OEQC LIBRARY

MAUI WAILEA 670

FINAL
ENVIRONMENTAL IMPACT STATEMENT

WAILEA, MAUI, HAWAII

OEQC LIBRARY

MAUI WAILEA 670

FINAL
ENVIRONMENTAL IMPACT STATEMENT

WAILEA, MAUI, HAWAII

PREPARED FOR: GCR/VMS MAUI 670
VMS REALTY PARTNERS, MANAGING PARTNER
WAILUKU, MAUI

PREPARED BY: PBR HAWAII
HONOLULU, HAWAII

DECEMBER 1988

FINAL

ENVIRONMENTAL IMPACT STATEMENT

MAUI WAILEA 670

WAILEA, MAUI, HAWAII

TAX MAP KEY: 2-1-08:56 AND 71

This Environmental Impact Statement is Submitted
Pursuant to Chapter 343, HRS

Prepared For:

GCR/VMS MAUI 670
VMS REALTY PARTNERS, WAILUKU, MAUI

December 1988

Wm. Frank Brandt, President
PBR HAWAII

December 20, 1988
Date

Prepared by:

PBR HAWAII

FOREWORD

This Environmental Impact Statement has been prepared for GCR/VMS Maui 670, VMS Realty Partners, to disclose information on its proposed Maui Wailea 670 residential/resort community project on that certain property at Wailea, Maui identified as Tax Map Key: 2-1-08:56 and 71.

The preparation and submittal of this document is pursuant to Hawaii Revised Statutes, Chapter 343, Environmental Impact Statements, Chapter 200 of Title 11, Environmental Impact Statement Rules and Chapter 201 of Title 11, Environmental Council Rules of Practice and Procedure.

The County of Maui Planning Department reviewed the environmental assessment, Maui Wailea 670 Residential/Resort Community, March 1988, that was prepared by PBR HAWAII as part of a Kihei-Makena Community Plan Amendment application and determined that an Environmental Impact Statement is required. The Environmental Impact Statement Preparation Notice (EISPN) appeared in the OEQC Bulletin dated May 23, 1988 and June 8, 1988. The deadline for requests to be a consulted party was June 22, 1988. Comments received during the 30-day EISPN consultation period and responses thereto are included in Chapter XI of this Final EIS.

The Draft EIS, incorporating comments received during the EISPN 30-day consultation period was officially submitted to the Office of Environmental Quality Control on July 20, 1988 and notice of its availability published in the July 23, 1988, August 8, 1988 and August 23, 1988 OEQC Bulletins. The deadline for comments and the end of the 45-day public review period was September 8, 1988. Comments received on or prior to that date and responses thereto are included in Chapter XII of this Final EIS.

I
INTRODUCTION AND SUMMARY

CHAPTER I

INTRODUCTION AND SUMMARY

1. PURPOSE OF THIS DOCUMENT

This environmental impact statement (EIS) has been prepared in support of an amendment to the Kihei-Makena Community Plan (CP) and redesignation from the present State Land Use Commission land classification (Agriculture) to Urban for a proposed 670-acre development in Wailea, Maui. Identified for planning and regulatory processing purposes as Maui Wailea 670, the project area includes TMK No. 2-1-08:56 and 71 and is owned in fee by GCR/VMS MAUI 670. The Maui Wailea 670 property is comprised of approximately 670 acres and is located on the relatively gentle lower slopes of Haleakala volcano on east Maui. The property is adjacent to the existing Wailea resort to the west, Seibu Makena resort to the south, Ulupalakua Ranch to the east and Maui Meadows subdivision and Kihei to the north. The site is bisected by property reserved for the planned extension of the state's Piilani Highway, a major transportation corridor that is planned to connect to the upcountry/Kula region. The project area includes approximately 370 acres mauka and 300 acres makai of the planned highway.

This EIS has been prepared in compliance with the provisions of Hawaii Revised Statutes (HRS) Chapter 343 and Sections 11-200-14 through 11-200-18 of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules and the rules and regulations adopted pursuant thereto. This EIS describes the Community Plan (CP) amendment and the proposed residential/resort project; the existing environmental conditions of the proposed

project site and surrounding area; the probable environmental impacts that might result from the proposed project; the mitigation measures that would be employed to minimize potential adverse environmental impacts; the alternatives to the proposed project that have been investigated; and the relationship of the proposed project to existing land use policies and controls.

The information contained herein has been drawn from site visits, planning and engineering studies and plans prepared for the proposed project and generally available sources regarding the environmental characteristics of the project site and surrounding area.

2. PROJECT DESCRIPTION

Maui Wailea 670 will be an ~~logical~~ extension of the Wailea-Makena resort community. The planned Maui Wailea 670 residential/resort community is dominated by two 18-hole golf courses and will provide ~~a focal point~~ for community activities in a mixed use village center and resort lodge accommodations to complement the luxury hotel accommodations of Wailea and Makena. Organized around a "village green" concept, the service and activity centers for this master planned resort/residential community would be concentrated to create a ~~convenient and exciting~~ community center. The primary activities/services to be planned within the mixed-use village would be a commercial and eatery center resort lodge visitor accommodations, visitor information center, and other facilities such as arts and crafts center and theaters. To serve as a landmark feature for the region, a church could also be prominently located within the village.// With a pedestrian oriented open space circulation system, the village center would provide an integrated sense of community and give the visitor or resident a strong sense of arrival and place.

Located within the makai 300 acres of the project with vehicular and pedestrian access to Wailea, Palauea and Makena via Kaukahi Street, the village center would be pedestrian oriented and in close proximity to the golf clubhouse and tennis center. The balance of the makai area would be utilized for an 18-hole golf course, resort lodges (low-rise hotel accommodations) and various single family and multifamily residential uses located along the open space corridors of the golf course.

The mauka portion of project area, approximately 370 acres, would be developed at lower residential densities and provide for an 18-hole golf course and golf oriented resort lodging facilities as a focal point. With the magnificent views afforded by the upper elevations of the project area, a variety of residential products would be developed including single family and multi-family residential neighborhoods with direct golf course frontage or ocean views.

With a preponderance of landscaped open space to blend the proposed residential community into the slopes of Haleakala overlooking Wailea, the Maui Wailea 670 project will provide the Wailea-Makena resort destination area with a greater sense of community. The village center will provide a community focal point with an integrated pedestrian pathway system to provide pedestrian links to the residential neighborhoods.

The proposed development concept for Maui Wailea 670 is based on an assessment of current market conditions and projected regional infrastructure system improvements. It is expected that with changes in the market conditions and the projected capacity of the infrastructural systems, there would be some modification to the development concept. Any modification to the development concept, however, would be of equal or lower density and would adhere to the general objectives of the proposed project.

The Maui Wailea 670 residential/resort is projected to be developed over a 15 to 20 year time frame. The project would be phased in conjunction with private and public infrastructure extensions and market demands. A summary of the general land use allocations and ranges of planned units is provided in Table I-1.

TABLE I-1

GENERAL LAND USE ALLOCATION

Land Use	Total Approx. Acres	Total Percent of Area	Total Units
Village/Mixed Use (includes lodging units)	31	5	720-850
Commercial	6	1	-
Resort Lodges	27	4	370-480
Residential	233	35	1060-1320
Golf Courses (two 18-hole courses)	341	51	-
Parks/Recreation	14	2	-
Open Space/Roads	18	2	-
TOTALS:	670	100%	2150-2650

Source: PBR HAWAII, 1988.

3. NEED FOR THE PROJECT

Within the region, Kihei, which stretches along the shoreline from Maalaea to Wailea, is a residential and resort community about six miles long with a resident population of about 10,600. Kihei Road serves as the primary linear circulation spine of the area.

Residential and resort development in Kihei is focused along Kihei Road and in proximity to shoreline recreation resources. Sugar Beach and Maui Lu Resorts are low-rise resort condominium projects typical of the area. The majority of the resort accommodations in Kihei are apartments, with some offering the

supporting services and amenities of a hotel. It is estimated that there are about 6,000 condominium units in the Kihei area.

Residential areas are predominantly single family with the quality of development varying considerably with location. In general, there is no discernible community pattern.

There are numerous existing and planned commercial developments within Kihei including the Azeka Place Shopping Center, Kai Maui Village, Kihei Town Center, Rainbow Mall, Kealia Beach Plaza, Kamaole Shopping Center, Dolphin Shopping Center and a proposed shopping center at the entrance to Kihei. Commercial centers that are planned or under construction in the Kihei area include the 30,000 square foot Kamaole Shopping Center and the 20,000 square foot Dolphin Shopping Center.

In Wailea, the existing shopping center has 40,000 square feet of gross leasable area and is presently soliciting proposals from architects for expansion of an additional 40,000 square feet of leasable area. Expansion could begin in late 1989. The market assessment performed for the Maui Wailea 670 project (Appendix A) indicates that there is regional support for additional commercial space, including office uses.

Industrial developments in Kihei are limited to the 300 acre Kihei Research and Technology (R & T) Park, currently planned mauka of Piilani Highway. This project is being marketed as a high technology park to attract "clean" industries and broaden Maui's economic base. This will be one of the first R & T parks in Hawaii. An 18-hole golf course (Silversword Golf Course) is located adjacent to the park and the highway.

Public recreational areas and facilities within Kihei are on the makai side of Kihei Road and include Kamaole Beach Parks, Kalama

Beach Park, and other shoreline parks. Excursion boat operators at the Maalaea Harbor offer sightseeing, diving and fishing charters.

The general development objectives that establish the framework for detailed project planning and design for Maui Wailea 670 include the following:

- Creation of a master planned residential/resort community that provides for regional community services, a focal point of activities and a place of identity and orientation for the Wailea-Makena region.

- Responsive to current and future residential/resort and commercial market trends and needs of the region;

- Responsive to the particular physical and environmental qualities of the site; and,

- Appropriate for the island of Maui and its vision of Wailea-Makena as a world-class resort/residential community.

The master plan concept, as previously described and illustrated (Figure II-6), is responsive to these general development objectives. Based upon detailed site planning and environmental studies, the Maui Wailea 670 project would utilize the county's Project District land use designation to provide for a mix of land uses within a master planned community. Further, the detailed market assessment studies that have been performed for the proposed project (Appendix A), indicate that the planned residential/resort facilities that would be built and the recreational amenities created, would be absorbed into the Maui

market within the development period time frame thereby enhancing the Wailea-Makena area as a world class resort destination.

4. SUMMARY OF ENVIRONMENTAL IMPACTS

In general, the proposed Maui Wailea 670 project is expected to have beneficial and/or minimal impacts on the physical, natural and socioeconomic environments of the project area. The summary of impacts listed below is based on published information concerning the study area; special studies conducted for the proposed project; and projections of the types of activities that would be associated with the proposed project.

4.1 PHYSICAL ENVIRONMENT

4.1.1 Physiography and Geology

The planned alterations to the project site are relatively insignificant compared to the overall geologic character of the site and region. As such, significant impacts resulting from the proposed project are not expected.

4.1.2 Soils and Agricultural Potential

Although the soils of the project site have been classified as poor to not suited for agricultural activities other than use as pasture or range land [Detailed Land Classification, Island of Maui, classification E29, E77 and E88 (100 percent)], the State Land Use designation is "Agriculture". This designation would be changed to Urban under the proposed project, thereby resulting in the loss of 670 acres from the Agriculture designation. There are no present or recent past agricultural activities taking place on the project property with the exception of occasional use for cattle grazing.

The makai 300 acres of the proposed project property are currently within a county project district for urban use. Amending the Kihei-Makena Community Plan to include the mauka 370 acres within this project district would permit the Maui Wailea 670 project to be an integrated development. Accordingly, the requested redesignation is in keeping with the Kihei-Makena Community Plan. The requested redesignation of the property from Agriculture to Urban is not expected to significantly impact the agriculture industry of the state or county. Similarly, due to the poor quality of the soils for agricultural activities, the proposed project is not expected to significantly impact the soils of the area. However, the soils of the project site may impact the proposed project in that some rock excavation may be required.

4.1.3 Hydrology and Drainage

Significant impacts to the hydrological and/or drainage characteristics of the project site are not expected to result from the proposed project. The proposed project is not expected to significantly impact the groundwater resources of the project site because (1) the quantity of groundwater flowing beneath the site is greater than that which would be withdrawn for project purposes; (2) the percolation inflow from the project would not contaminate groundwater resources; and (3) there are no potable water wells or supply sources down gradient from the project site. The groundwater flowing beneath the proposed project site is part of a common brackish water resource that underlies neighboring properties. Wailea Development Company, Inc. is currently utilizing a portion of this for irrigation purposes. Thus, the entire quantity of water flowing beneath the site is not available for the sole use of the proposed project. Further hydrologic studies and monitoring systems will determine the groundwater available for the proposed project so as not to impact the existing users of this resource.

The existing drainage structures serving the project site are adequate to handle increased runoff expected from the proposed project or would be enlarged to handle increased flows; and although existing drainage patterns would be changed slightly, significant impacts to the surface drainage patterns are not expected to occur.

4.1.4 Natural Hazards

Potential natural hazards (tsunamis, floods, volcanic events and earthquakes) are not expected to adversely impact the proposed project nor are natural hazards expected to be impacted by the proposed project. The project site is located outside the tsunami zone; there are no perennial streams and/or intermittent gulches of appreciable size on the property and the property is outside flood prone areas; the project site is located outside significant lava-flow and other volcanic event hazard areas; and earthquake hazards at the site are no greater than other locations on Maui.

4.1.5 Climate and Meteorology

The proposed project is not expected to have any impact on the climate or meteorology of the project area or region. Planned structures would not be tall enough to significantly effect existing wind patterns; and new landscaping or residential vegetation is not expected to be great enough to significantly effect temperature or rainfall patterns.

4.1.6 Air Quality

Impacts to the project area and regional air quality could be caused by increased vehicular activity; electrical generation off-site; solid waste disposal off-site; and construction activities. Because of the moderate level of existing traffic

volumes, additional construction vehicle traffic that would be generated by the proposed project should not violate state or federal air quality standards. Short-term construction impacts would be minimized by dust control measures (frequent watering) that would be employed during the construction period and new landscaping that will be part of the proposed project. These measures are expected to reduce existing fugitive dust emissions in the project area. The off-site concrete and asphalt batching operation contributions to the air quality of Maui are not possible to determine at this time as specific quantities required and/or the batching locations have not been determined. Although it is possible that significant quantities of fugitive dust emissions and particulates could be released by the batching plants, the plants would require review and approval by the State Department of Health to ensure compliance with applicable standards.

Based on the traffic and air quality analyses (see Appendices B and F) performed for this EIS, it appears that primary mobile source generated air pollutant of interest, carbon monoxide (CO), 1-hour, 8-hour and downstream concentrations would be within both federal and state air quality standards.

The project's contribution to the county emissions inventory would result in an approximate 6.4 percent increase over existing emissions due to potential stationary source air quality impacts (electrical generation and solid waste disposal) emissions.

4.1.7 Noise Quality

The existing noise quality of the proposed project site is dominated by natural factors including wind moving through the vegetation on the site and distant surf sounds. Based on noise

level measurements taken at other similar locations within the state, it is presumed that existing noise levels in the project area are approximately 30 to 45 dBa.

Potential impacts on the noise quality of the site and area are primarily limited to those generated by the increased volume of traffic that the proposed project is expected to generate and, in the short-term, construction activity noise. Other potential sources of noise could be golf course operation and maintenance activities. Increased human noise generation is also expected to occur in localized areas at different times. Traffic generated noise levels both on- and off-site, are expected to be in the range of 40 to 50 Leq (energy equivalent sound level for a given time period) (dB) at 50 feet, typical of a residential/resort condition. Traffic generated sound levels within the new residential area are expected to be lower, due to lower speed levels and landscaping along the roadways and around the residences. Increased noise activity due to construction would be limited to daytime hours and persist only during the construction period. Similarly, air conditioning equipment used on any of the residential or resort units would also be required to comply with appropriate noise control regulations. Golf course operation and maintenance activities are expected to be performed during daylight hours and equipment used would meet appropriate federal and state noise control regulations. Increased human activity noise levels in the area could be expected to occur in and around the public park areas primarily, although increased human activity throughout the project site can be expected.

4.1.8 Visual Attributes

The existing visual character of the proposed project site is one of open space and scrub/kiawe vegetation. View planes from the site include a variety of land elevations ranging from relatively

flat to steep slopes. The slopes leading upward to Haleakala provide commanding views to the north, west and south overlooking the entire site and the ocean beyond. Views out of the site would essentially remain the same in that Haleakala, Central and West Maui would still be visible and views of the ocean from the site would be retained. It is expected that the visual character of the site, as viewed from outside the site, would be improved through the addition of the landscaping noted above. Further, the single family and multifamily housing units would be designed to complement the background vistas.

4.1.9 Natural Environment

The proposed project is not expected to have a significant impact on the vegetation of the area because it is composed largely of exotic species, the majority of them weedy. The native species are found in similar environmental conditions throughout the state. Precautions would be taken and planned land uses adjusted to minimize impacts on the Category 1, candidate endangered species and other rare, uncommon or depleted native species found in the southwestern portion of the project site.

The present environment provides a limited range of habitats which are used by the typical array of exotic birds one would expect at this elevation and in this type of habitat on Maui. The proposed development would create a more diverse set of living spaces which would likely benefit species like plover, myna and sparrow. The Common (Ring-necked) Pheasant, Wild Turkey and Black Francolin will be most impacted by a loss of vegetation cover. The Gray Francolin will likely still occur on the site following development but at lower numbers. The loss of dense cover provided by high grass and brush may reduce mice and rat populations while cats, both feral and pets, will probably increase.

4.1.10 Historical and Archaeological Resources

Based on a complete archaeological reconnaissance survey of the project site, there are no surface features that would be jeopardized by the proposed construction and there is little chance for subsurface deposits within the project area.

The lack of any artifacts or features of significance within the project area indicate that there would be no impacts on archaeological or historical resources. The results of the archaeological reconnaissance have been fully reported to the State Department of Land and Natural Resources, Historic Sites Section (DLNR-HSS) staff and the results of their review of the archaeological reconnaissance survey included in Appendix D. As indicated by DLNR-HSS, the one possible archaeologically significant site found on the project property is "no longer significant" given the descriptive work performed and the proposed project "will have no effect" on significant historic sites. Should subsurface remains such as artifacts, burials or deposits of charcoal or shells be found during construction activities, work would be stopped and the Historic Sites Section of the Department of Land and Natural Resources would be contacted to determine the significance and recommended mitigation, if needed. The services of a qualified archaeologist will be retained to execute the mitigation plan.

4.1.11 Socioeconomic Environment

The projected average daily resort resident population would range between a low of 260 persons in 1995 to a high of 2,000 persons in 2010. This translates into approximately 1,400 to 1,810 additional residents and visitors on Maui in 1995 due to the proposed project, with visitors accounting for about 40 percent of the population increase. Additional residents and visitors could increase to between 4,160 to 4,840 by 2010, with

about one-third of the population increase being visitors. Projected total annual visitor expenditures resulting from the proposed project (direct, indirect and induced) range from a low of $50.8 million in 1995 to a high of $135.4 million in 2010.

Employment impacts from the proposed project are expected to be positive both during the construction phase and the operation phase. It is estimated that in the 1991 to 1995 period approximately 500 to 590 (direct, indirect and induced) construction workers would be required and that approximately 620 to 730 construction employees during the 2001 to 2005 time period would be required with the construction force decreasing to between 500 and 530 during the 2006 to 2010 period. Annual wages paid to these workers during the 1991 to 1995 is projected to range between $5.5 and $6.4 million, $6.7 and $7.9 million during the 2001 to 2005 period and $5.5 to $5.8 million during the 2006 to 2010 period. During the operational phases of the proposed project, it is estimated that between 1,060 and 1,450 employees will be required to provide the levels of service required in the 1995 period, increasing to between 2,155 and 2,575 in the 2010 period. Total annual wages for these employees is projected to range between $8.4 million and $11.5 million in 1995, increasing to between $17.1 million and $20.3 million in 2010.

The resort site, in its current unzoned and undeveloped status, will yield about $18,500 in real property taxes in 1988. The proposed project is expected to generate from $1.4 to $1.6 million annually in real property taxes by 1995. Real property tax revenues could increase to between $3.2 and $3.5 million in 2010. State tax revenues are projected to increase by $2.6 to $3.1 million annually in 1995 due to the resort. The total annual tax collections could increase to $7.1 to $8.2 million annually by 2010 as a result of the proposed project. State expenditures required as a direct result of the proposed project

are estimated to be about $700,000 to $900,000 in 1995 increasing to $4.1 to $4.6 million in 2010. County expenditures required as a direct result of the proposed project are estimated to be $700,000 to $800,000 in 1995 increasing to $2.2 to $2.5 million in 2010.

Based on the above noted projected state and county tax revenues and expenditures, it is estimated that the state revenue/expenditure ratio could reach 3.6 to 1 in 1995, gradually declining to the 1.7 to 1.8 to 1 range by 2010. Similarly, the county revenue/expenditure ratio is projected to be 2.4 to 1 in 1995, declining to the 1.4 to 1.7 to 1 range thereafter. The projected state and county revenue/expenditure ratios indicate that the proposed project will have both short- and long-term positive fiscal and economic benefits.

Given that the area is currently a destination resort area, increased numbers of tourists are not expected to cause significant adverse impacts on the social structure or fabric of the project area. It is possible that there may be an increase in some crimes, such as automobile theft and theft from resort/residential units. Also, at present the various types of housing units to be constructed within the project have not been definitively determined. When the final determination is made, an appropriate number of affordable housing units for various target groups will be proposed in accordance with applicable state and county regulations. Based on the type of project planned, many or all of these affordable housing units would be located offsite but within the region.

4.1.12 Infrastructure

Potential impacts resulting from the proposed project could affect the highway/roadway system serving the area and project; the potable water and sewerage systems serving the area; solid

waste disposal patterns; and the electrical and telephone systems serving the project area. Adverse impacts to any of these systems is not expected due to the measures that would be taken by the developer to enhance (enlarge or construct new facilities) the systems, either expressly for the proposed project or in conjunction with other developers, to serve adjacent existing or proposed developments or with the state or county.

4.1.13 Public Facilities

Potential adverse impacts resulting from the proposed project on the schools of the project area, police or fire services are not expected. The developer would continue to work with the State Department of Education to ensure that adequate public schools are available to serve the project residents; county police forces would be augmented by private security forces and county fire services, with adequate staffing, are expected to serve the proposed project.

4.1.14 Recreational Facilities

The proposed project is expected to add to the recreational facilities of the project area. The creation of golf, tennis and park facilities within the proposed project are expected to benefit both residents and visitors to the project area.

5. SUMMARY OF PROPOSED MITIGATION MEASURES

As indicated above, few potential adverse impacts to the area are expected to result from the proposed project. Mitigation measures to minimize potential adverse environmental impacts of the proposed project include the following:

- Use of appropriate engineering, design and construction measures to minimize potential seismic, volcanic and flood hazards.

- Use of appropriate engineering, design and construction measures to ensure adequate drainage of the site.

- Water spraying during construction activities to maintain dust control and landscaping to maintain long-term air quality.

- Use of taxonomically significant vegetation in landscape plans for the proposed project.

- Use of appropriate landscaping to increase the habitat attractiveness to birds and to increase the visual attractiveness of the area.

- Continued cooperation between the developer, other developers in the area and governmental agencies in the development of new or improved highway/roadway, drainage, waste water disposal, solid waste disposal, potable and brackish water sources and transmission/distribution systems, electrical/communication systems, schools and other public facilities and services for the area.

6. SUMMARY OF ALTERNATIVES

Known alternatives which could "feasibly" attain the objectives of the proposed project have been considered and are discussed in detail in Chapter III. "Feasible" actions that potentially reduce or eliminate environmental risks or costs have been evaluated. The alternatives investigated and analyzed have

included the following: alternative land use and circulation layouts and configurations of the site; various combinations of support services and facilities that could be provided; alternative uses of the property given the present land use designations; and the alternative of "no action".

In general, none of the alternatives investigated meet the objectives of the project to the degree that the proposed project does. In assessing the alternatives and the proposed project, it has been determined that the proposed action provides the desired benefits to both the community and the developer while minimizing environmental costs and risks.

7. SUMMARY OF UNRESOLVED ISSUES

The land owner is unaware of any unresolved public concerns at this time regarding the proposed project. The developer has been and will continue to work with the residents, community associations and businessmen of the area, as well as administrative and elected officials to assure that the final development plans meet the developer's project objectives and satisfactorily address concerns that may be raised during public review of this EIS.

Issues that remain unresolved at this time are permitting and procedural issues that this EIS is designed to help resolve. It is believed that these issues can be resolved without undue difficulty.

8. SUMMARY OF COMPATIBILITY OF LAND USE POLICIES AND CONTROLS

Based on the analyses conducted and review of applicable state and county land use plans, policies, goals and objectives, it appears that the proposed project would be in concert with those

plans. With adoption of the proposed Community Plan amendment and State Land Use boundary amendment, the proposed project would be consistent with state and county land use plans and policies.

9. NECESSARY APPROVALS AND PERMITS

The existing land use authorities, designations and related permits or approvals required are listed in Table I-2.

TABLE I-2
NECESSARY PERMITS AND APPROVALS

Authority	Approval Required
COUNTY OF MAUI Planning Department	Environmental Impact Statement Kihei-Makena Community Plan Amendment Zone Change Approval Project District Ordinance
Department of Public Works	Subdivision Approval Grading Permit Building Permit
STATE OF HAWAII State Land Use Commission	Boundary Amendment
Department of Land and Natural Resources	Ground Water Use Permit
State Commission on Water Resource Management	Well Construction and Pump Installation Permit

10. LIST OF FINAL EIS PREPARERS

Name/Affiliation	Title	Area of Expertise
GCR/VMS Maui 670		
J. McGrath	Vice President, Acquisition & Development	Land Development
J. Murray	Project Manager, Maui	Project Management
P. Nottage	Development Coordinator	Infrastructure Planning
PBR HAWAII		
Wm. F. Brandt	President	Planning
T. Witten	Vice President	Planning
M. Terry	Principal	Planning
J. Leonard	Project Manager	Environmental Planning
G. Bergdahl	Associate	Graphics
L. Warning	Editor	Editing
T. Ishikawa		
T. Ishikawa	Owner	Planning/Agency Coordination
Gordon A. Chapman Consulting Services		
G. A. Chapman	Owner	EIS Preparation
Char & Associates		
W. Char	Botanical Consultant	Botany
Archaeological Consultants of Hawaii		
J. Kennedy	Archaeologist	Archaeology
Phil Bruner		
P. Bruner	Owner	Biology/Avifauna
Peat, Marwick, Main & Company		
M. Tom	Partner-In-Charge	Market, Economics
Parsons, Brinckerhoff, Quade & Douglas		
J. Ng	Traffic Engineer	Traffic Engineering

List of Draft EIS Preparers (Continued)

Name/Affiliation	Title	Area of Expertise
Warren S. Unemori Engineering, Inc.		
W. Unemori	President	Civil, Structural Engineering
J. W. Morrow		
J. W. Morrow	Owner	Air Quality Analysis
John F. Mink		
J. F. Mink	Owner	Water Resources

II
DESCRIPTION OF THE PROPOSED PROJECT

CHAPTER II

DESCRIPTION OF THE PROPOSED PROJECT

1. REGIONAL SETTING

The regional extent of existing and planned land uses are shown in Figures II-1 and II-2. Kihei, which stretches along the shoreline from Maalaea to Wailea, as described below, is an extensive residential and resort community about six miles long The present estimated resident population of the area is about 10,600. South Kihei Road serves as the primary linear circulation spine for the area.

Residential and resort development in Kihei is focused along South Kihei Road and in proximity to shoreline recreation resources. Sugar Beach and Maui Lu Resorts are low-rise resort condominium projects typical of the area. The majority of the resort accommodations in Kihei are apartments, with some offering the supporting services and amenities of a hotel. It is estimated that, at present, there are about 6,000 condominium units in the Kihei area.

Residential areas are predominantly single family with the quality of development varying considerably with location. In general, there is no discernible community pattern. Most undeveloped land areas between existing residential subdivisions require extensive site drainage infrastructure before they can be developed. Until there is a public drainage system in Kihei, subdivision of these lands will not be feasible.

There are numerous existing and planned commercial developments within Kihei including the Azeka Place Shopping Center, Kai Maui

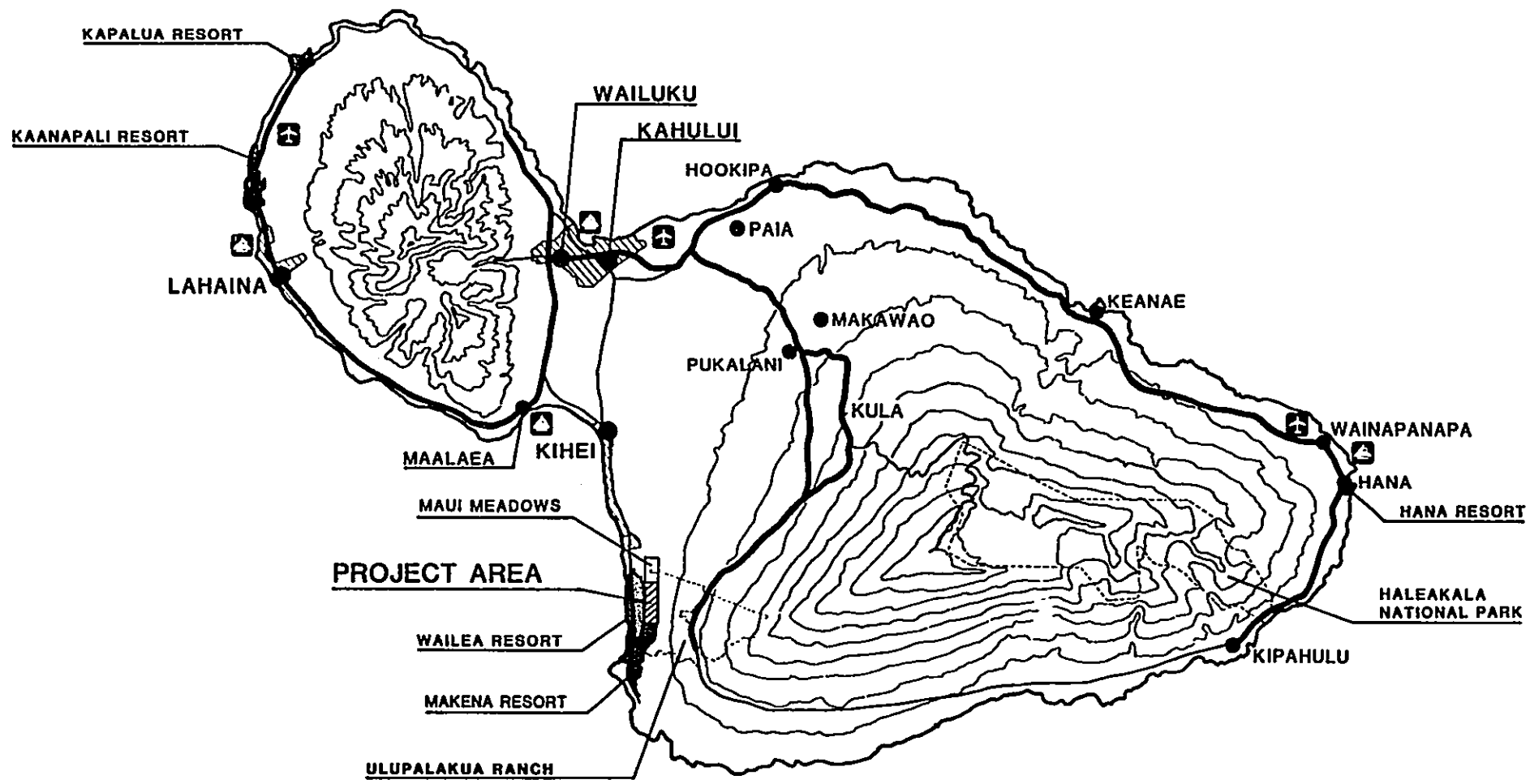
Village, Kihei Town Center, Rainbow Mall, Kealia Beach Plaza, Kamaole Shopping Center, Dolphin Shopping Center, and a proposed shopping center at the entrance to Kihei. New commercial centers in the Kihei area include the 30,000 square foot Kamaole Shopping Center and the 20,000 square foot Dolphin Shopping Center.

Industrial developments in Kihei are limited to the 300-acre Kihei Research and Technology (R & T) Park, currently planned mauka of Piilani Highway between Waipuilani Gulch and Keokea Stream. An 18-hole golf course (Silversword Golf Course) is adjacent to the park and the highway. This project is being marketed as a high technology park to attract "clean" industries and broaden Maui's economic base. This will be the first R & T park in Hawaii.

Public recreational areas and facilities within Kihei are on the makai side of Kihei Road and include Kamaole Beach Parks, Kalama Beach Park and other shoreline parks. Excursion boat operators at the Maalaea Harbor offer sightseeing, diving and fishing charters.

In the Wailea area south of Kihei and immediately adjacent to the northern boundary of the proposed Maui Wailea 670 project, is Maui Meadows, a single family residential subdivision. The homes within the subdivision are smaller and less expensive than those within Wailea Resort. Architectural design and lot landscaping within the subdivision are not controlled by architectural design standards or review procedures. The subdivision provides potential housing opportunities for future residents of the area, including locations for area-wide resort employees.

Wailea Resort, immediately adjacent to the western boundary of the proposed Maui Wailea 670 project site, includes two major resort hotels, two hotels under construction and an additional

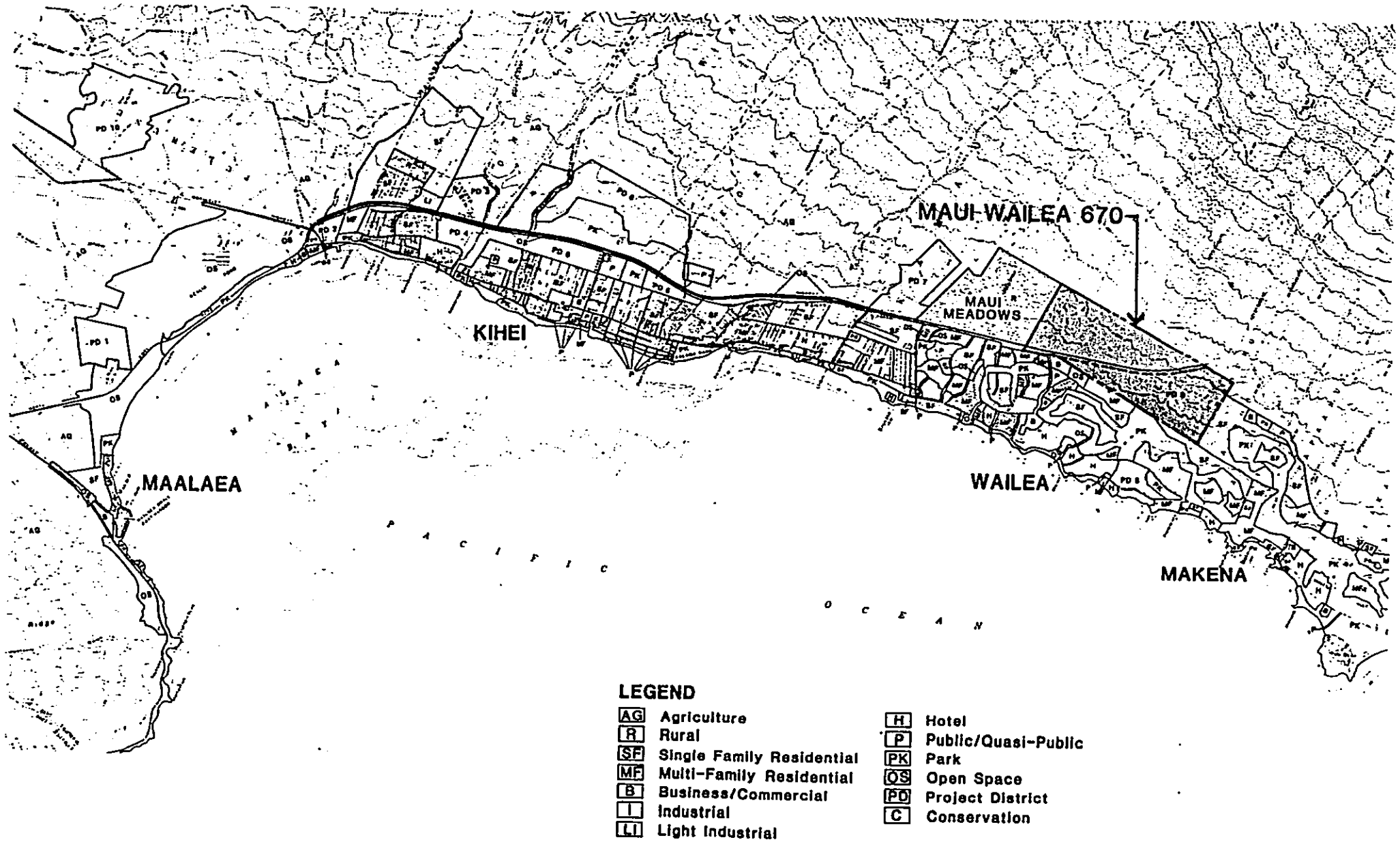


ISLAND LOCATION MAP

FIGURE II-1

MAUI WAILEA 670

PBR HAWAII



REGIONAL LOCATION MAP
KIHEI-MAKENA COMMUNITY PLAN

FIGURE II-2

MAUI WAILEA 670

PBR HAWAII

two in the planning or permitting stages. The mixed-use plan of Wailea Resort also incorporates other land-use types such as single family and multifamily residential units, parks. public beach rights-of-way, a tennis center and a commercial retail center. Additionally, there are two 18-hole championship golf courses with associated clubhouse and the necessary resort internal streets and infrastructural components. Another 18-hole golf course is planned for the resort.

The existing Wailea shopping center has 40,000 square feet of gross leasable area and is presently soliciting proposals from architects for expansion of an additional 40,000 square feet of leasable area. Expansion could begin in late 1989. The market assessment performed for the Maui Wailea 670 project (Appendix A) indicates that there is regional support for additional commercial space, including office uses.

South of Wailea, the Seibu Makena Resort contains the Maui Prince Hotel and an 18-hole golf course. Two new 9-hole courses, a second hotel site and large areas for single family and multifamily residential development are planned for the resort.

2. DESCRIPTION OF THE PROPERTY

Identified for planning and regulatory processing purposes as Maui Wailea 670, the project area includes TMK 2-1-08:56 and 71 and is owned in fee by GCR/VMS MAUI 670 (Figure II-3). Also located within the project area is a Maui Electric Company, Ltd. (MECO) electrical substation (TMK 2-1-08:43) that would be retained. The proposed project site includes approximately 670 acres on the relatively gentle lower slopes of Haleakala volcano on east Maui and, as noted previously, is adjacent to the existing Wailea resort to the west, Seibu Makena resort to the south, Ulupalakua Ranch to the east and Kihei and Maui Meadows subdivision to the north (Figure II-2).

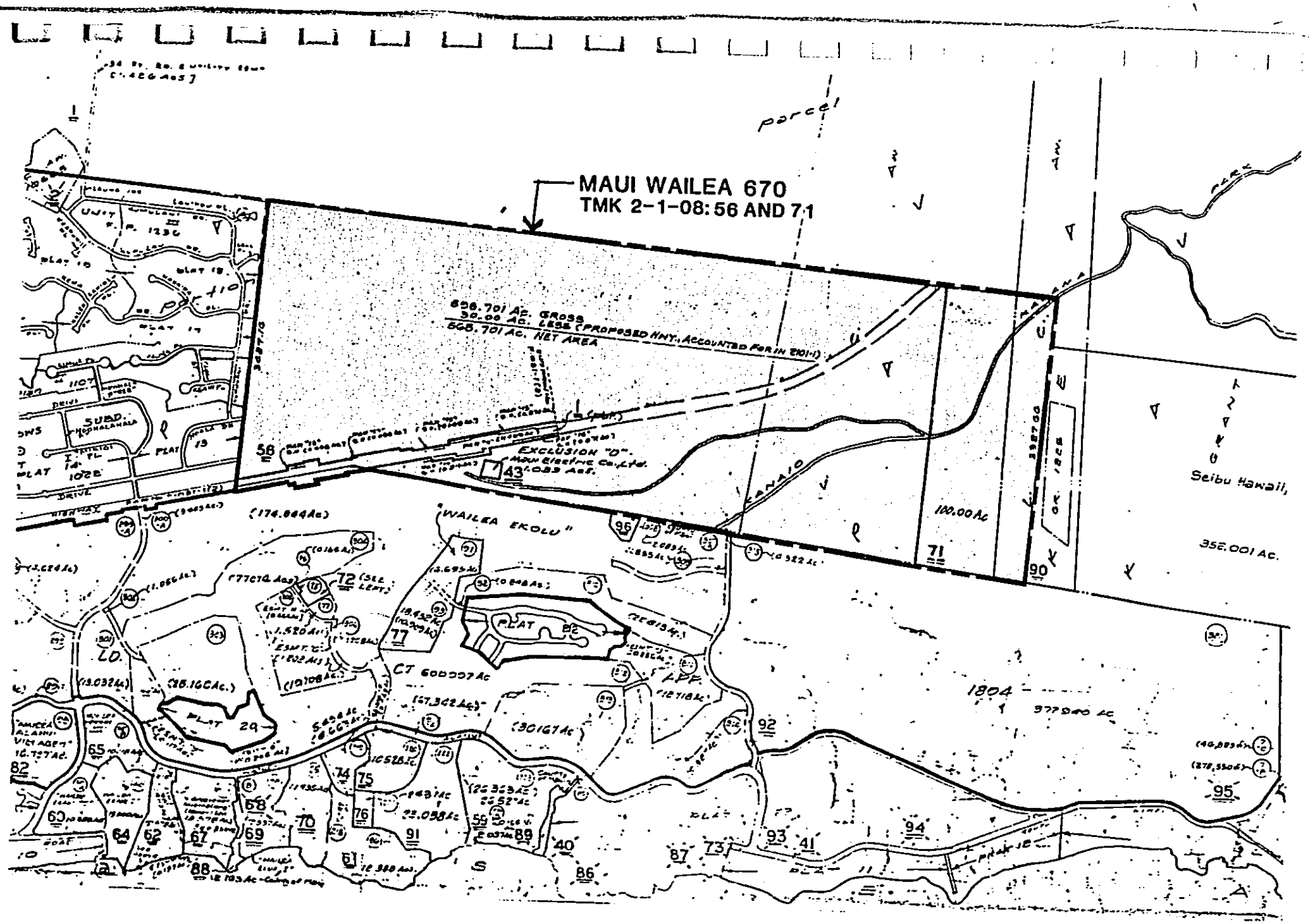
The site is bisected by property reserved for the planned extension of the state's Piilani Highway, a major transportation corridor that is planned to connect to the upcountry/Kula region. The project area includes approximately 370 acres mauka and 300 acres makai of the planned highway. As noted previously, a MECO substation is located on an approximately one-acre parcel near the western project boundary with overhead transmission lines leading eastward (mauka) from the substation across the project site. Elevations across the site range from approximately +300 to +700 feet above mean sea level (MSL). The site slopes to the ocean at an average slope of 12 percent. Existing vegetation consists of typical upland Kiawe forest which includes native wili-wili, kiawe and koa haole trees, ilima, lantana and grasses.

Panoramic views of shoreline, upland areas of Haleakala, West Maui Mountains and the offshore islands of Molokini, Kahoolawe, and Lanai are available from selected areas of the site. Views of the ocean are available from almost all areas of the site.

The entire project area is within the State Land Use agricultural district and classified "E" by the Land Study Bureau (Figure II-4). The makai portion (300 acres) of the project area is designated on the county's Kihei-Makena Community Plan as Project District No. 9 (1050 units) (Figures II-5 and II-6). The mauka portion of 370 acres, if included in the project district, would cause the project area to be contiguous with urban lands to the west (Wailea Resort), rural lands to the north (Maui Meadows) and planned urban lands to the south (Seibu Makena Resort).

3. DESCRIPTION OF THE PROPOSED ACTION (PROJECT)

The general development objectives that establish the framework for detailed project planning and design for Maui Wailea 670 include the following:



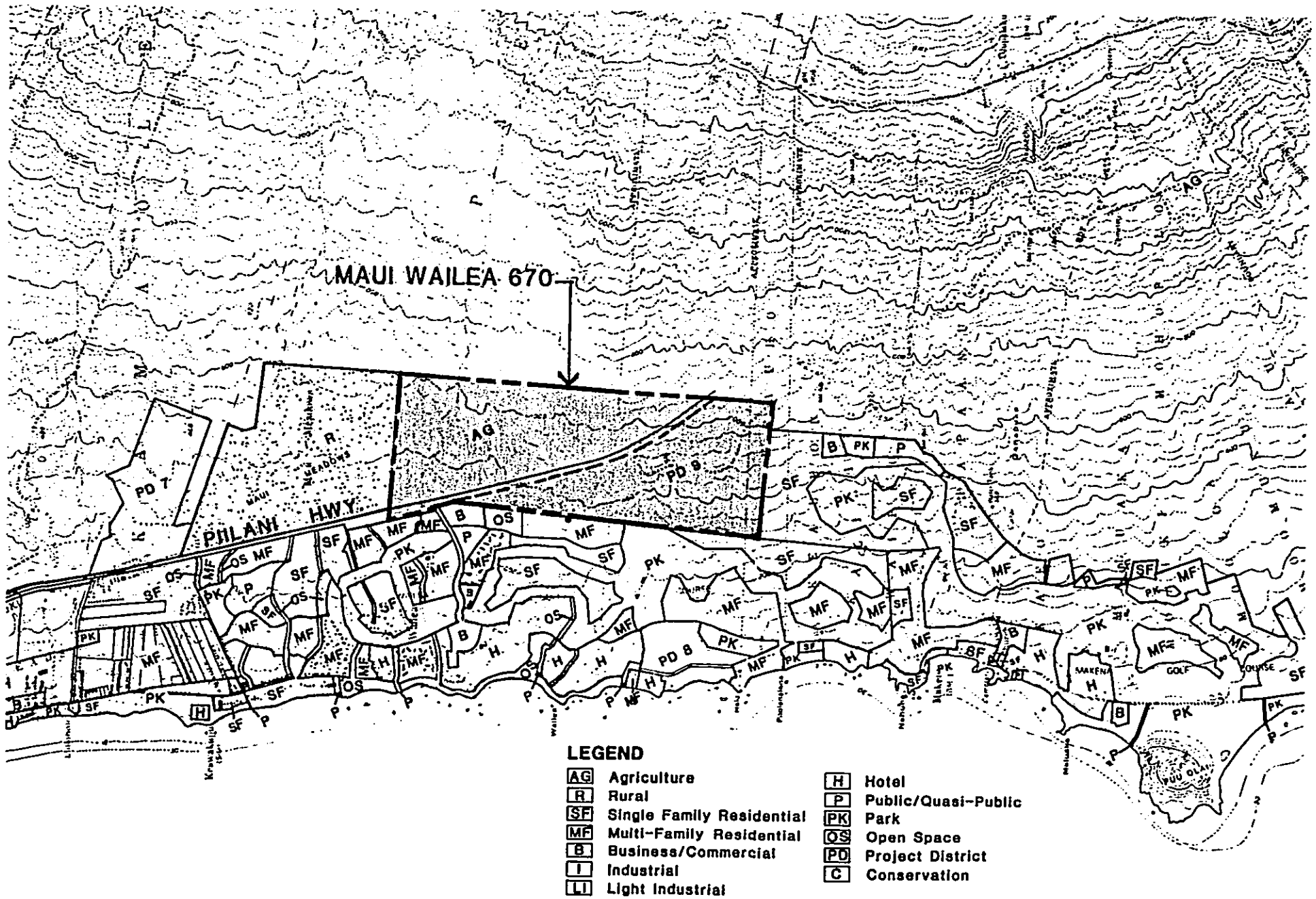
TMK MAP

MAUI WAILEA 670

FIGURE II-3

0 775 1550 FEET

PBR HAWAII



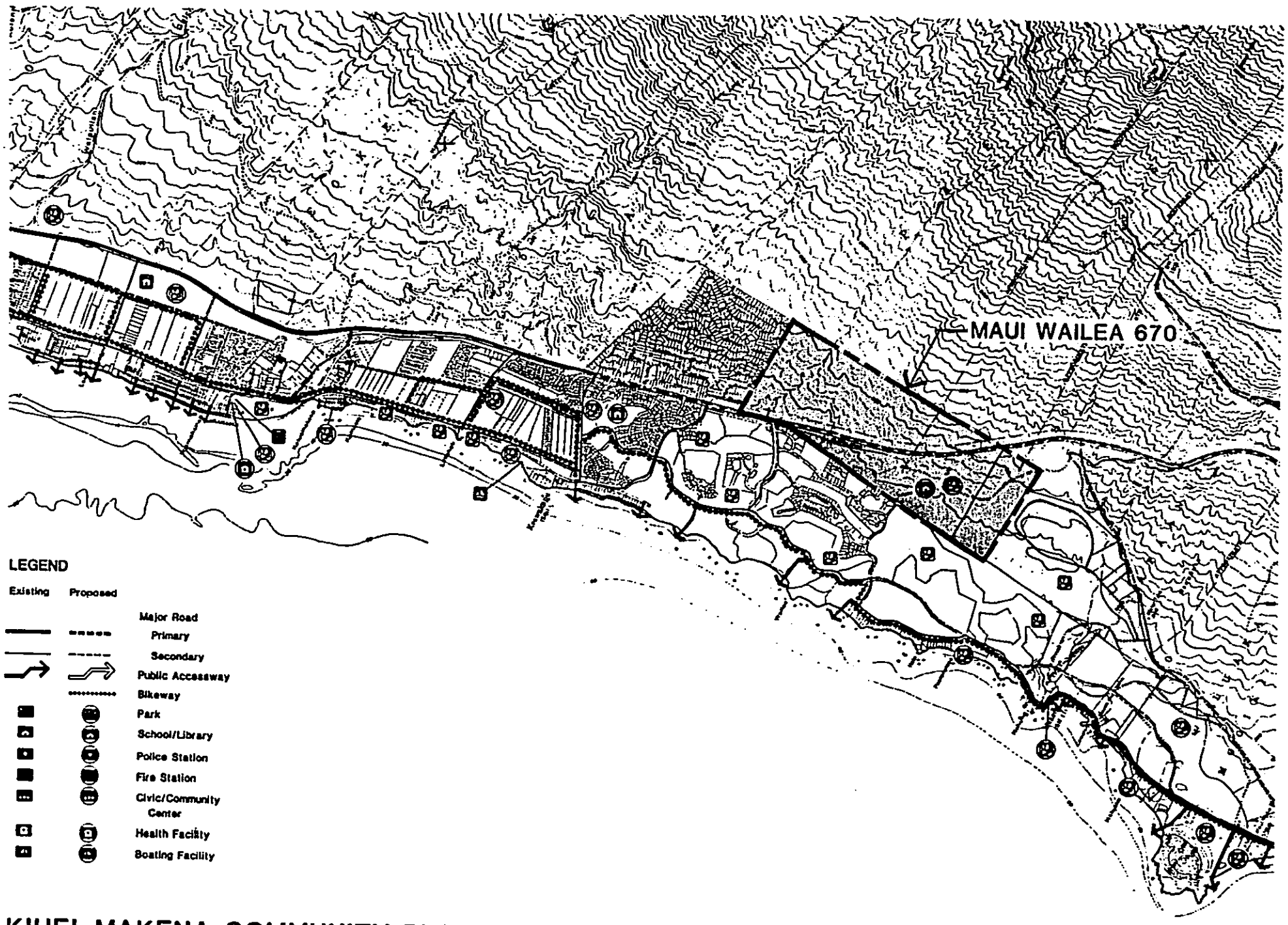
KIHEI-MAKENA COMMUNITY PLAN

FIGURE II-5

MAUI WAILEA 670

0 1700 3400 FEET

PBR HAWAII



KIHEI-MAKENA COMMUNITY PLAN: PUBLIC FACILITIES

FIGURE II-6

MAUI WAILEA 670

0 2140 4280 FEET

PBR HAWAII

- Create a master planned residential/resort community that provides for regional community services, a focal point of activities and a place of identity and orientation for the Wailea-Makena Region;

- Provide a residential/resort community plan that is responsive to current and future residential/resort and commercial market trends and needs of the region;

- Provide a residential/resort community that is responsive to the particular physical and environmental qualities of the site; and,

- Provide a residential/resort community that is appropriate for the island of Maui and its vision of Wailea-Makena as a world-class resort/residential community.

The Development Concept Plan (Figure II-7), is responsive to these general development objectives. Based upon preliminary site planning and environmental studies, the Maui Wailea 670 project would utilize the county's Project District land use designation to provide for a mix of land uses within a master planned community of the scale that economically and environmentally satisfies the above listed project objectives.

Maui Wailea 670 will be a logical extension of the Wailea-Makena resort community. As shown in Figure II-7, the planned residential/resort community is dominated by two 18-hole golf courses. A focal point for community activities will be provided in a mixed-use village center and resort lodge accommodations to complement the luxury hotel accommodations of Wailea and Makena. Organized around a "village green" concept, the service and activity centers for this master planned resort/residential community would be concentrated to create a convenient and

exciting community center. The primary activities/services to be planned within the mixed use village would be a commercial and eatery center, resort lodge visitor accommodation units, visitor information center and other facilities such as arts and crafts center and theaters. To serve as a landmark feature for the region, a church could also be prominently located within the village. With a pedestrian oriented open space circulation system, the village center would provide an integrated sense of community and give the visitor or resident a strong sense of arrival and place.

Located within the makai 300 acres of the project with vehicular and pedestrian access to Wailea, Palauea and Makena via Kaukahi Street, the village center would be pedestrian oriented and in close proximity to the golf clubhouse and tennis center. The balance of the makai area would be utilized for an 18-hole golf course, resort lodges (low-rise hotel accommodations), and various single family and multifamily residential uses located along the open space corridors of the golf course.

The mauka portion of the project area, approximately 370 acres, would be developed at lower residential densities and provide for an 18-hole golf course and related golf oriented resort lodging facilities as a focal point. With the magnificent views afforded by the upper elevations of the project area, a variety of residential products would be developed including single family and multifamily residential neighborhoods with direct golf course frontage or ocean views.

With a preponderance of landscaped open space to blend the proposed residential community into the slopes of Haleakala overlooking Wailea, the Maui Wailea 670 project will provide the Wailea-Makena resort destination area with a greater sense of community. The village center will provide a community focal

point with an integrated pedestrian pathway system to provide pedestrian links to the residential neighborhoods.

The proposed development concept for Maui Wailea 670 is based on an assessment of current market conditions and projected regional infrastructure system improvements. It is expected that with changes in the market conditions and the projected capacity of the infrastructural systems, there will be modifications to the development concept. Any modifications to the development concept, however, will adhere to the general objectives of the proposed project, and will be subject to all the existing governmental requirements.

Projected to be developed over a 15 to 20 year time frame, the project would be phased in conjunction with infrastructure extensions and market demands. The following table provides a summary of the general land use allocations and ranges of planned units.

TABLE II-1

GENERAL LAND USE ALLOCATION

Land Use	Total Approx. Acres	Total Percent of Area	Total Units
Village/Mixed Use (includes lodging units)	31	5	720-850
Commercial	6	1	-
Resort Lodges	27	4	370-480
Residential	233	35	1060-1320
Golf Courses (two 18-hole courses)	341	51	-
Parks/Recreation	14	2	-
Open Space/Roads	18	2	-
TOTALS:	670	100%	2150-2650

Source: PBR HAWAII, 1988.

4. NEED FOR THE PROPOSED PROJECT: MARKET ASSESSMENT

To determine the need and marketability of the proposed Maui Wailea 670 project, a detailed and comprehensive market assessment (Appendix A) was conducted. The following paragraphs summarize the findings of that assessment.

4.1 GOLF COURSES

Based on analyses of existing and known planned golf courses on the island of Maui, it was determined that the Maui Wailea 670 project could support two 18-hole golf courses. One, a resort course that could cater to guests at the two resort lodges, Maui visitors staying in the Maui Wailea condominiums and single family residences and daily fee golfers from outside the Maui Wailea project. The second golf course could be a private course reserved for the use of club members and guests at the project's golf lodge. Several factors appear to support strong demand for golf at the Maui Wailea 670 resort course:

- On-resort demand from resort lodge, condominium and single family residence guests could increase from 30 rounds per day in 1995 to between 110 and 130 off rounds per day in 2010.

- Significant resort sources of demand could be generated by the expected future levels of unmet golf demand at Wailea Resort. Thus, off-resort golf demand could increase from 60 rounds daily in 1995 to 90 rounds per day by 2000.

- Thus, total resort demand could increase from 90 rounds per day in 1995 to between 200 and 220 rounds per day in 2010.

The market assessment for the per day private club course demand indicated the following:

- Golf lodge guests could provide the most steady source of early demand for the club course, generating up to 50 to 70 rounds per day in 1995. Golf lodge guest demand could increase to between 60 and 80 rounds per day in 2010.

- About 13 to 15 percent of Maui Wailea 670 property owners could be expected to become golf club members, based on the experience of Wailea Resort. This could generate an additional 50 to 60 rounds per day in 2010.

- Expected higher rates of golf course utilization at Wailea Resort courses could draw new memberships at Maui Wailea 670 from residents of the Wailea Resort community.

- Total demand, including rounds generated from off-resort members, could be expected to represent 70 to 90 rounds per day in 1995, increasing to 120 to 150 rounds per day in 2010.

The projected golf course demand at the Maui Wailea 670 resort project described above is summarized in Table II-2. As indicated in the development concept, changes in market conditions may require modification to the golf course program.

4.2 RESORT AND GOLF LODGES

Demand for hotel accommodations on the island of Maui has been assessed using the latest estimates from state economic projections. Hotel demand is projected to increase from 4,900 hotel rooms in 1987 to 13,400 rooms in 2010. Based on an assumed 70 percent occupancy level and building of all currently planned resort hotels, there could still be further demand for additional

hotel rooms between 1990 and 2010. This net additional demand is estimated to represent 900 rooms in 1990, increasing to 3,400 rooms in 2010.

Market support has been assessed for two resort lodges in the makai area of the Maui Wailea 670 property, one of which is to be incorporated into the village/mixed use complex. A third lodge is planned to be golf-oriented and located in the mauka area of the project property.

TABLE II-2
PROJECTED GOLF COURSE DEMAND
AT THE MAUI WAILEA 670 RESORT

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Resort Course:								
On-Resort Demand:								
Resort lodge guests	20	20	20	20	40	50	40	50
Other resort guests	10	10	20	20	0	40	50	60
Non-club member property owners	-	-	10	10	10	10	20	20
Subtotal:	30	30	50	50	80	100	110	130
Off-Resort demand	60	60	90	90	60	60	70	70
TOTAL:	90	90	140	140	140	160	180	200
Club Course:								
On-Resort demand:								
Golf lodge guest	50	70	50	60	60	70	60	80
Club members	10	10	20	30	40	40	50	60
Subtotal:	60	80	70	90	100	110	110	140
Off-Resort demand[1]	10	10	10	10	10	10	10	10
TOTAL:	70	90	80	100	110	120	120	150

1 Other private club members and their guests.
Source: Peat Marwick Main & Co., 1988

Factors favorably influencing market support for the resort lodges include:

- Increasing numbers of repeat visitors to the island of Maui, who could be seeking new experiences.

- The expected emergence of Wailea Resort as a major resort destination area in the 1990's, and increasing visitor recognition of the Wailea area as a whole.

- Site characteristics and planned facilities of the Maui Wailea 670 Resort allowing development of a master planned community with ocean and golf course view orientations, attractive to visitors seeking a first-class level of service.

Resort lodge target guest markets could be expected to be distributed as shown in Table II-3.

TABLE II-3

TARGETED RESORT LODGE GUEST MARKETS

	Percent of Total Guests
FIT[1]	45
Package	35
Group Tours	10
Business Meeting and Incentive Groups	10
TOTAL:	100%

[1] Free and Independent Traveler
Source: Peat Marwick Main & Co., 1988

The Maui Wailea 670 Resort is estimated to be able to capture about 10 percent of demand for visitor accommodations in the Wailea area or about 3 percent of total Maui visitor room requirements. Thus, about 500 to 570 resort lodge units could be

supported by 2010. The projected market support and occupancy levels for all three lodges are shown in Table II-4 and resort lodge occupancies are summarized below in Table II-5.

TABLE II-4
PROJECTED MARKET SUPPORT FOR
MAUI WAILEA 670 RESORT LODGE UNITS
1990 to 2010

Year	Supportable Lodge Units		Occupancy Level Percentage
	Low[1]	High[2]	
1990	250	290	60
1995	320	370	70
2000	380	440	67
2005	450	510	75
2010	500	570	80

1 At island-wide occupancy level of 80 percent.
2 At island-wide occupancy level of 70 percent.
Source: Peat Marwick Main & Co., 1988

4.3 MARKET ASSESSMENT FOR A GOLF LODGE

Market support for the golf lodge has been assessed separately, because this facility could attract a unique and private club-based market. Demand for a golf-oriented lodge at Maui Wailea 670 could be generated by:

- Maui's growing visibility as a host to tournaments.
- The resort's strategic location along Maui's "Golf Coast".
- Demographic characteristics of the vacation golfer market.

TABLE II-5
SUPPORTABLE DEVELOPMENT AT THE
MAUI WAILEA 670 RESORT
1995 TO 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Golf rounds per day:								
Club course	70	90	80	100	110	120	120	150
Resort course	90	90	140	140	160	180	200	220
Lodge units:								
Resort lodges	320	370	380	440	450	510	500	570
Golf lodge	145	180	145	180	145	180	145	180
Total lodge units	465	550	525	620	595	690	645	750
Projected cumulative unit sales:								
Condominium units	245	305	540	630	865	1,000	1,190	1,370
Residential lots	75	100	175	225	300	340	340	340
Patio homes	-	-	50	75	110	110	110	110
Commercial area(1)	21,000	27,000	28,000	35,000	46,000	55,000	54,000	67,000

(1) Gross leasable square feet.

- Foreseeable crowded conditions on other resort golf courses on the island.

- Success of small, specialized golf-oriented first-class and luxury accommodation facilities in resort destination areas elsewhere in the United States.

Market support is anticipated for between 145 and 180 golf lodge units by 1995. Occupancy levels at the golf lodge would be expected to be similar to those experienced at the resort lodges. Guests could be expected to primarily represent members of the private golf club, golf instructional school attendees, business conference travelers, Free and Independent Traveler (FIT) golf vacationers and Hawaii residents.

4.4 RESORT CONDOMINIUM UNITS

Condominium units at Maui Wailea 670 are expected to attract buyers interested in first-class projects offering golf course frontage and excellent ocean views within a master planned residential/resort community. Condominium buyer market segments are expected to be distributed as shown in Table II-6.

TABLE II-6
ANTICIPATED RESORT CONDOMINIUM BUYER MARKETS

	Percent of Total Units
Part-time Residences	20
Vacation Residences/Rentals	50
Full-time Residences	20
Full-time Rentals	10
TOTAL:	100%

Source: Peat Marwick Main & CO., 1988

Projected supportable resort condominium sales have been estimated in terms of ratios of condominium sales to visitor units, planned hotel construction in the Wailea area, projected resales and market shares for new condominium sales at the Maui Wailea 670, Wailea Resort and the Seibu Makena Resort. Based on this analysis, the Maui Wailea 670 project is expected to support from 1,200 to 1,370 condominium units over the 1990 to 2010 period as shown in Table II-7. This is roughly equivalent to sales of 60 to 70 units annually.

Average achievable condominium sales prices at the project have been assessed in relation to comparable projects. Available sales prices at Maui Wailea 670 are expected to be about $230 to $255 per interior square foot. Individual unit prices would range from about $200,000 to $700,000 in 1988 dollars, with an average sales price of about $360,000.

4.5 SINGLE FAMILY RESIDENCES

The market assessment for single family residences included review of potential markets for residential lots ranging in size from 10,000 to 25,000 square feet, as well as for patio homes on lots of about 4,500 to 5,500 square feet. It is expected that single family lot and/or home sales would be positively affected by the following characteristics of the Maui Wailea project:

- Extensive golf frontage, mountain and ocean views.
- Country club atmosphere and lower density development.
- Master planned community and amenities.
- Proximity to the Wailea and Makena resort areas.

TABLE II-7

PROJECTED SUPPORTABLE CONDOMINIUM UNIT SALES

AT THE MAUI WAILEA 670 RESORT

1991 TO 2010

	1991 to 1995		1996 to 2000		2001 to 2005		2006 to 2010	
	Low	High	Low	High	Low	High	Low	High
Average cumulative hotel units completed over five year period(1)	3,910	3,910	4,425	4,425	4,940	4,940	4,940	4,940
Condominium demand per 100 hotel units	8	9	8	9	8	9	8	9
Total average unit sales over five years	1,560	1,760	1,770	1,990	1,980	2,220	1,980	2,220
Less resales to existing condominiums(2)	(750)	(750)	(800)	(900)	(890)	(1,000)	(890)	(1,000)
Total new unit sales	810	1,010	970	1,090	1,090	1,220	1,090	1,220
Less new sales to:(3)								
Wailea Resort	(405)	(505)	(485)	(545)	(545)	(610)	(545)	(610)
Makena Resort	(160)	(200)	(190)	(220)	(220)	(240)	(220)	(240)
Supportable unit sales at the Resort:								
In period	245	305	295	325	325	370	325	370
Cumulative	245	305	540	630	865	1,000	1,190	1,370

(1) Includes existing and planned units for the Wailea area, including hotel units proposed at the Resort as shown previously in Exhibits II-J and III-F.

(2) For the 1991 to 1995 period assumed a historically based 10% resale of condominium units. Thereafter, assumed 45% of total sales relate to resales.

(3) Assuming the new Wailea Resort condominium projects capture 50% and Makena Resort projects capture 20% of all new sales.

4.5.1 Market Assessment for Resort Lots

Potential markets include part-time vacation home purchasers, full-time residents such as resort employees, recent migrants and retirees and speculative builders. Sales projections indicate the planned 340 lots to be sold between 1991 and 2010, as shown in Table II-8. This is based on annual sales increasing from 15 lots during the first five years of marketing to 25 to 30 lots being sold annually over the last 15 years.

Golf frontage lots are estimated to range from $15 to $20 per square foot, and interior lots from $10 to $15 per square foot, in 1988 dollars. Individual lot prices would range from $90,000 to $450,000 in 1988 dollars with an average lot price of $135,000.

4.5.2 Market Assessment for Patio Homes

Patio homes, also called cottages, zero-lot or Z-lot line projects, would be a new resort product type for the state of Hawaii. Thus, selected comparable resort patio home developments in California and Arizona were surveyed for market review and analysis. Based on this study, and on the characteristics of the Maui Wailea 670 site and its other proposed development components, it has been recommended that about 110 patio homes be developed at the resort within five years of the resort's first marketing to diversify and further support the resort's real estate and private golf club markets.

Purchasers of patio homes are anticipated to be similar to those of single family lots at the resort, except that patio home buyers could include relatively more vacation or second home

TABLE II-8

PROJECTED SINGLE FAMILY UNIT SALES

AT MAUI WAILEA 670 RESORT

1991 TO 2010

Unit type	1991 to 1995		1996 to 2000		2001 to 2005		2006 to 2010	
	Low	High	Low	High	Low	High	Low	High
Resort residential lots:								
Annual	15	20	20	25	25	30	25	N/A
In period	75	100	100	125	125	115(1)	40(1)	N/A
Cumulative	75	100	175	225	300	340	340	340
Patio homes:								
Annual	-	-	10	15	15	20	N/A	N/A
In period	-	-	50	75	60(1)	35(1)	N/A	N/A
Cumulative	-	-	50	75	110	110	110	110
Total:								
Annual	15	20	30	40	40	50	25	N/A
In period	75	100	150	200	185	150	40	N/A
Cumulative	75	100	225	300	410	450	450	450

N/A Not applicable, as inventory could be sold out.
(1) Period sales restricted due to lack of inventory.

buyers, due to the turnkey convenience, security and assurance of common area maintenance associated with patio homes.

Units have been recommended to be sized at 2,500 to 3,800 net interior square feet on lots of 4,500 to 5,500 square feet. Projected achievable sales prices are estimated at $450,000 to $850,000 per unit, or from $205 to $225 per interior square foot, in 1988 dollars.

4.6 COMMERCIAL

Development of lodge units, resort condominiums and single family units at Maui Wailea 670 is expected to generate significant demand for retail commercial space at the resort. Hotel openings at Wailea Resort will also increase the population of visitors and residents in the general vicinity of Maui Wailea 670 commercial sites.

Thus, the market support is forecast for 21,000 to 27,000 square feet of commercial space by 1995 and between 54,000 and 67,000 square feet in 2010. The majority of this demand could be anticipated to be captured at the approximately 6-acre site located adjacent to the Wailea Resort's business-zoned 15.8-acre parcel. This site is considered ideal for commercial development, especially if development is undertaken in conjunction with the adjacent Wailea Resort site, due to its location on a major future intersection leading to Wailea, Makena and the Maui Wailea 670 resorts. The site is also located on what is proposed to become an extension of Piilani Highway, leading to the southern part of the island.

5. PROJECT SCHEDULE

As noted previously, the proposed Maui Wailea 670 project is planned to be constructed over a 15 to 20 year time period.

Initiation of work is dependent, in part, upon receipt of land use regulatory approvals, such as the Community Plan amendment and state land use approvals that this EIS will support. Based upon the required permits and regulatory agency approvals the following project schedule represents the estimated time frame for project approvals and development.

TABLE II-9

PRELIMINARY PROJECT SCHEDULE

Activity	Estimated Start (month/year)	Estimated Completion (month/year)
Community Plan Amendment (Including EIS)	03/1988	07/1989
State Land Use Approval	04/1989	12/1989
Change of Zone/Project District Ordinance	01/1989	04/1990
Subdivision/Construction Plans	01/1990	01/1991
Project Construction		
- Golf Course	01/1989	01/1992
- Residences	02/1991	12/2010±

Total project development (build-out) is estimated to be by 2010, given timely receipt of the regulatory approvals and market conditions as noted.

6. ESTIMATED PROJECT COSTS

Total development costs, including utility construction, residential (single family and multifamily) housing unit construction, roadway, golf courses, resort lodges and public recreational facility construction, have been estimated to be approximately $700 million, in 1988 dollars.

III
ALTERNATIVES TO THE PROPOSED PROJECT

CHAPTER III

ALTERNATIVES TO THE PROPOSED PROJECT

1. INTRODUCTION

The proposed project has been designed to provide a mix of recreational, resort, residential and commercial opportunities in the Wailea-Makena area that would be compatible with and add to the resort destination area concept envisioned in the Kihei-Makena Community Plan. The proposed project site environment would be controlled through design and maintenance standards and maintained for the betterment of all concerned.

In compliance with the provisions of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-17(f), the "known feasible" alternatives to the proposed project are discussed in this chapter. Those alternatives which could "feasibly" attain the objectives of the project are described and evaluated. An exploration and evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid or reduce some or all of the adverse environmental impacts, cost and risks, is included in order not to prematurely foreclose options which might enhance environmental quality or have less detrimental effects. In each case, the analyses have been sufficiently detailed to allow the comparative evaluation of the environmental benefits, costs and risks of the proposed action and each reasonable alternative.

Also, in conformance with the applicable rules, the alternatives have been evaluated relative to their capability to meet the proposed project objectives as previously stated in Chapter II, Section 3.1 and as described below.

The objectives of the proposed project are to:

- Create a master planned residential/resort community that provides for regional community services, a focal point of activities and a place of identity and orientation for the Wailea-Makena Region;

- Provide a residential/resort community that is responsive to current and future residential/resort and commercial market trends and needs of the region;

- Provide a residential/resort community that is responsive to the particular physical and environmental qualities of the site; and,

- Provide a residential/resort community that is appropriate for the island of Maui and its vision of Wailea-Makena as a world-class resort/residential community.

The Conceptual Development Plan (Figure II-7), is responsive to these general development objectives. Based upon preliminary site planning and environmental studies, the Maui Wailea 670 project would utilize the county's Project District land use designation to provide for a mix of land uses within a master planned community of the scale that economically and environmentally satisfies the above listed project objectives.

2. ALTERNATIVES ANALYZED

As noted previously, the proposed project has been designed to meet several key objectives. In keeping with sound land use planning practices and applicable EIS rules and regulations those alternatives which could feasibly attain the objectives of the proposed action, even though more costly alternatives, have been examined. The range of feasible alternatives considered is limited to those that would provide the same type of service and features that the proposed action would, while providing that service for about the same cost with similar efficiencies. The alternatives investigated have included alternative land use and circulation layouts and configurations of the site; various combinations of support services and facilities that could be provided; alternative uses of the property given the present land use designations; and the alternative of "no action".

2.1 ALTERNATIVE PROJECT LAYOUTS

The development of the proposed Maui Wailea 670 Master Plan involved the analysis of several different layout schemes for the various residential/resort facilities. The alternative layouts, including (1) various density patterns; (2) circulation patterns; (3) golf course configurations with varying degrees of difficulty; and (4) different site locations for the various facilities and amenities, were investigated prior to the determination that the proposed Master Plan conceptually provides the greatest benefits versus costs to the developer, future guests and residents, the Wailea-Makena community in general and the county. The analyses that were conducted included both technical and economic factors as well as marketability and sociological elements. The conclusion of the analyses was that the proposed Master Plan versus the various alternative layouts investigated best meets the objectives of the proposed project, and is in keeping with the goals and objectives of the Kihei-

Makena Community Plan and Maui General Plan. No one reason in particular tended to rule out a given alternative layout, but rather it was generally a combination of two or more evaluation factors and/or elements that would indicate a given alternative would not meet the project objectives. For example, increasing the numbers of multifamily or residential units proposed could potentially increase the developer's return on the property but could also increase population levels beyond that which would be desirable from the state or county point of view. Reducing the numbers of residential units could reduce the developer's return on the property to the point that the project would not be economically feasible and would not generate the level of tax revenue that the proposed project is expected to generate.

It should be noted that the current layout is based on assessment of current market conditions and projected regional infrastructure improvements. In light of the concerns raised by state and county agencies reviewing the Draft EIS, with regards to the potential long-term impacts to regional infrastructure systems, and in response to changing market conditions, the developer will continue to explore other alternatives which could reduce the intensity of development and potential infrastructural requirements while maintaining overall project feasibility.

2.2 ALTERNATIVE COMBINATIONS OF SUPPORT SERVICES AND FACILITIES

In addition to investigating alternative layouts of the proposed residential/resort accommodations, an analyses of various combinations and sizes of the support services and facilities that would be provided has been performed. The analyses indicated that the proposed support services and facilities, including golf courses, tennis facilities, commercial spaces and public park space, conceptually appear to be the best combination in terms of quantity and location for the proposed number of accommodation units of all types. Greater or lesser amounts of

any of the support services or facilities would not provide the levels of service required or would be economically unfeasible. As such, different combinations of support services and facilities would not meet the objectives of the proposed project and have been rejected for this reason.

2.3 ALTERNATIVE USES OF THE PROJECT PROPERTY

As indicated in Chapter II, Section 2, the proposed project property is presently classified as Agriculture by the State Land Use Commission. As such, it is possible that the land could be used for some type of agricultural activity. However, as is described in Chapter IV, Section 1.2.1 the land has been classified in the Detailed Land Classification, Island of Maui (University of Hawaii, Land Study Bureau, 1967) as E 29, E 77 and E 88, indicating its low productivity rating and lack of suitability for machine tillability. Further, the soils of the project site include very stony silt loam, very stony land, Makena stony complex and Keawakapu, extremely stony silty clay loam, thereby indicating the poor quality of the soils for agricultural purposes. The lands could be used for pasture lands, but the grasses and other vegetation on the lands are not particularly well suited for that purpose. The proposed project property could also be used for open space and/or regional park purposes. However, this would not be in keeping with the stated objectives of the Kihei-Makena Community Plan or the objectives of the developer of the property. Similarly, use of the project lands for a purpose other than that proposed would result in less than the highest and best use of the property and lower state and county revenues being generated. For these reasons, the alternative of utilizing the lands for some purpose other than that proposed has been rejected.

2.4 "NO-ACTION" ALTERNATIVE

As indicated at the beginning of this Chapter, the proposed project has been designed to achieve very specific objectives. The adoption of the alternative of "no-action" would effectively preclude these objectives from being met. Included herein are the objectives of providing a residential/resort community that provides for regional community services, serves as a focal point of activities and a place of identity and orientation for the Wailea-Makena Region. The alternative of "no-action" would also be outside the stated objectives of the Kihei-Makena Community Plan and would not provide the developer, state or county with the rate of return that the proposed project would. For these reasons, the alternative of "no-action" has been rejected.

In assessing each of the alternatives to the proposed project, as well as the proposed project itself, care was given to evaluate present land use designations, present state and county land use plans and policies, known concerns of citizens, the owner's financial position and forecast future growth trends for the Wailea-Makena area. Per the applicable regulatory requirements, the project objectives became the primary guidelines as to whether an alternative met the goals of the developer.

3. COMPARATIVE EVALUATION

In general, none of the alternatives evaluated provide the degree of satisfaction of meeting the project objectives as the preferred alternative. Due to the potential long-term impacts to regional infrastructure and changing market conditions alternative project layouts could result in a fewer number of residential/resort units and a lesser amount of public recreational facilities. Should the proposed project be developed at a lower

intensity, the resultant impacts as identified would be reduced and there may be a reduction in the projected state and county revenues.

The alternative of "no-action" similarly would not result in meeting the project objectives and would continue the present underutilization of the project property. The preferred alternative satisfies the project objectives and provides the best opportunity to assist in the satisfaction of Maui's forecast residential/resort/recreational facility needs over the forecast period of development.

APPENDIX A
MARKET ASSESSMENT

KPMG Peat Marwick

Market Assessment for the Planned Maui Wailea 670 Resort Community

Wailea, Maui, Hawaii

Prepared for

GCR/VMS MAUI 670

June 1988

A-1

KPMG Peat Marwick

Peat Marwick Main & Co
[illegible]
Honolulu HI 96812-4150

Telephone (808) 531-7286
Telex 723 8615

Telecopier (808) 536-1018

July 6, 1988

Mr. Robert Riley
Senior Vice President
VMS Realty Partners
642 Commercial Street
San Francisco, California 94111

Mr. Alan P. Greinetz
Senior Vice President
Blackman Flynn & Co.
One Montgomery Street, Suite 2250
San Francisco, California 94104

Re: Maui Wailea 670 Resort Market Assessment

Dear Messrs. Riley and Greinetz:

As you requested, Peat Marwick Main & Co. (Peat Marwick) has completed a market assessment for the proposed Maui Wailea 670 property on the island of Maui, Hawaii. The attached report presents the study background and objectives, and detailed findings, conclusions and recommendations. This letter summarizes the major conclusions and recommendations of our market assessment of the project.

VMS Realty Partners (VMS) seeks to develop the Maui Wailea 670 property into a resort and residential community (Resort) to include two 18-hole golf courses, single-family lots, multifamily condominiums, resort lodges, a retail shopping center and a tennis facility. The 670-acre property would be divided into two distinct but integrated areas by the planned extension of Piilani Highway. The area makai (ocean side) of the highway, consisting of about 300-acres, would include most of the Resort's high activity uses. The 370-acre mauka (mountain side) area is planned to be more private, low density and residential in character.

Peat Marwick has assessed the market support for golf courses, lodge facilities, condominiums, single-family lots and patio homes and a commercial retail center at the subject site.

GOLF COURSES

Two 18-hole golf courses are recommended for development at Maui Wailea 670:

- A resort course, catering to guests at the two resort lodges, Maui visitors staying in Resort condominiums and single-family residences, and daily fee golfers from outside of the Resort.
- A private course, reserved for the use of club members and guests at the Resort's golf lodge.

Market Assessment for
the Resort Course

Several factors appear to support strong demand for golf at the Maui Wailea 670 resort course, as summarized in Exhibit A:

- On-Resort demand from resort lodge, condominium and single-family residence guests could increase from about 30 rounds per day in 1995 to 110 to 130 golf rounds per day in 2010.
- Significant off-Resort sources of demand could be generated by the expected future levels of unmet golf demand at Wailea Resort. Thus, off-Resort golf demand could increase from 60 rounds daily in 1995 to 90 rounds per day by 2000.
- Thus, total resort demand could increase from about 90 rounds per day in 1995 to 200 to 220 rounds per day in 2010.

Market Assessment for
the Private Club Course

- Golf lodge guests could provide the most steady source of early demand for the club course, generating up to 50 to 70 rounds per day in 1995. Golf lodge guest demand could increase to from 60 to 80 rounds per day in 2010.
- From 13% to 15% of Maui Wailea 670 property owners could be expected to become golf club members, based on Wailea Resort's experience. This could generate an additional 50 to 60 rounds per day in 2010.
- Expected higher rates of golf course usage at Wailea Resort courses could draw new memberships from residents of that community.
- Total demand, including rounds generated from off-Resort members, could be expected to represent about 70 to 90 rounds per day in 1995, increasing to 120 to 150 rounds per day in 2010.

Management of Levels of Play

A desirable maximum level of play at resort courses is generally about 175 rounds per day. By 2005, the level of play at the resort course would be at about the maximum desired level. In the same year, golf demand at the club course is expected to exceed the approximately 135 rounds per day currently experienced at Wailea Resort. Thus, after several years of operations, it is projected that steps would have been taken to limit outside memberships at the golf club and outside play at the resort course.

Exhibit A

GCR/VMS MAUI 670

Projected Golf Course Demand
at the Maui Wailea 670 Resort

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Resort course:								
On-Resort demand:								
Resort lodge guests	20	20	20	20	40	50	40	50
Other Resort guests	10	10	20	20	30	40	50	60
Nonclub member property owners	-	-	10	10	10	10	20	20
Subtotal	30	30	50	50	80	100	110	130
Off-Resort demand	60	60	90	90	60	60	70	70
Total	90	90	140	140	140	160	180	200
Club course:								
On-Resort demand:								
Golf lodge guest	50	70	50	60	60	70	60	80
Club members	10	10	20	30	40	40	50	60
Subtotal	60	80	70	90	100	110	110	140
Off-Resort demand(1)	10	10	10	10	10	10	10	10
Total	70	90	80	100	110	120	120	150

(1) Other private club members and their guests.

RESORT AND GOLF LODGES

Demand for hotel accommodations on the island of Maui has been assessed, using the latest estimates from state economic projections. Hotel demand is projected to increase from about 4,900 hotel rooms in 1987 to about 13,400 rooms in 2010. Based on an assumed 70% occupancy level and building of all currently planned resort hotels, there could still be further demand for additional hotel rooms between 1990 and 2010. This net additional demand is estimated to represent about 900 rooms in 1990, increasing to about 3,400 rooms in 2010.

Market support has been assessed for two resort lodges in the makai area of the Maui Wailea 670 property, one to be incorporated into the village/mixed use complex. A third lodge is planned to be golf-oriented and located in the mauka area of the Resort.

Market Assessment
for Resort Lodges

Factors favorably influencing market support for the resort lodges include:

- Increasing numbers of repeat visitors to the island of Maui, who could be seeking new experiences.
- The expected emergence of Wailea as a major resort destination area in the 1990s, and increasing visitor recognition of the Wailea area as a whole.
- Site characteristics and planned facilities of the Maui Wailea 670 Resort allowing development of a master-planned community with ocean and golf course view orientations, attractive to visitors seeking a first-class level of service.

Resort lodge target guest markets could be expected to be distributed as follows:

Targeted Resort Lodge Guest Markets

	Percent of total guests
FIT	45%
Package	35
Group tours	10
Business meeting and incentive groups	10
Total	100%

The Maui Wailea 670 Resort is estimated to be able to capture about 10% of the demand for visitor accommodations in the Wailea area or about 3% of the total Maui visitor room requirements. Thus, about 500 to 570 resort lodge units could be supported by 2010. The projected market support and occupancy levels for all three lodges are shown in Exhibit B and resort lodge occupancies are summarized as follows:

Projected Market Support
for Maui Wailea 670 Resort Lodge Units

1990 to 2010

Year	Supportable units Low(1)	Supportable units High(2)	Lodge occupancy level
1990	250	290	60%
1995	320	370	70
2000	380	440	67
2005	450	510	75
2010	500	570	80

(1) At islandwide occupancy level of 80%.
(2) At islandwide occupancy level of 70%.

Market Assessment for a Golf Lodge

Market support for the golf lodge has been assessed separately, because this facility could attract a unique and private club-based market. Demand for a golf-oriented lodge at Maui Wailea 670 could be generated by:

- Maui's growing visibility as a host to tournaments.
- The Resort's strategic location along Maui's "Golf Coast".
- Demographic characteristics of the vacation golfer market.
- Foreseeably crowded conditions on other resort golf courses on the island.
- Success of small, specialized golf-oriented first-class and luxury accommodation facilities in resort destination areas elsewhere in the United States.

Market support is anticipated for between 145 and 180 golf lodge units by 1995. Occupancy levels at the golf lodge would be expected to be similar to those experienced at the resort lodges.

Guests could be expected to primarily represent members of the private golf club, golf instructional school attendees, business conference travelers, FIT golf vacationers and Hawaii residents.

RESORT CONDOMINIUM UNITS

Condominium units at the Resort are expected to attract buyers interested in first-class projects offering golf course frontage and excellent ocean views within a master-planned resort/residential community. Condominium buyer market segments are expected to be distributed as follows:

Anticipated Resort Condominium
Buyer Markets

	Percent of total units
Part-time residences	20%
Vacation residences/rentals	50
Full-time residences	20
Full-time rentals	10
Total	100%

Projected supportable resort condominium sales have been estimated in terms of ratios of condominium sales to visitor units, planned hotel construction in the Wailea area, projected resales and market shares for new condominium sales at the Maui Wailea 670, Wailea Resort and the Seibu Makena Resort. Based on this analysis, the Maui Wailea 670 Resort is expected to support from 1,190 to 1,370 condominium units over the 1990 to 2010 period as also shown in Exhibit B. This is roughly equivalent to sales of 60 to 70 units annually.

Average achievable condominium sales prices at the Resort have been assessed in relation to comparable projects. Achievable sales prices at Maui Wailea 670 Resort are expected to be about $230 to $255 per interior square foot. Individual unit prices would range from about $200,000 to $700,000 in 1988 dollars, with an average sales price of about $360,000.

SINGLE-FAMILY RESIDENCES

The market assessment reviews potential markets for residential lots ranging in size from 10,000 to 25,000 square feet, as well as for patio homes on lots of about 3,500 to 6,000 square feet.

Exhibit B

GCR/VMS MAUI 670
Supportable Development at the
Maui Wailea 670 Resort
1995 to 2010

	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Golf rounds per day:								
Club course	70	90	80	100	110	120	120	150
Resort course	90	90	140	140	160	180	200	220
Lodge units:								
Resort lodges	320	370	380	440	450	510	500	570
Golf lodge	145	180	145	180	145	180	145	180
Total lodge units	465	550	525	620	595	690	645	750
Projected cumulative unit sales:								
Condominium units	245	305	540	630	865	1,000	1,190	1,370
Residential lots	75	100	175	225	300	340	340	340
Patio homes	-	-	50	75	110	110	110	110
Commercial area(1)	21,000	27,000	28,000	35,000	46,000	55,000	54,000	67,000

(1) Gross leasable square feet.

It is expected that single-family lot and/or home sales would be positively affected by the following characteristics of the Resort:

- Extensive golf frontage, mountain and ocean views
- Country club atmosphere and lower density development
- Master-planned community and amenities
- Proximity to the Wailea and Makena resort areas

Market Assessment
for Resort Lots

Potential markets include part-time vacation home purchasers, full-time residents such as Resort employees, recent migrants and retirees, and speculative builders. Sales projections indicate that the planned 340 lots could be sold between 1991 and 2010, as shown in Exhibit B. This is based on annual sales increasing from about 15 lots during the first five years of marketing to 25 to 30 lots over the last 15 years.

Golf front lots are estimated to range from about $15 to $20 per square foot, and interior lots from about $10 to $15 per square foot, in 1988 dollars. Individual lot prices, then, would range from about $90,000 to $450,000 in 1988 dollars with an average of about $240,000.

Market Assessment
For Patio Homes

Patio homes, variously elsewhere called cottages, zero-lot or Z-lot line projects, would be a new resort product type for the state of Hawaii. Thus, selected comparable resort patio home developments in California and Arizona were surveyed for market review and analysis. Based on this study, and on characteristics of the Maui Wailea 670 Resort site and its other proposed development components, it is recommended that about 110 patio homes be developed at the Resort within about five years of the Resort's first marketing, to diversify and further support the Resort's real estate and private golf club markets.

Purchasers of patio homes are anticipated to be similar to those of single-family lots at the Resort, except that patio home buyers could include relatively more vacation or second home buyers, due to the turnkey convenience, security and assurance of common area maintenance associated with patio homes.

Units are recommended to be sized at about 2,200 to 3,800 net interior square feet on lots of about 3,500 to 6,000 square feet. Projected achievable sales prices are estimated at about $450,000 to $850,000 per unit, or from about $205 to $225 per interior square foot, in 1988 dollars.

COMMERCIAL

Development of lodge units, resort condominiums and single-family units at Maui Wailea 670 is expected to generate significant demand for retail commercial space at the Resort. Hotel openings at Wailea will also increase the population of visitors and residents in the general vicinity of Maui Wailea 670 commercial sites.

