TOM NANCE WATER
RESOURCE ENGINEERING

April 20, 1993
93TN-071 (93-02)

Mr. Tom Leppert
Castle & Cooke Properties, Inc.
650 Iwilei Road
Honolulu, Hawaii 96817

Dear Tom:

Overview of the Use of Lanai Wells 1 and 9 to
Irrigate the Manele Golf Course and Other Manele Landscaping

This letter provides a brief overview of my opinions concerning use of Wells 1 and 9 for irrigation at the Manele Resort. Irrigation uses will include the golf course, common area landscaping, and landscaping within residential lots. The letter has already been reviewed by John Mink. His comments on the use of Wells 1 and 9 and on the opinions expressed in this letter are attached. For clarity and brevity, I've listed my opinions in a numbered sequence below.

1. Wells 1 and 9 tap into high level groundwater compartments in which the water typically stands between 700 and 800 feet above sea level. This groundwater is part of the high level resource for which the State has adopted a sustainable yield of 6 MGD. The sustainable yield is based primarily on the work of John Mink compiled in a 1983 report prepared for Lanai Company.

2. The water in Wells 1 and 9 is brackish. Elevated temperature, high silica, and other indicators suggest that the salt content is most likely the product of geothermal activity.

3. Proposed pumpage of up to 0.80 MGD on an annual average from Wells 1 and 9 is a draw from the 6 MGD sustainable yield of the high level groundwater resource. Quantities of water extracted from these wells for irrigation limits other uses of the high level resource by an identical amount.

4. No adverse water quality effect on the high level potable resource is expected at the proposed rates of pumping from Wells 1 and 9. The higher elevation, potable groundwater compartments in nearest proximity are tapped by Wells 2, 3, 4, and 5 and Shaft 3.

5. Lanai Water Co. presently collects data at four-week intervals for each of the wells it operates. The data it collects -- pumpage, water level, chloride concentration, and temperature -- provide adequate information from which to evaluate the aquifer's performance. Use of a qualified, independent third party to collect or audit this data could be considered if creating a greater level of public confidence in the information is necessary. My own personal observation is that data presently collected and reported by Lanai Company is accurate.

6. Establishing management guidelines for use of the groundwater resource is prudent and appropriate. The enclosed guidelines, which include initial water level and chloride performance benchmarks, are a reasonable basis on which to begin use of Wells 1 and 9. The guidelines also provide for periodic review of the data by qualified professionals. The performance benchmarks of the guidelines could be revised during this review if aquifer response to pumpage indicates that such a change would be appropriate.

EXHIBIT I-26

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EXHIBIT I-6 2983

7. Based on the results of Well 10 on the outer edge of Palawai Basin, high salinity in the 200-foot deep test hole above the Manele Hotel, and a recent TDEM geophysical survey by Blackhawk Geosciences, the basal lens in the vicinity of the Manele Resort is not a viable source of irrigation water. Wells 12 and 13 drilled in Kaluakapo Crater can only provide a limited supply. The yield of Well 12 is estimated to be 0.15 MGD and Well 13 has no practical yield. Because of this, use of Wells 1 and 9 for irrigation at the Manele Resort is necessary and appropriate.

Sincerely,

Tom Nance

Tom Nance

Enclosures

cc: John Mink

Lanai Groundwater Management Guidelines

April 20, 1993

1. To validate monitoring and pumping data, an independent third party will be used to assist in meter readings or to audit these readings. The third party is to be selected with approval of the Company, the Lanaians for Sensible Growth (LSG), and the State Commission on Water Resource Management. Reasonable costs are to be paid by Lanai Company for a period of five calendar years, or until Designation, if earlier.

2. To establish management guidelines for use of the groundwater resource, the following well-by-well performance benchmarks are established. Periodic review of the pumpage and monitoring data will be conducted. This review will include evaluation and possible revision of the performance benchmarks, if appropriate.

   a. Performance Benchmarks

      1) Wells 1 and 9 in Palawai Basin and Wells 2, 3, 4, and 5 in close proximity and directly above Wells 1 and 9 are chosen for management purposes.

