

March 15, 1990

ADDENDUM TO LANAI WATER RESOURCES FINDINGS OF FACT WMA No. L-1

On the basis of continuing discussions with Lanai Company and its consultants the following changes regarding future land development and corresponding water demand should be made to the Lanai Water Resources Findings of Fact, WMA No. L-1:

- A) On pps. 5 & 11 the water level in Well #10 is stated as 600 ft and 212 ft above mean sea level respectively. This apparent discrepancy in water level is due to water levels measured before and after a preliminary pumping test. Thus, on p. 5 the fifth sentence should read:

"During the recent drilling of exploratory Well 10 (State Well No. 4555-01) on the southern rim of the Palawai Basin, high-level dike water at an elevation of 600 feet above mean sea level was initially encountered."

Likewise, on p. 11 the second sentence in the last paragraph should read:

"Water levels measured after preliminary pumping tests at wells 9 & 10 were 871 and 212 feet above mean sea level respectively."

- B) Updated future water requirements were submitted by M & E and Lanai Co., and the following changes should be made to Table VI on p. 19:

1. Pineapple water usage will decrease to 1.8 mgd, as pineapple acreage will be reduced from its present value of 11,000 to 13,000 acres to 6,000 to 7,000 acres. In light of the previous pineapple usage of 2.45 mgd estimated from the drought conditions of '83-'86, 1.8 mgd is a reasonable projected demand;
2. Hulopoe Beach project is using 0.07 mgd of potable, rather than non-potable, water;
3. Lanai Industrial is now called Central Service Facility;
4. Community gardens is now called Community Landscaping and its usage has been reduced to 0.03 mgd of potable demand;
5. Queen's multi-family residence (0.08 mgd potable demand) is no longer planned;

6. Waialua multi-family residence (0.08 mgd potable demand) has been added;
7. Manele Bay Hotel will be using 0.23 mgd of potable water instead of 0.20 mgd;
8. Water demand for other landscaping has been separated to show 0.4 mgd non-potable and 0.03 mgd potable;
9. Commercial Downtown is now called Commercial Area.

In addition to the nine changes above, changes have been made to the Manele and Koele golf courses such that projected water demand is now less than previously estimated. This is due to development of surface supplies at Koele, target golf course design change (including acreage reduction to 110 acres) at Manele, and computerized water application at both golf courses. Also, non-potable water use will replace potable water use at Koele within five years, according to conditions set forth in the county project district approval and a LUC special land use permit for the Koele golf course.

Although these golf course water use changes would lessen the demand for potable ground-water supplies, the earlier values in Table VI should remain unchanged, for the following reasons:

1. Current golf course water usage in Hawaii indicates that the values in Table VI are already on the low end of the normal range of water usage in similar dry areas on Oahu;
2. Computer controlled irrigation is a relatively new method for golf course irrigation;
3. Irrigation of Koele golf course with non-potable water is undesirable because the course overlies the island's sole potable aquifer. Thus, Koele may continue to be irrigated with potable water after the five-year period;
4. Leaving the golf course water demand values in Table VI unchanged would further add a factor of safety in light of the recent changes made to the golf course plans.

Practically speaking, the difference between the earlier Table VI and the updated Table VI, shown below, is the reduction in potable demand resulting from the reduction in pineapple acreage.

Table VI. Future Projected Water Demand for Lanai

<u>Year</u>	<u>Project</u>	<u>Potable Demand (mgd)</u>	<u>Non-potable Demand (mgd)</u>
* 1988	Lanai City	0.40	
	Dole Plantation	1.80	
1989	Koele Hotel	0.18	
	Lalakoa III	0.09	
	Hulopoe Beach		0.07
	Central Service Facility	0.03	
	Community Landscaping	0.03	
	Lanai City Apartments	0.02	
1990	Koele Golf Course	0.40	
	Lower Waialua	0.07	
	Waialua Multi-fam	0.07	
	Manele Bay Hotel	0.23	
	Manele Golf Course		1.00
	Other landscape	0.03	0.40
	Commercial Area	0.25	
	Koele SFR	0.02	
	Lalakoa (additional)	0.08	
1991	Manele Residential	0.25	
	Koele Residential	0.20	
Total		4.22	1.40

* *Pre-development drought demand ('83-'86 average) with 50% reduction in pineapple acreage considered.*

C. In light of the changes to Table VI on p.19, the following changes should be made in the text of the Findings of Fact.

On p.vii, Item 3 should read:

"Satisfying a future potable demand of 4.5 mgd would result in withdrawals amounting to 75% of Lanai's ultimate sustainable yield."

On p.18, the last sentence should be replaced with the following:

"Projections from past documents have been updated to February of 1990 and the most recent projections furnished by Lanai Co. and its development consultants are incorporated in Table VI."

On p.19, the last paragraph (continuing into pg.20) should be replaced with the following:

"Projected golf course irrigation requirements in Table VI are reasonable in view of existing water use patterns at other golf courses in Hawaii. At golf courses larger than 145 acres in arid coastal areas of Oahu, actual water use has ranged from 0.2 to 1.6 mgd. The Manele golf course will contain 110 acres and be a "target" type of course where the greens are maintained and fairways are left more or less at natural conditions. Water demands at Manele will be satisfied in part with treated sewage effluent and non-potable basal ground water. The Koele golf course will be roughly 200 acres in size, and planned alternative surface supplies will satisfy its water needs. Although the Koele golf course is larger than the one at Manele, it is important to note that the elevated Koele region receives more rainfall and fog drip while losing less to evapotranspiration than near-ocean golf courses. Finally, both courses will have computerized water application systems, although the effectiveness of this new technology has yet to be proven in Hawaii."

On p.20, the second paragraph should be replaced with the following:

"From Table VI, the reasonable estimate future total potable water demand (demand placed on the high-level aquifer) will be 4.22 mgd, while non-potable demand will be 1.4 mgd. To be conservative, the Commission should consider future average potable demand on the high-level aquifer as 4.5 mgd."

On p.22, the third and fourth paragraphs should be replaced with the following:

"Projected potable water demand for all projects, augmented by non-potable sources, could reach 4.5 mgd. This demand figure is conservative estimate."

Given the sustainable yield of 6 mgd for Lanai's high-level aquifer and a total projected demand of 4.5 mgd, the maximum withdrawal could reach 75% of the aquifer's sustainable yield. This would not warrant the designation of Lanai as a water management area."

On p.25, Item 3 should be as follows:

"With an ultimate sustainable yield of 6 mgd, a future potable demand of 4.5 mgd will result in withdrawals reaching 75% of Lanai aquifer's ultimate sustainable yield."