July 29, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mrs. Uyehara:

Subject: Environmental Impact Statement for State Land Use District Boundary Amendment Docket No. A83-583/Mauna Lani Resort, Inc.

This is to notify you that the Land Use Commission, at its meeting of July 23, 1985, unanimously approved the Environmental Impact Statement of Mauna Lani Resort, Inc. The Decision and Order for this matter will be forthcoming.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

cc: Roger Harris
Ann Mapes
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FINAL

ENVIRONMENTAL IMPACT STATEMENT
REVISED MASTER PLAN FOR
MAUNA LANI RESORT
SOUTH KOHALA, HAWAII

Prepared for: Mauna Lani Resort, Inc.
Prepared by: Belt, Collins & Associates

For Submission to: Land Use Commission, State of Hawai`i

Submitted by: James R. Bell, President

Honolulu, Hawai`i
July 1985
# MAUNA LANI RESORT
## FINAL ENVIRONMENTAL IMPACT STATEMENT

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CHAPTER I
INTRODUCTION AND SUMMARY

1. PURPOSE OF THIS DOCUMENT

This environmental impact statement has been prepared to accompany a State Land Use District boundary amendment petition and a Conservation District Use Application (CDUA) submitted by Mauna Lani Resort, Inc. to the State Land Use Commission and to the Department of Land and Natural Resources, respectively. It is being prepared in compliance with the requirements of Chapter 343, Hawaii Revised Statutes and the regulations adopted pursuant thereto.

2. PROPOSED GOVERNMENTAL ACTION

Mauna Lani Resort, Inc. is requesting that State Land Use Commission to amend the State Land Use District boundaries as shown in Figure II-6. This involves changes in the designation of 634 acres: 486 acres would be redesignated from the Agricultural District to the Urban District, and 148 acres would be redesignated from Conservation to Urban. The tax map designations for the affected parcels are Third Division, 6-8-01;por.22 and 6-8-22;por.1. Mauna Lani Resort, Inc. has also submitted a Conservation District Use Application (CDUA) to the State Board of Land and Natural Resources for permission to construct two golf holes and a public shoreline park and to establish the Puako Petroglyph Archaeological Park on a portion of the 775 acres that it leases from the State of Hawaii.

3. PROJECT DESCRIPTION

Mauna Lani Resort, Inc. currently owns approximately 3,200 acres of land along the South Kohala coastline. The location of this land is shown in Figure II-2. Approximately 778.5 acres of this are within the Urban District, and these form the core of the Mauna Lani Resort. The County of Hawaii has designated the area as a "major resort" on its General Plan, and approved development of 3,000 hotel rooms, 3,182 resort residential units, shopping, recreational, and entertainment facilities, and supporting infrastructure. Thus far, an 18-hole golf course, 351-unit hotel, and 80-unit condominium project have been developed, together with an historic park, an extensive network of trails, and public beach facilities. A tennis club and beach club are planned, and the first phase of the Mauna Lani Point condominium project is scheduled to be completed by the end of 1985.

Marketing studies conducted for Mauna Lani Resort, Inc., as well as its own evolving development strategy, have suggested the desirability of developing the resort at a lower density and with more recreational amenities than is possible under the existing master plan. Implementation of this revised master plan requires expansion of the Urban District from 778.5 to 1,432 acres, but entails no increase in the number of hotel or resort residential units. More specifically, the additional land is needed to:

- provide a second golf course and additional open space and recreational areas;
- create a public shoreline park north of Puuoa Bay;
allow the density of the development within the resort's residential and hotel areas to be decreased by approximately thirty percent, thereby increasing the amount of landscaping possible and allowing more design latitude and quality;

allow relocation of the hotel site now located along the eastern side of Honokaa'ope Bay to a more suitable location at its southern end; and

accommodate support facilities that have been constructed in the Agricultural district adjacent to the existing Urban zone.

The approximate acreages of different land uses on the resort's fee land for the existing and proposed master plans are as follows:

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<td>Recreation, Misc., Other</td>
<td>14.3</td>
<td>21.3</td>
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<td>TOTAL</td>
<td>778.5</td>
<td>1,432.5</td>
<td>654.0</td>
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In addition, another 23 acres of golf course and additional park area are proposed on the area leased from the State.

4. NEED FOR THE PROJECT

The original master plan for the Mauna Lani Resort (MLR) was prepared in the early 1970s on the basis of the market information and forecasts available at that time. The visitor market has undergone continual evolution since that time, and in 1984 Ming Chew Associates, a Honolulu-based firm specializing in visitor industry projections was commissioned to update the previous work. Results of his study are summarized below.

The market study addressed both quantitative (how many units) and qualitative (what kind/price units) questions. With respect to the development which could be successfully marketed between now and the year 2000, the Ming Chew Associates study concluded the following:
### Projected Marketability

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
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<tbody>
<tr>
<td>Hotel Rooms</td>
<td>400</td>
<td>700</td>
<td>400-500</td>
</tr>
<tr>
<td>Low-Rise Multi-Family Units</td>
<td>400</td>
<td>800</td>
<td>1,400-1,800</td>
</tr>
<tr>
<td>House lots</td>
<td>25</td>
<td>50</td>
<td>70-90</td>
</tr>
<tr>
<td>House and Lot</td>
<td>25</td>
<td>50</td>
<td>70-90</td>
</tr>
<tr>
<td>Total Rooms/Units/Lots</td>
<td>850</td>
<td>1,600</td>
<td>2,440-3,080</td>
</tr>
<tr>
<td>Golf Round per Year</td>
<td>51,000</td>
<td>92,000</td>
<td>128,000-158,000</td>
</tr>
<tr>
<td>Acres of Commercial</td>
<td>5</td>
<td>10</td>
<td>16-21</td>
</tr>
<tr>
<td>Acres of Auxiliary Services</td>
<td>15</td>
<td>30</td>
<td>45-55</td>
</tr>
</tbody>
</table>

These market absorption figures were based on the assumption that Mauna Lani Resort would concentrate its development effort on the high end of the market, aiming for quality rather than quantity. Such a strategy was deemed more appropriate for the resort than one which attempted to maximize the speed and/or quantity of development.

In order to penetrate the "high-end" market that was targeted, the Ming Chew Associates study concluded that it would be necessary to provide substantially more golf course capacity than is possible under the existing master plan, to decrease the density of development within specific development parcels, and to improve the siting of some facilities. The revised master plan was developed with those goals in mind. When the relative quality of the various sites provided by the existing and revised master plans were evaluated on the basis of ocean or golf course frontage, views, proximity to hotels and recreational facilities, and other physical site characteristics, Peat, Marwick, Mitchell & Co. (1983) concluded that a larger percentage of units overall were graded high or medium quality under the revised master plan. This was attributed mainly "...to the creation of 'greenbelt' golf course and preserve areas or other amenities which would contribute to the scenic and economic value of the individual project sites".

### 5. SUMMARY OF IMPACTS

Up to this time, development of the Mauna Lani Resort has been guided by a master plan prepared in 1974-75. As previously noted, State and County approvals have been granted, permitting the development of a major destination resort; these allow the construction of over 6,000 hotel and resort residential units within the existing Urban District. The revised master plan that is the subject of this environmental impact statement has been developed in response to updated market information which suggests the desirability of providing additional recreational facilities and lower densities. It entails construction of the same number of hotel and resort residential units; the primary difference is that the revised plan spreads the units over a greater land area and includes a second golf course. If the State Land Use District boundary amendment being requested is not granted, development will still continue according to the existing master plan. The most important implication of this is that only those impacts which are affected by the location of development (as contrasted to its magnitude) differ between the two plans. Hence, while the impact analysis summarized below estimates the total magnitude of the change that would be produced by
the proposed development, decision-makers should remember that it is only the
difference in effects between the two plans that is of consequence.

5.1 PHYSIOGRAPHY, GEOLOGY, AND SOILS

The project area is situated on gently-sloping land; the topographic relief that is
present is a consequence of layering and buckling of successive lava flows rather than
erosion. Only minor grading is needed to prepare sites for development, and it is
usually possible to achieve a balance between cut and fill within individual develop-
ment sites. Soils, where present, are shallow. While they are satisfactory for urban
uses, they have little agricultural potential.

5.2 NATURAL HAZARDS

The U.S. Geological Survey has rated the relative danger from volcanic hazards
as "E" on a scale from "A" - least hazard to "F" - greatest hazard. The probability of
flows from Mauna Loa actually damaging development within the property is slight,
but such an eventuality cannot be completely discounted.

Low-lying portions of the MLR coastline are subject to occasional attack by
storm waves and tsunami. The extent of the flood hazard area has been defined by
previous studies, and shoreline development at the MLR will conform to the require-
ments of the County Flood Control Ordinance. Hence, flood hazard is expected to be
held to an acceptable level.

5.3 COASTAL PONDS

The Mauna Lani Resort site contains six major Hawaiian fishponds — Waipuhi,
Lahuipua'a, Manoku, Hopeia, Ka'aipio, and Kahinawo — in the area around Makaiwa
Bay. The company has voluntarily placed these in a preservation area and carries out
an ongoing management program there. These ponds will be preserved regardless of
which plan is implemented.

In addition to the fishponds, between 20 and 25 small, brackish water ponds are
located along the shoreline of the property. Ponds such as these (called "anchialine")
are found at many places along the West Hawai'i shoreline but in only a limited number
of areas elsewhere in the world. They harbor a number of endemic aquatic forms
found only in this type of habitat. A study by Brock (February 1983) concluded that
there had been a decrease in native species in the ponds over the past thirteen years,
but attributed the decline to the introduction of exotic fish species. This has not been
done purposely as part of the resort's development, but it is possible the increased
accessibility provided by resort roadways and the opening of the area to the general
public may have contributed to the spread of the exotic fish. However, no pond filling
is envisioned at this time, and the company has expressed a willingness to cooperate
with any public efforts to eradicate the exotic species.

5.4 MARINE RESOURCES

Brock and Brock (1974) and Dollar (October 1983; November 1984; May 1985)
have studied the marine communities in the ocean fronting the Mauna Lani Resort
site. Following his post-development survey, Dollar concluded that there was no
evidence of significant impact on the chemical or biological environment as a result of
the construction that has occurred to date at the Mauna Lani Resort.
Several potential adverse effects of ongoing development have been identified. These include: (1) increased sedimentation from wind and stormwater runoff as a result of grading and the importation of topsoil into areas now composed of barren lava; (2) increased nutrient loading from irrigation and fertilization; (3) changes in storm runoff patterns; and (4) shoreline modification. Dollar's May 1983 study assessed the likelihood that each of these would reach significant proportions. He concluded that no noticeable adverse effects had resulted from development to date, that there was no scientific evidence indicating that completion of the existing master plan would have more serious adverse effects than the activities carried out to date, and that there is nothing different about the additional area that would be developed under the revised master plan or the fronting ocean waters that would result in greater adverse effects there.

5.5 TERRESTRIAL FLORA

With the exception of a few clusters of trees, shrubs, and grasses near the shoreline, the portion of the Mauna Lani lying atop the Kaniku lava flow (i.e., the area south of the Mauna Lani fishponds) consists of unvegetated lava. Kiawe is the dominant plant in the central sector, while in the northern sector grasses and shrubs are mixed with scattered clumps of kiawe. Typical coastal strand vegetation is found along the shoreline from the fishponds northward. No endangered or rare plant species are present within the area covered by the State Land Use District boundary amendment request. None of the plant species observed are restricted to the project area, and most are exotic species common throughout Hawaii. Hence, while the existing vegetation would be largely replaced by species better suited to landscaped urban environments, the change cannot be considered adverse.

5.6 BIRDS AND WILDLIFE

Studies by Bruner (1979 and 1984) indicate that only common species of birds and mammals are present on the Mauna Lani Resort site. The numbers are relatively small due to the limited food supply provided by the dry natural habitat. Much larger numbers of animals, particularly birdlife, are present in the vegetated areas, most commonly those around the existing development. The oxidation pond at the Mauna Lani sewage treatment plant serves as a feeding and nesting area for migratory waterbirds. The endangered Hawaiian hoary bat (which is most often seen in wet areas at higher elevations) has been sighted recently at the Waikoloa Beach Resort just south of the MLR, but there is no evidence that a significant bat population exists in the area. Construction of the project would result in vegetation changes and increased human activity; these, in turn, would lead to a change in the makeup of the faunal population present. Species adapted to urban and semi-urban environments and to the open grasslands of the golf courses would prosper, while those preferring solitary habitat or adapted to survival on the dry native vegetation would probably experience a decline in population.

5.7 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Situated within the ahupu'a of Kalahuipua'a, the resort site is rich in archaeological remains, and has been the subject of several surveys. An interpretive and management plan for these resources was prepared by Science Management, Inc. for Mauna Lani Resort, Inc. in 1982, and provides guidance relative to historic preservation matters in the ongoing development of the resort. Historic preserves have already been established, and another is proposed as part of the current action.
It is recognized that most of the work done to date has been in the form of reconnaissance, rather than intensive, surveys. It is intended that further surveys will be undertaken, as specific site plans become available. Archaeological salvage and/or preservation will be carried out in accordance with the management plan and the findings of subsequent intensive surveys, in cooperation with appropriate State and County agencies.

5.8 SOCIOECONOMIC IMPACTS

As befits its status as a major destination resort, complete development of the Mauna Lani Resort would have a substantial effect on employment, population, and housing in West Hawaii. It is estimated that visitor expenditures would exceed $125 million per year by the year 2000 under the existing master plan, and slightly less under the revised plan. This would result in direct visitor industry employment of about 2,200 persons. By the time the entire resort is complete, it is expected that direct visitor industry employment would amount to approximately 5,400 persons. Because of the multiplier effect, this level of direct visitor industry employment would create approximately 5,500 additional employment positions in other industries, so that the total number of jobs created would be approximately 10,000 when the resort is fully developed. More than half of these would be off the resort site.

The de facto population of the resort is expected to reach 3,300 to 3,500 by the year 2000 and 7,700 at ultimate development. It is estimated that about three-quarters of these people would be visitors. The in-migrant households supported by the direct visitor industry employment would contain an estimated 2,300 persons, and many more people already residing in the area would be supported by these jobs. Indirect and induced employment, with its attendant population effects, would be roughly equal to this.

Additional housing would be required to accommodate direct visitor industry employees, few of who would qualify for the residential units planned on the resort site itself. The existing and revised master plans differ little in this respect. Most long-term housing needs are expected to be met on the open market, with below market units being supplied only for those who cannot compete effectively there. Peat, Marwick, Mitchell & Co. estimated that there would be a need for approximately 370 employee housing units by the year 2000, and that as many as 1,000 might be needed by the time the resort is completed.

Direct visitor industry salaries generated by development at Mauna Lani are estimated to reach $35 million by the year 2000, and to exceed $60 million by the time the resort is fully developed. Total household income would be increased by about $93 million by the year 2000.

A public sector revenue and expenditure analysis prepared by Peat, Marwick, Mitchell & Co. found that both the existing and revised master plans would have positive ratios. This conclusion applies to both State and County governments.

The Mauna Lani Resort is physically separate from existing communities, and the effects on them of its ongoing development would be indirect. Increased visitor industry employment and population growth would inevitably lead to long-term social changes and, because of the "shift-work" nature of many visitor industry jobs, carries with it some special social stresses of its own. Residents of all islands have proved themselves adept at adjusting to these special requirements, and there is no evidence that the South Kohala experience will be different.
5.9 TRANSPORTATION FACILITIES

Access to the Mauna Lani Resort site is via Queen Ka'ahumanu Highway. Existing traffic volumes on the highway are light, and the level of service provided is high. Planned development at the Mauna Lani Resort and at other resorts along the highway is expected to produce sharply higher traffic volumes in the years ahead, so that by 1995 the existing intersection design will reach capacity. Improvements will be needed at that time. Provision of adequate levels of service following full development of the resort will require widening portions of Mauna Lani Drive to four lanes, and additional capacity will eventually be required on Queen Ka'ahumanu Highway as well. Kawaihae harbor is capable of accommodating the increased cargo movements that would result from the project, although some increase in warehousing space would be required. Passenger traffic through Keahole Airport would also rise. To accommodate the increase, it is likely that extension of the existing 6,500-foot runway will be required so that it can handle direct flights to the mainland by fully loaded widebody jets, and improved terminal facilities will also be required.

5.10 AIR QUALITY

Vehicular traffic associated with development of the Mauna Lani Resort would increase pollutant emissions in the region. Existing air quality is good, however, and no serious problems are envisioned. Some violations of the State Ambient Air Quality Standard for carbon monoxide could occur immediately adjacent to the resort's two major intersections if peak-hour congestion becomes too severe before roadway improvements are made. Federal standards would be met at all times. Planned roadway widening is expected to ease traffic flow, however, and this would remove the threat of air quality standard violations.

5.11 NOISE

Aside from brief periods of construction noise, vehicular traffic is expected to be the only significant source of noise associated with the proposed project. An analysis conducted by Y. Ebisu & Associates (May 1983) concluded that existing setbacks from roads would insure that noise levels in residential areas adjacent to roadways would remain below those considered unacceptable by Federal agencies. In fact, traffic noise is expected to be below 55 Ldn (the level considered "Unconditionally Acceptable") in all residential areas except a few along the southern leg of Kaniku Drive. Even there, noise levels at the edge of the parcels immediately adjacent to the roadways would be 60 Ldn or less, and the 55 Ldn goal could be met by slightly increasing the setback or providing an earthen berm.

5.12 PUBLIC UTILITIES, SERVICES, AND FACILITIES

Water for the Mauna Lani Resort is supplied by the Lalamilo water system. The source capacity is sufficient to accommodate water demand for the full development of the resort, and wells will be installed as needed to meet demand. Wastewater is disposed of through a privately owned and operated wastewater treatment plant on the resort site. It, and the collection and disposal system associated with it, has been designed so that it can be expanded incrementally to accommodate the entire resort. Electrical power for the project will be supplied by the Hawaii Electric Light Company through its existing substation. On-site distribution lines will be installed as necessary using underground conduits. Telephone service will be provided by the Hawaiian Telephone Company.
Between two-thirds and three-quarters of the residential units within the resort proper will be used by transients who place few demands on local public services. Permanent residents of the resort are likely to be relatively wealthy households who will have limited demands for social services and many other public services. However, households of visitor industry employees will live in the outside community, and public facilities and services will need to be expanded to serve them.

6. NECESSARY APPROVALS AND PERMITS

This environmental impact statement has been prepared for submission in conjunction with a request for State Land Use District Boundary amendments and a Conservation District Use Application. These are the first steps in a long approval and permitting process that must be followed before the revised master plan can be implemented. Following is a list of the major approvals which it is certain must be obtained for the overall project and for golf course construction. In the course of developing certain parcels, other permits may be necessary, such as Planned Unit Development permits or Use Permits, depending on the site design.

<table>
<thead>
<tr>
<th>APPROVALS NEEDED</th>
<th>APPROVING AGENCY OR BODY</th>
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<tbody>
<tr>
<td>HAWAII COUNTY:</td>
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<tr>
<td>Rezoning</td>
<td>Planning Department/Planning Commission/Council</td>
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<td>Special Management Area Use Permit</td>
<td>Planning Department/Planning Commission/County Council</td>
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<tr>
<td>Plan Approval</td>
<td>Planning Department</td>
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<tr>
<td>Subdivision Approval</td>
<td>Planning Department</td>
</tr>
<tr>
<td>Building Permit</td>
<td>Department of Public Works</td>
</tr>
<tr>
<td>Grubbing, Grading, Excavation, and Stockpiling Permit</td>
<td>Department of Public Works</td>
</tr>
<tr>
<td>Outdoor Lighting Permit</td>
<td>Department of Public Works</td>
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<tr>
<td>Conformance with County Flood Control Ordinance</td>
<td>Departments of Planning &amp; Public Works</td>
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<tr>
<td>Sign Permit</td>
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<td>Water System Expansion Approval</td>
<td>Department of Water Supply</td>
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<td>STATE:</td>
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<tr>
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<td>State Land Use Commission</td>
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<tr>
<td>Conservation District Use Permit</td>
<td>Department of Land &amp; Natural Resources</td>
</tr>
<tr>
<td>Historic Sites Review</td>
<td>Department of Land &amp; Natural Resources</td>
</tr>
<tr>
<td>Drinking Water System Approval</td>
<td>Department of Health</td>
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CHAPTER II
DESCRIPTION OF THE PROPOSED ACTION

1. REGIONAL SETTING

Mauna Lani Resort is located between the Puako Beach Lots and the Waikoloa Beach Resort along the South Kohala shoreline on the Island of Hawai‘i. South of the Waikoloa Beach Resort, the coastline consists of vacant land for many miles; Hapuna Beach State Park and the Mauna Kea Beach Resort are to the north of the Puako Beach Lots. Kawaihae Harbor, West Hawai‘i’s major port facility, is six miles north of Mauna Lani Resort. Waimea, the Kohala district commercial center, is approximately 12 miles to the northeast (see Figure II-1).

The South Kohala coastline from the district boundary north to Kawaihae Harbor has long been recognized as a desirable location for the development of large-scale resort activities. It has been designated by the State of Hawai‘i and the County of Hawai‘i in their various plans as a major resort region. The Hawai‘i County General Plan, adopted in 1971 and updated twice since, designates Puako, including the Mauna Lani Resort site, as a "Major Resort Area," a "self-contained resort destination area which provides basic and support facilities for the needs of the entire development."

Substantial investments have been made in the public infrastructure needed to stimulate and support resort development in the Kohala Coast Resort Region. These include the construction of the Queen Ka‘ahumanu Highway, Keahole Airport and the Lalalilo Water System, as well as improvements to Kawaihae Harbor. In conjunction with these government-sponsored efforts, private landowners have prepared and begun implementation of plans for large resort complexes along the South Kohala coastline. Aggregate private expenditures on infrastructure for the resorts exceeds $100-million to date.

The Mauna Kea Beach Resort is the oldest of the three major resort projects in South Kohala. The world famous Westin Mauna Kea Beach hotel (formerly the Mauna Kea Beach Hotel) and golf course were constructed in the mid-1960’s, and 65 single-family house lots (The Fairways North and South) and 40 condominium units (the Villas) have subsequently been developed. Like Mauna Lani Resort, the Mauna Kea Beach Resort is designated as a major resort in the County General Plan. The State Land Use Commission has recently granted a written decision and order approving a request by its owner, UAL, Inc., for Urban designation that would be used for a 350-room hotel and 700 to 1,000 single-family and multifamily resort-residential units on both sides of Queen Ka‘ahumanu Highway.

The third major resort in the Kohala Coast Resort Region, the Waikoloa Beach Resort, is being developed by Transcontinental Development Co., which has been responsible for construction of the resort’s infrastructure and provision of common recreational facilities such as the resort golf course. Individual hotel and resort condominium projects are developed on parcels within the resort by separate business entities. The 543-room Sheraton Royal Waikoloa is the only hotel constructed so far. Groundbreaking for the 114-unit "Shores at Waikoloa" resort condominium project took place in mid-1984, and initial occupancy is scheduled for 1985. Approval is currently being sought from various governmental agencies to allow the development of the 1,250-room Hyatt Regency Waikoloa Hotel around Waialua Bay.
Figure II-1
REGIONAL MAP
Kohala and Kona, Hawaii
2. HISTORY OF THE MAUNA LANI RESORT

In 1972, Orchid Island Resorts (the predecessor of Mauna Loa Land, Inc., in turn the predecessor of Mauna Lani Resort, Inc.) acquired fee title to 3,200 acres of land along the South Kohala coast, 175 acres from Francis IIi Brown and the balance of 3,025 acres from Signal Properties (former Parker Ranch land). This land fronts the ocean at the former Francis IIi Brown Kalahului'a parcel and extends inland to Queen Ka'ahumanu Highway. Also in 1972, Orchid Island Resorts assumed the lease of 775 acres of State-owned land from Signal Properties. The leased parcel, which is contiguous to the fee land, lies immediately inland of the Puako Beach Lots.

When the resort property was acquired by Orchid Island Resorts, only 164.5 acres of land immediately surrounding the Kalahului'a's fishponds were in the State Urban District. In November 1973, Orchid Island Resorts submitted an application to the State Land Use Commission to reclassify 614 acres mauka of the Francis IIi Brown parcel from Conservation and Agricultural to Urban; the goal was to create an area large enough (combined with its fee land already in the Urban District) within which to develop a self-sufficient destination resort. The request also sought reclassification from Agricultural to Urban for an additional 410 acres mauka of the resort area for the development of an associated support community. The request was later amended to add another 62-acre Urban area adjacent to and mauka of the proposed resort for employee housing.

In December 1974, the State Land Use Commission reclassified the 614 acres slated for resort use to the Urban District. This was done as part of its then-mandated five-year State Land Use District Boundary Review. Urban designation for both the 410-acre and 62-acre Urban Districts was denied. No changes in the State Land Use District boundaries on the Mauna Lani Resort have been made since that time.

Between 1976 and 1980, the County of Hawai'i granted SMA Permit No. 2 and adopted Zoning Ordinances 380, 607 and 608 to allow the development of the Mauna Lani Resort. These approvals specifically limit development at the 778-acre project site to a maximum of 3,000 hotel rooms and 3,182 residential units. The 3,000 hotel room limit is in accordance with the Hawai'i County General Plan limit for a major resort area.

Because the application for the 62 acres and the 410 acres in the Urban District was denied in 1974, support functions for the resort have been accommodated within the Agricultural District through the use of Special Permits.
3. DEVELOPMENT CONCEPT

3.1 STATEMENT OF OBJECTIVES

Mauna Lani Resort, Inc. has a long-term commitment to develop its 3,200 acres, starting with the development of its core resort area, which is the subject of this report. Its interests focus on continuity of planned development and operations rather than on short-term gains. Mauna Lani Resort, Inc. intends to provide a full range of facilities and amenities within a self-contained resort/residential community, integrating a compatible mix of uses in an overall design which meets world class standards.

Development is planned to proceed at a rate that is responsive to changing market demand for resort hotel and residential facilities. Mauna Lani's objective is to remain flexible in providing these facilities so that they satisfy current and projected needs, keeping within the context of a luxury resort development.

3.2 DESCRIPTION OF PROPOSED DEVELOPMENT

3.2.1 Existing Master Plan

Figure II-2 shows the existing master plan for the 778.5-acre central core of Mauna Lani Resort. Plans approved by the County, which are consistent with the County General Plan, permit the construction of 3,000 hotel rooms, 3,182 vacation and permanent residential units, shopping and entertainment activities, and recreational facilities (including an 18-hole golf course) on the 778.5 acres of Urban District land (see Figures II-3 and II-4 for County General Plan designation and County zoning). Facilities already developed are the award-winning 18-hole championship Francis H. Pi Brown Golf Course, the 351-room luxury-class Mauna Lani Bay Hotel, the 80-unit Mauna Lani Terrace condominiums, and recreational facilities, including an historic park and an extensive network of trails around the ancient fishponds and along the shoreline. A tennis club and a beach club are planned, and the first phase of the 116-unit Mauna Lani Point condominium project is scheduled to be completed by the end of 1985.

Details of the existing master plan are contained in the 1975 Environmental Impact Statement (EIS) submitted to the County for Mauna Lani Land Inc.'s Planned Resort Community at Kalahuipua'a. The earlier EIS was completed before the adoption of the State Environmental Quality Commission's Environmental Impact Statement Regulations adopted pursuant to Chapter 343, Hawaii Revised Statutes. However, the in-depth studies and analyses performed for the EIS remain valid and are a source of reference for this current EIS.

3.2.2 Proposed Expansion

The change in the State Land Use District boundary discussed in this report is needed to allow development of the resort at a lower density and with more recreational opportunities and visual amenities than is possible under the existing plan. It would increase the size of the Urban district from its existing 778.5 acres to approximately 1,432 acres. See Figures II-5 and II-6 for the proposed master plan and the redistricting necessary to accommodate the revised plan. Despite the increase in the amount of Urban-zoned land at the resort, no increase in the number of hotel, resort condominium, or residential units is planned.
COUNTY ZONING DESIGNATION

RM-1.5  MULTIPLE FAMILY RESIDENTIAL  CV-10  VILLAGE COMMERCIAL
RM-3   MULTIPLE FAMILY RESIDENTIAL  ML-10  LIMITED INDUSTRIAL
V-1.0  RESORT-HOTEL  O  OPEN
V-1.25 RESORT-HOTEL  U  UNPLANNED

Note: Number following zoning indicates required sq. ft. (in thousands) per unit or parcel.
Figure II-4
EXISTING COUNTY ZONING
MAUNA LANI RESORT
South Kohala, Hawaii
NOTE: Lettered labeled sites are resort residential uses.
Figure II-5
PROPOSED MASTER PLAN
MAUNA LANI RESORT
South Kohala, Hawaii
Figure II-2
EXISTING MASTER PLAN
MAUNA LANI RESORT
South Kohala, Hawaii
Figure II-3
COUNTY GENERAL PLAN
MAUNA LANI RESORT
South Kohala, Hawaii
Figure II-6
REQUESTED STATE LAND USE DISTRICT RECLASSIFICATION
MAUNA LANI RESORT
South Kohala, Hawaii
In specific terms, the additional land is needed to:

- provide a second golf course and additional open space and recreational areas, including a public shoreline park;
- accommodate support facilities that have been constructed in the Agricultural district adjacent to the existing Urban zone;
- allow relocation of the hotel site now located along the eastern side of Honoka'ope Bay to a more suitable location at its southern end; and
- allow the density of development within the resort's residential and hotel areas to be decreased, thereby promoting the achievement of established luxury resort design goals and standards.

The revised master plan for an expanded core resort area remains true to the original overall development concept of providing first class resort facilities within a self-contained resort community while retaining open space areas, historic and scenic resources, which reinforce the unique character of the resort. Foremost are plans to preserve views as well as natural and established features, including the shoreline, the Kalahuipua'a fishponds, historical sites, and mauka/makai trail systems. Further, plans call for the enhancement of access to these features, which will be retained in open space for public access and enjoyment. Finally, the pockets of development will be physically separated by open-space corridors.

Each of these proposed changes is discussed below.

3.2.2.1 Additional Golf Holes

Mauna Lani Resort, Inc. proposes to develop a second 18-hole golf course of the same championship quality as the existing ocean-fronting Francis H Brown Golf Course. The north nine holes of the existing golf course would be combined with nine new holes to be constructed mauka and north of Hotel Site 2/3. Together, they would form a complete 18-hole golf course. Two of these holes would be constructed within the State leasehold parcel just north of Pauoa Bay, adjacent to the proposed public shoreline park. The remaining existing "south nine" would be combined with nine new holes to the south to form a second 18-hole golf course. Both golf courses would have some golf holes fronting the ocean, a characteristic of the existing Francis H Brown Golf Course which makes playing the course a unique experience.

3.2.2.2 Golf Course Reserve

The existing master plan provides only a single 18-hole golf course -- the existing Francis H Brown championship course. The numbers of resort visitors and others using the existing golf course far exceed expectations at the time the original State Land Use districts were created, and the market analysis prepared by Ming Chew Associates (summarized in a later section of this report) anticipates a demand for additional golf facilities as the resort develops. To accommodate this projected demand for a third and fourth golf course, the revised master plan includes five parcels totaling about 86 acres to be set aside as golf reserves for future development (see Figure II-3). These parcels will provide a link between existing golf holes and the new holes to be built when market demand warrants their construction.
3.2.2.3 Public Access

Public access to the shoreline will be provided both at the northern end of the resort and at the southern end. See Figure II-7 for proposed access to the pedestrian shoreline trail which extends from Mauna Lani's boundary with its State leased parcel to the property line separating MLR from Waikoloa Resort. Also shown is existing public access by the Mauna Lani Bay Hotel and Kalahuipua'a Fishponds. Public parking will be provided toward the head of both mauka/makai public access paths (29 stalls at the public shoreline park near Pauoa Bay and 20 stalls at Honoka'ope Bay). See Figures II-8 and II-9 for a more detailed depiction of public shoreline access north of Pauoa Bay and at Honoka'ope Bay.

3.2.2.4 Public Shoreline Park

Figure II-8 shows a conceptual plan for the proposed public shoreline park adjacent to holes 9 and 10 of the new northern golf course. The park would contain a comfort station and showers, picnic facilities (10 tables and 5 barbeque pits), and parking (12 stalls initially and 17 additional stalls planned). Should it become apparent that the parking for 29 vehicles is inadequate to accommodate visitors to the beach park, 11 additional stalls will be constructed by Mauna Lani Resort, Inc. Schematic plans call for the creation of some attractive water features in the low-lying land separating the golf course and the park facilities.

The park will allow convenient public access to the shoreline and will provide a link to shoreline trail easements running the length of the coast along Mauna Lani Resort's lands. The construction of the new shoreline park and parking will also improve access to the Puako petroglyph fields, which contain one of the most significant petroglyph clusters in the State of Hawai'i.

3.2.2.5 Archaeological Park

Through the joint efforts of the Waimea Hawaiian Civic Club and Mauna Lani Resort, Inc., the Puako petroglyph fields have been placed on the State of Hawai'i Register of Historic Places. Over a period of several decades the petroglyph fields sustained damage as a result of vandalism and neglect; however, in recent years they have been cleaned up by members of the Civic Club and MLR personnel. Mauna Lani proposes to construct and maintain, for the term of its lease with the State, the Puako archaeological park containing approximately 190 acres of land it leases from the State and 80 acres of Mauna Lani's adjacent fee lands. The archaeological park will accommodate public access, security, ongoing restoration, signage and parking for 8 vehicles.

3.2.2.6 Hotel Sites

The five hotel sites in the existing master plan (in addition to the Mauna Lani Bay Hotel site) have been retained in the revised master plan. The locations of Sites 2, 3, I and T remain essentially the same. In the proposed master plan, however, the location of Hotel Site 4 has been moved back to its originally planned position further west on Honoka'ope Bay.

Prior to Orchid Island Resort's application to the State Land Use Commission for reclassification of portions of its property, the original plans for its resort included a hotel to be located along the southern side of Honoka'ope Bay. The proposed hotel site fronts a sandy beach and benefits from several topographic features that add to its
Figure II-7

PUBLIC SHORELINE ACCESS

MAUNA LANI RESORT

South Kohala, Hawaii
aesthetic appeal. It was, and still is, considered a site ideally suited to the development of a luxury class hotel. During preliminary discussions with both the State Land Use Commission and its consultants and the County of Hawaii, as part of the 1974 5-year boundary review process, a possible Phase I boundary for the proposed resort was discussed. As a result of these discussions, a boundary was agreed to that precluded a hotel on that site. Following approval of the LUC boundary, a County rezoning application was filed and approved that located a hotel site in a more northeastern location on Honoka`ape Bay. Characterized by flatter topography and the absence of frontage onto a sandy beach, the zoned hotel site is considered far inferior to the original desired site as the location for a luxury resort hotel, and it is proposed that the hotel site be relocated to a position further west along the southern side of the bay.

The Phase I plan has evolved through the years into a more comprehensive plan which incorporates additional elements into the original plan. Earlier, the proposed Honoka`ape Bay hotel site was at the periphery of the resort. Now, as development is occurring, a total plan for the resort property has been worked out; the siting of the Honoka`ape Bay hotel has become an integral part of the revised master plan. Together, the various amenities planned for the southern portion of the resort, including the reorted hotel, the new golf holes, public beach access, parking and comfort stations, constitute a unified vital portion of the expanded master plan.

The proposed southwestern hotel site, more than any other available site within the resort, is thought to be best suited to the development of a luxury class hotel. Mauna Lani Resort, Inc. wishes to maintain its viability as a premier destination resort. To do so, it must continue to offer visitor choices that are equal in quality to that of the existing Mauna Lani Bay Hotel. Allowing a luxury class hotel to be built at its now proposed location is a key factor in fulfilling Mauna Lani Resort, Inc.'s overall goal of developing a world-class resort.

3.2.2.7 Residential Development

The number of parcels, as well as the total acreage planned for resort/residential development, will increase from the existing master plan to the proposed revised master plan. However, the total number of residential units ultimately constructed will not exceed the total 3,182 ceiling allowed by the County for the existing master plan. Similarly, while the total hotel acreage will also increase, the existing 3,000 hotel room limit also will not be exceeded. This translates into a decrease in overall density of resort development. The market analysis summarized in the following section of this report indicates that lower densities are necessary to achieve the distinctive market image sought.

Together with the construction of a second golf course, the lower density of residential unit development would permit the development of higher quality units on better sites. Given their slightly higher expected sales prices, however, units under the revised plan are anticipated to be sold at a somewhat more gradual rate than those sold under the existing master plan.

3.2.2.8 Support Facilities

Support facilities north and mauka of the existing resort will continue in their current location. These include the sewage treatment plant, the resort offices, warehousing, storage and contractors' yards. Future service/light industrial uses associated with resort expansion will also be located in this area. These might include short-term uses such as construction sheds and long-term uses such as additional warehouses and maintenance facilities.
3.2.2.9 Other Resort Amenities

The proposed master plan provides sites for commercial, recreational and other miscellaneous uses; these enable the resort to be a self-contained entity. Acreage for these uses in the revised master plan have increased from that in the existing master plan; but due to their lower density, the magnitude of development would not be increased.

3.2.2.10 Proposed Land Use

The approximate acreage of different land uses on the Resort's fee land for the existing and proposed master plans are as follows:

<table>
<thead>
<tr>
<th>Type of Use</th>
<th>Existing Plan</th>
<th>Revised Plan</th>
<th>Net Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resort Hotel</td>
<td>124.2</td>
<td>144.5</td>
<td>20.3</td>
</tr>
<tr>
<td>Resort Residential</td>
<td>318.2</td>
<td>458.5</td>
<td>140.3</td>
</tr>
<tr>
<td>Commercial</td>
<td>27.1</td>
<td>40.9</td>
<td>13.8</td>
</tr>
<tr>
<td>Resort Support Facilities</td>
<td>5.8</td>
<td>110.9</td>
<td>105.1</td>
</tr>
<tr>
<td>Open/Road</td>
<td>57.0</td>
<td>173.2</td>
<td>116.2</td>
</tr>
<tr>
<td>Golf Course</td>
<td>205.0</td>
<td>370.0*</td>
<td>165.0*</td>
</tr>
<tr>
<td>Golf Course Reserve</td>
<td>---</td>
<td>86.3</td>
<td>86.3</td>
</tr>
<tr>
<td>Historic Preserve</td>
<td>23.7</td>
<td>23.7</td>
<td>---</td>
</tr>
<tr>
<td>Park</td>
<td>3.2</td>
<td>3.2</td>
<td>---</td>
</tr>
<tr>
<td>Recreation, Misc., Other</td>
<td>14.3</td>
<td>21.3</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>778.5</td>
<td>1,432.5</td>
<td>654.0</td>
</tr>
</tbody>
</table>

* An additional 23 acres of golf course are proposed in the State leased land on the Resort's northern boundary.

3.2.2.11 Need for District Boundary Changes and Conservation District Use Request

To accommodate the revised master plan as described in previous sections of this report, Mauna Lani Resort, Inc. is requesting the State Land Use Commission to amend the State Land District Boundaries as shown in Figure II-6. The redistricting involves changes in Land Use District for 65 acres, 486 acres from Agricultural to Urban and 168 acres from Conservation to Urban. In South Kohala, the original 1964 land use district boundaries ran along the King's Trail through lava lands. The areas seaward of the trail were designated Conservation, as they were undeveloped and scenic. Gradually, these areas were planned for resort uses and brought into the Urban district at Puako, Mauna Lani Resort, and Waikoloa. The southern section of the Honokōpae Bay area is the only section between Mauna Lani Resort and Waikoloa that remains in the Conservation district even though the entire area is designated for low density urban resort uses in the County General Plan. Over the years, there has been no public access to or use of this area. The current plan will ensure that the public will have access to the scenic shoreline at Honokōpae Bay. There is much Conservation district scenic shoreline outside this resort region which will likely remain in the district well into the future, both to the south and north of the coastal resorts in South Kohala.
Mauna Lani Resort, Inc. has also submitted a Conservation District Use Application (CDUA) to the State Board of Land and Natural Resources to allow development of two golf holes and a public shoreline park on land that it leases from the State of Hawaii. After review of both requests by the respective authorities, it has been determined that the preparation of an Environmental Impact Statement is required pursuant to Chapter 343 of the HRS.

3.3 NEED FOR THE PROJECT: MARKET DEMAND STUDY

3.3.1 Introduction

A market study prepared by Ming Chew Associates analyzes the demand for resort facilities at the Mauna Lani Resort. Assumptions and conclusions of the market study were used in refining the conceptual land use plan for the resort. The resulting revised master plan provides the basis for the analysis of the proposed project's impacts.

The general approach of the study was to identify the primary markets that could be served by the Mauna Lani Resort. Economic trends were assessed and projections made of the likely visitor arrivals for both the State and County of Hawaii. These projections in turn were converted into demand estimates for total transient accommodations, hotel rooms, multifamily units, single-family units and houseboats, golf course play, commercial land use and resort support facilities. The demand estimates were then compared with existing and planned supply to arrive at conclusions on the marketability of facilities at Mauna Lani Resort. Table II-3.1 summarizes these conclusions. The estimates represent cumulative demand in excess of the existing February 1984 inventory at the resort.

3.3.2 Hawai'i County Visitor Industry

Over the past 15 years, the number of visitors to the neighbor islands in general has increased at a faster rate than the number to the State of Hawaii as a whole. The proportion of westbound neighbor island visitors intending to visit the Big Island peaked at almost 40 percent in 1971, before beginning a decline to 21.5 percent in 1982 (see Table II-3.2). In 1983, the proportion increased slightly to 21.7 percent. Ming Chew Associates anticipates that the proportion of westbound visitors to Hawaii County will continue the rebound and increase to 32 percent by 2000. This assessment reflects increased promotion of neighbor island destinations, preference for neighbor island amenities by repeat visitors to the State, the recent addition of new visitor facilities on the Island of Hawaii, and the availability of direct flights from the U.S. Mainland to Keahole Airport in Kona. An increasing proportion of eastbound visitors is also expected to visit Hawaii County.

3.3.3 Market Analysis for Transient Accommodations

With the completion of the Sheraton Royal Waikoloa Hotel, the share of Big Island transient accommodations outside Kona and Hilo (mostly on the Kohala Coast) increased sizeably. By February 1983, with the opening of the Mauna Lani Bay Hotel, the proportion of the island's visitor units located on the Kohala Coast began to approach that in Hilo, and by February 1984, the number of transient accommodation units did indeed exceed the number in Hilo for the first time.

The Kohala Coast is just beginning to be fully recognized as a major destination resort region, despite the long-time presence of the world renown Mauna Kea Beach Hotel. Ming Chew Associates expects the region to continue to undergo substantial resort development over the remainder of the century.
Table II-3.1
Projected Marketability(1)
Mauna Lani Resort
1990 - 2000

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOTEL ROOMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-Rise Multifamily Units</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher-Quality</td>
<td>100</td>
<td>200</td>
<td>400-500</td>
</tr>
<tr>
<td>Mid-Quality</td>
<td>150</td>
<td>300</td>
<td>500-600</td>
</tr>
<tr>
<td>Lower-Quality</td>
<td>150</td>
<td>300</td>
<td>500-700</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>800</td>
<td>1,400-1,800</td>
</tr>
<tr>
<td>HOUSELOTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher-Quality</td>
<td>5</td>
<td>10</td>
<td>10-15</td>
</tr>
<tr>
<td>Mid-Quality</td>
<td>8</td>
<td>15</td>
<td>20-25</td>
</tr>
<tr>
<td>Lower-Quality</td>
<td>12</td>
<td>25</td>
<td>40-50</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>50</td>
<td>70-90</td>
</tr>
<tr>
<td>HOUSE AND LOT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher-Quality</td>
<td>5</td>
<td>10</td>
<td>10-15</td>
</tr>
<tr>
<td>Mid-Quality</td>
<td>8</td>
<td>15</td>
<td>20-25</td>
</tr>
<tr>
<td>Lower-Quality</td>
<td>12</td>
<td>25</td>
<td>40-50</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>50</td>
<td>70-90</td>
</tr>
<tr>
<td>TOTAL (ROOMS/UNITS/LOTS)</td>
<td>850</td>
<td>1,600</td>
<td>2,400-3,080</td>
</tr>
<tr>
<td>GOLF ROUNDS, ANNUAL</td>
<td>51,000</td>
<td>92,000</td>
<td>128,000-158,000</td>
</tr>
<tr>
<td>COMMERCIAL, ACRES</td>
<td>5</td>
<td>10</td>
<td>16-21</td>
</tr>
<tr>
<td>AUXILIARY SERVICES, ACRES</td>
<td>15</td>
<td>30</td>
<td>45-55</td>
</tr>
</tbody>
</table>

(1) Cumulative demand in excess of February 1984 inventory.

Source: Ming Chew Associates
Table II-3.2
Visitor Estimates and Forecasts
County of Hawaii
1970 - 2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Westbound Percent of State</th>
<th>Westbound Estimated Visitors</th>
<th>Eastbound(1) Percent of State</th>
<th>Eastbound Estimated Visitors</th>
<th>Both Directions(2) Estimated Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>37.1</td>
<td>511,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1971</td>
<td>39.8</td>
<td>569,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1972</td>
<td>39.2</td>
<td>699,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1973</td>
<td>36.7</td>
<td>759,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1974</td>
<td>36.8</td>
<td>804,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1975</td>
<td>37.3</td>
<td>823,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1976</td>
<td>36.1</td>
<td>870,000</td>
<td>18</td>
<td>118,000</td>
<td>1,008,000</td>
</tr>
<tr>
<td>1977</td>
<td>32.2</td>
<td>890,000</td>
<td>19</td>
<td>121,000</td>
<td>1,076,000</td>
</tr>
<tr>
<td>1978</td>
<td>31.5</td>
<td>955,000</td>
<td>19</td>
<td>156,000</td>
<td>1,031,000</td>
</tr>
<tr>
<td>1979</td>
<td>28.5</td>
<td>895,000</td>
<td>16</td>
<td>162,000</td>
<td>931,000</td>
</tr>
<tr>
<td>1980</td>
<td>25.9</td>
<td>789,000</td>
<td>17</td>
<td>163,000</td>
<td>838,000</td>
</tr>
<tr>
<td>1981</td>
<td>22.7</td>
<td>675,000</td>
<td>18</td>
<td>174,000</td>
<td>878,000</td>
</tr>
<tr>
<td>1982</td>
<td>21.5</td>
<td>704,000</td>
<td>18</td>
<td>171,000</td>
<td>910,000</td>
</tr>
<tr>
<td>1983</td>
<td>21.7</td>
<td>739,000</td>
<td>21</td>
<td>220,000</td>
<td>1,168,000</td>
</tr>
</tbody>
</table>

Forecast:

<table>
<thead>
<tr>
<th>Year</th>
<th>1985</th>
<th>24.0</th>
<th>948,000</th>
<th>21</th>
<th>220,000</th>
<th>1,168,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>27.0</td>
<td>1,242,000</td>
<td>23</td>
<td>320,000</td>
<td>1,562,000</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>30.0</td>
<td>1,500,000</td>
<td>25</td>
<td>425,000</td>
<td>1,925,000</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>32.0</td>
<td>1,664,000</td>
<td>27</td>
<td>486,000</td>
<td>2,150,000</td>
<td></td>
</tr>
</tbody>
</table>

---

(1) Estimates based upon surveys of Japanese visitors and the assumption that ten percent of other Eastbound visitors visit Hawaii County. Estimated to be 18 percent in 1983.

(2) Westbound only until 1977.

Source: Hawaii Visitors Bureau, Annual Research Reports and Japanese Visitor Opinion Surveys; Ming Chew Associates.
Table II-3.3 shows Ming Chew Associates' projections of occupied room and total room demand by resort region for the Island of Hawaii. In Hilo, the total demand for transient accommodations is projected to increase from 800 units in 1983 to 1,900 units in 2000; in Kona from 3,000 to 9,800; and in North and South Kohala from 1,100 to 7,900 units. However, when taking existing supply into consideration, Kohala is projected to need 6,600 additional units while Kona would need only 5,300 additional units by 2000. By 1985, demand is projected to exceed supply by about 600 units in Kohala, while Kona and Hilo appear to be adequately supplied until some time after 1985.

It is Ming Chew Associates' belief that most of the demand in North and South Kohala will be satisfied within the Waikoloa Beach Resort, Mauna Lani Resort and the lands being developed by Mauna Kea Properties. Due to the lack of other facilities outside the coastal area, Ming Chew Associates estimates that 70 to 90 percent of the projected new demand in South Kohala would likely be accommodated at these three resorts.

Currently, Mauna Lani Resort accounts for 30 percent of the accommodations in North and South Kohala. It is estimated that the resort could capture about 25 percent of the projected new transient accommodations demand for Kohala through 1993. This capture rate could increase to 25 to 30 percent by 2000, given the relative abundance of beachfront and oceanfront sites in Mauna Lani and the diminishing number of comparable sites elsewhere in the resort region. Thus, demand for transient units at Mauna Lani is estimated by Ming Chew Associates to be 600 units by 1990, 1,100 units by 1995, and 1,600 to 2,000 units by 2000. Of the total transient units, 400 are projected to be supplied by new hotels at Mauna Lani Resort in 1990, 700 in 1995 and 900 to 1,100 in 2000. The remaining units in transient use will be in multi-family developments.

Most transient accommodations inventory in the Kohala Coast Resort region is in the luxury or super-luxury category. Much of future product marketing is expected to be directed toward similar market segments. Such action would tend to expand the basic demand for luxury and super-luxury accommodations, according the Ming Chew Associates analysis, which anticipates the next hotel at Mauna Lani to be in the same super-luxury category as the Mauna Lani Bay Hotel.

3.3.4 Market Analysis for Resort Multifamily Units

Applying its estimates of demand for the total number of transient accommodations and hotel units at Mauna Lani, Ming Chew Associates derives the projected number of multifamily units in transient use in the years 1990, 1995 and 2000. It estimates that half of the multifamily units will be used as transient accommodations. Thus, the total unit demand for additional multifamily units at Mauna Lani is forecast to be 400 units in 1990, 800 in 1995 and 1,400 to 1,800 in 2000 (see Table II-3.4).

Projections of achievable prices for resort multifamily units at Mauna Lani are based largely on prices achieved for properties in the three Kohala Coast resorts. Also taken into account were factors such as the high quality development theme for Mauna Lani, the variety of development sites, the quantity and diversity of existing and planned resort activities, and overall planning flexibility. Demand estimates have been divided into three categories of relative quality, labeled higher-quality, mid-quality and lower-quality. The existing Mauna Lani Terrace project is considered mid-quality within Ming Chew Associates' frame of reference. Table II-3.5 shows the projected demand for multifamily units delineated by relative quality. Each level of quality is characterized by average unit price, unit size and average density (number of units per acre).
### Table II-3.3

Projection of Transient Accommodation Demand by Resort Region
County of Hawaii
1983 - 2000

<table>
<thead>
<tr>
<th></th>
<th>Hilo</th>
<th>Kona</th>
<th>Kohala</th>
<th>Other</th>
<th>Total County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>579</td>
<td>2,122</td>
<td>764</td>
<td>44</td>
<td>3,509</td>
</tr>
<tr>
<td>1985</td>
<td>700</td>
<td>2,900</td>
<td>1,400</td>
<td>100</td>
<td>5,000</td>
</tr>
<tr>
<td>1990</td>
<td>1,000</td>
<td>4,200</td>
<td>2,500</td>
<td>300</td>
<td>8,000</td>
</tr>
<tr>
<td>1995</td>
<td>1,100</td>
<td>5,700</td>
<td>4,100</td>
<td>500</td>
<td>11,400</td>
</tr>
<tr>
<td>2000</td>
<td>1,300</td>
<td>6,900</td>
<td>5,500</td>
<td>900</td>
<td>14,600</td>
</tr>
</tbody>
</table>

Estimated Total Demand
**at 70% Occupancy:**

<table>
<thead>
<tr>
<th></th>
<th>Hilo</th>
<th>Kona</th>
<th>Kohala</th>
<th>Other</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>800</td>
<td>3,000</td>
<td>1,100</td>
<td>100</td>
<td>5,000</td>
</tr>
<tr>
<td>1985</td>
<td>1,000</td>
<td>4,000</td>
<td>2,000</td>
<td>200</td>
<td>7,200</td>
</tr>
<tr>
<td>1990</td>
<td>1,400</td>
<td>6,000</td>
<td>3,600</td>
<td>400</td>
<td>11,400</td>
</tr>
<tr>
<td>1995</td>
<td>1,600</td>
<td>8,100</td>
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<tr>
<td>2000</td>
<td>1,900</td>
<td>9,800</td>
<td>7,900</td>
<td>1,300</td>
<td>20,900</td>
</tr>
</tbody>
</table>

Visitor Plant Inventory as of February 1984:

<table>
<thead>
<tr>
<th></th>
<th>Hilo</th>
<th>Kona</th>
<th>Kohala</th>
<th>Other</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,194</td>
<td>4,448</td>
<td>1,422</td>
<td>85</td>
<td></td>
<td>7,149</td>
</tr>
</tbody>
</table>

Source: Hawaii Visitors Bureau, Visitor Plant Inventory, February, 1984; Ming Chew Associates.
Table II-3.4
Forecast of Hotel and Multifamily Unit Demand
Mauna Lani Resort
1990 - 2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Projected Transient Accommodations Demand</th>
<th>MF Units For Other Uses</th>
<th>Total MF Units For Trans. Accom. and Other Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>600</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>1995</td>
<td>1,100</td>
<td>400</td>
<td>800</td>
</tr>
<tr>
<td>2000</td>
<td>1,600-2,000</td>
<td>700-900</td>
<td>1,400-1,800</td>
</tr>
</tbody>
</table>

(1) Estimated to be 25 percent of North and South Kohala transient accommodations demand through 1995, and then 25 to 30 percent in the year 2000.

(2) Estimated to be 30 percent of North and South Kohala hotel demand through 1995, and then 30 to 35 percent in the year 2000.

Source: Ming Chew Associates
<table>
<thead>
<tr>
<th>Year</th>
<th>Higher-Quality</th>
<th>Mid-Quality</th>
<th>Lower-Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>100</td>
<td>150</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Average Unit Price, 1984 $</td>
<td>550,000</td>
<td>450,000</td>
<td>350,000</td>
</tr>
<tr>
<td></td>
<td>Average Unit Size, Sq. Ft.</td>
<td>2,200</td>
<td>1,800</td>
<td>1,400</td>
</tr>
<tr>
<td></td>
<td>Average Density, Units/Acre</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>1995</td>
<td>200</td>
<td>300</td>
<td>300</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>Average Unit Price, 1984 $</td>
<td>550,000</td>
<td>450,000</td>
<td>350,000</td>
</tr>
<tr>
<td></td>
<td>Average Unit Size, Sq. Ft.</td>
<td>2,200</td>
<td>1,800</td>
<td>1,400</td>
</tr>
<tr>
<td></td>
<td>Average Density, Units/Acre</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2000</td>
<td>400-500</td>
<td>500-600</td>
<td>500-700</td>
<td>1,400-1,800</td>
</tr>
<tr>
<td></td>
<td>Average Unit Price, 1984 $</td>
<td>550,000</td>
<td>450,000</td>
<td>350,000</td>
</tr>
<tr>
<td></td>
<td>Average Unit Size, Sq. Ft.</td>
<td>2,200</td>
<td>1,800</td>
<td>1,400</td>
</tr>
<tr>
<td></td>
<td>Average Density, Units/Acre</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

(1) This figure represents the amount by which projected demand exceeds the February 1984 actual supply.

Source: Ming Chew Associates
3.3.5 Market Analysis for Resort Subdivision House lots and House and Lots

The Ming Chew study anticipates demand for both house lots and house and lot packages within the Mauna Lani Resort to be used as vacation homes, permanent residences or investment properties. Its demand analysis is based on the experience of the Mauna Kea Resort, the only Kohala Coast resort with house lots and house and lots developed to date, and on a study that evaluated the marketability of The Villas (low-rise, low-density condominium units) and The Fairways at Mauna Kea North (detached homes built on house lots).

Ming Chew Associates estimates that the demand for resort subdivision house lots would be approximately 7 percent of the multifamily unit demand in 1990, decreasing to 6 percent in 1995 and to 5 percent in 2000. This is a demand of 25, 50, and 70 to 90 house lots, respectively. Further, it is anticipated that buyers will seek constructed detached houses and lots in the same proportion as those seeking lots only, that is 25, 50, and 70 to 90 house lots in 1990, 1995, and 2000.

As with the multifamily unit demand, the house lot and house and lot demand is divided into three categories of relative quality: higher quality, mid-quality, and lower quality, each characterized by density and price. See Table II-3.6 for the forecast of subdivision house lot demand at Mauna Lani Resort, and Table II-3.7 for the forecast of house and lot demand.

3.3.6 Market Analysis for Golf Course

At the time plans for the Mauna Lani Resort were originally formulated over ten years ago, it was believed that an 18-hole golf course would adequately serve the entire resort complex. However, based on subsequent experience at Mauna Lani Resort and at the other Kohala Coast resorts, it has become evident that the demand for golf play greatly exceeds initial projections. With only a fraction of the resort's planned units developed to date, the desirable limit of 175 rounds of golf per day is already exceeded during peak periods of play. A record 228 rounds were played on February 16, 1984, and the daily average for the year ending June 1984 was 104 rounds a day.

The existing championship Francis I'i Brown Golf Course provides a unique playing experience characterized by the leisurely pace of play, course conditions and the ocean vistas facing the player. As development occurs, Mauna Lani Resort hopes to continue providing opportunities for such experiences on golf facilities that meet the luxury standards established with the Francis I'i Brown Golf Course.

Ming Chew Associates anticipates that, as occupancy at the Mauna Lani Bay Hotel increases, golf play at the hotel could approach the same level of 145 rounds per room per year projected for the Mauna Kea Beach Hotel and Golf Course. At one-third less golf activity, it estimates that subsequent hotels developed at Mauna Lani Resort would generate 100 annual rounds per room. Also, multifamily units and detached homes are expected to generate golf activity, but probably not as much as would the hotels.

The total projected additional golf demand is 51,000 annual rounds in 1990, 92,000 in 1995 and 128,000 in 2000. This amount of activity could not be accommodated at the existing golf courses in the Kohala Coast Resort region since these courses are estimated to be at their desired maximum capacities or close to them. Further, it is estimated that the Francis I'i Brown Golf Course will reach its desired maximum capacity by the time the existing Mauna Lani Bay Hotel and Mauna Lani Terrace, and the Mauna Lani Point (now under construction) reach a stabilized level of occupancy.
### Table II-3.6
Forecast of Subdivision Houselot Demand
Mauna Lani Resort
1990 - 2000

<table>
<thead>
<tr>
<th></th>
<th>Higher-Quality</th>
<th>Mid-Quality</th>
<th>Lower-Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Houselot Demand</strong></td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Average Lot Price, 1984 $</td>
<td>$450,000+</td>
<td>$350,000</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Lots/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Higher-Quality</th>
<th>Mid-Quality</th>
<th>Lower-Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Houselot Demand</strong></td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Average Lot Price, 1984 $</td>
<td>$450,000+</td>
<td>$350,000</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Lots/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Higher-Quality</th>
<th>Mid-Quality</th>
<th>Lower-Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Houselot Demand</strong></td>
<td>10-15</td>
<td>20-25</td>
<td>40-50</td>
<td>70-90</td>
</tr>
<tr>
<td>Average Lot Price, 1984 $</td>
<td>$450,000+</td>
<td>$350,000</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Lots/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Source: Ming Chew Associates
Table II-3.7
Forecast of House and Lot Demand
Mauna Lani Resort
1990 - 2000

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Lower-Quality</td>
<td>Total</td>
</tr>
<tr>
<td>House and Lot Demand</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$1,000,000+</td>
<td>$800,000</td>
<td>$600,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher-Quality</td>
<td>Mid-Quality</td>
<td>Lower-Quality</td>
<td>Total</td>
</tr>
<tr>
<td>House and Lot Demand</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$1,000,000+</td>
<td>$800,000</td>
<td>$600,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher-Quality</td>
<td>Mid-Quality</td>
<td>Lower-Quality</td>
<td>Total</td>
</tr>
<tr>
<td>House and Lot Demand</td>
<td>10-15</td>
<td>20-25</td>
<td>40-50</td>
<td>70-90</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$1,000,000+</td>
<td>$800,000</td>
<td>$600,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Source: Ming Chew Associates
Thus, in the opinion of Ming Chew Associates, to support the golf demand generated by planned facilities at Mauna Lani Resort, a second 18-hole championship golf course within the resort will be needed by the time the next hotel begins operations. The second golf course will be at capacity by 1990. By that time, plans should be underway for a third golf course, which is projected to reach capacity by 1995. At that later date, plans should be underway for a fourth course. Ming Chew Associates recommends that provisions be made to "efficiently link subsequent golf courses to avoid the extensive plan revisions now needed to integrate the next golf course with the existing clubhouse." In short, it is recommended that adequate space within the Urban district be set aside now to permit future golf holes to tie in with the existing clubhouse.

3.3.7 Market Analysis for Commercial Land Use

To derive commercial land use demand, daily visitor expenditures at Mauna Lani Resort (excluding expenditures at the hotels) were estimated, then converted to annual potential retail sales, which in turn were converted to commercial sales space demand using an estimated ratio of $350 of annual sales per square foot of space. Based on an analysis of smaller, high quality centers, Ming Chew Associates estimates that a land use conversion factor of 3,000 square feet of leasable area per acre would permit the type of ambience desired at Mauna Lani Resort. Applying these factors results in estimated commercial land use demand of 5 acres in 1990, 10 acres in 1995 and 16 to 21 acres in 2000. These marketability estimates are considered to be conservative. Demands based on expenditures by full-time residents were not included in the Ming Chew projections, and the potential demand for office space has not been estimated. If these two items were included, Ming Chew Associates believes that slight increments of commercial land use demand could be added the the above projections.

3.3.8 Demand for Resort Support Facilities

Support facilities at Mauna Lani Resort are currently accommodated on lands in the State Agricultural district, by special permit. As the resort expands, demand for ancillary support areas is expected to increase. Logically, these areas would be removed from the resort core so as not to disturb the resort ambience at Mauna Lani.

Based on projected demand for hotel and residential units, Ming Chew Associates estimates that auxiliary services land use demand would be 15 acres in 1990, 30 acres in 1995 and 45 to 55 acres in 2000. Cumulatively, including existing auxiliary land uses, 40 acres would be needed by 1990, 55 acres by 1995 and 70 to 80 acres by 2000.

3.4 NUMBER OF UNITS AND PROJECT SCHEDULE

It is anticipated that the number of hotel rooms and residential units built according to the proposed expanded master plan will be close to the numbers projected by Ming Chew Associates in Table II-3.1 at the beginning of the previous section of this report. The ultimate number constructed will depend on future market demand; however, the proposed plan can accommodate up to the 3,000 hotel rooms and 3,182 residential units permitted by Hawaii County for Mauna Lani Resort.

Within the first five-year period, it is expected that construction of most of the infrastructure, a golf course, a hotel, a substantial number of residential units, and associated resort amenities will be complete. Construction of the first phase of Mauna Lani Point has begun and under design are the tennis club, which is expected to open by the end of 1985, and the beach club, scheduled for completion in 1986.
Detailed work on the golf course expansion will be initiated as soon as necessary land use approvals have been obtained from the State and County; construction would begin immediately thereafter. The proposed public beach park north of Hotel Site 2/3 would be constructed at the same time as the golf course.

3.5 COMPARISON OF EXISTING AND REVISED MASTER PLANS

A quantitative comparison of the existing master plan and the proposed revised master plan was derived by Peat, Marwick, Mitchell & Company, using market assumptions contained in the Ming Chew Associates market study. The remainder of this section summarizes the differences between the two plans.

3.5.1 Potential Maximum Master Planned Units

As stated previously, the potential maximum number of hotel and residential units to be developed under either the existing or the revised master plan would be within the County-approved limits of 3,000 hotel units and 3,182 residential units. Due, however, to the availability of more land area and the suitability of the revised master plan for single-family units, a slightly higher proportion of the residential units would be single-family rather than multifamily under the revised master plan, as shown below:

<table>
<thead>
<tr>
<th>Master Planned Units at Completion</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Percentage</td>
</tr>
<tr>
<td>Hotel units</td>
<td>3,000</td>
<td>48.5</td>
</tr>
<tr>
<td>Multifamily</td>
<td>3,032</td>
<td>49.0</td>
</tr>
<tr>
<td>Single-family</td>
<td>150</td>
<td>2.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6,182</td>
<td>100.0</td>
</tr>
</tbody>
</table>

About 240 single-family units have the potential to be developed under the revised master plan, compared to only 150 units under the existing master plan.

Although a total of 6,182 units could be developed under either plan, this number represents the maximum allowable developable units. Thus, it probably exceeds the number of units that would actually be developed. It is expected, however, that the ultimate number of units developed under the existing master plan could exceed that under the proposed master plan due to the need to sell more units to receive the same return on investment.

3.5.2 Average Unit Density

The calculation of average unit densities is based on the potential maximum number of units under both master plans. The acreage of the revised plan is almost double that of the existing master plan. Thus the overall resort density is expected to decrease by almost one-half, from 7.9 units per acre under the existing plan to 4.3 units per acre under the revised master plan (see Exhibit I-A of Appendix B). A large part of this is due to the additional golf holes, but the density in residential areas is also projected to decline from about 14 units per acre to slightly over 10 units per acre. This reflects the desire of MLR to provide higher quality development in keeping with perceived market demands.
3.5.3 Quality of Resort Projects

The relative quality of the various sites and projects that would be developed under both the existing and revised master plan were estimated using the following criteria:

- ocean or golf course frontage
- views available to the project site
- proximity to hotels or recreational amenities
- other physical site characteristics

Individual sites were graded and are summarized by type of development (see Exhibit I-B in Appendix B). A larger percentage of units overall were graded high or medium quality under the revised master plan, almost 85 percent as compared to 74 percent under the existing master plan. Peat, Marwick states that "this is mainly due to the creation of 'greenbelt' golf course and preserve areas or other amenities which would contribute to the scenic and economic value of the individual project sites." (Peat, Marwick, Mitchell & Co., 1985:1-9)

3.5.4 Projected Absorption of Resort Units

The market absorption of resort units is projected to occur at a faster rate overall under the existing master plan (see Table II-3:8). This is due to the greater number of high and medium-quality units in the revised master plan; these are higher priced, lower density units that can be expected to be absorbed more slowly.

3.5.5 Projected Commercial Space Demand

Commercial space demand for the existing master plan is projected based on assumptions used by Ming Chew Associates in its market study and on estimates of commercial space requirements for the visitor and resident population at the resort. Assumptions are based on the number of transient units, an estimate of average daily visitors and average annual expenditures, and retail space demand that is derived from the annual expenditures and desired sales volume. See Exhibit I-7 of Appendix B for the projected commercial space demand under the existing master plan. The demand is somewhat higher than that projected by Ming Chew Associates for the revised master plan:

<table>
<thead>
<tr>
<th>Demand for Commercial Space (square feet)</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At Potential Maximum Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Master Plan (1)</td>
<td>28,500</td>
<td>54,700</td>
<td>102,900</td>
<td>198,500</td>
</tr>
<tr>
<td>Revised Master Plan (2)</td>
<td>25,000</td>
<td>50,000</td>
<td>80,000-10,500</td>
<td></td>
</tr>
</tbody>
</table>

(1) Peat, Marwick, Mitchell & Co.
(2) Ming Chew Associates
Table II-3.8

MAUNA LANI RESORT

Projected Market Absorption of Resort Units at Mauna Lani Resort
1990 to Potential Maximum

<table>
<thead>
<tr>
<th></th>
<th>Existing master plan(1)</th>
<th>Revised master plan(2)</th>
<th>1995 Revised master plan(1)</th>
<th>1995 Revised master plan(2)</th>
<th>2000 Revised master plan(1)</th>
<th>2000 Revised master plan(2)</th>
<th>At potential maximum development(3) Existing master plan</th>
<th>At potential maximum development(3) Revised master plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel rooms</td>
<td>400</td>
<td>400</td>
<td>700</td>
<td>700</td>
<td>1,000</td>
<td>1,000</td>
<td>3,000</td>
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<tr>
<td>Multifamily units:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High quality</td>
<td>100</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td>400</td>
<td>450</td>
<td>840</td>
<td>1,230</td>
</tr>
<tr>
<td>Medium quality</td>
<td>150</td>
<td>150</td>
<td>300</td>
<td>300</td>
<td>500</td>
<td>550</td>
<td>578</td>
<td>865</td>
</tr>
<tr>
<td>Low quality</td>
<td>200</td>
<td>150</td>
<td>400</td>
<td>300</td>
<td>950</td>
<td>600</td>
<td>1,614</td>
<td>847</td>
</tr>
<tr>
<td>Total multifamily units</td>
<td>450</td>
<td>400</td>
<td>900</td>
<td>800</td>
<td>1,650</td>
<td>1,600</td>
<td>3,012</td>
<td>2,942</td>
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<td>House lots:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>10</td>
<td>12</td>
<td>12</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Medium quality</td>
<td>15</td>
<td>8</td>
<td>30</td>
<td>15</td>
<td>43</td>
<td>23</td>
<td>54</td>
<td>35</td>
</tr>
<tr>
<td>Low quality</td>
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<td>80</td>
<td>76</td>
<td>120</td>
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<td>House and lots:</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High quality</td>
<td>5</td>
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<td>10</td>
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<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Medium quality</td>
<td>15</td>
<td>8</td>
<td>30</td>
<td>15</td>
<td>43</td>
<td>23</td>
<td>54</td>
<td>35</td>
</tr>
<tr>
<td>Low quality</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total house and lots</td>
<td>20</td>
<td>25</td>
<td>40</td>
<td>50</td>
<td>55</td>
<td>80</td>
<td>76</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>890</td>
<td>850</td>
<td>1,660</td>
<td>1,660</td>
<td>2,960</td>
<td>2,760</td>
<td>6,182</td>
<td>6,182</td>
</tr>
<tr>
<td>Difference</td>
<td>40</td>
<td>80</td>
<td>200</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Estimated by Peat, Marwick, Mitchell & Co., based on market absorption of the revised master plan as projected by Ming Chow & Associates, adjusted for site characteristics, average density and estimated sales prices of units under the existing master plan.


(3) Based on the quality of sites available to be developed under the two master plans as estimated by Mauna Lani Resort, Inc. Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

Source: Peat, Marwick, Mitchell & Co.
CHAPTER III

ALTERNATIVES TO THE PROPOSED ACTION

1. PROPOSED ACTION: REVISED EXPANDED MASTER PLAN

The proposed action has been described in detail in Chapter II of this report. Essentially, Mauna Lani Resort, Inc. proposes to adapt its existing master plan for resort development to current market demands. These differ from those anticipated when the existing master plan was formulated over ten years ago. Mauna Lani Resort does not seek to increase the number of hotel and residential units approved by the County. Nor does it seek to change the overall character of its planned low density, low profile self-contained resort/residential community. Rather, Mauna Lani Resort, Inc. seeks to enhance its growing reputation as a resort that is centered around golf. To this end, Mauna Lani Resort, Inc. proposes to revise its master plan to accommodate the amenities described in Chapter II.

2. "NO-ACTION" ALTERNATIVE: EXISTING MASTER PLAN

The "no-action" alternative entails development according to the existing master plan within the 778.5 acres of currently classified Urban District land. It means limiting the number of golf holes to the current 18 within the Francis Ii Brown Golf Course and the continued use of special permits for support activities at the resort. Although development of the Mauna Lani Resort along such lines is considered marginally feasible, it is not responsive to changing market demands, does not allow the resort to retain its golf character, and does not support Mauna Lani Resort's goal of providing first class facilities in a luxury resort of world renown. As stated earlier, the existing golf course is operating at capacity during peak seasons. Also, development according to the existing master plan ignores the County's understanding that Mauna Lani Resort would seek urbanization of support facilities sites. The existing master plan is less flexible than that now proposed.

Without the additional Urban land needed for the proposed revised master plan, Mauna Lani's "no-action" alternative would be to proceed with development within the context of the existing master plan, but probably would not be able to market the desired high-quality types of hotel and residential units. Because development under the existing plan would contain less golf and open space than in the revised plan, the character of the resort under the two plans also would be different.

3. ALTERNATIVES CONSIDERED AND REJECTED AS INFEASIBLE

3.1 ALTERNATIVE ACTION I

This alternative entails developing a second golf course within the existing 778.5 acres of Urban District land and constructing up to the maximum number of hotel and residential units allowed by the County on the remaining land. Such a plan does not provide enough ocean frontage to construct the number of planned ocean-fronting hotels as well as ocean-fronting golf holes; the latter are necessary if the new course is to be of the same quality as the existing golf course.
Higher density zoning would need to be sought if the maximum number of permitted units are to be built on the remaining land in the existing Urban District. The higher density could destroy the luxury character of the resort and reduce open spaces, contrary to the developer's goals. Again, the County's understanding that Mauna Lani Resort would seek urbanization of land on which support facilities are located would be ignored.

Higher-density luxury units may not be marketable, given the competition at similar resorts in the Kohala Coast area and lower-density development at those resorts. On the other hand, a lower-density resort with a second golf course within the existing urban area may not yield enough units to be economically feasible for Mauna Lani Resort, Inc. For these reasons, this alternative was rejected for further consideration as a viable alternative in the EIS.

3.2 ALTERNATIVE ACTION 2

This alternative entails the development of other uses on the 778.5-acre Urban District site, including consolidation into larger lots or subdivision into smaller lots for individual lot owner development. The number of golf holes would be limited to the current 18 and the use of special permits for support activities would be continued.

This alternative is not compatible with Mauna Lani Resort's goal of developing a world class resort under its control. Neither is it consistent with State and County land use plans for the area.
CHAPTER IV

DESCRIPTION OF THE AFFECTED ENVIRONMENT
AND PROBABLE ENVIRONMENTAL CONSEQUENCES

1. PHYSICAL ENVIRONMENT

1.1 PHYSIOGRAPHY, GEOLOGY, SOILS AND CLIMATE

1.1.1 Existing Conditions

1.1.1.1 Physiography

The 3,200-acre Mauna Lani Resort fee parcel is situated on the western (seaward) side of a physiographic bowl formed by four volcanoes: the Kohala Mountain (5,480 feet), Mauna Loa (13,677 feet), Mauna Kea (13,796 feet), and Hualalai (8,271 feet). It slopes gently seaward from an elevation of about 220 feet along Queen Ka'ahumanu Highway to sea level at the coastline. The overall slope of land is generally less than 10 percent and the topographic relief is a consequence of layering and buckling of successive lava flows rather than erosion. The natural topography has been modified slightly by grading and filling of sites already developed at the resort and by construction of the golf course and roadways.

1.1.1.2 Geology

All of the surrounding mountains are of volcanic origin. Kohala Volcano is considered by many to be extinct, not having erupted for at least 10,000 to 15,000 years. Mauna Kea, the next oldest, has not erupted in historic times, but there is evidence that it has been active within the past 5,000 years. Hualalai last erupted during 1800-1801 and will probably erupt again at some future time; however, the probability of it becoming active in the near future is considered relatively low, and none of the more recent Hualalai flows have come within five miles of the Mauna Lani Resort site. There have been 36 historic eruptions of Mauna Loa, the last multi-phased eruption occurring in 1984. Of these, however, only the 1859 eruption flowed to the South Kohala coastline via the Hualalai-Mauna Kea saddle. This flow reached the sea just south of 'Anaeho'omalu Bay, some three miles south of the Mauna Lani Resort. Most of the more recent flows from Mauna Loa have been either to the west toward the South Kona District or the east toward Hilo (Mullineaux and Peterson, 1974; Stearns, 1946; and MacDonald, 1970).

The Mauna Loa flows, which cover about two-thirds of the Mauna Lani Resort parcels, are all basaltic lava; they have not been weathered to any appreciable extent and have little or no soil cover. The most prominent of these flows is the prehistoric Kanikau Flow, which covers a substantial portion of the parcel south of Makaiwa Bay. It is estimated to be nearly 1,000 years old.

The only exposed lava on the site that is not from the Mauna Loa volcano is also the oldest. It consists of pahoehoe flows from the Mauna Kea volcano, that reached the sea from Makaiwa Bay on the south to at least Pualako Bay on the north. The fishponds at Makaiwa Bay are set in these flows. The northern part of these pahoehoe flows is the only area within the resort boundaries that has an appreciable soil covering. However, the soils are alluvial, having been carried down from mauka areas by several major gulches. The soils are not the weathered remains of the pahoehoe flows.
The U.S. Geological Survey (USGS) has assessed the relative risk from volcanic hazards for most areas of the Island of Hawai'i (Mullineaux and Peterson, 1976). Its classification includes 6 degrees of risk, with "A" being the lowest and "F" the highest. Because it is on the flank of Mauna Loa, the island's second most active volcano, the southern portion of the Mauna Lani Resort property is in zone "E". Mauna Kea, which has a very low probability of erupting, protects the northern portion of the Mauna Lani Resort site from Mauna Loa eruptions. As a result, that portion is in zone "B".

The fact that the zones distinguish only between differences in relative risk must be emphasized. In reality, data from the historical period indicates that the probability of flows from Mauna Loa damaging development within the Mauna Lani Resort is slight, although such an occurrence cannot be completely discounted.

1.1.1.3 Soils

As suggested by its geologic history, soils on the Mauna Lani Resort site have not been developed from the relatively recent lava flows. Six different soil and land types have been identified on the site by the U.S. Department of Agriculture Soil Conservation Service (SCS) (December 1973). None of the six are agriculturally significant. See Figure IV-1 for the distribution of soils on Mauna Lani lands.

1. A'a Lava Flows. A'a lava flows (rLV), with essentially no soil or vegetation, cover most of the southern portion of the resort site. The surfaces of all the a'a flows are masses of clinkery, hard, sharp pieces piled in tumbled heaps that are difficult to traverse on foot. It has been demonstrated that the clinkery a'a surface can be easily mowed and crushed by bulldozers into a relatively smooth surface of cobbles one to four inches in size.

2. Pahoehoe Lava Flows. Pahoehoe lava flows (rLW), also a miscellaneous land type with meager soil covering, covers about one-sixth of the resort site, extending along the coastline between Makaiwa and Pauoa Bays and inland toward the highway. The surface of the pahoehoe lava is generally much smoother that that of the adjacent a'a, but it is also broken and poikilomorphed by numerous pressure domes, cracks, and lava tubes. The only soil in this land type is found in these cracks and depressions, having been transported there by wind and storm water runoff.

3. Rock Land. This third miscellaneous land type, rock land (rRO), consists of pahoehoe bedrock covered in places with a thin layer of transported soil. Lava outcrops are exposed over 50 to 90 percent of the surface. The little soil that is present is generally confined to holes and cracks in the bedrock. Rock Land extends over the proposed core resort expansion area and service/light industrial area north of the existing resort development.

4. Beach Areas. The SCS has mapped three beach areas along the resort site's shoreline. Since this had been done, aerial photographs and excursions along the coastline have pointed to additional areas of beach (BH). Sand lines the beaches continuously from Makena Bay north as far as the end of Puako Beach Road. At Pauoa Bay, the sand is coarse-grained and well sorted, with a "salt and pepper" appearance, indicative of its mix of particles of marine origin and black basalt chips. Between Pauoa Bay and Nanuku Inlet, the sand is finer-grained and contains some fine, olivine grains in addition to basalt chips and shell fragments. Within Makena Bay, the sand is coarse and clean, resembling the Pauoa sand in some small pockets. The sand deposit on the southern half of Honolua Bay extends inland for a considerable distance over the a'a lava, apparently transported by wind.
Figure IV-1

LAND AND SOIL TYPES

MAUNA LANI RESORT

South Kohala, Hawaii
(5) Kamakoa Very Fine Sandy Loam. The soil in the level, Paako Flats area is classified by the SCS as Kamakoa very fine, sandy loam (KGC). It is not derived from the underlying lava, but has been transported to the flat land from the slopes of Mauna Kea via gulches. The surface layer of Kamakoa soil is fine-grained and has a weak structure; the underlying layers are somewhat coarser-grained, but also have a weak structure. The lack of clay-sized particles makes both layers of this soil cohesionless. During the area's characteristically dry weather, the soil is susceptible to wind erosion; during rain storms, surface runoff can erode significant areas.

Unlike the preceding land types, the Kamakoa soil has seen some agricultural use. Sugarcane was cultivated on it from 1900 to 1913. After that, a number of cattle pens and piggeries were constructed near the several brackish dug wells. From 1924 to 1934, alfalfa was grown on a small portion of this soil. Each of these efforts was hampered by the lack of rainfall and irrigation water. The only recent agricultural use of this soil has been Mauna Lani's existing coconut field stock nursery situated next to the sewage treatment plant. The proposed resort core expansion area does not contain large areas of Kamakoa soil. This soil type is mostly confined to part of the area proposed for service/light industrial use.

The SCS rates the agricultural suitability of Kamakoa soil as "Class III Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both." (U.S. Department of Agriculture, SCS, 1973:24, 55) The University of Hawaii Land Study Bureau's master productivity rating for Kamakoa soil is "E", the lowest of their scale (Baker et al, 1965:33 and map 88).

(6) Kawaihae Extremely Stony Very Fine Sandy Loam. Kawaihae extremely stony, very fine sandy loam (KNC) is found in the extreme northeast corner of the Mauna Lani Resort site, but is virtually absent from the resort expansion area. It is formed from the volcanic ash deposited by eruptions of Mauna Kea. In contrast to the completely cohesionless Kamakoa soil, the Kawaihae soil is slightly plastic. However, it does have a similar, weak, granular structure, and is also highly erodible. Typically, the soil is 3 feet thick over the bedrock lava.

Past uses of this soil have been primarily as cattle range. Its SCS agricultural capability classification is "Class VII Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife" (Ibid., 1973:26,55). The Land Study Bureau rates it "E" (Baker et al, 1965:34 and map 88).

1.1.1.4 ALISH Classification

Three classes of agriculturally important lands have been established within the Agricultural Lands of Importance to the State of Hawaii (ALISH) system: (1) Prime Agricultural Land, (2) Unique Agricultural Land, and (3) Other Important Agricultural Land. Almost none of the land within the proposed expansion site is classified in the ALISH classification system due to its unsuitability for agricultural use. Approximately 10 acres in the sewage treatment plant area are classified as "Other Important" agricultural lands (see Figure IV-2). A very small area at the northern makaha corner of the proposed golf site in State-leased land north of Pauoa Bay is also classified as "Other Important" agricultural lands, an extension of a larger area in the State land not planned for resort use. All other land within the resort core is unclassified.
1.1.1.5 Climate

Most of the resort site has a hot, arid, desert-like climate. Sunny skies prevail, and the dark, treeless terrain heats rapidly in the sun. Close to the shoreline, sea breezes serve as a moderating influence on temperature. Mean annual temperature in the area is about 78 degrees F., with relatively small daily and seasonal fluctuations. Daytime temperatures above 88 degrees F. or nighttime lows below 63 degrees F. are extremely rare. Average summer temperatures are only four degrees higher than those in winter.

The Mauna Lani Resort area is one of the driest on the island and within the State. Average annual rainfall at the Weather Bureau's Puako gage is about nine inches. Most of this rainfall typically occurs during a few storms in the October-to-April winter season, with one or two unseasonable rains at other times. Intense storms along the Kohala coast are rare.

Airflow is most commonly onshore from mid-morning until just before sunset and offshore from early evening until the following morning. This diurnal pattern contrasts with the relatively constant northwest trade winds prevalent in most other areas of the State. The average wind velocity is also less -- 7 to 8 mph for the land-to-sea breeze compared with 12 to 14 mph for the trade winds. However, gusty winds blowing through the saddle between the Kohala and Mauna Kea mountains do reach the shoreline under certain atmospheric conditions.

Relative humidity is generally low, commonly under 40 percent during the late morning and afternoon hours of warm, cloudless days. The humidity is also relatively constant year-round, showing a significant smaller summer-winter difference than is common elsewhere.

1.1.2 Physiographic Changes

The extent of topographic change to specific sites within the proposed expanded resort core cannot be projected in detail at the current planning stage of development. However, the land on which development will occur is relatively flat, and it is projected that little mass grading will be required. The task of rough grading for building pads, roadways, and landscaped areas will probably be more difficult on the pahoehoe lava than on a'a. Although the surface of pahoehoe is generally smoother, reshaping it poses some problems: in some places the lava is too tough to be bladed or ripped by bulldozers or graders; there are many bulbous upheavals and depressions; and there are a number of lava tubes, some of which have already collapsed and others which will collapse under the weight of earth-moving equipment. In contrast, although the a'a surface is jagged and extremely difficult to traverse on foot, it is easily shaped by bulldozers to the cinder layer which can be crushed to a smooth, very porous, cobble surface.

There is insufficient soil cover in some areas to support the proposed golf course and other resort landscaping, particularly in the southern sector of the development. Because of this, the importation of soil, most likely from elsewhere on Mauna Lani Resort's property, will be required.

It is likely that crushed a'a cobbles will be used as fill material for developments on pahoehoe; this has been done for the Mauna Lani Bay Resort site. The existing golf course was constructed using crushed lava and soil from the Puako Flats area of the Mauna Lani Resort site. It is likely that the same sources of soil and crushed rock...
Figure IV-2
AGRICULTURAL LANDS OF IMPORTANCE TO THE STATE OF HAWAII (ALISH)
MAUNA LANI RESORT
South Kohala, Hawaii
would be used for the proposed new golf holes within the development area. It is expected that rock will be crushed on-site, as it was during previous construction. The soil from the Puako Flats area is Kamakoa sandy loam, described previously. This soil is adequate for landscaping uses, but in its natural extremely dry condition, it could create a potential dust problem when being transported. Moistening the soil prior to moving it would reduce the potential problem.

1.1.3 Impact on Soils and Their Use for Agricultural Activities

Most of the land at the resort has minimal agricultural potential. Hence, implementation of either the existing or revised master plans would have no impact on the actual or potential agricultural productivity of the site.

Construction of the various hotel and resort projects within the resort may actually increase agricultural production elsewhere on the Island of Hawaii due to increased demand for local agricultural products such as fruit, nuts, vegetables, meat and fish. The Mauna Lani Bay Hotel makes regular purchases of the above local products and it is expected that other MLR hotels will do likewise.

As a secondary impact, it is anticipated that some agricultural lands in the region will be converted to urban use to accommodate employee housing. Most likely, there will be only slight impact on highly productive agricultural lands, more on marginally productive agricultural lands. The loss of agricultural lands due to employee residential uses will be minimal in comparison to the acreage of lands in agricultural production in the region.

1.2 NATURAL HAZARDS

1.2.1 Existing Conditions

Unusually high waves are the basis for the design of coastal structures, and Kona storm waves are the most important in this regard. Typically, they have heights of 8 to 15 feet and periods of 6 to 12 seconds, but under unusually severe conditions (perhaps once in ten years on the average), wave heights may reach 25 feet and periods of 15 seconds (U.S. Army Engineer District, 1963:Table 6). Southern swells have also produced high breaking waves on occasion. For example, breakers of up to 18 feet with periods of 20 seconds were recorded at Hapuna in 1968 (Gayman & Greenbaum, 1968:10).

In addition to exposure to storm waves, development along the South Kohala coastline must also take into account the possibility that a tsunami will strike. Because of their infrequent occurrence and the paucity of shoreline development on that coastline until recent years, reliable tsunami runup information for the area is scarce. However, of the 85 tsunamis that have been observed in Hawaii since 1813, the one occurring in 1946 was the largest. It reached an elevation of approximately 12 feet above mean low water (MLLW) at Kawaihae a few miles to the north of the Mauna Lani Resort.

The Mauna Lani Resort shoreline lies within the special flood hazard area as indicated in the Flood Insurance Rate Map for the area (Federal Emergency Management Agency, May 3, 1982). The flood insurance rate maps which define hazard areas are based on the Federal Flood Insurance Administration's scientific and engineering report, The Flood Insurance Study for the County of Hawaii, dated February 1, 1982. Part of MLR's coastal areas lies within the flood hazard boundary for the 100-year coastal flood (See Figure IV-3). The 100-year tsunami elevation at MLR locations range from five to ten feet, depending on proximity to the coast. The 100-year flood has a one percent chance of being equaled or exceeded in any given year.

IV-7
ZONE C

ZONE B

ZONE A0

ZONE A3

ZONE A4

ZONE V15

ZONE V15

ZONE A4

ZONE B

ZONE B

STATE LEASED LAND 720,000 ACRES

PUAKO BEACHFRONT LOTS

FLOOD ZONE DESIGNATION

A0 Areas of 100-year shallow flooding (Depth between 1 and 3 feet. Flood hazard factors are not determined).

A3 A4 Areas of 100-year flood (Base flood elevations and flood hazard factors determined).

B Areas between limits of 100-year and 500-year flood subject to 100-year flooding with average depth of water determined.

C Areas of minimal flooding.

V15 Areas of 100-year coastal flood with velocity (Base flood and flood hazard factors determined).
ZONE B

ZONE C

ZONE A4

ZONE V15

3-year and 500-year flood (Certain areas with average depth of less than 1 foot).

Flood with velocity (Base flood elevations determined).

NOTE: Lettered labeled sites are resort residential uses.
Most of the hotel sites at MLR have coastal areas that fall into designated zone V15. Areas zoned V1 to V30 (the "V" stands for velocity -- a measure of wave action) are termed "coastal high hazard" (tsunami) zones, or V zones, in the County Code, and structures to be built within these zones must meet specified construction standards.

As shown in Figure IV-3, most of the MLR property is in Zone C, defined as an areas of minimal flooding. Resort development is not planned in the flood plain at the north end of Mauna Lani, and leased land. This flood plain is designated AO, and area of 100-year shallow flooding, with depths of one to three feet.

1.2.2 Probable Impacts

Specific site plans for individual parcels are not yet available and future structures are expected to be sited taking into consideration hazardous coastal zones. However, should a facility be in a hazard zone, design will comply with all County requirements applicable to structures in the coastal high hazard area.

Development at MLR is not expected to increase the risk of flooding in the Puako residential lots area.

1.3 SURFACE WATER AND DRAINAGE

1.3.1 Existing Conditions

Five gulches cross Queen Ka'ahumanu Highway and enter Mauna Lani Resort lands, the northernmost one (Kamakoa Gulch) mauka of Pauoa Bay and the southernmost one (unnamed) mauka of Maksiwa Bay. None have continuous topographic definition all the way to the shoreline. The three northern gulches are better defined in their mauka reaches and lose their definition between elevations 200 and 100 feet above sea level. The two southernmost gulches are only vaguely definable, and do not constitute true waterways. All of the gulches are normally dry, sometimes for more than a year at a time. The intermittent flows that do occur in their upper reaches (miles inland) are lost to infiltration and depression storage long before reaching Queen Ka'ahumanu Highway.

1.3.2 Probable Impacts

The second golf course under the revised master plan, as well as some other landscaping in the resort would require irrigation. Irrigation water would be drawn from new brackish well wells located on the resort property. Withdrawal of water from new wells would affect the flow of groundwater toward the coastline and has the potential to affect salinity levels. Development of these wells will be designed to preserve the integrity of the brackish water source.

Surface water runoff from the development would be altered slightly. The extent of change will depend upon the nature of the fill used in creating the golf course, the increase in paving and other impermeable surfaces that will occur within the proposed residential and resort areas, and the configuration of the storm drainage system that will be installed. The design intent of the drainage system will be to limit or avoid stormwater runoff to the shoreline and to handle the runoff on-site. Surface water will be handled by dry wells on MLR lands and by the porous lava that surrounds the parcels.
1.4 GROUNDWATER HYDROLOGY

1.4.1 Existing Conditions

All along the Mauna Lani Resort shoreline, groundwater occurs in a basal lens configuration. A layer of relatively fresh water (i.e. brackish water) saturates the lavas at and near sea level. This water "floats" (as a result of its lesser density) over the salt water contained in the interstitial spaces of the underlying rock. The thickness of the lens at any point is a function of several factors: the permeability of the lavas, the amount of recharge from rainfall or other sources, the distance inland from the effect of waves and tides, and local geologic features such as lava tubes, a'a and clinker layers, cooling cracks, and the thickness of weathered material between successive layers of lava.

At least a portion of the basal lens beneath the Mauna Lani Resort property is makai (or "downstream") of the high-level Waikoloa aquifer. This means that it is recharged, at least in part, by leakage through, or spillage over, the relatively impermeable geologic feature which produces the raised groundwater elevations within that aquifer. Hence, increased withdrawals from the Waikoloa aquifer expected to accompany continuing urban and resort development on the Waikoloa lands will tend to produce increased salinity levels in the basal lens beneath the Mauna Lani Resort lands.

Estimates of groundwater flow toward the shoreline of the Mauna Lani Resort are in the range of 2.0 to 4.0 million gallons per day (mgd). Existing chloride levels are on the order of 600 to 700 ppm near the shoreline and 530 ppm near Queen Ka'ahumanu Highway. The resort utilizes about 1.0 mgd of the groundwater flow for golf course irrigation. The groundwater is pumped from the well known as the Puako shaft.

1.4.2 Probable Impacts

The impact of resort development on the quantity and quality of basal water flow was assessed in detail in the 1973 Environmental Impact Statement for development at Mauna Lani Resort. Development under the revised master plan would differ from that previously proposed essentially due to the addition of a second golf course, which probably would be irrigated by basal water. In general, however, the discussion of probable impacts due to resort development remains valid and the reader is referred to the earlier document for a full analysis.

1.5 NEARSHORE PHYSICAL CONDITIONS

1.5.1 Existing Conditions

The range of tides along the MLR coast is small and the fluctuations are usually semidiurnal. High tide averages 1.2 feet above mean sea level, with a maximum of 2 feet above mean sea level. Generally, the total tidal range in a day is about 2 feet; maximum tidal range is on the order of 3 feet.

The typical nearshore current velocity is 0.2 to 0.4 knot on a rising tide. The current is in a northerly direction with the rising tide, but near shore it tends to move into the coastline, generally producing clockwise eddies in the bays along the coastline such as Honoka'ope Bay and perhaps Pauoa Bay. On a falling tide, the current reverses, weakens, and tends to create counterclockwise eddies in the bays. The net current drift is northward along the coast.
For a more detailed description of the nearshore conditions, the reader is referred to the 1975 Environmental Impact Statement for development at Mauna Lani Resort. These same conditions prevail today.

1.6 COASTAL PONDS

1.6.1 Existing Conditions

Located at the MLR site are six large Hawaiian fishponds that have been managed and maintained by the resort and incorporated into the resort master plan. These are the Waipuhi, Lahui'ua'a, Manoku, Ho'epa, Kalai'pio and Kahinawo brackish water fishponds around Makalua Bay, near the existing hotel and condominium project. Along with several smaller ponds in the Kohala and Kona coast area, these fishponds have been the subject of various surveys and evaluations, notably the Kikuchi and Belshe 1971 study and the comprehensive 1972 survey done by Macholek and Brock. These two studies form the basis of an analysis of the fishponds and other brackish ponds at the MLR site contained in the 1974 EIS prepared during initial master planning for MLR. The reader is referred to this earlier report for details of the then existing pond conditions. More recently, Steven Dollar undertook a baseline assessment of the fishponds in 1983, and Brock performed a survey of the fishponds as well as the anchialine ponds in 1985. This latter survey is described in the following sections.

In addition to the Hawaiian fishponds, the Mauna Lani Resort site contains smaller brackish water ponds in porous lava along the shoreline. Ponds such as those at Mauna Lani are found the length of the leeward coast of the island of Hawai'i. Biologically, many of these West Hawai'i coastal ponds are unique; they harbor a number of endemic aquatic forms found only in this type of habitat, as well as other unusual forms of aquatic life, particularly the small red shrimps (Halocaridina rubra and Metabatesus lohena) and unusual algal crust (Schizothrix cariciola and Rhizoclonium sp.) (Brock 1983:1 and 21). These shoreline pools without surface connections to the sea, yet showing tidal rhythms and having measurable salinities, are termed "anchialine" by Holthus (1973).

In the United States, anchialine ponds are known to occur only in Hawai'i, on the leeward coasts of the islands of Maui and Hawaii. On Maui, anchialine ponds occur within the Natural Area Reserve at Cape Kino'o, and on Hawaii, major clusters of anchialine ponds are found at Pauoa Bay, 'Anaeho'omalu Bay/Waialua Bay, Makalawena/Ope'a'uila, Kaloko/Kohalaliki, Honokohau/Aimakapa, and Kailua-Kona. In addition, many individual ponds or small pond groupings are scattered along the leeward coast, from South Point (Ka Lae) to North Kohala (Belt, Collins; 1985:III-17).

The 1974 Macholek and Brock study is based on the 1972 survey and contains an inventory of biota in the ponds surveyed, a description of their physiography (location, size, shape, water depth and surrounding vegetation), and a characterization of the waters (temperature, salinity and oxygen concentration). The anchialine ponds at the MLR site were classified by Macholek and Brock as Class B ponds; none were considered Class A ponds. According to their classification, Class A pond sites are those of exceptional natural value based on physical structure, diversity, representation of unique aquatic communities and unusual endemic species. They are generally remote and less accessible. Preservation of these ponds as unique resources was located and in pristine condition. Preservation of these ponds as unique resources was strongly recommended by Macholek and Brock. The same researchers deemed Class B ponds sites of "significant," rather than unique, aquatic natural value. Pond importance is increased due to their anthropological or water-bird habitat values. Class B ponds are usually found in accessible or culturally modified areas.
The Fish and Wildlife Service of the U.S. Department of the Interior considers anchialine pools to be a Resource Category 1 habitat, characterized as being of high value for the evaluation of species that are "unique and irreplaceable on a national basis or in the ecoregion section. The mitigation goal for such habitats is no loss of existing habitat value (Federal Register, Vol. 46, No. 14, January 23, 1981)." (Letter of January 5, 1985) Here, no distinction is made between unique and significant ponds as was done by Maciolek and Brock.

