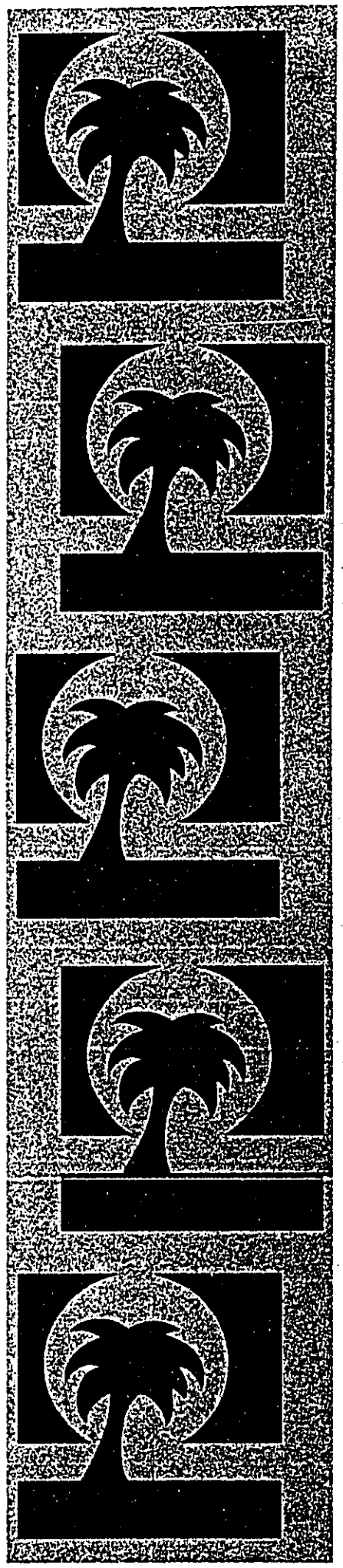
‘O‘OMA II

NORTH KONA, HAWAII

VOLUME I

FINAL SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT
November 1991

Prepared For: KAHALA CAPITAL CORPORATION
Prepared By: HELBER HASTERT & FEE, PLANNERS
For Submittal To: STATE LAND USE COMMISSION



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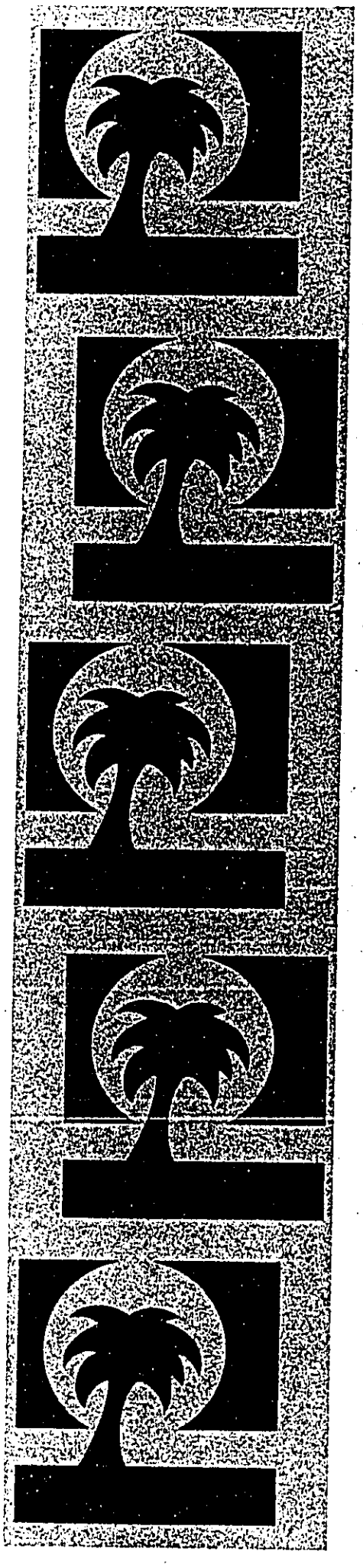
INTRODUCTION AND SUMMARY



CHAPTER I

INTRODUCTION AND SUMMARY

1.1 Intended Use of this Document

This final supplemental environmental impact statement (SEIS) has been prepared in support of a petition to the State Land Use Commission (LUC) to amend the State Land Use Boundary designation from Conservation to Urban for a 217.566-acre parcel identified as Tax Map Key (TMK) 7-3-09:4 (Parcel 4). The entire project area is 300.566 acres, the second parcel comprising the project area, which is 83 acres in size and is identified as TMK 7-3-09:22 (Parcel 22), is within the State Urban District and is not part of the petition for a boundary amendment. For the purposes of this document, Parcel 22 is included in all project descriptions and analyses.

On March 12, 1991, Kahala Capital Corporation, a Hawaii corporation, submitted a Petition for District Boundary Amendment to the LUC (Docket No. A91-666), involving Parcel 4, known as 'O'oma II, located about one mile south of the Keahole Airport. An earlier EIS, accepted by the County of Hawaii in 1986 for an amendment to the Hawaii County General Plan, was prepared in support of the 1986 General Plan Amendment. However, the initial master plan has been revised, the project area has changed configuration and the LUC has ruled that the current master plan shall require a supplemental EIS under the provisions of the Environmental Impact Statement Rules promulgated by Chapter 200 of Title 11, Department of Health.

An EIS Preparation Notice (EISPN) was subsequently published in the May 8, 1991 issue of the Office of Environmental Quality Commission (OEQC) Bulletin. Fifteen responses were received, many of them after the 30-day comment period. The concerns raised have been addressed and/or comments incorporated into this document to ensure an evaluation that is as comprehensive as possible.

This SEIS is intended to comply with Chapter 343, HRS and the EIS regulations promulgated by Chapter 200 of Title 11, Department of Health. The purposes of this EIS are to provide information to public officials and members of the community about the nature of the proposed action; to assess the existing environmental conditions of the property and surrounding areas; to evaluate potential impacts of the proposed action and to present mitigating actions for those impacts; and, to consider alternatives to the proposed action.

In addition to the State Land Use District Boundary Amendment petitions, this EIS has been prepared to fulfill the environmental requirements for a County of Hawaii Special Management Area Use Permit (SMP) and rezoning, and other permits required to implement the project.

1.2 Definition of Terms

Project Area: The project area (also referred to as the "project site") consists of two parcels (TMK 3-7-3-09:4 and 22), totalling 300.566 acres.

Petitioner: The petitioner is Kahala Capital Corporation, a Hawaii corporation, whose principal place of business and mailing address in the State of Hawaii and on the Island of Hawaii is 75-5751 Kuakini Highway, Suite 201, Kailua-Kona, Hawaii, 96740.

Proposed Action: The proposed action involves the development of the 300-acre project area in a multi-use master plan that includes: a 12-acre Ocean Science Center and 300 parking stalls; a Conference Center and 100 parking stalls; a 19-acre Water Recreation Park; a golf course and clubhouse, covering 176 acres, including a driving range; a Japanese style inn of 50 rooms; a 550-room hotel covering 22 acres; 70 Golf Course House Lots, at 10,000 square feet per lot; between 130 and 230 Golf Course Condominiums; about 35,000 square feet of retail commercial space; and, a 6-acre site devoted to maintenance and a wastewater treatment plant (WWTP).

1.3 Development Summary

Petitioner Landowner:	Kahala Capital Corporation 75-5751 Kuakini Highway Suite 201 Kailua-Kona, Hawaii 96740 (808) 326-1693
Preparers of Supplemental EIS:	Helber Hastert & Fee, Planners 733 Bishop Street Suite 2590 Honolulu, Hawaii 96813 (808) 545-2055
Petition Area:	217.566 Acres (An additional 83-acre area already in the Urban District is also included in the master plan

	SEIS.)
Location:	North Kona Judicial District, County of Hawaii 'O'oma, 2nd Ahupua'a, South of the Keahole Airport and Approximately seven miles north of Kailua-Kona
Tax Map Key:	Division 3, Zone 7, Section 3, Plot 09, Parcel 4 (217.566 acres, Conservation District and Parcel 22 (83.0 acres, Urban District)
Existing State Land Use District:	Conservation, Urban
County of Hawaii General Plan:	Resort, Urban Expansion, Open
County Zoning:	Open
Existing Uses:	Vacant and unimproved. Existing land use is limited to recreational use of the coastal areas of the site.
Proposed Uses:	Intermediate Resort, including: approximately 550 hotel rooms; 70 single-family and 230 multi-family residential units; 18-hole golf course, driving range and clubhouse; ocean science center; water recreation park; conference center; retail commercial area; Japanese-style inn, including about 50 rooms; and, a private sewage treatment plant.
Proposed Action:	Amendment of the State Land Use Boundary designation from Conservation to Urban.
EIS Approving Agency:	State Land Use Commission

1.4 Alternatives Considered

Three alternatives to the proposed action were considered: (1) "no action" (no amendment to the state land use boundary and no rezoning at the County level); (2) "major resort" development (including a hotel of up to 3,000 rooms); and, (3) "retreat resort" development (with a maximum of 100 hotel rooms). None of the three alternatives considered compared more favorably than the proposed action in establishing an economically feasible master plan that meets the developers standards of quality and also fulfills public policies and objectives.

1.5 Summary of Probable Impacts and Mitigating Measures

Flora and Fauna. No endangered flora or fauna are known to inhabit the site. While the proposed development will result in the loss of vegetation, primarily the scrub community, and some wildlife habitat, it is expected to have only a minimal impact on the total island populations of the species involved. In addition, it is anticipated that the development of the site, with the inclusion of water features and additional landscaping, will provide additional habitats for some native species.

Topography. Average slopes on the site range from 0 to 5 percent. The predominant land type is pahoehoe lava with smaller areas of a'a lava and beaches. Because of the relative flatness of the site, large-scale reshaping of the ground surface will be minimized. To minimize the need for large-scale reshaping and filling of the underlying land form, land uses have been sited to take advantage of natural physiographic features. The golf course and landscaped areas will require importation of topsoil.

Natural Hazards. The 'O'oma II property is sited within Zone DE for overall relative risk associated volcanic activity. The U.S. Geological Survey classification system contains six zones, descending in risk level from A through F. As with other lands on the Big Island, the subject property lies in seismic Zone 3. The Flood Insurance Rate Map identifies a coastal high hazard zone in portions of the coastline makai of the jeep trail except near Puhili Point where the boundary extends inland. The coastal hazard zone is defined as areas at risk from tsunami and high wave run-up. All structures within the property will be designed and constructed to conform with County building standards and regulations for potential seismic activity. No habitable structures will be constructed in the flood hazard area.

Historic and Archaeological Sites. Most of the identified archaeological sites are located in the coastal area within 600 feet of the shoreline. Since development will be concentrated in this area, many of the sites could be affected. However, significant sites will be protected and insignificant sites which must be disturbed will be recorded. Where appropriate, the interpretive value of these sites will be highlighted as features along pedestrian paths or as part of the marine park/ocean science center.

Visual Resources. The landscape of the property will be irretrievably altered from its present natural state to a man-made one. The development is not expected to interfere substantially with the line of sight from Queen Kaahumanu Highway

because of slope gradients that already obscure scenic vistas from the highway. Although detailed site plans have not been developed, planned land use densities are amenable to low-rise, low-density construction, extensive landscaped buffers to retain the open, spacious character of the Kona Coast, and maximum retention of makai-mauka view corridors.

Air Quality. Existing air quality is good in the vicinity of the subject property. Increased automotive emissions will have long-term impacts on air quality; however, the low density of the project, combined with the land-sea breeze wind regime in the mornings and late afternoons will limit the seriousness of the impacts.

It is probable that the application of pesticides and sewage effluent could drift off-site during periods of moderate wind. The impacts of this drift can be eliminated by the use of a state-of-the-art wind foil-style sprayer for the application of pesticides when winds are between five and twenty miles per hour, and a prohibition on the application of any pesticide requiring a sprayer in winds exceeding twenty miles per hour. In addition, the construction of a 15-foot high berm, combined with a 100-foot wide landscaped buffer near sensitive areas on the 'O'oma II property lines planting would further act as a physical barrier to the movement of aerosol sprays generated from normal pesticide usage or routine irrigation. In addition, it is recommended that sewage effluent be treated to the 2 NTU standard adopted by California, for use of effluent in turf irrigation. Adoption of this strict pre-chlorination clarity standard would mean that 'O'oma II's wastewater would be classified as Class B, suitable for human contact.

Noise. Noise from air operations at Keahole Airport could present an annoyance problem for certain activities within the development. The location of specific land uses has been influenced by the need to satisfy compatibility standards for the various levels of noise impacts. Several noise abatement strategies are available to further reduce noise problems and enable reasonable coexistence between the Keahole Airport and surrounding land uses, including the 'O'oma II development. Among the mitigating actions that can be taken by the developer are the siting of compatible land uses and the employment of structural and design techniques for sound attenuation.

Recreational Resources/Access. The coastline along the 'O'oma II property is a recognized recreational area. The proposed development provides for continued and improved public access, to and along the shoreline, including mauka-makai paved roads, parking, restroom and shower facilities and a shoreline pedestrian trail that is

intended to be integrated into the Ala Kahakai trail, a coastal trail planned by the Department of Land and Natural Resources from Kailua-Kona to Kawaihae.

Public Services. The proposed development will generate increased demand for police and fire protection services that are already operating near capacity. The recurring costs of increased manning levels would be offset by increased County tax revenues generated by the project.

Public Utilities. The estimated potable water demand for the project 0.74 million gallons per day (MGD), with an approximately additional 1.0 MGD needed for irrigation (including about 0.8 MGD for irrigation of the golf course). Based on currently available information, the Petitioner will need to develop additional sources of potable water for the proposed project. New potable water sources will need to be developed. These new sources could be either potable wells developed in North Kona and dedicated to the County or an *on-site desalination* plant. Three potential sources of irrigation have been identified: (1) treated sewage effluent; (2) brackish well water; and, (3) desalinated well water. It is possible that a combination of all three options could be employed, resulting in a water resource that is a blend of the possible sources.

Domestic wastewater flows from the proposed project is estimated at 0.47 MGD. The most feasible alternative for wastewater treatment and disposal appears to be secondary level treatment at a single on-site facility with the treated effluent used for golf course and landscape irrigation. If wastewater is used for irrigation, it will be treated to remove microbes to allow for human contact within 50 feet of application, to meet new effluent treatment standards recently adopted in California.

Groundwater and Nearshore Marine Environment Resources. The use of herbicides, pesticides, fertilizers and sewage effluent as an irrigation source for the proposed golf course at 'O'oma II should not harm the nearshore marine environment, as any leachates from these products will be diluted to infinitesimal levels upon reaching the shoreline. To further reduce any potential for harm to groundwater and the nearshore marine environment, an Integrated Golf Course Management (IGCM) program will be developed and followed, which provides sophisticated guidance for the application of pesticides, herbicides and pesticides, thereby reducing the volume of these compounds which leach to groundwater, and ultimately which reach the mixing zone of the shoreline. IGCM also stipulates that appropriate species of turfgrass be selected for specific climates and stresses the importance of proper golf

course construction and maintenance techniques to improve the ability of the turf and the soil to break down, filter and absorb applied chemicals.

The pesticides chlorophyrifos and isophenos could be used safely and effectively for termite control. However, due to concern raised about the use of termiticides, it is recommended that an alternative, non-chemical agent, basaltic sand, be used to control termites.

The construction of the seven-acre, unlined salt water lagoon, which will be the main feature of the proposed water recreation park, will cause groundwater seepage to the ocean to be directed north and south of the project site, resulting in slight increases in groundwater salinity and background concentrations of nitrogen. It is not anticipated that these increases will effect groundwater resources at NELHA to the north or anchialine ponds at Kohanaiki to the south. Further testing of subsurface geology at 'O'oma II will permit more refined calibration of anticipated effects of the salt water lagoon. If these tests determine that groundwater seepage to the ocean is not as direct as predicted, the salt water lagoon system, including lagoons associated with the golf course, hotel and water recreation park, may be redesigned to subsequently reduce the mounding effect.

Employment and Employee Housing. The proposed project will generate increased direct, indirect and induced employment and a related need for additional employee housing. The need for employee housing is cumulatively significant within the context of all proposed developments for the North Kona region, especially in light of recent trends in home ownership, household income and household formations. To this end the Petitioner intends to work closely with appropriate State and County agencies and other developers in developing an acceptable program to provide affordable employee housing.

Transportation. Assuming that Queen Kaahumanu Highway is widened to four lanes by the year 1998, the Queen Kaahumanu intersections at the Keahole Airport Access Road and Kaimi Nani Drive would both operate at "under capacity" conditions. Ultimately, the proposed 'O'oma II project would access the highway via a frontage road system, which would lead to planned interchanges to the north and south of the project site. Until the proposed interchanges and frontage road system are constructed, at-grade access should be provided at a channelized intersection under traffic control.

1.6 · Relationship to Land Use Plans and Policies

Chapter 3 contains a detailed discussion of the relationship between government plans and policies and the proposed action. The master plan for the 'O'oma II multi-use development is consistent with all relevant public policies, except for the State Land Use District boundary, that is the subject of the petition before the State Land Use Commission, and County zoning.

West Hawaii, particularly the North Kona-South Kohala area, has been the focus of efforts to expand the Big Island visitor industry. The 'O'oma II development represents an opportunity to promote economic growth by establishing a viable, high-quality, yet relatively affordable, resort area. But unlike resort-only developments, this project seeks to provide a wide variety of employment types and residential opportunities. A diverse range of quality jobs can have a ripple effect throughout the community stimulating educational goals and other economic pursuits.

1.7 Unresolved Issues

Ocean Science Center. Because tenants of the NELHA have also expressed an interest in developing an ocean science center, there has been some concern raised about the marketability of two ocean science centers within such close proximity. The Petitioner is aware of these concerns and is currently discussing this situation with the proponents of the second center. Although it is likely that only one center will be proposed after discussions are concluded, it is too early to say whether it would be located on NELHA property or at 'O'oma II. For this reason, the ocean science center is included in the proposal for 'O'oma II.

Subsurface Geology. As discussed in Section 4.7, Groundwater and Nearshore Marine Environment Resources, the development of a seven-acre, unlined salt water lagoon as part of the proposed water recreation park may create a "mounding" effect on groundwater seepage into the ocean, which could raise salinity and background nitrogen levels in groundwater within the project site and at NELHA to the north and Kohanaiki to the south. The analysis which leads to these predictions is based on conservative assumptions about subsurface geology under the project site, in the absence of specific data. Although current analysis reveals no harmful effects to the nearshore marine environment, the Petitioner will undertake subsurface testing to more accurately determine subsurface geology, which will allow more accurate analysis of impacts to groundwater and the nearshore environment. Such testing is pending approval of the Board of Land and Natural Resources. If these tests

determine that groundwater seepage to the ocean is not as direct as predicted, the salt water lagoon system, including lagoons associated with the golf course, hotel and water recreation park, may be redesigned to subsequently reduce the mounding effect.

CHAPTER II

DESCRIPTION OF THE PROPOSED ACTION

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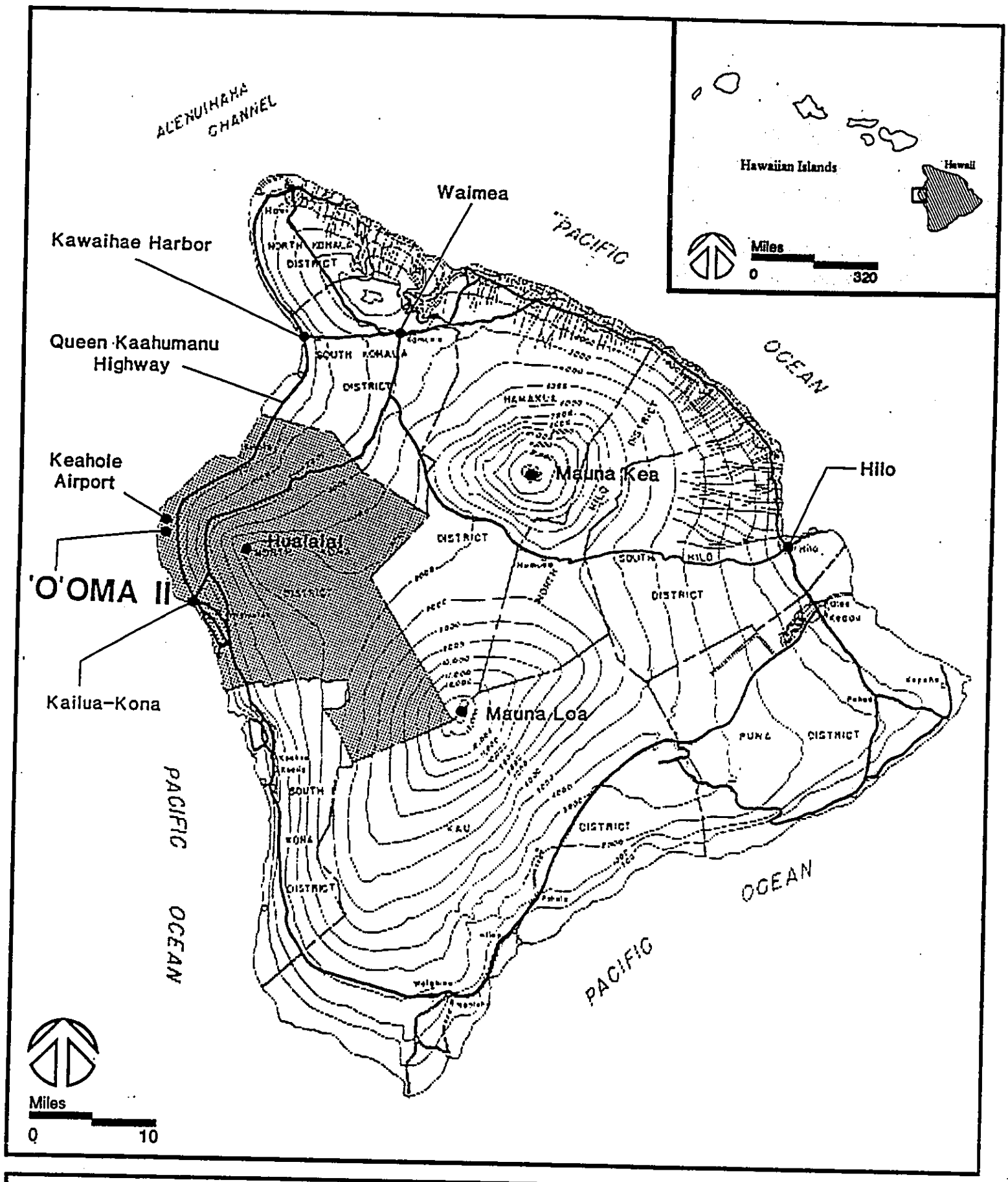
2.1 Location

The project site lies within the 'O'oma II ahupua'a on the leeward coast of the island of Hawaii, about one mile south of the Keahole Airport and seven miles north of the town of Kailua-Kona (Figure 1). The project site is bounded by Queen Kaahumanu Highway to the east (mauka), the proposed Hawaii Ocean and Science Technology (HOST) Park to the north, the proposed Kohanaiki Resort to the south and by the Pacific Ocean to the west (makai) (Figure 2). Two named coastal features appear in the vicinity; Wawaloli Beach is northwest of the project site near the Natural Energy Laboratory of Hawaii (NELH) at Keahole Point, and, Puhili Point is located at the southwest corner of the project site. The major existing land use in the area is the State-owned Keahole Airport, located approximately one mile to the north. Adjacent to the southern boundary of the Keahole Airport lies the NELH, a publicly-funded research facility. NELH is involved in the research and commercial application of alternative energy systems, aquaculture and related fields, utilizing deep ocean water pumped ashore via offshore pipelines. Another publicly-subsidized facility, the Keahole Agricultural Park, is located north of the project site, mauka of Queen Kaahumanu Highway. This park is located on State-owned land and was developed by the State of Hawaii, although individual parcels are leased to commercial growers, primarily in the horticultural industry.

The Kohanaiki Resort is the site of a proposed 450-acre master planned resort owned by Nansay Hawaii, Inc. The proposed master plan for the Kohanaiki Resort includes: a multi-use resort development featuring two hotels totaling 1,050 rooms; an 18-hole championship golf course and clubhouse; 330 multi-family dwelling units; 380 single-family dwelling units; an athletic club; a child care center; an artisan's village; a beach club; public park and related public access improvements; resort maintenance facilities; and, other resort amenities.

Immediately south of Kohanaiki is the Kaloko-Honokohau National Historical Park (NHP) being developed by the U.S. National Park Service. Mauka of the National Park is the Kaloko Industrial Park consisting of 194 fee simple, one-acre industrial lots. Beyond the NHP to the south lies the 245-slip Honokohau Small Boat Harbor operated by the State Department of Transportation, Harbors Division. South of the Harbor lies the State-owned Kealakehe tract. The County is now in the process of developing a regional wastewater treatment plant (WWTP) in the coastal area of Kealakehe. Above the Queen Kaahumanu Highway, about two miles south of the



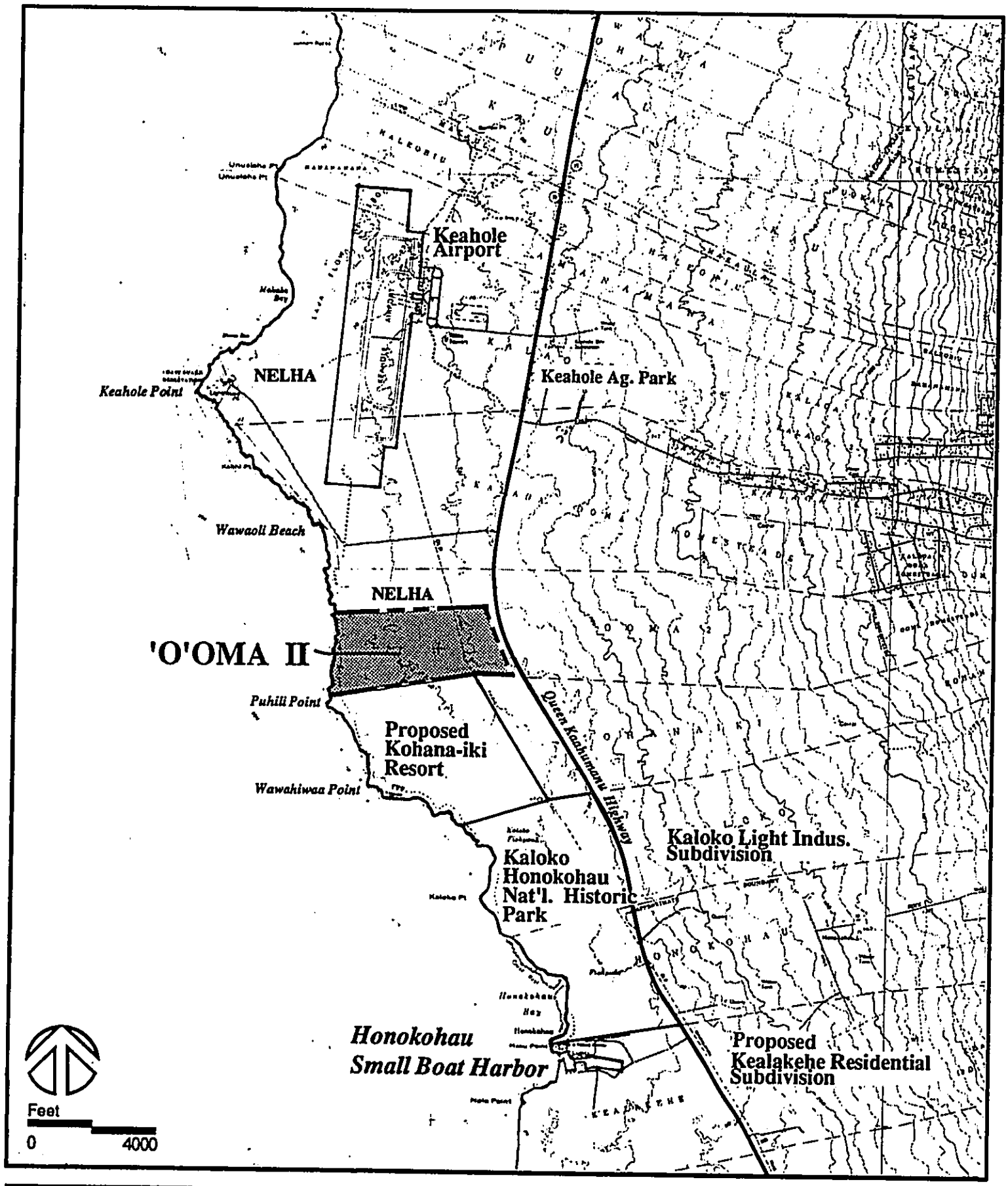
Project Location Map

'O'OMA II

Kahala Capital Corp.

Figure: 1

Helber Hastert & Fee, Planners



Regional Location Map

Figure: 2

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

project site, lies the proposed Kealakehe Residential Community, a project that is managed by the State Housing Finance and Development Corporation (HFDC). HFDC is planning to develop a major new civic center and up to 5,000 residential units in this area.

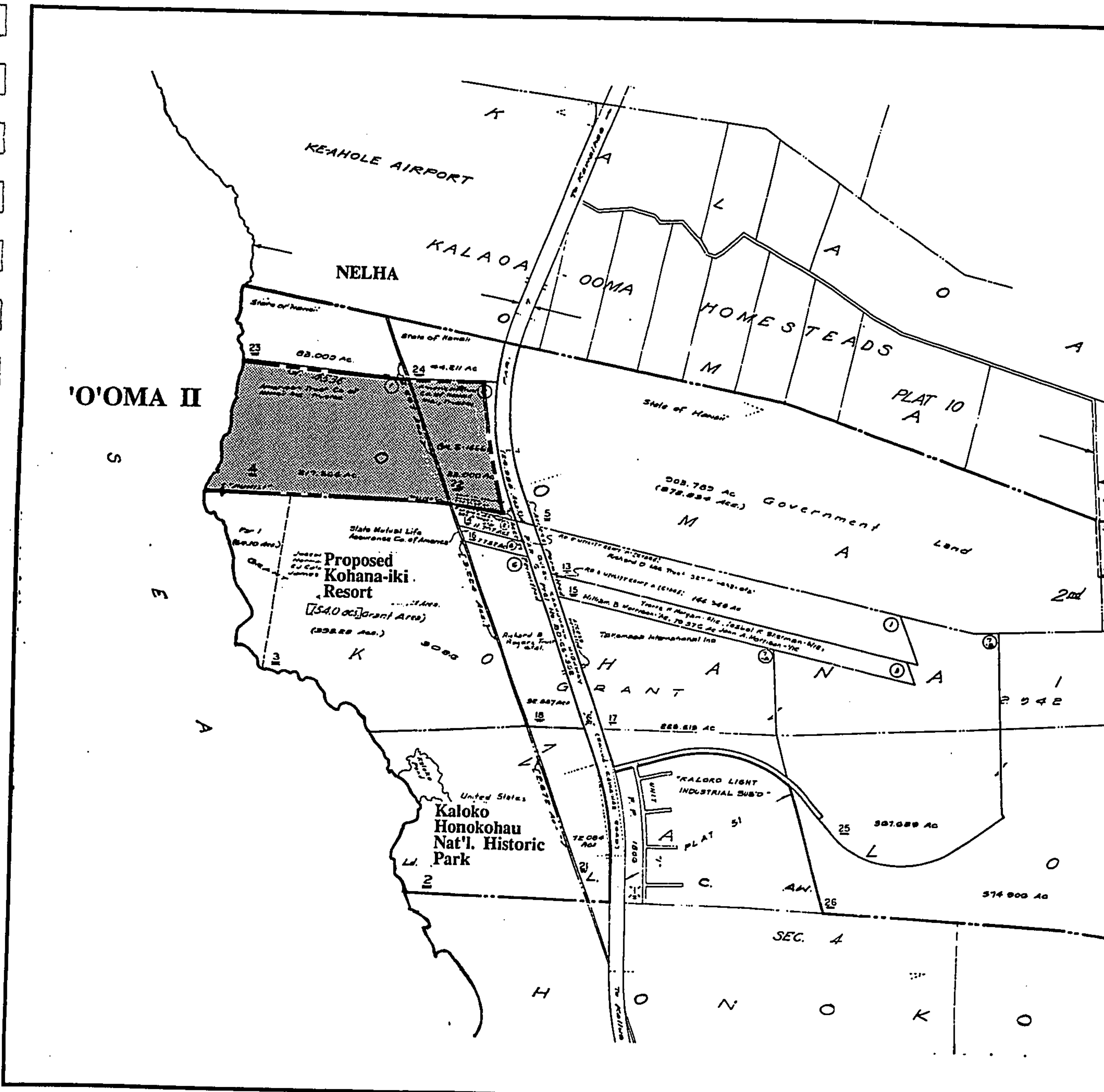
2.2 Environmental Setting

As noted above, the project site is comprised of two parcels, totalling 300.536 acres. The mauka parcel, Parcel 22, is 83.00 acres, roughly rectangular in shape and provides access to Queen Kaahumanu Highway. This parcel is within the state land use Urban district. The makai parcel, Parcel 4, is 213.536 acres in size and is also roughly rectangular in shape with approximately 2,700 lineal feet of coastline (Figure 3). This parcel is within the State Conservation District.

The entire project site is currently vacant and unused, in its natural state, consisting of prehistoric lava flows covered by sparse vegetation composed of grasses and scattered shrubs. Elevation of the property ranges from sea level to an elevation of approximately 110 feet at the northern mauka corner of Parcel 22. The land slopes gently with slopes averaging 0-5 percent. Localized mounds and depressions, characteristic of lava flows, are present throughout the site.

2.3 Historical Perspective

Permanent settlement in 'O'oma II is believed to have started in 1400-145 (Cordy, 1985). There is some debate about how intensively populated were the 'O'oma-Kalaloa ahupua'a in North Kona, with estimates ranging from just over a hundred to well into the hundreds. The Kona region figures largely in the history of Hawaiian royalty and unified governance of the Islands. One of the earliest archival references notes that between 1814-1819, the future Kamehameha III was raised in 'O'oma by the younger relatives of his guardian (ibid). Between 1819 and through the 1850s, however, the area experienced gradual depopulation as the populace moved to Kailua and Keahou, the centers of port commercial activities and Christianity. Maps of that era show only a few households in North Kona. An 1888 map by Emerson shows one house on the shore of 'O'oma II (ibid).


KE-AHOLE AIRPORT
NELHA
KALAOA OOMA
HOMESTEADS
PLAT 10
'O'OMA II
State of Hawaii
83.000 Ac.
Government Land
Proposed
Kohana-iki
Resort
(540 acs.)
Grant Area
KALOKO LIGHT INDUSTRIAL SUB'D
Kaloko
Honokohau
Nat'l. Historic
Park
United States
SEC. 4
To Kailua

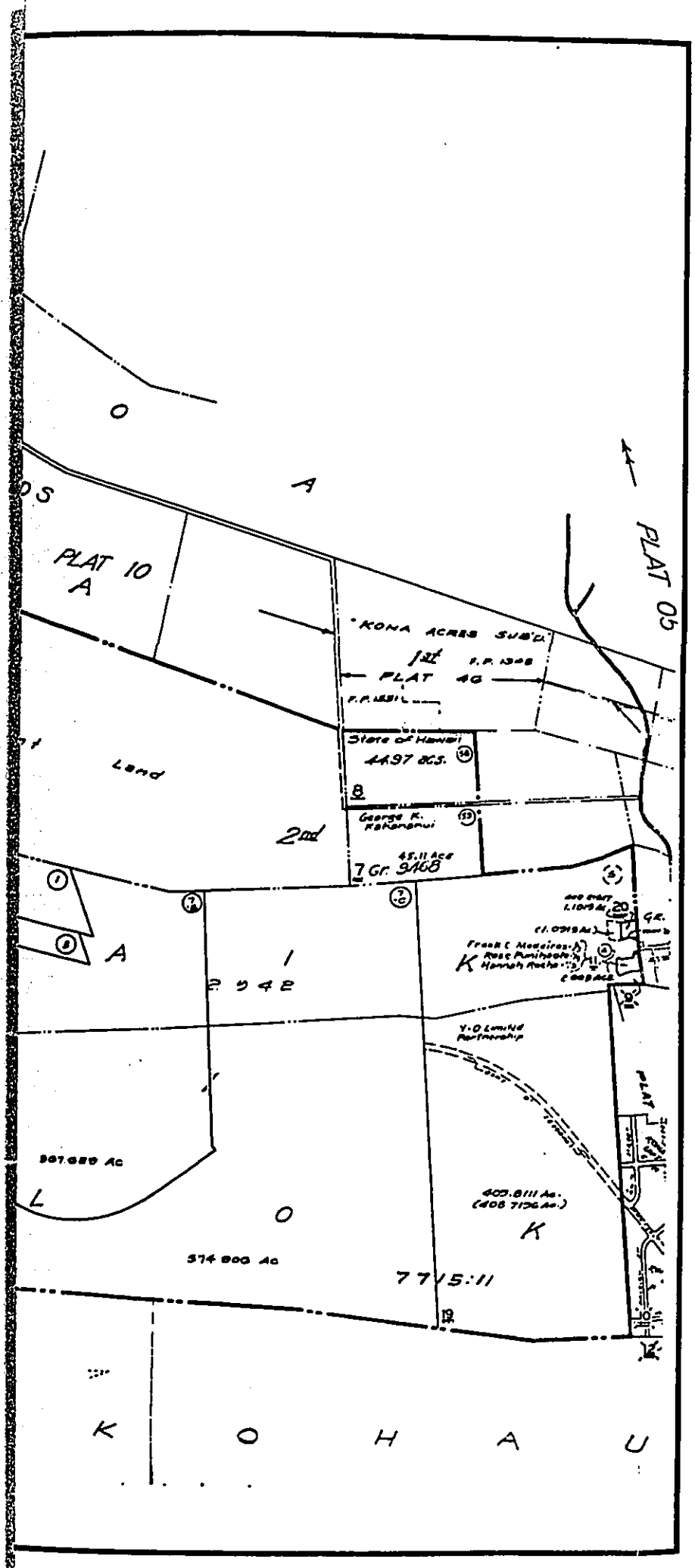


Figure: 3

Tax Map **7-3-9**

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

Feet

0 2000

Spurred by trading and agriculture, particularly coffee farming and ranching, the population in the Kona region increased steadily after the turn of the century, but remained relatively concentrated in the established communities. Agriculture continued to be the mainstay of the Kona economy. In 1960, North and South Kona had a population of 8,743 persons with 1,449 workers claiming employment in the agricultural sector versus 291 workers employed in the hotel industry (Kona Regional Plan, 1982). The 1970 census reported a population of 8,836 persons, or an increase of only 1 percent in ten years. The 1970 census did, however, register the end of the domination by the agricultural sector. There were only 333 agricultural employees, compared with 659 in personal services (including hotels).

The Kona population increased over 120 percent during the 1970's as seen in the 1980 Census which recorded a population of 19,664. The population of North Kona, separate from South Kona, grew 184 percent during this time period. In 1970, Kona's population constituted less than 14 percent of the County total; however, by 1980, it had grown to more than 21 percent of the County-wide population. This trend has intensified during the latter part of the 1980s, with the Kona population reaching 30,900 in 1989, representing a 53 percent increase since 1980 and 25 percent of the County-wide total. (DBED, 1990)

2.4 Project Objectives

Recognizing the opportunities presented by oceanfront property under a single ownership, and with sufficient acreage to develop a high-quality, multi-use project, the Petitioner has been engaged in planning for the project site for many years. Earlier planning efforts included an oceanfront parcel of 83 acres, identified by TMK 7-3-09:23, and resulted in the preparation of the previously accepted EIS for 'O'oma II in 1986. After a 1986 land exchange with the State of Hawaii, the Petitioner received Parcel 22, also 83 acres in size, in exchange for Parcel 23. Throughout the planning process, several objectives have provided guidance:

- To adopt a land use plan based on sound marketing concepts that identify market segments not yet satisfied by existing developments in order to compete successfully against other development proposals.

- To become part of the local community by generating jobs and spawning businesses that will be patronized by local residents. This development strategy is not intended to merely add a veneer of "local color," but to establish the

types of amenities offered and by increasing tax revenues that may ultimately be used for capital improvement and enhanced services.

- To minimize adverse impacts on the physical and socio-economic environments and on public facilities and services through continuous coordination with appropriate public agencies and organizations; mitigative actions to be refined as plans become more definite and their attendant impacts more evident.

- To implement a logical phasing plan so that building construction can proceed in response to market demand without unnecessary delay.

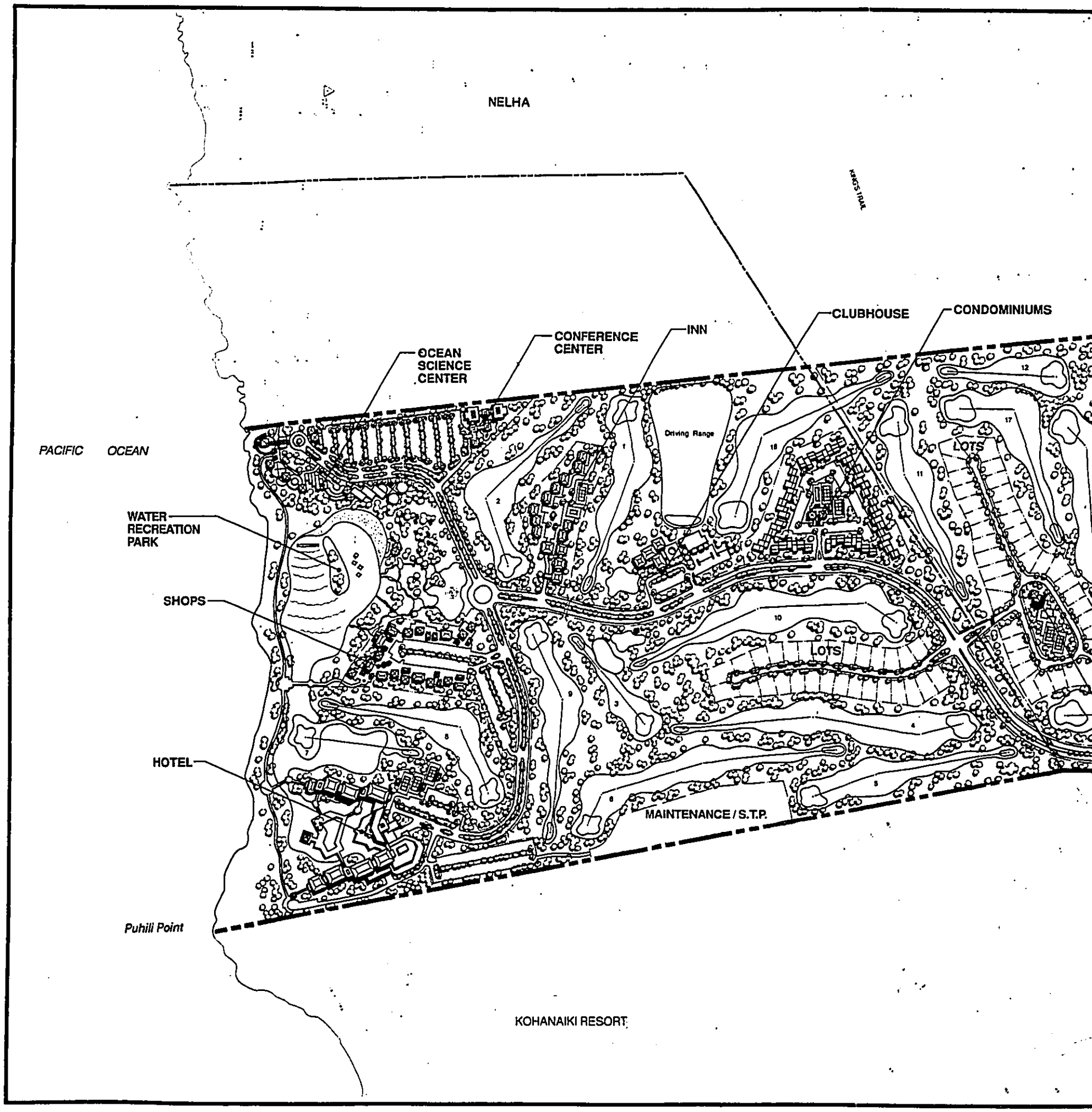
2.5 'O'oma II Master Plan

2.5.1 Development Concept

The Petitioner's proposed development at 'O'oma II is intended to provide a transition in land usage from the ocean science research and ocean-related industrial uses on the Natural Energy Laboratory of Hawaii Authority (NELHA) properties north of 'O'oma II (which include the Natural Energy Laboratory and the proposed HOST Park) to the more resort-related uses already approved by the State and County at Kohanaiki. The Petitioner intends to accomplish this transition by locating the proposed Ocean Science Center and Conference Center near the 'O'oma II/NELH boundary; a shoreline park, water recreation park and golf course in the center of the 'O'oma II property; and, the proposed retail center and first class hotel near the 'O'oma II/Kohanaiki boundary (Figure 4).

With the proposed development's focus on ocean science and recreation and the use of alternate energy systems and resource conservation measures throughout the project, the intended function of the proposed project to serve as a bridge between environmental and natural energy research and public environmental education and effective commercialization of natural energy systems will be more than a land use concept.

'O'oma II provides an excellent setting for a community designed to serve both residents and visitors with its extensive ocean frontage and central location in the West Hawaii region. The combination of active and passive entertainment opportunities at the ocean science center and water recreation park is expected to make the facility a full-day recreational opportunity, in a region which lacks large scale educational and recreational attractions. The master plan would include:


NELHA
KEEKS TRAIL
CLUBHOUSE
CONDOMINIUMS
INN
CONFERENCE CENTER
OCEAN SCIENCE CENTER
PACIFIC OCEAN
Driving Range
LOTS
WATER RECREATION PARK
SHOPS
HOTEL
MAINTENANCE / S.T.P.
Puhili Point
KOHANAIKI RESORT

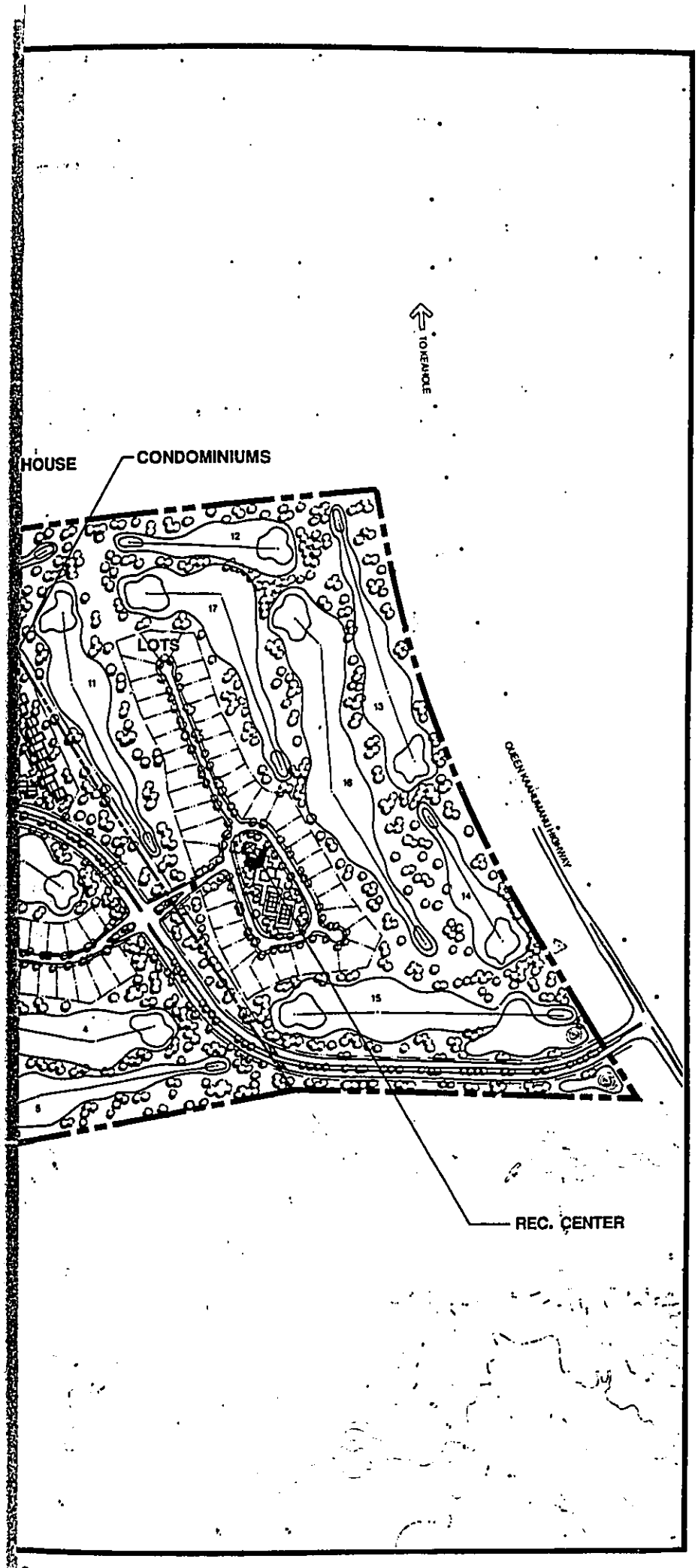


Figure: 4

'O'oma II Master Plan

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

Feet

0 600

Ocean Science Center. The Ocean Science Center will provide one or more large aquarium tanks viewed through either panoramic windows along descending ramps wrapping around the tank, or clear plexiglass tunnels that extend through the tank. Animal feeding periods and guided tours and scientific exhibits will be part of the center's attractions to allow visitors to gain a better understanding of different ecosystems and animal behaviors in the nearby ocean. The primary focus of the Ocean Science Center will be Hawaiian marine ecosystems with a particular concentration on the various systems and environment which exist at or near Keahole Point. There will be exhibits demonstrating various Hawaiian marine ecosystems such as anchialine ponds, tide pools, the intertidal zone, coral reef, dangerous marine animals, microaquariums and touch pools which will allow visitors the opportunity to interact with organisms in the intertidal and reef areas. Other exhibits may include other Pacific ecosystems, possibly deep water and cold water exhibits made possible by utilizing cold water from NELHA sources.

As with similar ocean science projects, the planned 'O'oma II Ocean Science Center would include restaurant and meeting facilities and perhaps an auditorium which could be utilized as a performing arts center. This would enable the center to be used for meetings and special functions in the evenings; both by the public and visitor groups.

Professional Conference Center. The professional conference center is planned in conjunction with the Ocean Science Center and is designed to service professional gatherings of a scientific and technical nature. The Conference Center is planned to include: function rooms readily subdividable into spaces of varying size and advanced communications technology permitting teleconferencing and satellite reception and high quality audiovisual capacity. The professional conference center could provide a focus for conference activity catering to the general corporate market, NELHA tenants, and the scientific community. It would be anticipated that conference attendees could stay at the first class hotel and the attendees and their families could utilize the ocean science center (including evening functions), the water recreation park and the golf course.

Water Recreation Park. The planned Water Recreation Park would leave the beach and strand areas essentially in their natural condition. The existing shoreline trail would be incorporated into the Ala Kahakai project under the Na Ala Hele branch of the Department of Land and Natural Resources. Mauka of the strand, on what is now low-lying lava land, an approximately seven-acre salt water swimming lagoon

would be created and would contain natural water slides, islands, and a wave generating machine. The water recreation park would be open to the general public for a fee. There would, of course, be no charge for use of the shoreline park and kama'aina rates would be offered for the water recreation park facilities.

Golf Course, Clubhouse and Inn. The proposed project will include a regulation par 72 golf course planned as a recreational and open space amenity within the 'O'oma II community, which will include a driving range, practice greens, and a clubhouse with pro shop, restaurant, pool and cart barn. Near the clubhouse, there would be a Japanese-style inn (ryokan) with approximately 50 rooms. The course would be private but public play will be provided, including kama'aina rates for Hawaii residents. The inn may be joined with the course as an economic unit as course memberships may include reduced room rates in the inn or similar arrangements.

Residential Properties. The proposed project will include two types of residential properties: single-family dwellings and multi-family condominiums. All residential properties would be located on the more mauka portions of the 'O'oma II property because of design requirements resulting from airport noise considerations. The design requirements will allow the developer to make use of energy efficient design and use of alternative energy systems in all residential properties.

The proposal includes 70 single-family golf course lots of approximately 10,000 square feet and 130 to 230 golf course condominiums. All residential units will have golf course frontage and will be supported by recreational facilities such as tennis courts and swimming pools.

Hotel and Retail Center. The proposed development includes a first class (not luxury) hotel of approximately 550 rooms located near the 'O'oma II/Kohanaiki boundary. A first class resort offers above-average accommodations at reasonable rates to appeal to the broad range of visitor markets including: free independent travelers (FIT) (travelers who make their own arrangements); families; packages; groups; and, meetings segments. Hotels in first-class resorts generally also provide meeting facilities to attract the group visitor market. The hotel would service the conference center and provide relatively affordable accommodations for families visiting the ocean science center, business travelers, and more budget minded visitors. In and around the hotel there would be food and beverage facilities, recreational amenities, and approximately 200 parking stalls. Near the hotel there would be a retail center containing retail shops and restaurants overlooking the lagoon and golf

course together with approximately 300 parking stalls. Table 1 summarizes the proposed land uses of the master plan.

Shoreline Public Recreation This aspect of master plan is distributed along the entire shoreline frontage of the project site and includes shower/restroom facilities at the northern and southern-makai corners of the property, public parking areas and a coastal pedestrian trail that is intended to become a link in the Ala Kahakai Trail, a trail planned by DLNR to stretch from Kailua to Kawaihae, along the shoreline. It is intended that existing coastal recreational opportunities remain unimpeded for local residents. In fact, with the construction of paved access roads and comfort stations, access to the shoreline area will be improved.

Table 1: 'O'oma II Master Plan Land Use Summary

Land Use	Gross Acreage	Units
Ocean Science Center	12 acres	
Conference Center	3 acres	
Water Recreation Park	19 acres	
Golf Course and Clubhouse	176 acres	
Inn	5 acres	50 rooms
Single-Family Dwellings	24 acres	70 lots
Multi-Family Dwellings	10 acres	130-230 units
Commercial/Retail	8 acres	35,000 square feet
Hotel	22 acres	550 rooms
Maintenance/Sewage Treatment Plant	6 acres	
Access Road	15 acres	
TOTAL	300 acres	

2.5.2 Development Phasing

The proposed project is intended to be developed on a phased basis with basic infrastructure (including public beach access and parking, internal roadway, water, sewer and electrical systems), landscaping, golf course, golf clubhouse and inn

developed first. The basic infrastructure is estimated to cost $41,039,000 in 1991 dollars and is estimated to require two years to construct. At least the initial phases of the ocean science center, professional conference center, water recreation park, hotel and retail center would be developed concurrently during this first phase. The golf course house lots and condominiums will be developed in phases driven by market demand.

2.6 Necessary Permits and Approvals

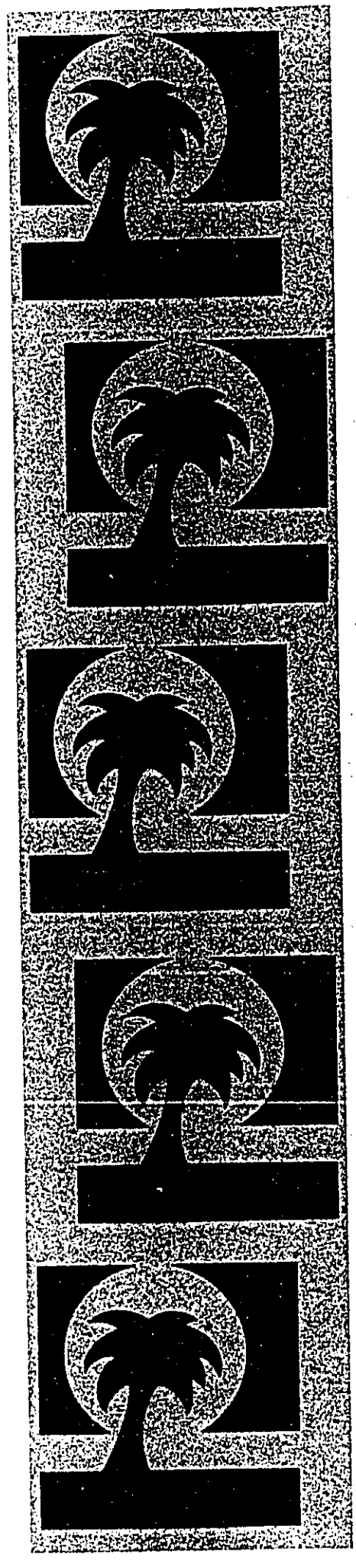
Table 2 lists the Federal, State and County permits that are required prior to implementation of the project. Other permits may be required for specific construction activity.

Table 2: Development Permits and Approvals

Authority	Approval Required
State of Hawaii	
State Land Use Commission	Land Use District Amendment
Department of Land and Natural Resources	Chapter 6E Review New water source development approval
Department of Health	Private wastewater treatment plant certification/permit
Office of State Planning	CZM consistency determination
County of Hawaii	
Planning Department	Rezoning Special Management Area (SMA) Use permit Subdivision approval Grading Permit
Department of Water Supply	Modified water distribution system approval

CHAPTER III

RELATIONSHIP OF THE PROPOSED ACTION TO EXISTING PUBLIC PLANS, POLICIES AND CONTROLS



CHAPTER III

RELATIONSHIP OF THE PROPOSED ACTION TO EXISTING PUBLIC PLANS, POLICIES AND CONTROLS

3.1 Hawaii State Plan

The Hawaii State Plan, established through the State's legislative process, represents public consensus regarding expectations for Hawaii's future. Chapter 226, Hawaii Revised Statutes (HRS), as amended, describes the purpose of the State Plan as follows:

> "...[it] shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State of Hawaii; provide the basis for determining *priorities* and allocating limited resources, such as public funds, services, manpower, land, energy, water, and other resources; improve coordination of state and county plans, policies, programs, projects, and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state and county activities." (Chapter 226-1, HRS; Findings and Purpose)

The proposed project is generally consistent with the goals, objectives, policies, and guidelines of the Hawaii State Plan. The following section analyzes project impacts with respect to three substantive areas of the Hawaii State Plan; the economy, the population, and, the physical environment.

Economy. Relevant objectives and policies focus on four areas of the State's economy: (1) its general vitality; (2) the agricultural sector; (3) the tourism sector; and, (4) potential growth activities. The plan also contains three major thrusts: (1) to increase and diversify employment opportunities to achieve full employment, increase income and job choice, and improve living standards for Hawaii's people; (2) to support the continued growth of the State's major industry, tourism; and, (3) to establish a steadily growing and diversified economic base that is not overly dependent on a few industries.

The proposed project will contribute toward these economic objectives. The proposed mix of economic activities, including resort and ocean-related commercial and conference facilities, will expand and diversify the economic base of the North Kona area in particular, and the County of Hawaii in general. These activities are intended to be "basic" industries, i.e., those that earn revenues from outside the local

economy and are able to generate relatively high employment multipliers. The conference center, ocean science center and the hotel will augment the State's activities currently under way at the adjacent Natural Energy Laboratory of Hawaii Authority (NELHA).

Population. A policy of the State Plan's population element is to encourage economic growth and greater employment opportunities on the neighbor islands in a manner consistent with community needs and desires, and to ensure that adequate support services and facilities are provided to accommodate the expansion.

Direct and indirect jobs and economic opportunities created by the proposed development will contribute to the population growth of the West Hawaii region to the extent that families move to, or decide to remain in the area in order to sustain a desired standard of living. The Petitioner, together with appropriate public agencies, will seek to expand existing infrastructure systems to accommodate increases in the local population that are attributable to the proposed project.

Physical Environment. Objectives and policies for the physical environment relate to the enhancement of terrestrial, shoreline, and marine resources, as well as scenic, aesthetic and historic resources. These objectives seek to encourage the prudent use of Hawaii's natural resources and to protect environmental resources that are considered unique or fragile.