      2) Two stages of water level benchmarks are established to trigger management controls: (i) Reaching Level 1 in any well would call for an immediate review of pumpage and monitoring data as described below; and (ii) Level 2 would be a minimum allowable water level an any well.

Well	Level 1 Advisory Level (Ft msl)	Level 2 Minimum Allowable Level (Ft msl)
1	600	500
9	600	500
2	1,150	1,000
3	800	700
4	1,150	1,000
5	1,150	1,000

Notes:
1. Water level readings are to be taken with the pumps off to eliminate the turbulent loss component of well drawdown.
2. Water Levels 1 and 2 for each of the wells are tentative and subject to review and revision as described below.

3) To ensure that appropriate groundwater quality is maintained, the following maximum and minimum chloride concentrations are established:

Well	Maximum Chlorides (MGL)	Minimum Chlorides (MGL)
1	--	250
9	--	250
2	50	--
3	70	--
4	50	--
5	50	--

b. Periodic Pumpage and Monitoring Data Review

1) On an annual basis or if a Level 1 advisory level is reached in any of the selected wells, all available pumpage, water level, and water quality data will be reviewed by John Mink and Tom Nance. This review will make resource management recommendations and also re-evaluate and revise, if appropriate, the Level 1 and Level 2 elevations for each of the wells.

2) A report of their findings will be issued. If changes in the Level 1 or Level 2 elevations are recommended, these Groundwater Management Guidelines will be revised to include the new elevations.

3. Lanai Company may develop additional wells in the Palawai Basin or in the higher elevation groundwater above in order to meet the management objectives. These wells would be developed solely for better management of the groundwater resource by more widely distributing the points of withdrawal. Limitations on total pumpage and irrigation use at Manele Golf Course would remain the same. All new wells would be subject to the appropriate water level and chloride concentration restrictions.

4. To address future golf course non-potable water usage, a limit of 800,000 GPD daily average throughout any calendar year after grow-in (24 months from completion of planting) is established which, if exceeded, would result in Lanai Company's consent to designation of Lanai as a Water Management Area.

5. To deal with regulatory issue, Lanai Company will accept designation if actual water usage (excluding effluent, basal lens, surface recapture, etc.) exceeds 4.2 MGD daily average throughout any calendar year.

6. To address concern over availability of water for potential agricultural use, Lanai Company agrees to accept 1.5 MGD daily average throughout any calendar year as an initial allocation for diversified agriculture in the event of designation. After a period of five years, this initial allocation shall be re-evaluated from the perspective of existing and potential agricultural use.

7. All conditions are based on the Company using brackish water from wells located in Palawai Basin, including Wells 1 and 9, for the construction, maintenance and operation of the Manele Golf Course development. If the Company ceases such use for any reason, including without limitation a prohibition of such use by the County of Maui or any governmental agency, these conditions will no longer apply or have any effect.

MEMORANDUM

Date: April 21, 1993.
Subject: Lanai High Level Water Development.

The the response of the Lanai high level aquifers to pumping will be amenable to better resolution when past operational data are analyzed employing computer programs which were not available when the basic reports were completed before and during 1983, and additional operational data are collected and evaluated. In the meantime, the total estimated sustainable yield of 6 mgd derived from total estimated infiltration of 9 mgd defines the limit of developability of groundwater from the combined windward and leeward areas of the aquifers.

The letter of April 20, 1993, from Tom Nance, Water Resources Engineering, to Tom Leppert, Castle and Cooke, correctly states the groundwater conditions as known today and recommends a reasonable compromise for providing brackish groundwater for Manele while setting water level benchmarks for decision-making. A very important aspect of the proposed management protocol is the collection of reliable data. The behavior of water levels under the proposed pumping schedule is needed to refine estimates of sustainable yield and to predict future aquifer response to a variety of pumping scenarios.

The entirety of the high level aquifers will not respond quickly to the proposed pumping. Several years are likely to pass before strong trends are established. Nevertheless, data should be reviewed virtually on a continuous basis and analyzed semi-annually to look for unambiguous water level decays that are greater than expected. Should such decays be identified, pumpage will have to be adjusted.

John F. Mink