Thus, market support is forecast for about 21,000 to 27,000 square feet of commercial space by 1995 and between 54,000 and 67,000 square feet in 2010. The majority of this demand could be anticipated to be captured at the approximately 6-acre site located adjacent to Wailea Resort's business-zoned 15.8-acre parcel. This site is considered ideal for commercial development, especially if development is undertaken in conjunction with the adjacent Wailea Resort site, due to its location on a major future intersection leading to Wailea, Makena and the Maui Wailea 670 resorts. The site is also located on what is proposed to become an extension of Piilani Highway, leading to the southern part of the island.

* * * * * * *

Thank you for this opportunity to assist you in the planning for this community. We have enjoyed the opportunity to work with you and the other members of your planning team.

Very truly yours,

Peat Marwick Main & Co.

Market Assessment for the Planned Maui Wailea 670 Resort Community

Wailea, Maui, Hawaii

Prepared for

GCR/VMS MAUI 670

June 1988

A-6

MAUI WAILEA 670

Table of Contents

	Page
INTRODUCTION	
Project Description	I- 1
Objectives and Scope of Market Assessment Assistance	I- 2
VISITOR INDUSTRY OVERVIEW	
Island and County of Maui	II- 1
Population	II- 1
Economic Trends and Outlook	II- 1
Visitor Industry Trends	II- 2
Statewide Visitor Arrivals	II- 2
Island of Maui Visitor Arrivals	II- 3
Visitor Travel Patterns	II- 4
Characteristics of Westbound Visitors	II- 5
Visitor Expenditures	II- 5
Projected State Visitor Arrivals	II- 5
Projected Maui Visitor Arrivals	II- 6
Resort and Hotel Industry	II- 6
Hawaii Resort Overview	II- 6
Maui Visitor Regions	II- 7
Maui Hotel Inventory	II- 8
Hotel Market Performance	II-10
Published Room Rates	II-10
Achieved Room Rates	II-10
Achieved Occupancy Levels	II-10
Guest Mix	II-10
Average Length of Stay	II-10
Guest Origin	II-10
GOLF COURSE MARKET ASSESSMENT	
Resort Golf Course Overview	III- 1
Benefits of a Resort Golf Course	III- 1
Levels of Utilization	III- 1
Fees at Hawaii Resort Courses	III- 2
Resort Golf Courses on Maui	III- 2
Golf Markets	III- 2
Demand for Golf in the Wailea Makena Region	III- 3
Seibu Makena Resort Golf Capabilities	III- 3
Projected Average Daily Population at Wailea Resort	III- 4
Projected Demand for Golf at Wailea Resort	III- 5
Projected Unmet Wailea Resort Golf Demand	III- 5
Maui Wailea 670 Golf Course Market Assessment	III- 6
Expected Golfer Markets for the Resort Course	III- 6
Demand at the Maui Wailea 670 Resort Course	III- 6
Expected Golfer Markets at the Club Course	III- 7
Golf Demand at Club Course	III- 8

MAUI WAILEA 670

Table of Contents, Continued

	Page
LODGE MARKET ASSESSMENT	
Projected Maui Hotel Occupancy Levels and Room Requirements	IV- 1
Projected Demand for Hotel Accommodations	IV- 1
Projected Maui Occupancy Levels	IV- 1
Projected Maui Hotel Unit Requirements	IV- 2
Maui Wailea 670 Resort Lodge Market Assessment	IV- 2
Resort Market Position	IV- 2
Anticipated Target Markets	IV- 4
Supportable Resort Lodge Rooms	IV- 6
Development Concept and Phasing Recommendations	IV- 6
Projected Occupancy Levels	IV- 7
Projected Achieved Room Rates	IV- 8
U. S. and Maui Golf Vacation Market Review	IV- 8
U. S. Golfer Market Trends	IV- 8
U. S. Golf Vacationers	IV- 9
Selected Comparable Golf Lodge Characteristics	IV-10
Potential Maui Golf Vacation Market	IV-11
Maui Wailea 670 Golf Lodge Market Assessment	IV-12
Target Markets	IV-12
Recommended Development Concept	IV-13
Pricing and Occupancy	IV-13
Proposed Marketing Activities	IV-14
Projected Achieved Room Rates	IV-14
CONDOMINIUM MARKET ASSESSMENT	
Condominium Development Trends	V- 1
Private Multifamily Authorizations	V- 1
Resort Condominium Development	V- 1
Residential Condominium Development	V- 2
Island of Maui Resort Condominium Inventory	V- 2
Existing Units	V- 2
Planned Units	V- 3
Comparable Project Review	V- 3
Resort Condominium Site Locations	V- 3
Comparable Project Review	V- 3
Project Characteristics	V- 4
Unit Mix	V- 4
Unit Size	V- 4
Facilities and Amenities	V- 4
Review of Market Performance	V- 4
Average Unit Sales Absorption in Wailea	V- 4
Resort Condominium New Unit Sales Absorption	V- 5
Average Unit Sales Price	V- 5
Buyer Profiles	V- 6

MAUI WAILEA 670

Table of Contents, Continued

	Page
CONDOMINIUM MARKET ASSESSMENT, CONTINUED	
Maui Wailea 670 Condominium Market Assessment	V- 7
Anticipated Buyer Markets and Purchase Motivation	V- 7
Projected Unit Sales Absorption	V- 8
Development Concept	V- 9
Projected Achievable Sales Price	V-10
SINGLE-FAMILY MARKET ASSESSMENT	
Resort Lot Development Trends	VI- 1
Location and View Orientation	VI- 1
Lot Sizes	VI- 2
Amenities	VI- 2
Planned Resort Lots on Maui	VI- 3
Market Performance of Resort Lots	VI- 3
Historical Sales	VI- 3
Prices	VI- 3
Buyer Profiles	VI- 4
Purchase Motivations	VI- 5
Patio Home Market Review	VI- 6
Product Concept and Amenities	VI- 6
Unit and Lot Sizes	VI- 7
Sales Prices	VI- 7
Sales Absorption	VI- 7
Buyer Profiles and Purchase Motivations	VI- 7
Market Assessment for Maui Wailea 670 Property	VI- 8
Anticipated Buyer Market Segments	VI- 8
Proposed Development Concept	VI- 9
Projected Sales Absorption	VI-10
Projected Patio Home Sales Absorption	VI-11
Projected Achievable Patio Home Sales Prices	VI-12
MAUI WAILEA 670 COMMERCIAL CENTER MARKET ASSESSMENT	
Resort Retail Development Overview	VII- 1
Relationship to Resort Development	VII- 1
Physical Characteristics	VII- 2
Tenant and Market Mix	VII- 2
Wailea-Kihei Regional Commercial Market Overview	VII- 3
Regional Market Support Factors	VII- 3
Existing Shopping Centers	VII- 3
Planned Shopping Centers	VII- 3
Maui Wailea 670 Retail Market Assessment	VII- 4
Expected Market Segments	VII- 4
Resort Resident Population	VII- 5
Resort Visitor Population	VII- 5
Supportable Commercial Area from Resort Population	VII- 5
Use of Commercial Sites	VII- 6

MAUI WAILEA 670

Table of Contents, Continued

EXHIBITS		Following page
I-A	Location of Maui Wailea 670 Property	II- 1
II-A	Map of Maui	II- 1
II-B	Major Economic Indicators for Maui County	II- 1
II-C	Historical and Projected Visitor Arrivals to the State of Hawaii	II- 2
II-D	Historical and Projected Visitor Arrivals to the Island of Maui	II- 3
II-E	Westbound Visitor Travel Patterns to the State of Hawaii	II- 4
II-F	Major Westbound Visitor Market Segments to the State of Hawaii	II- 4
II-G	Westbound Visitor Characteristics to the State of Hawaii	II- 5
II-H	Characteristics of Maui Resorts	II- 7
II-I	Development Status of Maui Resorts	II- 7
II-J	Existing and Planned Hotel Inventory on the Island of Maui	II- 8
II-K	Published Room Rates of Selected Hawaii First-Class and Luxury Resort Hotels	II-10
II-L	Average Room Rates of Hawaii Visitor Accommodations	II-10
II-M	Occupancy Levels of Hawaii Visitor Accommodations	II-10
II-N	Estimated Travel Status and Average Length of Stay at Selected Luxury Hotels and First-Class Maui Hotels	II-10
II-O	Estimated Guest Mix by Place of Residence at Selected Luxury Hotels and First-Class Maui Hotels	II-10
III-A	Rounds Played Per 100 Guests at Selected Resort Golf Courses	III- 1
III-B	Average Daily Rounds of Golf at Selected Resort Courses	III- 2
III-C	Fees at Selected Resort Golf Courses in Hawaii	III- 2
III-D	Resort Golf Courses in Hawaii	III- 2
III-E	Average Daily Resident and Visitor Population at Wailea Resort	III- 4
III-F	Projected Wailea Resort Golf Demand	III- 4
III-G	Wailea Resort Golf Demand and Supply	III- 5
III-H	Average Daily Maui Wailea 670 Resort Visitor Population	III- 6
III-I	Projected Average Daily Resort Course Golf Demand	III- 6
III-J	Projected Average Daily Club Course Golf Demand	III- 8
IV-A	Historical and Projected Visitor Hotel Room Demand on the Island of Maui	IV- 1
IV-B	Projected Hotel Occupancy Levels for the Island of Maui	IV- 1
IV-C	Projected Market Support for Hotel Rooms on the Island of Maui	IV- 2
IV-D	Projected Cumulative Hotel Room Requirements	IV- 2
IV-E	Estimated Market Share of Visitor Room Nights Selected Hawaii Resorts	IV- 6
IV-F	Supportable Resort Lodge Rooms at the Maui Wailea 670 Resort	IV- 6

MAUI WAILEA 670

Table of Contents, Continued

EXHIBITS		Following page
IV-G	Age Profile of the U. S. Golf Market	IV- 8
IV-H	Household Income Profile of U. S. Golf Market	IV- 9
IV-I	Characteristics of Selected U. S. Golf Resorts	IV-10
IV-J	Market Data on Selected U. S. Golf Resorts	IV-11
V-A	Private Multifamily Construction Authorizations in the County of Maui	V- 1
V-B	Resort Condominium Projects on Maui by Location	V- 2
V-C	Multifamily Condominium Projects on Maui	V- 3
V-D	Project Characteristics of Selected Maui Resort Condominium Projects	V- 4
V-E	Unit Mix of Selected Maui Condominium Projects	V- 4
V-F	Average Unit Sizes of Selected Maui Resort Condominium Projects	V- 4
V-G	Wailea Area Condominium Sales - New and Resales	V- 4
V-H	Market Time for Selected Resort Condominium Projects	V- 5
V-I	Average Condominium Sales Prices for Selected Hawaii and Maui Condominium Projects by Project Location	V- 5
V-J	Average Sales Price by Number of Bedrooms at Wailea Resort Condominium Projects	V- 6
V-K	Typical Hawaii Resort Condominium Unit Buyer Characteristics by Class of Condominium	V- 6
V-L	Ratio of Wailea Area Condominium Unit Sales to Hotel Units	V- 8
V-M	Supportable Condominium Units at the Maui Wailea Resort	V- 8
V-N	Recommended Condominium Development Characteristics at the Maui Wailea 670 Resort	V- 9
VI-A	Location and View Orientation of Residential Lots at Selected Hawaii Resorts	VI- 1
VI-B	Annual New Sales of Residential Lots at Selected Hawaii Resorts	VI- 3
VI-C	Sales Prices and Sizes of Lots at Selected Resort Subdivisions	VI- 3
VI-D	Lot Price Differentials Within Subdivisions at Selected Hawaii Resorts	VI- 3
VI-E	Characteristics of Resort Lot Purchasers	VI- 4
VI-F	Description of Selected Patio Home or Small Lot Single-Family Developments in Resort Locations in California and Arizona	VI- 6
VI-G	Market Performance of Selected Patio Home or Small Lot Single-Family Developments in Resort Locations in California and Arizona	VI- 6
VI-H	Projected Single-Family Unit Sales at Maui Wailea 670 Resort	VI-10
VI-I	Recommended Single-Family Unit Development Characteristics for Maui Wailea 670 Resort	VI-11

MAUI WAILEA 670

Table of Contents, Continued

EXHIBITS		Following page
VII-A	Shopping Center Retail Space at Selected Hawaii Resort Areas	VII- 1
VII-B	Description of Surveyed Hawaii Resort Shopping Centers	VII- 2
VII-C	Existing Shopping Centers in the Wailea-Kihei Region	VII- 3
VII-D	Planned Shopping Centers in the Wailea-Kihei Region	VII- 3
VII-E	Average Daily Resort Resident Population	VII- 4
VII-F	Projected Supportable Commercial Space at Maui Wailea 670 Resort	VII- 5

I - INTRODUCTION

VMS Realty Partners (VMS) engaged Peat Marwick Main & Co. (Peat Marwick) to conduct a market, economic and fiscal impact assessment for the proposed Maui Wailea 670 Resort project (Resort) on the island of Maui, Hawaii. This chapter describes the proposed development and the scope of services with respect to market assessment assistance provided by Peat Marwick.

Economic and fiscal impact assessment findings are presented in a separate report.

PROJECT DESCRIPTION

VMS owns approximately 670 acres on the western side of Maui, adjacent to the Wailea and Makena resorts in the Kihei-Makena region. The project area includes TMKs 2-1-08:56 and 71. The parcel is located on the relatively gentle lower slopes of Haleakala, and is bisected by property reserved for the extension of the Piilani Highway, a major State transportation corridor. About 370 acres of the site are located mauka of the planned highway extension, and 300 acres are situated makai of the highway. The general location of the property is shown in Exhibit I-A.

GCR/VMS plans to develop a master-planned resort community at the site. Visitor accommodations could be designed to complement the luxury hotels at Wailea and Makena, with three intimate-scaled lodges; one would be operated as a golf lodge located within a private club. "Name" designers are being solicited to design two 18-hole golf courses, including a resort course and a club course. The resort course would serve resort lodge guests and daily fee-paying golfers from outside the Resort, while the club course would serve club members and golf lodge guests.

The future Piilani Highway extension would divide Maui Wailea 670 Resort into two areas, termed the makai and mauka portions of the property. The land has been planned to create two distinct but interrelated segments of the project.

The makai portion of the resort consists of approximately 300 acres, and will contain most of the activity-generating uses at the Resort. Planned for the makai area are:

- The village/mixed use district, with a resort lodge, visitor center, church and park. Nearby would be several sites planned for multifamily residential use.
- A 6-acre commercial site adjacent to the planned major entry to the Wailea area from Piilani Highway.
- Three additional multifamily residential project sites, with moderate-intensity development of 15 to 20 units per acre.
- A second resort lodge and tennis center.

- More than 100 single-family residential lots, adjacent to the Seibu Makena Resort, with average size in the range of 11,000 square feet.
- A golf course and network of parks placed to buffer and adjoin all major makai uses.

The project's mauka area includes about 370 acres. Uses in this part of the property would be of somewhat lower intensity than on the makai property. The mauka area would have a more residential character. Features of the mauka property could include:

- A second golf course, with clubhouse and driving range.
- The golf lodge.
- About 230 single-family residential lots, to be developed along the resort's boundary adjoining both Ulupalakua Ranch lands and the Maui Meadows subdivision. These lots would be larger than in the makai residential area, averaging about 15,000 square feet in size, and would be oriented toward the golf fairways fronting the residential area.
- Four multifamily residential sites, planned at lower densities than on the makai property. These developments would build at about six to eight residential units to the acre.
- About 110 patio homes on lots ranging from 3,500 to 6,000 square feet in size. The patio home area could be within a private, gated community emphasizing orientation to the mauka golf course.

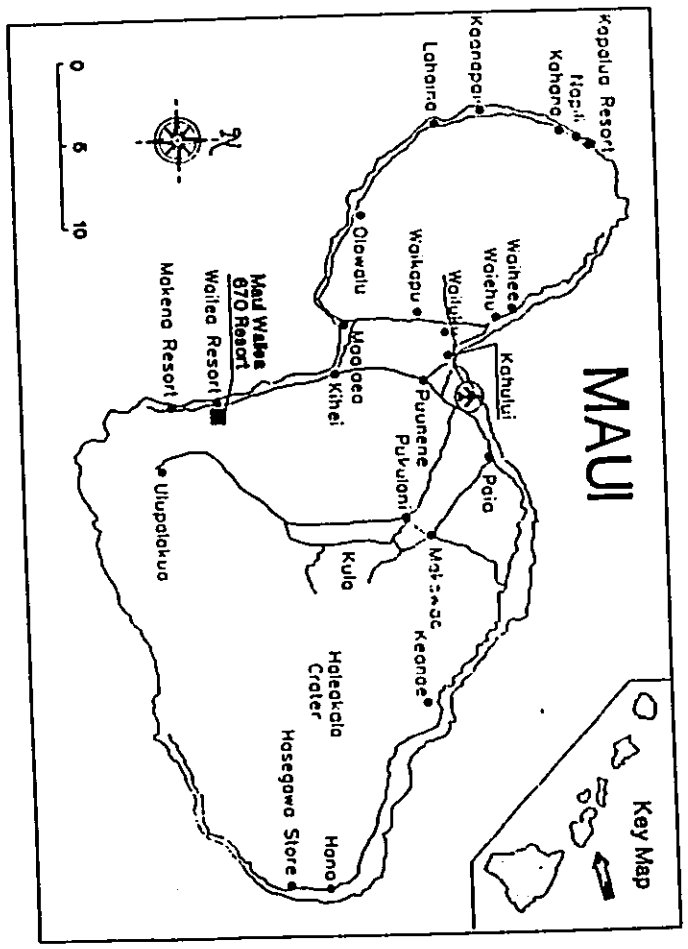
As a resort community, Maui Wailea 670 would offer a variety of single-family and multifamily condominium residential environments, including many lots with golf course frontage and an exclusive gated neighborhood for patio homes. Retail facilities could be offered on two sites, in the village/mixed use area and along its boundary with Wailea Resort.

OBJECTIVES AND SCOPE OF MARKET ASSESSMENT ASSISTANCE

Peat Marwick's primary objective was to assess the potential market support for various land uses proposed for the Maui Wailea 670 Resort.

To meet this objective, the following assistance was provided:

- Maui and Wailea Resort Visitor Industry Review - Reviewed the Maui and the Wailea hotel and visitor industries. Assessed the expected future market position of the Maui Wailea 670 Resort site with respect to other resort-related development.
- U. S. Mainland Golf and Golf Resort Market Review - Reviewed national trends in the U. S. golfer market and market and development characteristics of selected comparable golf resort lodge facilities in California and Arizona.



GCR/VHS MAUI 670

Location of Maui Wailea 670 Property

Exhibit I-A

- Hotel Lodge Market Assessment - Based on the industry review and characteristics of the site, assessed the market potential for hotel lodge development with respect to appropriate target markets, development concept, number of rooms and development phasing, projected occupancy and room rates.

- Multifamily Condominium Market Assessment - Reviewed recent development and sales trends in Maui's condominium market. Based on this review, assessed potential market support for condominium development at Maui Wailea 670 with regard to anticipated buyer markets, development concepts, number of units and projected sales prices and unit absorption.

- Single-Family Market Assessment - Reviewed current and expected inventory and sales trends in Maui's resort lot market, with particular emphasis on developments with lots of 1/4 to 1/2 acre. Reviewed market and development characteristics of selected comparable resort patio home developments in California and Arizona. On the basis of this review, projected potential market support for single-family lots and patio homes with respect to anticipated buyer markets, development concepts, number of lots and projected sales prices and unit absorption.

- Neighborhood/Community Commercial Market Assessment - Projected market support for neighborhood/community commercial development at the site, with respect to target markets and projected supportable space for retail and other uses.

- Golf Course Market Assessment - Assessed market support for development of two golf courses at the site, with regard to expected member/user profiles and projected average annual rounds of play.

- Reporting - Reported our findings and conclusions in progress reports and this report.

II - VISITOR INDUSTRY OVERVIEW

This chapter reviews the regional setting of the island of Maui and Hawaii visitor, resort and hotel industry trends, and the market performance of selected hotels.

ISLAND AND COUNTY OF MAUI

Maui is the second largest island in Hawaii and covers a land area of 728 square miles, 25 miles from north to south and 38 miles from east to west, as shown in Exhibit II-A. Maui is the largest and most developed island in a county jurisdiction. The other islands of Maui County are Lanai and Molokai. Maui is located 101 miles southeast of Oahu and is served by the Kahului and Kapalua-West Maui Airports. This section describes the island's population and economic trends and outlook.

Population

Maui island's population is centered around the four urbanized areas of Kahului, Wailuku, Lahaina and Kihei. The resident population of Maui island grew rapidly during the 1970s, increasing from 38,700 in 1970 to 62,800 in 1980, for an average annual growth rate of 5%. This trend continued into the 1980s as the island's population grew 3.7% annually to an estimated 78,700 persons in July 1986. Maui island is home to about 90% of residents of the entire county, for which population was estimated at about 87,500 in 1986. The population of Maui County is projected by the Department of Business and Economic Development (DBED), to increase to 135,000 residents by 2005. This would represent an average annual rate of growth of 2.3% over the period.

Economic Trends and Outlook

Led by record setting growth in the visitor industry, the economy of Maui County has experienced strong expansion over the past five years, with gross business receipts for 1986 increasing by an average of 11.3% over the past five years, as shown in Exhibit II-B. The majority of this growth is attributable to the strength of Maui island's economy.

The fastest growing sector of the economy has been tourism with visitor expenditures increasing 22% over the past five-year period, as also shown in Exhibit II-B. Growth in visitor arrivals and hotel occupancies have also stimulated the retail and construction industries in Lahaina, Kihei and Wailea.

Agriculture on Maui is in a transition period. Changes in the value of sugar and pineapple produced have been flat to negative, as indicated by increases in sales of about 4% to 5% annually over the past five years, or about equal to inflation. Diversified agriculture products such as macadamia nuts and flowers are becoming increasingly important as the value of these products grew at about 9% annually over this period.

Even with a modest 3.7% growth of employment in Maui's labor force, the county is nearing full employment as indicated by the 5.3% unemployment rate in 1986, as also shown in Exhibit II-B.

GCR/VMS MAUI 670

Major Economic Indicators for Maui County

1982 to 1986

	1982	1983	1984	1985	1986	Compounded annual percentage change 1982 to 1986
Gross business receipts (millions)	$ 1,203	1,376	1,613	1,695	1,843	11.3 (1)%
Employment (number)	39,550	41,450	42,250	44,050	45,750	3.7
Unemployment (percent)	7.7%	7.6%	6.0%	5.9%	5.3%	(8.9)
Westbound visitors (thousands)	1,550	1,646	1,855	1,831	1,999	6.6
Visitor expenditures (millions)	$ 540	793	1,078	1,106	1,196	22.0 (1)
Hotel occupancy rate (percent)	73.9%	75.2%	80.5%	78.5%	81.5%	2.5
Unprocessed cane sugar (thousands)	$ 55,000	73,500	72,600	63,600	67,500	5.2 (1)
Fresh pineapple (thousands)	$ 38,602	45,099	42,176	36,380	45,540	4.2 (1)
Other agricultural crops (thousands)	$ 13,814	17,335	18,122	19,269	19,496	9.0 (1)

(1) Unadjusted for inflation; Honolulu Urban Consumer Index increased 4.7% per annum over the same period.

Sources: State of Hawaii, Department of Business and Economic Development, County Trends in Hawaii 1977 - 1987, November 1987 and First Hawaiian Bank, Economic Indicators, July/August 1987.

Exhibit II-B

GCR/VMS MAUI 670

Map of Maui

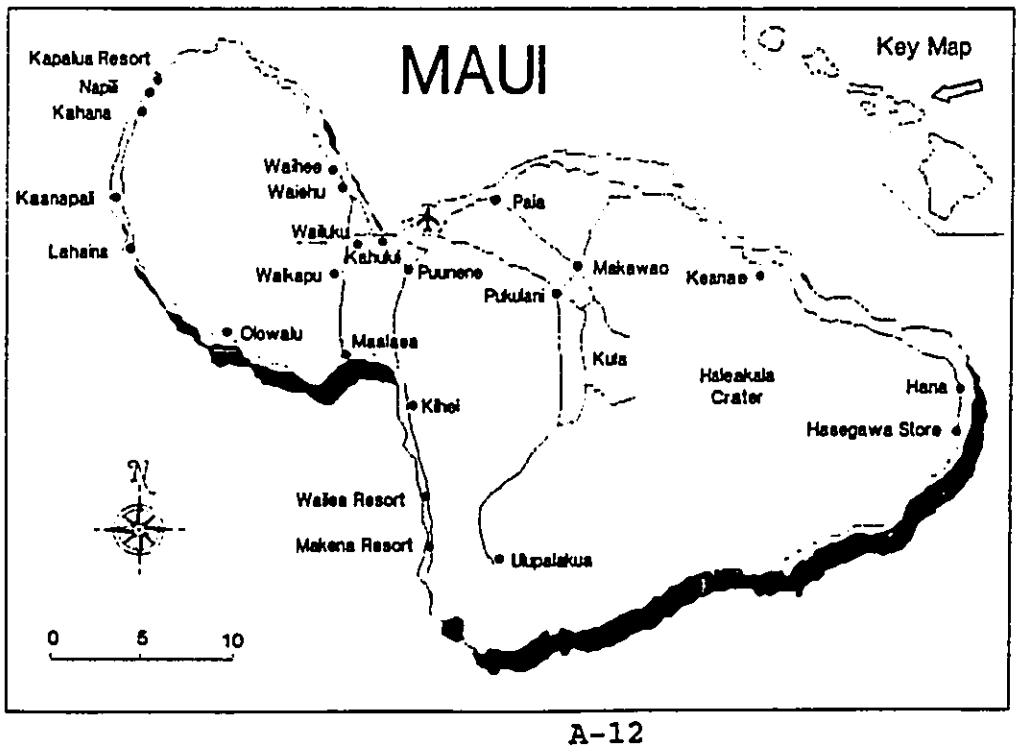


Exhibit II-A

Other areas of economic growth on Maui include advancements in the high-technology fields and unique consumer products. In the high-technology area, Maui has made progress with the following projects:

- Science City, Haleakala.
- Kihei Research and Technology Park.
- Identification of 14 possible Research and Technology Park locations for development through efforts by the Maui Economic Development Board.

In addition, the establishment and continuing success of unique "Made in Maui" consumer products such as potato chips, mochi, manju, wine and beer are examples of entrepreneurial success in the development of cottage industries that serve to further diversify the economic base.

In summary, the island of Maui is expected to benefit from the continued growth of visitor arrivals to the state in general and the advent of more direct flights from the mainland. However, the relatively limited current labor pool, inadequacy of roadways and other public facilities and unavailability of residential housing are challenges that remain for the island's business and government leaders.

VISITOR INDUSTRY TRENDS

This section reviews recent trends in the visitor market for the State of Hawaii and island of Maui in terms of visitor arrivals, travel patterns, characteristics and expenditures. Also, this section presents projected visitor arrivals to Hawaii and the island of Maui.

Statewide Visitor Arrivals

Overnight visitor arrivals to Hawaii totaled 5.7 million in 1987, of which about 4.3 million were westbound travelers and 1.4 million were eastbound travelers, as shown in Exhibit II-C.

Visitor growth has been strong with average annual increases of 19.4% in the 1960s, 8.5% in the 1970s and 5.7% for 1980 through 1987. Declining growth rates reflect an ever increasing visitor base and the maturing development of Hawaii as a visitor destination. In future years, growth rates are anticipated by the DBED to be even more moderate, as discussed later in the chapter.

Both west- and eastbound visitors have contributed to growth:

- Westbound - Over the past ten years, westbound travelers have represented about 76% of state travelers. Westbound arrivals have increased at an average annual growth rate of 18.1% from 1960 to 1970, 8.7% from 1970 to 1980 and 5.2% from 1980 to 1987.
- Eastbound - Although representing a significantly smaller segment of the visitor market, eastbound arrivals grew at a faster rate than westbound arrivals in the 1980s, increasing 7.2% per annum.

The visitor industry in Hawaii is currently benefiting from a number of favorable short- and long-term factors:

Exhibit II-C

GCR/VMS MAUI 670

Historical and Projected Visitor Arrivals
to the State of Hawaii

1970 to 2010

Year	Total(1)	Westbound Number	Westbound Percent(2)	Eastbound Number	Eastbound Percent(2)
Historical:					
1970	1,746,971	1,325,951	75.9%	421,020	24.1%
1975	2,829,105	2,206,702	78.0	622,403	22.0
1980	3,934,504	3,045,306	77.4	889,198	22.6
1985	4,884,110	3,707,039	75.9	1,177,071	24.1
1987	5,792,000	4,344,000	75.0	1,448,000	25.0
Projected:					
1990	6,400,000	4,800,000	75.0	1,600,000	25.0
1995	7,600,000	5,624,000	74.0	1,976,000	26.0
2000	8,800,000	6,512,000	74.0	2,288,000	26.0
2005	9,900,000	7,227,000	73.0	2,673,000	27.0
2010(3)	10,900,000	7,957,000	73.0	2,943,000	27.0
Compounded annual percentage increase:					
1970 to 1980	8.5%	8.7%		7.8%	
1980 to 1987	5.7	5.2		7.2	
1990 to 2010	2.7	2.6		3.1	

(1) Projected based on Department of Business and Economic Development, 1988 Updated Tourism Projections, 1985-2005.

(2) Projected based on historical relationships and discussions with tourism officials, hotel operators and Japanese tour operators.

(3) Assumes 1.9% per annum growth rate after 2005.

- Short-term factors:

  - Weak U. S. dollar relative to strengthening foreign currencies, particularly the Japanese yen, which tends to reduce interest in foreign travel by U. S. vacationers and to encourage travel to Hawaii by the Japanese.

  - Increased air capacities and expanded service at both points of origin and destination.

  - Lower air fares and affordably priced tours which are being promoted by major tour wholesalers and airlines.

  - European and other visitor destination travel uncertainties.

- Long-term factors:

  - More effective and aggressive marketing by Hawaii counties and agencies, resort destination associations, hotel operators and airlines.

  - Introduction of new U. S. travel markets to Hawaii.

  - Development of new resort destination areas on the neighbor islands.

  - Development of new and competitive hotel facilities.

  - Attraction of more internationally known hotel management companies.

  - Growing vested interests in hotel, golf course and resort ownership by the Japanese.

A-14

Island of Maui Visitor Arrivals

Since 1970, Maui has experienced the highest growth rate in westbound visitors of all the islands with an average annual growth rate of 9.8%. In 1987, Maui attracted about 1.9 million westbound visitors which represented nearly half of all westbound travelers to Hawaii, as shown in Exhibit II-D. Eastbound travelers, primarily Japanese visitors, represent a small but growing proportion of total visitors to Maui.

The success of Maui as a visitor destination area can be attributed to the following factors:

- Early development of master-planned resort destinations, particularly Kaanapali, Wailea and Kapalua with extensive recreational facilities.

- Increasing number of repeat visitors to the state seeking new vacation destinations and experiences on islands other than Oahu.

- Increased air service facilitated by nonstop and direct flights from major North American cities and the opening of a second interisland airport in West Maui in 1987.

Exhibit II-D

GCR/VMS MAUI 670

Historical and Projected Visitor Arrivals
to the Island of Maui

1980 to 2010

Year	Westbound Number	Westbound Capture rate(1)	Eastbound Number	Eastbound Capture rate(1)	Total(1)
Historical:					
1980	1,378,000	45.0%	87,060	10.0%	1,465,060
1985	1,831,110	49.0	110,590	9.0	1,941,700
1987	1,906,440	44.0	144,800	10.0	2,051,240
Projected:					
1990	2,544,000	53.0	160,000	10.0	2,704,000
1995	3,036,960	54.0	217,360	11.0	3,254,320
2000	3,581,600	55.0	251,680	11.0	3,833,280
2005	4,047,120	56.0	320,760	12.0	4,367,880
2010	4,535,490	57.0	353,160	12.0	4,888,560
Compounded annual percentage increase:					
1980 to 1987	4.7%		7.5%		4.9%
1990 to 2010	2.9		4.0		3.0

(1) Maui's share of total state visitors, as shown in Exhibit II-C.

Source: Hawaii Visitors Bureau, Research Report, annual.

- Availability of four major golf resort areas within a 10- to 60-minute drive of one another, permitting "golf course hopping."
- Aggressive marketing by the Maui County Visitor Association, resorts and hotel operators.
- A major shopping and activity area (Lahaina), capable of competing with Waikiki.
- Diverse natural attractions including an abundance of white sand beaches, excellent diving and humpback whale watching, Haleakala crater and favorable weather patterns.
- Demand for golf resorts and the success of nationally televised professional golf tournaments held on Maui.

Visitor Travel Patterns

The travel patterns of westbound travelers to the state are summarized below:

- Place of origin - In 1986, two-thirds of all visitors to the state resided in the continental United States. The balance of visitors, representing about 17%, 9% and 8% came from Japan, elsewhere in the Pacific and other, respectively.
- Purpose of trip - Westbound visitors to Hawaii tend to be primarily vacationers. About 82% of westbound travel to the state in 1986 was for pleasure, while another 10% combined business with pleasure. Pleasure travel to Hawaii has generally increased since 1970, as shown in Exhibit II-E.
- Accommodation usage - Accommodation usage has shifted significantly over the last ten years. Although hotels continue to serve the majority of visitors, condominium usage increased to represent nearly 22% of visitor accommodations in 1986, as compared to less than 1% in 1975, as also shown in Exhibit II-E.
- Average length of stay - Two-thirds of westbound visitors stay between 7 and 12 days, as also shown in the exhibit. The average length of stay in the state, over the last ten years at the has remained at the stable rate of ten days for most westbound travelers and six days for Japanese. Maui has shown the greatest nominal growth where the average length of stay has increased from 3.3 days in 1970 to 6.3 days in 1986.
- Travel status - Four major travel market segments represent more than 99% of visitors to the state. Free, independent travelers (FITs) have increased by about 10% over the last decade, representing 77% of all visitors in 1986, as shown in Exhibit II-F. Group inclusive tours (GITs) have declined by 2% over the last decade, representing only 15% of all westbound visitors in 1986. Incentive travel has grown an average of 16% per year since 1978 and represented about 5% of westbound visitors in 1986. The number of convention attendees has fluctuated, ranging from 4% to 9% of total westbound visitors in recent years.

Exhibit II-E

GCR/VMS MAUI 670

Westbound Visitor Travel Patterns
to the State of Hawaii

1970 to 1986

	1970	1975	1980	1985	1986
Purpose of trip:					
Pleasure	74.6%	76.4%	75.4%	80.2%	82.2%
Business and pleasure	9.9	10.7	13.3	10.6	10.1
Business	3.8	2.6	2.9	2.0	2.1
Military/government	.6	.3	.4	.5	.5
Relatives	6.3	3.7	4.1	2.7	2.4
Convention	4.5	6.2	3.5	3.6	2.4
Other	.3	.1	.4	.4	.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Accommodations:					
Hotel	84.2	91.7	71.2	67.7	66.5
Rented home or condominium	.8	.5	16.4	20.9	22.2
Friends or relatives	12.6	6.8	10.6	7.7	7.5
Other	2.4	1.0	1.8	3.7	3.8
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Length of stay in state:					
1 - 6 days	14.3	9.0	8.3	7.7	8.9
7 - 12 days	55.7	61.1	61.2	67.8	68.2
13 - 18 days	23.8	24.9	23.9	19.5	18.2
19+ days	6.2	5.0	6.6	5.0	4.7
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Average stay in state (days)	10.3	10.5	10.6	10.2	10.1

Source: Hawaii Visitors Bureau, Annual Research Report, annual.

Exhibit II-f

GCR/VMS MAUI 670

Major Westbound Visitor Market Segments
to the State of Hawaii

1978 to 1987

Year	FIT	GIT	Incentive group	Convention	Total westbound visitors to Hawaii
1978	1,563,746	738,897	68,750	230,273	2,698,831
1979	1,826,895	632,817	101,639	178,753	2,805,813
1980	1,934,393	410,646	100,367	230,891	2,718,863
1981	1,914,140	412,370	90,972	181,662	2,611,142
1982	2,163,210	396,797	126,615	167,558	2,896,255
1983	2,272,080	344,386	127,340	211,764	3,088,020
1984	2,482,360	367,388	189,800	255,152	3,385,880
1985	2,560,190	482,530	166,520	122,600	3,386,530
1986	3,277,280	626,130	219,420	95,310	4,257,200
1987	3,342,740	554,660	194,680	96,370	4,204,010
Compounded annual percentage increase (decrease) - 1978 to 1987	7.9%	(2.8)%	11.0%	(8.3)%	4.5%

Source: Hawaii Visitors Bureau, Annual Research Report, annual; and 1987 Westbound Visitors to Hawaii.

Characteristics of Westbound Visitors

Characteristics of westbound visitors to the state are shown in Exhibit II-G and summarized below:

- Average party size - Average party size has increased gradually since 1970, moving from 1.55 persons in 1970 to 1.84 persons in 1986.
- Age - The age structure of westbound travelers to Hawaii has changed little in the last decade and a half. Visitors aged 30 to 49 are by the far the largest age group to visit Hawaii, representing nearly 41% of all westbound arrivals. The median age has fluctuated between 40 and 44 since 1970.
- Occupation - Since 1970, Hawaii has experienced a slight shift to higher salaried professional/technical and business/managerial occupations, representing 38% and 25% of all westbound visitors to the state, respectively.
- Number of visits - Slightly more than 50% of Hawaii's visitors are first-time visitors to the state. However, the number of repeat visitors has increased dramatically from 33% in 1970 to 49% in 1986.

As compared to state westbound visitors, visitors to Maui tend to be older and more upscale travelers. Characteristics of westbound visitors to Maui in 1986 were as follows:

- Repeat visitors: 43%
- FIT travelers: 73.5%
- GIT travelers: 19.8%
- Median age: 50.4 years
- Average length of stay: 6.3 days
- Average party size: 1.9 persons
- Incentive meeting visitors: 61% of state's total
- Higher proportion of condominium users than for state
- Managerial and professional travelers: 65.1%

Visitor Expenditures

Westbound visitor expenditures for 1986 were estimated by the Hawaii Visitors Bureau (HVB) at $95 per person per day, up from $86 in 1983. The bulk of these expenditures were for lodging and food and beverages at $37 and $22 per day, respectively. The HVB estimates that in 1986, the average Japanese visitor to Hawaii spent $257 per day, or almost three times that of the typical westbound visitor. Japanese tend to spend more on gifts and personal shopping than do their westbound counterparts.

Projected State Visitor Arrivals

Projections of visitor arrivals are a basis of estimating additional visitor room requirements for Hawaii. According to preliminary forecasts made by the DBED in 1989, the state can be expected to receive 6.4 and 10.9 million visitors in 1990 and 2010, respectively, as shown previously in Exhibit II-C. This represents a growth rate of 2.7% from 1990 to 2010. The expected decline in growth rates is due primarily to the growing base of visitors. Continued growth in visitors to the state could be influenced by the following factors:

Exhibit II-G

GCR/VMS MAUI 670

Westbound Visitor Characteristics
to the State of Hawaii

1970 to 1986

	1970	1975	1980	1985	1986
Average party size	1.55	1.74	1.79	1.85	1.84
Age:					
Under 20	11.6%	9.2%	10.5%	10.3%	10.8%
20 - 29	22.9	16.2	17.6	18.6	18.0
30 - 49	34.0	36.0	38.0	36.9	40.7
50 - 59	18.9	22.8	19.4	18.9	14.9
60 and older	12.6	15.8	14.5	15.3	15.6
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median age (years)	40.7	44.5	41.3	39.7	39.7
Occupation:					
Professional and technical	27.9%	33.5%	35.8%	36.6%	37.5%
Business, managerial and official	21.6	26.9	26.2	25.5	25.3
Clerical, office and sales	12.2	11.2	9.7	9.8	9.3
Military and dependents	13.7	.9	1.0	1.0	1.3
Other employed	7.2	8.0	7.6	7.0	6.0
Retired	7.6	12.5	11.5	13.4	13.8
Students and unemployed	9.8	7.0	8.2	6.7	6.8
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Trips to Hawaii:					
First	67.2	60.3	51.6	53.7	50.8
Second	14.7	17.1	18.8	18.8	19.3
Third	5.6	7.2	9.1	8.7	9.3
Fourth	12.5	15.4	20.5	18.8	20.6
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Repeat visitors	32.8%	39.7%	48.4%	46.3%	47.2%

Source: Hawaii Visitors Bureau, Annual Research Report, annual.

- The further development of visitor facilities and amenities.
- The diversification of visitor market segments served.
- Increased and more effective marketing of each island and individual properties.
- Increasing numbers of Japanese travelers as their government continues to encourage foreign travel and as they continue to benefit from favorable foreign exchange rates.

Projected Maui Visitor Arrivals

It is expected that Maui visitors could represent from 53% to 58% and from 10% to 12% of statewide westbound and eastbound visitors over the 20 year projection period, respectively. The projections are based on the following considerations:

- Expanded direct and nonstop air service to Maui.
- Increasing number of repeat visitors to the state who seek new vacation experiences.
- Recent emergence of an affluent overnight Japanese visitor market to the neighbor islands that tends to travel individually.
- Continued attractiveness and desirability of Maui as a quality destination area.

Based on the above factors, it is estimated that Maui visitors could reach about 2.7 million in 1990 and 4.9 million in 2010, representing a 3.0% growth rate over the projection period, as was shown in Exhibit II-D.

RESORT AND HOTEL INDUSTRY

This section briefly describes Hawaii state and Maui resort areas and reviews the Maui hotel market in terms of the existing and planned hotels.

Hawaii Resort Overview

Hawaii could well be called the world's finest resort destination. It enjoys a tropical south seas mystique, a near perfect year-round climate, constant ocean temperatures in the high 70s, a wide variety of land forms and vegetation among the islands, highly developed and extensive tourism facilities and a stable economic and political system. In contrast to most other tropical resort destinations, Hawaii also enjoys low humidity and is relatively insect-free.

Currently, there are 14 major resorts in the state, as listed below by island:

- Kauai:
  - Princeville

XEROX COPY

- Oahu:
  - Turtle Bay
  - Makaha
  - Waikiki
- Molokai:
  - Kalua Koi
- Maui:
  - Kapalua
  - Kaanapali Beach
  - Wailea
  - Makena
- Hawaii:
  - Mauna Kea
  - Mauna Lani
  - Waikoloa
  - Keauhou
  - Punalu'u

With few exceptions, Hawaii resorts tend to be located on the protected leeward, or southern and western coasts of their respective islands. From this vantage point, they enjoy sunny weather, calm wind and ocean conditions and beautiful sunsets.

Maui Visitor Regions

Maui has four major resorts, all located on the western coast of the island. A brief summary and description of Kaanapali, Wailea and Kapalua resorts is shown in Exhibits II-H and II-I as described below:

- Kaanapali - Kaanapali is a 1,169-acre master-planned resort initially developed in the 1960s and is the best known resort on Maui. Existing facilities include about 5,100 visitor units, two golf courses and the 90,000-square feet Whaler's Village shopping area. The major hotels in the resort include the 815-room Hyatt Regency Maui and the recently opened 762-room Westin Maui. Kaanapali can be characterized as a higher density recreational activity resort, equally attracting package and GIT/FIT visitors. The North Beach area of Kaanapali is expected to become the more upscale end of the resort with over 3,200 hotel rooms planned.

- Kapalua - Kapalua is a 750-acre master planned resort initially developed in 1974. Existing facilities at the resort include the luxury 194-room Kapalua Bay Hotel, two golf courses and several luxury condominium developments. Developments now underway include the 450-room Ritz-Carlton Hotel and a 127-room expansion to the Kapalua Bay Hotel. The resort can be characterized as a tranquil high-end resort catering to the affluent, older individual who returns annually.

Exhibit II-H

SP 5W, MAUI 679

Characteristics of Maui Resorts

	Kaanapali Beach	Wailea	Kapalua
Site area (acres)	1,169	1,450	750
Distance from interisland airport	28 miles (Kahului)	15 miles (Kahului)	32 miles (Kahului)
Special site characteristics	Long stretch of sand beach, rock promontory	Arcuate beaches	Isolated beaches, old fishing village, historic sites
Existing development			
Hotel rooms	1,756	950	[illegible]
Condominium units	1,140	705	[illegible]
Single-family lots	[illegible]	350	[illegible]
Total units	5,196	2,005	[illegible]
Amenities			
Beach	White sand	White sand	Brown sandy beach
Shoreline (linear feet)	10,300	7,900	[illegible]
Percent usable for swimming	98%	N/A	[illegible]
Commercial space in shopping centers	79,000	40,000	22,000
Golf course holes	36	36	36
Tennis courts	19	13	13
Water activities	Sailing, catamaran cruises, surfing	Scuba diving, excursion boats	All water sports
Hotel development:			
Hotel class	Luxury/first-class/tourist	First-class/luxury	Luxury/first-class
1983 average hotel room rates[1]:			
Single	$64 - $100	$135 - $175	$175 - $300
Double-triple	[illegible] - 100	155 - 195	155 - 302
Typical condominium unit sales price[2]	$150,000 - $290,000	$185,000 - $1,000,000	$280,000 - $400,000
Market appeal	Oriented towards hotels. Promoted as an integrated resort with many attractions.	Low-density, well manicured resort with strong recreational appeal due to prominent golf and tennis facilities.	Remote, high-end resort with an overall high quality of hotel, condominium and recreational developments.
Typical visitor profile	About evenly divided between package and GIT/FIT visitors. Primarily younger, travelers from west coast and Canada.	Wide variety of visitors including FIT, package and GIT guests. Currently has a family and older visitor appeal.	Geared to affluent, older individual visitors who return annually.

N/A - Not available.

1. Indicated room rates for major hotels or condominiums is published by the Hawaii Visitors Bureau, Member Accommodations Guide, 1984.

2. Hawaii Real Estate Investor Multiple Listing Service and discussions with developers or realtors of the respective resorts.

Sources: Compiled by Peat Marwick Main & Co. based on discussions with developers, the Hawaii Resort Developer's Conference, Economics of Resort Development, 1983 and other published sources.

XEROX COPY

- Wailea - Wailea is a 1,450-acre master planned resort initially developed in 1972. Existing facilities include the Hotel Intercontinental Maui, Stouffer's Wailea Beach Resort and two championship golf courses. Plans for the resort include the 378-room Four Seasons, 450-room Embassy Suites, 426-room Grand Champions and 800-room Grand Hyatt hotels, as well as single-family and multifamily units. Wailea was once characterized as a secluded recreational resort; however, it now appears to be in transition and poised to become one of Hawaii's leading resorts. On an in-holding within Wailea Resort, VMS Realty Partners also has plans for an approximately 1000-room resort hotel complex.

- Makena - Makena is Maui's newest resort, initially developed in 1983. Existing facilities at the resort include the 310-room Maui Prince Hotel and Makena Surf condominium. Developed by the Seibu Group of Japan, no future plans have yet been disclosed.

- Other - Other areas of Maui with significant visitor accommodations include Kihei, Maalaea, Napili and Lahaina. These visitor areas have developed based on their location on the western coast of the island and profit from "spillover demand" due to their proximity to or location between the successfully marketed master-planned resort destinations. Accommodations in these areas are generally lower priced than those in the master-planned areas that offer golf and other visitor amenities. These areas are generally high density, unplanned condominium and hotel developments. There is little, if any, undeveloped beachfront land remaining in these areas.

Maui Hotel Inventory

Maui's visitor accommodations consist primarily of hotel and condominium units. As reported by the HVB in February 1987, Maui has 13,264 visitor units, representing 5,551 and 7,643 rooms in hotels and condominiums, respectively. This is the lowest ratio of hotels to condominiums in the state.

Competition in the Maui market is expected to increase in the future due to the large number of hotels planned on Maui. The inventory of Maui hotels is expected to more than double with the planned completion of about 8,000 rooms at 17 hotel projects by 2000, as shown in Exhibit II-J. A brief description of the planned hotels follows:

- Four Seasons Hotel, Wailea (378 rooms) - The showpiece hotel for the Four Seasons chain, the hotel is planned to be an eight-story facility located at the Wailea Resort. Guest rooms are to be luxuriously appointed with average room sizes of about 575 square feet. The hotel is expected to break ground in the spring of 1988 and to be completed by 1990.

- Embassy Suites Wailea, Wailea (450 rooms) - This Moorish-style hotel is being designed by Jose Loiz Esquerra, the architect of the Las Hadas Resort Hotel in Acapulco. The guest rooms are expected to be extremely elaborate and each unit is currently planned to consist of a two-story suite with a living room and dining area on the lower level and the bedroom suite on the upper level. A standard guest room would contain about 927 square feet with an interior spiral staircase. The hotel is being developed at a cost of more than $110 million and is expected to be completed by 1990.

Exhibit II-I

Development Status of Maui Resorts

	Year hotels opened	Hotel (number of rooms/units per acre)	Condominium (number of units)	Single-family lots (number of lots)	Retail facilities	Recreational facilities
Maui: Kaanapali		Existing:				
	1962	Sheraton Maui (504/21.9)	Whaler (160)	Kaanapali Villas (3)	Whaler's Village (78,000 square feet)	Royal Kaanapali Golf Course North (18 holes) and South (18 holes) Tennis (20 courts) at Hyatt
	1963	Royal Lahaina (607/17.1)	Maui Eldorado (204)	Royal Kahana Estates (11)		
	1964	Kaanapali Beach (613/39.8)	Kaanapali Plantation (62)	Kaanapali Shores (18)		
	1980	Hyatt Regency Maui (800/44.6)	International Colony Club (48)	Kaanapali Hill (18)		
	1981	Maui Marriott (320/45.2)	Kaanapali Royal (105)	Kaanapali Villas (26)		
	1987	Westin Maui (762/51.8)	Kaanapali Alii (264)			
			Maui Kaanapali Villas (26)			
	1992 and later	Planned - Five hotel sites (3,200/35.0)				
Wailea		Existing:				
	1976	Hotel Inter-Continental Maui (600/33.3)	Wailea Club (152)	Fairway Homes Site I (10)	Wailea Shopping Village (100,000 square feet)	The Blue Course (18 holes) The Orange Course (18 holes) Tennis (14 courts including two grass courts)
			Wailea Elua (148)	Wailea Kai (10)		
	1978	Stouffer Wailea Beach Resort (350/23.3)	Wailea Point (130)	Wailea Estates I (10)		
				Wailea Kraigo (10)		
		Planned:				
	1990	Grand Champions (426/45.6)				
	1991	Grand Hyatt (800/23.3)				
	1990	Four Seasons (378/32.7)				
	1990	Embassy Suites Wailea (450/19.1)				
Kapalua		Existing -				
	1978	Kapalua Bay Hotel (194/10.5)	The Bay Villas (18)	Pineapple Hill (100)	The Shops (22,000 square feet)	The Bay Course (18 holes) The Village Course (18 holes)
			The Golf Villas (186)			
			The Ironwoods (40)			
			The Ridge (161)			
		Planned:				
	1990	Ritz-Carlton Kapalua Kapalua Bay Hotel expansion (450/34.1) (127/N/A)				

N/A Not available.

Sources: Compiled by Peat Marwick Main & Co. based on discussions with developers; the Hawaii Resort Developer's Conference, Economics of Resort Development, 1983; and other published sources.

XEROX COPY

GCR/VMS MAUI 670

Existing and Planned Hotel Inventory
on the Island of Maui

1987

Project name	Location	Estimated date of completion 1990	1995	2000	2005	2010	Total
Luxury high-personal service:							
Four Seasons	Wailea Resort	378	-	-	-	-	378
Embassy Suites	Wailea Resort	450	-	-	-	-	450
Kapalua Bay addition	Kapalua Resort	127	-	-	-	-	127
Ritz-Carlton	Kapalua Resort	450	-	-	-	-	450
Luxury high-activity:							
Grand Champions	Wailea Resort	-	426	-	-	-	426
Grand Hyatt	Wailea Resort	-	800	-	-	-	800
Unnamed	Wailea area	-	1,000	-	-	-	1,000
Embassy Suites Maui Shores	Mahinahina	415	-	-	-	-	415
Other:							
Princess Iolani Hotel	Kihei	275	-	-	-	-	275
Maui Sun	Kihei	-	300	-	-	-	300
Maui Comfort Hotel	Kihei	-	100	-	-	-	100
Diamond Club	Wailea Resort	72	-	-	-	-	72
North Beach(1)	North Beach	-	1,600	1,600	-	-	3,200
Unnamed	Kihei	-	120	-	-	-	120
Unplanned/ unknown(2)	Various	-	-	-	1,000	1,000	2,000
Total, rounded		2,170	4,350	1,600	1,000	1,000	10,110

(1) Expected to include five oceanfront hotel projects.

(2) After 2000, estimated 200 hotel rooms per annum for unplanned and unknown projects.

Source: Based on discussions with project developers, county planners and other published sources.

- Grand Champions, Wailea (426 rooms) - This $115 million hotel intends to combine the tradition of a European hotel with the atmosphere of an exclusive country club and health spa. The hotel is expected to be completed by 1991.

- Grand Hyatt Hotel, Wailea (800 rooms) - This $190 million hotel is expected to be a high-activity hotel and includes extensive public areas. It is expected to be completed by 1991.

- Unnamed VMS Realty Partners hotel (1000 rooms) - Located within Wailea Resort's boundaries, this hotel is expected to include a separate villa and meeting complex providing both high personal service and high activity in one resort enclave. The complex is expected to be completed by 1995.

- Princess Iolani Hotel, Kihei (275 rooms) - No information available.

- Embassy Suites Maui Shores, North Beach, Kaanapali (415 rooms) - This hotel is to be managed by the Holiday Corporation, offering two-room suites with microwave ovens, refrigerators and wet bars. Room rates include complimentary cook-to-order breakfast and evening cocktails. This hotel is currently under construction and is slated for completion by 1989.

- North Beach, Kaanapali (3,200 rooms) - A joint venture between Amfac and a Japanese company, the area is master-planned to include five beachfront hotel projects including the Embassy Suites Maui Shores.

- Kapalua Bay Hotel, Kapalua (127-room addition) - This addition will include a new wing to the existing Kapalua Bay Hotel as well as additional meeting space, a fourth restaurant and a relocated swimming pool. The addition is underway and is expected to be completed by about 1989.

- Ritz-Carlton Kapalua, Kapalua (450 rooms) - The hotel is planned to feature a contemporary design in a three- to six-story structure. The hotel is expected to cater to both FIT and smaller upscale executive and incentive meeting groups and is planned to be completed by 1990.

- Maui Sun, Kihei (300 rooms) - This nonbeachfront hotel is expected to cater to local traffic. The projected completion date is by 1991.

- Maui Comfort Hotel, Kihei (100 rooms) - Also expected to cater to local traffic; projected to be finished by 1992.

- Diamond Club, Wailea (72 units) - A cluster of duplexes which are to be run like a hotel for members of a private Japanese club. The hotel is expected to be completed by 1990.

- Unnamed Lipoa Development, Inc. hotel, Kihei (120 rooms) - To be a six-story hotel located next to the planned Lipoa Center Shopping Complex, on a 6.51-acre site. Projected to target middle income vacation and business travelers and to feature a 20,000 square foot swimming pool. Development timetable, financing and further details not reported at this time; this project is estimated to be fairly long-term.

XEROX COPY

HOTEL MARKET PERFORMANCE

This section summarizes the recent market performance of selected hotels throughout the state and in Maui in terms of room rates, occupancy levels, guest mix, average length of stay and guest origin.

Published Room Rates

Published room rates in Hawaii for selected first-class and luxury resorts vary by resort and room type. Room rates range from $80 for a standard room at the Sheraton Waikoloa to $2,000 for a suite at the Halekulani, as shown in Exhibit II-K. Discounts, group and corporate rates, incentives plans, seasonal and kamaaina rates all affect rates actually charged to the hotel guests. Thus, published room rates exceed achieved room rates.

Achieved Room Rates

Maui hotels achieved room rates of $127 in 1987, representing a 11.0% per annum increase since 1980. West Maui which includes the Kaanapali and Wailea resorts achieved the highest rates in the state, at about $138, as shown in Exhibit II-L. The highest room rates reflect the performance of relatively newer facilities, master-planned resort areas and/or oceanfront properties.

Achieved Occupancy Levels

Occupancy levels indicate the demand for visitor accommodations relative to room supply. In 1987, Maui occupancy levels averaged about 80% or the second highest in the state next to Waikiki, as shown in Exhibit II-M. West Maui hotels averaged even higher occupancy levels at 83%, illustrating the popularity of the master planned resort areas in West Maui.

Guest Mix

Based on a review of selected hotels, it appears that the typical guest mix for luxury hotels is 70% FIT, 15% GIT, and 15% incentive while first-class hotels average about 45% FIT, 35% GIT and 20% incentive, as shown in Exhibit II-N. Neighbor island hotels are able to attract a higher percentage of FIT and incentive guests due to the greater resort and recreational amenities, newer facilities and more adequate meeting space.

Average Length of Stay

Luxury hotels experience slightly longer stays of about 5 days compared to 4.5 days for selected first class hotels, as also shown in Exhibit II-N.

Guest Origin

United States mainland visitors accounted for 70% to 90% of all guests at the selected hotels surveyed, as shown in Exhibit II-O. Japanese guests are the second largest market segment, but there is a greater variance in proportion ranging from about 3% to 20%.

Exhibit II-K

GCR/VMS MAUI 670

Published Room Rates of Selected Hawaii
First-Class and Luxury Resort Hotels

1987

	Island	Double occupancy room rates(1) Standard/ superior	Deluxe	Suites
Luxury hotels:				
Mauna Kea Beach(2)	Hawaii	$ 300 - 360	340 - 380	420 - 760
Mauna Lani Bay	Hawaii	195	220 - 295	400 - 425
Kahala Hilton	Oahu	155 - 255	255 - 355	465 - 1,270
Halekulani	Oahu	165 - 185	210 - 225	250 - 2,000
Kapalua Bay	Maui	175 - 300	-	400 - 950
First-class hotels:				
Hyatt Regency Waikiki	Oahu	95 - 160	145 - 210	325 - 1,200
Royal Hawaiian	Oahu	140 - 180	215 - 225	230 - 1,200
Hyatt Regency Maui	Maui	175 - 275	290 - 320	250 - 1,500
Maui Marriott	Maui	170	-	400 - 1,210
Stouffer's Wailea Beach	Maui	-	215 - 350	450 - 1,000
Wailea Intercontinental	Maui	145 - 175	165 - 195	250
Sheraton Royal Waikoloa	Hawaii	80 - 180	100 - 200	-
Waiohai	Kauai	125 - 170	190 - 200	280 - 720
Princeville Sheraton	Kauai	-	160 - 250	500 - 1,000

(1) Rack room rates without discounts.
(2) American plan hotel room rate includes breakfast, lunch and dinner.

Source: Hawaii Visitors Bureau, Member Accommodations Guide, 1987.

XEROX COPY

GCR/VMS MAUI 670

Occupancy Levels of
Hawaii Visitor Accommodations

1980 to 1987

Location	1980	1981	1982	1983	1984	1985	1986	1987(1)
Waikiki:								
On beach	73.9%	72.1%	72.7%	74.7%	81.6%	82.9%	84.2%	87.9%
Off beach (w/restaurant)	73.2	73.8	80.6	79.1	85.7	83.8	86.0	87.3
Off beach (w/o restaurant)	66.5	76.1	80.1	74.4	80.4	79.4	86.9	87.5
Other Oahu	74.6	75.3	79.4	73.3	85.0	82.7	83.0	86.9
Island of Oahu	72.3%	74.1%	77.8%	75.8%	83.3%	81.9%	85.4%	87.5
Hilo	34.4	35.3	37.7	39.2	58.2	57.8	54.6	59.0
Kona	59.0	49.5	46.9	47.0	54.9	58.7	64.6	69.7
Island of Hawaii	51.0%	44.9%	44.0%	44.7%	55.6%	58.5%	62.8%	67.2%
West Maui	74.8	73.7	78.0	77.8	84.1	83.2	85.8	83.4
Other Maui	67.4	58.1	61.4	67.0	70.3	67.3	70.9	70.8
Island of Maui	73.0%	70.3%	73.9%	75.2%	80.5%	78.2%	81.5%	79.7%
East Kauai	75.1	68.5	63.4	59.3	63.0	64.1	75.4	74.5
South Kauai	52.5	46.2	44.2	50.2	63.0	73.5	82.1	81.0
Island of Kauai	69.6%	62.7%	57.5%	57.2%	63.0%	67.1%	77.6%	76.3%
State total	69.3%	68.3%	70.4%	69.7%	76.0%	77.7%	81.7%	83.1%

(1) January to May.

Source: Pannell Kerr Forster, Trends in the Hotel Industry, monthly.

Exhibit II-M

GCR/VMS MAUI 670

Average Room Rates of Hawaii
Visitor Accommodations

1980 to 1987

Location	1980	1981	1982	1983	1984	1985	1986	1987(1)	Percentage increase 1980-1987
Waikiki:									
On beach	$ 59.01	61.05	61.15	62.69	69.15	85.01	94.80	106.43	8.8%
Off beach (w/restaurant)	34.78	33.90	35.69	36.32	39.56	46.84	49.74	53.14	6.3
Off beach (w/o restaurant)	27.67	27.40	28.70	30.21	31.10	33.51	37.93	42.04	6.2
Other Oahu	45.45	49.26	51.89	56.42	55.26	59.01	64.65	71.00	6.6
Island of Oahu	$ 42.70	43.05	44.88	46.93	50.06	57.00	62.13	68.73	7.0%
Hilo	33.71	30.53	30.01	30.41	32.30	34.88	37.23	35.99	9.4
Kona	49.96	52.81	53.49	55.42	65.22	71.76	82.02	93.70	9.4
Island of Hawaii	$ 46.40	47.16	47.25	48.84	58.13	65.35	75.19	81.74	8.4%
West Maui	63.19	77.82	81.19	89.52	97.12	105.84	125.40	138.16	11.8
Other Maui	55.30	53.49	51.50	52.82	61.26	72.16	77.87	92.43	7.6
Island of Maui	$ 61.34	73.27	75.02	81.60	88.89	96.75	113.66	127.07	11.0%
East Kauai	52.66	54.67	55.65	56.54	57.85	60.48	65.33	74.56	5.1
South Kauai	66.36	61.90	67.53	72.41	82.88	86.22	93.61	97.86	5.7
Island of Kauai	$ 55.16	56.06	58.51	59.78	65.09	69.51	75.37	81.29	5.7%
State total	$ 47.37	49.73	51.87	54.78	59.84	65.66	73.20	79.83	7.7%

(1) January to November.

Source: Pannell Kerr Forster, Trends in the Hotel Industry, monthly.

Exhibit II-L

Exhibit II-N

GCR/VMS MAUI 670

Estimated Travel Status and Average Length of Stay
at Selected Luxury Hotels and First-Class Maui Hotels

	Guest mix by travel status			Average length of stay
	FIT	Group	Incentive	(days)
Luxury hotels:				
Halekulani	70%	10%	10%	4.3
Kahala Hilton	75	20	5	4.0
Mauna Kea Beach	75	25	- (1)	5.5
Mauna Lani Bay	75	5	20	5.0
Kapalua Bay	80	5	15	4.5
Hyatt Regency Maui	40	60	- (1)	N/A
First-class hotels:				
Kaanapali Beach	75	25	-	3.5
Maui Marriott	25	55	20	5.0
Maui Intercontinental	35	35	30	4.5
Stouffer's Wailea Beach	65	20	15	4.5

N/A Not available.
(1) Included in group travel.

Sources: Interviews with hotel operators, or other published sources.

GCR/VMS MAUI 670

Estimated Guest Mix by Place of Residence
at Selected Luxury Hotels and First-Class Maui Hotels

	United States	Hawaii	Canada	Japan	Europe	Other
Luxury hotels:						
Halekulani	81%	4%	2 - 5%	10 %	2 - 5%	-%
Kahala Hilton	80 - 90		1 - 2	6 - 11	2 - 5	-
Mauna Kea Beach	93		-	4	3	-
Mauna Lani Bay	78	12	1	4	2 - 5	-
Kapalua Bay	70		5	20	5	-
Hyatt Regency Maui	1st		3rd	2nd	4th	-
First-class Maui hotels:						
Kaanapali Beach	86		4	5	3	2
Maui Marriott	84		4	10	2	-
Maui Intercontinental	78		-	12	10	
Stouffer's Wailea Beach	90		5	3	2	-

(1) Relatively high share of Hawaii resident guests may be due to special rates offered in recent years.

Sources: Interviews with hotel operators, and other published sources.

Exhibit II-O

XEROX COPY

III - GOLF COURSE MARKET ASSESSMENT

The Maui Wailea 670 Resort is proposed to be developed with two golf courses, termed the "resort course" and the "club course". Proposals are currently being solicited from nationally recognized "name" golf course designers to design and assist in the marketing of one or both of these courses. The two courses would differ in that:

- The resort course would be for the use of guests at the two resort lodges, visitors staying in resort condominiums or single-family residences at Maui Wailea 670 Resort that are rented for visitor use, Maui visitors staying at accommodations outside of the Maui Wailea 670 Resort, and the general public. Greens fees would be charged per round. Like most Hawaii resort courses, this course would be designed for relatively easier play by occasional golfers.

- The club course would be the primary amenity of a resort golf club, open only to members paying an annual membership fee or initiation fee and annual dues. Memberships would be primarily marketed to Maui Wailea 670 Resort property owners, to property owners in the Wailea Resort development, to other Maui and state residents and to people living outside of the state, such as those with second homes on Maui. The club course could also be used by guests at the golf lodge.

This chapter reviews the market and physical characteristics of resort golf courses statewide and on Maui, and projects the demand for golf in the Wailea area in general and at the proposed Maui Wailea 670 Resort golf courses in particular.

RESORT GOLF COURSE OVERVIEW

This section reviews major characteristics of Hawaii resort golf courses. Existing and planned courses on the island of Maui are also identified.

Benefits of a Resort Golf Course

Of Hawaii's 14 major resort areas, only the urban Waikiki area lacks a resort golf course. Golfing is a favored activity of more upscale hotel guests. Golf courses help to sell hotel room accommodations and resort real estate, draw day visitors who patronize restaurants, resort shops or other resort facilities, and provide open space and view orientations for the resort and its surrounding community.

Levels of Utilization

Hawaii resort courses vary widely in amount of hotel guest play. As Exhibit III-A shows, luxury resorts like Mauna Kea, Mauna Lani and Kapalua have very high rates of play among hotel guests. At the same time, some resorts with a first-class or budget traveler clientele, such as Turtle Bay, Makaha and Waikoloa Beach resorts, also show above-average golf course use by hotel guests.

Golf course use may be measured in average rounds played per day. Usage is affected by a number of factors, including prevailing weather, difficulty of the course, player familiarity with course conditions, the degree to which players use carts and starting time intervals.

GCP/VMS MAUI 670

Rounds Played Per 100 Guests
at Selected Resort Golf Courses

1984

	Estimated annual resort population(2)	Rounds per 100 guests(3)
Hotel guests:		
Oahu:		
Makaha	95,150	13.1
Turtle Bay	202,225	7.4
Maui:		
Kapalua	115,540	14.0
Kaanapali	2,231,800	2.0
Wailea	511,250	4.8
Hawaii:		
Mauna Lani	145,650	15.8
Mauna Kea	148,340	26.3
Waikoloa Beach	262,200	5.3
Keauhou	541,760	3.0
Total/average	4,253,915	4.8
Condominium and single-family guests:		
Maui:		
Kapalua	233,200	6.1
Kaanapali	1,076,500	4.2
Wailea	297,460	10.7
Hawaii:		
Mauna Lani	28,900	7.1
Mauna Kea	34,200	14.6
Kona at Keauhou	390,550	9.6
Kauai - Princeville	695,100	2.6
Total/average	2,755,910	5.6

(1) Rounds played by hotel or condominium guests, based on interviews with the course professionals or representatives of the respective courses.

(2) Calculated based on total resort units average occupancy rates and average number of guests per unit.

(3) Annual rounds played divided by annual resort population multiplied by 100.

Source: Compiled by Peat Marwick Main & Co. based on discussions with directors or representatives of the respective courses.

Achieving a desired level of play on a resort course requires balancing operational efficiency with golfers' preference for a more leisurely pace of play. It is also affected by the seasonal character of Hawaii resort golf use. Peak season occurs from January through March, as Mainland visitors arrive for longer stays, while the slowest periods tend to be in summer. Differences between peak and low season may vary by almost 100%.

Desired and maximum average daily levels of play are shown in Exhibit III-B for selected Hawaii resort courses in 1987, along with the actual average number of rounds played. The desired play figure represents course operators' estimates of the largest number of golfers they would want to schedule with ideal conditions. Maximum play level is the highest number of daily rounds operators had experienced. Stated maximum and desired levels of play do not vary greatly for most courses, although several (Turtle Bay, Princeville, Kiahuna and Keauhou) have higher criteria. Typically, maximum level of play is between 220 and 280 rounds daily, while the operators' desired level of play is generally between 200 and 250 rounds. For 1987, Hawaii resort courses averaged 144 rounds per day, with courses ranging between 124 and 190 rounds.

Fees at Hawaii Resort Courses

Greens fees and cart rental charges assessed at selected Hawaii resorts are shown in Exhibit III-C. Most resorts (other than Kaanapali) charge day visitors more than resort guests. Many of the resort courses maintain lower rates in the nonpeak season. The lowest guest fee rates in Hawaii are maintained by the two rural Oahu resorts; Maui resorts are priced at or above statewide average rates for both resort guests and visitors.

Resort courses generally do not offer memberships. Several resorts, however, make annual memberships available to resort lot or condominium owners within their projects; Mauna Kea, Wailea, Kapalua, Princeville and Keauhou-Kona all use this approach. Membership fees range from $450 to $3,000, represent a prepayment of green fees, and are subject to yearly adjustment.

Resort Golf Courses on Maui

The island of Maui currently includes seven 18-hole resort courses, with two each at the Wailea, Kaanapali and Kapalua resorts. Each of these resorts plans to add an additional 18-hole golf course within the next several years. Seibu Hawaii, which operates the Makena golf course at its resort site, also plans to add a new course in two 9-hole increments. Thus, within the next several years there are expected to be 11 resort courses on Maui, offering 198 holes, as shown in Exhibit III-D.

Golf Markets

Resort golfers are comprised of five major market segments: resort hotel guests, resort condominium/single-family guests, resort residents, nonresort visitors and island residents. A description of these various markets on Maui is presented as follows:

GCR/VMS MAUI 670

Average Daily Rounds of Golf
at Selected Resort Courses

1987

	Daily rounds of golf		
	Average	Desired	Maximum
Oahu:			
Makaha	152	200	200(1)
Turtle Bay	178	250	320
Maui:			
Wailea:			
Blue Course	135	216	216(1)
Orange Course	135	216	216(1)
Royal Kaanapali:			
North Course	173	N/A	250
South Course	123	N/A	250
Kapalua Golf Club:			
Bay Course	190	230	280
Village Course	137	210	240
Kauai:			
Princeville Golf Club(2)	178	200 - 235(3)	235
Kiahuna Golf Club	123	250	300
Hawaii:			
Mauna Lani - Francis I'i Brown Golf Course	129	200	250
Mauna Kea Beach Golf Course	148	230	265
Waikoloa Beach Resort Golf Course	123	180 - 200	230
Keauhou Golf Course(2)	187	250	350
Average (rounded)(4)	144	219	302

N/A Not available.

(1) Maximum level of play is the same as desired level.

(2) Utilizing all 27 holes available in 1987.

(3) Desired level of play is 200 rounds per 18 holes in the winter and 235 per 18 holes in summer months due to greater number of daylight hours.

(4) Excluding Princeville Golf Club and Keauhou Golf Course.

Source: Based on interviews with golf professionals or representatives of the respective courses.

Exhibit III-C

GCR/VMS MAUI 670

Fees at Selected Resort Golf Courses in Hawaii

1987

	Total cart and green fees	
	Resort guests	Nonresort guests
Oahu:		
Makaha	$ 35.00	75.00
Turtle Bay	32.00	40.00
Maui:		
Wailea - Blue and Orange Courses:		
Peak season (December - April)	45.00	80.00
Low season (May - November)	30.00	50.00
Royal Kaanapali - North and South Courses	70.00	70.00
Kapalua Golf Club - Bay and Village Courses	55.00	85.00
Kauai:		
Princeville Golf Club:		
Peak season (December - April)	56.00	70.00
Low season (May - December)	46.00	60.00
Kiahuna Golf Club	50.00	55.00
Hawaii:		
Mauna Kea Beach Golf Course:		
Peak season (December - April)	50.00	65.00
Low season (May - November)	40.00	50.00
Mauna Lani - Francis I'i Brown Golf Course:		
Peak season (December - April)	50.00	100.00
Low season (May - November)	50.00	60.00
Waikoloa Beach Resort and Golf Club:		
Peak season (December - April)	45.00	60.00
Low season (May - November)	38.00	38.00
Kona at Keauhou Golf Course:		
Peak season (December - April)	47.00	59.00
Low season (May - November)	43.00	57.00
Average	46.00	61.00

Source: Compiled by Peat Marwick Main & Co. based on published information.

Exhibit III-D

GCR/VMS MAUI 670

Resort Golf Courses in Hawaii

1987

Resort	Course	Number of holes
In operation:		
Wailea	Blue Course	18
	Orange Course	18
Kaanapali	North Course	18
	South Course	18
Kapalua	Bay Course	18
	Village Course	18
Makena	Makena Golf Course	18
Subtotal		126
Planned:		
Wailea	Third Course (1991-1992)	18
Kaanapali	North Beach Course (no date)	18
Kapalua	Third Course (1989-1990)	18
Makena	Makena Golf Resort - Third Nine (1991-1992)	9
Makena	Makena Golf Resort - Fourth Nine (no date)	9
Subtotal		72
Total		198

Source: Compiled by Peat Marwick Main & Co. based on published information.

- Resort guests and residents:
  - Between 20% and 90% of resort golf play comes from those market segments at different resorts.
  - Resorts with a low percentage of play usually accommodate convention visitors or group visitors who do not have as much leisure time to devote to all-day golf play or have lower vacation budgets.
  - Have higher median income.
  - Generally middle aged.
- Nonresort visitors:
  - Tend to represent a greater proportion of total play at golf courses that do not have a large "captured" visitor market such as Makaha, Turtle Bay and Makena.
  - Includes golf "course-hopping" visitors from neighboring resort areas such as Kaanapali guests that play at Kapalua Resort.
  - Represents 10% to 55% of total golf play.
- Island residents:
  - Account for between 10% and 45% of total play.
  - Highest percentage achieved at resort courses which provide for a special rate to island residents or groups.

The mix of different golfer markets at a resort course is influenced by several factors. As on-site resort population increases with residential lot and condominium development, the proportion of resident golfers will tend to increase. Location in proximity to residential communities, discount policies, and reservation procedures can affect resort visitor and local resident use. Differences in market composition can be large at different resorts; resort guests and on-site residents played 32% of all 1987 golf rounds at Kapalua, but accounted for 88% of all golf played at Mauna Kea.

DEMAND FOR GOLF IN THE WAILEA-MAKENA REGION

This section identifies future demand for golf at Wailea Resort, and compares demand to the expected supply of golf facilities at that resort. To the extent that unmet need remains after addition of a third course at Wailea Resort, other existing and planned regional courses, such as at Maui Wailea 670 Resort and Seibu Makena, can be expected to receive greater patronage.

Seibu Makena Resort Golf Capacities

The Seibu Makena Resort maintains an 18-hole resort course for guest and daily fee play. As shown in Exhibit III-D, an additional nine holes will be opened in

1991-1992, with a further nine holes planned in the future. The Seibu Makena course opened in 1981, and by 1984 had reached a daily level of play of 90 rounds.

Seibu Makena can also be expected to attract some of the overflow of golfers if Wailea Resort is unable to accommodate demand. However, projected demand from Seibu Makena Resort guests and residents is difficult to assess, as firm development plans have not been announced for the 1,026-acre resort parcel.

For purposes of this analysis, it is assumed that Makena will maintain some excess capacity, and thus along with the Maui Wailea 670 and other courses, may be able to serve some of Wailea's expected unmet demand.

Projected Average Daily Population at Wailea Resort

The two courses at Wailea currently serve visitor and resident demand in the Wailea and Kihei resort areas. As indicated in Exhibit III-A, each of the two Wailea courses now averages about 135 rounds per day.

This was somewhat below both the statewide resort course average of 140, and the average for the six selected Maui courses of 145 rounds per day. However, the Wailea courses do reach the maximum use level on typical days during peak season. Thus, much of the current excess capacity for golf at Wailea is limited to starting times during the off-peak season.

Development at Wailea Resort is expected to accelerate greatly in the next few years, with a number of large hotel projects being planned or under construction. Almost 2,000 additional hotel units are planned by 1990, along with more than 300 new condominium units and residential lots.

Golf demand at Wailea Resort is related to the number of visitors and resort residents on-site, a figure that is expressed as an average daily population. As Exhibit III-E indicates, daily population of visitors and residents at Wailea Resort could grow to more than 8,000 persons by 1995, and increase to more than 10,000 persons by 2010.

It should be noted that the condominium occupancy assumptions used for Wailea Resort in Exhibit III-E differ from similar assumptions used for Wailea 670 Resort in Exhibit III-H. The assumptions used are as follows:

Projected Resort Condominium
Occupancy by Group

	Wailea Resort	Wailea 670 Resort
Visitors	65%	50%
Part-time residents	10	30
Full-time residents	25	20

The differing occupancy projections anticipate changes in the two resort areas. It is expected that, with accelerated hotel development at Wailea, visitors will constitute a rising source of demand for resort condominium accommodations. The Wailea 670 resort, with lower densities and a more residential character, is expected to attract more part-time residents.

GCR/VMS MAUI 670

Average Daily Resident and Visitor Population
at Wailea Resort

1995 to 2010

	1995	2000	2005	2010
Hotels:				
Total units	4,076	4,076	4,076	4,076
Occupancy rate	72%	74%	81%	85%
Total hotel population(1)	5,580	5,730	6,270	6,580
Multifamily condominiums:				
Total units(2)	1,249	1,734	2,214	2,214
Full-time resident units	312	434	554	554
Occupancy rates	95%	95%	95%	95%
Subtotal(3)	740	1,030	1,310	1,310
Part-time resident units	125	173	221	221
Occupancy rate	50%	50%	50%	50%
Subtotal(3)	160	220	280	280
Visitor units	812	1,127	1,439	1,439
Occupancy rate	25%	25%	25%	25%
Subtotal(3)	510	700	900	900
Total condominium population	1,410	1,950	2,490	2,490

(Continued)

GCR/VMS MAUI 670

Average Daily Resident and Visitor Population
at Wailea Resort, Continued

	1995	2000	2005	2010
Single-family homes:				
Total units	525	650	650	650
Full-time resident units(4)	341	423	423	423
Occupancy rate	95%	95%	95%	95%
Subtotal(5)	910	1,120	1,120	1,120
Part-time resident units(6)	131	163	163	163
Occupancy rate	25%	25%	25%	25%
Subtotal(5)	90	110	110	110
Visitor units(7)	53	65	65	65
Occupancy rate	25%	25%	25%	25%
Subtotal(5)	40	50	50	50
Total single-family population	1,040	1,280	1,280	1,280
Grand total	8,030	8,960	10,040	10,350

(1) At 1.9 guests per unit.

(2) 25% of units assumed to be in full-time resident use; 10% in part-time resident use; 65% in visitor use.

(3) At 2.5 persons per unit.

(4) 65% of all units used by full-time residents.

(5) At 2.8 persons per unit.

(6) 25% of all units used by part-time residents.

(7) 10% of all units used by visitors.

Projected Demand for
Golf at Wailea Resort

Wailea Resort has plans to add a third golf course between 1990 and 1995; however, as Exhibit III-F shows, golf demand from within the resort is expected to increase faster than the capacity of the Wailea Resort courses to serve these additional golfers. Bases for this estimate relate to the specific golfer groups contributing to demand in the region:

- Hotel visitors: Wailea Resort hotel visitors play a daily average of about 5 rounds per 100 hotel guests, as shown in Exhibit III-A. However, as also shown in this exhibit, guests at upscale, luxury resorts play considerably more golf than the average visitor. Since the new Wailea hotel properties will be of the luxury category, average golf play of all resort hotel guests can be expected to rise. Exhibit III-F assumes an average daily golf participation rate of 8 rounds per 100 hotel guests.

- Other Visitors: Other visitors staying in Wailea Resort condominium and single-family accommodations also will use the Wailea courses. The 1984 golf participation rate of 10.7 rounds per 100 guests (rounded to 11), as shown in Exhibit III-A, is expected to remain an indicator of demand.

- Property owners belonging to the resort golf club: Wailea Resort has achieved a membership rate of 13% to 15% among owners of condominiums and single-family lots. These memberships produce a substantial number of rounds played, between 100 and 120 per membership annually including families and guests of members. This assessment uses the lower 13% figure to project golf memberships at Wailea Resort. Exhibit III-F estimates a steady rate of new memberships, with 100 annual rounds per member. As Wailea Resort builds out its planned condominium and single-family projects, golf memberships could more than double between 1990 and 2000.

- Property owners not belonging to the resort golf club: Some property owners choose to play an occasional round and pay greens fees, rather than join the golf club and pay an annual membership fee. Based on past play by nonmember property owners, this group could account for about one golf round daily per 100 condominium or residential properties sold.

- Other players: This group includes Maui residents and visitors staying at accommodations outside of Wailea Resort. Outside complex players constitute the largest single source of demand at the Wailea Resort resort courses. A 2% annual growth rate in this category is projected on 1987 daily play of more than 80 rounds.

Projected Unmet Wailea
Resort Golf Demand

Exhibit III-G indicates projected golf demand at the Wailea Resort courses, and compares demand with the capacity represented by the Wailea Resort courses. Capacity can be interpreted differently, notably by the golf course operator and resort golfer:

GCR/VMS MAUI 670

Projected Wailea Resort Golf Demand

1995 to 2010

	1995	2000	2005	2010
Average daily resort population(1):				
Hotel visitors	5,580	5,730	6,270	6,580
Other visitors	540	760	950	950
Part-time residents	250	330	390	390
Full-time residents	1,650	2,150	2,430	2,430
Total	8,020	8,970	10,040	10,350
Resident club members:				
Condominium units and lots sold	1,775	2,385	2,865	2,865
Memberships(2)	230	310	370	370
Resident club member average daily rounds(3)	60	90	100	100
Other:				
Residents(4)	20	20	30	30
Outside complex players(5)	100	110	120	130
Projected average daily golf rounds:				
Hotel visitors(6)	450	460	500	530
Other visitors(7)	60	80	100	100
Total golf demand	690	760	850	890
Projected average daily rounds:				
Per 100 visitors	8.2	8.3	8.3	8.3
Per 100 residents	4.3	4.4	4.6	4.6

(1) As shown in Exhibit III-E.
(2) Assuming 13% of property purchasers also purchase golf memberships.
(3) At 100 rounds per membership per year.
(4) At one round daily per 100 properties sold.
(5) Projected at 2% annual growth rate, includes Maui residents.
(6) At 8 rounds per 100 guests.
(7) At 11 rounds per 100 guests.

Exhibit III-G

GCR/VMS MAUI 670

Wailea Resort Golf Demand and Supply

1995 to 2010

	1995	2000	2005	2010
Total daily golf demand, rounds	690	760	850	890
Daily golf demand per course(1)	230	250	280	300
Total Wailea Resort capacity:				
At maximum use	650	650	650	650
At 175 daily rounds per course	525	525	525	525
At current use level	405	405	405	405
Unmet Wailea Resort demand:				
At maximum use	40	110	200	240
At 175 daily rounds per course	165	235	325	365
At current use level	285	355	445	485

(1) Based on third Wailea course being placed in service before 1995.

- Maximum capacity, estimated at 216 rounds per course per day, measures the highest usage possible with optimal conditions, the shortest possible starting time intervals and all filled foursomes. It is expected that usage at this level would produce a less leisurely pace and a less desirable experience for the resort golfer.

- Capacity at 175 rounds per day is established to approximate conditions at resort courses like Turtle Bay, the North Course at Royal Kaanapali and Princeville. The 175 round daily standard is selected as the most accurate measure of desirable playing conditions for both the operator and golfer.

- Capacity at current use measures future demand against the playing conditions that current Wailea Resort guests and residents have come to expect.

Even with a third Wailea course, projected golf demand will be substantially in excess of supply. At 175 rounds per day, unmet demand is projected to amount to 165 rounds per day in 1995, increasing to 365 rounds daily by 2010.

Because the Maui Wailea 670 Resort course would be located near the Wailea Resort, it would be expected to capture significant numbers of overflow and relocating golfers from the Wailea Resort courses.

The golf courses at the Maui Wailea 670 Resort project could accommodate much of the unmet demand at Wailea Resort. Furthermore, some of those golfers who could golf at Wailea Resort may find conditions less desirable and tee-times more difficult to obtain at busy periods. Regular golfers, such as current Wailea Resort Golf Club members, could seek a more accommodating playing situation as their annual memberships expire.

MAUI WAILEA 670 GOLF COURSE MARKET ASSESSMENT

This section identifies projected demand for the two golf courses proposed for the Maui Wailea 670 Resort. Demand for the resort course is assessed primarily on the basis of visitor unit occupancy at the resort and unmet golf demand originating from Wailea Resort, while club course usage is primarily related to the buildout of project resident units and occupancy at the Golf Lodge.

Expected Golfer Markets for the Resort Course

Resort course usage could come from several different groups: guests at two Maui Wailea 670 Resort lodges, visitors using Maui Wailea 670 Resort condominium and residential units, property owners who do not belong to the Maui Wailea 670 Resort golf club and off-resort golf demand. Particular golfer demand groups are discussed as follows:

- Resort lodge visitors: Resort lodge guest use of the resort course is projected at a rate of 6 daily rounds per 100 guests at the lodges. This participation rate is slightly above average for Hawaii resorts, as shown in Exhibit III-A. Projected occupancy is drawn from Chapter IV. The daily lodge guest population from which these estimates are derived is shown in Exhibit III-H.

- Other Maui Wailea 670 Resort visitors: It is estimated that golf participation by Resort visitors staying in condominium units and single-family residences will approximate the 11 daily rounds per 100 guests now observed at Wailea Resort.

- Nonclub member property owners: As at Wailea Resort, a golf participation rate of 1 daily round per 100 sold condominium units or residential lots is estimated for property owners who choose not to join the golf club.

- Off-resort golf demand: The Maui Wailea 670 Resort course and courses at Seibu Makena could be the only nearby resort golf alternatives to the Wailea Resort. As shown above, Wailea would not be able to accommodate all demand. It is estimated that the Maui Wailea 670 Resort course could capture 40% of the unmet demand at Wailea Resort up to the year 2000.

Demand at the Maui Wailea 670 Resort Course

Exhibit III-I indicates future golf demand, in daily rounds, at the Maui Wailea 670 Resort course from 1995 to 2010. Because demand factors closely relate to the buildout of hotel and resort units, golf demand is shown for both "low" and "high" buildout assumptions.

By 2005, it is expected that Maui Wailea 670 Resort's course will experience sufficiently high levels of play that capacity problems such as the lack of tee times at peak periods and the need to shorten start intervals may begin to appear. Given the need to ensure preferential play for Maui Wailea 670 Resort guests, pricing policies could be used to regulate player mix. By the year 2000, the resort course is expected to achieve a daily level of play of 140 rounds, the approximate current level of play at Wailea Resort courses. On the basis of projected demand in 2005, Maui Wailea 670 Resort's capture rate for off-resort golfers would be reduced from 40% to 20%.

Expected Golfer Markets at the Club Course

The Maui Wailea 670 Resort club course is planned to be developed for the use of club members and guests at the golf lodge. As a private club, the course would be designed for both skilled play and lower utilization than the resort course. Expected markets for the club course membership and use would be:

- Maui Wailea 670 Resort property owners
- Golf lodge guests
- Property owners at the Wailea Resort
- Other Maui residents

It is anticipated that membership rates and charges at the Maui Wailea 670 Resort will be competitive with Wailea Resort course charges.

GCR/VMS MAUI 670

Average Daily Maui Wailea 670 Resort Visitor Population

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Resort lodge units	225	300	225	300	475	550	475	550
Occupancy rate	70%	70%	67%	67%	75%	75%	80%	80%
Subtotal(1)	300	400	290	380	680	780	720	840
Golf lodge units	145	180	145	180	145	180	145	180
Occupancy rate	70%	70%	67%	67%	75%	75%	80%	80%
Subtotal(1)	190	240	180	230	210	260	220	270
Condominium units	250	300	500	600	800	1,000	1,140	1,470
Visitor units(2)	125	150	250	300	400	500	570	735
Occupancy rate	25%	25%	25%	25%	25%	25%	25%	25%
Subtotal(3)	80	90	160	190	250	310	360	460
Single-family units	100	100	200	200	300	325	390	450
Visitor units(4)	10	10	20	20	30	33	39	45
Occupancy rate	25%	25%	25%	25%	25%	25%	25%	25%
Subtotal(5)	10	10	10	10	20	20	30	30
Total	580	740	640	810	1,160	1,370	1,330	1,600
Total visitor units	510	640	640	800	1,050	1,260	1,230	1,510

(1) At 1.9 persons per unit.
(2) 50% of condominiums used by visitors.
(3) 2.5 persons per unit.
(4) 10% of single-family units used by visitors.
(5) 2.8 persons per unit.

Exhibit III-H

Exhibit III-I

GCR/VMS MAUI 670

Projected Average Daily Resort Course
Golf Demand

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
On-Resort population:								
Resort lodge guest population	300	400	290	380	680	780	720	840
Other guest population	90	100	170	200	270	330	390	420
Apartments and lots sold	350	400	700	800	1,100	1,325	1,530	1,920
On-Resort golf demand:								
Resort lodge guest(1)	20	20	20	20	40	50	40	50
Other guest(2)	10	10	20	20	30	40	40	50
Nonclub member(3)	-	-	10	10	10	10	20	20
Subtotal	30	30	50	50	80	100	100	120
Off-Resort market - unmet demand at Wailea courses(4)	150	150	220	220	310	310	350	350
Maui Wailea 670 share(5)	60	60	90	90	60	60	70	70
Total demand	90	90	140	140	140	160	180	200

(1) Resort lodge guest golf demand at 6 rounds per 100 guests.