The project site is rich in natural resources that have been identified in this report. The shoreline resources, consisting of beaches and lava promontories, are actively used by local beach-goers, and the maintenance of this shoreline resource is a prerequisite for the success of the proposed mixed use development. Public beach access will be enhanced and appropriate public parking facilities and comfort stations will be constructed to better accommodate recreational use by the local community.

The near-shore marine waters are considered pristine. Protecting the existing high quality is of extreme importance to the sustained economic viability of ocean-related research and commercial enterprises adjacent to and within the project site, and ultimately to the success of the development's resort component as well.

Archaeological surveys conducted at the site have identified numerous historic and prehistoric sites. All sites will be documented in accordance with accepted

archaeological practices. Those deemed culturally significant will be incorporated into the overall land use design to prevent deterioration induced by human activity.

3.2 State Functional Plans

The Hawaii State Plan directs the appropriate State agencies to prepare functional plans for their respective program areas. The plans set forth "...the policies, statewide guidelines, and priorities within a specific field of activity, when such activity or program is proposed administered, or funded by any agency of the State" (Section 226-2(1), HRS). Each functional plan contains objectives to be achieved and policies to be pursued within the specified areas. "The functional plan shall identify priority issues in the functional area and shall contain objectives, policies, and implementing actions to address those priority issues" (Section 226-55(b)).

Twelve State Functional Plans have been adopted to date by the Hawaii State Legislature in the areas of agriculture, transportation, conservation lands, housing, tourism, historic preservation, energy, recreation, education, health, human services and employment. Policies contained in the functional plans were examined and are discussed below as they relate to the proposed development. Discussion of the Education and Human Services Functional Plans have been omitted as these policies are not directly related to the project.

3.2.1 State Agriculture Functional Plan

The State Agriculture Functional Plan (prepared by the State Department of Agriculture) identifies two fundamental objectives to be achieved: (1) continued viability in Hawaii's sugar and pineapple industries; and, (2) continued growth and development of diversified agriculture throughout the State. The project site does not contain soils with agricultural capability. However, the proposed project will indirectly support the aquaculture industry with the presence of support facilities for NELHA; i.e., conference center, hotel and commercial uses.

3.2.2 State Conservation Lands Functional Plan

The State Conservation Lands Functional Plan (prepared by the Department of Land and Natural Resources) defines and addresses statewide concerns for environmentally sensitive areas such as watersheds, terrestrial habitat, ocean habitat, areas with endangered species, natural streams, shoreline, open space, natural areas, air and water quality sensitive areas, and scenic, historic and cultural sites.

There are no definable streams or drainage channels within the project site. With proper planning and mitigative actions, preservation and enhancement of valuable on- and off-site natural resources such as the shoreline, air and pristine water quality and historic and cultural sites, can be compatible with urban use.

Parcel 4 of the project site (217.566 acres) is classified in the State Conservation District. A petition for reclassification to the Urban District was filed with the State Land Use Commission on March 12, 1991 (Docket No. A91-666). A Final EIS that was prepared in support of a similar project that included Parcel 4 was submitted with the March 12 Petition along with updated technical studies covering a wide range of subjects. However, the Land Use Commission declined to consider the petition until the Petitioner files a supplemental EIS for the current 'O'oma II master plan. Further consideration of that petition is pending acceptance of this supplemental EIS.

3.2.3 State Energy Functional Plan

The objectives of the State Energy Functional Plan (prepared by the Department of Business, Economic Development and Tourism) include the provision of dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people and increasing energy self-sufficiency.

The island of Hawaii is at the forefront of much research on alternative sources of energy being conducted in the state. The Natural Energy Laboratory of Hawaii (NELH) is perhaps the world's premier research and development facility for ocean thermal energy conversion (OTEC), a renewable energy technology. Advocates of OTEC see it as a potentially major integrated resource, which, in addition to electrical power generation, can generate by-products for aquaculture, fresh water production and air conditioning. The 'O'oma II project is intended to interface with the adjacent NELHA by providing support facilities, such as conference and meeting facilities, lodging and restaurants.

3.2.4 State Health Functional Plan

The State Health Functional Plan (prepared and maintained by the State Department of Health) seeks to: (1) prevent disease and promote healthful lifestyles and environmental conditions: (2) ensure and promote appropriate provision and access to health care for the total community; (3) prevent environmental degradation and

enhance the quality of the air, land and water; and, (4) provide administrative leadership to develop necessary private and public sector capabilities to effect the plan.

Proposed development of the property is not expected to pose a significant risk to public safety or health. The acquisition and distribution of potable water, possible use of brackish water and treatment and recycling/disposal of wastewater will comply with all Federal, State and County regulations. Furthermore, the project will draw upon the experience of other resort areas that have successfully allocated different types of water according to their intended uses. As discussed below (Chapter IV), the project is not expected to have a significant adverse effect on air or water quality.

3.2.5 State Historic Preservation Functional Plan

The State Department of Land and Natural Resources (DLNR) is responsible for the State Historic Preservation Functional Plan. This plan identifies major priorities for such diverse activities as the collection and conservation of oral histories, historic records and artifacts, the perpetuation of traditional arts and skills, the preservation of historic properties and the education of the public with regard to Hawaii's past.

Following a preliminary assessment of 42 sites within Parcel 4, 13 are considered to be of sufficient value to warrant further field investigation. In addition, preservation with some level of interpretive development is recommended for three of the 13 sites assessed as significant additionally as good examples of site types and/or for cultural values (see Section 4.12). Increasing the visibility and interpretive value of these archaeological artifacts will help to promote public appreciation of these historic sites.

3.2.6 State Housing Functional Plan

The State Housing Functional Plan is prepared and maintained by the Housing Finance and Development Corporation (HFDC). The plan identifies six major concerns for: (1) increasing home ownership; (2) expanding rental housing opportunities; (3) expanding rental opportunities for the elderly and other special need groups; (4) preserving housing stock; (5) designating and acquiring land that is suitable for residential development; and, (6) establishing and maintaining a housing information system.

According to a preliminary housing impact analysis based on currently accepted assumptions of labor force composition and household size, a need for 280 employee housing units has been projected for the proposed project by the year 2010 (see Section 5.4). The availability of affordable employee housing continues to be a major concern of Kona residents and a major focus of the State Housing Functional Plan. Given the relationship between construction costs and household incomes, it will be difficult to expand the affordable housing supply without direct or indirect public or private subsidies. Solutions to the problems will require cooperation between State and local agencies, as well as the developers of major projects, including 'O'oma II.

3.2.7 State Recreation Functional Plan

The State Recreation Functional Plan (prepared and maintained by the Department of Land and Natural Resources) seeks to: (1) assess present and potential supply of and demand for outdoor recreation resources; (2) guide State and County agencies in acquiring or protecting lands of recreational value; (3) provide adequate recreation facilities and programs; and, (4) assure public access to recreation areas.

Development of the proposed project will have a significant positive effect on the recreational resources of the area. Beach access, currently limited to an unpaved shoreline jeep trail and one private mauka-makai jeep road, will be enhanced. The proposed land use plan provides for paved improved mauka-makai access including parking areas adjacent to the beaches at the north and south ends of the property. A pedestrian coastal trail will be improved, with the intent to integrate this trail into the Ala Kahakai coastal trail, a trail intended to provide access along the west shoreline of the island of Hawaii. In addition, the proposed water recreation park and a proposed 18-hole golf course will be accessible to Hawaii residents as well as visitors.

3.2.8 State Tourism Functional Plan

The State Tourism Functional Plan is prepared and maintained by the State Department of Business, Economic Development and Tourism. The overall theme of the State Tourism Functional Plan is embodied in language taken from the Hawaii State Plan is "[t]he achievement of a visitor industry that constitutes a major component of steady growth for Hawaii's economy." Toward this primary objective, the Tourism Functional Plan identities major issues and problem areas and sets forth policies and actions to insure against unplanned growth which could be damaging to

the visitor industry and to the quality of life and well-being of the people of the Hawaii. The major objectives of the plan reflect the need to find a balance among economic, social and environmental concerns:

- o achievement of steady and balanced growth of the visitor industry;
- o development and maintenance of a well-designed, high-quality visitor product;
- o respect for, and preservation and maintenance of the fragile resources which comprise Hawaii's natural environment and cultural heritage;
- o support of Hawaii's diverse range of lifestyles;
- o maintenance of a productive workforce which has opportunities for upward mobility and increases in real income;
- o maintenance of a high consumer awareness of Hawaii as a visitor destination in desired markets; and,
- o maintenance of visitor markets to support desired levels of economic activity, and diversification of markets to provide a secure economic base.

The benefits to the visitor industry through the development of the 'O'oma II project are as follows:

- o the development encourages the orderly mix of visitor accommodations including full-service hotels and condominium apartments;
- o creation of an activity center with a mixture of uses, including conference facilities, ocean science center and recreation and commercial attractions, rather than the singular expansion of accommodations for the transient market;
- o shoreline building setbacks and improved beach access to minimize disturbance of coastal resources while facilitating public use of the shoreline; and,
- o an opportunity to interact with and create a vital visitor destination area within the Keahole-Kailua-Kona corridor, with Kailua being an established visitor-oriented community; Kaloko-Honokohau being developed as a National

Park; NELHA creating a potentially new segment of the visitor accommodation market; and, the Keahole Airport, the region's primary entry/exit point.

3.2.9 State Transportation Plan

The State Transportation Plan (prepared and maintained by the State Department of Transportation) identifies two primary transportation objectives: (1) to provide an integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods; and, (2) a statewide transportation system consistent with planned growth objectives throughout the State.

The 'O'oma II land use plan has been developed based on currently available information regarding air operations at Keahole Airport. The plan is consistent with common criteria for accepted land uses within areas affected by certain levels of noise, i.e., noise contours.

At the present time, the project site is adequately serviced by the limited access Queen Kaahumanu Highway. However, as urbanization increases in the region, the two-lane highway may reach unacceptable levels of service, thus requiring future improvements, including the widening of the highway and the construction of limited interchanges. In designing the project's access to Queen Kaahumanu Highway, the Petitioner will consult with the staff of the Department of Transportation to ensure compliance with safety standards and observance of the right-of-way and future plans for the highway.

3.2.10 State Employment Functional Plan

The State Employment Functional Plan is prepared and maintained by the State Department of Labor and Industrial Relations and identifies four major objectives: (1) to improve the qualifications of entry-level workers and their transition to employment; (2) to develop and deliver education, training and related services to ensure and maintain a quality and competitive workforce; (3) to improve labor exchange; and, (4) to improve the quality of life for workers and families.

According to preliminary analysis of employment impacts, the proposed project is expected to support about 1,280 full-time equivalent positions throughout the state, in the form of direct, indirect and induced jobs (about 580 of these positions would be the result of the direct operation of the proposed project) (see Section 5.2). This

would provide employment opportunities as part of the operation of the ocean science center, the conference center, the two hotels, commercial shops and restaurants and the golf course. These positions would represent a wide diversity of jobs available in several areas of the service market, not just tourism-related.

3.3 State Land Use Law

All lands in the State have been classified in one of four land use districts by the State Land Use Commission (LUC), pursuant to Chapter 205, HRS; Urban, Rural, Agricultural and Conservation. The entire 213.566 acres of Parcel 4 of the project site lie within the State Conservation District, while the 83.00-acre Parcel 22 lies within the State Urban District (Figure 5). Urban Districts are located to the north, south and east, encompassing portions of the adjoining NELHA, Keahole Airport and the proposed Kohanaiki Resort. Agricultural District lands are present at the Kona Agricultural Park, directly mauka of the Keahole Airport and on much of the lands mauka of Queen Kaahumanu Highway above the 400-foot elevation.

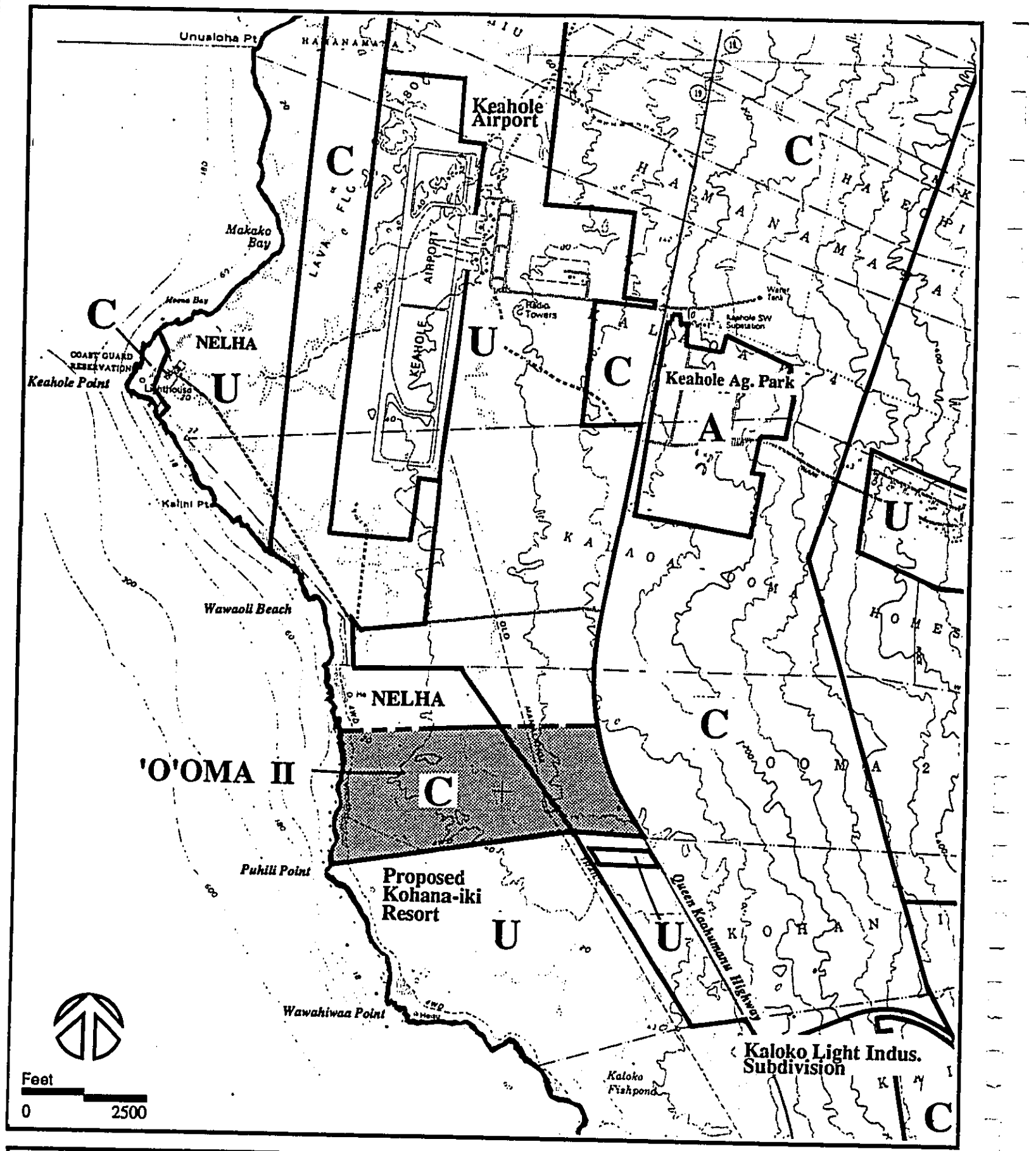
Reclassification to the Urban District is a prerequisite for development of Parcel 4. An earlier petition to reclassify Parcel 4 was rejected by the LUC in 1986. The review process for this updated petition was initiated with filing of the boundary amendment to the LUC on 12 March 1991 and assignment of Docket No. A91-666.

Section 205-17, Hawaii Revised Statutes (HRS), establishes the following decision making criteria for reclassification of District boundaries by the LUC:

(1) The extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii state plan and the adopted functional plans;

(2) The extent to which the proposed reclassification conforms to the applicable district standards; and

(3) The impact of the proposed reclassification on the following areas of state concern:
   - (A) Preservation or maintenance of important natural systems or habitats
   - (B) Maintenance of valued cultural, historical, or natural resources;
   - (C) Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources;
   - (D) Commitment of state funds and resources;



State Land Use Districts

'O'OMA II

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Figure: 5

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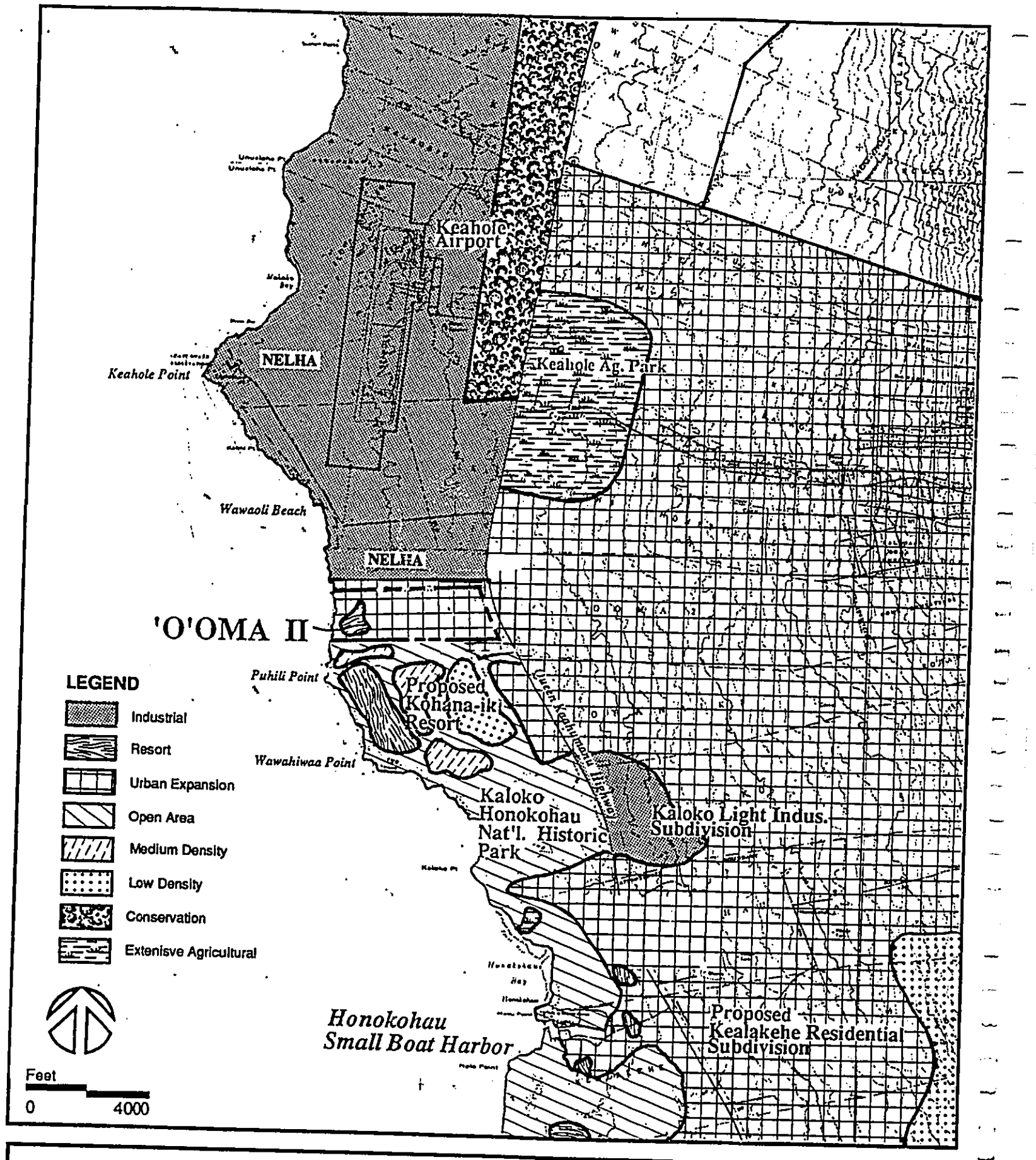
(E) Provision for employment opportunities and economic development; and

(F) Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups.

These criteria are addressed in the following sections in this chapter and in Chapters IV, V and VI, regarding probable impacts on the environment. Based upon these discussions, the proposed projects meets the criteria contained in Section 205-17, HRS.

3.4 Hawaii County General Plan

The Hawaii County General Plan (Ordinance No. 89-142, effective date: November 14, 1989), "is the policy document for the long-range comprehensive development of the island of Hawaii...[it] provides the direction for the future growth of the County. It brings into focus the relationship between residents and their pursuits and institutions, offering policy statements which embody the expressed goals for present and future generations." (General Plan, 1989). The plan contains goals, policies and standards containing thirteen elements, as well as a series of land use maps referred to as General Plan Land Use Pattern Allocation Guide (LUPAG) Maps. The LUPAG maps delineate thirteen different land use categories throughout the county. It is important to note that the LUPAG Map boundaries are not intended to be site specific, therefore, they are not intended to be interpreted in the same manner as zoning map boundaries. As a result of Ordinance No. 87-68 (effective date: June 23, 1987), the LUPAG designations for Parcel 4 were amended from Conservation and Open to Resort, Alternate Urban Expansion and Open (Figure 6) (Ordinance No. 87-68 also included land that was amended to an "Industrial" designation. However, as a result of a land exchange between the Petitioner and the State of Hawaii, portions of the land covered by this redesignation have since been transferred to the NELHA. The proposed project is generally consistent with the County General Plan. The proposed project is also consistent with the policies of the General Plan. Each of the thirteen elements contained in the County of Hawaii General Plan is discussed below as it relates to the proposed project.



Land Use Pattern Allocation Guide Map

'O'OMA II

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Figure: 6

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3.4.1 Economic Element

This section of the General Plan describes the full range of economic activities that are important to the County of Hawaii, including the visitor industry and aquaculture and "other fresh and ocean water-based activities." Within the overall context of encouraging economic activity, the General Plan notes the importance of protecting the quality of the County's land, water, air and sea. Another issue addressed is the need to diversify the economic base of the island. The nature of the proposed project is one of mixed-use, with elements supporting the visitor industry and the activities being pursued by NELHA. Every effort will be taken to insure that ground and ocean water quality is maintained recognizing not only the ecological importance of pristine water, but its economic value as well.

3.4.2 Energy

The island of Hawaii, more than anywhere else in the state, has seen the active research, development and commercialization of alternative sources of energy, including geothermal, hydroelectric, wind, ocean and biomass conversion. The 'O'oma II project particularly recognizes the potential of ocean thermal energy conversion (OTEC) and seeks to take advantage of its proximity to NELHA by proposing mutually beneficial support facilities, such as conference facilities, lodgings and restaurants. The Petitioner is exploring the possibility of becoming a tenant of NELHA to utilize cold water for the Ocean Science Center and air conditioning.

3.4.3 Environmental Quality

The General Plan is conscious of the need to protect the natural environment through the adoption of adequate regulations, the adherence to existing Federal, State and County environmental regulations and the establishment of appropriate monitoring programs. The Petitioner is particularly sensitive to the importance of maintaining the quality of near-shore water, ground water and air, because of the project's proximity to NELHA properties. As a result, all possible steps are being taken to insure that ocean water quality is protected, including the preparation of necessary scientific analyses with recommended monitoring programs and mitigation measures (see Section 4.7).

At a minimal level, development of the project site will comply with all Federal, State and County standards for pollutant controls. A significant portion of the development will be oriented to the visitor industry, thus maintenance of an attractive, high-quality environment will be tied directly to the success of the project.

3.4.4 Flood Control and Drainage

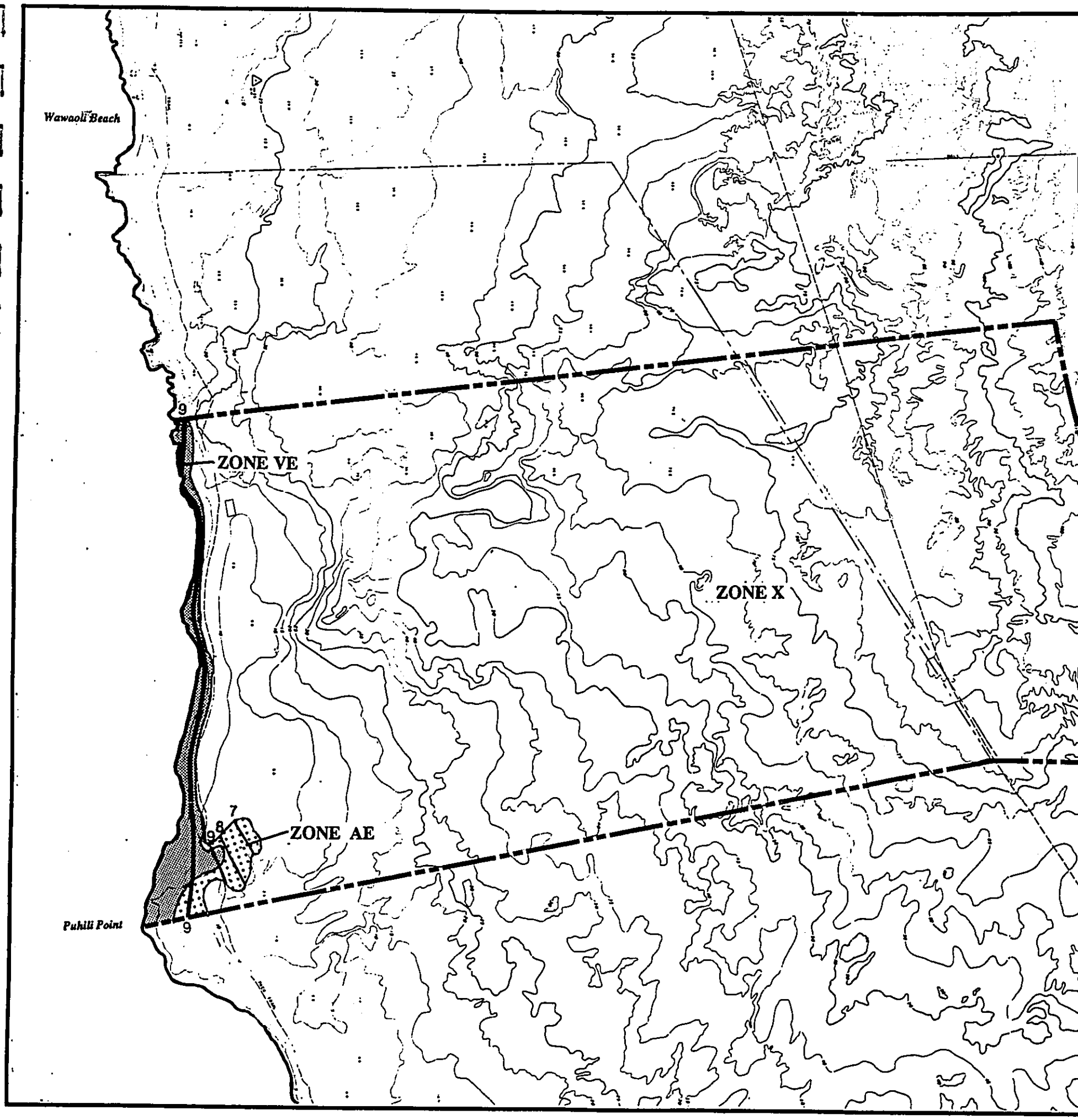
Flooding problems in the county are attributed to three sources: surface storm water runoff, high seas and tsunami inundation. Surface runoff due to impervious surfaces on the site is not expected to increase significantly due to low rainfall levels. Areas affected by flooding due to tsunami and high-wave run-up are identified in the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA) (September 16, 1988). The 100-year boundary along the 'O'oma II property closely follows the coastline makai of the coastal trail, except near Puhili Point, where the boundary extends inland for a short distance (Figure 7). No habitable development is planned for areas within the 100-year boundary.

3.4.5 Historic Sites

An archaeological survey has been prepared for the proposed project and the Petitioner recognizes the importance of preserving and refurbishing important and significant historical sites. It is noted that successful resorts in the region have played active roles in protecting and refurbishing archaeological and historic sites. To this end, the Petitioner will work closely with State and County officials as well as responsible members of the public in preparing a historic preservation plan. It is felt that sites on the 'O'oma II property could be incorporated into project development plans to preserve and enhance public access to them.

3.4.6 Natural Beauty

The General Plan states that "[t]he natural beauty of Hawaii is a universally recognized characteristic and as such is one of our most significant and valuable assets." The Plan also recognizes human modification as another factor, one that involves a desire to experience natural beauty (in part, to enhance that beauty by making it more accessible) and also to obtain economic benefits from it. The project will seek a balance between natural and man-made elements through architectural and landscape designs that are harmonious with the existing environment.


Wawaoli Beach
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ZONE VE
ZONE X
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ZONE AE
Puhili Point
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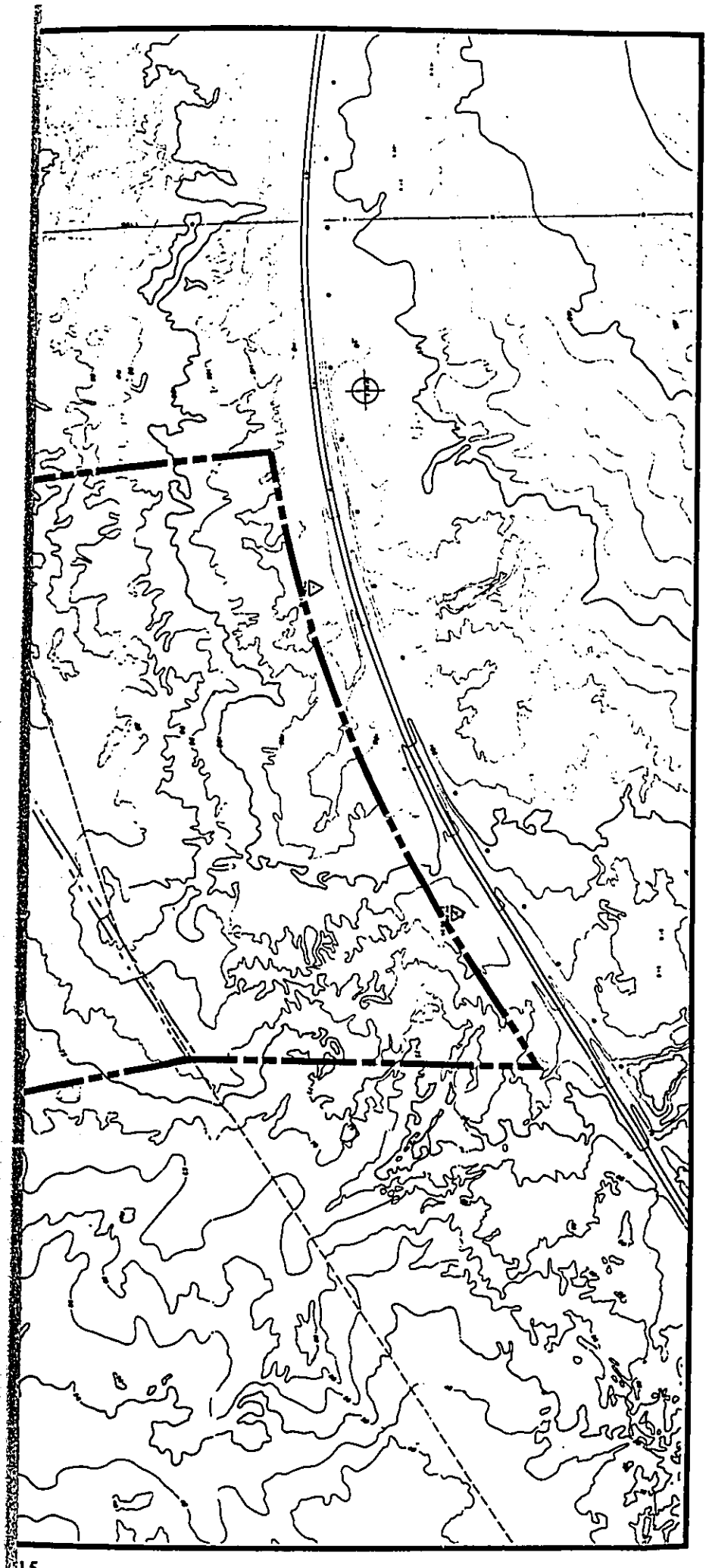

Figure: 7

Flood Hazard Map

LEGEND

ZONE AE
Base flood elevations determined.

ZONE VE
Coastal flood with velocity hazard (wave action); base flood elevations determined.

ZONE X
Areas determined to be outside 500-year flood plain.

Source: Flood Insurance Rate Map, Panel 155166 0683 C, September 16, 1988

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3.4.7 Natural Resources and Shoreline

Sand beaches, the rocky shoreline and pristine near-shore waters are important site resources. Shoreline areas will be protected by adhering to State and County setback regulations and public access will be improved by roadway development on the site and the provision of parking, shower and restroom facilities.

3.4.8 Housing

The General Plan notes that "in spite of the increase in both subdivision activity and housing construction in the North Kona district, housing problems for the low and moderate income groups have been particularly acute." This is especially relevant in recognition of the need to provide affordable employee housing. The 'O'oma II master plan does not include any on-site employee housing. The Petitioner has expressed a willingness to work with the County to meet employee housing needs that are generated by the development. Section 5.4 includes a full discussion of this issue. Actual needs will be determined before the project becomes operational, and a program to meet those needs will be established with the County.

3.4.9 Public Facilities

Public facilities include those service systems which are provided, staffed and maintained by government to serve the public health, safety and welfare. Public facilities include schools, libraries, fire stations, police stations, etc. In the north Kona region, these services are provided from the larger urban communities of Captain Cook, Kealakekua, Kawaihae, and Waimea. Direct and indirect State and County taxes that will be generated by the proposed project are anticipated to more than cover the costs of these services.

3.4.10 Public Utilities

Public utilities, namely water, electricity, telephone, gas and sewerage and sewage treatment are directly influenced by the location and intensity of land development. The 'O'oma II project will require on- and off-site improvements for adequate utility service. More detailed evaluation of estimated consumption rates and infrastructure requirements for the various utilities are contained in Chapter VI.

3.4.11 Recreation

The General Plan characterizes the existing recreational facilities in the North Kona district as "generally inadequate." Demand for recreational resources within the county and the district is expected to increase with growing numbers of visitors and residents. County policies are intended to increase the number and diversity of recreational opportunities, to provide public access to the shoreline and to preserve the quality of recreational resources. The proposed project includes several components that promote these goals and policies; two improved beach access roads, with restrooms, parking and shower facilities, improvement of a pedestrian trail along the coastline, and recreational amenities that will be available for use by residents, as well as visitors.

3.4.12 Transportation

The interrelationship between transportation and land use planning is reflected in the General Plan statement that "coordinated planning of transportation facilities requires an understanding of the characteristics of the modes of conveyance and the patterns and densities of the area which they are intended to serve." The 'O'oma II property is at the hub of three forms of transportation: Keahole Airport lies approximately one mile to the north of the property, the Honokohau Small Boat Harbor is approximately three miles to the south and the Queen Kaahumanu Highway is just mauka of the property's eastern boundary. Land uses proposed for the property are suitable for this prime transportation situation.

3.4.13 Land Use

Land Use policies contained in the General Plan which are relevant to this petition are those referring to: (1) zoning of urban uses in areas that are accessible to community services, employment centers, and adequate public utilities and facilities; and, (2) granting of rezoning requests in accordance with existing and projected needs of the neighborhood, community, region and county.

The site involved is in close proximity to a growing urban and resort area which lies between a major airport at Keahole, the largest urban area in West Hawaii, Kailua-Kona, and the major highway connecting the two; Queen Kaahumanu Highway. In addition, the development concept for the site links the HOST Park and NELH to the north and the proposed Kohanaiki Resort to the south, by combining elements of both neighboring projects within the 'O'oma development, namely resort and ocean

sciences. In addition, the 'O'oma II project would complement the NELHA operations by supplying support facilities, such as conference rooms, restaurants and accommodations for business visitors and employees.

3.5 Kona Regional Plan

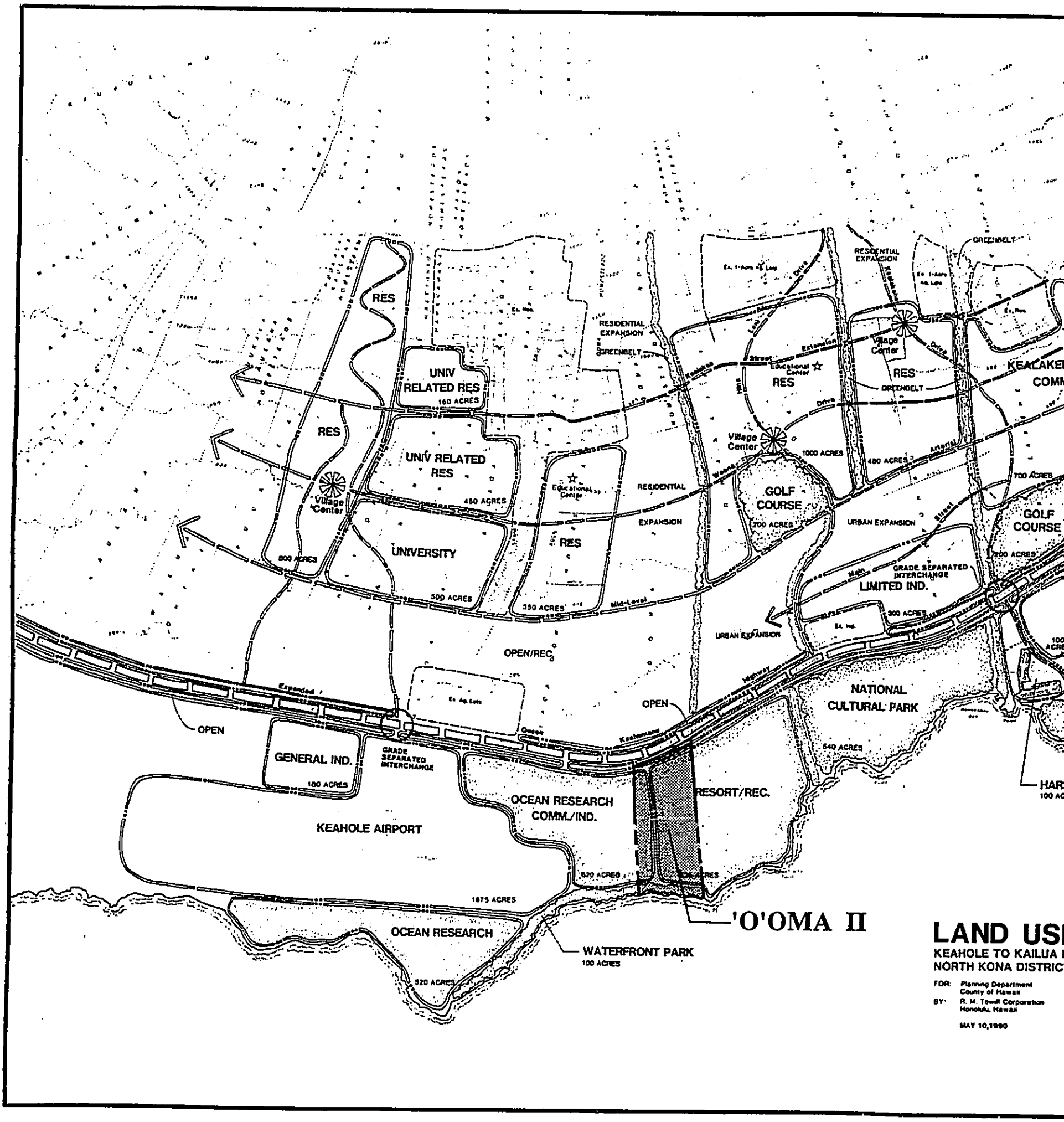
The Kona Regional Plan was intended to serve as a guide for land use decisions by the public and private sectors, rather than to be used as a regulatory document. To that end, it documents constraints and sets forth recommendations and growth policies. Since the original publication of a draft document in 1982 and adoption of the document by the Hawaii County Planning Commission in 1984 (resolution No. 1-84; April 10, 1984), substantial growth and development has occurred in the kona region (it should be noted that the County Council never took action on this document). The County has recently adopted by resolution, the Keahole to Kailua Development Plan, discussed below, which represents a more up-to-date guide for planning decisions in the Kona area. To that extent, the Kona Regional Plan is *somewhat dated.*

3.6 Keahole to Kailua Development Plan

The Keahole to Kailua Development Plan (K-K Plan), adopted by the Hawaii County Council on April 3, 1991 (Resolution NO. 296), was an effort by the County of Hawaii to prepare for the future urbanization of the study area to meet the growing needs of West Hawaii. Although the study was administered and funded by the County of Hawaii, State agencies, community groups and major landowners in the region contributed significantly to the process of developing a preferred plan. In this context, the plan provides a land use plan that emphasizes the siting of major infrastructure intended to serve the region.

While the purpose of the land use plan is to "provide a framework for the future growth and development of the Keahole to Kailua area," the plan itself is "not intended to be used as a "master site plan" ... i.e., a plan that has "fixed" all of the major roads and land use locations."

The land use plan that evolved from the K-K planning process acknowledges the transition in uses from the Natural Energy Laboratory of Hawaii (NELH) to the Kohanaiki Resort (Figure 8). Generalized land use areas designate the vicinity of the NELHA for ocean research, while the area of the proposed HOST Park is shown as ocean research, commercial and industrial. The project site is designated as a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UNIV RELATED RES
160 ACRES
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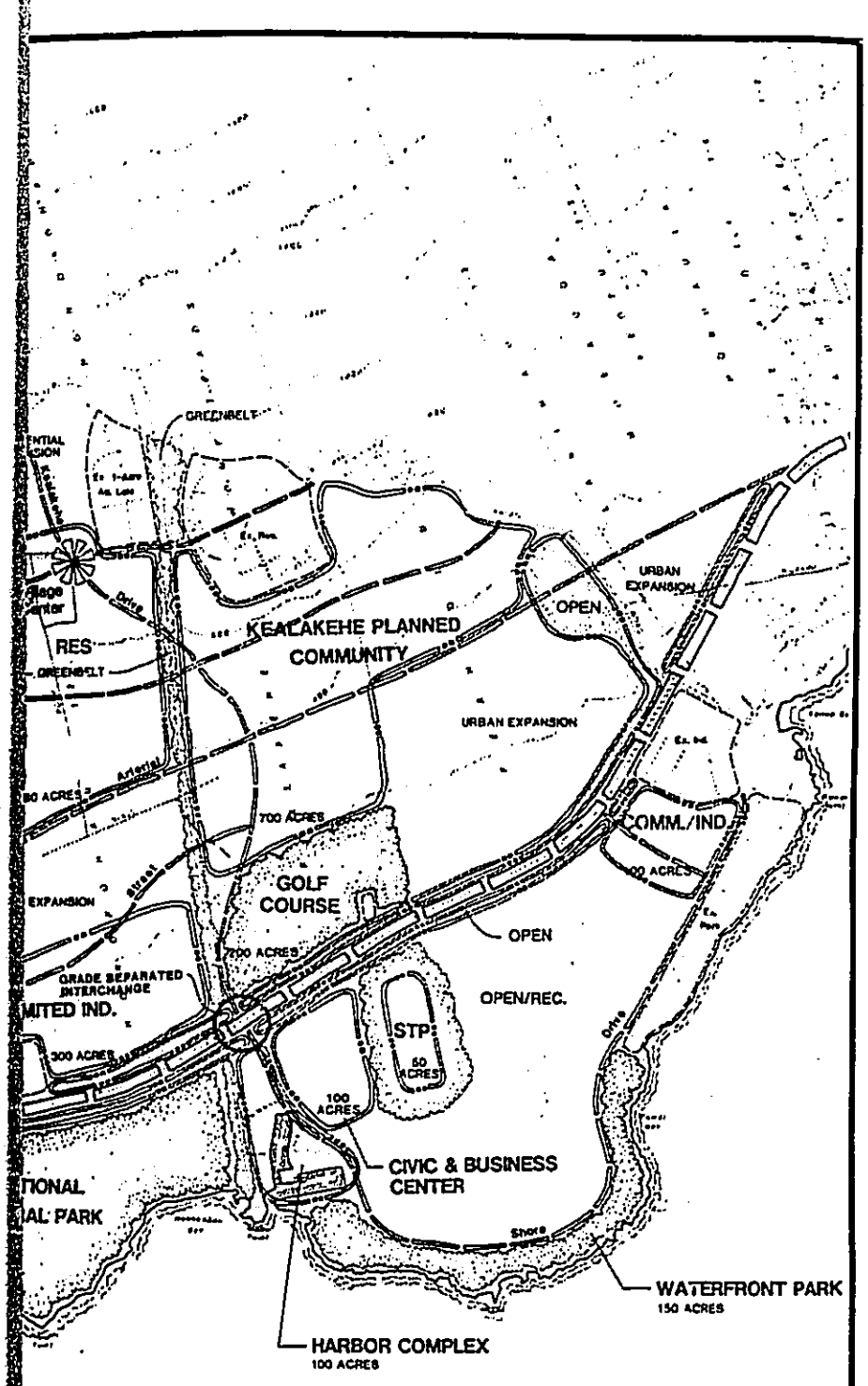
LIMITED IND.
300 ACRES
URBAN EXPANSION
OPEN/REC
OPEN
OPEN
NATIONAL CULTURAL PARK
540 ACRES
GENERAL IND.
180 ACRES
GRADE SEPARATED INTERCHANGE
OCEAN RESEARCH COMM./IND.
RESORT/REC.
KEAHOLE AIRPORT
820 ACRES
1675 ACRES
OCEAN RESEARCH
320 ACRES
WATERFRONT PARK
100 ACRES
'O'OMA II
LAND USE
KEAHOLE TO KAILUA
NORTH KONA DISTRICT
FOR: Planning Department
County of Hawaii
BY: R. M. Towill Corporation
Honolulu, Hawaii
MAY 10,1990



LAND USE PLAN

KEAHOLE TO KAILUA DEVELOPMENT PLAN
NORTH KONA DISTRICT, COUNTY OF HAWAII

FOR: Planning Department
County of Hawaii

BY: R. M. Towill Corporation
Honolulu, Hawaii

MAY 10,1990

Figure: 8

Keahole to Kailua Development Plan Land Use Map

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

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0 4000

combination of ocean research, commercial, industrial and resort/recreation while the proposed Kohanaiki Resort is shown as resort/recreation. In this sense, the project concept and master plan is fully consistent with the K-K Plan, because of the transition provided between ocean research and resort uses.

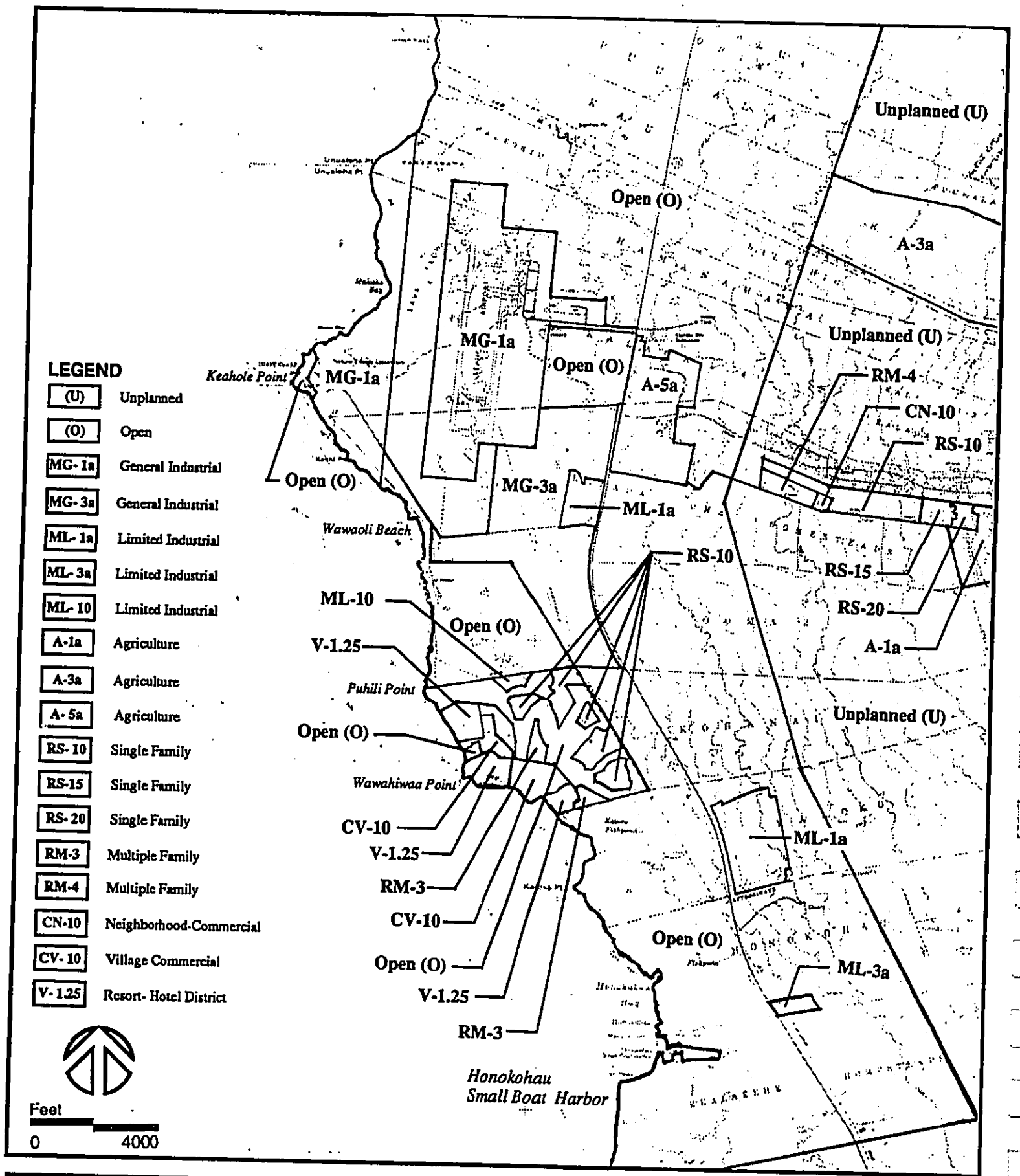
3.7 Hawaii County Zoning

The existing County zoning designation for the project site is "Open" (Figure 9). The Keahole Airport and the NELHA to north and the Kaloko Light Industrial Subdivision to the south are zoned Industrial. The proposed Kohanaiki Resort has various zoning designations, including; Resort Hotel, Village Commercial, Single- and Multi-Family Residential, Limited Industrial and Open. The 'O'oma II development is anticipated to request a zoning change to allow a mix of uses as indicated in the *master plan.*

3.8 Coastal Zone Management/Special Management Area Rules and Regulations

In an effort by the State of Hawaii to preserve and protect the natural resources of the coastal zones, special controls on development along the shoreline have been implemented, as contained in Chapter 205A, Hawaii revised Statutes (HRS), as amended. Chapter 205A, HRS, as amended, defines the Coastal Zone Management Area to be all the areas of the State of Hawaii, except forest reserve areas. In addition, Chapter 205A, as amended, contains the general objectives and policies, upon which all counties within the State of Hawaii have structured specific legislation which created Special Management Areas (SMAs) for each county.

Hawaii County, similar to other counties, has adopted SMA boundaries and Rules and Regulations for the SMA which are consistent with Chapter 205A, as amended. The proposed project is considered "development," as defined by Section 9-4 of the Rules of Practice and Procedure of the Hawaii County Planning Commission, and is therefore subject to review under those provisions. In addition, the SMA Rules and Regulations of Hawaii County require that any development proposed within the SMA boundaries must be consistent with the specific Objectives and Policies of Chapter 205A, as amended. These objectives and policies, as they relate to the proposed project, are presented below. Following each major subarea, a review of the relationship of the proposed project and the specific objective and/or policy is presented. Section 3.9 discusses the Special Management Area Guidelines for Hawaii County.



County Zoning

'O'OMA II

Kahala Capital Corp.

Figure: 9

Helber Hastert & Fee, Planners

Recreational Resources

Objective:
To provide coastal recreation opportunities accessible to the public.

Policies:

1. To protect unique coastal recreational resources;
2. To replace areas of recreational value as damaged or destroyed by development;
3. To provide adequate public access;
4. To provide adequate shoreline recreational facilities;
5. To develop new coastal recreational opportunities; and,
6. To encourage the dedication of coastal areas with recreational value for public use.

Comment: The proposed project should not have an adverse impact on coastal resources. As discussed in Section 4.7, the near-shore marine environment will not suffer any negative impacts from the operation of the ocean science center, the salt water lagoon system or the proposed golf course. Shoreline access will actually be improved with the construction of paved roadways and bathroom and shower facilities. In addition, pedestrian access along the shoreline will also be enhanced with the construction of a pedestrian trail, which is envisioned to become part of a regional coastal trail, the "Ala Kahakai" trail. The Petitioner also intends to preserve the Mamalahoa Trail and allow public access to the trail. This could be accomplished by creating a private easement over portions of the trail that are not within an existing State right-of-way, or effecting a land swap with the State of Hawaii, which would place the entire length of the Mamalahoa Trail within 'O'oma II under State ownership (for a full discussion of the Mamalahoa Trail, see Section 4.12).

Historic Resources

Objective:
Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

1. To identify and analyze significant archaeological resources;
2. To maximize information retention through preservation of remains and artifacts or salvage operations;

3. To support State goals for protection, restoration, interpretation and display of historic resources.

Comment: The master plan provides for the preservation of culturally significant archaeological remains. The identification of such remains will be carried out in full consultation with the Department of Land and Natural Resources-Historic Preservation Program/State Historic Preservation Office (DLNR-HPP/SHPO) and the County of Hawaii. As discussed above, the Petitioner fully intends to preserve the entire length of the Mamalahoa Trail within the project site.

Scenic and Open Space Resources

Objective:
To protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

1. To identify valued scenic resources in the coastal zone management area;
2. To insure that new developments are compatible with the visual environment;
3. To preserve and maintain shoreline open space and scenic resources;
4. To encourage developments which are not coastal dependent to locate inland.

Comment: Visual impacts of the proposed project have been described and analyzed in Section 4.11. The construction of resort land uses and major project infrastructure on the project site will not adversely impact scenic and open space resources. Potential visual impacts will not substantially interfere with or detract from lines of sight from scenic areas identified in the Hawaii County General Plan. The Petitioner intends to preserve and enhance shoreline open space and scenic resources.

Coastal Ecosystems

Objective:
Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all costal ecosystems.

Policies:

1. To improve the technical basis for natural resource management;
2. To preserve valuable coastal ecosystems of importance;
3. To minimize disruption of coastal ecosystems;, and

4. · To promote water quantity and quality management practices.

Comment: The impacts of the proposed project on coastal ecosystems and water quality are discussed in detail in Section 4.7. The Petitioner is cognizant of the importance of maintaining these valuable coastal resources, not only to protect the overall viability of the project (including the ocean science center), but to insure that there continues to be high quality feed water for the various scientific and commercial ocean-oriented activities at NELHA.

Economic Uses

Objective:
To provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:
1. To concentrate coastal dependent development in appropriate areas;
2. To insure coastal dependent development minimizes adverse social, visual and environmental impact; and,
3. To direct location and expansion of developments to existing designated areas.

Comment: Development of the project site is consistent with adopted County land use policies (Hawaii County General Plan, Keahole to Kailua Development Plan), adopted by the Hawaii County Council. The proposed mix of uses at 'O'oma II provides a logical transition from the ocean science research and commercial operations at NELHA and the resort facilities at the proposed Kohanaiki Resort.

Coastal Hazards

Objective:
To reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Policies:
1. To control development in areas subject to coastal hazards.;
2. To ensure that developments comply with the requirements of the Federal Flood Insurance Program; and,
3. To prevent coastal flooding from inland projects.

Comment: No habitable development is proposed for areas susceptible to flooding from tsunami and high wave run-up. Proposed land uses and infrastructure will be designed and constructed in accordance with Federal, State and County requirements to promote the stated objective and policies.

3.9 Special Management Area Guidelines

Chapter 205A, Hawaii Revised Statutes and the Hawaii County Planning Commission have established a series of guidelines to evaluate developments proposed within the SMA. These guidelines seek to minimize environmental impact, avoid restrictions upon public access to the coast, minimize adverse visual impacts and impacts to water quality. The guidelines note that "no development shall be approved ... unless it is first found that: (1) the development will not have any significant adverse environmental impact...; and, (2) the development is consistent with the County General Plan and Zoning ..." The guidelines seek to insure that: adequate access to the coast is provided; adequate provision for solid and liquid waste collection, treatment and disposal is made; adverse environmental or ecological impacts are minimized to the extent practical; and, that the proposed development is consistent with the goals, policies and standards of the General Plan.

As noted in Section 3.4, above, the proposed project is consistent with the General Plan and will not adversely impact coastal resources, including nearshore waters. Various sections in this statement address issues related to solid and liquid waste disposal, adequate access to the shoreline and other environmental and ecological aspects of the proposed project. All of these issues will be analyzed in detail again when the Petitioner files an application for a Special Management Area Use Permit (SMP) for the proposed project.

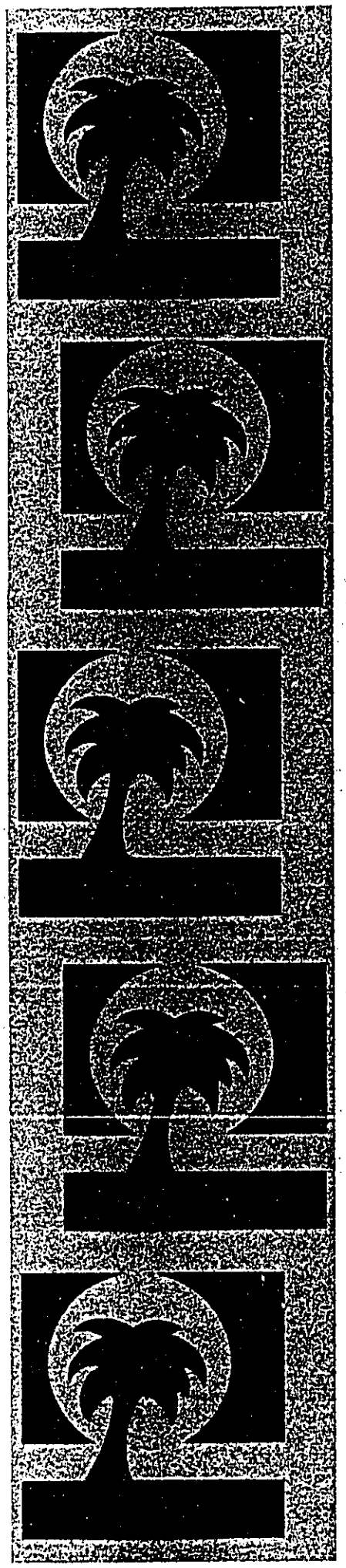
3.10 West Hawaii Regional Plan

In November 1989, the Office of State Planning (OSP) published the West Hawaii Regional Plan, a document which is intended to provide policy guidance for the State in order to most effectively meet the region's present and emerging needs. It is also intended to complement the County of Hawaii's General Plan and Community Development Plans. One of the primary assumptions of the plan is the identification of "Resort Destination Nodes" within the region. The primary purpose of establishing these nodes is the opportunity to locate resort development in such a manner to share the availability of public services. The 'O'oma II community is located within the Keahole/Keahou Resort Destination Node. The number of hotel

and residential units proposed included in the 'O'oma II master plan is consistent with the units assumed as part of this development in the West Hawaii Regional Plan. Therefore, the proposed project is consistent with the Plan.

CHAPTER IV

PHYSICAL AND NATURAL ENVIRONMENT



CHAPTER IV

PHYSICAL AND NATURAL ENVIRONMENT

This chapter describes the physical environment in which the proposed development is situated, discusses the probable impacts of the project and possible measures to mitigate adverse impacts. In certain cases, impacts are distinguished as: (1) *short-term impacts*, confined primarily to the construction period; (2) *long-term impacts*, that occur while the development is operational; or (3) *cumulative impacts*, resulting from the combined effects of developing the 'O'oma II Master Plan and other nearby lands.

4.1 Regional Description

The project area lies within the North Kona Judicial District, one of nine judicial districts in Hawaii County. The North Kona District lies on the western coast of the island of Hawaii within a larger region known as West Hawaii. Anaeho'omalu Bay marks the district's northern boundary and Kealakekua Bay marks the southern boundary. The inland boundaries are defined by the land masses of Mauna Loa and Hualalai. The North Kona Judicial District includes Census Tracts 215 (Kailua-Kona) and 216 (the remainder).