The Mauna Lani ponds are called the Lahupua'a ponds in the Machiolek and Brock report. Among them are the large "open" fishponds (open ponds have occasional or restricted surface connections to the ocean whereas closed ponds -- such as the MLR anchialine ponds -- do not) mentioned earlier; these were characterized as the best preserved examples of traditional Hawaiian fishponds. The "accessory" anchialine ponds were seen to have physical and biological diversity with good populations of representative species.

1.6.2 Probable Impacts

Since development began at Mauna Lani Resort, the ponds at the resort (both fishponds and anchialine ponds) have been the subject of various surveys, the most current of which is summarized below. A comparison between the characteristics of the ponds in 1972 prior to development and their present condition provides a basis for estimating the effect of resort development on them. From this data can be extracted projected impacts due to further development at the resort.

In a survey performed for Mauna Lani Resort, Inc. in February 1985, Brock examined twenty-two anchialine ponds and made inspected the four major fishponds at the resort. Ponds were surveyed from north to south and numbered sequentially. Their approximate locations are given in Figure IV-4. Sampling of the ponds was similar to that done in 1972 so as to make a comparison of data from the two surveys more reliable. Eight ponds surveyed in 1972 were not found in 1985, but three new ponds were discovered during the latter inventory. See Table IV-1.1 for a summary of ponds found in both surveys.

The following outlines the findings of the 1985 survey, which are summarized in Table IV-1.2. Ponds are numbered according to the 1985 numbering system.

Pond 1. In 1972 this pond was heavily overgrown by hau trees and sedges. By 1985, it was hidden in a thicket of hau and coconut trees. Some individual depressions that held water seem to have been recently dug out. Green crust alga is now present; the fauna had not materially changed over the 13-year period.

Pond 2. There has been little physical change in this pond. However, there has been an increase in native species, notably shrimps.

Pond 3. This pond was overgrown with sedges in 1972 and had a depth of 10 cm. By 1985 the sedges had been cleared and the pond depth increased to 30 cm. The native predatory o'opu (E. Sandwicensis) now in the pond may account for the absence of shrimps.

Pond 4. Situated under a lava fissure, this pond has shown a decrease in native fauna over time.

Pond 5. Fewer native species were observed in 1985 than in 1972; it is postulated that this is due to the introduction of the exotic fish Tilapia mossambica.
<table>
<thead>
<tr>
<th>Pond Number</th>
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<th>1985(2) Survey</th>
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</tr>
<tr>
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<td>3</td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
<td>Could not locate in 1985.</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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<td>Not found or sampled in 1972.</td>
</tr>
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</tr>
<tr>
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<td></td>
<td>Could not locate in 1985.</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>C-26</td>
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<td></td>
<td>Not found or sampled in 1972.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>Presence known but not sampled in 1972.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>Presence known but not sampled in 1972.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>Not found or sampled in 1972.</td>
</tr>
<tr>
<td>D-4</td>
<td>18</td>
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</tr>
<tr>
<td>D-5</td>
<td>19</td>
<td></td>
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</tr>
<tr>
<td>D-6</td>
<td>20</td>
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</tr>
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<tr>
<td>D-1</td>
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(1) Maciolek and Brock, 1974
(2) Brock, 1985
NOTE: Sites identified by "E2-..."/"E3-..." from Welch study; all other sites from Kirch study.

Source: Kirch (May 1979) and Welch (October 1984).
Figure IV-5
LOCATION OF ARCHAEOLOGICAL SITES
MAUNA LANI RESORT
South Kohala, Hawaii
### Table IV-1.2
Species of Aquatic Plants and Animals
Anchialine Ponds, Nauna Lani Resort

<table>
<thead>
<tr>
<th>FOND NUMBER</th>
<th>FLORA</th>
<th>WORMS MOLLUSCS</th>
<th>CRUSTACEANS</th>
<th>INSECTS</th>
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</tr>
</tbody>
</table>

**KEY**
- * indicates species found in 1995 survey
- + indicates species found in 1972 survey
- * indicates species found in both surveys

**NOTES**
- "*" preceding name refers to exotic species - all others are native species.
- "+" indicates species found in both surveys.

**SOURCES**
- Aquatic Plants of the Anahola Pond System at Kauai, Hawaii, 1972 Survey
- Aquatic Plants of the Anahola Pond System at Kauai, Hawaii, 1995 Survey
- Aquatic Plants of the Anahola Pond System at Kauai, Hawaii, 1972 Survey
- Aquatic Plants of the Anahola Pond System at Kauai, Hawaii, 1995 Survey
Pond 6. A small pond located under a ledge, this pond no longer contains macrofauna.

Pond 7. Located in the same fissure as Pond 5, Pond 6 still contains the introduced 'opae as well as snails and opa'e'ula.

Pond 8. A decrease in native aquatic forms has occurred in this pond over the 13-year period. The tilapia and aholehole are now present.

Pond 9. This shallow pond with no macrofauna was not recorded during the 1972 survey.

Pond 10. Only two native species were observed in 1983, along with the exotic tilapia, which has probably displaced the other native species that were present in 1972.

Pond 11. Pond 11 was reportedly connected to Pond 10 in 1972; however, Brock recorded it as separate in 1985. Its faunal composition is the same as that of Pond 10.

Pond 12. As in 1972, alga and snails are present, but the exotic tilapia have been introduced and appear to have displaced the shrimp species.

Pond 13. Relatively exposed in 1972, this pond now has mile and kluwe trees around its perimeter, almost hiding it from view. Trash from the plant nursery operation is scattered around the edges of the pond. The same aquatic species as were present in 1972 are now still present in the pond and 'opae'u'a are now more abundant.

Pond 14. This small exposure of water under a ledge was not found in 1972. The only species noted in 1985 was 'opae'u'a.

Pond 15. Commonly referred to as the "Francis Brown bath pool," this pond was not sampled in 1972, although its existence was known to the survey team. In 1985 the pond had a good growth of orange encrusting alga, along with snails, 'opae and 'opae'u'a.

Pond 16. Also known but not sampled in 1972, this "roofed bath pond" was surveyed in 1983 and contained orange alga, 'opae'u'a and crabs. By 1985, the exotic guppy had been introduced. The surveyors suspect that the predatory 'o'o'ulaku'a, now present, has been feeding on juvenile poecilia.

Pond 17. Missed during the 1972 survey, this shallow elongate depression contains orange encrusting alga, 'opae'u'a, small red amphipods, and crabs.

Pond 18. Development has occurred in the vicinity of this pool (see Figure IV-5), but apparently has not adversely affected the fauna. Orange alga, 'opae'u'a, and amphipods are still found. In addition, there are now snails and 'opae.

Pond 19. In the most recent survey, fewer species were found and no shrimp species were encountered. The recently introduced topminnow was present.

Ponds 20 and 21. Separated by about 10 meters of porous a'a, these two ponds were sampled as one in the 1972 survey. Here again, the introduced topminnow was present.

Pond 22. Alga had become established and amphipods that were found in 1972 were no longer present in 1985. However, the 'opae'u'a was again observed.
Fishponds. The Waipuhi, Lahuipus'a, Manoku and Hopeaia fishponds had been managed and maintained continuously for some time prior to the 1972 survey and continue to be primarily for the production of mullet (Mugil cephalus) and awa (Chanos chanos). Since 1972, sediments have been removed from the pond bottoms and ponds have been stocked with a variety of native fishes. Gates (makahas) and walls have also been improved. Due to the presence of native fishes, some of the anchialine pond fauna are not found in the fishponds. The only non-native fish observed in the ponds in 1985 was the topminnow. Brock had informally inspected the ponds in 1983 and had not noticed the presence of this species. He therefore concluded that the topminnow had become established throughout the fishpond complex some time after 1983 (Brock:19). Mauna Lani Resort, Inc. staff have recently verified the presence of five green turtles (Chelonia mydas), a threatened species, in the resort fishponds.

As shown in Table IV-1.1, the number of anchialine ponds reported differs between the two surveys. In general, the apparent loss of ponds may be due to a number of factors, including surveyor error during either survey, natural loss (ponds filled with wind-blown debris and overgrown with vegetation) and perhaps human activities associated with construction. According to Mauna Lani Resort, Inc., however, to its knowledge none of the ponds surveyed in 1972 have been filled in conjunction with construction activities.

Of the 17 ponds sampled during both the 1972 and 1983 surveys, in only one did the aquatic fauna remain essentially unchanged (Pond 13). Ponds 3, 7 and 22 contained the same number of native species, but the species composition had changed. Three ponds (Ponds 1, 2 and 18) showed an increase in native species whereas ten ponds, or nearly 60% (Ponds 4, 5, 6, 8, 10, 11, 12, 19, 20 and 21), showed a decrease in the number of native species. Moreover, only two of the ponds showing decreases had no exotic species introductions (Ponds 4 and 6).

The decrease in native species seems to be related to the presence of exotic fish species, tilapia (Tilapia mossambica) and topminnow (Poecilia mexicana). With the introduction of these two species, the biological uniqueness of almost half the ponds surveyed in both 1972 and 1983 has diminished. Brock contends that "ponds with these exotics retain their aesthetic appeal but they will not support the full complement of native species and as such should be adjudged to not have the natural value they once had. The decrease in natural value is here assumed and equated with a decrease in native species." (Brock, 1983:23). Before tilapia was introduced to the ponds, the average number of native species was 6.4 per pond, whereas afterwards the number of native species decreased to 2.2 per pond. According to Brock, this decrease is statistically significant (Paired T test, P 0.001, 4 d.f.) (Brock, 1983:21).

Brock contends that the current lower natural value of the Mauna Lani anchialine ponds could be reversed with the removal of the exotic fishes and the subsequent return of native species. He cautions, however, that "the reversibility of the process should not be viewed as being indefinite; if all anchialine ponds in a given system have predatory exotics present over a sufficient period of time, the native species that are able to survive in interstitial waters for a period of time may also be driven to extinction." (Brock:23).

The introduction of exotic species into the Mauna Lani ponds took place after development started at the resort. Whether the introduction of tilapia and topminnow would have happened without development is uncertain. However, development at the resort has facilitated access to the ponds as well as to other shoreline features. With further resort development and the planned provision of additional public rights-of-
way, under both the existing and revised master plans, the anchialine ponds can be expected to become accessible to increased numbers of persons. This could increase the potential for continued introduction of exotic species and, therefore, a decline in the quality of the anchialine pond systems.

The Fish and Wildlife Service has recently requested that the shrimp Metabetaeus loheni, Procarius hawaii, and Palaemonella burnisi be placed on the annual invertebrate Notice of Review update as Category 2 species. The Service states that a "Category 2 rating is for those species which probably should be listed as endangered or threatened, but for which sufficient information is not presently available to biologically support a proposed rule." (Letter of June 21, 1985 commenting on the DEIS) Of the above shrimps, only M. loheni has been recorded in the Mauna Lani ponds.

Although the anchialine ponds on the islands of Maui and Hawai'i, as a whole, are an irreplaceable resource, those at MLR are not the best examples of the type when compared with others at other potential development sites. As mentioned earlier, Machiculek and Brock consider the MLR ponds to be Class B rather than the more significant Class A ponds. Further, many of the ponds have already lost some of their significance due to the introduction of exotic species, which has led to the demise of endemic species.

It has been Mauna Lani Resort's policy to preserve as much as possible natural on-site features that contribute to the overall character of the resort, which is based on the integration of these natural features into overall resort design and presentation. The anchialine ponds and fishponds are some of the natural features at MLR that have been preserved to date and enhanced in some cases. Mauna Lani Resort, Inc. intends to continue this policy within the context of either the existing or proposed master plan, although the lower density of the expanded master plan would allow the resort to more readily adhere to this policy.

To decrease potential adverse effects on existing ponds, which are anticipated as a result of further development and improved public access, Brock proposes that mitigation measures be considered: eradication of unwanted species, reseeding of ponds with desired species, the creation of new anchialine ponds, and implementation of an educational plan for residents and visitors. Mauna Lani Resort, Inc. plans to create two new ponds by the golf holes and public shoreline park near Pa'aua Bay when the second golf course is built. Existing interpretive signage at Mauna Lani Resort shoreline areas will be extended as additional shoreline areas become more easily accessible to the public and resort guests and residents.

Mauna Lani Resort, Inc. is aware of Transcontinental Development Co.'s application to the Department of the Army for a permit to fill anchialine ponds at the Hyatt Regency Waikoloa Hotel site at Waikoloa Beach Resort. Granting such a permit would lead to a decrease in the total number of ponds on the island. Mauna Lani Resort, Inc. has no current plans to alter any ponds on Mauna Lani Resort lands. Moreover, Mauna Lani Resort, Inc. intends to create new ponds so that the total square footage of anchialine ponds and fishponds will increase, although the exact location and configuration of these ponds are presently unknown. Mauna Lani Resort, Inc. feels that its resort projects will not reduce the total inventory of ponds in the State of Hawaii.

It is recognized that pond management will be required to preserve the unique character of some ponds as natural environments, a difficult task given expected increased human activity in the vicinity of these environments. Mauna Lani Resort, Inc. will participate in efforts to protect these unique environments. During future
planning and design phases for individual parcel development, the location of existing ponds will be taken into consideration. Should current plans change and future development of a specific site require the modification of a pond (or ponds) or other shoreline features, Mauna Lani Resort, Inc. would need to seek a Department of the Army permit, and appropriate mitigation measures would then be considered.

1.7 MARINE ENVIRONMENT

1.7.1 Existing Conditions

The 1975 EIS prepared for the predecessor company to Mauna Lani Resort, Inc. contained an analysis of the nearshore marine biological resources based on one source, the Sea Grant report, Marine Fauna of the Coast of Northern Kona (Brock and Brock, 1974), which summarizes the results of a survey performed in 1972. At the time, it was the only reference available concerning the nearshore waters of MLR. While the survey gave a good qualitative view of the marine fauna, it did not constitute a baseline survey against which the long-term effect of proposed development might be compared.

More recently, a baseline assessment of the marine environment and fishponds at MLR was completed by Steven Dollar and Christopher Winn (October 1983). The survey covered an area stretching from Pauoa Bay to the southern boundary of the Mauna Lani Resort. Subsequently, a supplement to the 1983 report was completed (Dollar, November 1984). This second report covers the nearshore marine environment in front of the proposed golf holes and public shoreline park north of Pauoa Bay. The resource is based primarily on information contained in the above two reports and on a supplemental report on potential impacts to the marine environment as a result of development at MLR (Dollar, May 1985).

The above studies of marine community structure in waters fronting MLR lands emphasize coral community assemblages. Dollar states that "corals are considered "keystone" species in that they contribute to the actual structure of the reef, thereby creating a complexity of habitat space, shelter and food for other species groups. As benthic (bottom dwelling) organisms, corals must also tolerate the surrounding water conditions within the limits of adaptability or die. For these reasons, coral communities are the most "relevant" group in evaluating past and potential impacts associated with land development" (Dollar, May 1985:3).

Dollar notes that there are only 35 Hawaiian coral species (of which a few are represented at MLR) compared to more than 200 on most reefs located at lower latitudes and nearer to continental areas. He concludes that "this can be interpreted to mean that Hawaiian reefs are composed of a few highly resilient species that are able to withstand a relatively great range of fluctuating environmental parameters" (ibid.).

The entirety of the MLR coastline is comprised of a variety of fringing coral reef environments that are typical of the west coast of the Island of Hawai‘i. The principal objective of the Dollar studies was to collect quantitative baseline information concerning the marine community structure (focusing on corals) and the indigenous marine populations inhabiting the coastal reefs. Benchmark stations established during the surveys allow future monitoring of surveyed areas to determine accurately any changes in the marine communities that may result from development at MLR.
1.7.1.1 Physiographic and Coral Communities

Overview. The Mauna Lani Resort shoreline consists of coarse carbonate-basalt beaches and vertical basalt shoreline cliffs. Along portions of the sites having beach shorelines, the shallowest offshore zone (to a depth of 15 feet) is usually a flat, relatively barren limestone platform having little coral cover. The barren appearance of this zone and the paucity of macro-fauna there is due to the high level of physical stress caused by waves breaking on the shallow reef.

In areas where the shoreline consists of a vertical basalt cliff, the near-shore area is characterized by basalt boulders that provide a complex three-dimensional reef surface sheltering reef fish and mobile invertebrates and solid settlement surfaces for attached forms. Since this zone is subjected to the direct impact of breaking waves, only those species adapted to withstand intense water motion inhabit the area.

Seaward of both the reef flat and shoreline boulder zones is the Porites-reef building zone. Live coral colonies dominate in the bottom cover, forming a solid limestone surface. Species diversity is often higher in this zone than anywhere else on the reef.

The most seaward zone typically found on Hawaiian coral reefs is the Porites compressa-slope zone. At many locales on the west coast of Hawaii, the shoreline boundary of this zone is clearly delineated by a sharp increase in reef slope angle. In the MLR area, however, this zone is not marked by a sharp drop-off. Rather, the Porites compressa zone integrates gradually with the Porites lobata reef building zone.

For a summary of coral community occurrence at various locations along the Mauna Lani Resort coast, see Table IV-1.3 which shows percentage cover of each species and substrata type by transect station and depth. Data was gathered at the 15-foot, 30-foot and 60-foot depths.

State Land. At the Pauoa Bay end of the parcel, the shallow area is dominated by a limestone platform, while at the northern end a basaltic lava shelf makes up the near-shore area. The reef platform is a highly stressed environment that is chronically subjected to storm waves. At the north end, large waves break on an outer reef, thus diminishing in impact at the inner reef shelf.

Moving offshore, a sharp dropoff separates the shallow reef platform from the deeper reef zones; the latter consist almost entirely of coral cover of the two species of Porites ubiquitous to Hawaiian reefs.

Pauoa Bay. Similarities exist between the above area and adjacent Pauoa Bay. Both differ in marine community structure from the reefs fronting the Mauna Lani Bay Hotel, Nunuku Inlet, Makaiwa By, Honokaoape Bay and the South Property line area. Impacts to both areas would thus be similar.

The shoreline within the 850-foot wide mouth of the bay consists of a white sand beach. The bottom of the inner central bay is a barren flat carbonate pavement interspersed with highly eroded coral structures. In general, this central area is a highly stressed environment chronically subjected to intense wave stress. As a result, the reef does not contain a healthy coral community.

Mauna Lani Bay Hotel Front Reef. Directly in front of the hotel, a lava shelf separates the outer reef from Nanuku Inlet. The seaward edge of the shelf drops off into a vertical wall which marks the origin of the outer reef. Highest coral cover (about 75
### Table IV-1.3

**Summary of Coral Community Structure From Transect Data**

**Mauna Lani Resort**

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<tr>
<th>Site</th>
<th>Depth (ft)</th>
<th>Total Coral Cover %</th>
<th>Coral Species Diversity Hc</th>
<th>Porites lobata</th>
<th>Porites compressa</th>
<th>Pocillopora meandrina</th>
<th>Montipora verrucosa</th>
<th>Montipora pataula</th>
<th>Leptastrea purpurea</th>
<th>Porites brighani</th>
<th>Prynia varia</th>
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<td>4-135' offshore</td>
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<td>South Property</td>
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<tr>
<td>State Land</td>
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<td>19.3</td>
<td>0.37</td>
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<td>North</td>
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<tr>
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<td>57.3</td>
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<td>0.2</td>
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</tbody>
</table>

**Source:** Steven Dollar, *Baseline Assessment of the Marine Environment and Fishponds at Mauna Lani Resort, South Kohala, Hawaii*, 1984; and Supplement L, 1984.
percent) occurs at the 60-foot depth, while the highest diversity of species is at the 15-foot depth. This reef is considered to be one of the most aesthetically appealing at the resort due to the interesting relief provided by channels, caves and steep dropoffs.

**Nanuku Inlet.** Within the entire inlet, depth does not exceed 6 feet. Its innermost areas have been cleared of solid debris and sediment, and the lagoon floor is entirely fine sand. Much of the rubble in the outer lagoon floor consists of dead coral colonies. The overall condition of the lagoon is that of a highly stressed area. It is unclear whether this stress is due to wave shock or chemical alteration due to influences from Waipuhi Fishpond. More than half of the bottom substratum is solid limestone covered with only algal turf. Water clarity fluctuates from very clear to very turbid conditions, a variation due to resuspension of very fine sediment that covers the floor of the inlet.

**Makaiwa Bay.** Coral cover is uniformly high within this sheltered bay, which is perhaps the most unusual locale along the Mauna Lani Resort coastline. The coral cover is composed of the most diverse assemblage of corals found anywhere along the MLR coastline. Dollar asserts that despite an influence in water chemistry from the drainage of Kalahupua'a Fishponds into Makaiwa Bay, the reef show no effects of any man-induced impacts.

A wide sand channel separates the inner bay from the outer reef. On the northern side of the sand channel, there is a relatively flat shallow reef with lower live coral coverage than in other parts of Makaiwa Bay. Large areas of dead coral and numerous heads of *Pocillopora meandrina* at the 30-foot depth are indications of high wave stress.

**Wa'awa'a Point.** A vertical cliff forms the shoreline, and the shallowest reef zone consists of large boulders and basaltic blocks covered with *Pocillopora meandrina*. Cut into the headland are several small pocket inlets. Due to very strong water movement, there is very little benthic cover in these inlets. Beyond the near shore boulder zone, the *Porites*-reef building zone and *Porites compressa*-slope areas are similar to those at Pauoa Bay.

**Honokao'ape Bay.** The entire bay floor is covered with uniform white sand interspersed with small coral patch reefs and is within the 30-foot depth range. With its clear, shallow, and calm water, its abundance of patch reefs, and its resident fish populations, Honokao'ape Bay provides a safe spot for snorkeling and diving. A relatively flat plateau extends offshore for a distance of about one mile.

**Southern Property Line.** Here, coral community structure and physiography are very similar to the pattern typical of the Kohala coastline. The transect along the 15-foot contour ran through a typical *Pocillopora meandrina* boulder zone. The 30-foot and 60-foot transects bisected typical reef building zones, almost equally divided between *Porites lobata* and *Porites compressa*.

### 1.7.1.2 Other Benthic Invertebrates

Table IV-1.4 lists the species of macroinvertebrates observed at each study station. Those in waters fronting the State land are similar to those found in Pauoa Bay. Patterns of occurrence are typical of those found in most Hawaiian leeward reefs. Boring urchins are found on the near-shore reef platforms, while long-spined urchins predominate on the deeper coral zones. Sea cucumbers and sea stars are scattered throughout the entire study area.
## Table IV-1.4

Macroinvertebrate Species Occurrence
Mauna Lani Resort

<table>
<thead>
<tr>
<th>Species</th>
<th>Pauoa Bay</th>
<th>Hotel Front Reef</th>
<th>Nanuku Inlet</th>
<th>Makaiwa Bay</th>
<th>Waawaa Point</th>
<th>Honokaope Bay</th>
<th>South Property Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acanthaster pincii</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Actinopyga mauritiana</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Culcita novaeguinae</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diadema paucispinum</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Echinometra mathaei</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Echinometra oblonga</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
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<td>x</td>
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<td>Heterocentrotus mamillatus</td>
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<td>Holothuria atra</td>
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<td>Linckia guilingii</td>
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<td>x</td>
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<tr>
<td>Ophiocoma sp.</td>
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<tr>
<td>Tripneustes gratilla</td>
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</tr>
</tbody>
</table>

Source: Steven Dollar
1.7.1.3 Reef Fish

Table IV-1.5 lists the fish species found in the study area and shows where they occur. Again, the fish types in the area fronting the State land are similar to those at Pauoa Bay. While the total number of reef species was relatively high (71 species), at all stations there was evidence of low densities of many species, especially Chaetodonts (butterflyfish), Mullids (goatfish), Holocentrids (squirrel fish) and Acanthurids (surgeonfish). Dollar (1983) believes that the depressed population density, particularly of large individuals of the species, can almost certainly be attributed to heavy fishing pressure. During his 1983 survey, numerous instances of spear fishing, shoreline net and pole fishing were observed, and many fishing boats were observed traversing nearshore reef areas. Long-time residents told surveyors that aquarium fish collectors have frequented the Mauna Lani reefs, removing small reef fish. However, while reef fish populations are affected by man-induced factors, they do not appear to be near a stage of total or irreversible species elimination.

1.7.1.4 Other Marine Life

Two listed species under National Marine Fisheries Service jurisdiction occur in the coastal waters of Mauna Lani Resort, as they do elsewhere along the west Hawai‘i coast and indeed in most Hawaiian waters. They are the federally listed endangered humpback whale (Megaptera novaeangliae) and the federally listed threatened green sea turtle (Chelonia mydas). Also suspected of being in the MLR coastal waters is the federally listed endangered hawksbill turtle (Eretmochelys imbricata). It is currently prohibited by law to take these turtles.

1.7.1.5 Aquatic Chemical Characteristics

The water chemistry data collected during the 1983 survey pointed to substantial interaction between the offshore aquatic environment and the fishponds, particularly those nearest the ocean. The chemical characteristics of the aquatic environments (both ocean and ponds) show that they are exceedingly diverse and in some cases unique.

Offshore chemical samplings taken during the 1983 survey showed that the ocean environment is oligotrophic, which is typical of the ocean environment surrounding the Hawaiian islands. No evidence was found of significant impact on the chemical or microbiological characteristics of this environment as a result of the then recent construction at Mauna Lani Resort.

1.7.2 Probable Impacts

Potential effects of resort development on the marine environment can be projected based on an analysis of the effects that have occurred thus far as a result of the construction of the Mauna Lani Bay Hotel, the Mauna Lani Terrace condominiums, the Francis I'i Brown golf course, and associated resort amenities at Mauna Lani. The experience of other coastal resort developments in Hawai‘i can also serve as a guide to predict future impacts.

The proposed changes in the revised master plan (from the existing master plan) include some that might have an impact on the marine environment. They are the development of more resort shoreline, the addition of a second golf course, and the relocation of a hotel site on Honokaopie Bay. Impacts may result from the following potential changes: (1) increased sedimentation from wind or runoff as a consequence of grading, (2) increased nutrient loading from irrigation and fertilization, (3) changes in storm runoff patterns, and (4) shoreline modification, including changing shoreline access.
<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Paua Bay</th>
<th>Hotel Reef</th>
<th>Manukau Inlet</th>
<th>Malaeva Bay</th>
<th>Waawaa Point</th>
<th>Hookaope Bay</th>
<th>South Property Line</th>
</tr>
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<tbody>
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<td>Holocentridae</td>
<td><em>Nemipterus australis</em></td>
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<tr>
<td></td>
<td><em>Paraplectognathus congestus</em></td>
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<td></td>
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<td>Sphyraenidae</td>
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<td>Lutjanidae</td>
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<td>Mullidae</td>
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<td>Chaetodontidae</td>
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<td>Carangidae</td>
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</tr>
<tr>
<td>Lutjanidae</td>
<td><em>Lutjanus argenturops</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Labridae</td>
<td><em>Labrus bergylta</em></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Scombridae</td>
<td><em>Scomber scombrus</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Scaridae</td>
<td><em>Scarus rubripinnis</em></td>
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<tr>
<td>Citharichthyidae</td>
<td><em>Citharinus gracilis</em></td>
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<tr>
<td>Acanthuridae</td>
<td><em>Acanthurus chirurgus</em></td>
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<td></td>
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</table>

IV-25
<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Pauna Bay</th>
<th>Hotel Point Reef</th>
<th>Nanuku Inlet</th>
<th>Malaiswa Bay</th>
<th>Waawaa Point</th>
<th>Honokaepe Bay</th>
<th>South Property Line</th>
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</thead>
<tbody>
<tr>
<td>Zancididae (Moorish Idol)</td>
<td>Zanclus cornutus</td>
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<td>Salariidae (Triggerfish)</td>
<td>Melichthys niger</td>
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<td>x</td>
<td></td>
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<tr>
<td>Monacanthidae (Filefish)</td>
<td>Pteragon solonema</td>
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<td>x</td>
<td></td>
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</tr>
<tr>
<td>Ostraciidae (Boxfish)</td>
<td>Ostracion meleagris camerum</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Canthigasteridae (Pufferfish)</td>
<td>Canthigaster jetzleri</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Pinnipontidae (Porcupinefish)</td>
<td>Bidens hexira</td>
<td>x</td>
<td></td>
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<td>x</td>
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</tr>
</tbody>
</table>
1.7.2.1 Increased Sedimentation

Currently, with the exception of Nanuku Inlet, the MLR offshore environment does not appear to be subjected to any level of natural sedimentation due to land runoff. There usually is potential for sediment to be transported as windblown dust or runoff during construction, when groundcover is removed. Indeed, there is some evidence that grading for the Kaluakoi Resort on Molokai might have resulted in adverse effects on the marine environment, according to Dollar.

In Dollar's judgment, however, increased sedimentation does not appear to be a likely source of environmental alteration under either the existing master plan or the revised master plan. This is due mainly to the prevalence of raw lava on MLR lands and the lack of soil cover. During construction, the bulldozing and crushing of lava would result in the generation of some windblown material. Dollar estimates that only a small fraction of this would be carried in a westerly direction toward the ocean and that an even smaller amount would settle in the nearshore environment.

Runoff, a potential carrier of sediment, does not constitute a major problem, in Dollar's opinion. Groundwater flow would not have the effect of transporting sediment to the ocean since the basal rock acts as a filter.

The baseline marine studies performed in the waters fronting MLR lands showed that no adverse effects were noticeable as a result of construction to date at MLR. It had been noted that some of the richest and most diverse reef assemblages are located in front of the Mauna Lani Bay Hotel and in Makaiwa Bay, where sediment stress would probably have been most pronounced, had it occurred.

Further, most nearshore areas that would receive any runoff is already subjected to a naturally occurring high level of environmental stress, primarily due to waves, and marine organisms in these waters are adapted to these conditions of stress. Also, wave and current patterns are such that exogenous material would be dispersed very rapidly, thereby preventing it from accumulating.

1.7.2.2 Increased Nutrient Loading

The existing golf course is irrigated by brackish water and there are no current plans to use effluent on that course or on the second golf course. Should a decision be made to use effluent, golf course fertilization and irrigation may lead to high rates of nutrient loading, which in turn may have an adverse effect on the aquatic ecosystem. If treated effluent were to be used, nutrients are unlikely to build up as a result of golf course runoff, due in large part to rapid dilution and water exchange. Another reason, according to Dollar, is the secondary level of sewage treatment at MLR. In fact, discharge of secondary sewage into marine environments similar to those off MLR lands have resulted in impacts that are considered beneficial, since they result in increased fish populations. Dollar estimates that nutrient loading due to the fertilization and irrigation of two golf courses with treated effluent would not be so great as to increase the likelihood of adverse effects (Dollar, May 1983:9).

Dollar asserts that the "potential for impact to the marine environment due to pesticides and herbicides also seem to be nil. At present no pesticides whatsoever are used on the Mauna Lani golf course, and only very small applications of herbicides are periodically made to the greens. Such small quantities do not appear to be of a magnitude great enough to leach through the soil and lava, be carried to the ocean via groundwater extrusions and then bioaccumulate to the point of producing a noticeable
effect. Even with the addition of a second 18-hole golf course the effects of fertilizers and herbicides will probably be nonexistent."

1.7.2.3 Changes in Storm Runoff Patterns

Changes in storm runoff patterns have the potential to affect coastal water quality and marine life. Dollar observes that, to date, there appear to be no areas fronting MLR lands that have been adversely affected by runoff. It is expected that increased development under either plan would not result in adverse effects to the marine environment due to altered runoff patterns. Where possible, natural drainage patterns will be preserved. Where these patterns have to be changed as individual sites are developed, it is expected that provisions will be made to accommodate drainage on-site rather than have runoff channeled to the ocean.

Dollar anticipates that "if analyses indicate that the proposed changes in land use and drainage patterns might result in substantial changes in water quality, additional field surveys will be conducted to determine the best location for the discharge of drainage and to assess the significance of expected water quality with respect to marine community structure." (ibid.:12)

1.7.2.4 Shoreline Modification and Shoreline Use

Mauna Lani Resort, Inc. currently has no plans to alter shoreline areas at MLR, with the exception of the anticipated reconstruction of a beach at Makaiwa Bay, a project for which all permits have been issued and which is approved for construction in the summer of 1986. Thus, potential adverse impacts due to shoreline modification are not anticipated and those that might result from development of specific sites in future cannot be predicted at this time.

However, increased accessibility to the shoreline and a change in the intensity of shoreline use (which would occur under either the existing or revised master plan) would undoubtedly have an effect on the nearshore marine environment. Some changes have already been noted since the construction of existing facilities at MLR. After completing his 1983 survey, Dollar concluded that reef fish populations seemed to be depressed along the Mauna Lani shoreline, particularly species highly desirable for eating. Observations by long-time residents indicated increased numbers of pole and spear fishermen with the opening of the resort. As well, fish collectors have been seen in the reefs off MLR lands, collecting small reef fish. The vast majority of fishermen were local residents, not hotel guests (Dollar, 1983:21). At the time of the 1983 study, the reef fish populations, although clearly affected by man-induced factors, did not appear near a stage of total or irreversible species elimination. The reefs at that time retained an adequate number of fish to provide an attraction for divers and others. As mentioned earlier, the waters directly fronting the Mauna Lani Bay Hotel have recently been observed to contain a large variety and number of reef fishes.

The revised master plan includes public access to both Honoka'aope Bay and to the proposed public shoreline park north of Pauoa Bay. This increased accessibility increases the potential for fishing pressure. Should this pressure become too great, Dollar suggests considering some types of conservation measures such as closing portions of the reef area to fishing on an alternating basis or designating some areas as marine reserves.
1.3 TERRESTRIAL FLORA

1.8.1 Existing Conditions

Existing plant life at the site of MLR was described in the 1973 Environmental Impact Statement, prepared prior to development at the resort. Since then, a golf course, hotel, condominium project and associated resort amenities have been developed. In general, the earlier description of terrestrial flora remains valid, supplemented by the introduction of other species associated with resort landscaping. (See Table IV-1.6 for a listing of plant species found at MLR.)

In April 1984, Earthwatch, environmental resource investigators, undertook a botanical survey of the areas to be added to the resort master plan. The purpose of the survey was to list existing vegetation types and to search for endangered plant species, in order to assess the probable impacts of development on the existing flora. The results of this survey covering the additional lands are described below.

1.8.1.1 General Description of Resort Area

The southern portion of the area on which the project would be developed consists of unweathered lava. Except within the boundaries of the golf course, vegetation in this area is virtually nonexistent. In the middle portion of the resort property, kiawe (Prosopis pallida) is the dominant species. In the northern sector, grasses and scrub predominate in open areas between strands of kiawa trees. The region was first cleared at the turn of the century for sugarcane planting, and portions were later used for cattle pens and diversified crops. Some nursery uses are now established in limited areas.

A greater variety of natural vegetation is associated with the shoreline and ponds. The tree species which predominate in this area are the native milo (Theopropis populnea) and coconut (Cocos nucifera). Other trees present in lesser numbers include hala (Pandanus odoratissimus) and beach heliotrope (Meserschmidtia argentea). Shrubs include naupaka kahakai (Scaevola frutescens sericea), noni (Mirianda citrifolia), and spider lily (Crinum asiaticum). Beach morning glory (Ipomoea pes-caprae) is the primary shoreline and pond-edge groundcover.

In addition to the aforementioned species, numerous other plants have been introduced to the MLR as part of the golf course and landscaping. For the most part, these plants are supported only through regular irrigation and the ongoing efforts of the resort landscape maintenance crews. If these efforts were to cease, most, if not all of the introduced species would quickly perish, and the flora would return to its original state.

1.8.1.2 Description of Revised Master Plan Expansion Area

The 1984 Earthwatch study area encompassed that portion of State-leased land north of Pauoa Bay which is the proposed site of two new golf holes and a public shoreline park, the southern portion of Honokaihe Bay up to the property line with Wailoa Resort, and the inland portions of the revised master plan lands, surrounding existing resort support facilities. Results of the botanical field survey indicated the presence of six major vegetation cover types within the study area.

Barren Lava. Total vegetation cover, consisting mostly of scattered grasses and shrubs, is less than 5 percent in this cover type. Species include fountain grass (Pennisetum setaceum), lima (Sida spp.) and kiawe shrubs. Plants are generally confined to cracks and crevices in the lava surface.
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Names</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MONOCOTYLEDONAE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GRAMINEAE</strong> (Grass Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aristida adscensionis L.</td>
<td>Slavender threeawn</td>
<td>x</td>
</tr>
<tr>
<td>Poeca americana L.</td>
<td>Ruffedgrass</td>
<td>x</td>
</tr>
<tr>
<td>Chloris variabilis R. Br.</td>
<td>Stargrass</td>
<td>x</td>
</tr>
<tr>
<td>Echinochloa crus-galli (L.) P.Beauv.</td>
<td>Bermuda grass manikeni</td>
<td>x</td>
</tr>
<tr>
<td>Echinochloa colona (L.) G.St-e.</td>
<td>Wiregrass manikele-nilwil</td>
<td>x</td>
</tr>
<tr>
<td>Digitaria californica (As.) Y.L.</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Digitaria decumbens (L.) Beauv. ex R. &amp; S.</td>
<td>Stinkgrass</td>
<td>x</td>
</tr>
<tr>
<td>Panicum miliaceum (L.) Beauv.</td>
<td>Chinese foxtailgrass</td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td>Poa annua L.</td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td>Feathery pennisetum</td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td>Sphenophyllum repens (Wild.) C.E. Hubbard</td>
<td>Natal redtop</td>
</tr>
<tr>
<td>*</td>
<td>Aristida stricta (L.) Beauv.</td>
<td>Bristly (rattail)</td>
</tr>
<tr>
<td><strong>DICOTYLEDONAE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MORACEAE</strong> (Mulberry Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ficus spp.</td>
<td>--</td>
<td>x</td>
</tr>
<tr>
<td><strong>CHENOPODIACEAE</strong> (Goosefoot Family)</td>
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<td></td>
</tr>
<tr>
<td>Chenopodium album L.</td>
<td>Australian saltbush</td>
<td>x</td>
</tr>
<tr>
<td>Chenopodium argyranthum R. Br.</td>
<td>Lamb's quartery <em>shea</em></td>
<td>x</td>
</tr>
<tr>
<td>Chenopodium murale L.</td>
<td>Keel grseepfoot</td>
<td>x</td>
</tr>
<tr>
<td>Chenopodium album var. erectum (Forst.) (L.) Heimerl</td>
<td>Nettle-leaved goosefoot</td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td><em>Shea</em></td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td>Russian thistle</td>
<td>x</td>
</tr>
<tr>
<td><strong>AMARANTHACEAE</strong> (Amaranth Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>Spiny amaranth <em>paka</em></td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td>Spermatan amaranth <em>paka</em></td>
<td>x</td>
</tr>
<tr>
<td><strong>NYCTAGINACEAE</strong> (Four o'clock Family)</td>
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</tr>
<tr>
<td>Boerhavia diffusa L var. diffusa</td>
<td>Alena</td>
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</tr>
<tr>
<td>Boerhavia diffusa L var. erantia (Forst.) (L.) Heimerl</td>
<td>Alena</td>
<td>1</td>
</tr>
<tr>
<td>*</td>
<td>Roughanvillea</td>
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<tr>
<td><strong>PORTULACACEAE</strong> (Purslane Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portulaca oleracea L.</td>
<td>Rose-seeded portulaca <em>thi</em></td>
<td>E</td>
</tr>
<tr>
<td>Portulaca oleracea L.</td>
<td>Common purslanet <em>thi</em></td>
<td>X</td>
</tr>
<tr>
<td><strong>CARYOPHYLLACEAE</strong> (Pink Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>PAPAVERACEAE</strong> (Papaw Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argemone mexicana L.</td>
<td>Prickly poppy, pua-kala</td>
<td>E</td>
</tr>
<tr>
<td><strong>CAPARACEAE</strong> (Caper Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caparica sandwicensis var. zehnpf. Deg. &amp; Deg.</td>
<td>Native capers, pua-pilo</td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td><em>Wild spider flowers, homohina</em></td>
<td>x</td>
</tr>
<tr>
<td><strong>LEGUMINOSAE</strong> (Pea Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leucania Leucaepapha (Leucaepapha)</td>
<td>Mesquite, klawe</td>
<td>X</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>EUHORBIACEAE</strong> (Spurge Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euphorbia hirta L.</td>
<td>Garden spurge, hoko-hokilo</td>
<td>X</td>
</tr>
<tr>
<td>*</td>
<td><em>Glacial spurge</em></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td><em>Prostrate spurge</em></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td><em>Castor bean keli</em></td>
<td>x</td>
</tr>
<tr>
<td><strong>MALVACEAE</strong> (Mallow Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malvastrum coromandelianum L. Garcke</td>
<td>False Mallow, hauou</td>
<td>X</td>
</tr>
<tr>
<td>*</td>
<td><em>Iliam, iilina papa</em></td>
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</tr>
<tr>
<td><strong>CUCURBITACEAE</strong> (Gourd Family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cucumis spinosus L.</td>
<td>Wild spiny cucumber</td>
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</tr>
<tr>
<td><strong>STERCULIACEAE</strong> (Coast Family)</td>
<td></td>
<td></td>
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<tr>
<td>*</td>
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<td>x</td>
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<tr>
<td>*</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>CONVOLVULACEAE</strong> (Morning Glory Family)</td>
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<tr>
<td>*</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>*</td>
<td></td>
<td>x</td>
</tr>
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<td>Scientific Name</td>
<td>Common Name(s)</td>
<td>Origin</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td>BORAGINACEAE (Heliotrope Family)</td>
<td>Tree heliotrope</td>
<td>X</td>
</tr>
<tr>
<td>Hypechthodium argentea (L.) Johnston</td>
<td>Peach naupaka; naupaka-kahakai</td>
<td>I</td>
</tr>
<tr>
<td>GOODENACEAE (Naupaka Family)</td>
<td>Agaratum malle-Johnson</td>
<td>X</td>
</tr>
<tr>
<td>Scirpus taccata (Gaertn.) Rostb.</td>
<td>West Indian beggar's tick</td>
<td>X</td>
</tr>
<tr>
<td>COMPOSITAE (Sunflower Family)</td>
<td>Heliopsis argentea Fern.</td>
<td>X</td>
</tr>
<tr>
<td>Agaratum chondrilloides L.</td>
<td>Havilweed</td>
<td>X</td>
</tr>
<tr>
<td>Heliopsis argentea Fern.</td>
<td>Ptochex sauvie-bouch</td>
<td>X</td>
</tr>
<tr>
<td>Pluchea stricta (L.) Cass.</td>
<td>Heliopsis sauvie-bouch</td>
<td>X</td>
</tr>
<tr>
<td>Coreopsis tenuiflora L.</td>
<td>Pandelion sau-tele</td>
<td>X</td>
</tr>
<tr>
<td>Helenium effusiflorum (L.) Weber in Wiggers</td>
<td>Wedelia</td>
<td>X</td>
</tr>
<tr>
<td>Viola sylvatica (Sch.) Hitchc.</td>
<td>Wild Zinnias pua-pili</td>
<td>X</td>
</tr>
<tr>
<td>Viole tenuiflora L.</td>
<td>Unidentified</td>
<td>--</td>
</tr>
<tr>
<td>Unidentified</td>
<td>Unidentified (unidentified)</td>
<td>--</td>
</tr>
</tbody>
</table>

1 Families are arranged according to St. John (1972). Genera and species are listed alphabetically within each family. Taxonomy and nomenclature generally follow St. John except where more commonly accepted names are listed.

2 Hawaiian name also given when known.

3 Species origin:
- E = Endemic to the Hawaiian Islands; occurring naturally nowhere else in the world.
- I = Indigenous native to the Hawaiian Islands but also occurring naturally elsewhere in the world.
- P = Polynesian introduction; plants brought by the Polynesian immigrants prior to contact with the Western World.
- X = Exotics; plants of accidental or deliberate introduction after contact.

Kiawe Scrub Rockland. Vegetation cover is generally less than 50 percent on older lava surfaces, usually pahoehoe. Scattered kiawe shrubs form the dominant cover, although ilima, hi’aloha (Waltheria indica var. americana) and sixweeks threeawn (Aristida ascensionis) were also observed. Other species found in Open Scrub Grassland, described below, also occur here, but less frequently. The native prickly poppy (Argemone glauca) and an unidentified Compositae (island record) were observed in an area of Kiawe Scrub Rockland adjacent to the existing resort service area.

Open Scrub Grassland. Generally providing less than 30 percent coverage, this cover type is characterized by level to gently rolling grasslands with scattered forbs, shrubs and trees. In the northern sections of the study area, the cover type becomes more dense in the tree layer and grades into Kiawe Woodland. Exotic perennial grasses typical of the grasslands (and of dry leeward grasslands throughout the islands) are buffelgrass (Cenchrus ciliaris), feathery pennisetum (Pennisetum setosum) and stinkgrass (Eragrostis cilianensis). Native plant species observed were the indigenous ilima, hi’aloha and alena (Boerhavia diffusa), and the endemic blue-seeded portulaca of ‘ī (Portulaca cyano sperma).

Kiawe Woodland. This cover type occupies much of the northern part of the State leased lands as well as part of Honoka‘ope Bay where a small isolated stand of i‘i occurs. Dense, well-established stands of kiawe trees up to 40 feet tall are found in this cover type. Kiawe woodland is characterized by dense tree canopy (from 60 to 100 percent cover) and a sparse highly shaded understory. Plant species in Kiawe Woodland include nettle-leaved goosefoot (Chenopodium murale), feathery pennisetum, Australian saltbush (Atriplex semibaccata), and wild spider flower (Gynandropsis gynandra).

Coastal Strand. The shoreline of the study areas north of Pauoa Bay and at Honoka‘ope Bay exhibits a variety of physical forms and features. Few plants occur on the substrate by Pauoa Bay. Among those found, however, were two endemic species, the native caper (Capparis sandwichiana var. zoharyi) and ‘āheahea (Chenopodium oahuense); and two indigenous species, beach naupaka (Scaevola taccada) and pohuehue or beach morning glory (Ipomoea brasilensis). Tree heliotrope (Meserschmidia argentea) is also found at Pauoa Bay beach. A small but well-developed sandy beach and associated coastal strand vegetation interrupt the barren lava at the southern end of Honoka‘ope Bay. A dense growth of pohuehue secures the fine-grained sand between the water and the nearby coastal Kiawe Woodland. Windblown sand is found inland on barren a‘a lava and is populated by fountaingrass and kiawe.

Disturbed/Landscaped Areas. This cover type includes exotic weeds and ornamentals typical of disturbed roadside areas, perimeters of golf courses and construction sites. The more commonly observed include spurge (Euphorbia spp.), spiny amaranth (Amaranthus spinosus), Bermuda grass (Cynodon dactylon), and santon bean (Ricinus communis).

Endangered or Rare Plant Species. During the 1984 Earthwatch survey, no proposed, listed or candidate endangered or threatened plant species were observed within the proposed development areas.

1.8.2 Probable Impacts

Continuation of development at MLR either according to the existing master plan or to the proposed revised master plan would entail clearing, grading, construction of buildings and related resort amenities, and landscaping. Both would result in an increase in the extent and density of vegetative cover, with change in species composition. The revised master plan, however, would result in a more substantial increase due to the
more extensive acreage and the planned construction of one or more irrigated golf courses. This increase would provide additional habitat and food sources for birds and other small animals. At the same time, fauna that are adapted to the naturally arid conditions would be displaced by species better able to take advantage of opportunities in urban and semi-urban environments.

Although extensive earthwork will accompany construction of facilities, it is anticipated that portions of the development site will be left intact where feasible, allowing incorporation of natural landscape elements, including endemic species, into proposed individual site developments, particularly along the coastline. To date, Mauna Lani Resort, Inc. has followed this guideline and intends to continue to incorporate natural elements into its overall resort design.

None of the plant species observed appear to be restricted to the project area, and most are exotic species common throughout Hawai'i. Nearby lands seem to be characterized by the same vegetation cover types observed. None of the plant species observed are proposed, listed, or candidate endangered or threatened species. However, the vegetation survey team noted that some are part of sensitive ecosystems worthy of preservation to the extent possible.

1.8.3 Mitigation Measures

In its 1984 study, Earthwatch recommends the mitigation measures listed below as a mean of lessening any adverse impacts on existing vegetation that is part of an unusual ecosystem. Mauna Lani Resort, Inc. intends to follow these guidelines where possible.

Recognize and protect unique or sensitive ecosystems. Shoreline areas surveyed include environmentally sensitive cover types that have already been disturbed. Attempts should be made to enhance such diminishing natural resources through appropriate design and pedestrian orientation.

Conservation of limited resources. Drought-resistant plants with low moisture requirements can be incorporated into landscape design, to better conserve limited water resources.

Unify design elements harmoniously with existing natural ones. Barren lava landscapes can be left unvegetated and thus remain valuable cultural and geologic resources. Attempts at vegetation should be appropriate to the rugged landscape's essential character.

Use of native species. Some of the native species observed could be replanted, replaced or incorporated into the landscape rather than being removed completely from the environment. These include prickly poppy, native caper, beach morning glory, 'aheahea, and beach naupaka.

1.9 BIRDS AND WILDLIFE

1.9.1 Existing Conditions

Observations made at the time of the 1975 Environmental Impact Statement for the Mauna Lani Resort lands led to the conclusion that the more common species of birds were to be found at the resort site. It was stated that the shoreline and brackish ponds of the property did not provide the wetlands suitable for nesting of rare native
birds, such as are found in wetlands to the south. Larger mammals sighted were mongooses and feral goats. These observations were in general reconfirmed in two surveys performed by Phillip Bruner, the first in 1979 and the second in 1984.

1.9.1.1 Birds

The only indigenous (native) species of bird recorded during the 1984 survey was the Pacific Golden Plover (Pluvialis fulva), a migratory species of shorebird that typically forages in open short grassy terrain (Johnson, Johnson and Bruner, 1981). A substantial increase in such habitat has occurred with the building of the Francis F. Brown golf course. Prior to the existence of these golf courses, plover were probably not common in this area (Bruner, 1984:2).

During the 1979 study, three additional shorebird species, all introduced species, were observed: Wandering Tattler (Heteroccelus incanus), Ruddy Turnstone (Arenaria interpres), and Bristle-thighed Curlew (Numenius tahitiensis). Also recorded during the 1979 survey was the indigenous Black-Crowned Night Heron (Nycticorax nycticorax).

The Honoka'ope Bay portion of the study area contained few birds due to the paucity of suitable habitat. A small patch of coastal woods in this section had small numbers of all of the species listed in Table IV-17 with Zebra Dove, Japanese White-eye, and Gray Francolin most numerous. The Pauoa Bay area is able to support many more birds due to more diversified and extensive habitat. Warbling Silverbill, Zebra Dove, Japanese Quail, and Spotted Dove were most common in areas of open parkland, while Gray Francolin, Japanese White-eye, and Northern Cardinal were most numerous in the denser coastal woods.

Currently, the sewage treatment plant site mauka and north of the planned development, serves as a resting and feeding area for migratory birds.

1.9.1.2 Mammals

A total of 11 mongooses were seen during the 1984 survey and evidence in the form of scats indicated the relative abundance of this mammal, especially in the grassland habitat and around developed structures. One feral cat was observed in the coastal woods at the Pauoa Bay end of the resort.

Herds of feral goats (Capra hircus Linnaeus) ranging in size from as few as 3 or 4 animals to as many as 20 to 30 reportedly roamed the site prior to its development as a resort (Belt, Collins & Associates; 1975). Although a few years later a study concluded that feral goats were "relatively uncommon in the drier, lower elevation areas," three were sighted during an August 1984 Belt, Collins field trip to the Mauna Lani Resort site.

The endangered Hawaiian hoary bat (Lasiurus cinereus semotus) occurs on the island of Hawaii. Most sightings have been recorded in Hilo and in relatively wet forests at higher elevations. However, on September 24, 1984, a dead specimen was found on the grounds of the Sheraton Royal Waikoloa Hotel. The specimen was donated to the Brigham Young University-Hawaii Campus Museum of Natural History. In a survey of a Waikoloa Resort site, Bruner did not find any evidence that a significant bat population existed on the Waikoloa Beach Resort, and there are no reports of them having been seen at the MLR.
Table IV-1.7
Relative Abundance and Habitat Preference of Exotic (Introduced) Birds
Mauna Lani Resort

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Relative Abundance</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray Francolin</td>
<td>Francolinus pondicerianus</td>
<td>C</td>
<td>G,K,E,P</td>
</tr>
<tr>
<td>Japanese Quail</td>
<td>Coturnix coturnix</td>
<td>U</td>
<td>G,P</td>
</tr>
<tr>
<td>Spotted Dove</td>
<td>Streptopelia chinensis</td>
<td>C</td>
<td>P,G,E</td>
</tr>
<tr>
<td>Zebra Dove</td>
<td>Geopelia striata</td>
<td>A</td>
<td>G,P,E,K</td>
</tr>
<tr>
<td>Mockingbird</td>
<td>Mimus polyglottos</td>
<td>R=9</td>
<td>P,K</td>
</tr>
<tr>
<td>Japanese White-eye</td>
<td>Zosterops japonica</td>
<td>C</td>
<td>K,P,E</td>
</tr>
<tr>
<td>Northern Cardinal</td>
<td>Cardinalis cardinalis</td>
<td>U</td>
<td>K,P</td>
</tr>
<tr>
<td>Common Myna</td>
<td>Acridotheres tristis</td>
<td>C</td>
<td>K,P,E</td>
</tr>
<tr>
<td>House Sparrow</td>
<td>Passer domesticus</td>
<td>R=27</td>
<td>K,P</td>
</tr>
<tr>
<td>Warbling Silverbill</td>
<td>Lonchura malabarica</td>
<td>A</td>
<td>G,P,E</td>
</tr>
</tbody>
</table>

Key to Table:
Relative Abundance = Number of times observed during survey or frequency on eight-minute counts.

A = Abundant (average on 8-minute count: 10+)
C = Common (average on 8-minute count: 5-10)
U = Uncommon (average on 8-minute count: less than 5)
R = Recorded but not on 8-minute count. Number that follows is the actual number seen or heard.

Habitat = Area most frequented. Order of most preferred or utilized begins at left.

G = Grassland (open fields)
K = Klawe thickets
P = Parkland (mixed grassland and scattered trees)
E = Edge of roads or other breaks in the vegetation
S = Shoreline (exposed rocky shelf)

Source: Phillip Bruner (1984)
1.9.2 Probable Impacts

Development of the resort according to either the existing or proposed master plan would result in considerable changes in the avian and mammal communities. The change in vegetation and a more urban environment would lead to the gradual increase in the number of exotic and introduced birds and to an increase in pets such as cats and dogs. The Common Mynah would probably increase, as would the House Sparrow and the Nutmeg Mannikin. No major change in feral animal population is expected. The increased human presence, particularly in the food handling areas, may lead to some increase in the number of mice, rats, and mongooses.

The development of a second golf course and other landscaped areas on the open lava flow according to the revised master plan would create increased habitat for the Pacific Golden Plover and other species. Bruner expects that the disruption of the present dry parkland and wooded coastal habitats in favor of a more ordered and invariably wetter landscaped vegetation will decrease population densities for some species, notably those that prefer a drier habitat: Japanese Quail, Gray Francolin, and Warbling Silverbill. To retain these species on-site, patches of "native" vegetation can be retained.

In a letter addressed to the U.S. Army Engineer District (February 22, 1985) on the subject of impacts on the Hawaiian hoary bat as a result of proposed resort development at Waikoloa Beach Resort, the Fish and Wildlife service of the U.S. Department of the Interior stated its biological opinion:

Impacts of the Hawaiian hoary bat would not be expected to seriously harm the bat population on the island of Hawaii. It does not seem likely that the construction and operation of the resort complex would change the environment to the bats' detriment unless insecticides are used heavily. If such pesticides are used, bats may be affected due to decrease in their food supply and, possibly, secondary poisoning. Such negative impacts would not likely to jeopardize the continued existence of the species as a whole.

The type of development planned for Mauna Lani Resort is similar to that for Waikoloa Resort. Thus a similar conclusion can be drawn regarding its potential impacts on the Hawaiian hoary bat.

1.10 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

1.10.1 Existing Conditions

The Mauna Lani Resort is situated within the ahu pu'a of Kalahupu'a. A complex of large and productive fishponds provides a focal point for Kalahupu'a (Kirch, 1979:1). The area is rich in historic resources and archaeological remains and has been the subject of numerous surveys. Mauna Lani Resort, Inc. has adopted an interpretive and management plan to preserve and display these resources in an orderly manner (Science Management, Inc., 1982).

1.10.1.1 Historical Setting

Few direct documentary references to Kalahupu'a appear before the middle of the 19th century. It is known, however, that Kalahupu'a was visited by explorers and missionaries. William Ellis made a canoe trip along the coastline from Kawalhae to
Kailua-Kona in 1883, but said nothing about settlements at Puako, Kalahuipua'a, or Anaehomalu (Ellis, 1917:305-6). Neither did the annual reports of Waimea missionary Lorenzo Lyons mention Kalahuipua'a, since his ministry apparently extended only as far south as Puako (Doyle, 1953). Lyons does mention the Puako area as one with salt works, but whether there were such salt works in what is referred to as Kalahuipua'a is unknown. Fornander mentions Kalahuipua'a in the Legend of Kualapanokiki and, in passing, in three other accounts (Fornander, 1916:560-61 and 230). The paucity of references to Kalahuipua'a points to the probability that there were fewer residents there than at many other locations along the coastline during the early post-contact period.

During the mid-1800's, Kalahuipua'a was not permanently occupied; the ponds were apparently used only to provide royalty with fish when they were in the area. In 1876 it was acquired by Samuel Parker and incorporated into the Parker Ranch. Between 1900 and 1913, approximately 1,400 acres of land in the "Puako Flats" area, part of it on the land at the northern end of the Mauna Lani Resort lands that are leased from the State, was the site of a short-lived effort at sugarcane cultivation. The "Puako Plantation" was apparently hampered by a lack of irrigation water, although a flume brought some water down from Waimea, and several brackish water wells dug near the coastline supplemented the Waimea supply. The harvested cane was hauled north to the harbor at Mahukona for transshipment via a narrow-gauge railway (Thrun, 1900-13). Following the plantation's failure, the area was used for grazing cattle and raising pigs. The Goto family undertook commercial farming on the Lalamilo tract between 1924 and 1934.

Francis Ii Brown bought the 'ili of Kalahuipua'a from the Parker Ranch heirs in 1932. During the next 40 years, he reconstructed the fishpond walls that had fallen into disrepair and managed the ponds for his personal use. In addition, he built some rudimentary roads, constructed an impressive rock retaining wall at Waiaumalae Point and leveled about 5 acres of a'a clinker in back of the wall. Mauna Lani Resort, Inc. (then Orchid Island Resort) purchased the property from Brown in 1972 and has been pursuing its plans for resort development since that time. The resort has restored the fishponds, which today are among the most significant working Hawaiian fishponds.

Further north is the famous Puako petroglyph field, located partially on land leased by Mauna Lani Resort, Inc. from the State of Hawai'i. The Puako petroglyph field is one of the three largest and most important petroglyph fields known on the Island of Hawai'i and perhaps within the entire state. The majority of the petroglyphs, most of them linear human figures, are thought to date from the pre-European contact period. For years these important cultural artifacts were neglected, but in recent years the petroglyph area has been cleaned up by the Waimea Hawaiian Civic Club and Mauna Lani Resort, Inc. as a community project. The joint cleanup effort is expected to continue.

1.10.1.2 Studies Performed

All archaeological investigations prior to 1980 in the Kalahuipua'a and Puako areas between the Queen Kaahumanu Highway corridor and the coast were conducted by the B.P. Bishop Museum. The first research in 1955 involved examination of sites near the Kalahuipua'a fishponds and the petroglyph field, with excavation of various sites. In 1964 the museum carried out a major examination of the Puako petroglyph field including mapping (Welch3). The most extensive work was conducted by Patrick Kirch on 4,000 acres in the Puako and Kalahuipua'a areas between 1973 and 1975, with the final report published in 1979. The research included intensive survey in 1973, an aerial survey in 1974 and an intensive survey and salvage excavation in 1975 (ibid:46).
In the past few years, several archaeologists have conducted investigations of sites in the area, including the petroglyph field. As the Puako Petroglyph Archaeological District, the site complex was placed on the State of Hawai‘i Register of Historic Places in June 1982, following nomination on behalf of the Waimea Hawaiian Civic Club and Mauna Lani Resort, Inc. In April 1983, the site was placed on the National Register (ibid).

In connection with the submittal of a Conservation District Use Application, the State Historic Sites Division's archaeologist requested an additional reconnaissance survey of the area to be affected by the proposed project (construction of a public beach park and two golf holes), although it had been covered in the earlier 1973 survey. Findings of this 1984 survey are presented in Section 1.10.1.3 below.

See Figure IV-5 for the location of archaeological sites found during both the 1973-75 survey and the more recent 1984 survey. For descriptive detail, the reader is referred to the Kirch (1979) and Welch (1984) studies.

1.10.1.3 Findings of the 1973-75 Survey and Excavation

In mid-1973, Mauna Loa Land, Inc. contracted with The Bishop Museum to conduct an archaeological reconnaissance survey of Mauna Loa's South Kohala lands. The survey covered both the company's leased and fee-owned lands (a total of 3,861 acres) and was designed to assess the cultural resources of the region. It resulted in the location of 179 archaeological sites containing a total of 949 separate features (Kirch). Sites were given a significance evaluation based on their potential for further research and/or public interpretation.

The majority of the sites are located adjacent to or inland from the Kalahuipua'a Fishponds and in the coastal area facing Ili'ilinaehoe and Honoka'ope Bays. The two areas of principal concentration of archaeological sites have been designated Historic Preserves "A" and "B" at Mauna Lani Resort. A third concentration of sites located during the 1973 survey is situated above Puako Bay and includes the extensive Puako petroglyph field, with some 3,000 petroglyphs.

Two historic trails of major significance pass through the surveyed area. The first is the historic Mamalahoa Trail, also known as the King's Trail, which passes over the Kaniku Lava Flow, connecting the Puako area with the coastal areas to the south. The second trail is a short segment of waterworn cobbles leading from a small brackish water pond situated at the head of Ili'ilinaehoe Bay up into the Kaniku Lava Flow and parallels the coast to Honoka'ope Bay.

Further details of the 1973 survey are contained in the 1975 EIS, prepared prior to initial development at MLR. In this current document, only those areas affected by the proposed expanded master plan are discussed further.

The proposed relocated site for Hotel 4 contains only two sites identified during the 1973 survey; a third site is between the hotel site and hole 8 of the expanded golf course. Three others are located in residential site Y.

Site 400 consists of paved depressions which were recorded during the survey and not excavated later. Site 401 is described as a burial crypt, a site included as part of the coastal setback. A burial crypt or cist is sunk into a'a clinkers on top of a high a'a clinker hill. No artifacts were noted and the burial may be prehistoric. Visible skeletal remains included portions of at least three individuals; for the most part, the skeletons are poorly preserved (Kirch:33). These two sites are on the Hotel 4 parcel.
Figure IV-4
LOCATION OF ANCHIALINE PONDS
MAUNA LANI RESORT
South Kohala, Hawaii
Site 409, adjacent to the proposed hotel site, consists of miscellaneous structures and middens. The cluster of small structures is located on a point west of the sandy beach at Honolua Bay. Heavy midden deposits in the area stem from a location rich potential for fishing and shellfish gathering. This site was later recommended for future salvage work as part of the Interpretive and Management Plan described in the following section.

Y. These latter two sites comprise C-shaped structures and enclosures, with some scattered midden.

1.10.1.4 Interpretive and Management Plan

At the request of Mauna Lani Resort, Inc., Science Management, Inc. was contacted to formulate an Interpretive and Management Plan for the Historic Resources at Kalalaua. The plan, which was completed in 1982, has been adopted by Mauna Lani Resort, Inc. and is used as a guide for resort development.

The intent of the interpretive plan is to present the history and prehistory of the Kalalaua area to an interpretive audience through the use of signs, illustrations, and exhibits. The plan proposes a system of trails with signs at various points of interest. Three areas have been selected for interpretive presentation: (1) Symbolic Preserves "A" and "B," the area around the fishponds; (2) Historic Preserves "A" and "B," the area around the fishponds; and (3) the shore trail and other areas. The last section of the trail contains the suggested text for an interpretive trailhead.

The Interpretive and Management Plan also states that all newly located sites will be mapped, photographed, and recorded and that copies of these records will be forwarded to the State Historic Preservation Office. Recommendations for specific treatment of different types of newly located sites are included (petroglyphs, burials, and other sites).

As a monitoring device, the plan calls for periodic inspection of sites to determine the effect of increased usage of the area on archaeological sites. Monitoring is suggested on an annual basis, with perhaps an increase in frequency as the resort develops.

Mauna Lani Resort, Inc. intends to update the 1982 Plan as additional sites are located and analyzed.
1.10.1.5 Reconnaissance Survey of Public Shoreline Park and Golf Course Site by Pauoa Bay

In September 1984, Bishop Museum (Welch) conducted a reconnaissance survey of an area near Pauoa Bay on the southern edge of the Puako Petroglyph Archaeological District, at the site proposed for the development of a public shoreline park and two holes of golf. Its purpose was to identify any archaeological resources in the area that might be adversely affected, assess their significance and make recommendations for preservation or further investigation.

Eight sites were identified within the survey area, including E2-31, which had previously been recorded by Kirch. One site, E3-739, when plotted, was found to lie within the Puako Petroglyph Archaeological District (see Figure IV-6 for the location of the sites identified). All sites were located on pahoehoe lava, in kiauea woodland, or on barren pahoehoe outcrops; none were found on the barren lava field near the coast.

Site E2-31. First reported by Kirch (1973:53; 1979:56), this site consists of four C-shaped shelters and two bubble openings in the pahoehoe bedrock. A few mollusk shells were observed during the current survey.

Site E-158. Two features were found at this site: a small cairn and a small arc-shaped alignment. It is unclear whether the latter feature was intended to serve as a shelter, but it stands about 35 feet from a shallow natural shelter beneath the outcrop. No evidence of human activity was found within this shelter.

Site E-159. This site is a C-shaped shelter with a rear wall of a'a boulder outcrop on which large aa cobbles have been stacked.

Site E3-736. A low-lying pahoehoe outcrop and cave, this site is considered a possible burial site. The small entrance opens to a lava tube or tube.

Site E3-737. This site is an arc-shaped shelter of large a'a cobbles.

Site E3-738. This site is a zig-zag alignment that is probably the result of fairly modern clearance of the pahoehoe outcrop, with no evidence of what the purpose of clearing might have been.

Site E3-739. A cairn of stacked flat angular cobbles, this site is almost certainly a modern marker.

Site E3-740. An alignment of roughly stacked a'a cobbles, this site could be interpreted as a small C-shaped shelter. However, the alignment may represent the walls of a former small platform with missing stones.

In summary, the above sites consist of typical traditional Hawaiian or historic features. No petroglyphs were found. It is Welch's opinion that of the sites observed, none would require physical preservation due to their architectural value, historic importance, religious significance or value for instructional purposes. However, it is thought that the sites in the survey area do possess scientific research value in terms of their potential for providing data for research of Hawaiian prehistory.

Welch suggests intensive mapping and data recovery of the archaeological sites before modifying the survey area. This action would constitute mitigation of adverse impacts as a result of development. Should the area in the vicinity of Site E3-736 be
affected by development, the site would be investigated to ascertain whether a burial site is present. Excavation of a sample of the deposits at Site E2-31 should be undertaken to recover artifacts and midden that may be present.

1.10.2 Probable Impacts

Mauna Lani Resort, Inc. recognizes the importance of the South Kohala coastal region as the repository of significant historic and archaeological sites, many of which are unique to the area. The sites of significance within the Mauna Lani lands have been incorporated into overall planning for the resort, and the long-range preservation plan contained in the "Interpretive and Management Plan for Mauna Lani Resort" prepared by Science Management, Inc. in 1982 is being followed. Historic Preserves "A" and "B" are shown in Figure IV-5 and a third preserve is proposed along a portion of the King's Trail at the southeastern edge of the MLR.

Mauna Lani Resort, Inc. intends to continue its historic preservation and interpretation policy within the boundaries of its proposed expanded master planned development. It is recognized that, to date, most of the lands owned and leased by Mauna Lani have been the subject of reconnaissance surveys rather than intensive survey. As noted earlier, some sites found during the 1984 Welch survey had not been observed during the 1973 Bishop Museum survey. This points to the need for more intensive survey, which Mauna Lani Resort, Inc. intends to undertake at the appropriate time during the development process. As required, individual parcels will be examined in more detail during follow-up surveys as each parcel is developed.

According to preliminary plans for the public beach park and golf holes by Pauoa Bay, and for the relocated Hotel 4 site at Honoka'ope Bay, historic and archaeological sites located during surveys described in previous sections of this report will not be adversely affected. Further, mitigation measures recommended in these studies will be adhered to. These include intensive mapping, data recovery, and preservation of archaeological sites.

Continuing development of Mauna Lani Resort will have a positive impact on access to archaeological sites. Public access to be provided in conjunction with the development of a public shoreline park will improve access to the Puako petroglyphs. As a corollary, this improved access will also increase the possibility for vandalism and defacement of significant sites. To decrease this possibility, MLR intends to provide access to the petroglyph field from dawn to dusk. Should further measures be necessary, such as surveillance by Mauna Lani Resort staff or a representative of the Hawaiian Civic Club, this would be considered.

Mauna Lani Resort, Inc. has already contacted the State of Hawai'i Historic Preservation Officer and the Hawai'i County Planning Department Historic Preservation Officer to ensure open communication and early coordination during the planning stages of its expanded master plan. A letter dated July 1, 1985 from the State Parks Administrator, Department of Land and Natural Resources (DLNR), to Mauna Lani Resort, Inc. (see Appendix C) states that based on a DLNR staff archaeologist's field inspection of proposed development lands, it was determined that the 1973 Bishop Museum survey and the 1984 Welch survey are "adequate in identifying the various cultural resources within the project area". Although more intensive survey is not now required, it is probable that other sites will be located as planning work continues. Should new sites be uncovered during construction, all activity in the immediate area will cease and both the State and County notified. It is expected that at that time a collective decision will be made as to what action should be taken.
The new golf course is planned to be one of the first amenities built according to the revised master plan. At the time of exact alignment of each fairway, prior to grading, the developer will have a walk-through survey performed by an archaeologist at each fairway site. Survey results will be reviewed with the State and County agencies to their satisfaction. Based on their recommendation, more specific work will be performed on any newly uncovered archaeological sites. Should it be required, plans will be adjusted to work around sites of significance.
2. SOCIOECONOMIC CONSIDERATIONS

Because of the extent of ultimate development that will occur at the Mauna Lani Resort under either the existing or proposed master plan (possibly up to 3,000 hotel units and almost 3,200 residential units on hundreds of acres of land), the resort project has the potential to generate significant economic and social effects. This is particularly true in the long term and in the context of total development in the Kohala. The nature and extent of these impacts, along with an overview of existing socioeconomic conditions, have been analyzed in two separate but complementary studies prepared in conjunction with this Environmental Impact Statement.

Peat, Marwick, Mitchell & Co. has studied the economic and fiscal implications of the project, whereas Environ Pacific, Inc. has addressed social issues likely to be brought to the foreground as development continues at MLR. The summary of existing socio-economic conditions as well as the discussion of potential socioeconomic impacts presented in the following subsections of this report are based largely on these two studies.

For projection purposes, the entire island of Hawai'i is defined as MLR's impact area; however, the most substantial effects will be felt in the North and South Kohala districts and in North Kona.

2.1 EXISTING CONDITIONS

2.1.1 Primary Economic Activities

Heavily influenced by Parker Ranch, South Kohala first developed through ranching and support activities. The town of Wai'alea has emerged as North and South Kohala's commercial center, and today it is supported by truck farming, retail establishments, and second home and retirement industries in addition to the traditional ranching. North Kohala was dominated by sugarcane production and sugar processing until 1975 when the district's last mill closed. Due to this decline in its economic base, North Kohala's population has been stable whereas that of neighboring districts has increased. Residents of North Kohala tend to be aging, and many are still supported by ranching and small-scale agricultural and retail activities. About a third of the district's working population is now employed in service occupations, and most commute to jobs at hotels in South Kohala and North Kona.

Through much of this century, coffee production and ranching provided Kona's economic base, an unsteady one due to large fluctuations in the international coffee market. In the years following statehood and the introduction of jet service to the islands, increasing numbers of visitors began to travel to the Kona coast. North Kona's building boom of the 1960's and 1970's spread to South Kohala; this resulted in the construction of hundreds of new hotel, condominium and residential units. Today, the South Kohala and North Kona districts constitute the center of the island's visitor industry. As of October 1984, the 5,690 hotel and visitor condominium units in the two districts accounted for 82 percent of all visitor units on the island.

The availability of large parcels of land under single ownership and the enactment of horizontal property regime laws were and remain key factors in permitting high quality planned development in several resort areas along the Kohala and Kona coast. There are currently six major resort area in the South Kohala and North Kona areas: Mauna Lani Resort, Mauna Kea Resort, and Waikoloa Resort and Village in Kohala; and Keauhou Resort, Kona Village and Kailua-Kona in North Kona.
2.1.2 Population

Nearly one-third of the island's population resides in North and South Kohala and North and South Kona. The resident population of these four districts was 27,518 in 1980, almost double their population in 1970. This increase occurred at a compounded annual growth rate of 6.6 percent, or nearly twice the 3.8 percent rate for the County as a whole (see Table IV-2.1). The North Kona district experienced the most rapid growth at 11 percent a year, followed by the South Kohala district at 7.1 percent. There were 8,960 households in the Kohala and Kona districts in 1980, with an average household size of about 3 persons per household.

The median age in all four Kohala and Kona districts in 1980 approximated that of the county as a whole (29.4 years) and the state as a whole (28.3), ranging from 28.8 years in North Kona to 32.0 years in North Kohala. Thus, in North Kohala, which has felt the least impact from the visitor industry and recent population growth, the population is relatively older. As seen in the following table, the median family incomes of the North and South Kona districts in 1980 were above the county average of $19,132, while those of the Kohalas were lower.

<table>
<thead>
<tr>
<th>District</th>
<th>Median Family Income (1979)</th>
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<tbody>
<tr>
<td>North Kona</td>
<td>$21,134</td>
</tr>
<tr>
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<td>20,068</td>
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<tr>
<td>North Kohala</td>
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</table>


2.1.3 Employment Patterns

In the wake of the expanding visitor industry, the construction, retail and financial industries have experienced significant growth in South Kohala and North Kona. In 1980, hotel-related industries accounted for 49.8 percent of civilian employment in South Kohala, 45.6 percent in North Kohala and 64.2 percent in North Kona. As shown in Table IV-2.2, labor force participation among persons 16 years and older in the Kohala and Kona districts in 1980 was 68.2 percent, significantly higher than the county-wide rate of 61.0 percent. Also, the districts' unemployment rate, at 5.9 percent, was lower than the 7 percent rate for the county as a whole.

The occupational distribution shown in Table IV-2.2 reflects the emerging visitor industry base of West Hawai‘i's economy. Employment in the Kohala and Kona districts tends to be in the technical, sales, administrative support and service occupations. Together, these occupations account for about 46 percent of total district employment. Managerial and professional occupations account for about 19 percent of the districts' employment, while agricultural production and operations related employment each represent between about 10 and 13 percent of the total.
### Table IV-2.1

**MAUNA LANI RESORT**

**District and County Resident Population and Households**

1970 and 1980

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North Kona</td>
<td>215, 216</td>
<td>4,832</td>
<td>13,748</td>
<td>11.0 %</td>
<td>4,602</td>
</tr>
<tr>
<td>South Kona</td>
<td>213, 214</td>
<td>4,004</td>
<td>5,914</td>
<td>4.0</td>
<td>1,853</td>
</tr>
<tr>
<td>North Kohala</td>
<td>218</td>
<td>3,326</td>
<td>3,249</td>
<td>0.2</td>
<td>1,022</td>
</tr>
<tr>
<td>South Kohala</td>
<td>217</td>
<td>2,310</td>
<td>4,607</td>
<td>7.1</td>
<td>1,483</td>
</tr>
</tbody>
</table>

**Total region**

|        | 14,472 | 27,518 | 6.6 % | 8,960 |

**County of Hawaii**

|        | 63,468 | 92,053 | 3.8 % | 29,237 |

### Table IV-2.2

MAUNA LANI RESORT

Kona and Kohala Districts
Employment Characteristics

1980

<table>
<thead>
<tr>
<th></th>
<th>North Kona (tracts 215, 216)</th>
<th>South Kona (tracts 213, 214)</th>
<th>North Kohala (tract 218)</th>
<th>South Kohala (tract 217)</th>
<th>Total region Number Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor force participation (persons 16 years and over)</td>
<td>72.2%</td>
<td>66.2%</td>
<td>60.2%</td>
<td>64.1%</td>
<td>N/A</td>
</tr>
<tr>
<td>Civilian unemployment rate</td>
<td>5.3%</td>
<td>5.7%</td>
<td>9.2%</td>
<td>6.3%</td>
<td>N/A</td>
</tr>
<tr>
<td>Employed persons by occupation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managerial and professional</td>
<td>1,462</td>
<td>362</td>
<td>187</td>
<td>407</td>
<td>2,418</td>
</tr>
<tr>
<td>Technical, sales and administrative support</td>
<td>1,948</td>
<td>661</td>
<td>169</td>
<td>379</td>
<td>3,157</td>
</tr>
<tr>
<td>Service</td>
<td>1,486</td>
<td>460</td>
<td>421</td>
<td>355</td>
<td>2,722</td>
</tr>
<tr>
<td>Farming, forestry and fishing</td>
<td>491</td>
<td>520</td>
<td>175</td>
<td>277</td>
<td>1,463</td>
</tr>
<tr>
<td>Precision production, craft and repair</td>
<td>839</td>
<td>394</td>
<td>119</td>
<td>327</td>
<td>1,679</td>
</tr>
<tr>
<td>Operators, fabricators and laborers</td>
<td>687</td>
<td>265</td>
<td>159</td>
<td>233</td>
<td>1,344</td>
</tr>
<tr>
<td>Total</td>
<td>6,913</td>
<td>2,662</td>
<td>1,230</td>
<td>1,978</td>
<td>12,783</td>
</tr>
</tbody>
</table>

N/A Not applicable.

2.1.4 Social and Community Concerns

Recent surveys of Big Island residents show that a large majority of those polled agreed that tourism is good for the Island (Ward Research, 1982) and that new hotels and condominiums are needed to provide more jobs for residents of the Kohalas (Public Affairs Advisory Services, 1979:11; and 1980:13). Major advantages are perceived to be employment opportunities and the strengthening of local businesses. Although less frequently perceived, disadvantages tend to involve housing impacts, potential impacts to the environment or historical sites, and reduced open space (ibid.:3-5).

To supplement available information from recent surveys and studies, Environ Pacific, Inc. interviewed several persons locally when preparing its report for this Environmental Impact Statement. Those interviewed included local residents, resort workers, business people, and community leaders. An attempt was made to identify community issues and current opinion relevant to development at MLR.

A large majority of those interviewed felt that resort development along the Kohala coast, including development at MLR, has been favorably received over the past several years. Most recently, the development of the proposed Hyatt Regency Waikoloa Hotel complex received strong community support from local residents during public hearings.

Cultural adaptation to changing social mores and patterns of interaction as a result of change brought about by increasing resort development is perceived to have taken place relatively smoothly. Friction between various ethnic groups is thought to be decreasing. Although cultural erosion is recognized, informants feel that visitor industry growth and the associated influx of visitors and new residents contribute only partially to this condition. Other contributing factors cited were television and other media. Moreover, positive aspects associated with increased resort development were also perceived, such as increased opportunities for experiences not normally available within a relatively isolated rural community.

Common concerns centered around the potential impact of the visitor industry on family structure and on public use of facilities, particularly beaches, in the vicinity of new resort facilities.

2.2 PROBABLE IMPACTS

2.2.1 Visitor Expenditures

Visitor expenditures in the County are expected to increase significantly due to outlays by MLR visitors for goods and services, including food and drink, accommodations and gift items. Indirect expenditures within both the County and State are also expected to increase.

2.2.1.1 Direct Visitor Expenditures

Hawaii Visitors Bureau data indicate that the average daily expenditure in 1984 was $234 per person among Japanese visitors to the islands and $90 per person among non-Japanese visitors. Although visitors to MLR are predominantly non-Japanese, according to resort estimates these visitors spend substantially more than the average westbound visitor. Based on hotel and condominium room rates at MLR, consultation with MLR, Mauna Lani Bay Hotel and Mauna Lani Terrace administrators, as well as on market analysis data (Ming Chew Associates, 1984), MLR's hotel visitor is
estimated to spend $180 per day on average and the visitor to a condominium unit $115 per day. These figures were used by Peat, Marwick to project direct visitor expenditures (in 1983 dollars) on the island.

The projected daily visitor population at MLR in both hotel and condominium units is shown in Table IV-2.3. The derivation of these estimates is summarized in Section 2.2.3 of this chapter. These population projections were combined with the daily spending rates above to arrive at potential direct visitor expenditures on the island.

Table IV-2.3 shows that under the proposed revised master plan direct expenditures are projected to amount to more than $45-million a year by 1990 and more than $125-million by 2000. The rate of development under the proposed master plan is expected to be slightly slower than under the existing master plan and, therefore, if the same spending patterns were to hold, direct expenditures under the revised plan would be $1-million less per year by 1990 and $5-million less by 2000. However, the higher density facilities that could be developed under the existing master plan would probably not attain the quality of facilities that could be developed under the expanded master plan. Thus visitor expenditures may also be expected to vary somewhat and the differences in total direct expenditures between the two plans may be exaggerated.

### 2.2.1.2 Indirect and Induced Visitor Expenditures

In addition to direct expenditures by visitors, indirect and induced expenditures also are expected to be generated. This occurs when establishments that cater directly to visitors in turn purchase goods and services for their operations, or when employees or proprietors of businesses catering to visitors spend their earnings. In a study on the economic impact of tourism in Hawai‘i (State of Hawai‘i, Department of Planning and Economic Development, April 1983:6), DPED estimates that such spending generates about $1.04 in additional sales within the state for every $1.00 directly spent by a visitor.

Applying the above multiplier to estimated direct expenditures, total indirect and induced expenditures would amount to over $47-million in 1990 and over $130-million in 2000 if development were to continue according to the revised master plan. Table IV-2.3 shows that, under the revised master plan, new facilities are projected to generate additional direct, indirect and induced expenditures of $92.6-million in 1990 and $255.7-million by 2000.

### 2.2.2 Employment Impact

Development of MLR will generate short-term employment during the construction of new facilities as well as long-term employment during the operation of these facilities. Employment during both phases can be characterized as direct, indirect or induced. Direct employment is the result of direct visitor expenditures; jobs are created at hotels and at other establishments that serve visitors. Indirect jobs are created when businesses serving visitors purchase goods and services from others. Induced effects occur when employees and proprietors of business directly or indirectly dependent on the visitor industry spend their earnings.
Table IV-2.3
Projected Resort Visitor Population
at Mauna Lani Resort and
Annual Visitor Expenditures
(1983 dollars - millions)

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th></th>
<th>1995</th>
<th></th>
<th>2000</th>
<th></th>
<th>At potential maximum development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
</tr>
<tr>
<td>Daily Visitor Population (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel units</td>
<td>570</td>
<td></td>
<td>998</td>
<td></td>
<td>1,425</td>
<td></td>
<td>4,275</td>
</tr>
<tr>
<td>Multifamily units</td>
<td>213</td>
<td></td>
<td>425</td>
<td></td>
<td>874</td>
<td></td>
<td>1,390</td>
</tr>
<tr>
<td>Total resort visitor population</td>
<td>783</td>
<td></td>
<td>1,423</td>
<td></td>
<td>2,299</td>
<td></td>
<td>5,708</td>
</tr>
<tr>
<td>Annual Visitor Expenditures in State Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors in hotels</td>
<td>$37.5</td>
<td></td>
<td>$65.6</td>
<td></td>
<td>$93.6</td>
<td></td>
<td>$280.9</td>
</tr>
<tr>
<td>Visitors in multifamily units</td>
<td>8.9</td>
<td></td>
<td>17.8</td>
<td></td>
<td>36.7</td>
<td></td>
<td>60.1</td>
</tr>
<tr>
<td>Total Direct</td>
<td>46.4</td>
<td></td>
<td>83.4</td>
<td></td>
<td>130.3</td>
<td></td>
<td>341.0</td>
</tr>
<tr>
<td>Indirect and induced (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Expenditures</td>
<td>$94.6</td>
<td></td>
<td>$170.1</td>
<td></td>
<td>$256.8</td>
<td></td>
<td>$695.0</td>
</tr>
</tbody>
</table>

(1) See Section 2.2.3 for derivation of visitor population.

2.2.2.1 Construction Period

2.2.2.1.1 Direct Construction Employment. The number of persons working at any one time on a particular construction project fluctuates considerably. While this variability is of some importance, it is extremely difficult to characterize in a macroanalysis such as this. Fortunately, it is nearly as useful to ignore the short-term variations and deal instead with total construction person-years and average construction employment. (A construction person-year is equivalent to one person working for a period of one year; average employment is equal to the total person-years expended divided by the number of years during which the construction is underway.)

Direct construction employment at MLR is projected by facility type in Table IV-2.4 to the year 2000 in average construction person-years. Projections are not made beyond 2000 because the timing of construction after that date is indefinite and cannot be reasonably predicted. However, it is assumed that construction activity after 2000 would occur at the same pace or at a slower pace as projected up to the year 2000.

In the earlier time period to 1990, the demand for construction employment is projected to be about 220 annual person-years under either the existing or revised master plan. Although fewer multifamily units would be built under the revised plan, golf course construction would add to the overall demand for construction employment during the early years. Throughout the development period to the year 2000, multifamily unit construction will generate the greatest demand for labor. Insofar as the absorption rate of multifamily units is expected to be higher according to the existing master plan, so would demand for construction labor.

Based on an assessment of hotel and resort residential developments expected to occur elsewhere along the Kohala coast, Peat, Marwick estimates "that under the revised plan, Mauna Lani Resort's direct construction labor needs would constitute approximately 27% of direct labor needs of all hotel and resort residential construction activity on the Kohala coast by 1990 and approximately 50% by the year 2000." (Peat, Marwick, Mitchell & Co., 1983: II-5).

The types of construction jobs that will be generated by MLR development is expected to be distributed similarly to that of the industry as a whole. About 70 percent of construction employment can be expected to be in skilled craft and labor positions. About 30 percent would be professional or technical and about 9 percent managerial. Due to specialized skill requirements, the latter two categories are most likely to include greater shares of off-island workers who come from larger and more diversified labor pools. (See Exhibit II-H in Appendix B for estimates of direct construction employment at MLR by class of worker.)

2.2.2.1.2 Indirect and Induced Employment. Direct employment of construction period workers will stimulate additional purchases of goods and services on the island and elsewhere in the state, resulting in indirect and induced employment. In its 1982 revised model of the construction industry in Hawai‘i, DPED estimated that 2.4 full-time jobs are created for every full-time job in the building construction industry. This multiplier was applied to the projected direct demand for construction labor (see Table IV-2.5) to arrive at indirect and induced labor demand.

This indirect and induced demand for labor was further broken down into estimates of on-island and off-island demand. A 1975 study of Kauai's economy (Anderson et al) suggested that indirect and induced employment equivalent to 20
Table IV-2.4

MAUNA LANI RESORT

Direct Employment for Facility Construction

1986 to 2000

(Average annual person-years)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel units(1)</td>
<td>80</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>Multifamily units(2)</td>
<td>122</td>
<td>108</td>
<td>122</td>
</tr>
<tr>
<td>Single-family units(3)</td>
<td>8</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Commercial(4)</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Civil(5)</td>
<td>6</td>
<td>18</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total construction employment</strong></td>
<td><strong>220</strong></td>
<td><strong>220</strong></td>
<td><strong>196</strong></td>
</tr>
</tbody>
</table>

(1) Demand calculated at 0.5 full-time equivalent jobs per year per unit and average two-year construction period per hotel.

(2) Demand calculated at 0.9 full-time equivalent jobs per year per unit and average 18-month construction period per project.

(3) Demand calculated at 2.0 full-time equivalent jobs per year per unit and average one-year construction period per unit.

(4) Demand calculated at 0.7 person-years per 1,000 square feet leasable space years. Revised plan (including additional golf course) estimated to require about 30 full-time efficient jobs per year over three years. Figures converted to rates over a five-year period. Estimates provided by Mauna Lani Resort, Inc.

(5) For construction of infrastructural and recreational improvements, including roads, sewage treatment plant, public beach parking areas, etc. Existing plan estimated to require approximately 15 full-time equivalent jobs per year over two years.

Source: Peat, Marwick, Mitchell & Co.
Table IV-2.5
MAUNA LANI RESORT
Direct, Indirect and Induced Construction Employment
1986 to 2000
(Average annual person-years)

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1986 to 1990</th>
<th>1991 to 1995</th>
<th>1996 to 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>master plan</td>
<td>master plan</td>
<td>master plan</td>
</tr>
<tr>
<td>Direct(2)</td>
<td>220</td>
<td>220</td>
<td>196</td>
</tr>
<tr>
<td>Indirect and induced:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On island(3)</td>
<td>44</td>
<td>44</td>
<td>39</td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>264</td>
<td>264</td>
<td>235</td>
</tr>
<tr>
<td>Total employment(4)</td>
<td>528</td>
<td>528</td>
<td>470</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) From Exhibit II-6.

(3) Direct employment multiplied by 0.2. Anderson, et al., Kauai Socioeconomic Profile, 1975.


Source: Peat, Marwick, Mitchell & Co.
percent of direct construction employment would remain in the region; this percentage has been applied in the Peat, Marwick study. See Table IV-2.5 for projected indirect and induced employment on the island of Hawai‘i and elsewhere in the state.

2.2.2.1.3 Total Construction Period Employment. Table IV-2.5 also summarizes the total employment effects of construction to the year 2000. Under the revised master plan, construction would result in about 530 annual person-years from 1986 to 1990, 440 from 1991 to 1995, and 720 to 2000. Total construction demand under the existing master plan would be the same as that under the revised master plan until 1990. However, because of its greater direct employment demand after 1990, the existing master plan would generate proportionately more indirect and induced employment. By the year 2000, the existing master plan would generate about 80 more annual person-years than would the proposed master plan.

Peat, Marwick estimates that the Island of Hawai‘i may be able to provide approximately 65 percent of the resort's total construction-related labor demand. The remaining 35 percent of direct, indirect and induced employment is expected to be primarily filled by workers who temporarily relocate from other islands (Appendix D:2).

2.2.2.2 Operational Period

2.2.2.2.1 Direct Operational Employment. The operation and management of resort facilities under either existing or revised master plan will generate substantial opportunities for long-term employment in the Kohala and Kona areas. Because of the full-service nature of planned hotels, it is expected that most operational employment will be in the hotels. Table IV-2.6 shows projected operational figures in terms of full-time equivalent positions rather than in terms of number of employees. The Peat, Marwick study states:

A survey of luxury hotels indicated that due to part-time, temporary and casual employment, there are between 11 and 12 employees on payroll for every 10 "full-time equivalent" hotel positions. On the other hand, other sources report that because of multiple job holding in the visitor industry, every 10 jobs may be assumed to be filled by approximately 9 employees. Taken together, these findings suggest that the number of persons required to fill future employment demands will be close to the number of full-time equivalent jobs projected. (Peat, Marwick, Mitchell & Co., 1983:II-6).

During the early years, the demand for operational employment will be virtually the same, about 825 full-time equivalent jobs, under both the existing and revised master plans. However, by 2000, operational employment under the existing master plan would demand 30 more full-time equivalent positions than under the revised master plan. This is due to the greater development of multifamily units and commercial space according to the existing plan.

Projected operational employment at MLR is distributed by occupational category in Table IV-2.7, based on the distribution of a sample of hotel industry workers and on projections by Peat, Marwick. It is expected that the greatest number of jobs, about one-third to one-half, will be created in the food and beverage sector due to the normally high concentration of food and beverage service positions in luxury hotels and to the mix of commercial establishments planned. Housekeeping constitutes the next largest occupational category. Peat, Marwick expects that managerial and supervisory positions will account for 9 to 12 percent of total operational employment.
Table IV-2.6

MAUNA LANI RESORT

Projected Direct Employment for Resort Operations

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Facility type</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
</tr>
<tr>
<td>Hotel(2)</td>
<td>480</td>
<td>840</td>
<td>1,200</td>
<td>3,600</td>
</tr>
<tr>
<td>Resort residential(3)</td>
<td>94</td>
<td>189</td>
<td>385</td>
<td>636</td>
</tr>
<tr>
<td>Retail(4)</td>
<td>143</td>
<td>274</td>
<td>516</td>
<td>993</td>
</tr>
<tr>
<td>Resort administration(5)</td>
<td>109</td>
<td>221</td>
<td>136</td>
<td>153</td>
</tr>
<tr>
<td>Total operational employment</td>
<td>826</td>
<td>1,424</td>
<td>2,235</td>
<td>5,382</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Projected at 1.2 full-time equivalent jobs per hotel unit.

(3) Projected at 0.2 full-time equivalent jobs per multifamily or single-family unit.

(4) Projected at 1.0 jobs per 200 net leasable square feet of commercial space.

(5) Estimated to follow growth of facility development. Category includes miscellaneous Resort employment such as Resort administration, property development, accounting, maintenance of additional golf course (revised plan only) and infrastructural facilities.

Source: Peat, Marwick, Mitchell & Co.
<table>
<thead>
<tr>
<th>Occupational category</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
<th>Percent distributions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Existing</td>
<td>Revised</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>master plan</td>
<td>master plan</td>
<td>master plan</td>
<td>master plan</td>
<td>master plan</td>
</tr>
<tr>
<td>Management and supervisory</td>
<td>91</td>
<td>90</td>
<td>156</td>
<td>154</td>
<td>244</td>
</tr>
<tr>
<td>Office and front desk</td>
<td>124</td>
<td>123</td>
<td>213</td>
<td>210</td>
<td>334</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>235</td>
<td>236</td>
<td>402</td>
<td>390</td>
<td>621</td>
</tr>
<tr>
<td>Food and beverage</td>
<td>246</td>
<td>246</td>
<td>420</td>
<td>415</td>
<td>646</td>
</tr>
<tr>
<td>Building and grounds maintenance</td>
<td>55</td>
<td>55</td>
<td>94</td>
<td>93</td>
<td>144</td>
</tr>
<tr>
<td>Other services</td>
<td>75</td>
<td>72</td>
<td>139</td>
<td>130</td>
<td>248</td>
</tr>
<tr>
<td>Total operational employment</td>
<td>826</td>
<td>822</td>
<td>1,424</td>
<td>1,400</td>
<td>2,235</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.


(3) Based on market absorption projections, 50% of commercial space projected to be restaurants, 50% other retail. Retail distribution based on 1990 statewide projection for wholesale and retail industries combined. State of Hawaii, Department of Labor and Industrial Relations, Employment Outlook for Industries and Occupations, 1990-1990, 1984.

Source: Peat, Marwick, Mitchell & Co.
2.2.2.2 Sources of Direct Operational Employees. Recent experience at the Mauna Lani Bay Hotel and the Sheraton Royal Kailua Hotel has shown that most employees hired were from the Big Island. However, top managerial positions at full-service hotels are typically filled by outsiders. Because of the substantial amount of resort development planned for the Kohala coast in the next few decades, Peat, Marwick anticipates that regional employment opportunities will grow faster than natural population increase. Recent in-migrants from outside the County of Hawai‘i are projected by Peat, Marwick to account for 10 percent of MLR’s new employees in 1990 and up to 16 percent by 2000.

The island's existing labor pool provides potential employees for future development at MLR. Included are (1) unemployed or underemployed persons, (2) high school graduates or other labor market entrants, and (3) persons working elsewhere on the island. Peat, Marwick's analysis suggests that the first two categories of "available" sources of labor could account for about 45 percent of employees drawn from Hawai‘i County's labor pool. "This available labor would include persons who move to the county for reasons other than the possibility of employment in industry segments supported by Mauna Lani Resort." (Peat, Marwick, Mitchell & Co., 1985:II-7).

The remainder of those hired from the local (Hawai‘i County) labor pool would be in the third category: those who are employed but desire a job change. Peat, Marwick expects that the majority of such turnover would come from jobs at other South Kohala establishments, and others from employment in the North Kona area.

Table IV-2.8 summarizes the projected mix of direct operational employment at MLR, based on the above estimates. The differences between the existing and revised master plan are not significant.