(2) Condominium and residential guest golf demand at 11 rounds per 100 guests.

(3) Nonclub member property owner golf demand at 1 round per 100 condominium units and residential lots sold.

(4) Unmet demand at Wailea Resort courses from Exhibit III-G, includes Maui residents.

(5) Maui Wailea 670 Resort course share estimated at 40% of Wailea unmet demand from 1995 to 2000; 20% share thereafter, with implementation of policies to manage such use.

Fee structure at Wailea Resort for 1988 is as follows:

	December to April	May to November
Greens Fees:		
Wailea owners	$ 20	10
Wailea guests	25	15
Maui residents	25	15
General public	65	35
Annual membership rates:		
Regular	$ 650	
Single	875	
Family	1,650	

Golf demand at the club course is estimated using the following factors:

- Maui Wailea 670 Resort property owners: The Wailea Resort golf club has achieved a membership sales rate of 13% to 15% of condominium and residential property owners. From the high level of play registered by property owner club members (from 100 to 120 rounds annually per membership), it would appear that most memberships are held by owners who reside at Wailea much of the year. Demand at the Maui Wailea 670 Resort course has been estimated using a 13% membership sales rate, and 100 annual golf rounds per membership.

- Golf lodge guests: This group is expected to generate substantial demand for golf, since the sport represents the central market for lodge accommodations, as explained in Chapter IV. Occupancy projections for the golf lodge are presented in Exhibit III-H. It is expected that golf participation among golf lodge guests will compare with, or exceed, the highest participation rates at Hawaii resort courses. Demand was estimated on the basis of 25 daily rounds per 100 guests, a figure currently exceeded only by the Mauna Kea Beach Hotel's resort course.

- Wailea Resort Resort property owners: As Wailea Resort course usage increases, resident members may find conditions less desirable. The Maui Wailea 670 Resort club course is projected to have play levels more similar to current Wailea Resort conditions, than to the crowded conditions projected in the future. Total "other demand" for the club course is estimated at 10% of total play; this level could be achieved from Wailea Resort club members alone, if 10% shifted affiliation.

Golf Demand at Club Course

Exhibit III-J estimates daily play on the Maui Wailea 670 Club course. As with Exhibit III-I, low and high buildout assumptions are used for the resort. It is expected that the club course could attract from 70 to 90 golf rounds daily by 1995, increasing to 100 to 110 by 2005.

GCR/VMS MAUI 670

Projected Average Daily Club Course Golf Demand

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Resident club members:								
Condominium units and residential lots sold	350	400	700	800	1,100	1,325	1,530	1,920
Memberships(1)	45	50	90	105	145	160	200	230
Rounds per day(2)	10	10	20	30	40	40	50	60
Golf lodge guest rounds per day(4)	50	70	50	60	60	70	60	80
Other (5)	10	10	10	10	10	10	10	10
Total	70	90	80	100	110	120	120	150

(1) At 13% of unit and lot owners through 2000 and for low buildout estimates in 2005 and 2010; at 12% for high buildout projections in 2005 and 2010.

(2) At 100 rounds annually per club membership, rounded.

(3) At 2.1 guests per lodge unit, rounded.

(4) At 25 rounds daily per 100 guests.

(5) At 10% of total play; consists of play by other members, including Wailea Resort property owners and other Maui residents.

While maximum level of play is influenced by many factors, optimum play levels could be lower for the club course than for the resort course. As the Maui Wailea 670 project builds out condominium and residential elements, the increase in golf demand may necessitate steps to restrict club membership. Restrictive measures could include membership fee and other charge increases, changes in the structure of memberships, or nonrenewal of certain types of membership. Maui residents should continue to receive preference for membership over other off-Resort golfers. The potential need to implement membership restrictions is reflected in a reduction of the club membership sales rate from 13% to 12% in the high buildout estimates for 2005 and 2010.

IV - LODGE MARKET ASSESSMENT

This chapter assesses the market support for resort lodge and golf lodge development at the Maui Wailea 670 Resort based on the projected hotel occupancy rates and room requirements for the island as a whole, and market and development trends observed in the more specialized golf lodge market on the U. S. mainland. The market assessment for the subject property is reported in terms of guest target markets, supportable rooms, development concept, phasing issues, occupancy levels and room rates for resort lodge and golf lodge development at the Resort.

PROJECTED MAUI HOTEL OCCUPANCY LEVELS AND ROOM REQUIREMENTS

This section assesses the market support for additional hotel development based on the projected demand and supply for hotel rooms.

Projected Demand for Hotel Accommodations

The demand for visitor accommodations is based on the projected growth in overnight visitor arrivals to the island as presented in Chapter II. Projected daily Maui hotel room demand is presented in Exhibit IV-A. Major assumptions underlying the analysis are discussed below:

- Projected west- and eastbound visitor arrivals, as shown previously in Exhibit II-D, assume that there is a gradual increase in the share of state visitors who visit the island.
- Hotel users are estimated to represent 55% and from 93% to 96% of westbound and eastbound visitors, respectively. The rest of visitors are assumed to either stay in condominiums or with friends and family.
- Average nights of stay are assumed to gradually increase as more visitor attractions and activities are developed.
- Average party size is based on the most recent observations for the island, as reported by the HVB. It is expected that average party size will not significantly change over the projection period.

Based on the above assumptions, the average daily demand for Maui hotel units is projected to more than double from 4,920 units in 1987 to 13,380 units by 2010, as shown in Exhibit IV-A. This would represent a 3.5% average annual increase in demand over the 20 year projection period.

Projected Maui Occupancy Levels

Projected occupancy levels for the island of Maui are estimated based on the projected demand for hotel accommodations and the anticipated supply of new and existing hotel units. Projected occupancy levels are presented in Exhibit IV-B, with key assumptions discussed below:

XEROX COPY

Exhibit IV-B

GCR/VMS MAUI 670

Projected Hotel Occupancy Levels
for the Island of Maui

1990 to 2010

Year	Average daily room demand(1)	Projected hotel unit inventory(2)	Projected occupancy levels
1990	6,760	8,720	78%
1995	8,660	12,070	72
2000	10,190	13,670	75
2005	11,950	14,670	81
2010	13,380	15,670	85

(1) As shown in Exhibit IV-A.

(2) Includes 5,550 existing hotel units as reported by the Hawaii Visitors Bureau, Visitor Plant Inventory, February 1987, and planned hotel units with average annual addition of 200 more units after 2003, as shown in Exhibit II-J.

- Average daily room demand is estimated as shown in Exhibit IV-A.
- Projected hotel inventory is based on actual expected hotel unit completions as projected by developers over the projection period. Also after 2003, 200 units are assumed to be added annually to account for unplanned and unknown projects, as shown previously in Exhibit II-J.

Based on the above assumptions, Maui hotel occupancy levels are estimated to decrease to a low of 72% in about 1995 due to the large number of hotels expected to be completed that time, as shown in Exhibit IV-B. Thereafter, Maui hotel occupancy levels are projected to improve significantly to a high of 85% in 2010, as the new hotel supply is absorbed.

Projected Maui Hotel Unit Requirements

The projected number of hotel units required on the island is based on the demand for hotel facilities, assuming 70% to 80% average annual occupancy level for hotel establishments. Typically, 70% to 80% occupancy levels permit visitors choices in selection of accommodations and allow hotels to efficiently maintain and operate their facilities profitably through busy and slower visitor months.

Based on the projected average daily room demand and 70% to 80% occupancy levels, the island is expected to require a total of 8,450 to 9,660 hotel units and 16,730 and 19,100 hotel units in 1990 and 2010, respectively, as shown in Exhibit IV-C.

At the most favorable 80% occupancy level, accounting for existing and planned hotels, the supply of hotel units on the island is expected to exceed demand until about 2005. However, based on an acceptable 70% occupancy level, demand could exceed supply over the entire projection period, with a net additional demand for about 300 to 3,440 hotel units over those currently planned, as shown in Exhibit IV-D.

MAUI WAILEA 670 RESORT LODGE
MARKET ASSESSMENT

This section assesses the market for resort lodge development at the Resort in terms of the anticipated target markets, supportable rooms, development concept and phasing recommendations, occupancy levels and room rates.

Resort Market Position

GCR/VMS is planning to develop two resort lodges, representing about 475 to 550 rooms. Both lodges are planned for the makai area of the Resort with one incorporated into the village/mixed use complex; the other would stand alone, surrounded by golf fairways. Also planned is a 145- to 180-room golf lodge to be located in the mauka area of the Resort, as discussed later in this chapter. The potential market for resort lodge development at the Resort is influenced by the following factors:

Exhibit IV-C

GCR/VMS MAUI 670

Projected Market Support for Hotel Rooms
on the Island of Maui

1990 to 2010

Year	Average daily room demand(1)	Maui hotel room requirements 80% occupancy	Maui hotel room requirements 70% occupancy
1990	6,760	8,450	9,660
1995	8,660	10,830	12,370
2000	10,190	12,740	14,560
2005	11,950	14,940	17,070
2010	13,380	16,730	19,110

(1) As shown in Exhibit IV-A.

Exhibit IV-D

GCR/VMS MAUI 670

Projected Cumulative Hotel Room Requirements

1990 to 2010

Year	Existing and planned units(1)	At 80% occupancy: Total units required	At 80% occupancy: Cumulative additions required (surplus)	At 70% occupancy: Total units required	At 70% occupancy: Cumulative additions required (surplus)
1990	8,720	8,450	(270)	9,660	940
1995	12,070	10,830	(1,240)	12,370	300
2000	13,670	12,740	(930)	14,560	890
2005	14,670	14,940	270	17,070	2,400
2010	15,670	16,730	1,060	19,110	3,440

(1) Includes 5,550 existing hotel units as reported by the Hawaii Visitors Bureau, Visitor Plant Inventory, February 1987, and planned hotel units, as shown in Exhibit II-J.

- The State of Hawaii, particularly the island of Maui, is expected to continue to host an increasing number of repeat visitors seeking new and better quality facilities and experiences.

- Visitor arrivals to Maui have increased the fastest of all the Hawaiian islands as a result of:

  - Development of master-planned resorts on the island which offer a variety of recreational, shopping, entertainment and visitor attractions that are not available on Oahu.

  - Statewide increase in FIT and high status occupation visitors who seek a variety of vacation experiences.

  - Development of Maui as a unique and identifiable visitor destination through the diverse mix of resort developments, physical attractions, recreational opportunities and visitor experiences.

  - More direct flights to Maui.

- Maui's hotel occupancy levels, average room rates and growth in room rates have been the highest in the state. In particular, the West Maui region, in which the Resort is located, has out-performed the rest of the state.

- The Wailea Resort area compares favorably to other popular resort areas on Maui due to its:

  - Several bays with five excellent beaches.

  - Favorable weather conditions.

  - Well landscaped and planned master plan.

  - Ease of access.

  - Overall quality of hotel, residential, commercial and recreational developments.

- By about 1991, the Wailea Resort is expected to emerge as a leading resort in Hawaii, with international recognition due to:

  - The expected completion of a critical mass of hotel facilities at the resort, including about 2,000 new hotel rooms in the Wailea Resort and over 3,000 new hotel rooms in the Wailea area.

  - Development of further facilities at the resort to provide for dining, entertainment and recreational needs of resort visitors. These would include the possible addition of a third 18-hole golf course and a doubling of the existing 35,000-square foot Wailea Shopping Village by about 1992.

  - Significant upgrading in the typical profile of the Wailea Resort guest due to the quality and nature of the planned hotels.

  - Development of a large promotional and marketing network with the entry of four nationally recognized hotel operators.

- The Maui Wailea 670 site has the following characteristics:

  - Large site, permitting a master-planned enclave development.

  - Sloping terrain, providing panoramic ocean and mountain views.

  - Adjacent to Wailea Resort's mauka boundary, leading to potential marketing synergy and faster market acceptance.

  - Appropriate for a development concept that complements Wailea's plans to diversify its visitor profile by offering unique and activity-oriented guest facilities.

  - No beach frontage. However, guests could have beach access through the VMS Realty Partners hotel site within Wailea Resort, and/or to Wailea's various public beaches, utilizing a shuttle system.

  - The two 18-hole golf courses, tennis courts and commercial facilities planned for the site are expected to attract visitors who seek at least a first-class level of service.

In summary, the planned Maui Wailea 670 Resort is expected to benefit from the overall health of the Maui visitor industry, the continued positive outlook for the island, the emerging recognition and prestige of the Wailea area and the characteristics of the site.

Anticipated Target Markets

Based on the above factors, resort lodge development at the Resort is recommended to offer a first-class level of facilities and services targeted to a moderate- to upper-income clientele rather than to the luxury, upscale traveler. In this way, the Resort could position itself to:

- Benefit from the visitor reputation and quality image of the Wailea area.

- Avoid directly competing against the planned luxury developments in the Wailea area.

- Serve the mid- to upper-income travel markets by offering a higher quality alternative to other first-class hotels and a unique experience as compared to luxury hotels.

The target markets for the two resort lodges planned at the Resort are described as follows:

- FITs:
  - Repeat and longer-staying visitors who seek an integrated recreational resort, country club atmosphere, sense of community and fewer other visitors.
  - Two-wage earner couples and families headed by professionals or entrepreneurs, 35 to 55 years of age.
  - Active persons who place high importance on good value in first-class hotel facilities, quality restaurants, shopping, recreation and new travel experiences.
- Package tours:
  - Repeat visitors who like the convenience and competitive pricing of hotel, rental car and air transportation packages.
  - Local Hawaii residents on golf, tennis and weekend vacations.
- Leisure group tours:
  - Wholesale leisure-oriented tour groups.
  - Golf groups seeking recreation-oriented vacations.
- Meetings and incentive groups:
  - Employees of U. S. mainland and local companies and organizations seeking competitive pricing and a more intimate, retreat environment than available at the more active beachfront hotel sites.
  - Smaller corporate conventions, conference and meeting attendees.

Based on the anticipated appeal of the resort lodges to the various markets and the experience of comparable Hawaii visitor accommodations the distribution of these visitors is anticipated to be as follows:

Expected Maui Wailea 670
Resort Lodge Target Markets

	Percent of total guests
FIT	45%
Package	35
Leisure groups	10
Meeting and incentive groups	10
Total	100%

Supportable Resort Lodge Rooms

The successful development of resort lodge accommodations at the Resort is related to the overall demand for hotel rooms on the island of Maui over the 20 year projection period. Previous sections of this chapter evaluated the anticipated hotel room demand and supply on the island. Based on the analysis, the island could be expected to require from 400 to 3,300 rooms in addition to the inventory currently planned for the island.

As shown in Exhibit IV-B, hotel occupancies could increase significantly over the final ten years of the projection period from 72% in 1995 to more than 80% in 2010. Thus, the overall balance of visitor room demand and supply is expected to remain reasonably healthy in the future.

For major visitor destination resorts, market capture rates have varied from as little as 2% to as much as 47% of total room demand on the neighbor islands, as shown in Exhibit IV-E.

Based on review of the hotel buildout expected in the Wailea area, as shown in Exhibit II-J and assuming hotels in Wailea are able to capture slightly greater than their fair share (Wailea hotel room inventory relative to islandwide inventory), Wailea area hotels are estimated to capture from 30% to 35% of hotel room demand on Maui.

The Maui Wailea 670 Resort is comparable to Kapalua in terms of acreage of the Resort; however, it is expected to have a broader appeal more similar to Wailea. These resorts have historically achieved about 3% to 9% of the total Maui market, as also shown in Exhibit IV-E. Based on the competitive attractiveness of the Resort and the anticipated lower room rates, the Maui Wailea 670 Resort is estimated to be able to capture about 10% of the demand for hotel rooms in the Wailea area or about 3% of the total Maui visitor room requirements. Therefore, about 500 to 570 resort lodge rooms are anticipated to be supported at the Resort by 2010, as shown in Exhibit IV-F.

Development Concept and Phasing Recommendations

The facility concept for resort lodge development at the Maui Wailea 670 Resort is based on the anticipated facilities which are required to serve the target markets. Recommendations for the development of the hotel facilities are outlined below:

- Size and number of resort lodges - Two high-personal service retreat lodges of about 275-rooms each are proposed at the Maui Wailea 670 Resort as:
  - Two resort lodges would complement, rather than dominate, the overall master plan of low density single-family and condominium developments.
  - The mid-size resort lodges could allow for greater distinction, such as offering higher level of personal service and community as compared to larger planned Wailea area hotels.
  - The resort lodges would be able to support smaller incentive, meeting and conference groups which are expected to be an important market segment.

Exhibit IV-E

GCR/VMS MAUI 670

Estimated Market Share of Visitor Room Nights
Selected Hawaii Resorts

1985

	Estimated visitor room nights(1)	Island market share(1)
Oahu:		
Waikiki/Kahala(2)	29,790	93%
Leeward(2)	840	3
North Shore(2)	540	2
Other (airport/downtown)	630	2
	31,800	100%
Hawaii:		
Keauhou Resort	1,220	29
Kailua-Kona	1,290	30
Mauna Kea/Mauna Lani/Waikoloa(2)	930	22
Hilo/Ka'u/Volcano	800	19
	4,240	100%
Maui:		
Kaanapali	4,490	42
Napili/Honokowai/Lahaina	1,820	17
Kapalua	320	3
Wailea	900	9
Kihei/Maalaea	2,660	25
Kahului/Wailuku/Hana/Kula	400	4
	10,590	100%
Kauai:		
Princeville	640	17
Poipu/Kalaheo/Kokee	1,390	36
Wailua/Kapaa/Lihue	1,800	47
	3,830	100%

(1) Estimated based on the number of visitor units as reported by the Hawaii Visitors Bureau and the occupancy rate for the areas based on surveys conducted by Peat Marwick Main & Co.

(2) Smaller resorts have been combined with larger regions to preserve confidentiality of occupancy rates of individual facilities.

Exhibit IV-F

GCR/VMS MAUI 670

Supportable Resort Lodge Rooms
at the Maui Wailea 670 Resort

1990 to 2010

Year	Maui hotel room requirements 80% occupancy	Maui hotel room requirements 70% occupancy	Maui Wailea 670 Resort at a 3% market share Low	Maui Wailea 670 Resort at a 3% market share High
1990	8,450	9,660	250	290
1995	10,830	12,370	320	370
2000	12,740	14,560	380	440
2005	14,940	17,070	450	510
2010	16,730	19,110	500	570

- Phasing - Due to the expected completion of over 3,000 luxury-class hotel rooms in the Wailea area by 1995, it is recommended that VMS develop a 275-room resort lodge in the early 1990s in order to:
  - Avoid direct competition with the Wailea area hotels.
  - Complement and reinforce the low-density, country club environment of the Resort.
  - Cater to a pool of potential repeat visitors to the Resort who could become condominium and single-family lot purchasers.
- Development concept - The resort lodges could seek to create a country club atmosphere emphasizing high personal service in low-rise structures situated around golf fairways.

Projected Occupancy Levels

In estimating the projected occupancy levels for the proposed resort lodges, the following factors were considered:

- Generally higher occupancy levels projected for the island of Maui from 2000 and thereafter.
- Reasonably strong occupancy levels projected for the island of Maui over the entire projection period.
- The emergence of Wailea area as a leading Hawaii visitor attraction and destination.
- The initially limited recognition of the Maui Wailea 670 Resort.
- Start-up occupancy levels of recently completed Hawaii hotels.
- Hotel operators assumed to have national reputation, professional management practices and extensive marketing network.
- Lower room rates to offset the lack of beach frontage and proximity.
- Convenient beach access be provided to hotel guests through the VMS Realty Partners hotel site and/or to the five Wailea beaches.

Hotel inventory is projected to increase substantially between 1990 and 2000. Occupancy levels at Maui Wailea 670 lodges are projected to decline slightly between 1995 and 2000, due to increased competition from new Wailea area hotels.

Based on these factors, the estimated market position and phasing of the lodges, the projected occupancy levels for the two resort lodges in aggregate are as follows:

Projected Occupancy Levels for Maui Wailea 670, Maui Island and Proposed Resort Lodges at the Resort

1990 to 2010

	Projected occupancy levels	
	Maui island(1)	Resort
1990	78%	60%
1995	72	70
2000	75	67
2005	81	75
2010	85	80

(1) As shown in Exhibit IV-B.

Projected Achieved Room Rates

The projected average achieved room rates for the proposed lodges are based on review of rates of selected first-class and off-beach hotels in the state of Hawaii. The published room rates for the facilities could range from $90 to $120 with an average achieved room rate of about $80 per day in 1987 dollars.

U. S. AND MAUI GOLF VACATION MARKET REVIEW

A golf lodge is proposed for development at the Maui Wailea 670 Resort as an alternative type of visitor accommodation. Golf lodges are defined as a specialized type of overnight accommodation, linked physically and through market mechanisms to extensive golf facilities. Specialized lodges are an old concept in visitor accommodations, but one that is resurgent in some well developed destination areas on the U. S. mainland.

Thus, as background to the market assessment for golf lodge development at the Maui Wailea 670 Resort, this section reviews U. S. golfer and golf vacation market trends and characteristics of selected comparable golf lodge facilities on the U. S. mainland, and assesses the general potential for golf lodge development on the island of Maui.

U. S. Golfer Market Trends

According to the National Golf Foundation, 20.2 million U. S. golfers played 420 million rounds of golf in 1986. This represented a 15% increase in golfers over the previous year and a 1.2% increase in the number of rounds played. Demographic characteristics of golfers are described as follows:

- The rapidly increasing 30 to 59 year-old age group has the highest golf participation rates, as shown in Exhibit IV-G.
- The rapid growth of the female market. In 1983 only 21% of all new golfers were estimated to be women, whereas by 1986, 37% were, according to Market Facts, Inc. of Chicago.

Exhibit IV-G

GCR/VMS MAUI 670

Age Profile of the U. S. Golf Market

1986

Age	Golfers (millions)	Percent distribution	Golf participation rate(1)
5 - 19	2.32	11.5%	4.5%
20 - 30	4.58	22.8	10.7
30 - 39	4.42	21.9	11.3
40 - 49	2.92	14.5	11.1
50 - 59	2.58	12.8	11.8
60+	3.33	16.5	8.3
Total	20.15	100.0%	N/A

(1) Golfers as a percent of total U. S. population.

Source: National Golf Foundation.

- Golf participation is strongly related to income level as 16% and 20% of persons in households with annual incomes of $50,000 to $74,999 and $75,000 or more, respectively, play golf, as shown in Exhibit IV-H.
- Golfers also tend to be well educated, and nearly 70% have at least some college education, as shown in the table below:

Educational Attainment of U. S. Golfers

1986

Educational level	Percent of golfers
Less than High School	6%
High School Graduate	25
Some College	28
College Graduate	41

Source: National Golf Foundation, Golf Market Today, April 1987.

- Accordingly, golfers also tend to hold high status occupations, with more than half employed in professional or managerial positions, as shown in the table below:

Occupational Classification of U. S. Golfers

1986

Occupation	Percent of golfers
Blue collar	23%
Clerical/sales	18
Professional/managerial	52
Other	7

Source: Golf Market Today, April 1987. National Golf Foundation,.

U. S. Golf Vacationers

Defining golf trips as journeys with at least one night's stay away from home, on which golf is played, the National Golf Foundation finds that about one-third of U. S. golfers took at least one golf trip in 1985. With more than 20 million golfers in the United States as noted in Exhibit IV-G, the national population of golf vacationers numbers in excess of 6.5 million.

In 1985, golf vacationers were distinguished from all golfers as follows:

- Tend to be older - Older golfers are more likely to take golf trips, as 36% of golf vacationers were over the age of 50, while this group accounted for only 27% of all golfers.

GCR/VMS MAUI 670

Household Income Profile of U. S. Golf Market

1986

Annual household income	Golfers (millions)	Percent distribution	Golf participation rate(1)
Under $10,000	.90	4.5%	2.6%
$10,000 - $19,999	2.86	14.1	6.0
$20,000 - $29,999	3.85	19.1	8.7
$30,000 - $39,999	3.81	18.8	10.6
$40,000 - $49,999	3.37	16.7	12.2
$50,000 - $74,999	3.75	18.6	15.5
$75,000+	1.63	8.2	19.9
Total	20.17	100.0%	N/A

(1) Golfers as a percent of total U. S. population.

Source: National Golf Foundation.

- More avid players - 40% of golf vacationers played 25 or more rounds annually, compared with 25% of all golfers who played this often.

- Higher spending - Annual golf expenditures were considerably higher, at an average of $586 for golf vacationers, compared to the U. S. golfer average of $368.

Because of the positive demographic trends noted previously for the golf-age population and rates of participation in golfing, golf vacationers can also be expected to increase rapidly in the future.

Selected Comparable Golf Lodge Characteristics

From among the many resort properties that offer golf, three with specialized lodge-like facilities were selected for comparability with the planned Maui Wailea 670 golf lodge. These properties were selected based on:

- First-class or luxury class market orientation
- Location within a recognized resort area
- Availability of ample and high quality golf facilities
- Year-round (rather than seasonal) operations
- Substantial numbers of visitors arriving by air
- Small to medium facility size
- Strong marketing emphasis on golf

The selected golf resorts are located in California or Arizona, in resort areas that feature numerous competitive other golf-oriented visitor facilities. California and Arizona are appropriate sources of comparables, since their resort areas pose significant alternatives to Maui golf trips for those from the Pacific, Mountain and Great Lakes regions of the United States.

Characteristics of the selected facilities are shown in Exhibit IV-I. Among the similar aspects of the surveyed properties are:

- Small to medium size - The lodges range between 120 and 270 guest rooms, enhancing their private "club" atmosphere.

- Relationship to golf residential communities - Each of the facilities is related to a residential community of golf-front lots occupied by part-time and year-round residents. In the case of The Boulders, the residential/resort mix was planned; in the case of La Quinta, the hotel was in place many years before residential development started.

- Mix of golf course users - The two desert properties, The Boulders and La Quinta, offer golf course use to both resident members and guests. The La Quinta Hotel, which maintains one private club course, also offers guests the opportunity to play two other courses owned by Landmark Development, the hotel's owner. At Pebble Beach, the several courses are all open to the public for daily fee play.

- Distinguished golf facilities - Course quality and placement is a major element in resort identity. The Lodge at Pebble Beach draws a great deal of distinction from guests' use of world-famous courses such as Pebble Beach and Cypress. The Boulders features a course designed by Jack Nicklaus.

- Tennis facilities - Each of the selected lodges also offers tennis, and most give tennis nearly equal emphasis as golf. This serves to broaden their market appeal to sports-oriented, active lifestyle travelers.

Exhibit IV-J displays key aspects of the selected properties' market position and practices. Elements that appear common to such properties include:

- Significant competition within the resort area. Each of the properties surveyed competes with several golf-oriented resorts in the immediate area. In Palm Springs, at least five other resort properties serve a market similar to La Quinta's, and four competitors were identified for The Boulders in the Phoenix-Scottsdale area. However, the generally good occupancy rates at the selected properties indicate that their location within areas noted for golf facilities is a marketing asset.

- Close tie to business conference trade. Business travel is equally important; only at The Boulders was general leisure trade more than 50% of guest business. High-quality golf and tennis facilities are attractive to conference planners; at the same time, conference business helps to fill in some of the off-season leisure capacity.

- Off-season packaging. Each of the resorts has a distinct season when accommodations are in greater demand. Marketing for the off-season represents a significant challenge. The Boulders prefers to close for the hot summer months of July and August. The other resorts boost occupancies in markets other than the FIT guest. Golf instructional schools represent one way to bring in large numbers of guests who pay an inclusive weekly package price. La Quinta offers two-night golf and tennis packages, with unlimited play included in the cost of rooms.

- Midwest and East Coast markets. California urban areas represent a major market for each of the resorts, due to their locations. However, the desert resort operators all reported significant market penetration in midwestern and eastern urban areas, where vacation golfers can also choose Florida and other southern resorts during the winter.

Potential Maui Golf Vacation Market

Maui is seen to be in a favorable position to support the emergence of a specialized golf lodge serving a slightly different market niche than the other resort hotels and properties throughout the island. Factors supporting this outlook include the following:

- Westbound Maui visitor profiles indicate an upscale visitor with a significant propensity to golf:

  - Maui draws a greater proportion of high occupational status visitors than does the state as a whole. Almost two thirds of Maui visitors (66.4%) reported a professional and technical or business, managerial or official occupation in 1986, compared with 62.8% for all visitors to the state.

  - As noted previously in the U. S. golf review, professional or managerial people constitute more than half of all U. S. golfers.

GCR/VMS MAUI 670

Characteristics of Selected U. S. Golf Resorts

	The Lodge at Pebble Beach	The Boulders	La Quinta Hotel Golf and Tennis Resort
Location	Pebble Beach, California	Carefree, Arizona	La Quinta, California
Resort market	Monterey-Carmel-Pebble Beach	Phoenix-Scottsdale	Palm Springs
Visitor units	161	135(3)	269
Golf residential lots in project	Yes	Yes	Yes
Accommodations	Luxury	Luxury	First class/luxury
Associated golf holes	90	27	54
Course type	3 tournament, 2 resort	3 nine-hole resort	2 resort, 1 club
Charge for 18 holes	$25 - $95(2)	$60(1)	$60(1)
Golf tournaments	Annual	No	No
Instructional schools	Yes	No	Yes
Other facilities	Full-service hotel Tennis (13 courts) Conferences (8 rooms)	Full-service hotel Tennis (6 courts) Conferences (6 rooms)	Full-service hotel Tennis (30 courts, stadium) Conferences (12 rooms)

(1) Includes cart rental and other charges.
(2) Cart rental additional.
(3) Includes 15 golf frontage residences managed by hotel.

Exhibit IV-I

- More than 30% of westbound visitors to both Maui and the state as a whole are over 50 years of age, the highest participation group among U. S. golfers.

- Since the Wailea, Makena, Kapalua and Kaanapali resort areas have already been identified as "Maui's Golf Coast", visitor characteristics should exhibit some similarity to the profile of U. S. golfers and golf vacationers.

- Resort real estate trends on Maui have reflected a trend to higher prestige properties with an emphasis on golf course orientation, privacy and exclusivity.

- In addition to its strong California and Western U. S. clientele, Maui draws about 14% of its visitors from the Midwest and is above-average in visitors from New England and the Mid-Atlantic states of the East Coast.

MAUI WAILEA 670 GOLF
LODGE MARKET ASSESSMENT

This section presents the market assessment for golf lodge development at the Maui Wailea 670 Resort in terms of target markets, recommended development concept, projected occupancy levels, and proposed marketing activities.

Target Markets

The golf vacationer market represents one of several potential target markets for the golf lodge. As shown previously, the selected comparable properties rely on leisure guests for only 40% to 65% of all occupancy, and conference and business trade comprise the majority of other demand. Due to its location away from major business centers, the business and conference markets would not be expected to be as strong at the Maui Wailea 670 Resort.

However, with its combination of superior quality golf facilities and services with overnight accommodations in a private club atmosphere, golf lodge guests could be expected to include:

- Leisure visitors, primarily representing new visitor market segments to the state. Many of this group may become members of the private golf club, although they may not buy property at the Resort:

  - Serious golfers who seek affiliation with a prestigious private club near to a vacation or second home location, and opportunities to socialize with others who share their interests.

  - U. S. golf vacationers who currently travel to other resort areas to golf.

  - The growing numbers of new golfers seeking golfing vacations.

- Golf instructional school students seeking a private environment for concentrated study and recreation.

Exhibit IV-J

GCR/VHS MAUI 670

Market Data on Selected Golf Resorts

	The Lodge at Pebble Beach	The Boulders	La Quinta Hotel
Competing golf resorts in area	Yes	Yes	Yes
National marketing affiliation	None	Rockresorts	None
Hotel rack rates in-season	$225 - $275	$210 - $260	$195 - $275
Off-season discounts	No	No	Yes; offseason golf, tennis packages also offered
Annual occupancy rate	92%	75%	66%
Market mix:			
Conference/business guests	55%	35%	58%
Leisure guests	45	65	42
Total	100%	100%	100%
Major origin markets	California Other U. S.	New York/New Jersey/ Pennsylvania California Midwest urban areas	Orange County/San Francisco/Los Angeles Chicago Washington, D. C. New York

- High end, small to mid-sized business conference and incentive groups, including both North American and Pacific-based companies.

- Hawaii residents, some of whom may also be members of the private golf club.

The guest market mix for the golf lodge could be anticipated to be as follows:

Projected Maui Wailea 670 Golf Lodge
Guest Market Mix

Leisure golf vacationers	50 - 65%
Hawaii residents	5 - 10
Instructional schools	5 - 10
Business/incentive	10 - 30
Total	100%

Recommended Development Concept

The golf lodge is proposed to be built within the club course, near to the pro shop and clubhouse. The golf lodge and related facilities could include:

- 140 to 180 first-class to luxury quality guest rooms
- Private areas for socializing and/or for small group activities
- Business conference facilities with advanced audiovisual and telecommunication capabilities
- Full-service dining room and lounge
- Driving range
- Practice areas for fairway, rough, sand trap and short iron play
- Several putting greens, including a lighted green
- Golf swing and stance analysis
- Tennis and health club facilities
- Club storage, repair and cleaning services

Pricing and Occupancy

The golf lodge could be distinguished from resort hotels by an all-inclusive pricing policy, covering:

- Lodge room
- Some or all meals
- Greens fees, cart rental, club storage and cleaning
- Group functions, such as tournaments

Special pricing could also be available for members of the private golf club at the Resort.

Based on the markets targeted, it is estimated that a small golf lodge, as proposed, could achieve occupancy rates approaching those projected for the resort lodges at Maui Wailea 670.

Proposed Marketing Activities

Appropriate methods of marketing the golf lodge could include:

- Short-term rentals, in the manner of a hotel.
- Sale of individual memberships conferring either a proprietary or stock interest in the club and golf lodge.
- Sale of memberships conferring a right to use lodge and course facilities on a space available basis.
- Sale of time share intervals, possibly in association with intervals at other resorts.

Projected Achieved Room Rates

Golf lodges in other resort areas have been successful in all market segments. If accommodations are marketed as hotel rentals, daily room rates could range from $90 to $120. A room rate of about $80 per day in 1987 dollars could be achieved, depending on adjustments for inclusion of golf, meal plan and other services in the basic room charge.

V - CONDOMINIUM MARKET ASSESSMENT

This chapter assesses the market support for condominium development at the Maui Wailea 670 Resort. The sections below review condominium development trends, current and planned inventory of units on the island of Maui, comparable project characteristics and market trends relating to buyer profiles, absorption rates and sales prices. Based on this overview, the last section of the chapter presents the condominium market assessment for the Maui Wailea 670 Resort.

CONDOMINIUM DEVELOPMENT TRENDS

Condominium development and ownership in the state was legalized with the passage of the Horizontal Property Regime Act (Act) by the Hawaii State Legislature in 1961. The Act defines a condominium as a structure or structures that offer ownership of single units in a multiunit development with fractional ownership of the project's common elements. This section reviews private multifamily authorizations, and resort and residential development trends.

Private Multifamily Authorizations

Multifamily unit construction authorizations on Maui have averaged 758 units per year since 1975, with over half of all authorizations approved during the 1978 to 1981 period, as shown in Exhibit V-A. Multifamily development has been relatively slower in the 1980s due to weaker economic conditions, excess unsold unit inventory and more recently reduced real estate tax benefits under the Tax Reform Act of 1986. The average building permit value of multifamily units was estimated at $65,800 in 1986, as reported by the Bank of Hawaii.

Resort Condominium Development

Condominiums are an important force in the visitor accommodations industry and in many cases, are competitive with hotels. Currently, about 7,700 units, or 58% of Maui's total visitor units are condominium units reserved for transient visitor use as part of a rental pool.

The condominium market on Maui is anchored by the master-planned resort areas of Kaanapali, Kapalua and Wailea. Strip developments at Napili, Kahana, Maalaea and Kihei are located between and near to these major destination areas, offering a variety of free-standing condominium development alternatives. However, these off-resort condominium projects generally lack the extensive amenities and sense of identity found in the established resort areas.

Reasons for the rapid increase in the number of condominium units designated for visitor use include:

- Lower construction costs compared to hotel units due to generally minimal amenities and common areas such as administrative areas, food and beverage facilities, shopping areas, meeting/banquet rooms and supporting facilities.
- Relative ease in obtaining financing since cash flow may be established from individual investors and buyers before construction begins.

GCR/VHS MAUI 670

Private Multifamily Construction Authorizations
in the County of Maui

1975 to 1986

Year	Number of units	Average value
1975	2,208	$ 32,800
1976	229	48,600
1977	504	46,000
1978	1,103	56,800
1979	1,098	56,700
1980	1,840	94,200
1981	1,001	86,200
1982	122	40,100
1983	24	138,100
1984	6	63,300
1985	457	53,200
1986	506	65,800
Average annual units	758	

Source: Bank of Hawaii, Construction in Hawaii, 1987.

- Historically, favorable tax benefits to investors and buyers. However, many of these incentives were reduced or eliminated by the Federal tax law changes in 1986.

- Use in time-sharing as a sales marketing approach.

- Appeal to repeat and family visitors who seek more space, cooking facilities or longer occupancies.

Due to these reasons and to the increase in repeat visitors to the state and island of Maui who often patronize these units, condominiums are expected to continue to be a significant component of visitor accommodations.

Residential Condominium Development

Condominiums have not been extensively developed on Maui as primary homes for island residents. Since 1980, multifamily unit development on Maui has been mainly concentrated in the development of higher priced, visitor-oriented condominium units located in resort areas, such as Kihei, Makena, Kaanapali, Kahana and other oceanfront locations.

Reasons for the lower market acceptance of resident-oriented condominiums on Maui include:

- Extended family social patterns on Maui with a tendency for young adults and families to live with parents.

- Limited development of quality multifamily units, with project amenities such as play areas, pools and tennis courts and other recreational facilities.

- Unfavorable reputation and image of some existing condominium projects.

- Preference for lower density, single-family homes by Maui residents especially when homes are available at attractive prices.

However, C. Brewer Properties and Alexander & Baldwin, Inc. have long-range plans to develop over 2,200 multifamily units in the Wailuku and Kahului areas, oriented to Maui residents.

ISLAND OF MAUI RESORT CONDOMINIUM INVENTORY

This section reviews existing and planned condominium projects in the major resort areas of Maui.

Existing Units

The five major resort areas of Maui contain about 13,600 condominium units representing about 170 condominium projects, as shown in Exhibit V-8. About 52% of units offer ocean views but not golf frontage, and 4% are in projects located on golf courses. The Maui Wailea 670 condominium sites would generally provide both ocean and golf views. Wailea Resort has typically offered fee simple condominium projects while the Kaanapali and Kapalua resorts have

Exhibit V-8

GCR/VMS MAUI 670

Resort Condominium Projects on Maui by Location

1988

Resort area	Number of projects	Number of units: Beach/ ocean-front	Ocean view	Golf course	Other/ unspecified	Total
Kaanapali	15	1,216	404	309	396	2,325
Kapalua	5	40	347	-	178	565
Wailea/Makena(1)	5	207	-	196	300	703
Napili/Kahana	61	3,225	150	-	933	4,308
Kihei/Maalaea	86	2,393	452	-	2,822	5,667
Total	172	7,081	1,353	505	4,629	13,568
Percent distribution	100.0%	52.2%	10.0%	3.7%	34.1%	100.0%

(1) Excluding the Makena Surf project, now in foreclosure proceedings.

traditionally offered projects with leasehold land tenure. About 70% of the projects in Napili/Kahana sell in leasehold, while the same percentage of Kihei/Maalaea projects are offered in fee simple.

Planned Units

About 1,700 condominium units are planned for completion by 1994 on the island of Maui, as shown in Exhibit V-C. In the long term, Wailea Resort has urban-classified zoning potential to develop about 173 more acres of condominium projects. However, only about 76 acres or 750 to 1,125 units assuming buildout densities of 10 to 15 units per acre, would provide both golf frontage and ocean views. No plans have been disclosed for Makena Resort.

COMPARABLE PROJECT REVIEW

This section provides classifications of resort condominium sites and reviews the characteristics of selected comparable resort condominium developments on the island of Maui.

Resort Condominium Site Locations

Visitors to the State of Hawaii tend to associate the islands with ocean views, beaches, golf courses and lush landscaping. Thus, market performance for individual projects is strongly affected by their location with respect to these elements. Three types of condominium sites are differentiated in this study:

- Oceanfront - Ocean frontage is normally the most desirable location, as it may offer spectacular views and access to the ocean and beaches. As a result, projects with ocean frontage usually command the highest unit prices and sell most rapidly.
- Golf frontage - Golf-front sites are attractive in that they may provide views over well-maintained, landscaped areas. Many golf-front projects such as in Kapalua and Wailea resorts also offer ocean views because of the topography of the site. Golf-front sites with ocean views are generally preferred to those with only fairway views.
- Interior - Interior resort locations are the least desirable and, as a result support significantly lower unit prices than do projects with ocean frontage, ocean views or golf frontage. In order to compensate for this locational disadvantage, developers of interior projects often create views with water features or gardens.

Comparable Project Review

Characteristics of selected condominium projects located in resort areas on the island of Maui are reviewed in order to provide a context for the condominium market assessment for the Resort. Projects were selected for review based on the following criteria:

- Location in a master-planned resort on Maui
- Proximity to golf course and hotel developments within the resort
- Location on the ocean or fronting a golf course
- Low-rise development (three or fewer stories)

GCR/VMS MAUI 670

Planned Multifamily Condominium Projects on Maui

Location	Project	Project range, unit prices	Expected completion date	Land area(1)	Units	Location orientation	Density(2)
Wailea(3)	Grand Champions Villas I and II	$ 190,000 - 300,000	1990	10.5	188	Ocean view/ golf front	17.9
	Wailea Palms	325,000 - 350,000	1990	16.7	150	Ocean view	9.0
Napili/Kahana	The Kahili	92,000 - 152,500	1994	1.4	34	Mauka	24.6
Kihei/Maalaea	Cascades	98,000 - 198,000	1994	2.2	52	Ocean view	23.7
	Kalama Lanai	170,000 - 265,000	1994	1.5	48	Mauka	32.0
	Kamaole Beach Terrace	N/A	1994	N/A	432	Mauka	N/A
	Kihei Banyan	89,000 - 200,000	1994	21.5	768	Mauka	35.7
	Na Holokai	N/A	1994	N/A	12	Mauka	N/A
Total					1,684		

(1) Gross project area in acres.
(2) Units per gross project area.
(3) The 16 acres of Phase II and III of the Makena Surf has been put up for sale.

Source: Guideline Corporation, Maui Condominiums, January 1988 and discussions with developers and realtors.

Exhibit V-C

Based on these criteria, seven projects were selected for study and comparison to potential development at the Resort. These projects are discussed in the following subsections.

Project Characteristics

The selected comparable projects range in size from 40 to 186 units with an average size of 137 units. This represents a density of 4.3 to 13.6 units per gross project acre or an average of 7.6 at the selected projects, as shown in Exhibit V-D. Units are generally clustered, with 4 to 13 units per each two- to three-story building.

Unit Mix

Most of the projects include one- and two-bedroom units only. The luxurious Kapalua Ironwoods and Wailea Point projects are the only two that include units with more bedrooms, as shown in Exhibit V-E. Studio units are increasingly rare and are found mostly at older projects, such as those located in Kaanapali Beach Resort or in areas outside of master-planned resorts which cater to a less upscale market segment. None of the projects selected for study included studio units.

Unit Size

Excluding lanai and garage spaces, average unit sizes range from about 1,000 net square feet for one-bedroom units to about 2,500 square feet for four-bedroom units at selected condominium projects, as shown in Exhibit V-F.

Facilities and Amenities

Resort condominiums have become increasingly competitive in the provision of recreational and other project amenities. Amenities of recently completed projects include recreation centers, swimming pools, jacuzzis, saunas, tennis courts, meeting rooms and barbecue areas. Many also offer special provisions for memberships or preferential usage of the resort's recreational facilities such as for golf and/or tennis.

REVIEW OF MARKET PERFORMANCE

This section reviews the market performance of selected comparable projects on the islands of Maui and Hawaii in terms of sales absorption, sales prices and buyer profiles.

Average Unit Sales Absorption in Wailea

Annual condominium unit sales in Wailea are based on information provided by the Neighbor Island Multiple Listing Service (NIMLS) TMK database. The Wailea area is defined as TMK number 2-2-1 which primarily represents the Wailea and Makena resort areas.

Condominium sales in the Wailea area have ranged from 47 to 142 units per year and averaged about 86 over the last 8 years, as shown in Exhibit V-G. Condominium unit sales have increased in the last four years due to:

GCR/VMS MAUI 670

Project Characteristics of Selected
Maui Resort Condominium Projects

	Number of units	Units per gross acre	Average units per building	Maximum story height
Kapalua Bay Villas	141	8.5	5	3
Wailea Elua Village	152	6.4	6	2
Kapalua Golf Villas	186	11.8	12	3
Kapalua Ridge Villas	161	7.4	6	3
Kapalua Ironwoods	40	4.3	4	2
Wailea Ekolu	148	13.6	9	2
Wailea Point	130	6.3	13	3
Average	137	7.6	11	3

Source: Published sources and discussions with developers, realtors and resort representatives.

Exhibit V-F

GCR/VMS MAUI 670

Average Unit Sizes of Selected Maui Resort Condominium Projects

	Unit size (square feet)(1)			
	One-bedroom	Two-bedroom	Four-bedroom	Total
Kapalua Bay Villas	1,050	1,500	-	1,275
Wailea Elua Village	950	1,400	-	1,175
Kapalua Golf Villas	950	1,300	-	1,125
Kapalua Ridge Villas	1,150	1,800	-	1,475
Kapalua Ironwoods	-	1,900	2,550	2,225
Wailea Ekolu	900	1,300	-	1,100
Wailea Elua	900	1,300	1,650	1,275
Wailea Point	-	1,600	2,559	2,080
Average	1,000	1,543	2,555	1,494

(1) Excluding garage and lanai areas.

Source: Hawaii TMK Service, Condominium Guide and discussions with realtors of the respective projects.

GCR/VMS MAUI 670

Unit Mix of Selected Maui Condominium Projects

	Units									
	One-bedroom		Two-bedroom		Three-bedroom		Four bedroom		Total	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Kapalua Bay Villas	92	65%	49	35%	-	-%	-	-%	141	100%
Wailea Elua Village	38	25	98	65	16	10	-	-	152	100
Kapalua Golf Villas	79	42	107	58	-	-	-	-	186	100
Kapalua Ridge Villas	105	65	56	35	-	-	-	-	161	100
Kapalua Ironwoods	-	-	20	50	-	-	20	50	40	100
Wailea Ekolu	40	27	108	73	-	-	-	-	148	100
Wailea Point	-	-	76	59	48(1)	36	6	5	130	100
Total or average	354	37%	514	54%	64	7%	26	2%	958	100

(1) Wailea Point units can be remodeled by owners into two, three or four bedroom units.

Source: Published sources and discussions with developers, realtors and resort representatives.

Exhibit V-E

- Growing Maui and Wailea visitor base with greater number of repeat visitors.
- Increasing awareness of the Wailea area fostered in part by marketing efforts associated with the Resort and with its planned hotels.
- Generally improving economic conditions on the U. S. mainland over the last several years.
- The availability of new inventory in 1985 for the first time since 1979 at the Wailea Point.

The most limiting factor to condominium sales in the area was the lack of new inventory. In the future, condominium sales in the Wailea area are expected to increase significantly with the completion of a number of condominium projects and 3,000 hotel rooms in the area, hence attracting a greater number of upscale repeat visitors to the area and providing additional inventory for sale.

Resort Condominium New Unit Sales Absorption

Exhibit V-H focuses on new unit sales absorption by project for selected condominium projects located in resorts on Maui and Hawaii. Average sales absorption has generally ranged from about 17 units per year at Wailea Elua II, marketed between 1979 and 1983, to 161 units within six months at the Kapalua Ridge in 1978, as also shown in the exhibit.

Unit sales at those projects with new inventory remaining is reportedly very brisk, and include an undiscounted bulk sale of 32 luxury units to a Japanese buyer at the Wailea Point in early 1988. The latter is reported to be putting about 12 of these units back on the resales market, at prices significantly higher than originally paid.

Average Unit Sales Price

Condominium unit sales prices are analyzed two ways. The first discussion summarizes trends in unit sales prices in the Wailea area and the second considers prices by project location at selected resort projects on Maui and Hawaii:

- Unit sales price trends - Average prices of condominium units sold in the Wailea area have increased at an average of 7.3% annually since 1980, averaging about $472,000 in 1987, as shown previously in Exhibit V-G. These high average prices were affected by sales at the very exclusive and oceanfront Wailea Point. Excluding the Wailea Point, the average sales price in 1987 was about $279,500.
- Prices by project location - Unit sales prices are strongly affected by a project's location with respect to ocean and golf frontage. However, the Mauna Kea Villas project on the island of Hawaii demonstrates that a golf-front project with panoramic ocean views, location in a luxury resort and large, high-quality units can support high prices. Excluding this exceptional project, recent unit sales prices among selected luxury projects have averaged $395,000 at golf-front projects compared to $550,000 to $719,000 at oceanfront projects, as shown in Exhibit V-I.

GCR/VMS MAUI 670

Wailea Area Condominium Sales - New and Resales

1980 to 1987

	1980	1981	1982	1983	1984	1985	1986	1987	Average	Average annual compounded growth rate, 1980-1987
Number of sales(1)	77	52	47	57	133	73	142	110	86	N/A
Average sales price(1)	$ 288,600	274,700	266,600	248,100	345,100	301,000	364,300	471,900	N/A	7.3%

N/A Not applicable.
(1) Wailea area defined as TMK 2-2-1 represents both new sales and resales.

Source: Neighbor Island Multiple Listing Service TMK Database.

Exhibit V-G

Exhibit V-H

GCR/VMS MAUI 670

Market Time for Selected
Resort Condominium Projects

As of April 1988

Year first offered	Project	Number of units sold	Number of semiannual marketing periods	Average annual sales
1975	Wailea Ekahi I	100	2	100
	Wailea Ekahi II	90	1	180
	Kapalua Bay Villas	141	1	282
	Total	331	4	166
1976	Wailea Ekahi III	104	2	104
	Wailea Elua I	54	3	36
	Total	158	5	63
1977	Wailea Elua IB	32	3	22
	Kapalua Golf Villas	186	1	372
	Total	218	4	109
1978	Wailea Ekolu	148	4	74
	Kapalua Ironwoods	40	1	80
	Kapalua Ridge	161	1	322
	Total	349	6	116
1979	Kaanapali Royal	105	1	210
	Wailea Elua II	65	8	17
	Total	170	9	57
1981	Kaanapali Alii	264	8	66
1983	Hauna Lani Terrace	79	6	27
1984	The Villas at Hauna Kea - Phase I	23	2	23
1985	Hauna Lani Point	96	6	32
	Wailea Point	116	5	46
	The Villas at Hauna Kea - Phase II	17	5	7
	The Shores at Waikoloa	86	4	43
	Total	315	20	32

Sources: Discussions with representatives of the respective projects.

Exhibit V-I

GCR/VMS MAUI 670

Average Condominium Sales Prices for
Selected Hawaii and Maui Condominium Projects
by Project Location

1986 to June 1987

Project	Resort	Location	Average sales price
Luxury projects:			
Oceanfront:			
Hauna Lani Terrace	Hauna Lani	Oceanfront	$ 619,700
Hauna Lani Point	Hauna Lani	Oceanfront	550,000
Wailea Point	Wailea	Oceanfront	600,000
Ironwoods	Kapalua	Oceanfront	719,000
Range			$ 550,000 - 719,000
Golf-front or interior:			
Villas at Hauna Kea	Hauna Kea	Golf-front	947,000
The Shores at Waikoloa	Waikoloa Beach	Golf-front	395,000
Range			$ 395,000 - 947,000
First-class projects:			
Oceanfront:			
Kanaloa at Keauhou	Keauhou	Oceanfront	$ 166,800
Wailea Elua	Wailea	Oceanfront	412,100
Wailea Ekahi	Wailea	Oceanfront	201,600
The Whaler	Kaanapali	Oceanfront	288,200
Kapalua Bay Villas	Kapalua	Oceanfront	290,000
Range			$ 166,800 - 412,000
Golf-front or interior:			
Wailea Ekolu	Wailea	Interior	$ 200,550
Kapalua Golf Villas	Kapalua	Golf-front	187,400
The Ridge	Kapalua	Golf-front	201,800
Kaanapali Royal	Kaanapali	Golf-front	264,200
Country Club Villas	Keauhou	Golf-front	179,210
Range			$ 179,000 - 264,000

Sources: Hawaii TMK Service and Multiple Listing Service computer runs.

Among selected first-class resort condominium projects, unit prices ranged from an average of $166,000 to $412,000 for ocean front projects, compared to $179,000 to $264,000 for golf or interior-located projects, as also shown in the exhibit.

- Prices by number of bedrooms - Prices typically vary by unit size and number of bedrooms. Among 65 recorded transactions at the three older projects at Wailea, sales prices of one-bedroom units averaged 53% more than studio units, two-bedroom units were 36% more than one-bedroom units and three-bedroom units were 72% more than two-bedroom units, as shown in Exhibit V-J. Prices per interior square foot at these projects have ranged from about $220 at the interior-located Wailea Ekolu, to $560 for a luxurious, oceanfront three-bedroom unit at the Wailea Elua.

Buyer Profiles

The characteristics of resort condominium buyers are profiled for first-class and luxury projects. The characteristics of the typical buyers in each category are summarized in Exhibit V-K, and discussed as follows:

- Purchase motivation - In the middle-priced, first-class market, buyers are often motivated by investment opportunities as well as the desire for a vacation or retirement home. Such purchasers typically require rental income to cover a portion of their unit holding costs and seek capital gains upon the resale of their units. In contrast, the primary purchase motivation in the luxury or higher priced market is to have a vacation or retirement home in Hawaii.

- Typical age - The typical age of purchasers is comparable for both categories, at 45 to 50. However, the first-class market includes buyers of a greater age range than does the luxury market.

- Occupation - The resort condominium buyer is typically a professional such as an attorney or doctor, a successful entrepreneur or a corporate executive or officer. However, purchasers of first-class condominiums include a greater share of professionals who tend to earn less than do the entrepreneurs and highest-ranking corporate executives.

- Household income - Average annual household incomes range from about $100,000 to $250,000 in the first-class market to $200,000 or more in the luxury market.

- Investor sophistication - Buyers in both markets are generally experienced investors. However, the luxury condominium buyers are more likely to already own one or more vacation homes.

- Place of origin - In both markets, buyers are typically from the western United States, especially from California, Washington, Oregon and Alaska. Buyers from within the state are relatively more common in the less expensive condominium projects.

  In the future, foreign purchasers, especially the Japanese, are expected to become a greater part of the market due to the following factors:

GCR/VHS MAUI 670

Average Sales Price by Number of Bedrooms
at Wailea Resort Condominium Projects

1987

	Studio	One-bedroom	Two-bedroom	Three-bedroom	Average
Average unit sales prices:					
Wailea Ekahi	$ 150,000	228,895	296,667	-	238,100
Wailea Elua	-	366,333	568,333	975,000	548,400
Wailea Ekolu	-	199,950	246,708	-	240,000
Average	$ 150,000	240,300	308,639	975,000	286,700
Average prices per interior square foot:					
Wailea Ekahi	310	255	250	-	260
Wailea Elua	-	410	410	560	430
Wailea Ekolu	-	230	220	-	220
Average	$ 310	270	260	560	270

Source: Guideline Corporation, Maui Condominiums, January 1988 and discussions with realtors at Wailea Resort.

- Growing awareness of Maui as the number of repeat visitors and investments in hotels and other real estate increases.
- Increased development of activities and amenities on Maui, such as shopping centers and golf courses.
- Continued favorable currency exchange rates and financial terms in Japan.

- Purchase entity - Married couples are a major market segment in both markets; however, the first-class market also includes small "huis" or groups of friends or relatives.
- Other characteristics - The typical resort condominium buyer has visited the resort on previous occasions. The luxury condominium buyer tends to be a frequent visitor to the resort or area who has decided to make a commitment to the area as a vacation destination. As previously mentioned, first-class condominium purchasers are often also motivated by investment considerations.

MAUI WAILEA 670 CONDOMINIUM MARKET ASSESSMENT

A total of 1,140 to 1,470 condominium units are planned for the Maui Wailea 670 Resort. The majority, or about 840 to 1,070 units, are planned for the more active makai area of the property. This section assesses the market support for condominium development at the Resort in terms of projected buyer markets, development concept, sales absorption and unit prices.

Anticipated Buyer Markets and Purchase Motivation

The Resort is primarily expected to attract buyers interested in first-class condominium projects offering golf course frontage and panoramic ocean views within a master-planned resort and residential community. Buyer markets for condominium units are expected to represent those seeking the following:

- Part-time or vacation home - To be kept primarily for the owner's personal use. Purchasers in this category are expected to typically be:
  - Successful entrepreneurs or officers of both small and large corporations, with annual household incomes of $150,000 or more.
  - Between the ages of 40 to 50.
  - From a wide geographic area in the United States or from Japan.
  - Repeat FIT visitors who have stayed at the hotels at the Resort or elsewhere at Wailea or Makena.
  - Persons seeking golf frontage and ocean views.

Exhibit V-X

GCR/VMS MAUI 670

Typical Hawaii Resort Condominium Unit Buyer Characteristics by Class of Condominium

	First-class	Luxury
Example condominium projects	Kapalua Bay, Golf and Ridge Villas Wailea Ekolu and Elua Kanaloa at Keauhou Waikoloa Shores	The Villas at Mauna Kea Mauna Lani Terrace and Point Wailea Point Kapalua Ironwoods
Approximate unit price	$175,000 to $450,000	$450,000+
Purchase motivation	Investment, vacation or retirement home	Vacation or retirement home
Typical age range	35 to 60 years	40 to 55 years
Occupation	Professionals, entrepreneurs and developers	Chief executive officers and self-employed entrepreneurs
Household income	$100,000 to $250,000	Over $200,000
Investor sophistication	Experienced investors. Many own vacation homes elsewhere	Experienced investors. May be "trading up" and most own one or more vacation homes elsewhere
Origin	Mainland, majority from California. Few from Hawaii	Mainland; majority from west coast. Hawaii buyers rare
Purchasing entity	Couples, limited partnerships and huis	Couples
Other characteristics	Has been a visitor to the resort and the area and would like to make an investment with the benefit of a vacation home	Typically has been a frequent visitor to the resort and has decided to purchase a vacation or possible retirement home

Source: Discussions with realtors or representatives of Hawaii condominium projects.

- Part-time vacation home and rental property - Buyers in this category could be expected to be persons who seek vacation homes or investments, who depend on rental income to defray the holding costs of their unit. These buyers are expected to be more familiar with Maui and do not insist on ocean frontage. Additionally, these buyers exhibit the following characteristics:

  - Couples, huis or limited partnerships.

  - Persons between the ages of 35 to 55.

  - Entrepreneurs and professionals such as hotel industry executives, real estate developers or doctors with annual household incomes of $75,000 or more.

- Primary residence - This market is expected to consist mostly of retirees or employees of the Resort or of Wailea or Makena resorts. They can be characterized as follows:

  - Mostly couples or small families
  - Between the ages of 35 and 65
  - Visitor industry managers or retirees
  - In-migrants to the Wailea area

- Full-time rentals - The single-family housing shortage on Maui is expected to result in higher single-family prices, forcing more residents to consider renting a condominium. Therefore, the increase demand for rentals could increase rents sufficiently to attract condominium investors at the Resort. The investors are expected to rent the units on a long term basis, eventually selling the unit.

The mix of these anticipated condominium buyer market segments at the Resort is estimated as follows:

Projected Condominium Unit Buyer Market Mix
at the Maui Wailea 670 Resort

Part-time homes	20 - 25%
Part-time homes/visitor rentals	45 - 55
Full-time homes	15 - 20
Full-time rentals	5 - 10
Total	100%

Projected Unit Sales Absorption

The market support for resort condominium units at the Maui Wailea 670 Resort is related to the emergence of the Wailea area as a major visitor destination. Condominium unit demand is to a large extent related to the Resort's and Wailea's ability to attract a base of repeat visitors from which resort condominium buyers may emerge. The number of hotel rooms in an area can be used as an indicator of the potential number of repeat visitors/condominium buyers. Therefore, the market support for condominium units at the Resort is analyzed

by determining the historical ratio of condominium sales per 100 hotel units in the Wailea area. Over the last 8 years, there were about 8 condominium sales per year per 100 hotel units in the Wailea area, as shown in Exhibit V-L. However, this sales ratio ranged from a low of 5 to a high of 14 units per 100 hotel rooms.

Future supportable condominium unit sales at the Resort are estimated in Exhibit V-M, with the assumptions discussed below:

- Sales ratio ranges from 8 to 9 condominium sales per 100 hotel units, only slightly higher than the historical average and well within the historical range for this ratio.
- Hotels planned for the Wailea area are completed as scheduled and as shown previously in Exhibit II-J.
- Resales of existing units range from 45% to 48% of projected total sales.
- Future Wailea and Makena condominium developments are expected to capture 50% and 20% of all projected new sales, respectively.

Based on the above assumptions, the Resort is expected to support from about 1,200 to 1,370 condominium units over the 20 year projection period ending in 2010, as shown in Exhibit V-N. Therefore, over the entire marketing period, an average from about 60 to 69 units are projected to be sold annually. In comparison, other Hawaii condominium projects have achieved sale rates of up to twice as many units per year, as shown previously in Exhibit V-I. However, this lower rate is considered reasonable for the Resort considering the changes of the Tax Reform Act of 1986, more stabilized real estate values, relative market attractiveness of the Resort and the Wailea area, and the expected competition within the Wailea area, primarily from planned condominiums at the Wailea Resort.

Development Concept

The development concept for condominium projects at the Resort could feature the following:

- Densities - To range from 6 to 15 and 6 to 8 units per acre with the makai and mauka area projects, respectively.
- Buildings and Views - Two to three stories, oriented around the golf course to maximize ocean and mountain views.
- Unit mix - Primarily one- and two-bedroom units with perhaps 10% three-bedroom units.
- Unit sizes - Ranging from 1,000 to 1,200, 1,400 to 1,600 and 2,200 to 2,500 square feet for one-, two- and three-bedroom units, respectively.
- Project amenities - To include barbecue, play and function areas and possibly swimming pools at those projects oriented to full-time use; swimming pools, jacuzzis, recreation rooms and possibly tennis courts at higher-end projects. In addition, special membership rates or preferential usage of the Resort's golf and tennis facilities could be particularly marketed at the higher-end and mauka projects.

Exhibit V-L

GCR/VMS MAUI 670

Ratio of Wailea Area Condominium
Unit Sales to Hotel Units

1980 to 1987

	1980	1981	1982	1983	1984	1985	1986	1987	Total or average
Sales per year(1)	77	52	47	57	133	73	142	110	86
Hotel units(2)	950	950	950	950	950	950	1,260	1,260	1,028
Sales per 100 hotel units	8	5	5	6	14	8	11	9	8

(1) Recorded transactions from the NIMLS TMK database.
(2) As shown in Chapter II.

Exhibit V-M

GCR/VMS MAUI 670

Projected Supportable Condominium Unit Sales
at the Maui Wailea 670 Resort

1991 to 2010

	1991 to 1995		1996 to 2000		2001 to 2005		2006 to 2010	
	Low	High	Low	High	Low	High	Low	High
Average cumulative hotel units completed over five year period(1)	3,910	3,910	4,425	4,425	4,940	4,940	4,940	4,940
Condominium demand per 100 hotel units	8	9	8	9	8	9	8	9
Total average unit sales over five years	1,560	1,760	1,770	1,990	1,980	2,220	1,980	2,220
Less resales to existing condominiums(2)	(750)	(750)	(800)	(900)	(890)	(1,000)	(890)	(1,000)
Total new unit sales	810	1,010	970	1,090	1,090	1,220	1,090	1,220
Less new sales to:(3)								
Wailea Resort	(405)	(505)	(485)	(545)	(545)	(610)	(545)	(610)
Makena Resort	(160)	(200)	(190)	(220)	(220)	(240)	(220)	(240)
Supportable unit sales at the Resort:								
In period	245	305	295	325	325	370	325	370
Cumulative	245	305	540	630	865	1,000	1,190	1,370

(1) Includes existing and planned units for the Wailea area, including hotel units proposed at the Resort as shown previously in Exhibits II-J and III-F.

(2) For the 1991 to 1995 period assumed a historically based 10% resale of condominium units. Thereafter, assumed 45% of total sales relate to resales.

(3) Assuming the new Wailea Resort condominium projects capture 50% and Makena Resort projects capture 20% of all new sales.

Projected Achievable Sales Price

Projected achievable sales prices for condominium units at the Resort are based on sales experience of other projects in Wailea, as noted in Exhibit V-J, resort unit sales price trends, locational characteristics of the site, and the recommended unit sizes and mix, as discussed above. Relevant site characteristics are as follows:

- Location away from the ocean, but with excellent ocean views and/or golf course orientation from most sites at the Resort.
- Location within a master-planned community.
- Availability of resort and private golf club.
- Expected golf course affiliation with a nationally recognized golf course designer.

Based on the above considerations, it is estimated that the Resort could achieve prices per square foot that are slightly higher than those of the primarily interior-located Wailea Ekolu project, but generally lower than those of the Wailea Ekahi and Elua projects, both of which offer direct ocean access. Thus, typical unit prices are estimated to range from about $200,000 to $700,000, averaging about $360,000 overall, as shown in Exhibit V-N.

GCR/VMS MAUI 670

Recommended Condominium Development Characteristics
at the Maui Wailea 670 Resort

	One-bedroom	Two-bedroom	Three-bedroom	Average
Unit sizes (net interior square feet)	1,000 - 1,200	1,400 - 1,600	2,200 - 2,500	1,500
Unit mix	30%	60%	10%	100%
Typical prices: Per unit	$ 200,000 - 280,000	300,000 - 380,000	500,000 - 700,000	360,000
Per square foot	$ 230	235	255	240

Exhibit V-N

VI - SINGLE-FAMILY MARKET ASSESSMENT

This chapter reviews the development trends and market performance of existing and planned residential lot subdivisions and patio homes. The review covers selected comparable resort single-family lot projects in the state and patio homes projects in California and Arizona. The chapter concludes with an assessment of the market support for single-family development at the Maui Wailea 670 Resort.

RESORT LOT DEVELOPMENT TRENDS

Resort lots are differentiated from other residential lots by their integration within a master-planned and self-supporting resort community oriented towards recreational activities such as golf and tennis. In addition, homes built on resort lots are frequently used as secondary or vacation homes, although many lower-priced resort lots may become primary residences.

To date, resort residential lots have been developed at all major neighbor island resorts except at the Mauna Lani and Waikoloa Beach resorts on the island of Hawaii and the Makena Resort on Maui. Due to the home customization possible, resort lots help expand the range and types of visitor and resident accommodations at a resort as well as contributing a lower-density and more residential appeal. This section reviews residential lot developments at the following resorts:

- Island of Maui:
  - Wailea
  - Kaanapali Beach
  - Kapalua
- Island of Hawaii:
  - Keauhou
  - Waikoloa Village
- Island of Kauai - Princeville

Location and View Orientation

Resort residential lots are differentiated by their location and view orientation with respect to:

- Oceanfrontage or views
- Golf course fairways or greens
- Mountain or hillside locations providing views
- Interior locations providing no views

At the selected resorts, 46% of the existing and planned resort lots are classified as interior lots, as shown in Exhibit VI-A. Lots surrounding golf course fairways or greens and on a hillside providing ocean or mountain views represent 23% and 29% of existing and planned lots at the selected resorts, respectively.

GCR/VMS MAUI 670

Location and View Orientation of Residential Lots at Selected Hawaii Resorts

Resort subdivision	Primary view orientation	Ocean-front	Golf course	Hillside: ocean/ valley views	Interior: limited or no views	Total lots
Keauhou Estates I & II	Hillside ocean view	-	22	113	-	135
Waikoloa Village	Interior	-	N/A	N/A	N/A	968
Fairways at Mauna Kea:						
South	Golf course	-	16	-	17	33
North	Golf course	-	17	-	15	32
Wailea Resort:						
Fairway homesites	Golf course	-	31	-	-	31
Wailea Kai homesites	Interior	-	-	-	100	100
Wailea Golf Estates I & II	Golf course	-	71	20	20	111
Wailea Kialoa	Interior	-	-	25	77	102
Kaanapali Hillsides I & II	Golf course	-	25	107	-	107
Pineapple Hill (Kapalua)	Hillside/ocean view	40	144	84	282	550
Princeville:	Golf course	-	25	50	24	99
Increment I	Interior	-	-	25	72	97
Increment II	Interior	-	15	-	11	26
Sunset Drive	Golf course	-	-	-	68	68
Kauhale Park	Interior	-	-	-	5	5
Lot 5	Interior	-	-	-	-	-
Total(1)		40	341	424	691	2,364
Percent(1)		3%	23%	28%	46%	100%

N/A - Not available.
(1) Excludes Waikoloa Village lots except for totals.

Exhibit VI-A

while oceanfront lots represent only 2% of lots. This is primarily due to the common strategy of utilizing the most valuable oceanfront sites for higher density developments, such as hotels or condominiums.

View orientation is also a primary consideration of buyers in this market and may compensate for locational disadvantages of a resort lot. For example, the majority of lots at the Wailea Golf Estates I have lush fairway frontage as well as ocean or mountain views. Similarly, many interior lots at Wailea and Mirage Princeville resorts command ocean or mountain views which compensate for their less desirable location. The importance of views is illustrated by the experience at the Wailea Golf Estates I where interior lots sold more quickly than fairway lots due to their superior ocean views and lower prices.

Historically, resorts have offered the better quality lots early in the resort's development and the less desirable (interior) lots later as the resort matures. This pattern is particularly evident at Princeville which developed the ocean and golf frontage lots from 1971 to 1975 and the interior lots after 1979. In contrast, Wailea Resort's strategy was to offer alternating quality lots in each successive subdivision, thus appealing to a range of buyer markets at any given time.

Lot Sizes

Typically resort lots range from 9,500 to 20,000 square feet and average from about 10,000 to 14,000 square feet. They are thus larger than nonresort lots in Hawaii which generally range from about 6,000 to 9,000 square feet. In general, the higher priced golf course lots are larger than the interior or hillside view lots because purchasers of golf-front lots are more willing to pay for the additional square footage.

Amenities

Private recreational facilities and security are major features of successful lot developments on the mainland United States. These features have generally not been incorporated in first-class resort subdivisions in Hawaii. Instead, most of the subdivisions offer short-term, complimentary or voluntary memberships at the resorts' golf or tennis facilities, suggesting their inclusion in the resort community. The only resort lot developments currently offering recreational facilities are as follows:

- Sunset Drive, a subdivision in Princeville, has a recreation center which features a private pool, tennis court and pavilion.
- Pineapple Hill, a luxury subdivision currently being marketed in Kapalua, also features extensive condominium-like recreational amenities including a full-time, on-site resident manager, two tennis courts and a swimming pool.

Historically, private security has not been a significant feature of resort subdivisions in Hawaii. However, security is reportedly an important selling point of the new Keauhou Estates I subdivision where access is controlled by a private entry with an autogate and manned security.

Planned Resort Lots on Maui

On Maui, the 50-lot Wailea Golf Vistas is expected to be marketed in the near future. The Golf Vistas, formerly known as Wailea Golf Estates II, will provide both golf frontage and ocean views. No other planned projects were disclosed at the other Maui master-planned resorts.

In the long term, Wailea has the urban-classified zoning potential to develop over 300 resort lots. However, only about 120 would provide both golf frontage and ocean views.

MARKET PERFORMANCE OF RESORT LOTS

This section examines the market performance of selected resorts in terms of historical sales and price trends, buyer profile and purchase motivations.

Historical Sales

Since 1978, an annual average of about 110 resort residential lots statewide were sold, as shown in Exhibit VI-B. Lot sales had been rapid in 1978, 1979 and 1981 as new inventory was offered at the Mirage Princeville, Waikoloa and Wailea resorts.

Lot sales were relatively weak from 1982 through 1985, ranging from 35 to 80 annual lot sales, primarily due to the decrease in purchases by investors. In the past, investors represented a major market segment but investor purchasers were limited by the high interest rates and the economic slump of 1981 to 1983 when resort real estate values declined. Lots sold during this period were typically either lower-priced or offered at discounted sales prices or with attractive financing terms. Since 1986, sales have increased again, as resort real estate values have stabilized.

Except for the Mauna Kea Resort, an annual average of 20 to 50 lots were typically sold at the respective resorts, as also shown in Exhibit VI-B. Resorts that averaged higher rates of sales include the Waikoloa and the Mirage Princeville resorts which market lower priced lots. They have averaged about 39 to 47 lots, respectively, with lot prices ranging from about $35,000 to $65,000. In contrast, only two lots have been sold annually at the Mauna Kea Resort, where leasehold lots range from $400,000 to $600,000.

Prices

Resort lots currently marketed range from $35,000 for interior lots at Waikoloa Village to $600,000 for fairway lots at Mauna Kea North, as shown in Exhibit VI-C. Resort lot prices are primarily related to the following three factors:

- o lot location and view - Golf course lot prices typically range from 30% to 50% and as much as 97% higher than interior lots located within the same subdivision at selected resorts, as shown in Exhibit VI-D. For example, at the Wailea Golf Estates I interior lots recently sold for $8.00 to $13.00 per square foot while golf course lots with views of Haleakala commanded $17.70 to $20.30 per square foot and golf course lots with ocean views were priced at $20.00 to $26.50 per square foot.

GCR/VMS MAUI 670

Sales Prices and Sizes of Lots at
Selected Resort Subdivisions

1986 to 1987

Resort subdivision	Location and view orientation	Typical lot size (square feet)	Typical sales price	Price per square foot
Keauhou Resort - Keauhou Estates:				
Interior lots(some view obstruction)	Hillside/ocean view	16,500	$ 94,000 to 120,000	$ 6.10 to 10.00
Interior lots(180° view)	Hillside/ocean view	16,500	150,000 to 165,000	8.00 to 10.20
Fairway	Fairway	16,500	190,000 to 225,000	9.40 to 13.64
Waikoloa Resort - Waikoloa Village(lot resales)	Not available	11,000 to 13,000	35,000 to 45,000	3.40 to 4.20
Mauna Kea Resort - Fairways at Mauna Kea North	Interior	24,000 to 30,000	395,000 to 495,000	10.00 to 21.00
	Fairway	24,000 to 30,000	495,000 to 595,000	17.00 to 23.00
Wailea Resort:				
Wailea Golf Estates I	Golf/ocean views	14,000 to 18,000	240,000 to 255,000	14.20 to 17.10
Wailea Kai	Interior	10,000 to 11,000	80,000 to 90,000	8.20 to 10.00
Wailea Kialoa	Interior, some ocean view	10,400	110,000 to 125,000	10.00 to 13.00
Kaanapali Hillside	Hillside/ocean view	10,500 to 11,500	130,000 to 140,000	11.50 to 12.50
Kapalua Resort - Pineapple Hill	Fairway	10,000 to 11,000	240,000 to 290,000	22.70 to 26.00
	Interior	10,000 to 11,000	170,000 to 220,000	16.00 to 20.00
Princeville Resort(1):				
Increment II, Unit I and II	Interior	10,000 to 13,000	55,000 to 60,000	4.50 to 5.40
Sunset Drive	Fairway/interior	15,500 to 20,000	87,000 to 105,000	4.80 to 5.70

Source: Discussions with realtors or representatives of the respective projects.

Exhibit VI-C

GCR/VMS MAUI 670

Annual New Sales of Residential Lots
at Selected Hawaii Resorts

1978 to 1987

	First year offered for sale	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987(1)	Total	Average annual lot sales(2)
Keauhou Estates I	1985	-	-	-	-	-	-	-	-	27	58	85	43
Waikoloa Village	1978 to 1980	16	185	36	26	28	26	11	-	-	-	328	47
Mauna Kea - Fairways at Mauna Kea North	1982	-	-	-	-	1	4	2	1	-	N/A	8	2
Wailea Resort	1981 to 1987	-	-	-	68	5	19	20	3	21	95	231	33
Kaanapali Hillside	1983	-	-	-	-	-	24	27	30	17	9	107	21
Pineapple Hill, Kapalua	1986	-	-	-	-	-	-	-	-	40	38	78	39
Princeville	1978 to 1984	149	40	11	11	1	5	21	6	27	-(3)	271	30
Total		165	225	47	105	35	78	81	40	132	200	1,108	110

N/A Not available.
(1) Annualized estimate based on sales experience through July.
(2) During periods with inventory available.
(3) Number is not relevant because Princeville's lack of inventory.

Sources: Hawaii TMK Service and discussions with developers of the respective subdivisions or their representatives.

Exhibit VI-B

- Lot size - Larger lots may command a greater total price per lot but a lower price per square foot than the typical-sized lots.

- Quality of the resort in which the lot is located - A resort's reputation and ability to a attract a given market also affect the lot prices. For example, the Mauna Kea and Kapalua resorts are able to command higher prices than other resorts due to their established affluent visitor base, five-star hotels and extensive recreational amenities. Their price per square foot range from $17 to $26 for fairway lots, as also shown in Exhibit VI-D.

Buyer Profiles

The buyers of resort residential lots are characterized in terms of their occupation, age, income, residence and other characteristics, as shown in Exhibit VI-E. These characteristics are outlined as follows:

- Occupation - Occupational profiles vary according to the quality and price of the subdivision. Purchasers of lots within the $150,000 to $350,000 range, such as at Wailea Golf Estates I, are typically professionals, business executives or self-employed entrepreneurs and small businessmen.

  Purchasers of lots within the $60,000 to $140,000 range, such as at Kaanapali Hillside, Princeville and Keauhou Estates I, additionally include mainland and local contractors and financial institutions. The latter buyers are often investor-builders who purchase and develop lower-priced lots in areas which are residential-oriented.

- Age - Buyers are typically 40 to 55 years of age. Purchasers of higher-priced lots tend to be older while purchasers of less expensive property, including the speculative builders, tend to be younger.

- Income - Annual incomes of purchasers range from a low of $30,000 at Princeville (where an extensive employee discount plan was implemented) to a high of $250,000 a year at the Keauhou Estates I.

- Place of primary residence - Purchasers from California represent the majority of buyers, comprising between 20% and 60% of the total purchasers. Purchasers from other west coast states represented the next largest segment.

  Residents of the island on which the resort is located represent between 10% and 56% of total lot buyers. In comparison to other resort areas, Keauhou Estates I, Kaanapali Hillside, Waikoloa Village and Mirage Princeville have attracted a higher proportion of island residents due to their relatively lower prices.

- Buyer profile by preference for view lots - Given equal pricing, ocean view lots are the preferred type. However, interior and golf course lots without views have been successfully marketed at Mirage Princeville, Wailea and Waikoloa Village resorts.

GCR/VMS MAUI 670

Lot Price Differentials Within Subdivisions
at Selected Hawaii Resorts

Subdivision	Typical selling price: Per lot	Typical selling price: Per square foot	Range percent premium(1)
Kiahuna Plantations (Kauai):			
Interior lots	$ 115,000 - 125,000	9.00 - 11.00	
Fairway lots	185,000 - 205,000	12.40 - 17.70	38% - 55%
Princeville Resort (Kauai):			
Interior lots	50,000 - 95,000	5.00 - 8.00	
Fairway lots	67,000 - 150,000	7.00 - 12.00	40 - 50
Wailea Golf Estates I (Maui):			
Interior lots	155,000 - 190,000	9.00 - 13.00	
Fairway with mountain view	265,000 - 275,000	17.70 - 20.30	54 - 97
Fairway with ocean view	300,000 - 350,000	20.00 - 26.40	13 - 30
Fairways at Mauna Kea North (Hawaii):			
Interior lots	395,000 - 495,000	10.00 - 21.00(2)	
Fairway lots	495,000 - 595,000	17.00 - 23.00	10 - 70
Keauhou Estates I (Hawaii):			
Interior lots (some view obstruction)	94,000 - 120,000	6.10 - 10.00	
Interior lots (180 degree view)	150,000 - 165,000	8.00 - 10.20	2 - 31
Fairway lots	190,000 - 204,000	9.40 - 13.30	17 - 30

(1) Based on prices per square foot. Represents prices of fairway or fairway with ocean view lots compared to next less expensive lot type shown.

(2) Per square foot prices varied significantly depending on lot size, with larger lots typically priced at a lower per square foot price.

Source: Discussions with marketing agents at the various subdivisions and published lot sales offerings.

Exhibit VI-D

Purchasers who are willing to forego ocean views include buyers who visit Hawaii frequently, Hawaii residents and those intending to retire. These market segments tend to be more price sensitive than view lot purchasers. Purchasers who require ocean views are typically mainland residents who visit infrequently and for whom an ocean view represents Hawaii. These purchasers are often in higher income brackets than purchasers of nonview lots and accustomed to prestigious property.

- Other characteristics - Nearly all purchasers of lots at the selected resorts had previously vacationed at hotel or condominium facilities of the resort. These repeat visitors typically stay at the resort 2 to 5 times before purchasing a resort lot. Many already own a condominium unit or interior lot at the resort and are trading up.

Purchase Motivations

Historically, the majority of purchasers have been motivated to buy resort residential lots for future improvement as a vacation or retirement home, for investment or for speculative building. These three market segments are discussed below:

- Vacation or retirement home purchasers - Individuals purchasing a lot for a vacation or retirement home tend to buy at resorts that are well developed in terms of visitor facilities and amenities. These buyers are generally mainland residents who vacation regularly at the resort, know its facilities well and have friendship ties among its clientele and typically purchase the higher-priced, best-located lots. Such buyers are believed to value the privacy of a single-family dwelling in choosing a lot over a condominium. They may also prefer a custom-designed home and are willing and able to pay for it.

- Investors - Investment purchasers generally seek long-term appreciation. This group includes local as well as mainland residents and represented a sizable segment of lot buyers at Mirage Princeville. Such purchases tend to be highly elastic with respect to the anticipated appreciation of resort real estate values.

- Speculative builders - These purchasers include both Hawaii and mainland financial institutions, developers or home contractors who typically begin construction almost immediately and price the property with the expectation of realizing a profit.

During the last three to five years, there has been a reduction in the number of investor lot purchases and an increase in the proportion of intended vacation home and retirement purchases. This trend is attributed to the stabilization of real estate values in recent years, high interest rates and the higher quality and prices of more recently marketed subdivisions.

In addition, Hawaii is just beginning to follow the California trend in the emergence of an upscale primary home market for resort residential markets. The Wailea Fairways and Princeville subdivisions now have the highest percentage of full-time residents, representing about 25% and 65% of residents, respectively.

Exhibit VI-E

Characteristics of Resort Lot Purchasers

Primary Purchase Motivation	• Purchased in the hopes of at a later date with single-family homes, in the future retirement homes; some lots purchased by investors for appreciation or resale.
Intended Use	• Future use: homes not completed for about three years or more from date of purchase. Occupied longer than condominium units about once or twice a year for between two to six months. More likely to be occupied full time than condominiums.
	• About 70% to 75% of completed homes are rented while not in use; less likely to be rented than condominium units.
Primary Purchase Considerations	• Lots are purchased if current prices are attractive, are delayed or if sites are scarce and not likely to be available in the future.
	• Purchasers are made with anticipation of rising income and ability to support future home completion.
	• Postal income is well as tax benefits of depreciation are not considered in purchase decision.
Key Considerations in Selection	• Enjoy privacy.
	• Accustomed to single-family living.
	• Want homes more customized and personal than those being offered by condominiums.
	• Avoidance of maintenance fees of condominiums - especially important if planning to retire on fixed incomes.
	• Not ready to undertake financial outlay of a finished home or condominium.
Typical Buyer Profile: Occupation	Similar to condominium buyers - dependent on quality and pricing of subdivision development.
Age	45 to 55 years. Generally older and more retirees than condominium buyers.
Income	Generally slightly lower incomes than condominium buyers at comparable quality developments.
Other Characteristics	May have owned condominiums or other single-family lots at the resort and is "trading up."

Source: Developers and realtors of selected Hawaii resorts.

PATIO HOME MARKET REVIEW

A more recent trend in the resort residential marketplace is the emergence of high-end, prebuilt homes developed in clusters or small subdivisions, on relatively small lots. Variously termed cottage, patio home or zero-lot line or Z-lot developments, these products encompass a variety of development concepts that serve to broaden the resort residential market. This chapter provides a market review of such product types, which are collectively referred to here as patio homes.

As there have been no resort patio home developments to date in Hawaii, this section looks to relevant developments in golf-oriented resort areas in California and Arizona, reporting their market experience with respect to product concept, unit and lot sizes, sales prices and absorption and buyer markets. Patio home projects were surveyed at the following resort areas:

- Morningside, in Rancho Mirage, California, about 5 miles southeast of Palm Springs.
- The Vintage Club, in Indian Wells, California, about 10 miles southeast of Palm Springs.
- Coto de Caza, in Trabuco Canyon, California, about 10 miles from the South Coast Metropolitan Area, defined as the Irvine, Newport Beach, Costa Mesa and Santa Ana areas.
- The Biltmore, in Phoenix, Arizona, associated with the Biltmore Hotel.
- The Boulders in Carefree, Arizona, about 15 miles from the Phoenix/Scottsdale area.

Product Concept and Amenities

Patio homes combine the turnkey convenience of a multifamily condominium with the greater privacy, prestige and conveniences of single-family home living. They are generally one-story structures built in clusters on lots that are smaller than the average resort custom home lot. Patio or landscaped improvements are frequently built out to one edge of the lot and sometimes onto an easement taken from the adjacent lot.

Amenities frequently offered at the surveyed projects include security, common area maintenance, swimming pools and built-in barbeque or other outdoor entertainment areas. However, major amenities such as swimming pools and tennis courts, where offered, were likely to be shared among several units in a cluster.

All of the projects surveyed offer access to private or semi-private golf facilities within the resort. At the two Palm Springs area resorts, Morningside and The Vintage Club, property ownership at the resort is a requirement for membership eligibility in the resorts' private golf clubs.

Unit and Lot Sizes

At the surveyed projects, the average development includes 100 units of 2,300 to 2,800 net interior square feet, on a 5,600 square foot lot, as shown in Exhibit VI-F. The largest units are at Morningside Resort, with about 3,000 to 4,200 square feet. Lot sizes for the Morningside units were less than average, at about 5,200 square feet, thus demonstrating the high degree of lot coverage possible with this type of development.

Sales Prices

Recent unit sales prices at the surveyed projects have ranged from $185,000 to $725,000, for an average of about $330,000 to $470,000, as shown in Exhibit VI-G. This represents an average of about $140 to $175 per square foot. Prices were highest, at up to $725,000, at The Vintage Club and Morningside resorts. These premiums are attributed to:

- Their location in the Palm Springs area, a well established second home region located within weekend driving or air commuting distance of major affluent markets.
- Their association with golf facilities designed by two of the nation's most prominent golf course designers, Jack Nicklaus and Tom Fazio.
- The high quality of these resort developments in general and the construction of the individual units in particular.

Prices per square foot were also significantly higher than average at The Vintage Club, due to the relatively small size of units at the Cottages.

Sales Absorption

Unit sales averaged about 70 per year during periods of available inventory, as also shown in Exhibit VI-G. Sales absorption was most rapid at the relatively moderately priced Coto de Caza developments, which benefit from their proximity to centers of business and employment in the South Coast Metropolitan Area of sourthern California, and location between these employment centers and the affluent suburbs of Mission Viejo and Laguna Niguel. Thus, Coto de Caza is able to attract a sizeable primary home market.

Sales were relatively slower, at about 40 to 50 units per year, at those projects that were higher priced, and/or located in resort areas that are primarily dependent on second home markets, such as the Palm Springs area of California (The Vintage Club and Morningside) and Carefree, Arizona (The Boulders), as also shown in the exhibit.

Buyer Profiles and Purchase Motivations

Buyers of high-end resort patio homes tend to be similar to luxury resort condominium buyers, except that they frequently have higher incomes. Generally, the buyers also seek a convenient, prestigious and private residence that affords priority access to a high quality golf course in a secure community with social and entertainment opportunities and an attractive climate. In the most expensive and resort-oriented projects, typified by those at Morningside and The

XEROX COPY

[illegible]

Market Performance of Selected Patio Home or Townhome
Single-Family Developments in Resort Locations California and Arizona

Subdivision	Resort/Location	1987-1988 sales prices: Per unit Low	Per unit High	Per square foot Low	Per square foot High	Initial sales absorption: Year(s) first marketed	Average annual	Buyer market mix	Comments
Phases I and III	Morningside, California	$ 600,000	700,000	165	200	1983, 1985	52	Most from Southern California Second to fourth home buyers Attracted to golf Typical annual incomes $100,000+	Only home owners eligible for membership in country club
The Cottages, Phases I and II	The Vintage Club, California	550,000	225,000	240	300	1982, 1983	40	Many out-of-state buyers Most owner-occupied only Some use unit only few weeks per year "Captains of industry"	Golf-front premiums, $[illegible] Original prices $[illegible] - $500,000 Buyers prequalified via golf club
The Terraces	Coto de Caza, California	185,000	301,000	120	130	1987	120	Most families working in region 35% second home market, most live within one hour 5% out-of-state Smaller units: retirees Larger units: families	Golf-front premiums, $[illegible] Golf-front units sold first despite higher prices
Coto Country Homes	Coto de Caza, California	245,000	N/A	125	N/A	1987	93	Mostly couples with children or "empty nesters"	$25,000 premium for views
Biltmore Gates	The Biltmore, Arizona	360,000	500,000	115	160	1979 to 1982	N/A	50% primary residents; 50% out-of-state second home buyers	21 of 27 units front golf course
Village on the Lakes	The Biltmore, Arizona	250,000	300,000	100	130	1982-84	N/A	Mostly year-round residents Average age 30 to 40	Have primary residents, the Biltmore System or Biltmore Gates due to level of security and high [illegible] design
The Biltmore Square	The Biltmore, Arizona	250,000	325,000	100	150	Phase I: 1979-80 Phase II: 1983-84	N/A	25% second homes Affluent, golfers	Associated with [illegible] in Arizona Biltmore Golf and Tennis Club Golf-front premiums, $100,000 - $[illegible]
The 5th Green	The Boulders, Arizona	225,000	235,000	140	145	1985	33	Mostly snowbirds: fall to Easter residents Second or vacation homes [illegible] investor buyers	Golf-front premiums, $5,000 - $[illegible] Few may be used as private rentals
Average, rounded		$ 330,000	370,000	140	175		70		

N/A Not available.
1/ Buyer qualified for people who that sold out in less than one year or with [illegible] than one year sales experience to date.