The primary commercial center of the region is located at Kailua-Kona, the second largest town on the island of Hawaii. Secondary urban centers are found in the communities of Holualoa, Honalo, Kainaliu, Keahou and Kalaloa.

4.2 Climate

Affected Environment

Coastal areas of North Kona have a semi-tropical, semi-arid climate. The average annual temperature is 75 degrees F, with an average high of 83 degrees F, and an average low of 67 degrees F. Average annual precipitation in Kailua-Kona is 25 inches. The geographic distribution of precipitation closely resembles the topographic contours: a high rainfall belt lies between the 1,200- and 3,000-foot elevations on the leeward slopes of Hualalai and Mauna Loa, with zones of decreasing annual rainfall at lower elevations near the coast and at higher elevations above the rain-bearing trade wind regime.

The North Kona Coast is largely sheltered from the predominant trade wind system by the land masses of Mauna Loa, Mauna Kea and Hualalai. The prevailing pattern is on-shore winds in the morning and early afternoon, often collecting in a cloud bank at the higher elevations, then becoming off-shore breezes in the late afternoon and evening. Typical wind velocities range between 3 to 14 knots. Relative humidity is also generally stable year-round, the daily average ranging from 71 to 77 percent.

Impacts

No significant change in the site's macro (or regional) climate is anticipated. Modification of the micro (or site-specific) climate will result from the planting of shade trees and the construction of buildings that channel air flows. Equally important would be changes in people's perception of the climate through the addition of landscaping, the golf course, and water features throughout the site.

4.3 Access

Affected Environment

Direct access to the site is currently provided at two points: at the northern-makai corner and the southern-mauka corners of the property (Figure 5). The northern-makai access is a coastal jeep trail which begins at the makai terminus of the NELHA Access Road and runs along the makai frontage of the site. This coastal jeep trail runs the length of the oceanfront boundary of the project site, and continues along the length of the makai border of the adjoining proposed Kohanaiki Resort, ending at the northern boundary of the Kaloko-Honokohau National Historic Park. At this point, vehicular access along the shoreline is terminated. The second access point, located at the southern-mauka corner of the property, connects to the Queen Kaahumanu Highway via an unimproved easement 30 feet wide and approximately 1,600 feet long, running the length of parcels 22 and 4, connecting to the coastal jeep trail. Both of the trails through the project site are considered to be in poor condition and require the use of four-wheel-drive vehicles.

Impacts

Access to the property will improve substantially with construction of paved roadways and upgrading of the Queen Kaahumanu Highway intersection. The nature of access to and along the shoreline will change. Access to the shoreline

fronting the project site will be improved, with two paved roads and parking, bathroom and shower facilities to be located at the northern- and southern-makai areas of the project site. Through traffic on the existing coastal jeep road will be discontinued. Pedestrian access along the coastline will not be affected. In fact, it will be improved with pedestrian paths.

Mitigation Measures

Access to and along the shoreline remains an issue of vital concern to residents statewide. It has become an especially important issue in West Hawaii, in response to recent development proposals of large, previously undeveloped stretches of coastline. Access to and along the shoreline fronting 'O'oma II is closely integrated with the network of shoreline access fronting the proposed Kohanaiki Resort. During recent proceedings for the Special Management Area Use Permit for the Kohanaiki Resort, various parties, including the Petitioner, Nansay Hawaii, Inc. (the developer of the Kohanaiki Resort), the Friends of Kohanaiki, the West Hawaii Surfing Association and the Surfrider Foundation, reached agreement on provisions for access to and along the shoreline fronting both the Kohanaiki Resort and 'O'oma II. This agreement is presented in Appendix A. The basic agreement requires that all current access to and along the shoreline involving 'O'oma II, including existing jeep trails, be maintained until new facilities, including two paved mauka-makai roadways, parking areas and shower and restroom facilities have been completed by the Petitioner (similar provisions apply to the Kohanaiki Resort).

Once new facilities have been completed, existing jeep trails, including the coastal jeep trail, will be closed to vehicular traffic. It is important to note that the Department of Land and Natural Resources fully supports the closure of the coastal jeep trail and the improvement of a pedestrian trail to replace the jeep trail. Such action would provide an important link in the long-planned "Ala Kahakai," a trail that is intended to be a continuous pedestrian lateral shoreline trail from the Old Kona Airport in Kailua to Kawaihae. Ala Kahakai is a priority project of the Division of Forestry and Wildlife's Na Ala Hele Statewide Trail and Access program. Ala Kahakai was first conceived in 1973, and according to DLNR, is consistent with the Kaloko-Honokohau National Historic Parks plan adjacent to Kohanaiki, and other sections of the Ala Kahakai, which are currently in place or being restored at Kaupulehu, Kiholo, Waikoloa, Kalahuipuaa, and from Puukohola Heiau to Spencer Park to Mauumae Beach in Kawaihae.

4.4 · Natural Hazards

Affected Environment

Volcanic Activity. The U.S. Geological Survey (USGS) has identified "zones of relative risk" associated with volcanic activity on the island of Hawaii. These zones take into account both direct elements of volcanic activity (such as lava flow inundation, rock fragments and gases) and indirect hazards (such as subsidence, surface rupture, earthquakes, and tsunamis). The classification system includes six zones, "A" through "F.", with risk increasing from "A" to "F." The project site is located in the "DE" zone, indicating a relatively low degree of risk from volcanic action (Mullineaux and Peterson, 1974).

Seismicity. The entire island is susceptible to earthquakes originating in fault zones under and adjacent to it. Two fault zones have been identified within the Kona region: the Kealakekua and the Kaloho faults, both located in South Kona and well away from the project site. The Big Island is classified as a Zone 3 area for the purpose of structural design. The classification system is based on a scale of 0 to 4, increasing in level of risk due to seismic occurrence and danger. The Hawaii County Building Code requires that all new structures be designed to resist forces that might be expected in Zone 3 areas.

Lava Flow Inundation. The project site is susceptible to potential lava flow from Hualalai, one of five volcanoes comprising the island of Hawaii and one of three which have been active in historic times. The last active period of eruption occurred in 1801. The northwest volcanic rift zone at about the 1,600-foot elevation (in the vicinity of the Puhi o Pele Cinder Cone, just makai of the Mamalahoa Highway), produced a lava flow which extended to the shoreline just north of Keahole Point.

Flood Hazards. The Hawaiian Islands have been subjected to at least 50 tsunami occurrences within historic times. The greatest tsunami wave run-up heights ever recorded in the Kona region may have been that of the Japan tsunami of 1896 at Keahou, 18 feet above mean sea level (msl). The Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (FEMA) have identified coastal high hazard areas at risk from flooding due to tsunami and high wave run-up. As shown in Figure 7, the 100-year flood boundary closely follows the coastline makai of the beach trail, except near Puhili Point where the boundary extends inland for approximately 500 feet. Portions of the project site are located in flood hazard area AE (areas inundated by the 100-year flood with base flood elevations of seven

to nine feet above msl. Other portions of the project site are located in flood hazard area VE (areas inundated by the 100-year coastal flood with velocity hazards and a base flood elevation of nine feet above msl).

Impacts

The occurrence of a natural disaster, such as a volcanic eruption, earthquake, or tsunami, would pose a risk to life and property within the development. The 100-year flood boundary has a one percent chance of being exceeded in any given year.

Mitigation Measures

All structures within the property will be located, designed, and constructed to conform with local building standards and regulations for potential seismic activity. *More extensive geotechnical surveys will be required before detailed site* and construction plans can be drawn to ensure adequate stability and structural foundations. No habitable structures will be constructed in the flood hazard area.

4.5 Geology and Topography

Affected Environment

The project site is located on the western slope of Hualalai, a dormant shield-type volcano (elevation 8,271 feet). The Keahole Point area was formed by progressive layering of prehistoric lava flows from Hualalai. The lavas are primarily pahoehoe with thicknessess varying from 6 inches to 100 feet. The layers are very porous and contain numerous lava tubes, cracks, and fissures (R.M. Towill, 1976).

The elevation of the project site ranges from sea level at the coastline to approximately 110 feet above msl at the northern-mauka boundary. The land slopes gently, with average slopes ranging from 0 to 5 percent. Localized mounds and depressions, characteristic of lava flows, are present throughout the site.

Impacts

The 18-hole golf course will require a significant amount of site work, including alteration of the existing lava terrain. Roadways and building sites will also require grading. In addition, some excavation will be required to create the salt water

lagoon system for the water recreation park. The impacts of the salt water lagoon system are discussed in detail in Section 4.7, below.

Mitigation Measures

To the extent possible, the preliminary land use plan sites future uses in areas with suitable physiographic features to take advantage of views provided by the limited variation in ground elevation and to minimize the need for large-scale reshaping of the underlying land form.

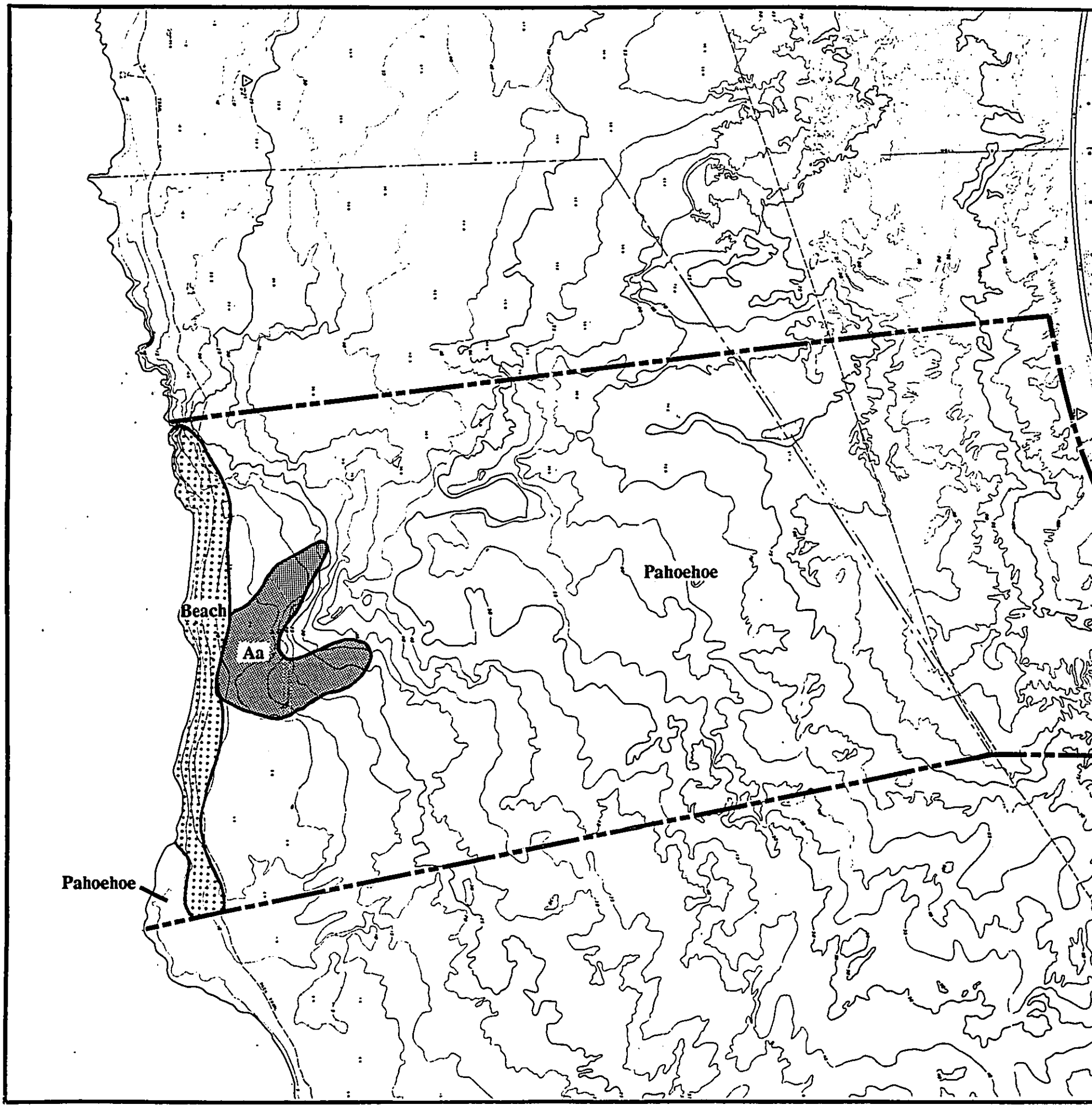
4.6 Soils

Affected Environment

The Soil Survey of the Island of Hawaii, State of Hawaii, prepared by the United States Department of Agriculture Soil Conservation Service, has identified three land types on the site: pahoehoe lava; a'a lava; and, beach areas. Figure 10 shows the distribution of land types on the project site. The predominant type is Pahoehoe lava which has a billowy, glassy surface that is relatively smooth, although the surface may be rough and broken in some areas, with hummocks and pressure domes. The second type consists of a'a lava flows that are scattered throughout the project site and are characterized by clinkery, hard, glassy pieces piled in tumbling heaps. The third land type includes the beach areas located along the coast. These are long, narrow, sloping areas of sand and cobbles varying in color according to the material from which they were formed. The white sand beaches fronting the project site are composed of coral and sea shells.

The Soil Survey indicates that the property is not suited for agricultural use. The two lava types listed above have a Capability Class Rating of VIIIs, defined as soils and land forms whose limitations preclude the cultivation of commercial plants. The beach areas have a rating of VIIIw, indicating agricultural use to be unsuitable because of water in or on the soil, which interferes with plant growth or cultivation.

The University of Hawaii Land Study Bureau's Detailed Land Classification--Island of Hawaii classifies the land forms into groupings similar to those mentioned above, and also indicates that the particular soil types were not suited for agricultural uses.


Pahoehoe
Beach
Aa
Pahoehoe
Pahoehoe

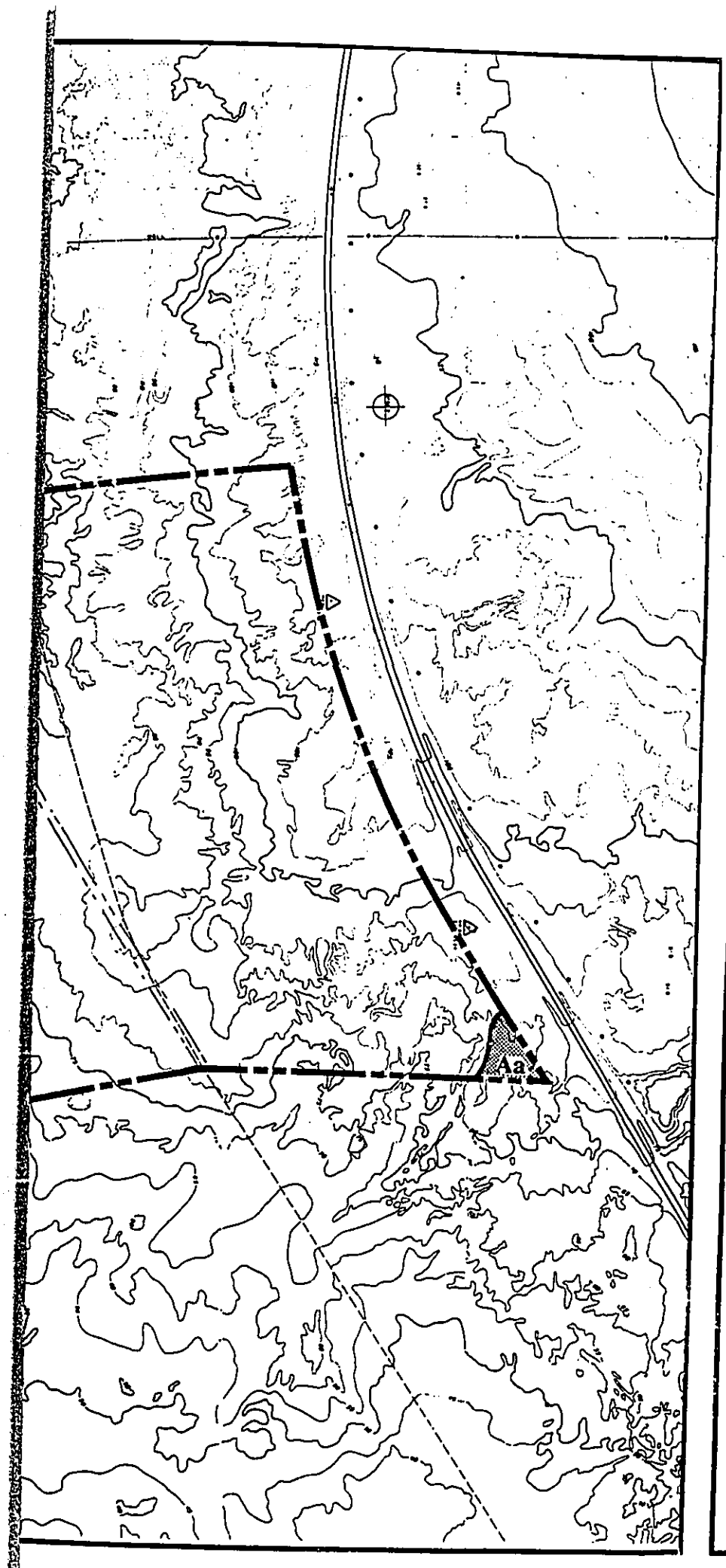


Figure: 10

Soils

LEGEND

Aa

Beach

Pahoehoe

'O'OMA II

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Feet

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The State Department of Agriculture has mapped Agricultural Lands of Importance to the State of Hawaii (ALISH). The project site does not contain "prime" or "unique" agricultural lands.

Impacts

Short-term Impacts. Construction activity will take place on a relatively flat surface, limiting the amount of earthwork required. However, much of the site is covered with pahoehoe lava which could present difficulties as a foundation material in comparison to a'a lava, which is more easily crushed and shaped by conventional bulldozers. Periodically during the grading and construction phases, loose lava particles and fill material will be exposed to wind and water erosion.

Long-term Impacts. Most of the property is covered with lava or sand, rather than soils per se. Development of the property will not reduce the inventory of agriculturally significant lands. On the other hand, lack of sufficient soil cover will require soil to be imported for the golf course and other landscaped areas. The amount of material needed has not been determined.

Mitigation Measures

The most important mitigative technique is the choice of grading scheme and the layout for the golf fairways and water features. Planned conformity between site design and the natural topography will minimize the amount of reshaping and filling needed.

To provide adequate on-site drainage, the complete elimination of mass grading would not be possible. Erosion control techniques called for by State and County agencies would be used where appropriate to minimize soil loss, although soil loss is not expected to be a problem because of regional climate and the limited amount of existing soil cover.

4.7 Groundwater and Nearshore Marine Environment Resources

Typical of other areas in West Hawaii, groundwater resources and the nearshore marine environment are inextricably connected, because groundwater enters the ocean from numerous points along the coast. This strong relationship is a direct result of the volcanic origins of the island and its relatively young geologic age,

which has created myriad subsurface pathways through porous lava for groundwater to reach the ocean. In the case of 'O'oma II, there is particular concern about maintaining the quality of groundwater and the nearshore environment because nearshore waters have been classified "AA" by the State Department of Health (DOH), because of proximity to NELHA to the north, anchialine ponds at Kohanaiki to the south and the importance of a high quality nearshore environment tohe the success of the proposed project. In recognition of this relationship, several studies have been prepared to anticipate the possible effects of development at 'O'oma II on groundwater and the nearshore marine environment:

- Baseline Assessment of the Marine Environment in the Vicinity of the 'O'oma II Resort Development, (Marine Research Consultants, 1986) (Appendix B)

- Assessment of Chemistry of Nearshore Waters in the Vicinity of the 'O'oma II Development, North Kona, Hawaii, (Marine Research Consultants, 1990a) (Appendix C)

- An Assessment of Nearshore Marine Community Structure at 'O'oma, North Kona, Hawaii, (Marine Research Consultants (1990b) (Appendix D)

- Effects of Golf Course Irrigation and Fertilization on Nearshore Marine Waters off the West Coast of the Island of Hawaii, (Marine Research Consultants, 1990) (Appendix E)

- Saltwater Ponds of the 'O'oma II Project: Recommended Circulation System and Analysis of Environmental Effects, by Tom Nance (Water Resources Engineering, 1991) (Appendix F)

- Environmental Risk Assessment for the Golf Course at the Proposed 'O'oma II Complex on the Kona Coast, by Dr. Stuart Cohen (Environmental & Turf Services, Inc., 1991) (Appendix G)

The results of these studies will be used to describe the affected environment at 'O'oma II, the possible effects of development on groundwater and nearshore resources, and mitigation measures which could be employed to reduce these effects. All of these studies are attached as technical appendices (Appendices B through G).

Affected Environment

As noted above, the nearshore waters off 'O'oma II property are classified as "AA" by the State DOH. Such a classification renders consideration of these waters as pristine. According to Chapter 54 of Title 11, Department of Health Water Quality Standards, "It is the objective of this class [of marine waters] that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions" (Section 11-54-03 (c) (1)). The following paragraphs describe the various elements which comprise groundwater resources and the nearshore marine environment, including a description of the proposed salt water lagoon system which will be part of the water recreation park.

Physical Structure of the Marine Environment. The main structural feature of the shoreline fronting 'O'oma II, is a basaltic ledge of pahoehoe lava with interspersed pockets of white calcareous sand. The intertidal platform, which is constantly subjected to the wash of the waves, is flooded in places to form tidepools. None of these pools, however, appeared to be separated from the ocean on a permanent basis, so they are not classified as "anchialine." The seaward edge of the lava shoreline is composed of either basaltic boulder fields, or vertical sea cliffs two to five feet in height. The one exception is a small area at the northern border of the property where a small sandy beach reaches the shoreline (Marine Research Consultants, 1990b).

Beyond the shoreline, the structure of the offshore environment at 'O'oma II generally conforms to the pattern that has been documented as characterizing much of the west coast of the island of Hawaii (Dollar, 1982). The zonation scheme consists of three predominant regions: (1) nearshore boulder zone; (2) mid-reef zone; and (3) deep slope zone. Beginning at the shoreline and moving seaward, the shallowest zone beyond the shoreline, the nearshore boulder zone, is comprised of a seaward extension of the basaltic shoreline bench, along with scattered basaltic boulders that have entered the ocean after breaking off from the shoreline. Pocillopora meandrina, a sturdy hemispherical coral, is the dominant colonizer of the nearshore area. This species is able to flourish in areas that are physically too harsh for most other species, particularly due to wave stress (Marine Research Consultants, 1986).

Seaward of the nearshore boulder zone, bottom structure is composed predominantly of a gently sloping reef bench composed of basalt, interspersed with lava extrusions

and sand channels. Water depth in this mid-reef zone ranges from about 20 to 50 feet. As wave stress in this region is substantially less than in shallower areas, and suitable hard substrata abound, the area provides an ideal locale for colonization by attached benthos, particularly reef corals, and generally the widest assortment of species and growth forms are encountered in this region (ibid).

The seaward edge of the reef platform (at a depth of about 50 feet) is marked by an increase in slope to an angle of approximately 20-30 degrees. In the deep slope zone, substratum changes from the solid continuation of the island mass to an aggregate of generally unconsolidated sand and rubble. The predominant coral cover in the slope zone is typically interconnected mats of "finger coral," which grow laterally over unconsolidated substrata. In some areas, the deep reef slope is covered primarily with rubble fragments generated by breakage of Pocillopora meandrina from wave forces. Moving down the reef slope, coral settlement and growth cease at a depth of approximately 80 feet; beyond this depth the bottom consists mostly of sand, with occasional basaltic outcrops (ibid).

Nearshore Water Chemistry. The nearshore water chemistry fronting 'O'oma II was analyzed by Marine Research Consultants in September 1990 (Marine Research Consultants 1990a). Thirty-two water samples were collected from three stations located in the vicinity of 'O'oma II. Analysis of these samples indicated that several dissolved nutrients (nitrate, total nitrogen, and silica) displayed horizontal gradients with highest values closest to shore and lowest values at the most seaward sampling sites. Correspondingly, salinity was lowest closest to the shoreline. These patterns indicate that groundwater is entering the marine environment near the shoreline and mixing with oceanic water. Along with horizontal gradients in some water chemistry constituents, there is a slight indication of vertical stratification within the water column. Such stratification is the result of incomplete mixing of a low density surface layer originating from groundwater input at the shoreline (Marine Research Consultants 1990a).

Comparison of the data collected by Marine Research Consultants in September 1990 with data from an ongoing water sampling program in the immediate area, (the Keahole Comprehensive Environmental Monitoring Program), indicates that there are presently no discernible differences between inputs at 'O'oma II and at more northerly locations toward Keahole Point. Results of the water chemistry analysis also indicates that there does not appear to be any unusual inputs or processes occurring off the 'O'oma II site. Water chemistry in the area is typical of nearshore oceanic conditions, without significant influences from land (ibid).

Groundwater. Groundwater beneath the project site and in the near vicinity occurs as a thin basal lens of brackish water. The brackish lens is separated from saline groundwater by a transition (mixing) zone. Salinity profiling undertaken in monitoring wells maintained by NELHA immediately north of 'O'oma II show that the salinity of shallow groundwater ranges from 5 parts per thousand (ppt) at the inland extent of the project site near Queen Kaahumanu Highway, about 5,200 feet from the shoreline, to 9 ppt near the coast, about 300 feet mauka of the shoreline (by comparison the salinity of seawater is about 35 ppt). Salinity of the groundwater increases with depth. In addition, the thickness of the lens decreases with proximity to the ocean. Lens thickness is about 27 feet near Queen Kaahumanu Highway and 15 to 17 feet thick about 300 feet from the shoreline (Nance, 1991).

The concentration of nutrients (nitrogen and phosphorus compounds) in the groundwater is one to two orders of magnitude greater than seawater. At various locations and depths in the brackish lens, the nutrient concentrations simply reflect a relative amount of dilution with seawater. Nitrogen is a key indicator of leachate from golf course fertilization reaching groundwater and nearshore waters because it is the most heavily applied and most mobile of these nutrients. The present concentration of nitrogen in the receiving groundwater in the area is 80 micromolar. The range of natural variability of this parameter is from 60 to 100 micromolar (ibid). As described by Marine Research Consultants (1990a), the nutrients entering the ocean along the shoreline are typical of nearshore oceanic conditions.

This brackish basal lens is thin and too salty for irrigation use (unless desalinated). This is the result of relatively limited groundwater recharge by rainfall on the inland slopes of Hualalai. Hydrologic budget calculations suggest that this rate is only 1.0 to 3.0 MGD per coastal mile, substantially less than occurs in South Kohala (to the north) and Kailua-Keahou (to the south). Data from the NELHA monitoring wells support this conclusion drawn from the hydrologic budget estimate (Nance, 1991). Evidence of limited groundwater flow discharging into nearshore waters is also provided by seawater sampling (Marine Research Consultants 1990a) and by infrared photography along the shoreline.

Coral Community Structure. In total, fourteen species of "stony" corals and two "soft corals" were encountered during survey work in 1990. The dominant species of coral on all the transects established for survey off 'O'oma II was Porites lobata, which accounted for about 60 percent of total coral cover. The second and third most abundant species, Pocillopora meandrina and Porites compressa, accounted for about

33 per cent of coral cover. Thus, these three species comprised about 93 percent of living coral cover. In 1986, the distribution of coral cover was remarkably similar; P. lobata comprised 60 percent of coral cover and the three dominant species totaled 94 percent of living coral cover. In total, coral cover accounted for about 45 percent of bottom cover. Comparison of coral cover between 1986 and 1990 indicates higher cover in the more recent survey on eleven of the twelve transects first established in 1986 and resurveyed in 1990. This consistent increase appears to be a result of regrowth across the entire reef following a particularly intense storm in February 1986, which preceded the original 1986 survey (Marine Research Consultants, 1990b).

Reef Fish Community Structure. Overall, the fish community off 'O'oma II is fairly typical of the assemblages found in Hawaiian reef environments, and is characterized by six general categories; juveniles, plantivorous damselfishes, herbivores, rubble dwellers, swarming tetrodonts, and surge-zone fishes. A total of 4,895 individuals representing 89 species were recorded during transect surveys. The reduced size of some food fishes, their tendency to avoid divers and their general scarcity indicates that this area is subjected to a substantial, but not overwhelming degree of fishing pressure. A scarcity of commercially valuable reef fishes also suggest that the community is somewhat affected by aquarium fish collectors (Marine Research Consultants, 1990b).

Anchialine Pond Feature at 'O'oma II. An anchialine pond feature was surveyed by Marine Research Consultants on August 24, 1991. A complete description of this pond, including water chemistry, can be found in Appendix H. This pond feature is located near the southern boundary of the 'O'oma II property and is part of an archaeological site complex (see Section 4.12). The pond is located in a sinkhole with a floor elevation several feet lower than the surrounding lava fields. The 1 m^2 anchialine pond in the center of the sinkhole is faced on the seaward side by rock walls and has a depth of about 0.5 m at high tide (Marine Research Consultants, 1991)

The water column throughout the pond was extremely clear with no apparent turbidity from suspended sediments or phytoplankton. The dominant biota in the ponds were the red shrimp opae'ula (Halocaridina rubra and Metabateus lohena), and the glass shrimp (Palaemon debilis). The extremely low turbidity value verifies the lack of suspended material that could ultimately affect tidal exchange in the pond. The existing chemical and biotic structure of the pond depicts the classic representation of anchialine pools in West Hawaii that have not been affected by activities of man (ibid).

Proposed Salt Water Lagoon System. Although the water recreation park is the primary component of the lagoon system, the proposed master plan includes several other nearby water-related features. These include:

- o Two ponds proposed south of the water park (Figure 4); one would be a golf course amenity and the other would be a feature of the proposed hotel.
- o The ocean science center which would be on the north side of the water recreation park

Table 3 lists the sizes and volumes of each of the water features which would be included in the proposed master plan. The largest pond, the 7-acre water recreation park, is currently planned to have a natural (unlined) bottom. Beaches would be constructed around some of its perimeter and the pond would have an average depth of 4.5 feet at mean tide. Its water level would be elevated slightly above sea level and fluctuate with the ocean tide. A wave machine may also be installed in this lagoon. The water recreation park would also have a smaller, elevated pond directly inland of the larger one. Its water surface would be 30 to 40 feet above sea level and its bottom would have an impervious liner. Water would descend from this higher pond to the lower one through several slides or "rapids" (Nance, 1991).

The golf course water feature would have a lined bottom and a water surface about 10 feet above sea level. The water feature around and within the hotel would include fish and other aquatic animals. It would also be lined and have a water surface about 10 feet above sea level. These two ponds would be hydraulically connected to each other and to the 7-acre pond. The ocean science center, located on the north side of the water recreation park, would include a number of aquarium tanks, the largest of which would exhibit indigenous Hawaiian marine life (ibid).

Table 3
Water Features Included in the Proposed 'O'oma Lagoon Circulation System

Water Feature	Water Area (Acres)	Ave. Depth (Feet)*	Volume (million Gallons)	Construction
Water Recreation Park	7.0	4.5	10.3	Unlined Bottom
Water Recreation Park	1.0	2.5	0.8	Lined Pond
Golf Course Pond	3.0	2.5	2.4	Lined Pond
Hotel Water Feature	3.5	2.5	2.8	Lined Pond
Ocean Science Center	- -	Variable	0.2 to 0.3	Aquarium Tanks

* Water level will fluctuate with ocean tides; depth given above is at mean tide level
Source: Nance, 1991

In order to maintain water quality within the entire lagoon system, it will be necessary to design a circulation system that keeps water residence time within the lagoons to an acceptable minimum. The turnover rate necessary to achieve acceptable water clarity in a single-pass, flow through system (water passing through the system only once and then discharged) is largely a matter of judgement. Fortunately, operating experience has been gained from similar systems at several resorts located elsewhere along the Kona-Kohala coast. Consistent success has been achieved when the residence time from the well head through the lagoon system to disposal is 10 hours or less (For the 200,000-gallon aquarium tank, a flow-through rate of about 2,200 GPM is recommended to achieve a residence time of about 90 minutes, and the circulation system for this tank needs to be operated independently). For the proposed 'O'oma II lagoon system, achieving this turnover rate would require pumping at 25,000 gallons per minute (GPM) continuously. This would be equivalent to turning over 36 million gallons per day (MGD) (ibid).

A low nutrient source of water can be developed through construction of a field of nearshore drilled wells. These would be designed to draw water from wells below the overlying brackish lens, thereby producing saline groundwater which would be virtually identical to nearby surface seawater in all chemical respects. The exact number of wells needed to achieve this flowrate would be determined through actual drilling and pump testing. Experience has shown, however, that 3,000 to 5,000 GPM per well is a reasonable expectation. At this yield per well, the project would require five to eight wells. These would be arrayed around the pond perimeters for delivery into the respective ponds. Typical well depth is likely to be about 200 feet (ibid).

Anticipated Impacts

The potential impacts of the proposed project at 'O'oma II on groundwater and the nearshore marine environment can be classified as a consequence of two factors: (1) leachate from the application of fertilizers, pesticides and herbicides to the proposed golf course; and (2) the "mounding" effect on groundwater created by the salt water lagoon for the proposed water recreation park. The following section describes the anticipated impacts on groundwater resources and the nearshore marine environment which could result from development at 'O'oma II.

Pesticide and Nutrient Transport. Environmental & Turf Services, Inc. (ETSI) prepared a report which assesses the risk of potential contamination of groundwater from the use of turf chemicals on the proposed golf course at 'O'oma II. The results of this work are summarized in the following paragraphs and appear in full in Appendix G.

One of the most significant pathways for contamination of sensitive receptors is through the leaching of chemicals vertically through the turf application area of a golf course down to the groundwater and then horizontal translocation of the leached chemicals to the ocean. Based on a series of scientific modeling techniques using available data on hydrology, soils, meteorology, plant uptake, surface runoff and erosion and chemical characteristics, among others, it is possible to predict the behavior of chemicals applied to the proposed golf course (ETSI, 1991).

One of the basic assumptions of the modeling techniques was to allow for a 10-inch layer of topsoil over the fairways of the proposed golf course. This should be considered the absolute minimum depth for topsoil to provide for proper rooting depth of fairway grass (which is assumed to be a bermuda variety) (ibid).

The results of this analysis reveal, as an example, that bensulide, a typical herbicide applied to golf course greens, would leach to groundwater in a predicted average daily concentration of 2.6×10^{-4} parts per billion (ppb), which is five orders of magnitude lower than the greatest level of concern for aquatic toxicity. Similar calculations for other chemicals simulated by ETSI confirm that none of the chemicals modeled for use on the 'O'oma II golf course are expected to reach concentrations in groundwater at the project boundaries closer than two orders of magnitude less than any level of concern for aquatic organisms. These levels are generally below any current means of analytical detection. With concentrations this low in groundwater, it is unnecessary to attempt to determine concentrations that

might occur in the ocean as a result of ground water extrusion to the open coastline. The additional dilution would further reduce the pesticide concentrations to infinitesimal values (ibid).

The prime nutrient of concern for groundwater contamination potential is nitrogen. Phosphorus tends to form insoluble complexes under certain conditions and also binds to clay and organic matter. Therefore, it is not a threat to leach to groundwater under normal turf management conditions. Potassium is mobile but non-toxic. It is not usually a nutrient of concern in ecological assessments, including wetlands sites (ibid).

Nitrogen, however, can cause excessive topgrowth of vegetation, e.g., algal blooms. Therefore, it is necessary to predict nitrogen losses to the environment. A realistic estimate of percentage of nitrogen to be leached to groundwater from application to the golf course is 2.6 percent of the total volume. As a control factor, a worst case value of 10 percent of the nitrogen leaching to the groundwater was used. The 10 percent leachate was assumed to be a worst case on the basis of evaluations of nutrient input from other golf courses on the Big Island. However, because of differences in irrigation practices and soil depth, these other situations are not necessarily applicable to 'O'oma II (ibid).

Nance (1991) modeled nitrogen loading to the shoreline using these values for nitrogen leaching. It was determined that the 2.6 percent nitrogen leaching rate would be fully diluted before reaching the shoreline (ETSI, 1991). At the worst case, (10 percent leaching rate), a nitrogen increase of 20 - 40 micromolar would occur in ground water reaching the shoreline. Monitoring at the site by Marine Research Consultants (1990a) indicates that this small increase at the worst case leaching rate would not normally be detectable due to the strong, narrow mixing zone at the shoreline.

Termiticides. There are no requirements for subterranean termite control on the Big Island. However, chemical treatment of soil is a standard industry practice, even in arid areas with minimal soil such as the proposed 'O'oma II site (ibid).

The pesticides chlorpyrifos and isofenphos could be used safely and effectively if handled properly. However, concerns have been raised about the use of termiticides and their effects on groundwater resources, especially since both these chemicals are toxic to fish.

Salt Water Lagoon System. Nance (1991) analyzed the effects of the salt water lagoon system on the brackish lens beneath the project site. The results of this analysis is presented below. Nance's full report is attached as Appendix F.

While much is known about regional subsurface geology, anticipating the specific effects of the salt water lagoon system on the basal lens beneath the project site requires specific geologic data. In the absence of this information, Nance developed simulations for the effects of the seepage of 25,000 GPM on the basal lens. It is important to note that groundwater movement is substantially influenced by such geologic features as voids, cracks and lava tubes (Nance, 1991). (The Petitioner will conduct testbores to more precisely determine the nature of subsurface geology. The results of the existing analysis of the mounding effect are based on conservative assumptions on the horizontal permeability of the substrata, representing a worst-case scenario.)

The major effect of the seepage of 25,000 GPM on the basal lens would be to create a "mounding" effect, as seepage of the salt water from the lagoon acts as a barrier to the natural flow of groundwater toward the ocean. As a result of the mounding effect, the seeping water would move away from the pond in all directions. This includes movement inland to a stagnation point approximately 2,000 feet inland, whereupon the water turns and flows toward the shoreline. The overall effects of mounding would be registered about 1,100 feet north of 'O'oma II and 1,900 feet south. This mounding would create the following effects:

- the water level of the 7-acre pond would rise 0.4 feet;

- the salinity of groundwater would register a slight increase, with approximate levels reaching 19 to 29 ppt in the vicinity of the North anchialine pond system at Kohanaiki, and a 2 to 3 ppt increase in an existing monitoring well at NELHA (well W-2); and,

- the profile of background concentrations of nitrogen in groundwater would rise further inland, as groundwater "backed-up" from the salt water lagoon, with overall concentrations reaching a level of about 90 micromolar in the vicinity of the North anchialine pond system at Kohanaiki.

According to Dr. Richard Brock of the Hawaii Institute of Marine Biology, research has shown that anchialine pond organisms appear to be tolerant to large changes in water chemistry and other environmental changes (the full text of a letter from Dr.

Brock to Ms. Toni Fortin concerning the effects of development on adjacent anchialine pools is attached as Appendix I). As an example, a species common to anchialine pools, the red shrimp 'opae 'ula (Halocardina rubra) is found naturally in anchialine pools with salinities ranging from 0.5 ppt to about 25 ppt. Dr. Brock has kept this species in the laboratory in salinities ranging from freshwater to seawater, with no ill effects. Dr. Brock writes: "...anchialine biota appears to live under tremendously variable conditions with respect to water chemistry (including nitrate nitrogen)."

In summarizing the results of 450 water samples collected annually from ponds at numerous Kona Coast localities, Dr. Brock identifies two points that emerge: (1) within a given location there is little variation in the water quality characteristics from year to year; (2) there is tremendous variation in the parameters that are measured between sites. In Brock's estimate, there would be no negative impacts to anchialine ponds due to changes in water chemistry that may be created by development at 'O'oma II.

Use of Sewage Effluent for Irrigation. One option being considered for irrigation of the proposed golf course at 'O'oma II is the use of treated sewage effluent. ETSI reviewed the risk potential for the use of sewage effluent as an irrigation source (ETSI, 1991). According to ETSI, this issue has been studied extensively in Hawaii, and it has been demonstrated that secondary and primary effluent can be used successfully for irrigation and concurrently for aquifer recharge. Also, natural grassed systems, such as bermuda grass, act as a surface living filter and a subsurface trickling filter, outperforming secondary treatment in improving water quality under certain conditions.

However, although the recharge water quality is acceptable, the applied effluent often contains human enteric viruses, even after chlorination. This would be a problem for off-site drift when effluent is applied as a spray (this problem is discussed in more detail in Section 6.1, Wastewater Treatment and Disposal and Section 4.10, Air Quality).

Ciguatera Toxin. Ciguatera poisoning can arise when people consume reef fish contaminated by ciguatoxins. The first reported ciguatera poisoning incident occurred in 1602, showing that this is not a recent phenomenon. There have also been recent outbreaks in New Caledonia, Fiji, Okinawa, Guam, Japan and in the Atlantic throughout the Caribbean and Florida. The toxins are produced by microscopic marine organisms called dinoflagellates (Gambierdiscus toxicus) that

attach to the surface of red and brown macroalgae. Herbivorous fish eat the algae and concentrate the toxins in gut, liver, roe and muscle tissues. Carnivorous reef fish that prey on the herbivores can accumulate the toxin, as can surgeon and parrot fish that feed directly on the algae or the coral reef that supports the algae (Marine Research Consultants, 1991).

The cause of ciguatera outbreaks is not known. It is known that significant habitat alteration, e.g. coral destruction through storms or dredging, can create ideal habitats for macroalgae. However, there are no specific factors that have been demonstrated to cause dinoflagellate blooms, including alterations of coral reef systems (Marine Research Consultants, 1991).

Two studies on this subject have recently been completed. The first, (Marine Research Consultants, 1991, attached as Appendix J), concludes that:

- o G. toxicus is more likely to occur in sheltered areas where land runoff and turbulence is minimal;

- o Increases in G. toxicus cells were not caused by increases in nitrate and phosphate, forms of commonly-used golf course fertilizers, in the only two studies where this relationship was evaluated;

- o Ciguatera outbreaks often appear to follow disturbance of coral reefs by man-made or natural causes, such as storms; however, these relationships are implied rather than proven; and,

- o The area of highest number of toxic incidences on West Hawaii are far removed from any development, but are associated with locations of the greatest fishing effort.

The second study, a preliminary study of West Hawaii attempted to identify relationships that might explain ciguatera outbreaks. The Clean Water Branch of the Department of Health (DOH) collaborated with the Natural Energy Laboratory of Hawaii and the Department of Pathology, University of Hawaii - Manoa to sample and analyze reef fish, substrates (coral, sand) and nearshore sea water. Approximately half of the fish sampled were found to be either positive or borderline for ciguatoxin. The most prominent nutrients in nearshore waters were dissolved silica and nitrates. However, there was a general absence of marine

macroalgae that could support G. toxicus. No G. toxicus was confirmed in algae, coral or sand (ETSI, 1991).

In other research, locations and types of ciguatera fish poisoning incidents was plotted for Oahu, Hawaii, Kauai, and Maui for the period 1984-1988. It is clear from the patterns of these plots that there are no obvious on-shore land use causes for the outbreaks (i.e., golf courses, hotels, cities, etc.). Therefore, causes of ciguatera outbreaks remain unexplained, with a lack of plausible hypotheses to identify a source of the outbreaks (Marine Research Consultants, 1991).

Mitigation Measures

As discussed above, there are two situations that could affect groundwater and the nearshore marine environment: (1) the application of pesticides, herbicides and fertilizers; and, (2) the mounding effect created by the seven-acre salt water lagoon of the water recreation park. There are many opportunities to reduce the potential effects of these two situations.

Pesticides, Herbicides and Fertilizers. It will be possible to limit the amounts of pesticides, herbicides and fertilizers applied to the proposed golf course at 'O'oma II by the use of an Integrated Golf Course Management (IGCM) program. IGCM can best be defined as a program that employs structural, cultural and mechanical means to closely monitor the existing health of turf grass on a golf course, and determine the appropriate amounts of irrigation, pesticides, herbicides and fertilizers that need to be applied to maintain the health of the turf. IGCM presupposes that these applications can be limited if appropriate monitoring techniques are in place. Limiting applications of chemicals and irrigation can significantly reduce any effect to groundwater. IGCM also stipulates that appropriate species of turfgrass be selected for specific climates and stresses the importance of proper golf course construction and maintenance techniques to improve the ability of the turf and the soil to break down, filter and absorb applied chemicals (ETSI, 1991).

ETSI (1991) describes in detail a proposed Integrated Golf Course Management program for 'O'oma II, which appears in full in Appendix G. Some of the salient features of the IGCM include:

- Soil testing of the greens and fairway soil mixture during the construction phase to provide accurate provisions of correct soil amendments;

- Creation of an approved soil erosion plan prior to construction;
- Use of appropriate construction techniques for sub-grading, fine-grading, topsoil cleaning and compaction;
- Selection of appropriate turfgrasses for fairways and greens;
- Use of appropriate pest managing techniques;
- Use of a specialized weather monitoring station with computer integrated functions, for irrigation and pest management;
- Use of proper mowing techniques; and,
- Frequent applications of lesser amounts of both fertilizers and irrigation water to reduce potential leaching;

In addition to the use of an IGCM program, a key element of the protection of the quality of the nearshore marine environment will be either the participation in ongoing water quality monitoring programs or the development of an independent program for the waters fronting 'O'oma II.

Mounding Effect. As discussed above, the construction of the seven-acre, unlined salt water lagoon will affect the flow of groundwater, and thereby the background concentrations of nitrogen and the salinity of groundwater. Anticipated impacts are based on conservative assumptions about the effects of local scale voids, cracks and lava tubes on groundwater seepage. In order to more definitively quantify the influence of small scale features in the lava between the seven-acre lagoon and the shoreline, it is essential that a number of small, shallow boreholes be drilled to quantify the existence of numerous cracks, lava tubes and voids which are known to exist throughout the site, but for which data are non-existent. With this information, further calibration of the computer-based numerical model can be accomplished and more accurate predictions of the effect of seepage on groundwater can be made (Nance, 1991).

In the event that the results of such tests reveal a more impermeable barrier to groundwater seepage to the ocean, it may be necessary to design a smaller salt water lagoon system to limit the effects attributed to the mounding of groundwater.

Termiticides. As discussed, some concern has been raised about the possible effects on groundwater that would result from the application of termiticides to the soil to protect woodframe buildings from subterranean termites. A recent development in ground termite pest control is the application of basaltic sand (which is produced from crushing basaltic rock). This sand acts a physical barrier to ground termites, preventing them from reaching the surface and eliminates the need to use traditional chemicals to control termites (ETSI, 1991).

4.8 Flora and Fauna

In October 1990, Char & Associates conducted a botanical assessment to update an earlier survey conducted in 1986. This report is attached as a technical appendix (Appendix K). During the 1990 assessment, special emphasis was placed on the area occupied by strand vegetation, which occupies a narrow belt along the coast. Although this area is small compared to the overall project site, the largest number of native species is found in this vegetative zone.

4.8.1 Flora

Affected Environment

A flora survey conducted in May 1986 inventoried a total of 51 vascular plant species. Of these, 31 species (61 percent) are exotic (or introduced), 18 species (35 percent) are native and two species (four percent) are of Polynesian introduction. among the 18 native species, 10 are indigenous (occurring only in the Hawaiian islands and elsewhere) and eight are endemic (occurring only in the Hawaiian Islands). During the October 1990 survey a few more species were observed, although most of these were weedy annuals which appear after rainy periods.

Strand Vegetation. The coastal strand vegetation varies in width from 300 feet to as little as 50 feet. The substrate varies from unconsolidated corraline sand to coral rubble, and, occasionally, pahoehoe flows. In places where the strand is narrow, the pahoehoe flows are found close to the beach. Beach naupaka (Scaevola sericea) forms rather dense stands three to five feet high along the entire coast. Tree heliotrope (Tourneforthia argentea), from eight to 12 feet high is also abundant, especially along the northern half of the project site. Native species common to occasional in this vegetation type include the native caper or maiapilo (Capparis sandwichiana), 'ilima (Fimbristylis cymosa), 'uhaloa (Waltheria indica), 'aki'aki or

beach dropseed grass (Sporobolus virginicus), nohu (Tribulus cistoides), alena (Boerhavia glabrata), pa'u-o-Hi'i-aka (Jacquemontia ovalifolia),

Certain portions of the strand vegetation makai of the coastal jeep trail show some damage. In some areas, the sand has started to move and pile up along the seaward side of the road, forming small banks and covering the lowering branches of the naupaka shrubs. On the northern half of the project site, closer to the HOST Park property, the coastal area appears to be more actively used. This is where the sand and corraline beach is widest. Because of vehicular traffic, most of the ground cover plants, such as 'aki'aki, 'ilima, hinahina, etc., are found at the base of the naupaka and tree heliotrope plants where they are protected. Many of the tree heliotrope, usually a much-branched, bushy shrub, have been cut so that the lower branches have been removed.

Scrub Vegetation. With the exception of the narrow belt of strand vegetation along the coast, scrub vegetation covers almost 95 percent of the project site. This vegetation type is composed of various grass and shrub species on pahoehoe and 'a'a lava flows. Fountain grass (Pennisetum setaceum) is the most abundant species. However, pili grass (Heteropogon contortus) and Natal redtop (Rhynchyletrum repens) are locally common in places. Common throughout this scrubland are smaller shrubs (subshrubs) of 'uhaloa, 'ilima and indigo (Indigofera suffruticosa). Widely scattered throughout the site are taller plants of kiawe (Prosopis pallida), Christmas berry (Schinus terebinthifolius), a'ali'i (Dodonaea viscosa), the native caper of maiapilo and noni (Morinda citrifolia). The more scoriaceous 'a'a flows support some of the species previously mentioned, but in fewer numbers.

4.8.2 Fauna

Affected Environment

During the May 1986 botanical survey, Char & Associates observed nine bird species. Of these seven are listed as foreign species, one is an indigenous species which leaves the islands when not breeding, and one species is a migratory winter visitor. The mongoose was the only mammalian species observed, although feral cat may also inhabit the area. No endangered wildlife species were observed. The Hawaiian Stilt or Ae'o (Himantopus himantopus knudseni) and the Hawaiian Hoary Bat (Lasiurus cinereus semotus), both endangered species, may fly over the project site, the latter probably feeding on insects along the coastal area during the evening and at night.

Two major faunal habitats are present in the project area. These correspond approximately to the vegetation types, but are less finely divided. The predominant scrub vegetation habitat was found to support low bird densities. One species, the Grey Francolin, was found on a more regular basis and presumably is able to utilize the available food sources more effectively than most other species.

Birds were more abundant in the coastal strand habitat, although it appeared that much of the activity was of a transient nature, as many species that fed there during the daytime hours roosted elsewhere at night. Beaches and sections of the rocky coastline makai of the strand form an important habitat for migratory shore birds. As the survey was conducted during a season when shore bird species are generally absent from the Hawaiian Islands, only one species, the Wanderling tattler, was found. However, two or three others (Bristle-thighed Curlew, Ruddy Turnstone and Sanderling) would be expected in this area on a regular basis. The Pacific golden Plover was observed on the adjacent Kohanaiki parcel.

Impacts

No endangered flora or fauna are known to inhabit the site. The proposed development will result in the loss of some vegetation presently found on the project site, primarily the scrub community and some wildlife habitat. However, it is believed the loss of existing habitat will be balanced by the improvement of some habitat and the creation of new habitats. The ultimate closure of the coastal jeep trail will stop the damage being inflicted on the strand vegetation by four-wheel drive vehicles. The improvement of this vegetation would also provide additional habitat for bird species.

Further, other aspects of the proposed action would provide new habitat bird species, with the introduction of salt water lagoons, water features on the golf course and landscaping throughout the project, including trees. Therefore it is expected the overall impacts of the proposed action will be positive, even though some existing habitats will be lost.

Mitigation Measures

To the extent possible, native plant species, especially those found in the coastal strand, could be incorporated into the development's landscape plans (i.e., naupaka, pohuehue, hinahina to provide additional habitats for native birds.

4.9 Noise

Noise impacts associated with the proposed project were analyzed by Darby & Associates in November 1990. A summary of their findings is presented below, with their complete report reproduced in Appendix L.

Affected Environment

The major source of man-made noise affecting the project site originates from air traffic operations at the Keahole Airport, located approximately one mile to the north. Otherwise, most of the site is exposed to relatively low noise levels, with wind, surf and occasional distant traffic being the only noticeable sounds.

The most dominant aircraft noise is that from inter-island jets flying over the western section of the project site, after taking off from Runway 17 at Keahole Airport. The normal flight pattern is a right turn out to sea, shortly after takeoff. This flight pattern is followed by commercial flights to Honolulu and Kahului, the two predominant destinations for aircraft leaving Keahole Airport. Commercial air tours, general aviation aircraft and military training flights may continue in a southerly direction after takeoff, and by flying over the project site, have a greater impact. Less commonly, aircraft also fly over the project site on their final approach to Runway 35.

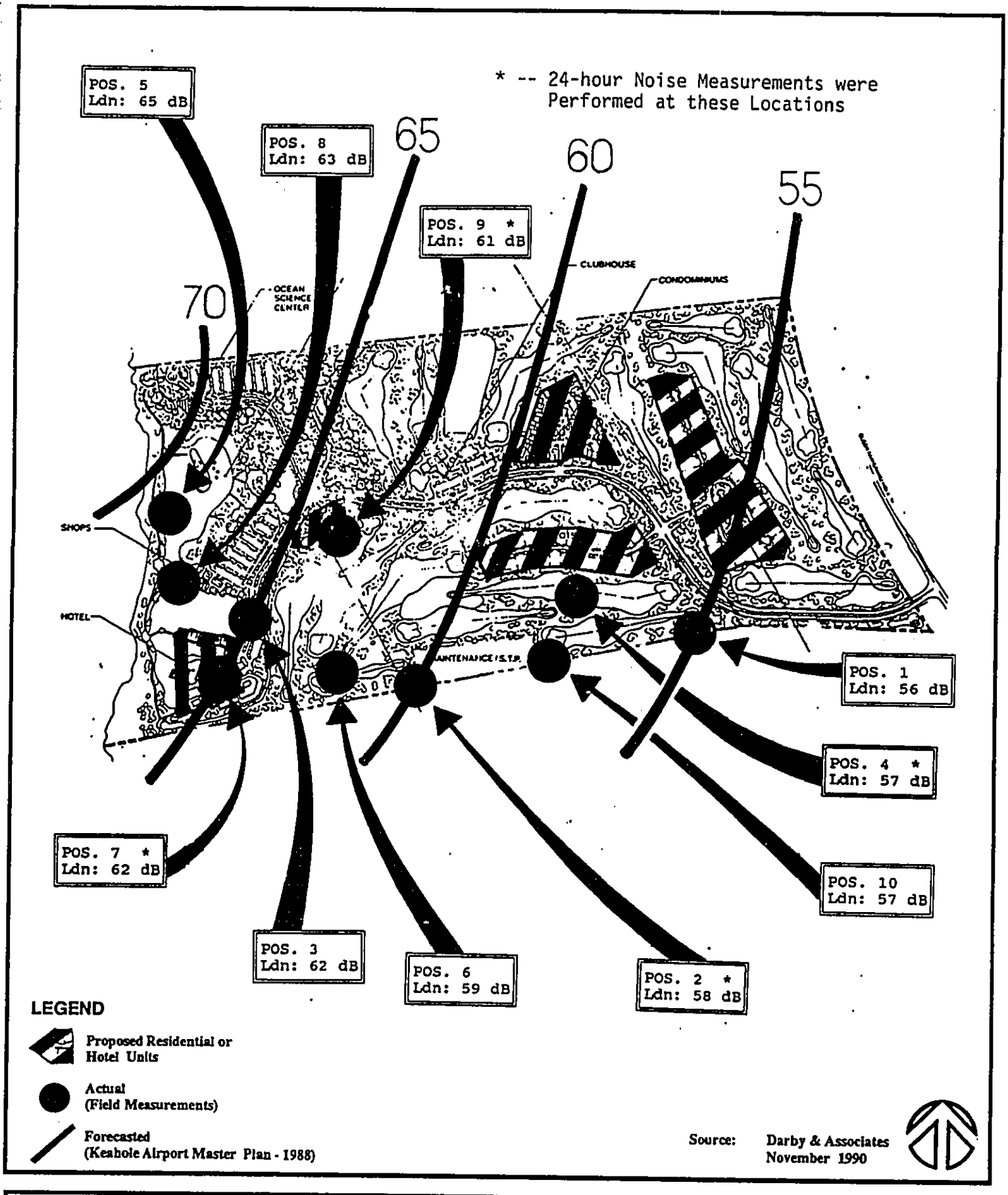
In measuring the impacts of noise, it is important to note that although people respond to the noise of single events, the long-range effects of prolonged exposure to noise appear to correlate best with cumulative metrics. "Ldn" is the Federal Aviation Administration's (FAA) standard metric for determining such exposure to noise. It measures average sound level in decibels for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the period 10. P.M. to 7 A.M. the next day, local time. Aircraft noise exposure maps with continuous noise contour levels of Ldn 55, 60, 65, 70 and 75 have been prepared showing anticipated 1990 noise contour lines.

The analysis of noise impacts on any development requires an understanding of the standards used to assess impacts. For example, the U.S. Environmental Protection Agency and the Department of Housing and Urban Development (HUD) and other federal agencies, specify that residential and other noise-sensitive developments can normally be constructed in areas subjected to noise exposure levels of up to Ldn 65 with no special noise control measures required in buildings of conventional construction. Sites exposed to Ldn's in the range of 65 to 75 dBA are normally considered unacceptable for residential development, with building approval subject to additional noise control measures.

In Hawaii, the State Department of Transportation, Airports Division, stipulates an aircraft noise exposure limit of 60 Ldn for residential buildings. It should also be noted that land use compatibility guidelines are typically less restrictive for transient lodging buildings, such as hotels, which are normally air-conditioned and better acoustically insulated than conventional residential buildings.

Estimated Aircraft Noise Exposure Levels. To assess existing noise exposure levels, measurements were made at ten locations. The estimated Ldn's at each of the measurement locations was then compared with actual measurements, showing reasonable agreement with published 1990 contours (Figure 11). However, this data indicates that the published 1990 60 and 65 contours overestimate the current noise exposure levels by two to three points (probably because of variations between the flight departure tracks assumed in the predictions and those actually used). In other words, the existing Ldn 60 and 65 (and, possibly, the Ldn 70) aircraft noise contours should be further west than indicated by the noise contour lines adopted by the State DOT, Airports Division.

A proposed future runway extension at Keahole Airport, and the gradual introduction of progressively quieter aircraft, should reduce future (year 2005) aircraft exposure levels at the project site to about 5 dBA below existing values (Figure 12).



