CHECKLIST

✓ Well Construction Permit __ Pump Installation Permit
   Water Use Permit Required Also

Well Name & Number: Palawai Basin Exploratory Well (4854-02) Island: Lanai
Applicant: Lani Company, Inc. Landowner: Castle & Cooke, Inc.
Consultant: Tom Nance Water Resource Engineering

Date application received: 8/26/94
✓ Date acknowledged receipt/request more info: 9/1/94
✓ Date filing fee deposited: 8/31/94

Application sent to following: Date sent Comments received
✓ Dept. of Health Safe Drinking Water Branch 9/1/94
✓ Office of Hawaiian Affairs Wastewater Branch 9/1/94
✓ Dept. of Hawaiian Home Lands 9/1/94
✓ State Historic Preservation Div. 9/1/94
✓ Sierra Club Legal Defense Fund 9/1/94
✓ Honolulu Board of Water Supply 9/1/94
✓ Maui Dept. of Water Supply 9/1/94
✓ Kauai Dept. of Water Supply 9/1/94
✓ Hawaii Dept. of Water Supply 9/1/94
✓ Hawaii Dept. of Public Works 9/1/94
✓ Koolauoa NB #28 (Oahu) 9/1/94
✓ Additional List (Melokai) 9/1/94

Eric Hirane / Lyann Misuna
✓ DIV. OF AQUATIC RES.
✓ HISTORIC PRESERVATION DIVISION 9/1/94
Date agenda due: 5 Oct 94
Date submittal due: 5 Oct 94
Date submittal sent to applicant: 
Date application approved OR disapproved: 19 Oct 94
Date applicant notified of decision: 

Remarks: ____________________________

David M. Map assign wells [Pencil in INDEX/summary] — 11/24

Mitch (Log in logbook [manuscript])
{ Log in computer (WELL PERMITS)
"Charley: Sure, having a hard time getting the numbers right first the elevations now. The water level. The included are our official measurements taken by th e crew. Numbers are depths from the surface.

Sorry for the confusion. I took my data from field reports now. I learned these were boil test and apparently were not accurate. The chemical pump data is correct."
## PUMP EFFICIENCY CHECK - LANAI WELL No. 14 - APRIL 23, 2004

<table>
<thead>
<tr>
<th>Time</th>
<th>D (')</th>
<th>Flow Reading</th>
<th>Time per Gallon (seconds)</th>
<th>G flow (gpm)</th>
<th>Q flow (gpm)</th>
<th>Depth to Water Level (ft)</th>
<th>Volts</th>
<th>Amps</th>
<th>PF</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:45 AM</td>
<td>600.82</td>
<td>36.63</td>
<td>300</td>
<td>17.0</td>
<td>0.15</td>
<td>695.97</td>
<td>94.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:35 AM</td>
<td>692.86</td>
<td>74.30</td>
<td>400</td>
<td>32.2</td>
<td>0.15</td>
<td>692.86</td>
<td>94.50</td>
<td></td>
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</tr>
<tr>
<td>9:25 AM</td>
<td>690.76</td>
<td>42.35</td>
<td>400</td>
<td>29.7</td>
<td>0.15</td>
<td>690.76</td>
<td>112.00</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10:25 AM</td>
<td>690.45</td>
<td>65.94</td>
<td>500</td>
<td>38.4</td>
<td>0.15</td>
<td>690.45</td>
<td>125.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Depth of water was measured using a graduated rod. 

* Pressure reading was measured using a 200 psi gauge.

---

![Diagram of well components]
May 14, 2004

Mr. Collins Lam
Castle & Cook Resorts, LLC
P.O. Box 630310
Lana'i City, HI 96790

Dear Mr. Lam:

Well Completion Report for Well No. 4854-02

We received your Well Completion Report Part II for the Lana'i 14 (Well No. 4854-02) on May 13, 2004 and acknowledge that it is complete. Other than the continuing water use reporting requirement, the permitting requirements for this well are complete.

If you have any questions, please contact Charley Ice of the Commission staff at 587-0251 or toll-free at or 1-800-468-4644, extension 70251.

Sincerely,

[Signature]

EDWIN T. SAKODA
Acting Deputy Director

cc: William Moore, Beylik Drilling, Inc.
Tom Nance Water Resource Engineering
BEYLIK DRILLING, INC. 
HAWAII DIVISION 
Serving the Water Industry

FACSIMILE TRANSMITTAL

DATE: 5-13-04

TO: C.W. CM

FROM: WILL MORE

REF: Location 14 - 4864 - 02

# OF PAGES TO FOLLOW: 1

ATTN: CHARLEY IBE

FAX NO.: 587-0219

RE: My TELECON MESSAGE - I

TALKED WITH GREG @ TUBE WDC

NOTED THAT THE THOMPSON WELL

SITE. ELEVATION USED TO DETERMINE THE TOP OF

THE CONC. BASE SO I.TD. FINISH ELEVATION

IS IN FACT IS 1142. THE CHASE

TUBE PROJECTS 1'-4" ABOVE THE TOP

OF THE P&O AS SHOWN ON THE

PLAN. POSITION TRANSMITTED WITH

THIS MESSAGE
UP PAD

H GRADE 1193.2

EXIST. 12.25" I.D. STEEL CASING

2- 1 1/4" PVC, FLUSH-JOINT, SOUNDING TUBE, SCH. 80 STRAPPED TO PUMP COLUMN (NEXT TO POWER CABLE) W/ S.S. STRAPS @ 10'-0" O.C.

8" G.I. PUMP COLUMN

JUNCTION BOX BEYOND

TOP OF PUMP BASE PAD
EL. = 1194.2
FAX: Transmitting 5 pages, including this one; call 587-0251 with any reception problems.

TO: Bill Moore

FROM: Charley Ice

Date: 13 May 04

Transmitting sheets for "Lana'i 14" (well No. 4854-02)
- Well Completion Report form pp 1-2
- Thompson survey report
- Construction drawings (plan or as-built?)

Return Fax: 587-0219
Return Post: P.O.Box 621, Honolulu 96809
WCR 2 Check for Well No. 4854-02 (survey to regulation memo)

1. **Pump Tests Check** (special condition of PIP? Yes/No) Glenn Bauer (initial if yes)
   - Yes
   - No
   - If no, describe deficiency

   **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

   **Geology Code for Well Index:** [__]

2. **Pump Installation Check** Mitch Ohye (initial)
   - Yes
   - No
   - If no, describe deficiency

   - 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. Ernie (initial) signature

7. Charley/lenore/Ryan File

---

Did we ever get elevation survey?
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 897-0228. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/cwrm/

<table>
<thead>
<tr>
<th>1. State Well No.:</th>
<th>4854-02</th>
<th>Well Name:</th>
<th>Lāna'i 14</th>
<th>Island:</th>
<th>Lāna'i</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Address:</td>
<td>Manele Road, Pālāwai Basin</td>
<td>Tax Map Key:</td>
<td>4-9-2:1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Pump Installation Company:</td>
<td>BEYLIK DRILLING, INC.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Date Pump Installed:</td>
<td>4-16-04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PERMANENT PUMP INFORMATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump Type, Make, Serial No.:</td>
<td>SUBMERSIBLE - CROWN 15236</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Capacity:</td>
<td>350 gpm at head of:</td>
<td>909 ft.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Type, H.P., Voltage, rpm:</td>
<td>HITACHI 125 #4 460 VOLT 3540 RPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of flow meter:</td>
<td>PROPELLER which measures in GPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model Number</td>
<td>TR-15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial Number</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pump type (check one):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep Well Turbine</td>
<td>Rotary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submersible</td>
<td>Rotary-Displacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Centrifugal</td>
<td>Reciprocating</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Propeller</td>
<td>Impulse</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6. Method of flow measurement:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flowmeter Manufacturer SPECIALTIES Make</td>
<td>Size 6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weir</td>
<td>Open Pipe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orifice*</td>
<td>Other*, explain below</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*attach schematic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Fill in the as-built section on the other side of this sheet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Attach photograph of well and concrete pad clearly showing benchmark on concrete pad.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Other remarks/comments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pump Installation Contractor (print) BEYLIK DRILLING, INC. C-57/C-57a/A Lic. No. AC-21896

Signature  

Date  

Permittee (print) COLLINS I. AM

Signature  

Date
9. AS-BUILT SECTION

(Please attach as-built if different from plan provided below)

Bench mark elevation surveyed to nearest 0.01 ft. = 673.36 ft. mean sea level

Elevation of top of chase tube 1346.75 ft. mean sea level

Pump intake depth = 832'10" ft. (referenced to bench mark)

Chase tube depth = 825'8" ft. (referenced to bench mark)

If airline installed, bottom of airline elevation = N/A ft. mean sea level

M94.06 +9 in.

Handwritten note: Bill Moore, 13 May 04
Well Elevation

1193.31 msl
Benchmark Elevation
(0.01 ft. above msl)

Concrete Pad

Benchmark reference control point
The project benchmark was obtained from work prepared by Austin Tsutsumi & Associates, Inc. for waterline improvements. Data was supplied by Lanai Company, Inc.

Surveyor's stamp and signature
WALTER P. THOMPSON, INC.

JAMES R. THOMPSON
LICENSED PROFESSIONAL LAND SURVEYOR
HAWAII, U.S.A.

WCR1 Form 9/12/01 Page 4 of 4
MODEL 7M-340

PERFORMANCE CHARACTERISTICS

MINIMUM WELL SIZE 8"
## Crown Pump Test Form

**date:** 08/15/03  
**time:** 1:00 PM  
**meter reading:** 0  
**flo-line:** 4"

**motor:** Franklin  
**h.p.:** 125  
**volts:** 460  
**phase:** 3  
**sf amps:** 163  
**sf kw:** 124

**pump model:** 7M-340  
**stage:** 12  
**h.p.:** 125  
**const:** 316 SS  
**s/n:** 15236

**submergence:**  
**imp. dia.:** 5.730/5.375  
**no. vanes:** 8

**comments:** Motor Model #: 2391056004  
Motor S/N 12-0023  
10 @ 871/30 'A'  
2 @ 6. 575 "B"

<table>
<thead>
<tr>
<th>volts</th>
<th>power factor</th>
<th>kw</th>
<th>amps 1</th>
<th>amps 2</th>
<th>amps 3</th>
<th>head per stage 1</th>
<th>head per stage 2</th>
<th>head per stage 3</th>
<th>friction loss</th>
<th>elevation</th>
<th>tdh</th>
<th>gpm</th>
<th>hp</th>
<th>eff.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>483</td>
<td>732</td>
<td>84.7</td>
<td>144.7</td>
<td>141.9</td>
<td>141.2</td>
<td>175</td>
<td>404.25</td>
<td>10.5</td>
<td>2</td>
<td>416.75</td>
<td>490</td>
<td>95.8</td>
<td>53.83%</td>
<td></td>
</tr>
<tr>
<td>481</td>
<td>762</td>
<td>93.6</td>
<td>154</td>
<td>152</td>
<td>150.9</td>
<td>329</td>
<td>759.99</td>
<td>8.1</td>
<td>2</td>
<td>770.09</td>
<td>400</td>
<td>106.9</td>
<td>72.77%</td>
<td></td>
</tr>
<tr>
<td>483</td>
<td>764</td>
<td>94.4</td>
<td>154.2</td>
<td>152.8</td>
<td>151.6</td>
<td>390</td>
<td>900.9</td>
<td>6.75</td>
<td>2</td>
<td>909.65</td>
<td>350</td>
<td>108.3</td>
<td>74.24%</td>
<td></td>
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<tr>
<td>489</td>
<td>759</td>
<td>92.7</td>
<td>149.5</td>
<td>154</td>
<td>149.1</td>
<td>440</td>
<td>1016.4</td>
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<td>2</td>
<td>1023.9</td>
<td>300</td>
<td>105.6</td>
<td>73.45%</td>
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<tr>
<td>485</td>
<td>725</td>
<td>81.2</td>
<td>136.6</td>
<td>142.8</td>
<td>137.8</td>
<td>505</td>
<td>1166.6</td>
<td>3</td>
<td>2</td>
<td>1171.6</td>
<td>200</td>
<td>92.7</td>
<td>63.83%</td>
<td></td>
</tr>
</tbody>
</table>

Specifics:
- 0 @ 1368
- 300 @ 1001 72%
- 350 @ 890 75%
- 450 @ 650 72.5%
MEMO and ROUTE SLIP #2 Follow-up tests

WCR 1 Check for Well No. 4854-02 (survey to regulation memo) 02/13/04

1. **Pump Tests Check** Glenn Bauer (initial)
   - **Yes**
   - **No**
   - If no, describe deficiency

   **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. **Construction Check** Mitch Ohye (initial)
   - **Yes**
   - **No**
   - If no, describe deficiency

   - data complete
   - followed Special Cond & elevations
   - well database updated

   20Feb: will send...

   **Latitude** NAD27 NAD83
   **Longitude**

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

   ATTACHMENTS FOR PUMP INSTALLATION PERMIT:
   - 1 COVER LETTER
   - 2 PERMIT (2x)
   - 3 DOH COMMENTS
   - 4 LAND DIV. COMMENTS
   - 5 WCR 2 FORM
   - 6 WUR FORM
   - 7 USGS MAP
   - 8 PARCEL CHECK
   - 9 DATABASE PRINTOUT
   - 10 GLENN'S WORKSHEET
   - 11 WELL As-Built CHECK PRINT

4. Roy (initial) check
5. Subia (initial) finalize
6. Dean (initial) signature
7. Charlie/Lenore/Ryan File

---

Well evidently grouted w/ leak so that perforations are plugged, hence heavy dd. Rather than start over, they'll live w/in limitations current situation.

---

not necessary – only WCP.

To be sent to applicant
FROM: **ERNIE**

**TO:** ANAKALEA, P.

**INIT:**

**TO:** LAU, E.

**INIT:**

**FOR:** Approval

**PLEASE:** See Me

**DATE:** FEB 11 2001

**SUSPENSE DATE:**

**TO:** BAUER, G.

**INIT:**

**TO:** MATHIAS, T.

**INIT:**

**FOR:** Signature

**PLEASE:** Review & Comment

**TO:** CHING, F.

**INIT:**

**TO:** NAKAMA, L.

**INIT:**

**FOR:** Information

**PLEASE:** Take Action

**TO:** DANBARA, S.

**INIT:**

**TO:** NAKANO, D.

**INIT:**

**FOR:** Type Draft

**PLEASE:** Type Final

**TO:** FUJII, N.

**INIT:**

**TO:** OHYE, M.

**INIT:**

**FOR:** File

**PLEASE:** Xerox ___ copies

**TO:** GOODING, K.

**INIT:**

**TO:** SAKODA, E.

**INIT:**

**FOR:**

**PLEASE:**

**TO:** HARDY, R.

**INIT:**

**TO:** SAKODA, E.

**INIT:**

**FOR:**

**PLEASE:**

**TO:** HIGA, D.

**INIT:**

**TO:** SWANSON, S.

**INIT:**

**FOR:**

**PLEASE:**

**TO:** ICE, C.

**INIT:**

**TO:** UYENO, D.

**INIT:**

**FOR:**

**PLEASE:**

**TO:** IMATA, R.

**INIT:**

**TO:** YODA, K.

**INIT:**

**FOR:**

**PLEASE:**

**TO:** KUNIMURA, I.

**INIT:**

**TO:** YOSHINAGA, M.

**INIT:**

**FOR:**

**PLEASE:**

**TO:**
Mr. Ernest Y.W. Lau  
Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809  

Dear Mr. Lau:  

Pump Test Data for  
Lanai Well 14 - State No. 4854-02  

Attached are the Step-Drawdown and Constant Rate pump test data sheets for Lanai Well 14. The sheets are being submitted to complete the requirements for a Pump Installation permit for the well. The constant rate test was run for more than the recommended minimum of 48 hours in the Commission's Standards, but it still was shut down sooner than intended due to an unexplained drop off in the pump's delivery rate.  

To overcome problems that resulted from poor placement of grout in the annular space during the well's construction, a substantial amount of development work was undertaken prior to the pump tests. As is evident in the constant rate test data, however, the well's performance continued to improve through this test.

Sincerely,  

Tom Nance  

cc: Nolan Perreira  

Attachments
Alternative way for determining $T$ from step-drawdown data (Mink, per. comm)

$Q = \text{ft}^3/d$

$Q_1 \text{ (gpm)} = 305 = 58713 \text{ ft}^3/d$

$s = \text{ft.}$

$Q_2 \text{ (gpm)} = 122 = 23485 \text{ ft}^3/d$

Set up two equations:

$s_1 = jQ_1 + nQ_1^2$

$s_2 = jQ_2 + nQ_2^2$

$Q_2 = 23485 \quad s_2 = 1.83$

$Q_1 = 58713 \quad s_1 = 3.86$

Well Depth below sea level = 187

Radius of well (ft) = 0.538 $= r$

$n = s_1 - (Q_1/Q_2)s_2/Q_1(Q_1-Q_2) = -3.5E-10$

$j = s/Q - nQ = 8.6E-05$

Laminar flow equation:

$s = jQ = 5.051667 \quad 130.87\% \quad \text{Head loss due to laminar flow}$

Thiem Eq.