Source: The Goodwin Group, interviews with project developers and/or published information.

Exhibit VI-5

[illegible]

Description of Selected Patio Home or Townhome
Single-Family Developments in Resort Locations in California and Arizona

Subdivision	Resort	Location	Number of units	Unit size(1): Low	Unit size(1): High	Average lot size(1)	Year(s) first marketed	Comments
Phases I and III	Morningside	Rancho Mirage, California	174	3,000	4,200	5,700	Phase I - 1983 Phase III - 1985	Gated, with constant security, patrol Jack Nicklaus designed course at resort
The Cottages Phases I and II	The Vintage Club	Indian Wells, California	135	2,285	2,400	N/A	Phase I - 1982 Phase II - 1983	Cottages arranged in clusters of six Pool and spa amenities for each cluster Condominium land ownership Tom Fazio designed course at resort
The Terraces	Coto de Caza	Trabuco Canyon, California	116	1,464	2,322	3,500	1987	J.M. Peters, developer Resort golf course opened February 1987: Robert Trent Jones, Jr. designer, 18-holes Clubhouse not yet completed
Coto Country Homes	Coto de Caza	Trabuco Canyon, California	93	1,938	2,357	5,000	1987	Pacesetter Homes, developer Three- to four-bedroom units
Biltmore Gates	The Biltmore	Phoenix, Arizona	40	3,100	3,300	6,500	1979-83	Gated, with security Adjacent to hotel
Village on the Lakes	The Biltmore	Phoenix, Arizona	50	2,300	3,000	N/A	1982-84	Located on man-made lake Each unit has own pool Some with attached walls No security or project gate Three- to four-bedroom units
The Biltmore Square	The Biltmore	Phoenix, Arizona	80	2,500	2,500	5,500	Phase I - 1979-80 Phase II - 1983-84	24-hour guarded gate Some 2-story units
The 5th Green	The Boulders	Carefree, Arizona	81	1,550	2,089	7,000	1988	Boulders/Malouf Partnership, developer One- and two-story units Project to include swimming pool & tennis courts 27-hole Jack Nicklaus course at resort
Average, rounded			100	2,300	2,800	5,600		

N/A Not available.
(1) Net interior square feet.

Source: The Goodwin Group, interviews with project developers and/or published information.

Exhibit VI-5

Vintage Club, golf course access is frequently the major motivation to resort real estate purchases of all kinds.

In the primarily resort areas of Rancho Mirage and Indian Wells, California and Carefree, Arizona, the majority of purchasers were seeking a second home residence. Buyers at these projects were generally affluent couples with grown children who have the time to devote to golf and other recreational pursuits. In many cases, the patio home purchase represents a third or fourth property for the couple, and greater portions of buyers at such projects keep their primary residence in another state.

In contrast, at resort communities with major economic bases located nearby, such as Coto de Caza (near the South Coast Metropolitan Area of southern California) and the Biltmore (in Phoenix, Arizona) significant to major shares of purchasers were seeking a primary residence or retirement home, as also shown in Exhibit VI-G.

None of the surveyed projects include significant shares of investor-buyers.

MARKET ASSESSMENT FOR MAUI WAILEA 670 PROPERTY

This section assesses the market support for single-family residential product development at the Maui Wailea 670 property. About 340 resort lots and 110 patio homes are planned at the community with all patio homes located in the mauka area and lots distributed between the mauka and makai areas of the Resort. Over 75% of the lots and patio homes are expected to have golf frontage while almost all units are expected to provide ocean views. The following subsections address anticipated buyer market segments, proposed development concept, projected lot sales absorption and projected pricing for these two single-family product types at the Maui Wailea 670 Resort.

Anticipated Buyer Market Segments

Based on buyer profiles observed at comparable other projects, and taking into consideration the project's location and other characteristics, the primary markets for both lots and patio homes is expected to come from West coast and other U. S. mainland repeat visitors to the Wailea area who seek a vacation or retirement home. Such purchasers could represent from 50% to 65% of total sales and are likely to have stayed in one of the many visitor units and/or possibly owned a condominium at the Resort or at the nearby Wailea and Makena resorts. Buyers are expected to be primarily attracted to the Resort's single-family products for the following reasons:

- Golf frontage and spectacular ocean and mountain views.
- The country club atmosphere of and lower density living offered at the Resort.

- Living within a master-planned community which offers:
  - Lots or homes with golf frontage and ocean views
  - Two 18-hole golf courses
  - 9-court tennis center
  - Safety and security
  - Shopping and dining opportunities at the Village center
  - Sense of identity
- Proximity to other resort areas offering recreational, dining and shopping opportunities.
- Affiliation with and proximity to both Wailea and Makena resorts, offering recreational, shopping and dining opportunities and world-class beaches.

In addition to the part-time vacation home purchasers, full-time residents in the area could represent from 20% to 30% of the total purchasers. These full-time residents could include:

- Employees of the Resort and Wailea and Makena resorts (primarily management and professional employees).
- Recent migrants to the region attracted by the entrepreneurial and other opportunities associated with the planned developments at the Resort and the Wailea and Makena resorts.
- Retirees who have chosen to live in the Wailea area on a full-time basis.

In addition to the factors that could attract vacation home buyers, full-time residents could be attracted to the single-family property at the Resort due to the convenience of commuting to work or other businesses at the Resort, in Wailea or Kihei and/or its location within a 20 to 25 minute drive from the major business, commercial and service centers of the island.

It is also expected that speculative investors or builders could represent 10% to 20% of the single-family market, in purchasing lots at the Resort. This segment could include both Hawaii and mainland individuals, financial institutions, developers or home builders. They would be attracted to the Resort by its expected competitive and lower prices compared to other resort lots in the Wailea area, allowing for greater appreciation potential, as well as those features that could attract the part- and full-time residents.

Patio home and single-family lot buyers could be expected to be similar, except that patio home buyers may more often be purchasing for immediate vacation or second home use, due to the turnkey convenience, security and assurance of common area maintenance associated with patio homes.

Proposed Development Concept

As currently planned, the Wailea 670 Resort would offer distinctive residential environments on the makai and mauka portions of the property. The makai area would provide a higher level of activity, with nearby resort lodges, commercial facilities and the tennis center. The mauka portion of the project would be more residential and lower density in character, with a more private environment than the makai area.

Thus, different types of residential development could be undertaken on the makai and mauka areas, with appeal to potential buyers with varying desires. The market strategy for the Resort's residential development is to appeal to different submarkets by offering a variety of housing products, and to differentiate the Resort's products from those offered at Wailea Resort.

- Mauka area - The mauka area is planned for up to 110 patio homes and 230 single-family residential lots. Features of the area could include:
  - A private and gated community.
  - Individual lots averaging about 15,000 square feet, ranging in size up to 25,000 square feet.
  - Patio homes of about 2,200 to 3,800 net interior square feet, on lots of about 3,500 to 6,000 square feet.
  - A majority of lots and patio homes accorded frontage on the fairways of the mauka golf course.
  - Superior ocean views due to the higher elevation.
  - Proximity to the private golf course, clubhouse and Golf Resort.
  - A low density, exclusive environment.
- Makai area - Up to 110 residential lots could be developed in the makai area of the Resort, with characteristics including:
  - Smaller lots, averaging about 11,000 square feet in size.
  - A majority of lots having frontage on the fairways of the makai golf course.
  - Higher activity living, with convenient access to resort lodge, recreational and commercial facilities.
  - Patrolling security, without gated access.

Projected Lot Sales Absorption

The sales absorption of single-family lots at the Maui Wailea 670 Resort is based on the sales of about 20 to 50 lots per year observed at the surveyed resorts over the past decade. As discussed previously, these sales rates include both visitor and resident purchasers and are influenced by lot pricing, maturity and stage of development of the resort and the overall appeal of the resort as a residential and resort community.

Projected lot sales absorption at the Maui Wailea 670 Resort is presented in Exhibit VI-H and is based on the following assumptions:

- Completion of hotel and condominium developments in the Wailea area as planned and expected growing recognition of Wailea as a world-class resort area.

GCR/VMS MAUI 670

Projected Single-Family Unit Sales
at Maui Wailea 670 Resort

1991 to 2010

	1991 to 1995		1996 to 2000		2001 to 2005		2006 to 2010	
Unit type	Low	High	Low	High	Low	High	Low	High
Resort residential lots:								
Annual	15	20	20	25	25	30	25	N/A
In period	75	100	100	125	125	115(1)	40(1)	N/A
Cumulative	75	100	175	225	300	340	340	340
Patio homes:								
Annual	-	-	10	15	15	20	N/A	N/A
In period	-	-	50	75	60(1)	35(1)	N/A	N/A
Cumulative	-	-	50	75	110	110	110	110
Total:								
Annual	15	20	30	40	40	50	25	N/A
In period	75	100	150	200	185	150	40	N/A
Cumulative	75	100	225	300	410	450	450	450

N/A Not applicable, as inventory could be sold out.
(1) Period sales restricted due to lack of inventory.

- Completion of condominium and hotel developments at the Resort as indicated in previous chapters.

Lots are expected to be marketed beginning in 1991. Lot sales at the Resort are expected to be relatively low during the first five years of the 20-year projection period, at about 15 to 20 lots per year due to the relatively limited recognition of the Resort area in its initial years of operations.

Lot sales are expected to increase significantly over the last 10 to 15 years of the 20-year projection period ranging up to 25 to 30 sales per year due to:

- Growing repeat visitors and trade-up market as the Maui Wailea 670 Resort and the Wailea and Makena resorts mature.
- Growing national and international recognition of the Wailea area as a premiere visitor destination and second home community.
- Growing awareness of the Resort as a desirable lower density resort and residential community as compared to Wailea Resort.

Thus, all of the 340 planned lots are expected to be sold at the Maui Wailea 670 Resort within 15 to 17 years of marketing, or before 2010, as shown in Exhibit VI-H.

Projected Patio Home Sales Absorption

Patio homes could be introduced after about five years of Resort operations, in order to diversify the resort real estate market at that time, and to capitalize on the established reputation of the Resort. Patio home sales are projected to represent slightly lower sales absorption than lots or condominiums, due to their relatively less established market presence in the Hawaii market at the present time. Thus, beginning in about 1996, patio home sales are projected to represent about 10 to 15 units per year, increasing to about 15 to 20 per year by about 2001. This would indicate a complete sell-out of the 110 units planned within the 2001 to 2005 period, as also shown in Exhibit VI-H.

Projected achievable resort lot sales prices are based on review of prices achieved at the two recently marketed Wailea Resort subdivisions and at other surveyed resorts in the state. The two Wailea Resort single-family projects, Wailea Kialoa and Wailea Golf Estates I, are somewhat comparable to the residential lots planned at the Maui Wailea 670 Resort in terms of their ocean view orientations, and in the case of the Golf Estates, their golf course frontage.

- Wailea Kialoa sales - More than 100 lots have been sold at Wailea Kialoa Homesites since February 1987. Kialoa lots are all interior lots with ocean views. Average 1987 sales price per square foot was $11.50, and prices ranged from $8.00 to $13.00 per square foot.
- Wailea Golf Estates I sales - Interior lots at Wailea Golf Estates I originally sold for prices similar to those at Wailea Kialoa Homesites, in the range of $9.00 to $13.00 per square foot, as shown previously in Exhibit VI-D. However, golf frontage lots with ocean views carried a substantial premium with lot prices of $20.00 to $26.40 per square foot.

Wailea 670 Resort lot prices have been estimated using the Wailea Resort sales prices as a base, in the case of interior lots, and adding the premium demonstrated to attach to golf frontage lots. About 75% of lots at Wailea 670 Resort would be expected to have golf frontage. Lot sizes are expected to differ between the makai and mauka residential subdivisions; makai lots could average about 11,000 square feet in size, while mauka lots could average about 20,000 square feet.

Interior lots at the Resort are expected to range from $10.00 and $11.00 per square foot, while golf lots could range from $21.00 to $24.00 per square foot. The average price per square foot for the subdivision as a whole would then range from $15.00 to $19.00. Lot prices could be expected to range from $90,000 for small interior lots, to $450,000 for larger, golf-front parcels, as shown in Exhibit VI-I. Average lot sales prices could represent about $240,000.

Projected Achievable Patio Home Sales Prices

Achievable patio home sales prices are estimated based on comparison of patio home compared to single-family lot and condominium sales prices at the other resort developments surveyed in California and Arizona, and the sales prices projected for lots and condominiums at the Maui Wailea 670 Resort.

Achieved patio home sales prices at the selected resort developments are estimated to represent about 120% to 130% of prevailing and comparable condominium unit prices, 80% to 95% of condominium per square foot prices, and 190% to 200% of resort lot prices. Thus, 2,200 to 3,800 square foot patio homes at the Maui Wailea 670 Resort are projected to be supportable at prices ranging from about $450,000 to $850,000, in 1988 dollars, as also shown in Exhibit VI-I.

Exhibit VI-I

GCR/VMS MAUI 670

Recommended Single-Family Unit Development
Characteristics for Maui Wailea 670 Resort

(In 1988 dollars)

	Lots		Patio homes	
	Low	High	Low	High
Typical unit size (in square feet):				
Land	11,000	15,000	3,500	6,000
Interior space	N/A	N/A	2,200	3,800
Typical sales prices:				
Per unit	$ 90,000	450,000	450,000	850,000
Per square foot(1)	$ 10	24	205	225

(1) Per net interior square feet for patio homes.

VII - MAUI WAILEA 670 COMMERCIAL CENTER MARKET ASSESSMENT

This chapter projects market support for commercial center development at the Maui Wailea 670 Resort project. Market segments are identified, as are observed relationships of commercial development to visitor and resident units at comparable Hawaii resorts. Based on these relationships, future support for commercial space is estimated in line with development of the entire Maui Wailea 670 Resort project.

RESORT RETAIL DEVELOPMENT OVERVIEW

The strength of Hawaii's visitor economy and the growth of self-contained visitor destination areas have contributed to the emergence of specialized retail development catering to visitors, in the form of the resort retail center. This section reviews selected resort retail centers in terms of their physical characteristics, relationship to their resort projects and tenant mix.

Five resort shopping centers in Hawaii are selected for comparison. Three of the projects (Whaler's Village, The Shops at Kapalua and the Wailea Shopping Village) are on the island of Maui; others reviewed are Kauai's Coconut Plantation Marketplace and the island of Hawaii's Keauhou Shopping Village.

Relationship to Resort Development

Resort retail centers in Hawaii range in size from about 22,000 gross leasable square feet to about 79,000 square feet. The lower figure is for The Shops, which serves a limited and exclusive market at Kapalua Resort; the higher figure is for Whaler's Village which is the primary retail center for the entire Kaanapali Beach Resort.

Exhibit VII-A summarizes selected Hawaii resort retail centers in relation to the regional visitor accommodations inventory that support them. At the surveyed resorts, commercial space represents between 15 and 70 square feet per visitor unit.

While Wailea Shopping Village represents a relatively small center for the size of the resort, sales per square foot indicate that more commercial space could be supported by Wailea's visitor and resident population even at current development levels. Thus, Wailea appears to be relatively underserved, with about 24 square feet of commercial space per visitor unit in 1987. The relatively lower supply of Wailea commercial space may also be related to the proximity of Kihei and its numerous strip and neighborhood commercial centers which market to both residents and visitors.

It is likely that commercial space per visitor unit at Wailea will increase. As both the Wailea Resort and Maui Wailea 670 Resort projects add visitor units, the mass of demand necessary for a broad retail base will expand. Also, the planned increases in Wailea visitor units could contribute to a more self-contained environment in the resort area, thus lessening resort visitor patronage of retail uses outside of the Wailea area.

Physical Characteristics

The selected shopping centers were reviewed with respect to physical characteristics such as site area, gross leasable area, floor area ratios, parking, architectural themes and building types. A summary of physical characteristics is shown in Exhibit VII-B. Principal findings are:

- Site areas vary from 1.6 acres for The Shops at Kapalua to 10.5 acres for the Wailea Shopping Village. Gross leasable areas range from The Shop's 22,000 square feet to 90,000 square feet at Whaler's Village. However, when the currently planned expansion at the Keauhou Shopping Village is completed, that center will include more than 150,000 square feet.

- Floor area ratio is defined as the relationship of gross leasable area to total site area. Gross leasable areas at typical neighborhood shopping centers range from 20% to 25% of site area. All but one of the five centers reviewed have floor area ratios in the same general range, between 18.3% and 31.3%. The site of the Wailea Shopping Village, which has a 5.7% floor area ratio, includes the necessary acreage to more than double its current leasable area.

- Architectural themes generally relate to the themes of the resorts where the selected shopping centers have been developed. Coconut Plantation Marketplace has an outdoor bazaar theme with many kiosks, reflecting the design theme of the Coconut Plantation resort. Whaler's Village recalls Lahaina's whaling history with exhibits and a Whaler's Museum; it also has ocean frontage which adds to the ambiance of its waterfront restaurants. Wailea Shopping Village has a Hawaiian resort style, with wood construction and ample open air and view orientations.

- Building construction is typically single-story or low-rise development in separate buildings. Second floor tenants are often office, rather than retail businesses; however, second floor locations are sought after by restaurants desiring superior view orientations, and both Whaler's Village and The Shops at Kapalua have many successful second floor retail tenants.

Tenant and Market Mix

Tenants at the selected resort shopping centers tend to be oriented toward visitor purchases, although Keauhou Shopping Center also caters to resort and neighboring community residents, with its anchor a large supermarket. Apparel, gift, craft or jewelry store and restaurant uses generally represent 85% to 95% of total retail space. Whaler's Village and Coconut Plantation Marketplace each has a motion picture theater complex. Drug and sundries stores are present in each of the centers, but represent only a small portion of total retail space.

Office tenants are present in all of the surveyed resort shopping centers except for The Shops at Kapalua. Office tenants represent from 6% of total leasable space at Whaler's Village to 20% at Keauhou Shopping Village. Office tenants are geared to serve both the visitor and residential market.

GCR/VKS MAUI 673

Shopping Center Retail Space at Selected Hawaii Resort Areas

1987

Resort shopping area	Residential/visitor units	Commercial space (square feet)	Commercial space per visitor unit	Comments
Whaler's Village (Kaanapali, Maui)	2,754 hotel 2,312 condominium 5,066 total	79,000	15.5	Kaanapali is also serviced by numerous shopping centers in nearby Lahaina town. This market is underserved as indicated by the extremely high sales per square foot at the center which is almost twice that of other centers.
Wailea Shopping Village (Wailea, Maui)	969 hotel 636 condominium 1,605 total	39,006	24.3	Presently underserved; rival area projects north of the retail needs for the resort. Expansion plans are for another 35,000 square feet by about 1992.
The Shops (Kapalua, Maui)	194 hotel 528 condominium 722 total	22,000	30.5	Underutilized; small shopping complex with little roadside visibility.
Keauhou (Keauhou, Hawaii)	1,302 hotel 832 condominium 2,134 total	72,000	33.8	Keauhou is also serviced by other retail establishments in town and is planning an expansion to increase its area to about 150,000 square feet.
Coconut Plantation Market Place (Coconut Plantation, Maui)	751 hotel 161 condominium 912 total	63,600	70.0	Coconut Plantation also serves other condominiums and hotels in the Wailua-Kapaa area as well as drive-through tourists.

Sources: Compiled by Peat Marwick Main & Co. based on the Hawaii Resort Developer's Conference, Economics of Resort Development, 1985, and discussions with representatives of the respective Hawaii resorts.

Exhibit VII-A

WAILEA-KIHEI REGIONAL COMMERCIAL MARKET OVERVIEW

This section reviews planned shopping centers in the Wailea-Kihei area. Population trends in Kihei are also discussed, since regional growth in resident and visitor population represents the source of commercial expansion in the region.

Regional Market Support Factors

Residential population in the area has grown substantially since 1970. As measured by the U. S. Census, population in the Kihei, Maalaea and Makena communities increased at a compounded annual rate of 15.4% between 1970 and 1980. Based on historical trends, population is estimated to have grown from 7,200 persons in 1980 to about 11,700 persons in 1987, with an annual growth rate of 6% to 7%. In addition, more than 1,100 new dwelling units could be completed or are under construction this year, adding more than 3,000 new residents to area population.

Because shopping centers in the region cater to both visitor and resident markets, increases in de facto population offer a more comprehensive measure of market support for commercial use. Based on historical trends and review of the area's inventory of vacation homes and resort condominiums, about 7,500 additional persons were included in the region's de facto population in 1987. This group included many second home residents and visitors.

De facto population will increase with development of new visitor facilities at Wailea Resort, Maui Wailea 670 Resort, Seibu Makena Resort and in resort condominium projects at Kihei. By 1995, Maui Wailea 670 Resort could add as many as 500 visitors and 400 residents to population, as described in Chapter III. Development at Wailea Resort could increase population by 4,000 visitors and 1,300 residents by 1995, as detailed in Chapter III.

Existing Shopping Centers

Exhibit VII-C lists existing shopping centers serving the Kihei-Wailea region. Retail development is centered in Kihei; of the eight operating centers shown in the exhibit, only the Wailea Shopping Village is within the resort area, and represents less than 20% of available shopping center space.

Other commercial space in Kihei is available in individual office commercial buildings and on smaller parcels with single uses. It can be expected that nonshopping center commercial uses will continue to "fill in" available parcels along existing strips.

Planned Shopping Centers

Twelve future retail projects are being planned in the region with three (Dolphin Shopping Plaza, Kukui Mall and the ABC Shopping Center) already under construction. Other projects are variously involved in financing, planning or government permit processing. The largest potential project, the Kihei Gateway regional center, has no firm development timetable as yet.

Exhibit VII-D summarizes key information about planned shopping centers. Each of the three centers under construction are oriented to the visitor market.

Exhibit VII-D

Description of Surveyed Hawaii Resort Shopping Centers

	Year Const. Started	Site Area (Acres)	Gross Leasable Area (Square Feet) Retail	Office	Total	Floor Area Ratio(1)	Number of Shops Retail	Office	Total	Park. Ing Space	Parking Ratio(2)	Building Description
Maui: Whaler's Village	1970 and 1984	8.5	84,500	5,400	90,000	24.3%	45	8	53	420	4.5	Oceanfront, one- and two-story complex centered in 22 condominium and hotel buildings. Shops occupy building on a third floor.
Wailea Shopping Village	1977	10.5	34,506	4,500	39,006	5.7	24	5	29	151	5.8	One story plus mezzanine, wood frame with stucco siding. Luxury resort style.
The Shops at Napilua	1979	1.6	22,152	-	22,152	31.3	29	-	29	145	6.6	One two-story concrete building with parking underneath.
Kauai: Coconut Plantation Marketplace	1972	8.0	43,600	-	43,600	18.3	23	-	23	354	5.6	Seven main one- and two-story buildings, with kiosks in interior courtyard.
Hawaii: Keauhou Shopping Village	1985	7.5	57,700	14,388	72,088	22.1	20	15	35	N/A	N/A	Six 1-story buildings and one 2-story office building, freestanding supermarket.

N/A: Not available.
(1) Gross leasable area as a percent of total site area.
(2) Parking spaces per 1,000 square feet of gross leasable area.

Source: Discussions with shopping center management and International Council of Shopping Centers, Hawaii Shopping Center Directory, 1985.

GCR/VMS MAUI 670

Planned Shopping Centers in the Wailea-Kihei Region

1988 to 1993

Project by location	Expected completion date	Land area (acres)	Gross leasable square feet	Developer	Expected market orientation
Wailea area - Wailea Shopping Village expansion	1993	N/A	35,000	Wailea Development Co.	Visitor
Kihei area:					
Dolphin Shopping Plaza	1988	2.0	18,800	Victor Lyon	Visitor
Kukui Mall	1988	4.5	40,600	Ber-Vep Development Co.	Visitor
ABC Shopping Center	1988	1.1	15,000	MNS, Ltd.	Visitor
Kihei Commercial Center	1988	.5	9,000	First Commercial Brokerage	Resident
Kamaole Beach Plaza(1)	1988	N/A	10,000	Bello Realty(2)	Visitor
Lipoa Center	1989	3.3	43,568	Keonekai Development Co.	Resident
Blackfield	1990	8.0	85,000	Blackfield Hawaii Corp.	Resident/service industrial
Azeka II Shopping Center	Indefinite	20.0	23,000(3)	Azeka Building Corp.	Visitor and resident
Kihei Gateway	Indefinite	29.2	266,000	Alexander & Baldwin/Weinberg	Unknown
Longs Business Retail Center	Indefinite	5.3	38,550	Longs Drug Stores	Unknown
Kihei area subtotal		73.9	549,518		
Maalaea area - Ma'alaea Village Shops(4)	1990	18.5	130,000	Ma'alaea Triangle Partnership	Visitor
Total for region		92.4	714,518		

N/A Not available.
(1) Phase II of existing center.
(2) Project broker.
(3) Phase I only.
(4) Phase I, consisting of 60,000 square feet, to be completed in 1990.

Source: Peat Marwick Main & Co.; interviews with developers, brokers and project representatives.

Exhibit VII-D

Exhibit VII-C

GCR/VMS MAUI 670

Existing Shopping Centers in the Wailea-Kihei Region

1988

Project by location	Year completed	Land area (acres)	Gross leasable square feet	Developer
Wailea area - Wailea Shopping Village	1977	15.2	34,506	Wailea Development Co.
Kihei area:				
Kai Nani Village	1975	.9	14,000	Kamaole Two Hui
Kihei Town Center	1977	3.0	39,336	Pacific Warehouse
Azeka Place Shopping Center	1978	5.5	70,000	Azeka Building Corp.
Kealia Beach Center	1983	1.1	N/A	Kealia Beach Partners
Rainbow Mall	1984	1.9	27,020	Rosemar
Kamaole Shopping Center	1986	2.0	30,000	Bello Realty
Kamaole Beach Plaza (Phase I)	1987	1.0	2,000	Bello Realty
Subtotal		15.4	182,356	
Total		30.6	216,862	

Three other projects designed to serve regional residents could be developed in the next three years.

The largest resident-oriented center with a definite time schedule is being planned by Blackfield Hawaii, although its current market concept emphasizes service-industrial types of tenants. Most of the other planned centers are of the neighborhood shopping center type, with from 10,000 to 40,000 square feet of leasable area planned.

The Ma'alaea Village Shops project would represent a departure from recent market trends, with development of a free-standing visitor shopping center in the nearby community of Maalaea. The Ma'alaea Village Shops is also planned to be larger than any of the existing Kihei shopping centers, with a 60,000 square foot Phase I and an ultimate buildout of 130,000 square feet.

MAUI WAILEA 670 RETAIL MARKET ASSESSMENT

This section identifies market segments likely to support commercial center development at Maui Wailea 670 Resort. Estimates of future visitor and resident population at the Resort are used to project supportable retail area. Use of the two commercial development sites is also discussed.

Commercial Development at Wailea 670

As noted in Chapter I, the Wailea 670 Resort will have commercial uses in two forms at the project site:

- A retail center is planned on a six acre site in the makai portion of the community, at the planned major entry to the Wailea area from Piilani Highway.
- The village/mixed use district will contain visitor center, community uses and some commercial facilities.

The analysis of this chapter identifies market support for the six acre commercial site from primary market segments.

Plans for commercial uses in the village/mixed use district have not been finalized at this time. It is expected that these uses could include fine dining restaurants, a community leisure and entertainment center, and other uses that would appeal to Maui Wailea 670 residents and visitors, as well as residents and visitors throughout the region and island of Maui.

Because of the projected growth in visitor and resident population in the region and island, significant market support may develop for specialized commercial uses that would draw patronage from beyond the project's boundaries. Provision could be made for these facilities, to be assessed when planned uses are more definite.

Expected Market Segments

Primary support for commercial facilities at Maui Wailea 670 Resort can be expected to come from:

- Visitors staying at resort hotels, condominium units and single-family residences.
- Residents of resort condominium and single-family developments.

Secondary sources of market support, although not projected in this analysis, could come from:

- Day visitors to the Resort such as daily fee golfers.
- Residents of the Kihei and Seibu Makena communities.
- Residents of, and visitors to, the neighboring Wailea Resort.

Resort Resident Population

Resort residents are expected to constitute a primary source of market support for commercial uses at the Maui Wailea 670 Resort. As detailed in Exhibit VII-E, residents of single-family and multifamily units at Maui Wailea 670 Resort are expected to total from 400 to 440 in 1995, increasing to from 1,710 to 2,110 by 2010.

Surveys conducted by the Urban Land Institute suggest that neighborhood shopping centers generally include about 2 to 4 square feet per person residing within a radius of approximately 1-1/2 miles, although some centers include up to 12 square feet per resident. In Hawaii, regional malls include about 4 to 5 square feet of retail area per resident within their primary trade areas. Market demand from Maui Wailea 670 Resort residents is estimated at 3.5 square feet of commercial space per resort resident.

Resort Visitor Population

Most of the market support for Maui Wailea 670 Resort commercial development is expected to come from visitors staying at the Resort site. As shown in Exhibit III-H, from 505 to 640 visitor units could be in place in 1995. Visitor units refer to lodge rooms, as well as those condominium and single-family units likely to accommodate visitors. The number of visitor units could increase to between 1,230 and 1,510 by 2010.

Based on the performance of resort retail centers as summarized in Exhibit VII-A, Maui Wailea 670 Resort could be anticipated to support about 35 square feet of retail area per visitor unit.

Supportable Commercial Area from Resort Population

Exhibit VII-F summarizes supportable commercial space at Maui Wailea 670 Resort. The exhibit calculates supportable space related to residents and visitors; it also includes additional demand equal to 13% of the total. The additional demand is expected to include office uses, which are found in all but one of the resort shopping centers described in Exhibit VII-A.

Market support is anticipated for from 21,000 to 27,000 square feet of retail and associated shopping center development by 1995. A growing visitor and resident population would be projected to support a total of from 55,000 to 67,000 square feet by 2010.

GCR/VMS MAUI 670

Projected Supportable Commercial Space
at Maui Wailea 670 Resort

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Resort resident demand:								
Average daily resident population(1)	400	440	820	910	1,250	1,480	1,710	2,110
Commercial space supported(2)	1,400	1,540	2,870	3,190	4,380	5,180	5,990	7,390
Resort visitor demand:								
Visitor units in place(3):								
Lodge units	370	480	370	480	620	730	620	730
Visitor condominiums	125	150	250	300	400	500	570	735
Visitor single-family units	10	10	20	20	30	33	39	45
Total visitor units, rounded	505	640	640	800	1,050	1,260	1,230	1,510
Commercial space supported(4)	17,850	22,400	22,400	28,000	36,750	44,100	43,050	52,850
Other commercial demand(5)	2,120	2,630	2,780	3,430	4,520	5,420	5,390	6,630
Total commercial space supported	21,370	26,570	28,050	34,620	45,650	54,700	54,430	66,870

(1) From Exhibit VII-E.
(2) Based on 3.5 square feet per Maui Wailea 670 Resort resident.
(3) From Exhibit III-H.
(4) At 35 square feet per visitor unit.
(5) At 10% of total; includes office and service space.

Exhibit VII-F

GCR/VMS MAUI 670

Average Daily Resort Resident Population

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Condominium residents:								
Condominium units	250	300	500	600	800	1,000	1,140	1,470
Full-time resident units(1)	50	60	100	120	160	200	228	294
Occupancy rate	95%	95%	95%	95%	95%	95%	95%	95%
Full-time residents(2)	120	140	240	290	380	480	540	700
Part-time resident units(3)	75	90	150	180	240	300	342	441
Occupancy rate	50%	50%	50%	50%	50%	50%	50%	50%
Part-time residents(2)	90	110	190	230	300	380	430	550
Subtotal: condominium residents	210	250	430	520	680	860	970	1,250
Single-family unit residents:								
Single-family units	100	100	200	200	300	325	390	450
Full-time resident units(4)	65	65	130	130	195	211	254	293
Occupancy rate	95%	95%	95%	95%	95%	95%	95%	95%
Full-time residents(5)	170	170	350	350	520	560	670	780
Part-time resident units(6)	25	25	50	50	75	81	98	113
Occupancy rate	25%	25%	25%	25%	25%	25%	25%	25%
Part-time residents(5)	20	20	40	40	50	60	70	80
Subtotal: single-family residents	190	190	390	390	570	620	740	860
Total average daily resident population	400	440	820	910	1,250	1,480	1,710	2,110

(1) Represent 20% of all condominium units.
(2) At 2.5 persons per unit.
(3) Represent 30% of all condominium units.
(4) Represent 65% of all single-family units.
(5) At 2.8 persons per unit.
(6) Represent 25% of all single-family units.

Exhibit VII-E

Use of Commercial Sites

The Maui Wailea 670 Resort preliminary plans show two parcels with potential for resort commercial use:

- A 15-acre site planned for "Village/Mixed Use" in the center of the project site. This parcel would front the Piilani Highway extension at the major entry to the Resort.

- A 6-acre site planned "Commercial", located on the makai frontage of the Piilani Highway extension, Makena side of Wailea Iki Drive. This parcel adjoins a 15.8 acre Wailea Resort site designated for business use.

The Village/Mixed Use area is also planned to include a church, recreation center and/or theater, and a Resort real estate sales pavilion. Retail uses at this site are expected to consist primarily of restaurants or other food/convenience establishments.

The six-acre commercial site is located at a future strategic road intersection, and could have excellent exposure to traffic headed toward Makena, Wailea Resort or the proposed Maui Wailea 670 Resort. Due to its position next to Wailea's planned future business/commercial center and its Piilani Highway extension frontage, the site could contribute to an excellent site for regional commercial development. In order for this to occur, planning for the six-acre site will have to be closely coordinated with that for Wailea Resort's neighboring parcel.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION AND SUMMARY . . . . . I- 1

1. PURPOSE OF THIS DOCUMENT . . . . . I- 1

2. PROJECT DESCRIPTION . . . . . I- 2

3. NEED FOR THE PROJECT . . . . . I- 4

4. SUMMARY OF ENVIRONMENTAL IMPACTS . . . . . I- 7

4.1 PHYSICAL ENVIRONMENT . . . . . I- 7
4.1.1 Physiography and Geology . . . . . I- 7
4.1.2 Soils and Agricultural Potential . . . . . I- 7
4.1.3 Hydrology and Drainage . . . . . I- 8
4.1.4 Natural Hazards . . . . . I- 9
4.1.5 Climate and Meteorology . . . . . I- 9
4.1.6 Air Quality . . . . . I- 9
4.1.7 Noise Quality I-10
4.1.8 Visual Attributes I-11
4.1.9 Natural Environment I-12
4.1.10 Historical and Archaeological Resources I-13
4.1.11 Socioeconomic Environment I-13
4.1.12 Infrastructure I-15
4.1.13 Public Facilities I-16
4.1.14 Recreational Facilities I-16

5. SUMMARY OF PROPOSED MITIGATION MEASURES I-16

6. SUMMARY OF ALTERNATIVES I-17

7. SUMMARY OF UNRESOLVED ISSUES I-18

8. SUMMARY OF COMPATIBILITY OF LAND USE POLICIES AND CONTROLS I-18

9. NECESSARY APPROVALS AND PERMITS I-19

10. LIST OF FINAL EIS PREPARERS I-20

TABLE OF CONTENTS
(Continued)

CHAPTER II

DESCRIPTION OF THE PROPOSED PROJECT . . . . . II- 1

1. REGIONAL SETTING . . . . . II- 1

2. DESCRIPTION OF THE PROPERTY . . . . . II- 3

3. DESCRIPTION OF THE PROPOSED ACTION (PROJECT) . . II- 4

4. NEED FOR THE PROPOSED PROJECT: MARKET ASSESSMENT . . . . . II- 8

4.1 GOLF COURSES . . . . . II- 8

4.2 RESORT AND GOLF LODGES . . . . . II- 9

4.3 MARKET ASSESSMENT FOR A GOLF LODGE II-12

4.4 RESORT CONDOMINIUM UNITS II-14

4.5 SINGLE FAMILY RESIDENCES II-15
4.5.1 Market Assessment for Resort Lots II-17
4.5.2 Market Assessment for Patio Homes II-17

4.6 COMMERCIAL II-19

5. PROJECT SCHEDULE II-19

6. ESTIMATED PROJECT COSTS II-20

CHAPTER III

ALTERNATIVES TO THE PROPOSED PROJECT . . . . . III- 1

1. INTRODUCTION . . . . . III- 1

2. ALTERNATIVES ANALYZED . . . . . III- 3

2.1 ALTERNATIVE PROJECT LAYOUTS. . . . . III- 3

2.2 ALTERNATIVE COMBINATIONS OF SUPPORT SERVICES AND FACILITIES . . . . . III- 4

2.3 ALTERNATIVE USES OF THE PROJECT PROPERTY . . . . III- 5

2.4 "NO-ACTION" ALTERNATIVE . . . . . III- 6

TABLE OF CONTENTS
(Continued)

3. COMPARATIVE EVALUATION . . . . . III- 6

CHAPTER IV

DESCRIPTION OF THE AFFECTED ENVIRONMENT, PROBABLE ENVIRONMENTAL CONSEQUENCES AND PROPOSED MITIGATION MEASURES . . . . . IV- 1

1. PHYSICAL ENVIRONMENT . . . . . IV- 1

1.1 PHYSIOGRAPHY AND GEOLOGY . . . . . IV- 1
1.1.1 Existing Conditions . . . . . IV- 1
1.1.2 Probable Impacts . . . . . IV- 3
1.1.3 Mitigation Measures . . . . . IV- 3

1.2 SOILS AND AGRICULTURAL POTENTIAL . . . . . IV- 4
1.2.1 Existing Conditions . . . . . IV- 4
1.2.2 Probable Impacts . . . . . IV- 6
1.2.3 Mitigation Measures . . . . . IV- 6

1.3 HYDROLOGY AND DRAINAGE . . . . . IV- 7
1.3.1 Existing Conditions . . . . . IV- 7
1.3.2 Probable Impacts IV-10
1.3.3 Mitigation Measures IV-11

1.4 NATURAL HAZARDS IV-12
1.4.1 Existing Conditions IV-12
1.4.2 Probable Impacts IV-14
1.4.3 Mitigation Measures IV-14

1.5 CLIMATE AND METEOROLOGY IV-15
1.5.1 Existing Conditions IV-15
1.5.2 Probable Impacts IV-17
1.5.3 Mitigation Measures IV-17

1.6 AIR QUALITY IV-17
1.6.1 Existing Conditions IV-17
1.6.2 Probable Impacts IV-18
1.6.3 Mitigation Measures IV-23

1.7 NOISE QUALITY IV-23
1.7.1 Existing Conditions IV-23
1.7.2 Probable Impacts IV-24
1.7.3 Mitigation Measures IV-25

TABLE OF CONTENTS
(Continued)

1.8	VISUAL ATTRIBUTES	IV-25
1.8.1	Existing Conditions	IV-25
1.8.2	Probable Impacts	IV-25
1.8.3	Mitigation Measures	IV-26
2.	NATURAL ENVIRONMENT	IV-26
2.1	FLORA	IV-26
2.1.1	Existing Conditions	IV-26
2.1.2	Probable Impacts	IV-27
2.1.3	Mitigation Measures	IV-27
2.2	FAUNA	IV-28
2.2.1	Existing Conditions	IV-28
2.2.2	Probable Impacts	IV-29
2.2.3	Mitigation Measures	IV-29
3.	HISTORICAL AND ARCHAEOLOGICAL RESOURCES	IV-29
3.1	EXISTING CONDITIONS	IV-29
3.2	PROBABLE IMPACTS	IV-30
3.3	MITIGATION MEASURES	IV-31
4.	SOCIOECONOMIC ENVIRONMENT	IV-31
4.1	EXISTING CONDITIONS	IV-31
4.2	PROBABLE IMPACTS	IV-32
4.3	MITIGATION MEASURES	IV-36
5.	INFRASTRUCTURE	IV-37
5.1	HIGHWAYS	IV-37
5.1.1	Existing Conditions	IV-37
5.1.2	Probable Impacts	IV-39
5.1.3	Mitigation Measures	IV-42
5.2	WATER SUPPLY	IV-42
5.2.1	Existing Conditions	IV-42
5.2.2	Probable Impacts	IV-44
5.2.3	Mitigation Measures	IV-47

TABLE OF CONTENTS
(Continued)

5.3	WASTEWATER DISPOSAL	IV-48
5.3.1	Existing Conditions	IV-48
5.3.2	Probable Impacts	IV-49
5.3.3	Mitigation Measures	IV-49
5.4	SOLID WASTE DISPOSAL	IV-50
5.4.1	Existing Conditions	IV-50
5.4.2	Probable Impacts	IV-50
5.4.3	Mitigation Measures	IV-50
5.5	ELECTRICAL POWER AND COMMUNICATION SYSTEMS	IV-51
5.5.1	Existing Conditions	IV-51
5.5.2	Probable Impacts	IV-51
5.5.3	Mitigation Measures	IV-52
6.	PUBLIC SERVICES AND FACILITIES	IV-52
6.1	PUBLIC SCHOOLS	IV-52
6.1.1	Existing Conditions	IV-52
6.1.2	Probable Impacts	IV-52
6.1.3	Mitigation Measures	IV-53
6.2	HEALTH CARE FACILITIES	IV-54
6.2.1	Existing Conditions	IV-54
6.2.2	Probable Impacts	IV-54
6.2.3	Mitigation Measures	IV-54
6.3	POLICE AND FIRE PROTECTION	IV-54
6.3.1	Existing Conditions	IV-54
6.3.2	Probable Impacts	IV-55
6.3.3	Mitigation Measures	IV-55
6.4	RECREATIONAL FACILITIES	IV-55
6.4.1	Existing Conditions	IV-55
6.4.2	Probable Impacts	IV-56
6.4.3	Mitigation Measures	IV-56

CHAPTER V

RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA . . . . . V- 1

1. THE HAWAII STATE PLAN . . . . . V- 1

TABLE OF CONTENTS
(Continued)

2. STATE FUNCTIONAL PLANS V-15

State Historic Preservation Funcional Plan - Historic Properties V-15
State Housing Functional Plan V-16
State Recreation Functional Plan - Access . . . V-16
State Tourism Functional Plan - Physical Development V-17
State Tourism Functional Plan - Employment and Career Development V-17
State Tourism Functional Plan - Community Relations V-18

3. GENERAL PLAN FOR THE COUNTY OF MAUI V-19

4. KIHEI-MAKENA COMMUNITY PLAN V-22

5. MAUI COUNTY ZONING V-22

6. COASTAL ZONE MANAGEMENT ACT (CHAPTER 205-A, HRS) V-23

7. ENVIRONMENTAL IMPACT STATEMENTS (CHAPTER 343, HRS) V-23

CHAPTER VI

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY . . . . . VI- 1

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES . . . . . VII- 1

CHAPTER VIII

CONSIDERATION OF OFFSETTING GOVERNMENTAL POLICIES . . . . . VIII- 1

CHAPTER IX

UNRESOLVED ISSUES . . . . . IX- 1

TABLE OF CONTENTS
(Continued)

CHAPTER X

REFERENCES . . . . . X- 1

CHAPTER XI

CONSULTED PARTIES, COMMENTS AND RESPONSES DURING CONSULTATION PERIOD . . . . . XI- 1

1. CONSULTED PARTIES . . . . . XI- 1

STATE AGENCIES . . . . . XI- 1
FEDERAL AGENCIES . . . . . XI- 2
COUNTY OF MAUI . . . . . XI- 2
COMMUNITY ORGANIZATIONS AND INDIVIDUALS . . . . XI- 2

CHAPTER XII

AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A COPY OF THE DRAFT EIS; WRITTEN COMMENTS RECEIVED DURING THE PUBLIC REVIEW PERIOD AND RESPONSES . . . . . XII - 1

APPENDICES

A. Market Assessment

B. Fiscal Impact Analysis Report

C. Air Quality Impact Analysis Report

D. Archaeological Reconnaissance Survey

E. Avifaunal and Feral Mammal Survey

F. Botanical Survey

G. Engineering Report

H. Traffic Assessment

LIST OF TABLES

Table		
I-1	General Land Use Allocation	I- 4
I-2	Necessary Approvals and Permits	I-19
II-1	General Land Use Allocation	II- 7
II-2	Projected Golf Course Demand at the Maui Wailea 670 Resort	II-10
II-3	Targeted Resort Lodge Guest Markets	II-11
II-4	Projected Market Support for Maui Wailea 670 Resort Lodge Units, 1990 to 2010	II-12
II-5	Supportable Development at the Maui Wailea 670 Resort, 1995 to 2010	II-13
II-6	Anticipated Resort Condominium Buyer Markets	II-14
II-7	Projected Supportable Condominium Unit Sales at the Maui Wailea 670 Resort, 1991 to 2010. .	II-16
II-8	Projected Single Family Unit Sales at Maui Wailea 670 Resort, 1991 to 2010	II-18
IV-1	Maui Wailea Project Area Drainage Basin Runoff	IV- 9
IV-2	Annual Wind Rose, Old Maui Airport, 1953 - 1957	IV-16
IV-3	PM-10 & SO2 Monitoring Data, Kihei, Maui, 1987	IV-19
IV-4	Summary of State of Hawaii and Federal Ambient Air Quality Standards	IV-20
IV-5	1980 Emissions Inventory, County of Maui . . .	IV-21
IV-6	Design Criteria Per 1971 Water Master Plan for County of Maui	IV-45
IV-7	Projected Water Consumption at Build-Out . . .	IV-46
IV-8	Projected Student Enrollment	IV-52

LIST OF FIGURES

FIGURE		Following Page No.
II- 1	Island Location Map	II- 2
II- 2	Regional Location Map, Kihei-Makena Community Plan	II- 2
II- 3	TMK Map	II- 4
II- 4	State Land Use/County Zoning	II- 4
II- 5	Kihei-Makena Community Plan	II- 4
II- 6	Kihei-Makena Community Plan: Public Facilities	II- 4
II- 7	Conceptual Development Plan	II- 6
IV- 1	Slope Analysis	IV- 2
IV- 2	Soils	IV- 4
IV- 3	Photo Index Map	IV-26
IV- 4	Site Photographs	IV-26
IV- 5	Existing Easements/Drainage	IV-38
IV- 6	Existing Access	IV-38

IV
DESCRIPTION OF THE AFFECTED ENVIRONMENT, PROBABLE ENVIRONMENTAL CONSEQUENCES AND PROPOSED MITIGATION MEASURES

CHAPTER IV

DESCRIPTION OF THE AFFECTED ENVIRONMENT, PROBABLE ENVIRONMENTAL CONSEQUENCES AND PROPOSED MITIGATION MEASURES

Descriptions of the affected environment (existing conditions), probable environmental consequences (impacts) of the proposed project on existing conditions and mitigation measures designed to minimize and/or eliminate potential adverse impacts are given in the following paragraphs. For ease of review and evaluation, information and analyses of the impacts of the proposed project on the physical and natural environment; historical and archaeological resources; socioeconomic environment; infrastructure; and public services and facilities, in that order, are provided. The information and analyses given are based on (1) field and/or office studies conducted specifically for this EIS; (2) comparisons and evaluations by specialty consultants (see Chapter I) of the proposed project relative to similar planned or existing housing projects; and (3) the input, advice, guidance and information provided by public agencies, private groups, organizations and residents of the project area during the development and review of the EIS Preparation Notice (EISPN) during the consultation period for this EIS.

1. PHYSICAL ENVIRONMENT

1.1 PHYSIOGRAPHY AND GEOLOGY

1.1.1 Existing Conditions

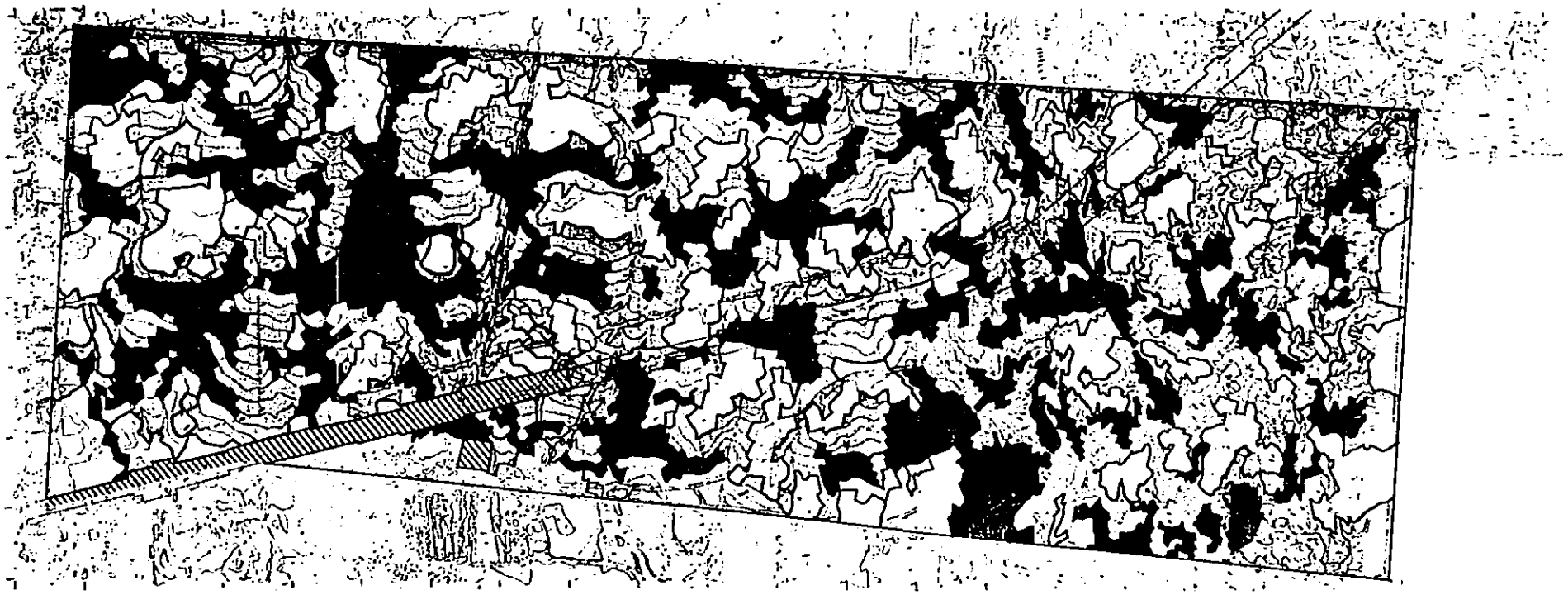
The general geology of the northern (approximately 500 acres) portion of the Maui Wailea project site is dominated by lava

flows of the Kula Volcanic Series while more recent lava flows known as the Hana Volcanic Series overlie the southern (approximately 170 acres) portion of the site. Kula Volcanic Series flows are early Pleistocene in age and Hana Volcanic Series lavas are late Pleistocene to recent flows, the last of which near the project area (La Perouse Bay) occurred around 1750. Lava flows at the project site are predominantly a'a basaltic lavas interlayered with clinker gravel.

Because of the relatively dry local climatic conditions, weathering and erosion of the surface clinker and basalt or the Kula lava flows has resulted in the formation of only a thin layer of residual clayey and sandy gravelly silts. The residual soils normally overlie less weathered clinker and massive a'a basalt. The clinkery material is generally unconsolidated and loose to medium dense in its natural condition. Exposures of massive a'a basalt lava interbedded with clinker zones are visible along the side walls of several of the major gullies found in the upper portions of the site.

Because the Hana lava flows are derived from younger volcanic eruptions than the Kula flows, less weathering and erosion of the surface clinker has taken place. Little to no soil cover is present over a major portion of the southern part of the project site.

The project site slopes generally in a mauka-makai direction at an average of 12 percent and is dissected by steeply sloping gullies which define ridges that are gently sloping on top and terminate in overlooks adjacent to steeply sloping areas (Figure IV-1). Ridges and gullies define drainage areas which convey significant quantities of on-site and off-site storm water run-off during storms. Modifications to gullies are constrained by flood hazards and drainage improvements previously installed downstream within Wailea.



LEGEND

SLOPE CATEGORIES

- 0-10%
- 11-20%
- 21-30%
- 30% & GREATER

SLOPE ANALYSIS

FIGURE IV-1

MAUI WAILEA 670

0 600 1200 FEET

PBR HAWAII

A previous consulting report (Dames and Moore, 1986), indicated that the geology of the site is conducive to development and that on-site materials are suitable for structural fills and for bearing the loads of structures, but that some heavy rock excavation can be anticipated due to the presence of exposed or lightly covered lava flows.

1.1.2 Probable Impacts

Impacts on the physiography and geology of the project site could be caused by alterations to the topography of the site to accommodate the various residential/resort facilities and amenities (housing units, golf courses and village) and infrastructural components (roadways, utilities and drainage structures). The planned alterations, however, are relatively insignificant compared to the overall geologic character of the site and region. As such, significant impacts to the geology and physiography of the project site, resulting from the proposed project, are not expected.

1.1.3 Mitigation Measures

Due to the expected lack of significant impacts on the physiography and geology of the project site or region, mitigation measures to minimize potential adverse impacts are not warranted. As noted in Subsection 1.4 below, appropriate engineering, design and construction measures would be taken to minimize potential volcanic and seismic impacts on the proposed residential units and facilities.

1.2 SOILS AND AGRICULTURAL POTENTIAL

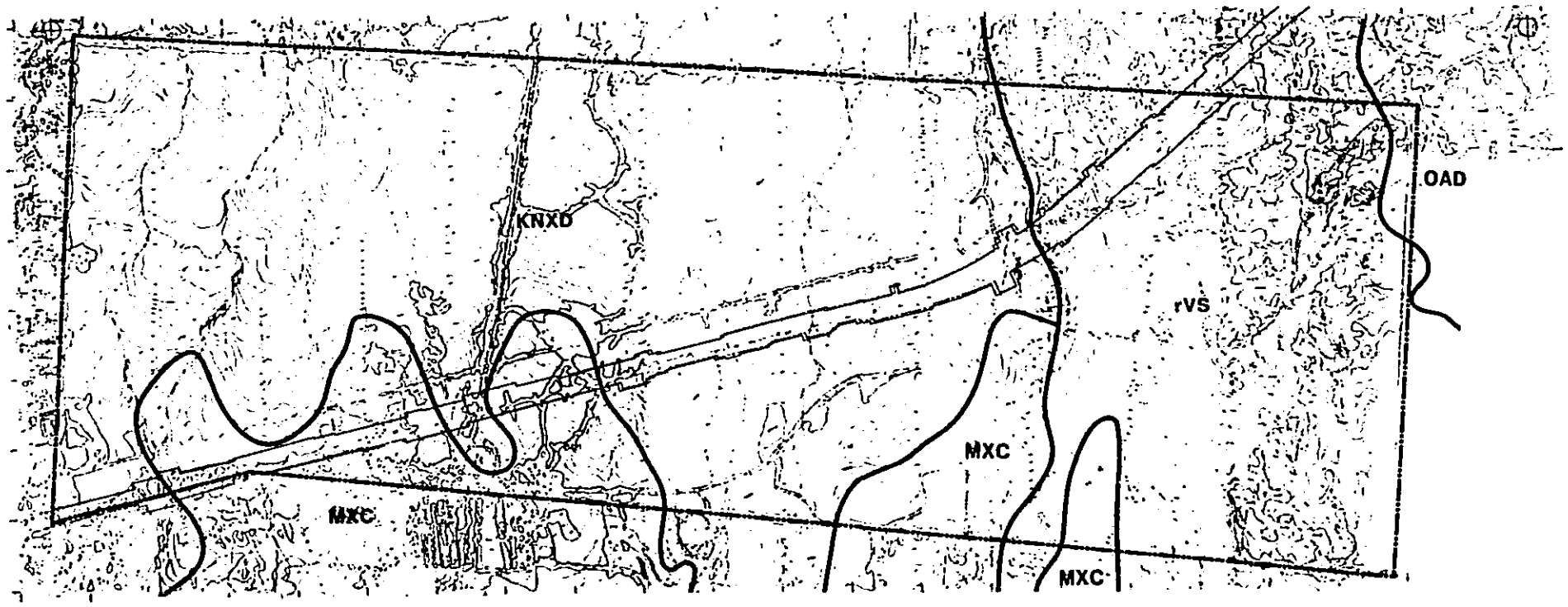
1.2.1 Existing Conditions

The soils of the project area include four soil types of two soils associations: Keawakapu-Makena association and Kamaole-Oanapuka association. The US Department of Agriculture Soil Conservation Service (USDA-SCS) designates the four on-site soil types as; Oanapuka, very stony silt loam (OAD); Very Stony Land (rVs); Makena Loam, stony complex (MXC); and Keawakapu, extremely stony silty clay loam (KNXD) (Figure IV-2). Each of the soil types has a distinguishing range of physical characteristics as described below.

OAD Oanapuka, very stony silt loam. This soil type is found in the southeastern corner of the project site. In a representative profile, the surface layer, about six inches thick, is a very dark brown and very dark grayish brown silt loam that has a granular and subangular blocky structure. This soil has been used to support pasture land and wildlife habitat with its various exotic grasses and trees. Permeability is moderately rapid, runoff is slow and the erosion hazard is slight to moderate. The Capability classification of this soil type is VIs, nonirrigated; pasture group 2.

rVs Very stony land. This land type consists of areas where 50 to 90 percent of the surface is covered with stones and boulders. In the proposed project area the southern one-third of the site is this soil type. This soil type consists of young a'a lava that has a thin covering of volcanic ash that locally extends deep into cracks and depressions. The ash covered area supports grasses and shrubs, such as Lantana, Kiawe and Natal Redtop. This land type is used for pasture and wildlife habitat. Pasture improvement is difficult because of the many stones and Capability classification is VIIs, nonirrigated.

MXC Makena loam, stony complex, 3 to 15 percent slopes. This complex is on the lower, western portion of the project site. In a representative profile, the surface layer, about four inches thick, is very dark brown loam that has a platy structure. On the Makena



LEGEND

SOIL CLASSIFICATION

KNXD	KEAWAKAPU STONY SILTY CLAY LOAM 3-25% SLOPE
MXC	MAKENA LOAM, STONY COMPLEX 3-15% SLOPE
rVS	VERY STONY LAND
OAD	ONAPUKA VERY STONY SILT LOAM 7-25% SLOPE

SOURCE: U.S. DEPARTMENT OF AGRICULTURE

SOILS

FIGURE IV-2

MAUI WAILEA 670

0 600 1200 FEET

PBR HAWAII

part of the complex, permeability is moderately rapid, runoff is slow to medium and the erosion hazard is slight to moderate. This complex is used for pasture and wildlife habitat and the Capability classification is VIs, nonirrigated, pasture group 1.

KNXD Keawakapu, extremely stony silty clay loam, 3 to 25 percent slopes. The majority of the project site is of this soil type. In a representative profile, the surface layer, about 2 inches thick, is dark reddish-brown extremely stony silt loam that has a platy structure. Permeability is moderate, runoff slow to medium and the erosion hazard is slight to moderate. The soil is used for pasture and wildlife habitat and Capability classification is VIs, nonirrigated, pasture group 1.

The capability classifications noted above, in Roman numerals, generally show the suitability of the soils for most kinds of crops. The soils are further classified by subclasses, with the letter "s" indicating that the soil is limited mainly because it is shallow, droughty or stony. Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their usage largely to pasture or range, woodland or wildlife habitat. Class VII soils have very severe limitations because of stoniness or unfavorable texture. The soils are very stony, very rocky, extremely stony or extremely rocky. As indicated in the descriptions listed above, the Soil Conservation Service has rated these on-site soils as generally unsuited for agricultural purposes, with low shrink/swell potential, low erodibility, good permeability, shallow depths to bedrock and fair to good suitability for road fill and other structural work.

Agriculturally, the Detailed Land Classification, Island of Maui, University of Hawaii, Land Study Bureau, 1967 (Map No. 41), classifies the project site lands as E 29, E 77 and E 88, and indicates their machine tillability capabilities for agricultural purposes as low productivity rating and poorly suited, very poorly suited and not suited, respectively. Historically, there

has been occasional use of the project area for cattle grazing. Other than this, there is no known agricultural use of the project site.

1.2.2 Probable Impacts

Given that the soils of the project site are poorly to not suited to agricultural activities other than use as pasture or range land, adverse impacts to the soils or agricultural potential of the project site are not expected to result from the proposed project. The use of the site for resort, residential and recreational purposes would, however, severely restrain potential future agricultural activities on the site if the land were required for agricultural purposes. There are no known proposed uses of the site for agricultural or other possible related activities at this time. The proposed project will not require the relocation or displacement of existing agricultural operations.

Although the proposed project is not expected to significantly affect the soils of the project site, the soils, because of their characteristics, could affect the project. As noted previously, a previous consulting report (Dames and Moore, 1986), indicated that the geology of the site is conducive to development and that on-site materials are suitable for structural fills and for bearing the loads of structures, but that some heavy rock excavation can be anticipated due to the presence of exposed or lightly covered lava flows.

1.2.3 Mitigation Measures

Given the poor quality of the soils for agricultural activities and possibly as building materials, it does not appear that the proposed project would have an adverse impact on the soils or

agricultural potential of the site. As such, mitigation measures to minimize potential adverse impacts do not appear warranted.

The removal of the site from potential agricultural activities could cause adverse impacts via the reduction in the number of acres of land on Maui that would be available for agricultural activities. At this time there are no known plans to utilize the project site for agricultural activities. Similarly, it does not appear likely that agricultural activities would be pursued on the site due to the lack of water and the poor quality of the soils.

1.3 HYDROLOGY AND DRAINAGE

1.3.1 Existing Conditions

Climatically, as will be noted below in Section 1.5, the project area is generally semi-arid, with rainfall averaging about 12 inches per year. The project site is underlain by a continuous aquifer of brackish groundwater having average salinity of 500 to 1,000 mg/l chloride. The acceptable chloride limit for drinking water is 250 mg/l. As such, no portion of the groundwater below the project parcel or downgradient from it is potable. However, the quality of the groundwater is suitable for agricultural activities based on grasses. It is noted that the ground water flowing beneath the proposed project site is part of a common brackish water resource that also underlies neighboring properties. Thus, the entire quantity of water flowing beneath the site is not available for the sole use of the proposed project and existing uses of this groundwater resource will not be impaired by the development of additional wells. The Underground Injection Control Line, as drawn by the State Department of Health, is along the 600-foot elevation contour, above the majority of the project parcel.

The water table of the project site lies at about two feet above sea level, or approximately at a depth equal to the surface elevation. The shallowest wells possible on the site would have to be about 400 feet deep. The best quality water lies below the most inland reach of the parcel and would require wells about 700 feet deep to develop.

The volume of groundwater moving through the property toward the coast is substantial and originates from the watershed of the upper slopes of Haleakala. The proposed project site is located on the western slope of Haleakala in what is often referred to as the Kihei-Makena watershed. The contributory drainage area above the project site contains approximately six square miles or roughly 3,850 acres. This off-site drainage area rises from an elevation of about 700 feet at the easterly (mauka) boundary of the project area to 6,400 feet at the ridge on Mount Haleakala, a distance of approximately 30,000 feet. About 85 percent of this watershed area is presently being used for grazing with the remaining 15 percent in conservation use.

Seaward and downgradient of the project parcel, several wells service irrigation needs in Wailea Development Company, Inc's property. It is estimated that the total flux of groundwater exceeds withdrawals, thereby allowing additional groundwater development. As noted above, the entire quantity of water flowing beneath the site is not available for the sole use of the proposed project. Additional hydrologic studies and monitoring systems will be utilized so as not to impact the existing users of this groundwater resource by the development of additional wells.

A hydrology report prepared for the State Department of Transportation, Highways Division, in conjunction with the

Piilani Highway project, indicates that there are five major contributory drainage areas above the project site. Numerically, they are designated as Drainage Basins 33, 34, 35, 39 and 43. Runoff from these and other drainage basins above the proposed Piilani Highway Extension are tabulated in Table IV-1.

TABLE IV-1
MAUI WAILEA PROJECT AREA
DRAINAGE BASIN RUNOFF

Drainage Basin No.	Rational Method 50 Yr. (cfs)	Rational Method 100 Yr. (cfs)	SCS Method 50 Yr. (cfs)	SCS Method 100 Yr. (cfs)
33	-	-	1,925	2,716
34	-	-	790	953
35	-	-	770	938
36	109	114	-	-
37	155	188	-	-
38	185	204	-	-
39	-	-	1,960	2,324
40	109	150	-	-
41	115	159	-	-
42	30	42	-	-
43	-	-	497	598
44	86	111	-	-

Source: Appendix H

Runoff from Drainage Basin No. 33 flows across the Grand Champions Condominium project site at the Wailea Tennis Complex, through two 7-foot by 12-foot concrete box culverts on Wailea Alanui into the drainage channel on Wailea Elua to the ocean. Flow from Drainage Basin No. 34 drains into the existing ditch on the northerly side of Wailea Ike Drive eastbound lane, through five 45-inch by 65-inch pipe arches under Wailea Ike Place and Wailea Alanui into the open channel in Wailea Elua.

A pair of 84-inch culverts convey runoff from Drainage Basin No. 35 across Wailea Ekolu Place in Golf Estates I and Wailea Alanui.

Open space has been set aside in Site B north of the public beach access and makai of Wailea Alanui for a drainageway to convey runoff from this basin into the ocean.

Drainage Basin No. 39 drains into a well defined gully south of Wailea Golf Clubhouse. Two 10-foot diameter culverts convey runoff across Wailea Alanui. This gully discharges into the ocean south of the Polo Beach Condominium.

Runoff from Drainage Basin No. 43 is conveyed via a 78-inch culvert and three 66-inch culverts across the recently completed portion of Wailea Alanui.

Preliminary indications are that all of the drainage structures were sized to handle flows based on a 50 year recurrence interval. Consequently, with the county now requiring that a 100 year recurrent interval be used, these drainage crossing will have to be re-evaluated and, if required, modified to handle the 100 year flow.

1.3.2 Probable Impacts

Impacts to the hydrological characteristics of the project site and/or area are not expected to result from the proposed project. As noted above, the groundwater flow exceeds present withdrawal quantities, thereby allowing additional development of the groundwater supplies. The effect of inland wells on Wailea's output will depend on the location of new wells and pumping rates of those wells. As noted above, ground water development of the proposed project site will be such that the water supplies of neighboring properties are unaffected. The Seibu irrigation wells are off the path flow of groundwater passing below the project property and would not be affected by new well development. Additional information regarding the development of

new water sources for the proposed project is given in Section 5.2 of this chapter. As noted above, there are no potable water supplies below the project property.

Similarly, although changes to the existing surface drainage patterns will be made, major impacts to the surface drainage patterns are not expected to occur. On-site planned improvements include storm drains that would collect surface water runoff and discharge into existing drainage channels. The proposed improvements include construction of street drain systems, in accordance with county standards. Additionally, to reduce flow rates of surface waters, retention basins may be designed into the golf courses. All drainage calculations and structures would be performed and designed in accordance with applicable state and county design criteria standards.

For temporary erosion control, appropriately sized ponding basins will be constructed on-site for desilting storm runoff prior to discharge into the existing drainage system. None of the planned improvements to the existing drainage system would be performed below the mean high water level (MHWL) of tidal waters.

A drainage master plan will be prepared and submitted for county concurrence prior to the development of the project per the project Conceptual Development Plan.

1.3.3 Mitigation Measures

Significant adverse impacts to the hydrological and drainage characteristics of the project site are not expected to result from the proposed project. Similarly, the hydrological and drainage characteristics of the site are not expected to significantly affect the proposed project. As such, mitigation measures to minimize potential adverse impacts, other than those

that will be designed into the proposed project, do not appear warranted at this time. All new drainage structures and storm drains would be designed to applicable engineering design codes and regulations.

1.4 NATURAL HAZARDS

1.4.1 Existing Conditions

Potential natural hazards to which the project property could be subjected include floods and volcanic eruptions. The project site is located outside the tsunami zone for the area which terminates mauka at Kihei Road at an elevation of approximately 25 feet mean sea level (MSL). Similarly, there are no perennial streams and/or intermittent gulches of appreciable size in the project area, thereby significantly reducing the possibility of flooding on the project site. It is noted, however, that there are several large dry gullies and smaller secondary dry gullies on the project site, indicating that rainwater runoff has caused some erosion in the past.

Volcanic hazards in the area have been studied in detail (Mullineaux, et al, 1987). The last volcanic eruption of Haleakala occurred in 1790 at a vent in the lower part of the southwest rift zone, and it produced a 3-kilometer long lava flow. The average frequency of eruptions on the volcano as a whole has been nearly one per 100 years during the past 1,000 years.

Lava-flow hazards on Maui have been defined (Mullineaux, et al, 1987) from highest (1) to lowest (5) degree of hazard. As an example, lava-flow hazard zone 1 includes areas in which about 50 percent of the land surface has been covered by lava flows during the last 1,000 years, and it covers the crater of Haleakala and the southwest rift zone. The proposed Maui Wailea 670 project

property is located in lava-flow hazard zone 3, which is defined as areas in which eruptions have not occurred for more than 1,000 years, but where much of the land surface has been covered by lava flows within the last 20,000 years. Flows have occurred at an average rate of at least one per 2,000 years in this area, although the last flow was erupted about 4,000 years ago.

In addition to lava-flow hazard zones, hazard zones for tephra falls have also been defined for Maui (Mullineaux, et al, 1987). Because of the low frequency of eruptions on Maui in comparison with the Big Island, the likelihood of areas being affected by ashfall is much lower. If an ash-producing eruption does occur, the active vent probably will be within the crater or somewhere along the southwest rift zone. Three zones of different ashfall hazard on Maui have been defined and are based on the estimated frequency and range of thickness of future ashfalls. Within each ashfall-hazard zone, maximum thicknesses should be expected near the source vent, with rapidly decreasing thicknesses at increasing distance downwind. The subject property is located in ashfall-hazard zone 2, which includes areas in which 1 to 100 cm of ash could fall less often than once per 500 years but more often than once per 1,000 years and in which less than 1 cm of ash is expected once per 200 to 500 years.

Hazard zones are not designated on Maui for pyroclastic surges, volcanic gases, ground fracture and subsidence or earthquakes. However, it is postulated by Mullineaux, et al (1987), that most future destructive earthquakes on Maui probably will be generated along the Molokai fracture zone (located between Molokai and offshore of West Maui) and thus could affect all or most parts of the island. Seismic hazards in the Wailea-Makena area are no greater than other locations on Maui and are accounted for in design standards and the building codes. Pyroclastic surge hazards are more likely from vents near or beneath sea level and

those in areas of high groundwater table. The most likely locations of such vents are near the coastline along the two rift zones of Haleakala. The area of greatest potential danger to human health from volcanic gases is probably within the crater of Haleakala and the most likely area of ground fracture and subsidence in the future coincides with the crater and southwest rift zone, the result of these events most likely being associated with an eruption.

1.4.2 Probable Impacts

Due to the location of the site and underlying geologic structure, the proposed project is not expected to either effect or be affected by flood hazards given the measures that will be taken to improve and upgrade drainage structures and channels. Similarly, the proposed project is not expected to either effect or be affected by tsunamis or seismic hazards due to the engineering design standards that will be followed in accordance with state and county rules and regulations. The project area could be impacted to some extent by volcanic eruptions and accompanying ashfalls. Based on the hazard analyses that have been performed by others (Mullineaux, et al, 1987), it appears that the project site is in the lower range of volcanic hazards and in the mid-range of ashfall hazards.

1.4.3 Mitigation Measures

Due to the lack of expected adverse impacts by floods, tsunamis or seismic activity, mitigation measures, other than adherence to engineering design and building standards to minimize potential adverse impacts, do not appear warranted. No special precautions can be taken to mitigate potential volcanic hazards. Should an eruption occur, highway routes from the project site appear to be adequate to allow people to evacuate in a timely and safe manner.

1.5 CLIMATE AND METEOROLOGY

1.5.1 Existing Conditions

The Maui-Wailea 670 project area is typical of Hawaii's climate with little seasonal or diurnal temperature variation. Monthly temperature averages vary only by a few degrees from the warmest months (July and August) to the coolest months (January and February) (NOAA, 1974). The area is dry with an annual rainfall of about 12 inches and a Thornwaite precipitation/evaporation (P/E) index of 14.6 (Thornwaite, 1931).

Local terrain on Maui plays an important role in determining both wind direction and speed at any particular location. Areas within the "wind shadows" of the highest elevations of the West Maui Mountains or Haleakala are shielded from all but the strongest tradewinds and experience a very pronounced land-seabreeze regime. The northeasterly tradewinds are accelerated due to a venturi affect as they pass between the two major mountain masses. Along the Kihei-Makena coast, the daytime tradewinds appear to have a more northerly component as they pass around the flank of Haleakala. At night, drainage winds coming down the mountains frequently prevail. Afternoon winds demonstrate a strong westerly component and predominance of northwesterly winds. These afternoon seabreezes also tend to have a higher average velocity as compared to the Old Maui Airport.

The northerly predominance (45 percent) is evident in the annual wind rose for the Old Maui Airport north of the project site. Low wind speeds were also common with an annual frequency of about 41 percent for wind less than 7 knots (Table IV-2) (Westinghouse, 1975).

TABLE IV-2
ANNUAL WIND ROSE
OLD MAUI AIRPORT
1953 - 1957

Direction	Speed (knots) 0-3	4-6	7-10	11-16	17-21	>21	TOTAL
N	.0602	.0923	.1162	.1417	.0380	.0026	.4491
NNE	.0231	.0265	.0264	.0564	.0246	.0026	.1596
NE	.0323	.0344	.0087	.0087	.0031	.0001	.0870
ENE	.0046	.0048	.0007	.0003	.0000	.0000	.0103
E	.0108	.0091	.0008	.0002	.0000	.0000	.0209
ESE	.0015	.0012	.0003	.00000	.0000	.0000	.0030
SE	.0044	.0033	.0013	.0006	.0000	.0000	.0096
SSE	.0011	.0013	.0009	.0004	.0001	.0001	.0039
S	.0050	.0077	.0157	.0111	.0027	.0006	.0426
SSW	.0009	.0016	.0032	.0024	.0003	.0000	.0084
SW	.0010	.0011	.0010	.0004	.0000	.0000	.0036
WSW	.0002	.0003	.0001	.0000	.0000	.0000	.0005
W	.0008	.0012	.0006	.0002	.0000	.0000	.0027
WNW	.0009	.0013	.0013	.0005	.0001	.0000	.0041
NW	.0154	.0244	.0253	.0147	.0023	.0003	.0824
NNW	.0156	.0254	.0331	.0314	.0063	.0003	.1121
TOTAL	.1776	.2359	.2335	.2687	.0776	.0066	0.9998

FRACTION OF CALMS = .0819

1.5.2 Probable Impacts

The proposed project is not expected to have any impact on the climate or meteorology of the project area or region. Planned structures would not be tall enough to significantly affect existing wind patterns; and new landscaping or residential vegetation is not expected to be great enough to significantly affect temperature or rainfall patterns.

1.5.3 Mitigation Measures

Due to the lack of expected adverse environmental impacts on the existing climatological and meteorological characteristics of the project area or region, mitigation measures to minimize potential adverse impacts do not appear warranted.

1.6 AIR QUALITY

1.6.1 Existing Conditions

The proposed project is classified as an "indirect source" of air pollution as defined in the federal Clean Air Act of 1977 because its primary association with air pollution is due to its inherent generation of mobile source, i.e., motor vehicle activity. The proposed project will also have off-site air quality effects due to increased demand for electrical energy, which must be met through the combustion of some type of fuel; disposal of the refuse generated by the residents of Maui-Wailea 670; and there will be short-term impacts during construction due to vehicular movement, clearing and grading, concrete and asphalt batching and general dust-generating construction activities (Appendix C).

At present, there are a number of possible sources that may affect air quality in the project area. Agricultural activities including sugar cane field burning, bagasse and fossil fuel

burning at sugar mills and the Maui Electric Company (MECO) Maalaea power plant and pesticide spraying all have the potential for affecting air quality in varying degrees. Existing Wailea resort activity and concomitant motor vehicle traffic also affect local air quality.

The nearest State Department of Health air monitoring station to the project site is located at Kihei, about seven miles north of Wailea. A summary of the most recent data from that site are presented in Table IV-3. These data suggest that state and federal standards for inhalable particulates (PM-10) and sulfur dioxide (SO_2) are being met. Federal and state air quality standards are shown in Table IV-4. The state currently has total suspended particulate (TSP) standards, but is measuring PM-10 particulates which are not directly comparable. The principal automotive pollutants, carbon monoxide (CO), nitrogen dioxide (NO_2) and hydrocarbons (HC) are not routinely monitored on Maui. The last measurement for NO_2 (1976) ranged from less than 0 to 39 ug/m^3 with an average of 18 ug/m^3 in Kahului. The 1980 ambient air quality emissions inventory for Maui County are another indicator of present ambient air quality. This inventory, while not a direct indicator of air quality, does provide some insight into the magnitude of pollutant emissions as well as highlighting the major source categories. The Maui County air quality emissions inventory is shown in Table IV-5. As shown in the table, it is evident that motor vehicles are the principal source of air pollution on Maui and that the most abundant pollutant is carbon monoxide.

1.6.2 Probable Impacts

Impacts to the project area and regional air quality could be caused by increased vehicular activity; electrical generation off-site; solid waste disposal off-site; and construction activities.

TABLE IV-3

PM-10 & SO2 MONITORING DATA

KIHEI, MAUI, 1987

	Particulate Matter (PM-10) 24-Hour Concentrations (ug/m3)				Sulfur Dioxide (SO2) 24-Hour Concentrations (ug/m3)			
MONTH	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 87	4	17	49	28	4	<5	<5	<5
Feb 87	5	11	23	17	4	<5	<5	<5
Mar 87	5	22	107	45	5	<5	6	<5
Apr 87	3	24	36	29	2	<5	<5	<5
May 87	2	20	41	30	3	<5	<5	<5
Jun 87	4	16	47	25	4	<5	6	<5
Jul 87	5	18	42	29	4	<5	12	7
Aug 87	3	13	33	22	3	<5	13	9
Sep 87	5	24	36	31	2	<5	<5	<5
Oct 87	Data not available				Data not available			
Nov 87		"	"			"	"	
Dec 87		"	"			"	"	
MEAN:	36	11	107	29	31	<5	13	<5

SOURCE: Department of Health

TABLE IV-4

SUMMARY OF STATE OF HAWAII AND FEDERAL

AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	SECONDARY	STATE STANDARDS
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	75	60	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	260	150	150
2. PM-10	Annual	50	50	--
(micrograms per cubic meter	Maximum Average in Any 24 Hours	150	150	--
3. Sulfur Dioxide (SO2)	Annual Arithmetic Mean	80	--	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	--	365
	Maximum Average in Any 3 Hours		1,300	1,300
4. Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	100		70
(micrograms per cubic meter)				
5. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
6. Photochemical Oxidants (as O3)	Maximum Average in Any 1 Hour	240		100
(micrograms per cubic meter)				
7. Lead (Pb)	Maximum Average in Any Calendar Quarter	1.5		1.5
(micrograms per cubic meter)				

TABLE IV-5
1980 EMISSIONS INVENTORY
COUNTY OF MAUI

Source Category	Annual Emissions (tons)				
	TSP	SOx	NOx	CO	HC
Steam Electric Power Plants	131	2,892	1,353	367	73
Gas Utilities	0	0	5	0	0
Fuel Combustion in Agriculture	1,866	354	677	0	7
Mineral Products Industry	158	36	61	0	0
Municipal Incineration	0	0	0	0	0
Motor Vehicles	212	143	2,483	34,422	3,676
Construction, Farm and Industrial Vehicles	23	21	300	796	139
Aircraft	5	14	137	1,286	159
Vessels	14	114	71	61	26
Agricultural Field Burning	2,110	0	0	24,316	2,228
Total (T/yr)	4,518	3,575	5,088	61,250	6,307

SOURCE: Department of Health
Environmental Permits Branch

The principal sources of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along Piilani Highway as well as in the vicinity of the project site. Because of the moderate level of existing traffic volumes, the additional construction vehicle traffic should not cause state or federal air quality standards to be violated.

Site preparation work and earth moving will create particulate emissions, as will building and on-site road construction. Additionally, off-site air emissions can be expected to increase due to concrete and asphalt batching.

Based on EPA studies (1984), fugitive dust emissions from construction activities could be about 1.2 tons per acre, given moderate silt content (30 percent) and a precipitation/ evaporation (PE) index of 50. The silt content of the project site is about 55 to 60 percent and the PE index is 14.6 (arid) indicating that there is significant potential for fugitive dust generation. These short-term construction impacts would be minimized by dust control measures (frequent watering) that would be employed during the construction period. It is expected that due to the new landscaping and residential plantings that will be part of the proposed project, existing fugitive dust emissions in the project area would decrease.

The off-site concrete and asphalt batching operation contributions to the air quality of Maui are not possible to determine at this time as specific quantities required and/or the batching locations have not been determined. Although it is possible that significant quantities of fugitive dust emissions and particulates could be released by the batching plants, the plants would require review and approval by the State Department of Health to ensure compliance with applicable standards.

Based on the traffic and air quality analyses (see Appendices B and F) performed for this EIS, it appears that primary mobile source generated air pollutant of interest, carbon monoxide (CO), 1-hour, 8-hour and downstream concentrations would be within both federal and state air quality standards.

Potential stationary source air quality impacts (electrical generation) emissions due to the Maui Wailea 670 project are estimated to increase 6.4 percent over existing emissions.

1.6.3 Mitigation Measures

Mitigation measures to minimize potential adverse air quality impacts, due to increased traffic and/or construction activities, would include frequent watering of unpaved roads and construction areas and planting of ground cover and vegetation as soon as possible after construction. Based on the air quality analysis performed for this EIS, it does not appear that additional mitigation measures for traffic or construction activities are required.

1.7 NOISE QUALITY

1.7.1 Existing Conditions

The existing noise quality of the proposed project site is dominated by natural factors including wind moving through the vegetation on the site and distant surf sounds. Based on noise level measurements taken at other similar locations on Oahu, it is presumed that existing noise levels in the project area are approximately 30 to 45 dBa.

1.7.2 Probable Impacts

Potential impacts on the noise quality of the site and area are primarily limited to those generated by the increased volume of traffic that the proposed project is expected to generate and, in the short-term, construction activity noise. Other potential sources of noise could be golf course operation and maintenance activities. Increased human noise generation is also expected to occur in localized areas at different times.

Traffic generated noise levels both on- and off-site, are expected to be in the range of 40 to 50 Leq (energy equivalent sound level for a given time period) (dB) at 50 feet. That is, traffic generated sound levels are expected to be typical of a residential/resort condition. Traffic generated sound levels within the new residential area are expected to be lower, due to lower speed levels and landscaping along the roadways and around the residences. Increased noise activity due to construction would be limited to daytime hours and persist only during the construction period. All construction related equipment and activities would be required to comply with the provisions of applicable state and county noise control regulations. Similarly, air conditioning equipment used on any of the residential units would also be required to comply with applicable noise control regulations. Golf course operation and maintenance activities are expected to be performed during daylight hours and equipment used would meet appropriate federal and state noise control regulations. Increased human activity noise levels in the area could be expected to occur in and around the public park areas primarily, although increased human activity throughout the project site can be expected. Structures would be designed and built to maximize containment of noise generated within the buildings, as well as minimize intrusion of outdoor noise sources.

1.7.3 Mitigation Measures

Mitigation measures to minimize potential adverse noise impacts resulting from increased traffic generation, other than those normally associated with any project, i.e., maintenance of vehicular muffler systems, do not appear warranted. Construction generated increased noise levels would be limited to daytime hours and do not appear to warrant additional noise mitigation measures. Similarly, it is expected that increased human activities and resultant increased noise levels in localized areas would be limited to daytime hours and not require additional mitigation measures other than adherence to standard engineering design and construction measures that would maximize containment of noise generated within structures and minimize intrusion of outdoor noise sources.

1.8 VISUAL ATTRIBUTES

1.8.1 Existing Conditions

The existing visual character of the proposed project site is one of open space and scrub/kiawe vegetation. View planes from the site include a variety of land elevations ranging from relatively flat to steep slopes (Figures IV-3 and IV-4). The slopes leading upward to Haleakala provide commanding views to the north, west and south overlooking the entire site and the ocean beyond.

1.8.2 Probable Impacts

Probable impacts to the visual character of the proposed project include changing the views into the site such that the present scrub vegetation would be removed and replaced with park, golf course and residential landscaping and structures. Views out of the site would essentially remain the same in that Haleakala, Central and West Maui would still be visible and views of the

ocean from the site would be retained. It is expected that the visual character of the site, from outside the site, would be improved through the addition of the landscaping noted above. Further, the single family and multifamily housing units would be designed to complement the background vistas.

1.8.3 Mitigation Measures

The primary mitigation measures to be employed to minimize adverse impacts to the visual attributes of the site include landscaping of the park, golf course and residential areas; architectural treatment of the buildings to complement background vistas; and maintenance of views of Haleakala, Central and West Maui and ocean views of Lanai, Molokini, Kahoolawe and Molokai. It is expected that the visual character of the site will be improved by the proposed project. As such, additional mitigation measures to minimize potential adverse impacts do not appear warranted.

2. NATURAL ENVIRONMENT

2.1 FLORA

2.1.1 Existing Conditions

A botanical survey of the project site was conducted in February 1988, and is included in Appendix F. Three major vegetation types were recognized on the project site; Kiawe and buffer grass pasture-lands, gully vegetation and scrub vegetation. Within these regimes 72 percent of the species were introduced and 28 percent were native species. No threatened or endangered species designated by federal or state agencies occur on the project site. One native species, the paunu vine (Canavalia pubescens), is listed as a Category 1, candidate endangered species by the U.S. Fish and Wildlife Service (USFWS) (1985). Two clumps of the

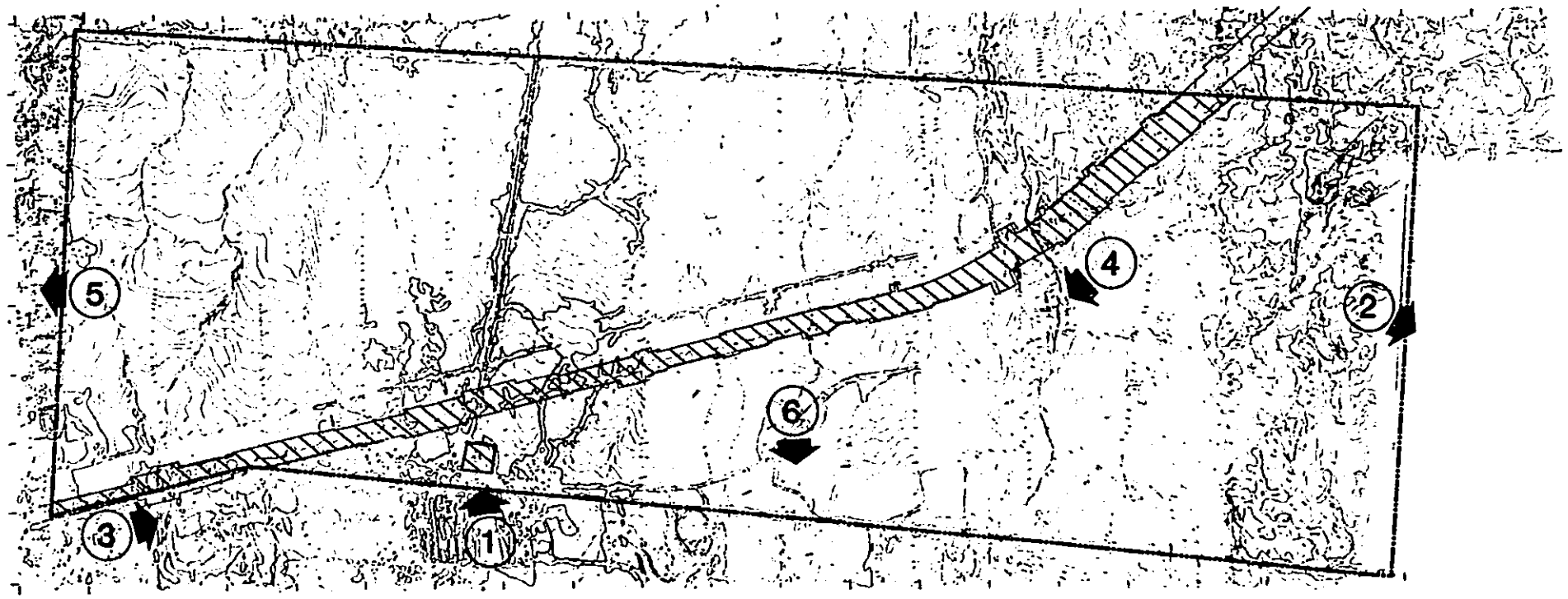


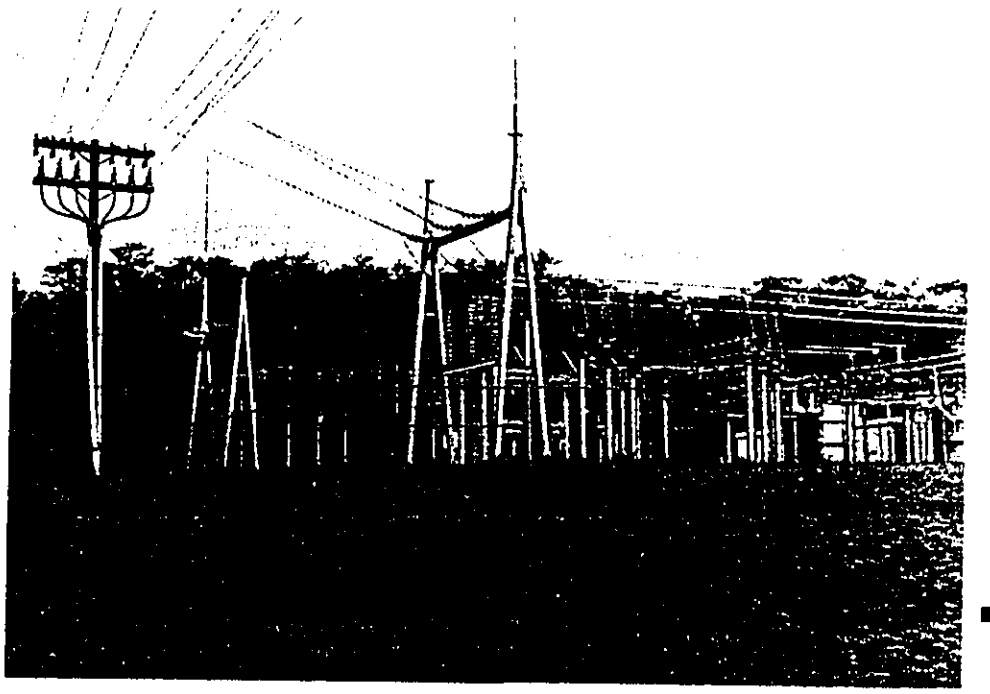
PHOTO INDEX MAP

MAUI WAILEA 670

FIGURE IV-3

0 600 1200 FEET

PBR HAWAII



1

MECO SUBSTATION

2

DISTANT VIEW OF PUU OLAI

SITE PHOTOGRAPHS

FIGURE IV-4

MAUI WAILEA 670

PBR HAWAII

3

POWERLINE

4

CATTLE WALL

SITE PHOTOGRAPHS

FIGURE IV-4

MAUI WAILEA 670

PBR HAWAII

5

VIEW OF MAUI MEADOWS AND WEST MAUI MOUNTAINS

6

TYPICAL RAVINE

SITE PHOTOGRAPHS

FIGURE IV-4

MAUI WAILEA 670

PBR HAWAII

plant were found on the extreme southwest corner of the project site. In the same area were found several species considered rare, uncommon or depleted (Fosberg and Herbst 1975), including: neke (Lipochaeta rockii), anunu vine (Sicyos hispidus), puapilo (Capparis sandwichiana) and uhiuhi (Senna gaudichaudii).