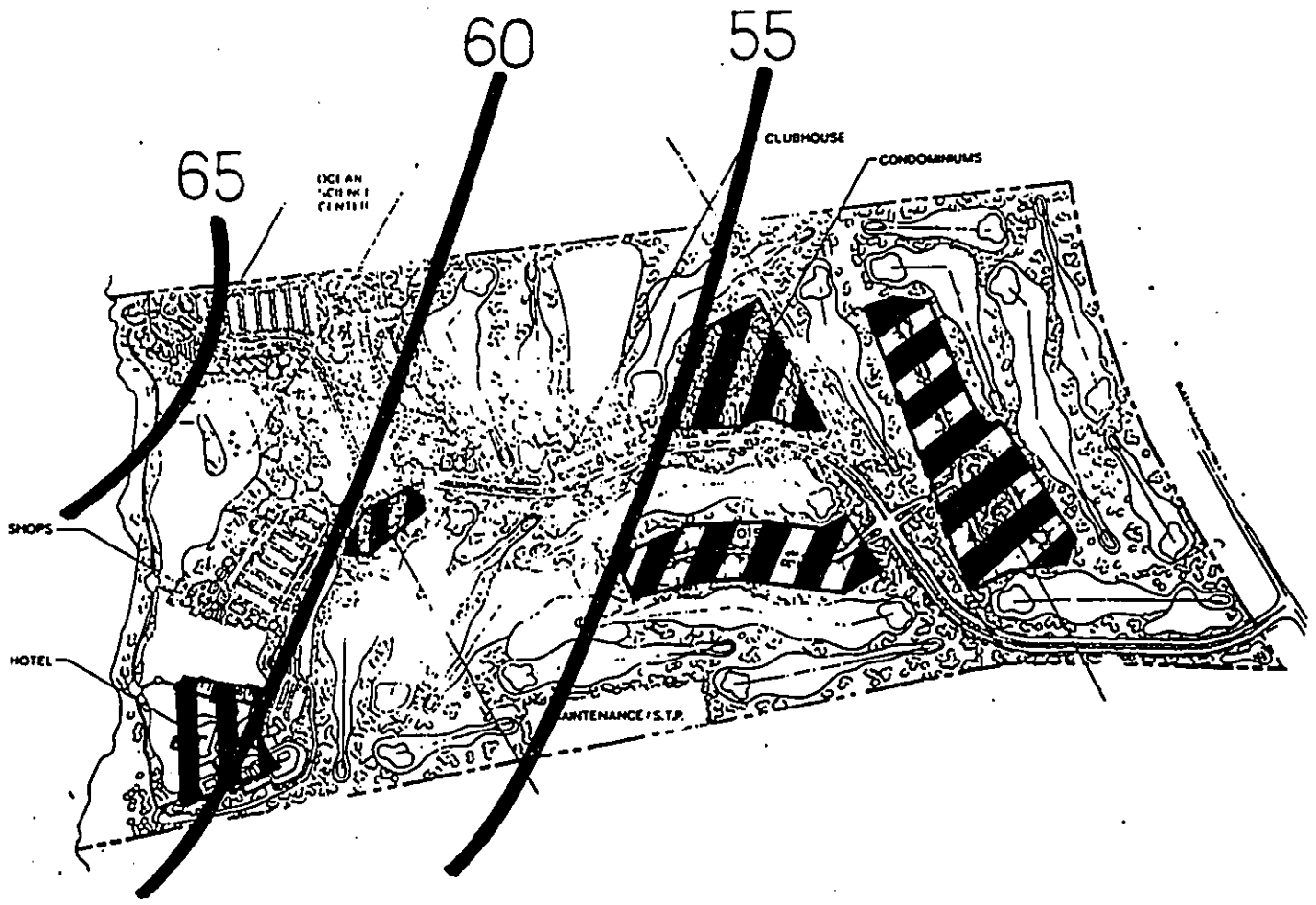
Aircraft Noise: 1990 Ldn Contour Lines

Figure: 11

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners



LEGEND

Proposed Residential or Hotel Units

Forecasted (Keahole Airport Master Plan - 1988)

Source: Darby & Associates November 1990

Aircraft Noise: 2005 Ldn Contour Lines

Figure: 12

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

Impacts

Aircraft Noise. Figure 11 indicates that the proposed single- and multi-family residential areas within the project site will be subjected to existing aircraft noise exposure levels of Ldn 58 or less, according to estimated 1990 contours, which is in compliance with the State DOT's Ldn 60 residential area limit. However, other measurements of noise, indicate these areas will require construction mitigation measures. For example, Maximum Noise Levels (Lmax) and Sound Exposure Levels (SEL) record single-event jet aircraft noise levels recorded during each aircraft movement. (SEL is the Equivalent Continuous Level normalized to a period of one second.) The proposed residential areas will be subjected to SELs of up to 85 to 90 dBA from noisier inter-island jets (including night freighters) and to corresponding maximum noise levels of about 75 to 80 dBA.

The proposed hotel and inn will be subjected to existing aircraft noise exposure levels of Ldn 63 or less. These areas will also be subjected to SELs of typically, 90 to 95 dBA from the noisier inter-island jets (including the night freighters) and to corresponding maximum noise levels of about 80 to 85 dBA.

Traffic Noise. Projected traffic volume (see Section 6.5) was evaluated with respect to future noise impact. The increase in traffic noise along Queen Kaahumanu Highway due to the completion of the proposed project is expected to be about 1-1/2 dB to the south of the project site and less than 1 dB to the north. This degree of increase is not considered significant.

The predicted traffic noise levels from the project access road at the condominiums and the home lots are less than 65 dB Day-Night Average Sound Level (Ldn), assuming a posted speed limit of 25 mph in the noise sensitive areas and that the structures are setback at least 100 feet from the center of the roadway. This noise level meets federal standards for housing. It is also to be noted that the condominiums and the homes are proposed to be air-conditioned, and interior noise levels from traffic should be most acceptable to all persons.

Golf Course Maintenance Noise. Noise from equipment associated with ground maintenance activities, including lawn mowers and leaf blowers, could have an adverse impact on the proposed nearby condominiums and homes, particularly when the equipment is near the housing. Such noisy equipment could also be disruptive to golf play.

Golf Clubhouse Noise. Noise from sources at or near the clubhouse, such as the kitchen, refrigeration and air conditioning equipment, exhaust fans, golf cart chargers, pumps and other stationary equipment, should be inaudible at the closest proposed condominium (which is more than 250 feet away). If live music and entertainment are planned inside the clubhouse, noise from these activities will also be inaudible at the closest homes provided the building structure incorporates an adequate degree of "sound proofing." A public address system near the clubhouse using state-of-the-art "low level", directional loudspeakers, should have minimal impact on nearby residential areas.

Stationary Equipment and Other Noises From Resort and Commercial Operations. Noise from the sewage treatment plant, air conditioning, pumps, fans, trash compactors and any other stationary equipment in the resort and commercial complexes will not exceed noise levels established as guidelines by State Department of Health (at this time only the City and County of Honolulu has adopted these noise regulations, and they are thus not applicable in the County of Hawaii).

Construction Noise. Development of the project site will involve grubbing, grading and the construction of infrastructure and buildings. The various construction phases of a development project generate significant amounts of noise. Actual noise levels will depend on the methods of construction employed during each stage of the process. Earthmoving equipment such as bulldozers and diesel powered trucks will probably be the loudest equipment used during the construction of the housing units. However, because there are no residences existing on the project site, and the closest possible residences would be located on the Kohanaiki property (with undetermined future occupancies), impacts to residents will be negligible.

Mitigation Measures

Aircraft Noise. Mitigation measures for aircraft noise are based on existing levels of noise generated by operations at Keahole Airport. As discussed above, projections of Ldn contour lines for Keahole Airport (year 2005) show reductions in noise levels. This is primarily due to anticipated modifications in aircraft design and to the proposed expansion of Keahole Airport. The expansion of the Keahole Airport in the future could reduce noise impacts to the benefit of 'O'oma II and other property in the vicinity of the Airport. A longer runway will allow higher elevations over developed areas and lower thrust from reduced flap angle with increased land speeds possible. Anticipating these changes, it is still necessary to plan for existing noise levels.

As stated above, single- and multi-family homes proposed on the project site will be located in areas that fall below the maximum Ldn noise exposure levels recommended by the State DOT, Airports Division. Although not mandatory, measures such as the following would provide a higher-than-normal degree of sound insulation and should reduce any impact from aircraft noise (particularly from night flights) on the residential building occupants:

- o Use sliding windows and sliding glass doors (with double strength or 1/4-inch thick monolithic glass), that seal well in the closed position;

- o Avoid jalousie windows, or restrict their use to the less noise-sensitive areas (bathrooms, laundries, etc); and,

- o Air-condition noise-sensitive areas (to allow windows to be kept closed for noise reduction purposes).

The above measures should provide an exterior-to-interior noise reduction of around 25 dBA, resulting in interior levels due to aircraft noise of Ldn 33 or less (with windows closed), which is clearly in compliance with the federal department of Housing and Urban Development's (HUD) Ldn 45 guideline, and in interior SELs of up to 60 to 65 dBA from the noisier aircraft.

In the case of the proposed hotel and inn, assuming conventional building design and construction with air-conditioned guestrooms and sliding glass doors providing access to guestroom lanais, the estimated exterior-to-interior noise reduction should be about 25 dBA (if the doors are well sealed when closed). Thus noise exposure levels inside the guestrooms due to aircraft noise should be Ldn 38 or less (with windows and sliding glass doors closed), which is also in compliance with the Ldn 45 criterion mentioned earlier. Jalousie windows should not be used in guestrooms.

As discussed above, the hotel and inn will be subjected to SELs of 90 to 95 dBA and to corresponding maximum noise levels of about 80 to 85 dBA from the noisier inter-island jets (including night freighters). Without any special sound insulation measures (apart from using sliding glass doors and windows provided with high quality weather stripping) the SELs inside guestrooms due to the noisier aircraft could be in the range of 65 to 70 dBA. This noise level is above the recommendations of a firm of acoustical consultants (Wylie Laboratories) involved with soundproofing homes near some of the major airports in the United States.

They recommend maximum interior SELs of 60 to 65 dBA in habitable rooms, with corresponding Lmax values of 50 and 55 dBA, respectively. It should be emphasized that these recommendations have not been formally adopted by any Federal, State of Hawaii or County of Hawaii agencies.

Although not mandatory, some additional "sound proofing" could reduce the intrusive noise from aircraft movements to levels more consistent with a quality hotel or inn environment. Additional measures could include laminated single-glazed, or acoustically double-glazed, guestroom windows and sliding glass doors, selected on the basis of providing exterior to interior noise reduction of 30 to 35 dBA.

Golf Course Maintenance Noise. All equipment powered by internal combustion engines will have exhaust mufflers. Schedules will be developed so noisier maintenance operations do not occur near residences before 7 a.m. The noise from ground maintenance operations will not cause "unreasonable" or "excessive" noise as defined by "Chapter 43 - Community Noise Control for Oahu," (Department of Health, State of Hawaii, Administrative Rules, title 11, 1981). It should be noted that no similar rules have been adopted by Hawaii County.

Construction Noise. All construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers. Also, construction vehicles using trafficways will satisfy the noise level requirements adopted for Oahu for similar noise generation ("Chapter 42 - Vehicular Noise Control for Oahu," Department of Health, State of Hawaii, Administrative Rules, Title 11, 1981.)

If blasting is used in the excavation of the lagoon system for the proposed Marine Park, there will always be undisturbed land between the lagoon and the open sea such that there will be no overpressure pulses to injure endangered species (namely humpback whales and green sea turtles) or major marine mammals.

4.10 Air Quality

An assessment of the existing air quality in the project area and the potential short-term and long-term direct and indirect air quality impacts that could result from the construction of the proposed project was conducted by B.D. Neal & Associates in November 1990. The results of their work is contained in Appendix M and is summarized below.

Affected Environment

Regional and local climatology significantly affect the air quality of a given location. Wind, temperature, atmospheric turbulence, mixing height and rainfall all influence air quality. Within the region of the project area, the presence of Mauna Kea and Hualalai affect local wind patterns, and hence local air quality.

Present air quality in the project area is mostly affected by air pollutants from natural, industrial, agricultural and or/vehicular sources. Natural sources of air pollution emissions which may affect the project area but cannot be quantified accurately, include the ocean (sea spray), plants (aero-allergens), wind blown dust and volcanoes. Of these natural sources of pollution, volcanoes are the most significant. This is especially so since the latest eruption phase of the Kilauea volcano, which began in 1983. Emissions from this eruption can be seen in the form of volcanic haze (vog) which persistently hangs over the area.

The major industrial sources in the project vicinity include the Keahole Power Plant (operated by Hawaii Electric Light Company) and the Kailua Landfill, operated by the County of Hawaii. Emissions from the landfill consist mainly of fugitive dust from heavy equipment operations and noxious fumes from underground fires, which has been the subject of numerous complaints from people residing and working nearby. The project is situated far enough away so as probably not to be adversely impacted by emissions from the landfill.

Queen Kaahumanu Highway, which borders the project site on the east, is the region's major arterial roadway, and as a result, contributes some exhaust of motor vehicles traversing Queen Kaahumanu Highway. It is likely that elevated concentrations of exhaust are confined to limited areas near intersections where and when traffic congestion occurs during poor dispersion conditions.

The State Department of Health operates a network of air quality monitoring stations at various locations around the state. Unfortunately, very little data is available for the island of Hawaii, and even less is available for the Kona area, specifically.

Impacts

Impacts to air quality as the result of the proposed project can be differentiated between short-term and long-term impacts.

Short-term Impacts. Short-term direct and indirect impacts on air quality could potentially occur due to project construction. For a project of this nature, there are two potential types of air pollution emissions which could directly result in short-term air quality impacts during the construction phase: (1) fugitive dust from vehicle movement and site excavation; and (2) exhaust emissions from on-site construction equipment. Indirectly, there could also be short-term impacts from slow-moving construction equipment traveling to and from the project site and from a temporary increase in local traffic caused by commuting construction workers.

Long-term Impacts. After construction is completed, use of the proposed facilities will result in increased motor vehicle traffic on nearby roadways, potentially causing long-term impacts on ambient air quality in the project vicinity. Motor vehicles with gasoline-powered engines are significant sources of carbon monoxide. They also emit nitrogen oxides, and those burning leaded gasoline contribute lead to the atmosphere. As older vehicles continue to disappear from the numbers of those currently operating on the state's roadways, lead emissions are approaching zero. Thus, lead in the atmosphere is not considered to be a problem anywhere in the state.

To evaluate the potential long-term indirect ambient air quality impact of increased roadway traffic associated with a project such as this, computerized emission and atmospheric dispersal models can be used to estimate ambient carbon monoxide concentrations along roadways leading to and from the project.

For this project, three scenarios were selected for the carbon monoxide modeling study: year 1990 with present conditions; year 1998 without the project; and, year 1998 assuming the project is built and complete. Based on mathematical modeling of projected vehicular traffic and on atmospheric dispersion estimates of vehicular emissions, it is predicted that with the proposed project, carbon monoxide concentrations in the year 1998 along roadways in the project vicinity will meet the national air quality but occasionally may exceed state standards in the vicinity of the project entrance. The state standards are set so low, however, they are probably exceeded at many intersections in the state that have even moderate traffic volumes.

Golf Course Pesticides and the Use of Sewage Effluent as an Irrigation Source. Pesticides will be used to maintain golf courses grasses. It is possible that these pesticides could drift with the wind to neighboring properties when applied with a sprayer. Similarly, the application of sewage effluent as an irrigation source could result in the air-borne drift of irrigation spray. It is known that microbes can

survive standard secondary treatment systems. This effluent/brackish water mix would be applied with high pressure spray heads, which means there would be the potential for microbial drift if no other precautions are taken (ETSI, 1991).

Power Generating Emissions. Some long-term impacts on air-quality also could potentially occur due to indirect emissions from power generating facilities supplying the project with electricity and from the disposal of waste materials generated by the project. Quantitative estimates of these impacts were not made, but it appears likely that any impacts will be small due to the magnitude of the project electrical and solid waste demands compared to the present county demands.

Mitigation Measures

Construction-Related Emissions. Strict compliance with State of Hawaii Air Pollution Control Regulations regarding establishment of a regular dust-watering program and covering of dirt-hauling trucks will be required to effectively mitigate fugitive dust emissions from construction activities. Twice-daily watering is estimated to reduce dust emissions by up to 50 percent. Use of wind screens and/or limiting the area that is disturbed at any given time may be required in sensitive or dust-prone areas.

Golf Course Pesticides and the Use of Sewage Effluent as an Irrigation Source. Pesticides should not be applied if crosswind speeds exceed five miles per hour (mph) and no windfoil-style shrouded spray applicator is used. If a windfoil-style spray applicator is used, applications could be made in winds up to 20 mph (ETSI, 1991).

A lava rock or similar vegetative berm should be constructed that is at least 15 feet high along the 'O'oma II property line near sensitive areas. A vegetative buffer should be planted on the downslope on-property side of the berm. The complete buffer should be 100 feet wide. Vegetation planted in this buffer should be watered with drip irrigation. Local trees should be planted that have a history of no significant insect or disease problems. If necessary, insecticides should only be applied through direct or deep root injection. Otherwise, no pesticides should be applied in the 100-foot buffer strip (ETSI, 1991).

It is also recommended that on-site sewage treatment be elevated to adopt California's 2 NTU standard for use of effluent water in turf irrigation "NTU" which is an acronym for "nominal turbidity unit," is a measure of the turbidity of cloudiness of a solution). Adoption of this strict pre-chlorination clarity standard would mean that effluent would be classified as Class B; suitable for human contact.

4.11 Visual Resources

Affected Environment

The SMA Rules require that any development proposed within the SMA boundaries must be consistent with the objectives and policies of Chapter 205A, HRS, as amended, relating to coastal zone management. Policies related to visual impacts are found in Rule 9.6 of the Planning Commission's Rules under Objective 3, as described below.

Objective 3

Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies

a. Identify valued scenic resources in the coastal zone management area.
b. Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline.
c. Preserve, maintain, and where desirable, improve and restore shoreline open space and scenic resources.

Rule 9.7 of the Planning Commission's rules for the SMA identifies the guidelines to be used in the review of development proposed in the SMA. Guideline A.3 discusses impacts relative to views toward the sea from the highway and other scenic areas as follows: "The Director shall seek to minimize, where, reasonable, any development which would substantially interfere with or detract from the line of sight toward the sea from the State highway nearest the coast or from other scenic areas identified in the General Plan."

The Hawaii County General lists several sites of natural beauty in North Kona, including the Honokohau coastline, Keahole Point and makai view planes from Queen Kaahumanu Highway.

For purposes of this section, coastal scenic and open space resources are identified as a visual resource accessible from public viewpoints. To assess potential impacts to the resource, an analysis was conducted to determine potential visual impacts associated with the implementation of the proposed action. Existing visual features of the site are first described, followed by an inventory of public views. Significant

public viewpoints were then selected. Through the use of first hand observation and photographs, potential impacts were identified and described. Finally, mitigating measures to reduce and minimize impacts from public viewpoints are then discussed.

Visual Features of the Project Site. The project site is presently vacant, sparsely vegetated and slightly sloped from Queen Kaahumanu Highway to the shoreline. It is because of these physical characteristics that the predominant visual impression of the project site is featureless.

Major Public Viewpoints. The project site is only visible for short periods of time between Keahole Point to the north and Honokohau Small Boat Harbor to the south as one travels along Queen Kaahumanu Highway. The project site is also visible from some points along Mamalahoa Highway. Beginning at the Natural Energy Laboratory of Hawaii (NELHA) Access Road and proceeding in a southerly direction, the site is partially visible for approximately 0.3 mile, beginning at the NELHA Access Road. Although the ocean is visible from the highway, the shoreline is not, as it is obscured by the topography of the site, which also prevents views of the makai portion of the project site. However, at this point, the elevation of the highway is depressed relative to the land makai of the highway, and all makai views are blocked by a berm or by vegetation.

Travelling in a northerly direction from the Honokohau Small Boat Harbor, views toward 'O'oma II are obscured by a berm and vegetation makai of the highway until approximately 1.9 miles north of the boat harbor. At this point, the highway elevation permits makai views toward 'O'oma II, but actual identification of project site is impossible because of the presence of a low ridge between the viewer and 'O'oma II.

Views of the project site are also obstructed by the topography between the Wawaloli Beach Park, near NELHA at Keahole Point and the project site.

Views of the project site from Mamalahoa Highway are transitory at best, lasting less than one second, occurring during breaks in the vegetation at streets and private driveways.

Impacts

The landscape of the property will be irretrievably altered from its present natural state to a man-made one. The proposed project is not expected to interfere with the

line-of-sight from Queen Kaahumanu Highway because of slope gradients and vegetation which presently obscure most views from the highway. In fact, it is highly probable that most buildings on the project site will not be visible from the highway or Wawaloli Beach Park because of the low-rise nature of the development.

Mitigation Measures

The development will conform to all County ordinances that regulate permissible building heights, bulk and setbacks. An aesthetically pleasing architectural design, complemented by landscaping would also lessen any visual impacts. Although detailed site plans have not been developed, low-rise, low-density construction is envisioned to retain the open, unrestricted character of the Kona Coast and to maintain mauka-makai view corridors to the extent possible. The appropriate use of landscaping will make it difficult to identify any structures, especially because of the rate of travel speed along Queen Kaahumanu Highway and the viewing distance from the site. Furthermore, because the coastline fronting the project site is not now visible from the highway, views to the coastline from the highway will not be adversely impacted. The makai view will be enhanced by the tree-lined access road and other landscaping elements which will be part of the overall improvements to the project site. It will also be more apparent from the heights overlooking the proposed project that the site is more lushly vegetated than it was previously.

4.12 Historic and Archaeological Resources

Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted an archaeological survey and field testing for the 'O'oma II coastal area in 1986, in conjunction with the EIS that was accepted as part of the petition to amend the Hawaii County General Plan that was approved by the Hawaii County Council (Ordinance No. 87-68; effective date June 23, 1987). PHRI followed this work up by reviewing the archaeological work conducted previously on the project site. PHRI's 1986 report and 1990 review report are summarized below and are included as technical appendices (Appendices M and N, respectively).

Affected Environment

Six archaeological surveys have been done in coastal 'O'oma II:

1. A brief reconnaissance by Reinecke (1930);

2. An inventory of several known sites by the Department of Land and Natural Resources (DLNR) staff (1971-72);

3. An intensive survey of larger sites by Cordy (1975, 1981);

4. A reconnaissance survey by Barrera (1985);

5. A field check by Cordy (1986); and,

6. An archaeological survey and field testing by Rosendahl (1986).

Site Patterning. Three environmental zones relevant to archaeological work have been identified in the vicinity of Keahole Point (the four Kalaloa and two 'O'oma ahupua'a)

(1) Coastal Zone

Elevation 0-20 feet
0-150 feet from the shore
Low pahoehoe with some sand beaches
Some shoreline vegetation

(2) Barren or transitional zone

Elevation 20-430 feet
150 feet-1.5 miles from shore
Pahoehoe with pockets of a'a with no soil
Vegetational changes from barren to grass to lantana

(3) Upland Forest Zone

Elevation 430-3,400 feet
1.6-3.7 miles from shore
Rough a'a and soil terrain
Vegetational transitional from koa haole and Christmas berry to large forest trees

The project site falls in the coastal and barren-transitional zones. In some of the previous archaeological surveys the coastal and inland areas have been delineated by

drawing an imaginary line 600-800 feet from the shoreline with elevations ranging from 20 to 30 feet.

Coastal Zone. The coastal concentration of sites extends inland into a small portion of the barren zone. Fifteen permanent habitation site complexes were identified within the coastal zone. Sites interpreted as temporary dwelling areas, such as caves and C-shaped shelters are also common and tend to be located just behind the coastal zone in the initial fringes of the barren zone. There is one large solitary structure in the coastal zone on the northern border of the project area that has been interpreted as a heiau (Site D15-18, discussed below).

Barren Zone. From the 20-foot elevation contour inland, the site density is extremely low. Sites consist of a few mauka-makai trails, the early historic Mamalahoa Trail, which runs parallel to the shore, and a few C-shaped enclosures and caves along the Trail, and cairns.

Background. The earliest dates for permanent housing and settlement in the 'O'oma II ahupua'a is 1430 A.D. (Cordy, 1985). Current evidence suggests that the bulk of the permanent population was on the coast with most fields located in the upland forest with trails (and associated shelters) connecting the two areas. Temporary habitations are also present on the coast. However, it is uncertain if the sites were used by people who lived permanently inland, by people who lived outside the area, or by people residing within the area on the shore.

One large structure bordering the project site (D15-18) may be a heiau which operated at the community level for local and national purposes. There is record of Puhili, a high priest for 'O'oma and the Kohanaiki ahupua'a to the south. As no heiau of large size is present on the coast in Kohanaiki, it has been conjectured that perhaps ceremonies for the two 'O'omas and Kohanaiki were performed at the 'O'oma II heiau.

Besides major religious structures, several smaller structures associated with local residence groups have been identified. Structures larger than dwellings but associated with dwellings and not approaching major heiau size, have been interpreted as men's houses. These often have upright basalts, coral, or other remains associated with religion.

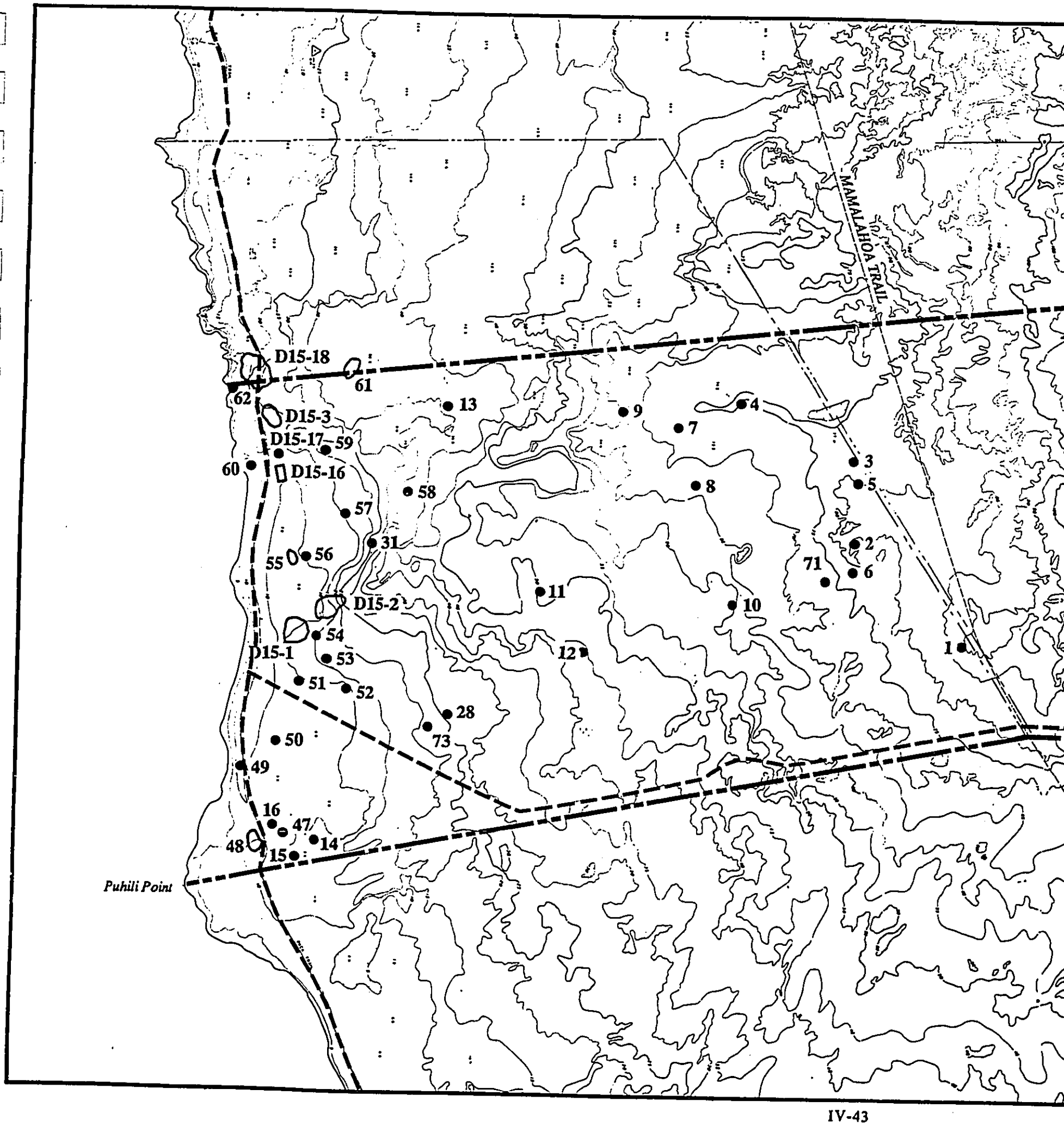
Site Identification. A total of 109 archaeological features at 42 sites have been recorded to date within the project area (It should be noted that Parcel 22 is within the State Urban District and has not been surveyed).

Site Significance Assessment. The significance of cultural remains can be defined in terms of potential scientific research, interpretive and/or cultural value. Thirteen sites have been identified as important for information content, with further data collection necessary: D15-2, D15-17, T-61, T-71, T-48, D15-3, T-14, T-62, T-15, D15-1, D15-18, T-13, T-31 (Figure 13). For four sites, further data collection would be sufficient treatment and no continued preservation would be necessary. Preservation with some level of interpretive development is recommended for three of the 13 sites assessed as significant additionally as good examples of site types and/or for cultural values, while preservation with protection only ("as is") is recommended for six of these sites.

One site within the project area, D15-18, has been identified as having high cultural value as a religious structure. Two sites, T-13 and T-31, have been provisionally designated as requiring further data collection, pending further testing for the presence/absence of skeletal remains.

No further work or preservation in any form is needed for the remaining 29 sites which were assessed as significant for information content only, and for which sufficient data collection has been completed.

Mamalahoa Trail. Although Parcel 22 has not been surveyed, the Mamalahoa Trail traverses almost the entire width of the parcel. The Mamalahoa Trail has been classified by Apple (1965) as a "Type C" trail. These trails were built during the mid-nineteenth century, the post-contact period, primarily by corvee labor under the direction of the island governors. The trails are generally two-horses wide and built in straight lines between major points, thus cutting off lesser coastal communities. The portion of the Mamalahoa Trail traversing the 'O'oma II ahupua'a begins near Kailua-Kona and terminates near Keahole Point. In 1969, the construction of the Keahole Airport destroyed a large segment of the northerly terminus of this segment of the trail. Another segment of the trail runs from Kiholo, North Kona to Kalahuipua'a, South Kohala (Helber Hastert & Kimura, June 1987).


MAMALAHOA TRAIL
D15-18
61
62
13
9
4
D15-3
7
D15-17
59
60
D15-16
3
8
5
58
57
31
2
71
6
55
56
11
10
D15-2
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Puhili Point

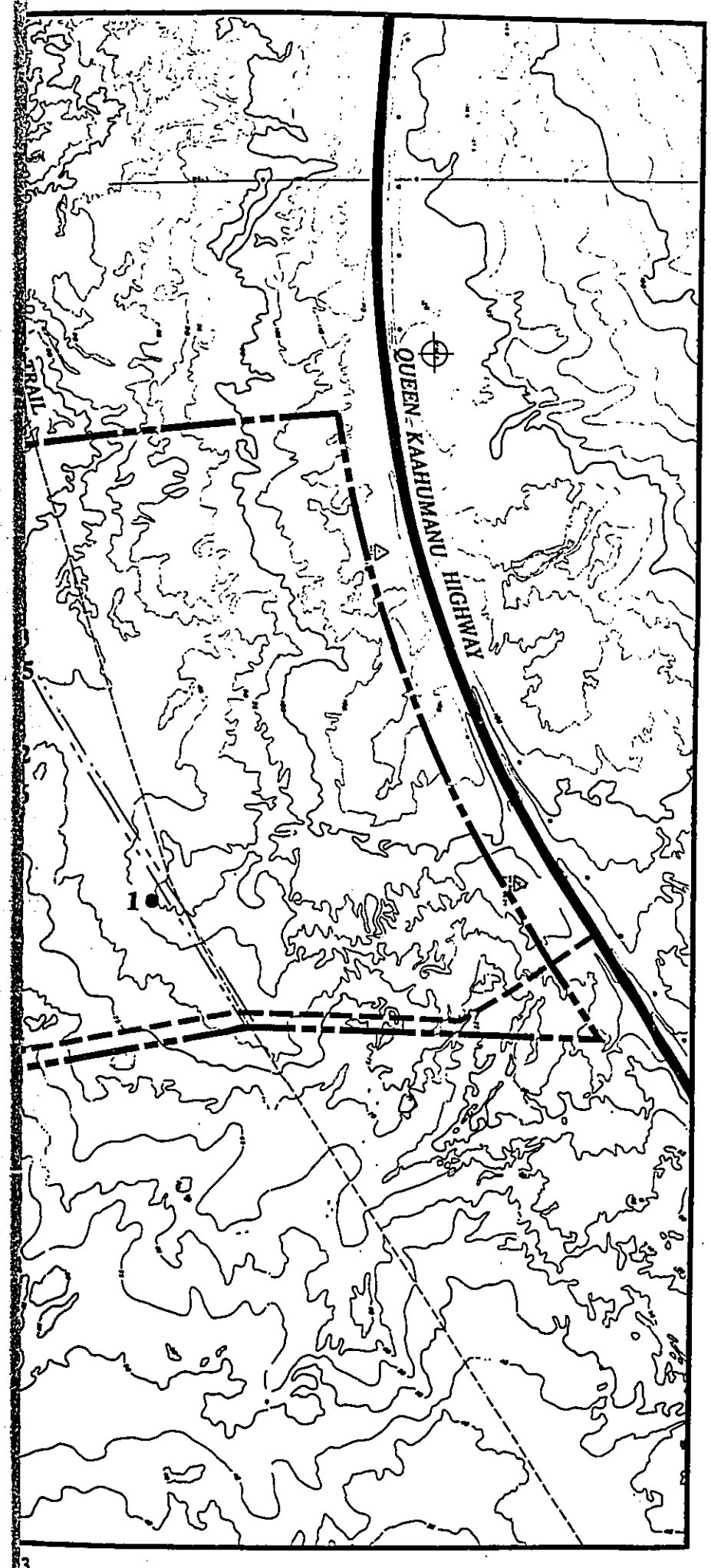


Figure: 13

Archaeological Sites

LEGEND

Historic Sites

Jeep Trail

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

Feet

0 600

This historic trail enters Parcel 22 from a State-owned 30-foot right-of-way that also traverses the width Parcel 22 (Figure 13). While the State-owned right-of-way roughly parallels the eastern boundary of Parcel 4 and the western boundary of Parcel 22, the Mamalahoa Trail veers mauka, away from the State right-of-way, and is located almost entirely within Parcel 22, which is within the State Urban Land Use District.

Impacts

Most of the identified archaeological sites are located within 600-800 feet of the shoreline. Since development will be concentrated in this area, many of the sites could be affected. In addition, it will be necessary to breach a portion of the Mamalahoa Trail, which is in the State Urban Land Use District, in order to construct the main access road for the project site.

Cumulative Impacts

A substantial amount of data on North Kona archaeology has been collected as a result of proposals for land development. This body of information has helped to shed light on the extent to which prehistoric and historic sites could be disturbed. At the same time, the data base has created opportunities for the effective management of significant resources. Some of the showpieces of Hawaiian prehistory have been preserved in West Hawaii, among them the City of Refuge, Puukohola Heiau National Historic Site and the Lapakahi State Historic Park. Continued inventory of historic resources will allow better identification of examples that are unique and which contain high cultural significance so that preservation programs can be coordinated on a regional basis.

Mitigation Measures

Table 4 summarizes general significance assessments and recommended general treatments of sites within the project area. These assessments have been reviewed by the Department of Land and Natural Resources-Historic Preservation Program/State Historic Preservation Office (DLNR-HPP/SHPO), and they are in concurrence with these results. As described above, thirteen sites will require further data collection. Further investigations may involve accurate locational plotting, detailed plan mapping, written descriptions and photographs, collection of portable remains, subsurface testing of sites with apparent excavation potential and/or subsurface testing to determine the presence/absence of buried deposits.

Table 4: Summary of General Significance Assessments and Recommended General Treatments

Site/Fea. Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
D15-2	+	-	-	-	+	-	-	-
D15-17	+	-	-	-	+	-	-	-
T-61	+	-	-	-	+	-	-	-
T-71	+	-	-	-	+	-	-	-
Subtotal: 4	4	0	0	0	4	0	0	0
T-48	+	-	-	*	+	-	-	*
D15-3	+	-	-	*	+	-	-	*
T-14	+	-	-	*	+	-	-	*
T-62	+	-	-	*	+	-	-	*
Subtotal: 4	4	0	0	4	4	0	0	4
T-15	+	-	+	-	+	-	+	-
Subtotal: 1	1	0	1	0	1	0	1	0
D15-1	+	-	+	+	+	-	+	-
D15-18	+	-	+	+	+	-	+	-
Subtotal: 2	2	0	2	2	2	0	2	0
T-13	+	-	-	+	*	-	-	+
T-31	+	-	-	+	*	-	-	+
Subtotal: 2	2	0	0	2	2	0	0	2
All others	-	+	-	-	-	+	-	-
Subtotal: 29	0	29	0	0	0	29	0	0
TOTAL: 42	13	29	3	10	13	29	3	6

General Significance Categories:

A = Important for information content, further data collection necessary
(PHRI=research value)
X = Important for information content, no further data collection necessary
(PHRI=research value, SHPO=not significant)
B = Excellent example of site type at local, regional, island, state or national level
(PHRI=interpretive value
C = Culturally significant (PHRI=cultural value)

Table 4: Summary of General Significance Assessments and Recommended General Treatments (Continued)

Recommended General Treatments:

FDC = Further data collection necessary (further survey and testing, and possibly subsequent data recovery/mitigation excavations)
NFW = No further work of any kind necessary, sufficient data collected archaeological clearance recommended, no preservation potential
PID = Preservation with some level of interpretive development recommended (including appropriate related data recovery work)
PAI = Preservation "as is," with no further work (and possible inclusion into landscaping), or minimal further data collection necessary

*** Provisional assessment, definite assessment pending further collection (i.e., testing for presence/absence of skeletal remains)**
Source: Paul H. Rosendahl, Ph.D., Inc., 1990

Some of the sites are burials or potential burials. Recent amendments to the State Historic Preservation Law (Chapter 6E) now require consultation with the Hawaii Island Burial Council to determine the treatment of any sites and features containing human burial remains. In-place preservation of confirmed burial sites and features is the treatment preferred by the Burial Council. Any proposed development involving the disinterment and reinterring of human burials would involve close negotiations with the Burial Council, which would be facilitated by having accomplished in advance:

(a) determination of the confirmed presence of any human burial remains at specific sites and features
(b) a search for any individuals claiming to be direct lineal descendants of any such identified remains

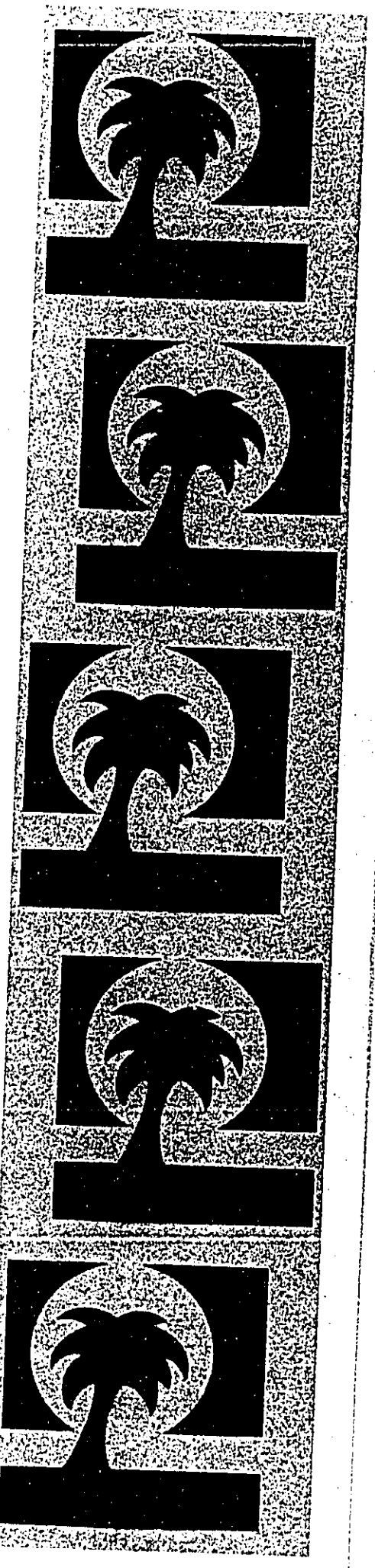
Historic preservation planning will be further refined as detailed site plans are developed and building sites are identified more precisely. The Petitioner will continue to maintain his coordination with the DLNR-HPP/SHPO and the Hawaii County Planning Department.

The Petitioner will also work closely with the DLNR-HPP/SHPO and the Hawaii County Planning Department to mitigate any impacts to the Mamalahoa Trail. It is probable that treatment of the breaching of the trail will be similar to other

developments in the region; i.e., display of interpretive text by signs located at the crossing, as well as the possible integration of a representation of the trail within the roadway at the point it breaches the trail.

CHAPTER V

SOCIOECONOMIC FACTORS



CHAPTER V

SOCIOECONOMIC FACTORS

5.1 Population

The impacts of the proposed project on the population of the island of Hawaii were analyzed by KPMG Peat Marwick. Their full report appears in Appendix P, and is summarized below.

Affected Environment

Resident Population. Population is considered in terms of resident population (those who customarily live in an area), and de facto population, which excludes residents temporarily absent but includes visitors temporarily present.

The resident population of North Kona and North/South Kohala was estimated at 21,600 in 1980. From 1970 to 1980, the resident population for the area increased at an annually compounded rate of 7.5 percent per year, or nearly twice the 3.8 percent rate for the county as a whole. Within the region, the North Kona District experienced the most rapid population growth at 11 percent per year, followed by the South Kohala district at 7.1 percent per year.

Since 1980, resident population growth on the island has been more gradual and continues to be most rapid in the North Kona and South Kohala districts, with the resident population of the region reaching 35,900 in 1989. Between 1980 and 1989, the population grew 5.9 percent and 7.7 percent per year in North Kona and South Kohala, respectively, compared to about 2.4 percent for the island as a whole.

De Facto Population. Growth in the islands de facto population, including visitors present but excluding residents absent, has also slowed since the 1970's, although still exhibiting a steady rate of growth. De facto population grew about 3.8 percent per year between 1980 and 1989, compared to 4.2 percent per year during the 1970s, with an overall increase in de facto population from 65,700 in 1970 to 138,000 in 1989.

Impacts

On-Site Population Impacts. The 'O'oma II community could contribute to population increase at the project site and elsewhere on the island. People would be residing

during most or parts of each year in the residential portion of the community, while visitors at the hotel, inn and rental accommodations would contribute to the average daily population at 'O'oma II. Operational and construction employees could also add to the population of the region and the island, although they would likely reside away from the project site.

On-site visitor population projections will be dependent on the number of units available for usage, average occupancy and party size. Based on assumptions made by KPMG Peat Marwick, the number visitors staying on the project site will range from about 770 persons in 1996 to 1,130 persons by the year 2010.

Considering the anticipated mix of full and part-time use of the single-family and multi-family dwellings at 'O'oma II, on-site resident population could be expected to grow from a daily average of about 30 persons in 1996, to nearly 180 by 2010. In total, the on-site population of 'O'oma II could range up to about 1,300 persons by 2010. The full- and part-time residents of 'O'oma II could represent about 15 occupied dwellings (single- and multi-family) in 1996 and nearly 80 per day by 2010.

Off-site and Total Population Impacts. 'O'oma II could also impact population outside of its boundaries, principally in nearby West Hawaii communities. For the island of Hawaii, this would be a result of operational and construction employees who move to the island because of the employment opportunities at 'O'oma, and from the dependents that may accompany these in-migrants. During the construction phases, these impacts would be temporary, while there would be long-term impacts from the new residents associated with operational positions at 'O'oma II.

The off-site population impacts of the proposed project range from about 920 persons in 1996, to about 840 by 2010. The apparent decrease in off-site population over the course of the implementation of the proposed project is due to completion of construction of the project and the phasing out of construction-related employment. Thus, in total, on- and off-site effects of the development could represent up to 2,100 additional persons on the island by the year 2010.

The addition of this many people to the population of the island of Hawaii, who, most likely, will concentrate in the West Hawaii region, are expected to increase the need for additional public services, public utilities and housing. These subjects are discussed in detail in this chapter and in Chapter VI, including possible mitigation measures.

5.2 Employment

KPMG Peat Marwick analyzed the employment impacts anticipated as a result of the proposed project. The results of their analysis are summarized below and are attached as a technical appendix (Appendix P).

Affected Environment

Between 1970 and 1980 the number of people employed in the North Kona District rose from 1,925 to 7,100, an increase of 268 percent. This is attributed to the rise of resort and tourist-related centers of employment which provided new job opportunities. This compares with a county-wide increase from 25,180 to 38,150 during the same period, an increase of about 51 percent, substantially less than that for North Kona. Between 1980 and 1990 the number of people employed in North Kona rose from 7,100 to 10,700, an increase of about 51 percent. Although this increase is less dramatic than during the previous decade, it still represents a healthy increase in the number of persons employed. By comparison, the county as a whole experienced an increase in the number of persons employed from 38,150 to 59,200, an increase of 55 percent.

The County of Hawaii averaged an unemployment rate of 3.8 percent during 1990, compared to a statewide average of 2.8 percent. The North Kona District unemployment rate was identical to the statewide average, indicating a healthy employment climate in the district. The parallel in unemployment rates between North Kona and the state as a whole continues a trend evident in 1980 and 1985 which shows that the North Kona economy seems to be closer to statewide trends than the county as a whole. Table 5 identifies unemployment trends in North Kona, the island of Hawaii and the State of Hawaii since 1970

Table 5: Unemployment Trends; 1980-1990
North Kona, the County of Hawaii and the State of Hawaii

Area	1980	1985	1990
State of Hawaii	4.9%	5.6%	2.8%
County of Hawaii	6.2%	8.5%	3.8%
North Kona	4.8%	5.5%	2.9%

Source: State Department of Labor and Industrial Relations, June 1991

State Policy on Non-Tourism Jobs. In his 1990 State of the State address, Governor John Waihee emphasized the need for the diversification of Hawaii's economy. In response to the Governor's message, the 1990 Legislature passed a resolution (H.C.R. 73-90) requesting the Office of State Planning (OSP) to prepare a report describing how the Governor's policy will be implemented. The policy, as formulated by OSP, stipulates that the developer must generate one non-tourism related job, or the equivalent value, for each hotel or hotel/condominium unit the developer is permitted to build. OSP defined "non-tourism related" as not related to hotels or residential condominiums intended for use as transient accommodations, or recreation, entertainment or other facilities and services used primarily by tourists (Mak, 1991).

Impacts

Development of 'O'oma II would generate short-term employment during the construction of new facilities and long-term employment in the operation and support of those facilities. Employment effects may also be classified as being direct, indirect or induced:

> Direct employment is that supported by expenditures generated by the community, such as the employment at facilities that serve visitors and residents. Most of the direct employment effects would occur on-site at the visitor-serving, recreational and conference facilities.

Indirect and induced employment is that resulting from off-site due to employment multiplier effects. Such employment could occur throughout the state's economy.

Direct Construction Employment. Direct construction employment is that which would be supported directly by the construction of the various facilities. Such employment includes on-site laborers, operatives and craftsmen, as well as professional, managerial, sales and clerical workers whose usual places of employment may be elsewhere on the island or in the state.

Construction period employment requirements would be greatest during the 1993 to 1996 period, when all the major infrastructure and most of the facilities of the community are anticipated to be developed. In this period, average construction employment could represent nearly 270 full-time equivalent jobs per year. This number decreases significantly after 1996, to about 5 full-time equivalent jobs in the period 2006-2010.

Indirect, Induced and Total Construction Employment. Direct construction employment stimulates additional purchases of goods and services on the island and elsewhere in state. For 'O'oma II, these indirect and induced employment effects could be expected to amount to about 210 person-years per year until 1996, tapering off to less than 10 per year by the 2006-2010 period. Portions of these multiplier effects could be expected to occur on Oahu or elsewhere in the state.

Including direct, indirect and induced effects, statewide employment supported by the construction of the proposed project could represent over 2,300 person-years, mostly during the pre-opening years, about 1993-1996, as shown in Table 6.

Direct Operational Employment. Operations of the planned commercial and residential facilities at 'O'oma II would also generate significant permanent employment. The direct operational employment effects are estimated based on the nature and scope of facilities planned at 'O'oma II and on surveys and observation of comparable other facilities. Direct impacts are estimated at about 700 full-time equivalent positions by project completion, as shown in Table 7.

Table 6: Projected Total Employment for Facility Construction
1993 to 2010

Type of Employment	Average Annual Person Years 1993-1996	1997-2000	2001-2005	2006-2010	Total Person-years
Direct Employment	266	40	9	5	1,290
Indirect and induced:					
On-island (1)	80	12	3	2	387
Elsewhere in State	133	20	5	3	645
Subtotal	213	32	8	5	1,032
TOTAL (2)	479	72	17	10	2,322

(1) Estimated at 30% of direct employment

(2) Total direct, indirect and induced effect estimated 1.8 full-time equivalent positions per direct position, based on 1989 ratios from DBED Input-Output Model and Hawaii Econometric Models, as presented in the DBED, "The Hawaii State Data Book," 1990

Source: KPMG Peat Marwick, February 1991

Indirect, Induced and Total Operational Employment. The direct operational positions created would also indirectly generate employment beyond the community site. Considering the multiplier effects associated with the various types of work expected, the proposed project could be expected to support up to 1,280 positions throughout the state by stabilization of its operations by 2000, as shown in Table 7.

This would include about 580 full-time equivalent positions supported as indirect and induced effects of the community's direct employment. These employment opportunities would be expected to occur in diverse fields, at sites located throughout the state.

Household Income. The dispersion of indirect and induced employment effects among many industries makes it difficult to project the total income effects of the proposed development. However, estimates of total household income, which includes rents, proprietary and unearned income effects of the visitor expenditures at 'O'oma II permits a perspective on the statewide income benefits that could result from the community.

Table 7: Projected Total Operational Employment
1996 to 2010
(Full-time Equivalent Positions)

Type of Employment	1996	2000	2005	2010
Direct Employment	650	690	700	700
Indirect and induced employment:				
Ocean science center (1)	61	75	85	85
Water recreation park (1)	14	17	17	17
Conference center (2)	7	9	9	9
Golf Course (1)	27	27	27	27
Japanese-style inn (2)	47	47	47	47
Single-family and condominium rentals (2)	3	11	11	11
Retail center (3)	63	63	63	63
Hotel (2)	307	307	307	307
Facilities admin (2)	5	9	9	9
Subtotal (rounded)	530	560	580	580
TOTAL	1,180	1,250	1,280	1,280

(1) Estimated at 1.68 full-time equivalent positions per direct position
(2) Estimated at 1.93 full-time equivalent positions per direct position
(3) Estimated at 1.63 full-time equivalent positions per direct position

Reference: DBED Input-Ouput Model and Hawaii Econometric Model as published in the "Hawaii State Data Book," 1990
Source: KPMG Peat Marwick, February 1991

Based on the ratios available from the Department of Business, Economic Development and Tourism, each direct dollar spent by visitors generates an estimated $0.52 in total income to households in the state. Thus, based on the annual direct expenditures of community visitors, household income from the development could exceed $45 million by 2010, in 1990 dollars.

Housing. As discussed above, the completion of the 'O'oma II community will create hundreds of jobs on-site and off-site. Many of these employees will require new housing units. The impacts associated with housing are discussed fully in Section 5.4, below.

Mitigation Measures

To maximize the employment competitiveness of long-time West Hawaii residents, the following strategies should be pursued as the project reaches the operational stage: (1) community outreach to stimulate awareness and interest in the visitor and high technology aquaculture industries; (2) in-service upgrade training programs; and, (3) possible employer incentives for an organized program of job recruitment and screening, summer internship programs and/or scholarships.

The Petitioner is aware of the State's policy on hotel units and non-tourism related jobs, and intends to coordinate a plan to satisfy this policy with appropriate State and County officials and community and civic groups.

5.3 Economy

The proposed project is expected to generate significant positive economic benefits to the County and State of Hawaii. The economic impacts associated with the proposed project have been analyzed by KPMG Peat Marwick (KPMG) and a summary of their findings is described below. Their full report is attached as a technical appendix (Appendix P). KPMG made several assumptions about the proposed project in order to facilitate the completion of their analysis:

- The first phase of the 'O'oma II Master Plan will be completed and available for use about 1996;

- Future phases of development would continue after 1996, mainly focusing on single-family and condominium units; and,

- The development schedule assumes a mid-range density of 70 single-family dwellings and 150 multi-family dwellings, to avoid over-estimation of economic and fiscal benefits and/or under-estimation of population impacts.

Affected Environment

On the island of Hawaii, much of the future economic growth is expected to occur in the West Hawaii region. It has been estimated that over $1 billion will be spent on developing new hotels and resort areas in this region. Hotel employment would be a major component of this growth, with an estimated 7,700-person hotel work force

increasing at a strong annual growth rate of 5.8 percent to 13,500 by the end of the century.

County of Hawaii employment projections reflect this overall strength with total job counts growing at a projected 4.7 percent annual rate from 58,000 in 1990 to 92,000 by the year 2000. Accordingly, the Hawaii General Plan projects a 60 percent increase in the island's resident population by the year 2000, from 129,000 in 1990 to a projected 212,000.

The West Hawaii region is expected to lead the growth that the island of Hawaii is anticipated to experience in the years ahead. The major capital investments planned for existing and new master-planned areas will help support this growth.

Impacts

The economic impacts anticipated as a result of the proposed project can be described in terms of direct, indirect and induced expenditures by consumers in the state. Most of these expenditures may be attributable to spending by visitors attracted to 'O'oma II, who would make direct expenditures for food, lodging, gift items and other goods and services. These expenditures, would, in turn, require those establishments serving these demands to purchase goods and services from other establishments in the state, otherwise referred to as indirect effects of the original expenditures. Induced expenditures are those made by employees and proprietors with income derived from establishments benefiting from these new direct and indirect expenditures.

Direct Expenditures. Expenditures generated by the proposed project within the State or County of Hawaii are estimated based on the proposed development's ability to attract new visitors to Hawaii. This may be considered a conservative statement of the potential benefits of 'O'oma II because it neglects potential new expenditures by:

- full- and part-time residents of the community who move from outside of the state, and thus bring new income and resources with which to make consumer expenditures on the island of Hawaii as well as throughout the state; and,

- full-time residents of the proposed project who move from Oahu or other islands, such as for retirement purposes. Expenditures by such persons would be new for the County of Hawaii, although not for the state as a whole.

Direct expenditure impacts would occur on-site, at the ocean science center, golf course, retail center and other commercial components of the proposed community, as well as off-site, when the visitors and residents attracted to Hawaii by the development at 'O'oma II make day trips within the county and state.

Total visitor expenditures directly attributable to the project's development are estimated to increase from about $59 million in 1996, to nearly $88 million by 2010.

Indirect, Induced and Total Expenditures. The Hawaii State Department of Business, Economic Development and Tourism Input/Output Model estimates the economic activity generated in the state by various types of visitor-related direct expenditures. The all-industries 1989 multiplier of $1.39 total expenditures for every $1.00 of direct visitor expenditure is used. Thus, the direct expenditures generated by 'O'oma II could be expected to generate indirect and induced expenditures throughout the state amounting to $23 million by 1996 and $34 million by 2010, in 1990 dollars.

Total expenditures attributable to the community including direct, indirect and induced effects, should amount to $81 million statewide in the initial year of operations, and up to $122 million per year by 2010, in 1990 dollars.

5.4. Housing

Affected Environment

Although new housing construction on the island of Hawaii reached high levels in the late 1980s, up significantly from the early part of the decade, it did not keep pace with the growth of population and households. Housing units for residents (total inventory, less visitor units) increased from 33,594 in 1980 to 40,772 in 1987, a rate of 2.8 percent per year. During the same period, population increased at an annual rate of about 3.1 percent, while the number of households increased at an annual compounded rate of 3.5 percent (KPMG Peat Marwick, July 1990).

Within this context, the percentage of owner occupancy (the percentage of resident households living in homes they own) has been decreasing in Hawaii County. Owner occupancy is considered to be an important indicator of housing affordability. While the number of units occupied by owners showed an increase of 1,456 between 1980 and 1988 (an annual compounded percentage of 1.0), the percentage of owner-occupied households decreased dramatically, from 59.5 percent in 1980 to 49.0

percent in 1988. This indicates that household income has been unable to keep up with the increased price of new units coming into the market (ibid).

In addition, the housing market also consists of rental units. The rental housing market has tightened significantly in the past several years, due to new jobs and population growth in the West Hawaii region. Among the indicators of diminished rental housing are: (1) a steady decline in vacancy rates for year round rentals, from 20 percent in the North Kona/South Kohala area in 1980 to virtually no vacancies in 1987; and (2) an increase in the average rents in the West Hawaii region, rising from about $650 in 1986 to about $910 in 1990 (ibid).

As described, a number of factors have contributed to a tightening of the housing market in West Hawaii. These factors include: rising population; insufficient numbers of affordable residential units being constructed; increasing numbers of household formations; increasing prices of new housing units; and, increasing prices for rental units.

Impacts

Development of the 'O'oma II community could affect West Hawaii's housing market in several ways. Temporary housing could be needed to house workers brought to the island of Hawaii during project construction. Operational employment at 'O'oma II would also trigger additional housing demand to accommodate in-migrant employees and their dependents.

Construction Employee Housing. Construction employment is temporary, and therefore does not generate the long-term housing demands associated with community operational employment. However, in-migrating construction workers could be expected to seek short- to medium-term rental units in the general market. Assuming that an average of 35 percent of construction workers would have to be attracted from off-island, that 90 percent of these workers could require rental housing and that construction workers would share housing at the rate of 1.25 workers per household, it is estimated that the average daily rental unit requirements could range from about 70 dwelling units in the period of maximum development activity, 1993 to 1996 (KPMG Peat Marwick, February 1991).

Operational Employee Housing Demand. 'O'oma II operational employees and their dependents who come from off-island would require long-term housing. Also, new household formation among prior island residents who work at the community could

create demands for new housing units. It is assumed that 60 percent of the permanent positions within the 'O'oma II development could generate in-migration to the island of Hawaii, based on continuation of existing tight labor market conditions. Thus, in-migrants would constitute the largest source of potential housing demand.

It is expected that housing demand related to resort operational employment will be about 260 units in 1996, increasing to 280 units in 2010 (ibid).

Housing Affordability. By observing local market prices for household ownership and rental, the minimum gross monthly income required for home ownership in the unassisted market is approximately $2,750, which would afford mortgaging a home of about $145,000, assuming $29,000 in savings that could be applied to a downpayment. For rentals, a minimum monthly income of about $2,500 could permit rental of about 50 percent of the multi-family units listed for long-term rent in West Hawaii in October 1990. These income levels serve as measuring points for home ownership and rental affordability (ibid). The calculation of this affordability measuring point assumes the following:

- o housing affordability standards used by the State Housing Finance and Development Corporation;

- o for ownership, maximum purchase price is based on typical prevailing terms for a 30-year, fixed-rate conventional mortgage loan; these include a 20 percent downpayment and 10 percent interest rate.; and,

- o for rentals, 30 percent of gross monthly income available for rent payments (ibid).

Based on these assumptions it is anticipated that affordable housing assistance could be required by 45 percent of those seeking to own and by 81 percent of those seeking to rent. This could represent about 58 owner and 123 renter housing. Conversely, 55 percent of potential owners and 19 percent of potential renters are expected to be able to find market housing. This indicates a need for an additional 71 owner and 28 rental households on the island.

Mitigation Measures

In recognition of the potential impact on housing, the developer will provide housing opportunities for low and moderate income Hawaii residents and for its

employees by constructing and offering for sale or rent and/or working in conjunction with other developers in the West Hawaii area, the Hawaii Housing Authority or the County of Hawaii to provide the required number of residential units in conformance with the established policy guidelines of both the Land Use Commission and the County of Hawaii. The preferential units will be offered for sale at prices that would enable the targeted population to qualify for and obtain State-assisted financing (e.g. Act 105 or Hula Mae) or federally-insured or assisted financing (e.g. FHA Section 245 Program) intended to encourage home ownership by low and moderate income families or employees.

Close cooperation will be maintained between the Petitioner and County and State of Hawaii housing officials to ensure that employee housing needs are met. The cumulative impacts of housing requirements generated by other developments in the region also raises the potential that developers will approach housing alternatives in a coordinated manner. The developer will work with other landowners in the Keahole to Keahou area in an effort to coordinate development of an affordable housing community or communities which will enable residents to live close to work, near schools and service areas.

5.5 Fiscal Impacts

A study of the overall potential public costs and benefits associated with the proposed project was prepared by KPMG Peat Marwick and concluded that the fiscal benefits of the proposed project are anticipated to exceed additional operating expenses for both County of Hawaii and State of Hawaii governments. These fiscal benefits were evaluated by comparing the tax revenues and government operating expenditures projected to result from project development and operations. The results of this study are summarized below and appear in full as a technical appendix (Appendix P) (dollar values represented in this discussion are reflective of the date of preparation for the study: February 1991).