$T = 1/2\pi j(\ln(re/r))$

$re = \text{Well Depth BSL} \times 1.6 = 299.2$

Therefore:

$T = 1/2\pi j(\ln(re/r)) = 11692 \text{ ft}^2/d$
### CONSTANT-RATE PUMP TEST DATA

**Pumped Well No.** 4854-02  
**Pumped Well Name** Lanzi Well 14  
**Target Q** 350 gpm  
**Distance between Obs. & Pumped Well** -- ft.  
**Reference pt. for depth to water** 1201.50 ft. msl  
**Static Water Level @ start of test** -- ft. msl  

**Water level measurements by:**  
- [ ] electrical sounder  
- [x] pressure transducer  
- [ ] airline

**START TEST** Date: 12-15-2003  
**Time of day:** 15:40

**Flow Meter Reading Start:** 4,634.800 gallons

<table>
<thead>
<tr>
<th>Suggested elapsed time (min)</th>
<th>Actual elapsed time (min)</th>
<th>Depth to water (nearest 0.1 ft)</th>
<th>Drawdown S (unadjusted to nearest 0.1 ft)</th>
<th>Pumping rate Q (gpm)</th>
<th>EC (milhos)</th>
<th>Cl (mg/l)</th>
<th>Temp. (°F or °C)</th>
<th>Data in this table is for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>530.21</td>
<td>0.00</td>
<td>671.29</td>
<td>1</td>
<td></td>
<td></td>
<td>Start test</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>502.73</td>
<td>27.48</td>
<td>672.77</td>
<td></td>
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<td>1.5</td>
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<td>36.31</td>
<td>289.0</td>
<td>710</td>
<td>85.4</td>
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</tr>
<tr>
<td>2</td>
<td>6</td>
<td>490.22</td>
<td>39.99</td>
<td>712.28</td>
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<td></td>
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1 Chloride sampling required
2 Use same ending drawdown figure as start for recovery

Max possible duration, water level or quality did not stabilize for any 24 period

Begin recovery data next page
Flow meter reading at end of pumped period: 6,206,360 gals
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END TEST  Date: 12-19-2003  Time of day: 6:05 AM (Running)

ADDITIONAL REMARKS: TEST ENDED DUE TO DROP OFF IN PUMP PERFORMANCE

Person in charge of pump test (print): TOM NANCE

Signature: 

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.
**STEP-DRAWDOWN PUMP TEST DATA**
(not required for wells producing < 100,000 gpd or 70 gpm)

- **Pumped Well No.:** 4854-02
- **Pumped Well Name:** Lenz Well 14
- **Target Q:** 350 gpm

- **Observation Well No.:** 04
- **Date:** 12-15-03
- **Time of day:** 13:05
- **Flow Meter Reading Start:** 4,608.50 gallons

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Remarks: Start test/ Step 1

Data in this table is for:
- Pumped Well
- Observation Well

Chloride sample taken

Step 2 begin?
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<th>Drawdown (S, unadjusted to nearest 0.1 ft)</th>
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Max possible duration, water level or quality did not stabilize for any 24 period.

Begin recovery data next page.
Flow meter reading at end of pumped period: 4,634,800 gals.

1. starting pumping rate Q
2. minimum length of step period of constant pumping rate
3. minimum mandatory Chloride (CI) measurement/sampling at end of every step
4. Use same ending drawdown figure as start for recovery
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<th>Recovery Drawdown ( S ) ( \text{(unadjusted to nearest 0.1 ft)} )</th>
<th>Pumping rate ( Q ) (gpm)</th>
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**END TEST**  
Date: **12-15-2003**  
Time of day: **15:39**

**ADDITIONAL REMARKS:**

Person in charge of pump test (print): **TOM NADE**

Signature: **[Signature]**

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.
Mr. Ernest YW Lau - Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii  96809

Dear Mr. Lau:

Variance for Lanai Well 14 (State No. 4854-02) to  
Install a Permanent Pump to Conduct an Aquifer Pump Test

This letter responds to the Commission's action granting approval of a variance to use the permanent pump of Lanai Well 14 to conduct an aquifer test (letter from Ernest Lau to Vince Bagoyo dated May 27, 2003). As presently scheduled, installation of the pump will begin on September 11, 2003. Tentatively, the aquifer test would begin a week later on September 18, 2003. We will update you on the schedule if there are any changes.

To confirm a conversation I had previously with Roy Hardy of your staff, we will be conducting the aquifer (constant rate) pump test for an extended period which will be greater than the minimum duration specified in the Commission's standards. Initially, we expect this to be a 14-day test, but the exact duration will depend on the aquifer's response. All other special conditions listed in your May 27, 2003 letter to Vince Bagoyo will be adhered to. Feel free to call if you have questions or need additional information.

Sincerely,

[signature]

Tom Nance

cc: Vince Bagoyo  [Fax only (004)]
TO: Commission on Water Resource Management
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Attention: Ernest Lau, Deputy Director

FROM: Greg Fukumitsu

SUBJECT: Lanai Well No. 14

We herewith transmit the following:
1 original Pump Installation Permit, Lanai Well No. 14 (State Well No. 4854-02)

Remarks:
We herewith transmit the executed document for your records.

cc: Vince Bagoyo - Lanai Water Company (incl enclosure)
    Nolan Perreira - Lanai Water Company (incl enclosure)
PUMP INSTALLATION PERMIT
Lana'i 14 Well, Well No. 4854-02

Note: This permit shall be prominently displayed at the site until the work is completed

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 Lana'i 14 Well (Well No. 4854-02) at Manele Road, Palawai Basin, Lana'i, TMK 4-9-2-1, 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 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and staff 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 350 gpm rated capacity at unknown ft. of head, or less, pump in the well.

3. The permittee, well operator, and/or well owner 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 authorization to pump water from a well shall not constitute a determination of correlative water rights. The permittee, well operator, and/or well owner are notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

5. The permittee, well operator, and/or well owner 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, well operator, and/or well owner 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 and any related staff submittal approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

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, well operator, and/or well owner 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, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

10. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: May 21, 2003
Expiration Date: May 21, 2005

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 and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee's Signature: __________________________ Date: 06/17/03
Printed Name: VINCE BAGYOT
Firm or Title: VICE PRESIDENT

Installer's Signature: __________________________ Date: 7/8/03
Printed Name: William C. Moore
C-57, C-57a, or A License #21690
Firm or Title: BEYLIK DRILLING INC

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 Branch
Maui Department of Water Supply
Tom Nance Water Resource Engineering
Facsimile Memorandum

TO: Commission on Water Resource Management

ATTENTION: Charlie Ice

FROM: Greg Fukumitsu

DATE: July 15, 2003

SUBJECT: Lanai Well No. 14 (State Well No. 4854-02) - Pump Installation Permit

Just checking on our records and need to confirm if the Pump Installation Permit was granted for this well? Please call me at 537-1141, ext. 2 or e-mail me at greg@tnwre.com

Fax cc: Nolan Perreira - Lanai Water Company
May 27, 2003

Ref:4854-02.pip

Mr. Vince Bagoyo
Castle & Cook Resorts, LLC
P.O. Box 630310
Lana‘i City, HI 96790

Dear Mr. Bagoyo:

Pump Installation Permit
Lana‘i 14 Well (Well No. 4854-02)

Enclosed are two (2) originals of your approved Pump Installation Permit for the captioned well(s) that authorize aquifer test 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 11:

**Special Conditions**

1. In conducting the pump tests, the permittee shall observe the following protocol:
   a. The permittee shall notify staff five business days prior to commencement of pump tests.
   b. The pump tests shall be started within five business days of the installation of the pumps. Otherwise, the pumps shall be removed.
   c. The applicant shall submit pump test results on forms provided by the Commission or electronic data acceptable to staff within two business days of completion.
   d. Staff will complete its analysis of pump results and respond with approval or further advice within two business days of receipt.
   e. In the event that pump tests or pump size are not satisfactory to Commission staff, the applicant may rerun the pump tests or install a different pump in accordance with "a" through "c" above until the installed pump is in compliance with permit requirements.
   f. If pump test results are unacceptable, pump must be removed.

2. Prior to the test, the applicant shall investigate the possibility for using other wells for observation during the pump tests.

3. If the elevation benchmark needs to be altered, the permittee, well operator, and/or well owner shall ensure that the benchmark is transferred (or the well resurveyed) and documentation of the new benchmark shall be submitted to the Commission within sixty (60) days after the pump is installed.
4. Please enclose the pump specification and rating curve for the installed pump with the Well Completion Report.

The permittee, well operator, and/or well owner are responsible for all conditions of the permit. This includes ensuring that the pump installation contractor 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 starting from the permit approval date.

Please sign and have the contractor sign both 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.

IMPORTANT - Pump installation shall not commence until a fully signed permit is returned to the Commission. Except for the monthly water use report form, please provide copies of all the information in this packet to your pump installation contractor.

Acceptance of your Well Completion Report - Part I will be complete upon acceptance of the pump test results.

If you have any questions, please call Charley Ice of the Commission staff at 587-0251 or toll-free at 1-800-468-4644, extension 70251.

Sincerely,

[Signature]
Peter T. Young
Chairperson

Enclosure

c: Tom Nance Water Resource Engineering
Note: This permit shall be prominently displayed at the site until the work is completed

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 Lana'i 14 Well (Well No. 4854-02) at Manele Road, Palawai Basin, Lana'i, TMK 4-9-2:1, 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 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and staff 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 350 gpm rated capacity at unknown ft. of head, or less, pump in the well.

3. The permittee, well operator, and/or well owner 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 authorization to pump water from a well shall constitute a determination of correlative water rights. The permittee, well operator, and/or well owner are notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

5. The permittee, well operator, and/or well owner 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, well operator, and/or well owner 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 and any related staff submittal approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

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, well operator, and/or well owner 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, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

10. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: May 21, 2003
Expiration Date: May 21, 2005

PETER T. YOUNG, 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 and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

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

Installer's Signature: ___________________________ C-57, C-57a, or A License #: __________ 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
USGS
Department of Health/ Safe Drinking Water & Wastewater Branch
Maui Department of Water Supply
Tom Nance Water Resource Engineering
PUMP INSTALLATION PERMIT
Lana'i 14 Well, Well No. 4854-02

Note: This permit shall be prominently displayed at the site until the work is completed

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 Lana'i 14 Well (Well No. 4854-02) at Manele Road, Palawai Basin, Lana'i, TMK 4-9-2-1, 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 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and staff 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 350 gpm rated capacity at unknown ft. of head, or less, pump in the well.
3. The permittee, well operator, and/or well owner 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 authorization to pump water from a well shall not constitute a determination of correlative water rights. The permittee, well operator, and/or well owner are notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.
5. The permittee, well operator, and/or well owner shall submit an initial application for the Well Completion Report of the Well Completion Report (attached) to the Chairperson within sixty (60) days after completion of work.
6. The permittee, well operator, and/or well owner 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 and any related staff submittal approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.
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, well operator, and/or well owner 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, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.
10. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.
11. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: May 21, 2003
Expiration Date: May 21, 2005

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 and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee's Signature: Date: 06/17/03
Printed Name: VINCE BAGOYO Firm or Title: VICE PRESIDENT

Installer's Signature: C-57, C-57a, or A License #: 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:
USGS
Department of Health/ Safe Drinking Water & Wastewater Branch
Maui Department of Water Supply
Tom Nance Water Resource Engineering
PUMP INSTALLATION PERMIT

Date of Approval: May, 2003
Expiration Date: May, 2005

PETER T. YOUNG, 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 and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

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

Installer's Signature: __________________________ C-57, C-57a, or A License #: __________ 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:

USGS
Department of Health/ Safe Drinking Water & Wastewater Branch
Maul Department of Water Supply
Castle and Cooke Resorts

Note: This permit shall be prominently displayed at the site until the work is completed.

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 Aloha Well (Well No. 1234-56) at 42-234 Kahekili Highway, Oahu, TMK 5-5-5: 55, 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 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and staff 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 350 gpm rated capacity at 1200 ft. of head, or less, pump in the well.

3. The permittee, well operator, and/or well owner 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 authorization to pump water from a well shall not constitute a determination of correlative water rights. The permittee, well operator, and/or well owner are notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

5. The permittee, well operator, and/or well owner shall complete and submit as-built drawings and Part II - (Permanent) Pump Installation Report of the Well Completion Report (not attached) to the Chairperson within sixty (60) days after completion of work.

6. The permittee, well operator, and/or well owner 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 and any related staff submittal approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

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, well operator, and/or well owner 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, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

10. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: May, 2003
Expiration Date: May, 2005

PETER T. YOUNG, 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 and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

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

Installer's Signature: __________________________ C-57, C-57a, or A License #: __________ 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:

USGS
Department of Health/ Safe Drinking Water & Wastewater Branch
Maul Department of Water Supply
Castle and Cooke Resorts

EXHIBIT 3
DEPARTMENT OF LAND AND NATURAL RESOURCES

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<td>TNWRE, INC.</td>
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<td>Bryan Sarasin</td>
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TOTAL 50.00

REMARKS:

LINE (1) Well No. 4854-02
LINE (2) Well No. 5631-08
LINE (3) 

PAY * * Twenty-five and 00/100 ** DOLLARS $ *25.00*

TO THE ORDER OF Department of Land & Natural Resources

Date September 23, 2002

BRA YN SAR ASIN

First Hawaiian Bank

For Use Only By Authorized Persons
Mr. Vince Bagoyo  
Castle and Cooke Resorts, LLC  
P.O. Box 630310  
Lanai City, HI 96790

Dear Mr. Bagoyo:

Notice of Commission Action
Variance to Install a Permanent Pump to Conduct Aquifer Tests

This letter serves as your official notice of action taken by the Commission on Water Resource Management (Commission) on the subject application. By a unanimous vote of the Commission at their meeting on January 30, 2002, the Commission:

A. Approved the variance for Lanai Well 14 (Well No. 4854-02) to install a 350-gpm permanent pump for conducting the aquifer pump tests in accordance with the Hawaii Well Construction and Pump Installation Standards, subject to the standard pump installation conditions and the following special conditions:

   a. The permittee shall notify staff five business days prior to commencement of pump tests.
   b. The pump tests shall be started within five business days of the installation of the pumps. Otherwise, the pumps shall be removed.
   c. The applicant shall submit pump test results on forms provided by the Commission or electronic data acceptable to staff within two business days of completion.
   d. Staff will complete its analysis of pump results and respond with approval or further advice within two business days of receipt.
   e. In the event that pump tests or pump size are not satisfactory to Commission staff, the applicant may rerun the pump tests or install a different pump in accordance with “a” through “c” above until the installed pump is in compliance with permit requirements.
   f. If pump test results are unacceptable, pump must be removed.
B. Prior to the test, the applicant shall investigate the possibility for using other wells for observation during the pump tests.

The Pump Installation Permit is enclosed.

If you have any questions, please contact Charley Ice of Commission staff at 587-0251, or toll-free at 1-800-468-4644 extension 70251.

Sincerely,

ERNEST Y.W. LAU
Deputy Director

Cl:ss
Enclosure
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

APPLICANT:
Castle and Cooke Resorts, LLC
P.O. Box 630310
Lāna’i City, HI 96790

LANDOWNER:
Same

DESCRIPTION:
Location: (See Exhibit 1) Dimensions: (See Exhibit 2)

BACKGROUND:
December 1, 1994
Well Construction Permit approved for “Palawai Basin Exploratory Well”.

January 8, 1996
Pump installation permit application for “Lanai Well 14” received. The well completion report had never been filed with any wellhead elevation survey or pumping tests, only a graph with three data points.

September 24, 2002
Staff received a letter from Tom Nance Water Resource Engineering noting that the driller had been identified and that it was hoped they could provide missing information to complete the well completion report.
September 25, 2002  Staff received a letter from Castle & Cooke Resorts, LLC, noting that available pump test data did not meet minimum requirements, and requesting a variance from standard procedures to install a permanent pump to conduct aquifer testing.

January 28, 2003  The applicant submitted an updated well completion report for Lanai Well 14, with as-built drawing and driller's log, but leaving two items incomplete: pump test results and wellhead elevation survey.

April 22, 2003  The applicant submitted a wellhead elevation survey.

WATER AVAILABILITY:

Leeward Aquifer System of the Central Sector
Estimated Sustainable Yield: 3 mgd
Current Aquifer System Pumpage (12-MAV as of February 23, 2003): 1.849 mgd
Proposed Use: 0.500 mgd., golf course and landscaping

ISSUES/ANALYSIS:

The Pump Installation Permit Standard Condition #4 states:

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

Potential impacts to other legal uses are determined on the basis of aquifer pump tests, performed according to standards. Normally, pump tests are conducted at the conclusion of well construction, but in this case, the exploratory well construction was followed only by chloride sampling and a non-standard step-drawdown test.

Well 14 is about 0.75 mile from Well 1 and a little farther from Well 9, two major sources of brackish water averaging between 300 and 475 ppm chlorides, higher in Well 9. It is toward the center of the P1 wai Basin, with chlorides measured at about 800 ppm. Although all are pumping dike-confined high level water, they are under the influence of geologic thermal effects, showing elevated temperatures (mid-80s F.) as well.

Standard pump tests might determine whether the chlorides remain stable at the proposed level of withdrawal and whether either Wells 1 or 9 could be affected. As the only users of these wells is Lanai Resorts, it is the company's risk to proceed. Because chloride and temperature data from this area can be useful, reliable pump test results would help Lanai Resorts to manage their non-potable sources.
Procedures:

Issuance of the permanent pump installation permit is normally done following an acceptable, complete well completion report, but the request for variance reflects the applicant's desire to install a pump just once and avoid removing it during analysis. Toward this end, the Commission has approved a declaratory ruling allowing use of permanent pumps for aquifer testing where the pump capacity is less than 70 gpm.

For larger pumps, the normal procedure is still required. In a few instances beginning January 2002, however, the Commission has approved a variance to allow larger permanent pumps to be installed to conduct pump testing. In these cases, the Commission approval was contingent upon following a protocol for quick transmittal of results and staff analysis while the installation rig is still in place, to reduce costs if pump tests prove unacceptable and need to be redone or if the pump needs to be removed. This enables the staff to ensure that minimum data is gathered to assess impacts to the resource and other legal uses. The original protocol is as follows:

a. The permittee shall notify staff shall be notified one week prior to pump tests.

b. The pump tests shall be started within one week of the installation of the pumps. Otherwise, the pumps shall be removed.

c. The step-drawdown test shall be conducted first and the well allowed to rest one full day or until full water level recovery occurs before starting the constant-rate test.

d. The applicant shall submit pump test results within one day of the completion of the pump tests on forms provided by the Commission.

e. Staff will complete its analysis of pump results and respond with approval or further advice within one business day; pump installation permit shall be issued following approval upon receipt of full well completion report part 2.

f. In the event that pump tests or pump size are not satisfactory to Commission staff, the applicant shall rerun the pump tests in accordance with “a” through “d” above until installed pumps are in compliance with permit requirements.