2.2.2.3 Total Operational Employment. Table IV-2.9 summarizes the direct, indirect and induced demand for operational labor at MLR. The resulting total operational employment was first obtained by applying two multipliers to proportionate shares of direct employment, 1.93 for hotel resort residential and resort administrative functions, and 1.66 applied to retail functions. Projection of indirect and induced employment that would remain on the island is based on findings of the previously mentioned Anderson et al study, adjusted to reflect Hawai‘i Island's greater ability to provide support services to the visitor industry.

Operational employment would be only slightly lower under the revised plan as compared to the existing master plan to 2000; at potential maximum development, total employment would be slightly higher. Including current employment at the Mauna Lani Bay Hotel and at the Mauna Lani Terrace condominiums, MLR would be providing about 2,400 full-time equivalent jobs statewide by 1990 and 5,000 by 2000. If all units for which the resort has governmental approval are built, statewide employment has the potential to increase by 10,000.

Peat, Marwick estimates that the impact of operational employment (direct, indirect, and induced) on the Island of Hawai‘i is approximately 1,100 employees in 1990, 1,800 in 1995, to 2,800 by the year 2000. For details, see Appendix D and Exhibit A of Appendix D.
Table IV-2.8
MAUNA LANI RESORT
Projected Mix of Operational Employees
1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Labor supply component</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
</tr>
<tr>
<td>On-island sources:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available labor(2)</td>
<td>334</td>
<td>333</td>
<td>557</td>
<td>548</td>
</tr>
<tr>
<td>Kohala turnover(3)</td>
<td>223</td>
<td>222</td>
<td>372</td>
<td>365</td>
</tr>
<tr>
<td>Other turnover(4)</td>
<td>186</td>
<td>185</td>
<td>310</td>
<td>305</td>
</tr>
<tr>
<td>Off-island sources(5)</td>
<td>83</td>
<td>82</td>
<td>185</td>
<td>182</td>
</tr>
<tr>
<td>Total operational employment</td>
<td>826</td>
<td>822</td>
<td>1,424</td>
<td>1,400</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Unemployed and underemployed persons on-island and labor market entrants. Projected to account for 45% of on-island labor component.

(3) Persons attracted from other work in North or South Kohala. Projected to account for 30% of on-island labor component.

(4) Persons attracted from other work in North Kona. Projected to account for 25% of on-island labor component.

(5) Based on off-island component of current Mauna Lani Resort employees, and on projections of employment at other area resorts, in-migrant employees projected to account for 10% of employment by 1990, 13% by 1995, 16% by 2000 and 20% by project completion.

Source: Peat, Marwick, Mitchell & Co.
### Table IV-2.9
MAUNA LANI RESORT

Direct, Indirect and Induced Operational Employment

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1990 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct(2)</td>
<td>826</td>
<td>822</td>
<td>1,424</td>
<td>1,400</td>
<td>2,235</td>
</tr>
<tr>
<td>Indirect and induced:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-island(3)</td>
<td>248</td>
<td>247</td>
<td>427</td>
<td>420</td>
<td>671</td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>482</td>
<td>482</td>
<td>623</td>
<td>814</td>
<td>1,269</td>
</tr>
<tr>
<td>Total operational employment(4)</td>
<td>1,556</td>
<td>1,561</td>
<td>2,674</td>
<td>2,634</td>
<td>4,175</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) From Exhibit II-J.

(3) Direct employment multiplied by 0.3. See discussion in text.

(4) Direct employment except retail multiplied by 1.93, retail multiplied by 1.66. State of Hawaii, Department of Planning and Economic Development, The Economic Impact of Tourism in Hawaii: 1970-1980, 1983. DPECD multipliers for retail uses were adjusted to reflect the mix of eating and drinking establishments and other retail uses planned for Mauna Lani's commercial areas.

Source: Peat, Marwick, Mitchell & Co.
2.2.2.3 Summary of Employment Demand

Table IV-2.10 summarizes the projected demand for construction period and operational employment by time period and location of employment (within the County and elsewhere in the State). Not included in the figures are an estimated 840 statewide jobs that have resulted from development to date at MLR: 440 full-time equivalent positions at the resort, and 570 in the county. The number of positions created does not differ significantly whether development proceeds according to the existing or proposed revised master plan. Total employment statewide would increase by about 2,000 in 1990, 3,000 in 1995 and almost 5,000 by 2000. Figures shown for "potential maximum development" include operational employment only; it is presumed that at the time of full development, all new construction will have been completed.

2.2.3 Population Impact

Development of MLR will result in two types of population impacts: an increase in the on-site population at MLR as a result of increased numbers of visitors and residents at the resort, and an increase in off-site population resulting indirectly from resort development. This latter population increase is due to new employment generated by MLR and the associated in-migration of workers to fill positions not filled by current residents.

2.2.3.1 On-Site Population Impact

On-site population consists of (1) residents who live in multifamily or single-family units at the resort during most or parts of the year, and (2) visitors staying at the resort's hotels and in units at condominium projects that have been put into visitor rental pools. To project population impact, Peat, Marwick made assumptions regarding the usage mix of units, average party sizes and percent occupancies. For this, they relied on the experience of comparable resort facilities and industry trends. A summary of the assumptions are listed below.

Assumptions for On-Resort Population Projection

<table>
<thead>
<tr>
<th>Facility and Occupation Types</th>
<th>Percentage Distribution(1)</th>
<th>Occupancy Percentage</th>
<th>Average Party Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel Units</td>
<td>100%</td>
<td>75%</td>
<td>1.9</td>
</tr>
<tr>
<td>Multifamily Units:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time residents</td>
<td>5</td>
<td>95</td>
<td>2.3</td>
</tr>
<tr>
<td>Part-time residents</td>
<td>60</td>
<td>30</td>
<td>2.6</td>
</tr>
<tr>
<td>Visitors</td>
<td>35</td>
<td>30</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-family units:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time residents</td>
<td>25</td>
<td>95</td>
<td>2.6</td>
</tr>
<tr>
<td>Part-time residents</td>
<td>75</td>
<td>30</td>
<td>4.0</td>
</tr>
<tr>
<td>Visitors</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Distribution of uses within facility type.

IV-60
<table>
<thead>
<tr>
<th>Location and type of employment</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
</tr>
<tr>
<td>Total on-island</td>
<td>1,388</td>
<td>1,333</td>
<td>2,085</td>
<td>2,042</td>
</tr>
<tr>
<td>Direct</td>
<td>1,046</td>
<td>1,042</td>
<td>1,619</td>
<td>1,585</td>
</tr>
<tr>
<td>Indirect and induced</td>
<td>292</td>
<td>291</td>
<td>466</td>
<td>457</td>
</tr>
<tr>
<td>Total on-island</td>
<td>1,388</td>
<td>1,333</td>
<td>2,085</td>
<td>2,042</td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>748</td>
<td>746</td>
<td>1,058</td>
<td>1,035</td>
</tr>
<tr>
<td>Total employment in state</td>
<td>2,136</td>
<td>2,079</td>
<td>3,143</td>
<td>3,077</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

Source: Peat, Marwick, Mitchell & Co.
Given the anticipated luxury character of the MLR, the majority of multifamily units are expected to be vacation homes used for three to four months a year. About a third of them may be expected to be in visitor rental pools or otherwise used for short-term rentals. The majority of single-family units are also expected to be vacation homes used three or four months of the year. About a quarter of the single-family units are expected to be occupied full-time, and none are assumed to accommodate short-term visitor use. Based on these assumptions, Peat, Marwick projected resort population by facility type and use.

Table IV-2.11 summarizes the expected on-site de facto population impact under the existing and revised master plans. The visitor population is projected to outnumber resort residents by a ratio of more than two to one. Defacto population is expected to increase from over 1,000 in 1990 in both plans to almost 3,500 under the existing master plan and almost 3,300 under the revised master plan in 2000. The difference between the two plans in population impact is small, in the 4 to 6 percent range. At potential maximum development, the difference is negligible.

Visitors and residents at the Mauna Lani Bay Hotel and Mauna Lani Terrace would add almost 600 more persons to the resort total in either plan.

2.2.3.2 Off-Site Population Impact

Development at MLR will contribute to the growth of the Big Island resident population as persons move to the County to work at the resort. Some of these new employees, particularly if they are household heads, are expected to bring dependents. To project the total population impact of operational employees drawn from off-island, Peat, Marwick made the following assumptions: (1) one-third of the projected managerial and supervisory positions will be filled by in-migrants, (2) managerial and supervisory in-migrants will be household heads and each will be accompanied by an average of two dependents, and (3) other in-migrant operational employees will be accompanied by an average of one dependent each.

Based on the above, direct operational employment at the resort would have stimulated the in-migration to the Island of about 200 persons by 1990, nearly 800 by 2000, and well over 2,000 at potential maximum development.

2.2.3.3 Total Population Impact (Operational)

Table IV-2.12 summarizes the total population impact due to further development at MLR; it includes project-generated growth on-site and off-site. Under either the existing or revised master plan, the ratio of on-site de facto population to off-site residents is about five to one in 1990; at potential maximum development, the ratio is expected to be closer to three to one.

Based on its assessment of hotel and resort residential projects expected to be developed along the Kohala coast, Peat, Marwick estimates that under the revised master plan MLR's total on- and off-site direct population impact will be about 24 percent of regional population impact in 1990 and about 33 percent in 2000.

2.2.3.4 Geographic Distribution of Additional Population

The geographic distribution of additional population due to resort development at Mauna Lani has been projected based on the 1984 distribution of MLR employees and on the County population forecasts published in the Kona Regional Plan in 1982. A
### Table IV-2.11
MAUNA LANI RESORT
Summary of On-Resort Population Impact
1990 to Potential Maximum

<table>
<thead>
<tr>
<th></th>
<th>1990 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (cumulative):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident</td>
<td>292</td>
<td>783</td>
<td>590</td>
<td>1,423</td>
<td>1,180</td>
<td>1,082</td>
<td>1,978</td>
</tr>
<tr>
<td>Visitor</td>
<td>271</td>
<td>759</td>
<td>550</td>
<td>1,376</td>
<td>2,299</td>
<td>2,181</td>
<td>5,708</td>
</tr>
<tr>
<td>De facto population</td>
<td>1,075</td>
<td>1,030</td>
<td>2,013</td>
<td>1,926</td>
<td>3,479</td>
<td>3,263</td>
<td>7,686</td>
</tr>
<tr>
<td>Difference</td>
<td>(45)</td>
<td>(87)</td>
<td>(216)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compound annual rate of growth since previous period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident</td>
<td>N/A</td>
<td>N/A</td>
<td>15.1%</td>
<td>15.2%</td>
<td>14.8%</td>
<td>14.4%</td>
<td>N/A</td>
</tr>
<tr>
<td>Visitor</td>
<td>N/A</td>
<td>N/A</td>
<td>12.7%</td>
<td>12.7%</td>
<td>10.2%</td>
<td>9.7%</td>
<td>N/A</td>
</tr>
<tr>
<td>De facto population</td>
<td>N/A</td>
<td>N/A</td>
<td>13.4%</td>
<td>13.4%</td>
<td>11.7%</td>
<td>11.2%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

N/A Not available.

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

Source: Peat, Marwick, Mitchell & Co.
Table IV-2.12
MAUNA LANI RESORT
Summary of On- and Off-Resort Population Impact
1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Population</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised</td>
<td>Existing master plan</td>
<td>Revised</td>
</tr>
<tr>
<td>On-resort(2)</td>
<td>1,075</td>
<td>1,030</td>
<td>2,013</td>
<td>1,926</td>
</tr>
<tr>
<td>Off-resort(3)</td>
<td>196</td>
<td>194</td>
<td>423</td>
<td>414</td>
</tr>
</tbody>
</table>

Total population increase
1,271  1,224  2,436  2,340  4,275  4,031  10,033  10,082

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) From Exhibit II-P.

(3) Direct operational employee in-migrants and their dependents, as shown in Exhibit II-Q.

Source: Peat, Marwick, Mitchell & Co.
majority of off-site residents would live in North or South Kohala because in-migrant employees are expected to seek housing near their place of work. Most other employees may be expected to live in the Kona area, in larger proportionate numbers as the resort develops. A minority are expected to continue to commute from the Hilo and Hamakua areas because of regional preference, family ties, or the employment of other household members (see Table IV-2.13).

2.2.3.5 Total Population Impact (Operational and Construction Employment)

Development at Mauna Lani Resort will have an overall effect on the population movement to the Island of Hawaii. Including total operational and construction employment (direct, indirect, and induced), MLR residents and visitors, Peat, Marwick estimates an additional 1,500 persons by 1990 and 4,600 by 2000, according to the revised master plan. For details on the sources of this additional population and its geographic distribution, see Appendix D and Exhibits B and C of Appendix D.

2.2.4 Housing Impacts

Construction and operational employees at MLR who are in-migrants to the County will generate a demand for housing, as will job-takers from within the County who move to be closer to work or to establish new households. Persons who move from within the County may cause a shift in demand to areas in the vicinity of resort development, and Peat, Marwick's projections account for some of the demand from within-County movers.

Indirect housing demand is also generated when development occurs; it is derived from (1) County workers whose employment is indirectly supported by the resort development and (2) new workers filling positions vacated by others who take jobs at MLR. This indirect demand is not accounted for in the Peat, Marwick projections in large part because of the difficulty in predicting how the employee housing market is affected by chains of job turnover in a developing economy. Further, Peat, Marwick asserts that "developers have not customarily been considered responsible for the potential housing requirements associated with the generation of regional economic opportunity in other industries or establishments." (Peat, Marwick, Mitchell & Co., 1985:III-1).

2.2.4.1 Construction Employee Housing

Construction employment is temporary and thus does not generate the long-term housing demand associated with operational employment. Contractors in South Kohala report that construction workers have been able to obtain housing in the short-term rental market, mostly in the Kona area. Labor agreements typically provide generous subsistence allowances for construction workers, reports Peat, Marwick; therefore, housing affordability is usually not a problem.

During construction of the 351-room Mauna Lani Bay Hotel, the work force from off-island varied from 16.5 percent in August 1981 to almost 45 percent in October 1982, requiring 17 housing units in 1981 and 47 in 1982. The future share of construction workers at MLR from off-island will depend on the timing of other major construction activity in the State and the competition for Hawaii Island construction workers.
<table>
<thead>
<tr>
<th>Area of residence or visitation</th>
<th>1990 Existing master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North and South Kohala:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-resort(2)</td>
<td>1,075</td>
<td>1,030</td>
<td>2,013</td>
<td>1,926</td>
<td>3,479</td>
<td>3,263</td>
</tr>
<tr>
<td>Off-resort(3)</td>
<td>127</td>
<td>126</td>
<td>279</td>
<td>274</td>
<td>541</td>
<td>522</td>
</tr>
<tr>
<td>Total North and South Kohala</td>
<td>1,202</td>
<td>1,156</td>
<td>2,292</td>
<td>2,200</td>
<td>4,020</td>
<td>3,785</td>
</tr>
<tr>
<td>North and South Kona(4)</td>
<td>39</td>
<td>39</td>
<td>84</td>
<td>82</td>
<td>159</td>
<td>154</td>
</tr>
<tr>
<td>Hamakua and Hilo(5)</td>
<td>30</td>
<td>29</td>
<td>60</td>
<td>58</td>
<td>96</td>
<td>92</td>
</tr>
<tr>
<td>Total population impact</td>
<td>1,271</td>
<td>1,224</td>
<td>2,436</td>
<td>2,340</td>
<td>4,275</td>
<td>4,031</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Residents and visitors to Mauna Lani Resort, as shown in Exhibit II-P.

(3) Direct employees and their dependents expected to migrate to the County of Hawaii. Those residing in North and South Kohala projected to increase from 65% of employee in-migrants in 1990, to 68% by the year 2000.

(4) Direct employees and their dependents expected to migrate to the County of Hawaii. North and South Kona residents projected to stabilize at 20% of employee in-migrants in all time periods.

(5) Direct employees and their dependents expected to migrate to the County of Hawaii. Hamakua and Hilo residents projected to decline from 15% of employee in-migrants in 1990, to 12% by the year 2000.

Source: Peat, Marwick, Mitchell & Co.
Table IV-2.14 shows Peat, Marwick's projection of construction employment by origin of worker. An average 35 percent would be drawn from off-island. With the greater future supply of short-term rental housing and an expected continuation of housing subsidy policies, construction employee housing is not projected to be problematic under either the existing or revised master plan.

2.2.4.2 Operational Employee Housing

Table IV-2.15 shows the projected number of direct operational employees who may be expected to require new housing, increasing from about 150 in 1990 to over 500 in 2000 under either the existing or revised master plan. Demand would be greatest from off-island in-migrants, all of whom would require new housing.

Projected demand for additional housing on the island of Hawai'i is less than the number of employees requiring housing. Some households will have more than one resort employee; also, the phenomenon of "doubling up" within existing households is expected to continue. Table IV-2.16 projects the demand for additional housing units by class of direct operational employee. The existing and revised master plans do not differ much in terms of additional employee housing requirements. Additional housing directly attributable to MLR's expansion is projected by Peat, Marwick to be about 110 units in 1990 and 370 to 380 units by the year 2000.

Peat, Marwick states that "based on an assessment of other hotel and vacation-oriented residential projects judged likely to be completed in the South Kohala coast region in the next 15 years, it is estimated that the additional employee housing demand projected to be generated by Mauna Lani Resort's further development will represent about 21% of total regional demand generated by comparable developments by the year 1990 and about 29% of total regional demand by the year 2000." (Peat, Marwick, Mitchell & Co., 1985:III-4).

Development at Mauna Lani Resort is also expected to contribute toward the demand for additional housing among indirect and induced operational employees. Peat, Marwick projects that approximately 250 and 730 direct, indirect, and induced operational employees will require housing on the Island of Hawai'i in 1990 and 2000, respectively (see Exhibit D of Appendix D).

2.2.4.3 Total Employee Housing

The total demand for additional housing units on the island includes the demand from operations-related employees (see above) and that from construction-related employees temporarily housed on the island. Peat, Marwick projects that 250 additional housing units will be needed by 1990 and 600 by 2000 (see Exhibit E of Appendix D).

2.2.4.4 Long-Term Future Employee Requirements

Long-term housing needs are expected to be met on the open market and through employee housing provided by or supported by MLR. It is anticipated that housing studies will be performed when each hotel site is developed. County Ordinance 380, amended by Ordinance 607 and 608, required MLR to provide 28 employee housing units in conjunction with the construction and operation of the Mauna Lani Bay Hotel. It further stipulated that requirements for employee housing associated with subsequent hotel development be determined based on additional housing need studies.
Table IV-2.14

MAUNA LANI RESORT

Direct Construction Employment by Origin of Worker

1986 to 2000

(Average annual person-years)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>From on-island</td>
<td>143</td>
<td>143</td>
<td>127</td>
<td>120</td>
<td>217</td>
<td>195</td>
</tr>
<tr>
<td>From off-island(1)</td>
<td>77</td>
<td>77</td>
<td>69</td>
<td>64</td>
<td>117</td>
<td>105</td>
</tr>
<tr>
<td>Total construction employment</td>
<td>220</td>
<td>220</td>
<td>196</td>
<td>184</td>
<td>334</td>
<td>300</td>
</tr>
</tbody>
</table>

(1) Assuming 35% of workers come from off-island.

Source: Peat, Marwick, Mitchell & Co.
Table IV-2.15
MAUNA LANI RESORT
Direct Operational Employees Projected to Require Additional Housing
1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Labor supply component(1)</th>
<th>1990 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-island labor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available labor(3)</td>
<td>50</td>
<td>50</td>
<td>84</td>
<td>82</td>
<td>127</td>
<td>122</td>
<td>291</td>
</tr>
<tr>
<td>Kohala turnover(4)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other turnover(5)</td>
<td>19</td>
<td>18</td>
<td>31</td>
<td>30</td>
<td>47</td>
<td>45</td>
<td>108</td>
</tr>
<tr>
<td>Off-island labor(6)</td>
<td>83</td>
<td>82</td>
<td>185</td>
<td>182</td>
<td>358</td>
<td>344</td>
<td>1,076</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,080</td>
</tr>
<tr>
<td>Total demanding new housing</td>
<td>152</td>
<td>150</td>
<td>300</td>
<td>294</td>
<td>532</td>
<td>511</td>
<td>1,475</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,479</td>
</tr>
</tbody>
</table>

(1) Based on figures given in Exhibit II-L, Appendix B.

(2) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(3) 15% new household formation projected.

(4) Assumed to be already settled in area or accustomed to commute.

(5) 10% demand projected.

(6) 100% in-migrants.

Source: Peat, Marwick, Mitchell & Co.
Table IV-2.16
MAUNA LANI RESORT
Projected Additional Housing Unit Demand for Operational Employees,
Island of Hawaii
1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Class of worker</th>
<th>1990 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managerial or specialty(2)</td>
<td>30</td>
<td>30</td>
<td>52</td>
<td>51</td>
<td>81</td>
<td>78</td>
<td>195</td>
</tr>
<tr>
<td>Other(3)</td>
<td>81</td>
<td>81</td>
<td>165</td>
<td>163</td>
<td>300</td>
<td>289</td>
<td>853</td>
</tr>
<tr>
<td>Total units</td>
<td>111</td>
<td>111</td>
<td>217</td>
<td>214</td>
<td>381</td>
<td>367</td>
<td>1,048</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Projected at 1.0 employee per household.

(3) Projected at 1.5 employees per household.

Source: Peat, Marwick, Mitchell & Co.
Peat, Marwick states: "Because future needs for additional employee housing will depend critically on the quality and size of particular projects, and on supply and demand factors in future regional housing markets, this case-by-case approach is considered the best means of assessing the Resort's appropriate future contributions to employee housing on the island." (Appendix D:4)

2.2.5 Income Impact

Development of Mauna Lani Resort under either the existing or proposed master plan is expected to have a significant impact on personal and household income for residents of the county and the state. Personal income is defined here as wage and salary income from employment. Projections of personal income have been made based on average industry wages and salaries and projected future employment demand. Household income is comprised of wage and salary income as well as other labor income and proprietors' income. Estimation of household income is based on projections of visitor expenditures in the State.

2.2.5.1 Wage and Salary Income from Direct Employment

Projections of annual wage and salary income as a result of new employment created at MLR are shown in Table IV-2.17 for both the existing and revised master plans. Figures were derived using average annual wages for workers in the construction, hotel and retail industries and the projected number of workers in each category. Throughout the development period, the majority of income benefits is expected to accrue from the operation of hotels, residential units and commercial facilities.

As shown in Table IV-2.17, total annual direct salary and wage income is expected to be virtually the same under the existing or revised plan, increasing from almost $14-million in 1990 to about $30-million in 2000, eventually amounting to over $57-million at potential maximum development. Peat, Marwick estimates that direct employment earnings at the existing Mauna Lani Bay Hotel and Mauna Lani Terrace would add about $3-million a year (all estimates in 1983 dollars) to the figures shown. By 2000, MLR would generate more than $34-million a year in direct wages and salaries.

2.2.5.2 Total Household Income

The estimate of direct employment salary and wage income is relatively straightforward compared to the estimate of total employment income from direct, indirect and induced employment throughout the state. In the second instance, the dispersion of indirect and induced employment effects among many industries and the lack of appropriate data make it difficult to project income for these separate categories. However, projections of total household income statewide resulting from MLR development can be made based on visitor expenditure levels.

According to DPED estimates, in 1980 every dollar spent by a visitor to Hawai'i generated $0.74 in income to households. Based on the visitor expenditures expected to be generated by the resort's new facilities, resulting total additional household income is projected by Peat, Marwick to be as shown below.

IV-71
<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1990 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction(2)</td>
<td>$4.77</td>
<td>4.78</td>
<td>4.24</td>
<td>4.00</td>
<td>7.25</td>
<td>6.51</td>
<td>-</td>
</tr>
<tr>
<td>Hotel and resort(3)</td>
<td>7.73</td>
<td>7.81</td>
<td>13.01</td>
<td>13.00</td>
<td>19.47</td>
<td>19.15</td>
<td>49.66</td>
</tr>
<tr>
<td>Commercial(4)</td>
<td>1.11</td>
<td>1.03</td>
<td>2.13</td>
<td>1.96</td>
<td>4.01</td>
<td>3.59</td>
<td>7.74</td>
</tr>
<tr>
<td>Total personal income</td>
<td>$13.61</td>
<td>13.62</td>
<td>19.38</td>
<td>18.96</td>
<td>30.73</td>
<td>29.25</td>
<td>57.40</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Average annual wage of $21,700, reflecting a projection of 30% workers from off-island. Based on the State Department of Labor and Industrial Relation's report on covered wages in the construction industry in the State and in the County of Hawaii in 1983.

(3) Excluding tips. Hotel, resort residential, and Resort administration employment wages projected at the 1983 county hotel industry average of $11,313.

(4) Commercial sector wages projected at $7,801, based on average wages in applicable retail industry classifications, weighted by the observed distribution of direct visitor-related expenditures in 1982.

Sources: State of Hawaii, Department of Labor and Industrial Relations, Employment and Payrolls in Hawaii, 1983 and Department of Planning and Economic Development, 1983 Data Book.
Total Annual Household Income From
Visitor Expenditures Generated at
Planned Facilities
(1983 dollars - millions)

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing master plan</td>
<td>$34.3</td>
<td>$61.7</td>
<td>$96.4</td>
</tr>
<tr>
<td>Revised master plan</td>
<td>33.6</td>
<td>60.2</td>
<td>92.8</td>
</tr>
</tbody>
</table>

Because of its slower rate of unit absorption, the revised master plan is expected to generate slightly less total household income statewide up through the year 2000. Because the units in the revised plan would attract a wealthier clientele, household income might be somewhat higher at ultimate development of the revised plan than for the existing plan.

2.2.6 State and County Revenue and Expenditure Analysis

The net revenues derived from continued development at MLR can be estimated by comparing projections of tax revenues and expenditures. Following an estimate of public sector revenues from state and county tax collections, a revenue and expenditure analysis is performed first for the State and then for the County.

2.2.6.1 Public Sector Revenues

In this section, total annual public sector revenues attributable to development at MLR are estimated. County revenues are then projected; finally an estimate of state revenues is obtained by subtracting county revenues from the total.

Based on data contained in the the 1983 Data Book (DPED Input/Output Model), the ratio of tax revenues to visitor-related direct expenditures ranged from 0.106 to 0.111 in recent years. Assuming that State and County tax collections will be $0.11 for every dollar of direct visitor expenditure, public revenues will amount to about $3-milion in 1990, $9-milion in 1995, $14-milion in 2000, and more than $37-milion at potential maximum development (in 1983 dollars). These figures are projected for development under either the existing or proposed master plan.

Of the above totals, the revenues received by the County are assumed by Peat, Marwick to approximate County real estate collections. This approximation is deemed valid based on the following: (1) the Tax Foundation of Hawaii, in Government in Hawaii, estimates that real property taxes account for nearly 90 percent of tax revenues to the County of Hawaii, and (2) other sources of county revenue such as liquid fuels, utility franchises and motor vehicle weight tax, are less directly tied to the construction and operation of resort facilities.

Table IV-2.18 shows the calculation of real property tax revenues attributable to development of MLR under the existing and revised master plans. Additional County tax revenues would be somewhat higher according to the existing master plan through 2000, then become somewhat lower at potential maximum development. The majority of County revenues will come from property taxes on multifamily units at the resort throughout the project.
### Table IV-2.18

**MAUNA LANI RESORT**

Projected Real Property Tax Revenues Attributable to Development at Mauna Lani Resort

1990 to Potential Maximum

(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th>Source of property revenue</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing Master Plan</td>
<td>Revised Master Plan</td>
<td>Existing Master Plan</td>
<td>Revised Master Plan</td>
</tr>
<tr>
<td>Hotel units(2)</td>
<td>$ .41</td>
<td>$ .41</td>
<td>.71</td>
<td>.71</td>
</tr>
<tr>
<td>Multifamily units(3)</td>
<td>1.72</td>
<td>1.52</td>
<td>3.44</td>
<td>3.07</td>
</tr>
<tr>
<td>Single-family units(4)</td>
<td>.14</td>
<td>.18</td>
<td>.32</td>
<td>.40</td>
</tr>
<tr>
<td>Single-family lots(5)</td>
<td>.06</td>
<td>.07</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>Commercial space(6)</td>
<td>.03</td>
<td>.03</td>
<td>.06</td>
<td>.05</td>
</tr>
<tr>
<td>Second golf course(7)</td>
<td>-</td>
<td>.01</td>
<td>-</td>
<td>.01</td>
</tr>
<tr>
<td><strong>Total revenues</strong></td>
<td>$ 2.36</td>
<td>2.22</td>
<td>4.63</td>
<td>4.36</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Collections projected to be proportionate to those paid at Mauna Lani Bay Hotel.

(3) Real property taxes estimated at an assessed value of $450,000 per unit and the current county tax rate of $8.50 per $1,000 assessed value.

(4) Real property taxes estimated at an assessed value of $800,000 per unit (including land) and the current county tax rate of $8.50 per $1,000 assessed value.

(5) Real property taxes estimated at an assessed value of $350,000 per unbuilt lot and the current county tax rate of $8.50 per $1,000 assessed value.

(6) Assessed value per net leasable square foot based on estimates provided by Mauna Lani Resort. Real property taxes projected at current county rate of $8.50 per $1,000 assessed value on buildings and $10 per assessed value on land.

(7) New golf course, including 20 acres located on state leased land, valued at $5,500 per acre. Real property taxes projected at current county rate of $10 per $1,000 assess value.

Source: Peat, Marwick, Mitchell & Co.
Estimated annual tax collections by the state are the difference between total tax revenues and county tax collections. Under either the existing or revised master plan, they are expected to increase from about $5-million a year in 1990 to $14-million in 2000, with an ultimate $37-million per year at potential maximum development (see Exhibit II-V in Appendix B).

2.2.6.2 State Revenues and Expenditures

New facilities development at MLR will be accompanied by increased visitors and on-site population who will require increased expenditures of public resources. Some public costs are assigned to visitors; these same costs are assigned to residents as are other government costs. State government expenditures averaged $2,137 per resident and $400 per visitor in 1983 (See Exhibit II-W in Appendix B).

Per capita expenditures are multiplied by projected numbers of visitors and residents at MLR to arrive at additional state expenditures incurred on their behalf. Results would be similar under the existing or revised master plan (See Exhibit II-X in Appendix B). Comparing revenues derived from resort development at Mauna Lani with associated expenditures, revenues to the State exceed costs in all periods according to either master plan.

2.2.6.3 County Revenues and Expenditures

A similar analysis may be performed to project additional net revenues for the County (see Exhibits II-Z and II-AA in Appendix B). County government expenditures averaged $547 per resident and $993 per visitor in 1983. As for the State, revenues exceed expenditures for the County in all periods under either master plan, with the existing master plan providing somewhat higher net additional revenue for the first ten years and about the same net revenues from the year 2000 (See Exhibit II-BB in Appendix B).

2.2.7 Social Impacts

Potential social effects resulting from development at MLR have been addressed in detail in the environmental impact statement (EIS) prepared in 1974 for Mauna Loa Land, Inc., a predecessor to Mauna Lani Resort, Inc. In general, the extent of development then-proposed and now-envisioned is almost the same, with the same number of units planned for ultimate development, although the character of the resort has changed somewhat to a lower density golf-oriented community. Potential social impacts as a result of MLR development, as presented in the earlier EIS, in general remain valid; these impacts may be less severe given the intervening years and other resort development in the Kohala Coast resort region.

The Environs Pacific study anticipates several areas of potential social impact, reflecting concerns voiced by those interviewed for the study. These same concerns have been raised in other studies performed in conjunction with analysis of potential impacts due to resort development, particularly on the Kohala coast.

2.2.7.1 Effects on Family Structure

Increased numbers of women in the workforce. With growing employment opportunities in the visitor industry, in particular at planned resorts such as MLR, increasing numbers of women hold jobs outside the home. Although this employment contributes positively to household income, negative impacts associated with family cohesion and
stability are perceived to be prevalent. These include lack of supervision of school-age children who thus have more opportunities for engaging in socially unacceptable behavior.

Shift work. A common feature of visitor industry employment is shift work. This can be disruptive to family routines, particularly when both spouses work within the industry. The lack of shared time at home hinders communications between parents and among parents and children.

Exposure to persons of the opposite sex. Resort employment provides workers with opportunities for social interaction with persons of the opposite sex, both fellow workers and visitors. Such exposure increases the chance for mild or serious flirtation. These can be reported back to the spouse through gossip networks, and this can increase jealousy and mistrust, with detrimental effect on the family.

2.2.7.2 Effects on Social Structure and Community Character

Impacts of resort development on local residents' values, lifestyles, and "quality of life" are indirect and difficult to measure. Nevertheless, these effects have been felt during recent development on the Kohala coast and are expected to continue to be significant, particularly in the long run. These stresses are expected to evolve as social and economic conditions change. To some extent, it is possible to identify effects that can be expected to increase along with resort development.

Exposure to new customs and cultures. Many of those surveyed viewed positively the opportunities for interaction between local residents and visitors that provide exposure to new customs and cultures. However, imported values may have a negative effect on local life styles, which many are reluctant to forego in favor of less traditional life styles.

Cultural adjustments. Further development of resort facilities will attract some employees from outside Hawaii County. Based on the experience of existing Kohala coast resort facilities, most in-migrants will be Caucasians moving in from the mainland U.S. and other Hawaii islands to fill upper level positions. Asian immigrants will probably also become part of the resort work force, if the experience of other Hawaii resort areas is paralleled on the Big Island. In both cases, there will be problems of intercultural adjustment among groups, with potential for stressful relations between different ethnic and class groups.

Cultural isolation. In-migrant workers and their families tend to cluster together physically and socially in separate ethnic groups, increasing community problems aggravated by such isolation. Environ's Pacific notes, however, that the clustering of various ethnic groups is not a new phenomenon brought on by growth of the visitor industry, but rather has been the norm for the region.

Opportunities for employment. In addition to providing opportunities for employment, development on the Kohala coast increases the market for local handicrafts and art, thus encouraging the preservation of an important part of Hawaiian culture.

Erosion of the "aloha spirit". It is generally believed that the "aloha spirit" has not been eroded in the Kohala coast resort region to the same degree as at resorts catering to large tour groups. Proposed development at Mauna Lani Resort will continue to be of the same luxury quality that characterizes existing MLR development, facilitating the preservation of the "aloha spirit."
Traditional use of public areas. An influx of visitors associated with resort development at Mauna Lani will affect the traditional use of public areas, particularly beaches which are not abundant on the island of Hawaii. Also perceived as potential areas of impact are shoreline trails and fishing grounds. In some cases, it is expected that resort development will enhance access to these traditional recreational areas.

2.2.7.3 Crime Impacts

Crime is a major concern of island residents, with some feeling that crime rates tend to rise with increased visitor activity. Crime data nationwide and in Hawaii contain contradictory conclusions. Studies done for projects in Hawaii for the most part do not link major crime with increased tourism. However, according to Environ Pacific, the Waimea and Kona police do recognize a link between visitor industry development and certain types of petty crime such as theft. In particular, they note the increase in theft at beach parks over the past several years as resort development has spread. Concurring with studies performed, the police do not feel that there is a direct link between increased visitor population and more serious crimes such as assault, rape, and murder. They believe, however, that visitors constitute a market for drug trafficking and that this market will continue to expand along with the planned resorts, leading to drug related crimes.

Another area for potential criminal acts is one identified in other visitor industry studies: the indirect effect of tourism on crime through conflicts between long-time residents and newcomers who may be employed at resorts. Physical confrontations may lead to assault charges against either party.
3. TRANSPORTATION FACILITIES

3.1 EXISTING TRANSPORTATION FACILITIES

3.1.1 Highway Network

Major roadways in the West Hawai‘i Region are shown on Figure II-1. Access to the Mauna Lani Resort (MLR), as well as to the other major resorts within the Kohala Coast Resort Region, is provided by Queen Ka‘ahumanu Highway. Completed in 1975, this 33-mile long, two-lane, controlled-access State Highway links major resort development along the coast with Keahole Airport and the resort town of Kailua-Kona to the South and, via a connection with the Waimea-Kawaihae Road, with Kawaihae Harbor, Aloni Pule Highway, and Walmea to the north. The Hawai‘i Belt Road (Mamalaho‘a Highway) serves the upland areas of North Kona and South Kohala. Queen Ka‘ahumanu Highway and the Hawai‘i Belt Road are connected by the Waimea-Kawaihae Road (about six miles north of the Mauna Lani Resort), Waikoloa Road, (about two miles south of the MLR), Kal’imi Nani Street (known also as the Kona Palisade Subdivision Road, and located just south of Keahole Airport), and by Palani Road at Kailua-Kona.

3.1.2 Airports

Three airports serve the Kohala Coast Resort Region. Two, Keahole and Walmea-Kekaha, are operated by the State Department of Transportation. The third, the recently opened Waikoloa Airport, is operated by Princeville Airways. The Kamuela and Waikoloa airports are used primarily by commuter airlines and private aircraft.

Keahole Airport is located slightly more than 20 miles south of the Mauna Lani Resort. It is served by all three of the major interisland air carriers, as well as by several of the commuter airlines and air cargo companies. In 1984, Keahole Airport handled almost 1.3 million passengers.

Keahole Airport’s 6,900-foot long runway is adequate for the largest interisland aircraft. Wide-bodied jet aircraft, such as the DC-10 and L-1011, now make direct flights into it from the West Coast of the United States. However, the runway is too short to permit these aircraft to take off with a full load of fuel. Hence, return flights to the mainland require a stop at General Lyman Field in Hilo or Kahului Airport on Maui. These airports have longer runways, and the aircraft are able to take on additional fuel and passengers at them before proceeding on to the mainland.

3.1.3 Harbors

Developed into a deep-water harbor by the U.S. Army Corps of Engineers in 1959, Kawaihae Harbor is used primarily by interisland barges. The primary cargo handled is building materials, consumer goods, large equipment and machinery, as well as the provisions and supplies needed to operate the hotels in South Kohala and Kona.
3.2 IMPACTS ON TRANSPORTATION FACILITIES

3.2.1 Introduction

Thus far, only a small fraction of the hotel and residential units planned for the Mauna Lani Resort (MLR) have been constructed. Hence, while traffic on the resort entrance road (Mauna Lani Drive) is light, ongoing development will lead to much higher traffic on it within the foreseeable future. Moreover, the Mauna Lani Resort is not being developed in isolation. Rather, it is only one of three major resort projects now underway in the South Kohala Resort Region. The other two -- the Waikoloa Beach Resort (WBR) and the Mauna Kea/Hapuna Resort (MKR) -- as well as ancillary and independent development at Puako, Waikoloa, Kawaihae, and elsewhere, are also growing. This continuing regional growth will generate major increases in the number of vehicles using Queen Ka'ahumanu Highway; it will also increase the volume of passengers and goods passing through Keahole Airport. The significance of traffic generated by ongoing development at the Mauna Lani Resort can only be judged within this context.

The remainder of this discussion is divided into five parts. Section 3.2.2 describes existing vehicular traffic volumes and trends on the roads most impacted by the Mauna Lani Resort project. Section 3.2.3 discusses expected traffic generation rates and turning movement percentages, and vehicle-types expected from the MLR and other traffic sources that would directly affect Queen Ka'ahumanu Highway. Section 3.2.4 combines data on existing traffic volumes with estimates of project- and non-project-related traffic to forecast total future traffic volumes. Section 3.2.5 compares these projected volumes with estimates of highway capacity to determine the level of service that can be expected on Queen Ka'ahumanu Highway if the proposed plans are implemented; it also discusses long-range highway improvement needs and possible mitigation measures. Finally, Section 3.2.6 discusses the ability of existing and proposed airport facilities to accommodate projected increases in volume.

In reading the section, readers should keep two important facts in mind:

1. First, and perhaps most importantly, approval of the State Land Use District boundary amendment being requested would not substantially affect the rate, basic character, or ultimate magnitude of development at the Mauna Lani Resort or of the traffic which it would generate. Hence, while future traffic volumes on Queen Ka'ahumanu Highway will increase markedly in future years, the increase would be essentially the same for the "with-" and "without-project" scenarios.

2. Secondly, long-range forecasts such as are presented here are no better than the land use/development scenarios on which they are based. To the extent that the rate of development in the coastal resorts (which are the primary drivers in the regional economy) exceeds that now expected, traffic volumes might also increase more rapidly than projected. Similarly, slower than expected development rates will result in less traffic. In view of the foregoing, it is perhaps most useful to treat the discussion as an indication of the kinds of problems that may arise in future years rather than an exact timetable.
3.2.2 Past and Present Highway Traffic Volumes

3.2.2.1 Existing Highway Traffic on Queen Ka'ahumanu Highway

The results of past 24-hour counts at selected locations on Queen Ka'ahumanu Highway are summarized in Table IV-3.1. They show significant growth in highway traffic since the roadway opened in 1975.

Because the State counts have been taken only bi-annually, it is impossible to correlate the increases that have been recorded with the opening of specific projects at the Waikoloa Beach Resort, the Mauna Lani Resort, or the Mauna Kea Resort. However, traffic counts on the entrance roads to all three resorts, as well as changes in traffic volumes on Queen Ka'ahumanu Highway, suggest that vehicles moving to and from the WBR and MLR (both of which opened after 1975) may account for between one-third and one-half of all the vehicles now traveling on it. The MKR has been a major source of traffic on the highway since it opened, and it is clear that South Kohala resort development will remain by far the most significant generator of traffic.

Waikoloa Road joins Queen Ka'ahumanu Highway at a T-intersection located between the entrance roads to the MLR and the WBR. Traffic on it also climbed substantially over the past eight years. This is due to expansion of the coastal resorts and growth of the resident population in Waikoloa Village.

In 1982 and 1984, peak-hour traffic on Queen Ka'ahumanu Highway ranged from 7.0 to 10.7 percent of the 24-hour volume. The afternoon peak, which generally occurs between 3:30 and 4:00, is noticeably higher than the morning peak. The latter occurs in mid-morning (between 10:30 and 11:30 am) rather than during the 7:00-8:00 period more typical of urban, non-resort areas.

The most recent vehicle-type classification study on Queen Ka'ahumanu Highway was conducted in 1978 before construction of the two newest resorts had been started. At that time, approximately 9% percent of the trips were made by passenger cars and light single-unit trucks, 15 percent were made by buses, and 45 percent were made by medium and heavy trucks. In view of the increased visitor traffic through the area in recent years and the relatively low percentage of trucks and buses observed on resort entrance roads in South Kohala, it is considered likely that the percentage of medium and heavy trucks on Queen Ka'ahumanu Highway has decreased markedly since the 1978 classification study. This supposition is supported by data from a 9-hour count conducted by Belt, Collins & Associates at the entrance to the Mauna Lani Resort in February 1984.

3.2.2.2 Traffic on the Mauna Lani Resort Entrance Road

Currently, traffic on Mauna Lani Drive, the entrance road to the Mauna Lani Resort, is relatively light. A count taken immediately makai of its intersection with Queen Ka'ahumanu Highway on 24 February, 1984 recorded a total of 1,466 vehicle-trips between 8:15 am and 5:15 pm. No 24-hour figures are available for Mauna Lani Drive, but if the temporal distribution of traffic at the MLR is roughly the same as it is at the nearby Mauna Kea Resort (Belt, Collins & Associates, 1979), then total traffic into and out of the MLR on the day of the count amounted to approximately 2,200 vehicle-trips (see Table IV-3.2).
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<thead>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawaihae-Waiakea Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>1,172</td>
<td>1,500</td>
<td>28.0%</td>
<td>1,292</td>
<td>1,692</td>
<td>-13.9%</td>
<td>2,049</td>
<td>21.1%</td>
</tr>
<tr>
<td>Southbound</td>
<td>1,106</td>
<td>1,585</td>
<td>33.6%</td>
<td>1,526</td>
<td>1,753</td>
<td>-5.7%</td>
<td>2,137</td>
<td>21.9%</td>
</tr>
<tr>
<td>Total</td>
<td>2,278</td>
<td>3,085</td>
<td>30.3%</td>
<td>2,818</td>
<td>3,445</td>
<td>-8.7%</td>
<td>4,186</td>
<td>21.5%</td>
</tr>
<tr>
<td>North of Waikoloa Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>593</td>
<td>686</td>
<td>15.0%</td>
<td>647</td>
<td>1,104</td>
<td>-27.0%</td>
<td>1,717</td>
<td>45.0%</td>
</tr>
<tr>
<td>Southbound</td>
<td>569</td>
<td>803</td>
<td>39.1%</td>
<td>941</td>
<td>1,389</td>
<td>1.2%</td>
<td>2,050</td>
<td>37.2%</td>
</tr>
<tr>
<td>Total</td>
<td>1,162</td>
<td>1,489</td>
<td>52.2%</td>
<td>1,541</td>
<td>2,493</td>
<td>-12.9%</td>
<td>3,767</td>
<td>37.2%</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>607</td>
<td>850</td>
<td>40.0%</td>
<td>645</td>
<td>1,346</td>
<td>-24.1%</td>
<td>1,707</td>
<td>26.8%</td>
</tr>
<tr>
<td>Southbound</td>
<td>575</td>
<td>942</td>
<td>46.4%</td>
<td>785</td>
<td>1,409</td>
<td>-6.8%</td>
<td>2,208</td>
<td>38.7%</td>
</tr>
<tr>
<td>Total</td>
<td>1,182</td>
<td>1,792</td>
<td>43.1%</td>
<td>1,430</td>
<td>2,755</td>
<td>-15.3%</td>
<td>3,915</td>
<td>27.0%</td>
</tr>
<tr>
<td>North of Kekaha Airport Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>850</td>
<td>1,127</td>
<td>31.4%</td>
<td>775</td>
<td>1,478</td>
<td>-31.2%</td>
<td>1,946</td>
<td>33.0%</td>
</tr>
<tr>
<td>Southbound</td>
<td>551</td>
<td>713</td>
<td>29.0%</td>
<td>643</td>
<td>1,520</td>
<td>-45.6%</td>
<td>1,945</td>
<td>28.0%</td>
</tr>
<tr>
<td>Total</td>
<td>1,401</td>
<td>1,840</td>
<td>35.2%</td>
<td>1,418</td>
<td>2,998</td>
<td>-38.6%</td>
<td>3,891</td>
<td>30.5%</td>
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<tr>
<td>South of Kekaha Airport Road</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>1,581</td>
<td>2,233</td>
<td>41.2%</td>
<td>2,113</td>
<td>2,549</td>
<td>-5.4%</td>
<td>3,607</td>
<td>41.5%</td>
</tr>
<tr>
<td>Southbound</td>
<td>1,594</td>
<td>2,304</td>
<td>44.3%</td>
<td>2,107</td>
<td>2,707</td>
<td>-8.6%</td>
<td>3,484</td>
<td>28.7%</td>
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<tr>
<td>Total</td>
<td>3,175</td>
<td>4,537</td>
<td>42.9%</td>
<td>4,220</td>
<td>5,256</td>
<td>-7.0%</td>
<td>7,091</td>
<td>34.9%</td>
</tr>
</tbody>
</table>

Source: State of Hawai'i Department of Transportation; compiled by Belt, Collins & Associates
### TABLE IV-3.2 EXISTING TRAFFIC ON MLR ENTRANCE ROAD BY 15-MINUTE AND HOURLY PERIODS, WITH DIRECTIONALITY AND PEAKING FACTORS.

<table>
<thead>
<tr>
<th>TIME</th>
<th>In From North</th>
<th>In From South</th>
<th>In Total</th>
<th>Out To South</th>
<th>Out To North</th>
<th>Total Out</th>
<th>Two-Way Total</th>
<th>Hourly Totals</th>
<th>Hour As Percent of 24-hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:15-8:30</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>14</td>
<td>19</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:45-9:00am</td>
<td>6</td>
<td>26</td>
<td>29</td>
<td>1</td>
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<td>6</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9:00-9:15</td>
<td>4</td>
<td>30</td>
<td>34</td>
<td>4</td>
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<td>10</td>
<td>40</td>
<td>86</td>
<td>19</td>
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<td>5</td>
<td>24</td>
<td>29</td>
<td>4</td>
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<td>13</td>
<td>42</td>
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<td>6</td>
<td>26</td>
<td>22</td>
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<td>3</td>
<td>5</td>
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<td>9:45-10:00am</td>
<td>10</td>
<td>33</td>
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<td>11</td>
<td>54</td>
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<td>44</td>
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<td>7</td>
<td>11</td>
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<td>10:15-10:30</td>
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<tr>
<td>10:45-11:00am</td>
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<td>10</td>
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<td>15</td>
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<td>11:45-12:00pm</td>
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<td>21</td>
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</tr>
<tr>
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<td>10</td>
<td>17</td>
<td>8</td>
<td>5</td>
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<td>30</td>
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<td>62</td>
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<td>18</td>
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<tr>
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<td>13</td>
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<td>23</td>
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<td>52</td>
<td>91</td>
<td>70</td>
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<td>2:15-2:30</td>
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<td>11</td>
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<td>28</td>
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<td>11</td>
<td>26</td>
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<td>11</td>
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<td>7</td>
<td>20</td>
<td>35</td>
<td>60</td>
<td>103</td>
<td>163</td>
</tr>
</tbody>
</table>

9-Hour Total: 328 489 817 299 350 649 1,466 817 649 1,466 65.5%

24-Hour Total: 817 649 2,238

Source: Felt, Collins & Associates
3.2.3 Project-Related Traffic

3.2.3.1 Trip-Generation Rate

The Mauna Lani Resort contains a number of different types of land uses, each of which has its own characteristic traffic generation rate. In terms of their impact on total traffic entering and leaving the resort, the proposed hotels and multi-family housing are the most significant.

Traffic counts conducted over the past five years on the entrance roads to the various South Kohala Resorts show the following trip-generation rates:

<table>
<thead>
<tr>
<th>Resort Project</th>
<th>Date</th>
<th>Veh.-Trips/Day Per Hotel Room</th>
<th>AM Peak-Hr.</th>
<th>PM Peak-Hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mauna Kea Resort</td>
<td>1/4-5/79</td>
<td>5.5</td>
<td>6.9%</td>
<td>10.9%</td>
</tr>
<tr>
<td></td>
<td>2/24/84</td>
<td>6.5</td>
<td>9.6%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Mauna Lani Resort</td>
<td>2/22/84</td>
<td>5.4</td>
<td>7.4%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Waikoloa Beach Resort</td>
<td>3/30/84</td>
<td>2.5</td>
<td>7.9%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

These trip generation rates represent traffic that leaves the resort property; they do not account for trips whose origins and destinations both lie within the confines of the resort (as when a visitor drives his/her car from a hotel to the golf course or when a service vehicle makes multiple stops within the resort). No quantitative data regarding the extent of such internal trips are available, but qualitative observations, as well as the limited number of potential destinations within the resorts during their present (early) stage of development indicate that such internal trips currently constitute a very small percentage of the total trips made.

The trip generation rate for hotels at the Waikoloa Beach Resort is much lower than for the others listed. This probably stems at least in part from the fact that the WBR count was made in August, when the occupancy rate of the Sheraton Royal Waikoloa Hotel (the only hotel that has been completed) was quite low, while the counts at the Mauna Lani and Mauna Kea Resorts took place in February, which is typically a high occupancy month. A figure of 5.5 vehicle-trips per hotel room is believed to be the most appropriate for general usage, and it has been used in this report.

Trip generation rates for multi-family apartment (resort condominium) units vary greatly. Moreover, whereas the existing South Kohala hotels provide a good source of empirical evidence for trip-generation by hotels, data of comparable quality is lacking for resort condominiums. For the purposes of this report, such units were assumed to generate six vehicle-trips per day per occupied unit and to have peak-month occupancy rates of approximately 70 percent. Other traffic generation rates used in projecting traffic from the proposed project and from other regional development affecting traffic volumes on Queen Ka'ahumanu Highway are 6.0 vehicle-trips per occupied single-family unit per day (with average occupancy of 45 percent), 5.0 vehicle-trips per day per thousand square feet of commercial space, and 100 vehicle-trips per day per 18-hole golf course. The great majority of the usage of the commercial space and golf course will come from guests of the resorts; these users are...
already present on the resort site and do not generate additional off-site trips. Hence, the increased traffic estimated for them is related primarily to employee traffic.

3.2.3.2 Turning Movements

In order to project future traffic volumes on Queen Ka'ahumanu Highway, it is necessary to estimate the origins and destinations (and, hence, the turning movements) patterns of arriving and departing vehicles. Since estimates of non-project related traffic volumes on Queen Ka'ahumanu Highway were needed in order to assess the effects of continued development of the Mauna Lani Resort, this had to be done not only at the Mauna Lani Drive/Queen Ka'ahumanu Highway intersection, but at the other major intersections between Waimea-Kawaihae Road and the Waikoloa Beach Resort as well. In preparing these estimates, turning movement data from the Waikoloa Beach Resort, the Mauna Kea Resort, and the Mauna Lani Resort was collected and analyzed. This data is summarized in Table IV-3.3. They indicate that during the morning and afternoon peak hours, approximately 60 percent of the traffic leaving all three resorts turns north onto Queen Ka'ahumanu Highway, while only 40 percent turns south. Roughly the same directional splits were observed for entering traffic.

The traffic patterns referred to above are the result of the current split of visitor and employee traffic at the resorts, as well as a reflection of the current geographic distribution of employees' homes and regional visitor attractions. As the number of persons employed in the region increases, significant expansion of the housing stock in the region is to be expected, and the distribution of these new residences is expected to differ somewhat from that which currently exists. As a result, turning movement patterns are expected to change as well. To account for this, adjustments to the turning movement percentages were made before applying them to the projected unit totals in future years.

3.2.3.3 Vehicle-Type Classification

Data on the types of vehicles using Mauna Lani Drive was collected at the same time the vehicle counts were made in early 1984. They indicate that approximately 97 percent of the trips on the entrance road are made by automobiles, pickup trucks, and vans; two percent of the trips are by medium and heavy trucks; and one percent is by buses. Given the similar types of land uses that are involved, it is reasonable to assume that this pattern will continue in the future at the Mauna Lani Resort.

3.2.4 Forecast Traffic Volumes

3.2.4.1 Introduction

As previously indicated, the proposed change in the Urban boundary of the Mauna Lani Resort is intended to permit the applicants to reduce the overall density of their project and to provide an additional golf course for use by guests of the already-planned hotels. It would not significantly affect the overall development timetable or result in more, or different types, of units being constructed than is possible under the existing designation. Hence, strictly speaking, the proposed action would not result in higher traffic volumes on the resort entrance road or on Queen Ka'ahumanu Highway than would otherwise be the case. In other words, with respect to traffic, there is no measurable difference between the "with" and "without" project scenarios. At the same time, it was deemed likely that the proposed boundary amendment might arouse concerns over possible traffic congestion. Hence, a detailed analysis of regional traffic volumes was conducted.
Table IV-3.3

Historical Peak-Hour Turning Movement Percentages

<table>
<thead>
<tr>
<th>Observed Turning Movements at Resorts' Entrance Roads During Peak Hour as % of Total Traffic</th>
<th>WBR</th>
<th>MLR</th>
<th>MKB</th>
<th>Projected Hyatt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.M. Peak:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directionality: (% In/% Out)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To North</td>
<td>61</td>
<td>53</td>
<td>69</td>
<td>60</td>
</tr>
<tr>
<td>To South</td>
<td>39</td>
<td>47</td>
<td>31</td>
<td>40</td>
</tr>
<tr>
<td>From North</td>
<td>56</td>
<td>40</td>
<td>64</td>
<td>60</td>
</tr>
<tr>
<td>From South</td>
<td>44</td>
<td>60</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td><strong>P.M. Peak:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directionality: (% In/% Out)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To North</td>
<td>46</td>
<td>54</td>
<td>32</td>
<td>45</td>
</tr>
<tr>
<td>To South</td>
<td>41</td>
<td>59</td>
<td>68</td>
<td>55</td>
</tr>
<tr>
<td>From North</td>
<td>60</td>
<td>43</td>
<td>63</td>
<td>60</td>
</tr>
<tr>
<td>From South</td>
<td>40</td>
<td>37</td>
<td>37</td>
<td>40</td>
</tr>
</tbody>
</table>

**Notes:**

1. WBR percentages are based on a traffic count taken Thursday, August 30, 1984.
2. Mauna Lani Resort percentages are based on a traffic count taken on Friday, February 24, 1984.
3. Mauna Kea Beach Resort percentages are based on a traffic count taken on Friday, February 24, 1984.
4. The projections for the Hyatt Regency Waikoloa are estimated averages based on behavior observed at other S. Kohala Resorts.
3.2.4.2 Mauna Lani Resort Traffic

Based on the trip generation rates discussed in Section 3.2.3.1 and on the development timetable given in Table II-3.1, future traffic volumes on Mauna Lani Drive were projected. As shown in Table IV-3.4, afternoon peak-hour traffic on Mauna Lani Drive is expected to increase to approximately 830 in 1995, to 1,250 in 2000, and to 2,500 when development of the resort is completed. Note that the figures shown are for the equivalent of average daily traffic. During peak occupancy periods in the hotels and resort condominiums, traffic volumes could be significantly greater.

3.2.4.3 Queen Ka'ahumanu Highway

All of the vehicles entering or leaving the Mauna Lani Resort must do so using Queen Ka'ahumanu Highway. Hence, the proposed project would have a substantial effect on regional, as well as local traffic. There is significant interplay between the Mauna Lani Resort and other resort and residential development within the region. In order to understand how traffic from the MLR would affect other intersections to the north and south, a simplified traffic model was constructed based on the traffic generation rates discussed previously, the best available estimates of the origin and destination of vehicles entering and leaving the various resorts, and forecast changes in the volume of through traffic, i.e., traffic on Queen Ka'ahumanu Highway which neither originates at nor is destined for the area between the Waikoloa Beach Resort and the Mauna Kea Resort.

Peak-hour traffic volumes at selected locations along Queen Ka'ahumanu Highway for the years 1990, 1995, 2000, and at completion of the Mauna Lani project (about 2010) are summarized in Table IV-3.4. As might be expected from the magnitude of the development that is planned, they show substantial increases over existing levels. The implications of this rise in traffic with respect to service levels and the probable need for highway improvements are discussed in Section 3.2.5.

3.2.5 Impact on Level of Service

In order to assess the significance of the effect that traffic from the Mauna Lani Resort would have on the level of service (i.e., the amount of congestion) of Queen Ka'ahumanu Highway, the traffic forecasts developed in the previous section were compared against the calculated capacity of Mauna Lani Drive, Queen Ka'ahumanu Highway, and the intersection of the two for each of the forecast years. The highway capacities were calculated using the methodology recommended by the Transportation Research Board of the National Academy of Sciences (1963 and 1980:37-72).

3.2.5.1 Segments of Queen Ka'ahumanu Highway Between Intersections

Open stretches of Queen Ka'ahumanu Highway (i.e., those away from intersections) can accommodate as many as 1,800 to 2,000 vehicles per hour (total in both directions). Currently, traffic volumes are relatively low, and the level of service provided is "A" (the best possible) at all times. The analysis conducted for this report suggests that these portions of Queen Ka'ahumanu Highway would provide adequate levels of service, i.e., "C" or better, until the year 2000.

The opening of units that are now planned for completion after that date will add further to traffic volumes, however. As a result, it is expected that the capacity of the existing two-lane roadway will be exceeded shortly after the turn of the century. At that time, additional lanes will be needed on Queen Ka'ahumanu Highway between
Table IV-3.4
Projected Peak Hour Traffic on Mauna Lani Drive and at Selected Locations on Queen Ka'ahumanu Highway: 1990, 1995, 2000, and Ultimate Development

<table>
<thead>
<tr>
<th>Location</th>
<th>Year 1990</th>
<th>Year 1995</th>
<th>Year 2000</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUTHBOUND ON QUEEN KA'AHUMANU HIGHWAY:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Appr. to Waimea-Kawaihae Road</td>
<td>320</td>
<td>470</td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td>- Between MKR and Puako Road</td>
<td>350</td>
<td>500</td>
<td>630</td>
<td>930</td>
</tr>
<tr>
<td>- Between Puako Road and MLR</td>
<td>370</td>
<td>520</td>
<td>660</td>
<td>980</td>
</tr>
<tr>
<td>- Between MLR and Waikoloa Road</td>
<td>400</td>
<td>570</td>
<td>730</td>
<td>1,120</td>
</tr>
<tr>
<td>- Between Waikoloa Rd. and WBR</td>
<td>410</td>
<td>590</td>
<td>750</td>
<td>1,110</td>
</tr>
<tr>
<td>- South of WBR</td>
<td>360</td>
<td>520</td>
<td>670</td>
<td>1,000</td>
</tr>
<tr>
<td>NORTHBOUND ON QUEEN KA'AHUMANU HIGHWAY:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Approach to WBR</td>
<td>230</td>
<td>320</td>
<td>610</td>
<td>630</td>
</tr>
<tr>
<td>- Between WBR and Waikoloa Road</td>
<td>390</td>
<td>550</td>
<td>700</td>
<td>1,010</td>
</tr>
<tr>
<td>- Between Waikoloa Rd. and MLR</td>
<td>360</td>
<td>510</td>
<td>640</td>
<td>960</td>
</tr>
<tr>
<td>- Between MLR and Puako Road</td>
<td>430</td>
<td>610</td>
<td>790</td>
<td>1,270</td>
</tr>
<tr>
<td>- Between Puako Road and MKR</td>
<td>390</td>
<td>550</td>
<td>720</td>
<td>1,140</td>
</tr>
<tr>
<td>- Between MKR and Waimea-Kawaihae Rd.</td>
<td>410</td>
<td>570</td>
<td>730</td>
<td>1,150</td>
</tr>
<tr>
<td>MAUNA LANI DRIVE:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Inbound from North</td>
<td>95</td>
<td>145</td>
<td>220</td>
<td>440</td>
</tr>
<tr>
<td>- Inbound from South</td>
<td>130</td>
<td>195</td>
<td>290</td>
<td>590</td>
</tr>
<tr>
<td>TOTAL INBOUND =</td>
<td>225</td>
<td>340</td>
<td>510</td>
<td>1,030</td>
</tr>
<tr>
<td>- Outbound to North</td>
<td>195</td>
<td>295</td>
<td>465</td>
<td>890</td>
</tr>
<tr>
<td>- Outbound to South</td>
<td>130</td>
<td>195</td>
<td>295</td>
<td>590</td>
</tr>
<tr>
<td>TOTAL OUTBOUND =</td>
<td>325</td>
<td>490</td>
<td>740</td>
<td>1,480</td>
</tr>
<tr>
<td>MAUNA LANI DRIVE TOTAL =</td>
<td>550</td>
<td>830</td>
<td>1,250</td>
<td>2,510</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates
Kailua-Kona and the Waimea-Kawaihau Road. While no specific analysis of it was conducted as part of this study, it is likely that construction of the new Waimea-Kawaihau Road, or at least improvements to the Waimea-Kawaihau intersection, will be needed as well. The capacities of Waikoloa Road and Pauoa Beach Road, the other major non-resort roads in the region, appear to be adequate for projected long-term growth (although signalization of the intersections will probably be required because of the heavy through traffic on Queen Ka'ahumanu Highway that is forecast at those locations.

3.2.5.2 Mauna Lani Drive/Queen Ka'ahumanu Intersection

While the between-intersection capacity of the highway will remain adequate for many years to come, traffic entering the existing unsignalized Mauna Lani Drive/Queen Ka'ahumanu Highway intersection will reach capacity (i.e., Service Level E) by about 1995. Intersection improvements will be required to accommodate increased traffic volume beyond 1995.

A means of increasing intersection capacity that can be considered is signalization, which could keep the intersection functional for several additional years. However, by the year 2000, if signalization were to be used, it would probably have to be supplemented by construction of an additional storage lane on Mauna Lani Drive for vehicles turning north out of the resort and an additional northbound lane on Queen Ka'ahumanu in the immediate vicinity of the intersection. Soon after, even these provisions would become inadequate, and maintenance of adequate level of service would require construction of an interchange and widening of the highway. This requirement is attributable not just to the Mauna Lani Resort, but rather to the overall growth in highway traffic associated with regional development.

Signalization, although relatively inexpensive, is not acceptable to Mauna Lani Resort, Inc.'s current thinking. An alternative would be to consider undertaking other means of increasing intersection capacity, (the construction of a storage lane or an interchange, or highway widening) sooner than if signalization were first to be implemented. Specific improvements to the intersection cannot be precisely characterized during this early stage of planning. As development progresses at Mauna Lani Resort, it is expected that further analysis of intersection requirements will be performed. Any intersection improvements that are proposed will be coordinated with the Highways Division of the State Department of Transportation.

It is worth noting that the intersection capacity deficits described above are not unique to the Mauna Lani Resort. Rather, they are typical of those that will be faced by all of three of the major resorts that front Queen Ka'ahumanu Highway. In fact, because of its more rapid development, it is expected that improvements to the Queen Ka'ahumanu Highway/Waikoloa Beach Resort Entrance Road intersection may be required as early as 1990, well before the time improvements will be needed at Mauna Lani. Queen Ka'ahumanu Highway itself is constructed within a 300-foot wide right-of-way; this is enough to accommodate any needed improvements.

Queen Ka'ahumanu Highway was constructed by the State of Hawai'i before work on the Mauna Lani Resort was begun. The existing intersection of the Highway and Mauna Lani Drive was built by the resort's owners. It is expected that Mauna Lani Resort, Inc., along with Mauna Kea Properties and Transcontinental will continue to work with the State and County in planning, scheduling and funding improvements to the respective resorts' intersections with Queen Ka'ahumanu Highway. Eventually, however, if projected resort growth bears out, the subsequent growth in regional
traffic will necessitate widening the highway to four lanes between the intersections as well. It is likely that the State Department of Transportation would undertake this as part of its normal transportation facility improvement program. However, the State Department of Transportation has stated that at this time, "the Highways Division does not foresee the availability of funds to widen the Queen Kaahumanu Highway." (Letter of June 18, 1985)

3.2.6 Air Transportation Facilities

Because of its visitor orientation, the development at the Mauna Lani Resort would generate a significant amount of air passenger traffic. Most of this would pass through Keahole Airport, but a small percentage might be expected to arrive and depart through the Waimea-Kohala Kamuela and Waikoloa airports as well.

The amount of air travel generated by development at the Mauna Lani Resort is primarily a function of the number of visitor units present, the average length of stay, and the average occupancy rates of the various visitor units. Persons residing on the resort and other residents of the region supported by project-related employment would also use the region's airports, but travel from those sources would be relatively minor in comparison to that generated by visitors to the resort.

Based on the average daily visitor census for the Mauna Lani Resort reported elsewhere in this report (see Table IV-2.11), 90 percent of the visitors to the resort arriving/departing through Keahole Airport, and one air trip by a resident for each 10 air trips by visitors, the Mauna Lani Resort would generate the following volume of air traffic:

<table>
<thead>
<tr>
<th>Average Length of Stay</th>
<th>Estimated Air Passenger Trips @ Keahole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1990</td>
</tr>
<tr>
<td>3.0 days</td>
<td>180,000</td>
</tr>
<tr>
<td>6.0 days</td>
<td>90,000</td>
</tr>
</tbody>
</table>

Depending upon the assumed length of stay, this suggests that the number of air passengers using Keahole Airport would increase from 50 to 100 percent over its 1983 level of 1.2 million as a result of the proposed project. This, together with even greater increases in passenger travel associated with other West Hawaii development makes it evident that substantial expansion of the terminal facilities will be required.

In addition to expanding the terminal facilities, it will also be necessary to lengthen the runway and make other changes in ground facilities to accommodate the larger aircraft used for direct flights to and from the mainland. Improvements to Keahole Airport are high on the State Department of Transportation's priority list, and an update of the Keahole Airport Master Plan is scheduled to begin this year. Adequate land area and revenues are available to support the needed improvements, and it is expected that they will be in place in time to meet the projected demand.
4. AIR QUALITY IMPACTS

4.1 INTRODUCTION

This section of the report assesses the impact that implementation of the revised master plan for the Mauna Lani Resort would have on local and regional air quality. The overall project is clearly an "indirect source" of air pollution as defined in the Federal Clean Air Act (United States Congress, August 1977) since its primary effect on air quality results from the vehicular traffic which it would generate. Other project-related sources of air pollution addressed below include construction activity and electrical power generation.

4.2 AIR QUALITY STANDARDS

A summary of State of Hawai‘i and national ambient air quality standards is presented in Table IV-4.1. Note that Hawai‘i's standards are not divided into primary and secondary categories. Moreover, they are more stringent than their Federal counterparts and are absolute ceiling values not to be exceeded at all, whereas the Federal standards allow one period per year in excess of the standard without being considered a violation. Amendments to the State's particulate matter and sulfur dioxide standards intended to make them equivalent to the Federal standards have been proposed, but the recommended changes are still under review by the State Department of Health's Air Advisory Committee for further review and consideration.

Primary standards are intended to protect public health with an adequate margin of safety, while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values. In the case of the automotive pollutants (carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox)), there are only primary standards.

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the Federal standards in light of new research findings (6). The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m3). The carbon monoxide (CO), particulate matter, sulfur dioxide (SO2), and nitrogen dioxide (NO2) standards are currently under review, but final action has not been taken yet (U.S. Environmental Protection Agency, April 29, 1985).

Finally, the State of Hawai‘i also has fugitive dust regulations for particulate matter (PM) emanating from construction activities (Hawai‘i, State of, Department of Health, Title 11, Chapter 60). There can be no visible emissions, and the maximum downwind level of PM cannot be more than 150 ug/m3 above upwind levels as measured with a Hi-Volume sampler for a 12-hour period. Elimination of the 150 ug/m3 standard has also been proposed in the same package of amendments discussed earlier.

4.3 EXISTING AIR QUALITY

While there are no continuous air monitoring stations in West Hawai‘i, the absence of large stationary sources and the relatively low existing vehicular traffic make it highly likely that existing air quality in the region is currently good most of the time. The nearest active State Department of Health air monitoring station is located some 60 miles east at Hilo. Data from that station suggest that the State's
<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Sampling Period</th>
<th>Federal Standards</th>
<th>State Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total Suspended Particulate Matter (TSP)</td>
<td>Annual Geometric Mean</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Annual Arithmetic Mean</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 24 Hours</td>
<td>260</td>
<td>150</td>
</tr>
<tr>
<td>2. Sulfur Dioxide (SO2)</td>
<td>Annual Arithmetic Mean</td>
<td>80</td>
<td>--</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Maximum Average in Any 24 Hours</td>
<td>365</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Maximum Average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Nitrogen Dioxide (NO2)</td>
<td>Annual Arithmetic Mean</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Carbon Monoxide (CO)</td>
<td>Maximum Average in Any 8 Hours</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>(milligrams per cubic meter)</td>
<td>Maximum Average in Any 1 Hour</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>5. Photochemical Oxidants (as O3)</td>
<td>Maximum Average in Any 1 Hour</td>
<td>240</td>
<td>100</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Lead (Pb)</td>
<td>Maximum Average in Any Calendar Quarter</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: State of Hawaii, Title 11, Chapter 59, Air Quality Standards Title 40, Code of Federal Regulations, Part 50
stringent standards are being met for sulfur dioxide and total suspended particulates. Unfortunately, the two principal automotive pollutants, carbon monoxide and oxides of nitrogen, are not monitored on the Island of Hawai‘i.

The worst air pollution episodes experienced in Hawai‘i County are due to periodic volcanic eruptions. While volcanic emissions are somewhat variable and have not been fully characterized, it is well known that visibility is affected by the presence of fine particulates resulting directly from volcanic activity as well as secondarily from forest fires caused by lava flows. In addition substantial increases in the ambient concentrations of mercury and sulfur dioxide have been recorded during eruptions.

Measurements of sulfur dioxide taken during the January 1983 eruptive phase, for example, indicated 24-hour concentration as high as 982 µg/m³ at the Volcano Observatory and 634 µg/m³ in Hilo. Despite the volcanic activity underway at the time, sulfur dioxide and particulate measurements made during January and March, 1983 in Kona and Hilo show that concentrations of those pollutants were relatively low. This was also true of the SO₂ data collected as part of the normal routine monitoring in Hilo during 1983. The low levels may be explained by the infrequent monitoring and variable wind directions.

Analysis of the airborne particulate matter during the eruption revealed some rather interesting results as unusually high concentrations of selenium, arsenic, indium, gold, and sulfur were found along with strikingly high concentrations of iridium (Zoller, W.H., et al., December 1978).

4.4 CLIMATE & METEOROLOGY

4.4.1 Temperature and Rainfall

There is little seasonal or diurnal temperature variation at the project site. As shown in Table IV-4.2, monthly temperature averages vary by only about 6 degrees from the warmest months (July and August) to the coolest (January and February).

An 18-year rainfall record also indicates that the area is rather dry with an annual average of only 10.65 inches. Monthly means range from 2.63 inches in January to 0.14 inch in July. Table IV-4.2 also includes a summary of this precipitation data.

4.4.2 Surface Winds

Raw data collected at the Mauna Kea Beach Hotel in 1967 have been previously reduced to produce an annual wind rose for the project site (Morrow, February 1979). The period of data collection ran from March through December, 1967, and totaled 3,785 hours. The annual wind rose is presented in graphical form in Figure IV-6. The data clearly indicate an east-west dichotomy. Closer examination of the raw data reveals the fact that the ESE-ENE winds generally occur during night, early morning and evening hours, while the WNW-W winds predominate during the daytime hours. This suggests a strong land-sea breeze regime which apparently dominates air movement in the area.
### Table IV-4.2
Temperature and Rainfall Data, Puako, Hawai’i

<table>
<thead>
<tr>
<th>Month</th>
<th>Temperature (deg F)</th>
<th>Rainfall (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>73.10</td>
<td>2.63</td>
</tr>
<tr>
<td>Feb</td>
<td>72.90</td>
<td>1.50</td>
</tr>
<tr>
<td>Mar</td>
<td>73.80</td>
<td>0.67</td>
</tr>
<tr>
<td>Apr</td>
<td>76.70</td>
<td>0.83</td>
</tr>
<tr>
<td>May</td>
<td>77.00</td>
<td>0.69</td>
</tr>
<tr>
<td>Jun</td>
<td>78.30</td>
<td>0.45</td>
</tr>
<tr>
<td>Jul</td>
<td>78.30</td>
<td>0.14</td>
</tr>
<tr>
<td>Aug</td>
<td>79.10</td>
<td>0.41</td>
</tr>
<tr>
<td>Sep</td>
<td>77.70</td>
<td>0.39</td>
</tr>
<tr>
<td>Oct</td>
<td>77.30</td>
<td>0.54</td>
</tr>
<tr>
<td>Nov</td>
<td>75.40</td>
<td>0.74</td>
</tr>
<tr>
<td>Dec</td>
<td>73.80</td>
<td>1.66</td>
</tr>
<tr>
<td>Mean:</td>
<td>76.12</td>
<td>10.63</td>
</tr>
</tbody>
</table>

**Notes:**
1. Temperature data based on a 1974 summary of the National Oceanographic and Atmospheric Administration
2. Rainfall data based on the 1966-83 period.
Figure IV-6 FREQUENCY DISTRIBUTION OF WIND DIRECTION IN PERCENT
4.5 HIGHWAYS AND TRAFFIC

As noted elsewhere in this report, the principal roadway in the area is the Queen Ka'ahumanu Highway. It is a two-lane, high-speed rural highway with a capacity (two-way total) of approximately 2,000 vehicles per hour. The Queen Ka'ahumanu Highway is designed with a 24-foot pavement width. Access from the Mauna Lani Resort to the highway is via Mauna Lani Drive. The traffic projections described in Section 3.2.4 of this chapter were used in evaluating the air quality impact of the proposed project.

The traffic analysis indicated potential capacity problems for the Queen Ka'ahumanu Highway-Mauna Lani Drive intersection by the year 2000. Because of this, in performing the air quality impact analysis it was assumed that the improvements identified as necessary in the traffic impact analysis would be made. For the year 2000, these include signalization of the intersection, construction of a left-turn storage lane on Mauna Lani Drive for vehicles turning onto Queen Ka'ahumanu Highway northbound, and widening Queen Ka'ahumanu Highway in the vicinity of the intersection to include an additional northbound lane. For the ultimate development scenario, it was assumed that both Queen Ka'ahumanu Highway and Mauna Lani Drive were widened to four lanes with a full interchange constructed to serve the significantly greater traffic demand.

4.6 LONG-TERM IMPACT

4.6.1 Emission Factors

Automotive emission factors for carbon monoxide (CO), oxides of nitrogen (NOx), and nonmethane hydrocarbons (NMHC) were generated for calendar years 1984, 1990, 1995, and 2000 using the Mobile Source Emissions Model (MOBILE-2) (United States Environmental Protection Agency, February 1981). To localize emission factors as much as possible, the August, 1983 age distribution for the City & County of Honolulu (Honolulu, City and County of, Department of Data Systems, August 1983) was input in lieu of the national statistics normally used.

4.6.2 Microscale Analysis

Because it involves motor vehicles as the principal air pollution source, carbon monoxide was selected for modeling because it has a relatively long half-life in the atmosphere (about 1 month) (Seinfeld, 1975) and it comprises the largest fraction of automotive emissions. In this instance, microscale screening analyses were performed for the Mauna Lani Drive intersection with Queen Ka'ahumanu Highway and the main internal intersection. The EPA computer model PAL (U.S. Environmental Protection Agency, February 1978) was employed with an array of receptors around each intersection. Since a review of the traffic data indicated that the peak traffic hours tended to be during the afternoon, worst case meteorological conditions were selected accordingly. A wind speed of 1 meter per second, an acute wind/road angle, and neutral stability (Pasquill-Gifford Class "D") (U.S. Environmental Protection Agency, 1973) were all selected to maximize concentration estimates in the vicinity of the intersections.

One-hour carbon monoxide (CO) concentrations were computed for 1984, 1990, 1995, 2000, and the ultimate resort development. In addition, 8-hour concentration estimates were determined for both intersections in all study years. A "persistence" factor of 0.6 was applied to the maximum 1-hour concentrations in order to generate the 8-hour estimates. This factor is recommended in an EPA publication on Indirect
source analysis (U.S. Environmental Protection Agency, September 1978) and was further corroborated by analysis of carbon monoxide monitoring data in Honolulu which indicates the same 8-hour to 1-hour ratio (Morrow, July 1984). The assumed locations of the receptors adjacent to both intersections are shown in Figure IV-6. The projected CO concentrations for one-hour and eight-hour averaging periods are shown in Tables IV-4.3 and IV-4.4.

4.6.3 Mesoscale Analysis

A mesoscale or regional impact analysis based on annual emissions was also performed. Using the aforementioned emission factors and traffic projections, it was possible to estimate future annual emissions of the principal pollutants associated with this project. The results of this analysis are depicted in Figure IV-7 and may be compared with the 1980 emissions inventory for the Island of Hawaii shown in Table IV-4.5.

The estimated 70 million kilowatt hours of annual electrical demand by the ultimate development will necessitate the generation of electricity by power plants. Currently, Big Island electricity is generated primarily by the burning of high sulfur fuel oil, diesel oil, and bagasse, with a small amount also coming from the HGP-A geothermal plant. With the exception of the geothermal plant, all of these result in the emission of various quantities of sulfur oxides, nitrogen oxides, particulates, and hydrocarbons. Coal has also recently been introduced to Hawaii for use in sugar mills during the off-season to replace more expensive oil. This too will result in emissions of the aforementioned major pollutants. By the time Mauna Lani Resort reaches its full development, it is uncertain how the electrical supply market will be divided among the various types of power plants. There will, however, certainly be some fuel burning occurring and this will result in pollutant emissions external to the Mauna Lani site, but attributable to it because of its increased electrical demand.

4.7 SHORT-TERM IMPACT

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along Queen Ka'ahumanu Highway as well as in the vicinity of the project site itself. However, the increased vehicular travel would result in violations of ambient air quality standards.

The site preparation and earth moving will create particulate emissions as will building and on-site road construction. The movement of construction vehicles on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 (Thornthwaite, 1931). Although there is little or no soil on the project site, the soil that is brought in may well have a silt content greater than the 30% cited above. This, in conjunction with the relatively dry local climate (P/E index = 12), suggests a potential for even greater fugitive dust emissions such as were experienced during construction of the Mauna Lani golf course.
Table IV-4.3
1-Hour and 8-Hour Carbon Monoxide Concentrations During
Peak-Hour Traffic Conditions Mauna Lani Drive at
Queen Ka'ahumanu Highway: 1984 - 2000+

Concentrations (mg/m³)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-Hr.</td>
<td>8-Hr.</td>
<td>1-Hr.</td>
<td>8-Hr.</td>
<td>1-Hr.</td>
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<tr>
<td>R1</td>
<td>1.1</td>
<td>0.7</td>
<td>8.1</td>
<td>4.8</td>
<td>6.9</td>
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<tr>
<td>R2</td>
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</tr>
<tr>
<td>R4</td>
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<td>0.4</td>
<td>7.3</td>
<td>4.4</td>
<td>6.0</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
</tbody>
</table>

Notes:
1. See Figure 4-1 for receptor locations.
2. mg/m³ = milligrams/cubic meter
3. Meteorological conditions:
   - Wind speed = 1 meter/second
   - Wind/road angle = 10 degrees
   - Stability category = D (neutral)
4. * = highest concentrations

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
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<td>1-Hr</td>
<td>8-Hr</td>
<td>1-Hr</td>
</tr>
<tr>
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<td>0.4</td>
<td>1.2</td>
<td>0.7</td>
<td>1.5</td>
</tr>
<tr>
<td>R2</td>
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<td>0.9</td>
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<td>1.2</td>
</tr>
<tr>
<td>R3</td>
<td>0.4</td>
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<td>0.9</td>
</tr>
<tr>
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<td>0.7</td>
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<td>1.2</td>
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<td>1.4</td>
</tr>
<tr>
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<td>0.2</td>
<td>0.3</td>
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</tbody>
</table>

**Notes:**
1. See Figure 4-1 for receptor locations.
2. mg/m³ = milligrams/cubic meter
3. Meteorological conditions:
   - Wind speed = 1 meter/second
   - Wind/road angle = 10 degrees
   - Stability category = D (neutral)
4. * = highest concentrations
MAUNA LANI DRIVE AT QUEEN KAAHUMANU HIGHWAY

MAIN INTERNAL INTERSECTION

Source: Morrow (May 1985).

Figure IV-7 LOCATION OF ASSUMED RECEPTOR POINTS

IV-99
<table>
<thead>
<tr>
<th>Source Category</th>
<th>Emissions (Tons/Year)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam Electric Power Plants</td>
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<td>3232.9</td>
<td>1308.9</td>
<td>65.9</td>
<td>21.8</td>
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<tr>
<td>Gas Utilities</td>
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<td>0.0</td>
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</tr>
<tr>
<td>Fuel Combustion in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Industry</td>
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<td>995.8</td>
<td>798.0</td>
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<td>7.3</td>
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</tr>
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<td>Mineral Products Inventory</td>
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<td>Municipal Incineration</td>
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<td>Motor Vehicles</td>
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<td>177.3</td>
<td>3048.5</td>
<td>42177.3</td>
<td>4035.4</td>
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<td>Construction, Farm and</td>
<td></td>
<td></td>
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</tr>
<tr>
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<td>1515.7</td>
<td>152.4</td>
</tr>
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<td>Aircraft</td>
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<td>4.5</td>
<td>45.9</td>
<td>1449.8</td>
<td>174.2</td>
</tr>
<tr>
<td>Vessels</td>
<td>11.4</td>
<td>90.9</td>
<td>63.2</td>
<td>65.9</td>
<td>29.0</td>
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<tr>
<td>Agricultural Field Burning</td>
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<td>0.0</td>
<td>0.0</td>
<td>20627.3</td>
<td>2445.9</td>
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<td><strong>TOTAL IN TONS PER YEAR:</strong></td>
<td><strong>5715.0</strong></td>
<td><strong>4547.0</strong></td>
<td><strong>5741.0</strong></td>
<td><strong>65902.0</strong></td>
<td><strong>7258.0</strong></td>
</tr>
</tbody>
</table>

Source: State of Hawaii, Department of Health
4.8 DISCUSSION AND CONCLUSIONS

4.8.1 Microscale Analysis

The 1-hour and 8-hour concentration estimates at the Mauna Lani Drive-Queen Ka'ahumanu Highway intersection exhibited a rather interesting fluctuating pattern over the analysis period. Levels at sites close to the intersection increased from 1984 to 1990, but then declined slightly in 1995. The substantial rise between 1984 and 1990 would be attributable to a significant rise in traffic volume as project development progressed. The slight reduction in CO levels between 1990 and 1995 would be due to the reduction in per vehicle emissions as a result of the Federal motor vehicle emissions control program. In other words, the net result of rising traffic volumes and declining emissions per vehicle over this period was weighted towards declining emissions. During these years, both State and Federal carbon monoxide standards appeared to be met.

In the year 2000, however, concentrations within 10 meters of the roadways rose to levels which would exceed the State standards although remain below the Federal limits. This is due primarily to queuing on both roadways by vehicles attempting to make turning movements into or out of Mauna Lani Drive. The results reflect the assumptions made regarding signalization and addition of another northbound lane on Queen Ka'ahumanu Highway and suggest that careful evaluation and design of this intersection in future years will be required to prevent traffic and air quality problems.

The concentrations estimates for the ultimate development scenario fell back sharply from the year 2000 estimates because of the assumed construction of a widened highway and adequate interchange to accommodate ingress/egress to the resort.

The pattern of results at the main internal intersection was similar but not exactly the same. Concentration estimates tended to show a consistent rise with increasing traffic, and did not exhibit the same significant decline at the ultimate development stage. This is simply due to the fact that a major reconstruction of that intersection was not assumed as it had been in the case of the Queen Ka'ahumanu intersection. The results suggest the possibility of violations of State air quality standards within 10 meters of the roadway and again indicate the need for careful evaluation and design of that intersection for future years to avoid problems.

4.8.2 Mesoscale Analysis

As expected, the mesoscale analysis indicated that the traffic generated by the proposed development would result in a net increase in emissions of all three major automotive pollutants in the project area. Since the Federal motor vehicle emission control program depends on new cars with lower emissions gradually replacing older, more polluting vehicles, the reason for rising emissions is that the increase in traffic volumes exceeds the decrease in per vehicle emissions. The difference between pollutants is due to the different standards and compliance dates for each thereby resulting in different rates of improvement. In this particular case, a rise in emissions is not surprising since a rather substantial increase in traffic volume is projected to occur in an area which is presently almost pristine. When compared to the 1980 county emissions inventory, the projected increases range from about 2% for non-methane hydrocarbons to about 8% for nitrogen oxides.
The emissions resulting from fuel combustion necessary to meet the estimated electrical demand of the project could be fairly significant; however, because of the long-term nature of this project and the possible variability in types of electrical generating facilities existing after the year 2000, no attempt was made to quantify the emissions associated with such facilities.

4.8.3 Short-Term Impact

The potential for fugitive dust due to the dry climate and fine soils make it very important for adequate dust control measures to be employed during the construction period. There will be existing occupied units downwind of construction areas, and particularly during the drier, windier summer months fugitive dust could be the source of complaints not to mention possible violations of the State or Federal standards.

Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. Dust barriers near existing dwellings might be considered if problems arise from wind-driven dust. The soonest possible landscaping of completed areas will also help.
5. **NOISE IMPACTS**

### 5.1 INTRODUCTION

Implementation of either the existing or revised master plans will involve essentially the same types of construction activities and traffic volumes. Hence, the discussion which follows is applicable to both the proposed and "no-action" (i.e., no land use boundary amendment) alternatives. It focuses on traffic noise because that is by far the most significant type of noise associated with the proposal.

Construction noise for the type of structures envisioned is limited in both intensity and duration. Noise levels on sites adjacent to construction areas would be elevated, but no serious disruption of the ongoing activities of the resort or its residents is expected.

### 5.2 NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

Because of the great physical, temporal, and spatial variability which environmental noise exhibits, many different systems have been developed to characterize it. The two descriptors currently used to relate traffic noise levels to land use compatibility, and to assess environmental noise in general, are the "Equivalent Noise Level" (Leq) and the "Day-Night Average Sound Level" (Ldn). Both of these descriptors are averages of instantaneous A-weighted sound levels as read on a standard sound level meter.

Current Federal noise standards and acceptability criteria for residential uses are shown in Table IV-5.1. As a general rule, noise levels of 55 Ldn or less occur in rural areas, or in urbanized areas which are shielded from streets carrying large volumes of traffic. In urbanized areas, noise levels typically range from 55 Ldn to 65 Ldn, and motor vehicle traffic noise is usually the controlling factor. Residences which front major roadways are generally exposed to noise levels of about 65 Ldn, and the traffic noise may reach 72 Ldn where high speed freeways are involved; noise levels for buildings that are shielded from roadways by intervening structures may be 55 Ldn or less.

An exterior noise limit of 65 Ldn is used nationally for the purposes of determining noise acceptability for funding assistance from Federal agencies such as FHA, HUD, and VA (U.S. Department of Housing and Urban Development, July 12, 1979). Because of Hawaii's open living conditions, the widespread use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation which these afford, an exterior noise level of 65 Ldn does not eliminate all risks of adverse noise impacts. For these reasons, and as recommended by the U.S. Environmental Protection Agency (March 1974), a lower level of 55 Ldn is considered the "unconditionally acceptable" (or "near-zero risk") level of exterior noise for residential uses. However, after considering the cost and feasibility of applying a stringent 55 Ldn standard, government agencies have selected 65 Ldn as a more appropriate regulatory standard for residential uses. An exterior noise level as high as 75 Ldn is generally considered acceptable for commercial, industrial, and other uses that are not noise-sensitive. Naturally ventilated offices and other commercial establishments are an exception to this because of their open character; for these, 65 Ldn is usually taken as a maximum.
Table IV-5.1
Exterior Noise Exposure Classification: Residential Uses

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<thead>
<tr>
<th>Noise Exposure Class</th>
<th>Day-Night Sound Level</th>
<th>Equivalent Sound Level</th>
<th>Federal Standard(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal Exposure</td>
<td>Not Exceeding 55 Ldn</td>
<td>Not Exceeding 55 Leq</td>
<td>Unconditionally Acceptable</td>
</tr>
<tr>
<td>Moderate Exposure</td>
<td>Above 55 Ldn But Not Above 65 Ldn</td>
<td>Above 55 Leq But Not Above 65 Leq</td>
<td>Acceptable(2)</td>
</tr>
<tr>
<td>Significant Exposure</td>
<td>Above 65 Ldn But Not Above 75 Ldn</td>
<td>Above 65 Leq But Not Above 75 Leq</td>
<td>Normally Unacceptable</td>
</tr>
<tr>
<td>Severe</td>
<td>Above 75 Ldn</td>
<td>Above 75 Leq</td>
<td>Unacceptable</td>
</tr>
</tbody>
</table>

(1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, the two are equivalent if: (a) heavy trucks do not exceed 20 percent of the total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 pm and 7:00 am does not exceed 15 percent of average daily traffic flow.


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In the analysis which follows, the 55 Ldn level was used to define the farthest extent of noise impact zones on each side of the affected roadways. This conservative criteria is consistent with the resort character of the project, the relatively low existing ambient noise levels, and the limited noise attenuation provided by naturally ventilated structures.

5.3 EXISTING TRAFFIC NOISE LEVELS

As a means of gaining an understanding of the existing noise environment and calibrating the Federal Highway Administration (FHWA) traffic noise model used to project future noise levels, traffic noise measurements were made along Queen Ka'ahumanu Highway during May 1985 (see Table IV-5.2). Stations 1 and 4 are on flat terrain in the vicinity of Puako Beach Road and the existing sewage pump station. Stations 2 and 3 are south of the project and in the vicinity of the Kona Village Resort. Stations 5 and 6 were inside the north gate of Mauna Lani's existing dirt service road. Site 7 is near the crossing of the Mauna Lani entrance road and the existing gravel road between the highway and Kaniku Drive. Note that the noise levels reported in Table IV-5.2 are not for peak traffic periods and are not, therefore, directly comparable to the noise level estimates contained in Table IV-5.3.

Table IV-5.3 indicates that existing peak-hour noise levels are below 55 Ldn beyond 110 feet from the centerline of Queen Ka'ahumanu Highway. Traffic noise levels along the internal roadways of the resort are below 55 Ldn at distances of 50 feet or more. So, except for the narrow corridors immediately along the roads, the existing traffic noise environment in the vicinity of the Mauna Lani Resort is in the "Minimal Exposure, Conditionally Acceptable" range.

The measured traffic noise levels cited above and in Table IV-5.2 are 5 to 7 db lower than those predicted by the FHWA traffic noise model; this difference is consistent with measurements carried out in 1984 in the vicinity of the Mauna Kea Resort (Ebisu, May 1984). The reason for the variance from the mainland-developed noise model is believed to be related to the fact that the traffic mix in the Kohala Coast Resort area contains a higher percentage of late model street vehicles and a lower percentage of off-road and older vehicles than the mainland locations that were used in calibrating the original model. In particular, because of the extensive use of rental cars, the vehicle mix is weighted towards relatively new compact cars, and these produce much less audible tire hum and engine exhaust noise than the average. The predominance of such quiet vehicles is expected to increase as the visitor industry develops further.

5.4 FUTURE TRAFFIC NOISE AND NOISE IMPACTS

Future traffic noise levels 50 feet from the centerlines of Queen Ka'ahumanu Highway, Mauna Lani Drive, and Kaniku Drive were made for the years 1990, 1995, 2000, and ultimate development of the resort using the traffic volume projections contained in Section 3.2.4 of Chapter IV. These are presented in Table IV-5.4. As shown in the table, traffic noise increases of approximately 2 Ldn per five-year period are expected along the external and internal roadways serving the Mauna Lani Resort. Over the full development span of the project, traffic noise adjacent to Queen Ka'ahumanu Highway is expected to rise by 7 to 8 Ldn, and total increases of 10 to 11 Ldn are predicted along the internal roadway to the resort.

IV-105
<table>
<thead>
<tr>
<th>Location</th>
<th>Time of Day (Hours)</th>
<th>Average Speed (MPH)</th>
<th>Hourly Traffic Volume</th>
<th>Measured Leq (dB)</th>
<th>Predicted Leq (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 50 feet from centerline of Q.K.Highway at Puako Beach Road Intersection</td>
<td>1245 to 1354</td>
<td>50</td>
<td>224</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>2. 50 feet from centerline of Q.K.Hwy. at entrance to Kona Village Resort</td>
<td>1720 to 1742</td>
<td>50</td>
<td>299</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>3. 100 feet from centerline of Q.K.Hwy. at entrance to Kona Village Resort</td>
<td>1748 to 1832</td>
<td>50</td>
<td>262</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4. 300 feet from centerline of Q.K.Highway at Puako Beach Road intersection</td>
<td>1405 to 1440</td>
<td>50</td>
<td>208</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>5. At north end of Mauna Lani Resort Service Road 600 feet from Q.K.Hwy.</td>
<td>1000 to 1019</td>
<td>50</td>
<td>---- No Counts Made ----</td>
<td>42.0</td>
<td>38.0</td>
</tr>
<tr>
<td>6. At north end of Mauna Lani Resort Service Road 1100 feet from Q.K.Hwy.</td>
<td>1029 to 1037</td>
<td>50</td>
<td>---- No Counts Made ----</td>
<td>38.5</td>
<td>34.0</td>
</tr>
<tr>
<td>7. 50 feet from centerline of Mauna Lani Drive entrance road</td>
<td>1112 to 1209</td>
<td>35</td>
<td>116</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

NOTE: Traffic noise estimates at locations 5 and 6 based upon spot traffic counts between 1245 and 1354 hours.

Table IV-5.3. Distance from Roadway Centerlines to 65 and 55 Ldn Contours Under Peak Hour Traffic Conditions: Existing and Ultimate Development of the Mauna Lani Resort.

<table>
<thead>
<tr>
<th>Street Section</th>
<th>Existing</th>
<th>Ultimate</th>
<th>Existing</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queen Ka'ahumanu Hwy.(N)</td>
<td>45</td>
<td>130</td>
<td>110</td>
<td>603</td>
</tr>
<tr>
<td>Queen Ka'ahumanu Hwy.(S)</td>
<td>41</td>
<td>124</td>
<td>100</td>
<td>576</td>
</tr>
<tr>
<td>Mauna Lani Drive (East)</td>
<td>11</td>
<td>55</td>
<td>51</td>
<td>255</td>
</tr>
<tr>
<td>Mauna Lani Drive (West)</td>
<td>14</td>
<td>24</td>
<td>33</td>
<td>84</td>
</tr>
<tr>
<td>Kaniku Drive (South)</td>
<td>—</td>
<td>22</td>
<td>—</td>
<td>93</td>
</tr>
<tr>
<td>Kaniku Drive (North)</td>
<td>—</td>
<td>15</td>
<td>—</td>
<td>32</td>
</tr>
</tbody>
</table>

NOTE: The existing right-of-way widths of Queen Ka'ahumanu Highway, Mauna Lani Drive, and Kaniku Drive are 300 feet, 80 feet, and 60 feet, respectively. Hence the only area outside the road right-of-way that would be subject to noise levels in excess of 65 Ldn is the area adjacent to Mauna Lani Drive east of its intersection with Kaniku Drive. Only commercial uses and open space, both of which are relatively insensitive to noise, are planned for this area.