Government Revenues

County Revenues. Commercial and unimproved real property in the County of Hawaii is currently taxed at $8.50 and $10.00 per $1,000 of assessed value for the improvements and land, respectively. Improved residential property is taxed at $8.50 per $1,000 total (land and building) assessed value.

Considering 'O'oma II's current property tax burden of approximately $36,000, and potential owner-occupant exemptions, the community could be expected to generate net new property tax revenues of about $1.5 million per year by 1996, or up to $1.9 million per year by 2010.

State Revenues. Visitors to the 'O'oma II development would generate new revenues to the State government through the general excise tax on their direct, indirect and induced expenditures and through the tax on rental of transient accommodations. These new revenues could amount to $3.4 million per year in 1996 and up to $6 million per year by 2010.

In addition, new residents attracted to the state by employment or residential opportunities of the project would bring in additional excise sales taxes, individual income taxes and other state taxes such as liquor, tobacco, fuel, inheritance, estate and conveyance taxes. In 1990, these individual income and other taxes are estimated at $2,460 for the average resident and $3,950 for high income ($100,000 household income) persons. Thus, new total tax revenues to the state government attributable to the residents and in-migrant employees of the community are estimated at $1.3 million by 1996 and $1.6 million by 2010.

In summary, the additional state tax revenues attributable to the total visitor and resident population impacts of the proposed project are estimated to increase from about $4.7 million in 1996 to $7.6 million by 2010.

Government Expenditures

New visitors and residents attracted to 'O'oma II would also necessitate additional expenditures of State and County public resources. In-migrant residents would incur public costs in terms of public safety, maintenance of highways, recreational facilities and natural resources, health and sanitation measures, special cash capital improvements, education, retirement and pension funds, public welfare and other government functions.

Visitors would also increase the average daily population of the community and would also require additional public expenditures.

County Operating Expenditures. The various County government operating expenditures for fiscal year 1989 were analyzed with respect to the relevant population served by each of the government functions. This analysis indicates that

Hawaii County government expenditures in fiscal year 1989 totaled about $590 per resident and $400 per visitor. Adjusting for a 7.2 percent rise in the Honolulu Consumer Price Index between second quarters of 1989 and 1990, these expenditures in 1990 dollars are estimated at about $630 and $430 per capita for residents and visitors, respectively.

Based on these County government outlays, public expenditures by the County of Hawaii on behalf of the population impacts of the proposed project represent about $0.9 million in 1996 and about $1 million in 2010.

State Operating Expenditures. A similar analysis of State of Hawaii operating expenditures and the relevant populations for the various government services indicate that expenditures in fiscal year 1989 totaled about $2,860 per resident and $810 per visitor. This is equivalent to about $3,070 per resident and $870 per full-time equivalent visitor when adjusted to 1990 dollars.

Based on these operating costs, state government operating expenditures attributable to the proposed project will reach $3.3 million in 1996 and up to $3.6 million by 2010. These projections may overstate potential state costs in that they assume all operational employees and their dependents who move to the island of Hawaii to work at 'O'oma II will be new residents of the state.

Revenue and Expenditure Analysis

The net fiscal impacts of the resort on County and State operating budgets are estimated by comparison of the projected additional new revenues and expenditures for each government entity.

County of Hawaii Cost/Benefit. The government of the County of Hawaii could expect positive fiscal benefits from the proposed project, representing a net additional $0.5 million in revenues in 1996, or about $0.8 million by 2010. The analysis also indicates that the additional county government revenues generated could approach two times county operating expenditures.

State of Hawaii Cost/Benefit. Based on similar analysis, net fiscal benefits to the state government in 1990 dollars are estimated at $1.4 million in 1996, increasing to $3.9 million by 2010. The additional state government revenues attributable to the proposed project could slightly exceed two times the additional operating expenditures incurred by the state.

5.6 Market Analysis

KPMG Peat Marwick prepared a market analysis for the proposed 'O'oma II development. The results of this analysis are summarized below, with the full report attached as a technical appendix (Appendix Q).

Site Characteristics. The 'O'oma II project site has a central location in regard to future employment centers and visitor movements within the West Hawaii Region. It is within three miles of Keahole Airport, and lies between the airport and the Kailua-Kona commercial and service center. This should provide a high-traffic location, outstanding visibility for uses at the 'O'oma II site and a residential setting, environment for work, shopping and cultural amenities.

Visitor Arrival Trends. Historically, Hawaii County's visitor growth has been slower than the other neighbor islands. This can be attributed to its relatively slower facility development, resulting in a less prominent market image among westbound travelers. However, the island has gained market momentum with the recent openings of major new hotels including the Hyatt Regency Waikoloa and Ritz-Carlton Mauna Lani.

Visitor arrivals to the island were stable at about 780,000 per year from 1986 through 1988. Arrivals increased to almost 960,000 in 1989, an increase of 23 percent, and are projected to further increase by 13 percent in 1990. The island attracted 24 percent of westbound visitors to the state in the first six months of 1990.

The island of Hawaii attracted 16 percent of total state arrivals in 1989, up from 14 percent the previous year.

Substantial visitor arrivals growth is projected for the island of Hawaii through the year 2010. Factors supporting growth include:

- Continuing increases in visitor arrivals to the state through expanded markets in continental North America, Japan, the Asian Pacific Rim, South Pacific and Europe;
- Development of high visibility hotels and destination resorts;
- Growth in visitor attractions and accommodations on the island, centering in the West Hawaii Region;

- o Greater interest in the neighbor islands among Japanese visitors, who in the prior stages of market growth have stayed primarily at Waikiki accommodations; and,
- o Increasing numbers of repeat visitors to the state seeking new destinations and experiences.

More rapid development of hotels, visitor facilities and amenities is expected to contribute to further increases in the share of visitors going to the island of Hawaii in the future. Island arrivals, which reached nearly one million in 1989, could increase to 2.4 million in 2000 and 3.8 million in 2010.

Ocean Science Center and Water Recreation Park market Assessment. The marine attraction at 'O'oma II is planned to include an ocean science center with an aquarium, as well as an active water recreation park. The combination of active and passive entertainment opportunities is expected to make the facility a full-day recreation opportunity, in a region which lacks large-scale commercial attractions. Market support for the park was assessed based on comparable facilities in other visitor destinations and on the market experience of major off-resort visitor attractions on Oahu. Admissions at the 'O'oma II facility are projected to reach about 380,000 in 1995 and more than 600,00 by 2010.

Golf Course market Assessment. The golf course at 'O'oma II is planned to include a large clubhouse and Japanese-style inn with lodging units for the use of club members. Market analysis indicates that on-property guests could constitute the largest source of demand for golf at 'O'oma II. Sufficient capacity is projected to be available, however, to accommodate play by on-property residents as well as by a limited number of private members. Golf demand from on-property guests and residents is projected at about 160 rounds per day in 2005. With on-property play at this level and reservation of rounds for public play, about 300 memberships could be offered.

Residential Lot market Assessment. Under the 'O'oma II project concept, from 70 to 100 residential lots could be developed in two locations of the property's mauka lands. Lots would be relatively small, averaging about 10,000 square feet, and would have golf course frontage. Based on review of comparable lot subdivisions, 'O'oma II is determined to have strength among U.S. mainland investors, and in the Hawaii investor and owner-occupant markets. Residential lots at 'O'oma II are anticipated to command prices of $250,000 to $300,000, or $22 to $28 per square foot. Sales absorption of 30 to 40 lots per year could be achieved at 'O'oma II.

Condominium Market Assessment. Support for condominium units at the 'O'oma II development is assessed based on comparable projects adjusted for the anticipated market position and planned development characteristics of 'O'oma II. Strong market support is expected for medium-sized, moderate-density golf-frontage units as planned at 'O'oma II. Sales absorption of 40 to 50 units per year is anticipated. Sales prices could range from $250 to $280 per square foot, for unit prices of $340,000 to $375,000.

Retail Market Assessment. Commercial facilities at 'O'oma II are expected to be patronized by on-property residents and visitors, general visitors to the region and those visiting the ocean science center and water recreation park. Facility concepts were assessed using centers comparable in location, market mix and size of on-property market segments.

While considerable inventory of commercial space is planned in the West Hawaii region, the 'O'oma II development is considered to have particular strength in terms of its on-property market and the potential patronage associated with the marine theme attraction. Based on anticipated on-property population and the ocean science center's market performance, total retail spending at 'O'oma II is projected as follows:

- o $10.0 million in 1996
- o $13.4 million in 2000
- o $16.2 million in 2010

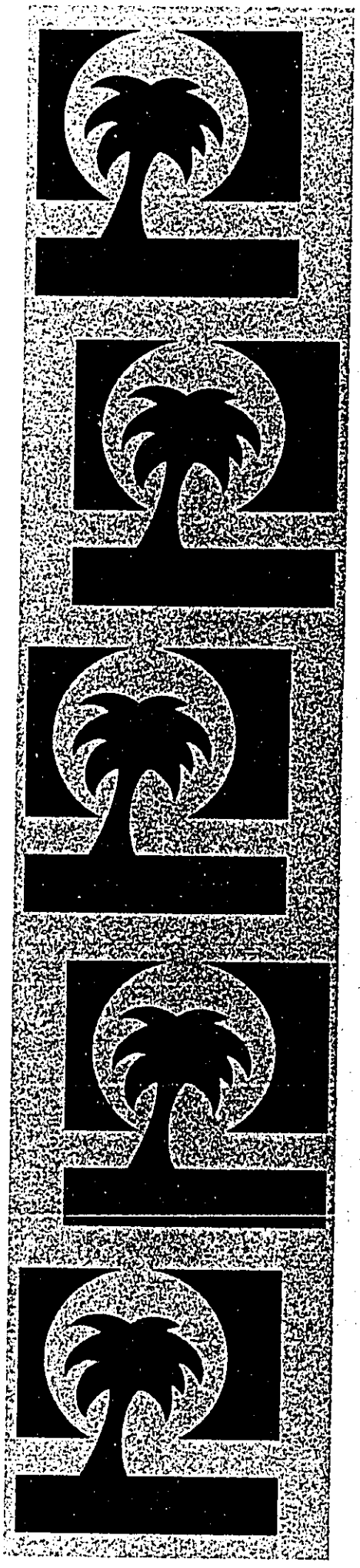
Island visitors are estimated to represent more than 90 percent of retail spending at 'O'oma II, mostly by guests at on-property visitor accommodations. Spending at these levels could support hotel shops, limited commercial space at the ocean science center and water recreation park, and a free-standing retail center of more than 50,000 square feet by 2010.

Hotel market Assessment. A fist-class hotel, with recreation and group meeting facilities, is planned as part of the proposed project. The facility could offer above-average accommodations to a broad range of visitor markets with particular emphasis on the family vacation and business traveler markets. Visitor unit demand is projected to be strong on the island of Hawaii, especially after the large number of luxury and upscale units are absorbed between 1991 and 1995.

Market performance of the 'O'oma II hotel is expected to exceed the projected islandwide occupancy level in 2000 and succeeding years. Occupancy is projected at 65 percent in 1995, increasing to 75 percent by 2000. Average achieved room rates are anticipated to be $120 to $140 per room, with rates ranging from $120 to $250 per night for standard rooms.

CHAPTER VI

INFRASTRUCTURE AND PUBLIC FACILITIES



CHAPTER VI

INFRASTRUCTURE AND PUBLIC FACILITIES

6.1 Wastewater Treatment and Disposal

An updated analysis of wastewater treatment and disposal for the project site was prepared by R.M. Towill Corporation, as part of an overall analysis of the infrastructure for the proposed project. The results of this update are summarized below, with the full report contained in Appendix R.

Affected Environment

Two methods of liquid waste disposal are used in the Kona area: private cesspool and municipal and private treatment plants. The primary method of domestic sewage treatment and disposal continues to involve the use of private cesspools. This disposal method is becoming increasingly problematic due to the permeability of the underlying lava substrate and the propensity of wastes to seep through the strata causing contamination of potable ground water sources and adjacent coastal waters. In fact, the State Department of Health (DOH) will no longer approve the use of cesspools for domestic sewage treatment. Rather, they require the installation of septic tanks and leaching fields.

The Kailua Municipal Sewerage System is one of five municipal sewage systems operated by the County of Hawaii. Built in the mid-1960's, the collection system involves 14,000 feet of sewer lines, six sewage pump stations and a wastewater treatment plant (WWTP) located in the Kailua Village Industrial Area. The system is presently operating near capacity (1.4 mgd). The WWTP utilizes an activated sludge/step aeration treatment process and produces secondary treated effluent for irrigation use at a nearby County park and dried sewage sludge which is disposed of in a landfill. The existing Keahole Airport system, located about one mile north of the project site, consists of an extended aeration, prefabricated treatment plant, with a capacity of 0.04 MGD, servicing the airport complex.

A new 2.8 MGD municipal WWTP is under construction at Kealakehe on State-owned land adjacent to the southern boundary of the Honokohau Small Boat Harbor. The facility includes land irrigation as the primary method of waste disposal. The new system will incorporate the existing collection system of the Kailua-Kona Sewerage System and would expand service in the Kailua-Kona area and northward to

approximately Honokohau. Final alignment and configurations for new areas to be sewered have not been developed. However, the facility will not have the capacity to accommodate the wastewater from the proposed project.

Impacts

The average flows expected to be generated by each of the major master plan activities is estimated at 474,200 gallons per day, as summarized in Table 8. These wastewater flows are based on Design Standards of the Wastewater Management, Vol. 1, Department of Public works, City and County of Honolulu, February 1984, and State of Hawaii, Department of Health Standards, November 1988.

Table 8: ESTIMATED WASTEWATER FLOWS

Proposed Uses	Units	Gallons/ Day/Unit	Estimated Flow (gpd)
Single-Family	70 dwellings	320	22,400
Multi-Family	230 dwellings	320	73,600
Inn	50 rooms	320	16,000
Hotel	550 rooms	320	176,000
Ocean Science Center	12 acres	4,000	48,000
Conference Center	3 acres	3,200	9,600
Golf Clubhouse	5 acres	3,200	16,000
Shops	8 acres	3,200	25,600
Water Recreation Park	19 acres	3,200	60,800
AVERAGE FLOW			438,400
INFILTRATION			26,200
TOTAL AVERAGE FLOW			474,200

Source: R.M. Towill Corp., June 1991

As stated above, there is presently no available municipal WWTP that can accommodate wastewater that will be generated by the proposed project. The recently adopted Keahole to Kailua Development Plan shows sewage from this development discharging to a proposed Municipal Treatment Plant No. 2, which will be located approximately two miles north of Keahole Airport. It is anticipated this plant will be completed in the year 2005.

In the interim, a temporary sewage treatment plant that will provide secondary treatment will be constructed as part of the proposed project. It will be located at approximately the center of the south boundary of the development. Six acres will

be reserved for this purpose, with the facility to be maintained and operated as a private facility.

As discussed in Sections 4.7 and 4.10, above, some microbes can survive secondary treatment. The use of effluent as an irrigation source could result in the air-borne drift of some microbes, unless further precautions are taken.

Mitigation Measures

As discussed in Sections 4.7 and 4.10, above, wastewater should be treated to California's 2 NTU standard for the use of effluent in turf irrigation. Adoption of this strict pre-chlorination clarity standard would mean that 'O'oma II's wastewater would be classified as Class B; suitable for human contact.

6.2 Water Supply

The need for water to service the many features of the proposed project includes potable water, irrigation water and sea water. Options for providing necessary water include: drilling fresh and brackish water wells; desalinating sea water for irrigation and/or potable water; and, using treated sewage effluent (possibly blended with brackish water) for irrigation. This Section contains a discussion of these options.

Affected Environment

The Department of Water Supply, County of Hawaii, maintains the North Kona Water System servicing the area between Keahole Airport to the north and Kealakekua to the south. The system is supplied by four wells and a shaft located at Kahaluu, situated between Kailua and Keahou Bay at the 600-foot level, one to one and one-half miles inland from the coast. The Keahole Airport area is fed from the Kahaluu reservoir through 8-, 12- and 16-inch gravity mains running along the Kuakini and Queen Kaahumanu Highways. A 16-inch main terminates at the Honokohau Small Boat Harbor access road intersection with the Queen Kaahumanu Highway, (about 2 and one-half miles from the proposed 'O'oma II access road) and a 12-inch main continues from this point along the Highway past the subject property terminating just north of the Keahole Airport access road. Presently, the municipal system is inadequate to serve the proposed project, therefore, other sources of water must be developed privately.

Groundwater resources in the Kona area have been estimated to total 100 mgd by the Hawaii Water Resources Plan. Presently, the average drawdown is 7.7 mgd. Water resources in the Kona region are primarily basal ground water. Due to the low levels of rainfall, the relatively high hydraulic conductivity of lava rock, and proximity to the coastline, water in the coastal region is expected to be brackish. Suitable potable water sources are expected to be found further inland at elevations between 1,500 and 1,800 feet. In light of the region's apparent considerable aquifer, water availability in the Kona region appears to be one of source development and transmission capacity, rather than one of source availability.

Impacts

Potable Water. The projected average daily potable water demands for the proposed action are estimated at 0.74 MGD, as presented in Table 9. These water demands are based on the Domestic Consumption Guideline in the Water System Standards of the Department of Water Supply, County of Hawaii, 1985.

Table 9: PROJECTED POTABLE WATER DEMAND

Proposed Use	Units		Gallons Day/Unit	Estimated Demand (gpd)
Single Family Dwellings	70	units	600/ unit	42,000
Multi-Family Dwellings	230	units	600/ unit	138,000
Inn	50	rooms	600/ room	30,000
Hotel	550	rooms	600/ room	330,000
Ocean Center	12	Acs	5,000/ acre	60,000
Conference/Science Center	3	Acs	5,000/ acre	15,000
Golf Clubhouse	5	Acs	4,000/ acre	20,000
Shops	8	Acs	4,000/ acre	32,000
Water Recreation Park	19	Acs	4,000/ acre	76,000
TOTAL				743,000

Source: R.M. Towill Corporation, June 1991

Fresh Water wells with a total installed pumping capacity of up to 1.14 MGD (maximum daily demand. (0.74 MGD), x 150%) may be needed, along with wells having appropriate standby pumping capacity. The precise location of these wells

has not been determined, although they would be located in the water resource development zone indicated by the Keahole-to-Kailua Development Plan of April 1991. Such wells would be developed in cooperation with the County Department of Water Supply. Consideration is also being given to desalination of brackish or salt water sources located on or near the project site, in order to facilitate the timely development of at least a portion of source requirements.

The required wells, storage tanks/reservoirs and transmission lines must be completed before occupancy of the project's first homes. The County of Hawaii's Keahole to Kailua Development Plan indicates a new 16-inch water line along Queen Kaahumanu Highway east of the proposed development. The average water demand used to size the 16-inch water line is 0.91 MGD for the 'O'oma II development. However, the implementation schedule of the County for these improvements is not compatible with the project schedule. Therefore, the design and construction of certain water system improvements will be undertaken as part of the proposed action. All potable water system improvements will be designed and constructed in compliance with applicable State Department of Health and Water Resources Development Commission rules and regulation and permit requirements, and the County Department of Water Supply standards.

Non-Potable Water. Non-potable water demand is estimated to be approximately 1 MGD. This includes irrigation water for the golf course (176 acres at 4,500 gal/acre/day or 792,000 gpd) and other open space areas. Water infrastructure will be designed to meet water needs exclusive of sewage reclamation. However, the availability and use of secondary treated effluent for irrigation would reserve the municipal water supply for domestic consumption, except as needed to supplement recycled wastewater.

Mitigation Measures

The discussion on mitigation measures will focus on the various alternatives to provide potable and irrigation water. The Petitioner is actively evaluating all alternatives.

Potable Water. Because the municipal water system cannot provide adequate potable water for the proposed project, the Petitioner must seek alternate sources of potable water. There are two basic alternatives to the development of potable water for the proposed project: drilling new potable wells or drilling brackish wells (either on-site

or off-site) and desalinating brackish or sea water to acceptable levels of consumption.

If potable wells are to be developed, possible sites for these wells are likely to be chosen from areas along the Mamalahoa Highway corridor, between the Kau and Kealakehe ahupuaas. Alternative sites might be located south of Keahou to be integrated with the County system. Regardless of where the wells are to be developed, the Petitioner understands that if the wells are to be turned over to the County for operation, and County transmission lines are to be used to transmit the water to the project site, asciguatera an agreed upon percentage of the water will dedicated for use by the County. This may require approximately four wells to be constructed. The exact number will depend on negotiations with the County.

Significant improvements to the existing County transmission system will be required to support the proposed project as well as other projects planned in the region. The Keahole to Kailua Development Plan (K to K Plan) identifies five planned corridors to transmit water from the water resource development zone along the Mamalahoa Highway corridor to makai areas. In addition to potential costs associated with source development, the Petitioner may be required to invest in the transmission system from the source to the project site. Since the County Department of Water Supply (DWS) does not presently have adequate transmission, the Petitioner will have to coordinate improvements with DWS. Fire flow for the project will also need to be included in the water system design. The needed storage to supply the required flow will be a factor in tank sizing and related land and construction costs.

If potable well sites cannot be found to meet the proposed project water demands, then an alternative would be to seek out brackish well sites which could be desalinated for potable use. The chloride levels of water developed from wells in this area is likely to be in the vicinity of 1,000 mg/l. This water could also be used for irrigation water. A final alternative to the production of potable water would be to develop wells on the project site. It is anticipated that these wells would have a chloride content of about 3,000 mg/l. This water would need to be treated to remove chloride for both drinking and irrigation purposes. This would require development of an on-site desalination facility. Any such facility constructed on-site would be below the Under Ground Injection Control (UIC) line. The State Department of Health (DOH) has expressed caution in the extraction of water for potable use below this line. If desalting treatment of on-site water resources for potable use is to be considered, then the developer will work closely with the DOH. The water could be used for irrigation purposes during this demonstration period. If a desalination plant

were to be developed, it would most likely be located in the vicinity of the proposed wastewater treatment plant, on the southern boundary of the project site.

Non-Potable Water. There are three alternatives to be considered in the development of non-potable water resources for the proposed project: (1) brackish wells, on-site; (2) brackish wells, off-site; and, (3) wastewater treatment plant (WWTP) effluent.

On-site brackish wells will produce water with chlorides ranging from about 3,000 to 5,000 mg/l. Such high salinity water cannot be used directly on bermuda grass. There are certain types of turf grasses which are more salt tolerant, which would allow on-site irrigation wells to be used directly or for blending with WWTP effluent. Use of such salt tolerant grasses could reduce or eliminate the use of desalting treatment for golf course irrigation. More exotic plantings will require water with lower chloride levels, which would necessitate partial desalting.

If untreated irrigation water is desired, then off-site resources would need to be developed. A key determinant in the choice of quality of source water will be the type of turf grass to be used on the golf course. Most golf turfs require water quality between 400 and 600 mg/l chlorides for best maintenance. Because of the location of the project site and favorable climatic conditions (low wind), it is probable a higher chloride concentration of up to 1,000 mg/l chlorides irrigation water can be used.

The final option for developing a source of non-potable irrigation water is to utilize the effluent generated by the WWTP that is proposed to handle the sewage generated by the proposed project (see Section 6.1 for a full discussion of sewage). Effluent is usually of sufficiently low salinity to be used to irrigate golf courses and can also be treated and recycled for irrigation of exotic plants. It would also be possible to blend effluent with brackish water sources for golf course irrigation.

It is likely that any final configuration of transmission lines will require a dual system, for potable and non-potable water.

6.3 Drainage

An updated analysis of storm drainage for the project site was prepared by R.M. Towill Corporation, as part of an overall analysis of the infrastructure for the proposed project. The results of this update are summarized below, with the full report contained in Appendix R.

Affected Environment

The existing 'O'oma II watershed contains an area of approximately 482 acres and extends from the western slopes of Hualalai to the coast. There are no perennial streams or well-defined water courses in the watershed due to a combination of meager rainfall and the lava landscape. Storm water consists primarily of sheet flows downward from the upper parts of the watershed to Queen Kaahumanu Highway. A man-made ditch on the mauka side of the highway conveys the run-off to culverts located to the north and south of 'O'oma II, discharging storm waters away from the project area.

Under existing conditions, and based on a 10-year 1-hour storm, a total of 90 cubic feet per second (cfs) is estimated to enter the project site from the eastern and southern boundaries of the project site and 268 cfs of run-off is generated within the project area. The 'O'oma II coastline receives 190 cfs of run-off from on-site areas and 4 cfs from off-site areas.

Most of the ground surface is covered with basaltic cobbles and gravel (clinker) with localized exposures of in-situ basait rock formation. The porous character of the lava results in relatively rapid percolation of rainwater. This condition, together with the semi-arid climate of Kona results in no well-defined drainageways on the property. There is also no evidence of streams or flooding. The majority of precipitation falling on the site infiltrates immediately and there is little or no runoff. The project would not be affected by future urbanization of upslope areas because of an interceptor drainage ditch located mauka of Queen Kaahumanu Highway which diverts runoff and discharge away from the site.

Impacts

The residential and non-residential uses of the subject property will alter the character of the surface runoff from the area. The paved roadways, sidewalks, roofs, parking lots and other impermeable surfaces will contribute to an increase in surface runoff. Percolation of rainwater through the porous lava will therefore be reduced because of the decrease in permeable surface area. Changes in land use based on the proposed 'O'oma II master plan, particularly the increase in impervious surfaces, are expected to increase storm water run-off within the project site from 260 cfs to 450 cfs.

Mitigation Measures

The overall drainage scheme would protect developed areas by intercepting storm runoff from open and off-site areas through a network of cut-off swales and ditches, inlets and drain pipes located within the road right-of-ways. The use of unlined channels, wherever possible, would allow infiltration of runoff into the porous lava rock and thus minimize flows at the discharge points.

Currently, the main discharge points are coastal outlets located at the north and south ends of the property. Most of the channelized runoff will be discharged to the south. This would minimize any impacts to the HOST park facility. The majority of the runoff would be allowed to drain naturally by sheetflow into the ocean, by percolation into the soil, and into a series of drywells. In addition, areas will be left in open space for drainage infiltration into the ground. The primary open space will be the golf course which will provide areas for retention basins for excess runoff.

6.4 Solid Waste Disposal

Affected Environment

The County operates 28 solid waste transfer station chutes at 21 locations around the island, including a transfer station at Kailua. Refuse collected at these stations is transferred to one of two landfill sites on the Big Island: Hilo or Kailua-Kona (Kealakehe). Refuse collected by private contractors cannot be deposited at the refuse transfer stations; instead it must be trucked to a landfill site. Hazardous wastes and sludge are not accepted at any of the County's landfills.

The Kailua Landfill, which presently serves the North and South Kona solid waste district, is expected to reach capacity in 1992. This landfill would then be closed and a new landfill would be opened at Puu Anahulu, south of Waikoloa. It is probable that the Kealakehe site would then be converted to a transfer station. Refuse from the 'O'oma II development would be accepted by the municipal landfill; however, collection and transfer would require the use of private collection companies.

Impact

Estimated populations for the proposed project are based on such factors as average occupancy rates, household size and unit usage and are fully discussed by KPMG

Peat Marwick (Economic and Fiscal Impact Assessment for the 'O'oma II Ocean Science and Recreation Community, February 1991), which is attached as Appendix P. Based on these assumptions, it is estimated that there will be 798 daily residents at 'O'oma II in 1996, and 1,308 daily residents in 2010. Applying a solid waste generation rate of 7.00 lbs/per capita/day, the 'O'oma II development would yield refuse on the order of 2.79 tons/day in 1996 and 4.58 tons/day in 2010 (recent trends in solid waste generation have seen the per capita generation decreasing; this has been attributed to increased awareness about solid waste among the general public, and successful recycling efforts). It is further anticipated that per capita solid waste generation rates will continue to fall throughout the rest of the century (Personal Communication, Gaylen Kuba, July 3, 1991).

It is difficult to project the relationship between the solid waste generated by the proposed project at 'O'oma II, and the solid waste generated by the North and South Kona districts. In 1990, approximately 108 tons per day of solid waste were generated in North and South Kona. However, as mentioned above, the per capita solid waste generation rate seems to be declining. Further, on July 2, 1991, Governor Waihee signed into law the Solid Waste Management Act (Act 324, Session Laws of Hawaii, 1991), which mandates a 25 percent decrease in solid waste generation by the year 1995 and a 50 percent reduction in solid waste generation by the year 2000. Each county is required to prepare a Waste Management Plan to realize these reductions.

Cumulative Impacts

The solid waste to be generated by the proposed development makes up a small fraction of the projected solid waste quantities of the refuse district. It should not require the construction af a new landfill or significantly shorten the landfill's projected lifespan.

Solid waste generation would also create additional truck traffic. The marginal amount of truck traffic should not significantly compound the increase in vehicular traffic on Queen Kaahumanu Highway.

Mitigation Measures

The anticipated closure of the Kealakehe Landfill offers an opportunity to develop an additional transfer station on the landfill site. This transfer station could serve the residential units being proposed at 'O'oma II, as well as the proposed residential

units at Kohanaiki, thereby providing a more convenient and efficient means for solid waste disposal within the region.

The Petitioner will work closely with the County Department of Public Works to coordinate participation in the implementation of any Solid Waste Management Plan that is developed by the County.

6.5 Transportation Facilities

6.5.1 Traffic Circulation

The Traffic Management Consultant prepared a traffic impact analysis report (TIAR) for the proposed project. The major findings of this report are summarized below and the full report is attached as a technical appendix (Appendix S)

Affected Environment

The study area for the TIAR is defined along Queen Kaahumanu Highway between Keahole Airport Access Road and the proposed project access road. The State Department of Transportation's (DOT) long-range plan for Queen Kaahumanu Highway is to develop a controlled access four lane highway. It is assumed that primary access to the project site, under this long-range plan, would be provided at an interchange to be located in the vicinity of the Keahole Airport. However, because the implementation of the State DOT plan is beyond the time-frame of this study, it is assumed that interim access to the project would be provided at a channelized at-grade intersection.

Queen Kaahumanu Highway is the primary arterial highway in the region. This two-lane, Class I State Highway is a limited access highway within a 300-foot right-of-way, with a posted speed limit of 55 miles per hour. Dedicated in 1975, the highway extends 38 miles to connect the towns of Kawaihae and Kailua-Kona and provides a vital transportation link between the growing coastal resort areas of South Kohala, Keahole Airport and Kailua-Kona.

Mamalahoa Highway was the main road between Kailua-Kona and Waimea prior to the opening of Queen Kaahumanu Highway in 1975. It still provides a major transportation link between Hilo and Kailua-Kona (via Waimea or directly when travelled in conjunction with the Saddle Road). The highway extends around most of the Big Island. The only existing connection between the two arterials is Kaimi

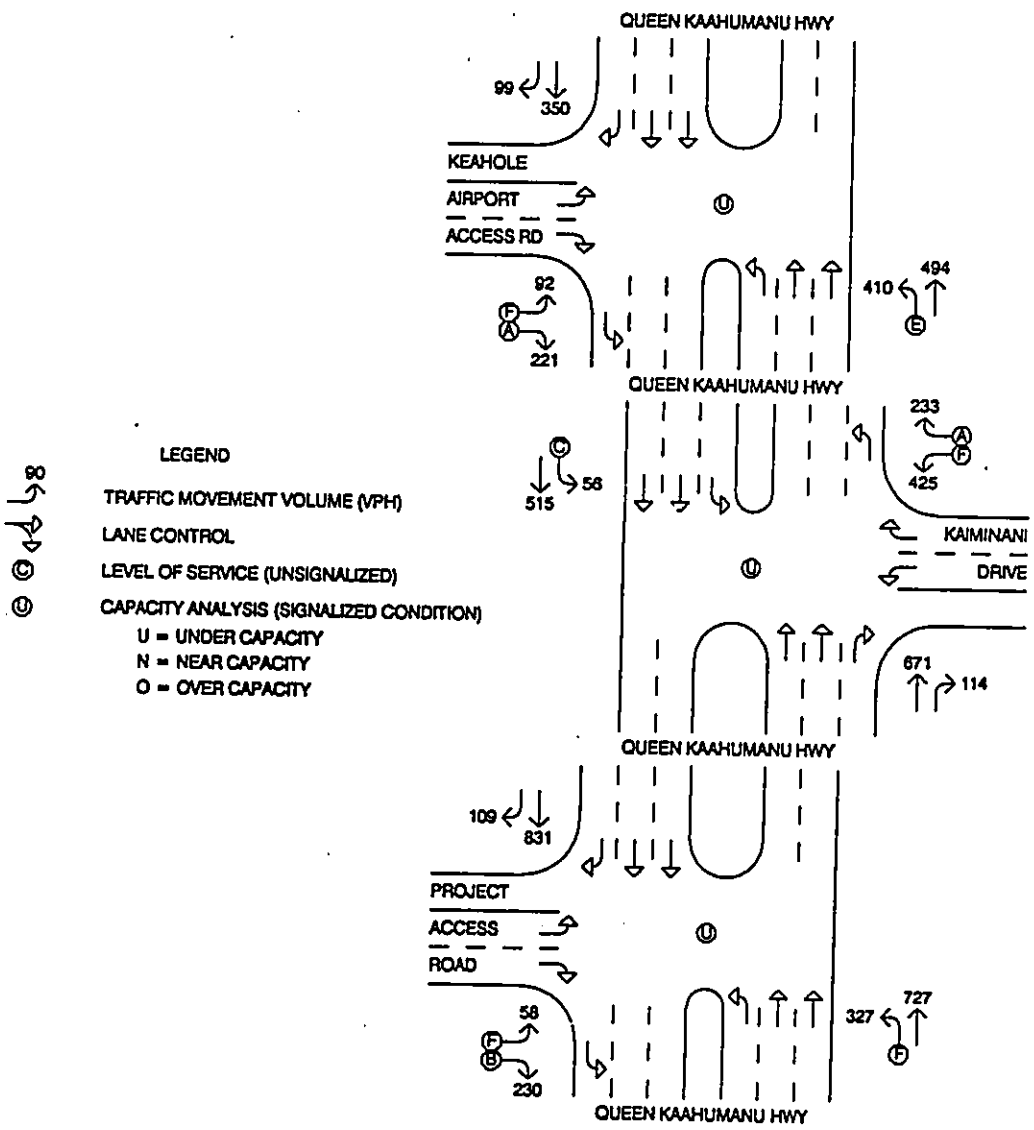
Nani Drive, a residential collector roadway. For the purpose of this analysis, it is assumed that Mamalahoa Highway would not be significantly impacted by the proposed project.

Existing Peak Hour Traffic. The AM peak hour of traffic in the study area occurs between 7:00 AM and 8:00 AM. Existing AM peak hour traffic volumes and capacity analysis are shown in Figure 14. The left turn movement from Keahole Airport Access Road to northbound Queen Kaahumanu Highway operates at Level of Service (LOS) "E" (LOS is a quantitative and qualitative assessment of traffic operations, defined by LOS "A" through LOS "F", with LOS "A" being the best operating condition and LOS "F" being the worst operating condition.). The remaining traffic movements operate at satisfactory LOS. The left turn movement from Kaimi Nani Drive to southbound Queen Kaahumanu Highway operates at LOS "F" during the AM peak hour of traffic. The remaining traffic movements operate at satisfactory LOS.

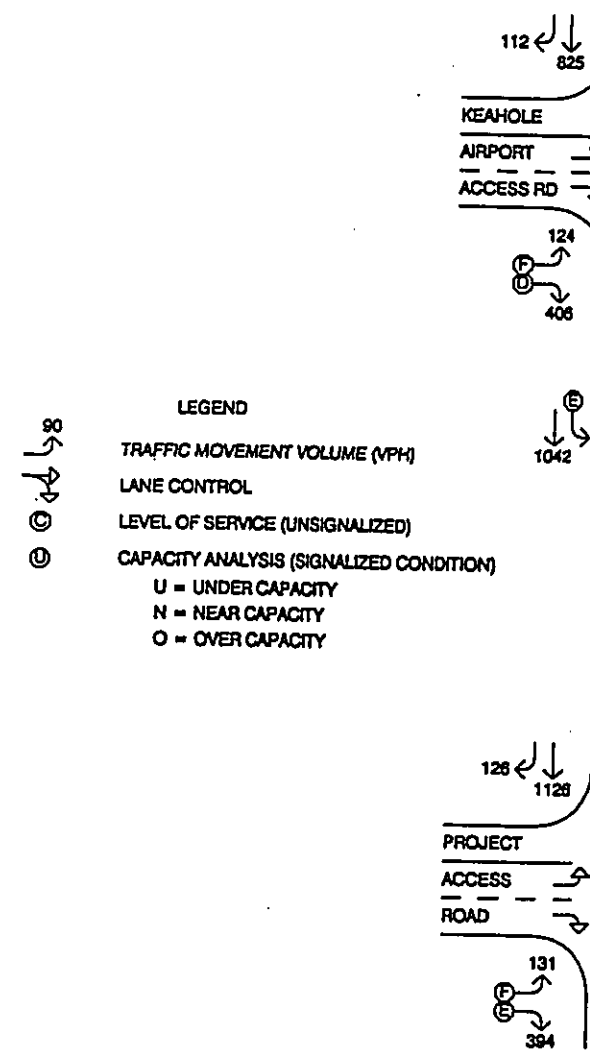
The PM peak hour of traffic in the study area occurs between 3:45 PM and 4:45 PM. The existing PM peak hour traffic volumes and capacity analysis are shown in Figure 14. The left turn movement from Keahole Airport Access Road to northbound Queen Kaahumanu Highway operates at LOS "E" during the PM peak hour of traffic. The remaining traffic movements operate at satisfactory LOS. The left turn movement from Kaimi Nani Drive to southbound Queen Kaahumanu Highway operates at LOS "F" during the PM peak hour of traffic. The remaining traffic movements operate at satisfactory LOS. During the existing PM peak hour of traffic, Queen Kaahumanu Highway, south of Kaimi Nani Drive, operates at LOS "D".

Impacts

The State Department of Transportation (DOT) and the County of Hawaii have recently completed a study which developed a travel forecast for the year 2010 (Island of Hawaii Long Range Highway Plan). The travel forecast is based upon a land use forecast for the year 20101 developed by the County of Hawaii. This study was used to project the anticipated traffic impacts of the proposed project.



CUMULATIVE AM PEAK HOUR CONDITIONS W/PROJECT



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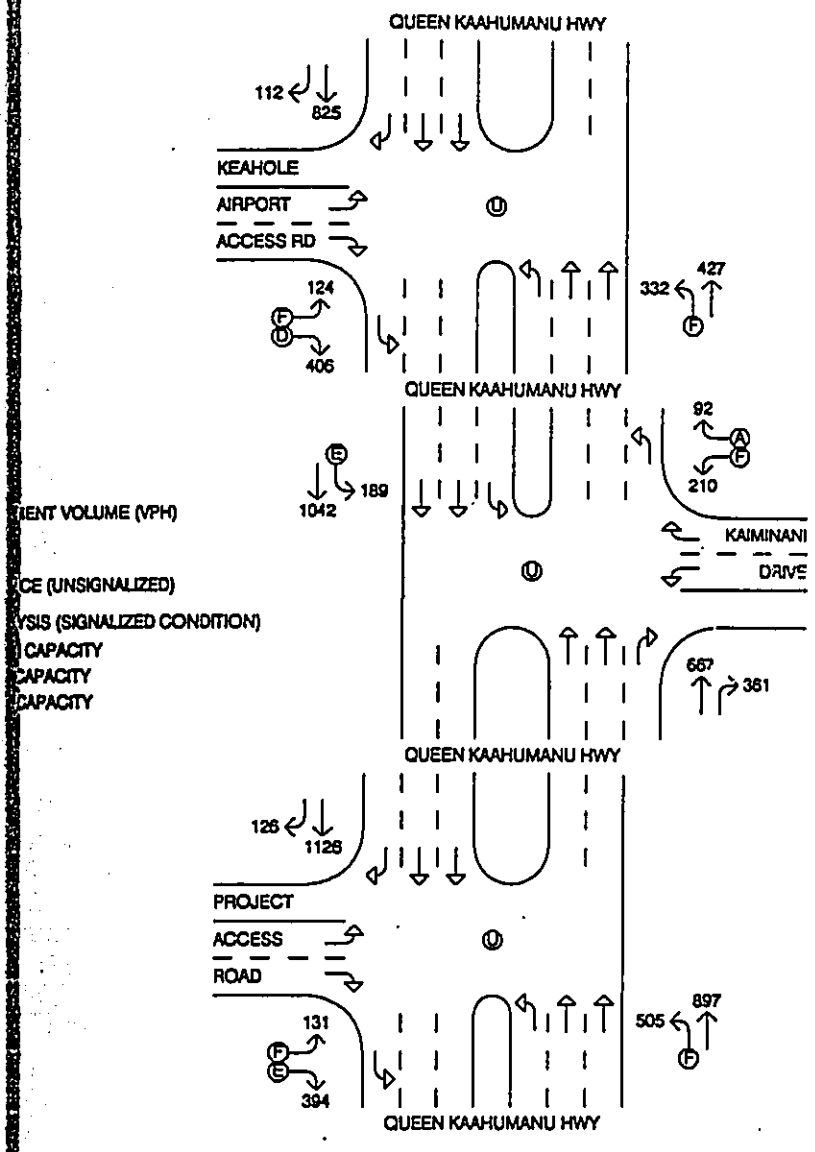


LATIVE PM PEAK HOUR CONDITIONS W/PROJECT

Figure: 14

Peak Hour Traffic Volumes

Source: The Traffic Management Consultant, July 1991

'O'OMA II

Kahala Capital Corp.

Helber Hastert & Fee, Planners

Total Traffic Without Project. By the year 1998, the intersections of Queen Kaahumanu Highway at Keahole Airport Access Road and at Kaimi Nani Drive would require signalization. During the 1998 AM and PM peak hours of traffic, the left turn movements from both side streets would operate at LOS "F" under unsignalized operations. At the Keahole Airport Access Road intersection, the right turn movement from the Access Road to southbound Queen Kaahumanu Highway, and the left turn movement from north bound Queen Kaahumanu Highway to the Airport Access Road would also operate at LOS "FF" during the PM peak hour. South of Kaimi Nani Drive, the two land Queen Kaahumanu Highway would operate at LOS "E" during both peak periods.

Total Traffic With Project. Capacity analysis for traffic with the project has been forecast for both signalized and unsignalized conditions. Furthermore, the peak hour conditions with the project-generated traffic are analyzed assuming Queen Kaahumanu Highway is widened to four lanes by the year 1998.

During the AM peak hour with the project-generated traffic, the Queen Kaahumanu Highway intersections at the Keahole Airport Access Road and Kaimi Nani Drive would operate at "under capacity conditions under signalized operations.

During the PM peak hour with the project-generated traffic, the Queen Kaahumanu Highway intersections at the Keahole Airport Access Road and Kaimi Nani Drive would operate at "under capacity" conditions.

Mitigation Measures

Eventually, Queen Kaahumanu Highway would be improved to a four-lane, divided, controlled access highway, i.e., a freeway. This improvement is consistent with the recommendations of the Island of Hawaii Long Range Highway Plan. The State DOT is currently in the process of developing an implementation plan for the Queen Kaahumanu Highway improvements. The first phase of the four lane widening would likely extend between Palani Road and Keahole Airport Access Road. The implementation plan would also determine the number and location of interchanges that would be allowed on Queen Kaahumanu Highway. Ultimately, the proposed 'O'oma II project would access the highway via a frontage road system, which would lead to planned interchanges to the north and to the south of the project site. Until the proposed interchanges and frontage road system are constructed, at-grade access should be provided at a channelized intersection under traffic signal control.

The proposed access road intersection for the 'O'oma II project should for a left turn storage lane (northbound), a right turn deceleration land (southbound), and a right turn acceleration lane (southbound) on Queen Kaahumanu Highway. Traffic volumes at this intersection should be monitored and traffic signals should be installed when warranted by the DOT. These improvements would be implemented on an interim basis, with the understanding that direct access to Queen Kaahumanu Highway would eventually be eliminated and replaced with a system of frontage roads leading to proposed interchanges.

With the implementation of these road improvements, the proposed channelized intersection should accommodate the proposed project needs until the DOT's long range plan for Queen Kaahumanu Highway is implemented.

6.5.2 Keahole Airport

Located approximately one mile north of the project site, the Keahole Airport consists of a modern terminal complex and a single runway 150 feet wide and 6,500 feet long. Aircraft generally approach the runway from a northerly direction and take off in a southerly direction. An update of the 1971 Keahole Master Plan was initiated by the State Department of Transportation (DOT), Airports Division in 1986 and culminated in the acceptance of an EIS for the Keahole Airport Master Plan in December 1988. The 1971 Plan had recommended that the 6,500-foot runway be extended to 12,000 feet by 1985, based on annual forecasts of four million passengers and 188,000 aircraft operations by 1985. The actual annual aviation activity tabulated for 1985 was 1,485,813 passengers and 93,878 aircraft operations, significantly less than the levels projected (Keahole Airport Master Plan EIS, 1988).

The purpose of the revised plan was to determine the type and extent of aviation facilities needed at Keahole Airport through the year 2005. An estimated 4,160,000 passenger emplanements and deplanements and 159,000 annual aircraft are projected for Keahole Airport by the year 2005 (ibid.).

Impacts

The 'O'oma II development will be responsible for additional air passenger traffic through the Keahole Airport, although increases attributable to 'O'oma II would not necessitate expansion of airport facilities. The aggregate demand on airport facilities from West Hawaii developments are anticipated to require future terminal

expansion and lengthening of the runway to accommodate fully-loaded wide-bodied aircraft. In fact, DOT, Airports Division is actively pursuing the implementation of the Keahole Airport Master Plan, having recently submitted requests for an SMP and zone change to the Hawaii County Planning Department for the Keahole Airport Master Plan.

6.5.3 Harbors

Three principal harbors provide service to West Hawaii; Kawaihae Harbor, Honokohau Small Boat Harbor, and Kailua-Kona Harbor. Kawaihae Harbor is the only State commercial harbor in West Hawaii and has a basin area of nearly 50 acres. It is located approximately 25 miles north of the proposed project. Developed in 1959, the harbor has a 40-foot deep entrance channel and a 35-foot deep harbor basin with an area of about 53 acres. In 1986, Kawaihae Harbor handled a total of 451 vessels (excluding domestic fishing craft). Of this total, 173 (38 per cent) were self-propelled vessels, and 95 per cent of these were tugboats or towboats. In that same year, the harbor handled over 592,000 short tons of cargo. Cargo handled includes building materials, consumer goods, large equipment, and machinery, as well as provisions and supplies for the resort facilities in South Kohala-North Kona.

There are two projects that intended to improve the operating capability of Kawaihae Harbor. The first project, which is under construction, will extend the existing pier from a length of about 620 feet to about 1,220 feet. The second project, which is expected to start construction by fall 1991, would make several landside improvements to the harbor facilities, including; paving existing container yards, improving the existing electrical system and improving the access roads to the harbor.

The Honokohau Small Boat Harbor is the major pleasure-craft, commercial and charter fishing anchorage in West Hawaii. The harbor is located approximately three miles south of the project site. Currently, the man-made harbor can accommodate a total of about 245 boats. All available slips are filled with a waiting list of interested parties. The long-range master plan for the facility calls for a total of 455 slips to be developed on the 65.5-acre harbor site.

Kailua-Kona's harbor serves as a recreational resource for visitor-related activities associated with Kailua Village. In addition to charter fishing boats, the harbor provides facilities for sunset dinner cruise boats, daytime tours, the Atlantis submarine tour service, parasails and other ocean-related recreational activities. The harbor also provides off-shore docking for interisland cruise ships.

Impacts

No adverse impacts are expected to result from the proposed project. It is probable that increases in cargo handling at Kawaihae Harbor and the use of ocean recreational experiences offered at the Honokohau and Kailua-Kona Harbors by visitors to the hotel at 'O'oma II will result in additional job opportunities.

6.6 Power and Communication

An updated analysis of power and communications for the project site was prepared by R.M. Towill Corporation, as part of an overall analysis of the infrastructure for the proposed project. The results of this update are summarized below, with the full report contained in Appendix R.

Affected Environment

Electrical Power. Electrical service to the project area as well as the entire island is provided by Hawaii Electric Light Company (HELCo). An existing 69 KV transmission line on the mauka side of Queen Kaahumanu Highway will serve the project. Present information from HELCo indicates their electrical generating capacity is 163.4 megawatts (MW), with a peak demand of approximately 139 MW. It is projected that HELCo will add about 45.8 MW of generating capacity by 1992, so that there is apparently sufficient generating capacity to support the proposed project.

Telephone. Hawaiian Telephone Company (HTCo) serves the project site from their Kailua-Kona Electronic Common Control (ECC) facilities with trunk cables supported on the HELCo 69 KV poles mauka of Queen Kaahumanu Highway. There are no significant spares in the trunking cables to support new major developments, in accordance with PUC directives.

Cable Television. Sun Cablevision is licensed to provide cable television service in the Kona-Kohala region. There are presently no cable lines immediate to the project area. The closest cabled areas are Kailua-Kona to the south and the Pacific Palisades subdivision four miles to the north. The anticipated population levels in the initial phases of the project will be insufficient to justify Sun Cablevision's expansion of their service to the project site. Cable service can be made available to the project site through developer funding of the capital improvements necessary.

Two options that are available to the Petitioner include microwave relay reception a the site and extension of new trunking cables of fiber optics along Queen Kaahumanu Highway. An underground easement would be required between the 69 KV riser pole, including highway crossing, and facilities makai of the highway.

Impacts

Electrical Power. The proposed project is expected to have an estimated demand of approximately 10 MW as an ultimate demand load, with approximately 5 MW materializing as early as the next five years and the remainder being completed perhaps within ten years. Such a development program will not burden HELCo's ability to support their customers in the area, or on the island as a whole. A new step-down substation, to be located near Queen Kaahumanu Highway, will be required for the project. It is anticipated that the substation will be located mauka of the highway and that it will require land acquisition as well as approval by the Public Utilities Commission (PUC). Underground feeders for all utilities, including HELCo, telephone and cable television (CATV) facilities will need to cross the highway. Switching vaults within the project site will serve the project facilities. The underground distribution system will be developed by HELCo, utilizing 12.47 KV underground feeder cables.

It is not anticipated that HELCo's present customers will be adversely or directly affected by the proposed project since there is sufficient capacity to serve the project. The new substation serving the proposed project will provide all the necessary power required for the project and it will not be necessary to support the project needs from other customer substations in the near vicinity. Nansay Hawaii, In. has already been granted a Conservation District Use Permit for a substation to serve the Kohanaiki Resort. This substation will be located within the 'O'oma II ahupua'a, immediately mauka of Queen Kaahumanu Highway. The are for the proposed substation is about four times that which would be needed to accommodate the electrical needs of the Kohanaiki Resort. It is anticipated that the Petitioner could expand this substation to accommodate the electrical demands of the 'O'oma II development.

Telephone. The telephone company's facilities at their Kailua-Kona ECC station are adequate to support the new telephone requirements for the project. However, it will be necessary to supplement the cable run between the Kailua-Kona ECC and the project site. An underground easement will be required between the 69 KV riser pole, including highway crossing, and facilities makai of the highway.

Mitigation Measures

The developer is fully aware of the need to conserve non-renewable energy sources. To this end, creative solutions to energy conservation within the proposed are being explored and are intended to be incorporated into the development. Such options include the use of solar water heaters, efficient construction design and building materials, and landscaping, among others.

6.7 Schools and Libraries

Affected Environment

Schools. The North Kona District is serviced by three public schools. The only public high school serving the region, Konawaena, is located in Captain Cook, south of Kailua-Kona. As the population of North Kona has increased in recent years (see Section 5.1), so has the enrollment in North (and South Kona) schools. As shown in Table 10, the enrollment in the public schools of North and South Kona have increased their collective enrollments by about 25 percent since 1984. The public schools in West Hawaii are approaching capacity and the Department of Education has plans to add a high school at Kealakehe to complement the proposed State development at Kealakehe. This high school is anticipated to be constructed by 1995 or 1996, and would serve the project site.

Table 10: Kona Schools

District	School	Location	Grades	1984 Enrollment	1990 Enrollment
North Kona	Kealakehe School	Kailua-Kona	K-8	1,244	1,738
	Kahakai School	Kailua-Kona	K-6	440	663
	Holualoa	Holualoa	K-6	321	373
South Kona	Konawaena Elem.	Kailua-Kona	K-6	613	689
	Konawaena Interm and High	Kailua-Kona	7-12	1,439	1,616
Total				4,057	5,079

Source: Department Of Education, June 1991

Libraries. The North Kona region is currently served by three public libraries: the Kailua-Kona Library; the Holualoa Library; and, the Kealakekua Library. A larger facility (c. 10,500 square feet) is presently under construction to replace the existing small facility (920 square feet) in Kailua-Kona.

Impacts

The State Department of Education has indicated that the proposed project will have a negligible impact on the public schools and libraries in the area.

6.8 Health Care Facilities

Affected Environment

Hospitals. There are presently four state hospitals and a private medical center on the island of Hawaii which serve the residents of West Hawaii. The State Department of Health administers the Kona Hospital, the Hilo Hospital and the Honokaa Hospital. The Kona Hospital is an 82-bed acute care facility, which is the closest facility to the project site. The Hilo Hospital is a much larger acute care facility, with 276 beds. Patients from West Hawaii are accommodated at the Hilo Hospital when there is either a shortage of beds at Kona or a need for a medical specialty not available at Kona that is available in Hilo. In addition there is a long-term 50-bed facility planned in Honokaa to replace an existing 30-bed acute facility that has outlived its structural usefulness. A fourth state facility, the Kohala Hospital, a 26-bed acute care facility, serves the residents of the Kohala area (Personal Communication, Bill Kam, Department of Health, June 10, 1991).

A planned community general facility is to be located in Waimea. This 50-bed facility will be designed as an acute-care facility, and will be constructed with matching State and private funding. When completed, the hospital will be privately run and will be the only facility offering acute care services in North Hawaii.

Emergency Ambulance. Emergency ambulance service is administered by the Emergency Services Branch of the Department of Health, with primary responsibility for the provision of emergency service given to the County of Hawaii Fire Department. Advanced life support ambulance units are located at the Kailua-Kona Fire Station (two units), the Captain Cook Fire Station (one unit) and the Mauna Lani Fire Station (one unit). Another unit is being planned for the region and is anticipated to be in service before the end of 1991. It is likely this unit will be

assigned to the Kailua-Kona Fire Department (Personal Communication, Donna Macava, Department of Health, June 10, 1991).

Impacts

The increase in de facto population attributable to the development will place a small additional demand on existing health facilities. One standard for calculating facility requirements is four hospital beds per 1,000 resident population. Most of the people in the development will be transients or employees. Resident population associated with the proposed project is expected to be approximately 600, resulting in slightly more than two additional hospital beds.

6.9 Recreational Facilities

Affected Environment

The North Kona District contains approximately 45.6 miles of shoreline, including about 18 miles that are under public ownership. Most of the public access points in North Kona are located from Kailua to Keahou Bay, which is the most urbanized stretch of the coast.

The recreational amenities presently afforded by the project site are limited to the coastal areas and include fishing, picnicking, snorkeling and beachcombing. In addition, there is a coastal jeep trail that parallels the shoreline and provides access to a popular swimming and surfing area known as "Pine Trees Beach," located south of the project site, fronting the proposed Kohanaiki Resort. The beaches fronting the site and surrounding areas, (including Wawaloli Beach, a beach park with minimal facilities near NELHA), are not considered good swimming beaches for the general public because of the steep underwater drop off and the lack of a suitable sand covered bottom.

Impacts

Development of the proposed project will provide a variety of recreational opportunities. Access to the shoreline is currently limited to unpaved jeep trails to and along the shoreline that requires four-wheel drive vehicles. Beach access will be improved by the provision of paved access roads, parking areas and shower and restroom facilities at both ends of the property (see Section 4.3 for a detailed description of coastal access). Although jeep travel along the shoreline will

ultimately be eliminated, a pedestrian trail will be improved that is planned to be one section of pedestrian trail along the coast, referred to as the Ala Kahakai (Trail by the Sea) concept.

The development of the proposed Water Recreation Park will provide unique oceanfront recreation opportunities. A seven-acre salt water lagoon would be created and would contain water slides, islands and a wave generating machine, as a commercial recreation attraction, unique on the island of Hawaii. This recreation park will be open to the public for a fee, with kama'aina rates offered to Hawaii residents.

The residential community at 'O'oma II would be provided with private recreational amenities. Both the single-family and multi-family elements of the master plan will contain recreational centers and may include swimming pools and tennis courts.

The master plan also includes a regulation par 72 golf course. Although the course will be private, public play will be provided, including kama'aina rates for Hawaii residents.

Mitigation Measures

As noted previously, the proposed development includes provision for continued and improved public access to and along the shoreline, including paved roads, beach parking and restroom/shower facilities. Local residents should be informed about the existence of these facilities with appropriate signage and notations on County recreational maps.

6.10 Fire Protection

Affected Environment

The Hawaii County Fire Department provides fire protection services to Big Island residents. Fire stations within the region are located at Captain Cook, Kailua-Kona, South Kohala and a volunteer station at Waikoloa. The Kailua-Kona Station is the closest in proximity to the project site, located on Palani Road above the Queen Kaahumanu intersection about eight miles from 'O'oma II (approximate response time of ten minutes). It is presently composed of one engine company, one ladder company and one ambulance unit, with a staff of 33.

The Hawaii Insurance Rating Bureau assigns Public Protection Classification numbers according to risk analysis in their Fire Protection Manual. The lowest rating in the Kailua-Kona area is a Class 6. This means that property is within 1,000 feet of a fire hydrant and within five road miles of a responding fire department station. The project site is rated as a Class 10, which means that fire protection facilities are not considered adequate for recognition by the bureau (Letter from Fire Chief Daniel Ayala, June 12, 1991).

Impacts

The existing Kailua Fire Station is operating near capacity. It is probable that a new Fire station will be required in the region to provide adequate fire protection services due to the increased population which may result from the numerous development proposals in the region. To date, no site for a new station has been selected (personal communication, Inspector Joseph Loyola, June 1991).

The County fire department also points out fire insurance premiums for improvements dramatically increase as the distance between a structure and the fire station increases, especially outside a five mile radius.

Mitigation Measures

In the event a new fire station is required, it could be funded similar to the recently constructed station in South Kohala. This station was funded through an agreement between the County and a cooperative of South Kohala resort developers. In this case, the station was funded and constructed on donated land at Mauna Lani and equipped and operated with County funds.

It will also be necessary to include adequate numbers of fire hydrants and automatic fire sprinkler systems within the overall development.

6.11 Police Protection

Affected Environment

Police protection for the region is provided by the Hawaii County Police Department operating from its regional headquarters in Kealakehe. The area served by the Kealakehe station extends from Manuka State Park in South Kona to Anaeho'omalu Bay in North Kona. Presently, substations are maintained in Captain Cook and

Kailua-Kona. Staffing for the region includes 88 persons, including officers and administrative and clerical staff (Personal Communication, Major Dennis Correa, June 1991).

Impacts

It is doubtful that the proposed project would require a full-time patrolman on the premises, or result in sufficient numbers of calls to justify such an allocation.

Cumulative Impacts

In the future, when the Kailua-Kona to Keahole Point corridor is more fully developed, as envisioned by the County General Plan, it is probable that a full-time position would be required within the region (one full-time position consists of five individual patrolmen working in three daily shifts throughout the week) (a broad discussion of the overall public fiscal impacts of the proposed project is contained in *Section 5.5*).

Mitigation Measures

The hiring of private guard services has become a common practice. The benefit of a private security unit at the proposed project would be to prevent crimes from happening and also to handle minor disturbances. Any private security arrangement, either for the overall development or by individual businesses, would be coordinated with the County police force.

CHAPTER VII

ALTERNATIVES TO THE PROPOSED ACTION

CHAPTER VII

ALTERNATIVES TO THE PROPOSED ACTION

7.1 Introduction

Chapter 200 of Title 11, Environmental Impact Statement Rules, requires a discussion of "any known alternatives...which could feasibly attain the objectives of the action." The rules further specify that the alternatives be explored and evaluated in light of enhancement to environmental quality or the avoidance or reduction of adverse environmental effects.

