cover a vast acreage, it is felt that other well fields could be developed within the total acreage to meet any additional water demands for future development.

Suggestions for Future Water Development of this Source:

Given the foregoing conclusions, we recommend the following program:

1. Install a 1 mgd pump in the existing well, with necessary power, equipment, storage and transmission lines. This should accommodate the anticipated water needs of your Phases I and II. For additional development or increased future water demand, this same well field could be expanded in the following manner.

2. Drill a similar "step-out" production well approximately 300' laterally from the present well, and equip as above.
3. The location of both wells, as outlined above, in the same well field, would permit certain economics through the common use of power lines and control systems. It is also possible that long term observation during the operation of these two wells may indicate that a third well could, in the future, be added to this well field to meet possible future increased demand in the area.

4. Estimated costs for constructing an additional well would be based on the same cost of the first well, except that a percentage factor would be added to the overall cost for inflationary increases in labor and materials.

Our final report concludes that your effort to find a suitable water source for the Kohala Estates project, and future development, has been outstandingly successful. This is particularly gratifying in view of the high degree of risk involved due to the fact that this water source has been developed in an area heretofore unexplored.

Your development of this exploratory water well project has certainly added tremendously to the geological knowledge of ground water in this region. Additionally, it is not to be expected that your well project will be the deepest fresh water production well operating in the State of Hawaii, with the deepest set pump of its type in the State.

We appreciate having had the opportunity to work with you on this project and we are proud to be a part of your pioneering effort to develop a water source for this area.

Very truly yours,

WATER RESOURCES INTERNATIONAL, INC.

E. C. Craddick, President

ECC/sm

Enclosures: Pump test reports dated June 25, 1979
Area Map
WELL TEST

JOB NO. J-211

DATE June 25, 1979

Well No. One

Location Hilton

Depth 1550

Dia. 12

Hole Casing 1450

Screen 120 ft.

Open Hole 17-1/2"

Datum + 1462 mls.

Reference Point

Test Pump Setting 1505 ft. to Suction

Air Line 1485.5 ft.

Gage Water Elev. + 9 ft.

from Top of concrete base

Equipment:

Pump Water Resources International, Inc.

Mfg'. Johnston, 25 Stage 10 LMC

Rated Q 700 GPM

Operating Speed 1800

Driver 16 V GMC

Mfg'. GMC

Present for Test D. Q. Craddick

Water Resources International, Inc.

Gage Air Line PSI 14 PSI

Gage Water Level + 9 ft. MSL

Start 6:00 p.m.

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**WELL TEST**

**JOB NO.: J-211**

**DATE:** June 25, 1979

**Well No.:** One  
**Location:** Hilton  
**Depth:** 1550 ft.

**Casing:** 1450 ft.  
**Screen:** 100 ft.  
**Open Hole:** + 1462 mls.

**Pump Setting:** 1505 ft. to Oulton  
**Air Line:** 1485.5 ft.

**Water Elev.:** + 9 ft.  
**from:** Top of concrete base

**Equipment:**
- **mp:** Water Resources International, Inc.  
- **Mfg’r.:** Johnston, 25 Stage 10 LMC  
- **Driver:** 16 V LMC  
- **Mfg’r.:** LMC  
- **Present for Test:** D. O. Craddick

**Static Air Line PSI:** 14 PSI  
**Static Water Level:** + 9 ft. MSL

**Start:** 6:00 p.m.

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<td>900</td>
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<td>Recovery</td>
<td>14</td>
</tr>
</tbody>
</table>
WELL TEST

JOB NO. J-221

DATE June 25, 1979

Do. One location Hilton Depth 1550 Dia. 12

 casing 1450 Screen 120 ft. Open Hole 17-1/2"

+ 1462 mls. Reference Point

mp Setting 1505 ft. to Suction Air Line 1485.5 ft.

Water Elev. + 9 ft. from Top of concrete base

Water Resources International, Inc. Mfg'r. Johnston, 25 Stage 10 LMC

Q: 700 GPM Driver 16 V GMC

ing Speed 1800 Mfg'r. GMC

Present for Test: D. O. Craddick

Water Resources International, Inc.