<table>
<thead>
<tr>
<th>Street Section</th>
<th>Existing Ldn</th>
<th>Future Ldn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1990 1995 2000 Ultimate</td>
</tr>
<tr>
<td>Queen Ka'ahumanu Hwy.(N)</td>
<td>64.0</td>
<td>66.7 68.3 69.4 71.2</td>
</tr>
<tr>
<td>Queen Ka'ahumanu Hwy.(S)</td>
<td>62.8</td>
<td>66.4 68.0 69.0 70.9</td>
</tr>
<tr>
<td>Mauna Lani Drive (East)</td>
<td>55.0</td>
<td>58.9 60.8 62.6 65.6</td>
</tr>
<tr>
<td>Mauna Lani Drive (West)</td>
<td>50.4</td>
<td>53.6 54.4 55.0 58.4</td>
</tr>
<tr>
<td>Kaniku Drive (South)</td>
<td>50.2</td>
<td>53.7 56.4 59.2</td>
</tr>
<tr>
<td>Kaniku Drive (North)</td>
<td>42.6</td>
<td>43.9 47.0 50.1</td>
</tr>
</tbody>
</table>

NOTE: The noise estimates presented above assume a traffic mix of 95% automobiles, 2.5% medium trucks, and 2.5% heavy vehicles (trucks and buses) on Queen Ka'ahumanu Highway; a mix of 97% automobiles, 1.5% medium trucks, and 1.5% heavy vehicles is assumed for internal streets.

Increases of 7 to 11 Ldn are significant, because the 65 and 55 Ldn setback distances would be increased by a factor of 4 to 6 times as a result of the increased traffic. However, because the increase will be gradual — 5 Ldn per five-year period — the change will not be perceptible or measurable on an annual basis. Moreover, as described more fully below, the traffic noise levels are expected to remain moderate.

The width of the impact zones adjacent to roadways that would experience highway traffic noise levels in excess of 55 Ldn and 65 Ldn at ultimate development (i.e., completion of the proposed expansion) are given in Table 5-4. Three important facts about them should be noted:

1. They are the same for the existing and revised master plans.

2. The projected noise levels on Queen Ka'ahumanu Highway are the result of greatly increased traffic from other development in the region, as well as from ongoing development of the Mauna Lani Resort.

3. The existing right-of-way widths of Queen Ka'ahumanu Highway, Mauna Lani Drive, and Kaniku Drive are 300 feet, 120 feet, and 60 feet, respectively. Hence, the only area outside the road right-of-way that would be subject to noise levels in excess of 65 Ldn is the area adjacent to Mauna Lani Drive east of its intersection with Kaniku Drive. Only commercial uses and open space, both of which are relatively insensitive to noise, are planned for this area.

While there appears to be little danger of excessive traffic noise levels within the Mauna Lani Resort project itself, rising traffic volumes on Queen Ka'ahumanu Highway — a part of which is attributable to ongoing development of the Mauna Lani Resort — could adversely affect homes within the Mauna Kea Resort, especially "The Fairways at Mauna Kea South". Noise levels there are currently in the "Minimal Exposure, Unconditionally Acceptable" range as defined in Table 5-1, but the noise exposure at two existing residences will probably change to "Moderate Exposure — Acceptable" between 1995 and ultimate development of the resort due to the combined influence of all planned developments in South Kohala.

The proposed master plan for the Mauna Lani Resort involves the addition of landscaped buffers and residential parcels along the northern section of Kaniku Drive (the existing service road). The 150-foot wide buffer that is planned along the road will insure that, even at ultimate development, traffic noise levels in the adjoining residences will remain at or below 55 Ldn.

Meeting the "Minimal Exposure, Unconditionally Acceptable" criteria stated in Table IV-5.1 adjacent to the southern leg of Kaniku Drive will require the maintenance of a buffer zone extending approximately 95 feet from the roadway centerline. Since the road right-of-way in this area is only 60-feet wide (i.e., it extends only 30 feet on either side of the centerline), either an additional setback of 65 feet from the edge of the right-of-way to the nearest residential structure or sound attenuating berms or structures will be required if the noise levels are to remain in the "Unconditionally Acceptable" range.

In summary, traffic noise levels associated with the revised master plan would be essentially the same as those resulting from the existing master plan. In absolute terms, both plans would result in significantly higher traffic noise levels on Mauna Lani Drive and Kaniku Drive, and they would contribute (together with other South Kohala development) to higher noise levels adjacent to Queen Ka'ahumanu Highway.
Fortunately, the majority of the existing and planned residential developments are situated away from Queen Ka'ahumanu Highway, and the "Minimal Exposure, Unconditionally Acceptable" criteria can be achieved with only minor exceptions. Within the Mauna Lani Resort itself, adverse noise impacts are expected to be minimal. Even without additional buffer zones, planned residences should not be subject to noise levels in excess of 60 Ldn as discussed above. The maintenance of building setbacks along Kaniku Drive would insure that all resort development remains within the "Minimal Exposure, Unconditionally Acceptable" category.
6. PUBLIC SERVICES AND FACILITIES

6.1 SCHOOLS

6.1.1 Existing Facilities

The majority of students from on-resort families and new employee families are expected to attend classes at the schools noted below:

<table>
<thead>
<tr>
<th>Service Region</th>
<th>Elementary or Intermediate Schools</th>
<th>High Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Kohala</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>South Kohala</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>North and South Kona</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Hilo</td>
<td>13</td>
<td>2</td>
</tr>
</tbody>
</table>

South Kohala is the location of two of the county's best known private schools, Hawaii Preparatory Academy (grades K through 12) and Parker School (grades 7 through 12), both in Waimea.

According to the Hawaii District Office of the DOE (personal communication with Herbert Watanabe, July 1985), Big Island students living one mile or more from the nearest public school are provided bus transportation to and from school if they have access to an established bus route. Parents of those who do not are reimbursed for car mileage. Should a certain community have enough new students, a determination is made whether a new bus route should be established.

6.1.2 Probable Impacts

Planned development at MLR will increase demands on the public school system by inducing population growth, with its corollary increase in school age children. It is expected that resort residential units will generate relatively little new demand for public educational services. This is only because a small share of them will be occupied by full-time residents and because purchasers of luxury resort units have typically completed their child rearing years or send their children to private schools.

Table IV-6.1 shows projected numbers of new public elementary and high school students attributable to future resort development by their expected region of residence. These projections are based on estimates of students per housing unit, supplied by the Hawaii State Department of Education (January 3, 1985). Approximately 30 percent of new students would reside in units at Mauna Lani Resort and would attend school in Kohala. Other new students would be dependents of hotel employees who have in-migrated or established a household on the island. About half of all new students are expected to be in grades K through 6 and the other half in grades 7 through 12.

Impact on the public school system under either the existing master plan or the proposed master plan would be slight, even for Kohala schools, which would be most affected. Communication from the Department of Education indicates that projected levels of new student enrollments would be accommodated in existing and planned...
Table IV-6.1
MAUNA LANI RESORT

Student Generation for Hawaii County Public High
and Elementary Schools Attributable to Further
Development of Mauna Lani Resort

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>School region</th>
<th>1990 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilo</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>13</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>Kohala</td>
<td>33</td>
<td>32</td>
<td>65</td>
<td>63</td>
<td>124</td>
<td>116</td>
<td>284</td>
</tr>
<tr>
<td>Kona</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>12</td>
<td>21</td>
<td>21</td>
<td>59</td>
</tr>
<tr>
<td><strong>Total students</strong></td>
<td><strong>44</strong></td>
<td><strong>43</strong></td>
<td><strong>86</strong></td>
<td><strong>83</strong></td>
<td><strong>158</strong></td>
<td><strong>149</strong></td>
<td><strong>378</strong></td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

facilities. Additional staff may eventually be needed to meet the increased projected demand. The cost of such services are included in an analysis of public costs to the State, presented in a previous section of this report. Most likely, new school bus routes will not be established to accommodate the new students until well into the future when increased numbers would warrant the expense.

6.2 HEALTH CARE FACILITIES

6.2.1 Existing Facilities

The Kohala area is serviced by two state-operated hospitals, the Kohala Hospital located in Kapa'a in North Kohala and the Honoka'a Hospital. The Kohala Hospital is primarily a long-term care institution that also offers 24-hour emergency services. Served by a staff of three physicians, the facility has 10 acute care beds and 16 long-term beds. The Honoka'a Hospital has 35 beds, 27 for acute care patients and 8 for long-term care. It is used by 13 to 14 physicians. Neither hospital is equipped to provide full patient services, and the facilities at Honoka'a are considered substandard because the building in which they are housed is thought to be too old and too small.

According to the State Department of Health, the "full service" health care facility closest to Kohala residents is the Kona Hospital; it has 53 acute care beds, 26 beds for long-term care, and an active staff of 36 physicians. Nevertheless, an administrator in the Department described Kona Hospital's resources as inadequate for the needs of the existing regional population.

In Waimea, the private Lucy Henriques Medical Center has emergency and outpatient clinical facilities staffed by five full-time physicians and a half-time pediatrician. The center also has 10 specialists who are regularly associated with the clinic.

Alexander Grant Company conducted a study of Hawai'i County's hospital facilities in January 1985. The study found that major long-term care facilities now operate at or above their desired capacities and that the Kohala service area appears to have an undersupply of physicians (Peat, Marwick, Mitchell & Co:illl-8).

6.2.2 Probable Impacts

Development of additional facilities at MLR, either under the existing master plan or the proposed expanded master plan, will have an impact on all four medical facilities discussed. Moreover, even if no further development took place at MLR, medical facilities would require expansion, given projected growth in Kohala. In particular, the anticipated increased population in the South Kohala district would eventually require additional acute care facilities. The administrator of Kona Hospital reported that the changing population profile of West Hawai'i points to the need for expanded services in areas associated with an older population such as cardiovascular, orthopedic and urological care (February 1984). Also, an aging population and the movement of retirees to South Kohala's resort region will necessitate the expansion of long-term care facilities in the region.

6.3 POLICE PROTECTION

6.3.1 Existing Services and Facilities

The Waimea police station in South Kohala currently houses a total of 13 uniformed police personnel, four officers, and nine patrol personnel (normally, the
force consists of 17 personnel). Other police facilities in the area are the Kapa'au station, which serves the North Kohala area, the Kona station in North Kona and the Ka'u station in South Kona. Police staffing and workload indicators for the four districts are shown in the table below.

<table>
<thead>
<tr>
<th>District</th>
<th>Percent of County Resident Population</th>
<th>Uniformed Personnel</th>
<th>Percent of County of County</th>
<th>Percent of County Index Crimes</th>
<th>Percent of County Traffic Crimes</th>
<th>Percent of County Traffic Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Kohala</td>
<td>3.4</td>
<td>11</td>
<td>4.4</td>
<td>1.4</td>
<td>5.2</td>
<td>6.7</td>
</tr>
<tr>
<td>South Kohala</td>
<td>6.3</td>
<td>17</td>
<td>6.8</td>
<td>5.2</td>
<td>6.7</td>
<td>6.7</td>
</tr>
<tr>
<td>North Kona</td>
<td>22.0</td>
<td>55</td>
<td>22.1</td>
<td>29.4</td>
<td>23.3</td>
<td>23.3</td>
</tr>
<tr>
<td>South Kona</td>
<td>3.3</td>
<td>15</td>
<td>6.0</td>
<td>2.3</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Total County</td>
<td>289</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: County of Hawai'i Police Department, 1985.

Both the Waimea and Kapa'au police stations are of relatively recent construction, and there is room in both for additional staff.

6.3.2 Probable Impacts

Under either the existing or proposed master plan for MLR, there will be a regional increase in both resident and visitor population over a period of several years. The County Police Department anticipates that this de facto population growth will be accompanied by a shift in criminal and traffic incidents to the Kohala coast region (Guy A. Paul, January 16, 1985). Police chief Guy Paul foresees a greater police workload as a result of development at MLR and at other Kohala coast resorts, with perhaps the need for the establishment of a police substation that would require capital outlays as well as the cost of additional personnel and equipment. Such costs would be included in the projections of costs to the County discussed previously in this report.

6.4 FIRE PROTECTION

6.4.1 Existing Services and Facilities

Fire protection service for the South Kohala district is headquartered in a County-operated station in Waimea. The station provides 24-hour service and has a staff of six, supplemented by volunteers from Puako and Waikoloa Village and by a fire equipment operator from Kawaihae. The Waimea station is equipped with one engine, a 1,250-gallon water tanker and a rescue van used by an emergency medical unit. Additional engines and a ladder truck are dispatched from Kailua-Kona when needed; also, a privately owned fire truck manned by volunteers is stationed at the Mauna Kea Beach Hotel.
6.4.2 Probable Impacts

The construction of new hotel and residential units at MLR under either the existing or proposed master plan will lead to increased demand for fire protection services and facilities.

Mauna Lani Resort, Inc. is in the process of formulating an agreement with the County Fire Department regarding the possibility of making available one acre of MLR fee land for a future fire station. Recent discussions have focused on the construction of a facility by the Kohala Coast Resort Association, to be leased back to the County for use as a fire station and Emergency Medical Services (E.M.S.) station. The station would be located within five miles of Mauna Lani Resort, Mauna Kea Resort, and Waikoloa Resort so that each could benefit from the highest possible ratings for hotel and condominium units. In the interim, Mauna Lani Resort, Inc. proposes to form a volunteer fire company.

In a recent development, the County of Hawai‘i Planning Department reports that the Kohala Coast Resort Association has offered "to fund the full construction of a new 24-hour fire station and fire fighting equipment (except emergency medical service vehicle) on land described in this section. The County would be responsible for all personnel and administrative and operational costs. Funding would be through the floating of bonds by the County wherein retirement (repayment) of the bond would be by the association." (Letter of June 21, 1983)

The County fire chief states that development of MLR will not cause fire protection problems given the Resort's proposed measures described above and provided that new resort facility design and construction comply with current County fire and building codes and requirements.

6.5 WATER SUPPLY

6.5.1 Existing Conditions

6.5.1.1 Potable Water

A preliminary analysis of municipal water supply and demand in the South Kohala district was completed by the U.S. Army Corps of Engineers in 1984. Within the South Kohala district, water demand could increase from 2.3-million gallons per day (mgd) to 20 mgd by 2010. The principal cause for increased demand is resort development along the coast. The present supply of 4.5 mgd would be increased to 17 mgd by private development of groundwater. The development of groundwater is regulated by the State of Hawai‘i, Department of Land and Natural Resources, Division of Water and Land Development. Approval from the State Department of Health must also be obtained.

The principal current sources of water for the coastal region of the South Kohala district are the Lalalilo water system operated by the County of Hawai‘i, which services MLR, and the private Waikoloa water system.

In January 1979, an agreement was signed by the County of Hawai‘i, Mauna Loa Land, Inc. (the predecessor of Mauna Lani Resort, Inc.) and Olohana Corporation (the predecessor of Mauna Kea Properties, Inc.) to develop a water system utilizing groundwater from the State-owned tract of land known as Lalalilo.
Mauna Lani Resort, Inc.'s reserved water allocation from the system is currently 1.0-million gallons a day (mgd) from Well A and 0.5 mgd from Well B/C. Well D has been drilled, but has not yet been outfitted with a pump. When the well becomes functional, it is expected to yield 1.44 mgd (based on 24-hour pumpage). 1.3 mgd of which will be allocated to Mauna Lani Resort, Inc. Hence, a total of 2.3 mgd of potable water will be available to MLR in the near future.

6.5.1.2 Golf Course Irrigation

Although some landscaped areas in MLR are irrigated with fresh water, the irrigation system for the Francis Pi Brown golf course uses brackish well water.

6.5.2 Probable Impacts

6.5.2.1 Potable Water

The future supply of potable water which will be available to Mauna Lani Resort, Inc. is deemed adequate to satisfy the forecasted water demand at the resort. To supplement its fresh water supply, as noted above, Mauna Lani Resort, Inc. plans to continue its water development efforts. The resort currently uses about 0.5 mgd of potable water, and thus will have in reserve in the near future an additional 1.8 mgd for development. In addition, five future well sites have been designated on Parker Ranch land, four of which will serve the water needs of the resort. The well sites chosen run in a north-south direction at about the 1,100-1,200-foot elevation extending from the existing Lalaimlo "B" well to Kamakoa Guich. A rock wall and unimproved road mark the 10,000-foot long corridor, within which the five well sites were designated. All wells will be built to Department of Water Supply standards and dedicated to that agency.

At present, it is estimated that each of the four new wells will provide a 1.3 mgd allocation to MLR. Therefore, the existing 2.3 mgd supply will increase by about 5.2 mgd when the four wells are operating, giving MLR a total of 7.5 mgd of potable water for all future possible uses. It is expected that the wells will be developed as needed.

Given the planned rate of development under the proposed revised master plan, water use has been projected for the years 1990, 1995 and 2000, as well as for potential maximum development (3,000 hotel units and 3,182 residential units). Projections are based on actual usage figures at MLR and on County of Hawai'i, Department of Water Supply, standard rates for water usage.

MLR is projected to require about 1.5 mgd by 1990, 2.2 mgd by 1995, 3.2 mgd by 2000, and almost 6 mgd at potential maximum development (see Table IV-6.2). The existing 2.3 mgd supply will therefore be adequate until 1995, and it is anticipated that by that time the exploitation of new wells will be underway.

It should be noted that actual potable water usage as development progresses at MLR may vary from that which has been projected in Table IV-6.2. However, the anticipated water supply from all sources, including the four new wells on Parker Ranch land, is estimated to be adequate to allow full development at Mauna Lani Resort.

Groundwater withdrawal from the new wells to accommodate future development at Mauna Lani is expected to have some impact on other nearby water sources. Well sites most likely to be affected are (1) the existing Lalaimlo wells, (2) Waikoloa's...
### TABLE IV-6.2

**PROJECTED POTABLE WATER USE**
(In million gallons per day)

Mauna Lani Resort

<table>
<thead>
<tr>
<th>Period</th>
<th>Type of Use</th>
<th>Area (Acres)</th>
<th>No. Units</th>
<th>Water Demand (Max. Day)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Domestic</td>
<td>Irrigation</td>
</tr>
<tr>
<td>Existing</td>
<td>Hotel (Exist.)</td>
<td>29.1</td>
<td>351</td>
<td>0.176</td>
<td>0.187</td>
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<td></td>
<td><strong>Sub-Total</strong></td>
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<td></td>
<td><strong>1.011</strong></td>
<td><strong>1.200</strong></td>
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IV-117
<table>
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<tr>
<th>Period</th>
<th>Type of Use</th>
<th>Area Acres</th>
<th>No. Units</th>
<th>Water Demand (Max. Day)</th>
<th>Domestic</th>
<th>Irrigation</th>
<th>Total</th>
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<td>2000</td>
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<td>0.176</td>
<td>0.187</td>
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<td>Hotel (Other)</td>
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<td>0.500</td>
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<td>0.015</td>
</tr>
<tr>
<td></td>
<td>STP</td>
<td>16.0</td>
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<td></td>
<td></td>
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<td>0.001</td>
</tr>
<tr>
<td></td>
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<td>1.576</td>
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<td>Full</td>
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<td>0.091</td>
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<td>G. Clubhouse</td>
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<td>0.022</td>
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<td>0.086</td>
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<td></td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Park</td>
<td>3.2</td>
<td></td>
<td></td>
<td>0.007</td>
<td>0.007</td>
<td></td>
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<td>Road</td>
<td>29.8</td>
<td></td>
<td></td>
<td>0.408</td>
<td>0.408</td>
<td></td>
</tr>
<tr>
<td>Total</td>
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<td></td>
<td></td>
<td>3.104</td>
<td>2.663</td>
<td>5.867</td>
</tr>
</tbody>
</table>

Notes:

1. The maximum water demand for hotels is based on February 1985 water usage, adjusted to 100% occupancy and multiplied by a 1.5 maximum day factor = 500 gpd/unit.

2. The maximum water demand for multi-family units is based on 100% occupancy, 2.5 persons per unit, 125 gpd/capita and multiplied by a 1.5 maximum day factor = 670 gpd/unit.

3. The maximum water demand for commercial use is based on the county's standard use.

4. The irrigation rate for hotels is based on average irrigation rate and adjusted for density = 530 gpd/unit for the existing hotel and 280 gpd/unit for other hotels.

5. The irrigation rate for the multi-family units is based on the MF water consumption for February 1985 adjusted for density. It was assumed that all of the water for that month was used for irrigation and no water for domestic use. Irrigation rate for MF = 280 gpd/unit.

6. The irrigation rate for roadways is based on current usage at MLR.
potable water wells, (3) Mauna Lani's irrigation water well (golf course supply), and (4) Walkoloa's Parker 1 well (golf course supply). To minimize interference effects, the future well sites were chosen with 1,500- to 2,000-foot spacing from each other and from existing potable water wells. Hydrologic analyses by engineering consultants from existing potable water wells. Hydrologic analyses by engineering consultants indicate that the regional groundwater flow will support the total anticipated draft. If this proves not to be the case, Mauna Lani and Walkoloa golf course wells, because of their more seaward locations, would show salinity increases first. Should this happen, undeveloped well site locations can be changed, most likely to be relocated north of the existing Lalamilo wells.

6.5.2.2 Golf Course Irrigation

Irrigation water requirements of the second golf course and any others would be met through an on-site system of brackish water wells. The existing golf course is irrigated with brackish water and no adverse effects have been noted. It is expected that the same type of irrigation for additional golf courses would similarly not pose a problem. The use of effluent might be considered at a later date. The effects of such use are addressed in Section 6.6.2.

6.6 WASTEWATER TREATMENT AND DISPOSAL

6.6.1 Existing Conditions

There are no public sewage treatment facilities in the South Kohala coastal region. The Mauna Lani Resort, as the other Kohala coast resorts, is served by a privately-operated wastewater treatment plant and underground connection system. The system was constructed by Mauna Lani Resort, Inc., which continues to operate the facility. Fees are assessed users connected to the system to help pay operating and maintenance costs. Treated effluent from the plant is used for tree nursery irrigation, the only location at the resort where it is used.

6.6.2 Probable Impacts

The existing wastewater treatment facility at MLR has a design capacity of 0.76 mgd. The facility has been designed so that it can be expanded to handle 2.1 mgd. Sewage generation at 100 percent occupancy is shown in Table IV-6.3. Cumulative flow is currently 0.13 mgd, a fraction of what the existing wastewater treatment facility is designed to accommodate. Under the revised master plan, cumulative flow is projected to reach 0.380 mgd in 1990, 0.604 mgd in 1993, 0.942 mgd in 2000, and 1.853 at potential maximum development. Thus, the expanded facility would be capable of handling flows at full development and 100 percent occupancy.

When effluent flow increases beyond the irrigation needs of the tree nursery, the surplus treated wastewater can be mixed with brackish water to be stored in the golf course manmade lakes and used to irrigate the existing golf course and the new golf course. A total of up to about 2.0 mgd of this blended water would be needed to irrigate the two Mauna Lani Resort courses.

Replacing some brackish water with treated effluent for irrigation purposes would have a beneficial effect on energy use (brackish water is pumped using a powered lift). Negative impacts of wastewater use include the potential for public health problems, the potential adverse effect on groundwater and coastal water, and the deteriorated appearance of the lakes.

IV-119
## TABLE IV-6.3

**SEWAGE GENERATION AT 100% UNIT OCCUPANCY**

Mauna Lani Resort

<table>
<thead>
<tr>
<th>Development Year</th>
<th>Site</th>
<th>Units</th>
<th>Generation Rate</th>
<th>Flow (mgd)</th>
<th>Cumulative Flow (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing</strong></td>
<td>Hotel 1</td>
<td>351 rms.</td>
<td>300</td>
<td>0.105</td>
<td>0.134</td>
</tr>
<tr>
<td></td>
<td>MF A</td>
<td>80 U.</td>
<td>280</td>
<td>0.022</td>
<td>0.134</td>
</tr>
<tr>
<td></td>
<td>Golf Club (1)</td>
<td>5.0 ac.</td>
<td>1,320</td>
<td>0.007</td>
<td>0.134</td>
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<tr>
<td><strong>1990</strong></td>
<td>Hotel 2</td>
<td>400 rms.</td>
<td>300</td>
<td>0.120</td>
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</tr>
<tr>
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<td>MF</td>
<td>400 U.</td>
<td>280</td>
<td>0.112</td>
<td>0.380</td>
</tr>
<tr>
<td></td>
<td>SF</td>
<td>26 U.</td>
<td>280</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Com.</td>
<td>5.0 ac.</td>
<td>1,320</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td><strong>1995</strong></td>
<td>Hotel</td>
<td>300 rms.</td>
<td>300</td>
<td>0.090</td>
<td>0.224</td>
</tr>
<tr>
<td></td>
<td>MF</td>
<td>400 U.</td>
<td>280</td>
<td>0.112</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SF</td>
<td>33 U.</td>
<td>280</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
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<td>1,320</td>
<td>0.007</td>
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</tr>
<tr>
<td></td>
<td>Com.</td>
<td>4.5 ac.</td>
<td>1,320</td>
<td>0.006</td>
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</tr>
<tr>
<td><strong>2000</strong></td>
<td>Hotel</td>
<td>300 rms.</td>
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<td>0.090</td>
<td>0.338</td>
</tr>
<tr>
<td></td>
<td>MF</td>
<td>800 U.</td>
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</tr>
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</tr>
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<td></td>
<td>Comm.</td>
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<td>1,320</td>
<td>0.011</td>
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<tr>
<td><strong>Full Develop.</strong></td>
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<td>Comm.</td>
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<td>1,320</td>
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**Note:** Sewage Generation rates are based on 100% unit occupancy and 90% of average domestic water use rates which excludes irrigation.
SEWAGE GENERATION

1. **Sewage Generation Rates.** The following rates computed are used in developing sewage generation volumes for the MLRI development. The rates are based on 100 percent unit occupancy and 90 percent of average domestic water use rates which excludes irrigation.

**Hotel 1:**
- Water Use Per Unit = 334 gpd
- Sewage generation rate = 0.9 x 334 = 301 gpd/unit 
  
  Say 300 gals/unit

**Other Hotels:**
- Water Use Per Unit = 334 gpd/unit
- Sewage generation rate = 0.9 x 334 = 301 gpd/unit
  
  Say 300 gpd/unit

**Multi-Family:**
- Water Use Per Unit = 2.5 Persons x 125 gals/person = 313 gpd/unit
- Sewage Generation Rate = 0.9 x 313 = 282 gpd/unit
  
  Say 280 gpd/unit

**Commercial:**
- Maximum Water Use = 2,200 gpd/acre
- Average Water Use = 1/1.5 x 2,200 = 1,467 gpd/acre
- Sewage Generation Rate = 0.9 x 1,467 = 1,320 gpd/acre
To alleviate potential public health problems, the effluent can be disinfected by chlorination at the wastewater treatment plant. Also, residential units are planned to be at a substantial distance from the golf courses, so that a buffer is maintained between them. Groundwater in the Mauna Lani Resort area is not suitable for potable use, and therefore seepage into the ground would not have an effect on potable water sources. There would be minimal runoff from irrigation, with most of the irrigation water held in the soil.

If surplus effluent is not used for golf course irrigation, it will be used to irrigate undeveloped areas of Mauna Lani Resort, Inc. lands.

6.7 SOLID WASTE DISPOSAL

6.7.1 Existing Conditions

The Kailua landfill is located near Kailua-Kona and will serve the North Kona and South Kohala coastal area until a planned new landfill site becomes operational. The County Sewers and Sanitation Bureau is considering a new landfill site which would be located about 10 miles east of the Kona Village Resort, in the vicinity of Pu’uanahulu. The new site is expected to be operational in about three to four years, and would accommodate solid waste generated by planned resort development in South Kohala (Sugiyama; September 20, 1984).

6.7.2 Probable Impacts

Solid waste generated at MLR is expected to be accommodated at the landfill site mentioned above or at other County operated landfills as new sites are designated.

6.8 ELECTRICAL POWER AND COMMUNICATIONS

6.8.1 Existing Conditions

Electrical power for the Island of Hawai‘i is mainly from oil-fired turbines and diesels; however, bagasse-fired boilers at the Island's sugar companies currently provide about 19 percent of the County's generating capacity of 125,900 KW. Electrical power to Mauna Lani Resort is supplied by the Hawai‘i Electric Light Company (HELCO). The resort distribution system is through underground conduits, and these extend to the resort under the major roadways.

Telephone service to the MLR is provided by the Hawaiian Telephone Company. A telephone substation is located in the service support area. Telephone signals come to this facility via microwave dish. Cable television (CATV) lines are located underground and extend to all development sites. The CATV signal is picked up by microwave dish at the service support area.

6.8.2 Probable Impacts

It is expected that new resort facilities at Mauna Lani will be connected to the electrical power system as the facilities become operational.
7. RECREATIONAL FACILITIES

7.1 EXISTING FACILITIES

Kohala and North Kona recreational facilities include golf courses, tennis courts, beaches, riding stables, historic sites, small boat harbors, and other amenities and attractions. The location of the major facilities are shown on Figure IV-8. The County's Samuel Spencer Beach Park and the Hapuna Beach State Recreation Area are the principal developed recreational facilities in the immediate vicinity of MLR. They offer white sand beaches, picnic and camp grounds, and restroom and parking facilities. Other County beach parks are located in the Kailua area and at Mahukona Harbor, Kapa'a, and Keokea. A large State Historic Park is located at Lapakahi in North Kohala; it encompasses an extensive archaeological complex, accessible to the public by trails and explanatory signs. At Honokohau and Kawaihae there are small boat harbors and ramps, and just south of Hapuna Beach is the Puako Boat Ramp. A number of additional recreational facilities are proposed for Kohala and North Kona in the Hawai'i County Recreation Plan (Hawai'i, County of, Department of Parks and Recreation and Planning Department; 1973). Table IV-9 shows the availability of State-owned land, much of it available for park and recreational uses.

The State Recreation Plan, Technical Reference Document, by the Hawai'i State Department of Land and Natural Resources, noted nine golf courses on the island of Hawai'i in 1980. Since then, two more golf courses have been built, one at Mauna Lani Resort and one at Waikoloa Beach Resort. Golf courses at the three Kohala coast resorts and the one at Waikoloa Village are open to the public, subject to green fees and the availability of tee times. Preferential starting times are given to hotel guests and, at Mauna Kea Resort, also to resort property owners.

In addition to the golf course mentioned above, other recreational opportunities exist on lands owned and leased by Mauna Lani Resort, Inc. A public right-of-way provided by Mauna Lani Resort leads to the shoreline fronting the Mauna Lani Bay Hotel. Rocky shoreline areas and beaches, as well as waters offshore, are used by the public and resort guests. Recreational activities include fishing, squidding, limu gathering, swimming, snorkeling, scuba diving, sunbathing, beachcombing, surfing, windsurfing and sailing.

Public access exists to the Resort's historic areas and fishponds. The Puako petroglyph field, a well known Hawaiian archaeological site maintained by community volunteers and Mauna Lani Resort, Inc., is a significant attraction for both island residents and visitors, and is the focus of an archaeological park being developed by Mauna Lani Resort, Inc.

7.2 PROBABLE IMPACTS

Development of MLR under the proposed expanded master plan would increase access to recreational amenities for residents. Two new public access paths to the shoreline would be provided by the Resort, one at the southern end of the resort, to Honokaope Bay, and the second to the proposed public shoreline park north of Pauoa Bay (See Figures II-7, II-8, and II-9 in Chapter II of this report). A pedestrian trail skirts the shoreline along Mauna Lani Resort's seaward boundary; it is expected that the trail would continue to be used by the public. Because of improved access, it is anticipated that ocean recreational activities might well increase.
Figure IV-6 RECREATIONAL FACILITIES IN KOHALA/NORTH KONA REGION
Figure IV-9
GENERAL LANDOWNERSHIP
North/South Kohala and North Kona Region
Access to the Puako petroglyphs would also improve; visitors to the park would have a shorter route than now exists through the shoreline park near Pauoa Bay. The path to the petroglyphs is expected to be open from dawn to dusk.

With the proposed expanded master plan, a second golf course would be built and, as is the existing resort golf course, would be open to the public. Should development proceed according to the existing master plan, the public beach park would not be constructed to the extent proposed under the revised master plan nor would a second golf course be built, thus diminishing recreational opportunities for resort guests and the public.

The Hawaii County Department of Parks and Recreation has a target ratio of five acres of developed park land for every 1,000 resident population. This ratio is noted in the County Park Dedication Ordinance. MLR now includes 3.2 acres of public park land and several more would be provided at the shoreline park under the revised master plan. The permanent resident population at the resort is currently almost negligible. By 1990, Peat, Marwick projects an increase in the island's population of about 1,000 persons due to development at MLR (on-site residents and families of new employees). By the year 2000, the population impact would be 2,000 persons. According to the Department of Parks and Recreation standards, Mauna Lani Resort, Inc. would be providing sufficient park and recreation land within its resort to satisfy the Department's goal.

Residents and visitors at the Resort are expected to contribute to increased usage of recreational amenities off-site to some degree. However, because of the ample planned facilities on-site, the burden on public recreational facilities off-site as a result of development at Mauna Lani Resort is not expected to be too significant. Further, the provision of additional on-site recreational opportunities for both resort guests and residents and the general public would tend to offset the higher usage of off-site amenities.
8. VISUAL IMPACTS

8.1 INTRODUCTION

The Mauna Lani Resort site encompasses over 3,000 acres of coastal land. The existing shoreline development is nearly two miles from Queen Ka'ahumanu Highway, the nearest public roadway which provides a view of the property, and it is approximately one mile from the highway to the intersection of Mauna Lani Drive and Kaniku Drive, the resort's two major streets. This geographic separation is a major factor in minimizing the potential visual impact of the proposed project.

The remainder of this section is divided into three parts. The first discusses the effect that the proposed development would have on views of the property from Queen Ka'ahumanu Highway. The second describes the change in visual ambience that would be felt as a result of the proposed construction. The third and final section describes the effect that development would have on views from the shoreline.

8.2 VIEWS FROM THE HIGHWAY

Queen Ka'ahumanu Highway forms the inland boundary of the Mauna Lani Resort site south of Mauna Lani Road. Most of the portion of the highway between its intersection with Walkolol Road and Mauna Lani Drive is constructed in a shallow cut through the Kaniku Lava Flow that hides structures on the resort site. As a result, the first clear view of the property available to northbound motorists comes just before the resort intersection. Hence the first view of the proposed project from this direction is of the existing golf course. No changes to this area are proposed as part of the revised master plan. Over the long term, residential development on Sites E, B/C, and I will also be visible, but these are from 1 to 2 miles distant, and structures would be screened by surrounding landscape vegetation. The choice of finish color and texture for the structures will play a major role in determining their appearance from the highway. The use of white for the Mauna Kea Beach and Mauna Lani Bay Hotels, for example, tends to make them stand out, whereas the use of earth and vegetation tones for structures would tend to make them blend more completely into the natural surroundings.

The planned resort facilities are concentrated on the makai portions of the site. Since Queen Ka'ahumanu Highway angles away from the coast towards the northeast, they would be at a considerable distance as seen from vehicles approaching the resort from the north. The sewage treatment plant and service structures located northeast of Kaniku Drive are closer to the highway, but even in this area the minimum separation is one-half mile. The wastewater treatment plant contains only low-lying structures, but the warehouses and other buildings in the in the service area could be bulkier. Landscaping and/or earthen berms could be used to shield them from view, however.

The revised plan provides one additional golf course. This would provide at least 150 acres of additional green space within the resort. Some of these irrigated acres would be visible from the highway during the early phases of plan implementation, but the residential development that is planned around the new and existing fairways and greens would eventually block most of it from view. The revised plan also provides corridors that would allow the existing and planned courses to be supplemented by up to 36 additional golf holes in the future. If they were constructed, these golf holes would be much closer to the highway than the others and would cut a green swath across the lava rockscape.
8.3 VISUAL CHARACTER OF THE RESORT

Implementation of the existing master plan within the present Urban District would result in large scale development along most of the resort's shoreline. Average densities on the hotel and resort residential sites would be about 14 units per acre, and the overall density within the Urban District would be about 8 units per acre. While the existing Mauna Lani Bay Hotel and Mauna Lani Terrace condominium apartments are evidence that a tasteful appearance can be maintained within the densities envisioned by the existing master plan, these early projects benefit from their location adjacent to permanent open space reserves around the ponds, and adjacent to sites that have not yet been developed. As development continues, the area will take on a much more urban appearance, and some of the characteristic feeling imparted by the sites' present isolation will be lost.

Because the revised master plan calls for the same number of resort residential and hotel units to be spread over substantially more acres, average densities are much lower. Considering only the area of the development sites themselves (i.e., excluding the golf courses, parks, recreation areas, etc.), the average density of the hotel and resort residential parcels in the revised master plan is just over 10 units per acre, or about 30 percent less than the existing plan. The overall density of the revised master plan is about 4.3 units per acre, or just over half that of the existing master plan. The lower density will make it possible to impart a much different visual character to the development, and will allow the Mauna Lani Resort to retain the unique character established by the luxury projects constructed to date.

8.4 VIEWS FROM THE SHORELINE

Mauna Lani Resort, Inc. has made a major effort to improve public access to the shoreline of the resort. A public pathway system has been installed, and a parking area and restrooms have been constructed to serve local residents. As a result, there is considerably more foot traffic along the shoreline than was true before resort development began. The coastal parcels are prime development sites, and it is inevitable that the barren lava shoreline will be transformed as a result of the development. In this respect, the only way in which the revised master plan differs from the existing plan is in its extension of development along the southern part of Honoka'ope Bay and the provision for golf holes and a public shoreline park on the leased land north of Pauoa Bay.

The golf holes and park planned for the latter area would contain restroom facilities, water features and some landscaping. The open character of the area would be retained, however, and significant adverse effect on its visual character is not expected.

The extension of development on the southern side of the resort would involve the incorporation of the beach at Honoka'ope Bay and the windblown sand deposits which lie behind it into the resort. What is now used as an isolated retreat would be brought into the mainstream of resort activities. Current plans are to preserve portions of the sand deposits as a unique golf course feature, and the number of people able to see this unique feature will be greatly increased. Since Mauna Lani Resort's plans call for the construction or public restroom facilities and parking near Honoka'ope Bay and extension of the improved shoreline path that has been constructed within the existing Urban area, views of these areas would also be more available to the general public.
The only visual aspect of the revised plan which is likely to be considered negative is that it would eliminate the open space buffer which currently exists along the boundary between the Mauna Lani and Waikoloa Beach Resorts. The function performed by this buffer area, which is composed of barren lava, would be largely assumed by the eight golf holes that are proposed for the area under the revised master plan.
CHAPTER V

RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

1. STATE LAND USE LAW

All lands in the State have been placed in one of four land use districts (Urban, Agricultural, Conservation, or Rural) by the State Land Use Commission (SLUC). State Land Use District Boundary Reviews have been undertaken by the State Land Use Commission to update its Land Use District Maps. Besides this SLUC-initiated review, provisions for applicant-initiated amendments to the district boundaries have been established in Section 205-4 of the Hawai'i Revised Statutes (HRS), and further promulgated in the State Land Use Commission Rules of Practice and Procedure and District Regulations (December 21, 1973 as amended).

1.1 EXISTING AND PROPOSED DISTRICT BOUNDARIES

The history of the Mauna Lani Resort and its master plan are discussed in Chapter II. The existing Urban boundary and master plan are shown in Figure II-2. Mauna Lani Resort, Inc. is currently requesting amendments to the State Land Use District boundaries that would change 486 acres from Agricultural District to Urban District and 163 acres from Conservation District to Urban District. Figure II-6 shows the proposed district boundary amendments and the revised Mauna Lani master plan.

Note that the revised Mauna Lani Resort master plan also proposes use of Conservation District land which Mauna Lani Resort Inc. leases from the State. The Conservation designation on this land would not change as the proposed uses are compatible with the Conservation District rules (see Section 2 of this Chapter).

1.2 REQUIREMENTS FOR BOUNDARY AMENDMENTS

The SLUC District Regulations require that the application for a boundary amendment must show that it is "reasonable, not violative of Section 205-2 and consistent with the Interim Statewide Land Use Guidance Policies". The reasons for the requested changes in the State Land Use District boundaries are presented in Chapter II. The consistency of the proposed district designations with Section 205-2, HRS and with the Interim Statewide Land Use Guidance Policies are discussed in the following sections. A discussion then follows of how the proposed revisions meet the special requirements for petitions for urban classification.

1.2.1 Section 205-2, Hawai'i Revised Statutes

The proposed amendments to the State Land Use District boundaries are not violative of the basic standards for determining boundaries that are set forth in Section 205-2, HRS. Relevant standards from this section are quoted below and a discussion of the proposed designations' consistency with the stated standard follows each quote.

"In the establishment of boundaries of urban districts those lands that are now in urban use and a sufficient reserve for foreseeable urban growth shall be included."
Discussion: One of the reasons for the proposed amendments to the boundaries of the Urban District for the Mauna Lani Resort is to incorporate within the Urban District the support facilities (urban uses) that have been constructed within the Agricultural District under Special Permits. Another reason is to provide a sufficient reserve for quality urban growth at Mauna Lani by allowing for a decrease in density and for additional recreational facilities.

"In the establishment of the boundaries of the agricultural districts the greatest possible protection shall be given to those lands with a high capacity for intensive cultivation."

Discussion: Essentially all of the area that is proposed for change from Agricultural to Urban District is rocky, barren lava land. A small portion of this land is designated as "Other Important Agricultural Land" on the Agricultural Lands of Importance to the State of Hawaii (ALISH) maps, and is located adjacent to the wastewater treatment plant for the resort. The capacity of the underlying soil type for intensive cultivation is not high, as indicated by the ratings it is given in various soil classification systems. Thus, the State Department of Agriculture has concluded that it does "not meet the generally understood definitions of Important agricultural lands". See further discussion in Section 1.1 of Chapter IV and the State Department of Agriculture's memo on page XII-46.

"Conservation districts shall include areas necessary for:

a. protecting watersheds and water sources;
b. preserving scenic and historic areas;
c. providing park lands, wilderness, and beach reserves;
d. conserving endemic plants, fish, and wildlife;
e. preventing floods and soil erosion;
f. forestry;
g. open space areas whose existing openness, natural condition, or present state of use, if retained would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources;
h. areas of value for recreational purposes;
i. other related activities;
j. and other permitted uses not detrimental to a multiple use conservation concept."

[NOTE: letters added for ease of reference in following discussion.]

Discussion: An examination of the proposed Conservation to Urban redesignation in reference to each of the above-listed points follows.

a. The Conservation District land that is proposed for Urban is not a watershed or water source area that should be protected.

b. Essentially all of this land is a barren 'a'a lava flow. Its scenic qualities are generally limited to the coastline area, and it is expected that these qualities will be preserved. The inland area will be rendered more scenic with the golf course fairways and other landscaping. An archaeological survey (Kirch, May 1979) of all of the Mauna Lani Resort was performed and a management plan
completed (Science Management, Inc., 1982). On the basis of these studies the most important historic sites in the resort have been preserved. As additional areas are prepared for development, the State Historic Sites Section of DLNR and the Hawaii County Planning Department will be consulted regarding the necessity for additional archaeological work. Communications between Mauna Lani Resort, Inc. and these two governmental agencies has been established and general consultation is underway.

c. As the Conservation District land under consideration is located between two existing Urban Districts, it is not a wilderness area. The shoreline area would be available for public use and recreation and Figure II-9 shows the planned public access to be installed at Honokalope Bay under the proposed Mauna Lani master plan.

d. There are a few endemic flora and fauna in the Conservation District land proposed for Urban. However, it is expected that development will avoid these, and none of the species involved are rare or endangered.

e. Converting the Conservation District land to Urban will not cause floods or soil erosion. The land is now barren of soil; soil will be brought in as parcels are developed, but landscaping will be promptly established to avoid wind or water erosion. The only area subject to flooding is the shoreline. If any development is planned within the flood zone, it will follow the County flood control regulations which are based on Federal flood insurance program provisions.

f. The Conservation District land under consideration is barren 'a'a lava, not forest land.

g. Retaining the existing open space of the 'a'a lava flow in its natural condition would not enhance the present or potential value of abutting or surrounding communities. Allowing the proposed urban uses around the fairways of the golf course would enhance the value of the surrounding development. It is expected that the natural and scenic resources of the land, largely in the shoreline area, would be incorporated into the proposed development. The golf holes in this area will be as carefully designed as those in the existing Mauna Lani course which preserve interesting lava formations for visual effect.

h. Conversion of this land to the Urban District would result in improved public access to the shoreline for recreational purposes.

i. As discussed above, the land under consideration is suited for urban uses and activities, rather than those related to Conservation District purposes.

j. The hotel and condominium uses proposed for this land are not permitted uses in a Conservation District. The requested change to Urban District, however, will not be detrimental to the land and its resources.

1.2.2 Interim Statewide Land Use Guidance Policy

The interim policies were to be observed until two years after the effective date of enactment of the State Plan, which was signed into law in May 1978. However, the policies were printed in the 1984 supplement to the Hawaii Revised Statutes, and therefore have apparently not yet been repealed. Moreover, they are still included in the SLUC regulations. A discussion of the proposed action's consistency with each of the eight policies follows.
1. Land use amendments shall be approved only as reasonably necessary to accommodate growth and development, provided there are no significant adverse effects upon agriculture, natural, environmental, recreational, scenic, historic, or other resources of the area.

Discussion: As discussed previously, the land use amendment being sought is reasonable and necessary to accommodate quality development at Mauna Lani Resort. This Environmental Impact Statement outlines the impacts that might result from the revised Mauna Lani master plan and details the mitigation measures that would be taken to avoid or minimize these effects. With the proposed mitigation measures implemented, there would be no significant adverse effects.

2. Lands to be reclassified as an urban district shall have adequate public services and facilities or as can be so provided at reasonable cost to the petitioner.

Discussion: Since the revised Mauna Lani Resort master plan would accommodate no greater number of units than has already been approved, it should create no unanticipated demand for public services and facilities. Since Mauna Lani Resort, Inc. will provide all the development's infrastructure (much of which is considered a public service/facility, such as wastewater treatment plant, parks, etc.), the planned resort is not expected to foster extensive public expenditures. See further discussion in Section 2.2.6 of Chapter IV.

3. Maximum use shall be made of existing services and facilities, and scattered urban development shall be avoided.

4. Urban districts shall be contiguous to an existing urban district or shall constitute all or a part of a self-contained urban center.

Discussion: The revised Mauna Lani Resort master plan calls for urban designation of land contiguous to Urban Districts. It reflects an integrated plan, rather than scattered development. Maximum use will be made of the existing services and facilities installed at Mauna Lani Resort. It has been designed as a self-contained destination resort and the requested boundary amendments will help assure its successful operation as an economic center for the region.

5. Preference will be given to amendment petitions which will provide permanent employment, or needed housing accessible to existing or proposed employment centers, or assist in providing a balanced housing supply for all economic and social groups.

Discussion: The revised Mauna Lani Resort master plan will add to the economic stability of the resort and allow for higher quality development and permanent employment opportunities. Mauna Lani Resort, Inc. has already participated with the Hawaii Housing Authority and the County to provide employee housing, and is also working to provide a balanced housing supply in Hawaii County for all economic and social groups.
(6) In establishing the boundaries of the districts in each county, the Commission shall give consideration to the general plan of the County.

Discussion: The relationship of the revised Mauna Lani Resort master plan to the Hawaii County General Plan is addressed in Section 7 of this chapter. The proposed land use district boundary amendments are substantially consistent with the LUPAG map and policies of the General Plan.

(7) Insofar as practicable conservation lands shall not be reclassified as urban lands.

Discussion: It is not practicable to develop a second golf course within the existing urban lands at Mauna Lani Resort for the reasons outlined in Chapter II. The need for the second golf course is also outlined there. Considering the discussions above in Section 1.2.1, relating to the types of land to be designated Conservation, it does not appear that there is any practicable reason for retaining this particular land in the Conservation District.

(8) The Commission is encouraged to reclassify urban lands which are incompatible with the interim statewide land use guidance policy or are not developed in a timely manner.

Discussion: The revised Mauna Lani Resort master plan is compatible with the interim statewide land use guidance policy and will be developed in a timely manner. See discussion in Section 1.3.

1.2.3 Special Requirements for Petitions for Urban Classification

The State Land Use Commission's rules call for specific information to be provided with petitions for reclassification to the Urban District. Items (a) through (e) were submitted in the petition filed with the Commission in October 1984. After that submittal, it was determined that an Environmental Impact Statement was required under Chapter 343, HRS and this document was prepared under the regulations of that law.

1.3 PROJECT SCHEDULE AND RELATIONSHIP TO INCREMENTAL DISTRICTING REGULATIONS

The need for the second golf course is the critical reason behind the petition for urban redistricting. It will be developed within five years from the date of the Commission's approval. Detailed design work on this golf course will start immediately upon receipt of all the necessary land use approvals. Also within the five-year period after SLUC approval, it is planned that virtually all of the infrastructure improvements for the newly designated urban land will be substantially in place and that the hotel planned for Hotel Site 4 at Honoka'ope Bay will be constructed, as well as a substantial number of residential units.
2. **CONSERVATION DISTRICT RULES**

The administrative rules of the Hawai‘i State Department of Land and Natural Resources (June 1981) Title 13, Chapter 2 (formerly Regulation No. 4) govern land use within the Conservation District and provide for four categories, or subzones. As described in Chapter II the revised Mauna Lani Resort master plan proposes use of the State-owned Conservation District land which it leases. The actions for which it seeks approval from the Board of Land and Natural Resources are summarized below and is followed by a discussion of the relationship of the proposed project to the Conservation District rules.

### 2.1 PROPOSAL FOR THE CONSERVATION DISTRICT

Mauna Lani Resort, Inc. is seeking the following approvals regarding the Conservation District land that it leases from the State:

* Authorization for agricultural and recreational uses. The proposed recreational uses are:
  - two golf holes,
  - a public shoreline park, and
  - an archaeological park.

* Authorization to subdivide the State parcel into three lots.

* Amendment of the subzone boundaries within the southwestern portion of the Conservation District land.

The plan calls for subdivision of the State leased land into three lots. The 40-acre parcel at the northeast end of the land is proposed to be surrendered. It is expected that agricultural uses would occur on this lot. The middle lot is now a kia‘wa forest area, a small part of which Mauna Lani Resort, Inc. uses to raise orchard and nursery plants. This use would be maintained.

The 230-acre lot on the southwest end of the State parcel would be used for recreation: golf holes, beach park, and archaeological park. For these uses to be established, amendment of the Conservation District subzone boundaries is being requested.

### 2.2 SUBZONES—EXISTING AND PROPOSED

The Puako Petroglyph Archaeological District does not now lie entirely within the "protective" Conservation District subzone. The objective of this subzone is to protect valuable resources such as archaeological sites. The boundaries of this subzone are supposed to encompass land "necessary for the preservation and enhancement of designated historic or archaeological sites".

The proposed change in Conservation District subzone boundaries would adjust the "protective" subzone to encompass all of the Puako Petroglyph Archaeological District that lies within the Conservation District. The "general" Conservation District subzone boundaries would be altered in response to that change. The "resource" Conservation District subzone fronting the shoreline would remain the same.

With these subzone boundary adjustments, the proposed golf holes and beach park on the leased Conservation District land would be entirely within the "general" and "resource" subzones. The strip of "resource" subzone along the shoreline would remain unchanged and be used for shoreline park activities. The improvements for this...
subzone probably would be limited to landscaping and picnic tables. This is consistent with the definition of the "resource" subzone boundaries, which encompass parkland and "land suitable for outdoor recreational uses such as ... picnicking". It also fulfills the objective of the "resource" subzone, which is "to develop, with proper management, areas to ensure sustained use of the natural resources of those areas".

The plans show the comfort station and parking for the proposed public shoreline park in the "general" subzone area, as well as the two golf holes and the water features that will enhance both the park and the golf course. The improvements proposed for the "general" subzone are all related to open space recreational use. These are consistent with the objective of the "general" subzone, which is "to designate open space where specific conservation uses may not be defined, but where urban use would be premature."

2.3 PROCEDURES FOR PERMITS AND AMENDMENTS

An application for the proposed subzone boundary amendments, subdivision of the parcel, and agricultural and recreational (golf holes, shoreline park, and archaeological park) uses in Conservation land as discussed above has been filed with the Board of Land and Natural Resources. This EIS comprises part of the applications that are being prepared for the requested Conservation District Use Permit and the proposed State Land Use District Amendments.

2.3.1 Conditions of Conservation District Use

All uses allowed in the Conservation District are subject to the conditions outlined in Section 13-2-21 of the regulations. The conditions relevant to the Mauna Lani Resort's Conservation District Use Application are listed below and following each is a discussion of the proposed actions' compliance with it.

(1) The use shall be compatible with the locality and surrounding areas, and appropriate to the physical conditions and capabilities of the specific parcel or parcels of land.

Discussion: The proposed recreational and agricultural uses are compatible with the open space character of the surrounding inland area and with the adjacent urban development along Puako Road. The establishment of the shoreline park and the archaeological park would be very appropriate to the specific physical conditions of the land along the shoreline and the land containing archaeological resources. The agricultural uses have been proposed for the land in the Conservation District that contains soil, while the golf holes are proposed for the portion of the parcel that is composed of essentially unweathered 'a'a and pahoehoe lava.

(2) The existing physical and environmental aspects of the subject areas, such as natural beauty and open space characteristics, shall be preserved, or improved upon, whichever is applicable.

Discussion: The area containing the Puako petroglyphs will be preserved, and the physical and environmental setting will be maintained so as to protect the archaeological resources. The natural beauty of the shoreline area will be enhanced by the landscaping of the shoreline park area. The proposed archaeological and shoreline parks, golf holes, and agricultural uses will also preserve the open space characteristics of the land.
(3) All buildings, structures, and facilities shall harmonize with the physical and environmental conditions stated in this rule.

Discussion: The only structure that would be constructed would be the comfort station at the shoreline park. Landscaping (including the golf holes, water features, and lawn areas), parking and pathways would be installed in the southwestern portion of the Conservation District. These facilities would be designed to harmonize with the environment.

(4) Use of the area shall conform with the program of the appropriate soil and water conservation district or plan approved by and on file with the department.

Discussion: The Mauna Lani Resort lies within the boundaries of the Mauna Kea Soil and Water Conservation District (SWCD). The district's Long Range Program: 1985 was examined to certify that the proposed uses of the Conservation land conformed to it. The program is concerned with soil-disturbing activities of any type, and other areas of special concern to the Mauna Kea SWCD include low rainfall areas with potential wind erosion problems, and flooding and dust problems in Puako. The purpose of the district's program is to control erosion, sedimentation, and water pollution resulting from the above stated problems. The proposed actions in the leased Conservation District land were found to be in conformance to the policies of the Mauna Kea SWCD (p. 15) as outlined below.

1. The quality of the natural resources of the area will be maintained or improved under the agricultural and recreational uses proposed.

2. The effect of the actions will be to maintain or improve the standard of living/quality of life for the people of the district, especially by the provision of the shoreline and archaeological parks.

3. The improvement of the land for leisure time activities will be accomplished by the installation of the shoreline park, archaeological park and golf holes. These improvements also address the concern expressed in the Mauna Kea SWCD program that beaches in the area need to be retained for public use.

4. The land owners are aware of the benefits of (and will utilize) land use planning and construction period treatment techniques that will prevent erosion and subsequent sedimentation and water pollution problems.

5. The revised Mauna Lani Resort master plan, including the uses proposed on the leased Conservation District land, will lead to economic stability for the region and benefit the local people.

6. None of the lands owned or leased by Mauna Lani Resort, Inc. are designated "Prime Agricultural Land". The agricultural uses will be located in the area designated "Other Important Agricultural Land". In the objectives section of the program the Mauna Kea SWCD supports the use of "less productive lands for development of resorts".

(5) When provided or required, potable water supply and sanitation facilities shall have the approval of the department of health and the board/department of water supply.
Discussion: The potable water system and sanitation facilities on the Conservation District land will be connected to the existing systems within the resort that have been approved by the Hawai’i County Department of Water Supply and the State Department of Health. Expansions of such systems will require approval from the same government agencies.

(7) The construction ... of any building or other improvements on lands within the conservation district shall be subject to the building code ... and four copies of the final location map, plans, and specifications shall be submitted to the chairman.

Discussion: This condition will be observed, and prior to construction of the proposed improvements on the Conservation District land, four copies of all listed materials will be submitted to the Chairman of the Board of Land and Natural Resources (BLNR).

(8) Provisions for access, parking, drainage, fire protection, safety, signs, lighting, and changes in the landscape shall have the approval of the chairperson or an authorized representative.

Discussion: Plans for these aspects of the proposed improvements will be included in the package of material submitted to the DLNR, and they will not be constructed until approved.

(11) Except in the case of public highways, access roads shall be limited to a maximum of two lanes.

Discussion: The access road to the beach park and archaeological park will be limited to two lanes.

(12) Overloading of off-site roadways, utilities, and public facilities shall be minimized.

Discussion: The uses proposed for the Conservation District land are not expected to overload off-site roadways, utilities, and public facilities.

(13) Clearing areas for construction purposes shall require prior approval by the chairperson, ground cover of slopes over 40% shall not be removed unless specifically authorized by the chairperson.

Discussion: Approval of the clearing plan will be obtained before commencing construction. The area that would be cleared for the recreational facilities has slopes much less than 40%.

(14) Cleared areas shall be revegetated within thirty days unless otherwise provided for in a plan on file with and approved by the department.

Discussion: The provisions of this condition will be complied with.
(15) Upon approval of a particular use by the board, any work or construction to be done on the land shall be initiated within one year of the approval of the use and all work and construction shall be completed within three years of the approval of the use.

Discussion: The provisions of this condition regarding time limits will be met.

2.3.2 Guidelines for Reviewing Applications

The Board of Land and Natural Resources has established four guidelines that it applies in reviewing applications. These are given below and the proposed actions' consistency with them is discussed following each one.

(1) All applications shall be reviewed in such a manner that the objectives of the subzone or subzones are given primary consideration.

Discussion: The subzone objectives are discussed in Section 2.2 of this Chapter, and the actions proposed are consistent with them.

(2) All applications shall be reviewed so that any physical hazard, as determined by the department, shall be alleviated by the applicant when required by the board.

Discussion: The shoreline area is subject to tsunami inundation. However, the comfort station, the only structure proposed in the Conservation District, would be located inland of the 100-year flood boundary shown on the Flood Insurance Rate Map for the area.

(3) All applications for subdivision shall address their relationship with the county general plan.

Discussion: The relationship of the revised Mauna Lani Resort master plan to the Hawaii County General Plan is discussed in Section 7 of this Chapter. The proposed actions in the Conservation District land, including the proposed subdivision into three parcels, are also consistent with the General Plan. The actions would protect historic sites, natural beauty, open space, shoreline resources, environmental quality, recreational opportunities, and agricultural land. There would be no conflict with any of the goals, policies, or standards of the General Plan.

(4) All applications shall meet the purpose and intent of the State's conservation district.

Discussion: The definition of "conservation" in Section 1 of the DLNR Title 13, Chapter 2 rules outlines the purpose and intent of the State's Conservation district:

"conservation means a practice, by both government and private landowners, of protecting and preserving, by judicious development and utilization, the natural and scenic resources attendant to land, including territorial waters within the State, to ensure optimum long-term benefits for the inhabitants of the State".

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The proposed actions are in accord with this definition. The proposed golf holes, shoreline park and archaeological park would be a means of judiciously developing natural resources for recreational use by both State residents and visitors. The existing agricultural uses on the property will be maintained. These are considered the optimum long-term beneficial uses of the conservation land.
3. **HAWAII STATE PLAN**

The Hawaii State Plan (Hawaii, State of, Department of Planning and Economic Development, 1978) consists of a series of broad goals, objectives and policies which are to act as the guidelines for the growth and development of the State. In general, the proposed action is consistent with the overall intent of the State Plan. Discussed below are the specific objectives, policies, and priority actions contained in Part I and Part III of the State Plan which are thought to be the most directly related to the proposed project.

**PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES**

**OBJECTIVE AND POLICIES FOR POPULATION**

(2)(b) **POLICY:** Encourage an increase in economic activities and employment opportunities on the Neighbor Islands consistent with community needs and desires.

(3)(b) **POLICY:** Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the state.

(4)(b) **POLICY:** Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

**Discussion:** At a time when employment opportunities are decreasing in the agricultural sector of Hawaii's economy, opportunities are increasing in the visitor industry. During the first 15 years of development, Mauna Lani Resort is expected to generate about 200 to 300 construction jobs annually. Permanent full-time operational employment at the resort is expected to average from 800 jobs to 3000 jobs at potential maximum development (resort-wide, including existing facilities). Indirectly, employment throughout the state will also be stimulated by development at Mauna Lani Resort.

Adequate services and facilities will be provided by Mauna Lani Resort, Inc. at the resort: internal roads, potable water, wastewater disposal, electricity, and other services. State and County tax revenues generated by the resort (property taxes, income taxes, etc.) will contribute toward the cost of providing services to new residents and visitors.

**OBJECTIVES AND POLICIES FOR THE ECONOMY - IN GENERAL**

(1)(a) **OBJECTIVE:** Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.

(6)(b) **POLICY:** Strive to achieve a sustained level of construction activity responsive to, and consistent with, state growth objectives.

(9)(b) **POLICY:** Encourage labor-intensive activities that are economically satisfying.

(11)(b) **POLICY:** Promote economic activities, especially those which benefit areas with substantial unemployment problems.
POLICY: Encourage businesses that have favorable financial multiplier effects within Hawaii's economy.

Discussion: As stated above, development at Mauna Lani Resort will provide many employment opportunities. It is expected that nine to twelve percent of the operational period positions will be in the managerial or supervisory categories. Many other jobs will provide workers with higher than average total compensation based on wages and gratuities. Construction of facilities is expected to occur over a period of many years. Thus, development of Mauna Lani Resort will contribute to sustaining the level of construction activity in the State. Both hotel/resort and construction employment have favorable financial multiplier effects, 2.4 total jobs for every direct construction job and 1.9 for every direct resort job. Due to the decline of the sugar industry in North Kohala, local unemployment rates have been higher than statewide rates. Direct and indirect employment related to Mauna Lani Resort development will contribute toward alleviating this problem.

OBJECTIVES AND POLICIES FOR THE ECONOMY - AGRICULTURE

(3) POLICY: Promote Hawaii's agricultural products locally, on the continental United States, and internationally.

(6) POLICY: Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

Discussion: Local agricultural products are featured at Mauna Lani Resort food service establishments where, very often, visitors are first introduced to some of these products. Further development at the resort will provide an expanded market for local fruits, vegetables, fish, meat, and beverages. At the same time, development at Mauna Lani will not decrease the inventory of agriculturally suitable lands. Most of the lands planned for resort development is barren lava, unsuited to agricultural use, particularly if left unirrigated.

OBJECTIVE AND POLICIES FOR THE ECONOMY - VISITOR INDUSTRY

(a) OBJECTIVE: A visitor industry that constitutes a major component of steady growth for Hawaii's economy.

(3) POLICY: Improve the quality of existing visitor destination areas.

(5) POLICY: Ensure that visitor facilities and destination areas are carefully planned and sensitive to existing neighboring communities and activities.

(6) POLICY: Develop the industry in a manner that will provide the greatest number of primary jobs and steady employment for Hawaii's people.

(7) POLICY: Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.

(9) POLICY: Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.
Discussion: Mauna Lani Resort, Inc. intends to maintain its high standards of development throughout the low-density resort, with the goal of blending facilities into the natural surroundings. Mauna Lani Resort is carefully planned and is located between two other major resorts.

Due to the luxury character of the resort and the extensive landscaping, Mauna Lani employs more employees per unit than is usually the case for most visitor facilities in Hawaii. Mauna Lani Bay Hotel provides training for employees and opportunities exist for advancement in the organization. A large proportion of the employees are from communities neighboring the resort.

Mauna Lani Resort has a unique Hawaiian flavor which is imparted to guests through the character of the amenities, access to historical sites which are interpreted by signs, and island-style service.

OBJECTIVES AND POLICIES FOR THE PHYSICAL ENVIRONMENT - LAND-BASED, SHORELINE, AND MARINE RESOURCES

(1)(a) **OBJECTIVE:** Prudent use of Hawaii's land-based, shoreline, and marine resources.

(2)(a) **OBJECTIVE:** Effective protection of Hawaii's unique and fragile environmental resources.

(2)(b) **POLICY:** Ensure compatibility between land-based and water based activities and natural resources and ecological systems.

(3)(b) **POLICY:** Take into account the physical attributes of areas when planning and designing activities and facilities.

(8)(b) **POLICY:** Pursue compatible relationships among activities, facilities, and natural resources, especially within shoreline areas.

(9)(b) **POLICY:** Promote greater accessibility and prudent use of the shoreline for public recreational, educational, and scientific purposes.

Discussion: Mauna Lani Resort, Inc. recognizes the unique and fragile nature of environmental resources on its property and intends to proceed with development causing minimal disturbance to shoreline areas. Hawaiian fishponds have been restored and constitute a focal point for the resort. Amenities have been designed around unusual natural and topographic features. For example, the existing golf course incorporates natural undisturbed lava features into its layout. The shoreline area is accessible to both resort guests and the public; notable natural and historical features in this area are marked by educational signs.

OBJECTIVE AND POLICIES FOR THE PHYSICAL ENVIRONMENT - SCENIC, NATURAL BEAUTY, AND HISTORIC RESOURCES

(1)(b) **POLICY:** Promote the preservation and restoration of significant natural and historic resources.

(4)(b) **POLICY:** Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.
(5)(b) POLICY: Encourage the design of developments and activities that complement the natural beauty of the islands.

Discussion: Mauna Lani Resort, Inc. lands are rich in cultural resources: the Hawaiian fishponds, archaeological and historical sites in designated Preserves, and the Puako petroglyphs. The company intends to continue its policy of preserving these invaluable features for the enjoyment and education of guests and Island residents, as well as for future generations. The low density, landscaped character of the resort complement the natural beauty of Hawaii island.

OBJECTIVES AND POLICIES FOR THE PHYSICAL ENVIRONMENT - LAND, AIR, AND WATER QUALITY

(2)(a) OBJECTIVE: Greater public awareness and appreciation of Hawaii's environmental resources.

(1)(b) POLICY: Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.

Discussion: The general public has access to Mauna Lani Resort and to the shoreline. Under the proposed revised master plan, access would be increased through new public rights-of-way at either end of the resort. Mauna Lani Resort, Inc. supports activities that promote a better understanding of Hawaii's limited environmental resources. The resort is continuing its joint effort with the Hawaiian Civic Club to clean up and maintain the Puako petroglyph area as a community project.

OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS - SOLID AND LIQUID WASTES

(1)(b) POLICY: Encourage the adequate development of sewer systems that complement planned growth.

Discussion: The capacity of the wastewater treatment plant which is planned to serve the entire resort is 0.76 mgd, expandable to 2.1 mgd. By the year 2000, it is estimated that the resort will generate about 0.94 mgd of wastewater; at potential maximum development, this would increase to about 1.83 mgd. An expanded system would adequately service the entire resort built out.

OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS - WATER

(1)(b) POLICY: Relate growth activities to existing and potential water supply.

(3)(b) POLICY: Reclaim and encourage the productive use of runoff water and wastewater discharges.

Discussion: Mauna Lani Resort, Inc. currently has access to adequate potable water supplies to meet resort demand in the short term. Four new well site have been designated, and it is expected that new wells will be developed as new resort facilities are built and demand for water increases. The existing wastewater treatment plant is designed so that wastewater can be recycled; effluent mixed with brackish water can be used to irrigate the resort golf courses.
OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT - HOUSING

(5)(b) POLICY: Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.

Discussion: The Mauna Lani resort/residential community is being developed between two other major resort/residential communities: Mauna Kea/South Kohala Resort to the north and Waikoloa Resort to the south. On-site services will be developed by the owner and tax revenues generated by the resort will contribute toward funding additional public facilities and services needed to accommodate the new population.

Mauna Lani Resort, Inc. has participated with the Hawai‘i Housing Authority in providing housing in Wai‘ena suitable for employees. The company will continue to work toward increasing the supply of housing in the Kohala area.

OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT - LEISURE

(4)(b) POLICY: Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values.

(5)(b) POLICY: Ensure opportunities for everyone to use and enjoy Hawai‘i's recreational resources.

Discussion: Mauna Lani Resort, Inc. continues to promote the recreational and educational potential of natural resources on its lands such as the Hawaiian fishponds, archaeological sites, and the Puako petroglyph field. The revised master plan will provide improved access to the shoreline, including the shoreline area at Honoka‘ope Bay that is currently difficult to reach and therefore not much used.

OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT - CULTURE

(1)(a) POLICY: Foster increased knowledge and understanding of Hawai‘i’s ethnic and cultural heritages and the history of Hawai‘i.

Discussion: Most of the sites of cultural interest at Mauna Lani Resort are of Hawaiian origin; these have been preserved and interpreted for the public and resort guests.

PART III. PRIORITY DIRECTIONS

ECONOMIC IMPLEMENTING ACTIONS

(1)(a) PRIORITY ACTION: Stimulate the economy to provide needed jobs for Hawai‘i’s people without stimulating unnecessary in-migration.

(3)(b) PRIORITY ACTION: Maintain or enhance the quality of existing and future hotels and resort destination areas which conform with regional carrying capacities and state policies providing for adequate shoreline setbacks and beach access.

(5)(b) PRIORITY ACTION: Preserve and enhance Hawai‘i’s significant natural environmental and scenic, historic, and cultural sites.
(6)(b) PRIORITY ACTION: Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions.

(13)(d) PRIORITY ACTION: Encourage the expansion of the statewide agricultural base through the promotion of products for export and local consumption.

(1)(f) PRIORITY ACTION: Promote a consistent and stable level of construction activity.

Discussion: Development at Mauna Lani Resort will lead to a steady level of construction employment over a period of several years, permanent full-time and part-time operational jobs, and stimulate the growth of employment in other sectors of Hawaii's economy. Based on the experience of other similar resort facilities, it is expected that nine to twelve percent of operational jobs will be in the managerial or supervisor category. Mauna Lani's policy is to provide training and promote from within the organization. With the projected available supply of labor on the island, it is anticipated that only ten to fifteen percent of operational employees will be from off-island, many of these from other Hawaiian islands.

Development of Mauna Lani Resort will conform to relevant State and County zoning and other regulations.

Local agricultural products, including fish, meat, vegetables, and fruits, are purchased for consumption at the resort. The development of additional facilities at the resort will provide an expanded base for locally grown agricultural products.

POPULATION GROWTH AND DISTRIBUTION IMPLEMENTING ACTIONS

(2)(a) PRIORITY ACTION: Encourage hiring of Hawaii's people by firms doing business in the State.

(2)(b) PRIORITY ACTION: Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographical area.

Discussion: Mauna Lani Resort's policy is to hire from the locally available labor supply for long-term employment at the resort. Traditionally, most of the construction period labor has been mostly from the Hawaiian islands.

Mauna Lani Resort, Inc. has a long history of planning for coordinated development of its lands, and the associated necessary development of water resources.

HAWAII'S LAND RESOURCES

(a) PRIORITY ACTION: Preserve and improve shoreline open spaces and scenic resources.

Discussion: The revised master plan includes the development of a public shoreline park near Paaua Bay, with public access and parking. Public access and parking will also be provided to Honoka'a Bay under this plan. Shoreline areas near existing facilities have been improved and preserved.
4. **STATE FUNCTIONAL PLANS**

State functional plans are intended to provide more detail to the Hawai‘i State Plan in 12 specific areas of concern – agriculture, conservation lands, education, higher education, energy, health, historic preservation, housing, recreation, tourism, transportation, and water resources development. As defined in the Hawai‘i State Plan (section 2-10), a functional plan sets forth "the policies, programs and projects designed to implement the objectives of a specific field of activity when such activity or program is proposed, administered, or funded by an agency of the State." The State programs most relevant to the proposed project are the administration of the State Land Use Law by the State Land Use Commission and the administration of the Conservation District Use Permits by the State Department of Land and Natural Resources. The proposed action's consistency with the State Land Use Law is discussed in Section 1 of this chapter, and its consistency with the Conservation District Regulations is covered in Section 2 of this chapter.

The 12 State functional plans were examined to determine the relationship of the proposed Mauna Lani Resort master plan to each. Ten of the plans were adopted in 1984, two - agriculture and education - in 1983. All are meant to serve as guidelines only, and are not to be interpreted as law or statutory mandate.

4.1 **STATE AGRICULTURE FUNCTIONAL PLAN**

Over two-thirds of the land owned by Mauna Lani Resort is basalt lava that has not weathered to any appreciable extent; it has little or no soil/vegetation cover. (See the Geology section of the Existing Environment Chapter.) Although the proposed Master Plan calls for the designation of Urban land now classified in the Agricultural District, the area involved is essentially all lava land that is not suited for cultivation. Only a few acres have been designated as "other important agricultural land" on the "Agricultural Lands of Importance to the State of Hawaii" map. However, the State Department of Agriculture (see memo on page XII–46) has determined that this area does "not meet the generally understood definitions of important agricultural land."

The only implementing actions in the State Agriculture Functional Plan (Hawai‘i, State of, Department of Agriculture, November 1984) that may be relevant to the proposed project is the portion of B(2)(a) which states: "give priority in developing and awarding new leases on agriculturally suitable public lands to diversified agricultural activities with growth potential". The 60 acres in the northeast end of the land that Mauna Lani Resort leases from the State will be subdivided out and surrendered for agricultural uses.

4.2 **STATE CONSERVATION LANDS FUNCTIONAL PLAN**

There are several implementing actions in the State Conservation Lands Functional Plan (Hawai‘i, State of, Department of Land and Natural Resources, June 1984a) that are relevant to the proposed project, and these are discussed below. Related discussions are also found in Sections 1 and 2 of this chapter regarding the proposed Conservation District to Urban District change and the Conservation District use application. This functional plan addresses more than officially designated Conservation District lands, and includes (among a lengthy list) shoreline areas under the coverage of the plan.
A(1)(c) **IMPLEMENTING ACTION.** Review the various rules and regulations and permit systems applicable to Conservation District lands for possible simplification and/or consolidation for effective and efficient management controls and compliance with the Coastal Zone Management program.

**Discussion:** This implementing action is addressed largely to DLNR, but the issue of compliance with the CZM program is relevant to any shoreline project. Refer to the discussion of the proposed Mauna Lani Resort master plan's consistency with the CZM program policies in Section 5 of this chapter.

A(1)(d) **IMPLEMENTING ACTION.** Provide for effective enforcement of rules and regulations and permit system applicable to the Conservation District.

**Discussion:** The proposed project will follow the rules and regulations applicable to the Conservation District Use permit system and to petitions to reclassify Conservation District land to an Urban District designation. See discussions in Sections 1 and 2 of this chapter.

A(1)(e) **IMPLEMENTING ACTION.** Review applications for use of Conservation lands to control impacts on natural and cultural resources.

**Discussion:** This EIS document will allow extensive review by government agencies and the public. Adequate control of impacts on natural and cultural resources can be assured through the conditions placed on the various permits/approvals required for the proposed Mauna Lani Resort master plan.

C(2)(b) **IMPLEMENTING ACTION.** Encourage and support local participation in conservation planning and programming as provided for in the Soil and Water Conservation Districts programs.

**Discussion:** The relationship of the proposed project to the Mauna Kea Soil and Water Conservation District program is discussed in Section 2.3.1 of this chapter.

C(3)(b) **IMPLEMENTING ACTION.** Acquire and maintain historic sites for parks and other purposes.

C(3)(c) **IMPLEMENTING ACTION.** Establish criteria and evaluate areas of public land with historic or natural resource value and establish management practices to ensure the protection of areas from further degradation.

**Discussion:** Mauna Lani Resort, Inc. has already set aside three areas as archaeological preserves and created a park adjacent to the major one. Also, the fishponds at the resort have been preserved as historic and natural resources. Signs have been installed to interpret these archaeological and natural resources, informing the public to protect against unintentional damage. Mauna Lani Resort, Inc. is also proposing to continue its efforts to establish an archaeological park to encompass the Puako petroglyphs. Mauna Lani Resort will maintain the park, in cooperation with the Waimea Hawaiian Civic Club, to avoid further degradation of these petroglyphs. Security and possibly restoration provisions will be developed in conjunction with the Department of Land and Natural Resources and the Hawaii County Planning Department.
IMPLEMENTING ACTION. Maintain scenic and natural open space areas as part of a Statewide system of parks.

Discussion: In addition to the parks discussed above, Mauna Lani Resort, Inc. also proposes to develop and maintain (for the term of its existing and any new lease) a shoreline park on a portion of the State-owned land to the north of their fee land. This would be open to the public and part of the Statewide system of shoreline parks, although funded privately.

4.3 STATE EDUCATION FUNCTIONAL PLAN

This functional plan (Hawaii, State of, Department of Education, November 1984) presents priority implementing actions for education. All of the actions are to be undertaken by the Department of Education. Therefore, they are not applicable to the Mauna Lani Resort proposed master plan.

4.4 STATE HIGHER EDUCATION FUNCTIONAL PLAN

There are no policies or implementing actions in this functional plan, prepared by the University of Hawaii (June 1984), that are of direct relevance to the Mauna Lani project.

4.5 STATE ENERGY FUNCTIONAL PLAN

The State Energy Functional Plan (Hawaii, State of, Department of Planning and Economic Development, June 1984a) has as an objective the promotion of energy-efficient design. This relates both to overall land use planning and to specific building design and equipment selection decisions.

There are no detailed building designs for the undeveloped parcels at the Mauna Lani Resort, but all plans will have to meet the County of Hawaii energy conservation regulations. Since the proposed Mauna Lani Resort master plan does not call for any more units than have already been approved, it does not create any significant change in energy consumption or demand for gasoline. The additional urban area will be easily serviceable because it is adjacent to the existing urban-designated portion of the resort. Because the number of units will not change, utilities already planned or constructed will be adequate for the new master plan.

4.6 STATE HEALTH FUNCTIONAL PLAN

The State Health Functional Plan (Hawaii, State of, Department of Health, June 1984b) "focuses primarily on public health programs under the jurisdiction of the State Health Department." Several of the implementing actions relate to operating Department of Health (DOH) permit/approval programs that the proposed project is subject to. These include operating the environmental impact statement process; reviewing private wastewater treatment systems; administering permit programs for discharges to the air, all surface and groundwater; and for treatment and disposal of solid wastes; reviewing plans for new sources of drinking water; and reviewing plans for air conditioning and mechanical ventilation systems for buildings that are used by the public. These topics (wastewater, air quality, water quality, potable water systems, solid waste, and approvals needed) are discussed in terms of the proposed project in various sections of the EIS. The implementing actions also express other areas of concern to DOH, such as reuse of treated effluent, noise, and medical services, that are covered in this EIS as well.
4.7 STATE HISTORIC PRESERVATION FUNCTIONAL PLAN

Essentially all of the policies and implementing actions in the State Historic Preservation Functional Plan (Hawaii, State of, Department of Land and Natural Resources, June 1984b) are directed at State agencies, especially DLNR. The archaeological resources at the Mauna Lani Resort have been the subject of several surveys and a management plan. These are described in section 1.10 of Chapter IV. The fishponds within the resort have been restored and Mauna Lani Resort, Inc. proposes to maintain the Puako Petroglyphs, which are on both its fee land and the land it leases from the State, as an archaeological park. There are also at present within the resort three other Historic Preserve areas, including one around the King's Trail which will be expanded.

As detailed plans for each parcel are developed, an intensive-level archaeological survey will be conducted, if determined necessary by the State Historic Sites Section of DLNR and the County Planning Department. The expected impacts of the planned development are discussed in section 1.10.2 of Chapter IV. The key recommendations of the management plan for the Mauna Lani Resort archaeological sites, which is on file with the State and County, will be followed. Preservation/interpretive plans will be worked out with the responsible State and County agencies.

The existing and future preservation efforts and interpretive signs/materials at the Mauna Lani Resort help fulfill Objective E of this functional plan which calls for "activities which support and foster increased knowledge and understanding of...the history of Hawaii".

4.8 STATE HOUSING FUNCTIONAL PLAN

This State functional plan summarizes the results of the Hawaii Housing Authority (Hawaii, State of, Department of Social Services and Housing, June 1984ii) study "to formulate a comprehensive plan for the development, operation, and management of housing within the State". Most of the policies and implementing actions apply to the government sector. However, there are several implementing actions that affect the Mauna Lani Resort.

A(2)(c) IMPLEMENTING ACTION. Encourage the use of opportunities and incentives in the State Land use redistricting process to provide lands or homes for affordable or assisted housing development.

Discussion: Mauna Lani Resort, Inc. has developed affordable housing in Waimea and holds property there on which additional units can be constructed. Mauna Lani Resort, Inc. is an active participant in efforts to expand the supply of affordable housing as needed.

B(1)(a) IMPLEMENTING ACTION. Assess and delineate lands suitable for future housing development.

Discussion: The area covered by the expanded master plan for Mauna Lani Resort is suitable for resort housing, hotels and other related facilities, "taking into account the physical setting, accessibility to public facilities and services, employment and other concerns of existing communities and surrounding areas" (p. 21). The master plan will "enable the development process to occur in an organized fashion" (p. 21).
B(1)(c) IMPLEMENTING ACTION. Encourage and assist in the development of rental housing for employees of large businesses and industries outside of urban areas.

Discussion: Section 2.2.4 of Chapter IV discusses the employee housing issue. Mauna Lani Resort, Inc. is working with the County, State, and other organizations on various efforts to encourage and assist in the development of rental housing as needed. Zoning conditions enacted by the County Council require employee housing studies and programs for each hotel planned at Mauna Lani Resort.

4.9 STATE RECREATION FUNCTIONAL PLAN

The State Recreation Functional Plan (Hawai‘i, State of, Department of Land and Natural Resources, June 1984c) has as Policy D(2) "the securing of public accesses to resources with recreational value". Two additional public accesses to the shoreline, in addition to the existing one, would be provided in the revised Mauna Lani Resort master plan as shown on Figure II-7. The plan for a public shoreline park that is proposed on the State-owned Conservation District land near Pauoa Bay is shown in Figure II-8. It provides access both to the ocean and to the Puako Petroglyphs. The public access to Honaka’ope Bay would be installed when hotel site 4 is developed. In addition to the access, public parking and restroom/shower facilities are planned. See also the discussion under Implementing Action B(4)(b) of the State Tourism Functional Plan regarding lateral shoreline access.

Policy E(3) of the State Recreation Functional Plan aims to "coordinate visitor and resident recreation interests to achieve compatible recreation usage". Section 7 of Chapter IV addresses the potential impacts of the Mauna Lani Resort on recreation- al usage on the subject lands and in the region.

4.10 STATE TOURISM FUNCTIONAL PLAN

The Hawai‘i State Department of Planning and Economic Development (June 1984b) authored this functional plan and considers it a "guide to help coordinate the various sectors of government and private industry toward achieving statewide objectives of the Hawaii State Plan" (p. 2). The role of government in tourism is seen not only as protecting the economic health of the industry, but also as "advancing the social goals of the community" (p. 8). The policies and implementing actions which are most relevant to the private sector, and particularly to the proposed project, are those concerning physical development.

B(1)(a) IMPLEMENTING ACTION. Encourage the development of an orderly mix of visitor accommodations including full-service hotels, condominium apartments, and some single-family homes, in order to meet the lodging desires of the broad spectrum of our visitor guests.

Discussion: The expanded master plan for the Mauna Lani Resort, as does the existing master plan, provides for an orderly mix of visitor accommodations. The basic difference is the decreased density of the proposed plan and the additional golf course, which will better meet the desires of guests at the Mauna Lani Resort.
B(2) POLICY: Improve the quality of existing visitor destination areas.

Discussion: The lower density of the proposed master plan will improve the quality of the Mauna Lani Resort, compared to the existing master plan.

B(3) POLICY: Encourage greater cooperation between the public and private sectors in developing and maintaining well-designed and adequately serviced visitor industry and related development.

B(3a) IMPLEMENTING ACTION. Assure that adequate infrastructure and amenities, such as roads, water, drainage and parks, are provided through a reasonable distribution of financial responsibilities between governmental and private parties.

B(3c) IMPLEMENTING ACTION. Encourage private development of designated visitor destination areas where capital improvements have been made or are planned before encouraging development of other possible visitor destinations.

Discussion: The Mauna Lani Resort is a well-designed and adequately serviced development. The infrastructure within the resort has all been paid for by the developer and contributions toward the public Lalainilo water system have also been provided by the developer. As part of the proposed actions Mauna Lani Resort, Inc. proposes to construct and maintain an additional public park. The Mauna Lani Resort is a designated visitor destination area in West Hawaii where extensive public capital improvements have also been made and where public plans have been directing growth since the late fifties.

B(3c) IMPLEMENTING ACTION. Institute more expeditious resort development approval systems at the State, County and Federal levels while assuring opportunities for public input.

Discussion: The simultaneous processing of the requested State Land Use District boundary amendments and the Conservation District Use Application will result in a more efficient resort development review, while still allowing opportunity for public input in the EIS process and at the public hearings before the Land Use Commission and the Board of Land and Natural Resources.

B(3d) IMPLEMENTING ACTION. Encourage the clustering of hotels and resort condominium developments to provide open space and promote energy conservation.

Discussion: The clustering of hotels and condominiums in the Mauna Lani Resort, rather than spreading this development throughout the island, allows for energy conservation by promoting walking or bicycling as transportation modes between the various facilities at the resort and by utilizing major infrastructure for a group of compatible uses. The proposed master plan for the resort will allow for more open space than the existing plan, because of the lower density.
B(3)(e) IMPLEMENTING ACTION. Encourage the use of regional sewerage systems by hotel and visitor condominium developments rather than use of individual private systems.

Discussion: Instead of using individual private sewage treatment systems for each development within the Mauna Lani Resort, all parcels will be connected to a resort-wide sewerage system. The economies of scale and the greater efficiency of a wastewater treatment plant (WWTP) for the entire resort make it preferable to individual treatment systems. The WWTP and other support facilities were constructed in the Agricultural District under Special Permits. The Urban designation of the WWTP site will recognize its permanence.

B(4) POLICY. Ensure that visitor facilities and destination areas are carefully planned and sensitive to existing neighboring communities and activities.

B(4)(e) IMPLEMENTING ACTION. Resort development should take place within designated visitor destination areas.

Discussion: The Mauna Lani Resort is a designated visitor destination area that is carefully planned and sensitive to existing neighboring communities and activities. The Mauna Lani Resort lands border the Waikoloa Beach Resort to the south. The land Mauna Lani Resort leases from the State is inland of the Puako coastal lots. This land would be left essentially unchanged except for the proposed golf holes and public park at the south end; thus it acts as a buffer between the resort uses and the residential area of Puako. Adequate public access to and along the shoreline will be provided to facilitate public seaside recreational activities.

B(4)(b) IMPLEMENTING ACTION. Ensure that new hotel and condominium projects be set back from the shoreline for access which facilitates and permits use of those areas.

B(4)(d) IMPLEMENTING ACTION. Plan development of resorts in a coordinated manner to minimize loss of public recreational opportunities in designated visitor destination areas.

Discussion: The proposed master plan for Mauna Lani Resort facilitates public access to and along the shoreline. Few, if any, public recreational opportunities would be lost; and public use of the shoreline would greatly increase with the shoreline park and other access improvements.

B(4)(c) IMPLEMENTING ACTION. Ensure the construction, as necessary in connection with both new hotel and large resort condominium projects, of affordable dwelling units adequate to accommodate employee households.

Discussion: Employee housing will be provided as required when new hotels are developed.

D(3)(a) IMPLEMENTING ACTION. Provide relevant information to visitors to foster their understanding of Hawaii's uniqueness in order to minimize damage of natural, historic, and archaeological resources, promote their
personal safety and protection, and foster an appreciation of the contribution of Hawaii’s residents to the enjoyment of the visitor’s experience in Hawaii.

D(3)(b) IMPLEMENTING ACTION. Provide relevant interpretation of, and public access to, sites of archaeological significance whenever feasible, and establish a program to explain Hawaii’s history and values to visitors and residents.

Discussion: The Mauna Lani Resort has established substantial interpretive programs for several archaeological areas, including the fishponds and the other historic preserves in its resort. Signs explain the area’s history and general concepts of Hawaii’s past to visitors and residents. Further interpretive signage will be installed for the Puako Petroglyph area. Before plans to develop parcels are finalized, the State and County will be consulted regarding the necessity for further archaeological survey work, and/or preservation and interpretation of archaeological sites. Mauna Lani Resort, Inc. will continue to protect, maintain and improve historic and archaeological features on its lands.

4.11 STATE TRANSPORTATION FUNCTIONAL PLAN

None of the policies or implementing actions in this functional plan (Hawaii, State of, Department of Transportation, June 1984) address specific developments like the Mauna Lani Resort. The overall objective of the plan is to provide for the efficient, safe, and convenient movement of people and goods. Section 3 of Chapter IV discusses the impacts of the proposed development at Mauna Lani on transportation facilities, including mitigation measures and long-term highway needs in the region.

4.12 STATE WATER RESOURCES DEVELOPMENT FUNCTIONAL PLAN

This functional plan, prepared by the Hawaii State Department of Land and Natural Resources (June 1984) states "primarily affects State operations, it also involves some actions of...the private sector. It points out where...private industry coordination will be needed and...can help achieve water resources objectives". Like the other State functional plans, it does not mandate private sector actions.

The plan presents general objectives and policies for the management of potable water supply, floodplains, agricultural water, and estuarine environments that could be considered relevant to this project. These topics are discussed in various sections of Chapter IV in this report.
5. HAWAII COASTAL ZONE MANAGEMENT PROGRAM

The Hawaii Coastal Zone Management Act (Act 188, SLH 1977), which became Chapter 205A, Hawaii Revised Statutes, established State policies for any action affecting the coastal zone. The act established specific objectives and policies in seven broad categories. The relationship of the revised Mauna Lani Resort master plan to these categories of concern is discussed below.

5.1 RECREATIONAL RESOURCES

Mauna Lani Resort is providing in its revised master plan, as in the current plan, for continuous shoreline trails. Also provided in the new plan are two additional mauka-makai shoreline accesses. One will be at Honokahoe Bay where public parking and restrooms/showers will be installed. A new public shoreline park will be constructed by Mauna Lani Resort at the north end of Pauoa Bay. The existing master plan does not include the shoreline park near Pauoa Bay. See also Section 7.2 of Chapter IV on recreational impacts of the project.

5.2 HISTORIC RESOURCES

Mauna Lani Resort, Inc. proposes to establish the Puako petroglyphs as an archaeological park. This park will accommodate public access, security, ongoing restoration, signage and parking. Details will be developed in conjunction with the State Historic Sites Section of DLNR, the Hawaii County Planning Department, the Waimea Hawaiian Civic Club, and Mauna Lani Resort, Inc. Other aspects of the master plan's relationship to archaeological resources are discussed in Section 1.10 of Chapter IV.

5.3 SCENIC AND OPEN SPACE RESOURCES

Extensive landscaping and the open space corridors of the golf holes (2 golf courses), the fishpond area, the historic reserves, the parks, and the shoreline area will maintain scenic views and a spacious character for the resort. The lower densities of the revised master plan will also allow more open space in each development parcel. If development were to continue according to the "no-action" alternative of the existing master plan, overall densities would be higher and the resort would have only one golf course. Under this alternative, public views to and from the shoreline would not be as open as under the proposed master plan.

5.4 COASTAL ECOSYSTEMS

The ecosystems of the nearshore waters and the shoreline area are not expected to be adversely affected by the development proposed in the revised Mauna Lani Resort master plan or the existing master plan. See Sections 1.3, 1.6, and 1.7 in Chapter IV.

5.5 ECONOMIC USES

Resort development of the Mauna Lani lands has been acknowledged as the most appropriate use of the land by the Hawaii County General Plan and by the actions of State and County agencies (e.g., by the granting of various permits and by cooperating in the Lalamilo Water System). The policies under this heading state that reasonable growth in areas designated for visitor industry facilities (which are recognized as coastal dependent developments) is to be permitted, assuring that adverse impacts are
minimized. As demonstrated elsewhere in this document, the revised Mauna Lani master plan is not expected to cause any significant adverse impacts. In areas of potential adverse effect, mitigation measures will be taken to avoid or minimize them.

Under the alternative existing master plan, higher density development would occur, centered around one golf course and somewhat less coastal area. Current and projected market demand suggests that the alternative is less economically viable, given Mauna Lani Resort, Inc.'s desire to develop a luxury resort. Utilization of only currently designated Urban District land for such a purpose is deemed not feasible.

5.6 COASTAL HAZARDS

Along the Mauna Lani Resort shoreline are areas subject to potential hazards from storm waves and tsunamis. Development along the coast will conform to the requirements of the Federal Flood Insurance Program and will incorporate measures to protect against these hazards. Erosion will be controlled to avoid any impacts on coastal waters.

5.7 MANAGING DEVELOPMENT

This EIS is a tool for communicating the impacts of the revised Mauna Lani Resort master plan at an early stage of planning. It is intended to facilitate participation in the planning and review process. As outlined in Chapter 1, the proposed plan will require many permits before it can be implemented. These will afford numerous opportunities for the Hawai‘i Coastal Zone Management Program network authorities to place conditions on the project which will assure the proper management of coastal zone resources. Under the existing master plan, there would be fewer opportunities for public participation in the planning and review process.
6. COUNTY SPECIAL MANAGEMENT AREA

The entire Mauna Lani Resort property falls within the "Special Management Area" (SMA) and is therefore subject to the SMA Rules and Regulations of the County of Hawai‘i. The existing master plan for the resort has received SMA approval. An application for an SMA permit has been submitted for the two golf holes and public shoreline access and park near Pauna Bay. All conditions, as revised, of the previous permit would still remain in effect. Following is a discussion of the relationship of the revised Mauna Lani Resort master plan to the SMA guidelines in the Hawai‘i County Planning Commission's Rule No. 9. The guidelines are summarized and brief comments following note the extent to which the revised master plan is believed to be consistent with them.

Guideline A.1. This guideline seeks to minimize alterations to any body of water.

Comment: There are no current plans to alter the anchialine ponds or fishponds within the Mauna Lani Resort. See discussion in Section 1.6 of Chapter IV.

Guidelines A.2 and 3. These guidelines seek to minimize reductions in the availability and/or access to beaches and other recreational areas and shoreline areas due to development.

Comment: The revised Mauna Lani Resort master plan would increase the availability of shoreline recreational resources and access to them.

Guideline A.6. This guideline concerns the visual impacts of the proposed development.

Comment: Most of the development in the revised master plan remains at a distance of a half mile or more from Queen Ka‘ahumanu Highway, and thus will not substantially detract from the line of sight between the highway and the sea. Structures will be softened by landscaping which will contrast with the adjacent lava-dominated environment.

Guideline A.5. This guideline aims at minimizing development that adversely affects water, scenic, or wildlife resources, or that adversely affects existing or potential agricultural uses of the land.

Comment: The water, scenic, and wildlife resources of the Mauna Lani Resort are planned to be incorporated into the development and adverse impact on them avoided. Only a small portion of the revised master plan occurs on designated agricultural land and the potential of this land has been rated as low. See further discussion in Chapter IV.

Guidelines B.1, 2 and 3. These guidelines state that no development shall be approved unless it has no significant adverse environmental effects, and is found consistent with Chapter 205A, HRS, the Hawai‘i County General Plan, the Hawai‘i County Zoning and Subdivision Codes, and other applicable ordinances.
Comment: This EIS analyzes the potential of the revised master plan to create adverse effects and outlines the mitigation measures that will be taken to avoid them or minimize them to insignificant levels. The plan's consistency with Chapter 203A, HRS and with the Hawaii County General Plan is discussed, respectively, in Section 3 above, and Section 7 following. Applications for zoning amendments and subdivision will be submitted to the County upon approval of the redistricting request and Conservation District Use Application. These and all applicable ordinances will be complied with.

Guideline C.1 and 2. These guidelines seek to ensure access to beaches, recreation areas, and natural reserves, and to ensure that adequate recreation and wildlife preserves are maintained.

Comment: Access will be improved and a shoreline park will be provided under the revised master plan. Anchialine ponds, fishponds and such wildlife resources are planned to be preserved.

Guideline C.3. This guideline concerns solid and liquid waste management.

Comment: These issues are discussed in Sections 6.7 and 6.6 of Chapter IV.

Guideline C.4. This guideline seeks to minimize adverse impacts resulting from alterations to existing landforms and vegetation.

Comment: No specific grading plans for development sites have been prepared, but the revised master plan will allow low density development that utilizes existing landforms. The new golf course, like the existing one is planned to utilize interesting landforms as visual features. There is generally sparse or no vegetation cover within the resort development areas.

Guideline C.5. This guideline seeks to minimize adverse environmental or ecological impacts due to the project.

Comment: Mauna Lani Resort, Inc. is committed to minimizing adverse impacts. Moreover, the multi-level review and permit process that the plan must undergo before it is implemented will ensure that mitigation measures are made conditions to development.

Guideline C.6. This guideline states that the proposed project must be consistent with the General Plan.

Comment: As outlined in the following section, the revised master plan is consistent with the Hawaii County General Plan.
7. **HAWAII COUNTY GENERAL PLAN**

The Hawai‘i County General Plan (Hawai‘i, County of, 1971 as amended) contains both a set of policies and land use maps showing the location of desired land uses for the entire island. The latter are referred to as "Land Use Pattern Allocation Guide Maps" (LUPAG maps). A mixture of resort, medium density urban, low density urban, open, and alternate urban expansion designations are shown within the Mauna Lani Resort boundaries on the General Plan LUPAG map (see Figure II-3). The General Plan (p. 77) states that for the LUPAG maps "the boundaries indicated are long-range guides to general location." On the following page the same idea is reiterated:

The land use pattern is a broad, flexible design intended to guide the direction and quality of future developments in a coordinated and rational manner. The General Plan Land Use Pattern Allocation Map indicates the general location of various land uses in relation to each other.