Three alternative actions that could reduce or eliminate environmental risks or costs were considered: (1) "no action" (no amendment to the existing land use classifications at ether the State or County level); (2) "major resort" development; and, (3) "retreat resort" development. It should be noted that the subject action combines several types of land uses, including intermediate resort. The second and third alternatives could be expanded similarly into packages of uses. However, in order to limit the combinations of land uses considered and to focus attention on the probable consequences of a given action, this analysis is limited to three concepts which typify carrying intensities of development and non-development.

7.2 No Action Alternative

The no action alternative would preserve the existing situation at 'O'oma II. The undeveloped coastal property, now characterized by a relatively barren landscape, would remain largely underutilized, except by recreationists.

Advantages: No further expenditure of resources by the developer or any public agency would be required. Areas that are considered environmentally sensitive, such as the near-shore waters and archaeological sites would remain undisturbed by development at 'O'oma II since environmental impacts of the type discussed in Chapter IV would not materialize. However, changes in the environment could still occur from other causes, such as natural cycles, indirect impacts from land uses on surrounding parcels and the existing use of the land by campers and vehicles on the shoreline jeep road.

Disadvantages: The absence of land development would also preclude economic benefits that might accrue from the project, such as additional employment,

increased tax revenues and increased economic activity in the region overall. Opportunities to implement State and County economic objectives and policies would be lost. Similarly, privately funded environmental programs designed to take positive actions toward resource management for public benefit and enjoyment would not be available.

7.3 Major Resort

The Hawaii County General Plan has defined and established standards for specific types of resort-oriented developments. A "major resort" area is described as 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." A general breakdown of land uses is provided as follows:

Maximum hotel and condominium-hotel units: 3,000 rooms

Resort acreage: 90 acres minimum

Active/passive recreation areas: 50 acres minimum

Accessory use within hotel or resort-zoned area shall be based on 50 square feet of floor area per hotel room

A maximum of 646 acres for residential use when other zoned lands are not available in close proximity for support use

Advantages: Strictly in terms of land use intensity, this alternative represents the highest use of the property. If this level of development were warranted by market demand, it could contribute significantly to the economic vitality of the region. Through economies of scale, fiscal revenues are expected to rise faster than outlays to fund public services and utilities.

Disadvantages: With approximately 300 acres, 'O'oma II does not contain sufficient land area to develop a high-quality resort area at the major-resort scale. Although a unit count that exceeds the 1,500 rooms allowed by the intermediate resort category could be accommodated physically on the site, the development would be congested and contrary to the unrestricted, open feeling that is characteristic of the Kona Coast. A major resort development would put 'O'oma II in a less competitive position compared to existing major resort areas that incorporate larger acreages.

Moreover, reservation of a greater number of acres for resort hotel and condominium uses would require a tradeoff in the diversity of uses that have been planned. The overall project would be more heavily oriented toward resort development, rather than the balanced profile currently offered.

7.4 Retreat Resort Area

The Hawaii County General Plan characterizes retreat resort as "generally an area which provides the user with rest, quiet, and isolation for an environmental experience. It shall have sewer, water, roads, employee housing, and recreational facilities, etc." Standards for land use include:

> Maximum hotel and condominium-hotel units: 100 rooms
>
> Resort acreage: 15 acres minimum
>
> Provide active and passive recreation area commensurate wit the scale of development
>
> Accessory uses within hotel or resort-zoned area shall be based on 50 square feet of floor per hotel room

The Kona Coast has an example of a premier retreat resort in the form of the Kona Village Resort, whose secluded site is set well back of the main highway. The individual thatched-roof bungalows are clustered in a village setting. Contrary to expectations of a luxury resort, man-made amenities are few, thus reinforcing the sense of isolation.

If a retreat resort were to be developed at 'O'oma II, similar guest accommodations would have to be provided together with a substantial amount of recreational facilities. The conference center, marine park and level of retail uses would not be compatible with a retreat resort.

Advantages: Because of its extremely low density, this alternative could result in a lower magnitude of impacts on the natural environment. At the same time, there would be a greater flexibility in the layout of urban facilities to minimize adverse impacts on existing archaeological and environmental features.

Disadvantages: The high capital cost of developing infrastructure to serve the development, combined with a low projected rate of return would call into question the economic feasibility of this alternative action. Development of the conference center, the ocean science center and the marine park are basically incompatible with

the retreat resort concept, unless extensive landscaping is installed to buffer the uses. In addition, the proximity of the project site to Keahole Airport and the attendant noise intrusions associated with aircraft traffic is incompatible with the retreat resort market.

7.5 Analysis and Conclusion

The EIS rules concerning "rigorous exploration and objective evaluation" of feasible alternatives apply to both public and private actions. However, feasibility is evaluated differently in the two cases. The benefits of public actions are measured by their contribution to the public good, which is determined through an inherently political process. On the other hand, the feasibility of a private action is ultimately determined by expected future returns, including a return on investment, compensation for risk, and a margin of profit. The importance of a project's economic feasibility, measured in these market terms, is underscored by the weight this factor is given is certain public decisions, such as those made by the State Land Use Commission, which require data regarding the Petitioner's financial condition. Therefore, although the EIS rules state that alternatives be evaluated "even though more costly," the consequences on a private action's feasibility set a minimum standard for establishing whether one alternative is chosen over another.

The "no action" alternative would preclude economic benefits that might accrue from the project. In addition, any positive resource management programs that might be established in conjunction with resort, would not be realized.

While the "major resort" alternative would seek to provide benefits that are not available in the "no action" alternative, it is uncertain whether this type of resort would meet the development objective of providing a high-quality resort environment. Without the qualitative merits of a superior resort development, the economic feasibility aspect would be diminished.

In many respects, the "retreat resort" alternative combines the benefits of the two previous alternatives: minimal environmental disruption supplemented by resource management programs (that would be integrated with the resort's offerings of guest amenities), and an infusion of capital into the regional economy. However, the cost-revenue balance of this type of resort development would not meet the feasibility requirement of the development program.

None of the three alternatives considered compares more favorably than the proposed action in establishing an economically feasible resort that meets the developer's standards of quality, offering a potentially viable mix of land uses, and also fulfilling public policies and objectives.

CHAPTER VIII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

CHAPTER VIII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction and operation of the 'O'oma II development will involve the irretrievable loss of certain environmental and fiscal resources. The cost of using these resources, however, should be evaluated in light of recurring benefits to the residents of the region and the County, and the alternative of taking no action.

Development of transient accommodations and the marine park/visitor center, as set forth in the master plan, will commit oceanfront land to urban development. Once development has been initiated, it would not be possible to reverse the process without expending substantial public funds to demolish the physical plant and to replace jobs and income. Given the lack of major economic development alternatives and the need to provide long-term job opportunities, development of this project appears justified.

The overall development will urbanize *approximately 300* acres at 'O'oma II (although only about 217 are in the State Conservation District). Construction of buildings and other man-made improvements will narrow the range of future non-urban uses for this site, although lack of suitable on-site resources mean that no agriculturally productive land will be taken out of the inventory.

A resort hotel, single-family dwellings, multi-family condominiums, a conference center and recreational facilities will remove most of the vegetation outside of the beach strand area. While the ground level environment will be altered, the visual "resource" attached to the site, namely its coastal and open space vistas, will be preserved to the extent possible by the golf course and other undeveloped areas, which amount to over 180 acres or more than one-half of the project site. The development of additional water sources (potable and treated) and their distribution will allow greener, more tropical landscaping than is possible at present.

Some historic sites will be preserved, with buffer-zones established to protect them. Some historic sites may be destroyed by construction; however, prior to such action, information will be extracted or other work performed in accordance with the recommendations of the historic preservation assessment which will be coordinated with the State historic Preservation Office.

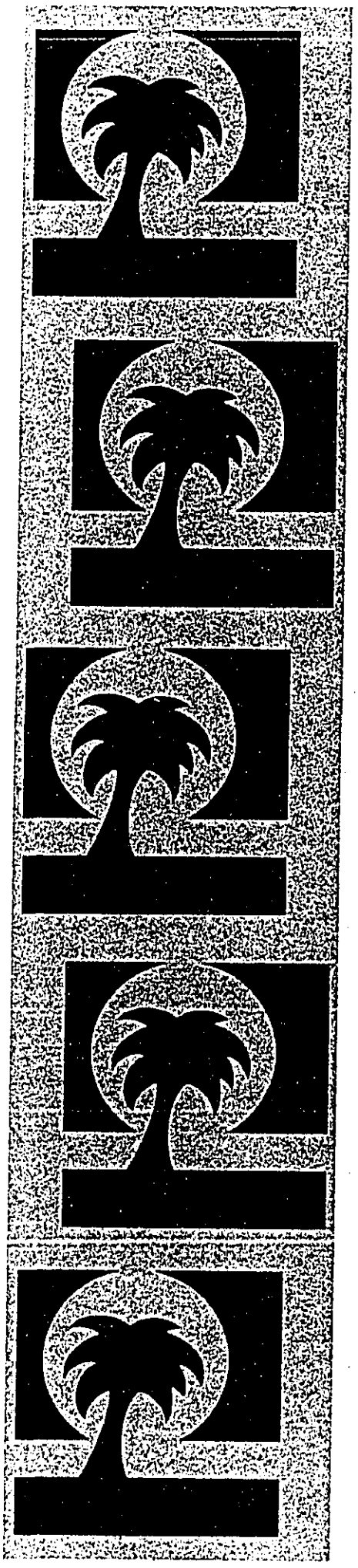
Development of a successful mixed use area is dependent on its close relationship with the ocean. With proposals for other resort development to the south of the property and ocean science and aquaculture development proposed north of the property, Kona residents may perceive this segment of the coast in jeopardy of being committed to private uses. However, it is not the intent of the Petitioner to prohibit of inhibit public use and enjoyment of the beaches or coastal resources. The resort development will comply with shoreline setback requirements and will provide public right-of-way accesses thereby promoting interaction between local residents and visitors in a recreational setting.

Construction and operation of the project will require the expenditure of labor, materials and energy, most of which are nonrenewable and irretrievable. Water for domestic use will require the commitment of a resource that is not readily accessible at present; water for irrigation use will be obtained from recycled and treated wastewater.

The proposed action will not require any new commitment of publicly supported services and facilities that is not compensated by increases in tax revenues.

CHAPTER IX

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY



CHAPTER IX

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Analyses of various on-site environmental features have found the 'O'oma II property to be well endowed with physical attributes that are desirable both as amenities in a multi-use, marine-oriented community and for their own sake. These include pristine near-shore waters and sites of cultural significance. The studies have also indicated that the proposed development is compatible with the existing natural environment. Specific recommendations to mitigate adverse impacts are being formulated in the planning stage and would be followed through in the design, construction and operation phases of the proposed project.

No short-term exploitation of resources that will have long-term consequences has been identified. The visitor accommodations and amenities that will be provided will be of high quality and designed to last for decades. If the development proposal is implemented as planned, little environmental degradation is expected to occur nor would it pose a significant risk to the health and safety of residents or visitors in the resort area or vicinity.

Improved public access to the shoreline, open space corridors and archaeological and ecological features designed to enhance public education and enjoyment are contained in the project's conceptual plan. These proposals represent long-term community gains.

As the property develops, its productivity in terms of generating tax revenues will increase. Employment opportunities generated on the site will have benefits that ripple through the regional economy. Income from property, personal and excise taxes are expected to more than offset expenses associated with expanded public services to meet he requirements of the resort and indirect population growth.

Environmental benefits and costs have not been quantified. However, where the potential for adverse environmental impacts related to the project has been identified, measures to mitigate the undesirable consequences of development have been proposed. With the possible exception of aquaculture, the property is unsuitable for certain alternative land uses in which productivity is measured by the value of their cultivated or extracted products.

CHAPTER X

CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS PREPARATION PROCESS

CHAPTER X

CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS PREPARATION PROCESS

10.1 Consulted Parties

The Environmental Impact Statement Preparation Notice (EISPN) for the proposed 'O'oma II project was published in the OEQC Bulletin on June 8, 1991. The thirty-day review period, announced in the OEQC Bulletin, ended on June 7, 1991. In addition, a more detailed EISPN, including maps of the project, was mailed directly to the agencies, organizations, and individuals listed below. The list contains parties believed to have an interest in the project or who requested consulted party status.

" * " indicates agencies or individuals who sent a written response to the EISPN

Federal Agencies

* Department of Agriculture, Soil Conservation Service
* Department of the Army, Engineering Division
  Department of Housing and Urban Development
  Department of Interior, Fish and Wildlife Service
  Department of Transportation, Federal Aviation Administration

State Agencies

* Department of Agriculture
* Department of Business, Economic Development and Tourism
* Department of Education
* Department of Health
* Department of Land and Natural Resources
* Department of Transportation
* Natural Energy Laboratory of Hawaii Authority

County Agencies

* Office of the Mayor
* Department of Parks and Recreation
  Department of Public Works
  Department of Research and Development
* Department of Water Supply
* Fire Department
* Police Department
  Department of Housing and Community Development
* Planning Department

Public Utilities

Hawaiian Electric Light Company
* Hawaiian Telephone Company

10.2 Participants in the DEIS Preparation Process

The DEIS was prepared for Kahala Capital Corporation by Helber Hastert & Fee, Planners. The following list identifies individuals and organizations who were involved in the preparation of the DEIS and their respective contributions.

Helber Hastert and Fee, Planners

Mark H. Hastert, AICP	Principal-in-charge and Project Manager
Scott Ezer	Principal DEIS Author and Project Planner

Subconsultants

KPMG Peat Marwick	Market Assessment Economic and Fiscal Impact Assessment
Paul H. Rosendahl	Historic Preservation Assessment
Char & Associates	Biological Assessment
Marine Research Consultants	Nearshore Water Chemistry Assessment
Marine Research Consultants	Nearshore Effects of Golf Course Irrigation Fertilization
R.M. Towill , Inc.	Preliminary Civil Engineering
The Traffic Management Consultant	Traffic Impact Assessment
B.D. Neal & Associates	Air Quality Study
Darby & Associates	Noise Assessment
Waimea Water Services	Water Supply Alternatives
Belt Collins & Associates	
Environmental & Turf Services, Inc.	

CHAPTER XI

COMMENTS AND RESPONSES RECEIVED DURING PREPARATION OF THE DEIS

CHAPTER XI

COMMENTS AND RESPONSES RECEIVED DURING PREPARATION OF THE DEIS

Fifteen letters were received in response to the Environmental Impact Statement Preparation Notice (EISPN); the individuals and agencies are listed below.

The following pages contain a copy of the EISPN and the cover letter requesting review of the proposed development with respect to issues that should be addressed in the DEIS. The comments received and follow-up responses are also reproduced.

Federal Agencies

Department of Agriculture, Soil Conservation Service
Department of the Army, Engineering Division

State Agencies

Department of Agriculture
Department of Business, Economic Development and Tourism
Department of Education
Department of Land and Natural Resources
Department of Transportation
Department of Health
Natural Energy Laboratory of Hawaii Authority

County Agencies

Office of the Mayor
Department of Parks and Recreation
Department of Water Supply
Fire Department
Police Department
Planning Department

Public Utilities

Hawaiian Telephone Company

Office of the Mayor

Lorraine R. Inouye
Mayor

25 Aupuni Street, Rm. 213 • Hilo, Hawaii 96720 • (808) 961-8211 • Fax (808) 961-6553

May 20, 1991

Mr. Mark H. Hastert, AICP
Helbert Hastert & Kimura
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Hastert:

State Land Use Boundary Amendment 91-2 (A91-666)
Applicant: Kahala Capital Corporation
O'oma II Master Plan
Supplemental Environmental Impact Statement
Preparation Notice (EISPN)

Thank you for the opportunity to provide comments on the preparation notice for the O'oma II Master Plan EIS. We will be coordinating our response through the Planning Department of the County of Hawaii.

Should you have any concerns in the meantime, please do not hesitate to contact my office or the Planning Department.

Aloha,

LORRAINE R. INOUYE
Mayor

XI-2

Helber Hastert & Kimura
Planners

June 3, 1991

The Honorable Lorraine R. Inouye, Mayor
Office of the Mayor
County of Hawaii
25 Aupuni Street Room 213
Hilo, Hawaii 96720

Dear Mayor Inouye:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated May 20, 1991.

We note that you will be coordinating your response through the Planning Department. We look forward to your comments and will continue to send you information and documents, including the Draft EIS, throughout this process.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

Environment Hawaii
733 Bishop Street
Suite 170-51
Honolulu, Hawaii 96813

May 20, 1991

State of Hawai`i Land Use Commission
Attention: Esther Ueda, Executive Officer
335 Merchant Street, Room 105
Honolulu HI 96813

RE: Kahala Capital Corporation amendment
to current State Land Use Commission Designation
on property situate at O`oma, North Kona, Hawai`i
TMK 7-3-09:04, 22

Dear Esther,

I read in the OEQC Bulletin of May 8, 1991, that the Kahala Capital Corporation is preparing an environmental impact statement for a boundary amendment on its property, cited above, in North Kona.

Pursuant to Chapter 343, Hawai`i Revised Statutes, I wish to indicate my interest in this project. I would like to have the applicant address, in addition to the items listed in the OEQC Bulletin, the following areas of concern:

- socio-economic impact, including work force impact;
- energy demand assessment;
- groundwater impact;
- impact on off-shore fisheries;
- potential impact on airport operations;
- potential impact on HOST Park operations.

Also, I note that the developers intend to build a "temporary maintenance/sewage treatment plant." I believe the EIS should include an assessment of the ability of the large-scale improvements proposed to the Kona wastewater treatment facilities to handle the added burden of wastewater generated by this development.

Thank you for forwarding my concerns to the petitioner.

Best wishes,

Pat Tummons

Patricia Tummons
editor

XI-3

Helber Hastert & Kimura
Planners

June 3, 1991

Ms. Patricia Tummons, Editor
Environment Hawaii
733 Bishop Street Suite 170-51
Honolulu, Hawaii 96813

Dear Ms. Tummons:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated May 20, 1991.

We note that you have expressed your interest in the above project, and we will add your name to our distribution list for the Draft EIS. We anticipate that the Draft EIS will be available during early summer.

We also note that you request the following subjects be addressed in the Draft EIS:

- o socio-economic impact, including work force impact
- o energy demand assessment
- o groundwater impact
- o impact on off-shore fisheries
- o potential impact on airport operations
- o potential impact on HOST Park operations

Please be advised that all the above areas of concern will be discussed in the Draft EIS, in addition to your final comment on the ability of the municipal wastewater treatment facilities to handle the added burden of the wastewater generated by the proposed project.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720
TELEPHONE (808) 969-1421 • FAX (808) 969-6996

May 21, 1991

Mark H. Hastert, AICP
Helber Hastert & Kimura
733 Bishop Street, Suite 2590
Honolulu, HI 96813

O'OMA II MASTER PLAN
PREPARATION NOTICE
TAX MAP KEY 7-3-9:4
FILE- BA-004-035

This is in response to your letter and supplement of May 10, 1991 regarding the subject property.

As previously commented on the project's EIS and Boundary Amendment request, water is not available unless additional source and transmission facilities are constructed.

The developer may either construct a private water system or improve the existing water system facilities. To improve the existing facilities, the following would be required.

1. Source facilities.
2. Transmission pipeline from the new source facilities to existing facilities.
3. Transmission pipeline improvement along Queen Kaahumanu Highway.
4. Transmission storage reservoirs.
5. Distribution storage reservoir.
6. Distribution pipelines.

Please be informed that it is necessary to determine more precisely the total water demand requirements for the project to adequately design the water system improvements.

Should you have any questions, please contact our Water Resources and Planning Section.

H. William Sewake
Manager

WA

XI-4

... Water brings progress...

Helber Hastert & Kimura
Planners

June 3, 1991

Mr. H. William Sewake, Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sewake:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09.04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated 21 May 1991.

As noted in your letter, the municipal water system cannot accommodate demand from the proposed project. A discussion of proposals to meet the project's domestic and irrigation water demands as well as the interrelationships with a regional water system will be presented in the Draft EIS.

You also pointed out that it is necessary to more precisely determine the total water demand requirements for the project. More specific information concerning the anticipated domestic and irrigation demands of the project will be included in the Draft EIS.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

May 22, 1991

Mr. Mark H. Hastert, AICP
Principal
Helber Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

SUBJECT: O'oma II Master Plan
North Kona, Hawaii
Supplemental Environmental Impact Statement
Preparation Notice (EISPN)

Our review of the subject preparation notice (EISPN) indicates that the proposed project will have negligible impact on the public schools in the area.

Thank you for the opportunity to comment.

Sincerely,

for Kenzo Nakata
Charles T. Toguchi
Superintendent

CTT:jl

cc: T. Nakai
A. Garson

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

XI-51

Helber Hastert & Kimura
Planners

June 3, 1991

Mr. Charles T. Toguchi, Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Toguchi:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated May 22, 1991.

We note that you indicate the proposed project will have negligible impact on the public schools in the area. We will be contacting your department in the near future for updated enrollment figures for the affected schools in the service district, to be included in the Draft EIS.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

Lorraine R. Inouye
Mayor
Victor V. Vierra
Chief of Police
Francis C. DeMorales
Deputy Chief of Police

Police Department

349 Kapiolani Street • Hilo, Hawaii 96720-3998 • (808) 961-2244 • FAX (808) 961-2702

May 22, 1991

Mr. Mark H. Hastert, AICP
Helber Hastert & Kimura
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Hastert:

SUBJECT: O'OMA II MASTER PLAN SUPPLEMENTAL EISPN
APPLICANT: KAHALA CAPITAL CORPORATION
REQUEST: AMENDMENT TO STATE LAND USE COMMISSION DISTRICT MAPS TO URBAN DISTRICT DESIGNATION
TMK: DIVISION 3, ZONE 7, SECTION 3, PLAT 09, PARCEL 4 AND PARCEL 22

The proposed application has been reviewed and if the project's roadways and proposed channelized intersection on Queen Kaahumanu Highway conform to County standards as stated in the report, we foresee no adverse effect should it be granted.

X1-6

Sincerely,

VICTOR V. VIERRA
CHIEF OF POLICE

JD:sk

cc: Kona Police

Helber Hastert & Kimura
Planners

June 3, 1991

Mr. Victor V. Vierra, Chief of Police
Police Department
County of Hawaii
349 Kapiolani Street
Hilo, Hawaii 96720-3998

Dear Chief Vierra:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject project by letter dated 22 May 1991.

Your comments concerning the project's proposed channelized intersection with Queen Kaahumanu Highway have been noted. A full description of the proposed traffic circulation improvements will be included in the Draft EIS.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

June 4, 1991

Planning Division

Mr. Mark H. Hastert, AICP
Principal
Helber Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

Thank you for the opportunity to review the Supplemental Environmental Impact Statement Preparation Notice (SEISPN) for O'oma II Master Plan, North Kona, Hawaii. The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act, the Rivers and Harbors Act of 1899, and the Marine Protection, Research and Sanctuaries Act.

a. The SEIS should state whether there are or are not any anchialine pools on the project site.

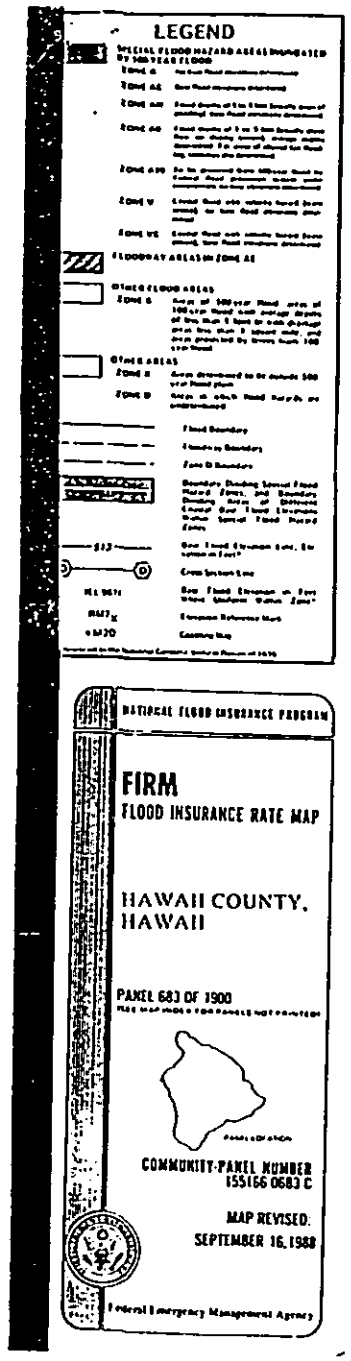
b. According to the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM), Panel 155166-0683-C, dated September 16, 1988 (copy enclosed), the project site is located in Zone AE (areas inundated by the 100-year flood with base flood elevations of 7 to 9 feet above mean sea level); Zone X - unshaded (areas determined to be outside of the 500-year flood plain); and Zone VE (areas inundated by the 100-year coastal flood with velocity hazards and a base flood elevation of 9 feet above mean sea level).

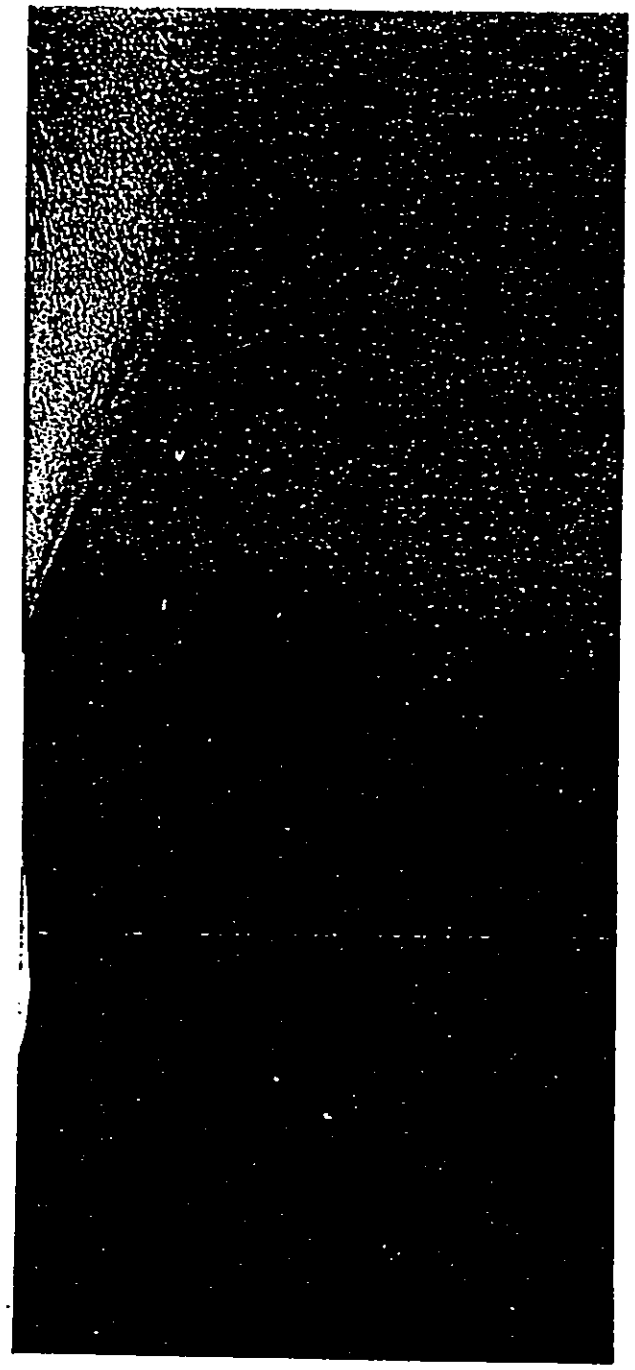
Sincerely,

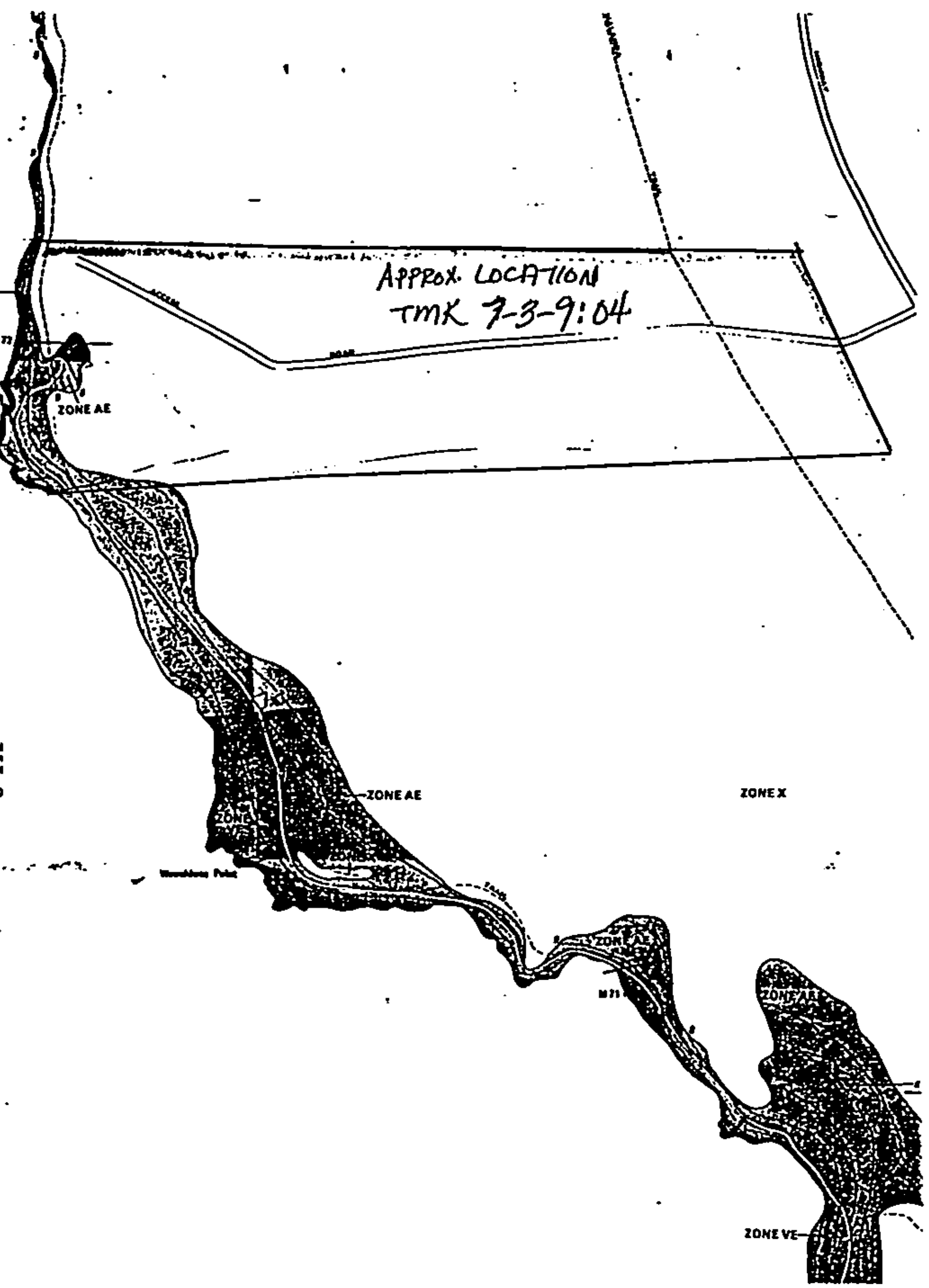
Kisuk Cheung
Director of Engineering

Enclosure

XI-7







Helber Hastert & Kimura
Planners

June 4, 1991

Mr. Kisuk Cheung, Director of Engineering
Department of Engineering
U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 4, 1991.

We appreciate that you confirmed the applicable flood hazard designations for the subject project. This information will appear in the Draft EIS. We also note your comment concerning the presence of anchialine pools on the project site. Because of the numerous anchialine pools that have been identified within the immediate region, we have taken specific action to identify any pools on the project site. We are quite certain that no pools are present.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone (808) 545-2055
Facsimile (808) 545-2050

NELH — HOST PARK
Natural Energy Laboratory of Hawaii — Hawaii Ocean Science and Technology Park

June 4, 1991

Mr. Mark H. Hastert, AICP
HELBER HASTERT & KIMURA, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

RE: O'oma II Master Plan
North Kona, Hawaii
Supplemental Environmental Impact Statement
Preparation Notice (EISPN)

Dear Mr. Hastert:

The Natural Energy Laboratory of Hawaii Authority (NELHA) depends on the high quality of the seawater and groundwater to support research, development and commercialization of aquaculture farms and other seawater use projects. The intake for the pipelines which supply warm seawater to NELHA are directly downcurrent from the O'oma property at depths of from 20 to 60 feet. The proximity of the O'oma development and the cumulative impact of other planned developments on the Kona coast are significant concerns to NELHA.

We appreciate the opportunity provided to NELHA to meet with Kahala Capital Corporation consultants for discussions about our concerns. We have reviewed the subject supplemental environmental impact statement preparation notice and offer the following comments.

1. The SEIS should address the impact of the 7 acre lagoon to nearshore seawater and to groundwater. The method and rate of draining or flushing the lagoon and the quality of the disposed water should be considered. Heavy use of the lagoon by people as well as any treatment of the lagoon water to allow recreational use may have an adverse impact on biota.

2. Wells at NELHA for aquaculture use have been established at depths which provide the required salinity and temperature for each user. If water for the lagoons and/or for irrigation is from wells, the effect on the brackish water lens should be discussed.

Natural Energy Laboratory of Hawaii Authority
P.O. Box 1749 • Kailua-Kona • Hawaii 96745 Phone (808) 329-7341 FAX (808) 326-3262

3. Both seawater and groundwater may be affected by herbicides, pesticides, fungicides and fertilizers applied to the golf course and to landscaped areas. The aquaculture farms of NELHA may experience mortalities and/or increased concentrations of toxic material in products. Types of chemicals and how runoff and leaching from the soil will be controlled needs to be discussed. The EISPN indicates that "any material that should reach the shoreline will likely be rapidly and thoroughly mixed below the level of detection". Recent studies indicate that high levels of toxic material in fish off the Florida coast are likely a result of uncontrolled use of pesticides in the Caribbean. It seems that the possibility of pesticides remaining in concentrations great enough to impact the flora and fauna is greater than the EISPN indicates.

4. Another concern is leaching of chemicals used for the treatment of building and house foundations for termite control. How will this treatment be managed for structures constructed by the developer and by private individuals?

5. The immediate proximity of the NELHA aquaculture farms to the O'oma development raises the concern of windblown herbicides, pesticides, fungicides and fertilizers used for the golf course and for landscape trees and shrubbery. None of the existing technical reports discusses the impact of windblown chemicals. Shellfish, finfish microalgae and macroalgae have a significant ability to remove toxins from the water which can cause unsuccessful recruitment in early life cycle stages of the organisms and may result in unacceptable harvested products.

6. As with the chemicals used on landscaping and golf courses, the effluent from the sewage treatment plant may impact the groundwater and nearshore seawater. The impacts and mitigating methods should be discussed.

7. The EISPN refers to the possible use of geothermal, solar, wind, and ocean energy as a source of electrical power to reduce the indirect emissions from project electrical demand. Each of these methods has associated environmental impacts which need to be addressed.

Thank you for the opportunity to review and comment on the EISPN. If you have any questions, please do not hesitate to contact me.

Sincerely,

Clare Hachmuth
Executive Director

cc: Murray Towill/Johnnie Sanders
C. Barry Raleigh

Helber Hastert & Kimura
Planners

June 6, 1991

Ms. Clare Hachmuth, Executive Director
Natural Energy Laboratory of Hawaii Authority
P.O. Box 1749
Kailua-Kona, Hawaii 96745

Dear Ms. Hachmuth:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 4, 1991.

The seven comments made in your letter can be grouped into three categories; (1) those related to the proposed seven-acre lagoon; (2) those related to the use of sewage effluent as an irrigation resource and the application of pesticides, herbicides and fertilizers on the proposed golf course; and, (3) the single comment related to the environmental impacts of the use of alternate energy resources.

As you are probably aware, studies are now being prepared concerning the first two categories of comments. Mr. Tom Nance, of Belt, Collins and Associates, is working on a study which will describe the construction, operation and maintenance of the proposed seven-acre lagoon, in addition to analyzing the impacts of the lagoon on coastal and ground water. He will specifically address possible impacts to the NELHA facilities.

Dr. Stuart Cohen, of Environmental & Turf Services, Inc. is preparing a study concerning the possible impacts related to the application of pesticides, herbicides and fertilizers on the proposed golf course. His primary focus will be on ground and coastal water. We will ask him to address your concerns about wind-borne chemicals on NELHA aquaculture farms and the possible leaching of chemicals used for treatment of building and house foundations for termite control.

The Draft EIS will also address your concerns related to the possible impacts of utilizing alternate energy resources.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

cc: Toni Fortin
Randy Vitousek
Stuart Cohen
Tom Nance

Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. BOX 50004
HONOLULU, HAWAII
96850

June 4, 1991

Mr. Mark H. Hastert
Helber Hastert & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

Subject: Supplemental Environmental Impact Statement Preparation Notice (EISPN)- O'oma II Master Plan, North Kona, Hawaii

We have reviewed the O'oma II Master Plan Supplemental Environmental Impact Statement Preparation Notice (EISPN) and like to make the following comments:

1) The area of the proposed project is predominantly lava and therefore normally has a low erosion hazard. However, the planned golf course and other facilities will probably require soil to be imported for development. If this type of work is planned, the Environmental Impact Statement (EIS) should address measures that would prevent sediment from reaching the ocean (DOH has identified this area as CLASS AA marine waters).

2) The EISPN indicates that storm runoff is planned to be handled by overland sheet flow into the ocean or by percolation into the ground through dry wells. The lava lands of the area have a high rate of percolation. Even with the addition of imported soil, there is a potential for negative impacts to any underlying groundwater and near shore water of the area by activities like golf courses. The EIS should identify measures that will be planned to mitigate these impacts.

Thank you for the opportunity to comment on this proposed project. We would appreciate reviewing the draft Environmental Impact Statement when it is completed.

Sincerely,

ACTING

WARREN M. LEE
State Conservationist

XI-11

Helber Hastert & Kimura
Planners

June 13, 1991

Mr. Warren M. Lee
Acting State Conservationist
Soil Conservation Service
United States Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Lee:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 4, 1991.

The comments in your letter are related to possible impacts of the ocean environment as a result of the proposed action. The first question concerns impacts of possible sediment loading reaching the ocean. This question will be addressed in the Draft EIS.

Your second question concerns possible impacts to near shore waters as a result of activities like golf courses. Marine Research Consultants has prepared an assessment of the nearshore effects of golf course irrigation and fertilization. In addition, Environmental & Turf Services, Inc. is preparing an assessment of the possible impacts to ground water as the result of golf course operations. Both of these assessments will be discussed and will be appear as appendices in the Draft EIS, in addition to possible measures to mitigate any impacts.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

JOHN WAIHEE
GOVERNOR
MURRAY E. TOWILL
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 FAX: (808) 548-1746

June 5, 1991

Mr. Mark H. Hastert, AICP
Principal
HELBER HASTERT & KIMURA
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

SUBJECT: O'oma II Master Plan - North Kona, Hawaii
Supplemental Environmental Impact Statement
Preparation Notice (EISPN)

Dear Mr. Hastert:

Thank you for the opportunity to participate in the evaluation of the above project. I have reviewed the subject material and offer the following comments.

1. I am specifically concorned about your statements on pages 4 and 5 under Nearshore Effects of Golf Course Irrigation and Fertilization. You state that the results of water chemistry analysis indicate that presently, there does not appear to be any unusual inputs or processes occuring off the O'oma site.

   The Supplemental Environmental Impact Statement (SIES) should specifically address in detail the results of the water chemistry analysis and the effects of long term use of chemicals over the entire project. The Natural Energy Laboratory of Hawaii Authority (NELHA) activities are reliant on contaminant-free, nutrient-rich deep ocean water. The upper layer of warm water is also used for mixing. Special attention should be given to the possible effects on the NELHA activities if water quality is affected.

2. The Keahole to Kailua Development Plan (November 1990) states that there is no assurance of finding sufficient sustainable potable groundwater in this area of relatively low rainfall. The SEIS should address the current status of additional fresh water sources, along with the water limitations to occur in the area's foreseeable future.

3. The SEIS should further discuss the availability of water for the proposed development as well as the impacts on water commitments for the "significant increase in resident/local population" and the "significant demand for housing in Kona" that are likely to occur as a result of developing the proposed project.

XII-12

The West Hawaii Regional Plan dated November 1989 stated that housing problems are perceived to be the most serious problem area for Kona. This is especially true in relation to the development of affordable housing. The SEIS should discuss the impacts of the proposed project on housing demand.

4. The SEIS should specifically discuss objectives and policies of the Hawaii Coastal Zone Management Program.

5. The SEIS should consider and discuss the impacts of other proposed adjacent resorts on the airport, NELHA and other land uses in the area. I am referring to a proposed resort development consisting of approximately 470 acres by NANSAY, south of O'oma II.

6. The SEIS should discuss the impact of the project on the access of the coastal area, currently used by local residents for recreational purposes such as fishing, diving and surfing.

For further discussion, of if you have any questions, you may contact Ms. Johnnie Sanders at 543-2746.

Sincerely,

Johnnie M. Sanders

for Murray E. Towill

OOMA.doc

Helber Hastert & Kimura
Planners

June 13, 1991

Mr. Murray E. Towill, Director
Department of Business, Economic Development & Tourism
Kamamalu Building
250 South King Street
Honolulu, Hawaii 96804

Dear Mr. Towill:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 5, 1991.

For your ease of reference we will respond to your comments in the order they appear in your letter.

1. *Off-Shore Water Chemistry.* An Assessment of the Chemistry of Nearshore Waters in the Vicinity of the O'oma II Development, North Kona, Hawaii was prepared for the proposed project by Marine Research Consultants. This report, in addition to others on the impacts of golf course irrigation and fertilization and the impacts of the proposed salt water lagoon system will be summarized and will appear as technical appendices in support of the Draft EIS. We believe these reports will address your concerns.

2. *Fresh Water Sources.* Waimea Water Services prepared an evaluation of water supply alternatives for the proposed project. The results of their analysis will be described and their full report will be included as a technical appendix to the Draft EIS.

3. *Water/Housing Impacts.* You note that in addition to expected impacts from the proposed development, the Draft EIS should also discuss how secondary population increases will be provided with water and housing, especially affordable housing. It is recognized that increases in off-site population that will occur as a result of the project will require additional development of water sources. The Draft EIS will contain an estimate of the additional water demand generated by secondary population increases.

   Affordable housing is recognized as a key issue facing West Hawaii. We are aware of this concern and will present alternatives to satisfy affordable housing requirements generated by the proposed project in the Draft EIS.

4. *Hawaii Coastal Zone Management (CZM) Program.* We note your comment on the Hawaii CZM program. The Draft EIS will contain an analysis of the proposed project as it relates to the Hawaii CZM program.

Grosvenor Center, Pill Tower | 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 | Telephone 808 545 2055 Facsimile 808 545 2050

5. *Impacts of Adjacent Resorts.* Your comment focuses on the potential impacts of the 470-acre development at Kohanaiki on the airport and NELHA, in particular. We assume that your comment refers to the possible cumulative impacts on these facilities with the development of the proposed project at O'oma II. Planning for the expansion of the Keahole Airport has been ongoing for several years, culminating in the preparation of a Final Environmental Impact Statement in October 1988 and the submittal of a zone change request to County of Hawaii in May 1990. These documents are based, in large part, on assumptions concerning the regional growth of tourism in West Hawaii. Therefore, the expansion of the Keahole Airport will be able to accommodate any increase in air traffic attributable to the Kohanaiki development in addition to the project at O'oma II.

   In so far as NELHA is concerned, we are aware of the need to maintain the quality of the near-shore marine environment. Studies of the impacts of the Kohanaiki development on the near-shore marine environment have been prepared and Nansay Hawaii, Inc. is now participating in a water quality monitoring program that includes NELHA. These studies and the water quality monitoring program will be discussed in the Draft EIS, particularly as they relate to the proposed project at O'oma II.

6. *Coastal Access.* We note your comment concerning coastal access for recreational purposes. The Draft EIS will contain a detailed description of proposed public access to and along the shoreline. This discussion will be in context with similar coastal access to the shoreline fronting the Kohanaiki property and the State-supported Ala Kahakai (Trail by the Sea) Concept.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer

Scott Ezer
Project Planner

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
AL PANG
JOYCE T. OMINE
JEANNE K. SCHULTZ
CALVIN M. TSUDA

IN REPLY REFER TO:
STP 8.4355

June 5, 1991

Mr. Mark H. Hastert, AICP
Principal
Helbert Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

SUBJECT: O'OMA II MASTER PLAN
NORTH KONA, HAWAII
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE (EISPN)

We have the following comments on the EISPN and maps which accompanied your letter of May 10, 1991:

1. We intend to have the Queen Kaahumanu Highway serve as a high speed, limited-access highway for the region.

2. We will allow access to the highway only at major interchanges. All other roadways will have to access onto a system of frontage roads on both sides of the highway which will then carry local traffic to the interchanges.

3. The developers should coordinate with adjacent developers to determine the best location of their interconnecting internal roadway system and other related infrastructure.

4. A traffic impact analysis report must be submitted for our review and approval.

5. Plans for construction work within the State highway right-of-way must be submitted for our review and approval. All costs incurred for roadway improvements shall be borne by the developer.

6. All utilities within the Queen Kaahumanu Highway right-of-way shall be placed underground and outside the edge of pavement. Bikepaths and highway landscaping should also be discussed.

7. Additional regional traffic mitigation measures required as a cumulative result of this and other projects in the area should also be provided by the developer. The developer should participate in the funding and construction of such regional traffic improvements on a pro rata basis, as determined by the State Department of Transportation.

8. The developer should commit to providing required roadway improvements. This commitment should also be a required condition for land use approval.

9. As in the past, we are very much concerned with this proposed development due to its proximity to Keahole Airport. Therefore, we request to be a consulted party. We would be interested in reviewing the details and data collected and used for the noise assessment found on Page 8 of the EISPN.

We appreciate this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

Helber Hastert & Kimura
Planners

June 13, 1991

Mr. Edward Y. Hirata, Director of Transportation
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hirata:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 5, 1991.

As you can appreciate, planning for the Queen Kaahumanu Highway corridor in the vicinity of the above project is of great importance. This is especially true in light of the many developments that may come on line in the next decade. We are very much aware of the complex transportation planning decisions that your agency must consider to insure that traffic movement does not suffer as these projects are built.

To this end, we note your comments concerning the plans for Queen Kaahumanu Highway as a limited access highway, with a minimum of interchanges and frontage roads connecting projects to the interchanges.

We also understand the need to be aware of neighboring properties' plans to implement access to Queen Kaahumanu Highway, as you suggest. In fact, the proposed project has been planned to accommodate an internal connection to the adjacent Kohanaiki property.

We also note your comments concerning the need to obtain DOT approvals for all improvements within the State highway right-of-way, including the undergrounding of utilities and the provision of bikepaths and highway landscaping. We certainly support the inclusion of a bikepath system along the West Hawaii coast, which is a primary training area for the world-famous Ironman Triathalon. However, we would hope that prior to the construction of any sections of a bikeway system, a comprehensive plan would be prepared and adopted by the County and the State.

We recognize the nature of cumulative traffic impacts that will be generated within the region as a result of this and other projects being planned in the area. We hope to work with the Department of Transportation throughout the land use approval process in identifying appropriate measures that could be employed to mitigate traffic congestion in the region. A traffic impact analysis report will be included in the Draft EIS.

Conservation Center, PBH Tower | 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 | Telephone: 808 545 2055 Facsimile: 808 545 2050

Finally, we understand your concern about this development due to its proximity to Keahole Airport. The noise assessment report will be included in the Draft EIS, which we will forward to you as soon as it is available.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Lorraine R. Inouye
Mayor
Norman K. Hayashi
Director
Tad Nagasako
Deputy Director

Planning Department

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720 • (808) 961-8288

June 7, 1991

Mr. Mark H. Hastert, AICP
Principal
Helber Hastert & Kimura
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Hastert:

Supplemental Environmental Impact Statement (SEIS)
Preparation Notice
O'oma II Master Plan
North Kona, Hawaii
TMK: 7-3-9:4 and 22

This is in response to the subject SEIS for the proposed project on the subject property. We have reviewed the information and provide you with the following comments:

1. The SEIS needs detail discussion of the different uses being proposed --- specifically the Ocean Science Center and the Water Recreation Park. What will be the source(s) and demands for water? How will the water be disposed of? What will the proposed monitoring of the movement of all water throughout the project site be? What are the impacts and/or mitigative measures on coastal resources?

2. The EISPN discusses a temporary on-site sewage treatment plant whose effluent will be used for irrigation. The permanent sewage disposal systems is to hookup to the proposed municipal treatment plant. In addition, desalination of brackish or salt water sources is being considered. Detail discussion on the brackish water source and location of the desalination plant site needs to be included in the SEIS.

3. NELHA is proposing an Ocean Science Center on the adjacent property. The marketability of two similar uses needs to be analyzed and discussed. The compatibility of the adjoining Ocean Science Center also needs to be discussed in the SEIS. A new connecting roadway between the two proposed Ocean Science Centers should be considered.

4. Detailed analysis and discussion of impacts of the proposed project to the existing and proposed uses of the surrounding properties need to be included in the SEIS.

5. A conceptual detail public access plan, including locations of shoreline access trails, roads, parking areas, needs to be included in the SEIS.

6. Any recent studies/reports should be included in the SEIS.

Thank you for the opportunity to comment on the SEIS. Should you have any questions, please feel free to contact our office.

Sincerely,

NORMAN K. HAYASHI
Planning Director

AK:smo
2053D
cc: OEQC

Helber Hastert & Kimura
Planners

June 13, 1991

Mr. Norman Hayashi, Director
Planning Department
County of Hawaii
25 Aupuni Street Room 109
Hilo, Hawaii 96720

Dear Mr. Hayashi:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 7, 1991.

For your ease of reference we will respond to your comments in the order they appear in your letter.

1. *Ocean Science Center/Water Recreation Park.* Your comments seem to focus on the possible ocean-related impacts associated with the operation of these facilities. Mr. Tom Nance of Belt Collins & Associates is preparing an assessment of the Ocean Science Center and the Water Recreation Park. His report will be summarized and be included as a technical appendix to the Draft EIS.

2. *Brackish Water as an Irrigation Source.* Waimea Water Services has evaluated the water supply alternatives for the proposed project at O'oma II. All alternatives for irrigation will be discussed and their report will appear as a technical appendix to the Draft EIS. Possible locations for a desalination plant will also be presented in the Draft EIS.

3. *Two Ocean Science Centers.* You note that NELHA is also proposing an Ocean Science Center on the adjacent HOST Park site, and question the marketability of two similar uses so close together. This concern will be discussed in the Draft EIS.

4. *Impacts to Surrounding Properties.* The Draft EIS will contain a discussion of and analysis of the possible impacts to surrounding properties, especially as they relate to the NELHA and the Kohanaiki Resort.

5. *Coastal Access.* We are aware of the importance of public access to the shoreline fronting the O'oma II property and to the adjacent Kohanaiki property. The Draft EIS will discuss in detail, plans to provide access to and along the shoreline, including access roads, trails and parking.

Grosvenor Center, Pauahi Tower | 733 Bishop Street, Suite 2590 | Telephone 808 545 2055
Honolulu, Hawaii 96813 | Facsimile 808 545 2050

Helber Hastert & Kimura
Planners

6. *Updated Studies.* All studies that have been prepared in support of the Draft EIS will appear as technical appendices to the document.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Lorraine R. Inouye
Mayor
Charmaine L. Kamaka
Director
Alan R. Parker
Deputy Director

Department of Parks and Recreation

25 Aupuni Street, Room 210 • Hilo, Hawaii 96720 • (808) 961-8311

June 10, 1991

Herber Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Subject: O'oma II Master Plan, North Kona, Hawaii
Supplemental Environmental Impact Statement
Preparation Notice

Dear Mr. Hastert:

Thank you for the opportunity to review and comment on the above.

As indicated in our review of the project (State Land Use boundary amendment application), shoreline public access concerns have been resolved through proposals outlined in the Shoreline Access Agreement (Exhibit 21).

If any questions should arise, please do not hesitate to contact us.

Sincerely,

Charmaine L. Kamaka
Director

XI-18

Helber Hastert & Kimura
Planners

June 18, 1991

Ms. Charmaine L. Kamaka, Director
Department of Parks and Recreation
25 Aupuni Street Room 210
Hilo, Hawaii 96720

Dear Ms. Kamaka:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 10, 1991.

We note that your concerns about shoreline public access have been resolved through proposals outlined in a Shoreline Access Agreement submitted with our earlier request for a State Land Use Boundary Amendment. This agreement will be summarized in the Draft EIS.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, Mauka Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

Lorraine R. Inouye
Mayor
Daniel Ayala
Fire Chief
Harding Fragas, Jr.
Deputy Fire Chief

Fire Department

466 Kinoole Street • Hilo, Hawaii 96720-2963 • (808) 961-8297 • Fax (808) 961-6920

June 12, 1991

Heller, Hastard & Kimura
733 Bishop St., Suite 2590
Honolulu, HI 96813

Attention: Mr. Scott Izer

Gentlemen:

RE: O'MAR II MASTER PLAN

The Hawaii Insurance Rating Bureau assess Public Protection Classification numbers according to risk analysis in their Public Protection Classification Manual. The lowest rating in the Kailua Kona area is a Class 6. This means that property is within 1,000 feet of a fire hydrant and within 5 road miles of a responding fire department station.

The area that this proposed development is to be made is zoned a Class 10 meaning that the fire protection facilities are not considered adequate for recognition by that bureau.

Risks located on premises of industrial, institutional and similar properties that are specifically classed as to fire protection may be classified based upon the premises classification.

Public fire hydrants must be connected to a public water system and the fire flows shall meet conditions of the Fire Code. Other considerations are type of construction.

It is our recommendation that some means of addressing this Fire Protection class be addressed as part of the Master Plan. (i.e. Fire Station within area, Automatic Fire Sprinkler)

61-IX-19

The expected savings for the different protection class is a major factor for life safety as well as property protection. It is cheaper to pay directly to receive fire protection than to pay an insurance premium and gamble on the fire loss.

Sincerely,

Daniel Ayala
Fire Chief

DA/ek

Attachment

Helber Hastert & Kimura
Planners

June 18, 1991

Mr. Daniel Ayala, Fire Chief
466 Kinoole Street
Hilo, Hawaii 96720-2983

Dear Chief Ayala:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 12, 1991.

We note your comments that according to the risk analysis of the Hawaii Insurance Rating Bureau, the project site is now classified as "Class 10," which means that existing fire protection services are not considered adequate for recognition. Possible mitigation measures addressing this problem will be discussed in the Draft EIS.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

manner deter or hinder the fire department from gaining immediate access to said equipment or hydrant. A minimum 3-foot clear space shall be maintained around the circumference of the fire hydrants except as otherwise required or approved by the chief.

(h) Identification of Hydrants or Equipment. All fire protection equipment or hydrants shall be clearly identified in a manner approved by the chief to prevent parking or other obstruction.

Fire Apparatus Access Roads

Sec. 10.207. (a) General. Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

(b) Where Required. Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access.

EXCEPTIONS: 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

For high-piled combustible storage, see Section 81.109.

(c) Width. The unobstructed width of a fire apparatus access road shall be not less than 20 feet.

(d) Vertical Clearance. Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

EXCEPTION: Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

(e) Permissible Modifications. Vertical clearances or widths required by this section shall be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

(f) Surface. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities. 20 TONS

(g) Turning Radius. The turning radius of a fire apparatus access road shall be as approved by the chief. 45'

(h) Turnarounds. All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

(i) Bridges. When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

(j) Grade. The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief.

(k) Obstruction. The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

(l) Signs. When required, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both.

Premises Identification

Sec. 10.208. (a) General. Approved numbers or addresses shall be placed on all new and existing buildings in such a position as to be plainly visible and legible from the street or road fronting the property. Said numbers shall contrast with their background.

(b) Street or Road Signs. When required by the chief, a street or road shall be identified with approved signs.

Key Box

Sec. 10.209. When access to or within a structure or an area is unduly difficult because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the chief may require a key box to be installed in an accessible location. The key box shall be a type approved by the chief and shall contain keys to gain necessary access as required by the chief.

Division III

INSTALLATION AND MAINTENANCE OF FIRE-PROTECTION, LIFE-SAFETY SYSTEMS AND APPLIANCES

Installation

Sec. 10.301. (a) Type Required. The chief shall designate the type and number of fire appliances to be installed and maintained in and upon all buildings and premises in the jurisdiction other than private dwellings. This shall be done according to the relative severity of probable fire, including the rapidity with which it may spread. Such appliances shall be of a type suitable for the probable class of fire associated with such building or premises and shall have approval of the chief.

(b) Special Hazards. In occupancies of an especially hazardous nature or where special hazards exist in addition to the normal hazard of the occupancy, or

where access for fire apparatus is unduly difficult, additional safeguards may be required consisting of additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved. Such devices or appliances may consist of automatic fire alarm systems, automatic sprinkler or water spray systems, standpipe and hose, fixed or portable fire extinguishers, suitable asbestos blankets, breathing apparatus, manual or automatic covers, carbon dioxide, foam, halogenated and dry chemical or other special fire-extinguishing systems. Where such systems are installed, they shall be in accordance with the applicable Uniform Fire Code Standards or standards of the National Fire Protection Association when Uniform Fire Code Standards do not apply.

(c) Water Supply. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed. When any portion of the building protected is in excess of 150 feet from a water supply on a public street, as measured by an approved route around the exterior of the building, there shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow. In setting the requirements for fire flow, the chief may be guided by the provision in Appendix III-A of this code.

The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on the public street or on the site of the premises to be protected as required and approved by the chief. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

(d) Fire Hydrant Markers. When required by the chief, hydrant locations shall be identified by the installation of reflective markers.

(e) Timing of Installation. When fire protection facilities are to be installed by the developer, such facilities including all surface access roads shall be installed and made serviceable prior to and during the time of construction. When alternate methods of protection, as approved by the chief, are provided, the above may be modified or waived.

(f) Approval and Testing. All fire alarm systems, fire hydrant systems, fire-extinguishing systems (including automatic sprinklers), wet and dry standpipes, basement inlet pipes, and other fire-protection systems and appurtenances thereto shall meet the approval of the fire department as to installation and location and shall be subject to such periodic tests as required by the chief. Plans and specifications shall be submitted to the fire department for review and approval prior to construction.

Maintenance

Sec. 10.302. (a) General. All sprinkler systems, fire hydrant systems, standpipe systems, fire alarm systems, portable fire extinguishers, smoke and heat

JOHN WAIHEE
GOVERNOR

YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE

ILIMA A. PIIANAIA
DEPUTY TO THE CHAIRPERSON

FAX: 548-6100

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96823-2159

June 13, 1991

Mr. Mark H. Hastert, AICP
Principal
Helber Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Hastert:

Subject: O'Oma II Master Plan Supplemental Environmental Impact Statement Preparation Notice (EISPN)
TMK: 7-3-09: 4, 22 North Kona, Hawaii
Area: 300.366 acres

The Department of Agriculture has reviewed the subject EISPN and has the following comments.

According to the Helber Hastert & Kimura letter of May 10, 1991, Kahala Capital Corporation is preparing an EIS for the purpose of re-submitting an application for State Land Use District reclassification of the subject site.

XI-21

According to the applicant's original 1986 EIS submitted for a State Land Use District Boundary Amendment (subsequently denied), the O'oma II Resort development listed an area of 313.66 acres. Since that time, 83 acres of the original area was removed from the subject area as part of a land exchange between the State of Hawaii and the Kahala Capital Corporation for the Hawaii Ocean Science and Technology Park.

In our response letter of September 5, 1986, we stated our desire that the development be integrated with a comprehensive water development plan for the area with emphasis on water source and distribution facilities. These comments remain germane to this latest application and EIS. Also, the applicant should carefully

examine the effects of applying sewage effluent and brackish water on local potable groundwater resources, and include a discussion of any concerns and mitigation measures in the Draft EIS.