The species recorded are indicative of the season (wet vs. dry) and environmental conditions at the time of the survey. A survey taken at a different season and under varying environmental conditions would yield slight variations in the species list, especially of the weedy, annual taxa.

2.1.2 Probable Impacts

The proposed project is not expected to have a significant impact on the vegetation of the area because it is composed largely of exotic species, the majority of them weedy. The native species are found in similar environmental conditions throughout the state. Precautions would need to be taken and planned land uses adjusted to minimize impacts on the Category 1, candidate endangered species and other rare, uncommon or depleted native species found in the southwestern portion of the project site.

2.1.3 Mitigation Measures

Due to the lack of expected adverse impacts to ecologically or taxonomically significant vegetation found on the project site, with the exception of the paunu vine, nehe, 'anunu vine, puapilo and uhiuhi, which are all found in the extreme southwest corner of the project site and will be protected from development activities and/or included in the landscape plans for the proposed project, additional mitigation measures to minimize potential adverse impacts do not appear warranted.

2.2 FAUNA

2.2.1 Existing Conditions

An avifauna and feral mammal survey of the site was conducted in January, 1988, and is included as Appendix E. No endemic birds or feral mammals were found on the site. Given the present nature of the property, the only likely endemic bird that might occur would be the Short-eared owl (Asio flammeus sandwichensis). Quarterly waterbird counts on Maui by State Department of Land and Natural Resources personnel do not provide data for the project site because no permanent wetlands are found on the site. Similarly, no resident indigenous birds were recorded nor would any be likely to occur in the present habitat.

A total of 14 exotic (introduced) species of birds were recorded during the field survey. The most common species were the Northern Cardinal (Cardinalis cardinalis), House Finch (Carpodacus mexicanus), Northern Mockingbird (Mimus polyglottus), Wild Turkey (Melegris gallopavo), Gray Francolin (Francolinus pondicerianus), Black Francolin (Francolinus francolinus) and Ring-necked Pheasant (Phasianus colchicus). Introduced feral mammals recorded during the field survey included cats and deer. The axis deer (Axis) were relatively abundant at the site with 14 individuals being seen within the property and on adjacent lands. No rats, mice or mongoose were recorded but are likely to occur on the property. The Hawaiian hoary bat (Lasiurus cinerus semotus) is the only terrestrial mammal native to the Hawaiian Islands. Despite several attempts to locate them by surveying the property at dusk on two separate evenings, none were observed on the field survey.

2.2.2 Probable Impacts

The present environment provides a limited range of habitats which are used by the typical array of exotic birds one would expect at this elevation and in this type of habitat on Maui. The proposed development would create a more diverse set of living spaces which would likely benefit species like plover, myna and sparrow. The Common (Ring-necked) Pheasant, Wild Turkey and Black Francolin will be most impacted by a loss of vegetation cover. The Gray Francolin will likely still occur on the site following development, but at lower numbers. The loss of dense cover provided by high grass and brush may reduce mice and rat populations while cats, both feral and pets, will probably increase.

2.2.3 Mitigation Measures

The proposed project will result in a loss of the present scrub and Kiawe vegetation which serves as habitat for several species of birds and mammals. To minimize potential adverse impacts to these species, a wide range of trees would be planted on-site to increase the biological diversity of the project area for birds. Also, the creation of ponds and water hazards in the proposed golf courses would provide habitat for water birds and serve as a source of water for birds and mammals during the dry summer months.

3. HISTORICAL AND ARCHAEOLOGICAL RESOURCES

3.1 EXISTING CONDITIONS

Archaeological resources within the Maui Wailea 670 property area were studied in February 1988 via a reconnaissance survey and are documented in Appendix D. The basic purpose of the survey was to identify and evaluate all sites of possible archaeological

significance present within the project area and to make recommendations for any further work which might be necessary prior to development. The field survey consisted of 100 percent coverage ground survey by means of vehicular and pedestrian sweeps.

A literature search and review of maps archives at the State of Hawaii Survey Office revealed nothing that would indicate any precontract settlement in the area. A visual reconnaissance resulted in no surface indications of either historic or prehistoric remains. The only feature of note consisted of a very long stone wall which was built either as a boundary wall or cattle barrier, and, according to the consulting archaeologist, is of little or no scientific or interpretive value.

The consulting archaeologist concludes that there are no surface features that would be jeopardized by the proposed construction and there is little chance for subsurface deposits within the project area. The study recommends that no further archaeological work is necessary at this location.

3.2 PROBABLE IMPACTS

The lack of any artifacts or features of significance within the project area indicate that there would be no impacts on archaeological or historical resources. The results of the archaeological reconnaissance have been fully reported to the State Department of Land and Natural Resources Historic Sites Section (DLNR-HSS) staff and the results of their review of the archaeological reconnaissance survey included in Appendix D. As indicated by DLNR, the one possible archaeologically significant site found on the project property is "no longer significant" given the descriptive work performed and the proposed project "will have no effect" on significant historic sites.

3.3 MITIGATION MEASURES

Based on the findings of the reconnaissance survey field work and the findings by the consulting archaeologist and DLNR Historic Sites Division that the proposed project will have no effect on significant historic sites, mitigation measures to minimize potential adverse impacts do not appear warranted. However, should subsurface remains or artifacts, burials or deposits of charcoal or shells be found during construction activities, work would be stopped and the Historic Sites Section of the Department of Land and Natural Resources contacted to determine the significance and recommended mitigation, if needed. The services of a qualified archaeologist will be retained to execute the mitigation plan.

4. SOCIOECONOMIC ENVIRONMENT

4.1 EXISTING CONDITIONS

The project site is located in U.S. Census Tract 303.02, which had a resident population of 100 in 1970 and 1,227 in 1980 (Hawaii, DBED, 1987). Projected population levels for the Kihei-Makena planning area for 1985, 1990, 1995 and 2000, as provided in the State Recreation Functional Plan, are 10,837, 14,515, 18,649 and 23,186 respectively. Average visitor population levels were projected to increase from 8,513 in 1985 to 17,750 in 1995 and 13,452 in 2000 (Hawaii, DLNR, 1987). Subsequent studies (see Appendices A and B), indicate that total 1987 Maui visitors were 1,906,400 persons which are projected to increase to 2.5 million in 1990 and 4.5 million in 2010. Census data (Hawaii, DBED, 1987) indicate that the project area average household size is 3.11 persons and that there is an average of 3.59 persons per family.

The employment status statistics for the island of Maui, for 1986 (the latest year for which complete data are available) indicate a total island civilian work force of 44,800, with 42,700 employed and 2,100 or 4.7 percent unemployed (Hawaii, DBED, 1987). Recent estimates indicate that the labor force has grown slightly and that unemployment is down to about 3 percent of the total civilian work force. Employment data for 1986 also indicate that there were approximately 2,400 employers on Maui; that the average employment was approximately 34,500 persons earning a total of approximately $527 million for an annual average wage of approximately $16,000 which is about $2,000 less than the state-wide average (Hawaii, DBED, 1987).

4.2 PROBABLE IMPACTS

The Maui Wailea 670 residential/resort project will contribute to an increase in resident and de facto population growth both at the project site and on Maui generally. Development of lodges, condominium units and single family homes will result in a future population of visitors and residents at the resort.

Creation of new job opportunities could also attract new residents to Maui, if the number of new jobs exceed the capacity of the available labor supply. In addition, temporary growth in population could result from in-migration of workers during project construction.

The proposed Maui Wailea 670 project includes the development of 390 to 450 single family residential units, 670 to 870 multifamily residential units, 370 to 480 resort lodge units and 720 to 850 village/mixed-use units. As presently planned, it is estimated that the majority of the single family units and about one-third of the multifamily units would be owner occupied on a full-time basis. The projected resident population impact, based on the preceding and assuming a household size of 3 persons,

would be an increase of between 1,840 and 2,220 persons in the Wailea area. It is also projected that the daily transient population increase resulting from the proposed project would range from approximately 2,290 to 3,050 persons, assuming two persons per day per multifamily and village/mixed-use unit and 2.5 persons per day per resort lodge unit with an annual average occupancy rate of 75 percent for all types of units.

The projected average daily resort resident population would range between a low of 260 persons in 1995 to a high of 2,000 persons in 2010. This translates into approximately 1,400 to 1,810 additional residents and visitors on Maui in 1995 due to the proposed project, with visitors accounting for about 40 percent of the population increase. Additional residents and visitors could increase to between 4,160 to 4,840 by 2010, with about one-third of the population increase being visitors. Projected total annual visitor expenditures resulting from the proposed project (direct, indirect and induced) range from a low of $50.8 million in 1995 to a high of $135.4 million in 2010.

Employment impacts from the proposed project are expected to be positive both during the construction phase and the operation phase. It is estimated that in the 1991 to 1995 period approximately 500 to 590 (direct, indirect and induced) construction workers would be required and that approximately 620 to 730 construction employees during the 2001 to 2005 time period would be required with the construction force decreasing to between 500 and 530 during the 2006 to 2010 period. Annual wages paid to these workers during the 1991 to 1995 is projected to range between $5.5 and $6.4 million, $6.7 and $7.9 million during the 2001 to 2005 period and $5.5 to $5.8 million during the 2006 to 2010 period. During the operational phases of the proposed project, it is estimated that between 1,060 and 1,450 employees will be required to provide the levels of service required in the 1995 period, increasing to between 2,155 and

2,575 in the 2010 period. Total annual wages for these employees is projected to range between $8.4 and $11.5 million in 1995, increasing to between $17.1 and $20.3 million in 2010.

The resort site, in its current unzoned and undeveloped status, will yield about $18,500 in real property taxes in 1988. The proposed project is expected to generate from $1.4 to $1.6 million annually in real property taxes by 1995. Real property tax revenues could increase to between $3.2 and $3.5 million in 2010.

County expenditures required as a direct result of the proposed project are estimated to be $700,000 to $800,000 in 1995 increasing to $2.2 to $2.5 million in 2010. That is, a positive county revenue/expenditure relationship is projected for the entire development period. The most favorable ratio is in the range of 2.4 to 1. As development proceeds, the revenue/expenditure ratio diminishes somewhat, but remains positive. Revenues could be expected to maintain a 1.4 to 1 ratio to expenditures after 1995.

State tax revenues are projected to increase by $2.6 to $3.1 million annually in 1995 due to the resort. Annual collections could increase to $7.1 to $8.2 million annually in 2010. State expenditures required as a direct result of the proposed project are estimated to be about $700,000 to $900,000 in 1995 increasing to $4.1 to $4.6 million in 2010. The state revenue/expenditure ratios are highest in the early years of the project, before substantial resident population is located at the resort. The ratio could reach 3.6 to 1 in 1995. The state revenue/expenditure ratio is expected to gradually decline to the 1.7 to 1.8 to 1 range by 2010.

Development of the proposed project could impact Maui's housing situation in several ways. Temporary housing will be needed when

workers are brought to the island during project construction. Operational employment at the resort will also trigger additional housing demand, particularly to accommodate in-migrant employees. It is estimated (Appendix B) that in the 1991 to 1995 period, a total of between 60 and 140 rental units will be required to house off-island and other workers. During the 2001 to 2005 period, estimated to be the peak construction period, it is estimated that between 70 and 170 rental units will be required for off-island and other construction workers. It is also estimated that these temporary housing needs could be absorbed by the existing general rental market on Maui.

Labor source is expected to be the key factor influencing housing demand by the resort's future employees. Workers drawn from the county's available labor supply could be expected to already occupy housing units. In-migrants would constitute the largest source of potential housing demand. Based on the analyses performed, it is estimated that resort employee housing demand would be between 175 and 230 units in 1995, increasing to a total of between 350 and 410 units by 2010. The projected number of additional "affordable range" single family housing units that could be required for the proposed project's work force is expected to range between 90 and 140 units in 1995 and could increase to between 180 and 250 units by 2010.

The required employee housing units and a range of residential opportunities, including low- and moderate-income and gap-group housing, would be provided either on- or off-site. The housing provided would be in conformance with applicable state and county rules and regulations. Appropriately priced housing units would be constructed in a timely manner to meet a demonstrated need.

Given that the area is currently a destination resort area, increased numbers of tourists are not expected to cause

significant adverse impacts on the social structure or fabric of the project area. It is possible that there may be an increase in some crimes, such as automobile theft and theft from resort/residential units. However, as will be noted below, both county and private security forces would be increased to the level required to provide protection to residents and visitors to the proposed project.

4.3 MITIGATION MEASURES

As indicated above, the proposed project is expected to result in positive economic and social impacts. Appropriate measures would be taken by the developer, in compliance with state and county housing regulations, to accommodate temporary and long-term workers. It is also likely that lodge, golf course and commercial space operators would establish in-house training programs to ensure that the levels of service provided meet the demands of the visitors and residents of the resort. Although the total number of housing and accommodation units that may be constructed at the proposed project are given, the actual number and type of units will be made in consultation with the county. At the time the final determination is made and the necessary zoning approvals obtained, an appropriate number of affordable housing units for various target groups will be proposed in accordance with applicable state and county regulations. Based on the type of project planned, many or all of these affordable housing units would be located offsite but within the region.

5. INFRASTRUCTURE

5.1 HIGHWAYS

5.1.1 Existing Conditions

As shown on Figures IV-5 and IV-6, access to the project site will be provided by Piilani Highway, which begins north of Kihei at its junction with Mokulele Highway, North Kihei Road and South Kihei Road. Mokulele Highway and North Kihei Road, both two-lane highways, connect to other parts of Maui; South Kihei Road provides local access to Kihei, parallel to Piilani Highway.

Increment I of the two-lane Piilani Highway, completed in 1981, is 6.8 miles long and extends south to Kilohana Drive, near the north end of Wailea. The highway consists of 12-foot wide lanes with 10-foot wide paved shoulders. Several unsignalized intersections allow traffic to connect to destinations within Kihei. No further improvements to Increment I are planned at present.

Construction of Piilani Highway Increment II improvements from Kilohana Drive south to Wailea Ike Drive, are planned to begin in 1988. This 1.4 mile segment will be similar to Increment I, and will end approximately 1,400 feet south of the north boundary of the project site and provide access to the project area.

The planned, but yet undesigned or budgeted Increment III improvements, will bisect the project site from the northwest to southeast corners of the property. The two-lane highway extension will be 4.6 miles long and is planned for 12-foot lanes; however, shoulder widths will be only four to six feet. Increment III is considered a long-range project with design currently expected to begin in eight to ten years and construction to follow when funds are made available by the

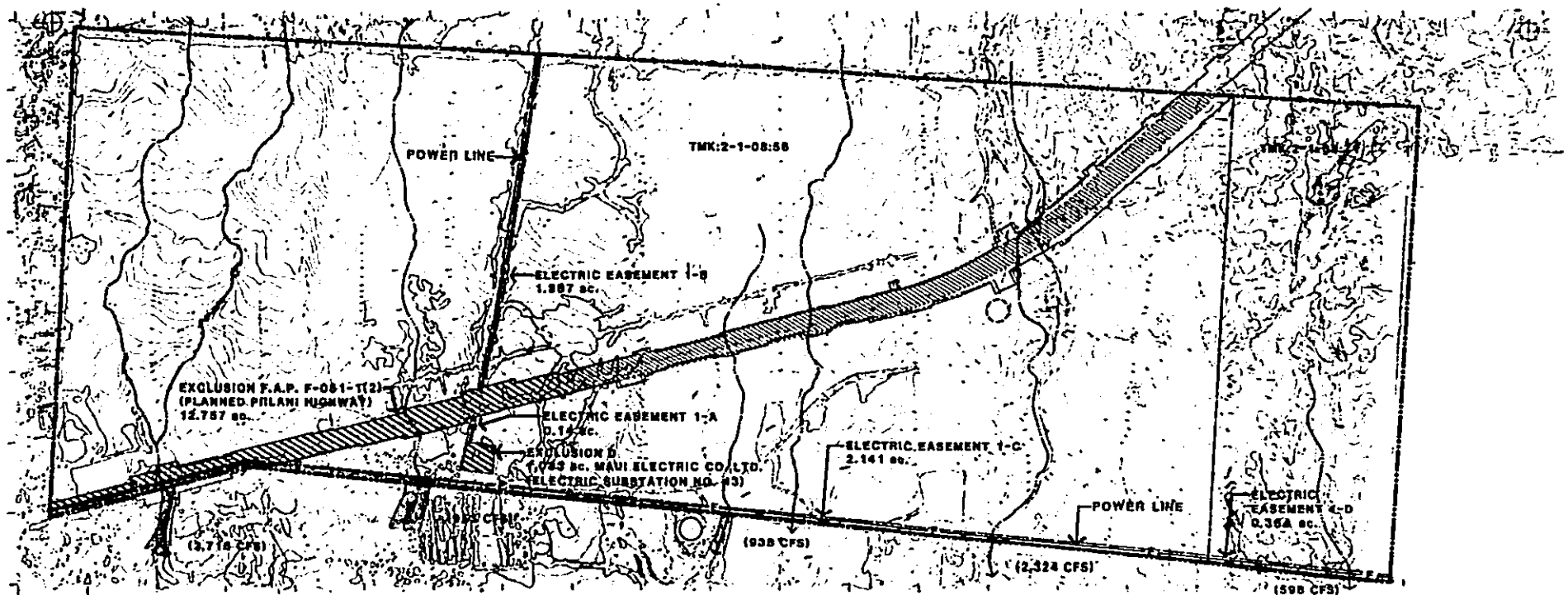
state. With completion of Piilani Highway, travel times between the Kihei and Kula areas will be reduced significantly.

Connection to Piilani Highway from the project site would be made at several at-grade intersections. A connection opposite Wailea Ike Drive would serve as the projects primary entrance. When Increment III of Piilani Highway is planned other connections would be coordinated with the design of the highway extension.

Existing traffic conditions (Appendix H) have been based on manual traffic counts and information from the State Department of Transportation, Highways Division. The section of Piilani Highway between Mokulele Highway and Kanani Road carries 950 vehicles per hour (vph) during the morning (AM) peak hour and 1,020 vph during the afternoon (PM) peak hour. At these levels, Piilani Highway presently operates at Level of Service (LOS) D during both peak hours (see Appendix H for description of LOS). The existing 24-hour two-way volume on Piilani Highway is approximately 8,600 vehicles per day (vpd). Field observations indicated a high percentage of construction-related vehicles using Piilani Highway during both peak periods.

The section of Piilani Highway between Keonekai Road and Kilohana Drive presently carries a two-way volume of 590 vph during the AM peak hour and 765 vph during the PM peak hour. This section of Piilani Highway operates at LOS C during both the AM and PM peak hours.

Existing conditions on Mokulele Highway north of Piilani Highway presently carries 1,005 vph (LOS D) during the AM peak hour and 1,150 vph (LOS D) during the PM peak hour.



LEGEND

INFRASTRUCTURE

- ELECTRICAL LINE (OVERHEAD)
- EXISTING WATER TANK
- PROPOSED WATER TANK

EASEMENTS

- ELECTRICAL EASMENTS (IN FAVOR OF MAUI ELECTRIC CO., LTD.)

DRAINAGE

- SURFACE DRAINAGE COURSE
- WAILEA OPEN ZONE FOR DRAINAGE

EXCLUSIONS

- PLANNED HIGHWAY/ ELECTRICAL SUBSTATION
- FUTURE HIGHWAY 17.243 ac.

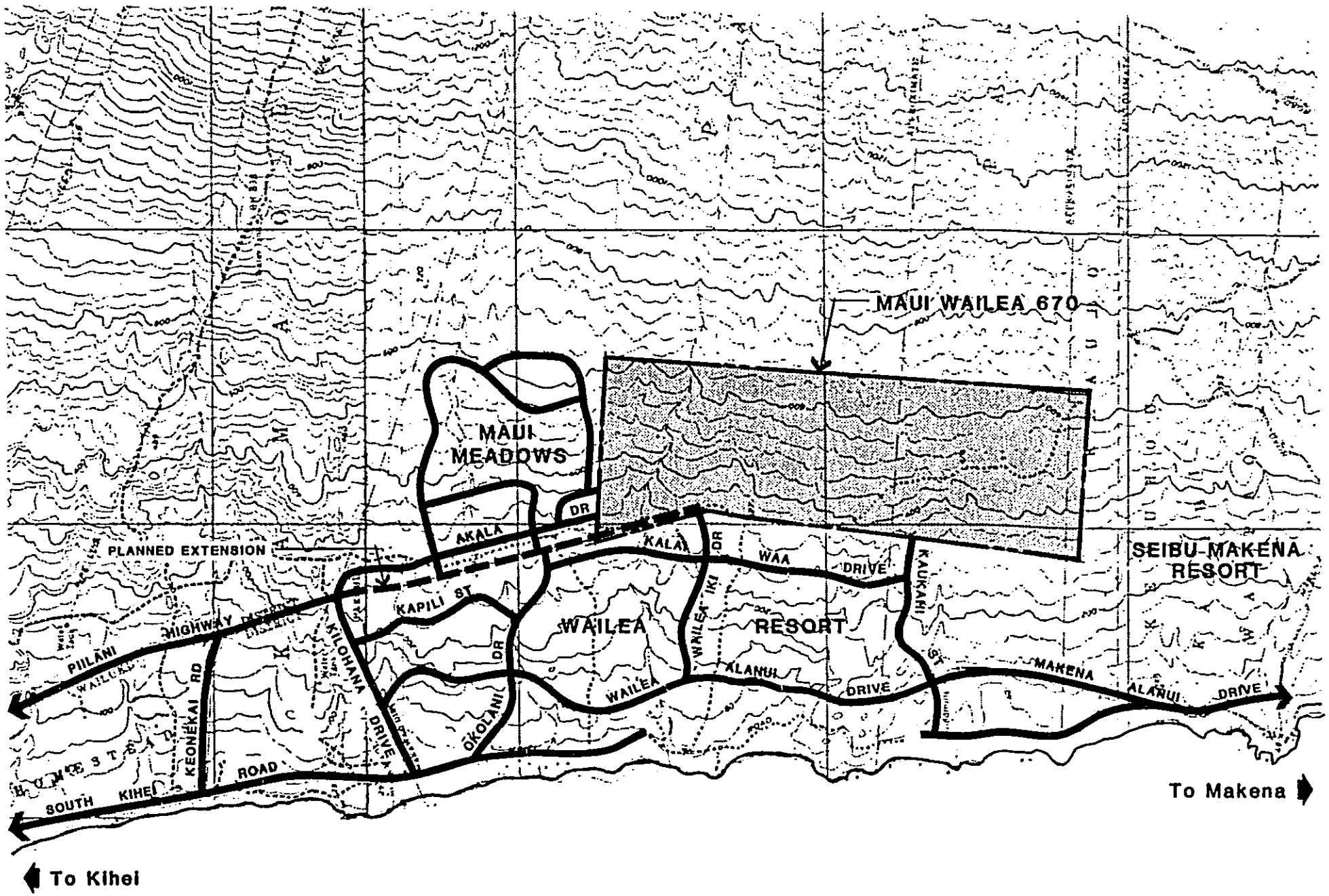
EXISTING EASEMENTS/DRAINAGE

FIGURE IV-5

MAUI WAILEA 670

0 600 1200 FEET

PBR HAWAII



EXISTING ACCESS

FIGURE IV-6

MAUI WAILEA 670

0 1375 2750 FEET

PBR HAWAII

5.1.2 Probable Impacts

Traffic impacts of the proposed project will be dependent upon the scale and rate of development of other projects in the area. To determine the projected traffic impacts resulting from the proposed project, a traffic impact study was performed and is included as Appendix H.

Based on the traffic analyses performed for the proposed project (Appendix H), traffic volumes on Mokulele Highway north of the Piilani Highway intersection would exceed capacity of the two-lane highway by the year 2000 (LOS F) without the proposed project. For the year 2010, the projected two-way volumes would be approximately 3,200 vph during the AM peak hour and 3,700 vph during the PM peak hour. Widening of Mokulele Highway to four lanes would be necessary prior to the year 2000 to serve anticipated traffic demands on the highway without the proposed project.

In the year 2006, the section of Piilani Highway between Mokulele Highway and Kanani Road would experience over-capacity conditions for a two-lane highway, without the proposed project. Widening the highway to four lanes would be necessary if the highway were to continue serving peak hour traffic demands. Additional lanes at intersections and signalization may be needed sooner to maintain adequate service to side street traffic.

In the year 2010, the section of the two-lane Piilani Highway between Kanani Road and Kilohana Drive is projected to carry a two-way volume of approximately 1,400 vph during the AM peak hour (LOS D) and 2,165 vph during the PM peak hour (LOS E).

Further, the extension of Piilani Highway past Kilohana Drive would transform the existing T- intersection into a cross-intersection. The extension of Piilani Highway is expected to

result in the diversion of Wailea traffic from Kilohana Drive to Wailea Ike Drive. Southbound left turns from Piilani Highway would operate at LOS A during the AM peak hour and LOS C during the PM peak hour. The traffic at the eastbound approach of Kilohana Drive would exceed available capacity (LOS F) during both peak hours while the westbound approach on Kilohana Drive would operate at LOS A and LOS B during the AM and PM peak hours respectively. The traffic volumes projected at this intersection would satisfy signalization at this intersection.

As noted above, the analyses of future conditions without the proposed Maui Wailea 670 and/or most other proposed Kihei/Makena projects, indicate that widening of Mokulele Highway would be needed. With the proposed Maui Wailea 670 project, a four-lane Mokulele Highway would operate at LOS E (northbound lanes to Kahului) and LOS D (southbound lanes to Kihei) during the AM peak hour. During the PM peak hour, the northbound lanes would function at LOS D while the southbound lanes would be at LOS E.

Prior to completing the initial phase of the proposed project, Piilani Highway would be extended to Wailea Ike Drive. Piilani Highway would intersect Wailea Ike Drive in a T - intersection, with the highway forming the stem of the intersection. Four lanes would be needed on Piilani Highway between Mokulele Highway and Kanani Road without the project. With the additional traffic generated by the proposed project, the four-lane highway would function at LOS E and LOS D (northbound and southbound lanes respectively) during the AM peak hour and at LOS D and LOS E during the PM peak hour. Similarly, capacity of the existing two-lane Piilani Highway between Kanani Road and Kilohana Drive would be exceeded without the project. With widening to four lanes (two in each direction) starting from the north and continuing through its intersection with Kilohana Drive, the northbound and southbound lanes would operate at LOS C

during the AM peak hour. During the PM peak hour the northbound and southbound lanes would operate at LOS D and B respectively.

Analysis of the two-lane Piilani Highway between Kilohana Drive and Wailea Ike Drive indicates LOS E conditions for both peak hours. Widening to four lanes could improve the Level of Service to LOS B for the northbound and southbound lanes during both peak hours; four lanes on Piilani Highway would also provide sufficient capacities for the Kilohana Drive intersection.

Kilohana Drive would intersect Piilani Highway in a cross-intersection. Traffic volumes for future conditions without the project exceed capacity and warrant signalization at this intersection. The signalized Piilani Highway/Kilohana Drive intersection would operate at LOS C during the AM peak hour and LOS E during the PM peak hour. The northbound and southbound approaches at this intersection would require a left turn only lane, a through lane and a shared through-right turn only lane. The eastbound approach would include two left turn only lanes and a shared through-right turn lane, while the westbound approach would be striped for a right turn only lane and a shared through-left turn lane.

The intersection of Piilani Highway and Wailea Ike Drive would be a T - intersection. The estimated volumes at this intersection would meet the criteria for signalization. As a signalized intersection, LOS B and LOS C conditions would be expected during the AM and PM peak hours respectively. The southbound approach on Piilani Highway would include a left turn only lane and a right turn only lane. The eastbound approach would require separate lanes for left turn and through movements. The westbound approach would have a through lane and a right turn only lane.

Within the project the extension of roads from Wailea Ike Drive and Kaukahi Street would be designed as major urban collector roadways with minimum rights-of-way of 60 feet and with the addition of landscape medians at the project entrances. Due to the relatively low density of development it was determined that the internal circulation system would be adequate to serve the project development without connecting to the existing roadways of Maui Meadows subdivision. However, a provision for emergency access through Maui Meadows is provided for via Akala Street.

5.1.3 Mitigation Measures

The increases in traffic volumes on Piilani Highway, with or without the proposed project, are expected to continue because of on-going development in the Kihei-Makena area. The increasing traffic volumes on the highway have created an existing need for improvements, such as widening or signalization so that cross-street traffic can be accommodated. With development of the entire Wailea Resort area a self-contained community could evolve resulting in slower traffic rates of growth on Piilani Highway and Mokulele Highway. To assist in the assurance that traffic impacts from the proposed project are minimized to the maximum extent possible, the developer will continue to work with the State Department of Transportation, Highways Division and County Department of Public Works. However, it is understood that in many instances, traffic conditions at present exceed highway and roadway capacities and that such conditions will continue to worsen with or without the proposed project.

5.2 WATER SUPPLY

5.2.1 Existing Conditions

Potable water for the Kihei region comes from drilled wells located in Iao Valley in Wailuku and in Upper Waiehu where deep

well turbine pumps penetrate the underground aquifer near sea level and lift fresh water to the surface (Appendix G). Two transmission lines transport water from these sources to the Kihei-Makena areas of Maui. Water from the Iao Valley or Mokuhau source is conveyed by means of an 18-inch transmission line. Water from the more recently developed source at Upper Waiehu is conveyed by a 36-inch diameter transmission line.

Water for the Wailea and Seibu developments located west and south, respectively, of the proposed Maui-Wailea 670 project area is from the Upper Waiehu source. The water source consists of several wells with a present developed capacity of approximately 13.5 million gallons per day (MGD). When fully developed per the joint venture's (A & B Properties, Inc., Wailea Development Company, Inc., Seibu Hawaii, Inc. and C. Brewer Properties, Inc.) agreement with the county, this source is expected to yield a minimum of 19.0 MGD. However, upon full development of the JV's source, the JV and county have committed to the state that no additional development will occur in the aquifer to protect the integrity of this water resource.

At present, all areas served by the Central Maui water system described are subject to a Special Rule that requires all new hookups, except for single family detached units and certain multifamily units, to pay a source assessment fee of $2,700 for each 1,200 gallons per day (GPD) of water demand. The fee is used to develop additional water sources to meet the continuously growing demands of the Central Maui and Kihei-Makena areas.

The nearest water transmission system to the proposed project is a 3.0 million gallon (MG) reinforced concrete reservoir in Wailea Development, located approximately 1,200 feet north of Kaukahi Street (see Figure IV-5) at an elevation of about 350 feet. This reservoir provides storage for Wailea Development's mid-level distribution system. A separate high level system calls for a

new 1.0 MG reservoir being constructed above Wailea Development in the proposed Maui-Wailea 670 project property at an elevation of about 500 feet. Water would be pumped from the 3.0 MG mid-level reservoir to the new high level reservoir. The proposed project area below the 400-foot elevation would be served by the new 1.0 MG reservoir, but the storage and pumping system may require enlargement. The area of the proposed project above 400 feet would be serviced from another new tank that would be constructed at an elevation of about 820 feet. Water to this new tank would be pumped from the 1.0 MG high level storage tank for Wailea Development Company.

Present planning calls for the proposed project water distribution system to be tied into the existing Maui Meadows distribution system, to ensure continuity of service and circulation.

With regard to irrigation water, preliminary investigations indicate that there is a limited supply of groundwater suitable for irrigation within the proposed project site. Salinity would be within the 500 to 800 parts per million range.

5.2.2 Probable Impacts

Table IV-6 indicates daily water rates for the county that have been used to determine the quantity of potable and irrigation water that will be required by the proposed project.

Based upon the average daily water rates, Table IV-7 summarizes the projected maximum water needs for the project for both potable and non-potable irrigation sources. The county and state are presently exploring the area between Waihee Stream and Kahakuloa Village as well as other areas as future sources of

ground water. Preliminary indications are that this aquifer can be developed to fulfill the future potable water demands of Central Maui.

TABLE IV-6

DESIGN CRITERIA PER

1971 WATER MASTER PLAN FOR COUNTY OF MAUI

Land Use	Population Person/Acre	Water Rate GPCD	Water Rate GPAD
Residential	13 - 18	140	1,800 - 2,500
Apartment	40	140	5,000
Hotel	75	250	17,000
Industrial	-	-	6,000
Commercial	-	-	6,000
School & Church	70	30	1,700
Hospital	40	100	1,800
		DWS	SCS
Agricultural		5,000 GPAD	7,000 GPAD
Rural		1,500 gpd/lot	

GPCD - Gallons per Capita Day
GPAD - Gallons per Acre Day

Source: Appendix H

Presently, it is estimated that the Wailea Development Company, Inc. wells capture much of the sustainable yield of the groundwater where they are located to the south of and downgradient of the proposed project. In the northerly section of the project site, it is estimated that non-potable irrigation groundwater flow is available since there are no wells located immediately downgradient of this area. It is expected that wells having a capacity of 300 gpm or less located in this area would not significantly impact the more southerly Wailea wells. As noted previously, water well development at Maui Wailea 670 will be performed such that it does not impair the utilization of wells on neighboring properties.

TABLE IV-7

PROJECTED WATER CONSUMPTION AT BUILD-OUT
(in million gallons per day)

Use	Gross Area Acres	Max. Units	Rated Used	Potable Domestic Demand (Ave.Day)	Potable Domestic Demand (MaxDay)	Non-Potable Irrigation Demand
Village/Mixed	31	850	6000 GPAD	0.186	0.279	-
Commercial	6	-	6000 GPAD	0.036	0.054	-
Resort Lodge	27	480	420 GPD	0.202	0.303	-
MF Residential	79	870	800 GPD	0.696	1.044	-
SF Residential	154	450	1000 GPD	0.450	0.675	-
Golf Course: Domestic	10	-	6000 GPAD	0.060	0.090	-
Irrigation	331	-	5600 GPAD	-	-	1.854
Parks/Recreation	14	-	5600 GPAD	0.078	0.078	-
Roadways	18 (5)	-	5600 GPAD	0.028	0.028	-
TOTALS:	670	2,650		1.736	2.551	1.854

In addition, the following irrigation water alternatives are being considered:

(1) Use effluent from the Kihei sewage treatment plant (STP): This option would be attractive if a new sewer collector and transportation system were to be installed between the project site and the Kihei STP. The force main to transport treated effluent back to Wailea could then be installed in the same trench as the gravity interceptor line to the STP;

(2) Use of effluent from private STP: One or two wells would have to be installed on-site to augment the volume of effluent from a private STP; or,

(3) Use of potable water: Under this option, a water source development fee would have to be paid.

Permits from the State Department of Land and Natural Resources will be required prior to drilling any wells within the project site and all water system improvements would be in accordance with applicable State Department of Health rules and regulations.

With regard to treated sewage effluent being injected into underground aquifer, this practice is not expected to have a detrimental effect because (1) there are no potable water sources immediately downstream of project site and (2) numerous studies in Hawaii and elsewhere indicate that the use of treated sewage effluent for golf course irrigation is an environmentally benign practice that enhances water conservation actions.

5.2.3 Mitigation Measures

As noted above, potable water will be obtained from existing Central Maui water sources that will be upgraded as required for the proposed project. As such, significant adverse impacts on the island water supplies are not expected. All potable water system improvements will be made in accordance with applicable state and county rules and regulations. Other measures to mitigate potential adverse impacts do not appear warranted. Irrigation water will be obtained from one or more of three possible sources as described above. Irrigation water source development will be in accordance with applicable state and county rules and regulations. Use of the possible sources is not expected to result in adverse impacts to the environment of

the project area or areas downgradient of the project site. As such, measures other than compliance with applicable rules and regulations do not appear warranted.

5.3 WASTEWATER DISPOSAL

5.3.1 Existing Conditions

The existing Kihei area sewer system, which serves the Wailea area, includes interceptor and transmission lines between Wailea and the Kihei Sewage Treatment Plant (STP). The Kihei STP was designed to handle 4.0 MGD. According to county sources, readings taken at the Kihei STP during December 1987 and January 1988 indicate that flows ranged between 3.0 and 3.2 MGD. Flow readings taken by the county in May 1988 through a new meter indicated total flows of 2.3 to 2.5 MGD, demonstrating a seasonal variation in flow rates. The estimated remaining capacity in the plant is approximately 1.0 MGD.

In view of the limited capacity of the existing Kihei STP, several alternatives are being considered to serve the Maui Wailea 670 project. These include (1) participation with other developers and the county in upsizing the existing gravity interceptors, pump stations and force mains between Wailea and the Kihei STP; (2) installing a new interceptor beginning at the southwest corner of the proposed project to the Kihei STP along Piilani Highway (costs would be shared with other developers); (3) participating with other developers and the county in enlarging existing STP; (4) constructing a private STP in the Wailea-Makena region in cooperation with other developers; or (5) participating with other developers in the construction of a second sewage treatment plant in the area for dedication to the county. The developer would continue to work with the county Department of Public Works to determine which of the alternatives under consideration is best suited for the proposed project,

other neighboring developments and the county. The ultimate determination of which alternative is adopted would be by the county.

5.3.2 Probable Impacts

As noted above, the present Kihei STP will require upgrading to handle the estimated wastewater flow generated by the proposed project or require the construction of a private STP. The adoption of any one of the alternative wastewater treatment methods under discussion is expected to result in positive impacts on the environment of the project and adjacent areas through the development of improved wastewater treatment facilities on the island. All wastewater treatment facility upgrading and/or construction of new facilities would be in accordance with applicable state and county rules and regulations.

5.3.3 Mitigation Measures

Due to the lack of expected adverse impacts on the waste treatment system serving the project area, mitigation measures to minimize potential adverse impacts do not appear warranted at this time. The developer will continue to work with appropriate governmental agencies and private parties to ensure the proper and safe disposal of wastewater generated by the proposed project.

5.4 SOLID WASTE DISPOSAL

5.4.1 Existing Conditions

At present, solid wastes generated by resort developments in the Kihei-Makena area are collected and disposed of by private contractors. It is expected that this practice would continue with the proposed project.

5.4.2 Probable Impacts

Estimated quantities of solid wastes to be generated by the proposed project can not be determined at this time due to the unknown nature of many of the facilities and amenities to be included in the project. However, it is expected that existing and/or planned public or private waste disposal sites would be available to handle increased amounts of solid waste to be generated. Further, the county has been considering the possibility of constructing a refuse fueled electrical generating station that would relieve pressure on existing land fill disposal sites. It is probable that the proposed lodges, condominiums, single family residences and other facilities would be equipped with waste compaction equipment to reduce the volume of solid waste generated by the proposed project, thereby minimizing the transportation requirements to dispose of solid waste at landfill sites.

5.4.3 Mitigation Measures

Due to the lack of expected adverse impacts resulting from solid waste disposal, mitigation measures to minimize potential adverse impacts do not appear warranted at this time.

5.5 ELECTRICAL POWER AND COMMUNICATION SYSTEMS

5.5.1 Existing Conditions

Electrical service to the project site would be provided by Maui Electric Company (MECO). Total load and demand requirements for the proposed project are not known at this time. The developer will work with MECO in determining the specific transmission, distribution and substation requirements for the project. Similarly, the developer will work with Hawaiian Telephone Company and other communication service companies to determine project needs and solutions.

At present, it is contemplated that electrical power would be used for both water heating and cooling purposes. However, during final design stages of the project, the developer will investigate the possible use of solar water heating and cooling purposes. Engineering and economic analyses will be performed to determine the most economical and energy efficient method of providing hot water heating and cooling to the residential units. This same level of analysis will be directed to water use and lighting systems in the final design stages of the various residential, commercial and public facilities. Careful consideration will be given to integrating cost effective energy conservation measures into the final design.

5.5.2 Probable Impacts

Based on the availability of present adequate service capabilities and/or planned improvements to the electrical and telephone utilities, significant impacts to or from these services are not expected to result from the proposed project.

5.5.3 Mitigation Measures

Based on the lack of expected impacts resulting to or from electrical or telephone services, mitigation measures to minimize potential adverse impacts do not appear warranted.

6. PUBLIC SERVICES AND FACILITIES

6.1 PUBLIC SCHOOLS

6.1.1 Existing Conditions

At present, two public schools (Kihei Elementary and Intermediate and Baldwin High School) service the proposed project area. According to the State Department of Education Facilities Branch, existing schools in the project area are operating at full room capacity.

6.1.2 Probable Impacts

The State Department of Education (DOE) has estimated that the numbers of students shown in Table IV-8 would be generated by the proposed development.

TABLE IV-8

PROJECTED STUDENT ENROLLMENT

SCHOOL	GRADE	PROJECTED ENROLLMENT [1]
Kihei Elementary/ Intermediate School	K - 8	50 to 100
Baldwin High School	9 - 12	20 to 30

1 Based on 2,150 to 2,650 unit residential/resort development.

Based on the above projections, the Department of Education cannot assure the availability of classroom space at the impacted schools and will require a legislative appropriation on a timely basis or assistance from the developer to accommodate the development. However, it is noted that it is expected that less than one-third of the planned residential/resort units would be occupied on a full-time basis, thereby most likely decreasing the numbers of students that would be generated by the proposed project. As such, the developer will continue to keep the Department of Education apprised of the development plans to assure that the educational demands and requirements of the area are met in a timely manner.

As noted in the Kihei-Makena Community Plan, a future school site has been indicated within the project area. Upon DOE's review of the Maui Wailea 670 project, the department will assess the need for providing school lands within the project area. If required, a school site will be reserved. The DOE currently has school sites designated in the area that have not been developed and, should the need arise, could provide for the projected school needs.

6.1.3 Mitigation Measures

As noted, the proposed development would increase the number of school students to the extent that existing nearby public schools would be utilized to over capacity. As such, the developer would continue to work with the Department of Education to ensure that adequate public school facilities are provided and that the Department of Education is involved with the siting of new school facilities should they be required as a result of the proposed project.

6.2 HEALTH CARE FACILITIES

6.2.1 Existing Conditions

Maui Memorial Hospital, located between Wailuku and Kahului, is the nearest major medical facility to the project area. Emergency facilities are located at the Wailea Shopping Village and a medical clinic and emergency ambulance service is available in Kihei. There are no nursing homes in the project area.

6.2.2 Probable Impacts

The proposed project is not expected to significantly add to the requirements for emergency or daily medical care facilities in the Wailea-Makena area. As such, no additional burden on public or privately provided medical care and services is expected.

6.2.3 Mitigation Measures

Based on the lack of expected impacts, mitigation measures do not appear warranted at this time.

6.3 POLICE AND FIRE PROTECTION

6.3.1 Existing Conditions

Police services for the region are provided by the Wailuku Police station with two to three beat officers assigned to the Kihei-Makena area. The nearest fire station is located in Kihei near Kalama Park. Response time to the project area is estimated to be five to ten minutes depending on traffic conditions.

With adequate staffing, these existing facilities and services provided by the county would be adequate to service the project area.

6.3.2 Probable Impacts

Although the proposed project will increase the population level and number of dwelling units in the district, it appears that the project will not significantly impact either department and/or their abilities to provide the levels of service required. In addition, a private security force would be contracted as required to assist the county services.

6.3.3 Mitigation Measures

Based on the expected lack of significant impacts resulting from the proposed project on the level of services provided by the county police and fire departments, mitigation measures, other than providing additional protection through private security forces, do not appear warranted at this time. During design stages of the residential units, consideration will be given to environmental security, e.g., deadbolts, window locks, adequate lighting, etc. for both the residential/resort units and public recreational facilities.

6.4 RECREATIONAL FACILITIES

6.4.1 Existing Conditions

With an ever increasing demand for golf, the proposed project includes two 18-hole championship golf courses. These courses should help to satisfy the increased demand for golf that will be generated by the continued development of this resort destination area.

In addition to the two golf courses, other recreational amenities include a tennis center, neighborhood parks and a pedestrian pathway system to link these major recreational features. Within

each of the multifamily residential project areas, additional private recreational facilities would be provided.

It is currently anticipated that the park areas within the project would be owned and maintained by the community association to assure the proper level of maintenance is provided.

Access to the existing shoreline parks and beaches of the Wailea-Makena area would be provided for through the operation of a jitney bus service. Integrated with the transportation systems with the region, the major project amenities and activity centers would be serviced by this system.

6.4.2 Probable Impacts

The proposed project is expected to significantly increase the level of public and private recreational facilities in Wailea-Makena area. The provision of public parks and golf courses that would be available to the public within the proposed project will add to the recreational opportunities of the proposed project area as well as the island.

6.4.3 Mitigation Measures

Due to the expected positive impacts to the area and island-wide public recreational facilities as a result of the proposed project, mitigation measures to minimize potential adverse impacts do not appear warranted. The developer will continue to work with County Departments of Planning and Parks and Recreation regarding the location and size of the proposed neighborhood parks to assure that the project and area needs are adequately addressed and met.

V

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

CHAPTER V

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

The Community Plan Amendment Application and Petition were submitted to the Maui County Planning Department on March 8, 1988. Upon acceptance of this Environmental Impact Statement, the Community Plan Amendment will be processed by Maui County. The remaining approvals (see Chapter I, Table I-2) will be applied for sequentially or concurrently, as allowed by law.

The proposed project will be consistent with: The Hawaii State Plans, the Maui County General Plan and the Kihei-Makena Community Plan.

The proposed project's relationship to these and other land use plans and controls is described in sections which follow.

1. THE HAWAII STATE PLAN

The Hawaii State Plan, Revised (Hawaii, State of, Department of Planning and Economic Development, 1986) 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 a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, 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."

Among its stated goals, objectives and policies is a clear statement of intent to support the visitor industry as a major element of steady growth in Hawaii's economy. Policies related to the development of the visitor industry emphasize the need for cooperation between the public and private sectors to assure a viable industry that is responsive to the economic, social, environmental and aesthetic values of the community as a whole.

In general, the proposed Maui Wailea 670 project is consistent with the overall intent of the Hawaii State Plan - Revised (1986). Specific objectives, policies and priority actions contained in the State Plan most relevant to the proposed project are discussed below.

(226-5) Objective and policies for population.

(a) "Guide population growth to be consistent with the achievement of physical, economic, and social objectives."

(b) (2) "Encourage an increase in economic activities and employment opportunities on the Neighbor Islands consistent with community needs and desires."

(b) (3) "Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands."

Discussion: At a time when employment opportunities are decreasing in the agricultural sector of Hawaii's economy, opportunities are increasing in the visitor industry. Permanent operational employment opportunities at Maui Wailea 670 would be significant and, indirectly, employment throughout the region and state would also be stimulated by this development. The proposed

development is of a scale and character that is consistent with that of the district and will encourage increased economic activities in the region.

Adequate services and facilities would be ensured by the resort developers. State and county tax revenues generated by the resort (property taxes, income taxes, etc.) are projected (see Chapter IV, Section 4.2) to more than offset the cost of providing public services to visitors and new residents.

(226-6) Objectives and policies for the economy in general.

(a) (1) "Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people."

(b) (6) "Strive to achieve a sustained level of construction activity responsive to, and consistent with, State growth objectives."

(b) (8) "Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility."

(b) (10) "Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems."

(b) (13) "Encourage businesses that have favorable financial multiplier effects within Hawaii's economy."

Discussion: If fully developed with lodging units, the labor-intensive lodging facilities could provide a full spectrum of employment and new business opportunities for the Kihei-Makena community. (See to Chapter IV, Section 4.2).

(226-8) Relevant Hawaii State Plan policies for the economy - visitor industry.

(a) "A visitor industry that constitutes a major component of steady growth for Hawaii's economy."

(b) (3) "Improve the quality of existing visitor destination areas."

(b) (4) "Encourage cooperation between the public and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities."

(b) (5) "Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people."

(b) (6) "Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry."

(b) (9) "Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values."

Discussion: State and county tax revenues to be generated by the development (see Chapter IV, Section 4.2) would contribute toward the cost of providing public services to new residents and visitors. Maui Wailea 670 is being carefully planned and located in a coastal area which has been designated by the Kihei-Makena Community Plan for resort development. Maui Wailea 670 intends to maintain the high standards set by other resorts on the island, especially those found in the Wailea area.

The proposed project would further the policy of providing opportunities for Hawaii's people to obtain job training and would allow for upward mobility within the visitor industry. The proposed development would offer short-term and long-term employment to residents of the state and county of Maui and would contribute to sustaining the level of construction activity in the state.

As noted in Chapter II, Section 4, Need for the Project, the projected market support for development at Wailea would support 645 to 750 resort lodge units, 1,200 to 1,370 condominium units, 110 patio homes and 340 resort single family lots at build-out. To be carefully planned and developed to meet market demands, the residential/resort community would provide a diverse range of employment opportunities within the region.

(226-11) Relevant Hawaii State Plan objectives and policies for the physical environment - land-based, shoreline, and marine resources.

(a) (1) "Prudent use of Hawaii's land-based, shoreline, and marine resources."

(a) (2) "Effective protection of Hawaii's unique and fragile environmental resources."

(b) (2) "Ensure compatibility between land-based and water-based activities and natural resources and ecological systems."

(3) "Take into account the physical attributes of areas when planning and designing activities and facilities."

(6) "Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii."

(8) "Pursue compatible relationships among activities, facilities, and natural resources."

Discussion: Conceptual plans for the proposed Maui Wailea 670 project were prepared only after extensive environmental studies of the site were conducted. This Draft EIS documents the process by which these environmental considerations were integrated into the planning process at the earliest steps. Although no historic features of significance or rare (threatened) or endangered species were encountered through these studies, any threatened or candidate species would be respected through appropriate site planning considerations.

(226-12) Relevant Hawaii State Plan policies for the physical environment - scenic, natural beauty, and historic resources.

(a) "Enhancement of Hawaii's scenic assets, natural beauty, and multicultural/historical resources."

(b) (1) "Promote the preservation and restoration of significant natural and historic resources."

(b) (3) "Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features."

(b) (4) "Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage."

(b) (5) "Encourage the design of developments and activities that complement the natural beauty of the islands."

Discussion: The residential/resort community at Maui Wailea 670 was conceived based on the unique site attributes and has thus been planned and designed to maintain and/or enhance the natural features of the site. Building groups will be sited to maintain the primary vistas to the mountains and ocean. The low density, landscaped character of the resort would provide a means for the development to accommodate and be complemented by the surrounding environment. As noted previously in Chapter IV, Section 3, an archaeological reconnaissance survey of the area found no features of historical significance and development of the proposed project would not jeopardize any surface features.

(226-15) Relevant Hawaii State Plan objective and policies for facility systems - solid and liquid wastes.

(a) (1) "Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.

(b) (1) "Encourage the adequate development of sewerage facilities that complement planned growth."

(b) (2) "Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic."

Discussion: As noted in Chapter IV, Section 5, one alternative by which the project wastewater would be handled is to develop a self-contained secondary, sewage treatment facility which will be expanded as development of the resort progresses and demand on the system warrants. The effluent would be safe to use for golf course irrigation while serving to conserve and recycle water.

(226-16) Relevant Hawaii State Plan objective and policies for facility systems - water.

(a) "The provision of water to accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities."

(b) (1) "Coordinate development of land use activities with existing and potential water supply."

(b) (3) "Reclaim and encourage the productive use of runoff water and waste water discharges."

Discussion: Irrigation water for Maui Wailea 670 could be supplied from wells developed on the northern boundary of the project site. A groundwater analysis of the Makena Region indicates adequate water resources and that wells down gradient of the project site would not be affected by the new withdrawals. As noted above, wastewater treatment plant could be designed so that wastewater can be recycled and treated effluent used to irrigate the golf course without adversely affecting downgradient water sources.

(226-18) Relevant Hawaii State Plan objective and policy for Facility Systems - Energy/Tele-Communications.

(a)(2) "Planning for the State's Facility Systems with regard to energy/tele-communication shall be directed towards the achievement of the following objectives: increased energy self-sufficiency.

(c)(3) "To further achieve the energy objectives, it shall be the policy of the State to promote prudent use of power and fuel supplies through conservation measures including education and energy-efficient practices and technologies."

Discussion: The developer will carefully investigate and analyze the most cost effective and energy efficient means of providing water heating and cooling for the planned residential, commercial and public facilities. Further, the developer will encourage the use of energy efficient and saving lighting equipment and promote energy conservation measures in the operation and maintenance of the planned facilities.

(226-19) Relevant Hawaii State Plan policies for socio-cultural advancement - housing.

(2) "The orderly development of residential areas sensitive to community needs and other land uses.

(b) (7) "Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the cultures and values of the community."

Discussion: The project's village concept has been designed to lend itself towards fostering a sense of community and cohesiveness. It is the intent of the proposed Maui Wailea 670 residential/resort to create a character that reflects the values that are traditional to Hawaii; an appreciation and respect for the beauty of the land and a caring for the community.

(226-23) Relevant Hawaii State Plan objective and policy for socio-cultural advancement-leisure.

(a) "The achievement of the objective of adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations."

(b) (1) "Foster and preserve Hawaii's multicultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities."

(b) (4) "Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved."

(b) (5) "Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources."

Discussion: The planned project provides recreational opportunities which would be integrated into the community. The proposed Maui Wailea 670 project includes provisions for a parks, open spaces, tennis complex, golf driving range and two 18-hole golf courses. In addition, opportunities for community activities, such as a theater, could be available within the village center. As such, a wide range of recreational facilities and opportunities could be made available.

(226-101 to 106) Priority Guidelines

(a) "Stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy."

(b) "To promote the economic health and quality of the visitor industry."

(b) (4) "Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources."

(b) (5) "Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions."

Discussion: The resort development would provide a steady level of construction employment over a period of several years, lead to the establishment of permanent full-time and part-time operational jobs and stimulate employment growth in other sectors

of Hawaii's economy. It is estimated that most employees would be Maui residents, and that almost all of the remaining employees would be from other islands.

Upon acceptance of this EIS and approval of the requested land use and community plan amendments, development at Maui Wailea 670 would conform with relevant state and county land use regulations, as well as other regulations pertinent to the proposed development. Beyond this, the thoroughly landscaped and low-scale community character of Maui Wailea 670 will yield a resort destination and community which is in keeping with the high quality of resorts found in the Kihei-Makena-Wailea area.

Local agricultural products, including fish, meat, vegetables and fruits, would be purchased for consumption at the resort, contributing to the maintenance and expansion of the agricultural base.

The population growth and land resources priority guidelines of the Hawaii State Plan include the following relevant priority guidelines:

(b) (1) "Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.

(b) (10) "Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in

the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources."

(b) (12) "Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations."

Discussion: The proposed project would be constructed according to a phased schedule as demand warrants and resources allow and employ locally available labor for long-term employment at the resort. The project site has historically been used for cattle grazing and has no practical agricultural use due to the generally poor soil quality. None of the land is classified as agricultural lands of importance under the State of Hawaii (ALISH) classification system. As previously noted, environmental studies conducted for the proposed project identified no critical habitats.

The affordable housing priority guidelines of the Hawaii State Plan include the following relevant priority guidelines:

(1) "Seek to use marginal or non-essential agricultural land and public land to meet housing needs of low and moderate-income and gap-group households."

(2) "Encourage the use of alternative construction and development methods as a means of reducing production costs."

(3) "Improve information and analysis relative to land availability and suitability for housing."

(6) "Encourage public and private sector cooperation in the development of rental housing alternatives."

(7) "Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations."

Discussion: To meet the anticipated demand for housing which is directly attributable to the resort development, the developer will strive to accomplish the above stated goals. (See Chapter IV, Section 4).

The economic priority guidelines of the Hawaii State Plan include the following relevant priority guidelines:

(226-103)

(f)(2) "Initiate, maintain and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy."

(f)(3) "Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings."

Discussion: The developer will analyze the cost and energy effectiveness of providing energy efficient appliances and equipment within the planned residences and commercial establishments. Engineering and economic analysis will be performed to determine the most economical and energy efficient methods of providing hot water heating and cooling as well as energy efficient methods of water use and lighting systems for proposed facilities.

2. STATE FUNCTIONAL PLANS

The Hawaii State Plan mandated the creation of twelve functional plans to provide detailed guidelines to implement its broad range of planning objectives. All of these plans, which function as guidelines only and are not to be interpreted as law or statutory mandate, have been adopted by the legislature. Development at Maui Wailea 670 considers the guidelines of the functional plans and the relevant goals and objectives of each.

The relevant state functional plans that were examined to determine their relationship to the proposed Maui Wailea 670 residential/resort project are discussed below.

State Historic Preservation Functional Plan - Historic Properties

"B. Objective: Compilation of an inventory that adequately locates and describes a significant portion of Hawaii's historic properties."

Discussion: An archaeological reconnaissance survey of the project area was completed to locate, describe and determine the significance of historic sites and features within the project area. The findings and recommendations of this survey are summarized in Chapter IV, Section 3 and Appendix D. These findings were forwarded to the Department of Land and Natural Resources (DLNR), Division of State Parks, Historic Sites Section for their comments. The State Parks Administrator and Deputy Historic Preservation Offices concurred with the conclusion of the consultant's report that there were no significant surface features on the project site and the proposed project would have 'no effect' on significant historic sites. A copy of the correspondence with DLNR is found in Chapter X.

State Housing Functional Plan

> "B. Objective: Assist the orderly development of residential areas sensitive to community needs and other land uses."

Discussion: Upon receipt of the necessary governmental approvals for the proposed project and a demonstrated need is determined, the applicant would assist in providing a mix of housing opportunities as required to support the proposed project.

State Recreation Functional Plan - Access

> "C. Objective: Provide a comprehensive range of opportunities which fulfill the needs of all recreation groups effectively and efficiently."

Discussion: As previously noted, the project would provide recreational opportunities. These include provisions for parks,

open spaces, a tennis complex, golf driving range and golf courses, in addition to community activities that could be accommodated within the village center.

State Tourism Functional Plan - Physical Development

"B. Objective: Development and maintenance of a well-designed and adequately serviced visitor industry and related developments in keeping with the needs and aspirations of Hawaii's people."

Discussion: The applicant has initiated physical planning for the resort in order to develop a visitor facility of high quality. Implementation of a master planned resort would eliminate the need for government funds for capital improvements. Planning for the proposed resort has taken into consideration land and water resources. The master plan for the resort reflects consideration for environmental, scenic and cultural resources.

State Tourism Functional Plan - Employment and Career Development

"C. Objective: Enhancement of career and employment opportunities in the visitor industry."

Discussion: The Maui Wailea 670 residential/resort community would provide significant employment, construction related and operational, that would enhance career opportunities in the visitor industry. The direct and indirect employment generated from the resort is expected to be significant (See Chapter IV, Section 4.2).

State Tourism Functional Plan - Community Relations

"D. Objective: Development of better relations and mutual awareness and sensitivity between the visitor industry and the community."

Discussion: The development at Maui Wailea 670 would be sensitive to the community concerns of the Kihei-Makena Community. In order to foster better relations with the community, the developer has engaged and will continue to enter into further discussions, with members of the community in order to address their concerns regarding the proposed project. Relatively far removed from the community of Kihei, the resort will become a destination resort community.

State Energy Functional Plan - Energy Conservation

"C. Objective: Moderate growth in energy demand through a comprehensive and coordinated energy conservation
program designed to permanently minimize waste and maximize efficient energy use."

Discussion: Conservation offers the most immediate, significant, economically feasible and environmentally compatible opportunities for reducing dependence on imported oil. The moderating effect of conservation on the growth in energy demand will also stretch the life of present petroleum supplies and enable the state to increase its energy self-sufficiency at a faster pace than if current inefficient consumption practices are continued. As noted previously, the developer will perform economic and engineering analyses to determine the most economical and energy efficient method of providing hot water heating and cooling. This same level of analysis will be directed to water use and lighting systems. Careful

consideration will be given to integrating cost effective energy conservation measures into the final design of the residential, commercial and public facilities. In addition, the developer will continue to work with Maui Electric Company, Ltd. to ensure that the projects's total energy requirements are adequately met in the most energy efficient manner.

3. GENERAL PLAN FOR THE COUNTY OF MAUI

The proposed project implements the objectives and policies of the County General Plan in areas of land use, environments, economic, urban design, public utilities and facilities, and recreation and culture. The specific applicable General Plan Objectives and Policies and their applicability to the proposed Maui Wailea 670 project are discussed below.

- Population Objective A: To manage the planned growth of resident and visitor populations in order to avoid social, economic, and environmental disruptions.

Discussion: The development of the project site will encourage a reasonable and beneficial use of the land in keeping with the surrounding resort development within the Kihei-Makena-Wailea community. Development of the land will be in sympathy with the area's natural topographic features, flooding hazards, scenic amenities and other resources.

- Land Use Objective A: To use the land within the County for the social and economic betterment of the county's residents.

Discussion: The proposed development will provide long-term employment and business opportunities that will enhance the stability of the Kihei-Makena area and the county of Maui.

Existing public utilities and services will be upgraded to support the project.

- Land Use Objective B: To make available agricultural lands that are well suited and feasible for agricultural products.

Discussion: The project site has historically been used for cattle grazing and has no other practical agricultural use. Both the Soil Conservation Service (USDA, 1972) and the Land Study Bureau (University of Hawaii, 1967) have indicated that the project site has little or no agricultural potential based on soil quality.

- Land Use Objective C: To preserve existing lifestyles through careful and effective use of the land.

Discussion: The proposed development will provide the opportunity for residents of the Kihei-Makena area to live and work in this area through the creation of long-term business and employment opportunities.

- Environmental Objective A: To preserve and protect the County's unique and fragile environmental resources.

Discussion: The development of the project site will preserve and protect existing environmental resources. Development of the site will be planned to minimize environmental disturbance and provide a quality environmental setting. In fact, some ongoing trends of erosion and silt runoff will be arrested by the proposed project off-site storm drainage improvements.

- Environmental Objective B: To judiciously use the County's inland, coastal, and marine resources.

Discussion: The coastal environment of the area will be protected from damage from pollution and runoff by effectively routing and treating storm water. The wildlife habitat of the project site is not significant due to its historic cattle grazing uses.

- Economic Objective A: To achieve stabilization, expansion, and diversification of the County's economic base.

Discussion: Development of the project site will help to maintain an economic environment favorable to full employment. Development of the site will also provide some economic diversification for the area.

- Urban Design Objective A: To encourage all developments to be well designed and in harmony with the environment in which they will be located.

Discussion: The petitioner intends to develop a well designed project in harmony with it's surroundings, which will be sensitively site planned, relating building structures to topography.

- Urban Design Objective B: To foster developments which reflect the unique character of the County and the culture of its people.

Discussion: The petitioner intends to enhance the character and culture of the area through the creation of a self-contained community focused around an active village center. The design of the community will be carried out with the high quality standards that are typical of resorts of the Wailea area.

- Public Utility and Facility Objective A: To provide high quality recreation facilities to meet the present and future needs of the County residents.

Discussion: The development of the project will include improvements to vehicular access to the area through road improvements up to and throughout the proposed development and new recreation facilities will be developed within the project.

4. KIHEI-MAKENA COMMUNITY PLAN

In January 1980 the County of Maui initiated a program to prepare and update the Community Plans for all lands within the jurisdiction of the county, including the Kihei-Makena region. The Kihei-Makena Community Plan designates 300 acres of the project site as Project District No. 9 which would provide a mix of single family and multifamily housing types, community parks integrated with pedestrian/bicycle recreation ways and buffer zones between residential, future highway and agricultural uses. The proposed development would require that 370 acres across the proposed extension of Piilani Highway be included into the Project District. The development scheme proposed for this area conforms to the requirements for this project district.

5. MAUI COUNTY ZONING

The developer will apply for zoning changes at the appropriate time in the development process.

6. COASTAL ZONE MANAGEMENT ACT (CHAPTER 205-A, HRS)

The proposed Maui Wailea 670 project is outside special management and coastal zone management areas.

7. ENVIRONMENTAL IMPACT STATEMENTS (CHAPTER 343, HRS)

Section 343-5(a)(6) of Chapter 343 HRS states "Any amendments to existing County General Plans where the amendment would result in designations other than agriculture, conservation or preservation..." requires an environmental impact statement. Accordingly, an Environmental Assessment for the project along with an application for a Community Plan Amendment was prepared and submitted to the Planning Department, County of Maui, on March 8, 1988. On April 26, 1988 the Maui Planning Commission reviewed the developer's request and determined the proposed project may have significant impacts on the environment and that an EIS would be required pursuant to the provisions of Chapter 343. This EIS serves that purpose.

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

CHAPTER VI

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 Maui Wailea 670 property to possess physical attributes that are desirable both as amenities in a residential/resort development and for their own sake. These attributes include magnificent ocean and mountain views, gently sloping terrain and dry, warm climate. The studies performed have also indicated that the proposed project is compatible with and will enhance the existing natural environment. The specific measures that will be employed to mitigate potential adverse environmental impacts are being formulated in the planning phase of the proposed project and would be followed in the design, construction and operations phases of the project.

No short-term exploitation of resources that will have negative long-term consequences have been identified. The proposed residential/resort development as envisioned by the developer will be of high quality and designed to last for decades. The principal long-term benefits of the proposed Community Plan amendment and project include the productive use of the property at a higher density than that at present. Increased residential, resort, recreational and economic opportunities for all socioeconomic levels could be provided along with increased community services and activities. The proposed project is a logical extension of the residential/resort community that

is developing along the Kihei-Makena corridor. Open spaces surrounding the project site and vistas to the ocean and mountains would be retained for the long-term benefit of the immediate area residents and visitors to the area.

As noted in the discussion of Alternatives to the Proposed Project (Chapter III), one short-term use of the property would be to retain the present vacant status of the property. This appears to be less than optimum use of the property. As the residential and resort units and amenities are developed, significant socioeconomic benefits to the community will result. Direct, full-time employment opportunities and temporary construction employment will be generated by the project and these in turn will have benefits that ripple through the regional and island economy. Similarly, indirect, induced employment will be generated in those industries and services that cater to the construction and service related businesses serving the proposed project. Public revenues from excise, personal and real property taxes are expected to more than offset any expenses associated with the expansion of public services to meet the requirements of the proposed project development and indirect population growth.

VII
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The development of the Maui Wailea 670 residential/resort project and resultant construction of detached single family and multifamily units, resort and golf lodges, mixed use/village and recreational amenities would result in the irreversible and irretrievable commitment of certain natural and fiscal resources. Major resource commitments include the land on which the project is located and on which the facilities would be constructed, as well as money, construction materials, manpower and energy. The impacts of using these resources should be weighed against the expected positive socioeconomic benefits to be derived from the project versus the consequences of taking no action or adopting another less beneficial use of the property.

A significant portion of the property would remain as open space (golf courses and parks - approximately 373 acres or 55 percent of the total land area) and include landscaping planted around the residential units and along the streets that would add to the aesthetic character of the area.

The commitment of resources required to accomplish the project includes building materials and labor, both of which are generally non-renewable and irretrievable. Construction of and resultant travel to/from the project by residents and visitors, would require the consumption of petroleum products and petroleum based electrical generation. This, too, represents an irretrievable commitment of resources.

The proposed project does not call for a substantial commitment of government supplied services or facilities that would not be

required without the proposed project. The project would add to the cultural and recreational facilities available to the residents of the project and the Wailea-Makena area in general. Similarly, the project would add to the tax revenues of the county and state.

VIII
CONSIDERATION OF OFFSETTING GOVERNMENTAL POLICIES

CHAPTER VIII

CONSIDERATION OF OFFSETTING GOVERNMENTAL POLICIES

By the very existence of a complex system of land use policies, plans, goals, objectives and controls at both the state and county levels of government, development proposals requiring land reclassification are often faced with inherent contradictions and conflicts within the land use regulatory system. As such, the Maui Wailea 670 residential/resort project must be reconciled against those planned elements that most appropriately apply. As indicated in Chapter V, the proposed project is generally consistent with the applicable Kihei-Makena Community Plan goals, policies and standards relating to the future growth of the Kihei-Wailea-Makena area. Adoption of the requested Community Plan amendment would enable the project to meet the initial land use regulatory requirements. Future actions, including application for and acceptance of zoning and subdivision requests would enable the project to meet all land use regulatory requirements.

IX
UNRESOLVED ISSUES

CHAPTER IX

UNRESOLVED ISSUES

The land owner is unaware of any unresolved public concerns at this time regarding the proposed project. The developer has been and will continue to work with the residents and businessmen of the area, as well as administrative and elected officials to assure that the final development plans meet the developer's project objectives and satisfactorily address concerns that may be raised during public review of this EIS.

Issues that remain unresolved at this time are permitting and procedural issues that this EIS is designed to help resolve. It is believed that these issues can be resolved without undue difficulty.

X
REFERENCES

CHAPTER X

REFERENCES

County of Maui. 1980. The General Plan of the County of Maui.

County of Maui. 1985. Kihei-Makena Community Plan.

Dames and Moore. 1986.

Fosberg, F. R. and D. Herbst. 1975. Rare and Endangered Species of Hawaiian Vascular Plants. Allertonia, Vol. 1, No. 1, pp. 1-72.

Hawaii State Department of Business and Economic Development. 1987. The State of Hawaii Data Book, 1987. Honolulu, Hawaii.

Hawaii State Department of Labor and Industrial Relations. May 1988.

Hawaii State Department of Land and Natural Resources. 1981. State Historic Preservation Plan.

Hawaii State Department of Land and Natural Resources. 1984. Hawaii State Recreation Functional Plan.

Hawaii State Department of Planning and Economic Development. 1986. The Hawaii State Plan Revised.

Hawaii State Department of Planning and Economic Development. 1984. State Tourism Functional Plan.

Hawaii State Department of Social Services and Housing, Hawaii Housing Authority. 1984. State Housing Functional Plan.

Land Study Bureau, University of Hawaii. 1967. Detailed Land Classification, Island of Maui.

Mullineaux, D. R., D. W. Peterson and D. R. Crandell. 1987. "Volcanic Hazards in the Hawaiian Islands", in Volcanism in Hawaii, R. W. Decker, T. L. Wright and P. H. Stauffer, Eds., US Geological Survey Prof. Paper 1350, pp. 599-621.

National Oceanographic and Atmospheric Administration (NOAA), U.S. Department of Commerce, Environmental Data Service. 1974. Hawaii and Pacific Annual Summary, 1974.

Thornwaite, C. W. 1931. Climates of North America According to a New Classification. Geog. Rev. Vol. 21, pp. 633-655.

Trans Meridian Engineers. 1978. Hydrology Report for Piilani Highway Extension. Report Prep. for State Department of Transportation, Highways Division.

U.S. Department of Agriculture, Soil Conservation Service. 1972. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii.

U.S. Fish and Wildlife Service (USFWS), Department of the Interior. 1985. Endangered and Threatened Wildlife and Plants; Review of Taxa for Listing as Endangered or Threatened Species. Notice of Review. Federal Register, Vol. 50, No. 188, pp. 39526-39527.

Westinghouse Electric Corporation, Environmental Systems Department. 1975. Environmental Impact Analyses for the Proposed Diesel-Combustion Turbine Generation Facility for Maui Electric Company.

XI
CONSULTED PARTIES, COMMENTS AND RESPONSES DURING THE CONSULTATION PERIOD

CHAPTER XI

CONSULTED PARTIES, COMMENTS AND RESPONSES DURING THE CONSULTATION PERIOD

1. CONSULTED PARTIES

The notice of availability of the Environmental Impact Statement Preparation Notice (EISPN) for Maui Wailea 670 development was published in the OEQC Bulletin by the Office of Environmental Quality Control on May 23, 1988. The agencies, organizations and individuals listed below were sent copies of the EIS Preparation Notice and were requested to comment on the project. Everyone believed to have an interest in the project or who requested consulted party status were included in the mailing. Those who responded within the 30 days to the request for comments are marked with an asterisk (*) and copies of the correspondence with them are included in this Chapter. Additional correspondence received after the June 23, 1988 deadline is marked with two asterisks (**). Copies of this correspondence is not included in this Chapter but is available from the applicant. In addition, numerous individuals, agencies and groups were contacted prior to the publication of the EISPN. Copies of this correspondence is also included in this chapter.

STATE AGENCIES

Department of Education *
Office of State Planning
Office of Hawaiian Affairs
Department of Agriculture *
Department of Health**
Department of Land and
  Natural Resources **

STATE AGENCIES (Continued)

Department of Business and
  Economic Development (DBED) *
  Housing Finance and
  Development Corporation *
Department of Accounting and
  General Services (DAGS) *
Department of Transportation
  Director *
  Highways Division *
University of Hawaii (UH)
  Environmental Center
  Water Resources Research
  Center

FEDERAL AGENCIES

Department of Agriculture,
  Soil Conservation Service **
Department of the Interior,
  Fish and Wildlife Service *
  Geological Survey, Water Resources Division *

COUNTY OF MAUI

Office of the Mayor *
Department of Human
  Concerns
Department of Parks and
  Recreation
Department of Public Works *
Department of Water Supply *
Planning Department *
Fire Department *
Police Department
Office of Economic
  Development *
Maui County Council

COMMUNITY ORGANIZATIONS
AND INDIVIDUALS

Hui Alanui O'Makena
Wailea Development Co, Inc. *
Seibu Hawaii, Inc.
Mr. Thomas Bodden *

HANNAH ALTAVILLA
Mayor

CHRISTOPHER L. HART
Planning Director
HALEKULANI MAKUIA
Deputy Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

May 9, 1988

Dr. Marivn Miura, Director
Office of Environmental
Quality Control
465 South King Street, #104
Honolulu, HI 96813-2910

Dear Dr. Miura:

Re: Request for an Environmental Impact Statement (E.I.S.) Assessment for a proposed Community Plan Amendment from Agriculture to Project District for 370 acres at TMK 2-1-8:56 and 71, Kihei, Maui, Hawaii (88/EA-7).

Please be advised that at its regular meeting of April 26, 1988, the Maui Planning Commission reviewed the above request and determined that the proposed project may have significant impacts on the environment and that an Environmental Impact Statement is required. The attached Environmental Assessment/Determination report prepared by the Planning Department was adopted as the preparation notice.

If additional clarification is required, please contact Clyde Murashige of this office.

Very truly yours,

CHRISTOPHER L. HART
Planning Director

encl.
CM:sc
cc: B. Hogarty

Environmental Assessment/Determination
CCP/VMS Maui 670
Maui Wailea 670
Tax Map Key: 2-1-8:56 and 71
Wailea, Maui

I. AUTHORITY:

The preparation of the Environmental Assessment/Determination is in accordance with the provisions of Chapter 343, Hawaii Revised Statutes and Title II, Chapter 200, Environmental Impact Statement, Subchapter 6, Determination of Significance, §11-200-9(E) of the State of Hawaii Department of Health.

II. APPLICANT:

Mr. Bill Hogarty
CCP/VMS Maui 670
2145 Wells Street, Suite 101B
Wailuku, Maui, HI 96793

Phone (808) 244-6891

III. ACCEPTING AGENCY:

Maui Planning Commission
County of Maui
200 S. High Street
Wailuku, Maui, HI 96793

IV. PROPOSED APPLICANT ACTION:

The applicant is proposing to apply to the Maui Planning Commission for a community plan amendment from agriculture to project district in order to expand project district no. 9 (Kihei Community Plan).

V. DESCRIPTION OF THE AFFECTED ENVIRONMENT:

1. Location -- The subject 370 acres (hereinafter identified as the "property") is part of a 670 acre parcel. The 670 acre parcel is rectangular in configuration and is bounded by pasture lands to the east, Maui Meadows rural residential subdivision to the north, the Wailea resort to the west, and undeveloped lands owned by Seibu Hawaii, Inc. to the south. A roadway corridor comprising approximately thirty acres bisects the parcel with the property located on the northeast side of said corridor.

2. Land Use Designations --

   a. State Land Use Classification -- Agriculture
   b. Kihei-Makena Community Plan -- Agriculture
   c. Special Management Area -- The subject site is not within the Special Management Area.

3. Description of the proposed action -- With the adoption of the Kihei-Makena Community Plan by the County of Maui in July 1985, came the designation of 300 acres of the subject parcel as project district no. 9. It is the intent this project district to provide single and multi-family housing types for a wide income range with an emphasis on single family units. A recommended density of 4.5 units per acre translates into 1,050 residential units. Amenities are to include community oriented parks integrated with pedestrian/bicycle recreation ways, and a school site.

The applicant is requesting a community plan amendment to increase project district no. 9 to include the property and expand the range of permitted uses. Proposed are two 18-hole golf course, a mixed use village center and a resort lodge in addition to the original single family and multi-family dwelling units.

A breakdown of the land use allocation is as follows:

Land Use	Acres	Units
Village Mixed Use	31	720-850
Commercial	6	
Resort Lodges	27	370-480
Residential	233	1,060-1,320
Colf Courses	341	
Parks	14	
Open Space/Roads	18	
	670	2,150-2,650

IV. REASON SUPPORTING DETERMINATION:

In reviewing the subject proposal the following comments are provided:

1. Site elevations range from 300+ feet to 700+ feet above mean sea level with an east-west slope of approximately twelve (12) percent. The Land Study Bureau Report classified the land as "E" which indicates a poor agricultural activity rating.

   Drainge improvements will utilize natural drainageways as much as possible, with consideration given to downstream drainage patterns and improvements of the Wailea Resort.

   According to the applicant, previous archaeological investigations of the site did not indicate the presence of significant archaeological features of value. However, a full archaeclogical reconnaissance will be conducted.

   Based on the aforementioned, additional information should be developed to ascertain if onsite or offsite natural or cultural resources may be impacted by the project.

2. Recent use of the site was for cattle grazing. Establishment of the project will eliminate the potential for agricultural and/or open space use.

   As the quality of the land is poor for agricultural production, the project may increase the beneficial uses of the site. Residential, commercial, and recreational facilities will be provided. Also, visitor accommodations will be provided.

   However, additional information is required to more adequately determine if the beneficial range of the environment may be curtailed.

3. The project attempts to address the State's long-term environmental policies by 1) providing diverse economic activities which are stable and in balance with the physical and social environments, and 2) establish a community which provides a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian.

4. The intent of the project is to provide a range of integrated land uses to develop a community focus for the Wailea area. Types and density of uses are substantial enough so an economic impact the Kihei-Makena community may occur. Assuming a significant amount of employment will be generated by the project, both short and long term, the economic benefit will generally be positive. However, it is not clear as to what type of employment can be expected.

   Socially, the project's impact is dependent upon the amount of units that are ultimately constructed and when the units are constructed. Other factors which figure into social impact are the economic bracket of the residents and the availability and types of employment provided to the community.

5. Given the general uses associated with the proposed development, it is not the type of uses which would lead to substantial impacts on public health. <u>However, not enough information has been provided to determine if specific uses may impact public health, both on and off the site, which could include adequacy of sewer treatment facilities and drainage facilities</u>.

6. An increare in population will occur as a result of the total 670 acres project in the range of 2,150 to 2,650 units. This could mean an increase of population from 5,800 to 9,000 people. Based on a current island population of 85,000 this project represents a 7% to 11% increase over a fifteen (15) year implementation time span.

   Such an increase in population will require the development of appropriate infrastructure including the continuation of Piilani Highway and the expansion of the Kihei Sewage Treatment Plant capacity.

   Although a range of recreational facilities including golf courses and tennis courts will be provided, the development will create the need for more park areas, and meeting and social facilities. Also, establishment of additional public school facilities need to be addressed.

7. Any type of development of a previously undeveloped site will impact the environmental quality of the site and potentially its surrounds. Whether the impact is positive or negative depends on the intent of the project and existing physical limitations associated with the site geometrics and carrying capacity.

   The development could involve a substantial degradation of the environmental quality associated with the site.

8. The project in itself is limited by its physical boundaries. However, the project is part of the Wailea Resort and is intended to be an integral part of said resort. It is highly likely that the project will function as a central activity core for Wailea where focus is to be on resident related facilities intermixed with some visitor accommodations.

   What should be further addressed is the project's relationship to the development concept of Wailea as well as its physical relationship to Wailea. This project is signficant as it borders upon four distinct land use types (Wailea Resort to the west, Maui Meadows rural subdivision to the north, vacant agriculture lands to the east, and undeveloped lands owned by Seibu to the south) and needs to be sensitive to the physical characteristics of each.

9. Plant type on the site include kiawe, wiliwili, and haole koa trees. Low to moderate dense shrub material including lantana, ilima, cactus, and hialoa. Also, existing are exotic grasses including natal round tip, finger grass, sour grass, and low climbing vines including morning glory.

   The kiawe and wiliwili tree species feature some mature specimens which warrant consideration for relocation or preservation. However, additional information needs to be provided including the location and significant of the matured trees.

   Confirmed siting of animal species common to the southeast area of Maui were noted on the site. This includes axis deer, mice, mongoose, gray franklin, lace neck dove, cardinal, mocking bird, and rice bird.

   Additional field work on the site needs to be conducted to determine if any rare, endangered or threatened animal and/or its habitats exist on the site.

10. As the proposed project involves residential, commercial, hotel and recreational uses, there will be an increase in ambient noise levels over non-processing agricultural uses.

    Impacts upon air quality will depend upon what specific uses are to be established. Any manufacturing or emission output could affect air quality both onsite and surrounding areas. Wind patterns are the primary determants towards air quality impact. This is especially important as the stronger afternoon tradewinds are oriented towards a populated area (Maui Meadows and Central Kihei).

    Water quality concerns are primarily that of runoff impact on downstream properties and offshore waters. Slopes associated with the site are in the twelve percent range. Sharp sloping gullies define ridge formations. Modifications to onsite drainage patterns must consider existing and proposed downstream improvements within the Wailea Resort.

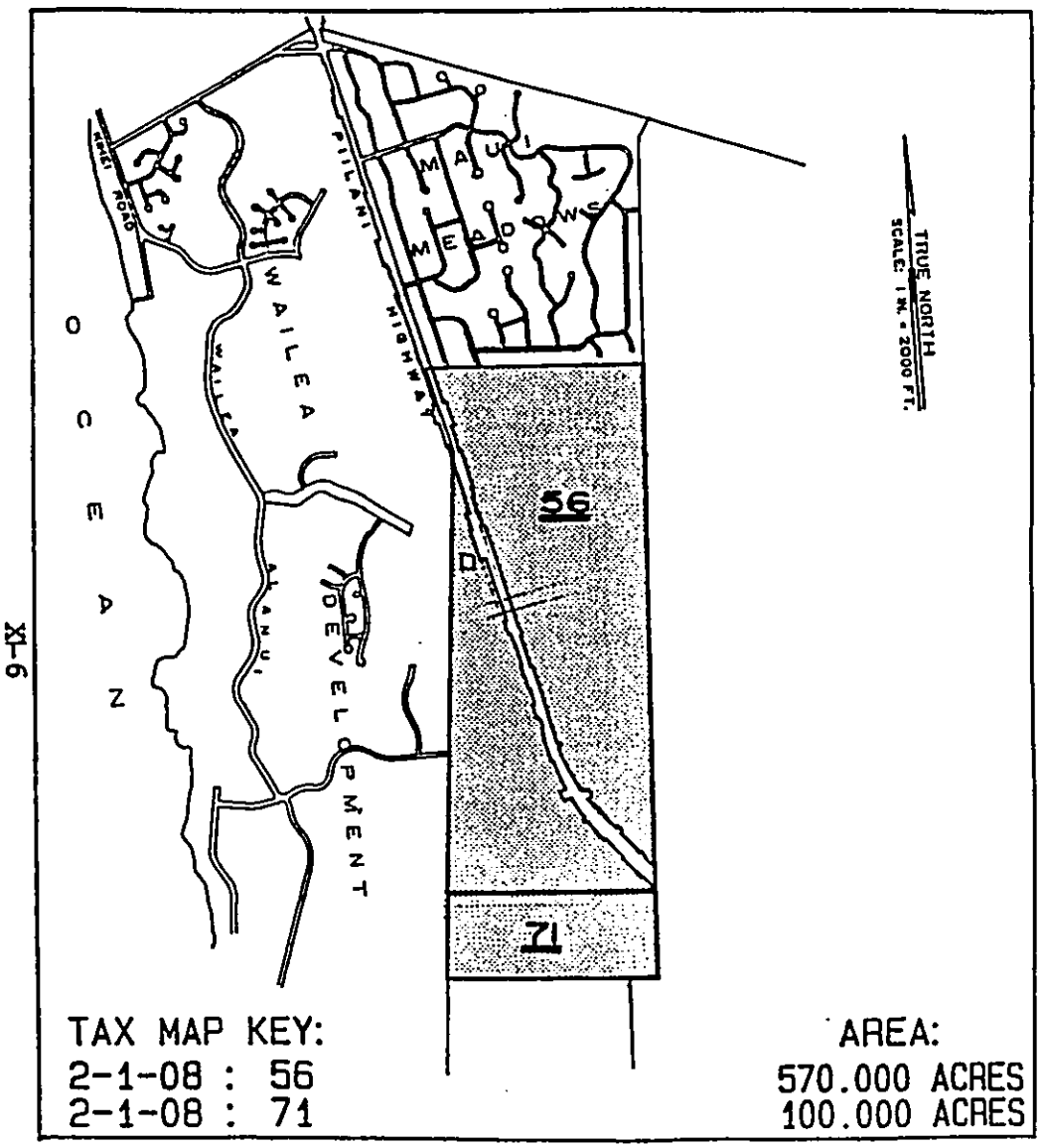
    Another concern pertaining to water quality is the potential use of petroleum based fertilizers and chemicals associated with golf course maintenance.

11. The project site is not within a flood plain, tsunami zone, erosion area, geologically hazardous area, estuary, or fresh water sources area.

    However, storm generated runoff could affect coastal waters. As such a detailed drainage analysis should be developed.

V. DETERMINATION

It is hereby determined that during the subsequent review process, the proposed project may have a significant impact on the environment as defined by Chapter 343, Hawaii Revised Statutes, and the Environmental Impact Statement Rules of the Department of Health, State of Hawaii, and that <u>an Environmental Impact Statement for the proposed project should be required</u>.


TRUE NORTH
SCALE: 1 IN. = 2000 FT.
MAUI MEADOWS
PILANI HIGHWAY
WAILEA
WAILEA
ALANUI
DEVELOPMENT
OCEAN
56
71
TAX MAP KEY:
2-1-08 : 56
2-1-08 : 71
AREA:
570.000 ACRES
100.000 ACRES

June 30, 1988

SAMPLE LETTER

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear :

GCR/VMS Maui 670 is requesting the County of Maui, Planning Department to consider an amendment to the Kihei-Makena Community Plan to change the designation of approximately 370 acres of land situated in Wailea, accessed from Piilani Highway. Specifically, the amendment requests a redesignation of the 370 acres from the current Agriculture designation to be included as part of Project District No. 9. Our firm has been retained to represent GCR/VMS Maui 670 in this process.

As the accepting agency, Maui Planning Department has determined that the amendment request will require the preparation of an Environmental Impact Statement (EIS) pursuant to Chapter 343, Hawaii Revised Statutes. Notice of this determination was published in the May 23, 1988 issue of the OEQC Bulletin. The publication of this determination begins a 30-day public review period wherein anyone can request to be consulted during the preparation of the EIS. All requests must be postmarked by June 23, 1988.