Start 6:00 p.m.

<table>
<thead>
<tr>
<th>TIME</th>
<th>G/SEC.</th>
<th>-GPM</th>
<th>AIR PSI</th>
<th>DRAWDOWN</th>
<th>TEMP</th>
<th>AG NO.</th>
<th>C�</th>
<th>SAMPLE NO.</th>
<th>REMARKS</th>
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<td>0</td>
<td>560</td>
<td>12</td>
<td>4.6 ft.</td>
<td>5 ml</td>
<td>56 ppm</td>
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<td>56 ppm</td>
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</tr>
</tbody>
</table>
**WELL TEST**

**JOB NO. J-211**  
**DATE** June 25, 1979

**Il No.** One  
**Location** Hilton  
**Depth** 1550  
**Dia.** 12

**Casing** 1450  
**Screen** 100 ft.  
**Open Hole**

**Pump Setting** 1505 ft. to Sultion  
**Air Line** 1485.5 ft.

**Water Elev.** + 9 ft.  
**from** Top of concrete base

**Equipment:**

- **Mfg' r.** Johnston, 25 Stage 10 LMC  
- **Driver** 16 V LMC  
- **Mfg' r.** LMC

**Present for Test** D. O. Craddick  
Water Resources International, Inc.

**Air Line PSI** 14 PSI  
**Water Level** + 9 ft. MSL

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**Start 6:00 p.m.**

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<tr>
<th>TIME</th>
<th>GPM</th>
<th>AIR PSI</th>
<th>DRAWDOWN</th>
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<th>CT's</th>
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<th>REMARKS</th>
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Route Slip
WATER RESOURCES & FLOOD CONTROL BRANCH

From: [Signature] Date: 4-1-81 File In: WELLS

To Initial
- Manabu Tagomori
- Albert Ching
- Daniel Lum
- George Matsumoto
- Nobu Kaneshiro
- Tom Nakama
- Paul Matsuo
- Edwin Sakoda
- Mitchel Ohye
- Milton Yamasaki
- JOE
- Doris Ilamada

Please
- See me
- Call
- Take action by __________
- Review & comment
- Draft reply by __________
- Type draft
- Type final
- Xerox ___ copies
- Mail

For Approval
- Signature
- Information

Robert Chuck
Takeo Fujii
James Yoshimoto

1745-01
CHLORIDES
First daily sample taken 3/21/81
WAILUA WELL 51 PPM
SWL = 3.71' (by steel tape)

KOHALA ESTATES WELL

56 ppm was obtained 56 ppm
no sign their pump test
DEPARTMENT OF LAND & NATURAL RESOURCES  
DIVISION OF WATER AND LAND DEVELOPMENT

DRILLER'S REPORT

DESCRIPTION

Date of report ........................................... Person filing report ...........................................

A. OWNER: Hilton Head Co.  
WELL: Hilton Head Kohala 12  
ISLAND: Hawaii  

B. GENERAL LOCATION: North Kohala

C. DRILLING COMPANY: Water Resources International

D. TYPE OF RIG: Roxy  
DRILLING COMPLETED: June 1979  
DRILLER: W.B. Braddick

E. ELEVATION, msl: Top of drilling platform 1462 ft.  
Height of drilling platform above ground surface 1500 ft.  
Height of bench mark below drilling platform 1462 ft.  

F. HOLES SIZE: 17.9 inch dia. to 1800 ft. below drilling platform.  
17.9 inch dia. to 1800 ft. below drilling platform.  
17.9 inch dia. to 1800 ft. below drilling platform.

G. CASING INSTALLED: 1.7 in. I.D. x 375 in. wall solid section to 1470 ft. below drilling platform.  
1.7 in. I.D. x 375 in. wall perforated section to 1570 ft. below drilling platform.  
Type of perforation: Slotted

H. ANNULUS: Grouted 1000 ft. to 1000 ft. below drilling platform.
Gravel packed 1000 ft. to 1000 ft. below drilling platform.