Thank you for the opportunity to comment.

Sincerely,

for YUKIO KITAGAWA
Chairperson, Board of Agriculture

c: Office of Environmental Quality Control
Office of State Planning

Helber Hastert & Kimura
Planners

June 20, 1991

Mr. Yukio Kitagawa, Chairperson
Board of Agriculture
Department of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814-2512

Dear Mr. Kitagawa:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 13, 1991.

You note that the development should be integrated with a comprehensive water development plan for the area with emphasis on water source and distribution facilities. Waimea Water Services has evaluated water supply alternatives for the proposed project at O'oma II. All alternatives will be discussed and the report will appear as a technical appendix to the Draft EIS.

You also suggest that the effects of applying sewage effluent and brackish water on local potable groundwater resources should be discussed in the Draft EIS. Dr. Stuart Cohen of Environmental & Turf Services, Inc. is preparing a report that will include analysis of the effects of the use of sewage effluent as an irrigation source on groundwater. Dr. Cohen's report will also be included in the Draft EIS as a technical appendix.

Sincerely,

HELBER HASTERT & KIMURA, Planners

Scott Ezer
Project Planner

XI-22

Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone (808) 545-2055
Facsimile (808) 545-2050

GTE Hawaiian Tel
Beyond the call

GTE Hawaiian Telephone Company Incorporated
P O Box 2200 · Honolulu, HI 96841 · (808) 546-4511

June 20, 1991

Mark H. Hastert, AICP
Helber Hastert & Kimura Planners
Grosvenor Center, PRI Tower
Honolulu, Hawaii 96813

Subject: O'oma II Master Plan
North Kona, Hawaii
Supplemental Environmental Impact
Statement Preparation Notice (EISPN)

Dear Mr. Hastert:

Thank you for including GTE Hawaiian Tel as a consulted party in the preparation of the Environmental Impact Statement for the above referenced O'oma II project.

I would appreciate all applicable matters concerning the subject project be discussed with Gordon Yadao, Outside Plant Supervising Engineer for the island of Hawaii. He can be reached in Hilo at 933-6459.

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If I can be of further assistance, please do not hesitate to call me at 546-3484.

Sincerely,

Walter M. Matsumoto
Operations Manager
OSP Engineering

Helber Hastert & Kimura
Planners

July 9, 1991

Mr. Walter M. Matsumoto, Operations Manager
OSP Engineering
GTE Hawaiian Telephone Co., Inc.
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Mr. Matsumoto:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated June 20, 1991.

We note your request that all matters concerning the O'oma II Master Plan be discussed with Mr. Gordon Yadao, Outside Plant Supervising Engineer for the island of Hawaii. We will contact Mr. yadao prior to the publication of the Draft Environmental Impact Statement.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

Grosvenor Center, PRI Tower
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Honolulu, Hawaii 96813
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JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
KEITH W. AHUE
MANABU TAGOMORI
Dan T. Kochi
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

REF:OCEA:WK

JUN 27 1991

File No.: 91-493
Doc. No.: 0974E

Mr. Mark H. Hastert
Helber Hastert and Kimura
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

SUBJECT: O'oma II Master Plan - North Kona, Hawaii. Supplemental Environmental Impact Statement Preparation Notice (EISPN)

Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the materials you submitted and have the following comments.

Our Department's Division of Aquatic Resources comments that to safeguard the quality of the coastal environment which attracts public use, consideration should be given to possible impacts of drainage water, wastewater disposal and nutrient enrichment, including possible impact to the nearby NELHA.

The applicants should provide, as they mentioned in the EISPN supplement, reasonably convenient public access to, and reasonable amounts of free public parking near the shoreline for fishermen and other recreational users. In addition, the applicants should declare intentions regarding commercial activities on public shoreline lands (such as charging customers to windsurf, jet ski, participate in snorkel or boat tours, etc.) and other activities that could interfere with public enjoyment of the area and excessively harass or disturb threatened and endangered marine life.

Proposed shoreline improvements or modifications should be adequately described in the forthcoming DEIS and the Department should have the opportunity to review all proposed activities within the Department's jurisdiction that may restrict or discourage the present public's use of State shoreline land in this vicinity.

The planned water recreation park should be described in detail and data submitted to the Department providing mitigation measures proposed that would limit or prevent impacts adverse to nearshore aquatic resource values or affect ongoing activities at the NELHA facility.
The Division of Forestry and Wildlife points out that the Ala Kahakai proposed trail traverses across the property along the coastline. The EIS needs to address this concern and how it will satisfy any rights-of-way for the public.

The Division of Water Resource Management indicates that the EIS should detail the quantity, quality, and source of water needed for this project.

Thank you for your cooperation in this matter. Please feel free to call me or Roy Schaefer at our Office of Conservation and Environmental Affairs, at 548-7837, if you have questions.

Very truly yours,

William W. Paty

Helber Hastert & Kimura
Planners

July 3, 1991

Mr. William W. Paty, Chairperson
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated May June 27, 1991.

We note your comment concerning possible impacts to the coastal environment as a result of drainage water, wastewater disposal and nutrient enrichment. All of these subjects are being analyzed by a group of consultants. The results of their analyses will be summarized in the Draft EIS, with their full reports included as technical appendices.

The proposed plans for the O'oma II development provide for paved access roads to public parking areas for beach access. We are fully aware of the importance to include access to and along the shoreline, thus insuring continued recreational use of the coastline for residents as well as visitors. In this spirit, restrooms, shower facilities and a pedestrian trail along the shoreline will be provided as part of the overall development. The coastal pedestrian trail is intended to be integrated into the proposed Ala Kahakai trail. A full description of all elements of our plans for public access will be included in the Draft EIS. We do not intend to offer any commercial activities on public shoreline lands. All shoreline areas will be left in their natural condition.

You also note that the planned water recreation park should be described in detail, and data should be provided identifying mitigating measures that could mitigate or prevent any adverse impacts to nearshore aquatic resources or that would affect ongoing activities at the NELHA facility. Mr. Tom Nance of Belt Collins & Associates is preparing a detailed analysis of the possible impacts associated with the water recreation park. His work will be summarized in the Draft EIS, with his full report attached as a technical appendix.

Gateway Center, 900 Fort [illegible] 733 Bishop Street, Suite 2590 Telephone 808 545 2055
Honolulu, Hawaii 96813 Facsimile 808 545 2050

Helber Hastert & Kimura
Planners

The Draft EIS will also contain a full discussion of water resources needed by the proposed project.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Toni Fortin

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
File: EMD/CWB

Ref. No. 91-2-158X

C0704EC

July 9, 1991

Mr. Mark H. Hastert, AICP
Principal
Helber Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

Subject: Supplemental Environmental Impact Statement Preparation Notice (EISPN) for O'oma II Master Plan, North Kona, Hawaii

The Department of Health appreciates the opportunity to comment on the subject EISPN transmitted by your letter of May 10, 1991.

Based on the scope stated in the EISPN, the Department feels that concerns in the following areas must be adequately addressed in your upcoming draft EIS:

1. A narrative description detailing the operation of the proposed Ocean Science Center (OSC). The description should include, but not be limited to, the nature of the OSC (i.e. commercial, research...etc.), the intake water sources, treatment and disposal methods of the effluent from the indoor and outdoor tanks, and the potential impact, if any, to the receiving waters.

2. Detailed description of the proposed Water Recreation Park operation. This should also include, but not be limited to, the intake water source(s), the treatment and disposal methods for effluent discharges from the swimming lagoon or swimming pools, and the potential impact, if any, to the receiving waters.

3. A comprehensive water pollution control plan. To minimize the potentially adverse-impact to the receiving water quality and nearshore ecosystem from golf course irrigation, fertilization, and the use of pesticides and herbicides, a plan should be prepared.

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The nearshore receiving water is classified by the Department as "Class AA, Marine Waters". Chapter 11-54, Water Quality Standards of the Hawaii Administrative Rules (HAR), states that:

> "It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected. No zone of mixing shall be permitted in this class:
>
> (A) Within a defined reef area, in waters of a depth less than ten fathoms; or
>
> (B) In waters up to a distance of one thousand feet offshore if there is no defined reef area and if the depth is greater than ten fathoms.
>
> The uses to be protected in this class of waters are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment. The classification of any water area as class AA shall not preclude other uses of the water compatible with these objectives and in conformance with the criteria applicable to them."

The concept of using the receiving water as mixing zone to assimilate the pollutant, as identified in the fourth paragraph on Page 5, is not acceptable nor does it comply with the Department's anti-degradation policy as listed in Section 11-54-01 of the HAR.

4. Stormwater control plan. It is predicted that a tremendous increase in stormwater runoff from the project site will occur after the development. The design and operation of stormwater drainage systems should preclude the concept of allowing the stormwater runoff by sheet flow into the receiving water. The potentially adverse-impact to the receiving water from the design and operation of the proposed drainage system must be adequately addressed.

5. A comprehensive erosion control plan. To minimize the potential impact of earth erosion from the project on nearshore waters, a plan should be prepared.

6. A comprehensive receiving water quality monitoring plan covering the pre-construction, during construction, and post-construction periods. Such a plan is required to identify the potentially adverse-impact to the receiving waters.

Heller Hastert
Planners

August 6, 1991

Dr. John C Lewin, M.D., Director of Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated July 9, 1991.

For your ease of reference we will respond to your comments in the order they appear in your letter.

1. Narrative Description of the Proposed Ocean Science Center. Dr. Tom Nance, of Belt Collins and Associates is preparing a comprehensive study on the impacts of the proposed Ocean Science Center (and the Water Recreation Park). This study will describe the operation of both facilities, potential impacts associated with each and any measures to mitigate potential impacts. Dr. Nance's report will be summarized in the draft EIS and will also be included in full as a technical appendix.

2. Detailed Description of the Proposed Water Recreation Park. See #1, above.

3. Comprehensive Water Pollution Control Plan. Dr. Stuart Cohen is analyzing the potential impacts associated with the operation of the proposed golf course, including impacts to ground water and ocean water as a result of the application of fertilizers, pesticides and treated effluent (as an irrigation source). Dr. Cohen's report will be summarized in the draft EIS and will also be included in full as a technical appendix.

4. Stormwater Control Plan. R.M. Towill Corporation prepared an infrastructure study for the O'oma II development, including drainage. This report is summarized in the draft EIS and will be attached to the draft as a technical appendix. Based on the proposed master plan, particularly the increase in impervious surfaces, storm water run-off within the project site is expected to increase from 268 cubic feet per second (cfs) to about 450 cfs. The majority of the runoff would be allowed to drain naturally via three methods: by percolation into the soil; by draining naturally into the ocean as a result of sheetflow; and, into a series of drywells. In addition, the primary open space on the property, (the proposed golf course), will provide areas for retention basins for excess runoff. It is anticipated that these methods will not result in an appreciable increase in storm water reaching the ocean, if at all. As planning for the proposed project reaches a greater level of detail, actual drainage improvements will be refined to ensure that receiving waters are not adversely impacted.

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Grosvenor Center, Pali Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
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7. Detailed description of anchialine pool protection measures. If there should be any anchialine pools located within the project site, the draft EIS must address how these anchialine pools would be preserved and protected.

In addition, the Hawaii County Wastewater Advisory Committee has determined that the subject project is located within the proposed critical wastewater disposal area. Consequently, no new cesspools will be allowed in the project area.

As no municipal wastewater treatment and disposal facility currently exists in the area, the Department concurs with the use of a temporary sewage treatment plant until the proposed municipal treatment plant is completed in the year of 2005. However, the Department does reserve the right to review the detailed wastewater plans for conformance with HAR, Chapter 11-62, Wastewater Systems.

The Department reserves the right to review and comment on the draft and final EIS. If you should have any questions, please contact Mr. Edward Chen of the Engineering Section, Clean Water Branch, at 543-8309.

Very truly yours,

JOHN C. LEWIN, M.D.
Director of Health

5. **Comprehensive Erosion Plan.** Because of the nature of existing soil types (predominantly pahoehoe and a'a lava), the overall lack of topsoil, and rainfall patterns in the Kona region, it is anticipated that erosion will not cause significant impacts on nearshore waters. The construction period (especially during the construction of the golf course, which will require the importation of large amounts of soil), and the "grow-in" period for the golf course landscaping will present the highest risk of potential erosion. These activities will be conducted in accordance with County grading requirements.

6. **Comprehensive Receiving Water Quality Monitoring Plan.** In 1986, Marine Research Consultants prepared a "Baseline Assessment of the Marine Environment in the Vicinity of the O'oma II Development." This study presented a detailed description of the physical and biological setting at four representative areas fronting the project site. Subsequent to this study, in 1990, Marine Research Consultants prepared an "Assessment of Chemistry of Nearshore Waters in the Vicinity of the O'oma II Development, North Kona, Hawaii," to analyze water chemistry constituents that contribute to water quality in the nearshore regions that are most likely to be affected by the proposed project. This most recent report describes the results of a survey designed to characterize the present water quality in the vicinity of O'oma II (both reports prepared by Marine Research Consultants will be included as technical appendices in the draft EIS).

In addition, there are two existing water quality monitoring programs in place within the region: (1) the ongoing "Keahole Point Comprehensive Environmental Monitoring Program"; (2) a monitoring program established by Nansay Hawaii, Inc. for the nearshore waters in the vicinity of the proposed Kohanaiki Resort; and, (3) an effort sponsored by Sea Grant and Mauna Lani Resort, Inc. to adopt uniform water quality monitoring procedures, parameters and standards. Comparison of data collected for the 1990 Marine Research Consultants study and data from the Keahole Comprehensive Environmental Monitoring Program indicates that there are presently no major discernible differences between inputs at the O'oma II site and at more northerly locations toward Keahole Point.

We are particularly cognizant of the need to protect nearshore water quality within the region and fully intend to develop and implement a comprehensive water quality monitoring program similar to those that currently exist. We also recognize the need to work closely with State and County officials in developing the program and with the Natural Energy Laboratory of Hawaii Authority (NELHA), Nansay Hawaii, Inc. and Sea Grant/Mauna Lani Resort, Inc. to ensure a cooperative approach to maintaining nearshore water quality.

7. **Anchialine Pool Protection Measures.** There are no anchialine pools located within the project site.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
KEITH W. AHUE
MANABU TAGOMORI
DAN T. KOCHI

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER RESOURCE MANAGEMENT

July 30, 1991

Mr. Mark Hastert, Principal
Helber Hastert & Kimura
Grosvenor Center - PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

SUBJECT: Supplemental EIS Prep Notice - O'oma II Master Plan
O'oma, North Kona, Hawaii
TMK: 7-3-9: 4

This responds to your letter of May 10, 1991, to Mr. Paty asking for our department's comments. We have missed our departmental deadline of June 6, 1991, so we are sending these comments separately.

The Supplemental EIS Preparation Notice's text on Archaeological Assessment does not use the correct terminology, nor does it include enough information, to be in compliance with historic preservation concerns. It should indicate that prior survey was reviewed by our office and found to be acceptable. It should cite the survey work (eg. PHRI 1986). It should indicate how many "significant" historic sites are present in the current project area, and the EIS should locate these sites on a map and present their significance evaluations in a table (indicating which criteria of the Hawaii Register of Historic Places apply to each site). It must then be stated what the agreed upon mitigation commitment for these sites had been agreed upon with our office. Some sites were to undergo the "archaeological data recovery" form of mitigation (not "data collection"), while others were to be preserved. Last, it should be stated that a detailed mitigation plan (data recovery scope of work and preservation plan) is to be approved by our office and the County's Planning Department and that these offices will verify your successful execution of these plans.

The above items are standard wording and steps in the historic preservation review process.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

cc: Norman Hayashi, Planning Department - County of Hawaii
Land Use Division, Office State Planning
OCEA (File No. 91-493)

Helber Hastert
Planners

August 7, 1991

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

Thank you for responding to our EIS Preparation Notice for the subject property by letter dated July 30, 1991.

We note your comments concerning standard wording and steps in the historic preservation review process. The draft EIS will include the information you identify in your letter.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

Helber Hastert & Fee
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
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JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
File: EMD/CWB

August 9, 1991

Ref. No. 91-2-158X

C0806EC

Mr. Mark H. Hastert, AICP
Principal
Helber Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

Subject: Supplemental Environmental Impact Statement Preparation Notice (EISPN) for O'oma II Master Plan, North Kona, Hawaii

This is a follow up to my letter No. C0704EC of July 9, 1991. It has come to my attention that some concerns regarding the proposed Ocean Science Center, Water Recreation Park, and Conference Center were inadvertently left out from the Department of Health's original comments.

X1-3

The following paragraphs now constitute our official position:

1. The public swimming pools and Water Recreation Park must meet the minimum applicable requirements under the Hawaii Administrative Rules (HAR), Title 11, Department of Health, Chapter 13, Public Swimming Pools, and Chapter 11, Sanitation.

   Section 11-13A-11(a) of Chapter 13, HAR, states that "The water supply serving the pool shall meet the requirements of HAR, Chapter 11-20, Potable Water Systems, except that the director may approve the use of water from natural sources including saline water."

   The concern is on the maintenance of water quality, as per the standards in HAR, Chapter 11-13, if the source is saline water.

2. Sanitary facilities must be provided for all the proposed public gathering places, such as the Ocean Science Center and Conference Center. Minimum facility requirements shall be provided for as set forth in HAR, Chapter 11-11.

The Department of Health reserves the right to review and comment on the draft and final EIS.

If you should have any questions regarding public swimming pools, please contact Mr. Kelvin Sunada, Sanitation Branch, at 548-5397. Questions regarding sanitary facilities may be addressed to Mr. Harold Yee, Wastewater Branch, at 543-8294.

Very truly yours,

JOHN C. LEWIN, M.D.
Director of Health

Helber Hastert
Planners

September 12, 1991

Dr. John C Lewin, M.D., Director of Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Environmental Impact Statement Preparation Notice

This is in response to your letter of August 9, 1991 (which we received on August 22, 1991) concerning our EIS Preparation Notice for the subject property. Your letter of August 9 was a follow-up to an earlier response we received from the Department of Health dated July 9, 1991.

We note your comments on the quality of the water supply serving the water recreation park and the need for sanitary facilities for all public gathering places, such as the Ocean Science Center and the Conference Center. All public facilities, including areas for public access, will be provided with adequate sanitary facilities.

We also recognize the need to provide water of sufficient quality for the water recreation park to meet the standards in HAR, Chapter 11-13, if the source is saline. We intend to coordinate all aspects of this project with your department during the approval and design processes.

Also, in our earlier letter to you, dated August 7, 1991, we noted that there were no anchialine pools on the subject property. Since that time, it has come to our attention that there is a small anchialine pond feature located on the southern property line, about 600 feet mauka of the shoreline. This anchialine pond feature is about 1 m^2. A complete description of this feature will be included in the draft Supplemental EIS, as well as a discussion of the effects of the proposed development on it.

XI-31

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

Helber Hastert & Fee
Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
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CHAPTER XII

REFERENCES

CHAPTER XII

REFERENCES

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CHAPTER XIII

PARTIES WHO REVIEWED AND COMMENTED ON THE DSEIS

CHAPTER XIII

PARTIES WHO REVIEWED AND COMMENTED ON THE DRAFT SEIS

A notice announcing the availability of the Draft Supplemental Environmental Impact Statement (DSEIS) was published in the OEQC Bulletin on 23 September 1991. Helber Hastert & Fee, Planners sent a copy of the DSEIS with a request for their comments to the agencies, organizations and individuals listed below.

Parties who submitted comments, including those who replied with a "no comment" statement, are marked with an asterisk. Parties who submitted comments but were not on the DSEIS distribution list are marked with a double asterisk. Their letters are reproduced followed by our responses.

Federal Agencies

Department of Agriculture, Soil Conservation Service
* Department of the Army, Engineering Division
Regional Division U.S. Environmental Protection Agency
Army Directorate of Facilities Engineer
* Naval Base, Pearl Harbor
U.S. Coast Guard
U.S. Fish and Wildlife Service
* U.S. Geological Survey
Department of Housing and Urban Development
* Federal Aviation Administration

State Agencies

* Department of Agriculture
* Department of Business, Economic Development and Tourism
* Department of Education
* Department of Land and Natural Resources
* Department of Transportation
* Department of Health
* Natural Energy Laboratory of Hawaii Authority
* Office of Environmental Quality Control
Department of Accounting and General Services
Department of Defense
DLNR Historic Preservation Office
* Housing Finance and Development Corporation
* DBED State Energy Office
* Office of State Planning

County Agencies

Office of the Mayor
Department of Parks and Recreation
Department of Water Supply
* Fire Department
* Police Department
* Planning Department
Department of Research and Development
Department of Housing and Community Development

Public Utilities

Hawaiian Telephone Company

Individuals/Community Organizations

Greenpeace Hawaii
Environment Hawaii
** Keahole Point Association

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO
11011
Ser 00F2/2515
26 SEP 1991

Department of Business, Economic Development
and Tourism Land Use Commission
Attn: Ms. Esther Ueda
335 Merchang Street, Room 104
Honolulu, Hawaii 96813

Gentlemen:

'O'OMA II MASTER PLAN

We have reviewed the subject DEIS and have no comments to offer. Since we have no further use for the DEIS, it being returned to the Office of Environmental Quality Control.

Thank you for the opportunity to review the draft.

Sincerely,

W. K. LIU
Assistant Base Civil Engineer
By direction of
the Commander

Copy to:
Kahala Capital Corp.
(Ms. Toni Fortin)
Helber Hastert & Fee, Planners
(Mr. Scott Ezer)
OEQC (w/DEIS)

XIII-3

Helber Hastert & Fee
Planners

October 10, 1991

Mr. W.K. Liu, Assistant Base Civil Engineer
Department of the Navy
Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860-5020

Dear Mr. Liu:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

We acknowledge receipt of your letter dated September 26, 1991 concerning the above, and note that you have no additional comments.

Thank you for reviewing the Draft Supplemental EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

Helber Hastert & Fee
Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone: (808) 545-2055
Facsimile: (808) 545-2050

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:

November 11, 1991

91-391/158/EPO

Ms. Ester Ueda
Land Use Commission
Department of Business, Economic
Development and Tourism
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS) for O'oma II Master Plan, North Kona, Hawaii
TMK: 7-3-09: 4, 22

We have reviewed the material on the subject project and have the following comments to offer:

XIII-4

Wastewater

Our main concern is domestic wastewater treatment and disposal. As no municipal wastewater treatment and disposal facility exists in this area, we concur with the use of a temporary sewage treatment works that will provide secondary treatment, constructed as part of the proposed project. Individual wastewater systems may not be appropriate for such wastes or developments. Detailed plans for both domestic and non-domestic wastewater must be submitted to and approved by the Department of Health's Wastewater Branch for conformance to Administrative Rules, Chapter 11-62, "Wastewater Systems."

If you should have any questions, please contact Mr. Harold Yee of the Wastewater Branch at 586-4294.

Water Pollution

1. The DSEIS identified desalinated water as one (1) of the three (3) water sources for golf course irrigation. We cannot find any statement describing the proposed desalination plant. The waters off the project site are classified by the Department of Health as AA marine waters. Discharge of process wastewater (or commingled with other waters) into AA waters is prohibited.

2. The construction project will involve more than five (5) acres. An application for a National Pollutant Discharge Elimination System permit for the project's storm water runoff is required. The applicant is encouraged to contact the Clean Water Branch for details.

3. The DSEIS calls for utilizing nearshore waters as a mixing zone for:

   a. Herbicides, fertilizers, and sewage effluent used in golf course irrigation which leached into groundwater and reached the shoreline (see Page I-6).

   b. Saline groundwater that is pumped into a salt water swimming lagoon and disposed of by seeping into the ground and subsequently enters nearshore waters at a rate of 36 million gallons per day (see Appendix F).

   The concept of utilizing the nearshore Class AA waters as a mixing zone is not acceptable. Utilizing Class AA waters to assimilate the pollutants from the project construction and operation does not meet the requirements as specified in Sections 11-54-01.1 and 11-54-03(c)(1) of the Hawaii Administrative Rules.

4. The difference in water quality between the existing ambient marine water (Tables 1 and 2 of Appendix F) and the saline groundwater (see Table 3 of Appendix F) from Waikoloa well 555-02 is very obvious. The difference of water quality between the brackish groundwater and the saline groundwater is also obvious. The impact of altering the groundwater flow on existing nearshore water chemistry has not been addressed. The impact from altering of existing nearshore water chemistry on the biotic structure was also not addressed.

   Page 10 of Appendix D states that "any changes in water quality owing to shoreline development would trigger mitigative action, hopefully at a level below that capable of inducing change in biotic structure." However, no mitigative plan is proposed.

If you have any questions on this matter, please contact Mr. Edward Chen at 586-4309.

Very truly yours,

Bruce S. Anderson

FOR JOHN C. LEWIN, M.D.
Director of Health

c: OEQC
Kahala Capital Corporation
Helber Hastert & Fee, Planners

XIII-5

Helber Hastert
Planners

November 22, 1991

Dr. John C. Lewin, M.D., Director of Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated November 11, 1991.

For your ease of reference, we will respond to your comments in the order they appear in your letter.

Wastewater

We acknowledge the need to submit detailed plans for the treatment of both domestic and non-domestic wastewater for approval by the department's Wastewater Branch for conformance to Administrative Rules, Chapter 11-62, "Wastewater Systems."

Water Pollution

1. We recognize that there is no statement in the SEIS which describes a proposed desalination plant. As you can appreciate, water availability in the North Kona region remains an issue full of uncertainties. Consequently, we are investigating several options to provide both potable and irrigation water for the proposed development, including a desalination plant. At this time, both the reverse osmosis and electrodialysis processes are being considered. Should desalination become the favored option, effluent disposal will be addressed in further studies coordinated with your staff.

2. We acknowledge that we will need to apply for a National Pollutant Discharge Elimination System (NPDES) Permit for the project's storm water runoff. We will contact the Clean Water Branch at an appropriate time.

3. You state that the Draft SEIS calls for utilizing nearshore waters as a mixing zone for herbicides, fertilizers and sewage effluent used for the proposed golf course and saline groundwater that will seep from a proposed saltwater lagoon into groundwater. You also state that the concept of utilizing the nearshore Class AA waters to assimilate the pollutants from the project construction and operation is not acceptable under the provisions of Sections 11-54-01.1 and 11-54-03 (c)(1) of the Hawaii Administrative Rules.

We believe that the report prepared by Dr. Stuart Cohen and others (Environmental Risk Assessment and Integrated Golf Course Management Plan for the Golf Course at the Proposed O'oma II Complex on the Kona Coast, September 1991), which appears in Volume II of the SEIS as Appendix G, clearly demonstrates that the nearshore waters will not be used as a mixing zone for leachates which enter the ground water from the operation and construction of the proposed project. Rather, these constituents will already be diluted before they reach the nearshore waters:

> "These [pesticide concentration] levels are compared with Human Health Advisory Levels (HAL) and to Aquatic Toxicity concentrations of concern. As can be seen from Table 20, the nearshore concentrations for all pesticides are well below any health hazards for humans or marine life which might be present. The Kohanaiki Anchialine Ponds are also within the dilution factor range and will not be adversely affected by properly applied pesticides.
>
> With concentration levels this low in the ground water [emphasis added], it is unnecessary to attempt to determine concentrations that might occur in the ocean as a result of ground water extrusion to the open coastline. The additional dilution would further reduce the pesticide concentrations to infinitesimal values." (pages 130-131)

As for the saline water that will be used for the seven-acre lagoon, you imply that this water is a pollutant which will need to be assimilated by the nearshore marine environment. As described by Mr. Tom Nance in his report which appears in Appendix F of Volume II of the Draft SEIS (Saltwater Ponds of the 'O'oma II Project: Recommended Circulation System and Analysis of Environmental Effects, September 1991), there are two basic approaches to keeping pond water clear and growth of aquatic plant life at acceptable levels; recirculation or single-pass, flow-through circulation. In the case of 'O'oma II, the single pass, flow-through circulation method has been chosen to control lagoon water quality. By achieving a high water turnover rate (10-hour residence time), water quality is maintained. Since the feed water for the lagoon will be almost identical to sea water, (about 95 to 97 percent saline), the lagoon water that seeps into the groundwater will actually be closer to the composition of sea water than would groundwater.

As for the chemical constituents of the lagoon water, Mr. Nance writes:

> "Nutrients in the well [feed] water, hopefully at concentrations as low as seawater, would be utilized in biological processes in the lagoon system. Nitrates and phosphates will be taken up by benthic algae and by phytoplankton as these plants grow within the system. These plants will be eaten by herbivores (fishes and invertebrates) or, upon their death, utilized by bacteria. These processes produce biomass, waste products such as ammonia, and particulate and dissolved organics. It is expected

> that nitrogen and phosphorus entering the system in well water will exit the system in several dissolved forms in the seepage water or become bound in organic and particulate matter, some of which would be retained and the balance of which may be lost through seepage." (page 10)

In effect, the proposed circulation system would amount to a recirculation of seawater. Seepage from the sides and bottom of the lagoon would percolate to the underlying groundwater lens and move from there to the shoreline.

4. You state that the impact from altering existing nearshore water chemistry on the biotic structure was not addressed. A report prepared by Marine Research Consultants (Effects of Golf Course Irrigation and Fertilization on Nearshore Marine Waters off the West Coast of the Island of Hawaii, November 1990), which appears in Volume II of the Draft SEIS as Appendix E, is devoted to this subject. The conclusions of this report state, in part:

> "Based on the results of this study, it appears that a golf course and associated development at the O'oma site would not cause any negative effects to the marine environment. It is entirely possible that higher loading, such as may occur with discharge of nutrient-laden waste waters directly into the nearshore zone, might invoke uptake and biotic response. Even though over irrigating and rapid percolation appear to be characteristics of some golf courses, and do not appear to result in measurable throughput to the ocean, the potential exists for impacts with inputs of larger magnitudes." (page 9).

In order to appreciate the conclusions of these two reports, it is important to understand the relationship of the quality of the groundwater reaching the nearshore waters and the adherence to an Integrated Golf Course Management Plan (IGCMP), as proposed by Dr. Cohen. The IGCMP provides guidelines for the construction and operation of the proposed golf course, including: the composition of subsurface soils and filtering materials; types of herbicides and fertilizers to be used and their application techniques; and, type of turfgrass for greens, tees and fairways, among others. We believe that the adherence to stringent management practices will limit impacts to groundwater, and thus ensure the continued high quality of the nearshore waters fronting 'O'oma II.

You also state that no mitigative plan is proposed should any changes occur in water quality as a result of development at 'O'oma II. We hope to work closely with your office in developing such a plan. We also hope to discuss with you and your staff, all issues presented in your letter of November 11, and other key concerns that may be raised during the review of this project.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin
OEQC

XIII-7

NELH — Natural Energy Laboratory of Hawaii

HOST PARK — Hawaii Ocean Science and Technology Park

November 8, 1991

LAND USE COMMISSION
335 Merchant Street, Rm 104
Honolulu, Hawaii 96813

Attn: Ms. Esther Ueda

SUBJECT: Comments on 'O'oma II Resort Development, North Kona, Hawaii, Draft Supplemental Environmental Impact Statement, Dated September, 1991

Dear Ms. Ueda:

The Natural Energy Laboratory of Hawaii Authority (NELHA) has reviewed the subject Draft Supplemental Environmental Impact Statement (DSEIS) and welcomes the opportunity to provide comments to be used in preparing the Final EIS.

As noted in our comments on the EIS Notice of Preparation, NELHA depends on the high quality of the seawater and groundwater at Keahole Point to attract and support research, development and commercialization of aquaculture, renewable energy and related technologies. Thus the potential and cumulative impacts of development along the Kona coast are of great concern.

Before addressing the potential impacts, we must point out the unique nature of the projects at NELHA and the extreme sensitivity to environmental changes which may occur due to development of the sort planned at 'O'oma II. Projects at the site culture many plant and animal species throughout their life cycles. Currently, abalone, flounder, salmon, oysters, Maine lobster, namako, sea urchins, ogo, nori, Spirulina and other micro and macroalgae are among the cultured species. These organisms are being grown in tanks and raceways in seawater pumped from two depths of the ocean - approximately 60 feet and 2000 feet deep, and/or in the brackish groundwater which underlies the site. Each of the organisms has sensitive larval or developmental stages which are very susceptible to minute changes in the environment. Many of the animals take a significant amount of time - up to 3 years - to reach market size. Both macro and microalgae are particularly adept at accumulating toxic materials during their relatively short growth cycle.

Because of these particulars, small environmental changes can have disastrous consequences for our aquaculture tenants. The impact on these aquaculture systems from a single pulse of toxic material will be far more severe than the impact would be on natural ecosystems which tend to be more extensive and thus more resilient. It is vital that the potential for economic catastrophe to these tenants be recognized.

The proposed 7-acre lagoon and the golf course are considered to have the greatest potential for adverse impact on NELHA. The DSEIS has

Natural Energy Laboratory of Hawaii Authority
P.O. Box 1749 • Kailua-Kona • Hawaii 96745 Phone (808) 329-7341 FAX (808) 326-3262

addressed the expected impacts of these features, but we feel that more attention must be paid to mitigation of the recognized impacts.

The hydrology study indicates a potential significant negative impact to the groundwater and the ocean in one scenario. The recommended mitigation efforts in the event of this impact need to be addressed.

Another concern is control of algae growth in the lagoon. The use of herbivorous fish and small invertebrates is the proposed control method in the DSEIS. However, this lagoon is for recreation and people will be swimming in it. Please discuss how the algaes will be controlled if there is incompatibility between people and the fish.

The IGCH program proposed by Dr. Cohen represents an admirable effort to address some difficult problems in mitigating the environmental impacts from the proposed golf course. We have the following comments on this aspect of the impacts of the proposed 'O'oma II resort.

Though we accept that compliance with the details of this plan may minimize the environmental impacts of the golf course, we also recognize that the plan will be ineffective if its details are not followed. The misuse of the biocides proposed for pest control and turf maintenance could easily lead to serious damage to the aquaculture projects at NELHA. Please discuss how the IGCH plan will be enforced and how its continued enforcement will be ensured after the resort has been taken over by a management organization or sold. This should include the enforcement of the use of the referenced California standards for treatment of sewage plant effluent to be used for golf course irrigation.

The 15' berm which is proposed for controlling aerial dispersal may actually have the effect of elevating the spray, allowing further dispersion. Please include modeling of the airborne contaminants under the various wind conditions that occur at Keahole Point.

The DSEIS indicates that biocide-free golf course maintenance would be difficult, however we believe that the solution to possible biocide drift to the aquaculture projects is to eliminate biocides.

Thank you for the opportunity to review and comment on this DSEIS.

Sincerely,

Clare Hachmuth
Executive Director

cc: Helber, Hastert & Kimura, Planners
Murray Towill/Johnnie Sanders

XIII-8

Helber Hastert
Planners

November 22, 1991

Ms. Clare Hachmuth, Executive Director
Natural Energy Laboratory of Hawaii Authority
P.O. Box 1749
Kailua-Kona, Hawaii 96745

Dear Ms. Hachmuth:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated November 8, 1991. For your ease of reference, we will respond to your comments in the order in which they appear in your letter.

1. The hydrology study indicates a potential significant impact to the groundwater and the ocean in one scenario. In the draft EIS, we described the potential effects of the most realistic scenario presented by Mr. Nance in his report (Saltwater Ponds of the 'O'oma II Project: Recommended Circulation System and Analysis of Environmental Effects, September 1991), which appears in Appendix F of Volume II of the Draft SEIS. Scenario 1, which predicts greater effects associated with the salt water lagoon does not consider geologic features which should, by reasonable conjecture, be present beneath 'O'oma II. As Mr. Nance states:

> "Scenario 1 is based exclusively on the model's calibrated regional permeabilities. As such, it does not reflect, smaller scale effects, specifically lava tubes, shrinkage cracks, clinker zones, and/or seams between lava flows, which are likely to significantly influence the local flow regime between the 7-acre pond and the shoreline. Scenario 2 was created to include such effects, thereby demonstrating more realistic head build-up and salinity responses in the receiving groundwater. This was achieved by including more permeable elements in the model between the pond and the shoreline to stimulate the impact of local scale voids, cracks, and lava tubes." (pages 24-25)

We must re-emphasize that even Scenario 2 is based on conservative assumptions, and although we believe actual conditions beneath the site will result in a more permeable flow of groundwater to the ocean, we need to confirm these conditions, hence the need for additional investigation. It is for this reason that we have filed a Conservation District Use Permit (CDUP) application with the Department of Land and Natural Resources (DLNR) to allow us to drill about 20 test monitoring holes to observe the behavior of groundwater in the vicinity of the proposed lagoon. We hope to have this information available in advance of any public hearing before the Land Use Commission concerning our petition for a state land use boundary amendment, and would certainly be willing to share this with you.

Helber Hastert & Kimura
Grosvenor Center, Pali Tower
733 Bishop Street, Suite 2290
Honolulu, Hawaii 96813
Telephone: (808) 545-2055
Facsimile: (808) 545-2050

As we stated on page IV-22 of the Draft SEIS; "[I]in the event that the results of such tests reveal a more permeable barrier to groundwater seepage to the ocean, it may be necessary to design a smaller salt water lagoon system to limit the effects attributed to the mounding of groundwater." In this respect, we are committed to ensuring that the groundwater beneath NELHA is not impacted by activity at 'O'oma II.

2. Algae growth in the salt water lagoon. You suggest that there might be some incompatibility between humans and the herbivorous fish and small invertebrates placed in the lagoon to control algae growth. We assume that your suggestion of incompatibility refers to the possibility of aggressive behavior on the part of the fish directed at human users of the lagoon. Because the fish to be stocked in the lagoon will be herbivorous, we doubt there will be any incompatibility with people. If you are suggesting that human presence could be incompatible to the fish, we believe that water quality will not be a problem because of the short (ten-hour) residence time of the water in the lagoon. What is more, we believe the presence of these fish will present an attractive recreational resource that will allow people to observe these fish in a natural environment, under safe snorkeling conditions.

3. Continued adherence to the Integrated Golf Course Management Plan (IGCMP). We note your statement that compliance with the details of the IGCMP might actually ensure that no significant effects would occur from the operation and construction of the proposed golf course. We also note your concern about continued compliance with the guidelines of the IGCMP should the project be taken over by a management organization or sold. We agree that a monitoring agency should be established, or one or a combination of several governmental agencies could be called upon to perform a monitoring function. We will participate in any such monitoring program and we are willing to have this language included in all land use approvals for the proposed project, both at the State and County level.

4. Aerial dispersal of biocides and treated wastewater. You express doubt about the effectiveness of the proposed 100-foot wide, 15-foot high vegetated buffer on the 'O'oma II/NELHA border. We believe that this vegetated buffer can offer significant protection for the filtering of any pesticide or microbial drift in the direction of NELHA. This buffer, in conjunction with a rational application of pesticides, and using a wind foil-style applicator at all times (in winds below 20 mph), instead of only when winds exceed 5 mph, will, we believe provide significant protection against wind drift to NELHA.

There are also alternatives which we would be willing to consider, that would further reduce the possibility of microbial drift from the application of treated wastewater as an irrigation source. For example, we have already recommended that several state-of-the-art weather stations be installed throughout the project site. We are exploring the possibility that the weather

stations could be programmed to shut down the irrigation system when wind speed reaches velocities from appropriate vectors that would promote wind drift toward NELHA.

5. Avoidance of the use of biocides. You suggest that 'O'oma II develop a management and landscaping plan which does not use pesticides. In the meantime, because of your comments, and similar comments from others, and our committment to building an environmentally responsible course, we are investigating all possible alternatives to traditional construction and operation of golf courses, including methods of controlling pests and application of fertilizers. We are thoroughly committed to investigating these alternatives, as well as adhering to the principles of the IGCMP.

We look forward to working with you, the tenants at NELHA and the Authority's board of directors in developing a project that is compatible with NELHA, and which allows the continued operation of activities within NELHA in a physical environment conducive to those activities.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin
Murray Towill
Johnnie Sanders

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
SEVEN WATERFRONT PLAZA, SUITE 300
500 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96813
FAX (808) 587-0600

JOSEPH K. CONANT
EXECUTIVE DIRECTOR

IN REPLY REFER TO
91:PPE/4943jt

November 7, 1991

Ms. Esther Ueda
State Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Re: Draft Supplemental Environmental Impact Statement for the Proposed O'oma II Master Plan

Thank you for the opportunity to review the subject report.

Policies A(3) and B(3) of the State Housing Functional Plan seek to ensure that housing projects and projects which impact housing provide an adequate amount of affordable homeownership and/or employee rental housing opportunities. The proposed project contains residential and resort/commercial components. We therefore believe that the petitioner should provide a fair share of affordable units, as well as sufficient employee units to mitigate housing impacts generated by the proposed project.

Attached are affordable price guidelines based on various mortgage loan interest rates, down payments of 5% and 10%, and other noted assumptions. We are willing to work with the petitioner, the Hawaii Housing Authority, and the County of Hawaii in formulating other acceptable guidelines for the provision of affordable housing units.

Sincerely,

Joseph K. Conant
Executive Director

XIII-10

Helber Hastert
Planners

November 11, 1991

Mr. Joseph K. Conant, Executive Director
Housing Finance and Development Corporation
Department of Budget and Finance
Seven Waterfront Plaza, Suite 300
500 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Mr. Conant:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments to the Draft Supplemental EIS (SEIS) for the subject project by letter dated 7 November 1991.

We note your comments that the petitioner should provide a fair share of affordable housing units, as well as sufficient employee units to mitigate housing impacts generated by the proposed project. As stated in Section 5.4 of the Draft SEIS, the petitioner intends to work closely with County and State housing officials, in addition to other landowners in the Keahole to Keauhou area, in an effort to coordinate development of an affordable housing community or communities which will enable residents to live close to work, near schools and service areas.

We appreciate the information on affordable price guidelines that you attached to your letter.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin
OEQC

Helber Hastert & Fee
Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone: (808) 545-2055
Facsimile: (808) 545-2050

c: Office of Environmental Quality Control
Kahala Capital Corporation
Helber Hastert & Fee, Planners

Attachment

HAWAII COUNTY 1991 MEDIAN INCOME: $33,100

Interest Rate	% of Median	Income	Payment	P&I	Loan Amount	Price @ 5% Down	Price @ 10% Down
9.00%	80%	$26,480	$728	$603	$74,967	$78,912	$83,296
	90%	$29,790	$819	$694	$86,280	$90,821	$95,866
	100%	$33,100	$910	$785	$97,592	$102,729	$108,436
	110%	$36,410	$1,001	$876	$108,905	$114,637	$121,006
	120%	$39,720	$1,092	$967	$120,218	$126,545	$133,575
	130%	$43,030	$1,183	$1,058	$131,531	$138,453	$146,145
	140%	$46,340	$1,274	$1,149	$142,843	$150,361	$158,715
9.50%	80%	$26,480	$728	$603	$71,737	$75,512	$79,707
	90%	$29,790	$819	$694	$82,562	$86,907	$91,735
	100%	$33,100	$910	$785	$93,387	$98,302	$103,764
	110%	$36,410	$1,001	$876	$104,212	$109,697	$115,792
	120%	$39,720	$1,092	$967	$115,038	$121,092	$127,820
	130%	$43,030	$1,183	$1,058	$125,863	$132,487	$139,848
	140%	$46,340	$1,274	$1,149	$136,688	$143,883	$151,876
10.00%	80%	$26,480	$728	$603	$68,735	$72,353	$76,372
	90%	$29,790	$819	$694	$79,108	$83,271	$87,897
	100%	$33,100	$910	$785	$89,480	$94,189	$99,422
	110%	$36,410	$1,001	$876	$99,852	$105,108	$110,947
	120%	$39,720	$1,092	$967	$110,225	$116,026	$122,472
	130%	$43,030	$1,183	$1,058	$120,597	$126,944	$133,997
	140%	$46,340	$1,274	$1,149	$130,969	$137,862	$145,522
10.50%	80%	$26,480	$728	$603	$65,942	$69,413	$73,269
	90%	$29,790	$819	$694	$75,893	$79,888	$84,326
	100%	$33,100	$910	$785	$85,844	$90,362	$95,382
	110%	$36,410	$1,001	$876	$95,795	$100,837	$106,439
	120%	$39,720	$1,092	$967	$105,746	$111,312	$117,496
	130%	$43,030	$1,183	$1,058	$115,697	$121,786	$128,552
	140%	$46,340	$1,274	$1,149	$125,648	$132,261	$139,609

1. 30 year mortgage
2. $125 CTF for taxes & insurance.
3. Housing expense is 33% of income.
4. Down payment of 5% or 10%.

3/13/91, H91PRICE

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
AL PANG
JOYCE T. OMINE
JEANNE K. SCHULTZ
CALVIN M. TSUDA

IN REPLY REFER TO

STP 8.4530

November 7, 1991

Ms. Esther Ueda
Executive Director
Land Use Commission
Department of Business, Economic
Development & Tourism
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

SUBJECT: 'O'oma II Master Plan - North Kona, Hawaii

This letter supersedes our previous letter dated October 23, 1991 (STP 8.4508). We have the following comments:

1. We intend to have the Queen Kaahumanu Highway serve as a high speed, limited-access highway for the region. We will allow access to the highway only a major interchanges. All other roadways will have to access onto a system of frontage roads on both sides of the highway which will then carry local traffic to the interchanges.

2. As in interim measure, the developer should provide a fully channelized intersection with deceleration, acceleration, and turning lanes at their temporary access to Queen Kaahumanu Highway and any related roadway improvements at no cost to the State. We will not allow the installation of traffic signals at the developer's access to Queen Kaahumanu Highway. The applicant should revise his analysis accordingly and recommend alternative mitigation measures.

3. The developer should be required to coordinate their access with other existing and proposed accesses to assure safe and efficient traffic operation of Queen Kaahumanu Highway.

4. Construction plans for work within the State highway right-of-way must be submitted for our review and approval.

5. The developer should be required to coordinate with adjacent landowners for the development of a frontage road system. This should be a required condition of land use approval.

6. The developers should commit to participate in regional highway improvements on a pro-rata basis as determined by the State Department of Transportation.

We appreciate this opportunity to provide comments on the 'O'oma II Master Plan.

Very truly yours,

Edward Y. Hirata
Director of Transportation

Helber Hastert
Planners

November 22, 1991

Mr. Edward Y. Hirata, Director of Transportation
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hirata:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Supplemental Environmental Impact Statement

Thank you for submitting additional comments to the Draft Supplemental EIS (SEIS) for the subject project by letter dated 7 November, 1991. We Understand this letter supersedes your previous letter dated 23 October 1991.

For your ease of reference we will respond to your comments in the order they appear in your letter.

1. We acknowledge that Queen Kaahumanu will ultimately serve as a high-speed, limited-access highway for the region, with major interchanges and connecting frontage roads.

2. We note that you will not allow the installation of traffic signals at the developer's access to Queen Kaahumanu Highway, and the need to develop alternative mitigation measures.

   One such measure would be to jointly use the proposed intersection being planned for access to Kohanaiki. We understand that this intersection is being designed for full build-out of the Kohanaiki Resort. However, because Kohanaiki will be a phased project, as will be the case for 'O'oma II, and the timing for the implementation of improvements to Queen Kaahumanu are uncertain, it may be possible for Kohanaiki and 'O'oma II to jointly use this planned intersection as a temporary measure, until improvements to Queen Kaahumanu Highway are completed.

   We would emphasize that the entire highway transportation picture for Queen Kaahumanu Highway is somewhat unclear. Although we recognize the general level of improvements for the Highway (see comment #1, above), the timing and design for these improvements are uncertain.

   We will investigate all options for providing access to Queen Kaahumanu Highway that are workable solutions, recognizing that all solutions will be temporary until the highway is improved. We are committed to closely coordinating the evaluation of any options with the Department of Transportation.

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Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone: (808) 545-2055
Facsimile: (808) 545-2050

3. You state that the developer should be required to coordinate access with other existing and proposed access to assure safe and efficient traffic operation of Queen Kaahumanu Highway. We are certainly interested in ensuring that safe, efficient access be provided to 'O'oma II, and we have already begun discussions with Nansay Hawaii, Inc. on how we can design joint access to Queen Kaahumanu Highway, in addition to providing internal connections to the respective developments.

4. We acknowledge that construction plans for work within the State highway right-of-way must be submitted for review and approval by the Department of Transportation.

5. Similar to our comment in item #3, above, we have already begun discussions with Nansay Hawaii, Inc. concerning opportunities to coordinate planning for all access to Queen Kaahumanu Highway.

6. The petitioner realizes that future improvements to Queen Kaahumanu Highway will result in pro-rata costs, as determined by the Department of Transportation.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

Lorraine R. Inouye
Mayor
Norman K. Hayashi
Director
Tad Nagasako
Deputy Director

Planning Department

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720 • (808) 961-8288

November 7, 1991

Mr. Scott Ezer
Helber Hastert & Fee
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Ezer:

Supplemental Environmental Impact Statement (SEIS)
'O'oma II Master Plan
North Kona, Hawaii
TMK: 7-3-9:4 & 22

This is in response to the subject SEIS for the 'O'oma Master Plan proposed on the subject properties. We have reviewed the SEIS and have one comment.

According to the 'development concept' described in the SEIS, the project's focal point will be ocean science and recreation and the use of alternate energy systems and resource conservation measures. There will be a combination of active and passive entertainment opportunities, including a seven-acre unlined salt water swimming lagoon with natural water slides, islands and a wave generating machine. Water for the lagoon will be drawn from a number of wells drilled to depths of approximately 200 feet. Appendix F of the SEIS entitled "Analysis of Salt Water Ponds" indicates that potential water temperature drawn from that depth would be relatively cold. The use of such cool water is not consistent with the purpose of human recreational activities such as swimming. This concept should be evaluated for compatibility.

Thank you for the opportunity to comment on the Draft SEIS. Should you have any questions regarding the above, please feel free to contact Connie Kiriu or Alice Kawaha at 961-8288.

Sincerely,

NORMAN K. HAYASHI
Planning Director

CRK:
3630D

cc: Kahala Capital Corporation
State Land Use Commission
OEQC

XIII-14

Helber Hastert
Planners

November 13, 1991

Mr. Norman Hayashi, Director
Planning Department
County of Hawaii
25 Aupuni Street Room 109
Hilo, Hawaii 96720

Dear Mr. Hayashi:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated November 7, 1991.

Your only comment on the Draft SEIS concerns the temperature of the water drawn from wells at an approximate depth of 200 feet, and the compatibility of this water for water recreation purposes. We appreciate your concern on this matter, as the temperature of the lagoon water will affect its attractiveness to potential users of the water recreation park. We are carefully considering all options to provide water for the lagoon that would provide a comfortable temperature for its users.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin
OEQC

Helber Hastert & Fee
Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone: (808) 545-2055
Facsimile: (808) 545-2050

JOHN WAIHEE
GOVERNOR

YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE

ILIMA A. PIANAIA
DEPUTY TO THE CHAIRPERSON

FAX: 548-6100

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96823-2159

November 6, 1991

Ms. Esther Ueda
Land Use Commission
Department of Business, Economic Development and Tourism
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: 'O'oma II Master Plan Draft Supplemental Environmental Impact Statement
TMK 7-3-9: 4 and 22 North Kona, Hawaii

The Department of Agriculture has reviewed the Draft Supplemental Environmental Impact Statement for the subject project and has the following comments.

The Department's initial concerns with the proposed action focused on three areas: the need for the project to be integrated with a comprehensive plan for development and distribution of water resources in the area; the potential impact of the project on groundwater resources; and the impacts stemming from the use of sewage effluent on the potable water supply in the area. We raised these issues in our review of the original EIS (September, 1986) and again on the subsequent Draft Supplemental EISPN (June, 1991).

The State maintains the Keahole Agricultural Park mauka of Queen Kaahumanu Highway in the vicinity of the applicant's proposed development. In light of this, the Department has some general reservations about the 'O'oma II project because of its overall contribution to the urbanization of the area. Interest has been expressed in development of additional lots at the agricultural park site and urbanization would conflict with this objective. Also, existing lessees in the agricultural park have already experienced some problems with inadequate water pressure and salinity.

As suggested in our previous comments, the applicant does not fully consider the need to integrate the plans for this project with the water resource development in the area. Although the Draft Supplemental EIS clearly acknowledges that current County

water resources and distribution capabilities do not meet the demands of the project, the applicant offers only minimal discussion of how to work with the County to resolve this problem.

The Draft Supplemental EIS indicates that the impact on groundwater would be negligible if used with proper turf management measures to ensure both minimal leaching of chemicals associated with landscaping maintenance and with use of the effluent. It appears that use of the wastewater -- possibly in combination with brackish water -- would be further mitigated by the natural filtering capabilities of the turf and other plants the water would irrigate. Further, if the applicant adheres to a strict standard modeled on the California regulations for spray irrigation of such effluent (described in Appendix G of the Draft Supplemental EIS), it should provide a sufficient safeguard against possible contamination.

The possible location of well sites for pumping up brackish water for on-site desalinization treatment below the Department of Health's Underground Injection Control Line raises a concern over the impact of such activity on the quality and quantity of the groundwater resource. It could potentially lead to additional saltwater intrusion into nearby groundwater.

When the petition for boundary amendment is available for review, this Department may have additional comments to offer on the Integrated Golf Course [Pesticides] Management Plan.

Thank you for the opportunity to comment.

Sincerely,

Yukio Kitagawa, Chairperson
Board of Agriculture

c: Kahala Capital Corporation (T. Fortin)
✓Helber Hastert & Fee (S. Ezer)
Office of State Planning

XIII-15

Helber Hastert
Planners

November 13, 1991

Mr. Yukio Kitagawa, Chairperson
Board of Agriculture
Department of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814-2512

Dear Mr. Kitagawa:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated November 6, 1991.

Most of your comments focus on the regional problems of water source development, the need to integrate the plans for this project with water source development in the area and the possible impacts of developing onsite brackish wells on saltwater intrusion into nearby groundwater.

As all other concerned landowners in the region, we are especially mindful of the need for careful planning, development and monitoring of future water resources in the North Kona region. A recent meeting of North Kona landowners, sponsored by the Department of Land and Natural Resources, Division of Water Resources Management (DLNR/DWRM), clearly identified problems faced by landowners and affected government agencies responsible for water resource development and transmission.

We intend to cooperate, to the fullest extent possible, with all efforts being conducted in the region, to help plan and integrate water sources for the North Kona Region. We are now in the process of analyzing specific opportunities for water source development, for potable and irrigation water, including the possible construction of a desalination plant on the project site.

It was clear from this meeting that DLNR/DWRM does not have sufficient information on existing water resources to understand how water extraction at one well will affect other wells in the area, including brackish wells. We hope to establish a test brackish well on the project site to determine the characteristics of the resource within our property, and will coordinate with the County Department of Water Supply in addition to DLNR/DWRM before proceeding with actual source exploitation.

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Mr. Yukio Kitagawa
November 13, 1991
Page 2

We are willing to share whatever information we obtain from any studies we conduct, including water quality parameters and possible desalination opportunities.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Toni Fortin
Esther Ueda
OSP

OFFICE OF STATE PLANNING

Office of the Governor

MAILING ADDRESS: P.O. BOX 3540, HONOLULU, HAWAII 96811-3540
STREET ADDRESS: 250 SOUTH HOTEL STREET, 4TH FLOOR
TELEPHONE: (808)587-2846, 547-2800
FAX: Director's Office 587-2846
Planning Division 587-2824

Ref. No. P-2539

November 6, 1991

MEMORANDUM

TO: Ms. Esther Ueda, Executive Officer
Land Use Commission

SUBJECT: Draft Environmental Impact Statement for O'oma II, North Kona, Hawaii, TMK 3-7-03-09: 4, 22

We have reviewed the Draft EIS and have the following comments. We note on page I-2 that the intention is that this document will fulfill the environmental requirements for a Special Management Area Use Permit. In our view, the document does not provide some information relating to an application for SMA approval. Although the entire site is apparently within the SMA, the document does not contain a map indicating the SMA boundaries. A map should be included showing the SMA boundary. Also, on page IV-42, Archaeological Resources, the DEIS indicates that parcel 22 has not been surveyed for historic sites. As a part of the site within the SMA, this area should be surveyed similar to the studies undertaken for parcel 4, which is within the Conservation District.

Our final comment relates to drainage and prevention of non-point source pollution of the nearshore waters. Section 3.4.4 on page III-14, Flood Control and Drainage, does not give any information on the drainage characteristics of the site before and after project construction. Also, there is no information and/or description of the best management practices that will be installed to control erosion of the topsoil for the golf course. This information should be included in the document.

Thank you for allowing us the opportunity of reviewing this DEIS. If you have any questions, please contact our Coastal Zone Management Program at 548-3961.

Harold S. Masumoto
Director

cc: Kahala Capital Corporation
√ Helber Hastert & Fee, Planners

XIII-17

Helber Hastert
Planners

November 13, 1991

Mr. Harold S. Masumoto, Director
Office of State Planning
P.O. Box 3540
Honolulu, Hawaii 96811-3540

Dear Mr. Masumoto:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated November 6, 1991.

You state that the Draft (SEIS) does not provide some information relating to an application for a Special Management Area Use Permit (SMP). Specifically, you ask that a map be included showing the Special Management Area (SMA) boundaries and that archaeological and historic site documentation be done for Parcel 22. We recognize that a separate application will be necessary to obtain the SMP from the County Planning Commission, and that some additional information will be required to complete the application requirements for that request. Since the SMA boundary for this area follows the center line of Queen Kaahumanu Highway, and the entire project site lies within the SMA, we do not believe it is necessary to include a map of the SMA boundary as part of the Draft SEIS.

We are aware of the need to provide archaeological and historic sites documentation for Parcel 22. This area was surveyed in 1985 (Chiniago, Inc.), and included as part of an earlier EIS to support the expansion of the Hawaii Ocean Science and Technology (HOST) Park. This survey resulted in the identification of two sites that must be preserved with some level of interpretive development. These two sites are the Mamalahoa Trail, which is discussed at some length in Section 4.12 of the Draft SEIS and site 10,155, which is a shelter associated with the trail. The Department of Land and Natural Resources, Historic Preservation Division, is aware of the 1985 survey and the need to preserve these two sites. The petitioner will develop a mitigation plan, to be approved by DLNR, for the preservation of these sites, when appropriate. A full discussion of these sites will be included in the petition for the SMP.

You also state that the Draft SEIS does not contain any information on the drainage characteristics of the site before and after project construction, nor does it include any information or description of the best management practices that will be installed to control erosion of the topsoil for the golf course.

Appendix R of the Draft SEIS (Infrastructure Study for O'oma II, R.M. Towill Corp., June 1991) includes a detailed discussion of the drainage characteristics of the site and the proposed project. Appendix G of the Draft SEIS (Environmental Risk Assessment and Integrated Golf Course Management Plan for the Golf Course at the Proposed 'O'oma II Complex on the Kona Coast, Environmental & Turf

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Grosvenor Center, Mauka Tower | Honolulu, Hawaii 96813 | Facsimile: (808) 545-2050

Services, Inc., September 1991), includes a detailed description of construction and management practices designed to control soil erosion, both during construction and operation of the proposed golf course.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

XIII-18

Keahole Point Association
P. O. Box 4715
Kailua-Kona, HI. 96745

Land use Commission
335 Merchant Street, Rm 104
Honolulu, HI 96813
Attn: Ms. Esther Ueda

November 5, 1991

Subject: O'oma II Master Plan,
North Kona, Hawaii, TMK 3-7-3-09: 4,22
Draft Supplemental Environmental Impact Statement

Dear Ms. Ueda:

The Keahole Point Association (KPA) is an association of all tenants with projects at the Natural Energy Laboratory of Hawaii Authority (NELHA). As president of the KPA, I am writing to express our concerns about the proposed O'oma II development which will border NELHA.

We have reviewed the Draft Supplemental Environmental Impact Statement dated September, 1991 for the O'oma II project. We are very concerned about wind drift from the proposed golf course which could contain sewage effluent irrigation water and pesticides (and herbicides). As pointed out in the Impact Statement "possibilities of even small amounts of microbial drift [from sewage effluent irrigation] into nearby aquaculture facilities should not be taken lightly". Further, pesticide drift into NELHA aquaculture projects could, at worst, kill cultured species and, at least, taint the natural products presently being produced.