We find that both applicants and staff may be unable to fulfill commitments of the protocol as initially designed, e.g. to give a full week's notice prior to pump testing; to submit results within a day of completed tests, or for staff to analyze data within a day of receipt. For this reason, we recommend the following protocol changes for installing permanent pumps larger than 70 gpm to conduct pump testing under this variance:

a. The permittee shall notify staff five business days prior to commencement of pump tests.

b. The pump tests shall be started within five business days of the installation of the pumps. Otherwise, the pumps shall be removed.

c. The applicant shall submit pump test results on forms provided by the Commission or electronic data acceptable to staff within two business days of completion.

d. Staff will complete its analysis of pump results and respond with approval or further advice within two business days of receipt.
e. In the event that pump tests or pump size are not satisfactory to Commission staff, the applicant may rerun the pump tests or install a different pump in accordance with “a” through “c” above until the installed pump is in compliance with permit requirements.

f. If pump test results are unacceptable, pump must be removed.

RECOMMENDATION:

That the Commission:

A. Approve the variance for Lanai Well 14 (Well No. 4854-02) to install a 350-gpm permanent pump for conducting the aquifer pump tests in accordance with the Hawaii Well Construction and Pump Installation Standards, subject to the standard pump installation conditions and the following special conditions:

a. The permittee shall notify staff five business days prior to commencement of pump tests.

b. The pump tests shall be started within five business days of the installation of the pumps. Otherwise, the pumps shall be removed.

c. The applicant shall submit pump test results on forms provided by the Commission or electronic data acceptable to staff within two business days of completion.

d. Staff will complete its analysis of pump results and respond with approval or further advice within two business days of receipt.

e. In the event that pump tests or pump size are not satisfactory to Commission staff, the applicant may rerun the pump tests or install a different pump in accordance with “a” through “c” above until the installed pump is in compliance with permit requirements.

f. If pump test results are unacceptable, pump must be removed.

B. Prior to the test, the applicant shall investigate the possibility for using other wells for observation during the pump tests.

Respectfully submitted,

[Signature]

ERNEST Y.W. LAU
Deputy Director

Exhibit(s): 1. (Location Map)
2. (Proposed Well Section)
3. (Standard Pump Installation Conditions)
EXISTING

10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

- The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

Bottom Elevation of Well Limit = \( \text{Water Level} + \frac{1}{4} \times \text{Aquifer Thickness} \)

Example: Estimated 2 ft. Water Level Elev. = \( 2 \text{ ft., msl} \)

Bottom Elevation of Well Limit = \( 2 + \frac{1}{4} \times 2 = -0.5 \text{ ft.} \)

Solid Casing Material:
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A52 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A512 (monitor wells)

ABS Plastic conforming to ASTM F490 and ASTM D1577: (check one): □ Schedule 40 □ Schedule 80

PVC Plastic conforming to ASTM F490 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120

Thermoset Plastic: (check one)
□ Filament Wound Resin Pipe conforming to ASTM D2996
□ Centrifugally Cast Resin Pipe conforming to ASTM D2997
□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A52 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A512 (monitor wells)

ABS Plastic conforming to ASTM F490 and ASTM D1577: (check one): □ Schedule 40 □ Schedule 80

PVC Plastic conforming to ASTM F490 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120

Thermoset Plastic: (check one)
□ Filament Wound Resin Pipe conforming to ASTM D2995
□ Centrifugally Cast Resin Pipe conforming to ASTM D2997
□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296

EXHIBIT 2
May 8, 2003

Mr. Vince Bagoyo
Castle & Cook Resorts, LLC
P.O. Box 630310
Lanai City, HI 96763

Dear Mr. Bagoyo:

Wellhead Elevation Survey for Well No. 4854-02

We received your wellhead elevation survey for the Lana'i 14 Well (Well No. 4854-02) on April 22, 2003. However, matters which must be addressed before we accept your Well Completion Report Part I report as complete are as follows:

1. Aquifer pump tests (step-drawdown and constant-rate)

   Your request for a variance to install the permanent pump to conduct these tests is scheduled to go before the Commission on Wednesday, May 21, 2003. You should be receiving a copy of the submittal shortly.

   If you have any questions, please contact Charley Ice of the Commission staff at 587-0251 or toll-free at 1-800-468-4644, extension 70251.

Sincerely,

[Signature]

ERNEST Y.W. LAU
Deputy Director

C: ss

c: Tom Nance Water Resource Engineering
Dear Mr. Lau:

Well Completion Report and Pump Installation Permit for

Lanai Well 14 - State No. 4854-02

Attached is the elevation survey for Lanai Well 14 as completed by Walter P. Thompson, Inc. Based on my discussion with Charlie Ice of your staff, the elevation survey was the last item needed for the Well Completion report and issuance of the Pump Installation permit.

If you have any questions, please feel free to call. Thank you for your attention to this matter.

Sincerely,

Tom Nance

cc:  Vince Bagoyo

Attachment
1. **Pump Tests Check**  Glenn Bauer (initial)

   **Yes**  **No**  **If no, describe deficiency**

   **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:**
   - 
   **Geology Code for Well Index:**

2. **Construction Check**  Mitch Ohye (initial)

   **Yes**  **No**  **If no, describe deficiency**

   - data complete
   - followed WCPI Stds
   - well database updated
   - 

   Ingrid Kunimura (initial)

   **Latitude**  **Longitude**

   NAD27

   NAD83

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

   ATTACHMENTS FOR PUMP INSTALLATION PERMIT:
   - 1 COVER LETTER
   - 2 PERMIT (2x)
   - 3 DOH COMMENTS
   - 4 LAND DIV. COMMENTS
   - 5 WCR 2 FORM
   - 6 WUR FORM
   - 7 USGS MAP
   - 8 PARCEL CHECK
   - 9 DATABASE PRINTOUT
   - 10 GLENN'S WORKSHEET
   - 11 WELL CHECK PRINT

   **not necessary – only WCP.**

   To be sent to applicant

4. Roy (initial) check

5. Subia (initial) finalize

6. Dean (initial) signature

7. Charley/Lenore/Ryan File
Ms. Linnel T. Nishioka - Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Well Completion Report - Part i - for  
Lanai Well 14 - State No. 4854-02  
Lanai, Hawaii

Attached is the Well Completion Report for Lanai Well 14 as prepared by Lee Mueller of Rainbow Drilling. This information, together with that previously submitted, is all the information we have been able to compile. If a more extensive pump test in accordance with your standards is appropriate to do, we'd like to use the permanent pump for that test.

Sincerely,

Tom Nance

cc: Vince Bagoyo  
Lee Mueller

Attachment
# WELL COMPLETION REPORT - PART I
## Well Construction

**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/](http://WWW.state.hi.us/dlnr/cwrm/)

1. **State Well No.:** 4854-02  
2. **Well Name:** Pa'ukawai Basin #14  
3. **Address:** Lanai Co. Inc. Box 1, Kona City, HI 96763  
4. **Drilling Company:** Rainbow Drilling Specialists, Inc.  
5. **Drilling method used during construction:** Rotary  
6. **Date Well Construction (drilled, cased, grouted) completed:** 7-8-95  

In addition to the driller's log, if a geologic log was prepared, please submit with this form.

7. **Was the subject well cored?**  
   - Yes  
   - No  

8. **Initial water-level encountered:** 504 ft. below ground  
9. **Step-Drawdown Test completed?**  
   - No  
   - Yes  

Attach Step-Drawdown Test form (12/17/97 SDPTD Form)

10. **Constant Rate Aquifer Test completed?**  
   - No  
   - Yes  

Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)

Parameters prior to pump test:

11. **Water-level:** 0 ft. above msl  
12. **Chloride:** 700 ppm  
13. **Temperature:** 84°F  

14. Fill in the as-built section on the other side of this sheet.
15. Fill in attached surveyor's report.
16. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)
17. **Remarks:** Lockable cover installed 9-7-95

---

**Licensed Driller (print):** C. Lee Mueller  
**C-57 Lic. No.:** 19137 & 18099

**Signature:** [Signature]  
**Date:** 12-23-2002

**Permittee (print):** [Signature]  
**Date:** 1-10-03

---

WCR1 Form 9/12/01 Page 1 of 4
13. AS-BUILT WELL SECTION

(Please attach as-built if different from diagram provided below)

- Elevation at top of casing: 1192.5 ft., msl
- Hole Diameter: 17 1/2 in.
- Minimum of 2' Radius & 4" Thick Concrete Pad
- Ground Elevation: 1193+ ft., msl

Please refer to the HAWAII WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS to ensure that your as-built is in compliance with applicable standards.

- Solid Casing: (≥ 90% x (Ground Elev. - Water Level Elev))
  - Length: 630 ft.
  - Nominal Diameter: 14 in.
  - Wall Thickness: 7/8 in.
  - Bottom Elevation: __________ ft., msl

- Rock or Gravel Packing:
  - Total Depth: 150 ft.
  - Water Level Elevation: __________ ft., msl

- Open Casing:
  - Length: 400 ft.
  - Nominal Diameter: 14 in.
  - Wall Thickness: 7/8 in.
  - Bottom Elevation: __________ ft., msl

- Solid Casing Material:
  - Carbon Steel: compliant with (check one or more):
    - ANSIAWWA C200
    - API Spec. 5L
    - ASTM A53
    - ASTM A139
  - Stainless Steel: (check one):
    - ASTM A409 (production wells)
    - ASTM A312 (monitor wells)
  - ABS Plastic conforming to ASTM F480 and ASTM D1527:
    - Schedule 40
    - Schedule 80
  - PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241):
    - Schedule 40
    - Schedule 80
    - Schedule 120
  - Thermoset Plastic:
    - Filament Wound Resin Pipe conforming to ASTM D2996
    - Centrifugally Cast Resin Pipe conforming to ASTM D2997
    - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
    - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
    - PTFE Fluorocarbon Tubing conforming to ASTM D3296
    - FEP Fluorocarbon Tubing conforming to ASTM D3268

- Open Casing Material:
  - Carbon Steel: compliant with (check one or more):
    - ANSIAWWA C200
    - API Spec. 5L
    - ASTM A53
    - ASTM A139
  - Stainless Steel: (check one):
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  - ASTM A53
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  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3268
# DRILLER'S LOG

**WELL NUMBER:** 4854-02

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<th>Depths (ft.)</th>
<th>Rock Description, Water Level, etc.</th>
<th>Dates</th>
<th>Depths (ft.)</th>
<th>Rock Description, Water Level, etc.</th>
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**Remarks:**
December 10, 2002

Mr. Vince Bagoyo
Castle & Cooke Resorts, LLC
P.O. Box 630310
Lanai City, HI 96763

Dear Mr. Bagoyo:

Request for Variance to Install Permanent Pump Prior to Issuance of Pump Installation Permit, to Conduct Pump Testing for Well No. 4854-02

Thank you for your letter of September 25 on the captioned subject. By our telephone conversations, we believed that Tom Nance would be preparing the Well Completion Report Part 1 (WCR1) for this well, to serve as the basis for your request. To date, we have seen nothing further.

We understand that you believe the original pump tests were inadequate for our analysis, and the appropriate way to move on is to file the WCR1 with the best available information, and an explanation if necessary. We await that filing before responding further.

If you have any questions, please call Charley Ice of the Commission staff at 587-0251 or toll-free at 1-800-468-4644, extension 70251.

Aloha,

GILBERT S. COLOMA-AGARAN
Chairperson

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<td>Signature</td>
<td>Information</td>
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<td>Take Action</td>
<td>Type Draft</td>
<td>Type Final</td>
<td>File</td>
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</table>

Have them submit it as first (with whatever prep data) before we accept. This app and consider the variance request. called Vince. He referred me to Tom. Talked to Tom of Oct 02, he'll prepare a Word (no drilling or) will probably have to follow the "Mike Robertson" pump test protocol.

DATE: 25-Sep-02


TO: INIT. FOR: PLEASE:

3 Approval 3 Signature 4 Information

1 Review & Comment Take Action

5 Type Draft acknow letter 2 Type Final, label new file folder 5 File

Xerox copies

WELL NUMBER 6854-02 WELL NAME Lanai 14

ATTACHMENTS FOR APPLICATION PROCESSING - Both applicant & staff generated

1 TRANS. LETTER 
2 CWRM MAP 
3 APPL. FORM (3X) 
4 USGS MAPS (3X) 
5 TAX MAPS (3X) 
6 PARCEL OWNER VERIF. MLS PRINTOUT 
7 CONTRACTOR VERIF. DCCA LICENSE SCREEN PRINTOUT 
8 ALL INFO FILLED IN 
9 BACKGROUND CHECK

FOLDER:

□ MADE NEW FILE FOLDER, ATTACHED
□ FILE FOLDER ALREADY MADE, IN FILE CABINET

INCOMPLETE ACTION DATES:

DATE ACTION

21 May 03 CWRM approved variance

need to reconcile w/6/19/94 app submited. requesting more: up to 500 kyd & bo; same 350 gpm need pump tests
September 25, 2002

Ms. Linnel T. Nishioka – Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Request for a Variance on Pump Testing for
Lanai Well 14 – State No. 4854-02
Lanai, Hawaii

Dear Ms. Nishioka:

Well 14 was completed in mid-1975 by Rainbow Drilling. Based on a search of our records, those of our consultant and a request for information from the contractor, we have concluded that the available pump test data do not meet the minimum requirements of the Commission on Water Resource Management (CWRM).

By this letter, we are requesting a variance from the permit conditions to complete the step-drawdown and constant rate pump tests using the permanent, 350 GPM pump. Both tests would be conducted in conformance with the CWRM’s current pump test protocols. Data would be submitted to the CWRM for its review and approval prior to the well being put into service.

Thank you for your consideration of this request. Feel free to call me at 565-3856 or our consultant, Tom Nance at 537-1141, if you require additional information.

Sincerely,

Vince Bagoyo

cc: Tom Nance
Nolan Perreira
MEMORANDUM

TO: Charley Ice
FROM: Tom Nance
SUBJECT: Copies of the Well Construction Permit Application and Executed Permit for Lanai Well 14

At the request of Vince Bagoyo, I am sending you copies of the Well Construction Permit application and executed permit for Lanai Well 14. We do not have a copy of the Well Completion Report, but I will try to get one from Lee Mueller of Rainbow Drilling when he returns from vacation on the mainland in mid-October.

cc: Vince Bagoyo
Attachments
Ms. Linnel T. Nishioka - Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Pump Installation Permit Application for
Lanai Well No. 14 - State Well No. 4854-02

Attached is the Pump Installation Permit application and $25 filing fee for Lanai Well No. 14, State No. 4854-02. The well would be used as a supplement source to irrigate the Manele Golf Course and Manele residential landscaping.

Feel free to call me or Vince Bagoyo at Lanai Holdings if you have questions. Thank you for your attention to this matter.

Sincerely,

Tom Nance

Attachments

cc: Vince Bagoyo
    Nolan Perreira
MEMORANDUM

TO: Charley Ice

FROM: Tom Nance

SUBJECT: Copies of the Well Construction Permit Application and Executed Permit for Lanai Well 14

At the request of Vince Bagoyo, I am sending you copies of the Well Construction Permit application and executed permit for Lanai Well 14. We do not have a copy of the Well Completion Report, but I will try to get one from Lee Mueller of Rainbow Drilling when he returns from vacation on the mainland in mid-October.

cc: Vince Bagoyo

Attachments
**August 24, 1994**

**PAY**

**Twenty-five and 00/100**

**DOLLARS $25.00**

**TO THE ORDER OF**

Department of Land and Natural Resources

---

### Filing Fee: Palawai Basin Exploratory Well

<table>
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<th>DATE</th>
<th>DESCRIPTION</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-24-94</td>
<td>Filing Fee: Palawai Basin Exploratory Well Job No. 93-02</td>
<td>$25.00</td>
</tr>
</tbody>
</table>
State of Hawaii  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Department of Land and Natural Resources  
APPLICATION FOR PERMIT  
8-11-94  
93-02

1. APPLICANT: (may be a, b, or c, but all must be filled in)
(a) WELL OWNER  
Lanai Company, Inc.
Vince Bagoyo, P.O. Box 1, Lanai City, Hawaii 96763  
(b) LANDOWNER  
Castle & Cooke, Inc.
Vince Bagoyo, P.O. Box 1, Lanai City, Hawaii 96763  
(c) CONTRACTOR
To Be Competitively Bid  
Contractor's C-3F License No.

2. WELL LOCATION/NAME:  
Palawai Basin Exploratory Well  
Island Lanai  
Address Along Manele Road in Palawai Basin  
Tax Map Key 4-9-02-1  
(Attach a USGS map, scale 1:2000, and a property tax map showing well location referenced to established property boundaries.)