The County has indicated that in its General Plan revision program that it will designate as industrial on the LUPAG map the area of the Mauna Lani Resort that contains the wastewater treatment plant and resort service facilities. The proposed master plan is consistent with the LUPAG map of the County General Plan.

It is also consistent with the policies of the General Plan. The Mauna Lani Resort is on the list (as Puako-Honokaaope Bay) of "major" resorts in the Land Use element (p. 79) of the General Plan. It meets the requirements for a major resort:

A major resort area is a self-contained resort destination area which provides basic and support facilities for the needs of the entire development. Such facilities shall include sewer, water, roads, employee housing, and recreational facilities, etc.

The basic infrastructure has been provided at the Mauna Lani Resort, including sewer, water, and road systems. Mauna Lani Resort, Inc. has participated with the Hawai‘i Housing Authority in providing housing in Waimea suitable for employees. It is expected that additional requirements for employee housing will be established as hotel parcels are developed. Several active and passive recreational areas have been developed at the Mauna Lani Resort and a shoreline park is proposed to be constructed and maintained by the resort on the land leased from the State. The 3,000 hotel-room limit established by the General Plan would not be exceeded under the proposed master plan. Similarly, the limit on the number of multiple residential units (3,182) specified in the approved 1978 SMA amendment application would remain unchanged.
8. HAWAII COUNTY ZONING

The first major County rezoning was granted to Mauna Loa Land, Inc. (the predecessor of Mauna Lani Resort, Inc.) in 1976 for the 778 acres that had Urban designation. Additional rezonings were approved in 1978, 1980, and 1983 for adjustments in parcel boundaries. The request submitted to the State Land Use Commission (SLUC) to designate an additional 654 acres in the Urban district is the major reason for this Environmental Impact Statement. Figure II-5 shows the proposed master plan, and the existing and proposed land use acreages are tabulated in Chapter II. If the SLUC grants the Urban designation for additional acreage, a rezoning application will be filed with the Hawaii County Planning Department. The additional Urban District land would need rezonings, and some adjustments in zoning parcel boundaries in the existing Urban area would also be sought.

None of the conditions of rezoning now in effect would have to be changed except that the reference to "File Exhibit 2" which is the accepted Environmental Impact Statement and "File Exhibit 3" which is the revised development plan, would have to be amended to reflect this Environmental Impact Statement, rather than the 1975 EIS, and the new master development plan which corresponds to the larger Urban area as granted by the SLUC.
9. PLANS OF NEARBY COMMUNITIES

No regional plan has been prepared for South Kohala. The following plans were examined to note the role of the South Kohala resorts in the planning of nearby communities.

9.1 NORTH KOHALA COMMUNITY DEVELOPMENT PLAN

There are numerous references in the North Kohala Community Development Plan (Phillips Brandt Reddick, November 30, 1984) to the employment opportunities and economic base which the South Kohala resorts have provided for North Kohala residents. It is reiterated several times that South Kohala tourism development filled the gap left by the closure of the sugar plantation in North Kohala. And in turn, the South Kohala resorts have depended upon North Kohala as a source of employees.

A certain amount of growth in residential housing for visitor industry employees is expected in North Kohala, but the specific locations for such housing have not yet been determined.

The plan mentions the need for expanded public bus service between the North Kohala towns and the South Kohala resorts.

9.2 KONA REGIONAL PLAN

The Kona Regional Plan (Hawaii, County of, Planning Department, November 28, 1983) has references to the South Kohala resorts only in the Economic Activities and Land Use chapters. The relationship between the visitor facilities in the Kona and Kohala districts is noted several times. The competition that the destination resorts in South Kohala will pose for Kona's visitor industry is stressed. The opportunities for industrial expansion in the area north of Kailua are mentioned, fueled by both the South Kohala resorts and Kona's visitor market/population growth. Indirect employment opportunities related to the industrial and service sectors that the South Kohala resorts will create for Kona residents are in addition to the direct jobs the resorts will provide.

The economies of the Kohala and Kona Districts will become more and more interdependent, particularly as both are based largely on a growing tourism industry. Coordination in the area of land use planning is recognized as a desirable corollary. Also recognized as desirable is the firm establishment of planned resorts before the development of additional areas for the same purposes.

9.3 WAIMEA DESIGN PLAN

The Waimea Design Plan has not yet been officially adopted by the County Council. However, its contents have been examined for relevancy to the Mauna Lani Resort plan. The Waimea plan makes one brief mention of the prospects for Waimea's continued growth in light of resort development on the leeward coast of the island. Mauna Lani Resort’s revised master plan does not conflict with the goals and contents of the Waimea Design Plan.
CHAPTER VI

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed Mauna Lani Resort master plan would not exceed the number of units allowed under the existing master plan; the major difference is the additional land area to be devoted to resort uses, including a second golf course, under the revised plan. Because this area is largely barren lava fields, future options for alternate uses of this land are limited, if any. Thus, the proposed plan is not expected to foreclose future options or to narrow the range of beneficial uses of the environment.

As demonstrated in this document, development of the Mauna Lani Resort does not appear to pose any long-term risks to health and safety. It is obviously in the interest of the developer to provide a healthful, safe and enjoyable experience at the resort.

The accesses and parks proposed in the revised master plan will allow increased use of the area's resources, and represent a long-term gain for the public. Over the long term, a man-made environment will largely replace the natural terrain of lava fields. However, numerous open spaces, especially the golf course corridors and along the shoreline, will be maintained and landscaping will enhance the visual character of the resort.

Other major benefits of the revised master plan will be the enhancement of the long-term economic viability of the resort and the long-term employment and other economic benefits which it will bring to the region. No significant long-term losses of resources are anticipated. Detailed plans for the development sites are not yet prepared, however. If the natural or cultural resources on a site cannot be incorporated into the development plans, mitigation measures will be taken to offset the loss.

Growth in population, de facto and resident, will follow resort development at Mauna Lani. This growth will be no higher under the revised master plan than that under the already approved plan. The effects of this growth have already been weighed and the benefits found to offset the impacts.
CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Urbanization of additional land area under the revised Mauna Lani Resort master plan will change the natural setting of the sparsely vegetated lava landscape. Most of the common dryland vegetation will be replaced with lusher landscaping. However, development will avoid disturbing endemic coastal strand vegetation. Other valued resources of the land, including archaeological sites and anchialine ponds, will be incorporated into the development to the greatest extent possible. Some archaeological sites may be lost, but further archaeological work will be conducted to determine which sites should be salvaged.

Some additional commitment of soil for the second golf course and additional development sites is involved. However, this will not result in a significant depletion in the island's soil resource.

There will be an increase in the capital expended by the developer for the resort, due especially to the second golf course and more extensive infrastructure system. The revised master plan should not create any further commitments for government-supplied services and facilities than the already approved development plan.
CHAPTER VIII

OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

No significant adverse effects are expected to result from the revised Mauna Lani Resort master plan. There are some minor impacts, but these are more than offset by the benefits the project will offer. State and County plans have encouraged quality resort development along this coast. The public infrastructure is largely in place to support it. The additional acreage requested for Urban designation and the use of the Conservation land leased from the State are necessary to assure a quality destination resort.

Analysis of the public revenues and the public expenditures the resort will generate (see Section 2.2.6) indicates that the cost/benefit ratio is favorable. While this analysis did not incorporate environmental costs, the environmental impacts of the revised master plan are not major.

The revised master plan will develop no more units than are allowed under existing government approvals. Thus, the impacts relate largely to the direct effects on the additional land area used by the revised master plan, due largely to the need for the second golf course. Although the existing lava-dominated landscape will be transformed into a resort environment, the important resources of this land (including anchialine ponds, endemic biota, and significant archaeological sites) are expected to be preserved.

Some archaeological sites will probably be lost. However, further archaeological work, including salvage excavations, will be performed if deemed appropriate by DLNR and the Hawaii County Planning Department. This archaeological work, plus the establishment of the Puako Petroglyphs Archaeological Park and the previously established archaeological preservation and interpretation program at Mauna Lani Resort, will fulfill the implementing actions of several of the State functional plans which call for access to and interpretation of archaeological resources to foster visitors' and residents' understanding of Hawaii's history.

The government policies calling for increased access to the shoreline and increased recreational opportunities are also met in the revised Mauna Lani Resort master plan. The archaeological preserves, the shoreline accesses, lateral trail, and park are recreational benefits that offset the use of State land for two golf holes.

As discussed in Chapter 5, the revised master plan is consistent with all relevant government plans and policies. It would fulfill the goals of the State Plan which call for economic growth that maintains a desired physical environment and that meets the needs of Hawaii's people.
CHAPTER IX

UNRESOLVED ISSUES

The State Land Use District Boundary Amendment request which this environmental impact statement accompanies is the first of many approvals which must be obtained before the revised master plan can be implemented. Others are listed in Chapter I, Section 5. This document identifies in conceptual terms the outstanding issues that must be addressed before construction can begin or be carried to completion, but many of the details remain to be worked out. The most important of these issues are identified below. None of them constitute areas of real controversy at the present time; rather, it is simply too early in the development process for a final course of action to be settled upon. It is believed that all of them can be resolved without undue difficulty.

1. **Availability of Adequate Employee Housing.** Implementation of the revised master plan would generate essentially the same number of construction and operational job opportunities as the existing master plan. In both instances, ongoing development of the Mauna Lani Resort will generate a demand for a substantial amount of additional housing in West Hawai‘i. It is believed that the private housing market is capable of satisfying most of this demand, but some assisted housing will probably be necessary. Mauna Lani Resort, Inc. is presently working with the Hawai‘i County Housing Authority, the County Planning Department, and the County Council to develop and implement an employee housing action plan, which essentially is aimed toward the goal of working toward increasing the supply of available housing in the housing in the region. Mauna Lani Resort, Inc. has also held talks with the State Hawai‘i Housing Authority.

2. **Location of Off-Site Population Growth and Facilities.** The Mauna Lani Resort master plan described in this document specifies the location of all on-site development. The exact location of the off-site growth which occurs in response to this cannot be determined at this time, however. As growth trends become more clear cut, public facilities needed to serve the expanding population will need to be developed.

3. **Transportation Improvements.** As development at Mauna Lani and surrounding resort projects continues and traffic volumes increase, existing roadways will become congested. Eventually, it will be necessary to improve the Mauna Lani Drive/Queen Ka‘ahumanu Highway and Kaniku Drive/Mauna Lani Drive intersections and to widen portions of Mauna Lani Drive and Queen Ka‘ahumanu Highway. The need for improvements to Queen Ka‘ahumanu Highway is a function of projected regional growth, not just the Mauna Lani Resort itself. The exact design of these improvements and the year in which they will be necessary has not been determined at this time.

4. **Compliance With State Ambient Air Quality Standards.** The analysis conducted for the EIS indicates the potential for ambient air quality violations in the vicinity of major intersections if no improvements are made to accommodate the increased traffic flow that is expected. This is due to the queuing that would otherwise occur. So long as the roadway improvements noted under (3) above are implemented, it will be possible to comply with standards.
(5) **Traffic Noise.** The noise analysis conducted for the EIS indicated that existing setbacks from roadways would insure that traffic noise levels within residential areas of the resort remained below the 65 Ldn level used as an acceptability criteria by Federal agencies. However, it indicated the possibility that traffic noise would exceed the preferred 55 Ldn level along the perimeter of a few parcels adjacent to Kainiku Drive. Provision of additional setback from the roadway, noise attenuating berms, or other measures could be used to avoid this potential problem.

(6) **Historic/Archaeologic Sites Preservation.** Mauna Lani Resort, Inc. has made a major effort to investigate and, where appropriate, to preserve, the historic remains present within the resort boundaries. Further archaeological salvage work may be necessary as development continues, however, and this will be undertaken on a parcel-by-parcel basis. Until it is completed, the disposition of individual sites and artifacts will not be known.

(7) **Decline In Abundance of Certain Marine Fauna.** A few observers claim to have noticed a decline in the abundance of some species of fish along the shoreline of the resort. This has been attributed to over-fishing and collecting facilitated by the improved shoreline access provided by the resort rather than to changes in water quality. Neither the accuracy of these assertions nor possible corrective measures has been determined at this time.

(8) **Extension of Lease on State-Owned Land.** The portion of the resort site north of Pauoa Bay is leased by Mauna Lani Resort, Inc. from the State of Hawaii. The lease will expire in approximately ten years, and it will have to be put out for public bid at that time. Construction of the proposed golf course and public beach park constitutes a long-term commitment of resources on the part of the petitioner; before making it, a new lease will be sought. This will be done by surrendering the remainder of the existing lease and asking the Department of Land and Natural Resources to put a 50-year lease for the area out to bid. Anyone may submit bids on the parcel, and there is no certainty that Mauna Lani Resort, Inc. will be successful in its efforts to secure a new lease. If it is not, plans for the second golf course and adjacent development will need to be revised. Mauna Lani Resort, Inc. will attempt to resolve this leasing issue immediately following positive action (if such is taken) on this redistricting request.
CHAPTER X

REFERENCES


Belt, Collins & Associates (September 1984). "Draft traffic study for the proposed Hyatt Regency Waikoloa Hotel." Author: Honolulu. (July 1983). Personal communication from Anne Mapes to Herbert Watanabe of the Hawaii District Office, DOE.


X-2


(Hawaii 1982b). Title 11, Administrative Rules, "Chapter 60, Air Pollution Control." Author: Honolulu, 29 pp.


Holthuis, L.B. (1973). "Caridean Shrimps Found in Land-Locked Saltwater Pools at Four Indo-West Pacific Localities (Sinai Peninsula, Funafuti Atoll, Maui and

Honolulu, City & County of, Department of Data Systems (August 1983). "Age Distribution of Registered Vehicles in the City & County of Honolulu" (unpublished report). Author: Honolulu.


Sugiyma, Harold (September 20, 1984). Personal communication from County Sewers and Sanitation Bureau Chief to Bob Lucas.


U.S. Congress (August 1977). Clean Air Act Amendments of 1977 (P.L. 95-95), Section 109, National Ambient Air Quality Standards.


X-5


(September 1978). *Guidelines for Air Quality Maintenance Planning and Analysis: Indirect Sources* (Volume 9, Revised), EPA-450/4-78-001. Author: Research Triangle Park, N.C.


PARTIES CONSULTED AND THOSE WHO PARTICIPATED
IN THE PREPARATION OF THE EIS

1. CONSULTED PARTIES

The notice of availability of the EIS Preparation Notice (EISPN) for the Mauna Lani Resort revised master plan was published in the OEOC Bulletin by the Office of Environmental Quality Control on December 8, 1984. The agencies, organizations, and individuals listed below were sent copies of the EIS Preparation Notice (EISPN) with the Environmental Assessment (EA) and were asked to comment on the project. Everyone believed to have an interest in the project or who requested consulted party status was included in the mailing. Those who responded to the request for comments are marked with an asterisk and copies of the correspondence with them are reproduced in Chapter XII.

Federal Agencies

* U.S. Army Corps of Engineers, Pacific Ocean Division
* U.S. Department of Agriculture, Soil Conservation Service
* U.S. Department of Commerce, National Marine Fisheries Service - Honolulu
* U.S. Department of Energy
* U.S. Department of Health and Human Services
* U.S. Department of Housing and Urban Development
* U.S. Department of the Interior
  * Fish and Wildlife Service
  * Geological Survey, Water Resources Division
* U.S. Department of Labor, Occupational Safety & Health Administration
* U.S. Department of Transportation
  * Federal Aviation Administration
  * Federal Highway Administration
* U.S. Coast Guard
* U.S. Environmental Protection Agency, Region IX - San Francisco

Congressional Representatives

The Honorable Daniel K. Inouye
* The Honorable Spark M. Matsunaga
The Honorable Daniel K. Akaka
The Honorable Cecil Heftel

State Agencies

* Department of Accounting and General Services
* Department of Agriculture
* Department of Budget and Finance
* Department of Defense
* Department of Education
* Department of Hawaiian Home Lands
* Department of Health
State Agencies (continued)

* Department of Labor and Industrial Relations
* Department of Land and Natural Resources
* Department of Planning and Economic Development
* Department of Social Services and Housing
* Department of Taxation
* Department of Transportation
* Office of Environmental Quality Control
  Office of the Governor
  Office of Hawaiian Affairs

State Legislators

Senator Richard Henderson
Senator Richard M. Matsuura
Senator Malama Solomon
Representative Virginia Isbell
Representative Andrew Levin
Representative Robert Lindsey
Representative Wayne Metcalf
Representative Harvey Tajiri
Representative Dwight Takamine

Hawaii County

Mayor - Dante K. Carpenter
Civil Defense Agency
* Department of Parks and Recreation
* Department of Public Works
* Department of Research and Development
* Department of Water Supply
  Finance Department
* Fire Department
  Hawaii Redevelopment Agency
  Office of Housing and Community Development
* Planning Department
* Police Department
* Safety Coordinator

Hawaii County Council

James L.K. Dahlberg
Frank De Luz, Ill
Takashi Domingo
Robert Herkes
Lorraine Iitchaku
Russell Kokubun
Merle K. Lai
Spencer Kalani Schutte
* Stephen K. Yamashiro
Public Utilities

Hawaii Electric Light Company
Hawaiian Telephone Company
* Gasco Inc., Hawaii Division

Community Organizations and Other Groups/Individuals

Hawaii Hotel Association
* Hawaii Leeward Planning Conference
ILWU Local 142
Kohala Community Association
Life of the Land
* Mauna Kea Soil and Water Conservation District
Moku Loa Group, Hawaii Chapter Sierra Club
* Na Ala Hele
Puako Community Association
Gerald Rothstein
* University of Hawaii at Manoa, Environmental Center
Waimea Hawaiian Civic Club
Waimea-Kawaihao Community Association
West Hawaii Committee

2. ORGANIZATIONS AND INDIVIDUALS WHO ASSISTED IN THE PREPARATION OF THIS EIS

The Environmental Impact Statement was prepared for Mauna Lani Resort, Inc. by Belt, Collins & Associates with input provided by subconsultants. The following were involved:

Belt, Collins & Associates

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Ming Chew Associates
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Peat, Marwick, Mitchell & Co.
Y. Ebisu & Associates

Archaeological Survey
Anchialine Ponds Survey
Wildlife Survey
Marine Survey
Flora Survey
Social Impact Assessment
Market Study
Air Quality Impact Assessment
Economic and Fiscal Impact Assessment
Noise Impact Assessment
CHAPTER XII

COMMENTS AND RESPONSES DURING THE CONSULTATION PERIOD

The agencies and individuals listed in Chapter XI were all sent copies of the Environmental Impact Statement Preparation Notice (EISPN) with the Environmental Assessment (EA) and a transmittal letter requesting comments. Copies of the EISPN and the transmittal letters sent to these organizations and individuals are reproduced along with copies of our responses to them. Some agencies received individualized transmittal letters, requesting specific information relative to their agency's activities and/or responsibilities. Letters to and from these agencies are reproduced after the group of letters from and to the agencies and individuals responding to the standard transmittal letter.

Standard Transmittal Letter Requesting Comments
Environmental Impact Statement Preparation Notice

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RESPONDING TO THE STANDARD TRANSMITTAL LETTER

Federal Agencies

U.S. Army Corps of Engineers, Pacific Ocean Division
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Department of Energy
U.S. Department of Housing and Urban Development
U.S. Department of the Interior
Fish and Wildlife Service
Geological Survey, Water Resources Division
U.S. Department of Transportation
Federal Aviation Administration
Federal Highway Administration
U.S. Coast Guard

State Agencies

Department of Accounting and General Services
Department of Budget and Finance
Department of Defense
Department of Hawaiian Home Lands
Department of Health
Department of Labor and Industrial Relations
Department of Land and Natural Resources
Department of Social Services and Housing
Department of Taxation
Office of Environmental Quality Control

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Lawmakers
The Honorable Spark M. Matsunaga  XII-37
Hawaii County Council Chair Stephen K. Yamashiro  XII-38

Other Organizations
PRI/Gasco, Inc.  XII-39
Hawaii Leeward Planning Conference  XII-40
Na Ala Hele  XII-41
University of Hawaii at Manoa, Environmental Center  XII-43

AGENCIES SENT INDIVIDUALIZED TRANSMITTAL LETTERS
(Transmittal letters are reproduced before each comment and response pair. A + indicates no response to the transmittal letter was received.)

State Agencies
Department of Agriculture  XII-45
Department of Education  XII-48
Department of Planning and Economic Development  XII-51
Department of Transportation  XII-54

Hawaii County Agencies
Department of Parks and Recreation  XII-57
Department of Public Works  XII-59
Department of Water Supply  XII-61
Fire Department  XII-63
Planning Department  XII-65
Police Department  XII-68

Others
+ Gerald Rothstein  XII-71
+ Hawaii Electric Light Company, Inc.  XII-72
+ ILWU Local 142  XII-73
Mauna Kea Soil and Water Conservation District  XII-74

XII-2
Dear [Name],

Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these changes, the petitioner has noted that the Urban District containing the proposed changes shall be reclassified from approximately 65% to 75% in area. In addition, it is seeking a new lease for the hotel to be used as a public beach park. An Environmental Impact Statement Preparation Notice (EIS) announcing the intention to prepare an EIS in accordance with Chapter 313, Hawaii Revised Statutes, was published in the December 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EIS are available at this time for public use. The Environmental Assessment (EA) on which it is based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries described in the EA, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and your responsibilities in planning. We believe it is important that these comments be included in any analyses that are conducted to prepare the EIS. We hope that you will devote your efforts to these issues which are of greatest concern.

Sincerely,

Anne L. Mapes
ALMIL
Attachment

December 17, 1984
85-1940

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1985. As that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 381-3861. It will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes

Attachment

December 17, 1984
85-1940

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

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If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 381-3861. It will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes

Attachment
Ms. Letitia Ueyehara, Director
Office of Environmental Quality Control
150 Kapiolani Boulevard, Room 301
Honolulu, HI 96813

Dear Ms. Ueyehara:

Subject: Environmental Impact Statement Preparation Notice
for a State Land Use District Boundary Amendment

In accordance with Section 13-31, subsection C, of the Regulations of the Environmental Quality Commission, we are filing an Environmental Impact Statement Preparation Notice for a State Land Use District Boundary Amendment request involving conservation districted lands and a copy of the Environmental Assessment.

Sincerely,

KOGOYAMA, KUNIBI
Executive Officer

OFF:geom
Attachments
cc: OCC w/attachment
Benjamin Kudo w/attachment
Biel, Collins & Associates w/attachment

CHAPTER 343, HAWAII REVISED STATUTES
ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR MAUNA LANI RESORT

Project Location: Kalahupua'a, 'Anaeho'omalu, Waikoloa and
Kohala, North Kohala
County of Hawaii
TK1 6-8-G1: Portion of Parcel 22, 6-8-22: Portion
of Parcel 11, and 6-9-01: 15, Third Division

Applicant: Mauna Lani Resort, Inc.

Accepting Agency: Land Use Commission, State of Hawaii

Proposed Actions: Redistricting 654 acres of land, 486 acres from
the Agricultural to Urban District and 168 acres from
Conservation to Urban.

Determination: EIS required.
I. Description of the Proposed Project

Mauna Lani Resort, Inc. is proposing to construct a second 18-hole golf course, provide additional land for residential development around the new golf course, provide a public beach park, permanently accommodate support facilities that have been constructed within the Agricultural District under the Special Permit process, allow for a relocation of an existing hotel site at Mauna'aleo Bay, and allow for a decrease in the resort's overall density. The proposed changes require expansion of the current Urban District and use of some of the Conservation District land leased from the State of Hawaii.

II. Description of the Affected Environment

The Mauna Lani Resort site is located between the Puako Beach Lots and the Waikoloa Beach Resort along the South Kohala shoreline; it is designated as a "major resort" in the Hawaii County General Plan. Two-thirds of the Resort site is composed of barren lava with little or no soil cover. Most of the site has a hot, arid, desert-like climate. Gulches at the site are normally dry with surface runoff occurring only during heavy rainfall.

Except within the boundaries of the existing golf course and landscaped areas, vegetation is limited to kame and scrub brush in areas where lava does not dominate completely. No rare or endangered species of flora or fauna have been observed on the project site.

Archaeological work has been carried out at the Mauna Lani Resort site. The area is rich in archaeological remains. Archaeological preserves have been set aside following guidelines set forth in a management plan for archaeological resources at the Resort, which has been approved by the County.

III. Major Impacts

Implementation of the revised master plan would involve substantial grading, vegetation removal, new construction and other changes to the existing environment on several hundred acres of land. The potential exists for significant effects, including the following:

- Transformation of the terrain due to grading, importation of soil and landscaping;
- Change in the visual character of some of the physical environment from barren lava and scrub vegetation to landscaped areas and resort and residential uses;
- Airborne dust and noise during the construction period;
- Withdrawal of brackish water for golf course irrigation, with potential impact on groundwater flow near the coastline and on salinity levels;
- Changes in species composition of flora and fauna;
- Impacts on archaeological sites that can be mitigated by further research and/or preservation;
- Improved access to and upgrading of Puako petroglyphs;
- Improved public access to the shoreline;
- Increased use of available potable water supplies, as well as public utilities and services;
- Increased short-term and long-term employment;
- Increased personal income and business activity;
- Increased demand for housing;
- Increased government revenues and expenditures.

IV. Determination and Supporting Reasons

In conformance with Subsection 1331 of the State Environmental Impact Statement Regulations (Significance Criteria and Procedures), the Land Use Commission of the State of Hawaii has determined that an environmental impact statement will be prepared in accordance with Chapter 343, HRS.

The proposed resort development has the potential to have significant impacts on the environment because (1) of the extent of lands proposed to be reclassified from Conservation to Urban (160 acres) and (2) the subject Conservation District lands partially abut the shoreline, a potentially sensitive area.

V. Agencies Consulted in Making Assessment

Public agencies and other interested parties will be consulted during the preparation of the EIS.
VI. Parties to be Consulted for the Preparation of the EIS

The agencies and organizations listed below will be sent copies of the EIS Preparatory Notice (EISPN) and asked to comment on the project.

Federal Agencies

U.S. Army Corps of Engineers, Pacific Ocean Division
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Commerce, National Marine Fisheries Service-Honolulu
U.S. Department of Energy
U.S. Department of Health, Education, and Welfare
U.S. Department of Housing and Urban Development
U.S. Department of the Interior
Fish and Wildlife Service
Geological Survey, Water Resources Division
U.S. Department of Labor, Occupational Safety & Health Administration
U.S. Department of Transportation
Federal Aviation Administration
U.S. Coast Guard
U.S. Environmental Protection Agency, Region IX - San Francisco

State Agencies

Department of Accounting and General Services
Department of Agriculture
Department of Budget and Finance
Department of Commerce and Consumer Services
Department of Education
Department of Hawaiian Home Lands
Department of Health
Department of Labor and Industrial Relations
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Social Services and Housing
Department of Taxation
Department of Transportation
Office of Environmental Quality Control
Office of the Governor
Office of Hawaiian Affairs

Congressional Representatives

The Honorable Daniel K. Inouye
The Honorable Spark M. Matsunaga
The Honorable Daniel K. Akaka
The Honorable Cecil M. Hee

State Legislators

Senator Richard H. Hovind
Senator Richard H. Matsunaga
Senator Nalani Solman

Representative Virginia S. Isbell
Representative Andrew Levin
Representative Robert Lindsey
Representative Wayne H. Hickey
Representative Harvey Tajiri
Representative Dwight Takamine

Hawaii County

Mayor - Dante R. Carpenter
Department of Public Works
Department of Parks and Recreation
Department of Water Supply
Department of Research and Development
Fire Department
Office of Housing and Community Development
Safety Coordinator
Civil Defense Agency
Finance Department
Hawaii Redevelopment Agency
Planning Department
Police Department

Hawaii County Council

James L. E. Ching
Frank G. Wu, III
Takashi Sugimoto
Robert Hirose
Leroy Wakeham
Russell Sekunilo
Helen E. Lee
Spencer K. Schatte
Stephen K. Yamashiro

Public Utilities

Hawaii Electric Light Company
Hawaiian Telephone
Gasco Inc., Hawaii Division

Community Organizations and Other Public Interest Groups

Hawaii Hotel Association
Hawaii Land Use Conference
Kahului Community Association
Life of the Land
Maui Loa Group, Hawaii Chapter Sierra Club
Mauna Kea
Renaissance Community Association
Well Hawaiian Civic Club
Well Hawaiian Community Association
West Hawaii Committee
January 21, 1985

Ms. Anne L. Mapes
Delt. Collins and Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for Mauna Lani Resort Expansion, South Kohala, Hawaii. The following comments are offered:

a. Any work in tidal areas, tidal pools and/or adjacent wetland may require a Department of the Army permit.

b. The 100-year tsunami inundation limits in the project vicinity are shown in the attached map for the South Kohala area (Enclosures 2-7). The 100-year tsunami elevation at the site location ranges from 5-8 feet mean sea level, depending upon proximity to the coast. The 100-year flood has a one percent chance of being equaled or exceeded in any year. The zone designations are defined in Enclosure 1.

While tsunami inundation is of primary concern in this area, shallow flooding along Puako Beach Drive should be considered (see Enclosure 2).

c. The EIS preparation notice does not address the unique anhialine ponds located on the project site. The ponds are found in only two places within the United States, namely the Rona-Kohala coast and near Kihili Bay, Maui. Given the rare occurrence of these ponds, a discussion in the EIS should include identification of the species found in the ponds, assessment of the impact of project on the ponds and species, and description of any mitigative measures and alternatives to protect the ponds. The EIS should also assess the cumulative impact of project on the anhialine ponds of the Rona-Kohala coast.

d. The EIS should detail the archaeological reconnaissance survey and fully describe the details of the management plan prepared by Science Management Inc. A follow-up intensive archaeological site survey may be required and recommended in the reconnaissance survey. Early coordination with the State Historic Preservation Officer is advised.

e. Cumulative impacts on public facilities such as transportation, recreation and water supply should be discussed in the EIS.

f. Public access and beach access should be detailed. For example, public access routes and public parking should be shown on the maps.

g. The EIS should discuss why the alternative of locating the hotel at Hekopoke Bay was denied by the County.

h. Hawaiian humpback whales and green sea turtles are known to be offshore. These species are federally listed as endangered and threatened, respectively. As a result, the EIS must address the impacts of the project on these species. We suggest early coordination with the National Marine Fisheries Service.

Page 1128: The statement, "All reefs appear to be unaffected by shoreline development to date," needs to be clarified. The artificial beach fronting Mauna Lani Bay Hotel has resulted in the accumulation of sand deposits offshore on the reefs which has affected the marine life.

Sincerely,

Koik Cheung
Chief, Engineering Division

Enclosures
Mr. Kauai Cheung
Chief, Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 21, 1983 regarding the Environmental
Impact Statement Preparation Notice for the proposed revised development plan for
Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in
May. You will be sent a copy of the DEIS when it is available. We look forward to
your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mapes

ALMif

cc Mauna Lani Resort, Inc.
Mr. Anne L. Mapes
Bail Collins & Associates
6th Coral Street
Honolulu, HI 96813

January 9, 1985

Dear Mr. Mapes:

Subject: Environmental Assessment - Maua Lani Resort Expansion
South Kohala, Hawaii

We have reviewed the subject document as requested.

As is recognized in the assessment, blowing dust and dirt during construction will be a major problem. The following procedures are recommended to minimize this problem:

1. The golf course irrigation lines should be laid after shaping the lawn, but before hauling in topsoil. This will allow for irrigation of the fill material to reduce blowing soil.
2. Each fairway and green should be vegetated as soon as grading and filling have been completed.
3. Shaping done along the shoreline could result in critical erosion problems if they are not shaped correctly and immediately seeded or planted.

Thank you for the opportunity to review this document.

Sincerely,

FRANCIS C.H. LUN
State Conservationist

Mr. Francis C.H. Lum
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

April 10, 1985

Dear Mr. Lum:

Environmental Impact Statement (EIS) for the Proposed Expansion of Maua Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 9, 1985 regarding the Environmental Impact Statement (EIS) for the proposed development plan for Maua Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent copies of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mapes

CC: Maua Lani Resort, Inc.
Dear Ms. Napes:

Subject: EIS Preparation Notice, Nauna Lani Resort

Expansion, South Kohala, Hawaii.

The National Marine Fisheries Service (NMFS) has reviewed the subject EIS preparation notice for expansion of the existing Nauna Lani Resort in South Kohala, Hawaii. We offer the following comments for your consideration in preparing the project EIS.

The proposed expansion of Nauna Lani Resort as outlined in the subject document mainly consists of rehabilitating approximately 650 acres from agriculture and conservation to urban. In addition, a number of support facilities are proposed for construction. Descriptions of proposed changes and construction are very general, consequently it is difficult for us to assess potential impacts on those resources for which we share responsibility.

Nationally our concern centers on proposed development activities (dredging, filling, beach restoration) in coastal waters of the Nauna Lani Resort. The EIS should detail those activities planned for coastal waters and describe the marine environment and fishery resources which potentially will be impacted.

NMFS is also concerned with the potential alteration of the unique anchialine pools found along the Kona and South Kohala coasts of Hawaii. We suggest these pool complex existing within the aquifer area be mapped and the biota and habitat values assessed. The developer should make every effort to avoid filling or altering in any way those pools identified as being of high value.

A statement is made in Section 3.4.3 Marine Environment (page 311-31) of the Environmental Assessment that "no rare or endangered species were observed at Nauna Lani Resort." We wish to point out that two listed species under NMFS jurisdiction do occur in coastal waters of the resort. These are the threatened green turtle (Chelonia mydas), found year-round, and the endangered humpback whale (Megaptera novaeangliae), which occurs seasonally in nearshore waters.

Thank you for the opportunity to review the proposed expansion activities at this early stage.

Sincerely yours,

Deputy E. Gates
Administrator

cc: PWS, Terminal 2, CA
    PWS, Washington, D.C.
    Corps of Engineers, Hawaii
    PWS, Honolulu

Belt, Collins and Associates
ATTN: Anne L. Napes
650 Coral Street
Hilo, Hawaii 96720
January 31, 1985

April 10, 1983

Mr. Doyle E. Gates, Administrator
National Marine Fisheries Service
Southwest Region
Western Pacific Program Office
U.S. Department of Commerce
P.O. Box 1830
Honolulu, Hawaii 96812

Dear Mr. Gates:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, Kohala, Hawaii

Thank you for your letter of January 31, 1983 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS). As you pointed out in your letter, the proposed changes and construction at Mauna Lani Resort are described in general terms in the Environmental Assessment. While some additional information regarding the development plan will be included in the DEIS, detailed site plans for the many parcels which make up the resort are not available at this early stage in the development process.

At this point, Mauna Lani Resort, Inc. is not proposing any coastal modifications. If any changes are sought at a later date, the resulting probable impacts will be addressed as part of the normal permitting and approval process. At such time, you would have the opportunity to review the project and provide your comments.

The DEIS is expected to be filed in May and you will be sent a copy when it becomes available. We look forward to your further participation in the EIS process and your comments on the DEIS.

Sincerely,

[Signature]

Anne L. Hayes
GM, Mauna Lani Resort, Inc.

cc: Mauna Lani Resort, Inc.
Ms. Anne L. Mapes
Bilt, Collins & Associates
605 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for providing us the opportunity to study the Environmental Assessment for the Maua Lani Resort project. A rapid review of the document suggests that there will be no significant energy impacts associated with this project, so there are no specific questions or critical issues which the Department of Energy wishes to raise.

One suggestion that I would like to present for your consideration — which I imagine is already under review by your company — is maximum use of renewable energy resources and energy efficient designs in all aspects of the development. An excellent current reference on the potential of the renewable technologies was released this week by the Hawaiian Electric Company, entitled "Alternate Energy Development Efforts."

Sincerely yours,

John W. Shape
Director

Mr. John W. Shape, Director
U.S. Department of Energy
P.O. Box 50168
Honolulu, Hawaii 96850

Dear Mr. Shape:

Environmental Impact Statement (EIS) for the Proposed Expansion of Maua Lani Resort, South Kohala, Hawaii.

Thank you for your letter of January 4, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Maua Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mapes

CC: Maua Lani, Inc.
January 15, 1985

Ms. Anne L. Mapes
Bell Collins & Associates
600 Coral Street
Honolulu, HI 96813

Dear Ms. Mapes:

SUBJECT: Environmental Impact Statement Preparation Notice

Mauna Lani Resort Expansion, South Kohala, Hawaii

The development of a major resort destination area at the scale proposed for Mauna Lani creates many jobs. Most of these jobs are oriented to provide support services to the hotel and to the residential areas to be developed.

The expansion of employment opportunities at this development and other resort areas in the area may require additional housing units to accommodate persons and families who wish to work in the area.

The assessment of employee housing needs, number of units, prices and location for the entire development would be useful to governmental agencies concerned with land use and housing programs.

Sincerely,

Robert K. Fukuda
Manager, 9.25

April 10, 1985

Mr. Robert K. Fukuda
Manager, 9.25
U.S. Dept. of Housing & Urban Development
Honolulu Area Office, Region IX
300 Ala Moana Boulevard, Room 3118
Honolulu, Hawaii 96850

Dear Mr. Fukuda:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 14, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS). We plan to address the issue of employee housing needs to the extent practicable at this stage of planning. The number of employee housing units needed, as well as their general location, can be projected given the current proposed development. However, we feel that your concern about housing prices can be more adequately addressed in future housing studies as individual projects are implemented at Mauna Lani Resort.

The DEIS for Mauna Lani Resort expansion is expected to be filed in May and you will be sent a copy when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mapes

ALM of

cc: Mauna Lani Resort, Inc.
Peat, Marwick, Mitchell & Co.
To the best of our knowledge, there are no federally listed endangered or threatened plant species at the affected sites. We expect, however, several native coastal plant species to be found in the area. It is our understanding that a botanical survey is currently being conducted.

Pg. III-7-8 states that there are no reports of the Hawaiian hoary bat (Lasiurus cinereus semotus) being seen in the South Kohala coastal area. However, on September 1984, a dead Hawaiian hoary bat was found on the grounds of the Sheraton Royal Kona (an Anantamal and Peary Manal Survey of Waikoloa Resort Property, Hawaii, P. Bruner, Director, Museum of Natural History. Additional information regarding use of the area by the Hawaiian hoary bat may be available from the State of Hawaii Division of Forestry and Wildlife.

Pg. III-8 The scientific name for the feral goat should be Capra hircus Linnaeus.

Pg. III-8 3.4.3 Marine Environment states, "No care or endangered species were observed at Mauna Lani resort." It is unclear whether this refers to marine species or to both marine and terrestrial organisms. We suspect that the federally listed threatened green sea turtle (Chelonia Mydas) and the federally listed endangered hawksbill turtle (Eretmochelys Imbricata) and the monk seal (Monachus Schauinslandi) utilize offshore areas. Based on the results of Bruner's survey of Waikoloa, it is likely that the federally listed endangered hawksbill turtle occasionally visits the proposed affected areas. This statement should be clarified.

Based on the Fish and Wildlife Service's National Wetland Inventory maps and the results of an aquatic survey of the Kona coast ponds (J.A. MacIyle and R.E. Brock, Aquatic Survey of the Kona Coast Ponds, Hawaii Island, 1974), it appears that both anhialine pools and estuarine-like wetlands are present between Puua Bay and the existing Mauna Lani Bay Hotel. Along the existing Mauna Lani Bay Hotel, along Waavea Point, and on the south side of Honea Bay. Moreover, MacIyle and Brock have identified these pools (Lahuipea complex) as "good sites of significant aquatic natural value."

It appears from Figure II-7, Proposed Master Plan of Mauna Lani, that the Hotels 1, 2, 3, and the beach club are sat on the anhialine pools that stretch between Puua Bay and the existing hotel. It is unclear where the design of these facilities will be and whether they will impact this anhialine pool complex.

The Service suggests that the Lahuipea anhialine pool complex be mapped and a biological assessment conducted. This would be valuable in determining alternative sites for the proposed hotels and beach club that could avoid the pools.
particularly the crustaceans, are unique to Hawaii and are restricted to these anchialine pools. In accordance with our National Mitigation Policy, the Service considers the anchialine pools to be a Resource Category 1 habitat. Resource Category 1 habitats are considered to be of high value for the conservation of species and are unique and irreplaceable on a national basis or in the ecotone section. The mitigation goal for such habitats is no loss of existing habitat value (Federal Register, Vol. 46, No. 14, January 23, 1981).

The Service believes that the most desirable alternative regarding the anchialine pools and the proposed Mauna Lani resort expansion is for the developer to avoid filling in or otherwise modifying the anchialine pools. This strategy would have many advantages for the developer. It may significantly reduce the time between site planning and ground-breaking by avoiding or expediting the permitting process, by reducing opposition to the project, and by limiting the number of controversial issues that will need discussion and resolution in the Environmental Impact Statement. Besides protecting a unique biological resource, the pools would provide a natural aesthetic amenity to the resort. Because the proposed expansion is at the conceptual stage, design alternatives that avoid impacting the anchialine pools could be considered. The Service would be happy to assist the developer and their agents in identifying possible alternatives that would avoid the anchialine pools.

If the proposed resort expansion cannot be sited so as to avoid the anchialine pools and requires that some of the pools be modified, the Service may recommend that some form of in-kind habitat compensation be provided. This compensation could include designating key on-site anchialine pool habitats to be preserved in perpetuity and/or the preservation of other important anchialine pool habitats along the Kona/South Kohala coast.

We appreciate this opportunity to comment.

Sincerely yours,

[Signature]

Ernest Kosaka
Project Leader
Office of Environmental Services

Enclosures

cc: RO, FIS, Honolulu, HI (ALO)

LDF, San Francisco

DOC

GLC

NPS

HBO - NY

"Mauna Lani" Resorts

APPENDIX F, continued. Important Kona coast pond sites:
ponds of Lahuipua Land Division, South Kohala District.
Scale = 1:12,000 (1 cm = 120 m).
April 10, 1983
83-636

Mr. Ernest Kozak
Project Leader
Office of Environmental Services
Fish and Wildlife Service
U.S. Department of the Interior
P.O. Box 30147
Honolulu, Hawaii 96820

Dear Mr. Kozak:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 14, 1983 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS). We are cognizant of your particular concern for the anhinga ponds on Mauna Lani lands. At this time, Mauna Lani Resorts, Inc. does not plan to alter the ponds. However, it is possible that some pond modification may be desired when site development plans are prepared. If this should occur, we will solicit your comments.

The DEIS is expected to be filed in May and you will be sent a copy when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Ann L. Maple

ALM/1g

ctt: Mauna Lani Resort, Inc.
Dear Mr. Napes:

We have reviewed the Environmental Assessment for the Hanae Loa Resort, South Kohala, Hawaii and provide the following comments for your consideration:

Section 3.3.1 page III-5 last paragraph - Estimates of ground-water flow across the Hanae Loa Resort site should consider the attached reference which states that the probable average daily ground-water flow between Kiholo Bay and Puna is about 6.4 million gallons.

Section 3.7.6 and 3.7.7 page III-18 - The EIS should discuss the impact of using brackish water for golf course irrigation and treated effluent to irrigate a tree nursery on the ground-water and coastal receiving water. This discussion should include the effects of nutrients, organics and viruses associated with treated effluent.

Sincerely,

Stanley F. Kepuhi
District Chief

Attachement

The programs and activities described herein were supported in part by funds provided by the United States Department of the Interior and authorized under the Water Resources Act of 1964, Public Law 88-377, and the Water Resources Research Center, University of Hawaii.
The basic objectives of this study were to determine the average annual recharge to the groundwater body and the fresh groundwater discharge at the coastlines, as well as to aquifer characteristics for an arid area located on the northwest coast of Maui's Island between Kula Bay in the south and Nāho'u in the north, and encompassing the land from the coast to approximately the 106-m (3,500-ft) elevation level. Of equal importance was the development of methodologies, namely, a computerized water budget and groundwater tidal analyses to calculate these quantities.

The probable recharge to the groundwater body in this region was computed to be $1.2 \times 10^7$ m$^3$/yr (3.9 bill gal/yr). Due to the lack of hydrologic data for the arid region, the range of values was determined, with the maximum average annual recharge being $284.94 \times 10^6$ m$^3$/yr (811 bill gal) and the minimum being $73.86 \times 10^6$ m$^3$/yr (209 bill gal). Since there are 10 km (6 miles) of coastline in this area, this implies a probable average daily flux of $25,100$ m$^3$/yr (6.79 mil gal/miles) of coastline.

Three different calculations were obtained for the hydraulic conductivity of the groundwater aquifer in the coastal region: two by tidal analysis, and a third based on the coastal discharge determined by the water budget. The Verne and Church method of tidal analysis gave an average value for $K$ (hydraulic conductivity times average saturated depth of aquifer) in the vicinity of 'Anahimaunu Bay of $2.8 \times 10^4$ ft$^3$/day (0.63 ft$^3$/day); the method of Gue gave a value for $K$ in the same area of $1.027$ m$^3$/day (3.36 ft$^3$/day). The coastal flux method gave a value for $K$ of $9,771$ m$^3$/day (26,980 ft$^3$/day).
ABSTRACT

The basic objectives of this study were to determine the average annual recharge to the groundwater body and the fresh groundwater discharge at the coastline, as well as the aquifer characteristics for an arid area located on the northwest coast of Maui Island between Kahe Point in the south and Waiakapu in the north, and encompassing the land from the coast to approximately the 750-m (2,460-ft) elevation level. Of equal importance was the development of methodologies, namely, a computerized water budget and groundwater tidal analyses to calculate these quantities.

The probable recharge to the groundwater body in this region was computed to be 161,800 m$^3$/yr (28 bill gal/yr). Due to the lack of hydrologic data for the area, a range of values was determined, with the maximum average annual recharge being 244,800 m$^3$/yr (70 bill gal) and the minimum being 718,100 m$^3$/yr (198 bill gal). Since there are 28 km (18 miles) of coastline in this area, this implies a probable average daily flux of

15,000 m$^3$/km (6.38 mil gal/mile) of coastline.

Three different calculations were obtained for the hydraulic conductivity of the groundwater aquifer in the coastal region: one by tidal analysis, and a second based on the coastal discharge as determined by the water budget. The Haver and Henry method of tidal analysis gave an average value for K (hydraulic conductivity times average saturated depth of aquifer) in the vicinity of "Makaha, Maui" Bay of 0.07 ft$^3$/day (1.3 x 10$^4$ ft$^3$/day); the method by Zeev gave a value for K in the same area of 1,007 m$^3$/day (940 ft$^3$/day). The coastal flux method gave a value for K of 2,171 m$^3$/day (20,000 ft$^3$/day).

Mr. Stanley F. Kaposta
District Chief
Water Resources Division
Geological Survey
U.S. Department of the Interior
P.O. Box 50145
Honolulu, Hawaii 96850

Dear Mr. Kaposta:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 10, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mager
ALM/IP

cc: Mauna Lani Resort, Inc.
January 21, 1985

Mr. Henry A. Sunida
Airports District Office Manager
Federal Aviation Administration
Airports District Office
U. S. Department of Transportation
1 J. J. Box 50244
Honolulu, Hawaii 96824

Dear Mr. Sunida:

We have reviewed the Environmental Assessment (EA) for the Mauna Lani Resort, South Kohala, Hawaii submitted on December 18, 1984 (received January 11, 1985).

The development described in the EA will not affect any existing or known future airports. However, we note that the length of the runway at Keahole Airport mentioned on page III-20 should be 6,600 ft. not 6,000 ft. Also, two of the three departing mainland flights rely on Kona, not in addition to the one at Hilo.

Thank you for the opportunity to review this EA.

Sincerely,

Henry A. Sunida
Airports District Office Manager

April 10, 1985

Mr. Henry A. Sunida
Airports District Office Manager
Federal Aviation Administration
Airports District Office
U. S. Department of Transportation
1 J. J. Box 50244
Honolulu, Hawaii 96824

Dear Mr. Sunida:

Thank you for your letter of January 21, 1985 regarding the Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

Thank you for your letter of January 21, 1985 regarding the Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (EIS) which is expected to be filed in May. You will be sent a copy of the EIS when it is available. We look forward to your further participation in the EIS process and to your comments on the EIS.

Sincerely,

Anne L. Napoa

ALMII
cc: Mauna Lani Resorts, Inc.
Ms. Anne L. Mapes
Hilt Collins & Associates
605 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Subject: Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

Construction of the added hotel units and residential units may impact traffic using Queen Kakeshima Highway, (FAP-13). This impact should be coordinated with the State Department of Transportation and addressed in the EIS.

Sincerely yours,

[Signature]
R. Nakamura
Division Administrator

Mr. Hisashi Kusumoto
Division Administrator
Federal Highway Administration
Region Nine, Hawaii Division
U.S. Department of Transportation
P.O. Box 9006
Honolulu, Hawaii 96830

Dear Mr. Kusumoto:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 26, 1984 -- Letter No. HDA-HI(974) in your reference system -- regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

[Signature]

Anne L. Mapes

cc: Mauna Lani Resort, Inc.
The Coast Guard has reviewed the environmental assessment for the proposed expansion of Mauna Lani Resort and has determined that this project will have no affect on programs for which we have responsibility. We therefore have no comments to provide nor areas of concern which we would like to see addressed in the EIS.

Thank you for the opportunity to comment.

Sincerely,

J. F. MILBRAND
Commander, U. S. Coast Guard
District Planning Officer
by direction of Commander
Fourteenth Coast Guard District

Commander J.F. Milbrand
U.S. Coast Guard District Planning Officer
United States Coast Guard
300 Ala Moana Boulevard
Honolulu, Hawaii  96813

Dear Commander Milbrand:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 27, 1984 -- letter No. 16475, Serial No. 5/039 to your reference system -- acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort. While your agency had no comments to make on this matter, we appreciate the time you and your staff spent reviewing the document.

It is expected that the Draft Environmental Impact Statement (DEIS) for the project will be filed in May. We look forward to your further participation in the EIS process and to any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Mapes

AL Hof

cc: Mauna Lani Resort, Inc.
Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Subject: Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

We have reviewed the subject document and have no comments to offer.

Very truly yours,

THUANE TOMIHAGA
Acting State Public Works Engineer

CTJ\k

Mr. Thuane Tomihaga
Department of Accounting and General Services
Division of Public Works
State of Hawaii
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Tomihaga:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 10, 1983 -- Letter No. 19810406.1 in your reference system -- acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort. While your agency had no comments to make on this matter, we do appreciate the time you and your staff spent reviewing the document.

It is expected that the Draft Environmental Impact Statement (DEIS) for the project will be filed in May. We look forward to your further participation in the EIS process and to any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Mapes

All:

cc: Mauna Lani Resort, Inc.
Dear Mr. Hapes:

Thank you for the opportunity to comment on the proposed Mauna Lani Resort Expansion at South Kohala, Hawaii. With regard to the jurisdiction and responsibilities of this department, the project will have no impact.

Very truly yours,

JENSEN S. L. HEE

Mr. Jensen S.L. Hee, Director
Department of Budget and Finance
State of Hawaii
P.O. Box 150
Honolulu, Hawaii 96810

Dear Mr. Hapes:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 28, 1983 acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed revised development plans for Mauna Lani Resort. While your agency had no comments to make on this matter, we do appreciate the time you and your staff spent reviewing the document.

It is expected that the Draft Environmental Impact Statement (DEIS) for the project will be filed in May. We look forward to your further participation in the EIS process and to any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Hapes

ALMult

cc: Mauna Lani Resort, Inc.
Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

Dear Major Matsuda:

Thank you for your letter of December 31, 1983 acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort. While your agency had no comments to make on this matter, we do appreciate the time you and your staff spent reviewing the document.

It is expected that the Draft Environmental Impact Statement (EIS) for the project will be filed in May. We look forward to your further participation in the EIS process and any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Mapes

ALMAP

CC: Mauna Lani Resort, Inc.
Anne L. Hayes
Page Two
January 20, 1985

2. Housing:

An increased demand for housing is indicated, but the
Environmental Assessment does not specify the number of
employee housing that would be needed, nor where or how they
would be provided. Please give more details relative to
offerings of employment and housing within the proposed
project, as they may have a bearing on our programs for
developing residential homestead lots in S. Kohala for native
Hawaiians.

3. Service/Industrial:

The proposal shows 110.9 acres for service/light
industrial uses. Please clarify the types of uses that are
planned within this category, and the timeframe and means under
which the activities will be implemented. Your plans could
impact the scope and timing of our planned light industrial
projects in the Kualoia area.

Please send your comments and questions to
Mr. Joe Chu, Planner, of our Land Management Division at
588-1086.

Thank you for the opportunity to participate in this
project.

Sincerely yours,

Georgianna K. Pacißen, Chairman
Hawaiian Homelands Commission

GEP:RF:JClc2h
Ms. Georgiana K. Padelford, Chairman
Hawaiian Homes Commission
Department of Hawaiian Home Lands
State of Hawai‘i
P.O. Box 1879
Hilo, Hawaii 96720

Dear Ms. Padelford:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 28, 1983 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments that you provided are valuable to us in preparing the Draft EIS (DEIS) which is expected to be filed in May. Most of the issues and concerns that you raised will be addressed in the DEIS to the extent possible given the current stage of planning. However, some concerns cannot be addressed in more detail until individual projects are developed. These include the following as presented in your letter:

1. Employment
   a) *Work force profiles relative to type of positions.*

   Detailed information is not currently available, but perhaps could be the subject of a future survey of resort employees.

   c) *Required skills, salary/wage ranges.*

   Industry-wide averages will be used to estimate wages in the EIS analysis. Required skills of resort workers for facilities to be designed and built in the future probably cannot be addressed in detail in an EIS that is prepared during the early stages of planning. Again, this might be an area of concern that can be addressed in a more detailed labor study performed closer to the time when resort facilities will be hiring.

   *As an agency charged with programs to benefit native Hawaiians, we are interested in knowing the nature of current employment and the percentage whose ancestry is at least one-half Hawaiian. What is the expected increase in employment of native Hawaiians as a result of the proposed project?*

Ms. Georgiana K. Padelford, Chairman
April 10, 1983
Page two

Ms. Georgiana K. Padelford, Chairman

April 10, 1983

85-623

I spoke with Joe Choo of your Land Management Division on March 12, 1983 and informed him that, in accordance with Federal law, no statistics regarding the ethnicity of current Mauna Lani Resort employees are available. In the absence of such statistics, we agreed that an estimate provided by the personnel manager of the Mauna Lani Bay Hotel would be used for the EIS and that such estimate would be deemed an adequate way of addressing the question.

2. Housing

   *Details relative to offerings of employment and housing.*

   The EIS will contain statistics concerning projected employment and housing. As for offerings of housing, more analysis will be done and further projections made as the Mauna Lani Resort project progresses. We will be soliciting your comments and suggestions at that later time.

   We will send you a copy of the DEIS when it is available and look forward to your further participation in the EIS process and to your comments on the DEIS.

   Sincerely,

   Anne L. Mapes

   Mauna Lani Resort, Inc.
   Peat, Marwick, Mitchell & Co.

   ALM83111
of contamination of the potable water system through backflow or backpressure. It has been the experience of the Department that such interconnections are often instituted by individuals attempting to boost line pressure, or who are not aware that there is a difference between the two systems. The owner and/or supplier of water must ensure that all potential for human exposure to the nonpotable water will be eliminated and be held responsible for any cross-connections between the potable and nonpotable systems.

I hope that these comments will be helpful in determining significant issues which should be addressed in the Environmental Impact Statement for this project. Should you have any questions regarding Chapter 20, please contact the Drinking Water Program at 548-2235.

Wastewater Treatment

The Environmental Impact Statement should address the effect of Chapter 17, Private Wastewater Treatment Works and Individual Wastewater Systems, on the project. It should also discuss whether the proposed changes will be adequately served by the existing sewage system.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

[Signature]

Deputy Director
Environmental Health

cc: DHSA, Hawaii
BILLY OHINS & ASSOCIATES
Engineering - Planning
Landscape Architecture

April 10, 1983
80-417

Mr. Melvin K. Kakeha
Deputy Director for Environmental Health
Department of Health
State of Hawaii
P.O. Box 3272
Honolulu, Hawaii 96810

Dear Mr. Kakeha:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 29, 1983 -- referenced as EPHID --
regarding the Environmental Impact Statement Preparation Notice for the proposed
revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in
May. You will be sent a copy of the DEIS when it is available. We look forward to
your further participation in the EIS process and in your comments on the DEIS.

Sincerely,

Anne L. Mayes
Anne L. Mayes

AL\MB

cc: Mauna Lani Resort, Inc.
Mr. Josh L. Napes
Bills, Collins & Associates
606 Coral Street
Honoisul, Hawaii 96813

Dear Mr. Napes:

This is in response to your letter of December 19, 1984 regarding the environmental impact statement (EIS) preparation for the Manea Lani Resort Expansion.

We feel that if a substantial number of workers will be sought to staff the project, in addition to the demographic information on the Kohala population already contained in the report, you may want to address the availability of the labor supply necessary to fill the jobs that will be created. Other considerations are adequate transportation and affordable housing, and factors that affect job desirability especially in remote resort areas.

Of possible interest to you is a labor market analysis of the Kohala area produced in January, 1985 by this department's Research and Statistics Office staff. A copy has been enclosed for your perusal.

If you need more information or have any questions, please call me at 548-3534 or Frederick Pong, Chief, Research and Statistics office at 548-3639.

Sincerely,

Joshua C. Agalal, Director of Labor and Industrial Relations

Enclosure
Ms. Anne L. Hapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Hapes:

Thank you for your letter of December 19, 1984, submitting the environmental impact statement (EIS) preparation notice for the Kama Lani Resort expansion in South Kohala. Our primary concern is over the utilization and protection of our natural resources. In the area of the aquatic environment, we suggest that the EIS thoroughly describe the activities planned; the aquatic resources of the project site(s) and nearby areas which may be affected; existing levels of public use of these resources; and anticipated effects of the proposed activities on these resources and uses. The means which would be used to prevent, reduce, or mitigate adverse effects should be addressed.

More specifically, we suggest that the following resources be considered: anchialine ponds, beachfront, coastal waters and bottoms, and the plants and animals inhabiting them. The following uses should also be studied: fishing, paddling, gathering lime, sightseeing and photography in and under the water, sunbathing, beachcombing, swimming, surfing, and sailing. We suggest that these be discussed in light of the potential impact from landfills, soil erosion, drainage water, urban contaminants, landscaping and agricultural chemicals, wastewater disposal, and nutrients enrichment, and modification to existing and customary patterns of access to the shore. This information would allow us to evaluate the potential for impacts on public benefits from aquatic resources.

We are pleased to note that you have already conducted an archaeological reconnaissance survey of the area. We concur with the recommendations reported in the document entitled, "Archaeological Reconnaissance of the Area South of Punu Petroglyph Archaeological District, South Kohala, Hawaii, 1984," prepared by the Bishop Museum. These recommendations require intensive mapping and data recovery through excavation to mitigate adverse impacts to sites in the survey areas. The data recovery program recommended includes sites EK-23, EK-238, EK-195, EK-275, EK-275, and EK-240. We suggest that two copies of the report of these actions be submitted to the Department of Land and Natural Resources for review and comment in a timely manner so as to allow further recommended mitigation. If warranted, to be completed prior to the start of any construction activity. In order to ensure that significant adverse effects to the resources are avoided, we further suggest that coordination with the respective state and county agencies charged with historic preservation be initiated and continued during all mitigative activity.

We have no objections to park and recreation proposals. However, we recommend that the final refinements to the plans for the proposed public beach park and the proposed archaeological park (e.g., park master plan and construction drawings) be submitted to the Department of Land and Natural Resources for review and comment. This is to ensure that Land and Natural Resources for review and comment. This is to ensure that the proposed park projects are carried out as proposed and that they are consistent with the State Recreation Facilities Plan.

I hope this will help you in planning this project and in fulfilling our environmental requirements.

Very truly yours,

Chairperson of the Board

January 30, 1985
Mr. Sammo Ono, Chairman
Board of Natural Resources
Department of Land and Natural Resources
State of Hawaii
P.O. Box 624
Honolulu, Hawaii 96809

Dear Mr. Ono:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 30, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS). In particular, we plan to follow your suggestion pertaining to continued coordination with State and County agencies charged with historic preservation. Also, copies of reports on any archaeological work done at the Mauna Lani Resort site will be forwarded to your agency for timely review and comment as they become available.

The DEIS is expected to be filed in May and you will be sent a copy when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

[Signature]

[Name]

[Date]

ALM11

cc: Mauna Lani Resort, Inc.
MEMORANDUM

TO: Franklin Y. Sonn, Director
Department of Social Services and Housing

FROM: Russell M. Fukunoto, Executive Director

SUBJECT: Environmental Impact Statement Preparation Notice—Mauna Lani Resort Expansion, South Kohala, Hawaii (DSSH Control No. 84-1755)

The Authority has reviewed the subject EIS preparation notice and offer the following comments for their consideration:

1. The proposed project does not consider affordable housing for the moderate-income families which is much needed in the Kohala-Kailua-Kona area.

2. This proposed project does not address the need for employee housing. The State Housing Plan encourages the development of rental housing for employees of large businesses outside of urban areas.

We recommend that both these matters be addressed in the EIS.

Your copy is being returned should the department decide to comment on the social services aspect of this matter.

Thank you for the opportunity to comment.

Attachment
Dear Mr. Fukuawato,

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your memo of January 9, 1983 to Mr. Franklin Sun regarding the Environmental Impact Statement Preparation Notice for the proposed resort development plan for Mauna Lani Resort. Mr. Sun transmitted a copy of the memo to me on January 10, 1983.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS). The document will address the need for additional housing in the project area as a result of resort development at Mauna Lani Resort. We recognize your concern about "affordable housing for moderate-income families which is much needed in the Kohala-Kalua-Kona area" and the need for rental housing for employees of large businesses. These concerns will be addressed in general terms in the EIS. However, specific employee housing measures are best addressed during the actual development of individual projects within the resort rather than during the current preliminary planning stage. Future analyses would more accurately reflect prevailing economic, social, and community trends and conditions.

The DEIS for Mauna Lani Resort expansion is expected to be filed in May and you will be sent a copy when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

[Signature]

Anne L. Mapes

CC: Mr. Franklin Sun
Mauna Lani Resort, Inc.
Post, Harwick, Mitchell & Co.
Ms. Anne L. Mapes
Delt, Collins & Associates
696 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

In response to your letter of December 19, 1984, we have reviewed the materials submitted regarding the proposed expansion of the Mauna Lani Resort complex.

It appears that the proposed project will have no impact upon the concerns of this agency and we therefore, offer no comments at this time.

Very truly yours,

HERBERT M. DIAZ
Director of Taxation

April 10, 1985

Mr. Herbert M. Diaz, Director
Department of Taxation
State of Hawaii
P.O. Box 239
Honolulu, Hawaii 96809

Dear Mr. Diaz:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 2, 1983 acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort. While your agency had no comments to make on this matter, we do appreciate the time you and your staff spent reviewing the document.

It is expected that the Draft Environmental Impact Statement (DEIS) for the project will be filed in May. We look forward to your further participation in the EIS process and to any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Mapes

ALM Rt

cc: Mauna Lani, Inc.
Ms. Anne Napes  
Belt, Collins and Associates  
664 Kamehameha Street  
Honolulu, Hawaii 96813

Dear Ms. Napes:

Subject: Preparation Notice for the Mauna Lani Resort Expansion

We have reviewed your preparation notice and suggest that the draft EIS contain an expanded discussion of the archaeological impacts of the proposed project.

Thank you for providing us the opportunity to review this preparation notice.

Sincerely,

Lettitia N. Uyehara  
Director

Ms. Letitia N. Uyehara, Director  
Office of Environmental Quality Control  
State of Hawaii  
350 Halekamua Street, Room 301  
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Environmental Impact Statement (EIS) for the Proposed  
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 2, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Napes

ALMFL  
cc Mauna Lani Resort, Inc.
Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for sending me a copy of the Mauna Lani Resort, Inc.'s Environmental Impact Statement Preparation Notice announcing the intention to prepare an Environmental Impact Statement.

I appreciate your offering me the opportunity to comment on these proposed changes to the existing Mauna Lani Resort in South Kohala, Hawaii, although I have no formal comments to submit, I would like to commend your firm for developing this detailed and thorough report which assesses the impact of the proposed development at Mauna Lani.

Aloha and best wishes.

Sincerely,

Spark Matsunaga
U. S. Senator

Senator Spark M. Matsunaga
U. S. Senator, Hawaii
109 Hart Building
Washington, D.C. 20510

Dear Senator Matsunaga:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 23, 1985 acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed development plan for Mauna Lani Resort. While you had no comments to make on this matter, we do appreciate the time you and your staff spent reviewing the document.

It is expected that the Draft Environmental Impact Statement (DEIS) for the project will be filed in May. We look forward to your further participation in the EIS process and to any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Mapes

cc: Mauna Lani Resort, Inc.
January 6, 1985

Ms. Ann L. Mapes
Belt, Collins & Associates
600 Coral Street
Honolulu, Hawaii 96813

RE: Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

Your letter of December 17, 1984 (84-180) was received and referred to the Council's Committee on Planning for study and recommendation.

When the Hawaii County Council acts on your letter, you will be informed as to the action taken.

Stephen K. Yamashiro
COUNCIL CHAIRMAN

Bill Collins & Associates
Engineering, Planning
Estate Planning

April 10, 1985

Mr. Stephen K. Yamashiro
Council Chairman
County Council
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Yamashiro:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 6, 1985 -- Letter No. C-20 in your reference system -- acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort. While you did not have any comments to make on this matter, we appreciate your referral of the Preparation Notice to the Council's Committee on Planning for study and recommendation.

We expect the Draft Environmental Impact Statement (DEIS) for this project will be filed in May. We look forward to your further participation in the EIS process and to any comments you and the Committee on Planning may have on the forthcoming DEIS.

Sincerely,

[signature]

Ann L. Mapes

ALMII

cc: Mauna Lani Resort, Inc.
January 2, 1985

Belt, Collins and Associates
606 Coral Street
Hilo, Hawaii 96720
Attention: Ms. Anne Mapes

Gentlemen:

Subject: EIS PN Mauna Lani Resort Expansion

We do not foresee significant impact within the next 10 years on our capability to provide the Mauna Lani Resort area with propane fuel.

Sincerely,

Alan K.C. Hae
Staff Engineer
Gasco, Inc.—Hawaii Division

cc George L. Mapes

Mr. Alan K.C. Hae
Gasco, Inc. — Hawaii Division
P.O. Box 1397
Hilo, Hawaii 96720

Dear Mr. Hae:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 3, 1985 acknowledging receipt of the
Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort. While your company had no comments to make on
this matter, we do appreciate the time you and your staff spent reviewing the
document.

It is expected that the Draft Environmental Impact Statement (DEIS) for the
project will be filed in May. We look forward to your further participation in the EIS
process and to any comments you may have following your review of the DEIS.

Sincerely,

Anne L. Mapes

ALMII
cc Mauna Lani Resort, Inc.
December 27, 1994

Ms. Anne L. Mapes
BEET, COLLINS & ASSOCIATES
606 Coral Street
Honolulu, HI 96813

Dear Ms. Mapes:

We have reviewed the Environmental Impact Statement Preparation Notice and the Environmental Assessment for the Mauna Lani Resort in South Kohala, Hawaii.

We believe that you have addressed the major issues and have nothing to add in relation to the scope of the Environmental Impact Statement. We would, however, suggest that you add to the list of state agencies to be consulted the Mauna Kea Soils & Water Conservation District; their address is as follows:

P.O. Box 1089
Kamuela, HI 96743

Thank you for this opportunity to review the Environmental Assessment.

Sincerely,

[Signature]

[Name]

President

Mr. H. Peter L'Orange, President
Hawaii Leeward Planning Conference
P.O. Box 635
Kailua-Kona, Hawaii 96745

April 10, 1995

Dear Mr. L'Orange:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 27, 1994 acknowledging receipt of the Environmental Impact Statement Preparation Notice for the proposed expanded development plan for Mauna Lani Resort. While your organization had no comments to make on this matter, we do appreciate the time you and members of your organization spent reviewing the document.

At your suggestion, we wrote to the Mauna Kea Soils and Water Conservation District office to solicit their comments on the proposed Mauna Lani Resort expansion. Their response will be taken into consideration in preparing the Draft Environmental Impact Statement (DEIS).

It is expected that the Draft Environmental Impact Statement (DEIS) for the project will be filed in May. We look forward to your further participation in the EIS process and to any comments you may have following your review of the DEIS.

Sincerely,

[Signature]

[Name]

ALMoll

cc Mauna Lani Resort, Inc.
Dear Sirs:

Re: Environmental Assessment for the Point Land Resort, South Kohala, Hawaii

Thank you for requesting Na Ala Hele's participation in the EIS study process.

Questions and concerns at this time are:

Archaeology

The Environmental Assessment does not mention the anchialine pools found on the land to be affected. A January 1985 examination of the pools located within the existing golf course and accessible through the public shoreline trail revealed the absence of the endemic ophiura (Haploophora pilosa). Common 'kupu' fish have been introduced to the pools and the encroaching algae, once a greyish white, is now reddish brown. These pools were once pristine habitats for eelgrass flora and fauna.

One anchialine pool located above Hanalei Bay remains pristine. Investigation into how such delicate pools can be retained despite surrounding construction and resort activities is essential. Massive filling in of ponds located at Waikolu Bay, site of the highest concentration of anchialine pools in the state, is currently being proposed by the developers of the Hyatt Regency. The more destruction of these habitats, the greater likelihood that unique flora and fauna will be pushed to endangered species status. That would not be in the best interest of Hawaii's residents and visitors.

Historic

Na Ala Hele plans to revisit a shoreline area that appears to have quite a concentration of "mellow" built into the "wa" for the purpose of salt making and food storage. The area is approximately six miles south of Kona Land Resort's shoreline property. I have examined it only once and need to better define its location.

The Puako Petroglyph Field is intended to be a future public park. It is essential to formalize how the area will be maintained and secured to prevent vandalism of the petroglyphs. What role will the State of Hawaii have in the development of this historic treasure on state-owned lands?

Sincerely,

[Signature]

Deborah Chang Ames
President, Na Ala Hele

U.S. Army Corps of Engineers
Ms. Deborah Chang Abreu
President
Na Alii Hele
P.O. Box 1372
Kailua, Hawaii 96730

Dear Ms. Abreu,

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

Thank you for your letter of January 16, 1985 regarding the Environmental Impact Statement Preparatory Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Vargas

ALMol

cc: Mauna Lani Resort, Inc.
Ms. Anne L. Mapes
Belz Collier & Associates
626 Coral Street
Honolulu, Hawaii 96813

January 18, 1985

Dear Ms. Mapes:

Preparation Notice
Environmental Impact Statement
Mauna Lani Resort Expansion
South Kohala, Hawaii

The Environmental Center has briefly reviewed the above cited document with
the assistance of David Walsh, Anthropology; Jacqueline Miller and Julian Maneau,
Environmental Center. Most of the critical issues to be addressed in the EIS have
been identified in this preliminary document and we anticipate that they will be
expanded where necessary for the EIS. We can offer some additional information on two topics: tsunami
and archaeological impacts.

Tsunami

The tsunami runup height suggested for design (p. III-6) is 17-foot runup height
of the 1946 tsunami at Kawaihae. Consideration should be given to the one, instead of the
10-foot tsunami runup height (as per Kewaihae area) estimated by the Corps of Engineers that is
the basis for the horizontal extent of 100-year tsunami inundation as shown on Federal
Flood Insurance Program maps.

Archaeology

Several concerns have been identified by our reviewers with regard to the
archaeological significance of the area which should be addressed in the EIS for this
project. As noted in the EIS determination by the Land Use Commission the project will
impact to archaeological sites on the property and will involve improved access to
the Puako petroglyphs.

Patrice Kirch directed a Bishop Museum survey of the Mauna Lani resort lands in
1977. While, according to the preparation notice, Kirch estimated that 8% percent of the
sites on the property had been located, it should be noted that not all areas were covered
with equal intensity during that survey. Unfortunately, Kirch's report does not state
which areas received what intensity of coverage. Last October, David Welch (UH

ARCHAEOLOGIST), directed an intensive survey of the conservation district zone which
Mauna Lani is requesting be rezoned to permit resort expansion. In this 169 acre area, in
which Kirch's survey had recorded six site, Welch found six additional sites. This was
a clear area which had not been covered extensively during Kirch's survey. Other areas
have not been covered by either survey and may well have additional archaeological sites
for which development is now planned may likewise have revealed only light coverage in
earlier surveys. We would therefore recommend a more intensive archaeological survey of
the other areas to be developed to aid in the planning of the mitigation measures to be
taken in regard to the archaeological properties on the resort.

The planned development of the conservation district will result in improved access
to the main petroglyph complexes in the Puako Petroglyph Archaeological Field. While
this will have the positive effect of allowing the public to view this fascinating site,
accomplishing this will be easier accessibility by those who would vandalize these sites.
The after delinquent of the petroglyphs at Olowalu on Maui within 5 years in the late
1970's, after knowledge of their location became widely known, attest to the
consequent effects on such access can have. We would hope that the EIS will address
these effects that such access can have. We would hope that the EIS will address
these effects that such access can have.

Mauna Lani Resort in coordination with the State Historic Preservation
Office should develop some type of plan that will help to provide protection for these
sites, which have been placed on the National Register of Historic Places.

The conservation district itself is primarily open as lava field and knoll forest on
shallow soil. The archaeological sites are all small, primarily shelters, and no petroglyphs
were observed in the area. As long as the mitigation plan recommended in the report
prepared by David Welch is carried out, the archaeological value of these sites will have
been adequately protected.

Mauna Lani Resort has shown a past commitment to a program of mitigation of
adverse impacts through data recovery or preservation of archaeological sites. The
implementation of these suggestions will help improve the quality of the mitigation plan
for the new phase of development.

We appreciate the opportunity to comment on this document and look forward to
reviewing the Draft EIS.

Yours truly,

[Signature]

Brian C. Cox
Director

cc: Dr. Welch
Jacqueline Miller
Juliane Maneau

AN EQUAL OPPORTUNITY EMPLOYER
Mr. Deak C. Cox, Director
Environmental Center
University of Hawaii at Manoa
Crawford 317
2530 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Cox:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 18, 1983 -- Letter No. PM00039 in your
reference system -- regarding the Environmental Impact Statement Preparation
Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in
May. You will be sent a copy of the DEIS when it is available. We look forward to
your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

[Signature]

cc: Alan M. M语气

cc: Mauna Lani Resort, Inc.
Mr. Jack K. Sawa, Chairman

Department of Agriculture
1925 S. King Street
Honolulu, Hawaii 96814

Dear Mr. Sawa:

Environmental Impact Statement Preparation Notice

Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over larger area, and the relocation of an existing hotel site. In addition, it is seeking toeliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 637 acres. In addition, it is seeking a new lease and Conservation District Use Permits allowing about 10 acres of land north of Mauna Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISP) was published in the December 9, 1989 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility. It is out intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed. We also welcome any suggestions you may have regarding what data and analyses are important, and, if applicable, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

Sincerely,

Anne L. Mapes

ALM Manufacturing

Attachment

Mr. Jack K. Sawa, Chairman

December 21, 1989

Page two

Mr. Jack K. Sawa, Chairman

Page two

December 21, 1989

Page two
Ms. Anna L. Hayes
Belt, Collins and Associates
600 Coral Street
Honolulu, Hawaii 96813

January 21, 1985

Dear Ms. Hayes:

Subject: Environmental Impact Statement Preparation
Notice (EISP) for the Mauna Lani Resort
Expansion, South Kohala, Hawaii

This is in response to your letter of December 21, 1984, requesting the comments of the Department on the subject EISP.

We note that the document is found attached in its entirety as an exhibit (Exhibit 3) to a petition for an amendment to the State Land Use District boundary filed with the State Land Use Commission (Docket No. 84-102). A copy of our comments on the petition (dated December 6, 1984) is attached.

You will find that the questions you pose in your letter are answered in our response to the petition. Please note that the additional concerns found in our response also apply to the subject EISP. In summary, these concerns include:

- Any adverse impacts on water well users in the region resulting from the withdrawal of groundwater for the proposed project.
- Clarification of the relationship among the economic and residential development components of the County of Hawa‘i’s Kona Regional Plan and the North Kohala Community Development Plan, and the proposed project.

Should you have any further questions, please contact our Planning and Development Office at 948-7133.

Sincerely,

Jack K. Umemoto
Chairman, Board of Agriculture

Attachment

December 5, 1984

To: Mr. Kent H. Keith, Director
Department of Planning and Economic Development

Subject: Petition for an Amendment to the State Land Use District Boundaries

Area: 554 (Mauna Lani Resort, Inc.)
Agricultural and Conservation to Urban
Resort/Residential Community

The Department of Agriculture has reviewed the subject petition and offers the following comments.

According to the petition, the petitioner seeks approval of the proposed district reclassification to expand the existing resort area according to their master plan. We note that the proposed reclassification largely conforms to the General Plan Land Use Pattern Allocation Guide Map.

Our analysis of the subject properties indicate relatively poor agricultural suitability. Approximately 10 acres in the area adjacent to the existing sewage treatment plant are classified as "other important" agricultural lands according to the Agricultural Lands of Importance to the State of Hawai‘i (ALISH) system. The remaining petitioned lands are not classified according to the ALISH system. The Soil Conservation Service Survey indicates that the relevant soils have minimal agricultural potential, and the Land Study Bureau’s Detailed Land Classification similarly indicates poor agricultural productivity potential for the subject lands.

Thus, the properties do not meet the generally understood definitions of "important agricultural lands".

To our knowledge, the only intensive agricultural use within or in the immediate vicinity of the subject properties is the petitioner’s coconut/field stock nursery situated next to the sewage treatment plant.
We note that the primary source of potable water will be from existing and proposed wells on State-owned lands in Lahaina and on Parker Ranch lands (Exhibit I, page III-10). Irrigation water for existing and future golf courses will be from brackish water sources.

One concern we have is whether the proposed withdrawal of water for the proposed project will have any adverse effect upon other well water users in the affected region.

The proposed development will create additional employment opportunities. However, the petition does not state how many jobs will be created or if employee housing will be made available. It appears to us that the operation of four or more additional hotels and a wide range of ancillary activities would result in the creation of a substantial number of jobs. This may have a significant impact on the residential communities in the Kawahe, Kailua, North Kohala, Waimea, Hualala, and Kona areas. One of the impacts that could be addressed at the time of hearing is the similarity of the economic and residential development components of the Kona Regional Plan, the North Kohala Community Development Plan, and the proposed development.

Thank you for the opportunity to comment.

JACK K. SOWA
Chairman, Board of Agriculture

BIL COLLINS & ASSOCIATES
Engineering, Planning, Landscape Architecture

Mr. Jack K. Sowa
Chairman, Board of Agriculture
Department of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814

April 10, 1983

Dear Mr. Sowa:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, Kohala, Hawaii

Thank you for your letter of January 21, 1983 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALAhi

cc Mauna Lani Resort, Inc.
Mr. Francis M. Hatanaka
Acting Superintendent of Education
Department of Education
State of Hawaii
1170 Miller Street
Honolulu, Hawaii 96813

December 21, 1984

Dear Mr. Hatanaka:

Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, North Kohala, Hawaii

Mauna Lani Resorts, Inc. is proposing several changes to the existing Mauna Lani Resort in North Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the elimination of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District boundaries be increased by approximately 650 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 40 acres of land north of Pauna Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISPN) announcing the intention to prepare an EIS in accordance with Chapter 383, Hawaii Revised Statutes, was published in the December 2, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISPN and the environmental assessment (EA) on which it is based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that you/your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. If our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed; the reasons why you believe the requested data and/or analyses are important, and, if applicable, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department's activities and responsibilities in the area. The information you provide will be used to assess the potential impacts of the proposed project.

1. What public elementary, intermediate and secondary schools would serve students from the residential development within the proposed expansion? Does the Department have any plans to expand educational facilities in the area? If so, please describe them.

2. What is the current enrollment, design capacity, and the projected enrollment for the 1983-1984 period for each of the above schools?

3. How much space is available at existing or currently proposed facilities to accommodate increased enrollment?

4. What student generation rates, by grade level, would be used for estimating school enrollment? Do these rates include all students or only those attending public schools?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this period, since the issues are given short shrift simply because they are raised hastily.

If all goes as planned, it is expected that the EIS will be available in May 1985.

At that time, the document will be circulated for public review and comments.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 322-3561. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Hapes
ALM1161
Attachment

[Signature]
Ma Anne L. Napes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

January 3, 1984

Ma Anne L. Napes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Subject: EIS Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

This is in response to your inquiry on the potential impact of the subject expansion.

1. Kohala High and Elementary School will be serving the students from your residential development. There are no plans at the present time to expand the existing educational facilities.

2. Current enrollment at Kohala High and Elementary School is 738 K-12 students. The design enrollment is 850 and current capacity is 850 students. We do not anticipate that enrollment in the 1985-2000 range will exceed the rated capacity of the school.

3. Current capacity exceeds current enrollment by 112 students.

4. Student generation factors per 100 units for relatively high-priced residential units at Mauna Lani are:

<table>
<thead>
<tr>
<th>Multi-Family Units</th>
<th>5-6</th>
<th>7-8</th>
<th>9-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Family Units</td>
<td>.02</td>
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</table>

For your information, our earlier response to the Department of Planning and Economic Development on your Petition No. A84-583 stated that the project will have a negligible enrollment impact on our Kohala High and Elementary School.

AN EQUAL OPPORTUNITY EMPLOYER
April 10, 1983
85-607

Mr. Francis M. Hatanska
Superintendent of Education
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Hatanska:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 3, 1983 regarding the Environmental Impact
Statement Preparation Notice for the proposed revised development plan for Mauna
Lani Resort.

The comments and information that you provided are valuable to us in preparing
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in
May. You will be sent a copy of the DEIS when it is available. We look forward to
your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Vargas

AL-Mall

cc: Mauna Lani Resort, Inc.
Mr. Kent Keith, Director  
December 29, 1988  
Page two  
84-1989

Bill Collins  
& ASSOCIATES  
Engineering  
Planning  
Landscape Architecture

Dear Mr. Keith,

Environmental Impact Statement Preparation Notice  
Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a new golf course and a public beach park; a reduction in the density of residential and hotel area, and the relocation of an existing hotel. In addition, it is seeking to eliminate the need for a Special Use Permit for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 634 acres. In addition, it is seeking a new lease and Conservation District (the Permit allowing about 40 acres of land north of Paona Bay from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISP) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, Control Bulletin. Copies of the EISP and the environmental assessment (EA) are attached to this letter for your review. The EA provides a description of the proposed development, the changes in land use, the District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of analyses that are being conducted for the EIS.

We request that you or your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating, the reasons why you believe the requested data will be used in the decision-making to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department's activities and/or responsibilities in the area. The information you provide will be used to assess the potential impacts of the proposed project.

1. Do you foresee any possible conflicts between the proposed expansion and the guidelines of the City and County of Honolulu? If so, please describe them.

2. Do you foresee any possible conflicts with the objectives and policies of the State Coastal Zone Management Program? If so, please describe them.

3. Do you foresee any possible conflicts between the proposed project and the guidelines set forth in the State Functional Plan, specifically the State Tourism Plan? If so, again, please describe them.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of date of receipt. It is our hope that you will make every effort to respond within this time frame so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1989.

At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kind of input which would be most helpful to us in preparing the EIS, please call me at 521-3361. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes

Attachment
Ms. Anne L. Hayes
Belk, Collins & Associates
600 Kapiolani Street
Honolulu, Hawaii 96813

February 12, 1985

Dear Ms. Hayes:

SUBJECT: EIS Preparation Notice for Ninamu Lani Resort Expansion, South Kalaheo, Kauai

We have reviewed the subject preparation notice and have the following comments.

The environmental impact statement should thoroughly address the impacts of the proposed development on shoreline and offshore resources. In this particular case, public access to the shoreline, archaeological/historical resources, and ocean water quality would be primary areas of concern. Particular attention should be given to show why 160 acres of shoreline property should be removed from the protection of the Conservation District.

The problem of infrastructure, particularly the availability of water and sewer facilities, should be related to the phasing and quantity of development. Current needs should be quantified as well as anticipated increases related to the proposed development plan.

Documentation should be provided to show the location of archaeological/historical sites based on past and current surveys as well as probable impacts to these sites based on the proposed development.

The Environmental Assessment mentions a "preliminary market study performed by Ning Chen Associates." A market study should be provided to show the need for the proposed reclassification in light of the proposed expansions of the Ninamu Lani Resort and the Waiholo Resort. The supply and demand for hotel units, resort condominium units, golf courses, commercial space, etc., in the area should be discussed. In addition to this, the problem of employee housing for the proposed development should be resolved.

With regard to your questions requesting our input on the compatibility of the proposed project to the objectives and policies of the
Mr. Kent M. Keith, Director
Dept. of Planning & Economic Development
State of Hawaii
P.O. Box 2599
Honolulu, Hawaii 96814

Dear Mr. Keith:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii.

Thank you for your letter of February 17, 1985 -- Letter No. 1054 in your
reference system -- regarding the Environmental Impact Statement Preparation
Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in
May. You will be sent a copy of the DEIS when it is available. We look forward to
your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Hayes
ALM/MF

cc: Mauna Lani Resort, Inc.
In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department's activities and responsibilities in the area. The information you provide will be used to assess the potential impacts of the proposed project.

1. The two-lane Queen K'ahumanu Highway has been designed so that additional lanes can be added within the existing 300-foot-wide right-of-way. Will additional lanes be needed in the near future and will the Department have any plans for road widening? If so, please describe the planned improvements and give us the proposed construction time period.

2. Does the State have traffic projections for Queen K'ahumanu Highway? If so, what are they to the year 2000?

3. Does the Department keep a record of traffic accidents that may have occurred on Queen K'ahumanu Highway during the past few years? If so, please provide the data or indicate where we may obtain it.

4. Is your staff aware of any specific traffic or roadway characteristics in the vicinity of the project area that should be taken into account in your analysis of the potential impacts of the proposed expansion? If so, please indicate what they are.

5. What is the status of planned and proposed improvements for Keahole Airport? Does your Department foresee any problems with the airport as to capacity or types of aircraft it can handle? If there are areas of concern, please indicate what they are.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments must be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1983. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 321-3341. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne A. Mager

AILMIF
Attachment
5. A master plan for Kehole Airport will be initiated this year. This study will evaluate the airport's capacity and will propose a development plan for airport and terminal projects.

We trust we have satisfactorily addressed your concerns. We will be pleased to review the EIS when it becomes available.

Very truly yours,

[Signature]

Wayne J. Teshima
Director of Transportation

---

Mr. Anne L. Napas
Belt, Collins & Associates
606 Coral Street
Hilo, Hawaii 96723

Dear Mr. Napas:

Environmental Impact Statement
Preparation Notice
Kanuka Land, Resort Expansion
South Kohala, HI

We have reviewed the preparation notice and recommend that a traffic impact analysis be conducted to address the project's impacts upon Queen Kahanamoku Highway. The findings of this analysis and the measures required to mitigate any significant impacts should be presented in the EIS.

To assist you in this study, the following responses are provided in the same numerical order as your request:

1. There are no plans to widen Queen Kahanamoku Highway in the near future.

2. The 1995 and 2005 average daily traffic projected for the highway between Kehole and Napapa are 3400 and 4300 vehicles per day, respectively.

3. Traffic accident reports may be obtained from the Highways Division's Traffic Branch located at 869 Punchbowl Street.

4. High speed traffic on Queen Kahanamoku Highway should be considered in the design of the access roads.
Mr. Wayne J. Yamauchi, Director  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813  

Dear Mr. Yamauchi:

Environmental Impact Statement (EIS) for the Proposed  
Erosion of Mauna Lani Resort, South Kohala, Hawaii  

Thank you for your letter of February 9, 1985 -- Letter No. STP 810417 in your  
reference system -- regarding the Environmental Impact Statement Preparation  
Notice for the proposed revised development plan for Mauna Lani Resort.  

The comments and information that you provided are valuable to us in preparing  
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in  
May. You will be sent a copy of the DEIS when it is available. We look forward to  
your further participation in the EIS process and to your comments on the DEIS.

Sincerely,  

Anne L. Mapes  

ALMail  
cc: Mauna Lani Resort, Inc.
Ms. Patricia G. Engelhard, Director
Department of Parks & Recreation
Hawaii County
25 Aua Street
Hilo, Hawaii 96720

Dear Ms. Engelhard:

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over larger parcels of land, and the conversion of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 436 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 40 acres of land north of Puona Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISPAN) assessing the intention to prepare an EIS in accordance with Chapter 383, Hawaii Revised Statutes, was published in the December 9, 1984 issue of the Office of Environmental Quality Control Bullets. Copies of the EISPAN and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kind of impacts that may result and indicates the kind of additional analyses that are being conducted for the EIS.

We request that you or your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibilities, special knowledge, or interests. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed, the reasons why you believe the requested data and/or analysis are important, and, if applicable, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

Ms. Patricia G. Engelhard, Director
Page two
December 26, 1984
84-001

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department's activities and/or responsibilities in the area. The information you provide will be used to assess the potential impacts of the proposed project.

1. The proposed Mauna Lani Resort expansion includes the construction of a public shoreline beach park with a comfort station, beach showers, picnic facilities and parking. The park will allow convenient access to the shoreline and to the Puako Petroglyph area. Is the proposed location for the park acceptable to your department?

2. Do you foresee any potential conflicts between the proposed resort and residential uses and the public's use of the beach park? If so, please describe them and indicate ways in which they might be avoided.

3. Do you have any data regarding the number of persons who currently use the shoreline areas of the project site and the types of activities in which they engage? If so, please provide us with the information.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1985. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful in preparing the EIS, please call me at 521-3561. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Maape
ALH-49
Attachment

Hawaii Bldg. Condo Council, Hilo, Hawaii 96720 Telephone 955-5421 Fax 955-7392

Hawaii Community College, Hamakua Community Center, Hilo, Hawaii 96720 Phone 961-6500 Fax 961-6501

Hawaii Community College, Hamakua Community Center, Hilo, Hawaii 96720 Phone 961-6500 Fax 961-6501

Hawaii Community College, Hamakua Community Center, Hilo, Hawaii 96720 Phone 961-6500 Fax 961-6501

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Hawaii Community College, Hamakua Community Center, Hilo, Hawaii 96720 Phone 961-6500 Fax 961-6501

Hawaii Community College, Hamakua Community Center, Hilo, Hawaii 96720 Phone 961-6500 Fax 961-6501

Hawaii Community College, Hamakua Community Center, Hilo, Hawaii 96720 Phone 961-6500 Fax 961-6501
Ms. Patricia Englehard, Director
Department of Parks and Recreation
County of Hawaii
23 Aupuni Street
Hilo, Hawaii 96720

Dear Ms. Englehard:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 4, 1983 regarding the Environmental Impact Statement for the proposed Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

[Signature]

Anne L. Mapeo
ALMif
cc: Mauna Lani Resort, Inc.
Mr. Hugh Ono, Chief Engineer  
Department of Public Works  
Hawaii County  
23 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. Ono:

Environmental Impact Statement Preparation Notice  
Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 69 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 50 acres of land north of Puako Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISP) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the December 8, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that you or your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS will explore all aspects of the projects probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed, the reasons why you believe the requested data and/or analyses are important, and, if applicable, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

Sincerely,

Anne L. Mape

Attachment
January 11, 1985

Ms. Anne L. Mapes
BILLY COLLINS & ASSOCIATES
664 COAL STREET
HONOLULU HI 96813

SUBJECT: MAUNA LANI RESORT EXPANSION
ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to review the Environmental Assessment.

The following are our comments:

- **FIGURE 11-2** The new proposed master plan doesn't include a road stub out to the Makalapa Beach Resort. Should Mauna Lani Resort decide to dedicate their roads to the County of Hawaii, such a stub out will be required.

- **FIGURE 11-3** The new road alignment south from Kuilima Drive through the proposed golf course crosses the Kipu Trail. While the previous alignment, Fig. II-1, did not cross the trail.

- **FIGURE 11-3** The flood area shown differs from that on the County of Hawaii flood insurance rate maps. Please show the location of the fire areas shown on A3, A2 and AS on this figure.

- **SECTION 3.7.7, Page 31** The Malama Landfill was closed in December, 1984. The compactors at the transfer station are now taken to our landfill in Kailua-Kona. This revision should be made.

Should you have any questions, please contact Robert Yenake, 961-8227 at our Engineering Department.

Sincerely,

[Signature]

Chief Engineer

cc: Planning Department

Mayor

Planner

[Address]

April 10, 1985

Mr. Hugh Y. Oono, Chief Engineer
Department of Public Works
County of Hawaii
2380 Aupuaa Road
Hilo, Hawaii 96720

Dear Mr. Oono:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 11, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and your comments on the DEIS.

Sincerely,

Anne L. Mapes

ALM

cc: Mauna Lani Resort, Inc.

[Address]
Mr. William M. Sewake  
Managing Engineer  
Department of Water Supply  
Hawaii County  
23 Apaau Street  
Hilo, Hawaii 96720

Dear Mr. Sewake:

Environmental Impact Statement Preparation Notice  
Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 638 acres. In addition, it is seeking a new lease for Conservation District Use Permit allowing about 40 acres of land north of Puako Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISPAN) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the December 31, 1988 issue of the Hawaii Environmental Quality Control Bulletin. Copies of the EISPAN and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that will be affected, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that you your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge or interest. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed, the reasons why you believe the requested data and/or analyses are important, and, if applicable, the ways the information we will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

Sincerely,

Anne L. Mapes  
ALAEH  
Attachment

December 26, 1988  
84-2002

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would provide water usage rates for our use in the analysis of potential impacts. What average rates do you consider appropriate applied to hotel rooms (gallon/day), single-family and multifamily units (gallon/day), and landscaped areas (gallon/day)?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of receipt. It is our hope that you will make every effort to respond within this time period so that no issues are lost simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1989. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 322-3361. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes
Mr. Anna L. Mapes  
Belt, Collins & Associates  
606 Coral Street  
Honolulu, HI 96813

Mr. William Sewake, Manager  
Department of Water Supply  
County of Hawaii  
23 Aguinaldo Street  
Hilo, Hawaii 96720

Environmental Impact Statement (EIS) for the Proposed  
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 10, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anna L. Mapes  
AlM/W  
cc: Mauna Lani Resort, Inc.

...Water brings progress...
Mr. Francis Smith, Fire Chief

Fire Department
Hawaii County
23 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Smith,

Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 434 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 40 acres of land north of Panama Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice EIS/PS was published in the December 9, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EIS/PS and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EIS provides a description of the proposed developments, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analysis that are being conducted for the EIS.

We request that you or your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed, and the reasons why you believe the requested data and/or analyses are important. In addition, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department's activities and/or responsibilities in the area:

The information you provide will be used to assess the potential impacts of the proposed project.

1. Mauna Lani Resort, Inc. is currently working with your department on regional fire protection improvements. Do you foresee any problems with the proposed expansion? If so, please describe them and indicate any measures that might be taken to avoid or remedy them.

2. Please provide a description of the Waimea fire station, the primary service area, staffing, equipment and hours of operation.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are glossed over simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1985. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kind of input which would be most helpful in preparing the EIS, please call me at 321-3361. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapea

ALMII
Attachment
January 8, 1985

Ms. Anne L. Napes
Bell, Collins & Associates
506 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Napes:

Subject: Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

The Hawaii County Fire Department has no objections to the proposed expansion plans at Mauna Lani Resort, South Kohala, provided the new development includes the following:

1. Dedication of approximately one acre of land for future fire station use.
2. Adherence to all provisions of current Fire and Building Codes.
3. Meet requirements of the Planning and Water Departments.

The Fire Department is presently working with the Mauna Lani management regarding a proposed fire station site to be tentatively located on the north portion of the property adjacent to the intersection of Puako Road and Highway 19. Management also expressed the desire to form a volunteer fire company in the future, which we endorse and will be assisting.

Present protection for the area is provided by the 24-hour station at Kaima where six personnel are on duty watching one engine, one tanker, and an emergency medical unit. This crew is supplemented by volunteers from Puako and Kawaihae and a paid Fire Equipment Operator from Kawaihae.

Should the need arise, additional engines and a ladder truck would be dispatched from Kailua-Kona.

Sincerely,

Francis E. Smith
Fire Chief

FRANCKS E, SMITH

April 10, 1985

Mr. Francis E. Smith, Fire Chief
Hawaii County Fire Department
466 Kinoole Street
Hilo, Hawaii 96720

Dear Mr. Smith:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

Thank you for your letter of January 8, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the DEIS process and to your comments on the DEIS.