I. PERMANENT PUMP INSTALLATION:

- Pump type, make, serial no. ........................................... Capacity g.p.m. ...........................................
- Motor type, H.P., voltage, r.p.m. ...........................................
- Depth of pump intake setting ft. below ........................................... which elevation is ft.  
- Depth of bottom of airline ft. below ........................................... which elevation is ft.

HYDROLOGY

J. INITIAL WATER LEVEL: 453 ft. below drilling platform.  
Date of measurement ...........................................

K. INITIAL CHLORIDE: 4 ppm, total depth of well 1550 ft. below drilling platform.  
Sampling Date ...........................................

L. PUMPING TESTS:  
Reference point (R.P.) used:  
which elevation is ft.  
Date ...........................................

Start water level 453 ft. below R. P.  
End water level 453 ft. below R. P.  
Depth of well 1550 ft. below R. P.  

Elapsed Time (hours) Rate Draw- Cl- Temp.  
Start water level ft. below R. P.  
End water level ft. below R. P.  
Depth of well ft. below R. P.  

L. PUMPING TESTS:  
Reference point (R.P.) used:  
which elevation is ft.  
Date ...........................................

Start water level 453 ft. below R. P.  
End water level 453 ft. below R. P.  
Depth of well 1550 ft. below R. P.  

Elapsed Time (hours) Rate Draw- Cl- Temp.  
Start water level ft. below R. P.  
End water level ft. below R. P.  
Depth of well ft. below R. P.  

M. DRILLER'S LOG:

Depth, ft.  
Rock Description & Remarks  
Water Level  
Depth, ft.  
Rock Description & Remarks  
Water Level  

N. REMARKS: ...........................................

FOR DRILLER'S USE

Job Name ...........................................
Job No. ...........................................

INSTRUCTIONS: Send three(3) copies to Manager-Chief Engineer, Division of Water and Land Development, P. O. Box 379, Honolulu, Hawaii 96809.


FOR OFFICIAL USE

Latitude 20° 05'.  
Longitude 155° 40'.  
Well No. 654901.
From: [Signature]
Date: 9/12
File In:

To  Initial

Robert T. Chuck
Takeo Fujii
James Yoshimoto

Manabu Tagomori

George Morimoto
Hong Fong Chang
Herbert Morimatsu

Harold Sakai
Leslie Asari

Albert Ching
George Matsumoto
Daniel Lum
Paul Matsuo
Noboru Kaneshiro

See Me
Take action by
Route to your branch
Review & comment
Draft reply by
For information
Xerox ______ copies
Acknowledge receipt

Jane Sakai
Doris Hamada
Lorraine Nanbu
Jean Slarot
Elsie Yonamine
Alyce Konishi

Hilton Head Lodge

6549-01
NOTICE OF INTENT TO DRILL

WELL OR PROJECT NAME: Hilton Head Kohala Island Hawaii

OWNER OF WELL: Hilton Head Co
Mailing Address: 90 John H. White 225 Queen St Honolulu 96813

DRILLING COMPANY: Water Resources Int Inc
Mailing Address: 2828 Pau St Honolulu 96819

Proposed Construction Date: Jan
Proposed Completion Date: Mar 19
Proposed Depth: 50 feet

PROPOSED USE OF WELL:
(a) Domestic ✓
(b) Irrigation ✓
(c) Industrial (type)
(d) Cooling (type)
(e) Waste Disposal (type)
(f) Soils Invest.
(g) Foundation Invest.
(h) Others (specify)

LOCATION OF WELL: (Attach copy of tax map, USGS topographic map, plantation field map, road map, or prepared drawing showing exact location. If not available, prepare a hand-drawn sketch map (not necessarily to scale) in the space below showing sufficient landmarks, distances, and directions for location in the field)

COORDINATE

155° 50' E
20° 05' N

TAX MAP KEY:

Date Submitted

Signature of Owner

Title (If Applicable)

FOR DRILLER'S USE

Job Name

FOR OFFICIAL USE

Latitude 20° 05' 29"
Longitude 155° 49' 23"
Well No. 6549-01

INSTRUCTIONS: Send three (3) copies to: Manager-Chief Engineer, Division of Water and Land Development, P. O. Box 373, Honolulu, HI 96809.