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

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

4. PROPOSED PUMP INFORMATION:
Rated Pump Capacity: 400 gallons per minute  
Motor:  
Type:  
Rotary  
Rotary-Displacement  
Reciprocating  
Differential  
Impulse  
Electric, rated horsepower of 200

5. PROPOSED USE:
- Municipal (including hotels, stores, etc.)  
- Military  
- Domestic (individual, non-commercial/water supply)  
- Industrial  
- Irrigation (crop)  
- Golf Course  
- Turf Grass  
- Other (describe)
State Land Use District:  
Golf Course in Manele Project District
County Zoning (describe)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL:
350,000 gallons per day  
(b) METHOD OF FLOW MEASUREMENT:
- Flowmeter  
- Open-pipe  
- Office Plate  
- War

7. PENDING ACTIONS:
- CUA  
- SMA  
- OBS  
- EA  
- NONE  
- Other (explain)

8. REMARKS, EXPLANATIONS:
See Reverse Side

NOTE: Signing below indicates that the applicant understands that, if the permit is granted, the applicant is required to file the Commission on Water Resources Management, the proposed work is to be completed within two (2) years of the approved date. In addition, the contractor will submit to the Commission a well completion report, well abandonment report, or both, within 30 days after the completion date of the permit work. The applicant also acknowledges that the monthly water use data shall be submitted to the Commission. The applicant further acknowledges that approval of the proposed permit shall not constitute a determination of water rights and that it will not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner  
Lanai Company, Inc.  
Signature  
Date

Landowner  
Castle & Cooke, Inc.  
Signature  
Date

Contractor  
Signature  
Date

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

(End of Form)
8. REMARKS, EXPLANATIONS:

The exploratory well is expected to encounter brackish, high level groundwater similar to the water pumped by existing Wells 1 and 9. If the well is successful, it would be connected to the Manele irrigation system. The addition of the well would not involve an increase in water use. It would be developed to provide management flexibility in the use of the groundwater resource and backup supply capability.

9. PROPOSED WELL SECTION

- Elevation at top of casing: 1192 ft. m.g.
- Ground Elevation: 1190 ft., m.g.
- Cement Grout: 390 ft.
- Rock Packing: 810 ft.
- Hole Diameter: 174 in.
- Total Depth: 1200 ft.
- Solid Casing:
  - Material: Steel
  - Length: 400 ft.
  - Diameter: 12 (ID) in.
  - Wall Thickness: 0.375 in.
- Casing:
  - Perforated: None
  - Screen: None
  - Material: Steel
  - Length: 800 ft.
  - Diameter: 12 (ID) in.
  - Wall Thickness: 0.3125 in.
  - Openings: 65 sq. in./L.F.
- Rock Grout: None
- Open Hole:
  - Length: None
  - Diameter: None

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

Please deliver the following pages to:

Name: Greg Fukumoto
Company: Tom Nance Water Resource Engineering
From: Charley Lee
Date: 14 Mar 96  Time: 3:15 pm

Message: transmitting submitted & approved minutes for
Lahai Well #14 (8854-02); copy of permit not
signed & returned to file.

FOUND PERMIT

Total number of pages (including Transmittal Page): 3

If you do not receive all of the pages legibly, please call back: (808) 587-0251

Sending Facsimile Number: (808) 587-0219
Receiving Facsimile Number: (808) 587-7757
WELL CONSTRUCTION PERMIT

for

Palawai Basin Exploratory Well
(Well No. 4854-02)
Palawai, Lanai

TO:  Lanai Company, Inc.
P.O. Box L
Lanai City, HI 96763

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 Palawai Basin Exploratory Well (Well No. 4854-02), 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 (Attachment A). A one-inch diameter (minimum) 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 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.
WELL CONSTRUCTION PERMIT
Well No. 4854-02

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 November 16, 1994 meeting are incorporated into the permit by reference.

7. The well construction 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 months. The work proposed in the well construction permit application shall be completed within two years from the date of permit approval.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management
DEC - 1 1994

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: [Signature]
Date: 12-9-94

Printed Name: VINCE G. RACOY, JR.

Firm or Title: Vice President - Lanai Company, Inc.

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

Attach.
cc: USGS
State Historic Preservation Division
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Wastewater Branch
Maui Department of Water Supply
August 24, 1994
94TN-168 (93-02)

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

Dear Mr. Ahue:

Well Construction Permit Application
for an Irrigation Well 11 in Palawai Basin

On behalf of Lanai Company, Inc., I am pleased to submit the enclosed well construction permit application and filing fee. The new well would be located along Manele Road in Palawai Basin. We expect to encounter high level, brackish groundwater. If its quality is suitable for landscape irrigation, the well would be outfitted as an addition to the Manele Resort irrigation system. It would not be used to increase pumpage from Palawai Basin, however. The intention is to have Well 9 and the new well be the chief sources of supply with Well 1 providing standby capacity. Development of this well is the result of recent discussions between the Company and Lanai community leaders.

If you have questions or need additional information, feel free to call me or Vince Bagoyo (808-565-3856). Thank you for your attention to this matter.

Sincerely,

Tom Nance

cc: Vince Bagoyo - Lanai Company, Inc.

Enclosures
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
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 9321, Honolulu, Hawaii 96809. Application must be accompanied by 5 copies and 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. For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.

APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)

1. (a) WELL OWNER: Lanai Holdings, Inc. Contact Person: Vince Bagoyo Phone: 808-565-3856
   Mailing Address: P.O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3881

(b) LAND OWNER: Castle & Cooke, Inc. Contact Person: Vince Bagoyo Phone: 808-565-3856
   Mailing Address: P.O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3881

(c) CONTRACTOR: Beylik Drilling, Inc. Contact Person: Dave Hines Phone: 682-5554
   Mailing Address: 91-259-A Olai Street Kapolei, Hawaii 96707
   Fax: 682-5866

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)

2. WELL NAME: Well 14 Island: Lanai
   Address: Along the Road to Manele Resort
   Tax Map Key: Zone 4 Sec 19 Plat 02 Parcel 1

3. PROPOSED WORK: (check all that apply)
   ~ State Well No.: 4854-02
   □ Construct New Well □ Install New Pump
   □ Modify Existing Well* □ Modify Pump*
   □ Abandon/Seal*
   □ Dilled □ Dug □ Shaft □ Tunnel
   Is this well part of a battery of wells? □ Yes □ No (Please describe)

4. CONSTRUCTION:
   □ Drilled □ Dug □ Shaft □ Tunnel

5. PROPOSED PUMPING RATE: 350 gallons per minute

6. PROPOSED USE: (check all that apply)
   □ Municipal (including hotels, stores, etc.) □ Industrial
   □ Domestic (individual, noncommercial water system)
   □ Irrigation (crop) □ Golf Course and Landscaping □ No. of Acres: 150
   □ Military □ Other (explain):

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Up to 500,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
      ~ Flowmeter □ Open-pipe □ Weir □ Orifice □ Other (explain):

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.
   Conservation District Use Permit (CDUP) To find out if a CDUP is necessary, call DLNR Land Division at 587-0414
      □ Not Required □ Required, date approved
   Environmental Impact Statement (EIS) or Environmental Assessment (EA) To determine if an EIS or EA is necessary, call OEQC at 588-4165
      □ Not Required □ Required, date published in OEQC bulletin
   Special Management Area Permit (SMAP) To determine if an SMAP is necessary: on Oahu, call 527-5574; on Hawaii, call 961-6288; for Maui county, call 270-7236; on Kauai, call 241-6977.
      □ Not Required □ Required, date approved

9. REMARKS, EXPLANATIONS:

   (if more space is needed, please attach additional sheet)

NOTE: Signing below indicates the signatories understand and swear that the information provided on this application is accurate and true to the best of their knowledge. Further, the signatories understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of cumulative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity; 5) in the event that the application is not completed correctly, any permit may be suspended until the item is brought in to compliance, and any work done while the permit is in suspension may result in fines of up to $1000/day.

Well Owner: Lanai Holdings, Inc. (print legibly)
Signature: [Signature]
Date: [Date]

Landowner: Castle & Cooke, Inc. (print legibly)
Signature: [Signature]
Date: [Date]

Contractor: Beylik Drilling, Inc. (print legibly)
Signature: [Signature]
Date: [Date]

For official use only
Latitude: [Latitude]
Longitude: [Longitude]
Aquiher System No.: [Aquiher System No.]
State Well No.: [State Well No.]

WCPA Form 8/21/01
**EXISTING WELL SECTION**

10. **PROPOSED WELL SECTION** (Please attach schematic if different from diagram provided below)

**For non-salt water Basal Wells - bottom elevation of Carbon Solid Stainless Steel:**

- **ASS Thermoset Plastic:** PVC

* The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = \( \frac{1}{4} \times \text{Water Level Elev.} \)

Example: Estimated + Water Level Elev. \( \Rightarrow \) Bottom Elevation of Well Limit = \( \frac{1}{4} \times (248 \text{ ft., msl}) = -18.5 \text{ ft.} \)

### Solid Casing Material:
- **Carbon Steel:** compliant with (check one or more): ANSIAWWA C200 API Spec. 5L ASTM A53 ASTM A139
  - And compliant with (check one or more): ASTM A242 Type E Type S Grade B Other
- **Stainless Steel:** (check one): ASTM A409 (production wells) ASTM A312 (monitor wells)
- **ABS Plastic** conforming to ASTM F480 and ASTM D1527: (check one) Schedule 40 Schedule 80
- **PVC Plastic** conforming to ASTM F480 and ASTM D1785 or ASTM D2241: (check one): Schedule 40 Schedule 80 Schedule 120
- **Thermoset Plastic:** (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296

### Open Casing Material:
- **Carbon Steel:** compliant with (check one or more): ANSIAWWA C200 API Spec. 5L ASTM A53 ASTM A139
  - And compliant with (check one or more): ASTM A242 Type E Type S Grade B Other
- **Stainless Steel:** (check one): ASTM A409 (production wells) ASTM A312 (monitor wells)
- **ABS Plastic** conforming to ASTM F480 and ASTM D1527: (check one) Schedule 40 Schedule 80
- **PVC Plastic** conforming to ASTM F480 and ASTM D1785 or ASTM D2241: (check one): Schedule 40 Schedule 80 Schedule 120
- **Thermoset Plastic:** (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
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  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

Well Construction and/or 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 621, Honolulu, Hawaii 96809. Application must be accompanied by 5 copies and 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 587-9225. For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.

APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)

1. (a) WELL OWNER: Lanai Holdings, Inc. Contact Person: Vince Bagoyo
   Mailing Address: P. O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3868
   Phone: 808-565-3856

   (b) LAND OWNER: Castle & Cooke, Inc.
   Mailing Address: P. O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3868
   Phone: 808-565-3856

   (c) CONTRACTOR: Beylik Drilling, Inc.
   Mailing Address: 91-259-A Olai Street Kapolei, Hawaii 96707
   Fax: 682-5866
   Phone: 682-5554

2. WELL NAME: Well 14
   Island: Lanai
   Address: Along the Road to Manele Resort
   Tax Map Key: Zone 4 Sec 9 Plat 2 Parcel 1

3. PROPOSED WORK: 
   (check all that apply)
   □ Construct New Well
   □ Modify Existing Well
   □ Abandon/Seal
   □ Install New Pump
   □ Modify Pump
   □ Drilled
   □ Dug
   □ Shaft
   □ Tunnel

4. CONSTRUCTION:
   □ D Domestic (individual, noncommercial water system)
   □ Industrial
   □ Other (explain)
   □ No
   □ Yes
   □ Is this well part of a battery of wells?
   If Yes, Please describe

5. PROPOSED PUMPING RATE: 350 gallons per minute

6. PROPOSED USE:
   (check all that apply)
   □ Municipal (including hotels, stores, etc.)
   □ Domestic (individual, noncommercial water system)
   □ Irrigation (crop)
   □ Golf Course and Landscaping
   □ Industrial
   □ No
   □ Yes
   □ No.
   □ Other (explain)

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Up to 500,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
      □ Flowmeter
      □ Open-pipe
      □ Weir
      □ Orifice
      □ Other (explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.
   □ Not Required
   □ If required, date approved

   Environmental Impact Statement (EIS) or Environmental Assessment (EA)
   □ Not Required
   □ If required, date published in OEQC bulletin

   Special Management Area Permit (SMAP)
   □ To determine if an SMAP is necessary: on Oahu, call 527-5374; on Kauai, Hawaii 961-5336, for Maui county, call 270-7235; in Kaui, call 241-6677.
   □ Not Required
   □ If required, date approved

9. REMARKS, EXPLANATIONS:

   (if more space is needed, please attach additional sheet)

NOTE: Signing below indicates the signatories understand and swear that the information provided on this application is accurate and true to the best of their knowledge. Further, the signatories understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity; 5) in the event that the application is not completed correctly, any permit may be suspended until the item is brought in to compliance, and any work done while the permit is in suspension may result in fines of up to $1000/day.

For Official Use Only:
Latitude _______ Aquifer System No. _______
Longitude _______ State Well No. _______

9-11-02

Well Owner Lanai Holdings, Inc.
Signature ____________________________ Date ___________

Landowner Castle & Cooke, Inc.
Signature ____________________________ Date ___________

Contractor Beylik Drilling, Inc.
Signature ____________________________ Date ___________

WCPIP PA Form 8/23/01
EXISTING

10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,
Bottom Elevation of Well Limit = (Water Level - \( \frac{1193.5\text{ ft.}}{4} \)) = -18.5 ft.

\[ \text{Example: Estimated } + 2 \text{ ft. Water Level Elev. } \rightarrow \text{Bottom Elevation of Well Limit} = (2 - \frac{1193.5\text{ ft.}}{4}) = -18.5 \text{ ft.} \]

Solid Casing Material:
- Carbon Steel: compliant with (check one or more): \( \square \) ANSI/WWA C200 \( \square \) API Spec. 5L \( \square \) ASTM A53 \( \square \) ASTM A139
- Stainless Steel: (check one): \( \square \) ASTM A409 (production wells) \( \square \) ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): \( \square \) Schedule 40 \( \square \) Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): \( \square \) Schedule 40 \( \square \) Schedule 80 \( \square \) Schedule 120
- Thermoset Plastic: (check one): \( \square \) Filament Wound Resin Pipe conforming to ASTM D2996 \( \square \) Centrifugally Cast Resin Pipe conforming to ASTM D2997
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- Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
- Carbon Steel: compliant with (check one or more): \( \square \) ANSI/WWA C200 \( \square \) API Spec. 5L \( \square \) ASTM A53 \( \square \) ASTM A139
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* The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,
Bottom Elevation of Well Limit = (Water Level - \( \frac{1193.5\text{ ft.}}{4} \)) = -18.5 ft.

Example: Estimated + 2 ft. Water Level Elev. \( \rightarrow \) Bottom Elevation of Well Limit = (2 - \( \frac{1193.5\text{ ft.}}{4} \)) = -18.5 ft.

Solid Casing Material:
- Carbon Steel: compliant with (check one or more): \( \square \) ANSI/WWA C200 \( \square \) API Spec. 5L \( \square \) ASTM A53 \( \square \) ASTM A139
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Open Casing Material:
- Carbon Steel: compliant with (check one or more): \( \square \) ANSI/WWA C200 \( \square \) API Spec. 5L \( \square \) ASTM A53 \( \square \) ASTM A139
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State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT
9-11-02
02-61

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 96803. Application must be accompanied by 5 copies and 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.

For further information and updates to this application form, visit http://www.state.hi.us/dlnr/owm.

APPLICANT INFORMATION: (Fill out all three. If applicable, and place a check next to the primary contact)

1. (a) WELL OWNER: Lanai Holdings, Inc.
   Mailing Address: P. O. Box 630310
   Lanai City, Hawaii 96763
   Phone: 808-565-3856
   Fax: 808-565-3881
   Contact Person: Vince Bagoyo

   (b) LAND OWNER: Castle & Cooke, Inc.
   Mailing Address: P. O. Box 630310
   Lanai City, Hawaii 96763
   Phone: 808-565-3856
   Fax: 808-565-3881
   Contact Person: Vince Bagoyo

   (c) CONTRACTOR: Beylik Drilling, Inc.
   Mailing Address: 91-259-A Olai Street
   Kapolei, Hawaii 96707
   Phone: 682-5654
   Fax: 682-5866
   Contact Person: Dave Hines

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)

2. WELL NAME: Well 14
   Island: Lanai
   Address: Along the Road to Manele Resort
   Tax Map Key: 4-9-02-1
   Zone - Sec - Plat - Parcel
   Attach: (a) portion of a 7.5-Minute Series USGS topographic map (scale 1:24,000) with well location labeled and include the name of the quad map

   (b) a property tax map, showing well location referenced to established property boundaries

3. PROPOSED WORK: (check all that apply)
   □ Construct New Well
   □ Modify Existing Well
   □ Abandon/Seal
   □ Install New Pump
   □ Modify Pump

   □ State Well No.: 4854-02
   (if unknown, please call Commission at 587-0225)

4. CONSTRUCTION:
   □ Drilled
   □ Dug
   □ Shaft
   □ Tunnel
   Is this well part of a battery of wells? □ Yes □ No
   (Please describe)

5. PROPOSED PUMPING RATE:
   350 gallons per minute

6. PROPOSED USE: (check all that apply)
   □ Municipal (including hotels, stores, etc.)
   □ Industrial
   □ Domestic (individual, noncommercial water system)
   □ Irrigation (crop)
   □ Golf Course and Landscaping
   □ No. of Acres: 150a
   □ Military
   □ Other (explain):

7. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   Up to 500,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
   □ Flowmeter □ Open-pipe □ Weir □ Orifice □ Other(explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.
   Conservation District Use Permit (CDUP) To find out if a CDUP is necessary, call DLNR Land Division at 587-0414
   □ Not Required
   □ If required, date approved
   Environmental Impact Statement (EIS) or Environmental Assessment (EA) To determine if an EIS or EA is necessary, call OEQC at 586-4185
   □ Not Required
   □ If required, date published in OEQC bulletin
   Special Management Area Permit (SMAP) To determine if a SMAP is necessary: on Oahu, call 527-5374; on Hawaii, call 961-2286; for Maui county, call 270-7235; on Kauai, call 241-6077.
   □ Not Required
   □ If required, date approved

9. REMARKS, EXPLANATIONS:

NOTE: Signing below indicates the signatories understand and swear that the information provided on this application is accurate and true to the best of their knowledge. Further, the signatories understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity; 5) in the event that the application is not completed correctly, any permit may be suspended until the item is brought in to compliance, and any work done while the permit is in suspension may result in fines of up to $100/day.