To facilitate your review of the proposed development, we have enclosed an expanded version of the EISPN published in the OEQC Bulletin. We would greatly appreciate your assistance in this

process by either responding with written comments to the enclosed EISPN or by identifying an individual within your organization whom we may contact to discuss the project in greater detail.

Thank you for your cooperation in this matter.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

Enclosures

cc: Bill Hogarty
Maui Planning Department
OEQC

342FL_6_.WP

465 SOUTH KING STREET · KEKUANAOA BUILDING, #104 · HONOLULU, HAWAII 96813 · TELEPHONE (808) 548-6915

OEQC BULLETIN

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

JOHN WAIHEE
GOVERNOR

DIRECTOR

Volume 5 | May 23, 1988 | Number 10

REGISTER OF CHAPTER 343, HRS DOCUMENTS

****

All Chapter 343, HRS documents submitted for publication in the OEQC Bulletin must be addressed to the Office of Environmental Quality Control, 465 South King Street, Room 104, Honolulu, Hawaii 96813. Documents addressed otherwise will not be considered for publication.

****

EIS PREPARATION NOTICES

The following proposed actions have been determined to require an environmental impact statement. Anyone can be consulted in the preparation of the EIS by writing to the listed contacts. 30 days are allowed for requests to be a consulted party.

COMMUNITY PLAN AMENDMENT FROM AGRICULTURE TO PROJECT DISTRICT FOR 370 ACRES, KIHEI, MAUI, Mr. Bill Hogarty/Maui Planning Commission

The applicant is requesting a community plan amendment to increase project No. 9 to include the property and expand the range of permitted uses. Proposed are two 18-hole golf courses, a mixed use village center and a resort lodge in addition to the original single family and multi-family dwelling units. The subject 370 acres (TMK:2-1-8-56 and 71) is part of a 670-acre parcel. The 670-acre parcel is rectangular in configuration and is bounded by pasture lands to the east, Maui Meadows rural residential subdivision to the north, the Wailea resort to the west, and undeveloped lands owned by Seibu Hawaii Inc. to the south. A roadway corridor comprising approx. 30 acres bisects the parcel with the property located on the northeast side of said corridor.

Contact: Mr. Clyde Murashige
County of Maui Planning Dept.
200 S. High St.
Wailuku, Maui, Hawaii 96793

Deadline: June 22, 1988.

NEGATIVE DECLARATIONS

The following are Negative Declarations or determinations made by proposing or approving agencies that certain proposed actions will not have significant effects on the environment and therefore do not require EISs (EIS Rules 11-200-11). Publication in the Bulletin of a Negative Declaration initiates a 60-day period during which litigation measures may be instituted. Copies are available at 25 cents per page upon request to the Office. Parties wishing to comment may submit written comments to the agency responsible for the determination (indicated in project title). The Office would appreciate a copy of your comments.

ENVIRONMENTAL ASSESSMENT

FOR

MAUI WAILEA 670 RESIDENTIAL/RESORT COMMUNITY

WAILEA, MAUI

TMK 2-1-08:71 AND 2-1-08:56

MARCH 1988

APPLICANT:	GCR/VMS MAUI 670 c/o Mr. Bill Hogarty 2145 Wells Street, Suite 101B Wailuku, Maui, Hawaii 96793
APPROVING AGENCY:	County of Maui Planning Department
AGENCIES CONSULTED IN MAKING ASSESSMENT:	County of Maui Planning Department

1. INTRODUCTION

1.1 PURPOSE AND CONTENT OF ENVIRONMENTAL ASSESSMENT

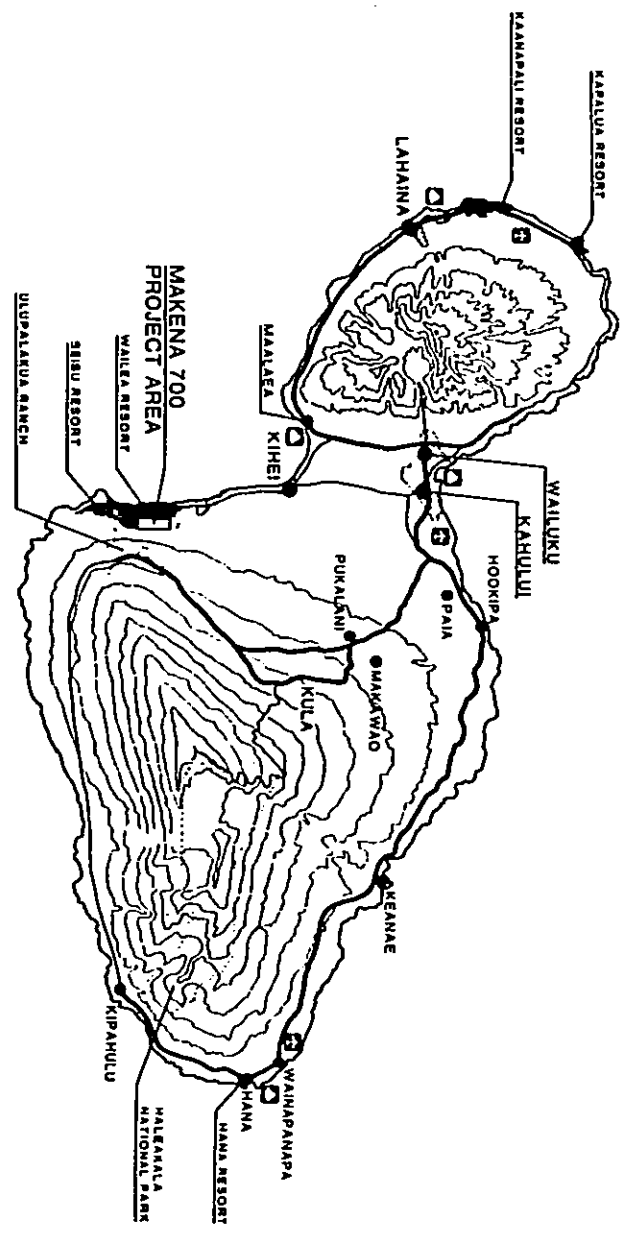
This Environmental Assessment (EA) is for the proposed development of "Maui Wailea 670" in Wailea, Maui. This EA has been prepared in accordance with the provisions of Hawaii Revised Statutes (HRS), Chapter 343 and Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Sections 11-200-9 through 11-200-13. This EA represents the initial assessment of the potential environmental impacts of the proposed project. A description of the proposed project (action), the affected environment, alternatives considered to date, proposed mitigation measures and preliminary determinations based on the information presented herein and the reasons supporting those determinations are provided. The information contained herein has been drawn from site visits, planning and engineering studies and plans prepared for the proposed project and generally available information regarding the project site and surrounding area and their environmental characteristics.

1.2 DESCRIPTION OF THE PROPERTY

Identified for planning and regulatory processing purposes as "Maui Wailea 670", the project area includes TMK No. 2-1-08:56 and 71 and is owned in fee by GCR/VMS MAUI 670 (refer to Figures 1 and 2). Comprised of approximately 670 acres, on the relatively gentle lower slopes of Haleakala volcano on east Maui, adjacent to the existing Wailea resort to the west, Seibu Makena resort to the south, Ulupalakua Ranch to the east, and Kihei and Maui Meadows subdivision to the north (refer to Figure 1). The site is bisected by property reserved for the planned extension of the State's Piilani Highway, a major transportation corridor that is planned to connect to the upcountry/Kula region. The project area includes approximately 370 acres mauka and 300 acres makai of the planned highway. Elevations across the site range from approximately +300 to +700 feet above mean sea level. The site slopes to the ocean at an average slope of twelve percent. Existing vegetation consists of typical upland Kiawe forest which includes native Wili-wili, Kiawe and Haole koa trees, Ilima, Lantana and grasses.

Panoramic views of shoreline, upland areas of Haleakala, West Maui Mountains, and the offshore islands of Molokini, Kahoolawe, and Lanai, are available from selected areas of the site. Views of the ocean are available from almost all areas of the site.

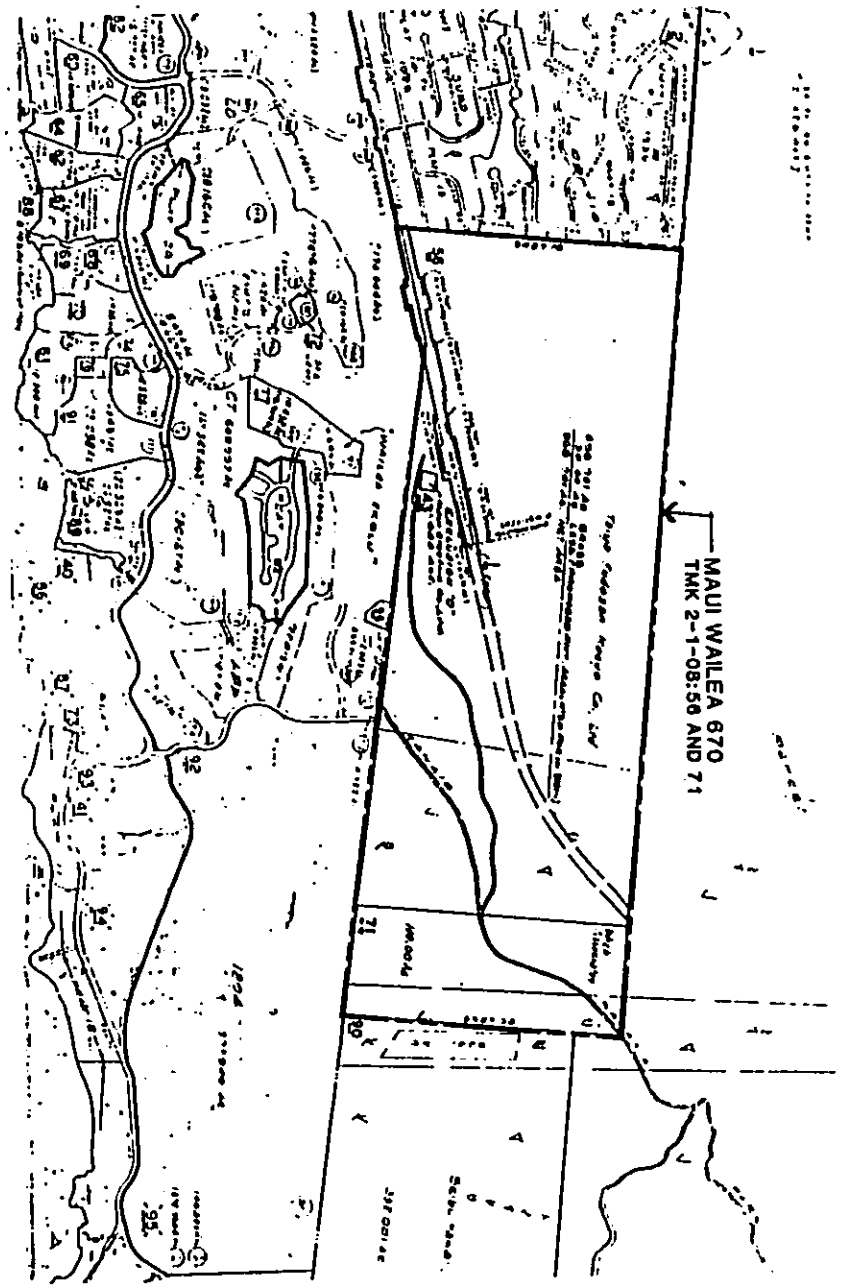
The entire project area is within the State Land Use agricultural district and classified "E" by the Land Study Bureau. The makai portion (300 acres) of the project area is designated on the County's Kihei-Makena Community Plan as Project District No. 9 (1050 units). Refer to Figures 4 and 5. It is contiguous to



ISLAND OF MAUI

MAUI WAILEA 670

FIGURE 1



TMK MAP

MAUI WAILEA 670

FIGURE 2

urban lands to the west (Wailea Resort) and rural lands to the north (Maui Meadows).

2. GENERAL DESCRIPTION OF THE PROPOSED ACTION'S TECHNICAL, SOCIAL, ECONOMIC AND ENVIRONMENTAL CHARACTERISTICS

2.1 DESCRIPTION OF THE PROPOSED ACTION

"Maui Wailea 670" will be a logical extension of the Wailea-Makena resort community. As shown in Figure 3, the planned residential/resort community is dominated by two 18-hole golf courses and will provide a focal point for community activities in a mixed use village center and provide resort lodge accommodations to complement the luxury hotel accommodations of Wailea and Makena. Organized around a "village green" concept, the service and activity centers for this master planned resort/residential community would be concentrated to create a convenient and exciting community center. The primary activities/services to be planned within the mixed use village would be a commercial and eatery center, resort lodge visitor accommodations, visitor information center, and other facilities such as theaters. To serve as a landmark feature for the region, a church would also be prominently located within the village. With a pedestrian oriented open space circulation system, the village center would provide an integrated sense of community and give the visitor or resident a strong sense of arrival and place.

Located within the makai 300 acres of the project with vehicular and pedestrian access to Wailea and Palauea via Kaukahi Street, the village center would be pedestrian oriented and in close proximity to the golf clubhouse and tennis center. The balance of the makai area would be utilized for an 18-hole golf course, resort lodges (low-rise hotel accommodations), and various multi-family and single family residential uses located along the open space corridors of the golf course.

The mauka portion of project area, approximately 370 acres, would be developed at lower residential densities and provide for an 18-hole golf course and related golf oriented resort lodging facilities as a focal point. With the magnificent views afforded by the upper elevations of the project area, a variety of residential products would be developed including single family and multi-family residential neighborhoods with direct golf course frontage or ocean views.

With a preponderance of landscaped open space to blend the proposed residential community into the slopes of Haleakala overlooking Wailea, the "Maui Wailea 670" project will provide the Wailea-Makena resort destination area with a greater sense of community. The village center will provide a community focal

point with an integrated pedestrian pathway system to provide pedestrian links to the residential neighborhoods.

To be developed over a 10 to 15 year timeframe, the project would be phased in conjunction with infrastructure extensions and market demands. The following table provides a summary of the general land use allocations and ranges of planned units.

Table 1

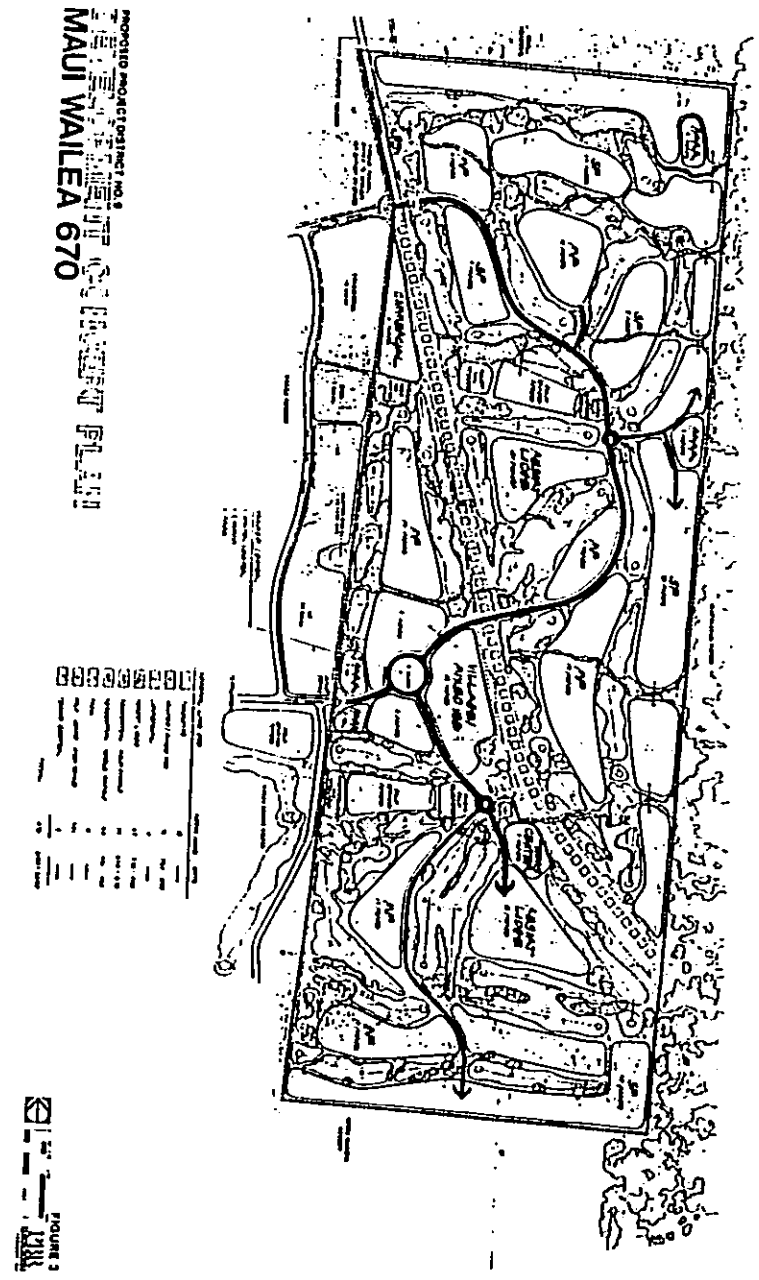
General Land Use Allocation

Land Use	Total Acres	Total % of Area	Total Units
Village/Mixed Use			
Commercial	31	5	720-850
Resort Lodges	6	1	-
Residential	27	4	370-480
Golf Courses (2 18-Hole Courses)	233	35	1060-1320
Parks/Recreation	341	51	-
Open Space/Roads	14	2	-
	18	2	-
TOTALS:	670	100%	2150-2650

The general development objectives that establish the framework for detailed project planning and design for "Maui Wailea 670" include the following:

- Creation of a master planned residential/resort community that provides for regional community services, a focal point of activities and a place of identity and orientation for the Wailea-Makena Region.
- Responsive to current and future residential/resort and commercial market trends and needs of the region;
- Responsive to the particular physical and environmental qualities of the site; and,
- Appropriate for the island of Maui and its vision of Wailea-Makena as a world-class resort/residential community.

The master plan, as previously described and illustrated (Figure 3), is responsive to these general development objectives. Based upon detailed site planning and environmental studies, the "Maui Wailea 670" project would utilize the county's Project District land use designation to provide the necessary flexibility to accomplish a master planned community of this scale.



2.2 DESCRIPTION OF THE SOCIAL AND ECONOMIC CHARACTERISTICS OF THE PROPOSED ACTION

2.2.1 Regional Context

The regional extent of existing and planned land uses are shown in Figures 4 and 5. Kihei, which stretches along the shoreline from Maalaea to Wailea, is a residential and resort community about six miles long with a resident population of about 10,600. Kihei Road serves as the primary linear circulation spine of the area.

Residential and resort development in Kihei is focused along Kihei Road and in proximity to shoreline recreation resources. Sugar Beach and Maui Lu Resorts are low-rise resort condominium projects typical of the area. The majority of the resort accommodations in Kihei are apartments, with some offering the supporting services and amenities of a hotel. It is estimated that there are about 6,000 condominium units in the Kihei area.

Residential areas are predominantly single family with the quality of development varying considerably with location. In general, there is no discernible community pattern. Vacant land areas between existing residential subdivisions require extensive site drainage infrastructure before they can be developed. Since there is no public drainage system in Kihei, subdivision of these lands will be long-term.

There are numerous existing and planned commercial developments within Kihei including the Azeka Place Shopping Center, Kai Maui Village, Kihei Town Center, Rainbow Mall, Kealia Beach Plaza, Kamaole Shopping Center, Dolphin Shopping Center, and Weinberg's proposed shopping center at the entrance to Kihei. Commercial centers that are planned or under construction in the Kihei area include the 30,000 square foot Kamaole Shopping Center and the 20,000 square foot Dolphin Shopping Center.

In Wailea, the existing shopping center, with 40,000 square feet of gross leasable area, has no immediate expansion plans, although the design does allow for additional space. Based on the demand for commercial space, there is a strong feeling that the Kihei area could support significantly more commercial development.

Industrial developments in Kihei are limited to the 300 acre Kihei Research and Technology (R & T) Park, currently planned mauka of Piilani Highway. It includes the 18-hole golf course (Silver Sword Golf Courses) adjacent to the park and the highway. This project is being marketed as a high technology park to attract "clean" industries and broaden Maui's economic base. This will be the first R & T park to get underway in Hawaii.

Public recreational areas and facilities within Kiehi are on the makai side of Kihei Road and include Kamaole Beach Parks, Kalama Beach Park, and other shoreline parks. Excursion boat operators at the Maalaea Harbor offer sightseeing, diving and fishing charters.

2.2.2 Access

Access to the project site will be provided by Piilani Highway, which begins north of Kihei at its junction with Mokulele Highway, North Kihei Road, and South Kihei Road. Mokulele Highway and North Kihei Road, both two-lane highways, connect to other parts of Maui; South Kihei Road provides local access to Kihei, parallel to Piilani Highway.

Increment I of the two-lane Piilani Highway, completed in 1981, is 6.8 miles long and extends south to Kilohana Drive, near the north end of Wailea. The highway consists of 12-foot wide lanes with 10-foot wide paved shoulders. Several unsignalized intersections allow traffic to connect to destinations within Kihei. No further improvements to Increment I are planned at the present time.

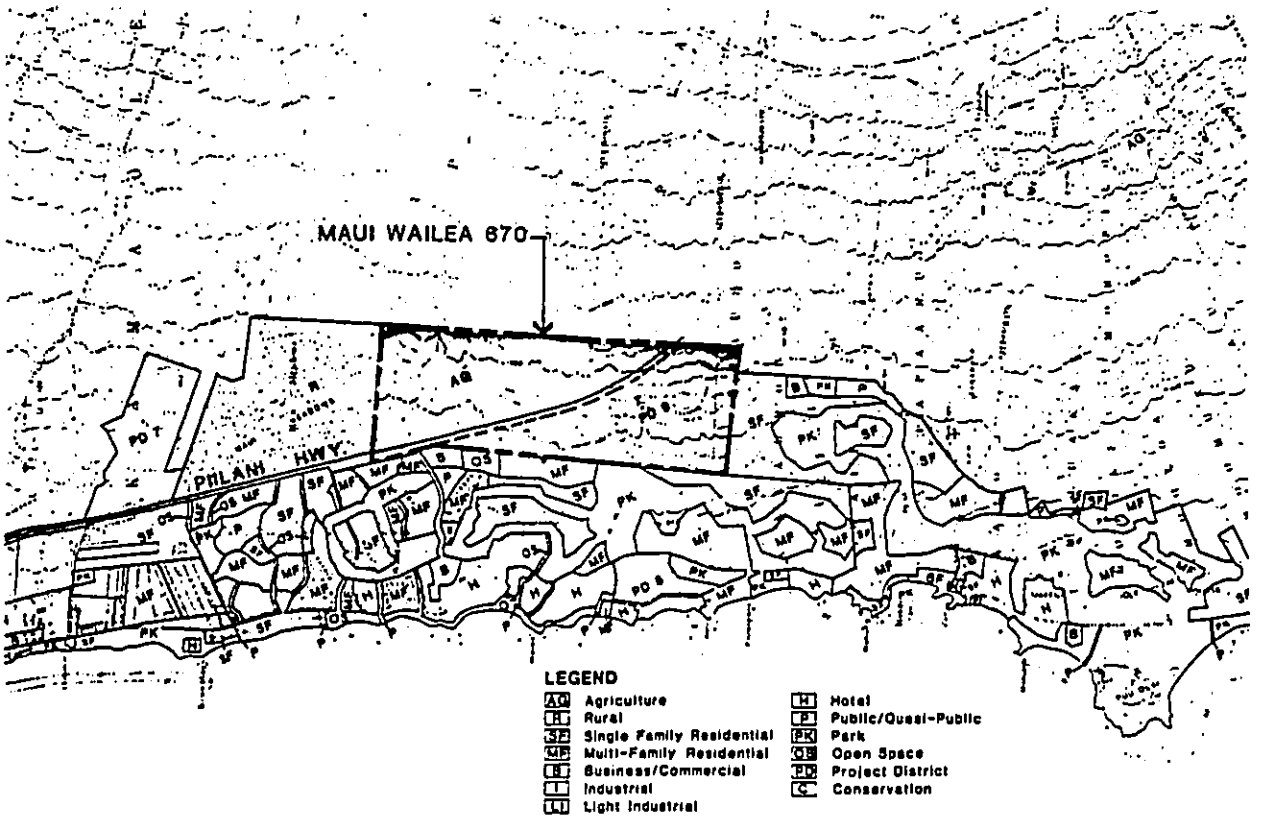
Increment II improvements from Kilohana Drive south to Wailea Ike Drive, are planned to begin construction to 1988. This 1.4 mile segment will be similar to Increment I, and will end approximately 1,400 feet south of the north boundary of the project site and provide access to the project area.

The planned but yet undesigned or budgeted Increment III improvements will bisect the project site from the northwest to southeast corners of the property. the two-lane highway extension will be 4.6 miles long and is planned for 12-foot lanes; however, shoulder widths will be only 4 to 6 feet. Increment III is considered a long-range project with design currently expected to begin in eight to ten years with construction to follow when funds are made available by the state. With completion of Piilani Highway, travel times between the Kihei and Kula areas will be reduced.

Connection to Piilani Highway from the project site would be made at several at-grade intersections. A connection opposite Wailea Ike Drive could serve the project until construction of Increment III of Piilani Highway. Other connections would be coordinated with the design of the highway extension. Traffic impacts of the proposed project will be dependent upon the scale and rate of development and other projects in the area.

2.2.3 Wastewater System

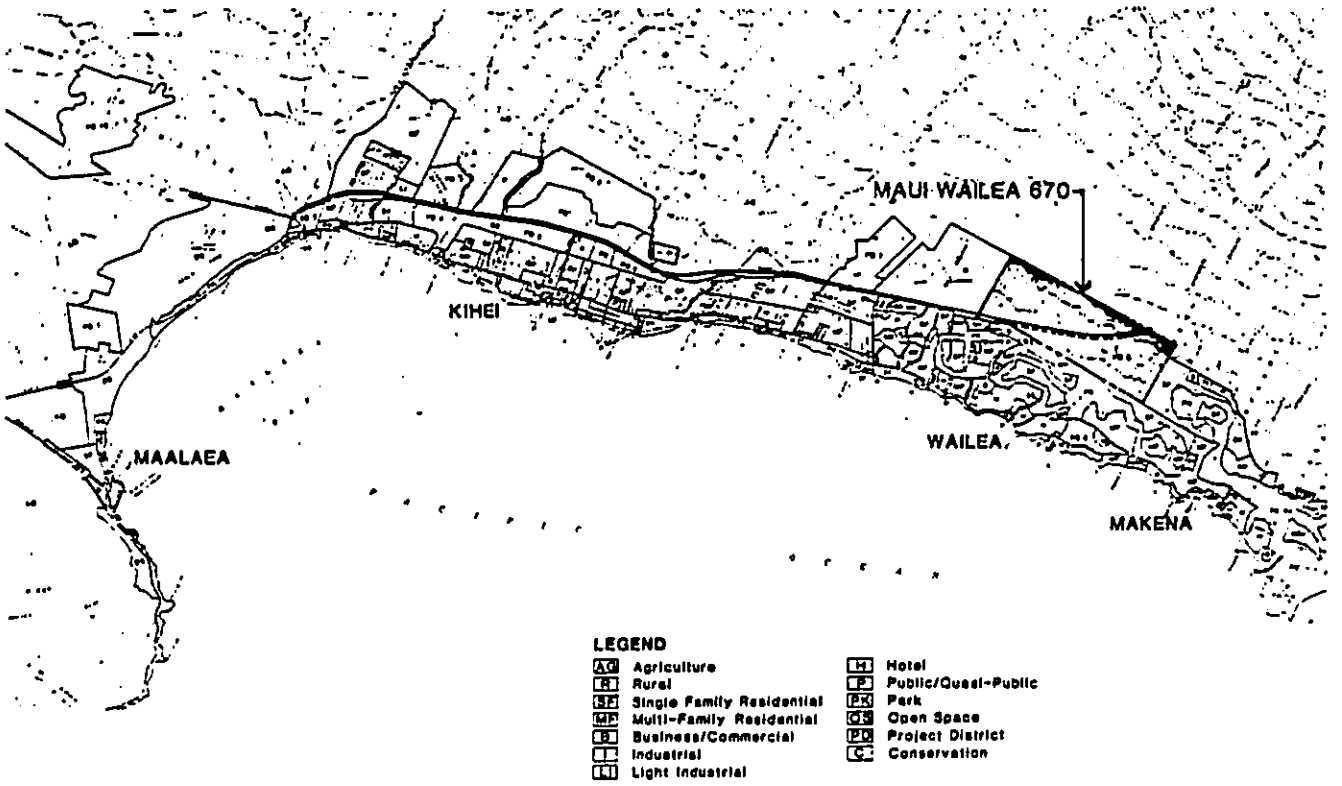
The Kihei Sewer Treatment Plant (STP) was designed to handle 4.0 million gallons of wastewater per day. According to county



KIHEI-MAKENA COMMUNITY PLAN : LAND USE

FIGURE 5

MAUI WAILEA 670



REGIONAL LOCATION MAP
KIHEI-MAKENA COMMUNITY PLAN

FIGURE 4

MAUI WAILEA 670

sources, most recent readings taken at the Kihei STP during December 1987 and January 1988 indicate that flows ranged between 2.8 and 3.0 MGD. They estimate the remaining capacity in the plan to be approximately 1.0 MGD.

In view of the limited capacity of the existing Kihei STP, several alternatives are being considered to serve the "Maui Wailea 670" project. These include participation with other developers and the county in upsizing the existing gravity interceptors, pump stations and force mains between Wailea and the Kihei STP; or installing a new interceptor beginning at the southwest corner of the proposed project to the Kihei STP along Piilani Highway (costs would be shared with other developers); participating with other developers and the county in enlarging existing STP; or constructing a private STP in the proposed project or Seibu Makena site in cooperation with other developers in South Wailea and Makena.

2.2.4 Water System

Potable water for the Kihei region comes from drilled wells located in Iao Valley in Wailuku and in upper Waiehu where deep well turbine pumps penetrate the underground aquifer near sea level and lift fresh water to the surface. Two transmission lines transport water from these sources to the Kihei-Makena areas of Maui. Water from Iao Valley or Mokuhau source is conveyed by means of an 18 inch line. Water from the more recently developed source at upper Waiehu is conveyed by a 36 inch diameter transmission system.

Water for the Wailea and Seibu developments located west and south, respectively, of the proposed project, is from the upper Waiehu source. This source was developed by the joint venture of Alexander and Baldwin, Inc., Wailea Development Company, Seibu Hawaii Inc. and C. Brewer and Company, Ltd. This source consists of several wells with a present developed capacity of approximately 13.5 million gallons per day (MGD). When fully developed per the Joint Venture's agreement with the County of Maui, this source is expected to yield a minimum of 19 MGD.

Being within the service area of the Central Maui system, the proposed project would obtain water from the county and pay a source assessment fee. In addition, the project will require additional improvements to the water system, including installation of the distribution system, new reservoirs and enlarging storage and pumping systems.

The following tables contain average daily water rates for Wailea Development and the County of Maui, respectively:

Table 2

Adopted Design Criteria for Wailea Development

Type of Development		Water Rates/Unit/Ave. Day
C	Condo	800 gpd
S	Single Family Residential	1,000 gpd
R	Hotel Room	420 gpd
B	Commercial	6,000 gpd
GC	Golf Course Irrigation	5,600 gpd

Table 3

Design Criteria Per

1971 Water Master Plan for County of Maui

Land Use	Population Person/Acre	Water Rate GPCD	Water Rate GPAD
Residential	13 - 18	140	1,800 - 2,500
Apartment	40	140	5,000
Hotel	75	250	17,000
Industrial	-	-	6,000
Commercial	-	-	6,000
School & Church	70	30	1,700
Hospital	40	100	1,800
		DWS	SCS
Agricultural		5,000 gpAd	7,000 gpAd
Rural		1,500 gpd/lot	

GPCD - Gallons per Capita Day
GPAD - Gallons per Acre Day

Based upon the average daily water rates, the following table summarizes the projected maximum water needs for the project for both potable and non-potable irrigation sources.

Table 4

Projected Water Consumption at Build-Out
(in million gallons per day)

Use	Gross Area Acres	Max Units	Rated Used	Potable Domestic Demand (Ave.Day)	Potable Domestic Demand (MaxDay)	Non-Potable Irrigation Demand
Village/Mixed	31	850	6000 gpAd	0.186	0.279	----
Commercial	6	---	6000 gpAd	0.036	0.054	----
Resort Lodge	27	480	420 gpd	0.202	0.303	----
MF Residential	79	870	800 gpd	0.696	1.044	----
SF Residential	154	450	1000 gpd	0.450	0.675	----
Golf Course: Domestic	10	---	6000 gpAd	0.060	0.090	----
Irrigation	331	---	5600 gpAd	----	----	1.854
Parks/Recreation	14	---	5600 gpAd	0.078	0.078	----
Roadways	18 (5)	---	5600 gpAd	0.028	0.028	----
TOTALS:	670	2650		1.736	2.551	1.854

With regard to irrigation water, preliminary investigations indicate that there is a limited supply of groundwater suitable for irrigation within the proposed project site. Salinity would be within the 500 to 800 parts per million range.

Presently, the Wailea wells capture much of the sustainable yield over the length where they are located down gradient of the proposed project. However, in the northerly section of the project site, groundwater flow is available since there are no wells located down gradient of this area. Wells having a capacity of 300 gpm or less may be located in this area without significantly impacting the more southerly Wailea wells.

The following irrigation water alternatives are being considered:

(1) Use effluent from the Kihei STP: This option would be attractive if a new sewer collector and transportation system were to be installed between the project site and the Kihei STP. The force main to transport treated effluent back to Wailea could then be installed in the same trench as the gravity interceptor line to the STP;

(2) Use of effluent from private STP: One or two wells would have to be installed on-site to augment the volume of effluent from a private STP; or,

(3) Use of potable water: Under this option, a water source development fee would have to be paid.

With regard to treated sewage effluent being injected into underground aquifer, this practice is not expected to have a detrimental effect since there is no potable water source downstream of project site. Permits from the State Department of Land and Natural Resources will be required prior to drilling any wells within the project site.

2.2.5 Drainage

The proposed project site is located on the western slope of Mount Haleakala in what is often referred to as the Kihei-Makena watershed. The contributory drainage area above the project site contains approximately 6 square miles or roughly 3,850 acres. This off-site drainage area rises from an elevation of about 700 feet at the easterly (mauka) boundary of the project area to 6,400 feet at the ridge on Mount Haleakala, a distance of approximately 30,000 feet. About 85 percent of this watershed area is presently being used for grazing with the remaining 15 percent in conservation use.

A hydrology report prepared for the State Department of Transportation, Highways Division in conjunction with the Piilani Highway project indicates that there are five major contributory drainage areas above the project site. Numerically, they are designated as Drainage Basins 33, 34, 35, 39 and 43. Runoff from Highway Extension are tabulated in Table 5.

Table 5

Drainage Basin Runoff

Drainage Basin No.	Stream	Rational Method 50 Yr. (cfs)	Rational Method 100 Yr. (cfs)	SCS Method 50 Yr. (cfs)	SCS Method 100 Yr. (cfs)
33		-	-	1,925	2,716
34		-	-	790	953
35		-	-	770	938
36		109	114	-	-
37		155	188	-	-
38		185	204	-	-
39		-	-	1,960	2,324
40		109	150	-	-
41		115	159	-	-
42		30	42	-	-
43		-	-	497	598
44		86	111	-	-

Preliminary indications are that all of the drainage structures were sized to handle flows based on a 50 year recurrence interval. Consequently, with the county now requiring that 100 year recurrent interval be used, these drainage crossing will have to be re-evaluated and, if required, modified to handle the 100 year flow.

XI-16

2.2.6 Electrical/Communication Services

Electrical service to the project site would be provided by Maui Electric Company (MECO). Total load and demand requirements for the proposed project are not known at this time. The developer will work with MECO in determining the specific transmission, distribution and substation requirements for the project. Similarly, the developer will work with Hawaiian Telephone Company and other communication service companies to determine project needs and solutions.

2.2.7 Community Services

As a master planned community that will be integrated into the adjacent resort designation area of Wailea-Makena, the planning for "Maui Wailea 670" has considered and provided for the following community needs and services.

Parks and Recreation

With an ever increasing demand for golf, the project includes two 18-hole championship golf courses. These courses should help to satisfy the increased demand for golf that will be generated by the continued development of this resort destination area.

In addition to the two golf courses, other recreational amenities include a tennis center, neighborhood parks, and a pedestrian pathway system to link these major recreational features. Within each of the multi-family residential project areas, additional private recreational facilities would be provided for.

It is currently anticipated that the park areas within the project would be owned and maintained by the community association to assure the proper level of maintenance is provided.

Access to the existing shoreline parks and beaches of the Wailea-Makena area would be provided for through the operation of a jitney bus service. Integrated with the transportation systems with the region, the major project amenities and activity centers would be serviced by this system.

Schools

The State Department of Education (DOE) is responsible for the planning and development of schools to meet the community needs. As noted in the Kihei-Makena Community Plan, a future school site has been indicated within the project area. Upon DOE's review of the "Maui Wailea 670" project, the department will assess the need for providing school lands within the project area. If required, a school site will be reserved. The DOE currently has school sites designated in the area that have not been developed and, should the need arise, could provide for the projected school needs.

Police and Fire Protection

Police services for the region are provided for from the Wailuku Police station with two to three beat officers assigned to the Kihei-Makena area. The nearest fire station is located in Kihei near Kalama Park. Response time to the project area is estimated to be 5 to 10 minutes depending on traffic conditions.

With adequate staffing, these existing facilities and services provided by the County of Maui would be adequate to service the project area.

2.3 DESCRIPTION OF THE ENVIRONMENTAL CHARACTERISTICS OF THE PROPOSED PROJECT

2.3.1 Slope, Soil Classification and Geology

The site slopes generally in a mauka-makai direction at an average of twelve percent. The site is dissected by steeply sloping gullies which define ridges that are gently sloping on top and terminate in overlooks adjacent to steeply sloping areas. Ridges and gullies define drainage areas which convey significant quantities of on-site and off-site storm water run-off during storms. Modifications to gullies are constrained by flood hazards and drainage improvements previously installed downstream within Wailea.

Detailed land classifications for on-site soils are E-Rated, or poor for agricultural use. The USDA Soil & Conservation Service designates four on-site soil types; Oanapuka, very stony silt loam (seven to twenty-five percent slopes); Very Stony Land (young aa lava flows); Makena Loam, very stony (three to fifteen percent slopes); and Keawakapu, extremely stony silty clay loam (three to twenty-five percent slopes). The soil Conservation Service has rated these on-site soils as generally unsuited for agricultural purposes, with low shrink/swell potential, low corrodibility, good permeability, shallow depths to bedrock and fair to good suitability for road fill and other structural work.

A previous consulting report indicated that the geology of the site is conductive to development and that on-site materials are suitable for structural fills and for bearing the loads of structures, but that some heavy rock excavation can be anticipated due to the presence of exposed or lightly covered lave flows.

The project site is almost completely covered with typical upland Kiawe forest vegetation, which consists of native Wili-wili trees, Kiawa and Haole Koa trees, significant amounts of the native Ilima, and other species such as Lantana, Cactus and Hialoa. A wide variety of introduced grasses are also common in this area including Natal Roundtop, Finger grass, and Sour grass, as well as some low climbing plants such as Morning Glory.

2.3.2 Flora and Fauna

There are many large existing Wili-wili and Kiawe trees on the site that would merit preservation if development patterns allow. Opportunities for the relocation of existing trees are dependent upon the condition of the trees (which in most cases is relatively poor) and ground conditions (which if rocky, may prohibit efficient relocation practices). The native Wili-wili relocates readily with ideal ground conditions and a healthy tree. The

mature Kiawe tree is more difficult to relocate due to its shallow and fibrous root system.

A botanical survey noted the presence of paunu vine, a candidate endangered species by the U.S. Fish and Wildlife Services (1985). The vine was found in the extreme southwest corner of the property, near an existing powerline. Planned use of the area will be adjusted to minimize impact on this colony of plants.

Wildlife present at the project site is confined to several species of birds and scattered wild deer, mice and mongoose. Bird species likely to be found at the project site include the Gray Francolin (an introduced partridge-like game bird), common ring-neck pheasant, Lace Neck Doves, Cardinals, Mockingbirds, and Rice birds. An avifauna survey revealed no presence of rare, threatened or endangered species on the property.

2.3.3 Archaeology

Previous archaeological investigations of the project site indicate that there are no known significant archaeological features of value. Archaeological sites discovered during a reconnaissance survey in 1972 were judge at that time to be of marginal significance. A full archaeological reconnaissance survey was recently completed for the project area and verified that there were no archaeological resources of significance.

2.3.4 Climate

The climate of the project site is consistent and mild. Temperatures range from a mean of 75 degrees in December to 80 degrees in August. Winds consist of gently sea breezes from the northeast in the morning which generally become stronger from the northwest in the afternoon. Humidity levels range from 50 to 65 percent. The average rainfall is twelve inches per year.

2.3.5 Visual and Aesthetic

Panoramic views of the West Maui Mountains, upland areas of Haleakala, the ocean and shoreline are generally available from the project site. Views of specific features along the shoreline are generally available from bluff and overlook areas at the ends of ridges and through drainage channels. The flatter areas behind ridges and within drainage basins are visually enclosed and views of the shoreline from these areas are frequently blocked, although views of the distant ocean and surrounding islands are usually available.

The visual impact of the project from the Wailea and Seibu Makena Resorts is not expected to be significant since the open space character of the proposed project is similar to the existing development. View exposure to the site from adjacent roads and

other public area is also not prominent due to the gently slopes of the site and surrounding areas. The relative elevation of the various areas of the site is critical in determining the expanse and quality of available views, as the ridges that divide the project site tend to visually enclose lower elevations and level areas away from bluffs. Specific visually prominent features include Puu Olai, the existing 69 kv powerlines to the MECO substation, the 3 MG reservoir adjacent to the western boundary of the site, the Polo Beach Club, the Wailea Stouffer and Maui Intercontinental Hotels, the Maui Prince Hotel, and several of the larger resort hotel and condominium developments in the Kihei area. Towards the north property boundary, views extend all the way to Maalaea and the West Maui Mountains beyond. The upper slopes of Haleakala are prominently visible throughout the site.

Negative view impacts occur in the northern boundary of the site adjacent to the Maui Meadows subdivision due to the lack of design controls, low standards of residential construction of many of the homes, and the open visual exposure of yards and work areas.

Primary existing development constraints related to site infrastructure include an existing MECO sub-station and two major 69 kv overhead powerlines. One powerline runs along the entire western boundary of the site; another nearly bisects the property from east to west.

Future increments of Piilani Highway will have a major impact on the property as the planned alignment bisects the site. Primary areas of concern include visual impacts due to highway improvements and traffic noise. The exact nature of the highway improvements has not yet been determined but construction of the highway to federal standards could be anticipated to create visible cuts and fill banks, headwalls and culverts similar to those that can be seen in completed portions of the highway to the north. The elevation of the highway relative to the site in different areas will create varying levels of traffic noise impact. In some areas existing views of the shoreline through drainage channels could be blocked by highway fills.

3. IDENTIFICATION AND SUMMARY OF MAJOR IMPACTS AND ALTERNATIVES CONSIDERED

3.1 MAJOR IMPACTS

The major potentially positive impacts that would result from the proposed project are increased economic gains to be realized from the construction and operation of the project and improvements of the overall quality of life in the community. The proposed project is not expected to significantly affect the physical, natural or social environmental characteristics of the project area, county of state. Similarly, the proposed project is not expected to result in any significant negative impacts to the environmental characteristics of the area, county or state. However, additional analyses appear to be required prior to final determination of potential impacts and their effect on the environment.

3.2 ALTERNATIVES CONSIDERED

As noted previously, the proposed project has been designed to meet several key objectives. In keeping with sound land use planning practices and applicable EIS rules and regulations those alternatives which could feasibly attain the objectives of the proposed action, even though more costly, have been examined. The range of feasible alternatives considered is limited to those that would provide the same type of service and features that the proposed action would, while providing that service for about the same cost with similar efficiencies. The alternatives investigated have included alternative layouts and configurations of the site, various combinations of support services and facilities that could be provided, alternative uses of the property given the present land use designations and the alternative of "no action".

4. PROPOSED MITIGATION MEASURES

The mitigation measures proposed to assure that potential adverse environmental impacts are minimized include limiting construction activities to daytime hours; adherence to federal, state and county environmental protection, health and safety and construction rules and regulations; establishment and maintenance of appropriate vehicular and pedestrian traffic ingress and egress routes and patterns; establishment of dense and appropriate landscaping in and around the project area; and the careful and well designed layout of the various elements of the master plan.

5. DETERMINATION

Based on the information available and the analyses conducted to date, and the provisions of Chapter 343, Section 343.5 (6), an environmental impact statement is required.

6. FINDINGS AND REASONS SUPPORTING DETERMINATION

In considering the significance of potential environmental effects, the applicant has considered the sum of effects on the quality of the environment and evaluated the overall cumulative effects of the proposed action. The applicant has considered every phase of the proposed action, the expected consequences, both primary and secondary and the cumulative as well as the short and long-term effects of the proposed action. As a result of these considerations, the applicant has determined that:

- The proposed action may not involve an irrevocable commitment to loss or destruction of any significant natural or cultural resource;
- The proposed action may increase the range of beneficial uses of the environment;
- The proposed action appears to be in concert with the state's and county's long-term environmental policies, goals and guidelines as expressed in Chapter 343, HRS, and any revisions and amendments thereto, court decisions and executive orders;
- The proposed action may involve secondary impacts, such as population changes or effects on public facilities that are not already contemplated;
- The proposed action does not appear to include elements that would substantially affect public health or overall environmental quality, but further analyses are required;
- The proposed action may affect rare, threatened or endangered species or habitats, but further analyses are required;
- The proposed action may detrimentally affect air or water quality or ambient noise levels;
- The proposed action may affect an environmentally sensitive area such as flood plain, tsunami zone, erosion-prone area, geolocially hazardous land, estuary or coastal waters; and,

- The proposed action appears to be individually limited, but cumulatively may have a considerable effect upon the environment or involve a larger commitment for larger actions.

Further, although it appears that the proposed action is compatible with the locality and surrounding project area and appropriate to the physical conditions and capabilities of the area to be served, additional analyses will be required to make a definitive determination.

HANNIBAL TAVARES
Mayor

de

FRED MATSUMOTO
Coordinator

COUNTY OF MAUI

OFFICE OF ECONOMIC DEVELOPMENT

WAILUKU, MAUI, HAWAII 96793
TELEPHONE 244-7710

June 9, 1988

Clyde Murashige
Planning Department
200 South High Street
Wailuku, HI 96793

Dear Murashige:

Re: Environmental Impact Statement Preparation Notice (EISPN) Wailea, Maui, Hawaii
TMKS: 2-1-08:56 and 71

Thank you for the opportunity to comment on the subject assessment. We, however, do not have any comments to offer at this time.

Very truly yours,

FRED MATSUMOTO
Economic Development Coordinator

XI-20

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 29, 1988

Mr. Fred Matsumoto
Economic Development Coordinator
County of Maui
Department of Economic Development
200 South High Street
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Matsumoto:

Thank you for your letter of June 9, 1988 to Mr. Clyde Murashige of the County of Maui, Planning Department regarding the EISPN for the proposed residential/resort project.

Your response is appreciated and we shall include you as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_19.WP

HANNIBAL TAVARES
Mayor
TELEPHONE 244-7855
HS

OFFICE OF THE MAYOR
COUNTY OF MAUI
WAILUKU, MAUI, HAWAII 96793

June 9, 1988

Mr. James M. Leonard,
Project Manager
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

This is in response to your letter dated June 6, 1988 regarding the Environmental Impact Statement Preparation Notice (EISPN) for the Maui Wailea 670 Residential/Resort Community in Wailea, Maui, Hawaii, TMKS 2-1-08:56 and 71.

My contact person with whom you may discuss this project in greater detail is my Planning Director, Christopher Hart.

I appreciate your making this project's plans available for our review and comments at this time.

Very truly yours,

HANNIBAL TAVARES
Mayor, County of Maui

cc: Director of Planning
W.S. Haines, Executive Assistant

X-21

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Honorable Mayor Hannibal Tavares
Mayor, County of Maui
Office of the Mayor
County of Maui
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mayor Tavares:

Thank you for your letter of June 9, 1988 regarding the EISPN for the proposed residential/resort project.

We will continue to keep the Planning Director informed regarding the on-going progress of this project and will include your administration in the review process of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_8_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 111 HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL [illegible] FAX [illegible]

DARIAN TAVARES
Mayor

CHRISTOPHER L. HART
Planning Director

RALPH M. NAGAMINE
Deputy Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

June 12, 1988

Mr. William Hogarty
GRC/VMS Maui 670
2145 Wells Street, Suite 101B
Wailuku, HI 96793

Dear Mr. Hogarty:

Re: Wailea 670 Environmental Impact Statement preparation, TMK 2-1-8:56 and 71, Wailea, Maui.

Transmitted herewith is a request by Thomas A. Bodden, attorney, to be placed on the consulting party list for the Environmental Impact Statement Review for the subject project. Please place Mr. Bodden on said list.

Thank you for your cooperation.

Very truly yours,

CHRISTOPHER L. HART
Planning Director

Attachment

cc: C. Murashige
Thomas A. Bodden

X1-22

THOMAS A. BODDEN LAW CORP.
Attorneys at Law

June 4, 1988

Thomas A. Bodden
Dwight K. Mirooka

1993 - 200 So. Kihei Rd. - P.O. Box 879, Kihei, Maui, Hawaii 96753
Telephone - (808) 879-7755

Mr. Clyde Murashige
County of Maui, Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

Re: TMK: (II) 2-1-8-56 & 71
Environmental Impact Statement

Dear Mr. Murashige:

I wish to be a Consulted Party in connection with the preparation of the Environmental Impact Statement for the proposed Community Plan Amendment from Agriculture to Project District for 370 acres, located at Kihei, Maui and identified by the tax key numbers referenced-above, as announced in the May 23, 1988 Bulletin of the Office of Environmental Quality Control.

My address is as indicated above. Thank you.

Sincerely,

Thomas A. Bodden

TAB:wbb

3033B/p8/78F

RECEIVED
JUN 16 1988
VMS REALTY PARTNERS

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Thomas A. Bodden
Thomas A. Bodden Law Corp.
1993-200 So. Kihei Road.
P.O. Box 719
Kihei, Maui, Hawaii 96753

SUBJECT: MAUI WAILEA 760 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Bodden:

By your letter of June 4, 1988 to Mr. Clyde Murashige, we have included you as a consulted party in the preparation of the subject EIS. A copy of the EIS Preparation Notice (EISPN) and Environmental Assessment is enclosed for your review and comment.

Please forward any comments you may have on the EISPN to us by July 8, 1988. Your letter of June 4, 1988, this letter and any comments you have on the EISPN will be appended to the Draft EIS.

Sincerely,

PBR HAWAII

XI-2 3

James Leonard
Project Manager

Attachments

cc: Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_16.WP

FINANCIAL PLAZA OF THE PACIFIC, 195 SOUTH KING STREET, SUITE 1100, HONOLULU, HAWAII 96813, TEL [illegible] FAX [illegible]
BRANCH OFFICE: HILO LAGOON CENTER, 101 AUPUNI STREET, SUITE 206, HILO, HAWAII 96720, TEL [illegible] FAX [illegible]

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR
LESLIE S. MATSUBARA
DEPUTY DIRECTOR

KAMAMALU BUILDING 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELEX: 7438210 HDPED

Ref. No. P-8459

June 14, 1988

Mr. James M. Leonard
PBR Hawaii
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for Maui Wailea 670 Residential/Resort Community, Wailea, Maui

We have reviewed the subject proposal and do not have any comments to offer at this time. We appreciate the opportunity to review this document, and request that we be included during the preparation of the EIS.

Sincerely,

Roger A. Ulveling

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Roger Ulveling, Director
State of Hawaii
Department of Business and Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Ulveling:

Thank you for your letter of June 14, 1988 regarding the EISPN for the proposed residential/resort project.

Your response is appreciated and we shall include your department as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_2_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521-2631 FAX (808) 523-1867
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-7999

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P. O. BOX 1109
WAILUKU, MAUI, HAWAII 96793

June 16, 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
130 Merchant Street, Suite 1111
Honolulu, Hi 96813

Dear Mr. Leonard:

Subject: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Thank you for giving us the opportunity to review the subject matter and your letter of June 3, 1988.

GCR/VMS Maui 670 should be advised and be aware that the Department of Water Supply may require the developer to develop a groundwater source for their proposed project. Other specific water requirements will be imposed during the development phase of the project.

If you have any question, please feel free to contact us.

Sincerely,

Vince G. Bagoyo, Jr., Director

VGB/ad

cc: Nolan Perreira, Deputy Director
Ed Kagehiro, Chief Engineer
Carl Kuiama, DWS Engr.

"By Water All Things Find Life"

XI-25

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Vince G. Bagoyo, Jr.
Director
Department of Water Supply
County of Maui
P.O. Box 1109
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Mr. Bagoyo:

Thank you for your letter regarding the EISPN for the proposed residential/resort project.

Your comments are appreciated and will be considered in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_9_.WP

FINANCIAL PLAZA OF THE PACIFIC [illegible] HONOLULU, HAWAII [illegible] TEL [illegible] FAX [illegible]
BRANCH OFFICE: [illegible] HILO, HAWAII [illegible] TEL [illegible] FAX [illegible]

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTIES
KENJI SUMIDA
HONALEIN IMAIKALO
DAN T. KOCHI

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

HWY-M 2.889-88

June 16, 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
130 Merchant St., Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Environmental Impact Statement
Preparation Notice
Maui Wailea 670

Thank you for submitting the expanded version of the EISPN for our review.

Different sections in our main Division office are currently reviewing the submittal. A formal response from our Statewide Transportation Planning Office, which will include comments consolidated from all the affected DOT offices, will be sent to you shortly.

If I can be of any further assistance, please write or call.

Very truly yours,

ROBERT O. SIAROT
District Engineer, Maui

CSS:sto

X1-26

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Robert O. Siarot
District Engineer
State of Hawaii
Department of Transportation
Highways Division, Maui District
650 Palapala Drive
Kahului, Hawaii 96732

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Siarot:

Thank you for your letter of June 16, 1988 regarding the EISPN for the proposed residential/resort project.

Please be informed that we have received comments regarding the subject material from Mr. Dan T. Kochi for the Director of Transportation and that these comments will be considered in the preparation of the Draft EIS. A copy is attached for your reference.

Your response is appreciated and we shall include you as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

Attachment

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_7_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521-3631 FAX (808) 521-1462
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-1979

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

June 16, 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

SUBJECT: Maui Wailea 670
EIS Preparation Notice

Our review of the proposed development indicates that our response of April 13, 1988, is still valid.

Please keep us informed of any changes.

Sincerely,

Charles T. Toguchi
Superintendent

CTT:jl

cc E. Imui, OBS
L. Lindsey, Maui Dist.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

XI-2

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

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

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Mr. Toguchi:

Thank you for your letter dated June 16, 1988 regarding the EISPN for the proposed residential/resort project.

Your previously transmitted comments are appreciated and will be considered in the preparation of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

Attachment

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_6_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE HILO FILMING CENTER 50 AUPUNI STREET, SUITE 106 HILO, HAWAII 96720 TEL [illegible] FAX [illegible]

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

April 13, 1988

Mr. James M. Leonard
Environmental Planner
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Maui Wailea 670, Proposed Residential/Resort Community Development, TMK: 2-1-08:56 & 71

Our review of the proposed development indicates that it may have the following enrollment impact on our area schools:

School	Grade	Proj. Enroll.
Kihei Elem/Inter.	K- 8	50-100
Baldwin High	9-12	20- 30

The projections are based on the planned 2,150-2,650 unit residential/resort development.

The above schools are operating at capacity. The Department of Education cannot assure the availability of classroom space at the impacted schools and will require a legislative appropriation on a timely basis or assistance from the developer to accommodate the development.

Please keep us informed of any changes.

Sincerely,

Charles T. Toguchi

Charles T. Toguchi
Superintendent

CTT:jl

cc OBS
Maui District

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 119, HONOLULU, HAWAII 96810

RUSSELL S. NAGATA
COMPTROLLER

KEN SUTABU
DEPUTY COMPTROLLER

LETTER NO. (P)1534.8

Mr. James M. Leonard
Project Manager
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Environmental Impact Statement
Preparation Notice
Wailea, Maui, Hawaii

We have reviewed the subject document and have no comments to offer.

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

CI:jk

XI-29

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Teuane Tominaga
State of Hawaii
Department of Accounting and General Services
Division of Public Works
P.O. Box 119, Honolulu, Hawaii 96810

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Tominaga:

Thank you for your letter of June 16, 1988 regarding the EISPN for the proposed residential/resort project.

Your response is appreciated and we shall include your department as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_3_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET SUITE 1111 HONOLULU HAWAII 96813 TEL (808) 521-5631 FAX (808) 523-1402
BRANCH OFFICE HILTON LAGOON CENTER 100 ALIPUNA STREET SUITE 206 HILO HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-2999

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTIES
JENNIFER DIKINA
HOWARD N. ONAKA
DAVID T. KIDANI
JEANNE R. SCHULTZ

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO
STP 8.2926

June 17, 1988

Mr. James M. Leonard, Environmental Planner
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Environmental Assessment
Maui Wailea 670 Residential/Resort Community
Wailea, Maui

The 2nd increment of our Piilani Highway extension project scheduled for construction in the near future provides for only one access point at the highway's intersection with Wailea Iki Drive. Additional accesses will be required along the further extension of Piilani Highway through the proposed development. The developer should dedicate the land and build the extension through his development at his expense and coordinate the project and additional accesses with our department. He should also coordinate his proposal with any adjacent developments in the area.

All plans for work within our State highway right-of-way such as drainage, intersection and access improvements must be submitted for our approval. The drainage culvert size should conform to County design standards to handle a 100-year storm. The developer should also bear the cost for these improvements.

For your information, we have received copies of the Traffic Impact Analysis Report and will be commenting on them shortly.

Thank you for this opportunity to provide comments.

Very truly yours,

for Edward Y. Hirata
Director of Transportation

XT-30

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Edward Y. Hirata
Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Mr. Hirata:

Thank you for your comment regarding the EISPN for the proposed residential/resort project.

Your comments are appreciated and will be considered in the preparation of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_11.WP

JOHN WAIHEE
GOVERNOR

Joseph K. Conant
Executive Director

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation
P. O. BOX 17907
HONOLULU, HAWAII 96817

IN REPLY REFER
TO
88:PLNG/2822JT

June 20, 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Re: Environmental Impact Statement Preparation Notice (EISPN) for the Proposed Maui Wailea 670 Project

Thank you for the opportunity to review the subject EISPN and related Environmental Assessment for the proposed project.

XI-3

The EIS should address the provision of affordable housing, more specifically:

1. The number of units affordable to families earning from 30% to 140% of the median income. (The median income for a family of four in the County of Maui is $34,000.

2. The types (single or multi-family) of units planned to be offered to families in the affordable housing target group.

3. Whether these units will be offered for-sale or for rent or a combination of both.

Sincerely,

JOSEPH K. CONANT
Executive Director

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Joseph K. Conant
Executive Director
State of Hawaii
Department of Business and Economic Development
Housing Finance and Development Corporation
P.O. Box 17907
Honolulu, Hawaii 96817

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Mr. Conant:

Thank you for your comments regarding the EISPN for the proposed residential/resort project.

Your comments are appreciated and will be considered in the preparation of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_13.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521 5631 FAX (808) 521 1042
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961 3333 FAX (808) 961 0999

Wailea Development Company, Inc.
161 Wailea Ike Place
Wailea, Maui, Kihei, Hawaii 96753-9599
(808) 879-4461 FAX 808-874-6295

June 20, 1988

Mr. James M. Leonard
Project Manager
PBR HAWAII
130 Merchant Street, Suite 1111
Honolulu, HI 96813

Dear James:

We have received your letter regarding the Environmental Impact Statement Preparation Notice for the GCR/VMS Maui Community Plan Amendment for 370 acres to be included as a part of Project District No. 9.

We would like to be consulted during the preparation of the EIS.

All contact may occur to the undersigned.

Very truly yours,

Robert A. Everingham
Manager, Project Planning

RAE:sh

X1-32

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Robert A. Everingham
Manager, Project Planning
Wailea Development Company, Inc
161 Wailea Ike Place
Wailea, Maui, Kihei, Hawaii 96753-9599

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Everingham:

Thank you for your letter of June 20, 1988 regarding the EISPN for the proposed residential/resort project.

Your response is appreciated and we shall include you as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director,
County of Maui
Office of Environmental Quality Control

342-L_5_.WP

United States Department of the Interior

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
P.O. Box 50166
Honolulu, Hawaii 96850

June 21, 1988

Mr. James M. Leonard
Project Manager
PBR HAWAII
Financial Plaza of the Pacific
130 Merchant St.
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Environmental Impact Statement Preparation Notice (EISPN)
Wailea, Maui, Hawaii, TMKS: 2-1-08:56 and 71

The staff of the Hawaii District Office of the U.S. Geological Survey, Water Resources Division, has reviewed the subject Environmental Impact Statement, but has no comments to make at this time.

Thank you for allowing us to review the subject statement.

Sincerely,

William Meyer
District Chief

XT 3

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. William Meyer
District Chief
U.S. Department of the Interior
Geological Survey
Water Resouces Division
P.O. Box 50166
Honolulu, Hawaii 96850

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Meyer:

Thank you for your letter of June 21, 1988 regarding the EISPN for the proposed residential/resort project.

Your response is appreciated and we shall include you as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_10.WP

FINANCIAL PLAZA OF THE PACIFIC: 130 MERCHANT STREET, SUITE 1101 HONOLULU, HAWAII 96813 TEL (808) 521 5631 FAX (808) 523 1402
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961 3333 FAX (808) 961 7999

HANNIBAL TAVARES
Mayor

ALVIN K. FUKUNAGA
Director

BRIAN HASHIRO, P.E.
Deputy Director

GEORGE KAYA
Highways Division

FRED ARAKI, P.E.
Engineering Division

EASSIE MILLER, P.E.
Waste Management Division

AARON SHINMOTO, P.E.
Land Use and Codes Administration

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

June 22, 1988

Mr. James M. Leonard
Project Manager
PBR HAWAII
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Re: Environmental Impact Statement Preparation Notice (EISPN) Wailea, Maui, Hawaii
TMKS:2-1-08:56 and 71

XT-34

Thank you for your June 3, 1988 submittal which we received on June 13, 1988.

We will withhold our comments until the final EIS is submitted.

If you have any questions, please contact Millie Septimo at 244-7760.

Very truly yours,

Brian Hashiro
for ALVIN K. FUKUNAGA
Director of Public Works

AKF:ng

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 29, 1988

Mr. Alvin K. Fukunaga
Director of Public Works
County of Maui
Department of Public Works
200 South High Street
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMK: 2-1-08:56 AND 71

Dear Mr. Fukunaga:

Thank you for your letter of June 22, 1988 regarding the EISPN for the proposed residential/resort project.

Your response is appreciated and we shall include you as a consulted party in the preparation of the EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_18.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET SUITE 1111 HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE 1001 LAHAINA CENTER 900 FRONT STREET SUITE 300 LAHAINA, HAWAII 96761 TEL [illegible] FAX [illegible]

JOHN WAIHEE
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

ROBERT Y. TSUYEMURA
ACTING DEPUTY
TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

June 23, 1988

PBR Hawaii
130 Merchant Street
Suite 1111
Honolulu, Hawaii 96813
Attention: Mr. James M. Leonard

Dear Mr. Leonard:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for Maui Wailea 670 Residential/Resort Community
GCR/VMS Maui 670
TMK: 2-1-08: 56, 71 Wailea, Maui
Area: 670 acres (370 in particular)

The Department of Agriculture has reviewed the subject EISPN and offers the following comments.

According to the Environmental Assessment, the applicant is seeking to redesignate the 370-acre portion of the subject property from Agriculture to Project District No. 9 in the Kihei-Makena Community Plan.

SOILS INFORMATION

The 670-acre site is not classified according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system. The Soil Conservation Service Soil Survey identifies the soils (in declining order of predominance) as Keawakapu extremely stony silty clay loam (KNXD) with 3 to 25 percent slopes, very stony land (rVS) with 7 to 30 percent slopes, Makena loam stony complex (MXC) with 3 to 15 percent slopes, and Oanapuka very stony silt loam (OAD) with 7 to 25 percent slopes. These soils are used for pasture and have capability classifications of VIs or VIIs (soils with severe limitations due to stoniness).

The subject area has Land Study Bureau Overall Productivity Ratings and Land Types of E29, E77 and E88. By this method of classification, the area has poor productivity potential for most agricultural uses.

OTHER ISSUES

The following issue should be addressed in the Draft EIS:

- Existing agricultural uses within and adjacent to the subject site should be identified along with any adverse impacts on these uses which may result from the proposed use. Any applicable mitigating actions should be discussed.

Thank you for the opportunity to comment.

Suzanne D. Peterson
SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: OEQC
Maui County Planning Department
LUC
OSP (attn: LUD)

XT-35

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 29, 1988

Ms. Suzanne D. Peterson
Chairperson, Board of Agriculture
State of Hawaii
Department of Agriculture
1420 So. King Street
Honolulu, Hawaii 96814-2812

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Ms. Peterson:

Thank you for your comments regarding the EISPN for the proposed residential/resort project.

Your comments are appreciated and will be considered in the preparation of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_17.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL. (808) 521-5631 FAX. (808) 523-1402
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 100 HILO, HAWAII 96720 TEL. (808) 961-3333 FAX. (808) 961-4909

POLICE DEPARTMENT
COUNTY OF MAUI
55 MAHALANI STREET
WAILUKU, HAWAII 96793
AREA CODE (808) 244-6400

HOWARD H. TAGONORI
CHIEF OF POLICE
STANLEY T. TADAKI
DEPUTY CHIEF OF POLICE

OUR REFERENCE
KD:tg
YOUR REFERENCE

June 23, 1988

Mr. James M. Leonard
Project Manager
PBR HAWAII
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, HI 96813

Dear Mr. Leonard:

RE: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 and 71

Pursuant to your request of June 6, 1988 for comments on the subject ten- to fifteen-year project, I feel this project will affect the police service and its concerns in the following manner:

1. A minimum of 2,650 vehicles will be generated by your project for your area; therefore a traffic light will most likely be needed on Piilani Highway at the entrance/exit point of your project. We have experienced the same situation at Lipoa Street at Piilani Highway.

2. Due to the projected 8,000 population of your project, we expect to need two additional beats for the Kihei/Wailea area. This will mean the need to hire twelve more officers to provide for 24-hour, 365-day-a-year coverage of the two additional beats. The present residential population of 10,600 for Kihei/Wailea area plus visitor-generated "calls for service" already overtax the efforts of our present three-beat structure for the area.

3. The five beats total projected for Kihei/Wailea due to your project necessitates a supervisor in the area on a 24-hour basis, which requires an additional six sergeants to provide 24-hour, 365-day-a-year supervisory coverage.

4. The administrative impact will be the addition of three to four police vehicles to our fleet and a

substation similar to that of the present Lahaina Station along with the related command and clerical staff, and administrative costs.

Should you have any questions regarding our assessment, feel free to call me at 244-6300.

Sincerely,

HOWARD TAGONORI
Chief of Police
Maui County Police Department

cc: Maui Planning Department

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Howard Tagomori
Chief of Police
Maui County Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Chief Tagomori:

Thank you for your comments regarding the EISPN for the proposed residential/resort project.

Your comments are appreciated and will be considered in the preparation of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard

XT-38

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_12.WP

FINANCIAL PLAZA OF THE PACIFIC, 250 SOUTH KING STREET, SUITE 220 HONOLULU, HAWAII 96813 TEL (808) 521-5631 FAX (808) 521-1982
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 106 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-7999

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P O BOX 50167
HONOLULU, HAWAII 96850

ES
Room 6307

JUN 23 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
130 Merchant Street, Suite 111
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice for the Maui Wailea 670 Residential/Resort Community, Wailea, Maui

Dear Mr. Leonard:

We have reviewed the referenced document and offer the following comments for your consideration.

The Draft Environmental Impact Statement should include the results of botanical and wildlife studies conducted for this project. A map showing the location of the candidate endangered plant and the proposed surrounding land use would be useful in evaluating potential impacts to this plant colony. In addition, information on the presence of the Hawaiian hoary bat in this area would be valuable in determining potential impacts to this endangered species.

We appreciate the opportunity to comment.

Sincerely,

Ernest Kosaka

Ernest Kosaka, Field Supervisor
Environmental Services
Pacific Islands Office

XI-39

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

June 28, 1988

Mr. Ernest Kosaka
Field Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
Environmental Services
Pacific Islands Office
P.O. Box 50167
Honolulu, Hawaii 96850

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMKS: 2-1-08:56 AND 71

Dear Mr. Kosaka:

Thank you for your comments regarding the EISPN for the proposed residential/resort project.

Your comments are appreciated and will be considered in the preparation of the Draft EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_14.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 111 HONOLULU, HAWAII 96813 TEL (808) 521-5631 FAX (808) 523-1402
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-4991

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

March 23, 1988

Ms. Annie Griffin
State of Hawaii
Dept. of Land & Natural Resources
Division of State Parks
Historic Sites Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Griffin:

On behalf of VMS Realty Partners, the managing general partner representing the land owners, PBR HAWAII requests your review and concurrence on the attached Archaeological Survey for a 670 acre parcel located near Wailea, Maui. Your timely response will be appreciated as your comments are critical in determining if further archaeological documentation is needed to satisfy the requirements of Chapter 6E, HRS, and the minimum requirements recommended by the Society for Hawaiian Archaeology and currently being used by the DLNR - Historical Sites Division.

Should you have any questions or require additional information, please do not hesitate to call me at 521-5631.

Sincerely,

PBR HAWAII

James Leonard
Environmental Planner

Attachment

cc: Joseph Kennedy, ACH
Kirk Li, VMS Realty Partners

D:\144\CL_1_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 523-1402
HONOLULU IRVINE DENVER

XT-40

JOHN WAIHEE
GOVERNOR OF HAWAII

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT A. LANDGRAF
DEPUTY

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 621
HONOLULU, HAWAII 96809

April 7, 1988

Mr. James Leonard, Environmental Planner
PBR Hawaii
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

SUBJECT: Historic preservation review of Archaeological Survey Report (Kennedy 1988. Archaeological Survey Results Concerning the Proposed Makena 700 Development.). Near Wailea, Maui
TMK 2-1-08: 56 & 71

This is in response to your letter of March 23, 1988 requesting that we review this report.

According to this report, a surface survey was conducted in the 700-acre project area. Only one site was found -- a long stone wall that probably corresponds to site 200, which was previously identified in a 1972 survey as a wall constructed by by the Ulupalakua Ranch in the 1880s as a cattle fence. This previous survey also found 11 other sites. The 1988 survey, however, re-located only the one site. The other 11 sites apparently were either mislocated in 1972 or have been destroyed by bulldozing activities since 1972. In sum, it appears that all historic sites within the parcel have been identified, totalling 1 site.

The report suggests that the wall is not significant, indicating that reasonable amounts of its information content have been recorded, basically its appearance on maps. We disagree with this evaluation, however. Basic site description (measurements, architectural style, etc.) and a site location map would be needed for this site to be considered "no longer significant", and this information is not presented in the report. Mr. Kennedy was contacted and he agreed to provide us with this additional information. Also, the list of references used in this report is not presented, and he has agreed to supply this list.

In sum, with the addition of the site description and map, we will agree that the site is "no longer significant". This means that there are no significant historic sites remaining in this project's area. Therefore, the proposed project will have "no effect" on significant historic sites.

CORRESPONDENCE PRIOR TO EISPN

Should you have further questions, please feel free to contact Ms. Annie Griffin, staff archaeologist handling the island of Maui, at 548-6408.

Sincerely yours,

RALSTON H. NAGATA
State Parks Administrator and Deputy
State Historic Preservation Officer

P.S. For your information, our Historic Sites Section does not currently use the minimum standards recommended by the Society for Hawaiian Archaeology. The standards that we use are somewhat similar, however.

41

CORRESPONDENCE PRIOR TO EISPN

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

April 5, 1988

Mr. Robert O. Siarot
Maui District Engineer
State Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Maui, Hawaii 96732

SUBJECT: PROPOSED RESIDENTIAL/RESORT COMMUNITY DEVELOPMENT
TMK: 2-1-08:56 AND 71

Dear Mr. Siarot:

GCR/VMS Maui 670 is proposing development of a residential/resort community in Wailea, Maui, which may affect the roads and traffic in the area.

GCR/VMS Maui 670 is requesting the County of Maui consider an amendment to the Kihei-Makena Community Plan to change the Community Plan designation of approximately 670 acres of land which is accessed from Piilani Highway. As the accepting agency, the Planning Department has determined that the amendment request will require the preparation of an Environmental Impact Statement (EIS) pursuant to Chapter 343, HRS. Our firm has been retained to prepare the necessary environmental and planning studies to assist in this effort.

The attached environmental assessment provides a description of the proposed project which calls for 2150-2650 units to be built over a 10-15 year period. A description of the traffic access and planned road improvements is found on page 5 of the environmental assessment.

Please advise us of the potential impacts this project would have on existing state roads and any mitigation measures, beyond those proposed, which should be considered.

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 523-1402
HONOLULU IRVINE DENVER

Because we are in the process of updating our environmental assessment for use in EIS preparation notice we would appreciate your timely response so that your comments can be considered. If you have any questions or require further information, please call me at 521-5631.

Sincerely,

PBR HAWAII

James M. Leonard
Environmental Planner

cc: Bill Hogarty

Attachment

342\CL_3_.WP

CORRESPONDENCE PRIOR TO EISPN

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN F. KOCHI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO
HWY-M 2.692-88

May 3, 1988

Mr. James M. Leonard
Environmental Planner
PBR Hawaii
130 Merchant Street, Suite 111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

SUBJECT: PROPOSED MAUI 670 RESIDENTIAL/RESORT COMMUNITY, TMK 2-1-08:71 and 2-1-08:56

The proposed full scale development is anticipated to substantially deteriorate the arterial level of service on Piilani Highway between Mokulele Highway and Wailea. We also expect a significant impact on Mokulele Highway between Kahului town and Kihei town. (Mokulele Highway is scheduled for jurisdictional transfer from the County to State.) The EIS should include a traffic impact study which focuses on the proposed development's effects on the above mentioned highways. Accordingly, the study should outline specific plans for addressing any adverse traffic impacts.

If you have any questions, please call Charlene Shibuya at 877-5061.

Very truly yours,

ROBERT O. SIAROT
District Engineer, Maui

CSS:jt

XI-43

CORRESPONDENCE PRIOR TO EISPN

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

April 22, 1988

Ms. Annie Griffin
Department of Land and Natural Resources
Division of State Parks
Historic Sites Division
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: ADDENDUM TO ARCHAEOLOGICAL SURVEY REPORT FOR THE PROPOSED MAUI WAILEA 670 DEVELOPMENT

Dear Ms. Griffin:

Attached for your review is an addendum to the Archaeological Survey Report prepared by Mr. Joseph Kennedy for a 670 acre parcel located in Wailea, Maui. The archaeological report will be made part of an Environmental Impact Statement related to the proposed development. Please note that the name of proposed project, previously Makena 700, has been changed to Maui Wailea 670.

As requested, the addendum contains; 1) a list of bibliographic references for the report, 2) a description of the rock wall located on the site, and 3) a map showing the location of the wall. Please let us know if the Archaeological Report together with the enclosed addendum is complete, with sufficient documentation to satisfy the requirements of Chapter 6E, HRS. A copy of the Archaeological Report is also attached for your reference.

I appreciate your prompt review of the original report and follow-up efforts with Mr. Kennedy and myself. If you have any questions, please feel free to call me at 521-5631.

Sincerely,

PBR HAWAII

James Leonard
Environmental Planner

Attachments

cc: Joseph Kennedy, ACH
Bill Hogarty, VMS Realty Partners

342CL_4_.WP

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

LIBERT K. LANDGRAF
DEPUTY

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

May 4, 1988

Mr. James Leonard, Environmental Planner
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant St., Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

SUBJECT: Addendum to the archaeological survey report for the proposed Maui Wailea 670 development
Palauea, Makawao, Maui
TMK 2-1-08: 56 & 71

Thank you for submitting the addendum to the report on the archaeological survey conducted in the proposed Maui Wailea 670 Development by Archaeological Consultant of Hawaii.

This additional information is adequate; thus, the site is "no longer significant." Therefore, the proposed project will have "no effect" on significant historic sites.

Sincerely,

RALSTON H. NAGATA
State Parks Administrator and Deputy
State Historic Preservation Officer

CORRESPONDENCE PRIOR TO EISPN

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

April 5, 1988

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

SUBJECT: PROPOSED RESIDENTIAL/RESORT COMMUNITY DEVELOPMENT
TMK: 2-1-08:56 AND 71

Dear Mr. Toguchi:

GCR/VMS Maui 670 is proposing development of a residential/ resort community in Wailea, Maui, which may affect the area's public education facilities.

GCR/VMS Maui 670 is requesting the County of Maui consider an amendment to the Kihei-Makena Community Plan to change the Community Plan designation of approximately 670 acres of land. As the accepting agency, the Planning Department has determined that the amendment request will require the preparation of an Environmental Impact Statement (EIS) pursuant to Chapter 343, HRS. Our firm has been retained to prepare the necessary environmental and planning studies to assist in this effort.

The attached environmental assessment provides a description of the proposed project which calls for an anticipated 1060 to 1320 residential units to be built over a 10-15 year period. There would also be 1090-1330 resort units developed over the same period but these will attract an elderly and vacationing population with few school age children.

Because the project is geared to an elderly and more affluent population, it is anticipated that the resident population will have a minimum impact on the existing school system. The DOE currently has school sites designated in the Wailea area, that have not been developed. Should the need arise, these sites may provide for the projected school needs.

Please advise us of the potential impact this project would have on existing facilities and any mitigation measures which should be considered at this time.

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 523-1402
HONOLULU IRVINE DENVER

Because we are in the process of updating our environmental assessment for use in an EIS preparation, we would appreciate your timely response so that your comments can be considered. If you have any questions or require further information, please call me at 521-5631.

Sincerely,

PBR HAWAII

James M. Leonard
Environmental Planner

cc: Bill Hogarty

Attachment

342\CL_2_.WP

CORRESPONDENCE PRIOR TO EISPN

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

April 13, 1988

Mr. James H. Leonard
Environmental Planner
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Maui Wailea 670, Proposed Residential/Resort Community Development, TMK: 2-1-08:56 & 71

Our review of the proposed development indicates that it may have the following enrollment impact on our area schools:

School	Grade	Proj. Enroll.
Kihei Elem/Inter.	K- 8	50-100
Baldwin High	9-12	20- 30

The projections are based on the planned 2,150-2,650 unit residential/resort development.

The above schools are operating at capacity. The Department of Education cannot assure the availability of classroom space at the impacted schools and will require a legislative appropriation on a timely basis or assistance from the developer to accommodate the development.

Please keep us informed of any changes.

Sincerely,

Charles T. Toguchi

Charles T. Toguchi
Superintendent

CTT:jl

cc OBS
Maui District

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

CORRESPONDENCE PRIOR TO EISPN

XII

AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A COPY OF THE DRAFT EIS; WRITTEN COMMENTS RECEIVED DURING THE PUBLIC REVIEW PERIOD; AND RESPONSES

CHAPTER XII

AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A COPY OF THE DRAFT EIS; WRITTEN COMMENTS RECEIVED DURING THE PUBLIC REVIEW PERIOD AND RESPONSES

The Draft EIS was officially submitted to the Maui County Planning Department and the Office of Environmental Quality Control on July 20, 1988 and notice of its availability published in the July 23, 1988, August 8, 1988 and August 23, 1988 OEQC Bulletins. The agencies, organizations and persons listed on the following Distribution List received a copy(ies) of the Draft EIS. The deadline for comments and the end of the 45-day public review period was September 8, 1988. All comments received on or prior to the September 8, 1988 date and the responses thereto are reproduced in this Chapter.

Table XII-1 summarizes all letters received and displays them in two categories; substantive and non-substantive. Substantive letters raised specific concerns that were addressed in preparation of the Final EIS while non-substantive letters expressed "no comment". The letters appear in the same order as they are listed.

TABLE XII-1

MAUI WAILEA 670 DEIS SUMMARY OF COMMENTS RECEIVED

NAME/AGENCY	DATE OF LETTER	DATE OF RESPONSE	SUBSTAN-TIVE	NON-SUB-STANTIVE	TOPIC OF CONCERN
Teuane Tominaga Department of Accounting and General Services	07/26/88	09/22/88		X	
Jerry M. Matsuda State, Dept. of Defense	07/27/88	09/22/88		X	
Charles T. Toguchi State, Department of Education	07/29/88	09/22/88	X		Projected school enrollment
Vince G. Bagoyo, Jr. County, Department of Water Supply	08/02/88	09/22/88	X		Water source development
Kisuk Cheung U.S. Army	08/08/88	09/22/88		X	
Hannibal Tavares County, Mayor	08/08/88	09/22/88	X		County reviewing sewer impact fees; reduction of solid waste
Ralston H. Nagata State, Dept. of Land & Natural Resources, Parks	08/08/88	09/22/88	X		Archaeological sites On-site ponding basins.
Marilyn Moniz-Kahoohanohano County, Dept. of Parks & Recreation	08/08/88	09/22/88		X	
William W. Paty State, Dept. of Land & Natural Resources	08/22/88	09/22/88	X		Archaeological sites On-site ponding basins.
Richard N. Duncan U.S. Dept of Agri-culture, Soils Con-servation Services	08/24/88	09/22/88		X	

NAME/AGENCY	DATE OF LETTER	DATE OF RESPONSE	SUBSTAN-TIVE	NON-SUB-STANTIVE	TOPIC OF CONCERN
Bruce S. Anderson State, Dept. of Health	08/26/88	09/22/88	X		Private wastewater treatment systems; wastewater used for irrigation
Neal Shinyama Maui Electric Co.	09/02/88	09/22/88	X		Location of transmission lines on-site
Maurice H. Kaya State, Dept. of Business & Economic Development	09/02/88	09/22/88	X		Energy conservation; total energy consumption
Jaquelin Miller University of Hawaii, Environmental Center	09/06/88	09/22/88	X		Underground injection within control line use of "Packaged" sewage treatment plant; disposal of solid wastes; archaeological site survey.
Robert A. Everingham Wailea Development Company	09/07/88	09/22/88	X		Impacts to groundwater resources, additional water sources, wastewater treatment alternatives.
Harold S. Masumoto State, Office of State Planning	09/08/88	09/22/88	X		Need for project; availability of work force; traffic; water quality; affordable housing; public fiscal resources.
Joseph K. Conant State, Housing & Finance Development Corporation	09/08/88	09/22/88	X		Affordable housing
Alvin K. Fukunaka Maui, Public Works	09/09/88 - late No response letter Issues addressed in FEIS		X		Housing needs of workers & employees; road requirements; wastewater treatment. Schedule of construction and occupancy

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

LETTER OF TRANSMITTAL

DATE: July 20, 1988

TO: Mr. Christopher Hart
Planning Director
County of Maui Planning Department
200 S. High Street
Wailuku, Maui, Hawaii 96793

FROM: Wm. Frank Brandt
President

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT

Pursuant to Chapter 200 of Title 11, Administrative Rules, entitled "Environmental Impact Statement Rules" and Chapter 343 H.R.S. as amended, the original (signed) Draft EIS and two copies are enclosed herewithin to be filed with the accepting authority. Simultaneously, sixty (60) copies of the Draft EIS are being filed with the Office of Environmental Quality Control for distribution per the attached list.

cc: Office of Environmental Quality Control (60 copies)

342DM_1_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL. (808) 521-5631 FAX: (808) 523-1102
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 106 HILO, HAWAII 96720 TEL. (808) 961-3333 FAX: (808) 961-4989

PBR HAWAII
FINANCIAL PLAZA OF THE PACIFIC
130 MERCHANT STREET, SUITE 1111
HONOLULU, HAWAII 96813
TEL.: (808) 521-5631
TELECOPIER: (808) 523-1402

LETTER OF TRANSMITTAL

TO: Office of Environmental Quality Control
465 S. King Street, Suite 104
Honolulu, HI 96813

ATTN: Dr. Marvin Miura, Director
DATE: July 20, 1988
PROJECT: Maui Wailea 670
PROJECT NO: 342

RECEIVED
'88 JUL 20 A11:22
OFC. OF ENVIRON.
QUALITY CONTR.

WE TRANSMIT: ☒ Herewith ☐ Under Separate Cover
VIA: ☐ Mail ☒ Delivery

☐ Prints
☐ Originals
☐ Reproducables
☐ Specifications
☐ Presentation Boards
☐ Photographs
☐ Report(s) (Draft EIS)
☐ Copy of ~~Letter~~ Transmittal
☐ Samples
☐ Product Literature
☐ Change Order
☒ Distribution List

TRANSMITTAL ACTION:
☐ As Requested
☐ For Your Use
☐ For Review and Comment
☐ For Approval
☐ Action Indicated On Item Transmitted
☐ For Signature and Return
☐ For Signature As Noted Below
☒ For Submittal / Distribution

COPIES	SETS	DATE	DESCRIPTION
1			EIS Distribution List
1		7/20/88	Copy of Transmittal To Mr. Christopher Hart, Planning
			Director, County of Maui Planning Dept.
60		7/20/88	Maui Wailea 670 DrafteEIS

REMARKS:

Received By:
Carolin Adams
July 20 1988
Date

COPY TO:

SIGNED: James Leonard
TITLE: Project Manager

John Waihee
GOVERNOR

FACILITIES BRANCH

JUL 26 12 25 PM '88

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

DEP. ___
ASST. ✓
P. R. ___

DIRECTOR
TELEPHONE NO
548-6915

OBS, tenes
Maui
app. action
Prep. reply
Dept's
Date: 8/4
7/25

Dear Reviewer:

Attached for your review is an Environmental Impact Statement (EIS) that was prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Administrative Rules, EIS Rules:

TITLE: Maui Wailea 670

LOCATION: Wailea, Maui, Hawaii

CLASSIFICATION: Agency Action

Your comments or acknowledgments of no comments on the EIS are welcomed. Please submit your reply to the accepting authority or approving agency:

Mr. Clyde Murashige
County of Maui Planning Dept.
200 S High Street
Wailuku, Maui, Hawaii 96793

Please send a copy of your reply to the proposing party:

Mr. James Leonard
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Your comments must be received or postmarked by: September 8, 1988

If you have no further use for this EIS, please return it to the Office of Environmental Quality Control.

Thank you for your participation in the EIS process.

DISTRIBUTION LIST

( ) E.A.
( ) APPLICANT ACTION
( ) AGENCY ACTION

( ) EIS
(X) APPLICANT ACTION
( ) AGENCY ACTION

Title: Maui Wailea 670

Location : Wailea, Maui

Proposing Agency/Applicant: GCR/VMS Maui 670 VMS Realty Partners

Accepting Authority/Approving Agency: County of Maui Planning Department

Deadline for Comments:

Date Sent/By:

STATE AGENCIES	NO. COPIES	REMARKS
OEQC	1	
Dept. of Agriculture	1	
Dept. of Accounting and General Services	1	
Dept. of Defense	1	
Dept. of Education (a)*	1	
Dept. of Hawaiian Home Lands (a)*		
Dept. of Health	1	
Dept. of Land and Natural Resources	3	
DLNR State Historic Preservation Officer	1	
Dept. of *Business and Economic Development*	1	
DBED Library	1	
Housing Finance & Development Corporation	1	
Dept. of Transportation	3	
State Archives	1	
State Energy Office	1	
Office of State Planning	1	
UNIVERSITY OF HAWAII		
Environmental Center	4	
Marine Programs (a)*		
Water Resources Research Center	1	
FEDERAL		
Army-DAFE (Facilities Eng.-USASCH)		
Environmental Protection Agency (a)*		
Navy		
Soil Conservation Service	1	
U.S. Army Corps of Engineers	1	
U.S. Coast Guard		
U.S. Fish and Wildlife Service	1	
U.S. Geological Survey (a)*	1	

Library Copy:
Total Received: ____
Total Distributed: ____
File Copy: ____

Copy of Distribution List Sent to: _____
Date: _____

(a)* Copy desired only if project involves the agency's responsibilities.

Honolulu Star-Bulletin	1	
Honolulu Advertiser	1	
Sun Press	1	
Hawaii Tribune Herald (b)**		
We Hawaii Today - Kona (b)**		
Ti.. Garden Island Newspaper - Kauai (b)**		
Maui News (b)**	1	
Ka Molokai (b)**		
CITY AND COUNTY OF HONOLULU (b)**		
Board of Water Supply		
Building Dept.		
Dept. of Housing and Community Development		
Dept. of General Planning		
Dept. of Land Utilization		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Transportation Services		
Fire Dept.		
Municipal Reference and Records Center (Oahu only)		
Police Dept.		
COUNTY OF HAWAII (b)**		
Planning Dept.		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Research and Development		
Dept. of Water Supply		
iversity of Hawaii - Hilo Campus Library		
COUNTY OF MAUI (b)**		
Office of the Mayor	1	
Planning Dept.	2 + original	
Dept. of Parks and Recreation	1	
Dept. of Public Works	1	
Dept. of Water Supply	1	
Economic Development Agency	1	
Maui Community College Library	1	
COUNTY OF KAUAI (b)**		
Planning Dept.		
Dept. of Public Works		
Dept. of Water Supply		
Kauai Community College Library		
NON-GOVERNMENTAL AGENCIES		
American Lung Association	1	
Hawaiian Electric Company	1	
Office of Hawaiian Affairs	1	
LIBRARIES		
U.H. Hamilton Library, Hawaiian Collection	1	
Legislative Reference Bureau	1	

(b)** Copy desired only if project is in respective county.