Mr. John Michael White  
The Hilton Head Company  
225 Queen Street  
Honolulu, Hawaii 96813  

Dear Mr. White:

Kohala Deepwell Project

Attached please find well test data obtained during testing of your well at North Kohala.

Our analysis of the well test data reflects that the well will safely yield one (1) MGD of potable domestic water.

We recommend that you install a pump meeting the following requirements:

The pump suction should be set at 1505 ft. below ground level.

Pump construction specs:
(a) Bowls
   1. Maximum O.D. 10 inches
   2. Class 50 cast iron
   3. Bolted construction fitted with "O" rings
   4. Maximum thrust factor 3.6
   5. Bowl shaft 17-4 PH
   6. Minimum lateral of 1 inch after assembly.

(b) Column - 1200 ft. minimum schedule 40, 8 inch I.D.
    - 300 ft. minimum schedule 60, 8 inch I.D.

(c) Shaft and tubing - 1-15/16" shaft, enclosed in schedule 80, oil lube tubing.

(d) Discharge head - heavy duty steel fabricated head fitted with WRIT tube tension assembly.

(e) Motor - 400 HP, 1800 RPM, 3 phase, 60 hz, 1.15 sf. with polyseal insulation, minimum thrust capacity 32,000 lbs. based on 10,000 hr. bearing life.
Mr. John Michael White  
The Hilton Head Company.

-2-  

July 3, 1979

Electrical controls to match the motor selected.

Special attention should be given in designing the discharge piping to protect against water hammer when pump is shutdown.

We are pleased with the well test and look forward to contracting with you for the design and installation of balance of your requirement to put the well into operation.

Yours truly,

WATER RESOURCES INTERNATIONAL, INC.

[Signature]

Douglas O. Craddick  
Vice President

DOC/sm  
Encl.

cc: Mr. Bill Craddick, Hilo – W/encl.
Mr. escott,

Dear John:

I am writing to you with regard to the current activities at the Kohala site. The tests through the three total wells have not been successful. Water quality and casing characteristics of the wells have not met the potential of the area.

Preliminary tests performed will be determined by the next phase of the project. Prior to reaming, the present pilot hole will be deeper by additional 50 feet by 60 feet. We request authorization to proceed with the phase II immediately, upon delivery of materials and equipment.

Very truly yours,

F. C. Credick
President

WATER RESOURCES INTERNATIONAL, INC.
John White 524-6000, Kohala Estates, said they're having a dedication and blessing of water well that they're drilling at Kohala Estates on Monday, Feb. 26 at 10:00 am. (starting up the well and blessing by Rev. Akaka). You and your staff are welcome to attend the dedication (sorry for the last minute invitation but it was only finalized yesterday). If you can't attend but would like to send your project engineer, please do so. Also, anytime that DOWALD is interested in looking at the progress of the well drilling (for the next three weeks) please feel free to do so.

The site of the dedication is: go mauka to the top of the paved road in Kohala Estates and continue one mile on the dirt road extension of the paved road.
State of Hawaii  
Department of Land and Natural Resources 
Division of Water and Land Development 
P. O. Box 373  
Honolulu, Hawaii  96809

Gentlemen:

Re: Kohala Estates Deepwell Project 6549-01
Hilton Head Company

With reference to the attached Notice of Intent to Drill the Kohala Deepwell, we wish to advise that our timetable calls for mobilizing in January 1979 and completing the 9-5/8" pilot hole to approximately ~50 ft. by the end of February 1979.

The pilot hole will then be checked for static water level and quality, and if suitable will be opened to 16" for installation of a 12-3/4" O.D. casing on March/April 1979 depending upon time of delivery of the casing from the mainland. Following this, the well will be pump tested for a minimum of 72 hours for determination of pump design.

You will be advised of exact elevation and site selection as soon as determined.

Very truly yours,

WATER RESOURCES INTERNATIONAL, INC.

É. C. Craddock
President

ECC/sm
Enclosure: Notice of Intent to Drill

cc: Mr. John Michael White - W/copy of enc.
The Hilton Head Company 
225 Queen St., Hon., Hi 96813

EXPLORATION AND DEVELOPMENT SPECIALISTS 6549-01