Well Owner
Lanai Holdings, Inc.
Signature: ____________________________ Date: ________________
(print legibly)

Landowner
Castle & Cooke, Inc.
Signature: ____________________________ Date: ________________
(print legibly)

Contractor
Beylik Drilling, Inc.
Signature: ____________________________ Date: ________________
(print legibly)

For official use only
Latitude ____________________________ State Well No. ____________________________
Longitude ____________________________

AQIiera System No. ____________________________

For Official Use Only: ____________________________
WCPIPA Form 921601
**EXISTING**

10. **PROPOSED WELL SECTION**

(please attach schematic if different from diagram provided below)

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole Diameter</td>
<td>17.5 in.</td>
</tr>
<tr>
<td>Total Depth</td>
<td>945 ft.</td>
</tr>
<tr>
<td>Estimated Water Level Elev.</td>
<td>552 ft, msl*</td>
</tr>
<tr>
<td>Ground Elev.</td>
<td>1193 ft, msl*</td>
</tr>
<tr>
<td>Casing Material:</td>
<td>Stainless Steel:</td>
</tr>
<tr>
<td></td>
<td>PVC</td>
</tr>
<tr>
<td></td>
<td>Centrifugally Cast Resin Pipe</td>
</tr>
<tr>
<td></td>
<td>Reinforced Plastic Mortar Pressure Pipe</td>
</tr>
<tr>
<td></td>
<td>Glass Fiber Reinforced Resin Pressure</td>
</tr>
<tr>
<td></td>
<td>PTFE Fluorocarbon Tubing</td>
</tr>
<tr>
<td></td>
<td>FEP Fluorocarbon Tubing</td>
</tr>
<tr>
<td>Casing Length</td>
<td>583 ft.</td>
</tr>
<tr>
<td>Nominal Diameter</td>
<td>13 in.</td>
</tr>
<tr>
<td>Wall Thickness</td>
<td>0.3275 in.</td>
</tr>
<tr>
<td>Bottom Elevation</td>
<td>610 ft, msl*</td>
</tr>
</tbody>
</table>

*The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = (Water Elevation - 41 x Water Level Elev.) / 4

Example: Estimated Water Level Elev. = 1193 ft, msl*

Solid Casing Material:
- Carbon Steel: compliant with: ANSI/AWWA C200, API Spec. 5L, ASTM A53, ASTM A139
- Stainless Steel: compliant with: ASTM A409 (production wells), ASTM A490, ASTM A53, ASTM A139

Open Casing Material:
- Carbon Steel: compliant with: ANSI/AWWA C200, API Spec. 5L, ASTM A53, ASTM A139
- Stainless Steel: compliant with: ASTM A409 (production wells), ASTM A53, ASTM A139

Please refer to the HAWAII WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS to ensure that your application is in compliance with applicable standards.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
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 5 copies and 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 587-6225. For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.

APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)
1. (a) □ WELL OWNER: Lanai Holdings, Inc. Contact Person: Vince Bagoyo Phone: 808-565-3856
   Mailing Address: P. O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3881 E-mail:
   (b) □ LAND OWNER: Castle & Cooke, Inc. Contact Person: Vince Bagoyo Phone: 808-565-3856
   Mailing Address: P. O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3881 E-mail:
   (c) □ CONTRACTOR: Beylik Drilling, Inc. Contact Person: Dave Hines Phone: 682-5654
   Mailing Address: 91-259-A Olal Street Kapolei, Hawaii 96707
   Fax: 682-5866 E-mail: Lic #: AC-21896 (circle one: C-57, C-57a, or A)

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)
2. WELL NAME: Well 14 Island: Lanai
   Address Along the Road to Manele Resort Tax Map Key: 4 - 9 - 02 - 1
   Zone Sec Plat Parcel
   Attach: (a) portion of a 7.5-Minute Series USGS topographic map (scale 1:24,000) with well location labeled and include the name of the quad map
   (b) a property tax map, showing well location referenced to established property boundaries
   3. PROPOSED WORK: (check all that apply)
      □ Construct New Well
      □ Modify Existing Well
      □ Abandon/Sell
      □ Install New Pump
      □ Modify Pump
      *State Well No.: 4854-02 (if unknown, please call Commission at 587-0225)
   4. CONSTRUCTION: □ Drilled □ Dug □ Shaft □ Tunnel
      Is this well part of a battery of wells? □Yes □No (Please describe)
      5. PROPOSED PUMPING RATE: __________ gallons per minute
      6. PROPOSED USE: □ Municipal (including hotels, stores, etc.) □ Industrial
         □ Domestic (individual, noncommercial water system)
         □ Irrigation (crop) Golf Course and Landscaping □ No. of Acres: 150a
         □ Military □ Other (explain)
      7. (a) PROPOSED AMOUNT OF WITHDRAWAL: □ Up to 500,000 gallons per day
         (b) METHOD OF FLOW MEASUREMENT: □ Flowmeter □ Open-pipe □ Weir □ Orifice □ Other(explain)

OTHER IMPORTANT INFORMATION:
8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.
   Conservation District Use Permit (CDUP) To find out if a CDUP is necessary, call DLNR Land Division at 587-0414
   □ Not Required □ Required, if required, date approved
   Environmental Impact Statement (EIS) or Environmental Assessment (EA) To determine if an EIS or EA is necessary, call OEQC at 586-4185
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   □ Not Required □ Required, if required, date approved

9. REMARKS, EXPLANATIONS:

NOTE: Signing below indicates the signatories understand and swear that the information provided on this application is accurate and true to the best of their knowledge. Further, the signatories understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity; 5) in the event that the application is not completed correctly, any permit may be suspended until the item is brought in to compliance, and any work done while the permit is in suspension may result in fines of up to $1000/day.

For official use only
Signature ___________________________ ___________________________ ___________________________
Date 9/17/02 4/17/02 Sept. 12, 2002

For Aquifer System No.
State Well No.

For more space is needed, please attach additional sheet)

WCPRA Form 8/21/01
10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

**EXISTING**

- **Elevation at top of casing:** 1193.5 ft., msl
- **Minimum of 2" Radius & 4" Thick Concrete Pad (to contain benchmark surveyed to nearest 0.01 ft.)**
- **Ground Elevation:** 1193 ft., msl
- **Cement Grout:** 90 ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)
- **Annular space between hole and casing (min.3"):** 2.06 in.
- **Rock or Gravel Packing:** 555 ft.
  - **Material:**
    - Crushed Basalt
    - Rounded Gravel
- **Estimated Water Level Elevation:** 552 ft., msl

**Solid Casing Material:**
- **Carbon Steel:** compliant
- **Stainless Steel:** compliant
- **Thermoset Plastic:** compliant
- **PVC:** compliant

**Open Casing Material:**
- **Carbon Steel:** compliant
- **Stainless Steel:** compliant
- **ABS:** compliant
- **Thermoset Plastic:** compliant
- **PVC:** compliant

- **Solid Casing:** (≥ 90% x (Ground Elev.-Water Level Elev))
  - **Total Length:** 583 ft.
  - **Nominal Diameter:** 13 in.
  - **Wall Thickness:** 0.3275 in.
  - **Bottom Elevation:** 610 ft., msl

- **Open Casing:**
  - **Perforated**
  - **Screen**
  - **Total Length:** 248 ft., msl

**Solid Casing Material:**
- **Carbon Steel:** compliant with (check one or more):
  - ANSI/AWWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
- **Stainless Steel:** compliant with (check one or more):
  - ASTM A242
  - Type E
  - Grade B
  - Other

**Open Casing Material:**
- **Carbon Steel:** compliant with (check one or more):
  - ANSI/AWWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
- **Stainless Steel:** compliant with (check one or more):
  - ASTM A242
  - Type E
  - Grade B
  - Other

**PVC Plastic conforming to ASTM F480 and (ASTM D1527):**
- **Schedule 40**
- **Schedule 80**
- **Schedule 583**
- **Schedule 120**

**Thermoset Plastic:**
- **Filament Wound Resin Pipe conforming to ASTM D2996**
- **Cementifugally Cast Resin Pipe conforming to ASTM D2997**
- **Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517**
- **Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950**
- **PTFE Fluorocarbon Tubing conforming to ASTM D3296**
- **FEP Fluorocarbon Tubing conforming to ASTM D3296**

**Open Casing Material:**
- **Carbon Steel:** compliant with (check one or more):
  - ANSI/AWWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
- **Stainless Steel:** compliant with (check one or more):
  - ASTM A242
  - Type E
  - Grade B
  - Other

**PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241):**
- **Schedule 40**
- **Schedule 80**
- **Schedule 120**

**Thermoset Plastic:**
- **Filament Wound Resin Pipe conforming to ASTM D2996**
- **Cementifugally Cast Resin Pipe conforming to ASTM D2997**
- **Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517**
- **Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950**
- **PTFE Fluorocarbon Tubing conforming to ASTM D3296**
- **FEP Fluorocarbon Tubing conforming to ASTM D3296**

*The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = (Water Elevation - 41 ft.)/4. Example: Estimated + 2 ft. Water Level Elev. → Bottom Elevation of Well Limit = (1193 - 41)/4 = 1158 ft.

**Note:** Neither bentonite nor mud should be used in saturated zone division drilling.

**Please refer to the Hawaii Well Construction and Pump Installation Standards** to ensure that your se-balls are in compliance with applicable standards.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

APPLICATION INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)
1. (a) WELL OWNER: Lanai Holdings, Inc.
   Contact Person: Vince Bagoyo
   Phone: 808-565-3856
   Mailing Address: P. O. Box 630310
   Lanai City, Hawaii 96763
   Fax: 808-565-3881
   E-mail: 

   (b) LAND OWNER: Castle & Cooke, Inc.
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   E-mail: 

   (c) CONTRACTOR: Beylik Drilling, Inc.
   Contact Person: Dave Hines
   Phone: 882-5554
   Mailing Address: 91-259-A Olail Street
   Kapolei, Hawaii 96707
   Fax: 682-5866
   E-mail: 

2. WELL NAME: Well 14
   Island: Lanai
   Address: Along the Road to Manele Resort
   Tax Map Key: 
   Zone: 4 Sec: 9 Flat: 02 Parcel: 1
   Attach: (a) portion of a 7.5-Minute Series USGS topographic map (scale 1:24,000) with well location labeled and include the name of the quad map (b) a property tax map, showing well location referenced to established property boundaries

3. PROPOSED WORK: (check all that apply)
   • Install New Pump
   • Modify Existing Well
   • Abandon/Seal* (State Well No.: 4854-02) (if unknown, please call Commission at 587-0225)

4. CONSTRUCTION: (check all that apply)
   • Drilled
   • Dug
   • Shaft
   • Tunnel
   Is this well part of a battery of wells? □ Yes □ No (Please describe)

5. PROPOSED PUMPING RATE: 350 gallons per minute

6. PROPOSED USE: (check all that apply)
   • Municipal (including hotels, stores, etc.)
   • Domestic (individual, noncommercial water system)
   • Industrial
   • Irrigation (crop)
   • Golf Course and landscaping
   • No. of Acres: 150±
   • Military
   • Other (explain): 

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Up to 500,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.
   Conservation District Use Permit (CDUP): To find out if a CDUP is necessary, call DLNR Land Division at 587-0414
   Environmental Impact Statement (EIS) or Environmental Assessment (EA): To determine if an EIS or EA is necessary, call OEQC at 586-4185
   Special Management Area Permit (SMAP): To determine if an SMAP is necessary: on Oahu, call 527-5374; on Hawaii, call 961-6288; for Maui county, call 270-7235; on Kauai, call 241-6877.

9. REMARKS, EXPLANATIONS:
   (If more space is needed, please attach additional sheet)

NOTE: Signing below indicates the signatories understand and swear that the information provided on this application is accurate and true to the best of their knowledge. Further, the signatories understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of cumulative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity; 5) in the event that the application is not completed correctly, any permit may be suspended until the item is brought to compliance, and any work done while the permit is in suspension may result in fines of up to $1000 per day.

Well Owner: Lanai Holdings, Inc.
Landowner: Castle & Cooke, Inc.
Contractor: Beylik Drilling, Inc.
Signatures:

For official use only
Latitude: _____________________
Longitude: _____________________
State Well No.: _____________________

WCPA Form 8/21/01
10. PROPOSED WELL SECTION
(Please attach schematic if different from diagram provided below)

Solid Casing Material:
Carbon Steel: compliant
ABS Plastic
Stainless Steel:
Thermoset
PVC Plastic

Solid Casing: (± 90% x (Ground Elevation - Water Level Elev.))
Total Length: 583 ft.
Nominal Diameter: 13 in.
Wall Thickness: 0.3275 in.
Bottom Elevation: 610 ft., msl

Open Casing: Not Perforated
Total Length: 248 ft., msl
Nominal Diameter: 13 in.
Wall Thickness: 0.3275 in.
Bottom Elevation: 248 ft., msl

Note: Neither bentonite nor mud should be used in extracted mine duction drillings.

Open Hole:
Length: ________ ft.
Diameter: ________ in.
Bottom Elevation: ________ ft., msl

EXISTING
11.935 ft., msl

Hole Diameter: 17.5 in.
Minimum of 2' Radius & 4" Thick Concrete Pad (to contain benchmark surveyed to nearest 0.01 ft.)
Ground Elevation: 1193 ft., msl

Please refer to the HAWAII WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS to ensure that your well is in compliance with applicable standards.

Cement Grout: 90 ft.
(min. 70% of distance from ground elevation to top of water surface or 800 ft., whichever is less.)

Annular space between hole and casing (min.3]):
2.06 in.

Rock or Gravel Packing:
655 ft.
Material:
 Crushed Basalt
 Rounded Gravel

Estimated Water Level Elevation: 552 ft., msl

Total Depth: 945 ft.

Note: Neither bentonite nor mud should be used in extracted mine duction drillings.

For non-salt water Basal Wells - bottom elevation of well shall not be deeper than 1/4 of aquifer thickness or,
Bottom Elevation of Well Limit = (Top of Casing - Aquifer Thickness x 4)
Example: Estimated Water Level Elev. = (2 - 41/4) = 13.5 ft.

Solid Casing Material:
Carbon Steel: compliant (check one or more):
ansi/awwa c200
api spec. 5l
astm a53
astm a139

And compliant with (check one or more):
ansi/awwa c950
astm a242
type e
other

Stainless Steel: (check one):
ansi/awwa c950 (production wells)
astm a312 (monitor wells)

abs plastic conforming to astm f480 and astm d1527: (check one)
schedule 40
schedule 80

PVC plastic conforming to astm f480 and astm d1785 or astm d2241: (check one)
schedule 40
schedule 80
schedule 120

thermoset plastic: (check one)
filament wound resin pipe conforming to astm d2996
centrifugally cast resin pipe conforming to astm d2997
reinforced plastic mortar pressure pipe conforming to astm d3517
glass fiber reinforced resin pressure pipe conforming to awwa c950
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APPLICATION FOR PERMIT

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APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)

1. (a) WELL OWNER: Lanai Holdings, Inc. Contact Person: Vince Bagoyo Phone: 808-565-3856
   Mailing Address: P. O. Box 630310 Lanai City, Hawaii 96763
   Fax: 808-565-3861 E-mail:

(b) LAND OWNER: Castle & Cooke, Inc. Contact Person: Vince Bagoyo Phone: 808-565-3856
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   Mailing Address: 91-255-A Oal Street Kapolei, Hawaii 96707
   Fax: 882-5566 E-mail:

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)

2. WELL NAME: Well 14 Island: Lanai
   Address: Along the Road to Manele Resort Tax Map Key: 4 9 02 1
   Attach: (a) portion of a 7.5-Minute Series USGS topographic map (scale 1:24,000) with well location labeled and include the name of the quad map
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   □ Construct New Well  □ Install New Pump*
   □ Modify Existing Well*  □ Modify Pump*
   □ Abandon/Seal*
   □ State Well No.: 4854-02

4. CONSTRUCTION:
   D Drilled  Dug  Shaft  Tunnel
   Is this well part of a battery of wells? □ Yes □ No (Please describe)

5. PROPOSED PUMPING RATE: 350 gallons per minute

6. PROPOSED USE: (check all that apply)
   □ Municipal (including hotels, stores, etc.) □ Industrial
   □ Domestic (individual, noncommercial water system)
   □ Irrigation (crop)  Golf Course and Landscaping
   □ No. of Acres: 150
   □ Military  Other (explain):

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Up to 500,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT: □ Flowmeter □ Open-pipe □ Weir □ Orifice □ Other (explain):

8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.
   Conservation District Use Permit (CDUP) To find out if a CDUP is necessary, call DLNR Land Division at 567-0414
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   Environmental Impact Statement (EIS) or Environmental Assessment (EA) To determine if an EIS or EA is necessary, call OEQC at 586-4185
   □ Not Required  □ If required, date published in OEQC bulletin
   Special Management Area Permit (SMAP) To determine if a SMAP is necessary: on Oahu, call 527-5374; on Hawaii, call 961-8288; for Maui county, call 270-7256; on Kauai, call 241-6577.
   □ Not Required  □ If required, date approved

9. REMARKS, EXPLANATIONS:

   (If more space is needed, please attach additional sheet)

NOTE: Signing below indicates the signatories understand and swear that the information provided on this application is accurate and true to the best of their knowledge. Further, the signatories understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/reabandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity; 5) in the event that the application is not completed correctly, any permit may be suspended until the item is brought in to compliance, and any work done while the permit is in suspension may result in fines of up to $1000/day.