Our fears are further supported by the statement in the Impact Statement that, "it might be appropriate to model the extent to which effluent irrigation spray water might drift off-site. Unfortunately, the current state-of-the-art can not support such modeling with a high degree of certainty."

To mitigate the impact of sewage effluent irrigation and pesticide wind drift on projects at NELHA the Impact Statement recommends that Kahala Capital:

a) Adopt California treatment standards for use of effluent water in turf irrigation (Title 22, Cal. Code Regns., Chapter 3, Sect. 60301).

b) Apply pesticides only when winds are less than 5 mph and a wind foil-style applicator is not used.

c) Allow pesticide applications in winds up to 20 mph if a wind foil-style applicator is used.

d) Construct a 100 ft wide physical buffer between the O'oma project and NELHA consisting of a 15 ft high rock berm with a vegetative layer planted on the down side of the berm.

KPA strongly urges adoption of item (a) above. However we are very concerned with the mitigation measures proposed for pesticide drift. This concern stems from a high potential for error during pesticide application and the reliance on an inadequate physical barrier.

If the above recommendations are adopted, the individual applying pesticides will have to choose the type of applicator based on wind speed and direction. There can be no assurance that this will be done correctly. With human nature as it is, we believe that the most convenient applicator will eventually be used, regardless of wind conditions. Also, even though initial guidelines and policies concerning pesticide use, type, and application will be established at the onset of the O'oma II project, there is no guarantee that these guidelines and policies will be followed if and when the project is sold to a different group.

Finally we do not believe that the proposed physical barrier will stop wind drift of effluent irrigation spray or pesticides. Modeling of the physical barrier or its effect on wind drift was not discussed in the Impact Statement. It appears that the barrier is proposed only for esthetics.

For these reasons the KPA strongly urges that the O'oma II project develop a golf course management and landscaping plan which **does not use pesticides or herbicides.** We feel that pesticide and herbicide use at O'oma II represents a real danger to existing and future projects at NELHA.

Sincerely,

Gerald R Cysewski, Ph.D.
President, KPA
President and CEO, Cyanotech Corporation

XIII-19

Helber Hastert
Fimes

November 22, 1991

Mr. Gerald R. Cysewski, Ph.D., President
Keahole Point Association
P.O. Box 4715
Kailua-Kona, Hawaii 96745

Dear Dr. Cysewski:

O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated November 5, 1991.

The focus of your comments concern the possible impacts associated with wind drift from the proposed golf course which could contain pesticides and microbes from wastewater effluent. Like you, we wish to limit any possible harmful effects that could result from such wind drift.

We note that you are supportive of our recommendation to adopt California treatment standards for use of effluent water in turf irrigation. We also note that you question the reliance on human choice to select an appropriate pesticide applicator in varying wind conditions. The draft SEIS recommends that pesticides should only be applied without a shrouded, or wind foil-style, applicator when winds are less than 5 mph. For winds between 5 and 20 mph, it is recommended the wind foil-style applicator be used. There would be no pesticide applications in winds exceeding 20 mph.

In response to your concern, we propose that only wind foil-style applicators be used for application of pesticides in all conditions below 20 mph.

You also express doubt about the effectiveness of the proposed 100-foot wide, 15-foot high vegetated buffer on the 'O'oma II/NELHA border. You state that the barrier is "proposed only for esthetics." On the contrary, we believe that this vegetated buffer can offer significant protection for the filtering of any pesticide or microbial drift in the direction of NELHA. This buffer, in conjunction with a rational application of pesticides, and using a wind foil-style applicator at all times (in winds below 20 mph), will, we believe, provide significant protection against wind drift to NELHA.

There are also alternatives which we would be willing to consider, that would further reduce the possibility of microbial drift from the application of treated wastewater as an irrigation source. For example, we have already recommended that several state-of-the-art weather stations be installed throughout the project site. We are exploring the possibility that the weather stations could be programmed to shut down the irrigation system when wind speed reaches velocities from appropriate vectors that would promote wind drift toward NELHA.

Helber Hastert & Fee
Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2290
Honolulu, Hawaii 96813
Telephone: [illegible]
Facsimile: [illegible]

You raise a concern about the continued use of the Integrated Golf Course Management Plan (IGCMP) should the project be sold to a different group. We agree that a monitoring agency should be established, or one or a combination of several governmental agencies could be called upon to perform a monitoring function. We will participate in any such monitoring program and we are willing to have this language included in all land use approvals for the proposed project, both at the State and County level.

Finally, you suggest that 'O'oma II develop a management and landscaping plan which does not use pesticides. Because of your comments, and similar comments from others, and our committment to building an environmentally responsible course, we are investigating all possible alternatives to traditional construction and operation of golf courses, including methods of controlling pests and application of fertilizers. We are thoroughly committed to investigating these alternatives, as well as adhering to the principles of the IGCMP.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

XIII-20

JOHN WAIHEE
Governor
MURRAY E. TOWILL
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 PHONE: (808) 587-3800 FAX: (808) 587-3820

91:0967e

November 5, 1991

Ms. Esther Ueda
Department of Business,
Economic Development & Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Re: Draft Supplemental Environmental Impact Statement (DSEIS) for O'oma II Master Plan, North Kona, Hawaii

Thank you for requesting our review of the above DSEIS.

The ultimate electrical demand load expected to result from this project is stated to be 6 MW (Vol. II, Appendix M, p. 22) and 10 MW (Vol. I, p. VI-18); these contradicting figures should be clarified. The additional demand is expected to be met mainly through the expansion of utility-owned, oil-fired generating facilities. Given the fact that considerable activity is underway to develop geothermal power on the Island of Hawaii, geothermal should be mentioned as a possible source of electricity for the project.

The DSEIS refers to the "use of alternate energy systems and resource conservation measures throughout the project" (Vol. I, p. II-7) and to the exploration and intended incorporation of "creative solutions to energy conservation" (Vol. I, p. VI-19). Solar water heaters, efficient construction design and building materials, and landscaping are mentioned as possible options. We request that energy conservation design/technologies and renewable energy sources intended to be used in this project be more extensively detailed in the Final SEIS.

Thank you for the opportunity to provide comments.

Sincerely,

Maurice H. Kaya
Energy Program Administrator

MHK/PE:dkik
cc: Toni Fortin
Scott Ezer

Heller Hastert
Planners

November 11, 1991

Mr. Maurice H. Kaya, Energy Program Administrator
Department of Business, Economic Development & Tourism
Energy Division
335 Merchant Street Room 110
Honolulu, Hawaii 96813

Dear Mr. Kaya:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments to the Draft Supplemental EIS (SEIS) for the subject project by letter dated 5 November 1991.

You note a contradiction in figures from different sections of the Draft SEIS representing the electrical demand load expected from the above project. In Section 6.6 of Volume I (page VI-18), it is stated that approximately 10 MW will be the ultimate electrical demand for 'O'oma II. In Appendix M of Volume II (p. 22), it is stated that six MW represents the ultimate electrical demand for 'O'oma II. The correct estimate is 10 MW. We should point out, that the number from Appendix M is taken from the Air Quality Study conducted by B.D. Neal & Associates (November 1990). Appendix R, which is the Infrastructure Study for 'O'oma II conducted by R.M. Towill (June 1991), also reports that the ultimate demand for the project is expected to be 10 MW.

B.D. Neal & Associates report in their study the anticipated project power demand will result in about a five percent increase in emissions from the electric utility, if all project power is derived from fuel oil. An increase in peak power demand from six to 10 MW would result in an increase in emissions from five percent to about eight percent, a minimal increase.

You request that geothermal should be mentioned as a source of electricity for the project. Such a declaration should be qualified, as geothermal energy will not directly be tied to the 'O'oma II project. Rather, when, and if, geothermal power is commercially available, it will be fed into the HelCo grid, serving the entire island, including 'O'oma II.

You also request that energy conservation design/technologies and renewable energy sources intended to be used in this project be more extensively detailed. I am sure you can appreciate the conceptual design level this project has achieved. As such, no final choices to improve energy efficiency have been made. Therefore, it would be premature to provide such detail at this time. We would like to emphasize that

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733 Bishop Street, Suite 2290
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

the petitioner is committed to investigating all practicable opportunities to reduce energy consumption, and has opened discussions with experts in this field.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

JOHN WAIHEE
Governor

BRIAN J. J. CHOY
Director

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 548-4185

November 4, 1991

Ms. Esther Ueda
Executive Director
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft Environmental Impact Statement for the 'O'oma II Master Plan

Thank you for the opportunity to review the subject document. We have no comments to offer.

Sincerely,

Brian J. J. Choy
Director

BC:jt

c: Kahala Capital Corporation
Helber Hastert & Fee

XIII-22

Helber Hastert
Planners

November 7, 1991

Mr. Brian J.J. Choy, Director
State of Hawaii
Office of Environmental Quality Control
220 South King Street
Fourth Floor
Honolulu, Hawaii 96813

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

We acknowledge receipt of your letter dated November 4, 1991 concerning the above, and note that you have no comments to offer.

Thank you for reviewing the Draft Supplemental EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

Helber Hastert & Fee
Governor Center, PBR Tower

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JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:OCEA:SKK

OCT 31 1991

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
KEITH W. AHUE
MANABU TAGOMORI
Dan T. Kochi
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

FILE NO.: 92-203
DOC. NO.: 1915E

Ms. Esther Ueda
Department of Business,
Economic Development & Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

SUBJECT: Draft Supplemental EIS for O'oma II
Location: North Kona, Hawaii

Thank you for giving our Department the opportunity to comment on this plan/petition. We have reviewed the Draft EIS and have the following comments and concerns regarding socio-economic impacts and noise, archaeological resources and values, trails, aquatic resources, water quality and supply.

Office of Conservation and Environmental Affairs Comments:

Brief Description:

The Kahala Capital Corporation seeks to reclassify approximately 218 acres of state zoned Conservation District Land (Resource and General Subzones) to the Urban District. The purpose of the reclassification is to accommodate land requirements for a 300-acre intermediate resort including: approximately 550 hotel rooms; 70 single-family and 230 multi-family residential units; 18 hole golf course, driving range and clubhouse; a 12 acre ocean science center with 300 parking stalls; conference center; retail commercial area; Japanese-style inn, including about 50 rooms; a private sewage treatment plant; and, a water recreation park consisting of a 7-acre unlined salt water lagoon.

The project site is bounded on the North by the Natural Energy Laboratory of Hawaii Authority (NELHA) and on the South by the proposed Kohana-iki Resort. Keahole Airport is approximately one mile North of the project site.

Comments:

Noise

The submitted Noise Impact Assessment (Appendix L) stated that noise levels were not expected to exceed state and federal standards for average day-night exposures of Ldn 60-65. However, we point out that noise exposure impacts associated with single-event aircraft landings, fly-overs and departures could be significant. Data in tables, 1,2 and 3 (pgs. 12-14) indicated that residential areas located in O'oma would be exposed to single-event exposure levels (SEL's) of up to 85 and 90 dBA '..from the noisier interisland jets (including night freighters) and to corresponding maximum noise levels of about 75 to 85 dBA'. Also, the enclosed data tables indicated that such exposure would occur more frequently between late evening and the early morning.

The study also identified three potential mitigative measures including the use of sliding glass windows with double strength glass, avoidance of jalousie windows and air-conditioning of noise-sensitive areas. We wonder if these mitigative measures would be implemented and/or are sufficient to effectively abate current and future single-event noise levels. Also, concerning the proposed runway extention at Keahole airport which would be designed to accommodate large body and wide body international aircraft, the following was reported:

> This expansion coupled with the gradual introduction of progressively quieter aircraft, should reduce future (year 2005) aircraft exposure levels at the project site to about 5 dBA below existing values (Appendix L. pg. 5).

This conclusion seems questionable, as larger aircraft coupled by an increase in air traffic projected for the year 2005 would seem to result in noise levels higher than at present. We are concerned that the location of the resort and residential community may not be compatible with air traffic activities, and believe that more information is necessary to adequately address this potential problem.

Income/Economic Multipliers

The submitted economic and fiscal impact study indicated that 'Total expenditures attributable to the community, including direct, indirect and induced effects could amount to about $81 million statewide in the initial year of operation, and up to $122 million per year, in 1990 dollars, by 2010 (Appendix P, III-2). We note that the estimated expenditure for both periods was not adjusted for leakage (no reference to leakage in study). As such, we believe that the submitted assessment could have overstated actual direct expenditure and income effects on local and state economies. For instance, it has been shown in Hawaii how 'direct expenditures' - i.e., direct and indirect payments made for goods and services provided by and resulting from the resort community - leak from the local and state economy immediately. This is because much of the income earned from visitor spending on goods and services which are imported or non-local in character accrues to people or companies elsewhere, such as Japan or the Mainland. A 1984 study (Economic Aspects of Tourism, Hitch, T.) reported that 'Visitors brought into Hawaii and spent in Hawaii approximately $4 billion. However, only 54 percent of the calculated $4 billion ended up in thre hands of anybody in Hawaii and constituted personal income to them, because the other 56 percent leaked out of the state immendiately.'

Under a more skeptical scenario, much of this estimated expenditure would be withheld form the Hawaii state economy. For example, the visitation package tours that have been marketed through multinational corporations generate low income multipliers for local residents. These packages will often include the cost of hotel and air fare, golf fees, food, etc., which may be purchased abroad. As such, the money paid for these package tours has little income effect on the local economy, especially if the resort, airline, restaurant, ect. are owned by non-local entities. In summary, the impact of visitor expenditures in general could be overestimated or misunderstood. Although substantial income and employment multipliers would naturally be expected to occur due to direct expenditures and investment, the submitted analysis which was based one set of assumptions (therories), should be interpreted with caution.

Division of Aquatic Resources Comments:

A 7-acre unlined salt water lagoon will be the main feature of the water recreation park. Groundwater seepage to the ocean from the lagoon system, including the proposed golf course lagoon, may be redesigned if tests indicate the mounding effect should be reduced to prevent adverse impacts to NELH to the north and the anchialine ponds to the south.

Due to the deep well supply of seawater for the 7-acre recreation park, contamination from plankton and other marine life to the facility should be minimal. However, should a benthic algae mat occur in the proposed 4-1/2 ft. deep lagoon, aided by nutrient infusion from the adjacent golf course, the planned disposal of seawater by seepage may be inhibited. Therefore, the applicant should have have an alternative method of seawater disposal or be prepared to shut down the system if impacts occur.

We note in (Appendix I) that increasing salinities should not significantly affect anchialine pond biota. However, we quote from Holthuis, L.B. 1963. On red colored shrimps (Decapoda, Caridea) from tropical land-locked saltwater pools. Rijksmuseum van Natuorlijke Historie, Leiden: 262-279 reports that Halocaridini rubra), endemic to Hawaii, "requires an intermediate degree of salinity and cannot survive on either pure saltwater or freshwater." Therefore, the infusion of seawater into the O'oma anchialine pond and the nearby Kohanaiki anchialine complex could adversely affect the life cycles of various anchialine pond inhabitants.

We suggest that a monitoring program be established that would identify and provide mitigation for possible excessive nutrient loading from golf course activities and rapid salinity changes in the anchialine pond(s) from the recreational lagoon.

Precautions should be taken to prevent eroded soil, debris, construction materials, landscaping and golf course chemicals and other contaminants from entering the anchialine pond(s) or coastal waters.

In summary, the Draft Supplemental EIS has provided adequate information on the numerous activities proposed, including public access and shoreline recreation facilities and infrastructures, and provided mitigation for most potential adverse impacts to aquatic resources. However, our comments reflect our concern about the cumulative long-term effect of this extensive development on the aquatic environment.

HISTORIC PRESERVATION DIVISION COMMENTS:

Our review for this LUC Petition document covers both parcels, because both are integral parts of the proposed resort. Rezoning of parcel 4 will definitely affect historic sites in parcel 22.

Parcel 4 underwent historic preservation review in 1986 as part of the O'oma II Resort. An acceptable inventory survey report by PHRI (Donham 1986) was received in 1986. It was agreed that all historic sites had been found, and significance evaluations were made in consensus -- determining that 23 sites were significant and eligible for the Hawaii Register of Historic Places. Preservation and data recovery commitments were agreed upon in 1986.

Parcel 22 underwent historic preservation review in 1985. An inventory survey report by Chiniago Inc. (Barrera 1985) was ultimately accepted, and 4 significant historic sites were present in what is now parcel 22. Two of these sites underwent archaeological data recovery mitigation as part of the HOST Park mitigation work. Two of the sites were to be preserved (Mamalahoa Trail; 10,155 a shelter cave next to the trail).

Upon the exchange of lands with the State's HOST Park (now part of NELH), portions of the original of O'oma II survey passed into State hands, and State lands (now parcel 22) passed into the resort's hands. It was made clear to our office by HOST Park and 'O'oma II representatives that both parties would abide by the earlier agreements. Thus, we notified our department's Land Management Division in January 1987 that this commitment to the earlier agreements would result in a "no adverse compliance with Chapter 6E. NELH is now in the process of preparing to comply with the agreements on their lands. For the 'O'oma II resort, for parcel 22, the commitment is to preserve and interpret the Mamalahoa Trail and an associated cave shelter (10,155). For parcel 4, 10 significant historic sites remain -- 7 to be preserved and 3 to undergo archaeological data recovery. We should note here that although some of sites D15-18 (heiau), T-62 (possible burial), and T-61 lie within parcel 4, the primary portions of the sites are in NELH land; thus, we consider the sites to be in those lands, with the preservation commitments there applying to 'O'oma II.

What this means is that the following previous mitigation commitments exist for the 12 significant historic sites within 'O'oma II Resort in parcels 4 and 22 and for the 3 significant historic sites primarily within NELH lands:

1. Preservation of 9 sites: Mamalahoa Trail; 10,155 (a cave shelter associated with the trail); D15-1 (a commoner's household with a men's house); T-15 (temporary habitation site in a sinkhole); and 5 possible burial sites (T-48, D15-3, T-14, T-13,T-31). The first four sites are to be interpreted. The last 5 sites are to undergo test excavations to determine if they are burials. If they are not, these sites will be formally moved into the archaeological data recovery form of mitigation. If they are burials, these sites are to be preserved.

2. Archaeological data recovery of 3 sites: D15-2, D15-17, and T-71.

3. For the three sites overlapping from NELH, preservation of portions of T-62 (possible burial) and D15-18 (heiau). Data recovery of T-61 is to be done by NELH.

The "Historic and Archaeological Resources" Section of this Draft Supplemental EIS (pp. IV-39-47) is quite good in presenting information on the site patterns for this area of northern Kona (pp. 40-41), on the number of sites found in parcel 4 (42 sites), on the significance evaluations agreed upon (pp. 42, 45, with 13 significant sites matching our 10 plus the 3 overlapping from NELH). The section, however, fails to cover survey of parcel 22 and the two significant historic sites there, although there is a good discussion of the Mamalahoa Trail (p. 42). Also, the section does not quite correctly cover mitigation agreements. Technically, the mitigation commitment is for preservation of some sites, data recovery of others. Nonetheless, except for the preservation of the two sites in parcel 22, the mitigation commitment expressed in this document is in effect the same as we understand it.

We can agree that execution of this general mitigation plan -- with the inclusion of the two sites in parcel 22 -- would have "no adverse effect" on significant historic sites. However, to ensure this plan is executed, we believe that the following conditions must be attached to any approved State LUC petition. The conditions will have to be fulfilled for parcel 22 and the 3 sites overlapping into parcel 4 from NELH in compliance with the State land exchange and Chapter 6E, H.R.S.

1. The applicant shall preserve 9 historic sites (Mamalahoa Trail; 10,155; D15-1; T-15; and 5 possible burial sites T-48, D15-3, T-14, T-13, T-31). A detailed preservation plan (scope of work) must be approved by the State Historic Preservation Division. This plan shall include acceptable buffer zones around the sites, interim protection measures during construction, and long-term management measures (e.g., public access, trails, interpretive sign design and text,

maintenance). The buffer zones and interim protection measures must be approved and implemented prior to construction. The State Historic Preservation Division must verify in writing the successful execution of the plan. [The 5 possible burial sites shall undergo test excavation to determine if they are burials. If they are not, these sites will be formally moved into the archaeological data recovery form of mitigation. If they are burials, these sites are to be preserved and included within the preservation plan.]

2. The applicant shall archaeologically data recover 3 sites (D15-2, D15-17, and T-71). An archaeological data recovery plan (scope of work) must be approved by the State's Historic Preservation Division, prior to the work. This plan must be executed prior to construction, and the State's Historic Preservation Division must verify in writing the successful execution of the plan.

3. The applicant shall preserve the portions of two sites overlapping from NELH (T-62, D15-18). This preservation must be compatible with the NELH preservation plans for these sites. The applicant shall incorporate these preservation concerns within the 'O'oma II Resort preservation plan, noted above.

We would like to add here a few more comments on preservation and our office's view of the place of this project's preservation plan in a larger northern Kona picture. First, in the preservation of historic sites, an adequate buffer zone around the site is a critical element of preservation. This buffer zone needs to be sufficient to protect the immediate surrounding physical terrain and the visual setting of the sites -- otherwise the context of the site is lost and the quality of preservation is greatly reduced. Buffer zones vary with the type of site (e.g., usually larger for heiau and smaller for a cairn of rocks), the terrain (e.g., smaller if a cliff rises behind, larger if the landscape is open), and the nature of the surrounding development (e.g., usually smaller if low rise such as golf course, usually larger if high rise such as hotel). Importantly, the buffer zone becomes part of the site that is being preserved.

Second, our office has as its aim the preservation of historic sites for interpretation for public education, for protection for cultural sensitivity (burials), and for protection for scientific research. The latter two cases are generally restrictive and site-specific. In the case of interpretation, we are attempting to

have the best examples of site types preserved in Kona, types which reflect different themes (e.g., settlement pattern showing differing subsistence adaptations, royal centers, battlefields, community organization, and others). The areas preserved may range from small sites to large acreages with many sites, and they may range from national, state and county parks to sites preserved on private lands in resorts or elsewhere. The aim is to have a series of linked historic sites, with interpretation at each area and with brochures and the like which enable the public to see which sites are related to a theme and which can be visited.

In this interpretive aim the 'O'oma II sites relate to several themes. The Mamalahoa Trail and its cave shelter reflect transportation routes of the early to mid-1800s. These sites within the resort would be associated with the rest of the trail preserved from the Airport through NELH, 'O'oma II, Kohanaiki, the Kaloko-Honokohau National Historic Park, and Kealakehe. The 'O'oma area happens to have one of the best examples of an associated rest shelter (the cave). The coastal commoner household site and temporary habitation site in 'O'oma II are related to the theme of coastal community settlements. Kaloko-Honokohau National Historic Park is the key element of this theme with the entire Kaloko and Honokohau communities' dwellings and temporary dwellings preserved. However, the two sites in 'O'oma II are forms of these sites which are not present in Kaloko and Honokohau, as are house sites being preserved in 'O'oma II and Kalaoa within NELH and in Kohanaiki. Thus, these sites are linked to a larger preservation picture, and we hope the preservation plan for 'O'oma II takes this into consideration.

With these preservation concerns noted, we can see some items in the Draft Supplemental EIS which may conflict with the preservation commitments:

1. The Ocean Science Center and nearby parking are much too close to the historic preserve in NELH in which lie two heiau and other habitation sites (a cluster complementing Kaloko-Honokohau park as part of a coastal community theme). A buffer of 100 feet around these sites are being maintained in NELH. At least a 100 foot buffer will be needed around the heiau (D15-18) and T-62 on the shore in the 'O'oma II Resort to maintain the historic preserve's integrity.

2. Site D15-1 seems to site right on the edge or within the water at the Water Recreation Park. It is a larger site -- a commoner household with a men's house and outlying features. This men's house is quite different than that in Kaloko and Honokohau in having small beach pebble paving and an upright stone. It will need a buffer zone that will preserve its immediately surrounding physical and visual context. The lagoon may conflict with this preservation commitment.

3. Site T-15, as a different type of temporary habitation site (modifications in a sinkhole) than is yet preserved, is on the south border evidently under a shoreline access parking lot and turn-around. This site and its buffer zone need to be accommodated.

4. The Mamalahoa Trail also will need a buffer zone around it. The Master Plan design appears to have houses fronting it on the mauka side. Care needs to be taken for adequate set-backs.

5. The shelter cave to be preserved along the Mamalahoa Trail is not included at all in the Master Plan drawing. This site with an approved buffer zone needs to be adjusted for.

If there are any questions, please have them addressed to Dr. Ross Cordy, our Branch Chief for Archaeology (587-0012), who will temporarily be handling Hawaii Island projects.

Division of Water Resource Management Comments:

The petitioner has not identified the specific sources of water supply that will be needed for his project. Whatever the sources might be, the petitioner should closely coordinate his water development efforts with the county and state water agencies, given the Kona area's limited water resource. Also, noted is the petitioner's proposal to undertake subsurface testing to better determine the character of the groundwater and the project's impacts to the resource.

Division of Forestry and Wildlife Comments:

The Mamalahoa Trail runs through the entire length of the project, as stated in the Draft Supplemental EIS, mitigative measures will be taken and DLNR-Historic Preservation will be included in the process. It is also recommended that the Big Island Naalahele Commission be notified of any mitigative action to be taken. This would also include the Ala Kahakai Trail.

In summary, we believe that information provided in the Draft Supplemental EIS is generally satisfactory. Notwithstanding this, we are still concerned about certain aspects of this proposal and its effect on conservation resources and values including the following: (1) source of potable and non-potable water, and impact on fresh water reserves in the Kona area; (2) design and environmental impact of the proposed water recreation park; (3) preservation of archaeological and cultural resources; and (4) cumulative long-term effect of fetilization/pesticide/herbicide use combined with sewage disposal, on aquatic resources and values. Furthermore, we feel that a more rigorous study and evaluation of the long and short-term socio-economic effects associated with this and other projects in the area needs to be provided. We believe that additional measures should be taken to address and relieve these concerns prior to Land Use Commission Approval.

Very truly yours,

WILLIAM W. PATY

cc: Kahala Capital Corporation
Herbert Hastert & Fee, Planners

Heller Hastert
Planners

November 13, 1991

Mr. William W. Paty, Chairperson
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letter dated October 31, 1991. For your ease of reference, we will respond to your comments in the order in which they appear in your letter.

Noise. You state that even though the proposed residential components of the 'O'oma II Master Plan appear to comply with state and federal standards of Day-Night Sound Levels (Ldn's), you are concerned about noise exposure impacts associated with single event exposure levels (SEL's). While it is true that SEL's of up to 85 and 90 dBA were reported at various monitoring stations at 'O'oma II, it is more appropriate to use the Ldn's as a measure of noise exposure because they are recognized standards for planning purposes. The derivation of the Ldn metric is based upon the SEL value. The Ldn contour lines which are represented in the draft SEIS have been adopted by the State Department of Transportation, Airports Division and are reflected in the Keahole Airport Master Plan EIS (October 1988) and the Final Report Noise Compatibility Program Keahole Airport, Hawaii (prepared for the Department of Transportation, Airports Division, by KPMG Peat Marwick) which was the report used to generate the adopted Ldn's for the Keahole Airport. The land uses which are presented in the 'O'oma II EIS are compatible with these Ldn contour lines if the noise mitigation measures recommended for the hotel and the commercial uses are implemented.

You state that the data tables indicate that aircraft noise exposures would occur more frequently between late evening and early morning. The referenced data Tables 1, 2 and 3 should not be used to determine a meaningful temporal distribution of aircraft events, because they represent arbitrary time periods when the investigator was on-site recording the data and identifying the aircraft type. Even if one were to use the tables for this purpose, it is curious how one could make such a conclusion using traditional definitions of "late evening" and "early morning," since, of the four days sampled, only one day contained samples after 6:30 p.m. and only one day contained samples before 10:30 a.m. The temporal distribution of aircraft events should be obtained from FAA records, the airlines, air cargo operators, etc., as was done when the Ldn noise contours were developed for the State Department of Transportation.

Even though the proposed single- and multi-family land uses are compatible with federal and state guidelines, the noise consultant for this project (Darby & Associates) has recommended additional measures for the residential uses that should

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provide an exterior-to-interior noise reduction of around 25 dBA, resulting in interior levels due to aircraft noise of Ldn 33 or less (with windows closed) and in interior SEL's of up to 60 to 65 dBA from the noisier aircraft. It should be emphasized that while these measures are not mandatory, the petitioner fully intends to implement them.

You also question a statement made in the draft SEIS concerning the reduction of future aircraft exposure levels due to the introduction of progressively quieter aircraft and the lengthening of the runway at Keahole Airport. Your concern is based on the increase in numbers of flights to and from Keahole Airport in addition to the presence of larger aircraft. These factors were considered in the development of future noise contours (also adopted by the Department of Transportation), and it is improbable that there would be an increase in the future average day-night exposures. Although Hawaii has been temporarily excluded from recent changes in federal aviation regulations that will require an industry-wide switch to quieter aircraft by the year 2000, it is apparent that the air passenger service industry is already moving toward replacing noisier aircraft (Stage 2 aircraft) with quieter aircraft (Stage 3 aircraft). Hawaiian and Aloha Airlines each have several Stage 3 aircraft in their respective fleets. The difference in sound exposures as a result of these two types of aircraft is evident by the noise levels recorded by Darby & Associates which appear in Tables 1, 2 and 3 of their noise assessment (Appendix L of the draft SEIS).

Income/Economic Multipliers. You state that the Economic and Fiscal Impact Assessment prepared by KPMG Peat Marwick (Appendix P of the draft SEIS) fails to adjust estimated expenditures attributable to the community, including direct, indirect and induced effects, for leakage. We should note that KPMG's analysis is based on economic multipliers developed and endorsed by the Department of Business, Economic Development and Tourism. These multipliers are derived from an analysis of the Hawaii economy, including resort projects that are owned by corporations outside of Hawaii and estimate monies that stay in the State after leakage from Hawaii. In fact, the majority of hotel rooms in Hawaii are owned and operated by out-of-state interests.

Salt Water Lagoon. You reference work by L.B. Holthuis (1963) concerning the inability of the red shrimps (Decapoda, Caridea) to survive on either pure freshwater or pure saltwater. You also suggest that the infusion of seawater into the anchialine feature on the southern property line of 'O'oma II and the anchialine ponds at Kohanaiki could adversely affect the life cycles of various anchialine pond inhabitants.

We believe Holthuis' work to be outdated. As Dr. Brock's letter indicates (Appendix I), these organisms are fully capable of surviving in either salt or fresh water. Dr. Brock's work is based on many years of observation and experimentation. We contend that Holthuis' work was not based on experiment, but rather on deduction, and we stand by the conclusions of Dr. Brock. Further, the work prepared by Tom Nance, (included in the Draft SEIS as Appendix F; Salt Water Ponds of the 'O'oma

II Project: Recommended Circulation System and Analysis of Environmental Effects), clearly indicates that none of the anchialine environments will be totally saline.

You also warn of the possibility of the inhibition of water seepage through the unlined salt water lagoon if a dense benthic algae mat occurs. While we believe such a possibility to be extremely remote, environmental conditions in the lagoon will be closely monitored, and should such a situation arise, we would be prepared to shut the system down.

Historic and Archaeological Resources. A significant portion of your comments concerning this subject are devoted to background information on previous historic preservation review efforts, agreements on preservation for Parcels 4 and 22 and data recovery for 23 sites made in 1986 and mitigation commitments for 12 significant historic sites within 'O'oma II parcels 4 and 22 and for 3 significant historic sites primarily within NELHA lands.

We acknowledge that the Draft SEIS does not discuss a survey report by Chiniago Inc. (Barrera 1985), which included what is now referred to as Parcel 22. We also acknowledge the presence of two significant sites on this parcel and the need to preserve and interpret these two sites: the Mamalahoa Trail; and, site 10,155 (a cave shelter associated with the trail).

We are also in agreement with the description of the status of all sites within the project boundaries described in the letter, relative to the need for preservation (Mamalahoa Trail; 10,155; D15-1; T-15; T-48; D15-3; T-14; T-13; T-31) and data recovery (D15-2; D15-17; T-71), in addition to the need to preserve portions of two sites overlapping NELHA property (T-62; D15-18).

On pages eight and nine of your letter, there are five items identified which you note may conflict with earlier preservation commitments, including the need for adequate buffering around several sites. We would like to emphasize that the petitioner is committed to preserving all historic sites on Parcels 4 and 22 identified by the department for preservation and recognize the need to develop a detailed preservation plan which must be approved by the State Historic Preservation Division. We should note that although some sites appear to be located within development features of the master plan, we fully intend to adjust final development plans to avoid these sites as well as providing adequate buffering. We believe there is sufficient flexibility in the master plan to accommodate full development and preservation of all important historic sites.

Water Sources. You correctly state that we have not identified a specific source of water supply for the proposed project. We are currently examining several options for development of reliable sources for potable as well as irrigation water and fully intend to coordinate our efforts with appropriate county and state agencies.

Mamalahoa Trail. You recommend that the Big Island Naalahele Commission be notified of any mitigation action to be taken relating to the preservation of the Mamalahoa Trail. Members of our planning team have already begun working with the Hawaii Na Ala Hele Advisory Council chaired by Ms. Leilani Hino. Mr. Gilbert Kahele, of the Advisory Council, has been assigned to work directly with our planning team on this project, and has already been on the project site. We look forward to continued coordination with Mr. Kahele and the rest of the members of the Advisory Council, to ensure that 'O'oma II provides the best possible trail opportunities. We will also be coordinating efforts with other trail groups on the Big Island.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

DEPARTMENT OF THE ARMY
U S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

October 28, 1991

REPLY TO ATTENTION OF

Operations Division

Ms. Esther Ueda
State Land Use Commission
Federal Building, Room 104
355 Merchant Street
Honolulu, Hawaii 96813

Dear Ms. Ueda:

This is a follow-up to the October 18, 1991 letter from Mr. Kisuk Cheung, Director of Engineering, Corps of Engineers, to the Commission regarding the Draft Supplemental Environmental Impact Statement (DSEIS) for 'O'oma II Master Plan, North Kona, Hawaii (TMK 7-3-09: 4, 22). The Operations Division was contacted by Mr. Scott Ezer of Helber, Hastert & Fee, Planners, consultant for the landowner, who clarified the scope of the salt water lagoon system.

According to Mr. Ezer, the water bodies to be developed for the project, including the proposed seven acre lagoon, would be constructed inland of the shoreline and are not directly connected to the ocean. With the exception of a one-meter-square anchialine pond feature which would be preserved, there are no other anchialine ponds on the property.

On this basis, no work is to be performed in waters of the United States; therefore, a Corps of Engineers permit is not required for the project. This determination corrects and supersedes the permit requirement stated in Mr. Cheung's October 18, 1991 letter. By copy of this letter, we are advising the landowner that no Corps permit is required for the project as described in the DSEIS.

We appreciate the opportunity to review the document. If there are additional questions on Corps permit requirements, please contact the Operations Division at 438-9258.

Sincerely,

Stanley T. Arakaki
Chief, Operations Division

Copy Furnished:

Helber, Hastert & Fee, Planners, 733 Bishop Street, Suite 2590, Honolulu, HI 96813
Kahala Capital Corporation, Attn: Ms. Toni Fortin, 75-5751 Kuakini Highway, Suite 201, Kailua-Kona, HI 96740

XIII-30

Helber Hastert
Planners

October 31, 1991

Mr. Kisuk Cheung, Director of Engineering
Department of Engineering
U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Supplemental Environmental Impact Statement

This is to acknowledge receipt of comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the subject property by letters dated 17 and 28 October 1991.

We appreciate the re-examination of comments made in your letter of 17 October and your clarification of 28 October which stated that a Department of the Army Permit would not be required for the proposed lagoon system.

We wish to acknowledge the work and assistance of Ruby Mizue of the Operations Division who responded to my inquiry in a timely and professional manner.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

Helber Hastert & Fee
Grosvenor Center, 1188 Tower

733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Telephone 808 545-2055
Facsimile 808 545-2050

United States Department of the Interior

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

October 24, 1991

Ms. Esther Ueda
Department of Business, Economic Development & Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft Environmental Impact Statement (DEIS) for the
'O'oma II Master Plan

The U.S. Geological Survey, Water Resources Division, Honolulu District office has reviewed the subject DEIS and has no comments.

Thank you for allowing us to review this document.

As requested, we are returning the EIS to the Office of Environmental Quality Control.

Sincerely,

William Meyer
District Chief

Enclosure

Helber Hastert
Planners

November 1, 1991

Mr. William Meyer, District Chief
Water Resources Division
United States Department of the Interior
Geological Survey
677 Ala Moana Boulevard Suite 415
Honolulu, Hawaii 96813

Dear Mr. Meyer:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

We acknowledge receipt of your letter dated October 24, 1991 concerning the above, and note that you have no comments.

Thank you for reviewing the Draft Supplemental EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

Helber Hastert & Fee
Grosvenor Center, 733 Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone: 808 545-2055
Facsimile: 808 545-2050

XIII-32

Police Department

Lorraine R. Inouye
Mayor
Victor V. Vierra
Chief of Police
Francis C. DeMorales
Deputy Chief of Police

349 Kapiolani Street • Hilo, Hawaii 96720-3998 • (808) 961-2244 • Fax (808) 961-2702

October 24, 1991

Ms. Esther Ueda
Department of Business, Economic Development
& Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT, 'O'OMA II MASTER PLAN
APPLICANT: KAHALA CAPITAL CORPORATION
TMK: 3-7-3-09: 4,22

The draft environmental impact statement has been reviewed and we recommend consideration of Captain Wendell Paiva's memorandum of October 23, 1991 prior to the approval of this project.

Sincerely,

VICTOR V. VIERRA
CHIEF OF POLICE

JD:sk

Enc.

cc: State Office of Environmental Quality Control
Kahala Capital Corporation
Helber Hastert & Fee, Planners
Kona Police

TO : VICTOR V. VIERRA, CHIEF OF POLICE

VIA : FRANCIS DEMORALES, DEPUTY CHIEF OF POLICE
JOHN DESA, ASSISTANT CHIEF, FIELD OPERATIONS BUREAU
DENNIS CORREA, MAJOR, FIELD OPERATIONS, AREA II

FROM : WENDELL D. PAIVA, CAPTAIN, PATROL, KONA DISTRICT

SUBJECT : O'OMA II MASTER PLAN
APPLICANT: KAHALA CAPITAL CORPORATION
TMK: 3-7-3-09: 4,22
CHIEF'S ROUTING SLIP 41538

We are concerned that any future development in the area will affect the traffic volume on Queen Kaahumanu Highway. The area is already considered a high density traffic area with related problems concerning traffic safety.

It is our recommendation that before any zoning change or any major development for that area is approved, the developer provide merging and deacceleration lanes at the entrance to Queen Kaahumanu Highway.

WENDELL D. PAIVA
CAPTAIN
OCTOBER 23, 1991

WDP:skk
Oc-10-23-91

XIII-33

Helber Hastert
Planners

October 31, 1991

Mr. Victor V. Vierra, Chief of Police
Police Department
County of Hawaii
349 Kapiolani Street
Hilo, Hawaii 96720-3998

Dear Chief Vierra:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments to the Draft Supplemental EIS (SEIS) for the subject project by letter dated 24 October 1991.

We note the attached memorandum attached to your letter which suggests that merging and deceleration lanes be provided at the entrance of the project at Queen Kaahumanu Highway. Section 6.5.1 of the Draft SEIS discusses the anticipated traffic impacts associated with the proposed project and possible mitigation measures, including a right turn deceleration lane (southbound), a right turn acceleration lane (southbound) and a left turn storage lane (northbound). The developer intends to provide these improvements to mitigate traffic impacts, until the State Department of Transportation can implement a plan to improve Queen Kaahumanu Highway to a four-lane, divided, controlled access highway. Thank you for reviewing the Draft Supplemental EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
OEQC
Toni Fortin

Helber Hastert & Fee
Grosvenor Center, 1700 Tower

733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Telephone 808 545-2055
Facsimile 808 545-2050

US Department
of Transportation
Federal Aviation
Administration

AIRPORTS DISTRICT OFFICE
BOX 50244
HONOLULU, HI 96850-0001
Telephone: (808) 541-1243
Fax: (808) 541-3462

October 11, 1991

Ms. Esther Ueda
Department of Business,
Economic Development & Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

We have reviewed the Draft Supplemental Environmental Impact Statement (DSEIS) for the 'O'oma II Master Plan, North Kona, Hawaii, and have the following comments:

1. The 1990 Ldn Noise Contours shown on page IV-28 are smaller than those prepared under the 1987 Keahole Airport Noise Compatibility Program (NCP). The explanation given for this on page IV-27 "(probably because of ... actually used)" assumes the 1987 NCP is incorrect. The Noise Exposure Maps prepared in 1987 were done using the FAA's Integrated Noise Model and verified by an on-site noise monitoring conducted by Darby & Associates, the NCP's acoustical consultant. These maps, accepted by the FAA on November 14, 1989, show the 60, 65, and 70 Ldn contours further east than this DSEIS. Based on the NCP location, some proposed residential and hotel units will lie within the 60 and 65 Ldn contour which could be a non-compatible land use. Therefore, we recommend these contours be checked, revised as appropriate and the land uses adjusted accordingly.

2. The statement on page IV-27 that "...the gradual introduction of progressively quieter aircraft should reduce future (year 2005) aircraft noise levels..." needs to be re-thought, Hawaii and Alaska are exempt from the current law mandating a phase out of older noisier aircraft; therefore, there could be little, if any, reduction in noise levels due to quieter aircraft, especially the 5 dBA noted.

We recommend you contact the State of Hawaii, Department of Transportation, Airports Division for the current operational and noise levels at Keahole Airport. If you have any questions regarding our comments, please call us.

Sincerely,

David J. Welhouse
Airport Engineer/Planner

Henry A. Sumida
Airports District Office Manager

cc:
Kahala Capital Corporation (Toni Fortin)
Helber Hastert & Fee (Scott Ezer)
DOT-A (Owen Miyamoto)

Helber Hastert
Planners

October 25, 1991

Mr. David J. Welhouse, Airport Engineer/Planner,
Federal Aviation Administration
U.S. Department of Transportation
Airports Districts Office
Box 50244
Honolulu, Hawaii 96850-0001

Dear Mr. Welhouse:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments on our Draft Supplemental EIS (SEIS) for the subject property by letter dated July 9, 1991.

For your ease of reference, we will respond to your comments in the order they appear in your letter.

1. 1990 Ldn Noise Contours. You state that the 60, 65 and 70 Ldn contour lines are not accurately represented in the Draft Supplemental EIS; that they should be located further east (mauka) from where they are indicated. As you have recommended, we have rechecked the 1990 contour lines, looking at both the Keahole Airport Master Plan EIS (October 1988) and the Final Report Noise Compatibility Program Keahole Airport, Hawaii (prepared for the Department of Transportation, Airports Division by KPMG Peat Marwick), which are the basis for the noise contour lines which appear in the Keahole Airport EIS, and find no inconsistencies between the contour lines in these documents and those portrayed in the Draft Supplemental EIS. Further contact with the DOT-A confirmed these maps to be current. Therefore, we believe the land uses in the 'O'oma II Master Plan to be compatible with the 1990 noise contour lines. For your convenience, we have identified the 'O'oma II project site on a copy of the 1990 noise contour lines contained in the 1987 KPMG report.

2. Future Aircraft Noise Levels. We note your comment suggesting we rethink our statement that "...the gradual introduction of progressively quieter aircraft should reduce future (year 2005) aircraft noise levels..." We are aware that Hawaii and Alaska have been excluded from recent regulations adopted by the U.S. Department of Transportation pertaining to the replacement of Stage 2 aircraft with Stage 3 aircraft by December 31, 1999. However, after discussions with staff members in Senator Daniel Inouye's office, we understand this exclusion is not intended to be permanent. In fact, both Hawaiian and Aloha Airlines already have Stage 3 aircraft in their respective fleets, and appear to be committed to eventual replacement of all Stage 2 aircraft. It should be pointed out that all flights originating on the mainland and flying into Keahole Airport (or vice versa), must comply with the new regulations, including United and Hawaiian Airlines.

   In addition, there is a bill now before President Bush for signature, if not already signed, that would make it impossible for United Airlines to operate Stage 2 aircraft in contravention of the new regulations, should they decide to

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establish operations as a local carrier. Although we would agree that the projected noise contours for 2005 should be re-examined, it is arguable that there would not be a reduction in noise levels, notwithstanding Hawaii's exclusion from the new regulations.

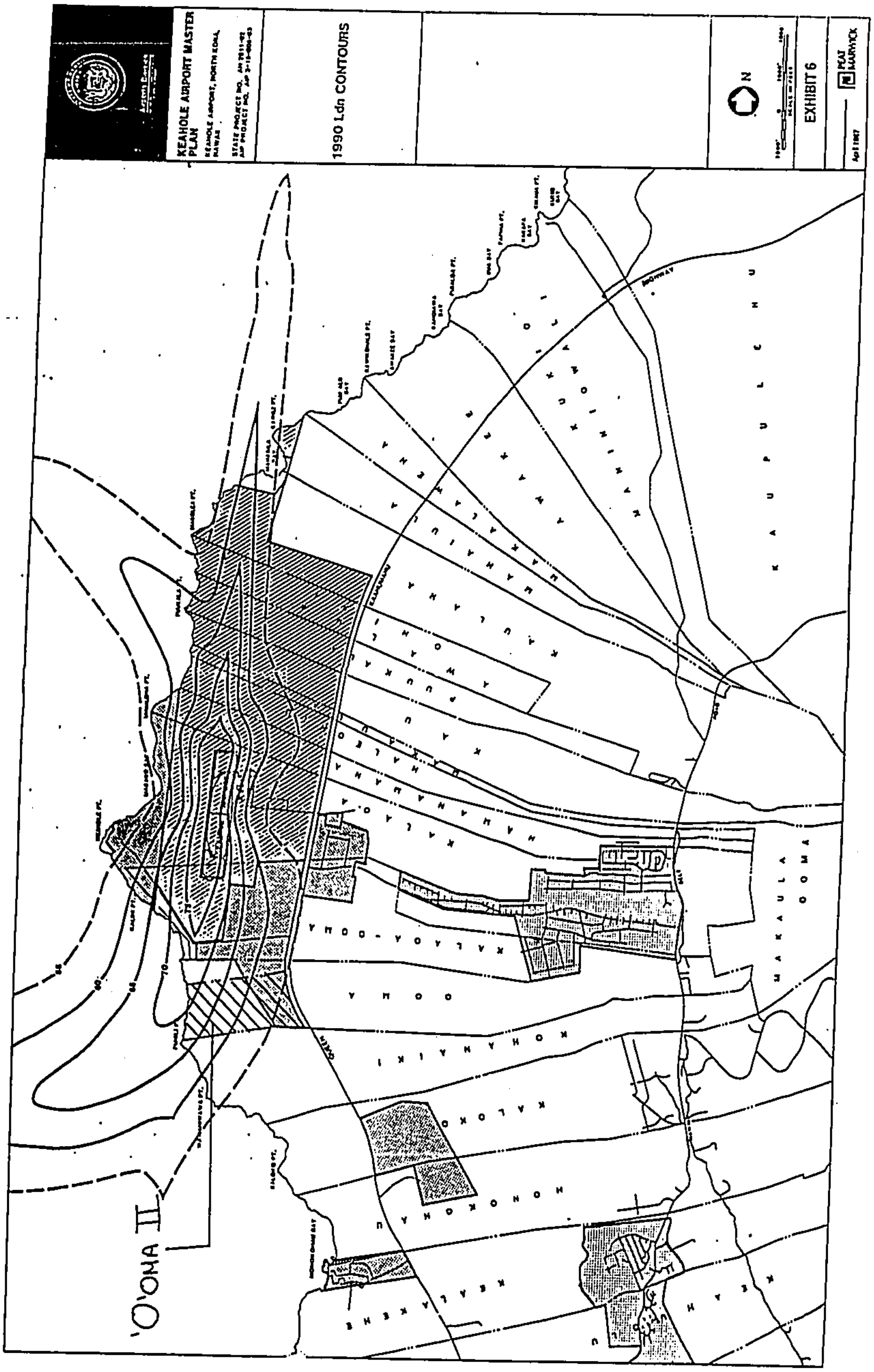
Regardless of any changes to the 2005 noise contour lines, we believe there are two critical issues for analysis in this case: (1) the acceptance of present 1990 noise contour lines used by the State Department of Transportation until updated noise contour lines are developed; and, (2) field measurements conducted by Darby & Associates (which are included in the draft SEIS) which suggest that these noise contours slightly overestimate current noise levels.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: DOT-A (Owen Miyamoto)
Esther Ueda
Toni Fortin


KEAHOLE AIRPORT MASTER PLAN
1990 Ldn CONTOURS
EXHIBIT 6
PEAT MARWICK
'O'OMA II

Lorraine R. Inouye
Mayor
Daniel Ayala
Fire Chief
Harding Fragas, Jr.
Deputy Fire Chief

Fire Department

466 Kinoole Street • Hilo, Hawaii 96720-2983 • (808) 961-8297 • Fax (808) 961-6920

October 3, 1991

Department of Business, Economic Development & Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Attention: Ms. Esther Ueda

Gentlemen:

Re: 'O'oma II Master Plan
North Kona, Island of Hawaii
TMK: 3-7-3-09:4,22

We have reviewed the Draft Environmental Impact Statement for the 'O'oma II Master Plan and have no additional comments.

Sincerely,

DANIEL AYALA
Fire Chief

DA/mo

cc: Kahala Capital Corporation
✓Helber Hastert & Fee, Planners

I-37

Helber Hastert
Planners

October 10, 1991

Mr. Daniel Ayala, Fire Chief
466 Kinoole Street
Hilo, Hawaii 96720-2983

Dear Chief Ayala:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

We acknowledge receipt of your letter dated October 3, 1991 concerning the above, and note that you have no additional comments.

Thank you for reviewing the Draft Supplemental EIS.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

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Grosvenor Center, Pali Tower
733 Bishop Street, Suite 2780
Honolulu, Hawaii 96813
Telephone: 808 545-2055
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JOHN WAIHEE
Governor
MURRAY E. TOWILL
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 Telephone: (808) 586-2408 Fax: (808) 586-2377

November 22, 1991

LAND USE COMMISSION
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Attention: Ms. Esther Ueda

SUBJECT: Comments on O'oma II Resort Development
North Kona, Hawaii
Draft Supplemental Environment Impact Statement
Dated September 1991

Dear Ms. Ueda:

On behalf of the Department of Business, Economic Development and Tourism (DBED), I appreciate the opportunity to participate in the evaluation of the O'oma II Resort Development Draft Supplemental Environment Impact Statement (DSEIS) to be used in the preparation of the Final SEIS. My comments are as follows:

Off-Shore Water Chemistry. My earlier concerns included the off-shore water chemistry. On Page IV-8, section 4-7, the DSEIS acknowledged that groundwater sources and the nearshore marine environment are inextricably connected. Although the DSEIS stated that there are presently no discernible differences between inputs at O'oma II and at more northerly locations, we would like the Final SEIS to discuss what the projections for future nearshore and oceanic conditions would be if the projected development were completed.

Golf Course Fertilization. The DSEIS's discussion of golf course fertilization and proposed mitigating factors is very thorough and addresses my concerns satisfactorily. However, please discuss further alternatives to the use of biocides.

Groundwater Contamination. Although I was pleased with the DSEIS's assessment of potential contamination of groundwater from the use of turf chemicals on the proposed golf course, I would like to see additional discussion on the use of termiticides and whether O'oma II is planning to use the suggested recent development in ground termite control with the application of basaltic sand.

IGCM Program. In its final SEIS, does O'oma plan to adopt the Integrated Course Management (IGCM) program? The IGCM program is outlined in the DSEIS as a program employing structural, cultural and mechanical means to closely monitor the existing health of turf grass on the golf course and determine the appropriate amounts of irrigation, pesticides, herbicides and fertilizers that need to be applied to maintain the health of the turf. Please discuss how the IGCM plan will be enforced and how its continued enforcement will be ensured after the resort has been taken over by a management organization or sold.

Fresh Water. As stated in my response to the DEIS Preparation Notice, there is no assurance of finding sufficient sustainable source of potable groundwater in this area of low rainfall. The DSEIS outlines options (Page VI-3) including drilling fresh and brackish water wells, desalinating sea water for irrigation, etc. The DSEIS also states that presently, the municipal system is inadequate to serve the proposed project. Therefore, other sources of water must be developed privately. The final SEIS should address the current status of additional fresh water sources, along with the water limitations to occur in the area's foreseeable future.

Housing. Page V-10 (section 5.4) addresses the critical housing situation in West Hawaii and states that it is insufficient. The developer agrees to provide housing opportunities for low and moderate income West Hawaii residents and for its employees. The developer agrees to work in conjunction with other developers in the area, the Hawaii Housing Authority and/or the County of Hawaii, to provide adequate housing facilities. I would like to see a specific plan to implement the above proposals.

Hawaii Coastal Zone Management (CZM) Program. This program was implemented by the State of Hawaii to preserve and protect the natural resources of the coastal zones. Page III-20 (section 3.8) discusses the objectives and policies of the CZM program under Chapter 205-A, Hawaii Revised Statutes (HRS) as amended. The final SEIS should discuss the current status of a potential land swap with the State of Hawaii and/or preservation of the entire length of the Mamalahoa Trail within the project site.

Impact of Adjacent Resorts. Two additional resorts are planned for the area and include the development of approximately 470 acres by Nansay, just south of O'oma II. Section VIII-2 outlines the irreversible and irretrievable commitments of resources that may cause Kona residents to perceive this segment of the coast in jeopardy of being committed entirely to private use.

Although it is stated that it is not the petitioner's intent to prohibit or inhibit public use of the beaches or coastal resources, it is necessary to discuss mutual plans between petitioners and other developers to mitigate the general perception of decreased public use and overdevelopment. The final SEIS should address this issue.

Thank you for the opportunity to review and comment on this DSEIS. Should you have any questions, please contact Ms. Johnnie Sanders at 586-2372.

Sincerely,

Murray E. Towill

cc: Helber, Hastert & Fee, Planners
Kahala Capital Corporation

doc b:\DSEIS

Helber Hastert
Planners

November 26, 1991

Mr. Murray E. Towill, Director
Department of Business Economic Development and Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Towill:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments to the Draft Supplemental EIS (SEIS) for the subject project by letter dated 22 November 1991.

For your ease of reference, we will respond to your comments in the order they appear in your letter:

Off-shore Water Chemistry. You state that you would like the Final SEIS to discuss what the projections for future nearshore and oceanic conditions would be if the projected development were completed. On pages IV-16 and IV-17 of the draft SEIS, there is a detailed description of the anticipated impacts of pesticides and nutrients to groundwater and the nearshore marine environment. In both cases, it is predicted that there will be no discernible impact to the marine environment from either of these sources.

Golf Course Fertilization. We note your acknowledgement of the thorough discussion of this subject, and your request to discuss further alternatives to the use of biocides during the construction and operation of the golf course. Because of your comments, and similar comments from others, and our committment to building an environmentally responsible course, we are investigating all possible alternatives to traditional construction and operation of golf courses, including methods of controlling pests and application of fertilizers. We are thoroughly committed to investigating these alternatives, as well as adhering to the principles of the IGCMP.

Groundwater Contamination. You ask whether the petitioner is planning to use the suggested use of basaltic sand as a termiticide, rather than traditional chemical means of controlling of these pests. The petitioner is committed to using viable non-chemical means of controlling pests throughout the proposed development, including the basaltic sand as a termiticide.

Integrated Golf Course Management Plan (IGCMP) Program. You raise a concern about the continued use of the Integrated Golf Course Management Plan (IGCMP) should the project be sold to a different group. We agree that a monitoring agency should be established, or one or a combination of several governmental agencies could be called upon to perform a monitoring function. We will participate in any such monitoring program to the fullest of our capabilities.

Fresh Water. You allude to the question of available fresh water supplies to serve the proposed project. We are acutely aware of this problem and are presently investigating all possibilities to provide the project with potable and irrigation water

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733 Bishop Street, Suite 2290
Honolulu, Hawaii 96813
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and fully intend to coordinate our efforts with appropriate county and state agencies.

Housing. You request that the petitioner provide a specific plan to implement the provision of adequate housing opportunities for low and moderate income West Hawaii residents and for employees of the proposed development. We realize the importance of this issue and are now exploring alternatives to provide these opportunities. In the upcoming weeks, we will be working with appropriate State and County agencies in developing a housing policy for 'O'oma II, which we will share with your department.

Hawaii Coastal Zone Management (CZM) Program. You mention that the final SEIS should discuss the status of the preservation of the Mamalahoa Trail, as it pertains to this proposed development. Section 4.12 of the draft SEIS (pages IV-46-47) presents a discussion of the mitigation measures to preserve the Mamalahoa Trail. As you are aware, we will be required to develop a Historic Sites Preservation Plan, which must be approved by the Department of Land and Natural Resources. The preservation of the Mamalahoa Trail will be an integral aspect of any such plan. A land swap with the State of Hawaii would be one consideration of this plan, and will be discussed with State officials.

XIII-40

Impact of Adjacent Resorts. You state that the final SEIS should address the issue of mutual plans between adjacent resort landowners (Nansay Hawaii, Inc. and Kahala Capital Corporation) to mitigate the general perception of decreased public use of the beaches and coastal resources fronting the two projects. This issue is discussed in detail in Section 4.3 of the draft SEIS. As we have stated in the draft SEIS, existing vehicular access along the shoreline will ultimately be discontinued. However, both Nansay Hawaii, Inc. and Kahala Capital Corporation are fully committed to continued public access to and along the shoreline by all local residents. This committment has been underscored by the petitioner's participation in an agreement which describes how public access to the shoreline will be guaranteed, both during construction of the proposed project, and during its operation. This agreement is included in Volume II of the draft SEIS as Appendix A.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

October 10, 1991

Department of Business, Economic Development & Tourism
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii .96813

Attn: Ms. Esther Ueda

Dear Ms. Ueda:

SUBJECT: 'O'oma II Master Plan
Draft Environmental Impact Statement (DEIS)
North Kona, Hawaii
TMK: 3-7-09: 4, 22

Our review of the subject draft EIS report indicates that the proposed development will have the following enrollment impact on the public schools:

School	Grades	Projected Students
Kealakehe Elementary	K-5	10
Kealakehe Intermediate	6-8	3
Konawaena High	9-12	3

The projected impact is based upon 77 single-family and 200 multi-family units listed in the report. This impact is a revision of our earlier reply dated May 22, 1991, which indicated negligible impact on the public schools.

The schools in the area are operating beyond capacity and will need additional classroom facilities to accommodate the enrollment increases. A new Kealakehe high school is proposed to serve the North Kona area.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

We request that the State Land Use Commission support our position on requiring the developer to contribute a fair share for the construction of school facilities. We estimate that the projected 16 students generated by this development will require 0.6 of a classroom at a cost of $197,801. The developer's fair share will be 50 percent of this cost or $98,900.

We also request that appropriate language for a fair share contribution for construction be included as a condition for approval of the application.

Should there be any questions, please call the Facilities Branch at 737-4743.

Sincerely,

Charles T. Toguchi
Superintendent

CTT:jl(AH)

cc: A. Suga
A. Garson
Kahala Capital Corporation
✓Helber Hastert & Fee, Planners

XIII-41

Helber Hastert
Planners

November 29, 1991

Mr. Charles T. Toguchi, Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Toguchi:

'O'oma II Master Plan, North Kona, Hawaii, TMK: 7-3-09:04,22
Draft Supplemental Environmental Impact Statement

Thank you for submitting comments to the Draft Supplemental EIS (SEIS) for the subject project by letter dated 10 October 1991, which we did not receiv until November 25, 1991.

We acknowledge your estimated enrollment impact of 16 students on the public school system as a result of the proposed project. We also acknowledge your request that the Land Use Commission include language in any approval that would require the petitioner to set aside a $98,900 fair share contribution for the construction of necessary school facilities to accommodate the impacts generated by the proposed project. We look forward to a fuller discussion of this issue during the approval process before the Land Use Commission.

Sincerely,

HELBER HASTERT & FEE, Planners

Scott Ezer
Project Planner

cc: Esther Ueda
Toni Fortin

Helber Hastert & Fee
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