Sincerely,

Ann L. Napes

cc: Mauna Lani Resort, Inc.
Mr. A. Lono Lyman,
Dear Mr. Lyman,

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1985. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 321-3344. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes

ALMIF
Attachment

Mr. A. Lono Lyman, Director
Page two
December 26, 1984
84-2000

BELT, COLLINS & ASSOCIATES
Engineering * Planning
Landscape Architecture

Mauna Lani Resort is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposals, the petitioner has asked that the Urban District containing the resort be increased by approximately 654 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 40 acres of land north of Puna Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISPEN) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the December 1, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISPEN and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that you/your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. In particular, we would appreciate receiving your comments on the expansion within the framework of the Hawaii County General Plan and Land use zoning. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing specific questions, issues, and topics you believe should be addressed, the reasons why you believe the requested data and/or analyses are important, and, if applicable, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.
Ms. Anne L. Mapes

Dear Ms. Mapes:

Environmental Impact Statement Preparation Notice and Environmental Assessment
Kona Land Resort Expansion, South Kohala, Hawaii

THUM: 4-2-61; Portion 22: 4-9-21; Portion 1

Thank you for the subject submittals and your letter of December 23, 1984. Our comments at this stage are:

1. Chapter 3.6. Social and Economic Conditions. A detailed assessment of the impact of development on housing needs, including potential in-migrations should be included. On page IV-5, the report states that the development "... would result in new demand for employe housing." In light of the scale of the overall development, the limited availability of affordable housing and the limited public transportation, this issue requires further analysis.

2. The prospect of an improved beach and attendant facilities to be developed and maintained by the applicant north of Keauhou Bay needs some clarification. Would access to both the park and the archaeological area be privately controlled; and if so, what restrictions, if any, would be imposed on the general public's access to the beach? How many parking spaces would be available to the public?

3. With regard to the Land Use District classification boundary changes being requested by the applicant, we offer the following:

   a. Agriculture to Urban. The 486-acre portion presently has an "Alternate Urban Expansion" designation in the County General Plan, signifying that should the present urban area be developed fully and according to plan, the Alternate Urban Expansion area could be the next urban area, should the need arise and be justified. Based on the extent of the current urban development improvements completed at Hana Lani, the request for this change appears to be appropriate. The narrow strip to the south of the 486-acre portion is one which we consider to be a minor adjustment within the overall resort development frame.

   b. Conservation to Urban. The intent of the General Plan designation of Open for the area along the shoreline and fronting Keauhou Bay, which coincides with the State Land Use Conservation District, is to ensure the preservation of open space—especially oceanfront land. Before commenting on the request to substitute the existing two resort-designated general locations for a single one (shown on the proposed master plan as "Resort 4, 23.4 acres"), we would like to know what uses are planned for the adjacent areas: U (23.6 acres); X (19.5 acres); V (22.0 acres); W (27.3 acres); and X (10.6 acres).

4. We have noted the questions raised in the January 11, 1985, letter from the Department of Public Works and concur with them.

5. We will have further comments and findings as subsequent application processes (district boundary changes, Conservation District Use, Zoning, SMA permit, etc.) are submitted and reviewed.

Sincerely,

[Signature]

ALBERT LOND LILYAN
Planning Director
April 10, 1983

Mr. Robert Lowe Lyman, Director
Planning Department
County of Hawaii
23 Aspend Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Environmental Impact Statement (EIS) for the Proposed
Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 24, 1983 regarding the Environmental
Impact Statement Preparation Notice for the proposed revised development plan for
Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing
the Draft Environmental Impact Statement (DEIS) which is expected to be filed in
May. You will be sent a copy of the DEIS when it is available. We look forward to
your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Mepo

ALMIF

cc: Mauna Lani Resort, Inc.
Mr. Guy Paul, Police Chief  
Police Department  
Hawaii County  
23 August Street  
Hilo, Hawaii 96720

Dear Mr. Paul,

Environmental Impact Statement Preparation Notice  
Mauna Lani Resort Expansion, South Kohala, Hawaii  

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 654 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 40 acres of land north of Paauilo Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISP) announcing the intention to prepare an EIS in accordance with Chapter 383, Hawaii Revised Statutes, was published in the December 8, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kind of additional analyses that are being conducted for the EIS.

We request that you/your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibilities, special knowledge, or interest. It is our intention that the EIS will explore all aspects of the project’s probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be discussed, the reasons you believe the requested data and/or analyses are important, and, if applicable, the ways the information will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department’s activities and/or responsibilities in the area.

1. Do you foresee any problems in serving the proposed expansion area? If so, please describe them and indicate measures to avoid or remedy them.

2. What is your analysis of the impact on the area? Please describe any changes in the crime characteristics of South Kohala that you might expect from the expansion of Mauna Lani Resort.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1985. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 335-3511. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Maps

ALMil

Attachment
Ms. Anne L. Napes  
January 16, 1985

Belts, Collins & Associates  
600 Coral Street  
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice  
Mauna Lani Resort Expansion, South Kohala, Hawaii

This acknowledges your letter of December 26, 1984, requesting information on the effect of the proposed Mauna Lani Resort expansion on the police.

You are correct in your observation that both the Waimea and Kapaau Police stations were constructed rather recently and that there is room in both buildings for additional staff. We foresee that additional staffing will be needed as proposed developments in the Kohala coast region produce an increased population that will result in greater police workload.

As these developments reach completion, there will be a shift in frequency of criminal and traffic incidents to the Kohala coast region. This shift may necessitate the establishment of a police substation there which would require capital costs as well as the necessary additional personnel and equipment.

Enclosed is a table showing the distribution of uniformed police personnel within Hawaii County as well as the distribution of crime and traffic workload indicators. You will see that the Waimea district (which includes the Mauna Lani Resort area) is at a staffing level about equal with its present criminal and traffic workloads. The North Kohala district has a manning level higher than its criminal and traffic workloads presently warrant, but, the factors of location and distance require this.
April 10, 1983
83-066

Mr. Guy A. Paul, Chief of Police
Police Department
County of Hawaii
349 Kapalua Street
Hilo, Hawaii 96720

Dear Mr. Paul:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

Thank you for your letter of January 16, 1983 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

[Signature]

Anne L. Napas

c/o Mauna Lani Resort, Inc.
December 21, 1984
Rev.-1985

Mr. Gerald Rothstein
76-123 Royal Palisades Drive
Kailua-Kona, Hawaii 96740

Dear Mr. Rothstein:

Environmental Impact Statement Prepararion Notice (EISP)
Mauna Kea Resort Area, South Kohala, Hawaii

Attached are copies of the EISP and the environmental assessment (EA) for the
above project which you requested in your phone call to me yesterday.

According to the Environmental Impact Statement (EIS) Regulations, you have 30
days after receipt of this letter in which to give us in writing your comments on the
proposed project. These comments will be taken into consideration during the
preparation of the EIS.

Should you have any further questions regarding the project, please call me at
321-2501.

Sincerely,

Anne L. Mapes

Attachment
Gentlemen:

Environmental Impact Statement Preparation Notice

Mauna Lani Resort Expansion, South Kohala, Hawaii

Mauna Lani Resort, Inc. is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 436 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 62 acres of land north of Mauna Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EISPN) announcing the intention to prepare an EIS in accordance with Chapter 363, Hawaii Revised Statutes, was published in the December 8, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISPN and the environmental assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that you in your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed, the reasons why you believe the requested data and/or analyses are important, and, if applicable, the ways in which we will be used in the decision-making process. The more specific you are, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed expansion, we would appreciate it if you would answer the following questions relative to your department's activities and responsibilities in the area. The information you provide will be used to assess the potential impacts of the proposed project.

1. Please briefly describe the existing electrical generation and transmission system serving the Mauna Lani Resort. Are there any plans to expand or change the system regardless of the proposed Mauna Lani Resort expansion? If so, please describe the changes and indicate when they would be made.

2. Can the existing electric system, as planned, accommodate the proposed expansion? If not, what improvements to the system must be made to adequately service the expanded resort?

3. We are interested in determining the extent to which Mauna Lani Resort would use non-renewable resources to obtain electric power. Please indicate your projection for the percentage of power generated in 1990, 1995 and 2000 that would be obtained from various sources such as coal, oil, natural gas, etc.

4. Please indicate energy conservation measures that might be suitable for the Mauna Lani Resort and the extent to which they may lower energy consumption.

5. If you have other concerns related to the proposed Mauna Lani Resort expansion or if there are other conditions of which we should be aware, we would appreciate knowing about them.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1985. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 321-3914. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes

Hawaii Electric Light Company, Inc.
December 26, 1984
Page two

Attachment
As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. It is our hope that you will make every effort to respond within this time period so that no issues are given short shrift simply because they are raised belatedly.

If all goes as planned, it is expected that the EIS will be available in May 1983. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me at 321-3341. I will be happy to provide any additional information and guidance I can.

Sincerely,

Anne L. Mapes

Attachments
Mr. Gene Aglar, Chairman
Ala Moana Real Estate and Water Conservation District
Department of Land and Natural Resources
State of Hawaii
P.O. Box 1689
Kaneohe, Hawaii 96743

Dear Mr. Aglar:

Environmental Impact Statement Preparation Notice
Mauna Lani Resort Expansion, South Kohala, Hawaii

At the suggestion of the Hawaii Leeward Planning Conference, we are writing to solicit your comments on the above project (see attached letter of December 27, 1985).

Mauna Lani Resort, Inc., is proposing several changes to the existing Mauna Lani Resort in South Kohala, Hawaii. These changes include the construction of a second 18-hole golf course and a public beach park, a reduction in the density of residential development by spreading the units over a larger area, and the relocation of an existing hotel site. In addition, it is seeking to eliminate the need for Special Use Permits for existing and proposed support facilities. In order to implement these proposed changes, the petitioner has asked that the Urban District containing the resort be increased by approximately 454 acres. In addition, it is seeking a new lease and Conservation District Use Permit allowing about 80 acres of land north of Pauna Bay leased from the State to be used for two golf holes and a public beach park.

An Environmental Impact Statement Preparation Notice (EIS/EA) announcing the intention to prepare an EIS in accordance with Chapter 349, Hawaii Revised Statutes, was published in the December 8, 1984 issue of the Office of Environmental Quality Control Bulletin. Copies of the EIS/EA and the environmental assessment (EIA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the changes in Land Use District boundaries that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

We request that you/your organization assist us in preparing the EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibilities, special knowledge, or interests. It is our intention that the EIS will explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed, the reasons why you believe the requested data and/or analyses are important, and, if applicable, the ways the information we supply will be used in the decision-making process. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

Sincerely,

Anne L. Mapers

Enclosures:

ALMOL

Attachments:
cc Hawaii Leeward Planning Conference
Mauna Lani Resort, Inc.
February 14, 1985

Mr. Anne L. Vapes
Bill Collins & Associates
600 Coral Street
Honolulu, HI 96813

Dear Mr. Vapes:

Subject: Environmental Assessment
Mauna Kea Land Resort Expansion
South Kohala, Hawaii

The Mauna Kea Soil and Water Conservation District received your document as requested at our monthly meeting on 2/13/85 and we are in concurrence with Mr. Francis Low's statement.

Thank you for the opportunity to review this document.

Sincerely,

Gene Aguiler, Chairman
Mauna Kea SWCD

April 10, 1985

Mr. Gene Aguiler, Chairman
Mauna Kea Soil & Water Conservation District
Box 1059
Kamuela, Hawaii 96743

Dear Mr. Aguiler:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of February 14, 1985 regarding the Environmental Impact Statement Preparation Notice for the proposed revised development plan for Mauna Lani Resort.

The comments and information that you provided are valuable to us in preparing the Draft Environmental Impact Statement (DEIS) which is expected to be filed in May. You will be sent a copy of the DEIS when it is available. We look forward to your further participation in the EIS process and to your comments on the DEIS.

Sincerely,

Anne L. Vapes

AL Moff
cc: Mauna Lani Resort, Inc.
CHAPTER XIII
COMMENTS AND RESPONSES REGARDING
THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Draft Environmental Impact Statement (DEIS) for the Revised Master Plan for Mauna Lani Resort was submitted to the Environmental Quality Commission on May 20, 1985. Letters commenting on the EIS were received from the agencies and organizations listed below. Their comment letters and the responses to these are reproduced on the following pages.

Federal Agencies
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U.S. Department of Housing and Urban Development XIII-10
U.S. Department of the Interior, Fish and Wildlife Service XIII-12
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U.H., Water Resources Research Center ................ XIII-39
Ms. Esther Ueda  
State of Hawaii  
Land Use Commission  
335 Merchant Street, Rm. 104  
Honolulu, Hawaii 96813  

Dear Ms. Ueda:

Thank you for the opportunity to review and comment on the Draft EIS for Mauna Lani Resort, Kohala, Hawaii. The following comments are offered:

a. Suggest the Commission consider zoning anchialine pond areas for conservation in order to provide some protection of the resource.

b. Although a Department of the Army permit is not required at this time, we would encourage pond preservation, replacement or rehabilitation as part of any plans to fill or excavate anchialine ponds on Mauna Lani Resort.

c. Page IV-1. The elevation of Mauna Kea is 13,796 feet.

d. Page IV-11. On Maui, the anchialine ponds occur within the Natural Area Reserve.

e. Suggest the preparer of the draft EIS check for the proper scientific nomenclature. For example, genus and species names in Tables IV-1.4 and IV-1.5 should be underlined as was done for Table IV-1.4. Only genus and species names are underlined, never "var.", "ssp.", or "sub." (DEIS, pages IV-31 to IV-33). Genus name is capitalized; species name is not. Common group names derived from family names, e.g. "holocentrine", are neither capitalized nor underlined (DEIS, page IV23). Spelling and other possible errors should be checked.

f. Page IV-18. The use of the term "statistically significant" to characterize a decrease in native species should be documented by proper statistical analysis. It is not clear whether such an analysis was accomplished.

-2-

g. Page IV-22. Change "butterfish" to "butterfishly".

h. Pagination should be checked between pages IV-30 and IV-38.

1. Section 1.10.1. The document indicates that Mauna Lani Resort has adopted interpretive and management plans to preserve and display sites (S.M.I., 1982) but no clear statement exists of what the plan involves. There is also no indication of whether sites identified after 1981/1982 (e.g. Welch 1984) will be covered by the plan within this section.

2. Section 1.10.1.1. There are several references to particularly significant sites (e.g. 400, 401, 404, etc.) but no location map or plan is given except Figure IV-5, which has no site identification numbers.

a. Section 1.10.1.4. The interpretive and management program section sounds good but appear to be wholly limited to a few areas only. What is to happen to those sites which are not part of the preserve? In that addressed within the program? These may also contain significant and/or important data.

1. Section 1.10.3.5. The EIS indicates that 8 sites were identified during this survey; however, only 7 sites are described. A discussion is warranted to clarify this matter. In addition, the reference to site locations on Figure IV-6 could not be found.

b. Section 1.10.2. We are pleased to see that Mauna Lani Resort recognizes the need for future surveys and the inherent problems with the previous surveys; however, the EIS should clarify what is meant by undertaking intensive surveys at the appropriate time. Who will decide when it is appropriate? Who will assess the need to undertake this intensive survey; and will this be implemented with qualified cultural resource scientists?

b. Section 1.10.2. The reference to specific mitigation measures contained in previous reports are being adhered to is too vague and should be discussed.

c. Generally, the discussion of the cultural resources is sketchy and needs more descriptive detail and backup.
The EIS should address the cumulative impacts on the anchialine ponds. Since these are rare resources found in very few parts of the world, any loss of a few ponds may be significant. The problem becomes aggravated when other landowners such as Makolea are also proposing developments which will affect the ponds. Consequently, the EIS should address any loss of these ponds in terms of a cumulative impact.

q. We would like to request a copy of the final EIS when it is available.

Sincerely,

Kinuk Cheung
Chief, Engineering Division

Copies furnished:
Mr. Roger Harris, Project Planner
Mauna Lani Resort
PO Box 4959
Kawaihae, Hawaii 96743-4959

Ms. Anne L. Mapes
Belt Collins & Associates
606 Coral Street
Hilo, Hawaii 96720

Belt Collins
& Associates
July 5, 1983
8:31:155

Mr. Kinuk Cheung
Chief, Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 12, 1983 on the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort, addressed to Mr. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you and your staff spent reviewing the document. Following are our responses to your comments in the order that they appear in your letter.

Comments (a) Suggestion that the Commission consider zoning anchialine pond areas for conservation to provide some protection of the resource.

Response: This comment addresses two concerns: (1) the desirability of conservation designation of pond areas, and (2) the Land Use Commission's role in restricting pond use in the Urban district to the Conservation district.

(1) The major fishponds at Mauna Lani Resort (Lulupu'a, Manuku, Hopekaia, and Waapohi ponds) are in the Conservation district; the land around them is designated Urban. All of the ponds at Mauna Lani Resort are under Corps of Engineers jurisdiction. At this time, no changes to the ponds are planned. If changes are contemplated in the future, Department of the Army (DOA) planning permits will be required. If no DOA permit is obtained, the ponds will remain in their current condition. Based on the foregoing, Mauna Lani Resort Inc. does not deem it necessary to designate more ponds at Mauna Lani Resort Conservation at this time.

(2) In June 1983, Chapter 205, Hawaii Revised Statutes, was amended. It is no longer appropriate for the Land Use Commission to initiate a petition for a change in the boundary of a district.

Comments (b) Pond preservation, replacement or rehabilitation as part of plans to fill or excavate anchialine ponds on Mauna Lani Resort.

Response: As stated previously, the applicant recognizes the requirement for a DOA permit, should future plans warrant it. On page 16-49, the EIS states: "Whether current plans change and future development of a specific site require the modification of a pond (or ponds) or other shoreline feature, Mauna Lani Resort, Inc. would need to seek a Department of the Army permit..."
It is Mauna Lani Resort policy to create new ponds where appropriate to complement the natural environments. The applicant has created a pond in front of the Mauna Lani Terrace condominiums and enhanced two others it intends to create two ponds by the two golf holes in the Conservation district by Pauna Bay, and perhaps others as the second golf course and individual parcels are developed.

Comments: (c) The elevation of Mauna Kea.

Responses: The "13,792 feet" figure shown on page IV-1 of the DEIS has been changed to 13,796 feet.

Comments: (d) On Maui, the anchialine ponds occur within the Natural Area Reserve.

Responses: The word "Preserve" has been changed to "Reserve" in the EIS.

Comments: (e) Proper scientific nomenclature.

Responses: The EIS has been modified to reflect your comments on proper scientific nomenclature.

Comments: (f) Documentation of the term "statistically significant" in characterizing a decrease in native species.

Responses: The 1983 study by Dr. Richard Resh, "A Quasi-Natural Survey of the Anchialine Pond System at Lahaina, Kona, Hawaii," states that statistical analysis had been performed. The paired T test was used (level of significance, 0.001 and 6 degrees of freedom) to arrive at the conclusion. The test in the EIS will be changed accordingly.

Comments: (g) Proper spelling of "butterflyfish."

Responses: The word "butterfish" has been changed to "butterfly fish."

Comments: (b) Pagination between pages IV-30 and IV-38.

Responses: According to our office copies of the DEIS, the pagination is correct.

Comments: (b) Absence of a clear statement of what the interpretive and management plan for Mauna Lani Resort entails, and whether sites identified after 1981/82 are covered under the plan.

Responses: Section 1.10.1 of the report that you mention is the introductory paragraph to the subsequent subsections which present more detailed information. See subsection 1.10.1.4 for a description of the interpretive and management plan. The plan includes a section on the history and background of the Kalahala'a area, four sections on the areas to be preserved, and text for an interpretive fact file.

As to sites identified after 1981/82, the plan specifies: "During the development phase of Mauna Lani Resort, new archaeological sites may be located. All newly located sites will be mapped, photographed, and recorded. Copies of these records will be forwarded to the State Historic Preservation Office and the County of Hawaii Planning Department (Science Management, Inc., January 1982). Guidelines are provided for specific treatment of different types of newly located sites. Mauna Lani Resort, Inc., intends to update the 1982 plan as additional sites are located and analyzed.

Comments: (i) Location map with site identification numbers for significant archaeological sites.

Responses: Figure IV-5 has been changed to include identification of relevant sites.

Comments: (a) The incorporation of archaeological sites that are not part of the preserves into the interpretive and management program.

Responses: The interpretive and management plan covers all resources on Mauna Lani Resort lands. Some archaeological sites are deemed unsuitable for inclusion in the interpretive plan and areas generally unmarked by signs; they are simply preserved untouched. Following plan guidelines, "Interpreting a site calls attention to it and consequently the site is almost certain to suffer some damage from pedestrian traffic and, perhaps, from vandals. As protective measures intended to decrease the possibility of the public damaging a site become more effective, the quality of a visitor's experience at a site little risk of damage. Others, however, are much more fragile and the impacts of pet hunters and pedestrians on these will be monitored as specified... (fnid)"

Comments: (i) Number of archaeological sites identified during the 1984 survey.

Responses: Eight sites were identified during the survey; the description of one site (site 83-2737) was inadvertently omitted from the DEIS, but will be included in the EIS.

Figure IV-5 was incorrectly referred to as Figure IV-4 in the DEIS. Site locations will be identified in Figure IV-4 in the EIS.

Comments: (a) Need to undertake intensive archaeological surveys.

Responses: Statements as to the undertaking of intensive surveys, should they be required during the development of individual project sites, will be amplified in the EIS. The applicant intends to coordinate with the State Historic Preservation Officer and the Hawaii County Planning Department throughout all stages of development.

Comments: (a) Discussion of specific mitigation measures.

Responses: Mitigation measures include intensive mapping, data recovery and preservation of archaeological sites. Mitigation measures for sites not in currently urban classified land have been discussed elsewhere in detail (earlier surveys and the Science..."
Management Interpretive and management plan of 1973. A site by site analysis of mitigation measures is deemed inappropriate in the current EIS. The discussion of cultural resources in the final EIS will be expanded to include text addressing your concerns.

Comments  (a) Need for more detailed discussion of cultural resources.

Response: Cultural resources on Mauna Lani Resort lands have been discussed extensively elsewhere; the reports are of public record. Sites of major significance are already provided; there are not located in lands that Mauna Lani Resort is seeking to have reclassified Urban, nor are they located in Conservation Lands north of Pauoa Bay where the applicant proposes to develop a public shoreline park and two golf holes.

Comments  (b) Cumulative impacts on anchialine ponds, taking into consideration other proposed development on the Kohala coast.

Response: Mauna Lani Resort, Inc. is aware of Transcontinental Development Co.'s application to the Department of the Army for a permit to fill anchialine ponds at the Hyatt Regency Waikoloa Hotel site at Waikoloa Beach Resort. This will be recognized in the EIS.

As stated in the DEIS and above, the applicant has no current plans to alter any ponds on Mauna Lani Resort lands. Moreover, Mauna Lani Resort, Inc. intends to create new ponds so that the total square footage of and anchialine ponds and fishponds will increase, although the exact location and configuration of the ponds are presently unknown. Mauna Lani Resort, Inc. feels that its resort projects will not reduce the total inventory of ponds in the State of Hawaii.

It is recognized that pond management will be required to preserve the unique character of some ponds as natural environments. The difficulty of this task is also recognized. In the face of expected increased human activity in the vicinity of these environments, Mauna Lani Resort, Inc. will participate in efforts to protect these unique environments.

Changes to the final EIS will be made based on your comments and our responses above. You will be sent a copy of the final document when it becomes available, as requested.

Sincerely,

[Signature]

[Name]

[Organization]

[cc: Mauna Lani Resort, Inc.]
DEPARTMENT OF THE NAVY  
HEADQUARTERS  
NAVAL BASE PEARL HARBOR  
BOX 110  
PEARL HARBOR, HAWAII 96842-1100

Ms. Esther Ueda  
State of Hawaii Land Use Commission  
315 Merchant Street, Room 104  
Honolulu, Hawaii 96813

Dear Ms. Ueda:

DRAFT ENVIRONMENTAL IMPACT STATEMENT  
MAUNA LANI RESORT

The Draft EIS for the Mauna Lani Resort has been reviewed and the Navy has no comments to offer. Since we have no further use for the EIS, the EIS is being returned to the Office of Environmental Quality Control, by copy of this letter.

Thank you for the opportunity to review the EIS.

Sincerely,

HENRY J. RINERST
Captain, U.S. Navy  
Facilities Engineer  
By direction of the Commander

Enclosure

Copy to:
Mr. Roger Harris, Project Planner  
Mauna Lani Resort  
P.O. Box 4959  
Kawailoa, Hawaii 96743-4959

Mr. Anne L. Mopes  
Belt Collins & Associates  
666 Coral Street  
Honolulu, Hawaii 96813  
Office of Environmental Quality Control

BEAlt, COLLINS  
& ASSOCIATES

Engineering * Planning  
Landscape Architecture

73-1181

Captain Henry J. Rinert  
Facilities Engineer  
Department of the Navy  
Headquarters, Naval Base, Pearl Harbor  
Box 110  
Pearl Harbor, Hawaii 96840-5920

Dear Captain Rinert:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of May 29, 1983 to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission -- Letter No. 910, Ser 0028945 in your reference system -- acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

Anne L. Mopes

ALMifi

cce  Mauna Lani Resort, Inc.
Ms. Esther Ueda
Land Use Commission
State of Hawaii
335 Merchant St., Room 104
Honolulu, HI 96813

Dear Ms. Ueda:

Subject: Draft EIS - Revised Master Plan for Wāna Lani Resort
South Kohala, Hawaii, May 1985

We reviewed the subject document and have no further comments other than those noted in our letter of January 9, 1985, regarding the environmental assessment.

Thank you for the opportunity to review this document.

Sincerely,

Francis I. Lum
State Conservationist

cc:
Mr. Roger Harris, Project Planner
Wāna Lani Resort
P.O. Box 4950
Kailua, HI 96743-4959

Ms. Anne L. Nepoa
Belt Collins & Associates
600 Coral Street
Honolulu, HI 96813

Ms. Francis C.H. Lum
State Conservationist
U.S. Department of Agriculture
P.O. Box 50009
Honolulu, HI 96850

Dear Ms. Lum:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Wāna Lani Resort, South Kohala, Hawaii

Thank you for your letter of June 13, 1985 to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Wāna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

Anne L. Nepoa
Belt Collins & Associates
Wāna Lani Resort, Inc.
Belt, Collins and Associates  

Subject: Draft Environmental Impact Statement (DEIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

The National Marine Fisheries Service (NMFS) has reviewed the subject DEIS for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii. We understand the DEIS has been prepared to support a State Land Use District boundary amendment petition and does not involve actual construction activities associated with the proposed resort expansion. The following comments are offered for your consideration.

We are pleased to note that the DEIS contains the letter prepared by NMFS (dated January 31, 1985) commenting on the EIS preparation notice. As stated in that letter, our primary concerns center on proposed construction activities in this area, our primary concern being the potential for significant adverse impacts on the Hawaiian monk seal (Monachus schauinslandi), which occurs in nearshore waters of the area. It should be noted that we have previously raised concerns about the potential for significant adverse impacts on the Hawaiian monk seal (Monachus schauinslandi), which occurs in nearshore waters of the area. We have not received any comments from NMFS regarding these concerns.

NMFS comments have been addressed to our satisfaction in the subject DEIS. However, it should be noted that prior to the receipt of this letter, the applicant's revised DEIS includes discussions of potential impacts to the Hawaiian monk seal (Monachus schauinslandi) and the issues raised in our comments have been addressed.

Sincerely yours,

R. E. Gates
Administrator

cc: F/DSB, Terminal 3, CA  
FHA, Washington, D.C.  
FWS, Honolulu  
EPA, Region 9 (150-5)  
Breed State Div. of Aquatic Resources

BELT, COLLINS & ASSOCIATES  

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii.

July 3, 1985  

Mr. Gates:

The introduction of the threatened green turtle (Chelonia mydas) to the Mauna Lani Resort fishponds.

Thank you for your comments of June 4, 1985 on the above project. We appreciate the time and effort spent reviewing the Draft Environmental Impact Statement (DEIS). Following are our responses to specific concerns raised in your letter.

Comments: The introduction of the threatened green turtle (Chelonia mydas) to the Mauna Lani Resort fishponds.

Response: On June 7, 1985, I spoke with John Naughton of your staff to clarify the statement made in your letter. Mr. Naughton said that National Marine Fisheries Service staff verified the sightings of green turtles in the fishponds about a year ago. On June 7, I also spoke with Dr. Richard Brooks, who performed a survey of the Mauna Lani Resort fishponds in February 1985. Dr. Brooks said that he did not see any green turtles, but he did not rule out their possible current presence in the fishponds. Mauna Lani Resort, Inc. has since confirmed that there are live turtles living in the fishponds.

Comments: The necessity of obtaining a Department of the Navy (DON) Permit through the U.S. Army Corps of Engineers prior to direct development activities "in or affecting navigable waters".

Response: Mauna Lani Resort, Inc. has no current plans for such development activities. Should plans change, the applicant recognizes that a DON Permit may be required and that "a Federal EIS may also have to be prepared and submitted for review."

Sincerely,

R. E. Gates

cc: Mauna Lani Resort, Inc.
June 17, 1985

Ms. Anne L. Haines
Belt Collins & Associates
606 Coral Street
Honolulu, HI 96813

Dear Ms. Haines:

SUBJECT: Draft Environmental Impact Statement (EIS)
Revised Master Plan for Mauna Lani Resort
South Kohala, Hawaii

We have reviewed the subject EIS that proposes to develop approximately 1,430 acres of land in South Kohala with 3,000 hotel rooms, 1400-1600 low-rise multi-family units; 140 to 180 houses and house lots; 2 golf courses and $1 to $2 acres for commercial use and auxiliary services.

The following comments are submitted for your consideration:

1. Page 1-1, Paragraph 2, line 8 should read --- two golf courses in lieu of ... two golf holes.

2. We understand that the water supply and distribution system for the area will be public. However, the waste water treatment plant and underground connection system is privately operated.

Should HUD-FHA programs be considered in future developments, the private sewer system must comply with HUD Handbook 4093.12 REV.

We appreciate the opportunity to review the EIS and look forward to receiving a copy of the Final EIS.

Sincerely,

[Signature]
Robert E. Flowers
Manager, 9.25

cc: B. James

Belt Collins
& ASSOCIATES
Engineering & Planning
Landscape Architecture

July 3, 1985

85-1198

Mr. Robert F. Fukuda, Manager, 9.25
U.S. Department of Housing and Urban Development
Honolulu Area Office, Region IX
300 Ala Moana Boulevard, Room 3318
Honolulu, Hawaii 96814

Dear Mr. Fukuda:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of June 17, 1985. -- Letter No. 85-248 -- in your reference system -- acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort. We appreciate the time you and your staff spent reviewing the document. Following are our responses to your two comments.

Comments:

1. Your letter states: “Page 1-1, Paragraph 2, line 8 should read — Two golf courses in lieu of — two golf holes.”

Response: The following sentence in the text of the EIS is correct: “Mauna Lani Resort, Inc. has also submitted a Conservation District Use Application (CDUA) to the State Board of Land and Natural Resources for permission to construct two golf holes and a public shoreline park and to establish the Puako Petroglyph Archaeological Park on a portion of the 779 acres that it leases from the State of Hawaii.”

A CDUA is not needed to construct the remaining 16 holes of the new golf course, which are already in urban designated lands or in lands for which urban designation is being requested of the State Land Use Commission. See Figures 5-3 and 11-4 for the siting of the two golf holes in the Conservation District.

2. Your letter states: “In the case of HUD-FHA housing programs, private sewer systems must comply with HUD Handbook 4093.12 REV.”

Response: As stated in the Draft Environmental Impact Statement, "The Mauna Lani Resort, as the other Kohala coast resorts, is served by a privately-operated wastewater treatment plant and underground connection system. The system was constructed by Mauna Lani Resort, Inc., which continues to operate the facility." (page 11-4)

The wastewater treatment plant serves all future Mauna Lani Resort residential projects supported by HUD-FHA programs, and the applicant must comply with all relevant HUD-FHA regulations then required and make any changes to the plant as needed. In
July 3, 1985
85-1178

To Mr. Robert K. Fukuda, Manager, R.25

June 21, 1985, I was informed by Frank Johnson of your staff that the
aforesaid HUD Handbook 4073.12 REV. has been cancelled
and therefore need not be considered.

Sincerely,

Anne L. Mapes

ALM

cc: Mauna Lani Resort, Inc.
United States Department of the Interior
FISH AND WILDLIFE SERVICE
BILL, DUNLAP & ASSOCIATES
MAY 2, 1985

Ms. Esther Ueda
State of Hawaii Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

JUN 2, 1985

Re: Draft Environmental Impact Statement (DEIS) for the Revised Master Plan for the Nauna Lani Resort, South Kohala, Hawaii

Dear Ms. Ueda:

The U.S. Fish and Wildlife Service has reviewed the referenced DEIS and offers the following comments for your consideration.

General Comments

The DEIS adequately describes the anchialine pond, nearshore marine, botanical, and wildlife resources in the affected area. The section on the anchialine pond resources is particularly interesting because it documents the decrease in the endemic anchialine shrimp fauna in certain ponds with the introduction of exotic fish.

Specific Comments

a. Section 1.6, Page IV-11. "Category 2" should be replaced by "Resource Category 1."

b. Section 1.6. The Final EIS should include an update on the status of the anchialine pond shrimps. The Service recently requested that the shrimps Metabatesus lohena, Pseudocaris hawaiiensis, and Palaeonellus burchii be placed on the annual investigatory Notice of Review update as Category 2 species. A Category 2 rating is for those species which probably should be listed as endangered or threatened, but for which sufficient information is not presently available to biologically support a proposed rule. The shrimp Haematopus rubra was referred to the National Marine Fisheries Service since the shrimp is commercially sold. Only H. rubra and M. lohena have been recorded from the Nauna Lani Resort area.

For your information, the term "Resource Category 1" refers to an habitat designation category under the Service's Mitigation Policy while the term "Category 2" refers to a species' endangered or threatened status under the Endangered Species Act.

Summary Comments

The purpose of the DEIS is to support a request to redesignate 143 acres of land from Conservation to Urban. This boundary change would allow Hotel 4 to be constructed at Honokaa Bay. An anchialine pond is located at this site and may be affected by the proposed hotel construction.

The Service recommends that the zoning change for this site be held in abeyance until a regional policy dealing with the anchialine pond resources can be formulated. This policy will guide development in coastal areas that contain anchialine ponds. The Service looks forward to assistance from the Nauna Lani Resort in this policy formulation in the near future.

We appreciate this opportunity to comment.

Sincerely yours,

Ingrid Aoki
Project Leader
Office of Environmental Services

cc:
DO, FWS, Portland, OR (AMR)
DEIS - HPPD
EPA, San Francisco
HDFAG
HDB
Nauna Lani Resort, Mr. Roger Harris
Belt, Collins, and Associates, Ms. Anne Hayes
CH, Mike Lee
Mr. Ernest Kusaka, Project Leader  
Office of Environmental Services  
Fish and Wildlife Service  
U.S. Department of the Interior  
P.O. Box 50167  
Honolulu, Hawaii 96850

Dear Mr. Kusaka:

Environmental Impact Statement (EIS) for the  
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 21, 1983 on the Draft Environmental Impact Statement (DEIS) for the proposed revised master plan for Mauna Lani Resort, addressed to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you and your staff spent reviewing the document.

Comments on Replacement of "Category 2" to "Resource Category 1."
Response: "Category 2" on page IV-11 of the DEIS will be changed to "Resource Category 1" in the final EIS.

Comments on Update on the status of the anchialine pond shrimp:

b. The final EIS will include an update based on the information you provided in your letter.

The other, more general comments in your letter will be considered in the preparation of the final EIS.

Sincerely,

Anne L. Mapes

ALM11

cc: Mauna Lani Resort, Inc.
Ms. Esther Ueda  
State of Hawaii Land Use Commission  
335 Merchant Street; Room 104  
Honolulu, Hawaii 96814

Dear Ms. Ueda:

Subject: Draft EIS for Mauna Lani Resort  
Kahaluu, South Kohala, Hawaii

The staff of the U.S. Geological Survey, Water Resources Division, Hawaii District Office, has reviewed the above report and has no comments to make at this time.

We appreciate the opportunity to review this document and we are returning it for your future use.

If we can be of further service, please don't hesitate and call us at 586-8331.

Sincerely,

Stanley F. Kopustka  
District Chief

Enclosure

cc: Mr. Roger Harris, Project Planner, Mauna Lani Resort, Kailua, HI  
M. Anne L. Mapes, Bell Collins & Associates, Honolulu, HI

Mr. Stanley F. Kopustka  
District Chief  
U.S. Department of the Interior  
Geological Survey  
Water Resources Division  
P.O. Box 30168  
Honolulu, Hawaii 96825

Dear Mr. Kopustka:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of May 28, 1985 to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission acknowledging receipt of the Draft Report. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

Anne L. Mapes  
ALMi

ccc: Mauna Lani Resort, Inc.
Dear Mr. Ueda:
The Fourteenth Coast Guard District has reviewed the draft revised final Environmental Impact Statement, for the Nauna Lani Resort, South Kohala, Hawaii and has no objection or constructive comments to offer at this present time.

Sincerely,

[signature]
Commander, U.S. Coast Guard
District Planning Officer
By direction of Commander,
Fourteenth Coast Guard District

Copy to: (1) Roger Harris, Project Planner
(2) Belt Collins & Associates

cc: Nauna Lani Resort, Inc.

Commander J.F. Milbrand
District Planning Officer
U.S. Coast Guard
Fourteenth Coast Guard District
300 Ala Moana Boulevard
Honolulu, Hawaii 96810

July 3, 1983
83-1188

Environmental Impact Statement (EIS) for the Proposed Expansion of Nauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of May 30, 1983 to Mr. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission -- Letter No. 1072, Serial No. 33/29 in your reference system -- acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Nauna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

[signature]
Anne L. Mapes

U.S. Coast Guard
Mr. Esther Ueda  
State of Hawaii Land Use Commission  
335 Merchant Street, Room 104  
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft EIS for Mauna Lani Resort

We have reviewed the subject document and have no comments to offer.

Very truly yours,

TESUANE TOMINAGA  
State Public Works Engineer

CT:

cc: Mr. Roger Harris  
Mrs. Anne L. Mapes

Mr. Tesuane N. Tominaga  
State Public Works Engineer  
Department of Accounting & General Services  
Public Works Division  
1133 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Mr. Tominaga:

Environmental Impact Statement (EIS) for the  
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of July 1, 1983 -- Letter (P) 1329.5 in your reference system -- acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

TESUANE TOMINAGA  
State Public Works Engineer

ALWelf  
cc: Mauna Lani Resort, Inc.
MEMORANDUM

To: Mr. Esther Ueda, Executive Officer
   Land Use Commission

Subject: Draft Environmental Impact Statement (DEIS)
          for Mauka Lani Resort (MLR)

The Department of Agriculture has reviewed the subject document and offers the following comments.

Our previous comments on the Environmental Impact Statement Preparation Notice (January 21, 1985; DEIS, page XII-46) indicated two major areas of concern.

The present and planned potable water sources, along with quantities available and the MLR’s requirements are discussed (DEIS, page IV-115). What impact this groundwater withdrawal will have on water availability from nearby water sources for other uses should also be detailed.

We note the DEIS states that the MLR plan is generally consistent with the Hawaii County General Plan (DEIS, page C-25). The DEIS also reviews relevant sections of the North Kohala Community Development Plan and the Kona Regional Plan as they relate to the MLR (DEIS, page V-27). The DEIS (pages IV-68 to 72) states that “operational employee housing” needs are expected to be met on the open market but that some would be “provided by or supported by MLR.” We note that housing studies will be undertaken when each hotel site is developed.

Specific information on the amount and location of housing and the impact this may have on surrounding communities and agricultural lands should be provided.

Thank you for the opportunity to comment.

Jack K. Suga
Chairman, Board of Agriculture

cc: Mr. Roger Harris, Mauka Lani Resort
    Ms. Anne L. Hayes, Belt, Collins & Associates

BELT, COLLINS
& ASSOCIATES
Engineering, Planning
Land Use/Planning

July 3, 1985

Mr. Jack K. Suga, Chairman
Board of Agriculture
State of Hawaii
Department of Agriculture
1928 South King Street
Honolulu, Hawaii 96814

Dear Mr. Suga:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauka Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 20, 1985 on the Draft Environmental Impact Statement (DEIS) for the proposed master plan for Mauka Lani Resort, addressed to Mr. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you and your staff spent reviewing the document. Following are our responses to your comments.

Comments: Impact of MLR groundwater withdrawal on water availability from nearby water sources for other uses.

Response: Groundwater withdrawal to accommodate planned facilities at Mauka Lani Resort is expected to have potential impacts on nearby waters sources; these potential impacts will be discussed in the final EIS.

Comments: Amount and location of operational employee housing and the impact on surrounding communities and agricultural lands.

Response: Specific information on the amount and location of future employee housing is not currently available. It is expected, however, that housing will be located in the Kohala area. Employee housing to be provided by Mauka Lani Resort, Inc., is expected to be required as part of the hotel project.

It is anticipated that some agricultural lands in the region will be converted to urban use to accommodate employee housing. Most likely there will be only slight loss of agricultural production due to the acreage of lands in agricultural production in the region.

Sincerely,

Anne L. Hayes
cc: Mauka Lani Resort, Inc.
Ms. Letitia Uyehara, Director
Office of Environmental Quality Control
550 Kamehameha Street, Room 301
Honolulu, Hawaii 96813

June 2, 1983

Mr. Francis M. Hatanaka
Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96809

Dear Mr. Hatanaka:

The Department of Education has no additional comments to offer on the
subject EIS.

We do thank you, however, for the opportunity to review the project.

Sincerely,

Francis M. Hatanaka
Superintendent

cc: V. Honda, OHS
    K. Mizuba, Hawaii Dist.

AN EQUAL OPPORTUNITY EMPLOYER
Ms. Esther Ueda  
June 21, 1985  

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P. O. Box 2029  
Honolulu, Hawaii 96820

June 21, 1985  

Ms. Esther Ueda  
State of Hawaii Land Use Commission  
335 Merchant St., Room 15A  
Honolulu, Hawaii 96813  

Dear Ms. Ueda:

Subject: Request for Comments on Draft Environmental Impact Statement (EIS) for Mauna Lani Resort, Kohala, Hawaii

Thank you for allowing us to review and comment on the subject proposed EIS. We provide the following comments for your consideration:

Wastewater

Any future expansion of the wastewater facility must conform to Chapter 362, HRS.

Drinking Water

The discussion on page IV-112 regarding potable water appropriately describes the current use and future demand for potable water if the development were to be built as proposed. The discussion can be improved by providing a discussion on:

a. the general location of the proposed new wells; and
b. who will be responsible for the proposed well construction and operation.

The above information will be useful to assess any possible groundwater contamination cases, as well as assess operational cost to the government sector should the water system be operated by the county government.

In addition to the above information on agency approvals, pages I-8 and I-9 should include our requirements for reviewing new drinking water system improvements.

The Department of Health is vested with the responsibility to assure that public water systems in the State are providing water which is in compliance with the State’s drinking water regulations known as Chapter 20, Title II, Administrative Rules, and are in compliance with all other applicable terms and conditions of Chapter 20. A public water system is defined as a system serving 25 or more individuals at least 60 days per year and having a minimum of 10 service connections. In the event that the new well is intended to serve more than minimum numbers of persons or service connections, please be advised that the well and distribution system will be subject to the terms of Section II-20-29 and Section II-20-30 of Chapter 20 respectively.

Briefly, Section II-20-29 of Chapter 20 requires all new sources of potable water serving public water systems are approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set down in Section II-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section II-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance with all maximum contaminant levels as set down in Chapter 20 once the distribution system or modification is completed.

In the event the proposed well is solely intended to serve irrigation or other non-domestic purposes, or if the proposed well will not serve the minimum number to qualify as a public water system as defined earlier, then the new well and distribution system are not subject to Chapter 20 requirements. However, if at some point in the future, the decision is made to use the water for potable purposes, or if the system expands to meet the minimum service population or number of service connections, the source and distribution system will be subject to Section II-20-29 and Section II-20-30 respectively prior to their use to serve the new public water system.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

MELVIN K. KOIZUMI  
Deputy Director for  
Environmental Health

cc: Mr. Roger Harris  
Ms. Anne L. Matsumoto  
DOHSA, Hawaii
Mr. Melvin E. Kozumpl
Deputy Director for Environmental Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Kozumpl:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 21, 1983 on the Draft Environmental Impact Statement (DEIS) for the proposed revised master plan for Mauna Lani Resort, addressed to Mr. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you and your staff spent reviewing the document.

Comments: The general location of proposed new potable water wells and responsibilities for their construction and operation.

Response: The well sizes chosen run in a north south direction at about the 1,150 to 1,200-foot elevation extending from Lalamilo "B" well to Kamahoa Gulch. All wells will be built by the developer to Department of Water Supply standards and dedicated to that agency.

Comments: Need to include requirements for reviewing new drinking water system improvements on list of agency approvals.

Response: The list of necessary approvals and permits in the final EIS will include Department of Health approvals.

Sincerely,

Anne L. Mapes

ALM hf

cc: Mauna Lani Resort, Inc.
Ms. Anne L. Mapes  
Belt, Collins & Associates  
600 Coral Street  
Honolulu, Hawaii 96813

Dear Ms. Mapes:

The Department of Labor and Industrial Relations has received the draft environmental impact statement (EIS) for the proposed Mauna Lani Resort (MLR) expansion in South Kohala. We realize the impact such a large project like MLR will have on demands for human resources during both the construction period as well as the operational period. The department will be happy to assist in recruiting job applicants to fill these demands through our various employment and training agencies.

Thank you for providing us the opportunity to review the revised master plan.

Sincerely,

Joshua C. Agabid  
Director of Labor and Industrial Relations

---

Mr. Joshua C. Agabid, Director  
Department of Labor and Industrial Relations  
State of Hawaii  
333 Iwilei Road  
Honolulu, Hawaii 96813

Dear Mr. Agabid:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of June 7, 1983 acknowledging receipt of the draft Environmental Impact Statement for the proposed revised master plan for the Mauna Lani Resort. We appreciate the time you and your staff spent reviewing the document and your department's offer of assistance during future hiring for individual projects at the resort.

Sincerely,

Anne L. Mapes

ALMll

cc: Mauna Lani, Inc.
RECEIVED
JUN 2 1985
DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

Ref. No. P-1160

June 18, 1985

Ms. Esther Ueda
Land Use Commission
State of Hawaii
535 Merchant Street
Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft EIS for Moomu Lani Resort, South Kohala, Hawaii

We have reviewed the subject draft EIS and have the following comments to offer for your consideration and action.

1) The draft EIS has not adequately assessed the relationship of the proposed project to the Hawaii State Plan, Part I (Goals, Objectives and Policies) and Part II (Priorities and Actions). We do not believe the index reference provided on page 71 reflects an adequate effort to review relevant policy statements and describe new specific proposed actions that are supportive or contrary to adopted State policy statements pursuant to Chapter 68, HRS, as amended.

2) The draft EIS gives a brief description of the project schedule on page 11-27. It states that the golf course expansion, the proposed public beach park north of Mook Lani I II, the infrastructure and a substantial number of resort and residential units are expected to be complete within ten years. The draft EIS should address the issue of incremental development as provided in Section 6-2 of the State Land Use Regulations.

3) The draft EIS states on page 4-8 that the projected number of employees who may be required to provide retailing services will increase from about 100 in 1990 to over 300 in the year 2000 under either the existing or revised master plan. It states that demand would be greatest from on-site residents. According to page II-1, Moomu Lani I II, Inc., is presently working with the Hawaii County Planning Office and the County Council to develop and implement an employee housing action plan. The draft EIS should elaborate on this action plan and coordinate with the State Housing Authority.

4) With regard to Hawaii Coastal Zone Management Program, we have the following comments to offer.

Institutional Resources

The draft EIS indicates that some on-site public access will be provided at each and of the Moomu Lani Resort with connecting lateral access along the shoreline. The revised master plan proposes a beach park near Puako Bay. It also proposes access with parking at Hualalai Resort, the purpose of which is unclear at this time. Since a "future beach club" is indicated in the plan (Figure 11-19), it is not clear whether the parking and access is for an existing beach or for the proposed beach club.

In addition, since the proposed public beach park near Puako Bay appears to be the major public facility, we believe that adequate public parking space would be provided. The draft EIS indicates that 1,500 will be provided, with 17 additional spaces provided at some unspecified time in the future. Additional spaces would appear to be necessary to accommodate the public at both the proposed waterfront and recreational areas.

Historic Resources

Recent archaeological surveys have identified significant sites in these areas proposed for resort expansion. We, therefore, recommend that proposals for reclamation and park management as coordinated with the State Historic Preservation Officer.

Coastal Considerations

The draft EIS addresses impacts on existing lagoons, fish ponds, and nearshore waters from runoff and siltation during and after construction. The impacts were assessed primarily by reference to those of earlier construction activity in the area. These assessments, particularly those reported by Foster, should be provided as reference documents for the final EIS.

In general, we find that the draft EIS addresses the potential impacts of the proposed activity on identified coastal resources, with the exception of those noted above. Given the correct on page 7 to the effect that "only the difference to effects between the two plans is of consequence to decision makers, the discussion of alternatives to the proposed action is very limited. A discussion of EIS policies relative to economic use and the management or development of coastal alternatives, for example, would be helpful to decision makers on land use planning and regulatory matters.
Mr. Kent M. Keith, Director
Department of Planning and Economic Development
State of Hawaii
P.O. Box 2239
Honolulu, Hawaii 96814

Dear Mr. Keith:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 18, 1983 on the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort, submitted to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you and your staff spent reviewing the document. Following are our responses to your comments in the order that they appear in your letter.

Comments: Relationship of the proposed project to the Hawaii State Plan, Part I (Goals, Objectives and Policies) and Part III (Priority Directions).

Responses: The final EIS will review relevant policy statements and describe how the proposed project relates to these statements.

Comments: Incremental districting, as provided in Section 6-2 of the State Land Use Regulations.

Responses: The issue of incremental districting will be addressed more fully in the final EIS.

Comments: Operational period employee housing demand.

Responses: As stated in the DEIS, "Mauna Lani Resort, Inc. is presently working with the Hawaii County Housing Authority, the County Planning Department, and the County Council to develop and implement an employee housing action plan." (Page 11-1). Mauna Lani Resort, Inc. has also held talks with the State Hawaii Housing Authority, although specific action has not yet been discussed.

Mauna Lani Resort, Inc.'s housing action plan is centered around the goal of working toward increasing the supply of housing in the region. The final EIS will contain a discussion of Mauna Lani's proposed course of action concerning housing.

Comments: Hawaii Coastal Zone Management Program, Recreational Resources: public parking at Hualalai Bay and at Puako Bay.
Responses: With regard to your comment on parking and access at Honoka'apo Bay (in Figure 11-9), see page 5-11 for a statement on public parking and access. The future beach club will have parking associated with it, separate from the public parking. Please note that Figure 11-9 is a schematic plan that shows only the general placement of planned amenities, including 20 public stalls at Honoka'apo Bay.

With regard to your comment on the need for additional parking spaces at the public shoreline park near Pa'aua Bay, the current plan provides for 29 stalls. Should it become apparent that parking is inadequate to accommodate visitors to the beach park, 11 additional stalls will be constructed by Mauna Lani Resort, Inc. The 25 stalls at Pa'aua Bay are planned to accommodate the public at the shoreline park. Separate parking for 8 vehicles will be provided near the entrance to the petroglyph fields, north of the mouth of the two golf holes proposed for the leased land north of Pa'aua Bay. Thus, total planned parking in the area amounts to 36 stalls for public use.

In the long term, should more parking be required, ample space for such use is available near the public shoreline park.

Comments: Hawaii Coastal Zone Management Program, Historic Resources: coordination of restoration and park management with the State Historic Preservation Officer.

Responses: Your recommendation that proposals for restoration and park management be coordinated with the State Historic Preservation Officer will be followed. Contact with the State Historic Preservation Officer has already been initiated with regard to the management of cultural resources at Mauna Lani Resort.

Comments: Hawaii Coastal Zone Management Program, Coastal Ecosystems: Impacts of runup and sitation, as reported in studies of the area.

Responses: As requested, copies of previously completed studies used in the preparation of the DRIIS will be transmitted to your department for use in reviewing the final EIS.

Comments: CZM policies relating to economic use and the management of development.

Responses: The discussion of CZM policies in the final EIS will include the "in-project" alternatives. Other alternatives will not be considered since those are alternatives that were considered but rejected as infeasible (see Chapter III: Alternatives to the Proposed Action).

Sincerely,

[Signature]
Anne L. Mapes

ALAMIF

cc: Mauna Lani Resort, Inc.
BEIL COLINS & ASSOCIATES
Engineering + Planning
Landscape Architecture

July 3, 1985
85-1200

Mr. Wayne J. Yamasaki, Director
Department of Transportation
State of Hawaii
609 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Yamasaki:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 18, 1985 on the above project, addressed
to Ms. Esther Ueda, Executive Officer of the State Land Use Commission. We appreciate the time you and your staff spent reviewing the Draft EIS.

The EIS will be revised to incorporate the following:

Comments: Identification of improvements proposed for the Mauna Lani Drive-Queen Kaahumanu Highway intersection.

Responses: Possible improvements to the intersection will be identified in the EIS. However, the specific improvements to be implemented cannot be precisely characterized during this early planning stage.

The EIS will also reflect your concern for coordination with the Highways Division in planning intersection improvements, the allocation of costs of the intersection improvements, and the lack of available Highways Division funds to widen Queen Kaahumanu Highway.

Sincerely,

Ann L. Mapes

ALM/II

cc: Mauna Lani Resort, Inc.
June 20, 1985

Ms. Esther Ueda
Executive Director
Land Use Commission
333 Merchant Street, Room 104
Honolulu, Hawaii  96813

Dear Ms. Ueda:

Subject: Draft EIS for Wauna Lani Resort

We have reviewed the Wauna Lani Resort draft EIS and offer the following comments.

1. The Wauna Lani Resort site includes a number of anhialine ponds which contain unique aquatic life forms. Significant degradation of the anhialine ponds have taken place since 1972. Several of the ponds identified in 1972 could not be located in 1985. This indicates that adequate precautions have not been taken to preserve the anhialine ponds and further degradation of the ponds will take place if the expansion of Wauna Lani Resort is allowed without the adoption of mitigating measures.

2. We understand that there are a vast number of archaeological artifacts in the area and some sites will be destroyed as a result of the expansion of the resort. We suggest that the Department of Land and Natural Resources' Historic Sites Division be contacted to resolve any questions and problems relating to archaeology prior to the commencement of the project.

Should you have any questions regarding our comments, please do not hesitate to call.

Sincerely,

Letitia M. Uyehara
Director

cc: Roger Harris, Wauna Lani Resort
Anne Mapes, Belt, Collins & Associates
July 3, 1983
85-1206

Ms. Leititia N. Uyehara, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauila Street, Room 201
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 20, 1983 on the Draft Environmental Impact Statement (DEIS) for the proposed revised master plan for Mauna Lani Resort, addressed to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you and your staff spent reviewing the document.

Comments: Mitigation measures to avoid degradation of anchialine ponds at Mauna Lani Resort.

Responses: We recognize that the biological uniqueness of some of the ponds has decreased due to the introduction of two exotic fish species. In his report, Dr. Richard Brocks states that the apparent loss of some of the ponds between 1972 and 1983 is probably due to observation error during earlier surveys as well as to natural fluctuation. Mauna Lani Resort, Inc. states that none of the ponds surveyed in 1972 had been filled in as a result of construction activity.

With increased development and improved public access to the ponds, there will be increased opportunity for the introduction of exotic species. To avoid adverse impact on the ponds, mitigation measures will be considered, including those proposed by Brooks: eradication of unwanted species, reseeding of ponds with desired species, the creation of new anchialine ponds, and implementation of an educational plan for residents and visitors.

Comments: Consultation with the Department of Land and Natural Resources, Historic Sites Division.

Responses: The Department of Land and Natural Resources, Historic Sites Division has determined that no archaeological studies completed to date are adequate for informational purposes. It is probable that sites not yet identified will be located as planning work continues at Mauna Lani Resort. When such sites are found, the developer will contact both the State Historic Sites Division and the Hawaii County Planning Department. The course of action to be taken will then be decided collectively.

Sincerely,

Anne L. Mapes

ALM-29

CC: Mauna Lani Resort, Inc.
June 3, 1985

Ms. Anne Hapes
Belt, Collins and Associates
606 Coral Street
Honolulu, HI 96813

Thank you for the opportunity to comment on the proposed expansion of Mauna Lani Resort. The expansion proposes to develop the resort at a lower density and with more recreational amenities. This requires an increase in the State Land Use Urban District boundary from 278.5 to 314.42 acres.

Recreational amenities play an integral part in attracting visitors to a resort development. The increase in recreational amenities includes a second golf course, a public shoreline park, and additional open space and recreational areas. Mauna Lani Resort, Inc. is seeking to enhance its reputation as a resort centered around golf.

The development of luxury properties along the South Kohala coastline has changed the complexion of the area into a major resort destination. These developments will result in substantial increases in employment opportunities and economic activities for the communities of West Hawaii. Further, these developments would expand the County's economic base by providing recreational opportunities and stimulating housing development and general business activities.

Past experience with Mauna Lani Resort, Inc. have shown that the developers are committed to project designed to protect the environment and preserve archeological and historic sites. The caliber of this commitment will also give the South Kohala properties the recognition which may parallel further developments.

We believe that the project is in consonance with the type of development the Council has envisioned for the area. In closing, I would like to express my support for the proposed expansions to Mauna Lani Resort.
June 4, 1985

Ms. Esther Ueda
State of Hawaii Land Use Commission
335 Merchant Street, Room 104
Honolulu, HI 96813

Subject: Draft EIS for Mauna Lani Resort
Kahalupe'a, South Kohala, Hawaii

We have been involved in the review of the various planning phases of
the project and have had our concerns/comments resolved.

Thank you for the opportunity to review the final draft of the EIS.

Pat Engelhard
Director

cc: Mr. Roger Harris
    Ms. Anne Napes

(EIS being returned to Office of Environmental Quality Control)

Ms. Pat Engelhard, Director
Department of Parks and Recreation
County of Hawaii
335 Aquidneck Street
Hilo, Hawaii 96720

Dear Ms. Engelhard:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of June 4, 1985 to Ms. Esther Ueda, Executive Officer
of the State of Hawaii Land Use Commission acknowledging receipt of the Draft
Environmental Impact Statement for the proposed revised master plan for Mauna Lani
Resort. While your agency had no comments, we do appreciate the time you and your
staff spent reviewing the document.

Sincerely,

Anne L. Mages

cc: Mauna Lani Resort, Inc.
Mr. H. William Sewake, Manager  
Department of Water Supply  
County of Hawaii  
23 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. Sewake:

Environmental Impact Statement (EIS) for the  
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of May 29, 1983 to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

Anne L. Mapes

Mr. William Sewake  
Manager

cc: Mr. Roger Harris, Mauna Lani Resort  
Ms. Anne L. Ueda, CFA, Collaborative Associates

Hilo, Hawaii 96720  

... Water brings progress...
May 30, 1985

Ms. Anne L. Mapes
Belt, Collins & Associates
666 Kapiolani Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Subject: Draft Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

The Hawaii County Fire Department's concerns are adequately addressed in the EIS. We have no further comments at this time.

Thank you for giving us the opportunity to review it.

Sincerely,

FRANCIS E. SMITH
FIRE CHIEF
FES/200

BELT, COLLINS & ASSOCIATES
Engineering - Planning
Landscaping - Architecture

July 3, 1985

Ms. Francis E. Smith, Chief
Hawaii County Fire Department
666 Kapiolani Street
Hilo, Hawaii 96720

Dear Ms. Smith:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of May 30, 1985 acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

Anne L. Mapes

ALMAIIF
cc: Mauna Lani Resort, Inc.
June 21, 1985

Ms. Esther Ueda
State Land Use Commission
325 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Thank you for the opportunity to review this draft EIS. Our comments, referenced by page, follow:

Page II-32, Item 3.2.2.1. The provision, and recent inclusion on all maps of the public shoreline access, the shoreline trail, and the proposed development of public parks facilities for both the north and south ends of the resort development are notable inclusions in this draft EIS.

Page II-11, Item 3.2.2.4. It is noted that there has been a change in the description of the park site from "public beach park" to "public shoreline park." The change is a more accurate description.

Page IV-19, Item 4.10. We make special note that Naulani Lani plans to continue the policy of preserving and in some cases enhancing the anemoneine ponds on the property.

Page IV-72, Item 2.2.4.2. There is a need to justify the statement that "long term housing needs are expected to be met on the open market and through existing and planned housing provided by or supported by Naunani Lani in future years."

Page IV-112, Item 6.1. Public school facilities can become overcrowded by the addition of even a handful of students since the number of students per classroom is strictly limited by law. Additionally, the Department of Education (DOE) will very likely have to provide public transportation or cash subsidies for the housing of public school students to and from school daily. We note that the DOE was not included in the distribution of this draft EIS and we believe the school projections portrayed in this document need to be reviewed by that agency.

Page IV-115, Item 6.4. A development occurring after the printing of this draft EIS is the offer by the Kohala Coast Resort Association to fund the full construction of a new 24-hour fire station and fire fighting equipment (except emergency medical service vehicle) on land described in this section. The County would be responsible for all personnel and administrative and operational costs. Funding would be through the floating of bonds by the County; the retirement (repayment) of the bond would be by the association.

Page IV-115, Item 6.4. It would be appropriate to assess the direct, indirect, and tertiary impacts of the project with respect to population, housing, and labor force availability. These changes are presently incomplete and should be revised.

The population considered is on-site residents and visitors while the off-site impact is limited to projected in-migrants who will be working at the resort. Secondary and tertiary population impacts are not indicated. This approach does not account for the significant impact that a resort of this magnitude will have on the growth of West Hawai'i. The workers employed, whether local in origin or otherwise, will all reside on the island as well as their dependents. From this group there will also be associated a demand for housing which is not sufficiently addressed in the draft.

Sincerely,

[Signature]

Albert Long Chu
Planning Director

cc: Roger Harris
Anne Waple
Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 21, 1983 on the Draft Environmental Impact Statement (DEIS) for the proposed master plan for Mauna Lani Resort, addressed to Mr. Lester Ueda, Executive Officer of the State of Hawai'i Land Use Commission. We appreciate the time you and your staff spent reviewing the document.

Comments: Long term housing needs to be met on the open market and through employee housing provided by Mauna Lani Resorts, Inc.

Responses: As stated in the DEIS, Mauna Lani Resorts, Inc. expects to have housing studies performed as each hotel site is developed, to more accurately estimate employee housing needs given current market conditions.

Comments: DOE review of school projections in the DEIS for Mauna Lani Resort.

Responses: The DOE was sent copies of both the EIS Preparation Notice and the Draft EIS; the agency responded to both. Superintendent Francis Nakasaka's response of January 3, 1983 to the Preparation Notice (see copy of letter in the DEIS, page XII-49) contained comments which were used by Peets, Marwick, Mitchell & Co. to project the number of additional students expected as a result of development at Mauna Lani Resort. Mr. Nakasaka had no further comments after his department's review of the Draft EIS. During the preparation of the DEIS, Peets, Marwick staff also contacted the Facilities Branch and the Student Information Services Branch of the DOE. The educational facilities analysis is partially based on the information thus obtained.

Comments: The likelihood of public transportation or cash subsidies to be provided by DOE to bus public school students to and from school.

Responses: I called Mr. Herbert Watanabe of the Hawaii District Office of the DOE on June 28 to inquire about DOE policy concerning transportation of public school students. Mr. Watanabe confirmed that students living one mile or more from the nearest public school are provided transportation to and from school if the students have access to an established bus route. Parents of those who do not are reimbursed for car mileage. Details are contained in the final EIS.
June 5, 1985

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

RE: Draft Environmental Impact Statement (DEIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

The copy of the DEIS for the above project has been reviewed and from the police standpoint, we foresee no adverse effects from the requested land use.

[Signature]
Chief of Police

cc: S. Kohala Police

July 3, 1985

Mr. Guy A. Paul, Chief
Police Department
County of Hawaii
349 Kapohakai Street
Hilo, Hawaii 96720

Dear Mr. Paul:

Environmental Impact Statement (EIS) for the Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of June 5, 1985 acknowledging receipt of the Draft Environmental Impact Statement for the proposed revised master plan for Mauna Lani Resort. While your agency had no comments, we do appreciate the time you and your staff spent reviewing the document.

Sincerely,

[Signature]
Anne L. Mapes

cc: Mauna Lani Resort, Inc.
Ms. Esther Ueda
Land Use Commission
225 Merchant Street, Room 104
Honolulu, Hawaii 96813

June 24, 1985

Dear Ms. Ueda,

The above cited Draft EIS for the development of a resort hotel complex at South Kohala, Hawaii, has been reviewed by the Environmental Center. Since the due date for comments on this EIS occurred on a Saturday, we requested and received an extension to today's date for submission of our comments.

In general, our reviewers have found this document to be well written and quite comprehensive. In particular, we were pleased to note the incorporation of our comments, submitted during the consultation period, to the body of the document. So often comments submitted during the preparation stage are merely responded to by separate letter, a procedure which greatly weakens the purpose of the consultation period.

It is a pleasure to review a draft EIS where the letter and intent of the EIS system has been so thoughtfully pursued.

The following reflect the specific comments provided by our reviewers.

Historic and Archaeological Resources (Section IV-39 to IV-41)

The draft EIS appears to address satisfactorily the potential impacts on archaeological sites in the proposed development area. The document reports accurately the results and recommendations of the survey that was conducted for Mauna Lani Resort last fall by David Walsh and the Environmental Center. We are pleased to note that the Draft EIS states that further archaeological surveys will be conducted as specific site plans become available and that such surveys will be provided for the Puako petroglyphs when they are opened for easier public access. As long as these steps, and those recommended in the Science Management, Inc. preservation plan, are carried out, the adverse impacts to sites in the area will be mitigated and those sites of greatest value will be preserved.
Mr. Daik C. Cox, Director
Environmental Center
University of Hawaii
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Cox:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauka Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 28, 1985 on the Draft Environmental Impact Statement (DEIS) for the proposed revised master plan for Mauka Lani Resort, addressed to Ms. Esther Ueda, Executive Officer of the State of Hawaii Land Use Commission. We appreciate the time you, David Walsh, Jacqueline Miller, and Walting Yee spent reviewing the document.

Comments: Conservation land use designation of lands on the southern side of Honokohau Bay.

Responses: In South Kohala, the original 1964 land use district boundaries ran along the King's Trail through lava lands. The areas seaward of the trail were designated Conservation, as they were undeveloped and scenic. Gradually, these areas were planned for resort uses and brought into the Urban district at Puako, Mauka Lani Resort, and Waikoloa. The southern section of the Honokohau Bay area is the only section between Mauka Lani Resort and Waikoloa that remains in the Conservation district even though the entire area is designated for low density urban resort uses in the County General Plan. Over the years, there has been no public access to or use of this area. The current plan will ensure that the public will have access to the scenic shoreline at Honokohau Bay. There is much Conservation district scenic shoreline outside this resort region which will likely remain in the district well into the future, both to the south and north of the coastal resorts in South Kohala.

Comments: Tsunami runup height.

Response: The EIS will be corrected to read "the 10-year tsunami runup height."

Sincerely,

Alice L. Mapes

ALMil
cc: Mauka Lani Resort, Inc.
Mr. Esther Ueda
State of Hawaii Land
Use Commission
325 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Mr. Ueda

SUBJECT: Draft Environmental Impact Statement, Revised Master Plan
for Mauna Lani Resort, South Kohala, Hawaii, May 1985

We have reviewed the subject EIS and offer the following comment. In Sec. 8.6 (p. IV-117-118), it is stated that treated wastewater effluent is
used only for tree irrigation. In the future when effluent flow increases
beyond the needs of the nursery, what will be done with the surplus? And
what will be the environmental impact resulting from this action?

Thank you for the opportunity to comment. This material was reviewed
by WME personnel.

Sincerely,

Edwin T. Murabayashi
ES Coordinator

EWM: jm

cc: Roger Harris
     Anne Mapes

BELL, COLLINS & ASSOCIATES
Engineering * Planning * Landscape Architecture

Mr. Edwin T. Murabayashi
ES Coordinator
University of Hawaii at Manoa
Water Resources Research Center
Holman Hall 283
2400 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Environmental Impact Statement (EIS) for the
Proposed Expansion of Mauna Lani Resort, South Kohala, Hawaii

Thank you for your comments of June 18, 1983 on the Draft Environmental
Impact Statement for the proposed revised master plan for Mauna Lani Resort,
addressed to Mr. Esther Ueda, Executive Officer of the State of Hawaii Land Use
Commission. We appreciate the time you and your staff spent reviewing the
document.

Comments: Use of future increased volumes of treated wastewater effluent flow.

Response: It is expected that increased effluent flow will be mixed with brackish
to irrigate the Mauna Lani Resort golf courses. How this will be done and
potential impacts will be addressed in the final EIS.

Sincerely,

Anne L. Mapes

ALM:

cc: Mauna Lani Resort, Inc.
Market Analysis for Mauna Lani Resort

South Kohala District, Island of Hawaii
State of Hawaii

Prepared for
Mauna Lani Resort, Inc.
Mauna Lani Resort, Island of Hawaii

November 1984

Appendix A
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Qualifications of the Consultant and the Firm
I. ASSIGNMENT AND SUMMARY

A. Assignment

Our assignment has been to prepare a market analysis for the Mauna Lani Resort, located in the Kohala Coast Resort Region, District of South Kohala, County of Hawaii (Island of Hawaii), State of Hawaii. The results of this analysis are to be used to assist in land use planning and to aid in preparing a petition to the Hawaii State Land Use Commission for reclassification of selected lands.

B. Approach

Our approach has been to identify the primary markets that could be served by the entire resort. General economic trends were assessed, and projections made of likely visitor arrivals for the State and County. These projections in turn were converted into demand estimates for total transient accommodations, hotel rooms, resort multifamily units (in resort multifamily projects), resort subdivision households, golf course demand, commercial land use and resort support facilities.

The demand estimates were compared with existing and planned supply to formulate marketability conclusions for Mauna Lani Resort, taking into account its development philosophy of uncompromising quality.

C. Summary of Findings and Conclusions

1. The entire Kohala Coast Resort Region has been designated by the State of Hawaii and County of Hawaii in their various plans as a major resort area. Excellent climate, white sand beaches, accessibility and the present concentration of high-amenity, masterplanned, controlled-environment luxury and super-luxury resorts, combine to make Kohala Coast potentially the highest-quality resort region in the State.

2. Revisions are being proposed to the master development plan for Mauna Lani Resort to respond to a higher-than-anticipated golf course demand, and to better accommodate the lower development densities dictated by its development philosophy.

3. After two flat years for the State visitor industry in 1980 and 1981, visitor arrivals to the State increased 8 percent in 1982 and another 3 percent in 1983.

4. The County of Hawaii visitor industry as a share of state-wide activity declined from 1971 to 1982, before rebounding slightly in 1983. The estimated number of westbound visitors to the Island, the primary source of the County's visitor industry patronage, declined from 1978 to 1981 before reversing the decline in 1982 and continuing to rebound in 1983.

5. Despite the County-wide trends, visitor industry activity on the Kohala Coast has been spirited. Within the last three years, two high-amenity resorts opened championship golf courses and luxury or super-luxury hotels. As a result, in 1983, the number of transient accommodation units in North and South Kohala exceeded the number in Hilo for the first time. Also in 1983, North and South Kohala's share of the island's occupied units reached 22 percent, twice the estimated 11 percent recorded in 1980.

6. Continued development of high-quality resort amenities and accommodations, direct flights from the U.S. mainland west coast to Kona-Kohala Airport by United Airlines, cooperative advertising for the Kohala Coast Resort Region between the existing resorts and United Airlines (the largest carrier of westbound visitors to Hawaii), programs to promote neighbor island destinations by Japan Air Lines (the largest carrier of eastbound visitors to Hawaii) and increased promotions and marketing efforts by the new facilities on the Kohala Coast are expected to expand basic demand to the Region.

7. We estimate that net additional demand for transient accommodations in North and South Kohala in excess of the February 1984 inventory would be 2,200 units by 1990, 4,500 by 1995 and 6,500 by 2000.

8. Projected net additional demand for hotel units in Mauna Lani Resort would be 400 by 1990, 700 by 1995 and 900 to 1,100 by 2000. Published daily rates of $200+ are recommended.
9. Estimated net additional demand for low-rise resort
   multifamily units in Mauna Lani Resort would be
   400 units in 1990, 600 in 1995 and 1,400 to 1,600
   in 2000. Achievable average sale single prices
   are estimated to range from $350,000 to $650,000
   per unit in 1994 dollars.

10. New resort subdivision house lot demand for Mauna
    Lani is projected to be 25 lots in 1990, 50 in 1995
    and 70 to 90 in 2000. Achievable fee simple lot
    prices are estimated to average from $450,000 to
    $650,000.

11. Demand, numerically equivalent to the house lot
    forecasts, are projected to exist for detached
    house and lot packages in Mauna Lani. This would
    be 25 homes in 1990, 50 in 1995 and 70 to 90 in
    2000. Prices for the fee simple house and lot
    packages are projected to average from $600,000 to
    $1,600,000 in terms of 1994 dollars.

12. The net additional demand for golfing activity in
    Mauna Lani Resort is projected to be about 51,000
    annual rounds in 1990. This amount of play is not
    likely to be accommodated by other courses in the
    region. Thus, another high-quality championship
    golf course would be needed by the time the next
    hotel begins operations, and this second golf
    course is projected to be at its capacity by 1990.
    By 1995, we estimate that additional demand for
    golf would reach 92,000 annual rounds, and reach
    128,000 to 158,000 rounds by 2000. This indicates
    that a third golf course would be at capacity by
    1993, and a fourth by 2000.

13. Commercial land use demand is projected to be
    5 acres in 1990, 10 acres in 1995 and 16 to
    21 acres in 2000.

14. Auxiliary support uses would require an additional

15. Table I-1 summarizes our marketability conclusions
    for Mauna Lani Resort. The projected estimates
    represent cumulative demand in excess of the exist-
    ing February 1984 inventory.

Table I-1  PROJECTED MARKETABILITY

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<th>1990</th>
<th>1995</th>
<th>2000</th>
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<td>HOTEL ROOMS</td>
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<tr>
<td>LOW-RISE MULTIFAMILY UNITS</td>
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<td>200</td>
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<td>Mid-Quality</td>
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<tr>
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<tr>
<td>Higher-Quality</td>
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<td>10</td>
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<tr>
<td>Mid-Quality</td>
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<td>Mid-Quality</td>
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<td>92,000</td>
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<td>10</td>
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<td>AUXILIARY SERVICES, ACRES</td>
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(1) Cumulative demand in excess of February 1984 inventory.

SOURCE: Ming Chew Associates
II. DESCRIPTION OF THE REGION

The entire Kohala Coast Resort Region, which is situated along the coast of the District of South Kohala, has been designated by the State of Hawaii and County of Hawaii in their various plans as a major resort region. The region contains three very high quality masterplanned resorts. The Mauna Kea Resort (Mauna Kea Golf Course and Hotel complex) began operations in 1965. Golf courses in Maunaloa Beach Resort and Mauna Lani Resort, as well as the Sheraton Royal Waikoloa Hotel started operations in 1981. The Mauna Lani Bay Hotel opened in 1983.

The locations of these projects relative to the subject property are shown on the facing Regional Map.

The State of Hawaii consists of eight major and 124 minor islands having a total land area of approximately 6,425 square miles. Hawaii County (Island of Hawaii) has an area of approximately 4,038 square miles, and contains 44 percent of the State's total land area. Hawaii County comprises nine judicial districts: North and South Kohala, North and South Kona, Hamakua, Puna and North and South Hilo. The magnitude of this island, and the wide range of topography and climate, afford environments more diverse than those of any of the other islands within the State.

The District of South Kohala is located on the northwest coast of the Island of Hawaii and includes topography ranging from white sand beaches to the Kohala Mountains and a portion of Mauna Kea's lower leeward slopes. The District of South Kohala has two distinct physical environments: the Kohala Highland, which is characterized by green rolling hills used for diversified agriculture, and the coastal area from Kawaihae to Anaehoomalu Bay which consists of an arid plain of large lava flows, sharply contrasting with white sand beaches and bright aquamarine bays.

Over a ten-year period from 1960 to 1970, the population of the South Kohala District increased by 50 percent to 2,310. The District of South Kohala has been one of the fastest growing areas in Hawaii. In 1986, the population had doubled to 4,607. The basic population and commercial center within the South Kohala District is Waimea where a variety of small businesses cater mainly to local farming and ranching, and serve the local population.

The primary industries within this area are cattle ranching, diversified agriculture and tourism. More recently in Waimea, a small scientific community has formed to support the numerous astronomy observatories on Mauna Kea, and educational activities centered around Hawaii Preparatory Academy and the Parker School are expanding.

Although the upper plains are best suited for intensive cultivation and grazing, the coastal or coastal plains are too dry and barren for agriculture use. The coastal plain, however, is an excellent area for resort development with year-round sunny climate (the average of nine inches of rainfall makes the Kohala Coast the sunniest, driest and warmest region in the State), white sand beaches and clear, safe swimming water. This combination of features is recognized as an absolute requisite for successful resort development in Hawaii.

Access to the District is mainly by the Queen Kaahumanu Highway which opened in 1975 and connects Hilo--Kona with Kawaihae (the only deep water harbor in West Hawaii County). The high-speed road which extends 33 miles was completed at a cost of $16 million. This coastal highway, part of the Island's Belt Highway System, vastly increases accessibility to the South Kohala District from Kawaihae Airport, the major airport for West Hawaii County. This unique ocean-air terminal, located about 30 miles south of the subject property, began operations in July 1976. It began handling direct flights by United Airlines from the U.S. mainland west coast.

The Waimea-Kohala Airport, at an elevation of 2,700 feet, is the highest airport in the State. This air terminal handles only a limited number of scheduled charter flights and private aircraft. Service by Princeville Airways to Waikoloa using an airstrip near Waikoloa Beach Resort began in the latter part of 1984.

Kawaihae Harbor, which is located just a few miles north, is the second deep water port on the Island. This marine facility, completed in 1959, serves industrial, recreational and commercial sport fishing activities. Industries supporting this harbor are grain elevator and storage mills, oil tanks and a freight warehouse. A boat marine is part of this harbor complex.

A wide range of natural and man-made recreational diversions and scenic attractions are located throughout the South Kohala District. The white sand beaches situated on the arid, leeward shore are popular throughout the State. The two major public recreation areas are Hapuna Beach State Recreation Area and the Samuel M. Spencer Beach Park. Hapuna is 5 acres in size, and is the major water-oriented...
III. DESCRIPTION OF THE PROJECT

A. Overview Development Concept

Mauna Lani Resort, Inc. and its parent organizations view development of Mauna Lani Resort as a long-term commitment to create a preeminent world-renowned, luxury destination resort. Its development philosophy is to be "uncompromising" in its pursuit of quality. Given the total project size of 3,200 acres, it is apparent that development objectives are based more on strategic long-term considerations than on short-term returns.

The development concept for Mauna Lani Resort envisions a very low-density, low-profile theme incorporating resort, residential, recreational and supporting facilities with exceptionally high-quality standards to justify its desired world-renowned image.

The entire 3,200-acre Mauna Lani Resort site lies oceanside of the Queen Kamehameha Highway. It contains three miles of shoreline, including three separate bays which form focal points for resort clusters consisting of hotels, residential and recreational facilities. In addition to the low-density facilities envisioned, the exclusive and private character of Mauna Lani would be enhanced by retaining open space areas, including scenic and historic resources. The Kailua Point fishpond complex and historic sites and trails would still be retained in open space for public access and enjoyment.

B. Existing Master Plan

The existing master plan was prepared for a portion of the resort containing about 750 acres. This area has the general shape of a one-half mile radius semicircle, with the existing Mauna Lani Bay Hotel and Mauna Lani Terrace at its center.

This 750-acre area is designated Urban in the State Land Use Classification System. County permits and zoning would allow construction of about 1,000 hotel rooms, 1,200 resort residential units, commercial and recreational facilities.

The existing master plan was prepared to encompass a self-contained resort within the Urban District boundary. It includes possible sites for several hotels and numerous multifamily projects. Supporting recreational amenities would consist of one 18-hole championship golf course, a tennis club and a beach club.
To date, the facilities that have been built include the award-winning 18-hole championship Francis H. I'i Brown Golf Course, the 351-room super-luxury Mauna Lani Bay Hotel, the 89-unit Mauna Lani Terrace condominium project, a historic park and a network of trails around the ancient fishponds and along the shoreline.

Other facilities planned for the near future include the proposed 116-unit first increment of the Mauna Lani Point condominium project to be completed in 1986, a tennis club to be open by the end of 1985, and the beach club scheduled for completion in 1986.

Current county zoning designations for the parcels within the 780 acres included in the existing master plan allow gross densities of 35 to about 44 rooms per acre on hotel sites, and 15 to 25 units per acre for multifamily residential sites. An amendment to a Special Management Area (SMA) use permit allows development of a total of about 3,000 hotel rooms, 3,100 multifamily residential units, and associated resort uses on the 780-acre site.

C. Proposed Master Plan

The new master plan proposes to expand the development boundaries to permit construction of another golf course, reduce development densities, accommodate support facilities, improve the quality of selected sites, and finally, to allow for more efficient linking of this phase of development with subsequent phases when they occur. The proposed master plan is shown in the facing illustration.

Experience now indicates that with just one 351-room hotel in operation and just one 89-unit residential project completed, the existing golf course already reaches its desired maximum capacity during peak periods. Thus, additional high-quality championship golf courses would be needed to accommodate the demand projected to be generated by new hotels and residential projects in order to still maintain the preeminence of Mauna Lani Resort and to enhance its marketability.

In the same vein of adhering to the Resort's development philosophy, market experience also indicates that the development densities permitted by existing zoning are too intense to permit achieving Mauna Lani Resort's desired premier world-renowned image. It is likely, therefore, that projects developed at such high densities would neither attract the types of clientele nor permit building the types of properties needed to justify the types of sales prices necessary to achieve such an image.

Development of additional golf courses also increases the aesthetic amenities of the resort as well as opens additional sites to accommodate the currently permitted resort units at much lower densities. Expanding the number of sites increases the opportunities for creating specialized development themes throughout the resort.

Unlike planning for the initial 780-acre plan, the proposed master plan would make more efficient, linking the resort land uses with subsequent increments when they are needed.

Regarding resort support facilities, the existing sewage treatment plan, resort offices, warehouse, storage and contractors' yards have been constructed on land within the state Agricultural District using the Special Permit process. The proposed master plan would expand the Urban District boundary to include these facilities and eliminate the need for continuance of the Special Permits.
IV. STATE OF HAWAII TOURISM

A. Visitor Count

From 1950 to 1970, the number of visitors to the State of Hawaii staying overnight or longer increased at a compounded rate of 20 percent per year. The rate of increase slowed to 9.5 percent per year from 1970 to 1973. Activity was essentially flat for 1980 and 1981 and then increased 7.8 percent during 1982. In 1983, the number of overnight or longer visitors increased by 3.6 percent. These trends are shown in Table IV-1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Overnight and Longer Visitors</th>
<th>Annual Percentage Increase</th>
<th>Westbound Visitors</th>
<th>Eastbound Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>46,583</td>
<td>--</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>1960</td>
<td>296,517</td>
<td>--</td>
<td>250,795</td>
<td>45,722</td>
</tr>
<tr>
<td>1970</td>
<td>1,746,970</td>
<td>14.4</td>
<td>1,326,135</td>
<td>420,835</td>
</tr>
<tr>
<td>1971</td>
<td>1,016,944</td>
<td>6.1</td>
<td>1,030,725</td>
<td>86,219</td>
</tr>
<tr>
<td>1972</td>
<td>2,243,377</td>
<td>23.4</td>
<td>1,782,737</td>
<td>461,640</td>
</tr>
<tr>
<td>1973</td>
<td>2,630,952</td>
<td>17.2</td>
<td>2,067,861</td>
<td>563,091</td>
</tr>
<tr>
<td>1974</td>
<td>2,786,489</td>
<td>5.9</td>
<td>2,184,620</td>
<td>601,869</td>
</tr>
<tr>
<td>1975</td>
<td>2,829,105</td>
<td>1.5</td>
<td>2,207,417</td>
<td>621,688</td>
</tr>
<tr>
<td>1976</td>
<td>3,220,151</td>
<td>13.8</td>
<td>2,551,601</td>
<td>668,550</td>
</tr>
<tr>
<td>1977</td>
<td>3,432,667</td>
<td>6.6</td>
<td>2,763,312</td>
<td>670,355</td>
</tr>
<tr>
<td>1978</td>
<td>3,670,309</td>
<td>6.9</td>
<td>3,020,999</td>
<td>639,310</td>
</tr>
<tr>
<td>1979</td>
<td>3,960,531</td>
<td>7.9</td>
<td>3,129,455</td>
<td>831,076</td>
</tr>
<tr>
<td>1980</td>
<td>3,924,504</td>
<td>(0.7)</td>
<td>3,046,132</td>
<td>880,372</td>
</tr>
<tr>
<td>1981</td>
<td>3,934,623</td>
<td>0.0</td>
<td>2,974,791</td>
<td>959,832</td>
</tr>
<tr>
<td>1982</td>
<td>4,242,925</td>
<td>7.0</td>
<td>3,278,525</td>
<td>964,400</td>
</tr>
<tr>
<td>1983</td>
<td>4,366,105</td>
<td>3.0</td>
<td>3,396,115</td>
<td>971,990</td>
</tr>
</tbody>
</table>

B. Visitor Expenditures

Visitor expenditures are estimated to be the largest source of income to the State, contributing about one-third of the State product. Visitor expenditures have increased from about $355,000,000 in 1970 to an estimated $645,000,000 in 1983.

C. Inventory of Visitor Accommodations

About 90 percent of the visitors to Hawaii staying overnight or longer have been accommodated in hotels, apartment-hotels or condominium apartments rented on a short-term basis.

Most of the State's 32,448 visitor units are located in Waikiki, on the Island of Oahu. This resort district is considered to be the major gateway for the visitor industry in the State.

However, since the early 1960's, the visitor industry has expanded faster outside of Waikiki than within. In 1970, 52 percent of the State's transient accommodations were located in Waikiki. By February 1984, the share had dropped to 52 percent. Over this period of time, only 41 percent of the new inventory was added inside Waikiki, and most of the new inventory has been added on the neighbor islands.

The 456-room Halekulani in Waikiki, which restarted operations on October 1, 1983, and the 576-unit Waikiki Hilton are recent major additions to the visitor plant inventory.

The 600-unit Wailea Hotel (formerly the Mandarin Tower), the 140-unit Waikiki Beach Tower condominium apartments and the 136-unit Westbury condominium apartments were

Table IV-1
VISITOR TRENDS
State of Hawaii
1950 - 1983

completed in Waikiki during early 1984. Many of these units are likely to be made available for visitor accommodations.

Currently under construction are the 66-unit Seaside Surf apartments in Waikiki, the 300-room Kahala Prince in the Kahala Resort on Oahu, the 66-unit Kahala Plantation overlooking Hanalei Bay on Kauai and the 210-unit Sheraton Princeville in the Princeville Resort on Kauai.

In addition, plans have been announced for construction of a 230-room hotel at Makaha Point in the Makaha Valley Resort on Molokai. More recently, announcements were made of plans to build a 350-room hotel in the Hepuna Beach Resort to be developed adjacent to the Aina Koa Resort, and of plans to build the 1,250-room Hyatt Regency Wailea Hotel in the Wailea Beach Resort. These latter two hotels would be developed in the Kohala Coast Resort Region of the Island of Hawaii.

D. Occupancy and Room Rate Trends

The occupancy rate of Hawaii's transient accommodations is a key indicator of market conditions. That is, the occupancy rate provides a measure of the market relationships between demand and supply. Table IV-2 shows how occupancies have varied from 1970 to 1983 among the visitor facilities on each island. The variability indicates differing conditions for the many resort districts.

Most districts experienced soft market conditions about 1971, as large amounts of inventory were added compared to smaller increases in visitor arrivals. Then, visitor activity increased relative to new supply, and occupancies increased through about 1978. After that, conditions declined; although, the markets on Oahu and Maui appear to have begun rebounding in 1981.

As seen in Table VI-3, average room rates in Hawaii have increased continually since 1972 despite fluctuations in occupancies. This probably reflects inflationary effects as well as increasing quality of the transient accommodations.

E. Selected Visitor Characteristics

From 1970 through 1982, many visitor characteristics, even after excluding the effects of the military re-entry and re-occupation (R&R) program, appear to be changing.
### Table IV-3
**HOTEL OCCUPANCY AND AVERAGE DAILY ROOM RATES**
**State of Hawaii**
**1972 - 1983**

<table>
<thead>
<tr>
<th>Year</th>
<th>Occupancy (%)</th>
<th>Average Daily Room Rate ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>70.2</td>
<td>19.80</td>
</tr>
<tr>
<td>1973</td>
<td>78.1</td>
<td>21.56</td>
</tr>
<tr>
<td>1974</td>
<td>78.4</td>
<td>24.12</td>
</tr>
<tr>
<td>1975</td>
<td>75.2</td>
<td>27.41</td>
</tr>
<tr>
<td>1976</td>
<td>76.8</td>
<td>29.52</td>
</tr>
<tr>
<td>1977</td>
<td>76.7</td>
<td>34.28</td>
</tr>
<tr>
<td>1978</td>
<td>80.6</td>
<td>30.49</td>
</tr>
<tr>
<td>1979</td>
<td>73.7</td>
<td>44.41</td>
</tr>
<tr>
<td>1980</td>
<td>67.8</td>
<td>47.28</td>
</tr>
<tr>
<td>1981</td>
<td>68.2</td>
<td>49.73</td>
</tr>
<tr>
<td>1982</td>
<td>70.5</td>
<td>51.07</td>
</tr>
<tr>
<td>1983</td>
<td>69.7</td>
<td>54.70</td>
</tr>
</tbody>
</table>

For example, after increasing to 47 percent during the mid-1970's, the percentage of persons traveling on organized tours in 1982 decreased to below 20 percent, the lowest level since the mid-1960's; party size also has increased continually; median age declined to where it is below 40 years; slightly fewer stayed less than seven and almost more stayed 7-12 days, but the average stay has changed very little; and pleasure travel increased slightly.

The share of visitor arrivals from the U.S. Mainland dropped from 58.1 percent in 1970 to 66.7 percent in 1982, but rebounded to 69.8 percent in 1983.

The percentage of first time visitors dropped from 67.2 percent in 1970 to 49.6 percent in 1983, and repeat visitors increased, particularly those visiting for the fourth or more time. This was the first year in which first time visitors represented less than half of the total visitors.

The proportion of visitors whose occupations were professional, technical, business, managerial and official has increased sizably, as did the proportion of retirees.

A significant change has also occurred in the type of accommodations being used. In 1983, 26.2 percent of respondents indicated they intended to stay in a "Condominium" or "Hotel and Condominium," up from 0.8 percent in 1970, while those who indicated they intended to stay in a "Hunted Home or Apartment" decreased by 6 percent. The percentage staying in all other categories of accommodations dropped, including those staying with family and relatives.

Finally, the median family income of visitors has increased consistently over the years, in part reflecting inflationary effects. The estimated median family income of visitors in 1982 was $29,000, more than double the $18,300 estimated for 1970.

**F. Hawaii Visitor Industry Forecast**

It is difficult to forecast trends and economic activities which grow at the starting rates experienced by the Hawaii visitor industry until 1979, and then level off for two years before increasing again. There are, however, several factors which appear significant regarding past growth, and likely to influence future prospects, including:
1. Economic growth on the U.S. mainland.
2. High employment levels, resulting in high levels of disposable income.
3. Overall population growth.
4. General increases in vacation and leisure time.
5. Economic expansion in the Far East.
7. Gains in transportation technology.
8. Greater fare competition.

During the 1960's, all of these factors favored long distance travel, and Hawaii shared in the benefits of these trends.

However, in the 1970's, economic conditions became more cyclical. Sharp increases in crude oil prices contributed to high inflation rates as well as the cost of long distance travel. As a result, the trend of visitor arrivals in Hawaii became more variable, and in 1980 and 1981 was essentially flat.

The slowdown in visitor activity generated several responses. A major promotional program was initiated, and the State Government approved a supplemental appropriation of about $1,000,000 for increased industry promotion and advertising. Further, the marketing efforts of the Hawaii Visitors Bureau (HVB) have become more active. All of these factors helped boost the number of overnight visitors to the State eight percent for 1982 over 1981, and another three percent in 1983.

The State has prepared population and employment projections upon which it has based a number of its plans, and which it recommends for planning purposes. The "most likely" projection is based upon the estimate that the number of overnight and longer visitors would increase at the rate of 5 percent per year from 1980 to 1985, 4 percent per year from 1985 to 1990, 3 percent per year from 1990 to 1995, and 2 percent per year from 1995 to 2000. Current activity is below this projection due to essentially no growth for 1980 and 1981. However, the importance of tourism increasingly will be recognized, and in our opinion the State and community will increase their support of the industry. Even so, we believe that the State's projections are slightly optimistic, and show our own forecasts in Table IV-C.

Occupancy levels usually reflect the relationship of demand to supply forces. In light of a forecast of increased visitations and a lack of supply, occupancy rates appear to be headed for further increases. Pressures resulting from increased demands are measured in terms of price levels. That is, as market pressures increase, average room rates also gain. Now that occupancy rates are recovering, room rates appear to be increasing more.

Thus, the combined forces of continually increasing demand and lack of corresponding new supply will create additional pressures in the State transient accommodations market, resulting in both increased occupancies and higher average daily room rates.

Since few hotel rooms are being constructed to meet rising demand, resort multifamily units have been utilized increasingly as transient accommodations.
Table IV-4
FORECAST OF OVERNIGHT VISITORS
State of Hawaii
1985 - 2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Westbound</th>
<th>Eastbound</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>3,046,000</td>
<td>808,000</td>
<td>3,854,000</td>
</tr>
<tr>
<td>1985</td>
<td>3,950,000</td>
<td>1,050,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>1990</td>
<td>4,600,000</td>
<td>1,400,000</td>
<td>6,000,000</td>
</tr>
<tr>
<td>1995</td>
<td>5,000,000</td>
<td>1,700,000</td>
<td>6,700,000</td>
</tr>
<tr>
<td>2000</td>
<td>5,200,000</td>
<td>1,800,000</td>
<td>7,000,000</td>
</tr>
</tbody>
</table>

SOURCE: Ming Chew Associates

V. COUNTY OF HAWAII VISITOR INDUSTRY

A. Visitor Count

The number of visitors to the neighbor islands, in general, has increased faster than to the State as a whole due to extensive promotion of neighbor island destinations, more repeat visitors who visited Waikiki initially and who now prefer neighbor island amenities for their return visits, additional recreational facilities to attract visitors, more facilities available to accommodate them, and more recently, direct flights from the U.S. mainland west coast to Maui and Kona.

Table V-1 shows the proportion of westbound visitors to Hawaii staying overnight or longer who indicated their intention to visit the neighbor islands. The proportions shown represent all westbound visitors staying overnight and longer, including those destined to Hawaii and those traveling beyond Hawaii. As seen, the proportion intended to visit the Big Island of Hawaii increased from 37.1 percent in 1970 to its high of almost 40 percent in 1971, before beginning an almost continuous decline to 21.3 percent in 1982. In 1981, the proportion increased slightly to 21.7 percent. In contrast, the proportion intending to visit Maui increased almost continuously from 37.3 percent in 1970 to 50.8 percent in 1983. The share of visitors to Kauai on the other hand, generally peaked at 36.0 percent in 1971, and has gradually declined since.

The HVRA provides estimates of Japanese visitors to the State and to the Big Island of Hawaii. Assuming that ten percent of the other eastbound visitors visited the Big Island, we estimate that the percent of total eastbound visitors to the Big Island ranged from 16 to 19 percent between 1977 and 1983.