Well Owner: Lanai Holdings, Inc. (print legibly) Landowner: Castle & Cooke, Inc. (print legibly) Contractor: Beylik Drilling, Inc. (print legibly)
Signature: [Signature] Date: 9/17/02 Signature: [Signature] Date: 9/17/02

For official use only
Latitude_________________________Longitude_________________________
State Well No._________________________

State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

For Official Use Only:

[Signature]
Date: 9/17/02

Form 8/21/01
**10. PROPOSED WELL SECTION** (Please attach schematic if different from diagram provided below)

**Solid Casing Material:**
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one) □ Filament Wound Resin Pipe conforming to ASTM D2996 □ Centrifugally Cast Resin Pipe conforming to ASTM D2997 □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517 □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950 □ PTFE Fluorocarbon Tubing conforming to ASTM D3296 □ FEP Fluorocarbon Tubing conforming to ASTM D3296

**Open Casing Material:**
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one) □ Filament Wound Resin Pipe conforming to ASTM D2996 □ Centrifugally Cast Resin Pipe conforming to ASTM D2997 □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517 □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950 □ PTFE Fluorocarbon Tubing conforming to ASTM D3296 □ FEP Fluorocarbon Tubing conforming to ASTM D3296

*The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = \( \frac{(Water \ Elevation - 4 \times Water \ Level \ Elevation)}{4} \)

**Example:** Estimated + 2 ft. Water Level Elev. \( \rightarrow \) Bottom Elevation of Well Limit = \( \frac{2}{4} \times 51.5 \text{ ft} \) = -18.5 ft.
With the well #1, I found the folder for a well then called "Palawai Exploratory Well". Sorry for any anxiosity.

Enclosed is our last letter, indicating test data required before accepting an application for a pump installation permit.
k, please printout this email for the file. Thanks.
Charley F Ice

We responded in March 1996 to the PIPA requesting pump test data. Nothing has happened since. Vince told me today that they simply aren't getting funds for a host of outstanding capital projects -- was happy to get a go-ahead to replace 10,000 LF of aged piping. Frankly, the pipelines are a very high priority. Well 14 has something 550 mg/l Cl, so he considers it an "active" prospect, aside from the lack of money. You're probably aware that the Resort is running in the red, has been for a while -- don't know whether it's better or worse now.
Roy Hardy

Since you were taking a look at the report yesterday I noticed this pending application has not been accepted yet. What is the status or are they cancelling the well project?
<table>
<thead>
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<th>COST</th>
<th>PROJECT PH ACT</th>
<th>AMOUNT</th>
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</table>

**REMARKS:**

**LINE (1):** Well No. 4854-02 (PIPA)

**LINE (2):**

**LINE (3):**

**LINE (4):**

---

**TWNRE INC.**

**DBA TOM NANCE WATER RESOURCE ENGINEERING**

**680 ALA MOANA BLVD, STE. 406**

**HONOLULU, HI 96813**

---

**Bank of Hawaii**

**5-102/1213**

February 6, 1996

**PAY TO THE ORDER OF Department of Land and Natural Resources**

**DOLLARS $25.00**

---

**TWNRE INC.**

**DBA TOM NANCE WATER RESOURCE ENGINEERING**

---

**DELUXE FORM WVC-3 V-2**

<table>
<thead>
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<th>DESCRIPTION</th>
<th>AMOUNT</th>
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<tr>
<td>2-6-96</td>
<td>Filing Fee: Pump Installation Permit For Lanai Well No. 14 [Job No. 95-41]</td>
<td>$25.00*</td>
</tr>
</tbody>
</table>
WELL CONSTRUCTION PERMIT

for

Palaawai Basin Exploratory Well
(Well No. 4854-02)
Palawai, Lanai

TO: Lanai Company, Inc.
P.O. Box L
Lanai City, HI 96763

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 Palaawai Basin Exploratory Well (Well No. 4854-02), 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 (Attachment A). A one-inch diameter (minimum) 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 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.
WELL CONSTRUCTION PERMIT
Well No. 4854-02

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 November 16, 1994 meeting are incorporated into the permit by reference.

7. The well construction 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 months. The work proposed in the well construction permit application shall be completed within two years from the date of permit approval.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management
DEC - 1 1994

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: VINCE C. BACOY, JR. Date: 12-9-94

Printed Name: VINCE C. BACOY, JR.

Firm or Title: Vice President - Lanai Company, Inc.

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

cc: USGS
State Historic Preservation Division
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Wastewater Branch
Maui Department of Water Supply
Mr. Vince Bagoyo  
Lanai Company, Inc.  
P.O. Box 774  
Lanai City, Hawaii 96763

Dear Mr. Bagoyo:

Pump Installation Permit Application  
Lanai Well 14 (Well No. 4854-02)

We received the captioned application, but request more data before accepting it for processing. Condition 4(e) of your well construction permit specifies your submittal of "complete pumping test records, including time, pumping rate, drawdown, chloride content, and other water quality data. We have received only one graph with three data points. Please forward complete pumping test data at your earliest convenience.

If you have any questions, please call Charley Ice at 587-0251 or Glen Bauer at 587-0263.

Sincerely,

RAE M. LOUI  
Deputy Director

Cl:ss
Charles, let's request more data for step 2. We need 6:30.

I can do a better analysis before we accept. Merid
of this request is that the installed pump should give
a more consistent pumping rate than the generator
inches. We can add a special condition to ensure an
improved pump quality if we find necessary. It's just that
usually it's cheaper for us to do a little test while
hunters are not up. More expensive for them but better
care for us this way.
What is the merit in permitting the pump without any preliminary pump test results? Am I leery of having someone change our procedures for us to circumvent what we think is the preferred sequence.

1. Completion report?
2. Sounds like we may want to test our procedures with another Twin Plant no test application for pump installation. No well at this in this.

Loui, R.
Mizuno, L.
Nakama, L.
Ohye, M.
Sakoda, E.
Subia, S.
Swanson, S.
Uwaine, S.
Yoda, K.

09/96

State has an ordinance which allows pumping from non-potable sources to be used @ Venice w 8 less 50,000 gpd. This will increase our pumping which is good. This ordinance really means the current authority limit we allow it unless we feel the current should designate.
Ms. Rae M. Loui - Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Ms. Loui:

Pump Installation Permit For  
Lanai Well No. 14

On behalf of Lanai Company, I am pleased to submit the enclosed Pump Installation permit application and filing fee for Lanai Well No. 14. We intend to install a 350 GPM submersible pump and connect it to the brackish Manele irrigation system. This addition will enable the draft from Palawai Basin for irrigation use at the Manele Resort to be distributed among Wells 1, 9, and 14.

To date, two short-term step-drawdown tests have been performed on Well 14. Their results are presented on an enclosed graph. Chlorides of samples collected during these tests ranged from 770 to 800 milligrams per liter. After the permanent pump is installed, complete pumping testing in accordance with the Commission's testing protocol will be conducted.

If you have any questions or require additional information, feel free to contact Vince Bagoyo (808-565-3856) or me. Thank you for your attention to this matter.

Sincerely,

Tom Nance

cc: Vince Bagoyo

Enclosures
APPLICATION FOR PERMIT

State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

2/8/96

APPLICATION FOR PERMIT

☐ Well Construction  ☐ Pump Installation

2-6-96

95-41

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 821, Honolulu, Hawaii 96809. 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: Lanai Company, Inc.
   Contact Person: Vince Bagoyo
   Ph: 808-565-3856
   Address: P. O. Box 774
   Lanai City, Hawaii 96763

   (b) LANDOWNER
   Firm/Name: Castle & Cooke, Inc.
   Contact Person: Vince Bagoyo
   Ph: 808-565-3856
   Address: P. O. Box 774
   Lanai City, Hawaii 96763

   (c) CONTRACTOR: To Be Competitively Bid
   Firm/Name:
   Ph: Contractor's C-57 License No:
   Address:

2. WELL LOCATION/NAME:
   Lanai Well No. 14
   Island: Lanai
   Address: Within Palawai Basin
   Tax Map Key: 4-9-02:1

   (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
   ☐ Install New Pump
   ☐ Pull Pipe
   ☐ Deepen
   ☐ * Abandon/Seal
   ☐ * Alter Location
   ☐ Redrill
   ☐ 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
   ☐ 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: 350 gallons per minute
   Pump Type:
   ☐ Deep Well Turbine
   ☐ Submersible
   ☐ Centrifugal
   ☐ Rotary
   ☐ Rotary-Displacement
   ☐ Centrifugal
   ☐ Propeller
   ☐ Reciprocating
   ☐ Impulse

   Motor:
   ☐ Diesel
   ☐ Gas
   ☐ Electric, rated horsepower of 125

5. PROPOSED USE:
   ☐ Municipal (including hotels, stores, etc.)
   ☐ Domestic (individual, noncommercial water sys.)
   ☐ Irrigation (crop)
   State Land Use District:
   ☐ Urban ☐ Agriculture ☐ Rural ☐ Conservation
   County Zoning (describe): Project District

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

6. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   300,000 gallons per day

   (b) METHOD OF FLOW MEASUREMENT:
   ☐ Flow-meter
   ☐ Open-pipe
   ☐ Orifice Plate
   ☐ Weir

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

8. REMARKS, EXPLANATIONS:
   See Reverse Side

   (If more space is needed, continue on back)

Well Owner: Lanai Company, Inc.
Signature: [Signature]
Date: 2-6-96

Landowner: Castle & Cooke, Inc.
Signature: [Signature]
Date: 2-6-96

Contractor:
Signature: [Signature]
Date: [Date]

For Official Use Only:
Date Received:
Date Accepted:
Field Checked By:
Date:

Longitude: [Longitude]
Latitude: [Latitude]
Aquifer System Name:
State Well No.: [State Well No.]

NOTE: Signing below indicates that the applicant understands that, if the permit request is granted by the Commission on Water Resource Management, the proposed work is to be completed within two (2) years of the approval date. In addition, the contractor shall submit to the Commission a well completion report, well abandonment report, or both, within 30 days after completion date of the permitted work. The applicant also understands that monthly water use data shall be submitted to the Commission. The applicant further understands that approval of the proposed permit shall constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

[Signature]
[Date]

[State Well No.]

[6/24/96]
8. REMARKS, EXPLANATIONS (cont'd): Lanai Well 14 will provide brackish water for irrigation of the golf course and other landscaping within the Manele Resort residential project. This well will tap the brackish high level water within Palawai Basin.

9. PROPOSED WELL SECTION

Elevation at top of casing: 1193.4 ft., msl.

Ground Elevation: 1193.2 ft., msl.

Cement Grout: 90 ft.

Rock Packing: 857 ft.

Hole Diameter: 17½ in.

Total Depth: 950 ft.

Solid Casing:
- Material: Steel
- Length: 608.9 ft.
- Diameter: 12.25 ID in.
- Wall thickness: 0.625 in.

Casing: Perforated
- Material: Steel
- Length: 336.1 ft.
- Diameter: 12.25 ID in.
- Wall thickness: 0.625 in.
- Openings: sq. in./L.F.

Open Hole:
- Length: 3 ft.
- Diameter: 12 in.

*Approximate elevation at the time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.
OPEN HOLE TEST ON MAY 11, 1995

TEST OF SEP. 20, 1995 AFTER CASING INSTALLATION

DRAWDOWN (FEET)

FLOWRATE (GPM)

STEP-DRADOWN RESULTS
LANAI WELL 14
MEMORANDUM

TO: Butch Gima, Chairperson
    and Lanai Water Committee Members

FROM: Vince Bagoyo

DATE: April 27, 1995

SUBJECT: Lanai Well No. 14 Profile

Per your request during the last meeting of the Lanai Water Committee, I am transmitting for your information the test profile of Well No. 14. Additionally, based on a grab sample, the well has CI = 805 mg/L.

If you have any question, please feel free to call me.

Encl.

c: Councilmember Robert Monden
SALINITY PROFILE
L148.Z

TEMPERATURE PROFILE
L148.Z

Lanai Well 14
L148.Z
April 12, 1995

[CTD Run From Bottom Up]
Lanai Well 14
L14A.Z
April 12, 1995
[ CTD Run From Top Down ]
| FROM: |
| TO: |
| R. LOUI |
| S. KOKUBUN |
| F. CHING |
| S. SUBIA |
| K. YODA |
| K. OSHIRO |
| R. HIRANO |
| G. BAUER |
| N. FUJII |
| E. HIRANO |
| S. EDMUNDS |
| L. MIZUNO |
| Y. SHIROMA |
| R. JINNAI |
| M. OHYE |
| I. KUNIMURA |
| S. SWANSON |

| DATE: 1/26/95 |
| SUSPENSE DATE: |

**TO: INIT:**

**SURVEY BRANCH**

- R. LOUI
- S. KOKUBUN
- F. CHING
- S. SUBIA
- K. YODA
- K. OSHIRO

**REGULATION BRANCH**

- E. SAKODA
- R. HARDY
- L. NAKAMA
- D. HIGA
- C. ICE

**PLANNING BRANCH**

- S. EDMUNDS
- L. MIZUNO

**FIELD SERVICES & TECHNICAL SUPPORT**

- Y. SHIROMA
- R. JINNAI
- M. OHYE
- I. KUNIMURA
- S. SWANSON

**FOR:**

| APPROVAL |
| SIGNATURE |
| INFORMATION |

**PLEASE:**

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

**FILE:**

10/94
Mr. Keith W. Ahue, Chairperson
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ahue:

Re: Well Construction Permit for Palawai Basin Exploratory Well
(Well No. 4854-02)
Palawai, Lanai

In accordance with Permit Condition No.1 stipulated in the Well Construction Permit issued on December 1, 1994, we are providing notification in writing prior to the initiation of drilling operations. The drilling rig is currently on Lanai and is being set-up for the well construction operations. We anticipate actual drilling to proceed at the earliest date of January 25, 1995.

Should you have any questions, do not hesitate to contact me.

Most Sincerely,

F. Albert McCullough III, P.E.
Superintendent of Utilities

cc: Mr. Vince G. Bagoyo, Jr.
Mr. Lee Mueller
TO: Lanai Company, Inc.
P.O. Box L
Lanai City, HI 96763

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 Palawai Basin Exploratory Well (Well No. 4854-02), 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 (Attachment A). A one-inch diameter (minimum) 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 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 November 16, 1994 meeting are incorporated into the permit by reference.

7. The well construction 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 months. The work proposed in the well construction permit application shall be completed within two years from the date of permit approval.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management
DEC - 11994

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: [Signature]
Date: 12-9-94

Printed Name: VINCE G. BAGOY0, JR.
Firm or Title: Vice President - Lanai Company, Inc.

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

Attach.
cc: USGS
State Historic Preservation Division
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Wastewater Branch
Maui Department of Water Supply
TO: Lanai Company, Inc.
P.O. Box L
Lanai City, HI 96763

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 Palawai Basin Exploratory Well (Well No. 4854-02), 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 (Attachment A). A one-inch diameter (minimum) 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 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:
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7. The well construction 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 months. The work proposed in the well construction permit application shall be completed within two years from the date of permit approval.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management

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.

cc: USGS
    State Historic Preservation Division
    Department of Health
    Safe Drinking Water Branch
    Ground Water Protection Program
    Wastewater Branch
    Maui Department of Water Supply
AQUIFER (PUMP) TEST PROCEDURES

The pump test procedure for new wells shall consist of a step-drawdown test followed by a long-term continuous aquifer test. Testing the well and aquifer in the prescribed manner should result in the hydrologic information needed to determine: 1) the well's performance with regard to yield and water quality (chloride concentration), and 2) the nearby hydraulic properties of the aquifer.

General Recording Requirements

The records required for analysis and the tolerance in measurement acceptable for the step-drawdown and long-term continuous aquifer test are as follows:

1. Discharge from the well shall not fluctuate beyond \(\pm 10\) percent.
2. Depth to water measurements in the pumped well shall be measured and recorded to the nearest \(0.01\) feet.
3. Time shall be accurate within \(\pm 1\) percent.
4. Water discharged from the well during the step-drawdown and long-term test shall be carried away from the well to a distance sufficient to preclude circulation of the discharge water downward to the ground-water table.
5. Recording of data should be on a form similar to Table 1. All information shown in Table 1 shall be provided. In addition, data shall be plotted on Graph 1 and provided.

Step-Drawdown Test

The purpose of the step-drawdown test is to establish the efficiency of the well and to provide preliminary information on the yield of the well, both from a quantity and quality standpoint.

1. Measurement of water level in the pumped well shall be made every 12 hours for a period of no less than two days prior to the initiation of the step-drawdown test in order to obtain the pretest trend in water levels.
2. The step-drawdown test will consist of continuously pumping the well for four hours at four different rates.
   a. The change from one pumping rate to the next must be sufficient to induce an observable change in water level in the well from the previous pumpage rate.
   b. If desired, the four different rates should represent the full range of pump capacity (if the yield can sustain this), but this is not necessary.
3. Each pumping rate should be continued for one hour, after which the new rate should be instituted as rapidly as possible.
4. Pumping should begin at the lowest rate and conclude with the highest rate.
5. Pumping should be continuous through the entire step-drawdown test.
AQUIFER (PUMP) TEST PROCEDURES

6. Measurement of chloride concentration and temperature of the discharge water shall be measured at least five times:
   a. at the end of each pumping rate during the step-drawdown test, and
   b. at the very beginning of the test.

7. A sufficient number of water level measurements shall be made in the pumped well following the termination of the step-drawdown test to establish that the water level fully recovers from each test to pretest levels.

Long-Term Continuous Test

The purpose of the long-term continuous test is to determine the hydraulic properties of the aquifer to explore for and identify nearby aquifer boundaries such as streams or dikes, and to observe the trend in chloride concentration of the discharge water.

1. The long-term test should not commence until the water level in the pumped well has fully recovered from the step-drawdown test. Generally, the time required for this recovery will be slightly greater than four hours. The water level in the pumped well should be measured immediately before initiation of the long-term test.