LIBRARIES	NO. COPIES	REMARKS
State Main Library	2	
REGIONALS:		
Waimuki Regional Library		
Kaneohe Regional Library		
Pearl City Regional Library		
Hilo Regional Library		
Wailuku Regional Library	1	
Lihue Regional Library		
OAHU:		
Aiea Library		
Aina Haina Library		
Ewa Beach Community-School Library		
Hawaii Kai Library		
Kahuku Community-School Library		
Kailua Library		
Kalihi-Palama Library		
Liliha Library		
Manoa Library		
McCully-Moiliili Library		
Mililani Library		
Wahiawa Library		
Waialua Library		
Waianae Library		
Waikiki-Kapahulu Library		
Waimanalo Community-School Library		
Waipahu Library		
HAWAII		
Bond Memorial (Kohala) Library		
Holualoa Library		
Honokaa Library		
Kailua-Kona Library		
Keaau Community-School Library		
Kealakekua Library		
Laupahoehoe Community-School Library		
Mountain View Community-School Library		
Pahala Community-School Library		
Pahoa Community-School Library		
Thelma Parker Memorial Library/Waimea Area Library		
MAUI		
Kahului Library	1	
Lahaina Library	1	
Makawao Library	1	
MOLOKAI		
Molokai Library		
LANAI		
Lanai Community-School Library		
KAUAI		
Hanapepe Library		
Kapaa Library		
Koloa Community-School Library		
Waimea Library		

DISTRIBUTION LIST
(Continued)

COMMUNITY ORGANIZATIONS AND INDIVIDUALS

Hui Alanui O'Makena
Wailea Development Company, Inc.
Seibu Hawaii, Inc.
Thomas A. Bodden

JUL 28 1988
PHILLIPS BRANDT ...

(P)1685.8

Jul 26 1988

Mr. Clyde Murashige
Planning Department
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Subject: Draft Environmental Impact Statement for Maui Wailea 670

We have reviewed the subject document and have no comments to offer.

Very truly yours,

T. Tominaga

TEUANE TOMINAGA
State Public Works Engineer

SS:jk
cc: Mr. James Leonard

XII-11

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Teuane Tominaga
State Public Works Engineer
State of Hawaii
Department of Accounting and General Services
P.O. Box 118
Honolulu, Hawaii 96810

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Tominaga:

This is to acknowldge receipt of your letter of July 26, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_24_.WP

FINANCIAL PLAZA OF THE PACIFIC [illegible] HONOLULU, HAWAII [illegible] TEL [illegible] FAX [illegible]
BRANCH OFFICE [illegible] HONOLULU, HAWAII [illegible] TEL [illegible] FAX [illegible]

Engineering Office

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Murashige:

Maui Wailea 670
Wailea, Maui, Hawaii

Thank you for providing us the opportunity to review the subject project.

We have no comments to offer at this time regarding this project.

Sincerely,

Jerry H. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

cc: Mr. James Leonard, PBR Hawaii

XII-12

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

Septebember 22, 1988

Major Jerry H. Matsuda
Department of Defense
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Major Matsuda:

This is to acknowledge receipt of your letter of July 27, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_8_.WP

JOHN WAIHEE
GOVERNOR

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

OFFICE OF THE SUPERINTENDENT

July 29, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 S. High Street
Wailuku, Hawaii 96793

Dear Mr. Murashige:

SUBJECT: Maui Wailea 670
Draft Environmental Impact Statement

Our response as shown on page I-28 of the subject document is still valid.

Thank you for the opportunity to comment.

Sincerely,

Kengo Dakuta
for Charles T. Toguchi
Superintendent

CTT:jl

cc J. Leonard, PBR Hawaii

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

7/29/88
CHARLES T. TOGUCHI
SUPERINTENDENT

PHILLIPS BRANDT REDDICK

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

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

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Toguchi:

This is to acknowledge receipt of your letter of July 29, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_9_.WP

FINANCIAL PLAZA OF THE PACIFIC: 195 SOUTH KING STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE: HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL [illegible] FAX [illegible]

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P. O. BOX 1109
WAILUKU, MAUI, HAWAII 96793

- 4 1988
PHILLIPS BRANDT REDD

August 2, 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
130 Merchant St., Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Draft Environmental Impact Statement (EIS)
Maui Wailea 670, TMK 2-1-08:56 & 71

Please be advised that our response and comments of June 16, 1988 is still valid.

Please keep us apprise of any changes.

Sincerely,

Vince G. Bagoyo, Jr., Director
Department of Water Supply

VGB/jaw

cc: Chris Hart
DWS Engineering

"By Water All Things Find Life"

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Vince G. Bagoyo, Jr.
Director
County of Maui
Department of Water Supply
P.O. Box 1109
Wailuku, Maui 96793

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Bagoyo:

This is to acknowledge receipt of your letter of August 2, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_10_.WP

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

REPLY TO ATTENTION OF:
Planning Branch

August 8, 1988

PHILLIPS BRANDT REDDICK

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for Maui Wailea 670, Wailea, Maui, Hawaii. The following comments are offered:

a. The project does not involve any work in waters of the United States or adjacent wetlands; therefore, a Department of the Army permit is not required.

b. The discussion of flood hazards (DEIS page I-8) is accurate.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Copy furnished:

Mr. James Leonard
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

XII-15

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Kisuk Cheung
Chief, Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Cheung:

This is to acknowledge receipt of your letter of August 8, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_11_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521-2631 FAX (808) 521-1892
BRANCH OFFICE: HILO LAGOON CENTER 100 AUPUNI STREET, SUITE 106 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-0959

HANNIBAL TAVARES
Mayor
TELEPHONE 244-1808
ms
bh/22c

OFFICE OF THE MAYOR
COUNTY OF MAUI
WAILUKU, MAUI, HAWAII 96793

PHILLIPS BRANDT REDD...

August 8, 1988

Mr. Clyde Murashige
Department of Planning
County of Maui
Wailuku, Hawaii 96793

Dear Mr. Murashige:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR MAUI WAILEA 670, TMK 2-1-08:56 and 71, WAILEA, MAUI

Please be advised of the following comments:

Pg. I-15 Public Facilities

The scale of the proposed development may warrant additional consideration for additional fire and police service.

Pg. IV-48 Waste Water Disposal

The County is reviewing a sewer impact fee proposal in the Kihei area.

Pg. IV-49 Solid Waste Disposal

Is any action being contemplated which would result in a reduction of solid waste in order to reduce impacts on the County landfill?

Thank you for the opportunity to comment.

Very truly yours,

Hannibal Tavares

HANNIBAL TAVARES
Mayor, County of Maui

cc: James Leonard, PBR Hawaii

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Honorable Hannibal Tavares
Office of the Mayor
County of Maui
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mayor Tavares:

Thank you for the copy of your letter of August 8, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

Public Facilities

Based on the fiscal analyses performed for the proposed project, it would appear that sufficient county revenues would be generated by the project to support additional police and fire department services. As noted in the Draft EIS (see Chapter IV, Section 6.3.2), a private security force would be contracted as required to assist the county services.

Wastewater Disposal

The developer is aware of the actions of the county regarding sewer impact fees. The developer will continue to work with the county Department of Public Works to determine the wastewater collection and treatment system that will best serve the county and developer.

Solid Waste Disposal

It is probable that the proposed lodges, condominiums, single family residences and other facilities would be equipped with waste compaction equipment to reduce the volume of solid waste generated by the proposed project.

FINANCIAL PLAZA OF THE PACIFIC [illegible] HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE [illegible] CENTER [illegible] HILO, HAWAII 96720 TEL [illegible] FAX [illegible]

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_12_.WP

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

WILLIAM T. ... CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
DEPUTIES
GILBERT S. COLOMA-AGARAN
PHILLIPS BRANDT REDDI...
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

August 8, 1988

Mr. Clyde Murashige
County of Maui
Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

SUBJECT: Review of the Draft Environmental Impact Statement for the Maui Wailea 670 (89-047)
Paeahu & Palauea, Makawao, Maui
TMK 2-1-08: 56 & 71

HISTORIC SITES SECTION CONCERNS:

The section Historical and Archaeological Resources (IV-29) of this document adequately addresses historic preservation concerns. It indicates that archival research and a complete survey of the proposed project area were conducted. Our office has been consulted (see X-40-41, X-44-45) and we have determined that the proposed project will have "no effect" on significant sites. However, we recommend that the last sentence of the subsection Mitigation Measures (IV-31) be re-written as follows:

> However, should subsurface remains such as artifacts, burials, or deposits of charcoal or shells be found during construction activities, work should be stopped and the Historic Sites Section contacted to determine the significance and recommend mitigation, if needed. The services of a qualified archaeologist will be retained to execute the mitigation plan.

RECREATION CONCERNS:

It is our understanding that ponding basins will be constructed-on-site for desilting storm runoff prior to discharge into the existing drainage system and that neighborhood parks, which would be owned and maintained by the community association, and two golf courses and other private recreational facilities would be provided. We assume that the developer had closely

coordinated their proposal for recreational facilities with the Department of Parks and Recreation of the County of Maui. If the proposal for recreational facilities is satisfactory to the Department of Parks and Recreation, then we have no objections to the project.

Sincerely,

RALSTON H. NAGATA
State Parks Administrator

cc: James Leonard

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Ralston H. Nagata
State Parks Administrator
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Nagata:

Thank you for the copy of your letter of August 8, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

The comments provided in your letter were also included in the Department of Land and Natural Resources letter of August 22, 1988. The requested sentence change regarding mitigation measures will be included in the Final EIS and the developer will continue to work closely with the county Department of Parks and Recreation regarding the public recreational facilities and opportunities to be provided by the proposed project.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,
PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_13_.WP

FINANCIAL PLAZA OF THE PACIFIC [illegible] HONOLULU, HAWAII [illegible] TEL [illegible] FAX [illegible]
BRANCH OFFICE HILO PAGODA CENTER [illegible] HILO, HAWAII [illegible] TEL [illegible] FAX [illegible]

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mrs. Marilyn Moniz-Kahoohanohano
Director of Parks & Recreation
County of Maui
Department of Parks and Recreation
1580 Kaahumanu Avenue
Wailuku, Maui 96793

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mrs. Moniz-Kahoohanohano:

This is to acknowledge receipt of your letter of August 23, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process and we will consult with you during the subsequent regulatory approval process. Your letter and this response will appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_14_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521-5631 FAX (808) 523-1942
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-0999

HANNIBAL TAVARES
Mayor

MARILYN MONIZ-KAHOOHANOHANO
Director
KENJI KAWAGUCHI
Deputy Director

PHILLIPS BRANDT REDDICK

COUNTY OF MAUI
DEPARTMENT OF PARKS AND RECREATION
1580 Kaahumanu Avenue
Wailuku, Maui, Hawaii 96793

August 23, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

SUBJECT: EIS FOR MAUI WAILEA 670

We have no comments on the EIS at this time. However, we would like to be consulted during the general plan amendment and zoning process for input.

Please feel free to contact me should you have any questions.

Very truly yours,

Marilyn Moniz-Kahoohanohano

MARILYN MONIZ-KAHOOHANOHANO
Director of Parks & Recreation

cc: Mr. James Leonard
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

JOHN WAIHEE
GOVERNOR OF HAWAII

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

PHILLIP S. BIG. LIBERT B. LANOGRAN
MANABU TAGOMORI
RUSSELL Y. TSUJI

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

DOC. NO.: 4050E
FILE NO.: 89-047

AUG 22 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

SUBJECT: Draft Environmental Impact Statement for Maui Wailea-670; TMK: 2-1-08: 56 and 71

Dear Mr. Murashige:

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.

In the Maui Wailea 670 submission the section Historical and Archaeological Resources (IV-29) of this document adequately addresses historic preservation concerns. It indicates that archival research and a complete survey of the proposed project area were conducted. Our Department's Historic Sites Section was consulted (X-40-41, X-44-45) and it determined that the proposed project would have "no effect" on significant sites. However, it recommended that the last sentence of the subsection Mitigation Measures (IV-31) be re-written as follows:

> However, should subsurface remains such as artifacts, burials, or deposits of charcoal or shells be found during construction activities, work should be stopped and the Historic Sites Section contacted to determine the significance and recommend mitigation, if needed. The services of a qualified archaeologist will be retained to execute the mitigation plan.

Our Department's Recreation Section points out that ponding basins will be constructed on-site for desilting storm runoff prior to discharge into the existing drainage system. Also, it is understood that neighborhood parks, which would be owned and maintained by the community association; and two golf courses and other private recreational facilities will be provided. We assume

that the developer closely coordinated their proposal for recreational facilities with the Department of Parks and Recreation with the County of Maui. If the proposal for recreational facilities is satisfactory to the Department of Parks and Recreation, then we have no objections to the project.

As a final comment, our Department's Division of Aquatic Resources notes that the Wailea 670 project is about one mile from the shoreline at an elevation of 300 to 700 feet, and that no perennial stream exists on the property. As a result, impacts adverse to aquatic resource values are not expected.

Please feel free to call me or Roy Schaefer of our Office of Conservation and Environmental Affairs at 548-7837, if you have any questions.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Mr. James Leonard

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. William W. Paty
Chairperson
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Paty:

Thank you for the copy of your letter of August 22, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

Archaeological Resources

The last sentence of the Mitigation Measures subsection 3.3 (Chapter IV, Section 3) will be rewritten as requested in your letter. We appreciate the cooperation and assistance provided by your staff.

Recreational Resources

The developer will continue to work closely with the county Department of Parks and Recreation to ensure that appropriate public recreational facilities and opportunities are provided.

Aquatic Resources

As indicated in the Draft EIS (see Chapter IV, Section 1.3), the proposed project is not expected to result in adverse impacts to the hydrological or drainage characteristics of the project area.

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1011 HONOLULU, HAWAII 96813 TEL (808) 521-5631 FAX (808) 521-1802
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-8991

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342PL_16_.WP

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

August 24, 1988

Mr. Clyde Murashige
County of Maui
Planning Department
200 S. High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Subject: Draft Environmental Impact Statement (DEIS) -
Maui Wailea 670, Wailea, Maui, Hawaii

We have no comments to offer at this time; however, we would appreciate the opportunity to review the final EIS.

Sincerely,

RICHARD N. DUNCAN
State Conservationist

cc:
Mr. James Leonard, PBR Hawaii, Financial Plaza of the Pacific, 130 Merchant Street, Suite 1111, Honolulu, HI 96813

XII-23

PBR
HAWAII
LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Richard N. Duncan
State Conservationist
United States Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Duncan:

This is to acknowledge receipt of your letter of August 24, 1988 regarding the subject project. Thank you for participating in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_15_.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE HILO FLAGSHIP CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL [illegible] FAX [illegible]

COPY

1 1988

PHILLIPS BRANDT RE

August 26, 1988

Mr. Clyde Murashige
Planning Department
County of Maui
200 South High Street
Wailuku, Maui, HI 96793

Dear Mr. Murashige:

Subject: Draft Environmental Impact Statement (EIS) for Maui Wailea 670 Project, Wailea, Maui, Hawaii

Thank you for allowing us to review and comment on the subject draft EIS. The draft EIS identified the development of a residential/resort community along the open space corridors of two 18-hole golf courses. If treated wastewater is used for irrigation, the EIS should address the potential health and safety concerns. Considerations should be given for the establishment of buffer zones, degree of wastewater treatment, limitation of drift from spray irrigation, and use of drip irrigation along fringe areas.

Also, we strongly recommend that regional or sub-regional wastewater treatment systems operated by the County of Maui be considered for this area. We feel that proliferation of small, private wastewater treatment systems would not be in the best public interest.

Please refer to the attached August 2, 1988 letter from the Director of Health to Mayor Hannibal Tavares which explains our position on the wastewater management problem in the Kihei-Wailea area.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

BRUCE S. ANDERSON, Ph.D.
Deputy Director for
Environmental Health

AB/rg
Attachment
cc: Office of Environmental Quality Control (w/attach)
Mr. James Leonard, PBR Hawaii (w/attach)

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

IN REPLY REFER TO:
FILE: EH-88-0TH/CB

August 2, 1988

The Honorable Hannibal Tavares
Mayor, County of Maui
200 S. High Street
Wailuku, Maui, HI 96793

Dear Mayor Tavares:

Subject: Kihei-Wailea Wastewater Management

As a result of the meeting of May 9, 1988 amongst our respective staff, we are aware of the limited flow capacity of the existing Kihei wastewater treatment plant and the pending developments in the Kihei-Wailea area. Due to the heavy concentration of development and vulnerability of coastal waters in this area to environmental degradation, we are taking this opportunity to express our grave concern regarding the wastewater management problem the County of Maui is facing that must be addressed.

I am sure that you agree that regional or sub-regional wastewater systems operated by the County of Maui are the best wastewater management alternative for this area. To this end, we hope that the County is expeditiously implementing the necessary treatment works to accommodate the planned developments. The proliferation of small, private wastewater systems would not be in the best public interest. Thus, construction of sub-regional wastewater systems where major development is being proposed would be an environmentally sound alternative.

In view of the gravity of this situation, the Department of Health will not approve of any development in the Kihei-Wailea area, unless connection to the County sewers is possible, until an acceptable wastewater management strategy is submitted.

Should you have any questions regarding this matter, please do not hesitate to call on me.

Very truly yours,

JOHN C. LEWIN, M.D.
Director of Health

cc: Maui County Council

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Dr. Bruce S. Anderson
Deputy Director for Environmental Health
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Dr. Anderson:

Thank you for the copy of your letter of August 26, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

As indicated in the Draft EIS (see Chapter IV, Section 5.3), the eventual method of wastewater disposal has not been determined at this time. However, the developer is working closely with appropriate county Department of Public Works personnel to develop a wastewater treatment and disposal method that will meet the needs and requirements of the project, county and state. All wastewater treatment and disposal will be in accordance with appropriate federal, state and county rules and regulations.

XII-25

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James H. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_17_.WP

FINANCIAL PLAZA OF THE PACIFIC [illegible] MERCHANT STREET, SUITE [illegible] HONOLULU, HAWAII [illegible] TEL [illegible] FAX [illegible]
BRANCH OFFICE: HILO LAGOON CENTER [illegible] KALAPUNI STREET, SUITE [illegible] HILO, HAWAII [illegible] TEL [illegible] FAX [illegible]

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96732-0398 • (808) 871-8101

SEP - , GOV 1-1-3
M-W/G
PHILLIPS BRANDT REDICK

September 2, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Subject: Environmental Impact Statement (EIS) for the Maui Wailea 670 Development

We have reviewed the subject EIS and offer the following comments:

1. As stated in the EIS, Maui Electric Company, Limited (MECO) has an electrical substation, Wailea Substation No. 25, located along the western boundary of the subject development. This substation serves the Wailea and Seibu resort areas, and the Kihei community north of the Wailea resort area through distribution lines that run along the western boundary of the subject development.

2. In addition to our substation and distribution lines, MECO has a sixty-nine thousand volt line within the subject property. This transmission line is part of MECO's upcountry transmission loop system and is very critical to MECO's electrical system. This line runs along the western boundary from the north boundary to the substation, then heads eastward across the subject property.

3. As noted in the EIS, MECO and the developer will need to work very closely to determine the specific transmission, distribution and substation requirements for the project. Because lead times for specific electrical equipment range from six months to a year, early and close coordination between the developer and MECO is essential.

Thank you for the opportunity to comment on the subject EIS. Should you have any questions on this matter, please call me at 871-2341.

Sincerely,

Neal Shinyama

Neal Shinyama
Staff Engineer

cc: C. Kuwanoe (MECO)
J. Leonard (PBR Hawaii)

An HEI Company

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Neal Shinyama
Staff Engineer
Maui Electric Company, Ltd.
210 West Kamehameha Avenue
P.O. Box 398
Kahului, Maui 96732-0398

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Shinyama:

Thank you for the copy of your letter of September 2, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

1. The information provided regarding the Maui Electric Company, Ltd. (MECO) equipment in the vicinity of the project site will be included in the Final EIS.

2. The MECO sixty-nine thousand volt transmission line that crosses the project property is noted in the Draft EIS (see Chapter IV, Section 5.5 and Figure IV-5).

3. The developer will continue to work closely with MECO personnel to ensure that reliable electrical service is provided to the project site in a timely manner.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_18_.WP

FINANCIAL PLAZA OF THE PACIFIC 33 MERCHANT STREET, SUITE 310 HONOLULU, HAWAII 96813 TEL [illegible] FAX [illegible]
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL [illegible] FAX [illegible]

DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR
LESLIE S. MATSUBARA
DEPUTY DIRECTOR

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813

88:652e

September 2, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Subject: Draft Environmental Impact Statement for Maui Wailea 670

The Energy Division has received the above-referenced Draft Environmental Impact Statement (DEIS) and has the following comments:

The DEIS contains minimal discussion of energy impacts that will result from the proposed project. It is stated in the document that the project will have an impact in terms of "the consumption of petroleum products and petroleum based electrical generation" (p. VII-1). However, that impact is addressed only minimally with the observation that while "at present it is contemplated that electrical power would be used for both water heating and cooling purposes," other energy efficient methods--including solar water heating and cooling--will be examined (pp. IV-49-50). The DEIS contains no estimate of total electricity consumption within the project and, apart from the mention of solar water heating, provides no discussion of energy conservation or renewable energy sources that might help meet the project's energy requirements.

We note also that in Chapter V, dealing with the Hawaii State Plan and State Functional Plan, neither the State Plan's guidelines for energy use and development nor the State Energy Functional Plan were examined for their relationship to the proposed project. We believe it is appropriate to include in this document an examination of these relationships as well as fuller discussions about the application of energy conservation and renewable energy resources.

This DEIS should comply with the requirements found in State laws for evaluating impacts that the project will have in the areas of energy consumption, energy conservation, and renewable energy sources. The mandate for such an evaluation is found in Chapter 344, HRS ("State Environmental Policy") and Chapter 226, HRS ("Hawaii State Planning Act"). In particular,

we cite Chapter 226-18(a)(2) and (c)(3); 226-52(a)(2) and (b)(2)(D); and 226-103(f)(1) and (2).

Thank you for the opportunity to comment on this DEIS. I hope these comments will be useful to you.

Sincerely,

Maurice H. Kaya
Energy Program Administrator

MHK/PE:do

cc: James Leonard

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Maurice H. Kaya
Energy Program Administrator
Department of Business and
Economic Development
335 Merchant Street, Room 110
Honolulu, Hawaii 96813

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Kaya:

Thank you for the copy of your letter of September 2, 1988 to Mr. Clyde Murashige, County of Maui, Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

Energy Conservation

Providing cost effective alternatives to conventional appliances and equipment within residences and commercial establishments is a concern shared by the developer of Maui Wailea 670. Not only does this make for a more competitive product on the residential market but also promotes operational efficiencies within commercial establishments, such as resort lodges, restaurants and rental outlets. As noted in chapter IV, section 5.5.1, engineering and economic analysis will be performed to determine the most economical and energy efficient method of providing hot water heating and cooling. This same level of analysis will be directed to water use and lighting systems in the final design stages of residential, commercial and public facilities.

It is premature at this initial planning stage to project the total energy use for the proposed project. During the final design stages, however, careful consideration will be given to integrating cost effective energy conservation measures into the final design. The developer will coordinate with the Maui Electric Company to ensure that the projects total energy requirements are adequately met.

Alternate Energy Development

Development of an alternate energy sources, other than the investigation of solar or heat pump technologies for water heating or cooling purposes would be to accomplished most effectively by the utility, similar to the proposed energy park near the MECO power plant in Maalaea. Integration of power

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521-5631 FAX (808) 523-1402
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-9599

supply and demand is typically handled through the utility pricing structure. As mentioned, the developer will continue to work with the utility to ensure that the power demands of the proposed project are met by the projected supply from conventional and alternate energy sources.

Relationship to State Energy Policies

As suggested, the Final EIS will fully address the objectives and policies relating to the efficient use of our energy resources found in the Hawaii State Plan and the State Energy Functional Plan.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_23_.WP

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

September 6, 1988
RE:0505

Mr. Clyde Murashige
Planning Department
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Draft Environmental Impact Statement
Maui Wailea 670
Wailea, Maui, Hawaii

The proposed Maui Wailea 670 is a residential/resort community, including two 18-hole golf courses, that is to provide a focal point for the activities of the luxury hotel accomodations of Wailea and Makena. It will include restaurant, visitor information center, arts and crafts center, and theaters.

The Environmental Center has reviewed the above referenced document with the assistance of Michael Graves, Anthropology; Roger Fujioka, Water Resources Research Center; and Nancy Kanyuk, Environmental Center.

Wastewater

Since part of the the project is within the underground injection control line, assurances should be made that this area will be respected and not be used for wastewater discharge. Additionally, although the document suggests that the discharging of treated sewage by injection into an underground aquifer is not expected to have a detrimental effect it should be recognized that such injection can impact coastal water quality. It should also be noted that the practice of irrigating golf courses with sewage effluent may result in adverse health effects unless the proposed treatment system design is effective.

It should be recognized that the small "packaged" sewage treatment plants have a history of poor performance. Therefore, upgrading of the existing Kihei STP in concert with other developers and the county is

AN EQUAL OPPORTUNITY EMPLOYER

likely to be the long term environmentally and economically preferred alternative.

Solid Waste

The reliance on private contractors for the disposal of solid waste does not represent a very assuring plan, given the magnitude of the proposed project.

Archaeology

The archaeological report fails to meet the minimum standards for a reconnaissance survey report set by the Society for Hawaiian Archaeology, and generally adhered to by professional archaeologists in the state. According to Appendix D the archaeological reconnaissance was carried out by two archaeologists over a 7 day period. Since the project area covers 670 acres, it is most unlikely that an adequate survey of the area could have been accomplished in the time indicated. However, it is very difficult to objectively judge the adequacy of the report/survey since there is no discussion of the survey methodology, other than to say that a combination of pedestrian and vehicular modes were adopted. The focus of the survey was to identify stone architectural features and to use these as a measure of prehistoric occupation in the project area. Yet, there are known archaeological deposits in Hawaii which do not always include obtrusive walls. Dryland agricultural features, including stone piles, shallow windbreaks or terraces, are not always visible from passing vehicles and are not visibly obtrusive. Such features, however, deserve to be documented if they exist. In order to document such features, adequate time must be devoted to a pedestrian survey of any given project area.

This is not to say that such features necessarily exist in the Wailea project area. Archaeological reconnaissance, however, should be conducted in such a fashion that if such features do occur, they have some opportunity to be observed. Hence, it does not appear from the evidence provided that sufficient time or intensity of effort was devoted to looking for more subtle archaeological features.

We conclude, from the comments provided by our reviewers, that the document, in its current form, has not adequately addressed a number of vital issues. We would strongly recommend inclusion of more specific data on the concerns we have voiced in the Final EIS.

Thank you for the opportunity to comment on this Draft EIS. We hope our comments will be helpful in preparing the final document.

Yours truly,

Jacquelin Miller
Associate Environmental Coordinator

cc: OEQC
James Leonard, PBR Hawaii
L. Stephen Lau
Michael Graves
Roger Fujioka
Jon Matsuoka
Nancy Kanyuk

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Ms. Jacquelin Miller
Associate Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Ms. Miller:

Thank you for the copy of your letter of September 6, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

Wastewater

The final method of treatment and disposal of wastewater generated by the proposed project has not been determined. However, all collection and disposal will be in compliance with appropriate state and county rules and regulations. Should wastewater be used to irrigate the proposed golf courses, the wastewater would be treated appropriately to prevent potential adverse public health effects. As is noted in Chapter IV, Section 5.3, several alternative treatment and disposal methods are still under consideration with the final determination expected to be made by the county.

Solid Waste

We note that, to the best of our knowledge, all resorts on Maui utilize private contractors to collect and dispose of solid wastes. It would appear that to do otherwise would place undue burdens on county personnel, resources and taxpayers.

Archaeology

The archaeological report included in the Draft EIS has been found to be adequate by the State Department of Land and Natural Resources Historic Sites Section (DLNR-HSS). As noted in Chapter IV, Section 3.2 and referenced in Chapter X, Page X-40, the proposed project "will have no effect" on significant historic sites. DLNR-HSS has concurred with this finding in their review of the Draft EIS. A copy of the relevant correspondence from DLNR-HSS is attached for your reference.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

Attachment

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_19_.WP

Wailea Development Company, Inc.
101 Wailea Ike Place
Wailea, Maui, Kihei, Hawaii 96753-8599
(808) 879-4461

September 7, 1988

Mr. James Leonard
Project Manager
PBR Hawaii
130 Merchant Street
Honolulu, HI 96813

Dear Jim:

Maui-Wailea 670: Environmental Impact Statement (EIS)

The following are comments in response to the Maui-Wailea 670 project EIS:

1. Page I-8, Section 4.1.3, Hydrology and Drainage

   The EIS states that the "proposed project is not expected to significantly impact the groundwater resources of the project site because (1) the quantity of groundwater flowing beneath the site is greater than that which would be withdrawn for project purposes; . . ."

   We would like to point out that the "groundwater flowing beneath the site" is part of a common brackish water resource which also underlies neighboring properties, including Wailea. Thus, the entire quantity flowing beneath the Maui-Wailea 670 site is not available for their sole use. Existing uses of this groundwater resource must not be impaired by the development of additional wells.

2. Page I-16, last paragraph

   Include "brackish water development" in the list of cooperative efforts with neighboring developers.

3. Page I-19, Table of Necessary Permits and Approvals

   The EIS states that a Ground Water Use Permit will be needed from the Department of Land and Natural Resources. If this refers to the project's proposed brackish water well development, under the new State water code a well construction permit and pump installation permit is required from the State Commission on Water Resource Management rather than the cited authority and approval.

4. Figure II-4, State Land Use/County Zoning Exhibit

   The Maui County Council has taken action to reclassify approximately 15 acres for the Embassy Suite project.

5. Page IV-8, last paragraph

   The total flux for groundwater exceeding withdrawals is not the only issue in allowing additional groundwater development. Additional wells must be developed and operated so as not to impair either the quantity or quality (salinity) of water being withdrawn by pre-existing wells.

6. Page IV-42, Water Supply

   The third paragraph states that the "(source assessment) fee is used to develop additional water sources in Upper Waiehu to meet the continuously growing demands . . ."

   Again, we must note that no additional development will occur in Upper Waiehu (site of the existing Central Maui Source Development JV wells). The JV and the County of Maui have committed to the state that no additional development will occur in this aquifer so as to protect the integrity of this water resource.

   Additionally, in paragraph 2, the members of the JV should be corrected to be: A&B Properties, Inc., Wailea Development Company, Inc., Seibu Hawaii, Inc., and C. Brewer Properties, Inc. The EIS citation is slightly incorrect.

7. Page IV-43, Section 5.2.2, Probable Impacts

   We should note that the County is also studying the groundwater development potential of other areas of the island (other than the Kahakuloa area) for supplying potable water to meet the future demands of the Central Maui area.

8. Page IV-44, Water Supply

   The paragraph following Table IV-6 should be headed or modified to clearly indicate that it refers to non-potable, irrigation water. Also, we would like to note that Wailea does have another irrigation well slightly north and makai of the northern boundary of the project site. Well development by Maui-Wailea 670 should not impair our utilization of this well as well as our other more southerly Wailea wells.

9. Page IV-47, Section 5.3.1, Wastewater Disposal

   Another alternative should be added to the four which are listed -- to participate in the construction of a second STP in the area for dedication to the County.

10. Page IV-48, Section 5.3.2, Probable Impacts

    Same comment as #9, the first sentence should also include the alternative of constructing a STP for dedication to the County (as opposed to a private STP).

11. Page V-9, Discussion Irrigation Water

A sentence should be added to this discussion stating that any development of this common brackish water resource underlying the Maui-Wailea 670 site as well as neighboring properties must be done carefully so as to avoid interference with any existing wells.

If you should have any questions, please feel free to call.

Sincerely,

Robert A. Everingham
Manager, Project Planning

RAE:dnm

cc: H. Nakamura
C. Champion
M. J. Ching

XII-34

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Robert A. Everingham
Manager
Wailea Development Company, Inc.
161 Wailea Ike Place
Wailea, Maui, Kihei, Hawaii 96753-9599

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Everingham:

Thank you for your letter of September 7, 1988, regarding the subject Draft EIS. The following is provided in response to your letter.

The information contained in your items 1 through 8 will be included in the Final EIS. We appreciate your bringing this information to our attention.

In response to your items 9 and 10, the alternative of jointly constructing a second sewage treatment plant in the project area for dedication will be added to the Final EIS.

The information requested in your item 11 will be included in the Final EIS.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342PL_20_.WP

OFFICE OF STATE PLANNING
Office of the Governor
STATE CAPITOL, HONOLULU, HAWAII 96813 TELEPHONE: (808) 548 5493
JOHN WAIHEE, Governor

SEP - 8

September 8, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 S. High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Murashige:

Subject: Comments on Draft Environmental Impact Statement for Maui Wailea 670, Wailea, Maui

We have reviewed the July 1988 Draft Environmental Impact Statement (DEIS) for Maui Wailea 670, a residential/resort community with golf courses, village center and resort accommodations which is intended to complement the luxury hotel accommodations of Wailea and Makena. The following comments are provided for your consideration.

Our concerns generally lie in six areas: need for the proposed project; availability of a work force and the impacts of continued in-migration to the island; traffic impacts and impact on water quality; public fiscal resources; and affordable housing.

With respect to the first area of concern--need for the project--more comprehensive information should be provided on the current and future availability of lands for resort uses on Maui and throughout the State. Most of the resort destination areas throughout the islands have yet to attain their full build out. The EIS should provide evidence indicating the need to reclassify and make available additional lands for resorts at this time.

In addition, more information should be provided on the work force requirements of the proposed project, the potential sources of employees, the rate and volume of in-migration, and the impacts of such continued in-migration. We note that the work force requirements of resort projects, such as the subject project, are relatively high. The means by which the developer proposes to overcome the low unemployment rate and shortage of workers on the island should be clearly identified and assessed. The housing needs of the workers should also be addressed.

Concerns about the continuing traffic problems on the island and the more recently publicized concerns about water quality in the Kihei-Wailea area should be more clearly identified and addressed. The latter subject matter is not currently addressed in the draft EIS. Based on the project's size, it is apparent that this project will be one of the larger traffic generators and wastewater generators in the region.

The fiscal impacts of the proposed project, as presented in the draft EIS, appear to indicate that County and State revenues will exceed expenditures by 140-180 percent. The data upon which this conclusion is based should be disclosed.

We appreciate this opportunity to review the draft EIS.

Sincerely,

Harold S. Masumoto
Director

cc: / James Leonard, PBR Hawaii

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Harold S. Masumoto
Director
Office of State Planning
Office of the Governor
State Capitol, Honolulu, Hawaii 96813

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Masumoto:

Thank you for the copy of your letter of September 8, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

1. Need for the Project

The need for the proposed project is summarized in Chapter II, Section 4 (Page II-7) and a detailed and comprehensive market assessment is provided in Appendix A of the Draft EIS. As indicated in the Draft EIS (Chapter II, Section 4.1) and based on analyses of existing and known planned golf courses on the island of Maui, the Maui Wailea 670 project could support two 18-hole golf courses. The rationale and supporting data for this finding is fully described in Appendix A.

Utilizing state economic projections, and assumed 70 percent occupancy level, and assuming the construction of all currently planned and proposed resort hotels on the island of Maui, it was determined that there would still be demand for additional hotel rooms between 1990 and 2010. The net additional demand is estimated to represent 900 rooms in 1990, increasing to 3,400 rooms in 2010 (see Chapter II, Section 4.2 and 4.3). The rationale for the estimates and assessment of market support for the two planned resort lodges at Maui Wailea 670 is included in Appendix A.

Condominium units at Maui Wailea 670 are expected to attract buyers interested in first-class projects offering golf course frontage and excellent ocean views within a master planned residential/resort community. Projected supportable condominium sales were estimated in terms of ratios of condominium sales to visitor units on Maui, planned hotel construction on Maui in general and specifically the Wailea area, projected resales and market shares for new condominium sales at the Maui Wailea 670, Maui Wailea and the Seibu Makena Resort (see Chapter II, Section 4.4).

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813 TEL (808) 521-5631 FAX (808) 521-1042
BRANCH OFFICE HILO LAGOON CENTER 101 AUPUNI STREET, SUITE 206 HILO, HAWAII 96720 TEL (808) 961-3333 FAX (808) 961-1994

The market assessment for single family housing included a review of potential markets for residential lots of various sizes as well as an assessment for patio homes on lots ranging from about 4,500 to 5,500 square feet. Based on the amenities provided at the Maui Wailea 670 project as well as those provided in the general Wailea area, it was determined that a supportable market for the planned residential lots and patio homes does exist at the Maui Wailea 670 project (see Chapter II, Section 4.5).

Based on the development of the above noted lodge units, resort condominiums and single family units at Maui Wailea 670, as well as planned further development of other resort properties in the Wailea area, a significant demand for retail commercial space at the resort would be generated. It has been projected that the market could support between 21,000 and 27,000 square feet of commercial space by 1995 and between 54,000 and 67,000 square feet in 2010 (see Chapter II, Section 4.6)

Given that the market analyses that have been performed have been prepared by qualified, experienced professionals, it would appear that the need for the project is well documented and supported by the assessments that have been performed and described in the Draft EIS.

2. Work Force Requirements, In-Migration Impacts and Housing Needs

Employment impacts from the proposed project are expected to be positive both during the construction and operation phases. As noted in the Draft EIS (Chapter IV, Section 4.2, Page IV-33), it is estimated that in the 1991 to 1995 period approximately 500 to 590 (direct, indirect and induced) construction workers would be required and that approximately 620 to 730 construction employees during the 2001 to 2005 time period would be required with the construction force decreasing to between 500 and 530 during the 2006 to 2010 period. Annual wages paid to these workers during the 1991 to 1995 is projected to range between $5.5 and $6.4 million, $6.7 and $7.9 million during the 2001 to 2005 period and $5.5 to $5.8 million during the 2006 to 2010 period. During the operational phases of the proposed project, it is estimated that between 1,060 and 1,450 employees will be required to provide the levels of service required in the 1995 period, increasing to between 2,155 and 2,575 in the 2010 period.

Total annual wages for these employees is projected to range between $8.4 and $11.5 million in 1995, increasing to between $17.1 and $20.3 million in 2010.

The sources of the employees that will be required is unknown at this time and can only be determined as the various types of construction and operational employees are required. In part, the sources of the employees will be dependent upon other projects that may be under construction and/or operational at the time the proposed Maui Wailea 670 project is beginning to come on-line. The developer is quite aware of the current shortage of qualified workers in all employment areas and will be working with appropriate federal, state and county agencies and private groups to assist in the development of adequate solutions to potential employment problems. Similarly, as worker requirements are better defined, employee housing needs will be addressed in the context of state and county rules, regulations and guidelines.

3. Traffic Problems

As indicated in Chapter IV, Section 5.1 of the Draft EIS, existing traffic without the proposed project operates at minimally acceptable levels in both the morning and afternoon peak hours. That is, there are clear indications that both county and state highway improvements are required at present.

Traffic impacts of the proposed project will be dependent upon the scale and rate of development of other projects in the area. To determine the projected traffic impacts resulting from the proposed project, a traffic impact study was performed and is included as Appendix H.

Based on the traffic analyses performed for the proposed project (Appendix H), it would appear that existing and projected traffic conditions have been adequately described and appropriate proposed mitigation measures included in the Draft EIS.

As noted in the Draft EIS (Chapter IV, Section 5.3), the developer will continue to work with the State Department of Transportation, Highways Division and County Department of Public Works to assist in the assurance that traffic impacts from the proposed project are minimized to the maximum extent possible. However, it is understood that in many instances,

traffic conditions at present exceed highway and roadway capacities and that such conditions will continue to worsen with or without the proposed project.

4. Water Quality in Kihei-Wailea Area

Wastewater generation and disposal are described in Chapter IV, Section 5.3 of the Draft EIS. As is noted, the developer recognizes that the County's Kihei Sewage Treatment Plant is operating at or close to capacity at present. In view of the limited capacity of the existing Kihei STP, several alternatives are being considered to serve the Maui Wailea 670 project. These include (1) participation with other developers and the county in upsizing the existing gravity interceptors, pump stations and force mains between Wailea and the Kihei STP; (2) installing a new interceptor beginning at the southwest corner of the proposed project to the Kihei STP along Piilani Highway (costs would be shared with other developers); (3) participating with other developers and the county in enlarging existing STP; or (4) constructing a STP within or near the proposed project in cooperation with other developers in South Wailea and Makena. The developer would continue to work with the county Department of Public Works to determine which of the alternatives under consideration is best suited for the proposed project, other neighboring developments and the county. The ultimate determination of which alternative is adopted would be by the county.

5. Fiscal Impact Analysis

As indicated in the Draft EIS (see Chapter IV, Section 4.2, Page IV-34), both state and county revenue/expenditure ratios resulting from the proposed project are expected to be positive. That is, state and county tax revenues are expected to be greater than state and county expenditure requirements for public facilities and services to support the proposed Maui Wailea 670 project. The basis for these estimates are described in Appendix B to the Draft EIS and include analyses of visitor expenditure trends, employment projections and trends, personal income projections, other economic activities, such as agriculture and high technology factors; demographic conditions for the state, Maui County and Kihei-Wailea areas; population and housing factors; and the present and proposed condition of the project property

and public infrastructure serving the project area. The analyses performed have been conducted by qualified professionals and are thought to accurately reflect estimated future conditions.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342FL_21_.WP

JOHN WAIHEE
GOVERNOR

Joseph K. Conant
Executive Director

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation
P. O. Box 29360
Honolulu, Hawaii 96820-1760

IN REPLY REFER TO:
88:PLNG/884B JT

September 8, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Murashige:

Re: Draft Environmental Impact Statement for the Proposed Maui Wailea 670 Project

We have reviewed the subject draft EIS and offer the following comments:

One of the objectives of the State Housing Functional Plan is to provide "greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals". It appears that the proposed project does not provide any affordable housing opportunities for families earning 140% and below of the county's median income (which is currently $34,000 for a family of 4).

We recommend that a reasonable amount of affordably priced units be provided to satisfy the housing needs of the targeted income groups which comprise the vast majority of the population. The breakdown is as follows:

% of Total Units	Target Group (% of Median Income)	Affordable Sales Price	Affordable Rent
10%	<80%	<$83,000	$680/mo
20%	80-120%	$83,000-$130,800	
30%	120-140%	$130,800-$154,700	

Sales price calculations are based on (1) a 1988 median income for a family of four of $34,000; (2) a 30-year loan; (3) an interest rate of 10%; (4) a 10% down payment; (5) an income to payment qualifying ratio of 3:1; and (6) $100 reserved for taxes, insurance and maintenance. Affordable rent, which includes utilities, is calculated as 30% of monthly income.

Thank you for the opportunity to comment.

Sincerely,

for JOSEPH K. CONANT
Executive Director

cc: Mr. James Leonard
PBR Hawaii

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Mr. Joseph K. Conant
Executive Director
State of Hawaii
Department of Business and Economic Development
Housing Finance and Development Corporation
P.O. Box 29360
Honolulu, Hawaii 96820-1760

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Conant:

Thank you for the copy of your letter of September 8, 1988 to Mr. Clyde Murashige, County of Maui Planning Department regarding the subject Draft EIS. The following is provided in response to your letter.

At present the various types of housing units to be constructed within the project has not been definitively determined. At the time the final determination is made, an appropriate number of affordable housing units for various target groups will be proposed in accordance with applicable state and county rules and regulations. Based on the type of project planned, many or all of these affordable housing units would be located offsite but within the region.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGrath, VMS Realty Partners

342PL_22_.WP

APPENDIX B
FISCAL IMPACT ANALYSIS REPORT

KPMG Peat Marwick

Management Consulting

Economic and Fiscal Impact Assessment for the Planned Maui Wailea 670 Resort Community

Wailea, Maui, Hawaii

Prepared for

GCR/VMS MAUI 670

July 1988

KPMG Peat Marwick

Peat Marwick Main & Co.
PO Box 4150
Honolulu HI 96812 4150

Telephone 808 531 7286
Telex 723 8615

Telecopier 808 536 8338

July 8, 1988

Mr. Robert Riley
Senior Vice President
VMS Realty Partners
642 Commercial Street
San Francisco, CA 94111

Mr. Alan P. Greinetz
Senior Vice President
Blackman Flynn & Co.
One Montgomery Street, Suite 2250
San Francisco, CA 94104

Dear Messrs. Riley and Greinetz:

At your request, we have completed our analysis of the economic and fiscal impacts of the proposed Maui Wailea 670 Resort in Wailea on the island of Maui. The accompanying report presents the detailed findings and conclusions regarding our assessment of the impacts of the proposed resort.

BACKGROUND

Blackman Flynn & Co. (as Grand Champions Resort (GCR)) and VMS Realty Partners (VMS) through GCR/VMS Maui 670, propose to develop a resort and residential community at Wailea on the island of Maui. The development would include two resort lodges, a golf lodge, two golf courses, multifamily condominiums, single-family residential lots and patio homes, tennis center and commercial uses. The development would be known as the Maui Wailea 670 Resort. GCR/VMS Maui 670 is preparing applications for necessary governmental development permits.

STUDY OBJECTIVES

The objectives of Peat Marwick Main & Co.'s (Peat Marwick) assistance were to:

- Project the economic impacts of the proposed resort with respect to:
  - Visitor expenditures
  - Employment
  - Resident income
  - Population
  - Housing

Peat Marwick

Mr. Robert Riley
Mr. Alan P. Greinetz
July 8, 1988

- Project the fiscal impacts of the proposed resort with respect to:
  - State and county government revenues
  - State and county government expenditures

REPORT ORGANIZATION

The report is organized into five chapters which are as follows:

I. Introduction and Executive Summary - Presents background and objectives of the impact assessment and summarizes the major findings and conclusions of the report.

II. Regional Economic Setting and Project Description - Describes the region within which the resort would be located and identifies the location, characteristics, scale and phasing of the proposed resort.

III. Economic Impacts - Assesses the economic impacts of the proposed resort in terms of visitor expenditures, employment, resident income and household income, and construction expenditures.

IV. Population and Housing Impacts - Identifies potential impacts of the project on the resident and de facto population of the island of Maui, and describes potential impacts on housing supply and employee housing requirements.

V. Fiscal Impacts - Assesses potential impacts of resort operation on state and county government revenues and expenditures.

* * * * * * *

We have appreciated this opportunity to assist you in planning for this resort community.

Very truly yours,

Peat Marwick Main & Co.

Economic and Fiscal Impact Assessment for the Planned Maui Wailea 670 Resort Community

Wailea, Maui, Hawaii

Prepared for

GCR/VMS MAUI 670

July 1988

Table of Contents

	Page
INTRODUCTION AND EXECUTIVE SUMMARY	
Study Background and Objectives	I- 1
Site Description and Project Concept	I- 1
Project Concept	I- 1
Economic Impacts	I- 2
Visitor Expenditures	I- 2
Construction and Operational Employment	I- 2
Personal Income	I- 3
Population	I- 3
Housing	I- 3
Fiscal Impacts	I- 4
Government Revenues and Expenditures	I- 4
REGIONAL ECONOMIC SETTING AND PROJECT DESCRIPTION	
Primary Economic Activities	II- 1
Agriculture	II- 1
High Technology	II- 1
Tourism	II- 2
Demographic Conditions	II- 3
Population	II- 3
Employment Patterns	II- 3
Projected Economic Growth	II- 4
Social Characteristics	II- 4
Future Trends in Maalaea/Kihei/Wailea Area	II- 5
Project Description	II- 6
Location	II- 6
Resort Character	II- 6
Makai Resort Area	II- 6
Mauka Resort Area	II- 7
Development Schedule and Phasing	II- 7
ECONOMIC IMPACTS	
Visitor Expenditures	III- 1
Visitor Population	III- 1
Visitor Expenditures	III- 2
Employment Impact	III- 2
Direct Construction Employment	III- 3
Indirect and Induced Construction Employment	III- 3
Direct Operational Employment	III- 3
Total Operational Employment	III- 4
Resident Income	III- 4
Direct Construction Employment	III- 4
Direct Resort Operational Employment	III- 4
Household Income	III- 4

GCR/VMS MAUI 670

Table of Contents, Continued

	Page
POPULATION AND HOUSING IMPACTS	
Projected Population Impact	IV- 1
Construction Period Population	IV- 1
On-Resort Population	IV- 2
Off-Resort Population	IV- 2
Total Potential Population Impact	IV- 3
Housing Impacts	IV- 4
Construction Employee Housing Demand	IV- 4
Operational Employee Housing Demand	IV- 5
Housing Affordability For Households Requiring Housing	IV- 6
Projected Affordable Housing Unit Demand	IV- 7
Impacts of Operational Employee Housing Demand	IV- 7
FISCAL IMPACTS	
Government Revenues	V- 1
County Revenues	V- 1
State Revenues	V- 1
Government Expenditures	V- 2
County Expenditures	V- 2
State Expenditures	V- 3
Revenue/Expenditure Comparison	V- 3
County	V- 3
State	V- 3

EXHIBITS		Following page
II-A	Island of Maui	II- 1
II-B	Island of Maui Census Districts	II- 1
II-C	Resident Population Trends for State of Hawaii, Maui County and Maalaea/Kihei/Wailea	II- 3
II-D	Projected Employment for Maui County	II- 4
II-E	Comparison of Ethnic and Education Characteristics Maui County and Kihei CDP	II- 4
II-F	Maui Wailea 670 Conceptual Development Plan	II- 6
II-G	Projected Facility Development Cumulative	II- 7
III-A	Assumptions for On-Resort Population Projections	III- 1
III-B	Projected Average Daily Visitor Population at Maui Wailea 670 Resort	III- 2
III-C	Projected Total Annual Visitor Expenditures	III- 2
III-D	Projected Direct Employment for Facility Construction	III- 3
III-E	Projected Direct, Indirect and Induced Employment for Facility Construction	III- 3
III-F	Projected Direct Operational Employment at Maui Wailea 670 Resort	III- 3
III-G	Projected Direct, Indirect and Induced Operational Employment at Maui Wailea 670 Resort	III- 4

GCR/VMS MAUI 670

Table of Contents, Continued

EXHIBITS		Following page
III-H	Projected Annual Personal and Household Income From Direct Employment	III- 4
IV-A	Projected Population Impact From Resort Construction	IV- 1
IV-B	Projected Average Daily Resort Resident Population at Maui Wailea 670 Resort	IV- 2
IV-C	Projected Source of Direct Operational Employees	IV- 2
IV-D	Projected Off-Resort Population Impact from Resort Operations	IV- 3
IV-E	Summary of On- and Off-Resort Population Impact	IV- 3
IV-F	Comparison of Project-Related Population Impact to Projected Maui Population Change	IV- 4
IV-G	Projected Rental Units Required for Off-Island Construction Workers at Maui Wailea 670 Resort	IV- 5
IV-H	Direct Operational Employees Projected to Demand Additional Housing	IV- 5
IV-I	Projected Household Incomes of Resort Operational Employees	IV- 6
IV-J	Resort Operational Employee Housing Affordability Analysis	IV- 6
IV-K	Projected Affordable Range Housing Units Required for Maui Wailea 670 Resort Operational Employees	IV- 7
V-A	Projected Annual County Real Property Tax Revenues Attributable to Resort Development	V- 1
V-B	Projected Annual State Government Revenues Attributable to Development of Maui Wailea 670 Resort	V- 1
V-C	County of Maui Per Capita Government Operating Expenditures Fiscal Year 1986	V- 2
V-D	Projected County Government Operating Expenditures Attributable to Development of Maui Wailea 670 Resort	V- 2
V-E	State of Hawaii Per Capita Government Operating Expenditures Fiscal Year 1986	V- 3
V-F	Projected Annual State Government Operating Expenditures Attributable to Resort Development	V- 3
V-G	County Government Annual Revenue and Expenditure Comparison	V- 3
V-H	State Government Annual Revenues and Operating Expenditures Comparison	V- 3

I. INTRODUCTION AND EXECUTIVE SUMMARY

This chapter presents the background and objectives of the assistance provided to GCR/VMS Maui 670 in this engagement, and summarizes the study's conclusions. More detailed findings and conclusions are presented in subsequent chapters.

STUDY BACKGROUND AND OBJECTIVES

Blackman Flynn & Co. (as Grand Champions Resort (GCR)) and VMS Realty Partners (VMS) through GCR/VMS Maui 670, own approximately 670 acres of land located mauka of Wailea resort on the island of Maui, Hawaii. GCR/VMS Maui 670 seeks to develop the property into a resort and residential community. In January 1988, GCR/VMS Maui 670 retained Peat Marwick Main & Co. (Peat Marwick) to conduct a market, economic and fiscal assessment of planned development of the resort community.

A separate report by Peat Marwick, entitled "Market Assessment for the Planned Maui Wailea 670 Resort Community", estimates market support for resort uses at the Maui Wailea 670 project. The present study has been performed to assess the economic and fiscal impacts of the Maui Wailea 670 resort development. The findings of the study are based on development of a project with similar components and phasing to the project reviewed in the market assessment report.

SITE DESCRIPTION AND PROJECT CONCEPT

The site for the proposed project is adjacent to the Wailea and Makena resorts, in the Wailea region of Maui. The project site consists of gently up-sloping lands at the base of Haleakala, which afford excellent views of neighboring islands. It would be bisected by the planned future extension of Piilani Highway. The site's location places it close to the center of the growing resort destination area which includes the Wailea and Makena resorts.

Project Concept

The Maui Wailea 670 Resort is designed to complement development of the overall Wailea resort region. Maui Wailea 670 is planned to evolve into a planned resort with a strong residential character and commercial, village and resort lodge elements that combine to form a complete community for visitors and residents.

The planned Piilani Highway extension would divide the resort into a makai area of about 300 acres, and a mauka area of approximately 370 acres. Each of these two areas is designed to possess a distinctive character; the makai area would encompass most of the active and visitor-oriented activities, while the mauka area would be more private and residential in character.

The makai area of the resort would accommodate a mixed use village district with commercial, community, visitor center and other activities. Two resort lodges are planned, to be built at the relatively intimate scale of 250 to 275 visitor units at each lodge. Several multifamily condominium sites would be located in the makai area along with single-family residential lots. Both condominiums and lots would be oriented around an 18 hole, resort golf course. A tennis

center, and a six-acre parcel suitable for a resort shopping center or neighborhood commercial center would also be developed in the resort's makai area.

The mauka area would include the resort's second golf links, an 18-hole private golf club course. The resort's third lodge site would be developed in this area as a golf lodge. Four parcels are reserved near the golf course for multifamily condominium development. Relatively large residential lots would be developed along the club course golf frontage, and an exclusive, gated community of patio homes is also planned on 3,500 to 6,000 square foot lots featuring fairway frontage.

The development schedule for the project, as reflected in the market assessment, would result in the following development in the milestone years of 1995, 2000, 2005 and 2010:

	1995	2000	2005	2010
Lodge units	395 - 455	395 - 455	645 - 750	645 - 750
Condominium units	245 - 305	540 - 630	865 - 1,080	1,190 - 1,370
Single-family homes	23 - 30	123 - 170	260 - 297	363 - 402
Commercial space (sf)	21,000 - 27,000	28,000 - 35,000	46,000 - 55,000	54,000 - 67,000

ECONOMIC IMPACTS

Development of the resort could be expected to impact the economy of the state and county by generating additional visitor expenditures, jobs in construction and operation of the resort, additional personal income and possible population growth.

Visitor Expenditures

Development of lodge, condominium and residential units at the Maui Wailea 670 Resort is projected to draw a substantial visitor population to the site. Average daily visitor population is expected to reach 600 to 710 persons in 1995, increasing to 1,380 to 1,600 persons in 2010. Direct spending by Resort visitors could amount to $30 to $36 million in 1995, increasing to $70 to $80 million in 2010. Because visitor spending is expected to generate additional indirect and induced expenditures, the total spending associated with Resort visitors could total $51 to $60 million in 1995, and could rise to $117 to $135 million in 2010.

Construction and Operational Employment

Resort development would generate employment, both for construction and for actual operation of facilities. Construction employment is expected to be relatively steady throughout the 1991-2010 project buildout period, with the highest levels reached during the 2001-2005 period. Construction employment, as measured in person-years, could reach 180 to 210 per year from 1991 to 1995,

with a high of 220 to 260 annual years of employment during the 2001-2005 period. Total employment associated with project construction, including induced and indirect positions, could amount to 500 to 590 jobs annually from 1991 to 1995, increasing to 620 to 730 jobs per year from 2001 to 2005.

Once Resort facilities are completed and open to visitors, operational employment opportunities will be created. It is projected that operational employment in 1995 could amount to 560 to 670 positions. On-site resort jobs could increase to 1,010 to 1,190 by 2010. Indirect and induced employment generated by Resort operations could produce, with direct jobs included, a total of 1,060 to 1,260 positions in 1995, increasing to 1,880 to 2,210 jobs in 2010.

Personal Income

Wages and salaries paid to direct employees of the project are expected to represent $14 million to $16 million annual income from 1991 to 1995, and could increase to $21 to $24 million by 2010. Wage and salary income figures do not include potential wages paid to holders of indirect and induced employment associated with the project, nor do they reflect income of proprietors whose businesses service the project. Total household income is expected to be considerably greater than direct wages and salaries, and could amount to $19 to $22 million in 1995, and $43 to $50 million in 2010.

Population

Resort development could add to Maui's population in several ways. Construction employees required to relocate to Maui, along with their dependents, would temporarily increase population. The visitors staying at the Resort would also add to Maui's de facto population.

New residents would be added from among full-time residents of Resort condominium and single-family residential units. Also, to the extent that Maui's available labor supply proves insufficient in filling new jobs, in-migrants would be needed for the Resort's labor force. Projected population impacts of the Resort are summarized as follows:

	1995	2000	2005	2010
Resident population	700 - 840	1,200 - 1,470	2,020 - 2,420	2,560 - 2,940
De facto population	1,380 - 1,710	1,940 - 2,370	3,330 - 4,050	4,020 - 4,680

Relative to the total population growth anticipated in official state projections, growth associated with the Maui Wailea 670 Resort would constitute less than 4% of expected resident and de facto population increase between 1985 and 1995, and less than 5% of the growth expected between 1985 and 2010.

Housing

Impacts on the island's housing market could be expected from the needs of both construction and operational employees at the Resort. Rental units required for construction workers are projected to amount to 30 to 80 units at average employment levels in 1995, with highest rental unit need in 2005, when 40 to 100 units could be required. Higher housing demand levels would be reached at peak employment levels. It is expected that rental unit demand associated with construction could be accommodated by the general rental market on Maui.

Additional housing units on the island could be needed to accommodate in-migrating employees at the Resort, as well as for the new households likely to form in response to new job opportunities. Additional homes could be needed for 170 to 200 households in 1995, increasing to 300 to 350 households in 2010.

The majority of these new households are projected to have sufficient incomes to buy single-family homes in the general market, if they choose. However, some would require assistance to buy single-family homes. The number of households requiring purchase assistance could amount to 90 to 120 in 1995, increasing to 150 to 210 in 2010. Many of these households might also prefer to purchase multifamily housing units or to rent their homes.

FISCAL IMPACTS

The fiscal impacts of the Maui Wailea 670 Resort are determined by comparing anticipated government revenues from the project with the government service costs associated with project population.

Government Revenues and Expenditures

Fiscal benefits of Resort development, as measured by additional government revenues, are anticipated to exceed additional government operating expenditures. Projected net additional revenues, and the ratio of projected government revenues to expenditures, are summarized below, calculated in millions of 1988 dollars:

	1995	2000	2005	2010
County of Maui:				
Net additional revenues	$ .7 - .9	.9 - 1.0	1.1	1.1
Revenue/expenditure ratio	1.9 - 2.5	1.8 - 1.9	1.6 - 1.7	1.4 - 1.5
State of Hawaii:				
Net additional revenues	$ 1.9 - 2.2	1.6 - 1.8	3.0 - 3.4	3.0 - 3.5
Revenue/expenditure ratio	3.6	1.9 - 2.0	1.9 - 2.0	1.7 - 1.8

II. REGIONAL ECONOMIC SETTING AND PROJECT DESCRIPTION

This chapter reviews the economic setting in which the Maui Wailea 670 Resort is to be developed, including primary economic activities, population and employment patterns. The Maui Wailea 670 resort project is also described in terms of its location, characteristics and phasing.

The island of Maui, shown in Exhibit II-A, is defined as the project's impact area for the purposes of specifying economic and fiscal impacts. Impacts are expected to mostly affect the Maalaea/Kihei/Wailea area.

The Maalaea/Kihei/Wailea area is shown in Exhibit II-B. This area, which also includes Makena, consists of Census Tracts 307 and 303.02.

PRIMARY ECONOMIC ACTIVITIES

Agriculture, high technology and tourism form Maui's primary economic base.

Agriculture

The island of Maui contains some of the best sugar-growing lands in the state of Hawaii, especially in the central valley bounded by Wailuku and Kihei and on the lower slopes of the West Maui mountain range. The island has also supported pineapple cultivation, livestock operations on the slopes of Haleakala, and diversified farming.

Maui's sugar industry remains active, despite the uncertain general outlook for Hawaiian sugar. While the value of sugar processed in Maui County represented 22% of territory-wide production in 1950, the county's share increased to 29% by 1986. Sugar acreage should decline as some lands are converted to pineapple cultivation on Maui.

Other agricultural activities have performed well. The value of pineapple grown in the county increased 66% from 1976 to 1986, with much of it on the island of Lanai. Diversified crops grew in market value from $7 million in 1976 to $19 million in 1986; this represented a compound annual increase of 3.5% per year after adjusting for inflation. Maui has developed an international reputation for such homegrown crops as onions, protea flowers, and wine grapes.

High Technology

The island of Maui is also one of Hawaii's centers for high technology research and development. Because of clear skies and high elevations, Haleakala is the location for a number of telescopes and observatories. A private research and technology park is being developed at Kihei, and is attracting businesses involved in communications, astronomy, space exploration, national defense and agricultural research.

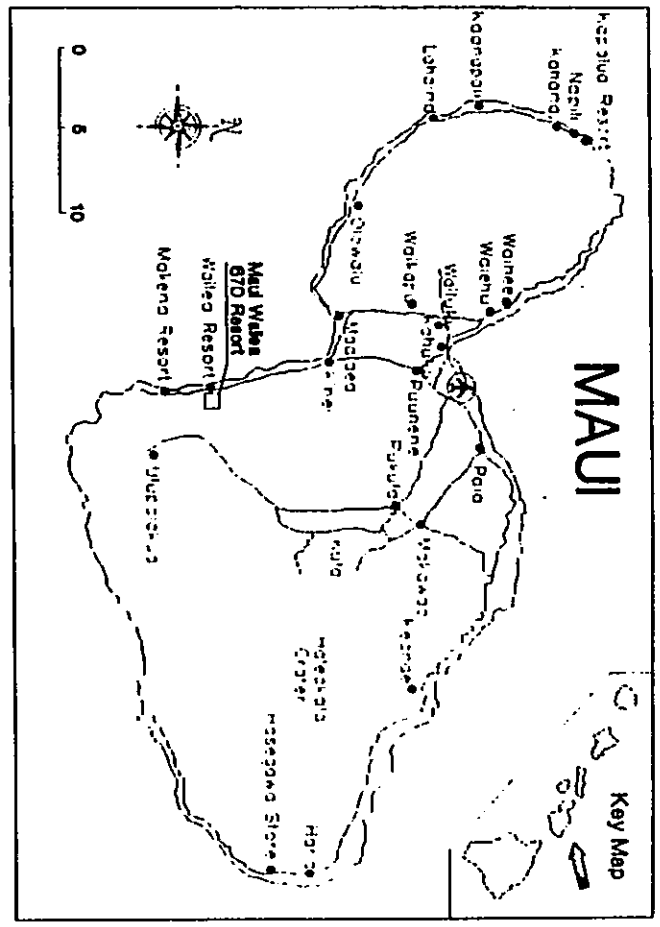
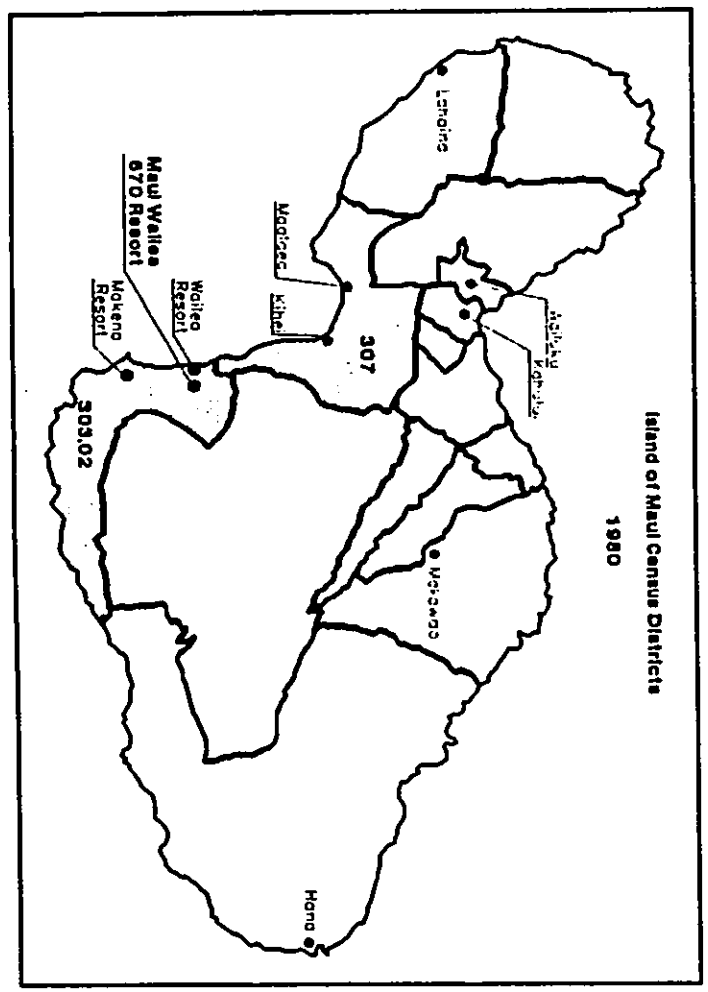


Exhibit II-A



Island of Maui Census Districts
1980

GCR/VMS MAUI 670
Island of Maui Census Districts

Tourism

The majority of the growth in Maui county's economy, however, has occurred with the expansion of tourism. The following table indicates changes in visitor units and visitor expenditures from 1970 to 1986:

Visitor Expenditures and Visitor Unit Inventory
State and Maui County

1970 to 1986

	1970	1980	1986
Visitor expenditures($ millions):			
State	$ 595	2,875	5,500
Maui County	54	400	1,195
Maui County share of State	9%	14%	22%
Visitor unit inventory:			
State	24,309	56,769	66,308
Maui County	2,464	11,359	14,096
Maui County share of State	10%	20%	21%

Sources: Hawaii Visitors Bureau, "Neighbor Island Statistics" (March 1987) and Visitor Unit Inventory, annual.

As the table shows, both visitor units and expenditures increased more rapidly in Maui county than for the state as a whole. Visitor expenditures in the county grew at an annual rate of almost 25% in the 1970 to 1986 period. The number of visitor units grew more quickly than visitor spending in the 1970s, but the opposite has been true in the 1980s. This trend shows a maturing of Maui's visitor industry and greater attraction of higher-spending visitors to Maui.

Visitor accommodations are located in numerous areas of Maui, including Hana, Kula/Paia/Makawao, and Wailuku/Kahului. However, present and planned resort development may be grouped in two main areas:

- West Maui - including the areas of Honokowai, Lahaina, Kaanapali, Napili, Kahana and Kapalua. The Kaanapali resort is the primary resort destination area in West Maui.

- East Maui - including Kihei, Maalaea, Makena and Wailea. The Wailea resort is the main destination location in East Maui.

To date, visitor industry growth on Maui has been centered mainly in the West Maui region, where the Kaanapali resort destination area is located. West Maui visitor units increased from 1,496 in 1970 to 8,776 in 1988.

The Maalaea/Kihei/Wailea area has also experienced significant growth in visitor unit inventory, increasing from 131 units in 1970 to 3,491 units in 1980 and 5,219 units in February 1988. Development in this area is expected to continue and to shift its focus from resort condominiums in Kihei and Maalaea directed toward lower-budget and longer-staying visitors, toward more upscale,

full-service hotel properties within master-planned resort destination areas at Wailea and Makena. More than 4,500 additional visitor units are planned in the Maalaea/Kihei/Wailea area by 1995.

DEMOGRAPHIC CONDITIONS

This section describes the demographic conditions of Maui, including historical and projected population and employment patterns and social characteristics. It concludes with an outlook on the directions of growth in the Maalaea, Kihei and Wailea areas.

Population

Exhibit II-C shows population trends for the state, Maui County, the island of Maui, and the Maalaea/Kihei/Wailea area. Of particular interest for this analysis are these factors:

- The island of Maui, in which population increased throughout the 1970s, continued to grow at a 2% annual rate from 1980 to 1985.
- Maui's growth rate was nearly twice the statewide average from 1970 to 1985.
- More than 90% of the county's population growth has occurred on the island of Maui.
- In July 1986, Maui county's population of 87,500 represented an increase of 2.3% from the previous year.
- The Maalaea/Kihei/Wailea area has grown substantially, from about 1,700 residents in 1970 to more than 10,000 in 1985. While the area represented less than 5% of Maui Island's population in 1970, its share had increased to more than 13% in 1985.

Employment Patterns

Labor force participation increased for Maui county between 1970 and 1980, and in the latter year 68.5% of all persons aged 16 years or more were in the civilian labor force. Within the study area:

- Population growth in the Kihei census tract (307) was accompanied by a substantial increase in labor force participation, from 51.5% to 72.3% in 1980.
- The proportion of Wailea-Makena census tract (303.02) residents who were employed in 1980 was lower than for Kihei; at 66.2%, this percentage was slightly less than for the county as a whole.

While comparable labor force participation data is not available for periods after 1980, State Department of Labor and Industrial Relations (DLIR) data can be used to identify changes in the size of the work force:

- From 1980 to 1987, the county's total work force grew from 37,550 to 51,750.

GCR/VMS MAUI 670

Resident Population Trends for
State of Hawaii, Maui County and Maalaea/Kihei/Wailea

1970 to 1986

	State	Maui County	Maui Island	Maalaea/Kihei Wailea area
Resident population(1):				
1970	769,900	46,200	38,691	1,736
1980	964,700	71,000	62,823	7,247
1985	1,051,500	85,500	76,630	10,400
1986	1,062,300	87,500	N/A(2)	N/A
Compound annual rate of growth:				
1970 - 1980	2.3%	4.4%	5.0%	15.4%
1980 - 1985	1.7	3.8	4.1	7.5
1970 - 1985	2.1	4.2	4.7	12.7
1980 - 1986	1.6	3.5	N/A	N/A
1970 - 1986	2.0	4.1	N/A	N/A

(1) Provisional estimate for 1986.
(2) Not available.

Source: State Department of Business and Economic Development, "The Population of Hawaii, 1980-1986", (Statistical Report #201, September 21, 1987); U. S. Census data for 1970 and 1980.

- Employment increased by 4.7% per year, a rate significantly greater than the resident population increase of 1.9% per year from 1980 to 1985.

- Therefore, the labor force participation rate increased as well. According to the DLIR, the island's overall labor force participation reached 88.6% in 1987.

- Unemployment for the county as a whole declined from 5.1% in 1980 to 4.4% in 1987. Unemployment was even lower for the island of Maui, at 3.8% the same as the statewide average.

Projected Economic Growth

Exhibit II-D shows the number of jobs in Maui's major industries, for 1985 and as projected for 1995 and 2010. The exhibit indicates that:

- Agriculture, while a significant user of land, represents a much smaller source of employment. About one in every eight jobs (12%) is in agriculture or manufacturing, with the latter category largely consisting of food processing.

- The hotel, other services and trade industries, which encompass about three-fourths of all visitor industry positions in the state, include more than half (53.8%) of Maui county's work force.

- About 65% of all new jobs expected to be created by 1995 would be in one of the three fields dominated by the visitor industry. In 1995, hotel, other service and trade jobs are projected to employ 57% of the Maui county work force.

Social Characteristics

Kihei residents differ from the general population of Maui County in various socioeconomic respects. 1980 U. S. Census data was analyzed to identify these differences. Since the information is available on several Census counts, some data represents the population of the two census tracts making up the region, while other data is available for the Kihei "census designated place", or CDP, which covers an area slightly smaller than the two census tracts.

Exhibit II-E illustrates ethnic distribution and educational attainment measures for the Kihei CDP and for the county as a whole.

The following table compares census tracts 307 and 303.02, which comprise the Maalaea/Wailea/Kihei region with Maui County as a whole, in terms of age structure and median household income:

Exhibit II-D

GCR/VMS MAUI 670

Projected Employment for Maui County

1985 to 2010

Industry	1985 Number	1985 Percent	1995 Number	1995 Percent	2010 Number	2010 Percent	Projected growth 1985 to 2010 Number	Growth percentage(1)
Services:								
Hotel	6,900	16.0%	9,100	15.3%	11,500	14.6%	4,600	2.1%
Other	6,000	13.9	9,400	15.8	14,000	17.8	8,000	3.4
Trade	10,300	23.8	15,400	25.9	22,000	28.0	11,700	3.1
Subtotal	23,200	53.7	33,900	57.0	47,500	60.4	24,300	2.9
Agriculture	3,000	6.9	3,000	5.0	3,100	3.9	100	0.1
Construction	1,300	3.0	2,100	3.5	2,800	3.6	1,500	3.1
Finance, insurance, real estate	2,800	6.5	4,500	7.6	5,600	7.1	2,800	2.8
Government	4,900	11.3	6,200	10.4	7,700	9.8	2,800	1.8
Manufacturing	2,100	4.9	2,000	3.4	2,100	2.7	-	0.0
Self-employed	3,600	8.3	4,400	7.4	5,200	6.6	1,600	1.5
Transportation, communication, utilities	2,300	5.3	3,400	5.7	4,600	5.9	2,300	2.8
Total	20,000	46.2	25,600	4.3	31,100	39.6	11,100	12.1
	43,200	100.0%	59,500	100.0%	78,600	100.0%	35,400	2.4%

(1) Compound annual growth rate.

Source: State of Hawaii, Department of Business and Economic Development, "Revised Long-Range Economic and Population Projections to 2010, State of Hawaii (Series M-K)", Table II.

GCR/VMS MAUI 670

Comparison of Ethnic and Education Characteristics
Maui County and Kihei CDP

1980

	Kihei CDP(1)	Maui County
Ethnicity:		
Caucasian	56.9%	33.6%
Filipino	14.5	18.9
Japanese	5.9	22.1
Hawaiian/part Hawaiian	14.9	17.4
Chinese	0.6	1.8
Other	7.2	6.2
Education:		
Percentage 25 years and high school graduate	83.4	67.7
Percentage 25 years and 4 years college	18.2	15.3

(1) Census designated place.

Source: U. S. Bureau of the Census, "Census of Population: General and Social Characteristics, Hawaii 1980", Tables 56 and 58.

Comparison of Age and Household Income Characteristics
Kihei Census Tracts and Maui County

1980

	Census tracts(1) 303.02	307	Maui County
Median age	33.4	29.1	29.6
% under 10 years	N/A	15.0%	17.5%
% 65 years and older	N/A	7.5	6.8
Median household income	22,750	20,260	22,579

(1) Location shown in Exhibit II-B.

Source: U. S. Bureau of the Census, Census of Population, General Population Characteristics, H-PC-80-1-C13.

This table and Exhibit II-E indicate that the Kihei area's population is considerably different from that of Maui County as a whole, since:

- The region's ethnic breakdown is predominately Caucasian.
- Regional residents tend to be better-educated than Maui residents taken as a group.
- Median household incomes do not differ greatly between the region and the county for 1980.
- Maalaea/Kihei/Wailea resident population contains relatively fewer children, and greater numbers of older people, than the county as an entity.

Future Trends in Maalaea/Kihei/Wailea Area

Continued growth is expected in the Maalaea/Kihei/Wailea area in the 1988 to 1995 period. The extent of future growth is more fully documented in the "Market Assessment for the Planned Maui Wailea 670 Resort Community" prepared by Peat Marwick Main & Co. A brief summary of these trends include:

- A substantial increase in the visitor unit inventory both in Kihei and in the Wailea region. Exhibit II-J of the market assessment identifies 1,900 additional planned visitor units by 1990, with 1,746 more units planned by 1995.
- Development of up to 455 lodge units and 305 resort condominium units at the Resort by 1995 would represent a further increase of about 20% in planned visitor units in the region.

- Resident housing development has increased at Kihei, with a number of single-family subdivisions being built on both sides of Piilani Highway. Almost 500 single-family homes and more than 600 multifamily residential units are under construction or planned to be completed in 1988.

- Accompanying these increases in regional resident and visitor population, a significant increase in commercial space is being planned. Twelve shopping center projects are under construction or being planned, as identified in Exhibit VII-D of the market assessment. Nine of these commercial projects have planned completion dates; if built, they could add as much as 417,000 square feet of space and provide employment for up to 2,000 people.

PROJECT DESCRIPTION

The Maui Wailea 670 Resort would be located in the Wailea region of the island of Maui. This section describes the planned project.

Location

The resort is planned on a 670 acre parcel adjacent to the Wailea and Makena resorts. The project site includes gently sloping lands at the foot of Haleakala, and is bisected by the planned future extension of Piilani Highway.

Resort Character

The Maui Wailea 670 Resort is conceived as a complementary development to the existing Wailea resort region. The planned highway extension would divide the resort into makai and mauka areas, and each is planned to have a distinct character:

- The makai portion would include the village center of the Resort, as well as most of the active, visitor-oriented aspects of the community.

- The mauka part is designed to be more private and residentially-oriented, with single-family and multifamily home sites located around the mauka golf course and golf lodge.

The conceptual land use pattern for the Resort is shown in Exhibit II-F.

Makai Resort Area

The makai portion consists of about 300 acres, and would include:

- A village/mixed use district with:
  - A resort lodge of from 250 to 275 units.
  - Visitor center.
  - Church.
  - Park.

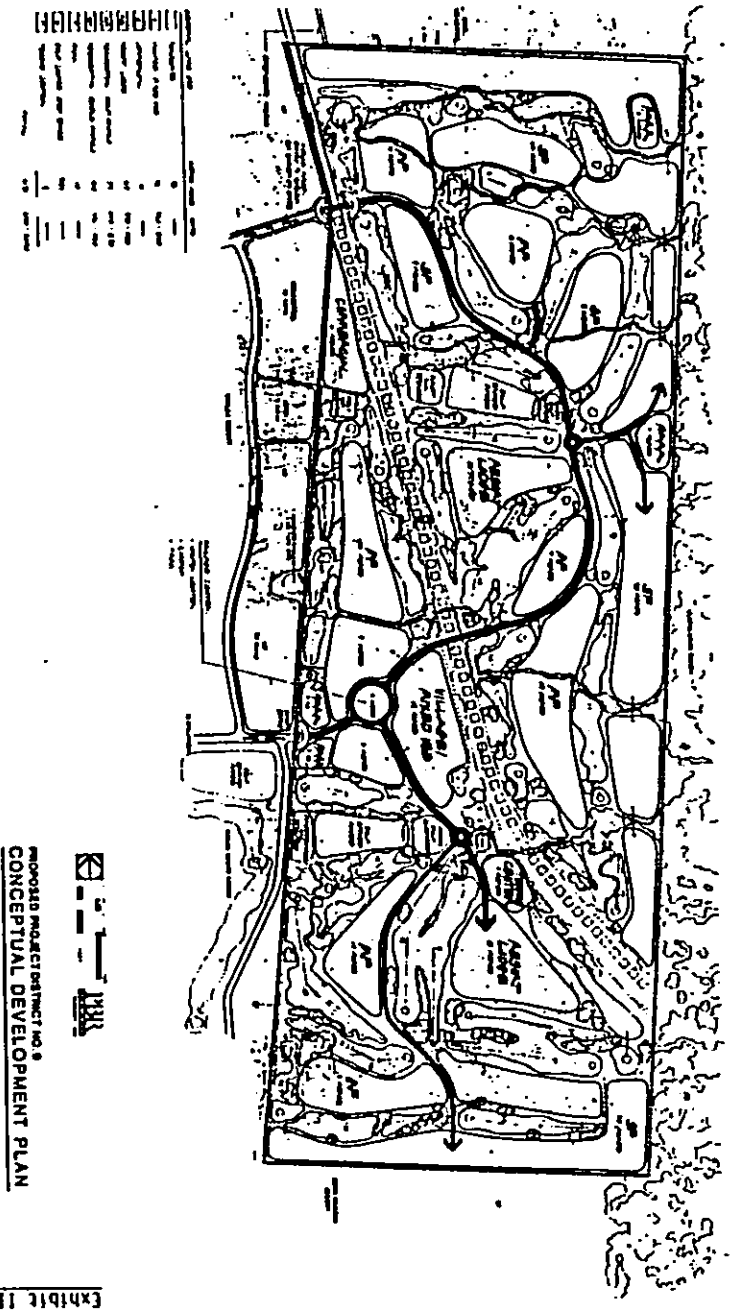


Exhibit II-F

Maui Wailea 670 Conceptual Development Plan

GCR/VMS MAUI 670

- Limited commercial uses, such as restaurants, a leisure and recreation center and shopping.

- Several multifamily condominium sites.
- 18-hole resort golf course and clubhouse.
- Tennis center.
- A six acre commercial site, suitable for a neighborhood or resort shopping center development that could be coordinated with business-oriented land uses proposed on adjacent lands in Wailea Resort.
- Two park sites.
- Single-family residential lots, primarily fronting the resort golf course.

Mauka Resort Area

The mauka resort area would incorporate about 370 acres located across the planned Piilani Highway extension. The mauka resort would emphasize residential uses in an open setting distinguished by the planned club golf course. Planned uses in the mauka resort area include:

- A golf lodge, planned as a 145 to 180 unit facility.
- The club golf course and clubhouse.
- Two park sites.
- Four multifamily condominium parcels with club golf course frontage.
- Several large parcels planned for large-lot residential development, with golf course frontage and located mostly along the Resort's boundaries with the Maui Meadows subdivision and Ulupalakua Ranch lands.
- An exclusive, gated residential community of patio homes to be developed on 3,500 to 6,000 square foot lots.

Development Schedule and Phasing

The Maui Wailea 670 Resort project would be completed by about 2010, although individual residential lots would be built upon after that year. The project development schedule, based in part on the findings of the market assessment, is shown in Exhibit II-G. The development schedule shown is incorporated in the specification of economic and fiscal impact scale and timing, as discussed in Chapters III, IV and V.

GCR/VMS MAUI 670

Projected Facility Development
Cumulative
1995 to 2010

Project element	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Lodges:								
Resort lodge units	250	275	250	275	500	570	500	570
Golf lodge units	145	180	145	180	145	180	145	180
Total lodge units	395	455	395	455	645	750	645	750
Residential units:								
Condominium units	245	305	540	630	865	1,080	1,190	1,370
Patio homes	-	-	50	75	110	110	110	110
Residential lots sold	75	100	175	225	300	340	340	340
Lots with completed homes(1)	23	30	73	95	150	187	253	292
Total single-family homes	23	30	123	170	260	297	363	402
Golf and commercial:								
Golf courses	1	2	2	2	2	2	2	2
Commercial space(2)	21,000	27,000	28,000	35,000	46,000	55,000	54,000	67,000

(1) Based on buildout of sold lots on the following schedule: homes constructed on 50% of lots within five years of sale; 95% of lots within ten years of sale; 100% of lots within 15 years of sale.

(2) Gross leaseable square feet.

Exhibit II-G

III. ECONOMIC IMPACTS

This chapter describes the projected economic impacts of the Maui Wailea 670 resort development, in terms of visitor expenditures, employment and resident income.

VISITOR EXPENDITURES

Resort development would generate direct, indirect and induced visitor expenditures in Hawaii. The different forms of spending are related thus:

- Visitors to the resort would make direct expenditures, both at the resort and elsewhere in the community for food, lodging, transportation and other commodities and services.
- The establishments serving visitors would generate indirect spending for advertising, warehousing and other business services, and purchases of materials and goods to be sold to visitors.
- Employees and proprietors with income from direct visitor spending would apply the income to personal needs, thus generating induced expenditures.

The same distinction of direct, indirect and induced economic activity is made in description of project impacts on employment.

Visitor spending is projected from the expected population of visitors at the Resort.

Visitor Population

Visitor population is estimated based on assumptions regarding development of Maui Wailea 670 resort facilities, average occupancy, party size and visitor use. These assumptions are derived from review of comparable resort properties in Hawaii.

The planned schedule of Resort development, on which the projections of this report are based, is shown in Exhibit II-G. Exhibit III-A indicates the occupancy assumptions used to estimate visitor and resident population. These include:

- Resort and golf lodge occupancy rates vary over time, due to changes in visitor arrivals and supply and demand of accommodations on the island.
- Party sizes of residents and visitors are expected to stabilize at 1.9 persons per lodge unit, 2.5 persons per condominium unit and 2.8 persons per single-family residence.
- Visitor use is expected to account for 50% of the condominium units and 10% of single-family homes. Part-time resort residents are expected to occupy 30% of condominium units and 25% of single-family homes, while the percentage of full-time residents could be 20% for condominium units and 65% for single-family homes. These estimates are drawn from the market experience of comparable Hawaii resorts.

Exhibit III-A

GCR/VMS MAUI 670

Assumptions for On-Resort
Population Projections

1995 to 2010

	1995	2000	2005	2010
Lodge units:				
Occupancy rate	70%	67%	75%	80%
Persons per unit	1.9	1.9	1.9	1.9
Condominium units:				
Percentage in visitor rentals	50%	50%	50%	50%
Visitor occupancy rate	25	25	25	25
Percentage in part-time resident use	30	30	30	30
Part-time resident occupancy rate	50	50	50	50
Percentage in full-time resident use	20	20	20	20
Full-time residency occupancy rate	95	95	95	95
Persons per occupied unit	2.5	2.5	2.5	2.5
Single-family units:				
Percentage in visitor rentals	10%	10%	10%	10%
Visitor occupancy rate	25	25	25	25
Percentage in part-time resident use	25	25	25	25
Part-time resident occupancy rate	50	50	50	50
Percentage in full-time resident use	65	65	65	65
Full-time resident occupancy rate	95	95	95	95
Persons per occupied unit	2.8	2.8	2.8	2.8

Sources: Peat Marwick Main & Co., based on interviews with resort operators and brokers and Hawaii Visitors Bureau, Profile: The Resort Condominium Market and Profile: The Resort Hotel Market, 1985.

- At any given time, 95% of units in full-time resident use are expected to be occupied. Part-time resident units are expected to be occupied 50% of the time, while condominium and single-family units in visitor rentals are expected to be used 25% of the time.

Exhibit III-B shows projected average daily visitor population at five-year milestones from 1995 to 2010. Resort development would lead to certain shifts in the character of visitors during this period:

- Visitor population in 1995 could range from 600 to 710, depending upon whether visitor units built are in the "low" or "high" planning range.
- Due to lower lodge occupancy rates from 1995 to 2000, visitor population by the latter year is projected to increase only to about 680 to 790 average daily population.
- By 2005, from 1,210 to 1,430 visitors could be staying at the resort, on average, and this number could increase to the 1,380 to 1,600 range by 2010.

The continued building of single-family homes after 2010 would result in a small increase in visitor population after completion of other resort facilities.

Visitor Expenditures

Exhibit III-C projects visitor expenditures in current dollars, based on the expected visitor population. Calculations are based on average daily spending of Neighbor Island visitors in 1987, as estimated by the Hawaii Visitors Bureau.

A weighted average was created to adjust for the great disparity in spending between westbound and Japanese visitors. The weighted average assumes that non-Japanese eastbound visitors (2% of current total visitors to Maui) and westbound visitors (93% of current total visitors) spend at the 1987 observed level of $126, while Japanese visitors spend $367 per day. Thus, the weighted average used in Exhibit III-C is $138 per day visitor spending, in 1988 dollars.

The exhibit indicates that:

- Total direct visitor spending could range from $30 to $36 million in 1995 and could increase to the $69 to $80 million range by 2010.
- With indirect and induced spending related to direct visitor expenditures, total spending related to the Maui Wailea 670 resort could range from $50 to $60 million in 1995, and increase to between $117 and $135 million by 2010.

EMPLOYMENT IMPACT

Development of the Maui Wailea 670 Resort will create job opportunities for construction and operational employment.

Employment effects, like the income effects of visitor spending, affect the economy with the ripple of an economic multiplier. Thus, employment effects can also be defined as direct, indirect or induced.

GCR/VMS MAUI 670

Projected Average Daily Visitor
Population at Maui Wailea 670 Resort

1995 to 2010

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Resort lodge	330	370	320	350	710	810	760	870
Golf lodge	190	240	180	230	210	260	220	270
Condominium units	80	100	170	200	270	340	370	430
Single-family homes	-	-	10	10	20	20	30	30
Total	600	710	680	790	1,210	1,430	1,380	1,600

Source: Exhibit II-G and III-A.

Exhibit III-C

GCR/VMS MAUI 670

Projected Total Annual
Visitor Expenditures

1995 to 2010

(in millions of 1988 dollars)

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Direct(1)	$ 30.2	35.8	34.3	39.8	60.9	72.0	69.0	80.1
Indirect and induced	20.6	24.3	23.3	27.1	41.4	49.0	47.3	54.8
Total (rounded)(2)	$ 50.8	60.1	57.5	66.9	102.4	121.0	116.8	134.4

(1) 1987 Hawaii Visitors Bureau expenditures data, weighted to reflect spending for both westbound and eastbound visitors, for $138 daily averge.