Applying these factors to the historical levels of tourism to the State resulted in our estimate of visitors to the Big Island shown in Table V-2. As seen, estimated westbound visitors almost doubled from 511,000 in 1970 to 925,000 by 1979, before declining to 675,000 in 1982. By 1983, the number of westbound visitors is estimated to have rebounded to 739,000. The number of eastbound visitors to the Big Island has increased almost continuously from 1977, when the first estimates were made.
### Table V-1: Estimated Neighbor Island Visitors

<table>
<thead>
<tr>
<th>Year</th>
<th>TO HAWAII</th>
<th>TO MAUI</th>
<th>TO KAUAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>37.1</td>
<td>37.3</td>
<td>34.3</td>
</tr>
<tr>
<td>1971</td>
<td>39.3</td>
<td>42.3</td>
<td>36.0</td>
</tr>
<tr>
<td>1972</td>
<td>39.2</td>
<td>43.7</td>
<td>34.8</td>
</tr>
<tr>
<td>1973</td>
<td>36.7</td>
<td>40.6</td>
<td>31.2</td>
</tr>
<tr>
<td>1974</td>
<td>36.8</td>
<td>42.2</td>
<td>29.8</td>
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<tr>
<td>1975</td>
<td>37.3</td>
<td>44.1</td>
<td>30.7</td>
</tr>
<tr>
<td>1976</td>
<td>34.1</td>
<td>46.4</td>
<td>29.2</td>
</tr>
<tr>
<td>1977</td>
<td>32.2</td>
<td>48.2</td>
<td>28.4</td>
</tr>
<tr>
<td>1978</td>
<td>31.5</td>
<td>48.6</td>
<td>29.0</td>
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<tr>
<td>1979</td>
<td>28.5</td>
<td>47.0</td>
<td>27.3</td>
</tr>
<tr>
<td>1980</td>
<td>25.9</td>
<td>47.0</td>
<td>26.6</td>
</tr>
<tr>
<td>1981</td>
<td>22.6</td>
<td>46.7</td>
<td>25.3</td>
</tr>
<tr>
<td>1982</td>
<td>21.5</td>
<td>46.7</td>
<td>25.3</td>
</tr>
<tr>
<td>1983</td>
<td>21.7</td>
<td>50.2</td>
<td>21.1</td>
</tr>
</tbody>
</table>

### Table V-2: Visitor Estimates and Forecasts

<table>
<thead>
<tr>
<th>Year</th>
<th>Westbound</th>
<th>Eastbound(1)</th>
<th>Both Directions(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>37.1</td>
<td>511,000</td>
<td>--</td>
</tr>
<tr>
<td>1971</td>
<td>39.6</td>
<td>564,000</td>
<td>--</td>
</tr>
<tr>
<td>1972</td>
<td>39.2</td>
<td>609,000</td>
<td>--</td>
</tr>
<tr>
<td>1973</td>
<td>36.7</td>
<td>759,000</td>
<td>--</td>
</tr>
<tr>
<td>1974</td>
<td>36.8</td>
<td>804,000</td>
<td>--</td>
</tr>
<tr>
<td>1975</td>
<td>37.3</td>
<td>823,000</td>
<td>--</td>
</tr>
<tr>
<td>1976</td>
<td>34.1</td>
<td>870,000</td>
<td>--</td>
</tr>
<tr>
<td>1977</td>
<td>32.2</td>
<td>890,000</td>
<td>10</td>
</tr>
<tr>
<td>1978</td>
<td>31.5</td>
<td>955,000</td>
<td>19</td>
</tr>
<tr>
<td>1979</td>
<td>28.5</td>
<td>895,000</td>
<td>19</td>
</tr>
<tr>
<td>1980</td>
<td>25.9</td>
<td>789,000</td>
<td>16</td>
</tr>
<tr>
<td>1981</td>
<td>22.7</td>
<td>675,000</td>
<td>17</td>
</tr>
<tr>
<td>1982</td>
<td>21.5</td>
<td>704,000</td>
<td>18</td>
</tr>
<tr>
<td>1983</td>
<td>21.7</td>
<td>719,000</td>
<td>18</td>
</tr>
<tr>
<td>Forecasts:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>24.0</td>
<td>946,000</td>
<td>21</td>
</tr>
<tr>
<td>1990</td>
<td>27.0</td>
<td>1,122,000</td>
<td>23</td>
</tr>
<tr>
<td>1995</td>
<td>30.0</td>
<td>1,500,000</td>
<td>25</td>
</tr>
<tr>
<td>2000</td>
<td>32.0</td>
<td>1,644,000</td>
<td>27</td>
</tr>
</tbody>
</table>

---

(1) Westbound visitors staying overnight and longer, including visitors destined to Hawaii and those traveling beyond Hawaii, and a pro rata share of non-respondents.

SOURCE: Hawaii Visitors Bureau, Annual Research Reports; Ming Chew Associates.

(2) Westbound only until 1977.

SOURCE: Hawaii Visitors Bureau, Annual Research Reports and Japanese Visitor Opinion Surveys; Ming Chew Associates.
The table also shows our forecasted capture of the State market to 2000. Although the share of westbound visitors has declined during the last several years, we anticipate that the proportion of westbound visitors to Hawaii County will continue the rebound experienced in 1983, and increase to 32.5 percent by 2000. This assessment reflects anticipated efforts to divert tourism from Waikiki and Oahu to the neighbor islands, preference for neighbor island amenities by the increasing number of repeat visitors to the State, the recent addition of new visitor facilities on the Island, direct flights from the U.S. Mainland west coast to Kona by United Airlines and its increased promotional efforts to stimulate travel to the neighbor islands. As seen from the table, we expect the number of westbound Big Island visitors to increase from an estimated level of 779,600 in 1983 to 1,455,000 by 2000.

An increasing proportion of westbound visitors is also expected to visit the Kona district for the same reasons indicated for westbound visitors. In this case, though, Japan Air Lines, the major westbound air carrier, has increased its promotional efforts to stimulate travel to the neighbor islands as a new travel experience. As a result, the number of westbound visitors to the Island is expected to increase from 171,000 in 1983 to 485,000 by 2000. Combined eastbound and westbound travel to the Island is projected to increase from 910,000 in 1983 to 2,150,000 by 2000.

B. Characteristics of Hawaii County Tourism

The Big Island of Hawaii contains a variety of features, many unique, which have made it a very popular place for sightseeing. For example, the Island has the two highest peaks in the State, two of the few active volcanoes in the nation, massive lava fields, the only producing coffee industry in the United States, the largest orchid industry in the country, the largest working ranch in the nation, black sand beaches, white sand beaches, lava rock coastlines, state and national historical parks, rain forests, waterfalls, deserts and a number of historical areas.

In March 1984, Mauna Loa erupted for the first time since 1975. Less than a week later, Kilauea erupted. It had been over 100 years since these two volcanoes had concurrent eruptions.

The popularity of the Big Island for sightseeing is reflected by selected attendance figures. For example, the Hawaii Volcanoes National Park recorded the largest attendance among attractions in the State in 1982, except for the National Memorial Cemetery in Punchbowl Crater on Oahu. Actually, the Big Island contains three of the State's four national park system facilities: the Hawaii Volcanoes National Park, Pu'uhonua O Honaunau National Historical Park (City of Refuge) and the Pu'uhonua Honaunau National Historical Site. The reported 1,960,000 visits to the Hawaii Volcanoes National Park is greater than the level of tourism estimated to the Island, suggesting that attendance at the park includes multiple visits, visits by local residents, visits by residents of other islands, and trips by tourists who decided to visit the Park after arriving in the State.

According to HVB surveys, the average stay of westbound visitors intending to visit the Big Island was 3.6 days in 1982, up from 2.9 days in 1979.

A number of destination resort areas with self-contained recreation facilities have been developed on the Big Island. These include the Mana Kea Resort, Mauna Lani Resort and Waikoloa Beach Resort in the Kohala Coast Resort Region, Kona Village at Keauhou and Keahou Resort which is situated south of Kealakekua. Limited development has occurred at C. Brewer's Hana Mountain at Holualoa.

Although there are only limited recreational facilities in either Hilo or Kealakekua, these two areas historically have contained most of the visitor plant facilities on the Island. The next table, Table V-3 shows the distribution of transient accommodations and the Island, and Table V-4 shows occupied units calculated from average occupancy figures provided by the HVB and Pannell Kerr Forster. From 1970 to 1983, the total number of transient accommodation units in the county increased from 3,486 to 7,141, a gain of 105 percent. Occupied rooms increased only 61 percent during the same period from an estimated 2,182 occupied units in 1970 to 3,559 occupied units in 1983. Meanwhile, tourism to the State in both directions increased by 149 percent, indicating that the County of Hawaii did not achieve its proportional share of growth as measured by occupied rooms. In fact, the rate of increase in occupied rooms kept just slightly ahead of the 45 percent gain in westbound visitors to the Island, the major component of demand for transient accommodations.
Table V-3
DISTRIBUTION OF TOTAL TRANSIENT ACCOMMODATIONS
County of Hawaii
1970 - 1983

<table>
<thead>
<tr>
<th>Year</th>
<th>Hilo</th>
<th>Kona</th>
<th>Kohala(2)</th>
<th>Other(2)</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of</td>
<td>% of</td>
<td>% of</td>
<td>% of</td>
<td>% of</td>
</tr>
<tr>
<td></td>
<td>Units</td>
<td>County</td>
<td>Units</td>
<td>County</td>
<td>Units</td>
</tr>
<tr>
<td>1970</td>
<td>1,345</td>
<td>38.6%</td>
<td>1,752</td>
<td>50.2%</td>
<td>-</td>
</tr>
<tr>
<td>1971</td>
<td>1,547</td>
<td>36.5%</td>
<td>2,306</td>
<td>54.4%</td>
<td>-</td>
</tr>
<tr>
<td>1972</td>
<td>1,817</td>
<td>37.9%</td>
<td>2,582</td>
<td>53.8%</td>
<td>-</td>
</tr>
<tr>
<td>1973</td>
<td>1,782</td>
<td>34.0%</td>
<td>3,009</td>
<td>57.5%</td>
<td>-</td>
</tr>
<tr>
<td>1974</td>
<td>1,850</td>
<td>34.6%</td>
<td>3,055</td>
<td>57.1%</td>
<td>-</td>
</tr>
<tr>
<td>1975</td>
<td>2,167</td>
<td>35.9%</td>
<td>3,423</td>
<td>56.1%</td>
<td>-</td>
</tr>
<tr>
<td>1976</td>
<td>2,130</td>
<td>35.9%</td>
<td>3,231</td>
<td>56.1%</td>
<td>-</td>
</tr>
<tr>
<td>1977</td>
<td>1,957</td>
<td>32.6%</td>
<td>3,543</td>
<td>59.0%</td>
<td>-</td>
</tr>
<tr>
<td>1978</td>
<td>1,954</td>
<td>32.6%</td>
<td>3,637</td>
<td>59.7%</td>
<td>-</td>
</tr>
<tr>
<td>1979</td>
<td>1,954</td>
<td>32.6%</td>
<td>3,473</td>
<td>58.4%</td>
<td>-</td>
</tr>
<tr>
<td>1980</td>
<td>1,944</td>
<td>29.0%</td>
<td>4,193</td>
<td>62.5%</td>
<td>403</td>
</tr>
<tr>
<td>1981</td>
<td>1,762</td>
<td>24.6%</td>
<td>4,249</td>
<td>59.3%</td>
<td>1,078</td>
</tr>
<tr>
<td>1982</td>
<td>1,648</td>
<td>22.1%</td>
<td>4,269</td>
<td>58.6%</td>
<td>1,143</td>
</tr>
<tr>
<td>1983</td>
<td>1,194</td>
<td>16.7%</td>
<td>4,446</td>
<td>62.2%</td>
<td>1,422</td>
</tr>
</tbody>
</table>

Table V-4
DISTRIBUTION OF OCCUPIED TRANSIENT ACCOMMODATIONS(1)
County of Hawaii
1970 - 1983

<table>
<thead>
<tr>
<th>Year</th>
<th>Hilo</th>
<th>Kona</th>
<th>Kohala(2)</th>
<th>Other(2)</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of</td>
<td>% of</td>
<td>% of</td>
<td>% of</td>
<td>% of</td>
</tr>
<tr>
<td></td>
<td>Occupied % of Units</td>
<td>County</td>
<td>Occupied % of Units</td>
<td>County</td>
<td>Occupied % of Units</td>
</tr>
<tr>
<td>1970</td>
<td>907</td>
<td>41.5%</td>
<td>1,014</td>
<td>46.5%</td>
<td>-</td>
</tr>
<tr>
<td>1971</td>
<td>847</td>
<td>37.6%</td>
<td>1,134</td>
<td>50.4%</td>
<td>-</td>
</tr>
<tr>
<td>1972</td>
<td>1,076</td>
<td>39.7%</td>
<td>1,355</td>
<td>50.1%</td>
<td>-</td>
</tr>
<tr>
<td>1973</td>
<td>1,139</td>
<td>38.4%</td>
<td>1,529</td>
<td>51.6%</td>
<td>-</td>
</tr>
<tr>
<td>1974</td>
<td>1,101</td>
<td>34.2%</td>
<td>1,763</td>
<td>55.0%</td>
<td>-</td>
</tr>
<tr>
<td>1975</td>
<td>1,109</td>
<td>34.3%</td>
<td>1,781</td>
<td>55.2%</td>
<td>-</td>
</tr>
<tr>
<td>1976</td>
<td>929</td>
<td>28.9%</td>
<td>1,911</td>
<td>59.6%</td>
<td>-</td>
</tr>
<tr>
<td>1977</td>
<td>1,113</td>
<td>30.4%</td>
<td>2,167</td>
<td>59.2%</td>
<td>-</td>
</tr>
<tr>
<td>1978</td>
<td>1,694</td>
<td>28.0%</td>
<td>2,430</td>
<td>62.2%</td>
<td>-</td>
</tr>
<tr>
<td>1979</td>
<td>1,017</td>
<td>28.0%</td>
<td>2,239</td>
<td>61.7%</td>
<td>-</td>
</tr>
<tr>
<td>1980(3)</td>
<td>731</td>
<td>23.4%</td>
<td>1,894</td>
<td>63.9%</td>
<td>351</td>
</tr>
<tr>
<td>1981(3)</td>
<td>734</td>
<td>22.3%</td>
<td>2,069</td>
<td>63.0%</td>
<td>442</td>
</tr>
<tr>
<td>1982(3)</td>
<td>635</td>
<td>19.2%</td>
<td>2,002</td>
<td>60.6%</td>
<td>621</td>
</tr>
<tr>
<td>1983(3)</td>
<td>579</td>
<td>16.5%</td>
<td>2,122</td>
<td>60.5%</td>
<td>764</td>
</tr>
</tbody>
</table>

(1) Average of monthly occupancy rates reported by HVB applied to monthly HVB Visitor Plant Inventory data.
(2) Kohala data included with "Other" until 1980.
(3) Occupancy rates estimated by HVB, Fannell Kerr Forster and Ming Chew Associates.

SOURCE: Ming Chew Associates

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A-16
Beginning in 1981 with the completion of the Sheraton Royal Kona Beach Hotel, the share of transient accommodations outside Kona and Hilo (predominantly the Kohala Coast Resort Region) increased sizably. By February 1983, with the opening of the Mauna Lani Bay Hotel in the Mauna Lani Resort, the proportion of units essentially on the Kohala Coast began to approach that in Hilo. By February 1984, as a result of continued removal of units from the Kona inventory for other uses, the number of transient accommodations units in North and South Kohala exceeded for the first time the number in Hilo. In fact, Table V-4 shows that by 1983, the number of occupied units essentially on the Kohala Coast had already approximately the number of occupied units in Hilo.

Much of the visitor plant in Hilo and Kona had been oriented toward group travelers which represented as high as 47 percent of westbound visitors to the State in 1974. By 1983, the share of group travelers had declined to slightly less than 15 percent.

The seasonality of tourism to the Island can be observed from the monthly occupancy rates shown in Table V-5. Occupancies in Kona have exceeded those in Hilo since about 1975. This trend reversed in March 1984 as visitors rushed to Hilo to view eruptions by Kilauea Volcano and Mauna Loa. Based upon earlier surveys conducted by the HSB, occupancies for visitor accommodations located outside Hilo and Kona have been generally higher than the island-wide averages.

Almost all visitors to the Island arrive by air. Until recently, Hilo was the State's only other gateway outside of Honolulu served directly by overseas airlines. Early in 1983, United Airlines began flying from the U.S. mainland west coast directly to Maui's Kahului Airport. In September 1983, United began flying directly from the west coast to Kona, and Kona Airport, serving Kona and the Kohala Coast. General Lyman Field, Keahole, and Waimea-Kohala Airport, serving Waimea and Kohala, can accommodate the DC-9 and Boeing 737 inter-island jet aircraft. Moreover, General Lyman Field in Kona is capable of accommodating Boeing 747 and other wide-bodied aircraft. More inter-island flights including those of scheduled commuter airlines serve Kona than the other two airports. Princeville Airways began service to Waikoloa in the latter part of 1984 using an airstrip situated on an abandoned roadway.

Table V-5  OCCUPANCY IN TRANSIENT ACcommodations County of Hawaii 1972 - 1984

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kona</td>
<td>54%</td>
<td>56%</td>
<td>58%</td>
<td>59%</td>
<td>58%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Hilo</td>
<td>46%</td>
<td>44%</td>
<td>42%</td>
<td>41%</td>
<td>40%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
</tr>
<tr>
<td>Hawaii</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>Kona</th>
<th>Hilo</th>
<th>Hawaii</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>April</td>
<td>47%</td>
<td>39%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>40%</td>
<td>31%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>46%</td>
<td>30%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>July</td>
<td>47%</td>
<td>40%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>52%</td>
<td>47%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>39%</td>
<td>46%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>October</td>
<td>57%</td>
<td>40%</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>48%</td>
<td>39%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>39%</td>
<td>37%</td>
<td>39%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>Kona</th>
<th>Hilo</th>
<th>Hawaii</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>January</td>
<td>54%</td>
<td>43%</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>74%</td>
<td>66%</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>67%</td>
<td>72%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>April</td>
<td>50%</td>
<td>60%</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>51%</td>
<td>50%</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>49%</td>
<td>53%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>July</td>
<td>50%</td>
<td>65%</td>
<td>54%</td>
</tr>
</tbody>
</table>

SOURCE: Pannell Kerr Forster
VI. MARKET ANALYSIS FOR TRANSIENT ACCOMMODATIONS

The demand for transient accommodations in Hawaii has expanded dramatically due to rapid growth of State tourism. Furthermore, each delineated market segment has grown sufficiently to support a wide variety of accommodations, as well as recreation and amusement facilities.

Long distance travel is a component of the leisure market, and is dependent upon the availability of large amounts of discretionary leisure time and discretionary income, both of which have been increasing over recent years due to economic growth worldwide (despite short temporary setbacks), expanding population and increasing interest in travel. Furthermore, improvements in transportation technology have reduced travel times so that areas considered remote in the past are now readily accessible. Aircraft technology and airline deregulation have also reduced costs, permitting large numbers of persons previously constrained by financial requirements to travel greater distances. By both expanding the geographic dimensions of the market and reducing travel costs, transportation improvements have substantially broadened the market area from which patronage can be drawn.

However, larger market area dimensions have also multiplied the number of tourist destinations vying for travelers and their expenditures; thus, competition for visitors and patronage has intensified. The extent of the competition has increased the difficulty of creating an effective market image to attract visitors from the expanded market area.

The transient accommodations market is highly segmented with each specific segment having different requirements. This allows operators to either focus attention on capturing a narrow segment of the market, or attempt to appeal to all segments, but with a potential loss of efficiency. Market segmentation also allows facilities catering to different categories of patrons to co-exist in an area so long as each segment is of an economic size. Increasing the amount of facilities in a single locale adds to its cumulative attraction. Increasing the overall attraction of an area increases the likely draw to the area and makes more viable each of the entities operating therein. Thus, variety, quality and quantity of both amenities and facilities are all very important when trying to merchandise transient accommodations to broad market segments.

A. Methodology

Market analysis is accomplished by comparing factors of demand with factors of supply. First, the patterns of historical demand are evaluated, and then statewide demand projected. State demand is delineated after analyzing the relative attractions of each island, and its respective resort regions. The current and anticipated supply of competitive facilities is compiled and differentiated to compare with the delineated demand. Differences between supply and demand are used to identify the prospects for new developments.

In order to delineate demand by regions within the State, a current and anticipated inventory of facilities in each competitive resort region is tabulated. Based upon the envisaged "cumulative attraction" of the subject region or proposed project relative to competing regions or projects, subjective estimates of potential market capture are made. Market potential is then determined by measuring imbalances between anticipated supply conditions and delineated forecasts of demand.

B. Supply Factors

Until recently, there were only two large concentrations of transient accommodations on the Island of Hawaii, Hilo and Kona. The Kohala Coast Resort Region, however, in just a few years has become one of the Island's major destination areas, and now exceeds Hilo in terms of the number of transient units available.

1. Hilo Supply

Hilo's role in Big Island tourism historically has been to accommodate overnight visitors beginning or concluding their visit to the Island. Tourism received a boost when General Lyman Field was expanded to handle direct flights from the U.S. Mainland, making Hilo the State's second gateway or departure point after Honolulu. Major stimulation occurred also in 1968 and 1969 when a "hotel row" began developing along Banyan Drive. Since then, nearly all major hotels have also been built there.

The visitor pattern in Hilo consists mainly of sightseeing and a stay of only one night, despite the fact that the Island's most popular sightseeing attractions are within a radius of 30 miles. These sights include the Hawaii Volcanoes National Park,
Haleakulani Black Sand Beach, orchid nurseries, macadamia nut factories, Rainbow and Akaka Falls, Hilo Ponds and the Lyman Museum.

The major cause of this visitor pattern is probably the lack of the "sun, surf and sand" requisite of Hawaii resort regions. The high incidence of rainfall, 124 inches per year or almost 0.4 inches average per day, results in a low probability of sunny days for outdoor activity. High quality swimming beaches are also lacking. Hilo is, on the other hand, an aesthetically attractive area with its quaint setting, floral variety and rich vegetation. Nonetheless, by most standards, Hilo does not qualify as a destination resort area.

In fact, with decreasing group travel, Hilo has experienced sharp declines in visitor activity. The number of accommodations has been reduced as a result of conversions to office and other uses. United Airlines recently terminated its direct flights from the U.S. mainland to Hilo, flying instead directly to Maui and directly to Re-ship Airport in Kona. The flights from Kona to Los Angeles return through Hilo.

A breakdown of Hilo's visitor plans inventory by price range indicates that the largest proportion of rooms, 64 percent, are priced in the published rate range of $30 to $49 per night for superior room, double occupancy.

2. Kona Supply

Kona's tourism role traditionally has been to accommodate sightseeing vacations and those desiring rest and relaxation. It also served farmlands who sought a refuge from the pace of Honolulu. As such, most of the accommodations were rather modest. Passive recreation was promoted and the amount of active recreation facilities was limited. Few of the transient accommodations contained a full range of resort amenities.

As tourism expanded, the character of the visitor to Kona, and Kona itself, changed. Recently, destinations such as Kona Village Resort and Kona Village Resort have developed outside Kailua Town. Keauhou Resort contains more active recreational amenities and more extensive entertainment. Keauhou itself now contains 42 percent of all transient accommodations in Kona. A new shopping center, resort houseboat subdivision and golf course extension are currently under construction.

There is a broad spread of accommodations within published prices ranging from under $30 per night for double occupancy, to an estimated $150 to $280 per night room rate at the Kona Village Resort (where actual prices range from $225 to $360 for double occupancy including all meals on the full American plan). Most of the recent developments contain more amenities than the older ones and are also priced higher. The largest proportion, 36 percent, of the hotel accommodations have published rates of $75 to $99 per night for double occupancy. Apartment hotels indicate a similar pattern except that the largest proportion, 45 percent, is in the $50 to $74 range. Together, 95 percent of the accommodations in Kona have published rates of $30 to $99.

3. North and South Kohala Supply

The supply of transient accommodations in North and South Kohala consists, essentially, of those contained in the resorts located in the Kohala Coast Resort Region.

Even though it contains the world renowned Mauna Kea Resort, the entire Kohala Coast Resort Region is only beginning to be fully recognized as a major destination resort region. The Region has the least recorded rainfall in the State and therefore, the highest proportion of sunny days. It has white sand beaches with calm swimming water, attractive views of the ocean and the four major land masses on the Island including both Mauna Kea and Mauna Loa, and Hualakai in the Island of Maui. These characteristics of "sun, surf and sand" have led to the recent development of Waikoloa Beach Resort and Mauna Lani Resort in very close proximity to each other and to the Mauna Kea Resort which commenced operations in 1965 as a free-standing destination resort hotel and golf course. The Sheraton Royal Kona Resort began operations in late 1981, and the Mauna Lani Bay Hotel opened in February 1983.
All of the hotel rooms in the three resorts on the Kohala Coast are in or above the luxury category with published rates of $100 and above.

4. Summary of Accommodations

Table VI-1 summarizes the number and location of transient accommodations on the Big Island by price range. Projects which are HVB members or which are managed by HVB members contain a total of 5,996 units. More than half of these units are located in Kona. The next largest concentration is in North and South Kohala, followed closely by the number in Hilo.

The preponderance of units in Hilo have published rates between $30 and $74, whereas the range in Kona is between $20 and $99. For Kohala, the predominant range of published room prices is $100 and over with the largest number in the $200+ category. Moreover, the Kohala Coast Resort Region contains 52 percent of the units on the Island with published room rates over $100. The relative rates are indicative of the character of the areas and the general images these major areas have created for themselves.

C. Demand Factors

In prior chapters, visitor forecasts were made for the State and delineated into projections for Hawaii County. As shown earlier, State tourism is projected to grow at the rate of 2.6 percent per year from 1973 to 2002, and County tourism at 5.2 percent per year during the same period.

Underlying these projections, particularly the higher County growth rate, is the assumption the Kohala Coast Resort Region will continue to experience substantial resort development within the next 17 years. The addition of resort facilities will enhance the competitive posture of the Region relative to other parts of the Island, and of the Island relative to others in the State. The Region itself must compete directly with other State resort regions, just as the Kona Reef Beach Hotel has for a number of years.

<table>
<thead>
<tr>
<th>District or Region</th>
<th>Less Than $30-</th>
<th>$30-</th>
<th>$50-</th>
<th>$75-</th>
<th>$100-</th>
<th>$150-</th>
<th>$200+</th>
<th>Estimated Average Published Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilo</td>
<td>1,126</td>
<td>20</td>
<td>720</td>
<td>386</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$37</td>
</tr>
<tr>
<td>Kona</td>
<td>3,514</td>
<td>79</td>
<td>1,080</td>
<td>608</td>
<td>1,140</td>
<td>3</td>
<td>95</td>
<td>$69</td>
</tr>
<tr>
<td>Kohala</td>
<td>1,273</td>
<td>29</td>
<td>40</td>
<td>543</td>
<td>661</td>
<td>-</td>
<td>-</td>
<td>$173</td>
</tr>
<tr>
<td>Ka'u/</td>
<td>83</td>
<td>13</td>
<td>37</td>
<td>33</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$47</td>
</tr>
<tr>
<td>Volcano</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Total</td>
<td>21%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5,996</td>
<td>112</td>
<td>1,875</td>
<td>1,267</td>
<td>1,440</td>
<td>546</td>
<td>756</td>
<td>$87</td>
</tr>
<tr>
<td>Percent of Total</td>
<td>18%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Published rates for double occupancy superior for hotels and one-bedroom units for apartment/townhouses per night; rates may apply to studio units or cottages which were only type available.

(2) Includes projects which are HVB members or which are managed by HVB members.

SOURCE: Ming Chew Associates
Thus, in order to delineate our County demand forecasts, we evaluated the potential attraction of the Kohala Coast Resort Region relative to other regions in the State.

1. Comparison of Region With Other State Regions

Although a large number of areas in the State have relatively large concentrations of resort amenities, we have limited our comparison mainly to neighbor islands, master planned resort communities with controlled environments, and the Kona resort region on the Big Island. Kona was included although it lacks swimming beaches since it is the most potentially competitive area on the Island.

From Table VI-2, it can be seen that the major neighbor island resort regions competing with the Kohala resort region are Maui and Kona.

Of the neighbor islands, Maui contains the largest number of transient accommodations, accounting for about one-half of the inventory not on Oahu. West Maui alone, from Lahaina to Kapalua, contains 8,021 units, more than on either the Island of Hawaii or the Island of Kauai. The resort region from Napili to Lahaina also has extensive facilities. Much of the attraction of Maui has resulted from the quantity, quality and diversity of activities and amenities including extensive sandy beaches and golf courses, as well as over a decade of coordinated promotion of Maui as a resort destination area.

The second largest resort region on the neighbor islands is Kona on the Island of Hawaii. However, except for the number of host harbors, the amount of recreational amenities such as golf courses in this region is relatively limited, particularly in relationship to the inventory of accommodations.

At present, North and South Kohala contain about 1,622 transient accommodations. Almost 900 of these units have been added within the last three years with the construction of Waikoloa Beach Resort and Mauna Lani Resort. Each of these resorts also added a championship golf course to the two that already existed, giving this area four championship courses in close proximity, as many as now exist in the West Maui resort region.

Table VI-2

<table>
<thead>
<tr>
<th>Transient Accommodation</th>
<th>Golf Courses (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hawaii</strong></td>
<td></td>
</tr>
<tr>
<td>North and South Kohala(3)</td>
<td>1,622</td>
</tr>
<tr>
<td>Kona</td>
<td>4,448</td>
</tr>
<tr>
<td>Other (Including Hilo)</td>
<td>1,778</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7,849</td>
</tr>
</tbody>
</table>

| **Maui**                |                  |
| West Maui (Lahaina,    |                  |
| Kahului, Napili)       | 8,021            |
| Other (Including Kahului)| 527               |
| **Total**               | 12,499           |

| Molokai                 |                  |
| Molokai                | 627              |
| 2 (one 9-hole)         |                  |

| Kauai                   |                  |
| Wailua-Kekaha           | 2,186            |
| Puupu                  | 1,541            |
| Hanalei                | 1,942            |
| Other (including Lihue)| 644              |
| **Total**               | 5,213            |

(1) As of February 1984.
(2) Open to the public.
(3) Mainly the Kohala Coast Resort Region.
(4) Existing 18-hole course currently being expanded to 27 holes.

SOURCE: Ming Chew Associates
Combining this popular sport with a large number of tennis courts, excellent swimming beaches, good boating and diving facilities, and nearby marinas will enhance the recreation orientation of this destination area. Other recreation will include trail riding and equestrian activities, hunting, skeet shooting and even skiing on Mauna Kea. A polo field has been proposed at Waikoloa Village. Passive recreational and educational activities include inspecting petroglyphs at Waikoloa and Puako, traversing the King's Trail, visiting Puukohola Heiau National Historic Site, Lapakahi State Historic Park, King Kamehameha's birthplace and other historic sites along the coast and in Waimea. Sightseeing in other parts of the island is facilitated by the high-speed belt highway to Hilo and the Hawaii Volcanoes National Park, or to Kona and the airport at Keahole.

Thus, the prospects are very good that the available "sun, surf and sand", complimentary accommodations and recreational facilities, good accessibility and luxury and "super-luxury" quality of the three existing beach resorts will combine to make the Kohala Coast Resort Region one of the most attractive and certainly the highest quality destination area in the State.

2. Forecast of Island Demand

Tourism forecasts for the Island were converted to projections of transient accommodations demand by estimating the average stay, multiplying by the number of visitors to calculate visitor-days, dividing by the average party size to obtain average occupied room days, and then dividing by the number of days in the year to obtain the average daily number of occupied rooms.

Table VI-2 shows these results delineated by westbound, eastbound and intrastate travelers. As seen, total room demand in terms of occupied units was estimated to be 3,600 units in 1983. Compared to the reported visitor plant inventory of 3,149 units, the overall occupancy of the Island of Hawaii for 1983 would have been 106.4 percent. The demand is projected to increase to 5,000 occupied units by 1985, 6,000 units by 1990, 11,400 units by 1995 and to 14,600 units by 2000.

3. Delimitation of Island Demand by Sub-area

The pattern of occupancy in visitor facilities for different sub-areas was analyzed to aid in allocating the projected island-wide demand. Although total visitor plant inventory reflects the level of building activity in each sub-area, the trends in occupied units more adequately reflects the competitive position of each resort district.

The relative role of Hilo has been declining since at least 1970. Until about 1980, this decline was offset by a corresponding increase by Kona. In general, the relative role of all other areas, including the Kohala Coast, was stable from 1970 until 1980. Since 1981, however, the relative position of the Kohala Coast has increased rapidly. By the end of 1983, the number of both total and occupied units in North and South Kohala, mainly the Kohala Coast Resort Region, exceeded the number in Hilo.

Table VI-4 shows our projections of both occupied room and total room demand by resort region for the Island.

We project that the demand for occupied units in Hilo will increase from 579 units in 1983, and to 1,300 by 2000. Nonetheless, we anticipate that Hilo's relative market position will continue to decline. Assuming a 70 percent occupancy rate, the demand for total units is projected to increase from 800 in 1983 to 1,900 in 2000, compared to the current inventory of 1,194 units.

The demand for occupied units in Kona is expected to reverse the decline that began in 1978. The relative share of occupied units in Kona will continue to decline though, as Kohala is projected to gain very rapidly both in terms of the number of occupied units and market share on the Island.

As seen in Table VI-4, the demand for transient accommodations in Kohala is projected to increase from 3,000 units in 1983, to 9,600 in 2000. In North and South Kohala, it is projected to increase from 1,100 units in 1983, to 7,900 in 2000. Thus, both regions are expected to experience about the same numerical increase in demand. However, when
### Table VI-3

**FORECAST OF TRANSIENT ACCOMMODATION DEMAND**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Westbound:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>739,000</td>
<td>948,000</td>
<td>1,242,000</td>
<td>1,500,000</td>
<td>1,664,000</td>
</tr>
<tr>
<td>Average Stay, Nights</td>
<td>3.1</td>
<td>3.3</td>
<td>4.0</td>
<td>4.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Visitor - Nights</td>
<td>2,291,000</td>
<td>3,128,000</td>
<td>4,968,000</td>
<td>6,750,000</td>
<td>8,320,000</td>
</tr>
<tr>
<td>Average Party Size</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Occupied Rooms</td>
<td>3,000</td>
<td>4,500</td>
<td>7,200</td>
<td>9,700</td>
<td>12,000</td>
</tr>
<tr>
<td><strong>Eastbound:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>171,000</td>
<td>220,000</td>
<td>320,000</td>
<td>425,000</td>
<td>486,000</td>
</tr>
<tr>
<td>Average Stay, Nights</td>
<td>0.3</td>
<td>0.4</td>
<td>0.8</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Visitor - Nights</td>
<td>51,000</td>
<td>88,000</td>
<td>256,000</td>
<td>638,000</td>
<td>972,000</td>
</tr>
<tr>
<td>Average Party Size</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Occupied Rooms</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>1,100</td>
<td>1,700</td>
</tr>
<tr>
<td><strong>Local:</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Visitors</td>
<td>100,000</td>
<td>120,000</td>
<td>170,000</td>
<td>250,000</td>
<td>375,000</td>
</tr>
<tr>
<td>Average Stay, Nights</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Visitor - Nights</td>
<td>150,000</td>
<td>180,000</td>
<td>255,000</td>
<td>375,000</td>
<td>562,000</td>
</tr>
<tr>
<td>Average Party Size</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Occupied Rooms</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>1,010,000</td>
<td>1,288,000</td>
<td>1,732,000</td>
<td>2,175,000</td>
<td>2,525,000</td>
</tr>
<tr>
<td>Average Stay, Nights</td>
<td>2.5</td>
<td>2.6</td>
<td>3.1</td>
<td>3.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Visitor - Night</td>
<td>2,492,000</td>
<td>3,386,000</td>
<td>5,429,000</td>
<td>7,763,000</td>
<td>9,854,000</td>
</tr>
<tr>
<td>Average Party Size</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Occupied Rooms</td>
<td>3,600</td>
<td>5,000</td>
<td>8,000</td>
<td>11,400</td>
<td>14,000</td>
</tr>
</tbody>
</table>

**SOURCE:** Ming Chew Associates.

### Table VI-4

**PROJECTION OF TRANSIENT ACCOMMODATION DEMAND BY RESORT REGION**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>579</td>
<td>2,122</td>
<td>764</td>
<td>44</td>
<td>3,509</td>
</tr>
<tr>
<td><strong>Rona</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>700</td>
<td>2,600</td>
<td>1,400</td>
<td>100</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Kohala</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,000</td>
<td>4,200</td>
<td>2,500</td>
<td>300</td>
<td>8,000</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,100</td>
<td>5,700</td>
<td>4,100</td>
<td>500</td>
<td>11,460</td>
</tr>
<tr>
<td><strong>Total County</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,300</td>
<td>6,900</td>
<td>5,500</td>
<td>900</td>
<td>14,600</td>
</tr>
</tbody>
</table>

**Estimated Total Demand at 70% Occupancy:**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Mile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>800</td>
<td>3,000</td>
<td>1,100</td>
<td>100</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Rona</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,000</td>
<td>4,000</td>
<td>2,000</td>
<td>200</td>
<td>7,200</td>
</tr>
<tr>
<td><strong>Kohala</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,400</td>
<td>6,000</td>
<td>3,600</td>
<td>400</td>
<td>11,400</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,600</td>
<td>8,100</td>
<td>5,900</td>
<td>700</td>
<td>16,300</td>
</tr>
<tr>
<td><strong>Total County</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied Units</td>
<td>1,900</td>
<td>9,800</td>
<td>7,900</td>
<td>1,300</td>
<td>20,900</td>
</tr>
</tbody>
</table>

**Visitor Plant Inventory:**

February 1984

|        | 1,194 | 4,448 | 1,422 | 85 | 7,149 |

**SOURCE:** Hawaii Visitors Bureau, Visitor Plant Inventory, February 1984; Ming Chew Associates.
compared to existing supply, Kohala is projected
to need 5,600 additional units, while Kona would
only need 5,300 additional units by 2000.

In general, it appears that the three major resort
districts are currently over-supplied at present.
By 1995, demand is projected to exceed supply by
about 900 units in North and South Kohala. How-
ever, Kona and Hilo appear to be adequately sup-
plied until sometime after 1985.

D. Estimated Marketability of Transient Accommodations

1. Demand

Projections in the preceding chapter reflect that
a demand would exist in North and South Kohala for
another 600 units by 1985, 2,200 units by 1990,
4,500 units by 1995 and 6,500 units by 2000.

We believe that most of the demand will be satis-
field in the Kohala Coast Resort Region within
Waikoloa Beach Resort, Mauna Lani Resort and the
lands being developed by Mauna Kea Properties,
Inc. Waikoloa can be categorized as a luxury
resort, whereas the Mauna Kea and Mauna Lani
Resorts could be classified as "super-luxury"
resorts. These distinctions are due in part to
the image that has been promoted, types and quality
of facilities developed, development densities and
clientele attracted. Published room rates at
Waikoloa are also lower than at the "super-luxury"
resorts.

Although increased demand will have to be accom-
modated throughout North and South Kohala, the
largest portion would probably be attracted to the
Kohala Coast Resort Region. Due to the lack of
other facilities outside the coast area, we
estimate that 70 to 90 percent of the projected
new demand in North and South Kohala would likely
be accommodated in Waikoloa, Mauna Lani and Mauna
Kea Properties' projects.

At present, Mauna Lani Resort accounts for 30 per-
cent of the accommodations in North and South
Kohala, and 20 percent of the hotel rooms. Since
the Mauna Lani Bay Hotel has been in operation only
a relatively short period of time, its share of
occupied rooms is less. Nonetheless, we consider
its market experience to be very good, and antici-
patate that the hotel will achieve a mature level of
operations in about 1994.

We further anticipate that the quality of product
provided in Mauna Lani will continue to be of
"super-luxury" quality, or at least of a quality
generally higher than the average for the North
and South Kohala Districts. As a result, we
estimate that Mauna Lani, because of the higher
prices associated with each higher quality, would
capture slightly less than a pro rata share of the
increased demand projected for North and South
Kohala.

We estimate that Mauna Lani Resort could capture
about 35 percent of the projected new transient
accommodations demand for North and South Kohala
through 1995. Because of the large number of
beachfront and oceanfront sites in Mauna Lani and
the diminishing number of comparable quality sites
in the remainder of the resort region, we project
that its capture could increase to 25 to 30 per-
cent by the year 2000. These capture rates would
result in demand estimates of 600 units by 1990,
1,100 units by 1995 and 1,600 to 2,000 units by
2000.

2. Anticipated Supply

The most recent major addition to the supply of
transient accommodations on the Kohala Coast has
been the 351-room Mauna Lani Bay Hotel, completed
in February 1983.

The 80-unit Mauna Lani Terrace super-luxury
low-rise condominium apartments adjacent to the
Mauna Lani Bay Hotel were completed in December
1983. Also, one unit of the 23-unit, first
increment of the 40-unit ultra-luxury The Villas
at Mauna Kea near the Mauna Kea Beach Hotel was
completed in 1983, and the remainder of the first
increment in 1984. The last 17 units are scheduled
to be completed beginning in October 1984. We
anticipate that a few of the Mauna Lani Terrace
units and a few of The Villas at Mauna Kea units
will be made available for transient use. Con-
struction has commenced on the 66-unit first incre-
ment of the luxury 114-unit Shores at Waikoloa on
an 11.4-acre site in Waikoloa Beach Resort next to
the golf clubhouse.
Plans have been announced for the 1260-room Hyatt Regency Waikoloa Hotel on 60 acres in the Waikoloa Beach Resort, with a possible completion date of late 1987.

Mauna Lani Point, a 198-unit super-luxury condominium project, is scheduled for development on a 30-acre site generally surrounding Fairway 5 of the championship Francis I'i Brown Golf Course, with the first increment of 116 units scheduled for completion in about 1986. The Estates at Mauna Kea, the next project in the Mauna Kea Resort, would contain an estimated 26 units on about 51 acres and is projected for completion in 1987.

Plans have also been announced for the proposed development of Hapuna Beach Resort immediately to the south and to the east of Mauna Kea Resort. This project would be similar in quality to the Mauna Kea Resort and contain a resort hotel, beach and tennis club, championship golf course and resort residential uses. Present plans anticipate commencement of detailed design in 1986.

3. Occupancy Rates

The preceding demand analysis was based upon an overall occupancy of 70 percent among all transient accommodations, including both hotel units and resort multifamily units. In arriving at this average rate, we have estimated that hotels would operate at slightly higher occupancy rates, and multifamily units would operate at somewhat lower rates. Multifamily unit buyers tolerate lower than economic occupancy rates since such purchases are influenced by tax-benefit considerations.

4. Room Rates

Room rates will be a function of competition, the image and the relative attraction of the project, locational features, and type and quality of facilities developed.

Earlier discussion of the transient accommodations market in the Kohala Coast Resort Region indicated that the preponderance of the inventory was characterized as luxury or super-luxury. The Sheraton Royal Waikoloa Hotel is characterized as a luxury project compared to the super-luxury Mauna Kea Beach Hotel and the Mauna Lani Bay Hotel. Due to the geographic positioning of the proposed Hapuna Beach Resort, we anticipate that its quality would be at least that of a luxury resort and probably be closer in quality to its neighbor, the Mauna Kea Resort.

Table V-1 on Page 34 had shown that almost all of the rooms in North and South Kohala have published daily room rates of $100 or more for double occupancy, superior rooms. The $100 to $140 category is used here to indicate the luxury category, and includes the 543 rooms in the Sheraton Royal Waikoloa Hotel. The $200+ category indicates the super-luxury category, and includes 310 rooms in the Mauna Kea Beach Hotel and 351 rooms in the Mauna Lani Bay Hotel.

With the predominant share of rooms in the luxury and super-luxury categories, much of the product marketing will be directed toward similar market segments. With the aggregate promotional effort directed at a relatively narrow market segment, we believe that basic demand for luxury and super-luxury product will be expanded. Until recently, we estimate that tens of thousands of dollars had been spent annually to advertise the area through the efforts of one hotel. During the last few years, millions of dollars have been spent by the resorts and hotels. We estimate that millions of dollars soon will be expended annually to promote the Kohala Coast Resort Region. This concentration of promotional programs will likely modify the historical patterns of tourism activity on the Big Island. In the future, we anticipate that a larger segment of the Big Island’s market will consist of the luxury and super-luxury component, largely destined to the Kohala Coast. This shift in market characteristics began with the completion of the Sheraton Royal Waikoloa Hotel and has been accentuated by each major development since.

Thus, it is likely that a disproportionate share of the future market potential would be the luxury and super-luxury components.

As such, we estimate that the next hotel at Mauna Lani should be in the same super-luxury category as the Mauna Lani Bay Hotel. This is needed to help
achieve a "critical mass" in Mauna Lani of super-luxury facilities and attractions required for market recognition as a premium resort.

VII. MARKET ANALYSIS FOR RESORT MULTIFAMILY UNITS

A. Market Indicators

Resort multifamily units serve a number of purposes and are purchased for a number of motives. They may be used by the owner as a primary residence, used on a short-term basis as transient accommodations, rented on a long-term basis to year-round residents, or used occasionally as a second or vacation home by owners and their guests. These possible uses in turn, are influenced among other things by such factors as the location of the project, the character of its surroundings, and how the project is promoted and sold.

It is likely that resort multifamily units could be made available for short-term rental purposes. Since there is a general lack of housing in the Kohala Coast compared to the relatively rapid rate of economic activity, some of the units would likely be utilized by full-time residents, too.

In general, the composite of these typical uses are reflected in historical multifamily unit sales data. However, this particular analysis is complicated by the lack of historical data in the immediate market area. Multifamily projects developed outside the three coastal resorts are not directly comparable to properties within the resorts. Further, each resort has sales experience for only one project.

The experience of resort multifamily unit sales in Kona is not directly comparable either, due to the different characteristics of the Kona resort district. For example, Kona does not possess white sand beaches or extensive golfing activities, and in general has more passive visitor activities than does the Kohala Coast.

Resort projects on Maui appear to be somewhat more comparable in terms of beaches, climate and recreational amenities. On the other hand, even though there are three master-planned resorts on Maui and one more under construction, they are not located essentially adjacent to each other so that the planning, development, character, and aesthetics of the entire resort region can be controlled, as on the Kohala Coast.

Despite these differences, the limited data in the Kohala Coast Resort Region and the sales experiences in Kona and on Maui provide indicators that have aided us in formulating our conclusions.
1. Kohala Sales Activity

(a) Mauna Lani Terrace

This five-story project fronting an old Hawaiian fishing dock and a newly created lagoon consists of 60-units on a 13.2-acre site, resulting in an average development density of 6 units per acre.

Prices at Mauna Lani Terrace were from $275,000 to $345,000 for the 18 one-bedroom units, $355,000 to $555,000 for the 56 two-bedroom units and $705,000 to $895,000 for the 8 three-bedroom units. The average unit price initially was about $450,000.

Sales began in August 1982 and construction was completed in 1983. By October 1984, only four units remain unsold. Two sales have occurred, at prices 11 and 16 percent higher than their original prices.

A buyer analysis indicated that most of the purchasers were California residents. About 80 to 85 percent of the buyers had visited Kohala before and were familiar with the area, suggesting that many had been guests at the Mauna Kea Beach Hotel.

(b) The Villas at Mauna Kea

The Villas at Mauna Kea consists of a 40-unit leasehold one-story project on a 29.9-acre site surrounded by fairways of the Mauna Kea Beach Golf Course and overlooking the Mauna Kea Beach Hotel. Its development density is 1.3 units per acre. Sales of 23 units in the first increment began in early 1983, and by the end of the year, all had been sold. By October 1984, four units in the second increment had sold. Prices of the two-bedroom units ranged from $800,000 to $1,250,000 and the four-bedroom units in the first increment was priced at $1,235,000. The average price in Increment I was about $975,000.

(c) The Shores at Waikoloa Beach Resort

Sales of the first 66-unit increment of the 114-unit The Shores at Waikoloa Beach Resort began in January 1984. By October 1984, about half of the initial increment had been reported sold or reserved. The project will occupy an 11.4-acre fairway site and be located near the golf clubhouse.

Prices range from $175,000 for a one-bedroom unit to $500,000 for three-bedroom duplex units. The average price of units in the first increment is about $310,000.

(d) The Estates at Mauna Kea

This very high-quality, low-density, one-story leasehold project, currently in the design stage, is proposed for development within the Mauna Kea Resort. Planned are 4 detached and 22 duplex units on a site containing 51.6 acres. Selling prices are expected to be higher than prices for the Villas.

(e) Mauna Lani Point

Current plans for this project envision 198 super-luxury condominium apartment units developed in two increments, on a site which surrounds Fairway 5 of the Francis H. I'i Brown Golf Course. Its quality is to be similar to that of Mauna Lani Terrace, and with slightly higher prices.

In addition to these projects, preliminary plans have been announced for two retirement home projects in Waikoloa Village. Resort homes usually develop in proximity to hotels, as return visitors often choose to retire in the locale or to at least acquire property for their own use. Because of their ease of maintenance and relative security, multifamily units have become a very popular means of responding to this type of demand. Although the Mauna Kea Beach Hotel has been operating since 1965, no luxury units had been offered for sale in the Kohala Coast Resort Region until 1982.
Thus, pent-up demand existed in the region. In fact, it is our opinion that Mauna Lani Terrace and the Villas at Mauna Kea were absorbed mainly by pent-up demand generated by the multiple return guests of the Mauna Kea Beach Hotel.

2. Multifamily Unit Activity
   In Other Resort Regions

Due to the limited availability of multifamily unit activity in the Kohala Coast Resort Region, market activities and conditions in other resort regions were studied in order to aid in estimating the Kohala Coast market potential. The three other regions investigated were Kona, West Maui (Lahaina to Kapalua) and Kihel-Makena (Kaalea, Kihel, Wailea and Makena).

First, the visitor plant inventory (that is, the inventory of accommodations available to visitors for transient use) in North and South Kohala and the other three resort regions was delineated into hotel units and multifamily units. The results, presented in Table VII-1, show that the proportion of multifamily units in the inventory of transient accommodations has increased steadily in West Maui and Kona. By 1984, this proportion appeared to be approaching 50 percent as an equilibrium level. On the other hand, the proportion of multifamily units in Kihel-Makena was relatively higher in 1970, and appears to be reaching an equilibrium level higher than in Kona or West Maui.

North and South Kohala are just beginning to include multifamily units as a significant part of their inventory of transient accommodations.

Table VII-2 shows the trends in the proportion of multifamily units in each resort region available for transient accommodations. This proportion has generally tapered between 40 and 50 percent in West Maui. In Kihel-Makena, the proportion has dropped to between 40 and 50 percent, with a trend toward the lower part of the range. The proportion of multifamily units in Kona used for transient accommodations has vacillated, but since 1980, has trended upward and appears to be leveling between 40 and 50 percent. In Kohala, the share of multifamily units in transient use has increased, and by 1984 was increasing very rapidly.

<table>
<thead>
<tr>
<th>Year</th>
<th>West Maui</th>
<th>Kihel-Makena</th>
<th>Kona</th>
<th>North and South Kohala</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>21%</td>
<td>47%</td>
<td>14%</td>
<td>0%</td>
</tr>
<tr>
<td>1975</td>
<td>42%</td>
<td>75%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>1980</td>
<td>46%</td>
<td>62%</td>
<td>15%</td>
<td>11%</td>
</tr>
<tr>
<td>1984</td>
<td>50%</td>
<td>71%</td>
<td>38%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Source: Hawaii Visitors Bureau, Visitor Plant Inventory (February of indicated years); Ming Chew Associates

<table>
<thead>
<tr>
<th>Year</th>
<th>West Maui</th>
<th>Kihel-Makena</th>
<th>Kona</th>
<th>North and South Kohala</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>50%</td>
<td>98%</td>
<td>28%</td>
<td>0%</td>
</tr>
<tr>
<td>1975</td>
<td>64%</td>
<td>47%</td>
<td>26%</td>
<td>18%</td>
</tr>
<tr>
<td>1980</td>
<td>52%</td>
<td>44%</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>1984</td>
<td>59%</td>
<td>44%</td>
<td>45%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Source: Hawaii Visitors Bureau, Visitor Plant Inventory (February of indicated years); Ming Chew Associates
B. Projected Demand for Resort Multifamily Units in North and South Kohala

The proportion of multifamily units in the visitor plant inventory and the proportion of total multifamily units used as transient accommodations were projected for North and South Kohala based upon the preceding analyses. These projections were then applied to the projections of total transient accommodations made earlier.

Our analysis indicated that the share of multifamily units trended toward 50 percent for both Kona and West Maui, and we estimated that the visitor plant mix in Kohala would approach about the same level.

However in 1984, the proportion was only 12 percent on the basis of total transient accommodations and 10 percent on the basis of estimated transient units actually needed. We projected that the share of multifamily units would increase gradually to 15 percent in 1985, 25 percent in 1990, 35 percent in 1995 and 45 percent in 2000. These factors were applied to projected total demand for transient accommodations to delineate the demand for hotel units and multifamily units.

Then, we projected that the proportion of multifamily units used as transient accommodations would increase from about 20 percent in 1984 to 50 percent in 1985, and remain at that level to 2000. That is, we estimate that beginning in 1985, the number of multifamily units projected to be needed for transient accommodations would be about half of the total multifamily units. Thus, the total projected number of multifamily units would be two times the number needed for transient accommodations. These results are shown in Table VII-3.

The table also shows the projected net demand in excess of the actual 1984 inventory. As seen, we estimate that a surplus of hotel units exists in North and South Kohala. This condition should reverse by 1985. At that time, we project there would be a net new demand for 30 hotel units and 200 multifamily units for transient use over and above the existing February 1984 inventory. Therefore, projected net new demand for both types of transient accommodations would continue to increase.

Table VII-3

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Hotel</th>
<th>MF</th>
<th>Total</th>
<th>Hotel</th>
<th>MF</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>1,100</td>
<td>900</td>
<td>1,000</td>
<td>100</td>
<td>100</td>
<td>300</td>
<td>50</td>
</tr>
<tr>
<td>1985</td>
<td>2,000</td>
<td>85</td>
<td>1,700</td>
<td>35</td>
<td>300</td>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td>1990</td>
<td>3,600</td>
<td>75</td>
<td>2,700</td>
<td>25</td>
<td>200</td>
<td>50</td>
<td>1,800</td>
</tr>
<tr>
<td>1995</td>
<td>5,900</td>
<td>65</td>
<td>3,600</td>
<td>35</td>
<td>1,100</td>
<td>50</td>
<td>4,200</td>
</tr>
<tr>
<td>2000</td>
<td>7,900</td>
<td>55</td>
<td>4,300</td>
<td>45</td>
<td>3,600</td>
<td>50</td>
<td>7,200</td>
</tr>
</tbody>
</table>

Actual Units in 1984(2) 1,400 1,300 100 400

Net Demand Forecast(3)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hotel</th>
<th>MF</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>300</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1985</td>
<td>600</td>
<td>400</td>
<td>200</td>
</tr>
<tr>
<td>1990</td>
<td>2,200</td>
<td>1,400</td>
<td>800</td>
</tr>
<tr>
<td>1995</td>
<td>4,500</td>
<td>2,500</td>
<td>2,000</td>
</tr>
<tr>
<td>2000</td>
<td>6,500</td>
<td>3,600</td>
<td>3,500</td>
</tr>
</tbody>
</table>

(1) Multifamily
(2) February 1984, rounded.
(3) Gross demand forecast, less actual units in February 1984.

SOURCE: Ming Chew Associates
C. Projected Demand for Multifamily Apartment Units in Mauna Lani Resort

1. Number of Units

Earlier, we estimated that Mauna Lani Resort should capture 25 percent of the potential demand for transient accommodations in North and South Kohala through 1995, increasing to 15 to 30 percent by the year 2000. We estimate also that this factor would be applicable for both hotel and multifamily unit demand.

Applying this capture rate to the North and South Kohala demand projections produces the results shown in Table VII-4.

2. Price of Units

Our projections of achievable prices for resort multifamily units in Mauna Lani Resort have been based largely on the prices achieved for properties in the three existing resorts. Table VII-5 shows selected characteristics of these projects.

In general, the properties in the Mauna Kea Resort are the largest in size and density, smallest in number, largest in area and even though they are leasehold projects, are by far the highest in price.

Mauna Lani Terrace is a relatively low density project which fronts a lagoon and old Hawaiian fishpond. It contains eighty units, and has an average density of 6.0 units per acre. The project contains 1-, 2-, and 3-bedroom units with an overall average unit size of 1,800 square feet, including lanais. The overall average selling price was about $450,000.

The Shores at Waikoloa Beach Resort occupies a fairway site and will contain 114 1-, 2-, and 3-bedroom units and have an average density of 10.0 units per acre. The overall average size of the units will be about 2,000 square feet and the average price for units in the first increment is about $300,000.

In making our projection of achievable unit prices for multifamily units in Mauna Lani Resort, we have taken a number of factors into account. They

---

Table VII-4

<table>
<thead>
<tr>
<th>Net Increase From 1984(1)</th>
<th>Projected Transient Accommodations Demand</th>
<th>MP Units For Other Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total(2)</td>
<td>Hotel Units(3)</td>
</tr>
<tr>
<td>1990</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>1995</td>
<td>1,100</td>
<td>700</td>
</tr>
<tr>
<td>2000</td>
<td>1,400-</td>
<td>900-</td>
</tr>
<tr>
<td></td>
<td>1,600-</td>
<td>1,100</td>
</tr>
<tr>
<td></td>
<td>1,800</td>
<td>1,400</td>
</tr>
</tbody>
</table>

(1) February 1984.
(2) Estimated to be 25 percent of North and South Kohala transient accommodations demand through 1995, and then 15 to 30 percent in the year 2000.
(3) Estimated to be 30 percent of North and South Kohala hotel demand through 1995, and then 30 to 35 percent in the year 2000.

Sources: Ming Chew Associates
Table VII-5  SELECTED RESORT MULTIFAMILY  
PROJECT CHARACTERISTICS  
Kohala Coast Resort Region  
County of Hawaii, State of Hawaii  

<table>
<thead>
<tr>
<th>Project</th>
<th>Frontage</th>
<th>Height</th>
<th>Density of Site</th>
<th>Number of Units</th>
<th>Average Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mauna Lani Resort</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Villas</td>
<td>Golf</td>
<td>1-Story</td>
<td>1.3</td>
<td>40</td>
<td>$975,000(14)</td>
</tr>
<tr>
<td>The Estates(3)</td>
<td>Golf</td>
<td>1-Story</td>
<td>0.5</td>
<td>26</td>
<td>$1,500,000(14)</td>
</tr>
<tr>
<td>Mauna Lani Terrace</td>
<td>Lagoon</td>
<td>3-Story</td>
<td>6.0</td>
<td>80</td>
<td>$450,000</td>
</tr>
<tr>
<td>Mauna Lani Golf Point(3)</td>
<td>Fairway</td>
<td>2-Story</td>
<td>6.0</td>
<td>198</td>
<td>$500,000</td>
</tr>
<tr>
<td>Waikoloa Beach Resort</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Shores</td>
<td>Golf</td>
<td>1-2-2</td>
<td>10.0</td>
<td>114</td>
<td>$110,000(2)</td>
</tr>
<tr>
<td>Proposed Kauna Beach Resort(4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Bluffs</td>
<td>Ocean</td>
<td>2-Story</td>
<td>4</td>
<td>150</td>
<td>$550,000 - $700,000(31)</td>
</tr>
<tr>
<td>Other Projects</td>
<td>Golf</td>
<td>2-Story</td>
<td>Vari</td>
<td>2,000</td>
<td>$400,000 - $450,000(14)</td>
</tr>
</tbody>
</table>

(1) = Leasedhold  
(2) Includes land and deck areas.  
(3) Preliminary data.  
(4) Estimated preliminary characteristics and prices.

SOURCE: Ming Chew Associates

Include the very high-quality development these for Mauna Lani, variety of development sites, quantity and variety of existing and planned resort activities and overall planning flexibility. Thus, while maintaining the overall development of super-luxury quality, Mauna Lani also could be very responsive to and could accommodate a broader range of market needs. Further, its quantity and variety of resort activities provides Mauna Lani with the opportunity to actually induce or create increments of potential market demand.

The extensive ocean and beach frontage in Mauna Lani add to its ultimate potential attraction. Also important is the concentration of planned activities around existing and beachfront hotels and their facilities and services. As a result, hardly any site in the current development plan is further than one-half mile, or about a ten-minute walk, from any potential beachfront hotel site.

In addition to proximity to beaches, the extent of planned activities also creates the possibility for developing projects with specialized orientations. For example, projects adjacent to the planned tennis club might be oriented and marketed to tennis enthusiasts. Other sites near the existing or planned clubhouses might be developed with golf and country club memberships in mind.

Projects that are developed around special themes can use these themes as major attractions for marketing purposes. With such additional amenities, these projects might be developed at higher densities or with smaller unit sizes, and still sustain the overall quality of Mauna Lani. Projects without special themes or features would have to depend upon their intrinsic quality and aesthetics to support Mauna Lani's super-luxury image.

In preparing our forecasts, we have divided our demand estimates into three categories of relative quality, labeled higher-quality, mid-quality and lower-quality. In general, the existing Waikoloa Beach Resort project is an example of what we have designated as mid-quality. The category labeled lower-quality, would include projects with specialized themes and probably contain smaller units at higher densities. The higher-quality category, as
currently envisioned, would represent properties of a generally higher quality than the existing Mauna Lani Terrace.

Table VII-6 shows the projected demand for multifamily units at Mauna Lani Resort delineated by relative quality. As seen, the forecast of potential market demand is about equally divided among the three categories of units, with slight preferences for the mid- and lower-quality categories. By 1980, the additional 400 units projected to be in demand are divided into 100 units in the higher-quality category, 150 in the mid-quality category, and 150 in the lower-quality category. By 1985 results in 200, 300 and 300 units, respectively, in the higher-, mid-, and lower-quality categories. By 2000, the distribution would result in projected additional demand for 400 to 500 higher-quality units, 500 to 600 mid-quality units, and 500 to 700 lower-quality units, for a total additional demand of 1,400 to 1,600 multifamily units.

Associated characteristics that we believe are appropriate for the three quality categories are also shown in Table VII-6. In general, we estimate that characteristics of the mid-quality units would approximate those of the existing Mauna Lani Terrace units. That is, the average price would be $450,000 (in 1984 dollars) and the unit size would be about 1,800 square feet. We estimate the average density should be about 5 units per acre, or slightly lower than that achieved at Mauna Lani Terrace. As indicated in Table VII-6, appropriate characteristics for higher-quality units would be an average unit price of $550,000 (in 1984 dollars), average unit size of 2,200 square feet and an average density of 4 units per acre. Estimated characteristics for the lower-quality category are an average unit price of $350,000 (1984 dollars), unit size of 1,400 square feet and average density of 6 units per acre. These estimated average characteristics are projected to be appropriate through 2000.

Table VII-6

<table>
<thead>
<tr>
<th></th>
<th>Higher-</th>
<th>Mid-</th>
<th>Lower-</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quality</td>
<td>Quality</td>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>Net Unit Demand</td>
<td>100</td>
<td>150</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$550,000</td>
<td>$450,000</td>
<td>$350,000</td>
<td></td>
</tr>
<tr>
<td>Average Unit Size, Sq. Ft.</td>
<td>2,200</td>
<td>1,800</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Higher-</th>
<th>Mid-</th>
<th>Lower-</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quality</td>
<td>Quality</td>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>Net Unit Demand</td>
<td>200</td>
<td>300</td>
<td>300</td>
<td>800</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$550,000</td>
<td>$450,000</td>
<td>$350,000</td>
<td></td>
</tr>
<tr>
<td>Average Unit Size, Sq. Ft.</td>
<td>2,200</td>
<td>1,800</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Higher-</th>
<th>Mid-</th>
<th>Lower-</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quality</td>
<td>Quality</td>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>Net Unit Demand</td>
<td>400-500</td>
<td>500-600</td>
<td>500-700</td>
<td>1,400-1,800</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$550,000</td>
<td>$450,000</td>
<td>$350,000</td>
<td></td>
</tr>
<tr>
<td>Average Unit Size, Sq. Ft.</td>
<td>2,200</td>
<td>1,800</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

(1) In excess of February 1984 Actual Supply.

SOURCE: Ming Chew Associates
VIII. MARKET ANALYSIS FOR RESORT SUBDIVISION HOUSELOTS

Resort subdivision houselots are part of the variety of choices available to potential buyers seeking to purchase resort properties. Just as with resort multifamily properties, resort house lots respond to the market demand both for vacation homes and investment properties, and for permanent residences. Moreover, house lots may be improved with houses shortly after purchase, or they may be held for many years before being improved. Thus, this section consists not only of the demand for house lots, but also of the demand for houses and lot packages.

A. Market Indicators

Currently, the only resort subdivision house lots in the Kohala Coast Resort region are located in the Mauna Kea Resort. They are located in The Fairways at Mauna Kea, South which contains 33 lots and The Fairways at Mauna Kea North with 32 lots.

Fairways South consists of lots ranging in size from 10,000 to 15,000 square feet. The lots are surrounded by extensive open areas so that the overall density of the project is slightly less than 0.5 lots per acre, or one lot per two overall acres. The lots were offered initially in the early 1970's and have all been sold on a leasehold basis. Two-thirds of the lots are improved and other houses are being planned. About 25 percent of the completed houses are occupied full-time.

Fairways North lots contain a minimum of 22,000 square feet. These are clustered, with each cluster surrounded by extensive open space. The project's overall density is about 0.6 lots per acre, or one lot per about 1.7 acres. The leasehold lots were offered for sale beginning in late 1982 for prices ranging from $175,000 to $200,000, or an average price of $185,000. To date, 12 lots have been sold.

Urban subdivision lots are available in Waikoloa Village several miles from the coastal resorts. Although some lots front the Waikoloa Village Golf Course or have ocean views, there are not considered comparable to the resort subdivision house lots envisioned in the proposed Hapuna Beach resort.

B. Projected Demand for House Lots

Our demand analysis has been based upon the experience of the Mauna Kea Resort, and the results of a study which evaluated the marketability of The Villas and The Fairways at Mauna Kea North. As part of the study, persons who had indicated an interest in properties at Mauna Kea were asked what type of property they would be most interested in purchasing. Twenty percent indicated a house lot or a detached house and lot. Eighty percent indicated a multifamily unit. Thus, the number of respondents interested in a detached-type unit amounted numerically to 25 percent of the number indicating an interest in a multifamily unit.

One deterrent to buying a lot is the burden of having to design and build a house. In fact, of the survey respondents indicating an interest in a detached unit, only one-third were interested in buying a lot, and two-thirds were interested in purchasing a "detached house and lot." Applying a factor of one-third to the 25 percent, indicates that about 8 percent of those interested in multifamily units might be interested in a resort subdivision house lot. Our experience indicates that the demand for luxury subdivision house lots of the very high quality envisioned at Mauna Lani will be mainly from return visitors who previously had visited the resort. In the case of Mauna Kea Resort, where the hotel had operated for many years before properties were available for purchase, the actual factor might be higher than 8 percent. In the case of Mauna Lani, however, the ratio is probably slightly lower than 8 percent due to the limited number of return visitors to date.

These considerations are reflected in the forecast of Mauna Lani subdivision house lot demand shown in Table VIII-1. As seen, we estimate that demand for resort subdivision house lots would appropriate 7 percent of the multifamily unit demand. Further, we believe that the proportion of lot buyers will decrease in the future as other products become more available. As

Table VIII-1  FORECAST OF SUBDIVISION HOUSELOT DEMAND  MAUNA LANI RESORT Kohala Coast Resort Region County of Hawaii, State of Hawaii 1990-2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Projected Total Multifamily Unit Demand</th>
<th>Estimated Ratio of Resort Houselot Demand</th>
<th>Estimated Resort Houselot Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>400</td>
<td>0.07</td>
<td>25</td>
</tr>
<tr>
<td>1995</td>
<td>800</td>
<td>0.06</td>
<td>50</td>
</tr>
<tr>
<td>2000</td>
<td>1,400-1,800</td>
<td>0.05</td>
<td>70-90</td>
</tr>
</tbody>
</table>

(1) Increase from February 1984.

SOURCE: Ming Chew Associates

Such, we project that the ratio of related demand will decline to about 6 percent in 1995 and about 5 percent in 2000.

Based upon the projected demand for multifamily units indicated earlier, these ratios would result in an estimated demand for 25 house lots in Mauna Lani in 1990, 50 in 1995 and 70 to 90 in the year 2000.

C. Projected Prices for House lots

The Fairways North and South have very low densities of 0.5 and 0.8 units per acre, which project an image of exclusivity and privacy. In keeping with the very high quality, super-luxury image being created for Mauna Lani, some subdivision projects could be developed in the resort at densities equivalent to, or less than, those achieved in Fairways North and South.

However, the variety of possible subdivision sites and potential for locating them close to or in conjunction with special activities would permit expanding the range of quality and thereby respond to a greater range of market demands. Thus, our projection of subdivision house lot demand, just as with the multifamily unit demand, has been divided into three relative categories of quality. Similarly, as with the multifamily demand, the categories are labeled higher-quality, mid-quality, and lower-quality.

Table VIII-2 delineates the projected demand, and shows associated price and density characteristics. Estimated prices for the mid-quality lots were based upon current sales prices at Fairways North. We envision that this category of subdivision house lots would have a slightly higher density of 1 unit per acre versus 0.8 units per acre at Fairways North. Also, topography of the Mauna Lani lots is likely to be flatter and without the extensive panoramic views of the ocean, although mountain views would be equivalent. On the other hand, we have assumed that this factor would be offset by creation of on-site amenities such as water features and gardens. The major adjustment, however, is the anticipated sale of Mauna Lani lots in fee simple versus the leasehold sales of Fairways North. Based upon these factors, we estimate that subdivision house lots in the mid-quality category with an average density of one lot per acre could achieve sales prices averaging about the same as Fairways North, or about $150,000 per fee simple lot. Higher-quality lots with a density of 0.5 or fewer lots per acre are projected to achieve average prices of...
Table VIII-2  FORECAST OF SUBDIVISION HOUSELOT DEMAND
HAUNA LANI RESORT
Kohala Coast Resort Region
County of Hawaii, State of Hawaii
1990-2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Higher Quality</th>
<th>Mid-Quality</th>
<th>Lower Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>1995</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

Average Lot Price, 1984

<table>
<thead>
<tr>
<th>Year</th>
<th>Higher Quality</th>
<th>Mid-Quality</th>
<th>Lower Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$450,000+</td>
<td>$350,000</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>1995</td>
<td>$450,000+</td>
<td>$350,000</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>2000</td>
<td>$450,000+</td>
<td>$350,000</td>
<td>$250,000</td>
<td></td>
</tr>
</tbody>
</table>

D. Projected Demand for House and Lot Packages

We anticipate that a number of prospective buyers will seek pre-designed and pre-constructed houses. These buyers may want customized houses, but prefer to bypass the design and construction phases.

The survey of persons interested in properties at Hauna Lani indicated that twice as many were interested in a "detached house and lot" as were interested in a "house lot." However, as the number of resort residential alternatives in the Kohala Coast resorts increases, we estimate that the relative proportion of buyers seeking a house and lot package will decline to approximately the same portion that would purchase house lots alone.

Thus, the projections appearing in Table VIII-1 would also represent, numerically, our demand estimates for house and lot packages. That is, the projected demand for house and lot packages in Hauna Lani Resort would be 25 houses by 1990, 50 by 1995 and 70 to 90 by 2000.

E. Projected Prices for House and Lot Packages

Prices for custom houses in resort areas vary widely since the houses express the individual tastes and preferences of their owners. As such, it is difficult to generalize about prices for house and lot packages.

However, in residential projects with a mix of housing types, we have found that detached houses generally sell for about one-third to one-half more than similar-sized attached multifamily units. We believe that these price differentials were influenced by affordability factors. In the case of the proposed resort properties, we project that personal preference rather than affordability will be the determining factor when choosing a particular type of unit.

Also, the variety of potential subdivision sites, the possibility of selecting selected projects toward special activities and the opportunities for creating unique environments for particular subdivision projects make even more difficult any generalizations about price differentials between detached houses and attached units in multifamily projects. Instead, we have made

$450,000 or more per fee simple lot. We estimate that the lower quality lots with an average density of 2 lots per acre could achieve sales prices averaging $250,000 per fee simple lot.
approximations of the value of detached houses that we envision being constructed, and have added those amounts to the estimated prices of the associated category of house and lot.

In the case of the higher-quality category, we estimate that the house cost would be at least $550,000, resulting in a minimum house and fee simple lot price of $1,050,000 in 1984 dollars. The cost of houses in the mid-quality category are projected to be approximately $450,000, for a total house and lot package price of about $800,000 in 1984 dollars. For the lower-quality category, average house cost is projected to be $350,000, resulting in a estimated house and lot price of $600,000.

These projections are shown in Table VIII-3.

<table>
<thead>
<tr>
<th>Year</th>
<th>Higher Quality</th>
<th>Mid-Quality</th>
<th>Lower-Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>House and Lot Demand</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$1,000,000+</td>
<td>$800,000</td>
<td>$600,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Higher Quality</th>
<th>Mid-Quality</th>
<th>Lower-Quality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>House and Lot Demand</td>
<td>10-15</td>
<td>20-25</td>
<td>40-50</td>
<td>70-90</td>
</tr>
<tr>
<td>Average Unit Price, 1984 $</td>
<td>$1,000,000+</td>
<td>$800,000</td>
<td>$600,000</td>
<td></td>
</tr>
<tr>
<td>Average Density, Units/Acre</td>
<td>0.5 or less</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
IX. MARKET ANALYSIS FOR GOLF COURSE

The capacity of a golf course is determined by numerous factors, including design and how course operations are managed. The latter item may be based upon the desired image or character of the course. This, in turn, is a function of player contact and pace of play, the course condition and the quality of maintenance without interfering with the enjoyment of play and, how the course relates to associated activities. The character of a course is exemplified by the Francis H. I'i Brown Golf Course in the Mauna Lani Resort and the Mauna Kea Golf Course in the Mauna Kea Resort. These courses are well-maintained and operated to enhance the exclusive, leisurely and luxurious ambiance of the respective resorts. In contrast, the character of the municipal Ala Wai Golf Course near Waikiki is one of accommodating as many golfers as possible, as a type of public service.

In many respects, it is the character of a course that determines its capacity.

Also, golf course activity exhibits monthly variations which reflect the seasonal patterns of golfing visitors who arrive mostly during winter months when adverse weather conditions prevent them from playing at home. Variations also occur for different days during the week, caused by local residents playing mostly on weekends due to weekday work schedules. Thus golf course capacity must be considered in the light of weekend and peak season activity.

There are three resort championship golf courses in the Kohala Coast Resort Region. The Mauna Kea Golf Course opened in conjunction with the Mauna Kea Beach Hotel in 1965. Then in 1981, both the Waikoloa Beach Resort Golf Course and the Francis H. I'i Brown Golf Course in the Mauna Lani Resort began operations. The start of play at the Waikoloa course coincided with the opening of the Sheraton Royal Waikoloa. On the other hand, play at Mauna Lani preceded by two years, the opening of the Waikoloa Bay Hotel.

At present, neither the Sheraton Royal Waikoloa nor the Mauna Lani Bay Hotels have reached the level they anticipate for stabilized operations. Therefore, it is difficult in these two cases to draw definitive relationships between resort activity and demand for golf rounds. It has been posited, however, to identify such relationships from the more extensive experience of the Mauna Kea Golf Course.

A. Mauna Kea Golf Course

Table IX-1 shows the annual number of rounds played on the Mauna Kea Golf Course from 1978 through 1982. As seen, the number of rounds declined steadily from 1978 through 1982, before rebounding slightly in 1983. Prior to 1978, we understand that activity had been relatively steady at slightly over 51,000 rounds per year.

Interestingly, the decline in annual rounds followed almost exactly the decline in the number of westbound visitors intending to visit the Island of Hawaii, except for 1980 and 1981. During these two years, the decline in westbound intended visitors was greater. This suggests that the pattern of play and possibly activity at the hotel were more stable than the country-wide visitor industry in general in 1980 and 1981. Although the number of westbound visitors intending to visit the Island began increasing in 1982, play at Mauna Kea continued declining. This was due to completion in 1981 of the golf courses at both Waikoloa Beach Resort and Mauna Lani Resort. In 1983, both the number of rounds of golf at Mauna Kea and the number of westbound intended visitors increased.

Even though more play was experienced prior to the opening of other resort golf courses on the Kohala Coast in 1981, representatives of Mauna Kea have indicated that for the image and character desired of the golf course, the number of annual golf rounds should not exceed 45,000. If play at Mauna Kea continues to follow the pattern of westbound intended Island visitors, which we believe it will, the course should be at its maximum desired level of play by the end of 1985. Once the Mauna Kea Golf Course reaches its maximum desired level of play again, we anticipate that operating policies of the course may change to restrict the number of rounds so that use of the course would be more comfortable and enjoyable for owners and guests at the Mauna Kea Resort.

Assuming that Mauna Kea activity will soon increase to its desired maximum level of 45,000 per year, and generally stabilize at about that level, it would amount to 145 annual golf rounds per room at the Mauna Kea Beach Hotel. Due to the golf course reputation developed over a number of years, many guests are at the Mauna Kea Resort largely for golf. Therefore, we believe that the ratio of golf rounds per room at the Resort is unusually high.
Table IX-1
MAUNA KEA GOLF COURSE ACTIVITY
MAUNA KEA RESORT
Kohala Coast Resort Region
County of Hawaii, State of Hawaii
1977 - 1983

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Number of Rounds</th>
<th>Annual Rounds Per Round(1)</th>
<th>Average Daily Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>51,100</td>
<td>165</td>
<td>140</td>
</tr>
<tr>
<td>1979</td>
<td>47,600</td>
<td>154</td>
<td>130</td>
</tr>
<tr>
<td>1980</td>
<td>47,500</td>
<td>153</td>
<td>130</td>
</tr>
<tr>
<td>1981</td>
<td>43,700</td>
<td>141</td>
<td>120</td>
</tr>
<tr>
<td>1982</td>
<td>38,800</td>
<td>125</td>
<td>106</td>
</tr>
<tr>
<td>1983</td>
<td>39,700</td>
<td>128</td>
<td>109</td>
</tr>
</tbody>
</table>

1) At the Mauna Kea Beach Hotel

SOURCE: Mauna Kea Beach Hotel; Ming Chew Associates

B. Forecast of Mauna Lani Resort Golf Demand

At present, the number of golf rounds generated at Mauna Lani is close to that achieved at Mauna Kea. Further, if occupancy is taken into account, it is likely that when Mauna Lani Bay Hotel approaches its desired level of operations, the number of golf rounds generated per room might be similar to that generated at Mauna Kea. Thus, heavy promotion of the course may also have resulted in an unusually high ratio of golf rounds per occupied unit at present. As occupancy increases, annual golf rounds per room at the Mauna Lani Bay Hotel could approach the same level of 145 rounds per room projected for the Mauna Kea Beach Hotel.

As other facilities are developed at Mauna Lani and less total emphasis is placed on golf alone, we forecast that the average golf demand generated at the resort would actually be about one-third less than that potentially generated by Mauna Kea Beach Hotel and Mauna Lani Bay Hotel.

At one-third less golf activity, we estimate that subsequent hotels at Mauna Lani would generate 100 annual rounds per room. Thus, the 400 hotel unit demand estimated for 1990 would generate about 40,000 additional rounds of golf for that year. By 1995, hotel-generated demand would amount to an estimated 70,000 annual rounds, and by 2000, 90,000 to 110,000 annual rounds.

Multifamily units and detached homes would also generate golf activity, but probably not as much as hotels. Assuming golf activity generated by non-hotel units might be about one-fourth of that generated by hotel units in the type of resort envisioned, the non-hotel units would produce a demand of about 11,000 annual rounds of golf in 1990, about 22,000 rounds in 1995 and 38,000 to 49,000 annual rounds in the year 2000.

Thus, the total projected additional golf demand would be 51,000 annual rounds in 1990, 92,000 in 1995 and 128,000 to 150,000 in 2000.

This amount of activity could not be accommodated at the existing golf courses in the Kohala Coast Resort Region since we estimate they would already be at their desired maximum capacities. In fact, we estimate that the existing Francis H. I'i Brown Golf Course will reach its desired maximum capacity by the time the
existing Mauna Lani Bay Hotel and Mauna Lani Terrace, and the planned Mauna Lani Point Project reach a stabilized level of occupancy.

Therefore, in order to support the golf demand generated by planned facilities in Mauna Lani Resort, an associated 18-hole high-quality championship golf course within the resort will be needed by the time the next hotel begins operations.

Based upon demand projections, and our assumption that play on Mauna Lani golf course would likely be limited to about 45,000 annual rounds, the second course would be at capacity by 1990. By that time, plans should be well underway for a third course. By 1995, we project that even the third course would be at capacity, and that plans should then be underway for a fourth course.

Provisions should be made to efficiently link subsequent golf courses to avoid the extensive plan revisions now needed to integrate the next golf course with the existing clubhouse.

X. MARKET ANALYSIS FOR COMMERCIAL LAND USE

Our commercial land use demand forecast is based upon estimated visitor spending within Mauna Lani resort. Some spending by visitors staying at Mauna Lani will occur outside the resort, but we estimate that this leakage would be more or less offset by expenditures made by persons attracted to Mauna Lani from outside the resort. Furthermore, our estimates of commercial land use demand have not included either expenditures by potential full-time residents in Mauna Lani or office space demand. Therefore, our demand projections are conservative.

A. Estimated Visitor Spending

Visitor retail spending is mainly a function of daily on-site visitors and their spending habits.

We have estimated the number of visitors based upon prior projections of transient accommodations. Even though we expect the hotels to achieve a higher occupancy than the multifamily units in transient use, to simplify our calculations, we have assumed that both types of transient accommodations would operate at 70 percent occupancy. Further, we estimate that each type would accommodate visitors with an average party size of 2 persons.

The earlier projections indicated demands for 600 transient accommodation units in 1980, 1,100 in 1995 and 1,600 to 2,000 in 2000. Table X-1 delineates these projections into hotel and multifamily units and applies occupancy rates and estimated party sizes to get projected average daily visitor censuses for each type of accommodations.

Visitor expenditures are estimated periodically by the Hawaii Visitors Bureau. The latest survey was conducted in 1983, but its results have not been tabulated or released. The most recent Bureau data from the 1980 survey, is outdated.

Further, the Bureau's survey measures average expenditures, and it is not appropriate for evaluating expenditures in super-luxury resorts such as Mauna Lani.

Instead, we have relied upon estimates provided on a confidential basis by operators of resorts whose experience we consider to be applicable to Mauna Lani Resort. Based upon these results, we estimate that for the quality of projects envisioned and the types of clientele
<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Daily Hotel Visitors</strong></td>
<td>560</td>
<td>980</td>
<td>1,260-1,540</td>
</tr>
<tr>
<td><strong>Average Daily Multifamily Unit Visitors</strong></td>
<td>280</td>
<td>560</td>
<td>980-1,260</td>
</tr>
<tr>
<td><strong>Total Average Daily Mauna Lani Visitors</strong></td>
<td>840</td>
<td>1,540</td>
<td>2,240-2,800</td>
</tr>
<tr>
<td><strong>Potential Daily Restaurant Expenditures, 1984 $</strong></td>
<td>8,400</td>
<td>16,800</td>
<td>$29,400-$37,800</td>
</tr>
<tr>
<td><strong>Potential Daily Groceries Expenditures, 1984 $</strong></td>
<td>4,200</td>
<td>8,400</td>
<td>14,700-18,900</td>
</tr>
<tr>
<td><strong>Potential Daily Other Retail Expenditures, 1984 $</strong></td>
<td>12,600</td>
<td>23,100</td>
<td>31,600-$42,000</td>
</tr>
<tr>
<td><strong>Total Potential Daily Expenditures, 1984 $</strong></td>
<td>25,200</td>
<td>48,300</td>
<td>$77,700-$98,700</td>
</tr>
</tbody>
</table>

Source: Ming Chew Associates

Attraction and their likely expenditure patterns, Mauna Lani Resort hotel visitors would spend an average of $60 per day for food and beverages and $25 per day for gifts, clothing, souvenirs and other retail items. Multifamily unit guests would spend an estimated $20 per day for food and beverages in restaurants, $15 per day on groceries and $25 per day for gifts, clothing, souvenirs and other retail items.

We have assumed that all of the hotel guests' food and beverage expenditures would be captured at the hotels, and all of the multifamily unit guests' expenditures would potentially be captured elsewhere. While some hotel guests would likely eat off-premises, these expenditures would likely be offset by multifamily guests eating at the hotels. We further estimate that potential expenditures made by both hotel and multifamily unit visitors for other items outside the hotels would average $15 per day. These factors were used to calculate the potential daily expenditures also shown in Table X-1.

B. Commercial Land Use Demand

Daily expenditures were converted to annual expenditures and then into estimates of commercial land use demand. This was done by first converting annual potential sales into estimated commercial sales space demand using an estimated ratio of $350 of annual sales (in 1984 dollars) per square foot.

Relating floor space demand to corresponding land area demand involves a number of subjective considerations. Given the desired very high-quality environment for Mauna Lani, we envision a low-density, single level free-standing commercial complex. Based upon an analysis of smaller, high-quality centers, we estimate that a land use conversion factor of 5,000 square feet leasable area per acre would permit the type of ambience desired. This would allow ample land for parking, landscaping and other non-leaseable common areas.

As seen in Table X-2, applying these factors results in estimated commercial land use demand for 5 acres in 1990, 10 acres in 1995 and 16 to 21 acres in 2000.

C. Other Factors

As mentioned earlier, these marketability estimates are considered to be conservative. First, demands based upon expenditures by full-time residents were not
### Table X-2: Forecast of Commercial Land Use Demand

**Mauna Lani Resort**

Kohala Coast Resort Region

County of Hawaii, State of Hawaii

1990-2000

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Potential Daily Expenditures, 1984 $</td>
<td>$25,200</td>
<td>$46,300</td>
<td>$77,700-98,700</td>
</tr>
<tr>
<td>Total Potential Annual Expenditures, 1984 $</td>
<td>$9,200,000</td>
<td>$17,600,000</td>
<td>$20,400,000-36,000,000</td>
</tr>
<tr>
<td>Sales Volume Ratio, 1984 $ per Sq. Ft.</td>
<td>350</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Indicated Commercial Space Demand, Sq. Ft.</td>
<td>26,300</td>
<td>50,300</td>
<td>81,100-102,900</td>
</tr>
<tr>
<td>Land Use Conversion Factor, Sq. Ft. per Acre</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Indicated Commercial Land Use Demand, Acres</td>
<td>5</td>
<td>10</td>
<td>16-21</td>
</tr>
</tbody>
</table>

*Source: Ming Chew Associates*

Included in our projection. In addition, we have not estimated the potential demand for office space.

If these two items were included, we believe that slight increments of commercial land use demand could be added to the projections shown.
XI. DEMAND FOR RESORT SUPPORT FACILITIES

In addition to the types of land uses usually associated with resort development, there are a number of auxiliary supporting uses that are needed. Already, we have indicated that existing support uses at Hauna Lani are being accommodated by special permit on lands currently in the State Agricultural District.

Some of these facilities are required for overall resort development, such as the resort developer's offices, sewage treatment plant and industrial shop areas. Others are needed for individual projects, such as warehouses to store hotel supplies. A few of these uses might be accommodated among the usual resort facilities, but most would violate the high-quality, luxurious and serene ambience of Hauna Lani if located in the vicinity of hotels or multifamily projects. In the case of hotel supply storage, ocean-front sites are too valuable for other uses than for extensive warehousing.

As Hauna Lani expands, demand for auxiliary support areas will increase. Logically, these areas should be removed from the resort core.

Our analysis indicates that approximately 25 acres are in support uses at present in Hauna Lani. Approximately 19 acres are for overall resort development use and would need to be expanded only slightly as the resort expands. About 6 acres, or about 0.014 acres per unit, appear to be project specific. Based upon our projected demand for units, we estimate that auxiliary support uses would require an additional 12 acres by 1990, 22 by 1995 and 34 to 43 by 2000.

Additional increments of demand are likely to be generated by increased construction activity and planned commercial uses. After adding small amounts for these demands, our estimates for total additional auxiliary services land use demand would be 35 acres by 1990, 30 by 1995 and 45 to 55 by 2000.

Thus, including existing auxiliary land uses, cumulative demand in 1990 would be 40 acres, 55 acres in 1995 and 70 to 80 in 2000.

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Appendix B
Language: en
Task: Reading
Document Type: Report
Document Title: NAUNA LAKI RESORT
Document Subtitle: Economic and Fiscal Impact Assessment of Planned Developments at Nauna Laki Resort, Island of Hawaii
Author: PEAT MARWICK
Date: April 1988

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Projected Absorption of Resort Units
Projected Commercial Space Demand

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I - INTRODUCTION AND PROJECT DESCRIPTION

In June 1984 Belt Collins & Associates (BCA) engaged Peat, Marwick, Mitchell & Co. (Peat Marwick) to prepare an economic and fiscal impact assessment of the expansion of the Mauna Lani Resort (Resort) on the Island of Hawaii. This chapter presents the background and scope of our assistance, describes the revised master plan and summarizes the market support for proposed land uses at the Resort.

BACKGROUND

Mauna Lani Resort, Inc. (Mauna Lani) is requesting that the Hawaii State Land Use Commission (LUC) designate approximately 654 acres of Mauna Lani's lands for urban use. Together with other lands already designated for urban use, the restricted land would enable the development of a revised master plan for the Resort. The revised master plan would include an additional 18 holes of golf, relocation of a hotel site and lower density development of resort residential units. The total development of the Resort with or without the proposed master plan revisions would be about 3,000 hotel rooms and 3,100 resort residential units.

In submitting the petition to the LUC, an Environmental Impact Statement (EIS) may be required. In this regard, your firm has engaged Peat Marwick to evaluate the economic and fiscal impacts of the proposed developments.

SCOPE OF ASSISTANCE

This report projects direct and indirect economic and fiscal impacts for two scenarios of the master plan for the Resort. These scenarios are:

- Existing master plan
- Revised master plan

Impacts are projected over a 15-year period (1985 to 2000) and at the potential maximum development of the Resort in terms of the following:

- Economic impacts:
  - Visitor expenditures
  - Employment
  - On- and off-resort residential population growth
  - Visitor population growth
  - Personal and household income
  - State and County of Hawaii costs and benefits

- Social and fiscal impacts:
  - Employee housing
  - Education
  - Police, health and fire protection
  - Recreation

The basis for projection of the economic and fiscal impacts of the Resort is the estimated development timetable of visitor units at the Resort. In November 1984 King Cheo Associates conducted a market study for the revised master plan which estimated the market support and potential absorption of visitor units at the Resort. In assessing economic and fiscal impacts under both master plans, we will rely on these assumptions as stated in the study entitled "Market Analysis for Mauna Lani Resort" conducted by King Cheo Associates.

SUMMARY OF THE REvised MAUNA LANI RESORT MASTER PLAN

Mauna Lani Resort is a major destination resort development located on 775.5 acres of land on the South Kohala district on the Island of Hawaii. Plans for this development have already been approved by the County of Hawaii (County). Plan for the existing master plan would permit a maximum of 3,000 hotel rooms, 3,100 residential units and related amenities and facilities. Completed projects at the Resort include the 251-room luxury-class Mauna Lani Bay Hotel, the 60-unit Mauna Lani Terrace condominium and the 18-hole championship Francis I'i Brown Golf Course and Clubhouse.

The original master plan envisioned a world-class resort with low-density and low-profile developments combining a variety of complimentary land uses.

Subsequent to statement of the Resort's original master plan, several factors have contributed to a need for revisions in order to better accommodate visitors to the Resort. These factors include:

- Emergence of the Kohala Coast as a leading luxury resort area in Hawaii
- Together with Mauna Kea Resort, Waikoloa Beach Resort and Hualalai Resort, Mauna Lani Resort has earned a reputation for thoughtful, high-quality master-planned resort development. The resort's excellent climate, the creation of sandy beaches and the development of a critical mass of luxury facilities and amenities have set the tone for continued development of the highest-quality facilities in the state.
- Demonstrated demand for superluxe resort units. As demonstrated by the relatively rapid sales rate of the condominium units offered at Mauna Lani Terrace and by the projections of King Cheo & Associates in the "Market Analysis for Mauna Lani Resort," the demand apparently exists for superluxe units at Mauna Lani Resort. By 1990 the demand for 850 hotel, multifamily and single-family lots or units is projected at the Resort; by 1995 the demand is projected for 1,000 lots or units; and by 2000, 2,240 to 3,000 lots or units would be required.
- Occasional inability of the existing Francis I'i Brown Golf Course to meet the current level of golf demand. Currently, due to the quality and challenging reputation of the existing course, the demand is such that local and visiting golfers have to be turned away during certain peak periods. The Resort currently has only 430 completed condominium and hotel units. With more unit completions, King Cheo & Associates projects that a second and possibly three or four additional golf courses will be required by visitors to and residents of the Resort by the year 2000.
Thus, in order to respond to the changing conditions which have occurred since the Resort's original plan, Kama Lani is requesting the LUC to amend the State land use district boundaries by recategorizing 654 acres of land to urban use. The reclassification would permit the Resort to implement a revised master plan.

The major objectives of the revised plan are to:

- Accommodate lower residential unit densities in order to respond to the demand for high-quality, low-density development.
- Provide for additional open space and recreational areas including the completion of a high-quality, ocean-oriented golf course to accommodate anticipated golf demand.
- Allow for the relocation of an existing hotel site to a more desirable location on Honokae Bay.

Major differences between the two master plans are described in the following sections in terms of number of units planned, average Resort density and the quality of units.

### Potential Maximum Master-Planned Units

Although the revised master plan includes the addition of 654 acres, the potential maximum number of units is planned to remain within the county-approved limits of 3,000 hotel units and 1,182 residential units. However, due to the availability of more land area and the suitability of the revised master plan from a marketing perspective, a greater number and proportion of single-family units are proposed under the revised master plan than under the existing plan, as shown in the table below:

<table>
<thead>
<tr>
<th>Master-Planned Units at Completion</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Units</th>
<th>Percentage</th>
<th>Units</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel units</td>
<td>3,000</td>
<td>3,000</td>
<td>48.5%</td>
<td></td>
<td>3,000</td>
<td>48.5%</td>
</tr>
<tr>
<td>Multifamily</td>
<td>3,022</td>
<td>2,942</td>
<td>45.0%</td>
<td></td>
<td>2,942</td>
<td>47.6%</td>
</tr>
<tr>
<td>Single-family</td>
<td>555</td>
<td>555</td>
<td>8.5%</td>
<td></td>
<td>555</td>
<td>9.1%</td>
</tr>
<tr>
<td>Total</td>
<td>6,182</td>
<td>6,497</td>
<td>100.0%</td>
<td></td>
<td>6,497</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

A maximum of 3,000 hotel units could potentially be developed under either master plan. However, about 240 single-family units could potentially be developed under the revised master plan compared to only 240 under the existing master plan. Conversely, a maximum of 2,942 multifamily units could be developed under the revised master plan, compared to 2,942 under the existing plan.

It should be noted that although a total of 6,182 units could be developed under either master plan, this number represents the maximum developable number of units and will probably not exceed the actual number of units ultimately developed at completion of the Resort. However, it is expected that the majority of units developed under the existing master plan would be greater than under the revised plan due to the need to sell more units to receive the same return on investments.

### Average Unit Densities

The average unit densities are calculated assuming the maximum potential number of units under the two master plans. The revised plan calls for development of 6,182 hotel and residential units on 1,182 acres. This compares to the same unit development on only 748.5 acres under the existing master plan. Thus, the overall Resort density is expected to decrease by almost one-half, from 3.9 units per acre under the existing plan to 4.3 units per acre under the revised plan, as shown in Exhibit 14.

Considering hotels and residential acreage only (for hotel, multifamily and single-family units), unit densities are projected to decline from 14.0 units per acre under the existing plan to 12.3 units per acre. Similarly, by type of development, hotel, multifamily and single-family unit densities are estimated to decline significantly to accommodate the lower densities dictated by the high-quality development philosophy of the Resort.

### Quality of Resort Projects

The quality of the various sites and projects at Kama Lani Resort was estimated by representatives of the Resort and BEA as determined by:

- Ocean or golf fairway frontage
- Views available to the project site
- Proximity to hotels or other recreational amenities
- Other physical site characteristics

The individual project sites were graded for quality and are summarized by type of development in Exhibit B. A greater percentage of the planned hotel, multifamily, and single-family sites were graded of high or medium quality under the revised plan than under the existing plan. This is mainly due to the creation of "greenbelt" golf course and preserve areas and other amenities which would contribute to the scenic and economic value of the individual project sites.

In total, 65% of the project sites were graded high quality under the revised master plan compared to 63% under the existing master plan. About 15% of the sites were graded medium quality under the revised plan compared to 13% under the existing plan. By type of development, a greater percentage of the Resort's multifamily homesteads are graded high or medium quality under the revised plan as compared to the existing plan.

### Market Support for Proposed Land Uses at Kama Lani Resort

The market support for hotel, multifamily, single-family, and commercial land uses at the Resort under the revised master plan has been estimated by Hing Chew & Associates in its November 1984 report, "Market Analysis for Kama Lani Resort." This section assesses the market support for those land uses under the existing master plan in order to later compare the impacts of the two master plans.

The market support for the existing master plan is expected to be different from that under the revised master plan because of differences in the number and types of residential units or products that could potentially be developed.
### Exhibit 1-A

**Mauna Lani Resort**

**Average Unit Density at Potential Maximum Development**

<table>
<thead>
<tr>
<th></th>
<th>Existing master plan</th>
<th>Revised master plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Acres per acre</td>
</tr>
<tr>
<td>Hotel</td>
<td>3,000</td>
<td>124.2</td>
</tr>
<tr>
<td>Multifamily</td>
<td>3,032</td>
<td>263.0</td>
</tr>
<tr>
<td>Single-family</td>
<td>150</td>
<td>55.2</td>
</tr>
<tr>
<td>Amenities</td>
<td>324.1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6,182</td>
<td>778.6</td>
</tr>
</tbody>
</table>

**Gross unit density**

- **Overall resort**: 7.6
- **Hotel and residential areas(1)**: 14.0

(1) Includes acreage for hotel, multifamily and single-family development only.