2. The pump rate for the long-term test should be sufficient to create an observable drawdown.

3. The test should be run 24 hours per day for at least seven days. If during the test, the water level remains the same for a period of 24 hours, the test can be terminated.

4. Measurement of chloride concentration and temperature of the discharge water during the long-term test shall be made at the beginning of the test and every six hours thereafter.

5. Depth to water in all wells shall be measured with sufficient frequency that each logarithmic cycle in time on the data plots (Graph 1) contains at least 10 data points spread through the cycle. Thus, depth to water should be made at t=0 (immediately prior to start of the test), and as close as possible at t=1, 1.5, 2, 2.5, 3, 4, 5, 6, 7; and 8 minutes for the first ten minutes and at all succeeding decimal multiples of these numbers to the end of the test (t=10, 15, 20, 25, 30, 40, 50, 60, 70, and 80 minutes for the log cycle 10 to 100 minutes, etc.)

6. A sufficient number of water level measurements shall be made in the pumped well following termination of the long-term continuous test to establish that the water level fully recovers from each test to pretest levels.
TO:  Lanai Company, Inc.
P.O. Box L
Lanai City, HI 96763

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 Palawai Basin Exploratory Well (Well No. 4854-02), 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 (Attachment A). A one-inch diameter (minimum) 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 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 (referred to mean sea level, msl) survey by a Hawaii-licensed surveyor.
   c. As-built sectional drawing of the well.
   d. Plot plan and map showing the exact location of the well.
   e. Complete pumping test records, including time, pumping rate, drawdown, chloride content, and other water quality data.
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 November 16, 1994 meeting are incorporated into the permit by reference.

7. The well construction 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 months. The work proposed in the well construction permit application shall be completed within two years from the date of permit approval.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management

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.

Attach.
cc: USGS
State Historic Preservation Division
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Wastewater Branch
Maui Department of Water Supply
AQUIFER (PUMP) TEST PROCEDURES

The pump test procedure for new wells shall consist of a step-drawdown test followed by a long-term continuous aquifer test. Testing the well and aquifer in the prescribed manner should result in the hydrologic information needed to determine: 1) the well's performance with regard to yield and water quality (chloride concentration), and 2) the nearby hydraulic properties of the aquifer.

General Recording Requirements

The records required for analysis and the tolerance in measurement acceptable for the step-drawdown and long-term continuous aquifer test are as follows:

1. Discharge from the well shall not fluctuate beyond ± 10 percent.

2. Depth to water measurements in the pumped well shall be measured and recorded to the nearest 0.01 feet.

3. Time shall be accurate within ± 1 percent.

4. Water discharged from the well during the step-drawdown and long-term test shall be carried away from the well to a distance sufficient to preclude circulation of the discharge water downward to the ground-water table.

5. Recording of data should be on a form similar to Table 1. All information shown in Table 1 shall be provided. In addition, data shall be plotted on Graph 1 and provided.

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2. The step-drawdown test will consist of continuously pumping the well for four hours at four different rates.
   a. The change from one pumping rate to the next must be sufficient to induce an observable change in water level in the well from the previous pumpage rate.
   b. If desired, the four different rates should represent the full range of pump capacity (if the yield can sustain this), but this is not necessary.

3. Each pumping rate should be continued for one hour, after which the new rate should be instituted as rapidly as possible.

4. Pumping should begin at the lowest rate and conclude with the highest rate.

5. Pumping should be continuous through the entire step-drawdown test.
AQUIFER (PUMP) TEST PROCEDURES

6. Measurement of chloride concentration and temperature of the discharge water shall be measured at least five times:
   a. at the end of each pumping rate during the step-drawdown test, and
   b. at the very beginning of the test.

7. A sufficient number of water level measurements shall be made in the pumped well following the termination of the step-drawdown test to establish that the water level fully recovers from each test to pretest levels.

   **Long-Term Continuous Test**

   The purpose of the long-term continuous test is to determine the hydraulic properties of the aquifer to explore for and identify nearby aquifer boundaries such as streams or dikes, and to observe the trend in chloride concentration of the discharge water.

1. The long-term test should not commence until the water level in the pumped well has fully recovered from the step-drawdown test. Generally, the time required for this recovery will be slightly greater than four hours. The water level in the pumped well should be measured immediately before initiation of the long-term test.

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6. A sufficient number of water level measurements shall be made in the pumped well following termination of the long-term continuous test to establish that the water level fully recovers from each test to pretest levels.
Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

November 16, 1994

Gentlemen:

Lanai Company, Inc.
Application for a Well Construction Permit
Palawai Basin Exploratory Well (Well No. 4854-02), Lanai

Applicant: Lanai Company, Inc.
P.O. Box L
Lanai City, HI 96763

Landowner: Castle & Cooke, Inc.
P.O. Box L
Lanai City, HI 96763

Action Requested: Permission to construct and test Palawai Basin Exploratory Well (Well No. 4854-02) for exploratory use.

Well Location/Tax Map Key: The well site is at Palawai Basin, Lanai, at Tax Map Key: 4-9-02: 1 (see attached map).

Well Description:
- Ground elevation: 1190 ft.
- Casing diameter: 12 inches
- Solid casing depth: 400 ft.
- Screen casing depth: 1200 ft.
- Open hole: none
- Total depth: 1200 ft.
- Grouted annulus: 0 to 390 ft.

Agency Review: The application has been sent for review to the Maui Department of Water Supply, the State Historic Preservation Division, Office of Hawaiian Affairs, and Division of Aquatic Resources (DAR), and to the State Departments of Health and Hawaiian Home Lands. We have received no objections to the application.

Analysis: The applicant proposes to drill an exploratory well to develop brackish, high-level water. No adverse impacts are expected.

Water Availability: The well will be located in the Central Sector, Leeward Aquifer System of Lanai. Sustainable yield for the Central Sector is estimated at 6 mgd. Groundwater withdrawn from the Sector is about 2.1 mgd. Water use from the aquifer by the year 2010 is estimated at 3.6 mgd.

RECOMMENDATIONS:
That the Commission approve the issuance of a well construction permit, subject to the following conditions:
STANDARD WELL CONSTRUCTION PERMIT CONDITIONS

1. The Commission shall be notified before work 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 (Attachment A). A one-inch diameter (minimum) 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 the well shall not constitute a determination of correlative water rights.

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   a. Well completion report.
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7. The well construction 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 months. The work proposed in the well construction permit application shall be completed within two years from the date of permit approval.

Respectfully submitted,

RAE M. LOUI
Deputy Director

APPROVED FOR SUBMITTAL:

KEITH W. AHUE, Chairperson
TO  
DATE 10/17/94
TIME

WHILE YOU WERE OUT

Tom Name

TELEPHONED
CALLED TO SEE YOU
WANTS TO SEE YOU

PLEASE CALL
WILL CALL AGAIN
URGENT

RETURNED YOUR CALL

Phone 284-1242

Message
TV will send copy of
Mr. & Mrs. Smith's Will
to Mr. & Mrs. Blackburn
will explain to Paul in

[Signature]
Operator

---

Message
WCP

Fabiwai Bosian-Lama

Comments due on 10/1
Director has to review yet.
I told her to go for
ahead & send in.

[Signature]
Operator
AQUIFER (PUMP) TEST PROCEDURES

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AQUIFER (PUMP) TEST PROCEDURES

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<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>$t$ (min)</th>
<th>Depth to water (ft)</th>
<th>$s$ (unadjusted) (ft)</th>
<th>Adjustment as (ft)</th>
<th>$Q$ (gpm)</th>
<th>$Cl^-$</th>
<th>Temp. $^\circ$F or $^\circ$C</th>
<th>Remarks</th>
</tr>
</thead>
</table>

**Table 1**

AQUIFER TEST DATA

County: ________________________________ Observation well no.: ____________________________

Location: ______________________________ Pumped well no.: ______________________________

Average $Q$: __________________________ gpm Distance between Observation & Pumped Well: ______ ft.
Mr. David Craddick, Director  
Department of Water Supply  
County of Maui  
200 South High Street  
Wailuku, Hawaii 96793

Dear Mr. Craddick:

Well Construction and Pump Installation Permit Applications

Please review the following permit application pursuant to your area of concern and submit your comments to us by **OCT 1, 1994**.

<table>
<thead>
<tr>
<th>Island</th>
<th>Well Name</th>
<th>Well No.</th>
<th>Application Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai</td>
<td>Palawai Basin Exploratory Well</td>
<td>4854-02</td>
<td>Well</td>
</tr>
</tbody>
</table>

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

Sincerely,

RAE M. LOUI  
Deputy Director

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Response:

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

Contact Person: **Ellen Knudson**  
Phone: **243-7833**

Signed: **David Craddick**  
Date: **10/26/94**
October 10, 1994

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

Dear Ms. Loui,

Re: Proposed well construction and pump installation at Palawai Basin, Lanai; Comments on application for Well Construction No. 4854-02 submitted by Lanai Company

We understand that the Lanai Company will be or is using some of the better irrigation equipment with water-saving potential. However, we suggest that it is the water demand of the plants used, rather than the response with irrigation which more fundamentally effects the amount of water used on well-maintained courses.

In light of the severe source limitation on Lanai, the Board of Water Supply advises that any approval of a well permit for golf course irrigation be conditioned upon the applicant designing, installing and maintaining xeric plantings for any new or replacement fairways, roughs and landscapes. We suggest that a successful scheme in terms of water-savings and marketing would be as follows:

**Roughs and Landscapes:** Very-low water use grass species such as Buffalograss (Buchloe dactyloides 'Prairie,' 18"-28" rainfall and/or applied fresh water/year) and native Hawaiian species which are adapted to stay green with less rainfall and water.

**Fairways:** Turf species with very-low water use requirements, for example, possibly a Buffalograss hybrid.

**Greens:** Higher water use grass species as required for play.

The subject site is located in what is naturally part of the arid coastal vegetation zone. Native plants characteristic of this vegetation zone include, but are not limited to the following species: **trees** - Wiliwili (Erythrina sandwicensis, 20'ht.), Hao (Rauvolfia sandwicensis, 20'ht.); **shrubs** - Naio (Myoporum sandwicense, 10'ht.), Naupaka (Scaevola sericea, 6'ht.), 'A'ali'i (Dodonaea viscosa, 6'ht.), U'ulei (Osteomeles anthyllidifolia,
October 10, 1994
Ms. Rae M. Loui
Proposed well construction at Palawai Basin, Lanai
No. 4854-02 submitted by Lanai Company
page 2

4'ht.); and groundcovers - 'Akia (Wikstroemia uva-ursi and W. species, 2'ht.), 'Ohai (Sesbania tomentosa, 1'ht.), Mau’u ‘Aki’aki (Fimbristylis cymosa, .5'ht.), Pa’uohiaka (Jacquemontia ovalifolia subsp. sandwicensis, .5'ht.) and 'Ilima papa (Sida fallax .5'ht.)

Planting with these or similar species, as site conditions permit, saves water. The plants survive on the site’s rainfall (6" annually in one day) supplemented with low amounts of irrigation (<30"; many plants <20" annually.) Many natives have good salt-tolerance. Their use may also reduce the amount of water which is being applied now just to flush the soil of brackish water salts.

Using low-water-use grasses and native plantings does not limit the way a course can be designed and marketed. Many of the native plants are full, rich-colored and evergreen. Low-water use rough and fairway grasses such as Buffalograss also are full and strong green. These plants look "tailored" and require no special care beyond establishment. Therefore, traditional european, stylish nontraditional and postmodern-inspired course designs are all still possible with their use.

Developers in the western mainland have already experimented with devising course and landscape plantings which save water. You can contact the Board’s Water Resources Planning Division at ph.808-243-7835 if you would like assistance in investigating existing, cutting-edge, water-saving course designs.

Sincerely,

Daniel Craddick, Director

The ideas presented are not intended as an endorsement by the Board of Water Supply of any method, process or specific product but are merely suggestions.

attached: copy Texas A&M Ag. Ext. info. sheet, "Buffalograss" copy CDWR conservation checklist "Golf Courses"
A Checklist of Water Conservation Ideas
For
Golf Courses and Industrial Landscapes

This checklist provides water conservation tips successfully implemented by industrial and commercial users. This list has been revised from the original copy first published and distributed by the Los Angeles Department of Water and Power.

☐ Start a water conservation program

Increase employee awareness of water conservation.

Install signs encouraging water conservation in employee and customer restrooms.

When cleaning with water is necessary, use budgeted amounts.

Read water meter weekly to monitor success of water conservation efforts.

Assign an employee to monitor water use and waste.

Seek employee suggestions on water conservation; locate suggestion boxes in prominent areas.

Determine the quantity and purpose of water being used.

Determine other methods of water conservation.

Identify capacity of each water-carrying unit and frequency of use.

Determine specific use for each entry source.

☐ Interior areas

Discontinue continuous flow.

Use ponded water where available.

Adjust flows to reduce discharge of water.

Install water-saving devices to decrease water consumption -- Restrooms (toilet dams and flappers), faucets (aerators), cooling systems.

Use recycling systems for chillers and cooling towers.

Consider installing energy- and water-efficient air conditioning equipment.

Conservation suggestions for clubhouse areas are contained in the "Restaurants" and "Hotels and Motels" checklists.

☐ Survey the facility

Identify water source points.

Develop a schematic of all water entry points (know where your faucets, time clocks, solenoids, booster pumps, sprinklers and bubblers are located).
**Maintenance procedures**

- Sweep materials from floor instead of washing down whenever possible.
- Instruct clean-up crews to use less water where appropriate.
- Check water supply system for leaks.
- Repair dripping faucets and continuously-running or leaking toilets.

**Design and maintenance criteria for turf and landscape areas**

- Contact the Department of Water Resources or your local water supplier about possible landscape water auditor classes for your golf course managers.
- Hire a golf course and/or landscape architect with water conservation and xeriscape experience.
- Use turf only where actually necessary: Immediate picnic areas/outside lunch areas and golf course target areas (greens, tees, landing areas).
- Limit or exclude turf from roughs.
- Use only low-water use plant material in non-turf areas.
- Use automatic irrigation systems monitored by moisture probes (i.e., tensiometers).
- Design dual watering systems with sprinklers for turf and low-volume irrigation for plants, trees, and shrubs. Operate sprinkler system before sunrise and after sunset. Amount of irrigation can be determined by the evapotranspiration rate, which DWR can help you determine.
- Use properly-treated waste water for irrigation where available.

**Exterior areas**

- Discontinue using water to clean sidewalks, tennis courts, pool decks, driveways, and parking lots.
- Stop irrigation water from running onto streets and alleys.

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The ideas presented are not intended as an endorsement by the California Department of Water Resources of any method, process or specific product but are merely suggestions.
Native lawns in Texas often display the fine, curly, blue-green leaves of buffalograss, curly mesquite, grama and needlegrasses. Of these, buffalograss produces the most uniform and attractive turf.

Buffalograss, *Buchloe dactyloides*, is a perennial grass native to the Great Plains from Montana to Mexico. In Texas, it is commonly found from South Texas to the Texas Panhandle; but is rarely found on the sandy soils in the eastern part of the state or in the high rainfall areas of southeast Texas. It is one of the grasses that supported the great herds of buffalo that roamed the Great Plains. Buffalograss also provided the sod from which early settlers built their houses.

Buffalograss is, perhaps, our only truly native turfgrass. Its tolerance to prolonged droughts and to extreme temperatures together with its seed-producing characteristics enables buffalograss to survive extreme environmental conditions. Overgrazing and, in the case of turf, overuse or excessive traffic are the pressures that lead to the deterioration of a stand of buffalograss.

Buffalograss spreads by surface runners, or stolons, and seed. It forms a fine textured, relatively thin turf with a soft blue-green color. It does not possess underground stems, or rhizomes. Buffalograss is also destroyed quite readily by cultivation. For these
reasons, it can be readily removed from flower beds and gardens.

Buffalograss is a low growing, commonly only 8 to 10 inches high, warm season perennial grass. Individual leaf blades may reach 10 to 12 inches in length, but they fall over and give the turf a short appearance. Buffalograss has a stoloniferous growth habit, curly leaves, and both staminate and pistillate flowers. Staminate (male) plants have 2 to 3 flag-like, one-sided spikes on a seedstalk 4 to 6 inches high. Spikelets, usually 10, are 4 mm long in two rows on one side of the rachis.

Pistillate (female) plants appear very different from the staminate plants. Pistillate spikelets are in a short spike or head and included in the inflated sheaths of the upper leaves. The thickened rachis is woody and surrounded by the outer glumes. The glumes together with the lemma and palea form a bur-like enclosure for the mature seed.

Both male and female plants have stolons from several inches to several feet in length, internodes 2 to 3 inches long, and nodes with tufts of short leaves. Plants often take root at the node and produce new shoots. Each plant propagates vegetatively its own kind, and only rarely are both male and female flowers produced on the same plant. Commonly each kind of plant is found in patches some distance apart.

As buffalograss and curly mesquite are both low growing, stoloniferous grasses with curly leaves, some difficulty may be encountered in
Adaptation and Use

distinguishing them. If the grasses are not in flower, they can be identified by their nodes and internodes. Nodes of buffalograss are smooth, and those of curly mesquite are villous. Also, the internodes of buffalograss are quite short (less than 3 inches) while those of curly mesquite are quite long.

The production and utilization of buffalograss is hampered by poor germination of the seed, or bur. It has been suggested that poor germination is due to the mechanical restraint imposed on the embryo by the tough enclosing outer glumes. The fact that seed extracted from the bur readily germinate is cited as evidence of inhibitor substances in the glumes that delay germination of the seed.

Buffalograss is found throughout the Great Plains from Mexico to Montana. In Texas, buffalograss is commonly found from the south central region westward to El Paso and north to the High Plains and Rolling Plains. It favors the heavy clay soils in moderate to low rainfall areas. Buffalograss is rare in the sandy soils of east Texas and the high rainfall areas of southeast Texas.

When buffalograss is planted in high rainfall areas or when it is irrigated and fertilized, bermudagrass and other weedy grasses invade a stand of buffalograss. Buffalograss is best adapted to low rainfall areas (15 to 30 inches annually) or areas that receive thorough, but infrequent irrigation.
Buffalograss is not adapted to shaded sites or to sites that receive heavy traffic. Also, under intensive management bermudagrass and other more aggressive grasses tend to replace buffalograss in the lawn.

Roadsides, school grounds, parks, open lawn areas, golf course roughs and cemeteries are good sites for buffalograss in central, west and north Texas. Buffalograss is particularly well suited for sites to be planted to bluebonnets and other Texas wildflowers since it produces a relatively open, thin turf and requires little mowing. It is the ideal grass for those wanting a "native" landscape.

Buffalograss can be established from seed (burs) or sod. Buffalograss established from seed develops into patches of male and female plants, with the male plants producing the seedstalks that may appear unsightly in lawns. When planting buffalograss vegetatively, female plants are generally selected since they do not produce the taller seedstalks. Prairie and 609 buffalograsses are female plant selections released by the Texas and Nebraska Agricultural Experiment Stations in 1990. They produce a more dense and uniform turf than common types. Prairie and 609 buffalograsses must be established from sod or sod plugs.

When planting seed, seed treatment, seeding rate and date of seeding are important considerations. Treated seed, seed chilled at 5 to 10 degrees for 6 to 8 weeks or treated chemically to break dormancy, have a much higher germination rate (80% to 90%) than untreated seed (20%). For spring and summer plantings, treated seed should be planted.

April and May are the best months to plant treated buffalograss seeds as temperatures are favorable and moisture is generally adequate. With irrigation the planting date can be extended into July and August.

Fall plantings of untreated buffalograss seed are also successful, but maximum germination does not occur until the following spring.

Treated seed planted in May will germinate in 7 to 10 days if moisture is adequate. Without irrigation the seed will remain dormant until moisture is favorable. Seed planted in dry conditions without irrigation should be drilled ¼ inch into a well prepared seedbed. Seed broadcast on the surface may germinate when little or no subsurface moisture is present to sustain the young seedlings.
Seeding rates may range from less than 0.5 pounds of seed per 1,000 sq. ft. to 4 to 6 pounds, depending on the method of planting and the time available to obtain a cover. Seeding rates are generally much higher for broadcast seeding on the soil surface than for that drilled in rows into the seedbed. Buffalograss seed drilled in rows at 10 to 20 lbs. per acre will produce a complete cover in one growing season with favorable moisture conditions. With no irrigation, broadcast seeding rates of 1 to 2 lbs. per 1,000 sq. ft. may require several seasons to develop a complete cover. In contrast, broadcast seeding rates of 4 to 6 lbs. per 1,000 sq. ft. will cover in several months with adequate moisture.

For sites that cannot be irrigated during establishment, recommended seeding rates would be 0.5 lb. per 1,000 sq. ft. if drilled and 2 to 4 lbs. per 1,000 sq. ft. if broadcast. If irrigated, areas could be planted at ½ the rate recommended for nonirrigated sites. All of the seeding rates are for planting treated seed in late spring and summer for lawns, golf courses or other well maintained areas of turf. Roadsides, parks and other low maintenance areas can be planted at 10 to 20 lbs. of seed per acre.

Fall plantings using untreated seed should be at rates of 2 to 4 lbs. per 1,000 sq. ft. of lawn or turf area. Significant germination should not be expected until the following spring or summer when moisture is favorable.

Buffalograss can be established from pieces of sod or sod plugs not less than 2 inches square. These should be planted on a well prepared seedbed in about 18-inch rows. Plants can be spaced anywhere from 6 inches to 2 feet apart, depending on how quickly a complete cover is desired. The closer they are spaced, the sooner the ground will be covered. In digging up material for planting care should be taken to keep the roots moist as the plants die very quickly when the roots get dry. When planting, dig a hole deep enough to set the plants in so that the grass is above ground level. If the pieces of sod are covered with soil, they will die. The soil should be packed around the plants. Planting is best done in moist soil or where irrigation is available. The grass should be planted in early fall, spring or early summer, when moisture is favorable. Plants should be well watered after planting and as needed for several weeks, thereafter.
Management

Buffalograss is only recommended for low maintenance, low use turfgrass areas. It does not persist where use is intensive. Consequently, only minimum maintenance practices are required to keep a buffalograss turf.

Mowing height and frequency depend on the use of the site. In lawns, buffalograss can be mowed at heights of 2 to 3 inches. At the shorter heights weekly mowing may be required to keep a buffalograss turf.

On irrigated golf course fairways, buffalograss is mowed weekly at \( \frac{3}{4} \) inch. Without irrigation, it is mowed only as needed at a 1 inch height. In rough areas on golf courses, buffalograss is mowed only as needed at the heights between 2 and 3 inches.

Buffalograss does not need fertilization, but it will respond to light applications of nitrogen. Nitrogen fertilization should not exceed 2 lbs. of nitrogen per 1,000 sq. ft. per year. If bermudagrass is undesirable in the lawn, avoid nitrogen fertilization.

With irrigation, buffalograss will remain green throughout the spring and summer. One inch of water per week is adequate to maintain a green buffalograss turf. Without irrigation, buffalograss will turn brown and dormant during the dry summer months. As with fertilization, excessive water promotes bermudagrass encroachment.
Prairie Buffalograss Licensees

1. Crenshaw and Douget Turfgrass, Inc.
   7447 Bee Caves Road
   P. O. Box 161952
   Austin, Texas 78746
   512/328-0884
   Contact: David Douget

2. H Bar H Turf Farms
   Rt. 2, Box 10
   Amarillo, Texas 79710
   806/622-0861
   Contact: Amy Smith

3. Milberger Turf Farms
   Rt. 1, Box 229
   Bay City, Texas 77414
   409/245-8175 or 245/7521
   Contact: Arthur Milberger

4. Rod Farm
   Rt. 1, Box 68
   El Campo, Texas 77437
   409/543-9023
   Contact: Glenn Rod

5. Thomas Brothers Grass Company
   Rt. 3, Box 487
   Granbury, Texas 76048
   817/573-2404
   Contact: Ike Thomas

6. Trinity Turf Nursery
   P. O. Box 811
   Pilot Point, Texas 76258
   817/686-2000
   Contact: Doug O'Connor

7. Wharton Turf-Grass, Incorporated
   Box 1029
   Wharton, Texas 77488
   409/532-4340
   Contact: Charles Davis
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 OCT 1, 1994.

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</table>

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: 597-1835

Signed: Luis A. Manrique  
Date: 09/27/94
MEMORANDUM

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

FROM:    Don Hibbard, Administrator  
           State Historic Preservation Division

SUBJECT: Historic Preservation Review of a Proposed Exploratory  
Well Construction in the Palawai Basin for the Lanai  
Company (Well No. 4854-02)  
       Palawai Basin, Lanai  
       TMK: 4-9-02:1

We believe that this permit application to construct an exploratory well at the subject parcel will have "no effect" on significant historic sites. The area was previously under pineapple cultivation, and it is unlikely that any historic sites are still present.

If you have any questions, please call Sara Collins at 587-0013.

SC:jen
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 **OCT - 1 1994**.

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

Sincerely,

[Signature]

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: **Bill Wong**

Signed: **Bill Wong**

Phone: **586-1258**
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 OCT 1, 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: Darrell Yagodich, Administrator
Phone: 586-3837

Signed: Darrell Yagodich
Date: 9/8/94
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 SEP 16 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: Mr. Henry M. Sakuda  
Phone: 91-1234  
Date: 9/12/94

Div. of Aquatic Resources
Mr. Thomas Arizumi, Chief
Environmental Management Division
State Department of Health
Five Waterfront Plaza
500 Ala Moana Blvd., Suite 250
Honolulu, Hawaii 96813

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 ______ OCT - I 994 ______.

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

Sincerely,

[Signature]

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: Lori Kajiwara
Phone: 586-2924
Signed: Lori Kajiwara
Date: 9-7-94
For further information regarding this plan, please call Roland Tejane, our staff engineer, on Maui (at Maui District Health Office). His phone number is 243-5095.

Refer to file 3145.
Mr. Vince Bagoyo  
Lanai Company, Inc.  
P.O. Box L  
Lanai City, Hawaii  96763

Dear Mr. Bagoyo:

We have received your application and filing fee for a permit to construct Palawai Basin Exploratory Well (Well No. 4854-02) at Palawai, Lanai, (TMK: 4-9-02:1). 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,

RAE M. LOUI  
Deputy Director

ES:ss

c: Tom Nance
Mr. Thomas Arizumi, Chief  
Environmental Management Division  
State Department of Health  
Five Waterfront Plaza  
500 Ala Moana Blvd., Suite 250  
Honolulu, Hawaii 96813  

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 OCT - 1 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. Thomas Arizumi, Chief  
Environmental Management Division  
State Department of Health  
Five Waterfront Plaza  
500 Ala Moana Blvd., Suite 250  
Honolulu, Hawaii  96813  

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 **OCT - 1 1994**.  

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

Sincerely,  

[Signature]  

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: ___________________________ 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 OCT 1 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: ______________
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 **01/01/1994**.

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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: _______________
State of Hawaii  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
Commission on Water Resource Management  
Honolulu, Hawaii  

SEP - I 1994

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 SEP 16 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: ________________
Mr. David Craddick, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Craddick:

Well Construction and Pump Installation Permit Applications

Please review the following permit application pursuant to your area of concern and submit your comments to us by OCT 1, 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: __________
Dear Mr. Ahue:

Well Construction Permit Application
for an Irrigation Well 11 in Palawai Basin

On behalf of Lanai Company, Inc., I am pleased to submit the enclosed application and filing fee. The new well would be located along Manele Road and is expected to encounter high level, brackish groundwater. If its quality is suitable, the well would be outfitted as an addition to the Manele Resort irrigation system to increase pumpage from Palawai Basin, however. The intention is to have Well 11 provide additional capacity to the chief sources of supply with Well 1 providing standby capacity. Development of this well is the result of recent discussions between the Company and Lanai community leaders.

If you have questions or need additional information, feel free to call me or Vince Bagoyo (808-565-3856). Thank you for your attention to this matter.

Sincerely,

Tom Nance

cc: Vince Bagoyo - Lanai Company, Inc.

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

Dear Mr. Ahue:

Well Construction Permit Application  
for an Irrigation Well 11 in Palawai Basin

On behalf of Lanai Company, Inc., I am pleased to submit the enclosed well construction permit application and filing fee. The new well would be located along Manele Road in Palawai Basin. We expect to encounter high level, brackish groundwater. If its quality is suitable for landscape irrigation, the well would be outfitted as an addition to the Manele Resort irrigation system. It would not be used to increase pumpage from Palawai Basin, however. The intention is to have Well 9 and the new well be the chief sources of supply with Well 1 providing standby capacity. Development of this well is the result of recent discussions between the Company and Lanai community leaders.

If you have questions or need additional information, feel free to call me or Vince Bagoyo (808-565-3856). Thank you for your attention to this matter.

Sincerely,

Tom Nance

cc: Vince Bagoyo - Lanai Company, Inc.

Enclosures
DETACH AND RETAIN THIS STATEMENT.

THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED BELOW. IF NOT CORRECT PLEASE NOTIFY US PROMPTLY. NO RECEIPT DESIRED.

DE LUXE FORM WVC-3 V-2

<table>
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<tr>
<th>DATE</th>
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</thead>
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<tr>
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<td>Filing Fee: Palawai Basin Exploratory Well Job No. 93-02</td>
<td>$25.00</td>
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Pay: **Twenty-five and 00/100** DOLLARS $25.00

TO THE ORDER OF Department of Land and Natural Resources

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APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
   Name: Lanai Company, Inc.
   Firm/Name: Lanai Company, Inc.
   Contact Person: Vince Bagoyo
   Address: Honolulu, Hawaii 96809
   (b) LANDOWNER
   Name: Castle & Cooke, Inc.
   Firm/Name: Castle & Cooke, Inc.
   Contact Person: Vince Bagoyo
   Address: Honolulu, Hawaii 96809
   (c) CONTRACTOR
   Name: To Be Competitively Bid
   Firm/Name: To Be Competitively Bid
   Address: Honolulu, Hawaii 96809

2. WELL LOCATION/NAME: Palawai Basin Exploratory Well
   Island: Lanai
   Address: Along Manele Road in Palawai Basin
   Tax Map Key: 4-9-02:1

3. (a) PROPOSED WORK:
   [ ] Drill New Well
   [ ] Modify Existing Well
   [ ] Redrill
   [ ] Install New Pump
   [ ] Replace Pump
   [ ] Modify Pump

4. PROPOSED PUMP INFORMATION: Rated Pump Capacity: 400 gallons per minute
   Motor: Diesel
   Fuel: Gas
   Electric, rated horsepower: 200

5. PROPOSED USE:
   [ ] Municipal (including hotels, stores, etc.)
   [ ] Military
   [ ] Domestic (individual, noncommercial water use)
   [ ] Industrial
   [ ] Irrigation (crop)
   [ ] Golf Course Turf Grass
   [ ] Other (explain)
   [ ] Land Use District: Urban
   [ ] Agriculture
   [ ] Rural
   [ ] Conservation
   [ ] Golf Course in Manele Project District

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: 350,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
      [ ] Flow-meter
      [ ] Open-pipe
      [ ] Orifice Plate
      [ ] Well

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

8. REMARKS, EXPLANATIONS:
   See Reverse Side

OTE: Signing 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 two (2) years of the approval date. In addition, the contractor shall submit to the Commission a well completion report, well abandonment report, or both, within 30 days after the completion date of the permitted work. The applicant further understands that approval of a proposed permit shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner
Name: Lanai Company, Inc.
Signature: __________________________
Date: __________________________

Landowner
Name: Castle & Cooke, Inc.
Signature: __________________________
Date: __________________________

Contractor
Name: __________________________
Signature: __________________________
Date: __________________________

For Official Use Only:
Date Received
Date Accepted
Field Checked By
Date

Applicant
Firm/Name
Contact Person
Address

Aquifer System Name
State Well No.

Director of Water Resources
Date: __________________________
8. REMARKS, EXPLANATIONS:

The exploratory well is expected to encounter brackish, high level groundwater similar to the water pumped by existing Wells 1 and 9. If the well is successful, it would be connected to the Manele irrigation system. The addition of the well would not involve an increase in water use. It would be developed to provide management flexibility in the use of the groundwater resource and backup supply capability.

9. PROPOSED WELL SECTION

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

8-11-94

Well Construction or Pump Installation

1. APPLICATION: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
   Firm/Name: Lanai Company, Inc.
   Contact Person: Vince Bagoyo
   Phone: 808-565-3856
   Address: P.O. Box 1
   Lanai City, Hawaii 96763

   (b) LANDOWNER
   Firm/Name: Castle & Cooke, Inc.
   Contact Person: Vince Bagoyo
   Phone: 808-565-3856
   Address: P.O. Box 1
   Lanai City, Hawaii 96763

   (c) CONTRACTOR
   Firm/Name: To Be Competitively Bid
   Contractor's C-57 License No.: _______________________
   Address: ____________________________

2. WELL LOCATION/NAMES: Palawai Basin Exploratory Well
   Island: Lanai
   Address: Along Manele Road in Palawai Basin
   Tax Map Key: 4-9-02:1

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

4. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: 400 gallons per minute

   Pump Type:
   - Deep Well Turbine
   - Submersible
   - Centrifugal
   - Rotary
   - Rotary-Displacement
   - Propeller
   - Reciprocating
   - Impulse
   - Electric, rated horsepower of 200

5. PROPOSED USE:
   - Municipal (including hotels, stores, etc.)
   - Military
   - Domestic (industrial, non-commercial water use)
   - Industrial
   - Irrigation (Golf Course Turf Grass)
   - Other (explain)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: 350,000 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: See Reverse Side

NOTE: Signing 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 two (2) years of the approval date. In addition, the contractor shall submit to the Commission a well completion report, well abandonment report, or both, within 30 days after the completion date of the permitted work. The applicant also understands that monthly water use data shall be submitted to the Commission. The applicant further understands that approval of the proposed permit shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner: Lanai Company, Inc.
Signature: ____________________________
Date: ____________________________

Landowner: Castle & Cooke, Inc.
Signature: ____________________________
Date: ____________________________

Contractor: ____________________________
Signature: ____________________________
Date: ____________________________

For Official Use Only:
Date Received: ____________________________
Date Accepted: ____________________________
Field Checked By: ____________________________
Date: ____________________________

Longitude: ____________________________
Latitude: ____________________________
Aquifer System Name: ____________________________
State Well No.: ____________________________
8. REMARKS, EXPLANATIONS:

The exploratory well is expected to encounter brackish, high level groundwater similar to the water pumped by existing Wells 1 and 9. If the well is successful, it would be connected to the Manele irrigation system. The addition of the well would not involve in an increase in water use. It would be developed to provide management flexibility in the use of the groundwater resource and backup supply capability.

9. PROPOSED WELL SECTION

Elevation at top of casing 1192 ft., msl.

Ground Elevation: 1190 ft., msl

Cement Grout: 390 ft.

Rock Packing 810 ft.

Solid Casing:
Material: Steel
Length: 400 ft.
Diameter: 12 (ID) in.
Wall thickness: 0.375 in.

Hole Diameter: 17½ in.

Total Depth 1200 ft.

Casing: □ Perforated □ Screen
Material: Steel
Length: 600 ft.
Diameter: 12 (ID) in.
Wall thickness: 0.3125 in.
Openings 65 sq. in./L.F.

Open Hole:
Length: None
Diameter: None

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