---

### Exhibit 1-B

**Mauna Lani Resort**

**Quality of Resort Projects at Mauna Lani Resort**

<table>
<thead>
<tr>
<th></th>
<th>Existing master plan</th>
<th>Revised master plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Percentage</td>
</tr>
<tr>
<td>Hotel sites (all high quality)</td>
<td>3,000</td>
<td>100.0%</td>
</tr>
<tr>
<td>Multifamily sites:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High quality</td>
<td>640</td>
<td>21.3%</td>
</tr>
<tr>
<td>Medium quality</td>
<td>578</td>
<td>17.1%</td>
</tr>
<tr>
<td>Low quality</td>
<td>1,251</td>
<td>41.4%</td>
</tr>
<tr>
<td>Total</td>
<td>2,077</td>
<td>100.0%</td>
</tr>
<tr>
<td>Single-family sites:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High quality</td>
<td>108</td>
<td>3.3%</td>
</tr>
<tr>
<td>Medium quality</td>
<td>108</td>
<td>3.3%</td>
</tr>
<tr>
<td>Low quality</td>
<td>108</td>
<td>3.3%</td>
</tr>
<tr>
<td>Total</td>
<td>314</td>
<td>10.0%</td>
</tr>
<tr>
<td>High quality</td>
<td>3,082</td>
<td>62.5%</td>
</tr>
<tr>
<td>Medium quality</td>
<td>826</td>
<td>15.4%</td>
</tr>
<tr>
<td>Low quality</td>
<td>1,014</td>
<td>19.7%</td>
</tr>
<tr>
<td>Total</td>
<td>6,182</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Potential maximum development under the existing master plan compares to the revised master plan as follows:

- Fewer single-family units (150 units) under the existing master plan compared to 240 under the revised plan.
- More multifamily units (3,012 units) under the existing master plan compared to 2,792 under the revised plan.
- Fewer and proportionately less multifamily units located on sites graded high or medium quality (1,418 units, or 47% compared to 2,096 units or 71%).
- Higher unit densities in hotel and residential areas, as shown in the table below:

<table>
<thead>
<tr>
<th>Units per acre</th>
<th>Existing</th>
<th>Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>24.2</td>
<td>20.8</td>
</tr>
<tr>
<td>Multifamily</td>
<td>11.6</td>
<td>9.0</td>
</tr>
<tr>
<td>Single-family</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Total residential unit density</strong></td>
<td><strong>14.0</strong></td>
<td><strong>10.3</strong></td>
</tr>
</tbody>
</table>

Thus, due to the different unit mix, lower quality of sites and higher unit densities of the existing master plan, the proposed units could be expected to receive a different level of market support and sales absorption than under the revised plan.

Projected Absorption of Resort Units

The absorption of proposed units under the existing master plan is based on market assumptions provided by King Chew & Associates in its market analysis for the revised master plan. The following factors were considered in projecting market support for Resort units under the existing master plan:

- The inventory of high-, medium- and low-quality units available to be developed compared to that under the revised master plan.
- The project lower sales prices of the units developed under the existing plan corresponding to fewer desirable project sites and higher project densities.
- The relatively faster rate of sales absorption of lower-priced units compared to higher-priced units due to increased affordability and to the price elasticity of demand.

The market absorption of Resort units under the existing master plan is projected to occur at a faster rate than under the revised master plan. As shown in Exhibit 1-6, about 890 hotel, multifamily and single-family units are projected to be absorbed by 1990 under the existing plan. This represents 400 more units than projected by King Chew & Associates for the revised master plan. Similarly, by 1995 a cumulative total of about 1,600 units is projected to be absorbed under the existing master plan, an increase of 80 units over the 1,520 projected under the revised master plan. By 2000, 2,160 units are projected to be absorbed, an increase of 440 units over the projected 1,720 units under the revised master plan. Thus, due to the relatively faster rate of sales, under the existing master plan, Moomu Lani Resort could be expected to reach completion under a shorter time span than under the revised master plan.

By type of unit, hotel room demand is projected to be identical under the two master plans. This is due to the fact that no major changes in product or market orientation are expected to occur since only one of the hotel sites would be changed. In contrast, condominium sales are projected to occur at a relatively faster rate under the existing plan due to the relatively lower sales prices of the units corresponding to the lower-quality sites available and higher unit densities. However, single-family lots and house and lot packages are projected to be sold at a relatively slower rate due to the higher sales prices and better-quality products available under the existing plan.

Projected Commercial Space Demand

Commercial space demand under the existing master plan is projected based on (1) assumptions provided by King Chew & Associates and (2) commercial space requirements necessary to serve the hotel, condominium and single-family resident and visitor populations as units are completed. These assumptions are listed as follows:

1. Transit units are defined as those available for use by visitors and are assumed to represent 100% of total hotel units and 50% of the total condominium units completed.
2. Average daily visitors are estimated based on an average of two persons per unit at an average annual occupancy level of 70% for both hotel and condominium units.
3. Average annual expenditures are estimated in 1984 dollars and are defined as expenditures which would occur in freestanding commercial shopping centers (includes visitor expenditures in commercial areas and restaurants that are located in hotels).
4. Retail space demand is estimated based on total annual expenditures and a desired sales volume of $150 per square foot per year for commercial space.

Based on these assumptions, the demand for commercial space under the existing master plan is projected to amount to about 28,200 square feet of space by 1990, 54,700 square feet by 1995, 100,000 square feet by 2000 and 198,500 square feet at completion, as shown in Exhibit 1-6.
<table>
<thead>
<tr>
<th>Projected unit completions:</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential max development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td>400</td>
<td>700</td>
<td>1,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Multifamily</td>
<td>550</td>
<td>900</td>
<td>1,150</td>
<td>3,000</td>
</tr>
<tr>
<td>Total</td>
<td>950</td>
<td>1,600</td>
<td>2,150</td>
<td>6,000</td>
</tr>
<tr>
<td>Projected transient units:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel</td>
<td>400</td>
<td>700</td>
<td>1,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Multifamily(2)</td>
<td>225</td>
<td>450</td>
<td>675</td>
<td>1,615</td>
</tr>
<tr>
<td>Total</td>
<td>625</td>
<td>1,150</td>
<td>1,675</td>
<td>4,615</td>
</tr>
<tr>
<td>Average daily visitors(3):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel</td>
<td>660</td>
<td>900</td>
<td>1,170</td>
<td>4,400</td>
</tr>
<tr>
<td>Multifamily</td>
<td>315</td>
<td>450</td>
<td>625</td>
<td>2,400</td>
</tr>
<tr>
<td>Total</td>
<td>975</td>
<td>1,350</td>
<td>1,795</td>
<td>6,800</td>
</tr>
<tr>
<td>Average annual expenditures (in 1984 dollars):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurants(4)</td>
<td>$3,449,250</td>
<td>$6,898,500</td>
<td>$14,180,250</td>
<td>$22,240,280</td>
</tr>
<tr>
<td>Grocery(5)</td>
<td>$1,724,925</td>
<td>$3,449,250</td>
<td>$7,090,525</td>
<td>$11,810,140</td>
</tr>
<tr>
<td>Other retail(6)</td>
<td>$4,790,625</td>
<td>$8,018,750</td>
<td>$14,735,125</td>
<td>$24,915,140</td>
</tr>
<tr>
<td>Total</td>
<td>$9,964,800</td>
<td>$19,367,500</td>
<td>$35,996,900</td>
<td>$58,965,560</td>
</tr>
</tbody>
</table>

Indicated demand for commercial space (square feet, rounded(7))

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>28,500</td>
<td>54,700</td>
<td>102,900</td>
<td>198,500</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.
(2) Estimated at 50% of all multifamily units.
(3) Estimated at 70% occupancy level at an average of two persons per room.
(4) Estimated at $30 per day per multifamily visitor.
(5) Estimated at $15 per day per multifamily visitor.
(6) Estimated at $15 per day per hotel and multifamily visitor.
(7) Estimated based on a desired annual sales rate of $350 per square foot.
II - ECONOMIC IMPACTS

The developments proposed under either the existing or the revised master plans will impact the economy of the region by affecting visitor expenditures, employment, resident and visitor population and income to residents. This chapter summarizes the economic impact of the proposed developments at the Resort, comparing the existing and revised master plans. The chapter also weighs the public costs and benefits of the two master plans.

REGIONAL ECONOMIC SETTING

Although the entire island of Hawaii is defined for projection purposes as the Resort's impact area, impacts will tend to be concentrated in the North and South Kohala and North Kona districts. These districts are located along the western coast of the Island of Hawaii, shown in Exhibit II-4. North and South Kohala and North and South Kona may collectively be referred to as West Hawaii.

A generation or two ago, the Kohala area was an agrarian community dominated by sugar plantations and pasture lands, while Kona was an area of coastal fishing villages with a handful of independent farmers on the mountain slopes. The economy of this region has changed considerably since Hawaii's statehood. Today the region is primarily supported by its real estate and visitor industries. The Kohala and Kona districts have ideal weather conditions, a black lava coastline with scattered sandy beaches and important historical sites. Among the major visitor attractions of the region are the City of Refuge, Captain Cook monument, and Kona billfishing. This section describes this region and its economic setting.

Primary Economic Activities

Under the influence of the Parker Ranch, South Kohala grew first through ranching activities. Recently, the town of Waimea has emerged as a service and retail center. Today Waimea is supported by truck farming, retail establishments, and second-home industries in addition to ranching. North Kohala was dominated by sugar production and processing until 1975 when the district's last mill closed. Because of the decline of this economic base, North Kohala has experienced significant out-migration resulting in little or no growth in total population over the past two decades. Most of the residents are elderly, with the share of residents over age 65 growing from 6.53% in 1970 to 13.2% in 1980. Many are still supported by ranching and small-scale agricultural and retail activities. About a third of North Kohala's population is employed in service occupations and most of these persons commute to jobs associated with North Kona and South Kohala hotels.

Coffee production and ranching provided Kona's economic base through much of this century, but it was an unsteady economy due to great fluctuations in the international coffee market. In the years following statehood and the introduction of jet service to the islands, the Kona coastline began to host an increasing number of visitors. In the 1960s and 1970s, North Kona fueled a building boom that spread to South Kohala and resulted in hundreds of new hotel and condominium units and residential dwellings.
Currently the South Kohala and North Kona districts are the heart of the island of Hawaii's visitor industry. As of October 1984 the 5,600 hotel and visitor condominium units in these two districts represented 2% of the island's total.

The availability of large parcels of land under single ownership and the establishment of horizontal property regime laws have permitted high-quality master-planned development in several resort areas along this coast. Six major resort areas currently exist in the South Kohala and North Kona districts. In South Kohala these are:

- Mauna Kea Resort
- Mauna Lani Resort
- Waikoloa Village and Waikoloa Beach Resort

And in North Kona:

- Kailua-Kona
- Keauhou Resort
- Kona Village Resort

Population

Nearly one-third of Hawaii Island's population resides in the two Kohala and two Kona districts. In 1980, the estimated population of these four districts was 77,518, and the 1980 rate of growth for this area was 2.8%. The South Kohala and North Kona districts, which include the Mauna Kea, Mauna Lani, and Keauhou Resort areas, experienced the most rapid population growth at 5.1% per year. The median household size in the Kohala and Kona districts in 1980 was 3.07 persons.

In 1980 median age in the region ranged from 25.8 to 32 years of age, with the relatively older populations residing in areas less impacted by the visitor industry and recent population growth, as shown in Exhibit II-C.

As also shown in the exhibit, the median family incomes of the North and South Kona districts were higher than the county average of $19,132, while the median incomes of the North and South Kohala districts were notably lower than the county average.

Employment Patterns

Because of the expanding visitor trade, the retail, construction, and financial industries of South Kohala and North Kona have also experienced significant growth. Altogether in 1980, hotel-related industries are estimated to have accounted for 49.8% of civilian employment in South Kohala, 45.6% in North Kohala, and 64.2% in North Kona as reported by the U.S. Bureau of the Census.

Also in 1980, employment and labor force participation in the Kohala and Kona districts were higher than for the county as a whole. As shown in Exhibit II-D, labor force participation among persons aged 16 years and older was 88.2% in the region, compared to the countywide rate of 81%. Additionally, the Kohala and Kona districts' unemployment rate of 5.9% was lower than the 7% observed in the county as a whole.
### Table 1: Employment Characteristics

#### Labor Force Participation

<table>
<thead>
<tr>
<th></th>
<th>North Kona</th>
<th>South Kona</th>
<th>North Kohala</th>
<th>South Kohala</th>
<th>Total Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Tracts 215, 216)</td>
<td>72.2%</td>
<td>66.2%</td>
<td>68.7%</td>
<td>64.1%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Civilian Unemployment Rate

<table>
<thead>
<tr>
<th></th>
<th>North Kona</th>
<th>South Kona</th>
<th>North Kohala</th>
<th>South Kohala</th>
<th>Total Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.3%</td>
<td>5.7%</td>
<td>9.7%</td>
<td>6.3%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Employed Persons by Occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>North Kona</th>
<th>South Kona</th>
<th>North Kohala</th>
<th>South Kohala</th>
<th>Total Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managerial and professional</td>
<td>1,468</td>
<td>362</td>
<td>187</td>
<td>407</td>
<td>2,438</td>
</tr>
<tr>
<td>Technical, sales and administrative support</td>
<td>1,248</td>
<td>681</td>
<td>169</td>
<td>379</td>
<td>3,157</td>
</tr>
<tr>
<td>Service</td>
<td>491</td>
<td>250</td>
<td>215</td>
<td>277</td>
<td>1,463</td>
</tr>
<tr>
<td>Farming, forestry and fishing</td>
<td>491</td>
<td>250</td>
<td>215</td>
<td>277</td>
<td>1,463</td>
</tr>
<tr>
<td>Precision production, craft, and repair</td>
<td>679</td>
<td>250</td>
<td>169</td>
<td>233</td>
<td>1,366</td>
</tr>
<tr>
<td>Operators, fabricators, and laborers</td>
<td>679</td>
<td>250</td>
<td>169</td>
<td>233</td>
<td>1,366</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,912</td>
<td>2,662</td>
<td>1,210</td>
<td>1,928</td>
<td>12,783</td>
</tr>
</tbody>
</table>

*Note: N/A not applicable.*

The occupancy distributions shown in Exhibit 1-4 also reflect the varying weather conditions and the need for additional facilities during the summer months. The hotel occupancy rate is expected to increase gradually over the next five years, reaching about 70% by 2000. The resort's remaining facilities, such as restaurants, shops, and golf courses, are also expected to experience similar growth trends.

Exhibit 1-4 summarizes the facility development plans developed by the resort's management. The hotel is expected to be completed by 1995, with additional facilities scheduled for 1996 and 1997. The resort's overall construction budget is estimated at $100 million, with $30 million allocated for the hotel alone. The remaining funds will be used to develop the resort's other amenities.

As for the resort's operational expenses, the projected costs for the year 2000 are expected to be $20 million, with an additional $5 million allocated for marketing and advertising. The resort's management is confident in its ability to maintain a balanced budget and achieve its projected goals.
Based on an assessment of visitor-related developments expected to occur elsewhere along the Kona coast, it is estimated that the additional direct visitor expenditures generated at new Kona Lani Resort facilities will constitute approximately 22% and 29% of additional direct expenditures by the years 1990 and 2000, respectively.

**Indirect and Induced Visitor Expenditures**

Indirect and induced expenditures are those that are generated when establishments that cater directly to visitors purchase goods or services in order to produce visitor products or when employees or proprietors of such establishments spend their earnings. The State of Hawaii, Department of Planning and Economic Development (D PED) estimates that such spending generates about $1.04 in additional sales throughout the state for every $1.00 directly spent by a visitor.

Based on this multiplier, Exhibit II-F also shows the indirect, induced and total expenditures projected to be generated in Hawaii by visitors to planned facilities at the Resort. Under the revised plan, new facilities are projected to generate total additional annual visitor expenditures of approximately $93 million by 1990 and $226 million by 2000. These expenditures are projected to be slightly lower than those generated under the existing master plan due to the more gradual rate of population growth.

**EMPLOYMENT IMPACT**

Planned developments at Kona Lani Resort will generate short-term employment during the construction of new facilities and longer-term employment in the operation and support of these facilities. Employment effects may also be classified as being direct, indirect or induced. Direct effects are those occurring directly supported by the expenditures of these facilities, such as the employment at hotels and other establishments that serve visitors. Direct employment would generally be located in the County of Hawaii both at and outside of the Resort.

Indirect effects occur when directly affected establishments purchase goods or services from other businesses in order to fulfill their needs. Induced effects are those supported by the state's economy when employees or proprietors directly or indirectly dependent on visitor expenditures spend their earnings.

Because of its more gradual facility development, the employment impacts of the revised plan are expected to be equal to or less than those of the existing plan throughout the projection period.

**Direct Construction Employment**

Construction employment projections are presented in Exhibit II-G as average annual person-years. Construction employment projections are not made beyond the year 2000 because the timing of construction activities after the year 2000 is highly uncertain. It might reasonably be assumed that construction activity is very light for the years after 2000 would occur at a comparable or slower pace to that projected up until 2000.

---

<table>
<thead>
<tr>
<th>Year</th>
<th>Direct</th>
<th>Indirect and Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$93,000,000</td>
<td>$226,000,000</td>
<td>$319,000,000</td>
</tr>
<tr>
<td>2000</td>
<td>$226,000,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Annual Visitor Expenditures

(Ko Kona Lani Resort)

(In 1980 dollars; millions)
In the 1986 to 1990 period direct demand for construction employment is projected to total about 220 person-years per year under either plan. Although the revised plan would build fewer multifamily units, labor needs for construction of the additional golf course make its employment demand in the first period comparable to that of the existing plan. In ensuing years, however, the revised plan suggests slightly lesser demands for construction labor than does the existing plan. Construction activity under the revised plan is projected to annually require approximately 180 person-years in the early 1990's and about 300 person-years per year in the late 1990's. Under the existing plan, direct demand for construction labor is projected to total more than 230 person-years per year in the late 1990's.

Based on assessment of hotel and resort residential developments expected to occur elsewhere along the Kohala coast, it is estimated that under the revised plan, Mauna Lani Resort's direct construction labor needs would constitute approximately 27% of direct labor needs of all hotel and resort residential construction activity on the Kohala coast by 1990 and approximately 50% by the year 2000.

The types of construction jobs that will be generated by the Resort is projected based on the State of Hawaii, Department of Labor and Industrial Relations (DLIR) analyses of occupational trends within industrial classifications. Exhibit II-G shows that about 10% of construction employment may be expected to occur in skilled craft and manual labor positions. In addition, about 5% of positions may be expected to be professional or technical and about 95% nonmanual. Because of their higher or specialized skill requirements, the latter two categories are most likely to include greater shares of off-island workers than are the other occupational categories shown in the exhibit.

**Total Construction Employment**

The direct employment of construction workers at Resort projects will stimulate additional purchases of goods and services on the Island of Hawaii and elsewhere in the state. In its most recent (1985) revisions to a model of the construction industry in Hawaii, DLI calculated that 4.4 full-time jobs are created in the state for every full-time job in the building construction industry. This multiplier is used to project indirect and induced labor demand from the direct demands for construction labor that were shown in Exhibit II-G.

A 1975 study of Kauai's economy suggested a regional capture rate of total indirect and induced employment amounting to about 20% of direct employment. Although the Island of Hawaii's future economy may be expected to be more developed than Kauai's economy in 1975, this figure is assumed to be appropriate due to the number of construction workers who are expected to come from off-island. (The actual share of construction employment going to off-island workers will depend on the timing of other major projects planned for the county. See discussion under construction employee housing in Chapter III.)

Exhibit II-I applies these findings to project the total employment effects of construction to the year 2000. Facility construction under the revised plan is projected to provide a total of about 530 person-years per year by 1990 and about 730 by the year 2000. In the 1986 to 1990 period about 220 person-years would be directly created by construction contractors, while another 40 would be required in positions indirectly generated elsewhere on the island. In this period about 260 person-years of work per year could be expected to be
MAUNA LANI RESORT

Direct Construction Employment by Class of Worker
1986 to 2000
(Average annual person-years)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Existing</td>
<td>Revised</td>
</tr>
<tr>
<td></td>
<td>master plan</td>
<td>plan</td>
<td>master plan</td>
<td>plan</td>
</tr>
<tr>
<td>Professional, technical and kindred</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Managerial</td>
<td>20</td>
<td>20</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Craft and kindred</td>
<td>116</td>
<td>116</td>
<td>103</td>
<td>97</td>
</tr>
<tr>
<td>Operative</td>
<td>15</td>
<td>15</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Labor</td>
<td>38</td>
<td>38</td>
<td>35</td>
<td>33</td>
</tr>
<tr>
<td>Sales, clerical and service</td>
<td>21</td>
<td>21</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Total construction employment</td>
<td>220</td>
<td>220</td>
<td>186</td>
<td>184</td>
</tr>
</tbody>
</table>


MAUNA LANI RESORT

Direct, Indirect and Induced Construction Employment
1986 to 2000
(Average annual person-years)

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1986 to 1990</th>
<th>1991 to 1995</th>
<th>1996 to 2000(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>master plan</td>
<td>plan</td>
<td>master plan</td>
</tr>
<tr>
<td>Direct(2)</td>
<td>220</td>
<td>220</td>
<td>196</td>
</tr>
<tr>
<td>Indirect and induced:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Island(3)</td>
<td>44</td>
<td>44</td>
<td>39</td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>264</td>
<td>264</td>
<td>235</td>
</tr>
<tr>
<td>Total employment(4)</td>
<td>528</td>
<td>528</td>
<td>470</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) From Exhibit II-10.

(3) Direct employment multiplied by 0.2. Anderson, et al., Kealal Socioeconomic Profile, 1975.

### MAUNA LANI RESORT

**Projected Direct Employment for Resort Operations**

**1990 to Potential Maximum**

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel(12)</td>
<td>400</td>
<td>480</td>
<td>840</td>
<td>840</td>
<td>1,200</td>
<td>1,200</td>
<td>3,600</td>
<td>3,600</td>
<td>636</td>
<td>636</td>
<td>933</td>
<td>933</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort residential(3)</td>
<td>96</td>
<td>122</td>
<td>234</td>
<td>234</td>
<td>356</td>
<td>356</td>
<td>833</td>
<td>833</td>
<td>115</td>
<td>115</td>
<td>168</td>
<td>168</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail(43)</td>
<td>143</td>
<td>175</td>
<td>312</td>
<td>312</td>
<td>516</td>
<td>516</td>
<td>1,393</td>
<td>1,393</td>
<td>193</td>
<td>193</td>
<td>269</td>
<td>269</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort administration(5)</td>
<td>62</td>
<td>78</td>
<td>132</td>
<td>132</td>
<td>186</td>
<td>186</td>
<td>476</td>
<td>476</td>
<td>68</td>
<td>68</td>
<td>93</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total operational employment</td>
<td>626</td>
<td>782</td>
<td>1,414</td>
<td>1,414</td>
<td>2,235</td>
<td>2,153</td>
<td>5,398</td>
<td>5,398</td>
<td>766</td>
<td>766</td>
<td>1,070</td>
<td>1,070</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Projected at 1.2 FTE equivalent jobs per hotel unit.

(3) Projected at 0.2 FTE equivalent jobs per multifamily or single-family unit.

(4) Projected at 1.0 FTE jobs per 200 net leasable square feet of commercial space.

(5) Estimated to follow growth of facility development. Category includes miscellaneous Resort employment such as Resort administration, property development, accounting, maintenance of additional golf course (revised plan only) and infrastructural facilities.

---

Direct Operational Employment

The operation and management of the Resort's additional hotels, multifamily, and retail establishments will result in the creation of approximately 2,235 FTE jobs. In many cases, these jobs will also be created in existing facilities because of the efficient operation of the Resort's facilities. The personnel for these positions will be in hotels, restaurants, retail outlets, and resort administration.

### Facility Projections

- **Hotel:** 1,414 FTE jobs
- **Resort Residential:** 2,235 FTE jobs
- **Retail:** 5,398 FTE jobs
- **Resort Administration:** 766 FTE jobs

Total operational employment: 5,398 FTE jobs.
Occupational Distribution of Direct Operational Employees

Exhibit II-8 distributes the projected operational employment by occupational category. It is expected that between 35% and 37% of total jobs will be created in food and beverage service positions due to the high concentration of such work in luxury hotel operations and to the mix of commercial establishments planned by the Resort. The next largest occupational category is expected to be Housekeeping, a very large component of hotel and resort residential employment throughout the state. Between 30 and 33% of the Resort's total operational employment may be expected to occur in managerial or supervisory positions.

Sources of Direct Operational Employees

The recent experience of the Kahala Lani Beach Hotel and the Sheraton Royal Hawaiian Hotel has been that few employees hired were from off-island. Because of corporate policies, however, top managerial positions at full-service hotels are typically filled by outsiders. However, because of the level of resort facility development planned throughout the South Kona area over the next few decades, it is anticipated that regional employment opportunities will grow more rapidly than will natural population increase. Hence recent in-migrants from outside the county are projected to account for 10% of the Resort's new employees in 1990 and up to 15% by the year 2000.

From the island's existing labor pool, new employees may be (1) persons who were formerly unemployed or underemployed, (2) labor market entrants such as recent high school graduates or other previously unemployed persons and (3) persons who formerly worked somewhere else on the island.

Analysis and projection of unemployment and underemployment trends, county high school graduates, and labor force participation rates within the county suggest that the first two "available" sources of labor noted could account for about 45% of employees drawn from the island's labor pool. This available labor would include persons who move to the county for reasons other than the possibility of employment in industry segments supported by Kahala Lani Resort.

The remainder of persons hired from the local labor pool would come as turnover from other county jobs. With more of the county's employment concentrated in South Kona, it is expected that in the future the majority of such turnover would come from jobs at other South Kona establishments. Other employees attracted through job turnover are expected to most frequently have been employed in the North Kona area.

Exhibit II-8 applies the above findings to project operational employment according to four sources of labor. The differences between the two upper plans are not significant. In all periods, the largest of the labor supply components are expected to be labor market entrants or formerly unemployed or underemployed persons. This would be made possible by resident population growth through natural increase and in-migration not motivated by employment opportunities generated by the Resort. How many who are in-migrants to the county are projected to increase from about 80 persons per year in 1990 to more than 300 per year in 2000.
### MAUNA LANI RESORT

**Projected Mix of Operational Employees**

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Labor supply component</th>
<th>1990 master plan</th>
<th>1990 revised master plan</th>
<th>1995 master plan</th>
<th>1995 revised master plan</th>
<th>2000 master plan</th>
<th>2000 revised master plan</th>
<th>At potential maximum employment(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-island sources:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available labor(2)</td>
<td>334</td>
<td>333</td>
<td>557</td>
<td>598</td>
<td>884</td>
<td>814</td>
<td>1,997</td>
</tr>
<tr>
<td>Kohala turnover(2)</td>
<td>223</td>
<td>222</td>
<td>316</td>
<td>365</td>
<td>566</td>
<td>542</td>
<td>1,289</td>
</tr>
<tr>
<td>Other turnover(4)</td>
<td>386</td>
<td>385</td>
<td>435</td>
<td>485</td>
<td>665</td>
<td>635</td>
<td>1,578</td>
</tr>
<tr>
<td>Off-island sources:</td>
<td>83</td>
<td>82</td>
<td>182</td>
<td>182</td>
<td>358</td>
<td>344</td>
<td>786</td>
</tr>
<tr>
<td>Total operational</td>
<td>826</td>
<td>827</td>
<td>1,428</td>
<td>1,400</td>
<td>2,233</td>
<td>2,153</td>
<td>5,103</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Unemployed and underemployed persons on-island and labor market entrants. Projected to account for 45% of on-island labor component.

(3) Persons attracted from other work in North or South Kohala. Projected to account for 30% of on-island labor component.

(4) Persons attracted from other work in North Kona. Projected to account for 25% of on-island labor component.

(5) Based on off-island component of current Mauna Lani Resort employment, and on projections of employment at other area resorts, in-migrant employees projected to account for 10% of employment by 1990, 15% by 1995, 16% by 2000 and 10% by project completion.

---

**Total Operational Employment**

- **11.8%**: Excludes seasonal labor. The flexible work schedules employed in this table represent the best estimate of the full-time equivalent (FTE) employment for construction, operational and temporary labor in the resort area.

- **12.8%**: The total labor force needed is expected to be about 4,000 people. This includes approximately 2,000 local workers, 1,000 workers from the Kona District, and 1,000 workers from other areas of the island.

- **13.8%**: Of this total, about 50% will be employed on the construction phase of the project, 33% on the operational phase, and 17% on the maintenance phase.

- **14.8%**: Total regional employment would require about 1,000 more full-time workers, including both construction and operational employees.

- **15.8%**: Including the construction phase, a total of nearly 5,000 jobs in the state will be produced.

---

**Exhibit 114**

- **16.8%**: This exhibit shows the projected demand for construction and operational employment by the project. It is based on the number of workers employed in the construction phase and the number of workers needed to maintain the resort in full operation.

- **17.8%**: The chart reflects the number of jobs that will be created during each phase of the project.

- **18.8%**: Full-time equivalent (FTE) employment is projected in the chart. The chart includes full-time, part-time, and temporary workers.

---

**B-18**
### MAUNA LANI RESORT

**Direct, Indirect and Induced Operational Employment**

**1990 to Potential Maximum**

<table>
<thead>
<tr>
<th>Type of Employment</th>
<th>1990 (Existing)</th>
<th>1995 (Revised)</th>
<th>2000 (Master Plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct(2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-Island(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>258</td>
<td>247</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td>274</td>
<td>267</td>
<td>261</td>
</tr>
<tr>
<td></td>
<td>1,429</td>
<td>1,374</td>
<td>1,362</td>
</tr>
<tr>
<td></td>
<td>1,516</td>
<td>1,465</td>
<td>1,458</td>
</tr>
<tr>
<td></td>
<td>2,376</td>
<td>2,235</td>
<td>2,213</td>
</tr>
<tr>
<td></td>
<td>5,282</td>
<td>5,198</td>
<td></td>
</tr>
</tbody>
</table>

Total operational employment(4) | 1,516 | 1,465 | 1,458 |

---

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) From Exhibit II-J.

(3) Direct employment multiplied by 0.3. See discussion in text.

(4) Direct employment except retail multiplied by 1.93, retail multiplied by 1.66. State of Hawaii, Department of Planning and Economic Development, The Economic Impact of Tourism in Hawaii, 1970-1980, 1983. OYED multipliers for retail uses were adjusted to reflect the mix of eating and drinking establishments and other retail uses planned for Mauna Lani’s commercial area.

### MAUNA LANI RESORT

**Total Direct, Indirect and Induced Employment**

**From Construction and Resort Operations**

**1990 to Potential Maximum**

<table>
<thead>
<tr>
<th>Location and Type of Employment</th>
<th>1990 (Existing)</th>
<th>1995 (Revised)</th>
<th>2000 (Master Plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Island:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>1,046</td>
<td>1,042</td>
<td>1,041</td>
</tr>
<tr>
<td>Indirect and induced</td>
<td>237</td>
<td>237</td>
<td>237</td>
</tr>
<tr>
<td>Total on-island</td>
<td>1,383</td>
<td>1,279</td>
<td>1,278</td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>746</td>
<td>746</td>
<td>746</td>
</tr>
<tr>
<td>Total employment in state</td>
<td>2,106</td>
<td>2,025</td>
<td>2,025</td>
</tr>
</tbody>
</table>

At potential maximum development(1) |

---

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.
PROJECTED POPULATION IMPACT

Now facilities will increase population at the Resort and elsewhere on the island. On any given day there will be visitors staying at the Resort's hotels and in residential units that have been put in visitor rental pools. There will also be persons residing during most or parts of each year at multi- or single-family properties at the Resort. In addition, operational employees attracted from off-island will add to the population of the region. This section discusses the on-resort and employee population impacts of the Resort's further development.

On-Resort Impact Assumptions

In order to project population impact at the Resort, assumptions must be made regarding the usage mix of residential units, and average party sizes and percentage occupancies of hotel and residential units at the Resort. In making such assumptions for Mauai Lani Resort, usage patterns and party size characteristics were considered for the Mauai Lani Terrace condominiums, Mauai Kea Resort's Villas condominiums and Fairways South single-family home subdivision, Kaiola Resort's Ironwoods condominiums and Kauai-Kane Resort's Kauai Kai condominiums. We also examined findings of the Hawaii Visitors Bureau's (HVB) 1983 study of the resort condominium market and evaluated impact assumptions that have been made in studies for other resorts in the islands. These considerations lead to the assumptions presented in the following table:

<table>
<thead>
<tr>
<th>Assumptions for On-Resort Population Projection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility and occupation types</td>
</tr>
<tr>
<td>Hotel units</td>
</tr>
<tr>
<td>Percentage distribution (%) Average occupancy</td>
</tr>
<tr>
<td>Full-time residents</td>
</tr>
<tr>
<td>Part-time residents</td>
</tr>
<tr>
<td>Visitors</td>
</tr>
<tr>
<td>Mauai Lani's hotels are likely to experience low occupancies initially, but after several years of operations, should be able to achieve occupancies approaching annual averages of 50%. For purposes of projection, 75% occupancy is assumed for all hotels. Hotel guests are expected to be primarily couples.</td>
</tr>
</tbody>
</table>

Because of characteristics of the luxury resort condominium market, the majority of the multifamily units at the Resort may be expected to be vacation homes used for an average of three to four months per year. About a third of multifamily units may be expected to be put in visitor rental pools, or otherwise used for short-term visitor rentals. Hotel units, condominium units rented to visitors experience low occupancy rates initially and only gradually establish a following. However, resort condominium units in rental pools seldom achieve occupancy rates comparable to those of hotels. This study assumes an annual average of 50% occupancy at condominium units in visitor rental pools in order to reflect the various phases of market identity that individual projects will have established during the study period. At present no condominium units at Mauai Kea, Mauai Lani or Kauai Kai Resorts are used as primary residences. However, it is expected that some full-time residential use of luxury condominiums will emerge with the maturation of South Kohala as a destination area.

It is assumed that the majority of single-family homes built or purchased at the Resort will be vacation homes used for an average of three to four months per year. About a quarter are expected to be occupied full time. Because they are generally expensive and owner-designed, luxurious single-family homes in resort areas are seldom used for short-term visitor rentals. At Mauai Kea Resort, a few homes in the Fairways South subdivision are now being made available for visitor use, but such units are still a minority. For purposes of projection, we assume no short-term visitor use of single-family units at Mauai Lani Resort during the study period.

Projection of On-Resort Population Impact

Exhibit II-6 summarizes the projected effects of the two development scenarios on population at Mauai Lani Resort. By 1990 additional facility development is projected to increase the Resort's population by about 1,000 persons under either scenario. As shown in the exhibit, the majority of the on-site population generated by the Resort is expected to consist of visitors staying in hotels. By implementing the revised plan as the existing plan, there would be an average daily population of about 45 fewer persons at the Resort in 1990, about 50 fewer persons in 1995 and about 200 fewer persons in the year 2000, as shown in Exhibit II-9. This difference in resort population under the two plans is mainly due to the slower rate of condominium sales and development under the revised master plan.

If the maximum number of approved units were eventually developed, greater de facto population is projected to result under the revised plan than the existing plan, due to the former plan's greater share of single-family homes. However, it is unlikely that the maximum number of approved units would ever be developed under any development scenario.

Resident Population Impact at the Resort

The number of those who are expected to reside on a full- or part-time basis at Mauai Lani Resort in condominium and single-family homes is summarized in Exhibit II-9. Under the revised master plan, the resident population of the Resort is projected to increase from about 370 persons in 1990 to nearly 1,100 persons in the year 2000. Growth would be relatively slower than under the existing master plan.
### MAUNA LANI RESORT

**Projected Resort Population**

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Facility type and use</th>
<th>1990 Actual</th>
<th>1990 Master Plan</th>
<th>1995 Revised Master Plan</th>
<th>2000 Revised Master Plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel units (all visitors)</td>
<td>570</td>
<td>630</td>
<td>998</td>
<td>998</td>
<td>1,425</td>
</tr>
<tr>
<td>Multifamily units:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time residents</td>
<td>49</td>
<td>44</td>
<td>98</td>
<td>97</td>
<td>202</td>
</tr>
<tr>
<td>Part-time residents</td>
<td>111</td>
<td>107</td>
<td>242</td>
<td>237</td>
<td>866</td>
</tr>
<tr>
<td>Visitors</td>
<td>113</td>
<td>109</td>
<td>264</td>
<td>266</td>
<td>714</td>
</tr>
<tr>
<td>Total multifamily units</td>
<td>473</td>
<td>520</td>
<td>944</td>
<td>959</td>
<td>1,942</td>
</tr>
<tr>
<td>Single-family units:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time residents</td>
<td>13</td>
<td>16</td>
<td>29</td>
<td>26</td>
<td>46</td>
</tr>
<tr>
<td>Part-time residents</td>
<td>19</td>
<td>24</td>
<td>42</td>
<td>43</td>
<td>66</td>
</tr>
<tr>
<td>Visitors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total single-family units</td>
<td>32</td>
<td>40</td>
<td>71</td>
<td>69</td>
<td>112</td>
</tr>
<tr>
<td>Total</td>
<td>1,075</td>
<td>1,030</td>
<td>2,013</td>
<td>1,926</td>
<td>3,479</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

### MAUNA LANI RESORT

**Summary of On-Resort Population Impact**

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Year</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Number (Cumulative)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>292</td>
<td>271</td>
<td>Resident</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>783</td>
<td>766</td>
<td>Visitor</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>1,183</td>
<td>1,174</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At potential maximum development(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Compound annual rate of growth since previous period:

<table>
<thead>
<tr>
<th></th>
<th>Resident</th>
<th>Visitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>15.1%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Growth</td>
<td>14.9%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Growth</td>
<td>14.4%</td>
<td>9.7%</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

B-21
<table>
<thead>
<tr>
<th>In-migrant employee type</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers and supervisory employees (A)</td>
<td>30</td>
<td>30</td>
<td>52</td>
<td>51</td>
<td>81</td>
<td>70</td>
<td>195</td>
<td>196</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other household members (B)</td>
<td>45</td>
<td>45</td>
<td>101</td>
<td>101</td>
<td>153</td>
<td>154</td>
<td>390</td>
<td>391</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other employees (C)</td>
<td>50</td>
<td>50</td>
<td>132</td>
<td>132</td>
<td>228</td>
<td>228</td>
<td>588</td>
<td>588</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other household members (D)</td>
<td>33</td>
<td>33</td>
<td>124</td>
<td>124</td>
<td>277</td>
<td>277</td>
<td>680</td>
<td>680</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total new residents</td>
<td>188</td>
<td>188</td>
<td>422</td>
<td>418</td>
<td>795</td>
<td>768</td>
<td>2,047</td>
<td>2,155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) One-third of managerial and supervisory employees shown in Exhibit II-C projected to come from off-island.

(3) Projected at two additional persons per household.

(4) In-migrants other than managerial or supervisory employees from Exhibits II-C and II-D.

(5) Projected at one additional person per household.
Based on an assessment of hotel and resort residential projects expected to be developed elsewhere along the Kohala coast, it is estimated that under the revised plan Mauna Lani Resort's total on- and off-resort direct population impact will represent about 24% of the regional population impact of such development in 1990 and about 32% by the year 2000.

Geographic Distribution of Additional Population

Exhibit II-5 shows how the Resort's total population impact might be distributed by area of residence after some period of adjustment for household moves and new household formation. The projection is based on the observed 1984 residential distribution of Mauna Lani Resort employees and on the county population forecasts published in the Kona Regional Plan in 1982. In the latter publication, the County Department of Planning projected that West Hawaii's resident population would see a slight shift through the end of the century, with relatively more persons living in North and South Kohala.

The majority of the Resort's direct population impact may be expected to reside or be housed in North or South Kohala because of the large numbers of Resort residents and visitors and because in-migrant employees are expected to seek housing near to their place of work.

Most other employees may be expected to live in Kona area. A minority will continue to commute from the Hanalei and Hilo areas because of family ties, the employment of other household members or other regional preferences.

INCOME IMPACT

The Resort could be expected to have a significant impact on personal and household income for residents of the county and state. The Resort's development will generate income as employee wages, salaries and fringe benefits and as income to proprietors. Direct employment income (excluding fringe benefits) is projected on the basis of average industry wages and salaries and projections of future employment demand. Estimation of the total income paid to households in the state (including wages, salaries, fringe benefits and proprietors' incomes) is based on the projections of visitor expenditures in the state.

Wage and Salary Income

Exhibit II-6 projects annual wage and salary income (in 1983 dollars) to be derived from new employment created at Mauna Lani Resort. In any given year, the majority of income benefits will come from operations of hotels, resort units and commercial spaces. However, up until the year 2000, construction employment is expected to contribute between 31% and 35% of direct wages and salaries.

As shown in the exhibit, wage and salary earnings derived from the Resort may be expected to increase from $13.6 million per year by 1990 to $19.2 million (under the revised plan) or $30.7 million (under the existing plan) by the year 2000.

Employment earnings at the existing Mauna Lani Bay Hotel and Mauna Lani Terrace are estimated to add approximately $4.9 million per year to the figures shown. Hence, under the revised plan, Mauna Lani Resort's direct employment by the year 2000 may be expected to generate a total of about $14.2 million (1983 dollars) per year to the economy.
### MAUNA LANI RESORT

#### Geographic Distribution of Total Population Impact

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Area of residence or visitation</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
<th>Existing master plan</th>
<th>Revised master plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>North and South Kohala: Off-resort(3)</td>
<td>1,075</td>
<td>1,020</td>
<td>7,213</td>
<td>7,926</td>
<td>3,479</td>
<td>3,263</td>
<td>7,385</td>
<td>7,327</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total North and South Kohala</td>
<td>1,262</td>
<td>1,156</td>
<td>2,022</td>
<td>2,020</td>
<td>4,020</td>
<td>3,785</td>
<td>9,283</td>
<td>9,328</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North and South Kona(4)</td>
<td>79</td>
<td>79</td>
<td>84</td>
<td>82</td>
<td>163</td>
<td>164</td>
<td>470</td>
<td>471</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hāna and Hilo(5)</td>
<td>93</td>
<td>93</td>
<td>90</td>
<td>90</td>
<td>195</td>
<td>195</td>
<td>490</td>
<td>490</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total population impact</td>
<td>1,421</td>
<td>1,374</td>
<td>2,746</td>
<td>2,740</td>
<td>5,372</td>
<td>5,031</td>
<td>10,075</td>
<td>10,092</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Residents and visitors to Mauna Lani Resort, as shown in Exhibit II-5.

(3) Direct employees and their dependents expected to migrate to the County of Hawaii. Those residing in North and South Kohala projected to increase from 65% of employee in-migrants in 1990, to 60% by the year 2000.

(4) Direct employees and their dependents expected to migrate to the County of Hawaii. North and South Kona residents projected to stabilize at 20% of employee in-migrants in all time periods.

(5) Direct employees and their dependents expected to migrate to the County of Hawaii. Hāna and Hilo residents projected to decline from 15% of employee in-migrants in 1990, to 10% by the year 2000.

### MAUNA LANI RESORT

#### Annual Wage and Salary Income From Direct Employment

1990 to Potential Maximum

(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction(3)</td>
<td>4.77</td>
<td>4.26</td>
<td>4.18</td>
<td>4.74</td>
</tr>
<tr>
<td>Hotel and resort(3)</td>
<td>7.75</td>
<td>7.57</td>
<td>7.50</td>
<td>8.40</td>
</tr>
<tr>
<td>Commercial(4)</td>
<td>1.11</td>
<td>1.04</td>
<td>1.03</td>
<td>1.03</td>
</tr>
<tr>
<td>Total personal income</td>
<td>12.63</td>
<td>10.85</td>
<td>10.40</td>
<td>12.21</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Average annual wage of $11,700, reflecting a projection of 356 workers from off-island. Based on the State Department of Labor and Industrial Relations' report on covered wages in the construction industry in the State and in the County of Hawaii in 1983.

(3) Excluding 515, hotel, resort residential, and Resort administration employment wages projected at the 1983 county hotel industry average of $11,315.

(4) Commercial sector wages projected at $7,000, based on average wages in applicable retail industry classifications, weighted by the observed distribution of direct visitor-related expenditures in 1982.

Sources: State of Hawaii, Department of Labor and Industrial Relations, Employment and Payrolls in Hawaii, 1983 and Department of Planning and Economic Development, 1983 Data Book.
Total Household Income

Because of the dispersion of indirect and induced employment effects among many industries and the lack of appropriate data, it is extremely difficult to project the income benefits of the Resort's direct, indirect, induced or total employment effects to an acceptable level of accuracy. However, projection of total household income based on visitor expenditure levels permits a perspective on the total statewide income benefits that would result from Nauna Lani's further development.

Household income generated by visitor expenditures includes the wages, salaries, fringe benefits and proprietors income paid by establishments that sell goods and services directly to visitors. Thus household income includes the income figures shown in Exhibit II-7 for direct operational employment. In addition, household income includes proprietors' income and income generated directly by establishments that deal directly with visitors and by the responding of direct and indirect incomes.

DPED found that in 1980, every dollar spent by visitors to Hawaii generated a total of $0.74 in income to households. Based on the visitor expenditures expected to be generated by the Resort's new hotels, resort residences and commercial areas, it is projected that household income resulting from these developments will be as shown in the table below:

Total Household Income From Visitor Expenditures Generated at Planned Facilities at Nauna Lani Resort
1990 to 2000
(1983 dollars; millions)

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing plan</td>
<td>34.3</td>
<td>63.7</td>
<td>96.4</td>
</tr>
<tr>
<td>Revised plan</td>
<td>33.6</td>
<td>60.2</td>
<td>92.8</td>
</tr>
</tbody>
</table>

STATE AND COUNTY REVENUE AND EXPENDITURE ANALYSIS

The net public benefit of Nauna Lani Resort's proposals may be evaluated by comparing projections of tax revenues and expenditures attributable to additional development at the Resort. This revenue and expenditure analysis is performed first from the state and then from the county perspective.

Public Sector Revenues

Results of DPED's Input/Output model published in the 1981 Data Book indicate that visitor-related direct expenditures totaled $4,273 million in 1980, while state and county tax revenues attributable to tourism totaled $448 million. Based on calculations from the same source, the ratio of tax revenues to visitor-related expenditures has ranged from 0.106 to 0.111 in recent years.

Assuming that state and county tax collections will amount to $0.11 for every $1.00 of direct visitor expenditure, public revenues attributable to new development at the Resort are projected to be as follows:

State and County Tax Collections Attributable to Planned Developments at Nauna Lani Resort
1990 to Potential Maximum
(1983 dollars; millions)

At potential maximum
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing plan</td>
<td>$5.10</td>
<td>9.17</td>
<td>14.33</td>
</tr>
<tr>
<td>Revised plan</td>
<td>4.99</td>
<td>8.95</td>
<td>13.79</td>
</tr>
</tbody>
</table>

The above figures represent total revenues projected to be received by both the state and county. Of this total, revenues received by the County of Hawaii are estimated based on county real property tax collections. Real property taxes are used to estimate total county tax revenues because (1) in the latest edition of Government in Hawaii, the Tax Foundation of Hawaii indicates that real property taxes account for nearly 50% of tax revenues to the County of Hawaii and (2) other sources of county taxes (liquor, utility franchises and the motor vehicle weight tax) are less directly tied to the development or operations of resort facilities.

Exhibit II-8 shows the calculation of real property tax revenues attributable to new facility developments at the Resort. Real property taxes generated by hotels are estimated to be proportionate to those collected at the Nauna Lani Bay Hotel (based on its 1984 assessment). Real property tax collections from planned residential units are valued according to approximate selling prices based on King Chow & Associates' 1984 market study. Taxes are based on additional commercial space and on the second golf course are projected by using assessed values provided by Nauna Lani Resort representatives and the county tax assessor for the Nauna Lani region.

Additional county tax revenues are projected to increase from $22.2 million per year in 1990 to $18.12 million per year in 2000 under the revised plan, and from $25.3 million per year to $30.8 million per year, respectively, under the existing plan. The majority of these county revenues will come from property taxes on new multifamily units at the Resort.

Tax collections from the state are estimated as the difference between total tax revenues and estimated county tax collections, as shown in Exhibit II-9. As a result, state tax collections are estimated to increase from $7.77 million per year in 1990 to $6.67 million Nauna Lani Resort in 2000 under the revised plan, and from $7.74 million per year to $5.53 million per year, respectively, under the existing plan.
### MAUNA LANI RESORT

**Project Real Property Tax Revenues Attributable to Development at Mauna Lani Resort**

1990 to Potential Maximum  
(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th>Source of property revenue</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Master</td>
<td>Existing</td>
</tr>
<tr>
<td>New revenue sources:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel units(2)</td>
<td>.41</td>
<td>.41</td>
<td>.71</td>
<td>.71</td>
</tr>
<tr>
<td>Multifamily units(3)</td>
<td>1.72</td>
<td>.64</td>
<td>3.54</td>
<td>3.57</td>
</tr>
<tr>
<td>Single-family units(4)</td>
<td>.11</td>
<td>.18</td>
<td>.32</td>
<td>.40</td>
</tr>
<tr>
<td>Single-family lots(5)</td>
<td>.06</td>
<td>.07</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>Commercial space(6)</td>
<td>.00</td>
<td>.03</td>
<td>.06</td>
<td>.05</td>
</tr>
<tr>
<td>Second golf course(7)</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td><strong>Total revenues</strong></td>
<td>2.33</td>
<td>2.32</td>
<td>4.63</td>
<td>4.36</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Collections projected to be proportionate to those paid at Mauna Lani Bay Hotel.

(3) Real property taxes estimated at an assessed value of $500,000 per unit and the current county tax rate of $8.50 per $1,000 assessed value.

(4) Real property taxes estimated at an assessed value of $100,000 per unit (including land) and the current county tax rate of $8.50 per $1,000 assessed value.

(5) Real property taxes estimated at an assessed value of $250,000 per unbuilt lot and the current county tax rate of $8.50 per $1,000 assessed value.

(6) Assessed value per net leasable square foot based on estimates provided by Mauna Lani Resort. Real property taxes projected at current county rate of $8.50 per $1,000 assessed value on buildings and $10 per assessed value on land.

(7) New golf course, including 20 acres located on state leased land, valued at $5,500 per acre. Real property taxes projected at current county rate of $10 per $1,000 assess value.

---

### MAUNA LANI RESORT

**Projected Revenues to State and Hawaii County Governments Attributable to Additional Development at Mauna Lani Resort**

1990 to Potential Maximum  
(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Master</td>
<td>Existing</td>
</tr>
<tr>
<td>Revenues to county(2)</td>
<td>2.26</td>
<td>2.22</td>
<td>4.63</td>
<td>4.36</td>
</tr>
<tr>
<td>Revenues to state(3)</td>
<td>2.74</td>
<td>2.77</td>
<td>4.36</td>
<td>4.60</td>
</tr>
<tr>
<td><strong>Total revenues</strong></td>
<td>5.00</td>
<td>4.99</td>
<td>9.07</td>
<td>8.96</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Estimated as new property tax revenues, from Exhibit II-U.

(3) Total revenues less estimated county share.

(4) $0.12 per $1.00 direct visitor expenditure. State of Hawaii, Department of Planning and Economic Development, 1983 Data Book, 1983 as shown on pp. II-12.
<table>
<thead>
<tr>
<th>Function</th>
<th>Expenditures (000's)</th>
<th>Service population</th>
<th>Annual per capita expenditures(2)</th>
<th>Per resident</th>
<th>Per visitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>General government</td>
<td>$115,854</td>
<td>1,100,000</td>
<td>$105.24</td>
<td>105.24</td>
<td>105.24</td>
</tr>
<tr>
<td>Public safety</td>
<td>78,060</td>
<td>1,100,000</td>
<td>65.45</td>
<td>65.45</td>
<td></td>
</tr>
<tr>
<td>Highways</td>
<td>57,007</td>
<td>1,100,000</td>
<td>51.96</td>
<td>51.96</td>
<td></td>
</tr>
<tr>
<td>Natural resources</td>
<td>286,494</td>
<td>1,100,000</td>
<td>25.80</td>
<td>25.80</td>
<td></td>
</tr>
<tr>
<td>Health and sanitation</td>
<td>72,070</td>
<td>1,100,000</td>
<td>65.65</td>
<td>65.65</td>
<td></td>
</tr>
<tr>
<td>Hospitals and institutions</td>
<td>96,335</td>
<td>1,007,400</td>
<td>91.63</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Public welfare</td>
<td>319,353</td>
<td>1,007,400</td>
<td>321.91</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Education</td>
<td>690,219</td>
<td>1,007,400</td>
<td>688.16</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Recreation</td>
<td>13,885</td>
<td>1,007,400</td>
<td>12.81</td>
<td>12.81</td>
<td>12.81</td>
</tr>
<tr>
<td>Utilities and other enterprises</td>
<td>76,836</td>
<td>1,007,400</td>
<td>75.29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Debt service(3)</td>
<td>199,213</td>
<td>1,007,400</td>
<td>194.37</td>
<td>194.37</td>
<td>194.37</td>
</tr>
<tr>
<td>Retirement and pension(3)</td>
<td>123,443</td>
<td>1,007,400</td>
<td>120.44</td>
<td>22.56</td>
<td></td>
</tr>
<tr>
<td>Employees health and hospital insu(3)</td>
<td>211,127</td>
<td>1,007,400</td>
<td>20.60</td>
<td>3.66</td>
<td></td>
</tr>
<tr>
<td>Unemployment compensation</td>
<td>90,027</td>
<td>1,007,400</td>
<td>89.54</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Grants-in-lieu to counties</td>
<td>16,173</td>
<td>1,007,400</td>
<td>16.04</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urban redevelopment and housing</td>
<td>131,536</td>
<td>1,007,400</td>
<td>152.82</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cash capital improvements</td>
<td>11,861</td>
<td>1,007,400</td>
<td>11.77</td>
<td>10.77</td>
<td>10.77</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>23,699</td>
<td>1,007,400</td>
<td>23.62</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,190,640</strong></td>
<td><strong>1,007,400</strong></td>
<td><strong>$2,137.29</strong></td>
<td><strong>300.20</strong></td>
<td><strong>2137.29</strong></td>
</tr>
</tbody>
</table>


(3) Allocated to residents and visitors in proportion to other State government expenditures.
# MAUNA LANI RESORT

Projected State Government Expenditures Attributable to Additional Population Impacts of Mauna Lani Resort

1990 to Potential Maximum

(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th>Population type</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
</tr>
<tr>
<td>Residents(2)</td>
<td>$.62</td>
<td>.58</td>
<td>1.20</td>
<td>1.18</td>
</tr>
<tr>
<td>Visitors(3)</td>
<td>.32</td>
<td>.20</td>
<td>.57</td>
<td>.38</td>
</tr>
<tr>
<td>Total expenditures</td>
<td>$.64</td>
<td>.78</td>
<td>1.77</td>
<td>1.56</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Residents estimated to require $2,140 per capita in government expenditures. See Exhibit II-W.

(3) Visitors estimated to require $400 per capita in government expenditures. See Exhibit II-W.

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# MAUNA LANI RESORT

Comparison of Projected Public Revenues and Expenditures to the State of Additional Development at Mauna Lani Resort

1990 to Potential Maximum

(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing master plan</td>
<td>Revised master plan</td>
<td>Existing master plan</td>
<td>Revised master plan</td>
</tr>
<tr>
<td>New revenues</td>
<td>$ 2.74</td>
<td>2.77</td>
<td>4.54</td>
<td>4.60</td>
</tr>
<tr>
<td>New expenditures</td>
<td>.94</td>
<td>.88</td>
<td>1.63</td>
<td>1.73</td>
</tr>
<tr>
<td>Net additional revenues</td>
<td>$ 1.80</td>
<td>1.89</td>
<td>2.91</td>
<td>2.87</td>
</tr>
<tr>
<td>Revenue/expenditure ratio</td>
<td>2.34</td>
<td>2.91</td>
<td>2.06</td>
<td>2.07</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

Sources: Exhibits II-V and II-X.

8-28
MAUNA LANI RESORT
County of Hawaii Per Capita Government Expenditures
Fiscal year 1983

<table>
<thead>
<tr>
<th>Function</th>
<th>Expenditures (000s)</th>
<th>Service population</th>
<th>Annual per capita Expenditures</th>
<th>Per resident</th>
<th>Per visitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>General government</td>
<td>$ 7,402</td>
<td>102,600</td>
<td>$ 60.89</td>
<td>191.83</td>
<td>191.83</td>
</tr>
<tr>
<td>Public safety</td>
<td>20,242</td>
<td>108,600</td>
<td>191.74</td>
<td>46.03</td>
<td>46.03</td>
</tr>
<tr>
<td>Highways</td>
<td>2,999</td>
<td>108,600</td>
<td>26.75</td>
<td>24.75</td>
<td>-</td>
</tr>
<tr>
<td>Health and sanitation</td>
<td>1,640</td>
<td>101,900</td>
<td>16.12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Public welfare</td>
<td>668</td>
<td>101,900</td>
<td>6.49</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Education</td>
<td>745</td>
<td>101,900</td>
<td>6.31</td>
<td>6.31</td>
<td>-</td>
</tr>
<tr>
<td>Recreation</td>
<td>1,199</td>
<td>101,900</td>
<td>11.74</td>
<td>11.74</td>
<td>-</td>
</tr>
<tr>
<td>Interest(3)</td>
<td>1,099</td>
<td>100,600</td>
<td>10.75</td>
<td>10.75</td>
<td>-</td>
</tr>
<tr>
<td>Bond redemption(3)</td>
<td>7,402</td>
<td>102,600</td>
<td>86.75</td>
<td>86.75</td>
<td>86.75</td>
</tr>
<tr>
<td>Retirement and pension(3)</td>
<td>1,019</td>
<td>101,900</td>
<td>9.96</td>
<td>9.96</td>
<td>9.96</td>
</tr>
<tr>
<td>Mass transit</td>
<td>425</td>
<td>102,600</td>
<td>6.01</td>
<td>6.01</td>
<td>-</td>
</tr>
<tr>
<td>Cash capital improvements</td>
<td>38</td>
<td>102,600</td>
<td>0.78</td>
<td>0.78</td>
<td>-</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1,103</td>
<td>101,900</td>
<td>0.73</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 39,001</strong></td>
<td><strong>101,900</strong></td>
<td><strong>$ 346.58</strong></td>
<td><strong>493.03</strong></td>
<td>-</td>
</tr>
</tbody>
</table>

(3) Allocated to residents and visitors in proportion to other County government expenditures.

MAUNA LANI RESORT
Projected County Government Expenditures Attributable to Additional Population Impacts of Mauna Lani Resort
1990 to Potential Maximum
(In 1983 dollars; millions)

<table>
<thead>
<tr>
<th>Population type</th>
<th>1990 Existing master plan Revised master plan</th>
<th>1995 Existing master plan Revised master plan</th>
<th>2000 Existing master plan Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents(2)</td>
<td>.16 .15</td>
<td>.22 .20</td>
<td>.50 .50</td>
<td>1.08 1.13</td>
</tr>
<tr>
<td>Visitors(3)</td>
<td>.08 .07</td>
<td>.18 .27</td>
<td>.76 .78</td>
<td>1.66 1.78</td>
</tr>
<tr>
<td><strong>Total expenditures</strong></td>
<td><strong>.54 .57</strong></td>
<td><strong>1.07 .80</strong></td>
<td><strong>1.76 1.66</strong></td>
<td><strong>3.68 3.91</strong></td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.
(2) Residents estimated to require $550 per capita in government expenditures. See Exhibit II-2.
(3) Visitors estimated to require $490 per capita in government expenditures. See Exhibit II-2.
### Table: MAUNA LANI RESORT
Comparison of Projected Public Revenues and Expenditures to Hawaii County of Additional Development at Mauna Lani Resort

**1990 to Potential Maximum**

<table>
<thead>
<tr>
<th>Year</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>Existing Master Plan</th>
<th>Revised Master Plan</th>
<th>At Potential Maximum Development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$2.36</td>
<td>$2.22</td>
<td>$4.33</td>
<td>$4.19</td>
<td>$8.14</td>
<td>$16.66</td>
<td>$3.81 $3.31</td>
</tr>
<tr>
<td>1995</td>
<td>$1.04</td>
<td>$1.22</td>
<td>$3.09</td>
<td>$3.86</td>
<td>$1.10</td>
<td>$1.68</td>
<td>$15.07 $16.15</td>
</tr>
<tr>
<td>2000</td>
<td>$1.04</td>
<td>$1.22</td>
<td>$3.09</td>
<td>$3.86</td>
<td>$1.10</td>
<td>$1.68</td>
<td>$15.07 $16.15</td>
</tr>
<tr>
<td>Net Additional Revenues</td>
<td>$1.82</td>
<td>$1.70</td>
<td>$3.61</td>
<td>$3.38</td>
<td>$7.03</td>
<td>$6.66</td>
<td>$11.02 $12.24</td>
</tr>
<tr>
<td>Revenue/Expenditure Ratio</td>
<td>4.4</td>
<td>4.3</td>
<td>4.5</td>
<td>4.6</td>
<td>4.8</td>
<td>4.8</td>
<td>4.1 4.1</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

Sources: Exhibits II-12 and II-16.
III - FISCAL IMPACTS

The further development of Mauna Lani Resort may affect community resources and public services and facilities by attracting additional residents and visitors to the area and by changing land use at the Resort. This chapter addresses the projected impacts of the planned developments on employee housing requirements, public education, police and fire protection, health care and recreational opportunities.

EMPLOYEE HOUSING REQUIREMENTS

The previous chapter projected the demand for construction and operational employees resulting from the two plans for facility development. The projections of the previous chapter are the basis for projection of employee housing requirements. Housing demand is generated by the Resort when:

- Construction or operational employees in-migrate from outside of the County of Hawaii.
- Job-takers from within the county move in order to be closer to work.
- Job-takers from within the county establish a new household.

Workers that move within the county after taking employment at the Resort create a demand for additional housing in one area (such as in South Kohala) but also free some supply of housing elsewhere (such as in Hilo). Such movers do not create additional housing demand on the Island, although they may cause a shift in demand among regions of the Island. However, the methodology used for projection of the housing needs of operational employees does account for some demand from such within-county movers. This is because the long-term development of the South Kohala and North Kona districts may be associated with long-term shifts in the residential distribution of the county. Thus in some cases, movers may vacate housing in rural areas for which continued demand for housing will be less than in the past.

Two types of indirect housing demand generation are recognized but not included in the present analysis. These indirect sources of demand derive from: (1) county workers whose employment is indirectly supported by the Resort's development and (2) workers that leave ongoing jobs in the county in order to take employment at Mauna Lani Resort, creating indirect demand for labor at the establishments vacated. (The latter would not occur where former sources of housing are being lost, as in the sugar industry.)

A portion of those workers employed indirectly by the Resort or who refill vacated positions will also demand additional housing. Such indirect housing demand is not accounted for in projections made because:

1. Information on the composition of a resort's indirect employment effects and on how the employee housing market is affected by changes in a developing economy is not available.

2. Developers have not customarily been considered responsible for the potential housing requirements associated with the generation of regional economic opportunity in other industries or establishments.

Construction Employee Housing

Construction employment is temporary and so does not generate the long-term housing demands that are associated with operational employment. Contractors in South Kohala have generally found that construction workers tend to pick up slack in the short-term rental market in the Kona area. Moreover, labor agreements typically provide a rather generous subsistence allowance to construction employees, so housing affordability is not usually problematic. For instance, in the 1980 to 1982 period, the general contractor for projects under construction at Mauna Lani Resort paid monthly subsistence allowances of $260 to hourly workers and $300 to salaried workers. By sharing housing and other costs, it was found that many workers easily competed for Kona rental units in the $800 to $1,000 per month range.

In compliance with County Ordinance 100, Condition 70, between November 1980 and October 1982, the Resort provided a semiannual status report concerning the construction housing needs of construction workers on the Mauna Lani Bay Hotel. Off-island employees averaged 25% of the construction work force for the three points observed. This percentage was greater near the project's end, where construction activity was principally in specialty areas such as finish work, millwork and interior decoration. Thus in October 1982, three months after the hotel had been topped off, 50% of the 250 construction workers employed at the site were from off-island. These figures are shown in the table below.

Construction Employee Housing Requirements Generated at Mauna Lani Resort

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Work Force</th>
<th>Percent of Work Force from Off-Island</th>
<th>Rental Housing Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Houses</td>
</tr>
<tr>
<td>August 1981</td>
<td>151</td>
<td>16.5%</td>
<td>5</td>
</tr>
<tr>
<td>March 1982</td>
<td>301</td>
<td>28.0%</td>
<td>48</td>
</tr>
<tr>
<td>October 1982</td>
<td>250</td>
<td>44.8%</td>
<td>63</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>32.0%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Mauna Lani Resort.

The future share of workers drawn from off-island will depend on the timing and location of other major construction activities in the state and the resultant competition for Hawaii Island construction workers. It is in the interests of the construction firms to maximize the employment of the local labor force since doing so mitigates against the necessity for additional subsistence payments or other housing contributions. It is also expected that with continued development, the Resort will develop a larger, more skilled labor force, thus reducing the need to bring specialized labor from off-island.
Based on the Resort's prior experience, an average of 35% of construction workers are projected to be drawn from off-island, as shown in Exhibit III-A. Workers from off-island are expected to amount to about 80 employees on any given day in the 1965 to 1969 period, and between 100 and 120 on any given day in the 1975 to 2000 period. Numbers of off-island employees do not vary significantly between the two master plans.

The Resort's 1960 to 1962 studies found no adverse effects on the island housing market in terms of competition with island residents or visitors and no other significant problems in the housing of up to 112 off-island construction workers at a time. The provision of subsistence allowances was deemed to be effective and the most satisfactory means of handling the housing needs associated with temporary resident construction workers.

Because (1) the future supply of short-term rental accommodations in Kona and Kohala will be greater than in the past and (2) the absolute number of the Resort's future off-island labor needs are expected to be comparable to these accommodations in the regional housing market. In the past, construction employee housing requirements are not projected to be problematic under either the existing or revised plans for facility development at the Resort.

The Resort's construction labor housing studies also found that among units rented from the local market, 6% were located in Kailua-Kona, 11% in Waimea, 10% in Hilo, and the remainder in Puna or North Kohala. It is expected that with the continuation of housing subsidy allowances, temporary resident construction workers will lend strength to the rental markets in South Kohala and North Kohala throughout this century.

Operational Employee Housing

Operational employee housing impacts are assessed on a countywide basis. However, this section also includes discussions of potential shifts in the housing market within the county.

Projected Employees Requiring Housing

In Exhibit III-A, figures from Exhibit II-A are used to project the number of employees that may be expected to demand new housing. The largest segment is expected to be in-migrants from off-island, all of whom would require additional housing. Also, those hired from the available labor pool of the island might be at risk of forming new households, especially among those who are recent school leavers. It is projected that about 80% of the "new" housing component may be expected to seek housing after becoming employed at the Resort.

Persons formerly employed elsewhere in Kohala are presumed to be already settled in the Kohala area, or accustomed to commuting to work. Some of this labor segment may have taken new employment in order to be closer to their place of residence. Hence, no additional housing demand is projected for the Kohala job turnover group.

Those who had previously worked elsewhere on the island may be expected to generate some in-migration into the North Kohala or South Kohala areas. Since most of this group are expected to have previously been employed on Kona, the homes that move vacate are likely to be within commuting distance of Kona and hence could serve as potential housing for employees hired to refill the jobs that are vacated. However, it is projected that 10% of this labor supply component may be expected to create additional demands for housing in the north Kohala or south Kohala region in relation to the attainment of employment at the Resort.
Projected Housing Demand

The demand for additional housing on the island of Hawaii is projected to be less than the number of employees requiring housing. This is due to households which could be expected to have more than one resort employee as well as to the doubling-up of employees within existing households on the island. Exhibit III-6 projects the demand for additional housing units by class of worker. About one-third of the off-island in-migrants that were shown in Exhibit III-6 could be expected to be experienced personnel brought to fill managerial or specialty positions. Such persons may be expected to be principally heads of households, thus each managerial level in-migrant is projected to generate demand for one additional home. On the other hand, experience has shown that many service employees share housing. Nonmanagerial and nonspecialty employees in need of new housing are projected to generate housing unit demand at a ratio of 1.5 employees per housing unit.

The two master plans do not differ significantly in terms of additional employee housing requirements. The cumulative demand for additional housing directly attributable to the Resort’s expansion is projected to equal to about 110 units by 1990 and 210 to 310 units by the year 2000. Between 29% and 30% of this unit demand would occur among persons in managerial or specialty positions with a relatively greater ability to afford housing.

It may be expected that shares of both managerial and other employees projected to demand additional housing in the county will require assistance in satisfying this demand. However, due to (1) the uncertainties associated with the supply and other characteristics of the future housing market and (2) the exact timing and nature of future hotels to be developed at the Resort, it will be more appropriate to address the requirements for employee housing assistance in relation to the planning of particular hotels.

Based on an assessment of other hotel and vacation-oriented residential projects judged likely to be completed in the South Kohala coast region in the next 15 years, it is estimated that the additional employee housing demand projected to be generated by Wauna Lani Resort’s further development will represent about 21% of total regional demand generated by comparable developments by the year 1990 and about 29% of total regional demand by the year 2000.

PUBLIC EDUCATION

The Resort’s planned developments will increase demands on the public school system by inducing population growth and thereby increasing the number of school age children on the island. These additional students may be dependent on (1) the full-time resident owner of units at the Resort or (2) resort employees. However, Resort residents who own units could be expected to generate relatively little new demand for public education because of the small share of units expected to be occupied by full-time residents and because of the profile of expected buyers. Buyers of luxury resort units are typically completed their child rearing years and those who do have school age children most often send those children to private schools.
Section Services and Facilities

Public schools serving the areas in which the majority of the Resort's residents and employees are projected to live currently number as follows:

<table>
<thead>
<tr>
<th>Service region</th>
<th>Elementary schools</th>
<th>Intermediate schools</th>
<th>High schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Kohala</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>South Kohala</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>North and South Kona</td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Hilo</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

South Kohala is also the location of two of the county's best known private schools, Hawaii Preparatory Academy (grades kindergarten through 12) and Parker School (grades 7 through 12).

Required Additional Facilities

Exhibit III-0 shows projected new secondary public school students that are expected to be attributable to the Resort's expansion. The projections shown are based on student per housing unit multipliers for luxury and middle-income residences, as supplied by the Hawaii State Department of Education.

Approximately 30% of new students are expected to reside in units at Mauna Lani. Approximately one half of all new students shown are expected to be in grades kindergarten through 6; the other half in grades 7 through 12.

The impact on the public school system is expected to be slight under either master plan. Kohala district schools would be most affected, but even there additional demand would number only about 30 students by 1990 and fewer than 120 students by the year 2000. Written and oral communications from the acting superintendent of schools and other administrators from the Department of Education indicate that such levels of new student enrollments could be accommodated in existing and planned facilities in the area.

It may be expected that additional staff would eventually be required to meet the increased demand projected. The cost of such services are included in the analyses of public costs to the State presented in Chapter II.

POLICE PROTECTION

Increased needs for police services are expected to occur because of the increases in de facto population that the Resort's expansion will incur. Much of this demand for new services is expected to be in the areas of traffic control and parking violations.
Recent studies relating tourism and crime in Hawaii have shown conflicting results. Incidences of robbery are consistently linked to increased tourism, but whether or not a relationship exists between tourism and more serious crimes (such as burglary, rape, murder or assault) remains unclear. In 1984 the Kona and South Kohala police captains indicated that crimes associated with South Kohala's luxury visitor establishments were minimal and were generally thefts by hotel employees from hotel rooms or rental cars. These incidents were also most frequently handled by security officers of the resort or hotel involved.

Existing Services and Facilities

The Kailua police station provides police services for the South Kohala district, while the Kapa'a Police Station serves the North Kohala area, the Kona district, while the Kapa'a Police Station serves the Kona district. Police Station serves North Kohala, and the Ka'u Station serves South Kohala.

Presently the county's uniformed personnel are distributed among these areas roughly in proportion to resident population.

A total of 13 policemen are presently on the force at Waimea. This includes four patrolmen and nine patrolmen. Normally the force has 17 policemen including 13 patrolmen and four patrolmen. Police staffing and workload indicators for these districts are as shown in the table below:

<table>
<thead>
<tr>
<th>District</th>
<th>Percent of County resident population</th>
<th>Uniformed personnel number</th>
<th>Percent of County index crimes</th>
<th>Percent of County traffic accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Kohala</td>
<td>3.4%</td>
<td>11</td>
<td>4.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>South Kohala</td>
<td>6.3%</td>
<td>17</td>
<td>6.0%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Kona</td>
<td>22.0%</td>
<td>55</td>
<td>22.1%</td>
<td>23.5%</td>
</tr>
<tr>
<td>South Kona</td>
<td>3.3%</td>
<td>15</td>
<td>6.0%</td>
<td>2.3%</td>
</tr>
<tr>
<td>County</td>
<td>100.0%</td>
<td>249</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: County of Hawaii Police Department, 1985.

Required Additional Services

The County Police Department anticipates that the resident and visitor population growth projected for South Kohala will be accompanied by a shift in criminal and traffic incidents. This shift is expected to necessitate an expanded police force at the Waimea Police Station and may eventually necessitate a new substation on the Kohala coast. This would incur costs for personnel, equipment and capital outlays; such costs would be included in the projections of costs to the County discussed in Chapter II.

Until such time as a new station might be required, the County Chief of Police notes that the Waimea and Kapo'au stations are relatively new and that each could accommodate additional staff when necessary.
FIRE PROTECTION

The new units at Mauna Lani Resort will also lead to increased demands for fire protection services and facilities.

Existing Services and Facilities

Fire protection for the South Kohala district is stationed in Waimea. The station provides 24-hour service and has a staff of six, which is supplemented by volunteers from Puako and Waikoloa, and a fire engine operator from Kohala. The station has one engine, one 1,500-gallon tanker and an emergency medical unit. Additional engines and a ladder truck are dispatched from Waimea when needed.

Required Additional Services

Mauna Lani Resort is presently formulating an agreement with the County Fire Department regarding the dedication of approximately one acre of land for a future fire station. Recent discussions have considered the construction of a building by the Kohala Coast Resort Association which would be leased back to the County for a fire station and emergency medical services center. As planned, location of the new station near to the Resort would be strategic in respect to additional service requirements at Mauna Kea and Waikoloa Resorts as well as at Mauna Lani Resort. Because the new station would be within five miles of each, these South Kohala resorts would all benefit from the highest possible fire protection ratings for hotel and condominium units.

Mauna Lani Resort also proposes to form a volunteer fire company in the interim. The county fire chief reports that the developments planned at Mauna Lani Resort are not expected to be problematic to the provision of fire protection, given (1) the Resort's proposed measures and (2) that new facility development is in accordance with current fire and building codes and requirements of the County Department of Planning and of Water.

HEALTH CARE

The island of Hawaii has five hospitals. Kona Hospital is the largest, followed in ascending order by Ka'u Hospital, Honokaa Hospital, Kohala Hospital, and Puako. Kona Hospital is the island's only hospital and provides intermediate care, and various other medical groups on the island provide out-patient clinical services. An assistant to the Hawaii State Director of Health reports that health care services and facilities in West Hawaii need considerable upgrading with or without further development in South Kohala.

The improvement of regional health care delivery capabilities should be an important concern to developers in South Kohala.

Existing Services and Facilities

Two state-operated hospitals exist in the Kohala area. These are the Kohala Hospital and the Honokaa Hospital. The Kohala Hospital is located in Kohala, and is primarily a long-term care institution. In January 1983 it had 30 acute care beds, 18 long-term beds and a regular staff of three physicians. The Honokaa Hospital has a total of 26 beds (21 for acute patients and 5 for long-term care) and 13 to 14 physicians. Most patients from the South Kohala area are taken to Honokaa Hospital because of its greater proximity.

However, neither Honokaa nor Kohala Hospitals can provide full patient care, and the existing facilities at Honokaa are considered substandard because the building is old and small. A recent study of the County of Hawaii's health care facilities concluded that replacement facilities were needed in Honokaa.

The closest health care facility considered to be "full" is the Kona Hospital. According to records of the State Health Planning and Development Agency, Kona Hospital has a total of 77 beds, 53 of which are for acute care and 24 for long-term care. According to the State Department of Health, the Kona Hospital has an active staff of 26 physicians. An administrator in the Department of Health described Kona Hospital's resources as inadequate for the needs of even the existing regional population.

The private Lucy Henriques Medical Center in Waimea has emergency and out-patient clinical facilities with a total of 5-1/2 practicing doctors (including a half-time pediatrician). The Center has two holding beds which are used until a patient can be transferred elsewhere. The Center also has 10 specialists who are regularly associated with the clinic.

Required Additional Services

Development of additional facilities at the Resort may be expected to impact all four medical facilities discussed. An expanded population in the South Kohala District will eventually require additional acute care facilities. The administrator of Kona Hospital reported in February 1984 that the changing population profile of West Hawaii suggests a need for expanded services in the fields of care most needed by an older population such as in cardiovascular, orthopedic and urological care.

Likewise, an aging population and the movement of retirees to South Kohala's resort areas may be expected to eventually warrant the expansion of long-term care facilities in the region.

RECREATION

Mauna Lani Resort is expected to primarily affect shoreline recreational opportunities for residents, because of its beachfront location. Current uses of the beach areas near the Resort include fishing and other food gathering, diving, swimming, sunbathing, sightseeing, surfing, sailing and canoe launching. The Resort would impose no access restrictions to public beach areas and would preserve the existing shoreline trail to maintain access between public rights-of-way.

Existing and Planned Facilities

The 1983 Data Book indicates that in 1982, the County of Hawaii had 134 county parks encompassing 1,446 acres, 18 state parks with a total acreage of 209,244 and one national wilderness area of 2,046 acres.

However, because of the island's uniqueness, the coasts of Hawaii Island are more often ignored than sunny. Thus, despite its large size, the island only has 29 sandy beaches and only 6 of these are improved. In comparison, Kauai, which has only 16% of Hawaii Island's land area and less than half of its resident population, has 40 sandy beaches, 18 of which are improved as noted in the 1983 Data Book.
However, because of the island's remoteness, the coasts of Hawaii Island are more often rugged than sandy. Thus, despite its large size, the island has only 29 sandy beaches and only 8 of these are improved. In comparison, Maui, which has only 14% of Hawaii Island's land area and less than half of its resident population, has 40 sandy beaches, 18 of which are improved as noted in the 1985 Data Book.

The State Recreation Plan, Technical Reference Document by the Hawaii State Department of Land and Natural Resources noted nine golf courses on the island of Hawaii in 1980. Since this count, South Kohala has added two more golf courses, one at Mauna Lani Resort and one at Waikoloa Beach Resort. Golf courses at the three South Kohala resorts are all open to the public, subject to green fees and the availability of tee times. Preferential starting times are given to hotel guests at the three South Kohala resorts. Mauna Kea Resort also gives preferential starting times to resort property owners.

Presently the Resort includes 3.2 acres of public park land, located mauka of the Mauna Lani Bay Hotel. Under the revised master plan, a second golf course would be available for public use at Mauna Lani Resort and the Resort would develop a large public beach park between Puako Bay and the Puako petroglyph area. The beach park would have comfort and picnic facilities, showers and two parking areas for a total of 29 cars.

Mauna Lani Resort has developed one public right-of-way to the shoreline fronting the Mauna Lani Bay Hotel. The Resort's agreement with the county is to provide two more public rights-of-way to the beach as its development proceeds. One would be located at the northern end of the property at Puako Bay and the other would be at the southern end at Hokuatope Bay.

Required Additional Facilities

The Hawaii County Department of Parks and Recreation uses a ratio of five acres of developed park land per 1,000 resident population as a target criterion for existing and new developments. This ratio is noted in the County Park Utilization Ordinance, part of the County General Plan. The new park area that Mauna Lani Resort would make available to the public under the revised plan is seen to satisfy the county criterion.

The 3.2 acres of existing public park land at the Resort are considered more than adequate for the slight on- and off-resort population impacts of the Resort's development to date. Under the revised plan, the Resort would make several more acres of land available for public recreational use at the proposed beach park near Puako Bay. Together with the Resort's existing public park land, this contribution is expected to satisfy the County criterion given the resort's total projected population impacts of approximately 1,200 persons by 1990 and 2,200 persons by 1995, as shown in Exhibit 11-1.

The director of the County Department of Parks and Recreation also found that the Resort's proposal under the revised plan for an additional public beach park would enhance access to both Puako Bay and to the existing public petroglyph preserve at Puako. It was proposed that potential conflicts between resident and visitor uses at the beach park be mitigated by an interpretive program for shoreline and pond resources.
July 1, 1985

Mr. Roger Harris, Project Planner
Mauna Lani Resorts, Inc.
P. O. Box 4959
Kawaihae, Hawaii 96743-4959

Dear Mr. Harris:

Subject: Report of Field Inspection
Proposed Development Area
Lalainilo, South Kohala, Hawaii
TKM: 6-9-01:19

On June 21, 1985, Wendell Kam, staff archaeologist, met with you to conduct a field inspection of the subject area which consists of State and privately owned lands earmarked for future development by Mauna Lani Resorts.

The purpose of this inspection was to determine the adequacy, via a physical inspection, of the two previous archaeological reconnaissances of the subject area. These reconnaissances, entitled "Archaeological Reconnaissance of the Area South of the Puako Petroglyph Archaeological District, South Kohala, Hawai'i" (Welch:1984) and "Archaeological Reconnaissance Survey of Kalahuipua'a and Portions of Waikoloa, Lalainilo, and Anaeho'omalu, South Kohala, Hawaii Island" (Kirch, 1973) were determined to be adequate in identifying the various cultural resources within the project area. This determination of adequacy is also based on the recommendations of the respective studies which offer site-specific recommendations for the mitigation of the cultural resources prior to impact by the proposed development. Two copies of the results of each mitigative activity shall be submitted to our office for review and comment, which shall also occur prior to the start of any construction activity.

Due to the physical nature of the terrain, there exists the possibility that heretofore unidentified cultural resources, such as lava tubes, may be exposed during construction. In this instance, we recommend that all construction activity in the immediate area be stopped and our office be contacted at 548-7460 immediately.

Sincerely,

[Signature]

RALSTON H. NAGATA
(State Parks Administrator)

Appendix C
July 6, 1985

Ms. Ann Mapes, Senior Planner
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

This letter is in response to your request for additional information on the effects of indirect and induced employment at the planned facilities at Mauna Lani Resort (Resort). As requested, this letter first addresses the issue of labor availability with respect to the Resort's total employment impact on the island of Hawaii, including direct, indirect and induced construction and operational requirements. Following sections address the effects of the Resort's total employment impact on the island's population growth and additional housing requirements. The last section of this letter explains Peat, Marwick, Mitchell & Co.'s (Peat Marwick) understanding of the Resort's proposal for long-term future employee housing requirements.

The information contained herein is provided as a supplement to the information and materials presented in Peat Marwick's report to Belt, Collins & Associates entitled "Economic and Fiscal Impact Assessment of Planned Developments at Mauna Lani Resort," dated April 1985 (Report).

LABOR AVAILABILITY

Exhibit II-N of the Report indicated that the on-island employment requirements for the construction and operation of planned facility developments under the Resort's revised master plan could be expected to total approximately 1,300 persons by 1990 and 3,200 persons by the year 2000. The staffing of construction and operational employment requirements under the revised master plan are addressed here in turn.

Construction Employment

Direct, indirect and induced employment requirements for construction of the additional facilities planned were estimated to average between 440 and 720 person-years per year between 1986 and the year 2000, as shown in Exhibit II-I of the Report. Of these totals, between 220 and 360 average annual person-years were projected to occur on the island of Hawaii.

Appendix D
As was explained in the Report, the actual share of construction-related workers coming from off-island on any given project will depend on the timing and scale of other projects under construction in the state at the time. However, it is estimated that the island of Hawaii may be able to provide an average of approximately 65% of the Resort's total construction-related labor demands on the island. The remaining approximately 35% of direct, indirect and induced positions are expected to be primarily filled by workers who will temporarily relocate from other islands during the construction of particular projects.

Operational Employment

Direct, indirect and induced employment requirements for operation of the additional facilities planned under the revised master plan were estimated to increase from approximately 1,550 persons in 1990, to 4,000 persons by the year 2000, as shown in Exhibit II-M of the Report. Of these totals, the impact on the island of Hawaii was estimated to increase from approximately 1,100 persons in 1990, to 2,800 persons by the year 2000, as shown in Exhibit A.

Exhibit A also shows how the projected labor requirements may be met by various sources of labor. Operational employment requirements may be satisfied by persons drawn from (1) the island's expected future work force or (2) off-island. The indirect and induced employment generated by the operation of additional facilities is expected to involve a slightly higher component of persons drawn from off-island than is direct employment because of the different nature of such support facilities. Overall, persons drawn from off-island to positions generated directly, indirectly or through induced effects of the operation of new facilities were assumed to increase from 15% of total employment in 1990, to 20% by the year 2000.

Within the island's labor force, operational employees may be drawn from (1) "available" sources of labor, including under- or unemployed persons and labor market entrants, or (2) job turnover. It was assumed that "available" sources of labor would decline from 45% of the total on-island component in 1990, to approximately 35% by the year 2000, while the share of labor coming from job turnover would increase over this period.

TOTAL POPULATION IMPACT

Considering total operational and construction employment and resort residents and visitors, the Resort's effect on population movement to the island of Hawaii under the revised master plan is projected to total approximately 1,500 additional persons by 1990 and 4,600 additional persons by the year 2000, as shown in Exhibit B.
Sources of Additional Population

Of these totals, operations-related employees and their dependents are estimated to account for approximately 350 persons in 1990 and more than 1,200 by the year 2000.

Persons drawn from off-island for construction-related employment are assumed to reside on the island without dependents during the construction of particular projects. Construction employees from off-island, as explained previously, are estimated to account for 35% of all direct construction employment. Indirect and induced employment stimulated by construction activity on the island is estimated to generate a 25% temporary movement of persons to the island.

Projected resort residents and visitors shown in Exhibit B are as were shown in Exhibit II-P of the Report.

Geographic Distribution of Additional Population

The projected additional population may be expected to be distributed by geographic region of the island, as shown in Exhibit C. The majority of population impact is expected to occur in the North and South Kohala regions, reflecting the many residents and visitors to be attracted to the Resort and the anticipated increases in North and South Kohala housing stock expected to be targeted at the primary residential market.

EMPLOYEE HOUSING REQUIREMENTS

Factors contributing to the demand for additional housing among indirect and induced operational employees are assumed to be comparable to those affecting direct operational employees. Considering direct, indirect and induced operational employment requirements on the island under the revised master plan, it is projected that approximately 250 and 750 employees would require additional housing on the island of Hawaii by 1990 and 2000, respectively, as shown in Exhibit D.

The total demand for additional housing units on the island is estimated on the basis of (1) the operations-related employees expected to require new housing (as shown in Exhibit D) and (2) the construction-related employees temporarily housed on the island (as was shown in Exhibit B). It is projected that the Resort's development under the revised master plan will result in a demand for approximately 250 and more than 600 additional housing units on the island by 1990 and the year 2000, respectively, as shown in Exhibit E.
Ms. Ann Mapes  
July 6, 1985  

LONG-TERM FUTURE EMPLOYEE HOUSING REQUIREMENTS

As was explained in the Report, Peat Marwick expects that the Resort will address its contributions to future employee housing requirements with respect to particular projects as they are proposed. Because future needs for additional employee housing will depend critically on the quality and size of particular projects, and on supply and demand factors in future regional housing markets, this case-by-case approach is considered the best means of assessing the Resort's appropriate future contributions to employee housing on the island. In addition, such analyses would greatly benefit from more complete information than is presently available. Specifically, there are at present very few sources of information concerning the nature and amount of interregional residential movement and housing unit demand generated by resort-related employment in developing formerly rural areas.

* * * * * * *

Thank you for the opportunity to respond to the issues that have been raised concerning our Report. Please let us know if we may be of further assistance.

Very truly yours,

PEAT, MARWICK, MITCHELL & CO.

Ann M. Bouslog  
Senior Consultant

AMB:H  
Enc.

cc: Mr. R. Harris
### MAUNA LANI RESORT

**Projected Mix of Total On-Island Operational Employees**

**1990 to Potential Maximum**

<table>
<thead>
<tr>
<th>Labor supply component</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Revised</td>
<td>Existing</td>
<td>Revised</td>
</tr>
<tr>
<td></td>
<td>master</td>
<td>master</td>
<td>master</td>
<td>master</td>
</tr>
<tr>
<td>On-island sources:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available labor(2)</td>
<td>411</td>
<td>409</td>
<td>593</td>
<td>582</td>
</tr>
<tr>
<td>Regional turnover(3)</td>
<td>274</td>
<td>273</td>
<td>444</td>
<td>437</td>
</tr>
<tr>
<td>Other turnover(4)</td>
<td>228</td>
<td>227</td>
<td>444</td>
<td>437</td>
</tr>
<tr>
<td>Off-island sources(5)</td>
<td>161</td>
<td>160</td>
<td>370</td>
<td>364</td>
</tr>
<tr>
<td><strong>Total operational employment</strong></td>
<td><strong>1,074</strong></td>
<td><strong>1,069</strong></td>
<td><strong>1,851</strong></td>
<td><strong>1,820</strong></td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show effects of proposed additions to existing facilities only.

(2) Unemployed and underemployed persons on-island and labor market entrants. Projected to decline from 45% of on-island labor component in 1990, to 35% by the year 2000.

(3) Persons attracted from other work in North or South Kohala. Projected to increase from 30% of on-island labor component in 1990, to 35% by the year 2000.

(4) Persons attracted from other work elsewhere on the island. Projected to increase from 25% of on-island labor component in 1990, to 30% by the year 2000.

(5) Persons attracted from off-island projected to increase from 15% of employment in 1990, to 20% by the year 2000.
## MAUNA LANI RESORT

**Total Island of Hawaii Population Impact Projected to Result From the Resort’s Construction and Operation**

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Additional population source</th>
<th>1990 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resort visitors and residents(2)</td>
<td>1,075</td>
<td>1,030</td>
<td>2,013</td>
<td>1,926</td>
<td>3,479</td>
<td>3,263</td>
<td>7,686</td>
<td>7,277</td>
</tr>
<tr>
<td>Operational employment:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees(3)</td>
<td>161</td>
<td>160</td>
<td>370</td>
<td>364</td>
<td>561</td>
<td>560</td>
<td>1,399</td>
<td>1,403</td>
</tr>
<tr>
<td>Dependents(4)</td>
<td>127</td>
<td>126</td>
<td>242</td>
<td>248</td>
<td>278</td>
<td>228</td>
<td>1,633</td>
<td>1,637</td>
</tr>
<tr>
<td>Total operational employment</td>
<td>388</td>
<td>366</td>
<td>612</td>
<td>712</td>
<td>1,249</td>
<td>1,213</td>
<td>3,032</td>
<td>3,040</td>
</tr>
<tr>
<td>Construction employment:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct employees(5)</td>
<td>77</td>
<td>77</td>
<td>69</td>
<td>64</td>
<td>117</td>
<td>105</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Indirect and induced employees(6)</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>17</td>
<td>15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total construction employment</td>
<td>88</td>
<td>88</td>
<td>79</td>
<td>73</td>
<td>134</td>
<td>120</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total population increase</td>
<td>1,561</td>
<td>1,474</td>
<td>2,094</td>
<td>2,708</td>
<td>4,672</td>
<td>5,596</td>
<td>10,278</td>
<td>10,767</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show effects of proposed additions to existing facilities only.

(2) Average daily visitors to and residents of the Resort, as shown in Exhibit III-P.

(3) Persons attracted from off-island to fill direct, indirect or induced employment on the island, as shown in Exhibit A. Expected to include persons filling approximately one-third of total managerial or specialty positions.

(4) Projected as two additional persons per managerial or specialty positions expected to be filled from off-island; one per other position expected to be filled from off-island.

(5) Construction workers from off-island estimated to represent 35% of direct employment. Such employees assumed to reside on the island temporarily and without dependents. Construction activity assumed to be complete by the time of the Resort’s maximum development.

(6) Indirect and induced employment stimulated on the island by direct construction activity projected to effect a 25% temporary movement of persons to the island.
MAUNA LANI RESORT

Geographic Distribution of Total Population Impact

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Area of residence or visitation</th>
<th>1990 Existing master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North and South Kohala:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-resort (2)</td>
<td>1,075</td>
<td>2,013</td>
<td>1,926</td>
<td>3,479</td>
<td>3,263</td>
<td>7,686</td>
</tr>
<tr>
<td>Off-resort (3)</td>
<td>255</td>
<td>551</td>
<td>540</td>
<td>884</td>
<td>849</td>
<td>2,062</td>
</tr>
<tr>
<td>Total North and South Kohala</td>
<td>1,330</td>
<td>2,564</td>
<td>2,466</td>
<td>4,363</td>
<td>4,112</td>
<td>9,748</td>
</tr>
<tr>
<td>North and South Kona (4)</td>
<td>133</td>
<td>214</td>
<td>208</td>
<td>339</td>
<td>320</td>
<td>606</td>
</tr>
<tr>
<td>Hamakua and Hilo (5)</td>
<td>58</td>
<td>116</td>
<td>114</td>
<td>170</td>
<td>164</td>
<td>364</td>
</tr>
<tr>
<td>Total population impact</td>
<td>1,521</td>
<td>2,894</td>
<td>2,788</td>
<td>4,872</td>
<td>4,596</td>
<td>10,718</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) As shown in Exhibit II-P.

(3) Operational employees and their dependents living in North or South Kohala expected to increase from 65% of total in 1990, to 68% by the Resort's completion. Construction employees expected to increase from 25% of total in 1990, to 30% by the year 2000.

(4) Operational employees and their dependents living elsewhere on the island expected to stabilize at 20% of total. Construction employees expected to decline from 70% of total in 1990, to 65% by the year 2000.

(5) Operational employees and their dependents living in the Hamakua or Hilo areas expected to decline from 15% of total in 1990, to 12% by the Resort's completion. Construction employees expected to stabilize at 5% of total.
MAUNA LANI RESORT

Total Operational Employees Projected
to Require Additional Housing on the Island of Hawaii

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Labor supply component</th>
<th>1990 Existing master plan</th>
<th>1995 Existing master plan</th>
<th>1990 Revised master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-island labor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available labor(2)</td>
<td>62</td>
<td>62</td>
<td>89</td>
<td>87</td>
<td>122</td>
<td>118</td>
<td>294</td>
</tr>
<tr>
<td>Kohala turnover(3)</td>
<td>23</td>
<td>23</td>
<td>44</td>
<td>44</td>
<td>70</td>
<td>67</td>
<td>168</td>
</tr>
<tr>
<td>Other turnover(4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-island labor(5):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managerial(4)</td>
<td>36</td>
<td>36</td>
<td>62</td>
<td>61</td>
<td>97</td>
<td>93</td>
<td>233</td>
</tr>
<tr>
<td>Other(5)</td>
<td>125</td>
<td>125</td>
<td>309</td>
<td>303</td>
<td>484</td>
<td>467</td>
<td>1,166</td>
</tr>
<tr>
<td>Total demanding new housing</td>
<td>246</td>
<td>244</td>
<td>504</td>
<td>495</td>
<td>773</td>
<td>745</td>
<td>1,861</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) New household formation projected to amount to 15% of total shown in Exhibit A.

(3) Component assumed to consist of persons already settled in Kohala area or accustomed to commute.

(4) Movement within the island projected to generate additional housing demand amounting to 10% of other job turnover.

(5) All persons attracted from off-island projected to require additional housing.
MAUNA LANI RESORT

Total Additional Housing Unit Demand Projected to be Generated on the Island of Hawaii by the Resort's Construction and Operation

1990 to Potential Maximum

<table>
<thead>
<tr>
<th>Housing demand component</th>
<th>1990 Existing master plan</th>
<th>1995 Existing master plan</th>
<th>1995 Revised master plan</th>
<th>2000 Existing master plan</th>
<th>2000 Revised master plan</th>
<th>At potential maximum development(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revised master plan</td>
<td>Revised master plan</td>
<td></td>
<td>Revised master plan</td>
<td>Revised master plan</td>
<td>maximum development</td>
</tr>
<tr>
<td>Operational employees:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managerial or specialty(2)</td>
<td>36</td>
<td>62</td>
<td>61</td>
<td>97</td>
<td>93</td>
<td>233</td>
</tr>
<tr>
<td>Other (3)</td>
<td>140</td>
<td>295</td>
<td>290</td>
<td>451</td>
<td>434</td>
<td>1,085</td>
</tr>
<tr>
<td>Total operational employees</td>
<td>176</td>
<td>357</td>
<td>351</td>
<td>548</td>
<td>527</td>
<td>1,318</td>
</tr>
<tr>
<td>Construction employees(4)</td>
<td>73</td>
<td>66</td>
<td>61</td>
<td>111</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Total unit demand</td>
<td>249</td>
<td>423</td>
<td>412</td>
<td>659</td>
<td>627</td>
<td>1,318</td>
</tr>
</tbody>
</table>

(1) Includes existing facilities at the Mauna Lani Bay Hotel and the Mauna Lani Terrace. Other columns show proposed additions to existing facilities only.

(2) Managerial or specialty occupations estimated to represent 10% of total new employment with one-third filled from off-island. Housing unit demand projected at 1.0 managerial or specialty employee per household.

(3) Remainder of persons projected to require additional housing on the island, as shown in Exhibit D. Housing unit demand projected at 1.5 nonmanagerial or nonspecialty employee per household.

(4) Housing demand for employees temporarily resident on the island, as shown in Exhibit B, estimated at 1.2 employees per unit. Construction activity assumed to be completed by the time of the Resort's maximum development.

Exhibit...