(2) Projected at $1.68 per $1.00 in direct expenditures. Based on 1986 estimates from the DBED Input-Output Model, as reported in the DBED Data Book, 1987.

Direct Construction Employment

Direct construction employment includes laborers, craftsmen, operatives and supervisors engaged in building the resort, as well as technical, administrative and other personnel working on the project off-site. Exhibit III-D projects total direct construction employment supported by development of the resort.

Employment figures are reported in "person-years", in which the unit of measure is a job supporting one employee full-time for a single year. Exhibit III-D reports the average annual construction employment over five-year periods.

Construction employment is expected to remain at a relatively steady level over the 20-year development period. Higher numbers of workers could be present at the project site during parts of individual years when various tasks overlap. Also, higher job counts can be expected during the following periods:

- From 1991 to 1995, when infrastructure to serve the project is projected to be installed and two of the three planned lodges could be built. Average annual employment during this period is estimated to range from 180 to 210 employees.

- From 2001 to 2005, when the third lodge, several resort condominium projects and many single-family homes could be built. During this five-year period, average annual construction employment is anticipated to reach from 220 to 260.

Indirect and Induced Construction Employment

Construction of the Maui Wailea 670 Resort would support a sizeable number of indirect construction-related employees, such as suppliers, and induced workers relying on the income of direct and indirect employees.

Exhibit III-E projects the total construction employment impact of the development. More indirect and induced employment will result from the project than direct employment.

The amount of indirect and induced employment that will occur on Maui depends upon the availability of business and professional services to support direct construction operations. Exhibit III-E uses a multiplier of 0.2 to project indirect and induced jobs that would be created on Maui. With this multiplier, it is estimated that average annual indirect and induced construction-related employment on Maui could range between about 30 and 50 jobs. The more developed the local economy becomes when the project is built, the higher would be the proportion of indirect and induced jobs captured on the island of Maui.

Direct Operational Employment

Exhibit III-F shows the direct employment expected at the Maui Wailea 670 Resort once visitor operations commence. The largest single source of employment would be the resort and golf lodges. Estimates for each of the resort facilities were made from comparable Hawaii resorts.

Based on the planned buildout of resort facilities, from 560 to 670 direct operational jobs could be created by 1995. Operational employment could reach from 1,010 to 1,190 by 2010 and would continue to grow by a small amount as additional resort residential units are completed after 2010.

GCR/VMS MAUI 670

Projected Direct, Indirect and Induced Employment for Facility Construction

(Average Annual Person-years)

1995 to 2010

Type of employment	1991 - 1995 Low	1991 - 1995 High	1996 - 2000 Low	1996 - 2000 High	2001 - 2005 Low	2001 - 2005 High	2006 - 2010 Low	2006 - 2010 High
Direct(1)	180	210	140	150	220	260	180	190
Indirect and induced:								
On-island(2)	36	42	28	30	44	52	36	38
Elsewhere in state	288	336	224	240	352	416	288	304
Subtotal(3)	324	378	252	270	396	468	324	342
Total (rounded)	500	590	390	420	620	730	500	530

(1) From Exhibit III-D.

(2) Estimated as 20% of direct employment. Based on Anderson et al., Kauai Socioeconomic Profile, 1975.

(3) Direct employment multiplied by 1.8 State of Hawaii, Department of Business and Economic Development, personal communication, 1987.

Exhibit III-E

GCR/VMS MAUI 670

Projected Direct Employment for Facility Construction

(Average Annual Person-years)

1995 to 2010

Facility type(1)	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Resort and residential units:								
Lodge units(1)	79	91	-	-	50	59	-	-
Condominium units(2)	51	64	62	68	68	74	68	61
Patio homes(3)	-	-	20	30	24	34	-	-
Single-family homes(3)	9	12	29	38	60	75	101	117
Subtotal	140	167	111	136	202	242	169	178
Commercial and recreation:								
Retail/commercial(4)	3	3	1	1	2	2	1	1
Village center(4)	-	-	-	-	-	-	-	-
Golf courses(5)	11	22	11	-	-	-	-	-
Tennis center(5)	-	-	1	1	-	-	-	-
Subtotal	14	25	13	3	3	3	1	2
Infrastructure and public facilities(6)	22	22	16	16	10	10	10	10
Total (rounded)	180	210	140	150	220	260	180	190

(1) Employment calculated at 0.5 person-years per unit and two year construction period.

(2) At 0.7 person-years per unit and 1.5 year construction period.

(3) At 2.0 person-years per residence and one year construction period.

(4) At 0.6 person-years per 1,000 gross leasable square feet; retail commercial would have one year period; village center would have two year construction period.

(5) Based on construction cost estimates provided by PBR-Hawaii; at $230,000 construction cost per person-year.

(6) Based on construction cost estimates provided by PBR-Hawaii; at $190,000 construction cost per person-year.

Exhibit III-D

Total Operational Employment

Direct resort operations would also generate jobs outside of the Maui Wailea 670 Resort. Research by the State Department of Business and Economic Development (DBED) indicates that each direct resort hotel position would support 0.93 indirect and induced jobs; each resort retail, restaurant and recreation service job would support 0.53 indirect and induced jobs.

Exhibit III-G shows projected direct, indirect and induced employment for Maui Wailea 670 Resort. For the state as a whole, the full employment impact of the resort could amount to between 1,060 and 1,260 positions by 1995, increasing to between 1,880 and 2,210 jobs by 2010.

RESIDENT INCOME

Resort operations would generate resident income in the form of employee wages, salaries and benefits, and in income to business proprietors. The income effects of resort employment are summarized in Exhibit III-H. Personal income estimates are based on average wages by industry in Maui County for 1986; income was then updated to 1988 dollars by indexing 1986 earnings to subsequent change in state per capita income.

Direct Construction Employment

Personal income from resort construction is projected to be between $5.5 and $6.5 million in 1995. Income could increase to about $6.8 to $8 million in 2005, before declining to the $5.5 to $5.8 million annual level in 2010.

Direct Resort Operational Employment

Income from resort operations is shown in Exhibit III-H for commercial, hotel and resort and golf and tennis employment. Total income from these activities could amount to $8.4 to $10 million in 1995 and this figure could increase to $15 to $17.5 million in 2010.

Household Income

The dispersion of indirect and induced employment effects among many industries make it difficult to project the total income effects of the resort's development. However, estimation of total household income effects based on visitor expenditure levels permits a perspective on the statewide income benefits that could result from the resort's development.

Total household income generated by visitor expenditures would include fringe benefits and proprietors' income from establishments selling goods and services to visitors, as well as the wages and salaries estimated previously. Household income also includes income generated through the multiplier effects of indirect and induced visitor expenditures.

The DBED reports the estimate that each dollar spent by visitors in 1986 generated 62 cents in total income to households in Hawaii.

Exhibit III-F

CBA/SMS MAUI 670

Projected Direct Operational Employment
at Maui Wailea 670 Resort
1995 to 2010

Facility type(1)	1995 LOW	1995 HIGH	2000 LOW	2000 HIGH	2005 LOW	2005 HIGH	2010 LOW	2010 HIGH
Lodges:								
Resort lodge(2)	250	280	250	280	500	560	500	560
Golf lodge(2)	150	180	150	180	150	180	150	180
Subtotal	400	460	400	460	650	740	650	740
Other units:								
Multifamily condominium units(3)	20	20	40	50	70	90	70	90
Single-family residential units(4)	-	-	-	-	-	-	-	-
Subtotal	20	20	40	50	70	90	70	90
Commercial and recreational uses:								
Commercial(5)	70	90	90	120	150	180	180	220
Club golf course(6)	30	40	35	45	35	45	35	45
Resort golf course(7)	30	40	35	45	35	45	35	45
Tennis center	5	10	5	10	5	10	5	10
Subtotal	135	180	165	220	225	280	255	320
Property management and sales	5	10	5	10	5	10	5	10
Total (rounded)	590	670	610	740	950	1,110	1,010	1,160

(1) From development schedule shown in Exhibit II-G.
(2) At 1.0 direct jobs per lodge unit.
(3) Based on 0.15 direct on-site jobs per visitor unit and 0.003 direct on-site jobs per resident unit, with 50% of units as visitor units, 50% as resident units.
(4) Based on 0.15 direct on-site jobs per visitor unit and 0.003 direct on-site jobs per resident unit, with 10% of units as visitor units, 90% as resident units.
(5) One employee per 300 square feet gross leasable commercial area.
(6) Club course operational employment based upon comparable local and national clubs.
(7) Resort course operational employment based upon resort courses similar to the Wailea 670 course.

GCR/VMS MAUI 670

Projected Annual Personal and Household
Income From Direct Employment

(in millions of 1988 dollars)

1995 to 2010

Type of employment	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Construction(1)	$ 5.5	6.5	4.3	4.6	6.8	8.0	5.5	5.8
Hotel and resort(2)	6.6	7.7	7.0	8.1	11.3	13.3	11.8	13.6
Commercial(3)	0.8	1.0	1.0	1.4	1.7	2.1	2.1	2.5
Golf and tennis(4)	1.0	1.3	1.1	1.5	1.1	1.5	1.1	1.5
Total personal income (rounded)	$ 14.0	16.5	13.4	15.6	21.0	24.9	20.5	23.5
Total household income(5) (rounded)	$ 18.7	22.2	21.2	24.7	37.8	44.7	43.1	50.0

(1) Annual average of employment over five-year period ending with year shown. Average annual wage of $28,518, reflecting 30% of workers from off-island and 1986 average income of $27,965 for Maui construction workers and $29,810 for construction workers throughout the state (State of Hawaii, Department of Labor and Industrial Relations, 1987). Updated 1988 dollars.

(2) Excluding tips. Based on 1986 Maui County average wage for hotel and resort workers of $14,500. Updated to 1988 dollars.

(3) Based on 1986 Maui County average wage for retail workers of $10,697. Updated to 1988 dollars.

(4) Based on 1986 Maui County average wage for amusement/recreation service workers of $13,760. Updated to 1988 dollars.

(5) Based on State of Hawaii, Department of Planning and Economic Development estimate of $0.62 total household income for each $1.00 spent by visitors to the state in 1986.

Source: State of Hawaii, Department of Labor and Industrial Relations, Employment and Payrolls in Hawaii: 1986, 1987.

Exhibit III-H

GCR/VMS MAUI 670

Projected Direct, Indirect and Induced
Operational Employment at Maui Wailea 670 Resort

1995 to 2010

Type of employment	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Direct(1)	560	670	610	740	950	1,130	1,010	1,190
Indirect and induced:								
Lodges and other units	460	540	480	580	740	880	770	900
Commercial and recreational(3)	40	50	50	60	80	100	100	120
Subtotal	500	590	530	640	820	980	870	1,020
Total (rounded)	1,060	1,260	1,140	1,380	1,770	2,110	1,880	2,210

(1) As shown in Exhibit III-G.

(2) Estimated as 0.93 indirect and induced employees per direct employee in hotel, service and administrative positions.

(3) Estimated as 0.53 indirect and induced employees per direct employee in retail trade jobs.

Source: Hawaii State Department of Business and Economic Development, unpublished estimates based on DBED Input-Output Model; reprinted in DBED Data Book, 1987.

Exhibit III-G

Annual direct expenditures of resort visitors are estimated in Exhibit III-C. As noted previously, visitor spending is projected to be in the $30 to $36 million annual range in 1995, increasing to the $69 to $80 million range in 2010. Based on these visitor spending estimates, total household income from the resort is expected to be from $19 to $22 million in 1995, increasing to the $43 to $50 million annual range in 2010.

IV. POPULATION AND HOUSING IMPACTS

Development of the Maui Wailea 670 Resort is expected to contribute to an increase in Maui's population. Population increase will, in turn, contribute to the demand for additional housing on the island. This chapter describes anticipated population and housing impacts of the project.

PROJECTED POPULATION IMPACT

The Maui Wailea 670 Resort will contribute to an increase in resident and de facto population both at the project site and on Maui in general. Development of lodges, condominium units and single-family homes would result in a future population of visitors and residents at the Resort.

If the number of new jobs created at the Resort is too large to be filled from available labor supply on the island, new residents could migrate to Maui. In addition, temporary growth in population could result from in-migration of workers during project construction.

Construction Period Population

The amount of labor required to build the Maui Wailea 670 resort project is detailed in Exhibit III-D. As noted in discussion of the exhibit, average annual construction employment is expected to range from 140 to 260 over the 20-year project development period.

Population impact during project construction will depend upon two factors:

- The timing of the project relative to other large projects on Maui, which will determine how many construction workers must temporarily relocate to Maui from other islands.
- The number of construction workers who bring their families to Maui with them.

Based on past experience, between 20% and 50% of the direct construction work force could come from off-island. For projection purposes, it is estimated that 30% of construction employees will consist of workers relocating from outside of Maui. It is also assumed that the number of dependents relocating to Maui will be about half as large as the number of workers.

Population impact from construction is shown in Exhibit IV-A. Construction-period population impact is expected to be relatively low, representing:

- During the 1991-1995 period, 80 to 160 construction workers and dependents could be temporarily located on Maui.
- The larger number of relocating construction workers and dependents would be present on Maui from 2001 to 2005, when 100 to 200 additional persons could be living on Maui temporarily.

GCR/VMS MAUI 670

Projected Population Impact From Resort Construction

1991 to 2010
(average annual person-years)

	1991 - 1995		1996 - 2000		2001 - 2005		2006 - 2010	
	Low	High	Low	High	Low	High	Low	High
Average annual employment(1)	180	210	140	150	220	260	180	190
Off-island workers(2)	54	105	42	75	66	130	54	95
Off-island workers' dependents(3)	27	53	21	38	33	65	27	48
Total (rounded)	80	160	60	110	100	200	80	140

(1) From Exhibit III-E.

(2) Low estimate based on 30% of employment originating from off-island, and high estimate based on 50% of employment from off-island.

(3) Estimated at .5 dependents per off-island worker.

On-Resort Population

Population at the Maui Wailea 670 Resort site will consist of visitors and full-time and part-time residents living in condominium and single-family units.

On-Resort visitors will include those staying in lodges, condominium units and single-family homes rented for visitor use. Average daily visitor population is shown in Exhibit III-B. Depending upon the pace of resort facility development, daily visitor population could grow from 600 to 710 visitors in 1995, and increase to 1,380 to 1,600 visitors in 2010.

Resort resident population, is shown in Exhibit IV-B, is expected to be relatively low during the early years of project development, as in 1995 when 260 to 320 residents could be present. By 2010, the average daily resident population could increase to 1,760 to 2,000 persons.

Off-Resort Population

The Maui Wailea 670 Resort's primary impact on resident population could come from the in-migration of new residents to fill jobs created there.

Exhibit IV-C estimates the number of resort employees drawn from different sources of available labor, with in-migrants treated as a residual. By this method, all jobs that could not be filled from the available labor force would be filled by in-migrants. The assumptions used in the labor supply analysis are that:

- Projected available labor in the county is expected to supply about 35 percent of projected jobs created in Maui, under DBED's revised economic projections. Sources of available labor would include:
  - Approximately one-third of high school graduates, based on surveys showing that proportion of graduates entering the local workforce after completion of their studies.
  - About one-third of Maui Community College graduates, also based on past studies of graduating student employment patterns.
  - Absorption of potential workers from Molokai. That island's labor force participation remains at about 60% compared with almost 90% on the island of Maui. Molokai workers have shown a willingness to commute by ferry to Maui and a further rise in labor force participation could be expected in that area.
- New job opportunities at Maui Wailea 670 would also attract applicants currently employed in the Maalaea/Kihei/Wailea region, seeking either a change in position or additional part- or full-time employment. Based on experience at other Hawaii resorts, this regional turnover is estimated at 20% of in-county labor supply, or 13% of total labor.
- Turnover is also expected to involve workers currently employed outside of the region, for the same motivations that empower regional turnover. It is anticipated that this other turnover would account for 10% of the in-county labor supply, or 7% of total labor.

Exhibit IV-B

GCR/VMS MAUI 670

Projected Average Daily Resort Resident Population at Maui Wailea 670 Resort

1995 to 2010

Facility type	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Condominium units	210	260	460	540	740	920	1,010	1,160
Single-family homes	50	60	260	350	540	620	750	840
Total	260	320	720	890	1,280	1,540	1,760	2,000

Source: Exhibits II-G and III-A.

Exhibit IV-C

GCR/VMS MAUI 670

Projected Source of Direct Operational Employees

1995 to 2010

Labor source	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
In-county sources:								
Available labor(1)	200	230	210	260	330	400	350	420
Regional turnover(2)	70	90	80	100	120	150	130	150
Other turnover(3)	40	50	40	50	70	80	70	80
Subtotal (rounded)	330	410	360	450	570	680	600	710
In-migrants(4)	230	260	250	290	380	450	410	480
Total (rounded)	560	670	610	740	950	1,130	1,010	1,190

(1) Unemployed, underemployed, high school and community college graduates within county and off-island commuters. Projected to account for 35% of total work force.

(2) Persons attracted from other employment in the Maalaea/Kihei/Wailea region. Projected to account for 13% of total work force.

(3) Persons attracted from other employment in the county. Projected to account for 7% of total work force.

(4) Based on projections of available labor supply and work force surveys at other Hawaii resorts. Projected to account for 45% of total work force.

- In-migrating workers could constitute the remainder of the Resort workforce, about 45% of all employees.

The new population associated with in-migrating workers could vary greatly, depending upon the household characteristics of the new employees. Attributes of current Hawaii resort employee households have been used to estimate population impacts of future in-migrating workers.

Estimates of family and employment characteristics of resort workers have been made from 1987 surveys of employees at two west Hawaii resorts. The surveys, conducted by Community Resources, Inc., were done with workers at the Mauna Kea Beach and Mauna Lani Bay hotels in South Kohala. Key findings used in this analysis include:

- Multiple-worker families were the norm, rather than the exception, among resort workers. Managerial workers were found to have 1.5 resort workers per household and nonsupervisory workers had 1.7 resort workers in each household.

- While household sizes were relatively large (in the 3 to 4 person per household range), the number of children was small and the number of other wage earners in the household was larger. Since the average household size observed is in the 3.5 to 4.0 person range, and the number of resort workers per household was in the range of 1.5 to 1.9, it is assumed that approximately one additional household member could accompany each in-migrating worker.

Based upon experience at other Hawaii resorts, managerial positions are projected to be one-ninth (11%) of the work force. Because of the scarcity of trained managers at neighbor island resorts, a greater proportion of this group, perhaps 60%, are expected to be in-migrants. The remaining 89% of the required work force would consist of nonsupervisory positions. About 40% of nonsupervisory workers would be expected to in-migrate.

Exhibit IV-C indicates that, while the majority of Resort jobholders are expected to already be Maui residents, many new jobs could be filled by in-migrants. In 1995, Maui Wailea 670 resort jobs could attract 230 to 260 in-migrant employees which could increase to 410 to 480 by 2010.

Exhibit IV-D estimates the off-resort population impact of in-migrating resort workers and their families. With the number of dependents projected to be about the same as in-migrating employees, the total population impact of the new workers could be approximately twice the number of resort positions filled by in-migrants. In 1995, in-migrating employees and their families could amount to 440 to 520 persons. The number of in-migrants could increase to 800 to 940 persons by 2010.

Total Potential Population Impact

The Maui Wailea 670 Resort's total potential population impact is shown in Exhibit IV-E. Total potential impact would include Resort residents and visitors, in-migrating workers and their families and temporary construction employees and their dependents.

Exhibit IV-D

GCR/VMS MAUI 670

Projected Off-Resort Population Impact from Resort Operations

1995 to 2010

In-Migrant Type	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Managerial and supervisory:								
Employees(1)	40	40	40	50	60	70	70	80
Other household members(2)	40	40	40	50	60	70	70	80
Subtotal	80	80	80	100	120	140	140	160
Other:								
Nonsupervisory employees(3)	180	220	200	240	310	370	330	390
Other household members(2)	180	220	200	240	310	370	330	390
Subtotal	360	440	400	480	620	740	660	780
Total (rounded)	440	520	480	580	740	880	800	940

(1) Managerial and supervisory positions constitute 11% of total operational employment, of which in-migrants are projected to be 60%.

(2) At one additional person per worker.

(3) Nonsupervisory positions constitute 89% of total operational employment, of which in-migrants are projected to be 40%.

Exhibit IV-E

GCR/VMS MAUI 670

Summary of On- and Off-Resort
Population Impact

(Average daily population)

1995 to 2010

Population Category	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
On-Resort:								
Visitor(1)	600	710	680	790	1,210	1,430	1,380	1,600
Resident(2)	260	320	720	890	1,280	1,540	1,760	2,000
Subtotal	860	1,030	1,400	1,680	2,490	2,970	3,140	3,600
Off-Resort:								
Operational employees and dependents(3)	440	520	480	580	740	880	800	940
Construction employees and dependents(4)	80	160	60	110	100	200	80	140
Subtotal	520	680	540	690	840	1,080	880	1,080
Total	1,380	1,710	1,940	2,370	3,330	4,050	4,020	4,680

(1) From Exhibit III-B.
(2) From Exhibit IV-B.
(3) From Exhibit IV-D.
(4) From Exhibit IV-A.

Total potential impact could represent some future double-counting, especially between resort residents and in-migrating resort employees:

- As shown in Exhibit II-G, the Resort project could include 1,640 to 1,820 condominium and single-family residential units.
- Based on the occupancy projections noted in Exhibit III-A, about 530 to 570 residential units could be occupied by full-time residents of Maui.
- While average prices for these homes are expected to be in the upper reaches of the market, some units could attract Resort employees, particularly those in management positions. With residential lots projected to start from about $90,000, and multifamily homes from about $200,000, residents could form a target submarket for some of the on-Resort housing inventory.
- If Resort employees do become, concurrently, Resort residents, population and housing impacts would be lessened.

Using total potential population impact, Exhibit IV-E indicates that:

- In 1995, 1,380 to 1,710 additional residents and visitors could be present on Maui due to the Resort. Visitors would constitute more than 40% of the population increase in 1995.
- The number of additional visitors and residents could increase to 4,020 to 4,680 by 2010. The number of visitors is expected to be about one-third of the population increase in that year.

Exhibit IV-F places the population impact of the Maui Wailea 670 Resort project into perspective with total population change projected for Maui under the revised long-range projections proposed by DBED. Additional resident population attributed to the resort represents less than 5% of the resident population growth projected for Maui county from 1985 to 2010. The project's share of de facto (resident and visitor) population from 1985 to 2010 could be expected to be between 3.8% and 4.5% per cent of total projected growth by the latter year.

HOUSING IMPACTS

Development of the Wailea 670 Resort could affect Maui's housing situation in several ways. Temporary housing will be needed when workers are brought to the island during project construction. Operational employment at the Resort will also trigger additional housing demand, particularly to accommodate in-migrant employees.

Construction Employee Housing Demand

Construction employment is temporary, and therefore does not generate the long-term housing demands associated with resort operational employment. However, in-migrating construction workers could occupy some rental units in the general market.

Construction workers from other islands hired under union contract would normally receive generous housing subsidy allowances in addition to hourly wages. Rental housing demand for construction workers could be affected by several factors:

- The number of construction workers who choose to live together in rental units. Because housing allowances are to be paid to each worker, it would be advantageous for workers traveling without dependents to share rental units. The present analysis assumes an average of 1.25 workers to occupy each rental unit.

- The percentage of construction workers who choose to live in units rented on a long-term basis, as opposed to a weekly or monthly basis. Workers might find apartment-hotel or resort condominium units offering housekeeping and other services preferable to renting units that would otherwise be used by Maui residents.

Exhibit IV-G indicates the range of rental housing impacts that could be expected based on of differing assumptions about the number of off-island construction workers and their housing preferences. The range of estimates includes:

- A high rental unit demand estimate, resulting from the assumption that 50% of the average work force will come from off-island. The maximum demand estimate uses the further assumption that almost all (90%) of the employees would choose rental units.

- A low rental unit demand estimate, resulting from the assumption that 30% of the average construction work force will come from off-island. The low demand estimate uses the further assumption that 75% of the employees would choose rental units.

In addition to the range of rental unit demand estimates, two different measurements are made based on employment levels. The first range of estimates shown in Exhibit IV-G is based on average annual employment levels. Because the resort construction project could have periods in which greater numbers of workers could be on-site, a peak employment level estimate has been made, with peak employment assumed to be 75% greater than annual average employment.

Rental housing demand associated with project construction workers is expected to be relatively low. Required units range from about 30 to 100 at any given time on the basis of average employment levels. At peak employment levels, rental unit demand could range from 50 to 170 units for shorter periods. It is anticipated that these temporary housing needs could be absorbed by the general rental market on Maui.

Operational Employee Housing Demand

Labor source is expected to be the key factor influencing housing demand by the resort's future employees. Workers drawn from the county's available labor supply could be expected to already occupy housing units, and would therefore have a less pressing need for housing than in-migrant workers.

Exhibit IV-H indicates projected demand for housing by the resort's operational employees, using the labor source distribution shown in Exhibit IV-C. Identified components of housing demand are:

Exhibit IV-E

GCR/VMS MAUI 670

Comparison of Project-Related Population Impact
to Projected Maui Population Change

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Wailea 670 population impact:								
Resident(1)	700	840	1,200	1,470	2,020	2,420	2,560	2,940
Temporary construction population(1)	80	160	60	110	100	200	80	140
Resort visitors(1)	600	710	680	790	1,210	1,430	1,380	1,600
Total	1,380	1,710	1,940	2,370	3,330	4,050	4,020	4,680
County projected growth from 1985(2):								
Resident population	27,100	27,100	40,200	40,200	51,400	51,400	60,400	60,400
Wailea 670 Resort as percent of projected growth(3)	2.7%	3.5%	3.2%	3.9%	4.2%	5.0%	4.5%	5.1%
De facto population	47,800	47,800	68,500	68,500	87,100	87,100	105,000	105,000
Wailea 670 Resort as percent of projected growth(4)	2.9%	3.8%	3.0%	3.6%	4.0%	4.8%	4.0%	4.6%

(1) From Exhibit IV-E.

(2) State of Hawaii, Department of Business and Economic Development, "Revised Long-Range Economic and Population Projections to 2010, State of Hawaii (Series M-K)", Preliminary Report: Table 11, January 1988.

(3) Includes resident population only.

(4) Includes resident, visitor and temporary construction population.

Exhibit IV-G

GCR/VMS MAUI 670

Projected Rental Units Required for
Off-Island Construction Workers
at Maui Wailea 670 Resort

1991 to 2010

	1991 - 1995		1996 - 2000		2001 - 2005		2006 - 2010	
	Low	High	Low	High	Low	High	Low	High
At average employment level:								
Average annual employment(1)	180	210	140	150	220	260	180	190
Off-island construction workers(2)	50	110	40	80	70	130	50	100
Workers requiring rental units(3)	40	100	30	70	50	120	40	90
Rental units required(4)	30	80	20	60	40	100	30	70
At peak employment level:								
Peak employment(5)	320	370	250	260	390	460	320	330
Off-island construction workers(2)	100	190	80	130	120	230	100	170
Workers requiring rental units(3)	80	170	60	120	90	210	80	150
Rental units required(4)	60	140	50	100	70	170	60	120

(1) From Exhibit III-D.

(2) Low estimate based on 30% of construction workers originating from off-island; high estimate based on 50% from off-island.

(3) Low estimate based on 75% of workers requiring rental units; high estimate based on 90% requiring rental units.

(4) At 1.25 construction workers per rental unit.

(5) Peak employment estimated to be 75% higher than average level.

Exhibit IV-H

GCR/VMS MAUI 670

Direct Operational Employees
Projected to Demand Additional Housing

1995 to 2010

Labor source	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
In-county sources:								
Available labor(1)	33	41	36	45	57	68	60	72
Turnover	-	-	-	-	-	-	-	-
Subtotal	33	41	36	45	57	68	60	72
In-migrants:								
Managerial(2)	27	27	27	33	40	47	47	53
Nonsupervisory(3)	106	129	118	141	182	218	194	229
Subtotal	133	156	145	174	222	265	241	282
Total (rounded)	170	200	180	220	280	330	300	350

(1) New household formation projected at 15%.
(2) At 1.5 workers per managerial employee household.
(3) At 1.7 workers per nonsupervisory employee household.

- Those workers drawn from the available labor supply, consisting of unemployed, underemployed and new labor force entrants, are expected to already occupy housing. However, new housing demand might occur, due to rising income, the desire to live closer to work, or the opportunity to live independently or start a family. Thus, a 15% new household formation factor is used to measure housing demand of workers recruited from available labor.

- In-migrants constitute the largest source of potential housing demand. Because the incomes and household characteristics of managerial and nonsupervisory workers differ, Exhibit IV-H projects numbers separately by occupational group.

- Due to the high incidence of multiple resort worker households identified at other neighbor island resorts, the housing demand assessment projects 1.5 workers per managerial household, and 1.7 workers per nonsupervisory household.

Based on these standards, Exhibit IV-H shows housing demand related to resort employment of about 170 to 200 units in 1995, increasing to a total of 300 to 350 units by 2010.

Housing Affordability For Households Requiring Housing

Household income is the primary determining factor in housing affordability. Exhibit IV-I projects the household incomes of Maui Wailea 670 Resort employees, based on the observed income distribution of workers at west Hawaii resorts. Figures have been adjusted to reflect 1987 dollars. The exhibit indicates that:

- Managerial households have the highest overall incomes, with a median of $38,000 in 1987 dollars. Almost 7 in 10 managerial households are expected to earn more than $32,500 per year.

- The median income of households with nonsupervisory workers is projected to be somewhat lower, at $25,400 per year. About one-third of this group (34%) would have annual incomes in excess of $32,500.

Housing affordability is established by the relationship between household income and the prices of available housing units in the community. The projected income distribution of Maui Wailea 670 Resort employees is compared with the prices of single-family homes sold on Maui in 1987, to determine the ability of resort employees to obtain single-family homes in current market conditions.

Exhibit IV-J identifies the relative affordability of single-family homes on Maui by projected household income categories for resort employees. Information in the exhibit is based upon:

- Household incomes reflecting the distribution of west Hawaii resort employees, adjusted to 1987 dollars.

- Housing affordability standards used by the State Housing Finance and Development Corporation.

- Typical prevailing terms for 30 year, fixed-rate conventional mortgage loans; these include a 10% mortgage interest rate and 20% downpayment.

Exhibit IV-I

GCR/VMS MAUI 670

Projected Household Incomes of
Resort Operational Employees

(1987 dollars)

Annual household income(1)	Percentage of management	Percentage of nonsupervisory	Total
Less than $22,500	8%	40%	34%
$22,500 to $26,000	8	13	11
$26,001 to $32,500	14	15	15
More than $32,500	69	34	39
Total	100%	100%	100%
Median income (rounded)	$ 38,000	25,400	27,700

(1) Annual incomes for 1986, adjusted to 1987 dollars by adding change in statewide per capita personal income through the second half of 1987. Income categories are rounded.

Source: Community Resources, Inc., and Datametric Research, Resort Employee Survey for Final Environmental Impact Statement, South Kohala Resort, December 1987.

Exhibit IV-J

GCR/VMS MAUI 670

Resort Operational Employee
Housing Affordability Analysis

(1987 dollars)

	Household Income	Cumulative percentage distribution(1)	Percentage county median income at upper range(2)	Maximum affordable unit price(3)	Number sales below target(4)	Percentage of all single-family sales(5)
Up to:	$ 22,500	35%	66.2%	$ 81,000	33	6%
	26,000	45	76.5	94,000	65	13
	32,500	60	95.6	119,000	170	33
Above:	$ 32,500	100%	N/A	$ 119,000+	N/A	N/A

(1) Based on Exhibit IV-I.

(2) County median income estimated at $34,000 in 1987.

(3) Calculated using 32% of monthly household income less $100, based on 10% mortgage interest rate, 30 year mortgage with 20% downpayment.

(4) Target price of $80,000, $95,000 and $120,000, respectively, for three groups.

(5) Neighbor Island Multiple Listing Service single-family units sold in 1987 within zones 2, 3 and 4.

- Measurement of worker income groups relative to Maui's median household income, which was $34,000 for 1987.

- The sales price distribution of all single-family residential units conveyed in west, central and east Maui in 1987, as recorded by the Neighbor Island Multiple Listing Service. Sales reflect all activity in zones 2, 3 and 4.

Exhibit IV-J, when reviewed in conjunction with the income distribution shown in Exhibit IV-I, indicates that housing affordability will be most significant for households of employees earning less than $26,000 per year. By income category, the exhibit shows that:

- Most managerial employee households are projected to earn more than $32,500 per year. At the lower end of this group, about one-third of all single-family homes sold during 1987 could be affordable. At the median income for managerial employee households of $38,000, single-family units priced below $140,000 could be affordable.

- About one-third of nonsupervisory employee households are expected to find single-family homes priced below $119,000 affordable. Additional housing choice might be available to nonsupervisory households earning above $26,000; in 1987, this group might have been able to buy about one in eight single-family homes sold.

Projected Affordable Housing Unit Demand

The projected number of additional affordable range single-family units that could be required for the Maui Wailea 670 Resort work force is shown in Exhibit IV-K. The exhibit's calculations are based on several assumptions:

- Available single-family homes for purchase is used as the standard for affordability. In March, 1988, Maui Multiple Listing Service sales data showed an average resale price of $213,000 for single-family homes and $175,000 for condominium units. Condominium units could represent a valid choice for many employees seeking lower-priced ownership units.

- Housing for purchase is used to measure affordability. Many in the work force, particularly those in smaller or younger households, or employees not expecting to remain on Maui, could prefer to rent housing.

On the basis of the household income distribution shown in Exhibits IV-I and IV-J, it is determined that from 50% to 60% of resort employee households could experience difficulty in finding affordably-priced single-family homes to purchase. Between 50% and 55% of all households could be expected to have incomes below 80% of the county median family income.

Based on these criteria, affordable range housing demand could be expected to range between 90 and 120 units in 1995, and could increase to 150 to 210 units by 2010, as shown in Exhibit IV-K.

Impacts of Operational Employee Housing Demand

The way in which Resort employees' housing needs could affect the Maui market has both a quantitative and qualitative dimension. Quantitative issues deal with the number of additional housing units needed, and the ability of the local

GCR/VMS MAUI 670

Projected Affordable Range Housing Units Required for
Maui Wailea 670 Resort Operational Employees

1995 to 2010

Type of employee	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
All households requiring additional units(1)	170	200	180	220	280	330	300	350
Share in affordable housing range:								
At 50%	90	100	90	110	140	170	150	180
At 60%	100	120	110	130	170	200	180	210

(1) From Exhibit IV-H.

market to provide them. Qualitative issues deal with the distribution of housing units needed by employees, in terms of price and whether the homes required would be for ownership or rental.

Overall housing supply requirements were identified in Exhibit IV-H. A maximum of about 200 units would be needed by 1995, increasing to a total of 350 units by 2010. It would appear that overall supply could be readily satisfied by the Maui market, based on these factors:

- Supplying Resort employee housing needs with new homes would require about 30 units annually until 1995, and less than 20 new homes each year from 1995 to 2010.
- The inventory of resident housing units on Maui increased by about 6,400 from 1980 to 1987, representing more than 900 new homes each year. Resort employees would augment demand by no more than 3% over 1980-1987 levels.
- The Maui Wailea 670 Resort development program itself is projected to add a greater number of resident housing units by 2010 than would be required to accommodate employees. However, most of these units would not be affordable by employees.

It would appear, then, that the increase in housing demand would not be of sufficient size to generate widespread impacts on the local market. However, many future employees could face an affordability problem, in terms of their ability to pay for housing relative to the prices or rents for available units. The qualitative problem can be described as follows:

- As shown in the analysis leading to Exhibit IV-K, from 40% to 50% of the projected resort employee households requiring additional housing would have had reasonable choice in single-family ownership units under 1987 market conditions.
- For the remaining 50% to 60% of employee households, the affordability problem would have required another choice, principally between seeking lower-priced multifamily ownership units or renting.
- Renting could be the desired choice for many resort employees. The west Hawaii resort survey indicated that 55% of nonsupervisory workers who had resided on the island for less than 5 years were renters. It is not known whether this tenure pattern results from lack of affordably-priced ownership units, desire for mobility or decisions about use of disposable income.
- For resort employees at lower income levels desiring homeownership, units would be needed at prices below about $90,000 to $95,000. Multifamily units could be developed without government assistance at these prices in some locations on the island, to the degree that developer interest, appropriate zoning and public services were available.
- New single-family homes in this price range were not widespread in 1987; however, government development assistance programs have been delivering new homes at prices well under the $90,000 - $95,000 level:

- The Ohukai subdivision project at Kihei, with assistance from the County Housing Division, Department of Human Concerns, is providing 106 new single-family homes at $74,000 to $84,000 per unit.

- The Skill Village project at Paia, another county-sponsored endeavor, is planned to deliver 207 homes at an average price of $72,000.

- According to information provided by the Housing Division, county assistance programs had delivered 1,180 rental and ownership units through 1986, with most priced well below the target level for resort employees.

- The State Housing Finance and Development Corporation has been active in developing ownership units for this market group as well. The HFDC is developing a master-planned community at Waiehu, which will contain 800 units at completion. Single-family homes planned for completion in 1987 averaged $85,000 in sales price.

- Thus, some resort employees could fall into the target market for government-assisted housing programs on Maui.

It is also expected that affirmative efforts would be required of the developers of Maui Wailea 670 Resort in meeting employee housing needs. According to county policy, employee housing should be provided by resort developers, in an amount equal to one employee unit for each 6 hotel, motel or apartment-hotel units. Since the Resort plans to develop from 645 to 750 resort lodge units, the county policy would require about 110 to 125 employee housing units.

V. FISCAL IMPACTS

This chapter describes projected state and county tax revenues from Maui Wailea 670 Resort's construction and operation. Costs attributable to the project are presented in order to compare the governmental revenues and expenditures attributable to the resort project.

GOVERNMENT REVENUES

Spending by visitors to the resort would create revenues to government, as would income received from direct, indirect and induced employment. This chapter separately describes anticipated revenues for the two units of government affected by the project, the State of Hawaii and the County of Maui.

County Revenues

The County of Maui would realize most revenues from the resort in the form of real property taxes on the resort site. As the site is improved, and higher economic uses are built, land value (and consequently, assessed valuation for tax purposes) is expected to increase substantially.

Exhibit V-A projects annual real property tax revenues anticipated on the basis of the development schedule from Exhibit II-G. Projected assessed values of developed property have been estimated on the basis of comparable current resort uses in the region, as estimated by the Real Property Tax Division of the County Department of Finance. Anticipated real property tax revenues would be as follows:

- The resort site, in its current unzoned and undeveloped status, will yield about $18,500 in real property taxes in 1988.

- If developed as planned, the site could generate from $1.4 to $1.6 million annually by 1995.

- Real property tax revenues could increase to from $3.2 to $3.5 million in 2010.

State Revenues

Additional state government tax revenues would be generated by the 4% general excise tax, the 5% tax on transient accommodations, and by individual income and other taxes paid by resort residents. Those resort residents who moved to the site from another Hawaii residence would transfer existing revenues, rather than creating new revenues. It is estimated that about 15% of resort residents would have been previous Hawaii residents.

Exhibit V-B indicates projected state tax revenues from operation of the Maui Wailea 670 resort. Revenue sources itemized are:

- General excise tax on direct, indirect and induced visitor expenditures, as shown in Exhibit III-C.

Exhibit V-A

GCR/VMS MAUI 670

Projected Annual County Real Property Tax
Revenues Attributable to Resort Development

1995 to 2010

(in millions of 1988 dollars)

Source of property tax revenue	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Lodges(1)	$ 0.51	0.57	0.51	0.57	0.82	0.92	0.82	0.92
Condominium units(2)	0.21	0.27	0.47	0.55	0.76	0.94	1.04	1.18
Residential units and patio homes(3)	0.17	0.21	0.51	0.69	0.89	0.93	0.95	1.00
Commercial and village center(4)	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.12
Golf courses and tennis center(5)	-	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Undeveloped acreage(6)	0.56	0.29	0.19	0.12	0.05	0.02	0.01	-
Total (rounded)	$ 1.49	1.38	1.78	2.04	2.65	2.96	2.98	3.27
Total in 1988 dollars (rounded)	$ 1.60	1.48	1.90	2.19	2.84	3.17	3.19	3.49

(1) Based on estimated value of $130,000 per resort lodge room and $140,000 per golf lodge room, land value of $18 per square foot and combined land and building tax rate of $7.00 per $1,000 of assessed value.

(2) Based on estimated value of $140,000 per condominium unit, land value of of $15 per square foot and combined tax rate of $4.75 per $1,000 of assessed value.

(3) Based on estimated value of $180,000 per patio home and $250,000 per single-family residence, land value of $25 per square foot for patio homes and $20 per square foot for single-family residences.

(4) Based on construction cost estimates provided by PBR-Hawaii, $25 per square foot land value and combined tax rate of $6.00 per $1,000 of assessed value.

(5) Tennis center based on construction cost estimates provided by PBR-Hawaii, $25 per square foot land value and combined tax rate of $6.00 per $1,000 of assessed value. Golf course based on construction cost estimates provided by PBR-Hawaii, $8,600 per acre assessed value and combined tax rate of $4.75 per $1,000 of assessed value.

(6) Based on $7 per square foot land value and combined tax rate of $4.75 per $1,000 of assessed value.

Source: Peat Marwick Main & Co. and Maui County Department of Finance, Real Property Tax Division.

Exhibit V-B

GCR/VMS MAUI 670

Projected Annual State Government Revenues
Attributable to Development of Maui Wailea 670 Resort

1995 to 2010

(in millions of 1988 dollars)

Revenue source	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Visitors:								
General excise tax(1)	$ 2.0	2.4	2.3	2.7	4.1	4.8	4.7	5.4
Transient accommodations tax(2)	0.4	0.5	0.5	0.6	0.9	1.0	1.0	1.1
Subtotal	2.5	2.9	2.8	3.2	5.0	5.8	5.6	6.5
On-Resort residents(3):								
General excise tax(4)	0.1	0.1	0.3	0.4	0.5	0.6	0.7	0.8
Individual income and other taxes(5)	0.0	0.1	0.3	0.4	0.6	0.6	0.8	0.9
Subtotal	0.2	0.2	0.5	0.7	1.1	1.2	1.5	1.6
Total (rounded)	$ 2.6	3.1	3.3	3.9	6.0	7.1	7.1	8.2

(1) Based on 4% of direct, indirect and induced visitor expenditures, extrapolated from Exhibit III-C.

(2) Based on 5% of estimated gross room revenues for lodge, condominium and residential units rented to visitors. Average achieved rates estimated at $80 for lodge units, $70 for condominium units and $100 for residential units.

(3) Full-time and part-time Resort residents, less 15% estimated to have been residents of the state.

(4) Based on 4% of selected household budget items. Household incomes estimated at $60,000 for full-time residents and $120,000 for part-time residents.

(5) Estimated at $1,440 per on-Resort full-time resident.

- Transient accommodations tax on resort lodge, condominium and single-family unit rentals to visitors, at projected occupancy levels and average daily rates of $80 for lodge units, $70 for condominium units and $100 for residential units.

- General excise tax projected to be paid by resort residents.

- Individual income and other taxes to be paid by resort residents. Based on Hawaii state personal tax collections for fiscal 1986 and the higher expected income levels of future Resort residents, annual tax collection per resident is estimated at $1,440 in 1988 dollars.

State tax revenues are projected to increase by $2.6 to $3.1 million annually in 1995 due to the resort. Annual collections could increase to $7.1 million to $8.2 million in 2010.

GOVERNMENT EXPENDITURES

Visitors to the resort, and residents of the resort community would necessitate additional expenditure of public resources. Additional county expenditures would be required to service those new employees and their families who relocate to Maui County as a result of the additional jobs.

Visitors are expected to create additional costs in terms of the following services:

- Public safety, including police and fire protection.

- Development and maintenance of highways, parks and recreation facilities, sanitation and natural resources.

- Cash capital improvements.

New Maui residents are expected to require additional services in all county functions. Additional state services for new residents would be necessitated only if the residents came from outside of Hawaii.

County Expenditures

County operating expenditures for the 1986 fiscal year were analyzed to determine the per capita cost of services for residents and visitors. The 1986 per capita costs were then adjusted to 1988 dollars. Exhibit V-C indicates a per capita county cost of approximately $350 for each visitor and $630 for each resident, in 1988 dollars.

Exhibit V-D estimates projected county government operating expenditures from the additional population of visitors and new residents associated with the resort. Population estimates are drawn from Exhibit III-B. Projected expenditures related to the resort include:

- Additional county expenditures could be from about $700,000 to $800,000 in 1995, representing an expenditure increase of about one per cent from 1986, when the Maui County budget was approximately $61 million.

GCR/VMS MAUI 670

County of Maui Per Capita Government
Operating Expenditures
Fiscal Year 1986

(in thousands of 1988 dollars)

Function	Expenditures(1)	Service population(2)	Estimated expenditure allocation: Per Resident	Estimated expenditure allocation: Per Visitor
General	$ 7,753	86,500	89.63	-
Public safety	14,326	118,000	121.41	121.41
Highways	4,776	118,000	40.47	40.47
Health and sanitation	5,192	118,000	44.00	44.00
Hospitals and institutions	211	118,000	1.79	1.79
Public welfare	4,088	86,500	47.26	-
Education	179	86,500	2.07	-
Recreation	4,022	118,000	34.08	34.08
Interest	2,065	86,500	23.87	-
Bond redemption	1,858	86,500	21.48	-
Retirement and pension	3,425	86,500	39.60	-
Miscellaneous	3,668	86,500	42.40	-
Cash capital improvements	9,932	118,000	84.17	84.17
Total (1986 dollars)	$ 61,495		592.23	325.92
Per capita expenditure in 1988 dollars(3)			$ 633.69	$ 348.74

(1) County government operating expenditures for fiscal year ending June 30, 1986, as reported in Tax Foundation of Hawaii, Government in Hawaii, 1987.

(2) Resident and de facto population estimates as of January 1, 1986, interpolated from July 1, 1985 and July 1, 1986 estimates prepared by the State of Hawaii, Department of Business and Economic Development.

(3) Updated based on change in Consumer Price Index for urban consumers.

Exhibit V-D

GCR/VMS MAUI 670

Projected County Government Operating Expenditures
Attributable to Development of Maui Wailea 670 Resort

1995 to 2010

(in millions of 1988 dollars)

Population and expenditure type	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Population:								
Resort visitors	600	710	680	790	1,210	1,430	1,380	1,600
Resort residents	260	320	720	890	1,280	1,540	1,760	2,000
Subtotal	860	1,030	1,400	1,680	2,490	2,970	3,140	3,600
Off-Resort residents	440	520	480	580	740	880	800	940
Total	1,300	1,550	1,880	2,260	3,230	3,850	3,940	4,540
Expenditures:								
Resort visitors(1)	$ 0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.6
Resort residents(2)	0.2	0.2	0.5	0.6	0.8	1.0	1.1	1.3
Subtotal (rounded)	0.4	0.5	0.7	0.8	1.2	1.5	1.6	1.8
Off-Resort residents(2)	0.3	0.3	0.3	0.4	0.5	0.6	0.5	0.6
Total (rounded)	$ 0.7	0.8	1.0	1.2	1.7	2.0	2.1	2.4

(1) Visitors estimated to require $350 in annual county government expenditures, as detailed in Exhibit V-C.

(2) Residents estimated to require $630 in annual county government expenditures, as detailed in Exhibit V-C.

- As the population of visitors and residents associated with the resort increases, so too would county expenditures. By 2010, annual additional county expenditures could increase to from $2.1 to $2.4 million.

State Expenditures

Analysis of state government operating expenditures for 1986 indicates per capita spending of about $2,440 per resident and $310 per visitor in 1988 dollars. This is shown by functional area in Exhibit V-E.

Some Maui Wailea 670 Resort residents are expected to move to the resort from another residence in the state. For this group, no new state expenditures would be incurred since they would already be receiving services. Relocating state residents are estimated to represent 15% of all resort residents.

Exhibit V-F details additional state operating expenditures attributable to the Resort. Expenditures could amount to from $700,000 to $900,000 in 1995, and could increase to from $4.1 to $4.6 million by 2010.

REVENUE/EXPENDITURE COMPARISON

This section analyzes the net fiscal impact of the Maui Wailea 670 Resort by comparing projected revenues and operating expenditures.

County

Exhibit V-G compares annual projected county expenditures and revenues from the resort project. The comparison is summarized in a revenue/expenditure ratio. Results of the analysis are as follows:

- A positive county revenue/expenditure relationship is projected for the entire project development period.
- The most favorable ratio, in the range of 2.5 to 1, is attained under the low buildout assumptions early in the project (1995), before a substantial on-resort population is attained.
- As development proceeds, the revenue/expenditure ratio diminishes somewhat, but remains positive. Revenues could be expected to maintain a 1.4 to 1.9 ratio to expenditures, after 1995.

State

State government revenue/expenditure ratios, as shown in Exhibit V-H, are considerably more favorable than the county ratios because state revenue is greatly augmented by visitor spending. The same trend over time is apparent with state revenue/expenditure relationships as with county patterns:

- State revenue/expenditure ratios are highest in the early years of the project, before a substantial resident population is located at the resort. The ratio could reach 3.6 to 1 in 1995.
- The state revenue/expenditure ratio is expected to decline gradually to the 1.7 - 1.8 to 1 range by 2010.

Exhibit V-E

GCR/VMS MAUI 670

State of Hawaii Per Capita Government
Operating Expenditures
Fiscal Year 1986

(in millions of 1988 dollars)

Function	Expenditures(1)	Service population(2)	Estimated expenditure allocation: Per Resident	Estimated expenditure allocation: Per Visitor
General government	$ 194,678	1,056,900	$ 184.20	-
Public safety	92,618	1,163,900	79.58	79.58
Highways	104,534	1,163,900	89.81	89.81
Natural resources	21,411	1,163,900	18.40	18.40
Health and sanitation	83,782	1,163,900	71.98	71.98
Hospital and institutions	120,827	1,056,900	114.32	-
Public welfare	322,461	1,056,900	305.10	-
Education	773,223	1,056,900	731.60	-
Recreation	16,751	1,163,900	14.39	14.39
Utilities and other enterprises	90,262	1,056,900	85.40	-
Debt service	262,385	1,056,900	248.26	-
Retirement and pension	141,454	1,056,900	133.84	-
Employees' health insurance	659	1,056,900	0.62	-
Employment compensation	63,072	1,056,900	59.68	-
Urban redevelopment and housing	94,762	1,056,900	89.66	-
Cash capital improvements	13,480	1,163,900	11.58	11.58
Miscellaneous	41,587	1,056,900	39.35	-
Total (1986 dollars)	$ 2,437,946		$ 2,277.77	$ 285.74
Per capita expenditure in 1988 dollars(3)			$ 2,437.21	$ 305.74

(1) State government operating expenditures for fiscal year ending June 30, 1986, as reported in Tax Foundation of Hawaii, Government in Hawaii, 1987.

(2) Resident and de facto population estimates as of January 1, 1986 interpolated from estimates for July 1, 1985 and July 1, 1986 prepared by the State of Hawaii, Department of Business and Economic Development.

(3) Updated based on change in Consumer Price Index for urban consumers.

Exhibit V-F

GCR/VMS MAUI 670

Projected Annual State Government Operating
Expenditures Attributable to Resort Development

1995 to 2010

(in millions of 1988 dollars)

Population and expenditure group	1995 Low	1995 High	2000 Low	2000 High	2005 Low	2005 High	2010 Low	2010 High
Population:								
Resort visitors	600	710	680	790	1,210	1,430	1,380	1,600
Resort residents(1)	220	270	610	760	1,090	1,310	1,500	1,700
Total (rounded)	820	980	1,290	1,550	2,300	2,740	2,880	3,300
Expenditures:								
Resort visitors(2)	$ 0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.5
Resort residents(3)	0.5	0.7	1.5	1.9	2.7	3.2	3.7	4.1
Total (rounded)	$ 0.7	0.9	1.7	2.1	3.0	3.6	4.1	4.6

(1) Full-time and part-time residents, less 15% estimated to have been state residents.

(2) Visitors estimated to require $310 in state government operating expenditures; from Exhibit V-E.

(3) Residents estimated to require $2,440 in state government operating expenditures; from Exhibit V-E.

Exhibit V-G

GCR/VMS MAUI 670

County Government Annual Revenue and Expenditure Comparison

1995 to 2010

(in millions of 1988 dollars)

(rounded)

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Additional revenues	$ 1.6	1.5	1.9	2.2	2.8	3.2	3.2	3.5
Additional expenditures	0.7	0.8	1.0	1.2	1.7	2.0	2.1	2.4
Net additional revenues	$ 0.9	0.7	0.9	1.0	1.1	1.1	1.1	1.1
Revenue/expenditure ratio(1)	2.5	1.9	1.9	1.8	1.7	1.6	1.5	1.4

(1) Additional revenues divided by additional expenditures.

Exhibit V-H

GCR/VMS MAUI 670

State Government Annual Revenues and Operating Expenditures Comparison

1995 to 2010

(in millions of 1988 dollars)

(rounded)

	1995		2000		2005		2010	
	Low	High	Low	High	Low	High	Low	High
Additional revenues	$ 2.6	3.1	3.3	3.9	6.0	7.1	7.1	8.2
Additional expenditures	0.7	0.9	1.7	2.1	3.0	3.6	4.1	4.6
Net additional revenue	$ 1.9	2.2	1.6	1.8	3.0	3.4	3.0	3.5
Revenue/expenditure ratio(1)	3.6	3.6	2.0	1.9	2.0	1.9	1.7	1.8

(1) Additional revenues divided by additional expenditures.

APPENDIX C
AIR QUALITY IMPACT ANALYSIS REPORT

AIR QUALITY IMPACT REPORT
MAUI WAILEA 670
July 5, 1988

J. W. MORROW
ENVIRONMENTAL MANAGEMENT CONSULTANT
KAILUA, HAWAII

C-1

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION..... 1
2. AIR QUALITY STANDARDS..... 1
3. EXISTING AIR QUALITY..... 2
4. CLIMATE & METEOROLOGY..... 3
5. SHORT-TERM IMPACTS..... 4
6. MOBILE SOURCE IMPACT..... 6
   6.1 Mobile Source Activity..... 6
   6.2 Emission Factors..... 6
   6.3 Modeling Methodology..... 6
   6.4 Results: 1-Hour Concentrations..... 7
   6.5 Results: 8-Hour Concentrations..... 7
   6.6 Correlation with Meteorological Data..... 8
7. OTHER LONG-TERM IMPACTS..... 8
   7.1 Agricultural Burning..... 8
   7.2 Electrical Generation..... 8
   7.3 Solid Waste Disposal..... 9

CONTENTS (Continued)

8. DISCUSSION AND CONCLUSIONS..... 10

8.1 Short-Term Impacts 10

8.2 Mobile Source Impacts..... 10

8.3 Other Long-Term Impacts..... 10

REFERENCES

TABLES

FIGURES

LIST OF TABLES

NUMBER	TITLE
1	Summary of State and Federal Ambient Air Quality Standards
2	Emissions Inventory, County of Maui, 1980
3	PM-10 & SO2 Monitoring Data: Kihei, Maui 1987
4	Annual Wind Rose, Old Maui Airport, 1953-57
5	2:00 P.M. Wind Rose, Keawakapu Beach, Maui
6	Estimated Emissions From Diesel Fuel Combustion To Meet Project Electrical Demand

LIST OF FIGURES

NUMBER	TITLE
1	Project Location
2	Surface Trade Wind Streamlines During Daytime Hours
3	Surface Trade Wind Streamlines During Nighttime Hours
4	Frequency Distribution of Wind Direction (%) Old Maui Airport (1953-57)
5	Frequency Distribution of Wind Direction (%) Keawakapu Beach, Maui (2:00 p.m.)
6	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Piilani Highway, PM-Peak Hour (1987)
7	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Piilani Highway, PM-Peak Hour (2010 Without Project)
8	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Piilani Highway, PM-Peak Hour (2010 With Project)
9	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Piilani Highway at Kilohana Drive (2010 With Project)
10	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Piilani Highway at Wailea Ike Drive (2010 With Project)

AIR QUALITY IMPACT REPORT
MAUI WAILEA 670

1. INTRODUCTION

The partnership of Grand Champions Resort Development (Hawaii), Inc. and VMS Realty Partners (GCR/VMS MAUI 670) is proposing a master planned residential/resort community on some 670 acres located on the western side of the Island of Maui adjacent to the Wailea and Makena Resorts (Figure 1).

The purpose of this report is to assess the impact of the proposed development on air quality on a local and regional basis. The overall project can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act [1] since its primary association with air quaity is due to its inherent generation of mobile source, i.e., motor vehicle, activity. Much of the focus of this analysis, therefore, is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for existing (1987) and future (2010) conditions.

A residential/resort project such as this also has off-site impacts due to increased demand for electrical energy which must be met through the combustion of some type of fuel and solid waste disposal which may involve incineration. These combustion processes result in pollutant emissions to the air which have been addressed.

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated due to vehicular movement, grading, concrete and asphalt batching, and general dust-generating construction activities. These impacts have also been addressed.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1 [2, 3]. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [4]. Some of Hawaii's

standards are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. It should also be noted that in April, 1986, the Governor signed amendments to Chapter 59 (Ambient Air Quality Standards) making the state's standards for particulate matter and sulfur dioxide the same as national standards. In the case of particulate matter, however, this uniformity did not last long. On July 1, 1987, the EPA revised the federal particulate standard to apply only to particles 10 microns or less in diameter (PM-10) [5], leaving the state once again with standards different than the federal ones.

In the case of the automotive pollutants [carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox)], there are only primary standards. Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January, 1983 [6].

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings [7]. The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m3) [8]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO2), and nitrogen dioxide (NO2) standards are currently under review, but final action has not been taken yet [9].

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [10]. There simply can be no visible emissions from fugitive dust sources.

C-4

3. EXISTING AIR QUALITY

While they are not a direct indicator of ambient air quality, emissions inventories do provide some insight into the magnitude of pollutant emissions as well as highlighting the major source categories. The 1980 emissions inventory for Maui County can serve these purposes and has therefore been presented in Table 2. It is quite evident from the table that motor vehicles are the principal source of air pollution on Maui and that the most abundant pollutant is carbon monoxide.

There are a number of possible sources which may affect air quality in the project area. Agricultural activities including sugar cane field burning [11], bagasse and fossil fuel burning at sugar mills, and pesticide spraying all have the potential for affecting air quality in varying degrees. Resort activity with

its concomitant motor vehicle traffic can also affect local air quality. A recent study in Lahaina, for example, revealed carbon monoxide concentrations which exceeded State standards [12].

What is of greater importance than raw emissions, however, are ambient pollutant concentrations. While there are no continuous air monitoring stations in the immediate project area, the State Department of Health does operate a station at Kihei, some 7 miles north of Wailea. A summary of the most recent data from that site are presented in Table 3. These data suggest that state and federal standards for inhalable particulates (PM-10) and sulfur dioxide (SO2) are being met, although it should be pointed out that the state currently has total suspended particulate matter (TSP) standards, but is measuring PM-10 particulates which are not directly comparable.

Unfortunately, and despite the growing population on Maui, the principal automotive pollutants, carbon monoxide (CO), nitrogen dioxide (NO2), and hydrocarbons (HC) are not routinely monitored on Maui. NO2 was last measured in 1976 and at that time ranged <0 - 39 ug/m3 with an average of 18 ug/m3 in Kahului.

4. CLIMATE & METEOROLOGY

The project area is typical of Hawaii's climate with little seasonal or diurnal temperature variation. Monthly temperature averages vary by only a few degrees from the warmest months (July and August) to the coolest (January and February) [13]. The area is dry with annual rainfall of about 12 inches and Thornwaite precipitation/evaporation (P/E) index of 14.6 [14].

Local terrain in Maui plays an extremely important role in determining both wind direction and speed at any particular location. Areas within the "wind shadows" of the highest elevations of the West Maui Mountains (Puu Kukui) or Haleakala are shielded from all but the strongest tradewinds and experience a very pronounced land-seabreeze regime. The northeasterly tradewinds are accelerated due to a venturi effect as they pass between the two major mountain masses. Along the Kihei-Makena coast the daytime tradewinds appear to have a more northerly component as they pass around the flank of Haleakala (Figure 2). At night, drainage winds coming down the mountains frequently prevail (Figure 3).

The northerly predominance (45%) is quite evident in the annual wind rose for the Old Maui Airport north of the project site. Figure 4). Low wind speeds were also common with an annual frequency of about 41% for winds less than 7 knots (Table 4) [16].

Since the air impact analysis focused on the p.m. peak traffic

period, afternoon wind conditions were of interest. Fortunately a National Weather Service Civil Station had been operated at Keawakapu Beach (near Wailea) during the 1970's, and afternoon weather data were available for analysis. A 2:00 p.m. wind rose was therefore created in both tabular (Table 5) and graphic (Figure 5) forms. The results indicate a strong westerly component and predominance of northwesterly winds. These afternoon seabreezes also tended to have higher average velocities as compared to the Old Maui Airport annual wind rose.

5. SHORT-TERM IMPACTS

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along Piilani Highway as well as in the vicinity of the project site itself.

Because of the moderate level of existing traffic volumes, the additional construction vehicle traffic should not exceed road capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and on-site road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [14,17].

In this case, the predominant soils on the project site are silt loams and silty clay loams (silt content 55-60%). With this soil composition and a P/E Index of 14.6 (arid) as determined by the local temperature/ rainfall conditions, one must conclude that there is a significant potential for fugitive dust generation.

In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt concrete batching plants needed for construction. Since the concrete and asphalt requirements for the proposed action are not yet known, and it is also too early to identify specific facilities that will be providing the concrete and asphalt, the discussion of air quality impacts is necessarily generic.

Design and operating features of a typical concrete batching plant on Maui were obtained for this analysis. This plant (Rex Transit Mix Batch Plant, Model LO GO 5) [18], is a portable unit capable of producing up to 100 cubic yards of concrete per hour. Assuming 8 hours/day operation and published EPA emission factors

[17] for both direct plant emissions and fugitive dust emissions, estimates of worst case ambient impact were derived using the PTPLU screening model. Ninety percent control of particulate emissions from the plant itself and 60% control of fugitive dust emissions from the process were assumed. One-hour concentration estimates were adjusted to 8-hour averages using an EPA-recommended factor [19] and then to 24-hour averages based on a weighted averaging technique. The worst case concentration of total suspended particulates (TSP) was thus estimated to be 105 micrograms/cubic meter (ug/m3) due to the plant operation.

Assuming that the plant would be located near the project site, existing data from the Kihei site were reviewed (Table 3). If one assumes that the particulate emissions from the batch plant are all 10 microns or less, then the batch plant's TSP level of 105 ug/m3, if added to the second highest 24-hour PM-10 concentration at Kihei (49 ug/m3), would indicate an exceedance of the federal PM-10 standard of 150 ug/m3. Since the temporary batch plant is not going to be necessarily located in an area with the same PM-10 levels as Kihei, there is some uncertainty about the likelihood of the apparent exceedance. Furthermore, the plant would be reviewed by the Department of Health to insure compliance with ambient air quality standards before it would be permitted to operate.

Design and operating data for a typical asphalt concrete batch plant (Astec Industries Model PDM-636-C) on Maui were also obtained and reviewed. This plant has a production capacity of 186 T/hour and thus could provide the required 2,400 tons of asphalt within a short period. The two primary emission sources associated with such a plant are the drum mix asphalt plant and a 600 Kw diesel generator.

The modeling technique employed for the concrete batch plant was again employed for the asphalt plant with the results as shown in the following table.

ESTIMATED IMPACT OF AN ASPHALT CONCRETE BATCH PLANT

Pollutant	24-hour Concen. (ug/m3)	Existing Concen. (ug/m3)	Total (ug/m3)
Particulates	34.9	49	83.9
Sulfur dioxide	13.6	13	26.6
Nitrogen dioxide	203	30	233
Carbon monoxide	44.2	n/a	44.2
Volatile organic compounds	16.2	n/a	16.2

The existing concentrations for particulates and SO2 are 1987 Kihei data (Table 3). Existing NO2 concentration is based on historical data from the Kahului monitoring site. The same caveats noted for the concrete batch plant also apply in this case, i.e., uncertainty about background concentration at the plant site and requirement for DOH review and permit.

6. MOBILE SOURCE IMPACT

6.1 Mobile Source Activity. A traffic impact report (TIR) was prepared for the proposed Maui Wailea 670 project and served as the basis for this mobile source impact analysis [20]. Existing traffic volumes and projections for 2010 at the Kilohana Drive and Wailea Ike Drive intersections with Piilani Highway were provided.

The TIR identified the p.m. peak-hour as the most critical period during the day and thus focused on that period. This is typical of resort areas where traffic gradually builds up from mid-morning throughout the day, and the late afternoon often experiences the peak-hour. A small a.m. peak-hour is usually identifiable but not nearly as significant as in more urbanized areas such as Honolulu. This air quality impact analysis therefore also focused on the p.m. peak-hour.

It should be noted that highway improvements and mitigative measures assumed in the TIR were also assumed for the purposes of this air quality impact report.

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 1987 and 2010 using the Mobile Source Emissions Model (MOBILE-3) [21]. To localize the emission factors as much as possible, the September, 1986 age distribution for registered vehicles in the City & County of Honolulu [22] was input in lieu of national statistics. That same age distribution was the basis for the distribution of vehicle miles travelled as well.

6.3 Modeling Methodology. Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (ca. 1 month)[23], and it comprises the largest fraction of automotive emissions.

Using the available traffic data, modeling was performed for a segment of Piilani Highway between Kanane Road and Kilohana Drive for 1987 and 2010 (with and without the project). Analyses at the two previously mentioned intersections were conducted for 2010 with the project.

Because of the time of day of the analysis and the generally low level of urbanization in the area which would otherwise contribute to a "heat island" effect and increased turbulence, a neutral atmosphere (Category "D") [24] and 1 meter per second (m/sec) wind speed were assumed as worst case meteorological conditions. Preliminary modeling with 10, 20, 45, and 60-degree wind-road angles indicated that the 60-degree angle would produce the maximum pollutant concentrations. Review of the traffic data, and the potential for queuing in particular, indicated that a northwest wind direction was most likely to produce the maximum CO concentrations near the intersections; thus, this wind direction was input for all initial modeling. An updated version of the EPA guideline model CALINE-4 [25,26] was employed to estimate near-intersection carbon monoxide concentrations. An array of receptor sites at distances of 10 to 40 meters from the road edge were input to the model. Because of the generally low level of urbanization in the area, a background CO concentration of 0.1 milligram per cubic meter (mg/m3) was assumed.

6.4 Results: 1-Hour Concentrations. The results of this modeling are presented in Figures 6 through 10. Each figure depicts the concentrations in milligrams per cubic meter (mg/m3) at 12 receptor locations on the southeast side of the intersection. Key input parameters are also summarized.

The trend at the Piilani Highway section between Kanane Road and Kilohana Drive was downward from 1987 - 2010 without the project, but upward with the project (Figures 6 - 8). In each case, however, the maximum 1-hour CO concentrations were well below the state standard.

At the two studied intersections, 1-hour CO levels were all below the state standard, both with and without the proposed project. Only within 10 meters of the intersections was the 1-hour CO concentration even close to the state standard of 10 mg/m3.

6.5 Results: 8-Hour Concentrations. Estimates of 8-hour concentrations can be derived by applying a "persistence" factor of 0.6 to the 1-hour concentrations. This "persistence" factor is recommended in an EPA publication on indirect source analysis [27] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to- 1-hour ratio [28].

Applying this factor to the 1-hour results indicates compliance with federal and state 8-hour standards at all receptor locations.

6.6 Correlation with Meteorological Data. A more detailed analysis of the local meteorological data was undertaken in order to estimate the frequency of occurrence of the maximum CO concentrations. While both the Old Maui Airport and the Keawakapu Beach data indicate high probability of northwesterly winds, the latter data suggest that afternoon wind speeds are generally greater than 1 m/sec (2.2 knots) (freq = 0.0); thus, the probability of reaching the highest concentration in close proximity to the intersections would appear low. And since the concentrations are inversely proportional to the wind speed, a doubling of windspeed, from 1.0 to 2.0 m/sec, would result in a halving of the 1-hour CO concentration.

7. OTHER LONG-TERM IMPACTS

7.1 Agricultural Burning. Burning of sugar cane fields prior to harvest is a long-standing practice in Hawaii's sugar industry. However, as urbanization closes in around agricultural operations, it is inevitable that an increasing number of residents may be exposed resulting in a increase in complaints about the air pollution. Cane fires result in the emission of particulates, carbon monoxide, and trace amounts of other organics. This was most recently demonstrated in an EPA study of cane burning on Maui [29]. Concentrations of particulates can reach high levels within about one mile of the fires [11]. A complete quantitative characterization of cane smoke, however, has yet to be performed. Most pre-harvest fires occur once every two years and only last about 20 - 30 minutes. Other field fires, e.g., seed fields, may be more frequent.

7.2 Electrical Generation The estimated 2,650 residential and resort units anticipated in the proposed development will create a substantial additional demand for electrical power, i.e., on the order of 31 million kilowatt-hours per year. The nearest power generating station to the proposed project is Maui Electric Company's Maalaea facility. It is currently comprised of 11 diesel units ranging in size from 2.75 to 12.5 megawatts. Emissions from this facility would eventually increase as a result of the project's electrical demand. Estimates of the annual emissions resulting from diesel fuel combustion to meet the project's electrical demand are presented in Table 6. Based on the assumption of an 80% load factor on the Maalaea plant, these emissions would represent an 6.4% increase over existing emissions.

As part of its ongoing energy planning process, the Maui Electric Company, Ltd. (MECO) maintains a forecast committee which meets annually to review growth in electrical demand and refine its plan for meeting that demand [30]. The company recently installed two 2.5 MW units at Maalaea and is currently seeking permits for two additional 12.5 MW diesels. As the Maui Wailea 670 resort

and other projects on Maui proceed, MECO will continue to evaluate the increasing demand and plan for new generating capacity as required.

In order to provide some indication of the ambient air quality impact resulting from that electrical demand, a recent air permit application for the Maalaea Generating Station was reviewed [31]. That particular application addressed two 12.5 MW diesel units, the approximate size that would be required to meet the Maui Wailea 670 demand. The estimated individual impact of a single 12.5 MW unit as derived from that application is shown in the following table.

IMPACT OF A SINGLE 12.5 MW DIESEL GENERATOR

	Concentration (ug/m3)				
Pollutant	1-Hour	3-Hour	8-Hour	24-Hour	Annual
SO2	--	40.8	--	5.2	0.53
NO2	--	--	--	--	6.3
TSP	--	--	--	3.6	0.2
CO	112	--	15	--	--

The cumulative impact of all the existing and proposed new units is depicted in the following table.

PROJECTED CUMULATIVE IMPACT OF THE MAALAEA GENERATING STATION

	Concentration (ug/m3)		
Pollutant	3-Hour	24-Hour	Annual
SO2	463.6	158	22.5
NO2	--	--	50.3

The above data from the permit application indicate that while there will be additional air quality impact, compliance with both state and federal ambient air quality standards will still be maintained.

7.3 Solid Waste Disposal. Solid waste generated by the proposed project may in the future be a contributor to offsite air emissions. At the present time, the primary disposal means is landfilling; however, the County of Maui has been exploring the feasibility of constructing a resource recovery facility which would burn refuse and generate electricity. Should such a facility be built in the future, then the refuse generated by the proposed project would most likely be burned at that facility and thus be a contributor to emissions at that site. The facility, would, of course, have to demonstrate compliance with all air

pollution control requirements and air quality standards in order to receive a permit to operate from the State Department of Health.

8. DISCUSSION AND CONCLUSIONS

8.1 Short-Term Impacts. Since as noted in Section 5, there is a significant potential for fugitive dust due to the dry climate and fine soils, it will be very important for adequate dust control measures to be employed during the construction period. During the latter stages of development there will be occupied units which will at times be downwind of construction activity. Fugitive dust, particularly during the drier, windier summer months, could be a source of complaints not to mention possible violations of the state or federal standards.

Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. During later phases, dust barriers upwind of existing units might be considered if problems arise from wind-driven dust. The earliest possible landscaping of completed areas will also help.

8.2 Mobile Source Impacts. As noted in Section 6, project-related traffic does not appear to threaten state or federal carbon monoxide standards.

8.3 Other Long Term Impacts.

As noted in Section 7.1, the proposed project may itself be impacted by upwind burning of sugar cane fields. This is an intermittant impact that can be mitigated by having sugar companies' cooperation in choosing optimum times to burn and in not locating seed fields upwind of populated areas. The Hawaiian Sugar Planters' Association has recently begun development of an agricultural burning management program to use real-time local meteorological data to help in determining the optimum times to burn fields so as to minimize human exposure [32]. It should also be noted that active cane fields are some distance from the project site which would result in significant dilution before smoke plumes reached the area.

The proposed project will increase electrical demand which in turn will cause more fuel to be burned and more pollutants to be emitted into Maui's air. This increase in emissions was estimated to be approximately 6.4% of that already occurring at the Maalaea Generating Plant. The estimated emissions also represent increases over the 1980 Maui County Emissions Inventory (Table 2) of approximately 1 - 10% for individual pollutants. Until other nonpolluting means of generating electricity are

developed, such increases in emissions are inevitable. Emissions can be reduced to some extent by reducing electrical demand by the user, e.g., use of solar water heating, heat pump water heaters, or waste heat recovery.

Finally, as noted in Section 7.3, refuse generated by the project may in the future contribute to air emissions if it is burned at a resource recovery facility.

REFERENCES

1. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95, Section 110, Implementation Plans, August, 1977.

2. U. S. Government. Code of Federal Regulations, Title 40, Protection of Environment, Part 50, National Primary and Secondary Ambient Air Quality Standards.

3. State of Hawaii. Title 11, Administrative Rules, Chapter 59 Ambient Air Quality Standards, as amended, April, 1986.

4. Library of Congress, Congressional Research Service. A Legislative History of the Clean Air Amendments of 1970, Volume 1, p. 411, January, 1974.

5. U.S. Environmental Protection Agency. Revisions to National Ambient Air Quality Standards for Particulate Matter, Federal Register, Vol. 52, p. 2463, July 1, 1987.

6. U. S. Environmental Protection Agency. National Ambient Air Quality Standards for Hydrocarbons: Final Rulemaking, Federal Register, Volume 48, No. 3, p. 628, January, 1983.

7. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95) Section 109, National Ambient Air Quality Standards, August, 1977

8. U. S. Environmental Protection Agency. National Ambient Air Quality Standards for Photochemical Oxidants: Final Rulemaking, Federal Register, Volume 44, No. 28, p. 8202, February 8, 1979

9. U. S. Environmental Protection Agency. Regulatory Agenda, Federal Register, Volume 50, No. 82, p. 17784, April 29, 1985.

10. State of Hawaii. Title 11, Administrative Rules, Chapter 60, Air Pollution Control.

11. Root, B.D. et al. Spatial Distribution of Particulates from Sugar Cane Fires in Hawaii: Measurements and Calculations, J. Air Pol. Con. Assoc., Vol.25, No. 6, June, 1975.

12. Anderson, Bruce S. et al., The Lahaina Investigation, Perspectives in Environmental Epidemiology, Issue No. 2, May 1984

REFERENCES (Continued)

13. U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, Environmental Data Service. Hawaii and Pacific Annual Summary, 1974

14. Thornwaite, C. W. Climates of North America According to a New Classification, Geog. Rev. 21: 633-655, 1931.

15. Peterson, C.M., The Trade Wind Regime of Central and Western Maui, National Weather Service Technical Bulletin.

16. Westinghouse Electric Corporation, Environmental Systems Department, Environmental Impact Analyses for the Proposed Diesel-Combustion Turbine Generation Facility for Maui Electric Company, November, 1975.

17. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, Third Edition, 1984, with Supplements 1 - 15.

18. Rexworks, Inc. LO GO 5 Transit Mix Batch Plant, Bulletin No. 1017-283

19. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised): Procedures for Evaluating Air Quality Impact of New Stationary Sources, EPA-450/4-77-001, October 1977.

20. Parsons Brinckerhoff Quade & Douglas. Traffic Impact Study (Pre-Final), Maui Wailea 670, June 3, 1988.

21. U. S. Environmental Protection Agency. User's Guide to MOBILE-3 (Mobile Source Emissions Model), EPA-460/3-84-002, June, 1984.

22. City & County of Honolulu, Department of Data Systems. Age Distribution of Registered Vehicles in the City & County of Honolulu (unpublished report), September, 1986.

23. Seinfeld, John H. Air Pollution: Physical and Chemical Fundamentals, p. 69, McGraw-Hill Book Company, 1975

24. U. S. Environmental Protection Agency. Workbook of Atmospheric Dispersion Estimates, AP-26 (Sixth Edition), 1973.

REFERENCES (Continued)

25. U.S. Environmental Protection Agency. Guideline on Air Quality Models (Revised), EPA-450/2-78-027R, July, 1986.

26. California Department of Transportation. CALINE4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadway (Final Report), November, 1984

27. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis: Indirect Sources Volume 9 (Revised), EPA-450/4-78-001, September, 1978.

28. Morrow, J. W. Air Quality Impact Analysis: Kaka'ako Redevelopment District Plan, July, 1984.

29. U.S. Environmental Protection Agency, Air and Energy Engineering Research Laboratory. Results of Sampling Program for Emissions from Sugarcane Field Burning--Hawaii, April, 1986, EPA-600/X-87-240, August, 1987.

30. Maui Electric Company, Ltd., personal communication with Mr. Paul Shinyama, October 9, 1987.

31. Maui Electric Company, Ltd. PSD Permit Application for Two Medium Speed Diesel Generators at the Maalaea, Maui Generating Station, February, 1987.

32. Hawaiian Sugar Planters' Association. The Hawaiian Sugar Industry: Perspectives on Current Issues, February, 1988.

TABLES

TABLE 1

SUMMARY OF STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	FEDERAL STANDARDS SECONDARY	STATE STANDARDS
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	--	--	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	--	--	150
2. PM-10	Annual	50	50	--
(micrograms per cubic meter	Maximum Average in Any 24 Hours	150	150	--
3. Sulfur Dioxide (SO2)	Annual Arithmetic Mean	80	--	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	--	365
	Maximum Average in Any 3 Hours		1,300	1,300
4. Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	100		70
(micrograms per cubic meter)				
5. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
6. Photochemical Oxidants (as O3)	Maximum Average in Any 1 Hour	240		100
(micrograms per cubic meter)				
7. Lead (Pb)	Maximum Average in Any Calendar Quarter	1.5		1.5
(micrograms per cubic meter)				

TABLE 2

1980 Emissions Inventory
County of Maui

Source Category	Annual Emissions (tons)				
	TSP	SOx	NOx	CO	HC
Steam Electric Power Plants	131	2,892	1,353	367	73
Gas Utilities	0	0	5	0	0
Fuel Combustion in Agriculture	1,866	354	677	0	7
Mineral Products Industry	158	36	61	0	0
Municipal Incineration	0	0	0	0	0
Motor Vehicles	212	143	2,483	34,422	3,676
Construction, Farm and Industrial Vehicles	23	21	300	796	139
Aircraft	5	14	137	1,286	159
Vessels	14	114	71	61	26
Agricultural Field Burning	2,110	0	0	24,316	2,228
Total (T/yr)	4,518	3,575	5,088	61,250	6,307

SOURCE: Department of Health
Environmental Permits Branch

TABLE 3

PM-10 & SO2 MONITORING DATA
KIHEI MAUI, 1987

	Particulate Matter (PM-10) 24-Hour Concentrations (ug/m3)				Sulfur Dioxide (SO2) 24-Hour Concentrations (ug/m3)			
MONTH	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 87	4	17	49	28	4	<5	<5	<5
Feb 87	5	11	23	17	4	<5	<5	<5
Mar 87	5	22	107	45	5	<5	6	<5
Apr 87	3	24	36	29	2	<5	<5	<5
May 87	2	20	41	30	3	<5	<5	<5
Jun 87	4	16	47	25	4	<5	6	<5
Jul 87	5	18	42	29	4	<5	12	7
Aug 87	3	13	33	22	3	<5	13	9
Sep 87	5	24	36	31	2	<5	<5	<5
Oct 87	Data not available				Data not available			
Nov 87		*	*			*	*	
Dec 87		*	*			*	*	
MEAN:	36	11	107	29	31	<5	13	<5

SOURCE: Department of Health

TABLE 4

ANNUAL WIND ROSE
OLD MAUI AIRPORT
1953-57

Direction	Speed (knots) 0-3	4-6	7-10	11-16	17-21	>21	TOTAL
N	.0602	.0923	.1162	.1417	.0380	.0026	.4491
NNE	.0231	.0265	.0264	.0564	.0248	.0026	.1596
NE	.0323	.0344	.0087	.0087	.0031	.0001	.0870
ENE	.0046	.0048	.0007	.0003	.0000	.0000	.0103
E	.0108	.0091	.0008	.0002	.0000	.0000	.0209
ESE	.0015	.0012	.0003	.00000	.0000	.0000	.0030
SE	.0044	.0033	.0013	.0006	.0000	.0000	.0096
SSE	.0011	.0013	.0009	.0004	.0001	.0001	.0039
S	.0050	.0077	.0157	.0111	.0027	.0000	.0426
SSW	.0009	.0016	.0032	.0024	.0003	.0000	.0084
SW	.0010	.0011	.0010	.0004	.0000	.0000	.0036
WSW	.0002	.0003	.0001	.0000	.0000	.0000	.0005
W	.0008	.0012	.0006	.0002	.0000	.0000	.0027
WNW	.0009	.0013	.0013	.0005	.0001	.0000	.0041
NW	.0154	.0244	.0253	.0147	.0023	.0003	.0824
NNW	.0156	.0254	.0331	.0314	.0063	.0003	.1121
TOTAL	.1776	.2359	.2335	.2667	.0776	.0066	0.9998

FRACTION OF CALMS = .0819

SOURCE: Reference 16

TABLE 5

2:00 P.M. WIND ROSE
KEAWAKAPU BEACH, MAUI
1974

Direction	Speed (knots) 1-3	4-6	7-10	11-16	17-21	>21	TOTAL
N	.00000	.00301	.00602	.00301	.00000	.00000	.01205
NNE	.00000	.00904	.00602	.00301	.00000	.00000	.01807
NE	.00000	.00301	.00301	.00000	.00000	.00000	.00602
ENE	.00000	.00301	.00000	.00000	.00000	.00000	.00301
E	.00000	.00301	.00000	.00000	.00000	.00000	.00301
ESE	.00000	.00000	.00000	.00000	.00000	.00000	.00000
SE	.00000	.00000	.00000	.00000	.00000	.00000	.00000
SSE	.00000	.01205	.00904	.00301	.00301	.00000	.02711
S	.00000	.00904	.03614	.03012	.01506	.00000	.09036
SSW	.00000	.01205	.03012	.01807	.00602	.00000	.06627
SW	.00000	.02108	.04217	.01506	.00000	.00000	.07831
WSW	.00000	.05723	.04819	.01807	.00000	.00301	.12651
W	.00000	.03012	.06627	.00904	.00000	.00602	.11145
WNW	.00000	.01807	.08434	.01506	.00000	.00602	.12349
NW	.00000	.00000	.03313	.02711	.02108	.02108	.10241
NNW	.00000	.00301	.02711	.04819	.06928	.05422	.20181
TOTAL	.00000	.18373	.39157	.18976	.11446	.09036	0.96988

FRACTION OF CALMS = .02711

SOURCE: National Weather Service

TABLE 6

ESTIMATED EMISSIONS FROM DIESEL FUEL COMBUSTION
TO MEET PROJECT ELECTRICAL DEMAND

Pollutant	Emissions (T/yr)
Sulfur dioxide	35
Nitrogen oxides	525
Particulate matter	37
Carbon monoxide	114
Total Hydrocarbons	42

Note: Estimates based on average emission rate for diesel units at the Maalaea Generating Station.

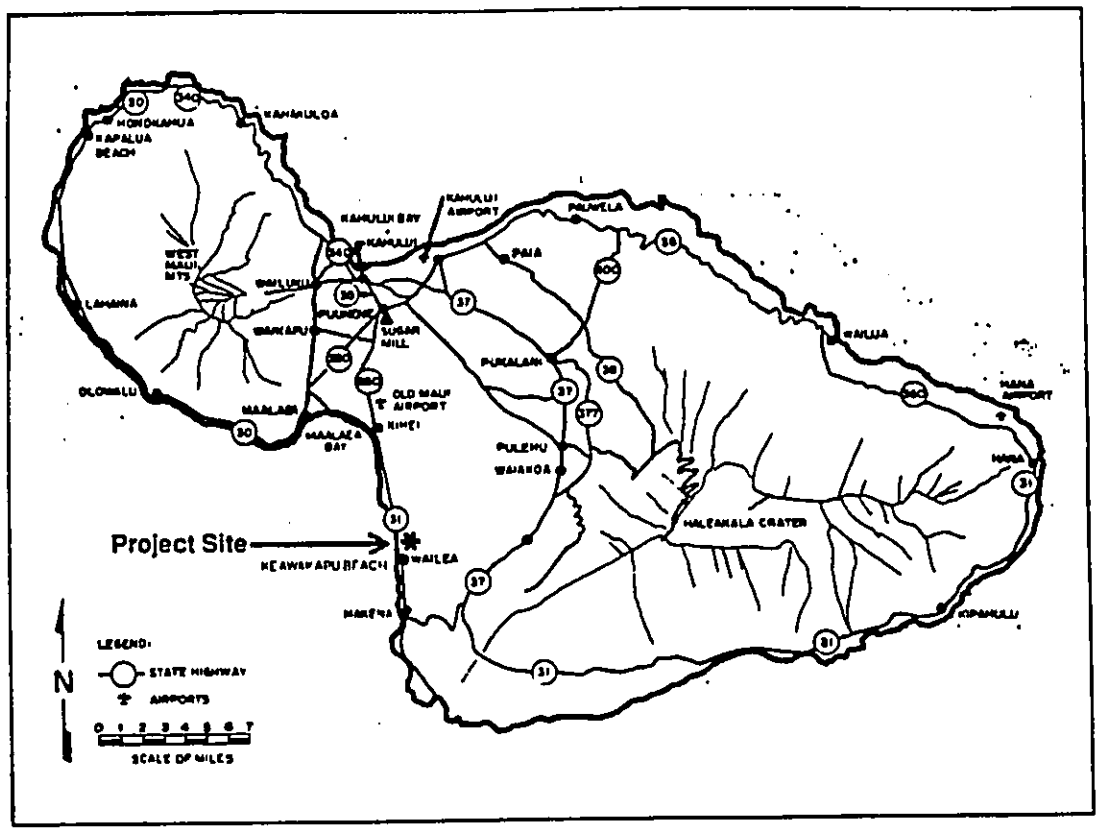


Figure 1. Project Location

FIGURES

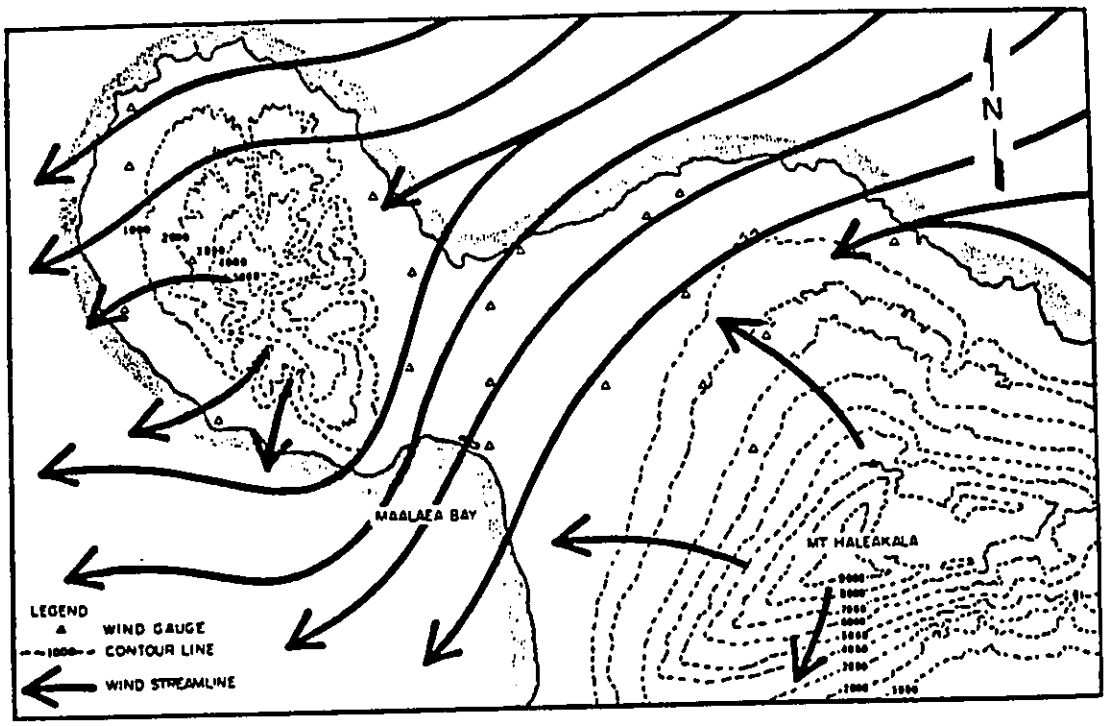


Figure 3. Surface Trade Wind Streamlines During Nighttime Hours
Source: Naitonal Weather Service

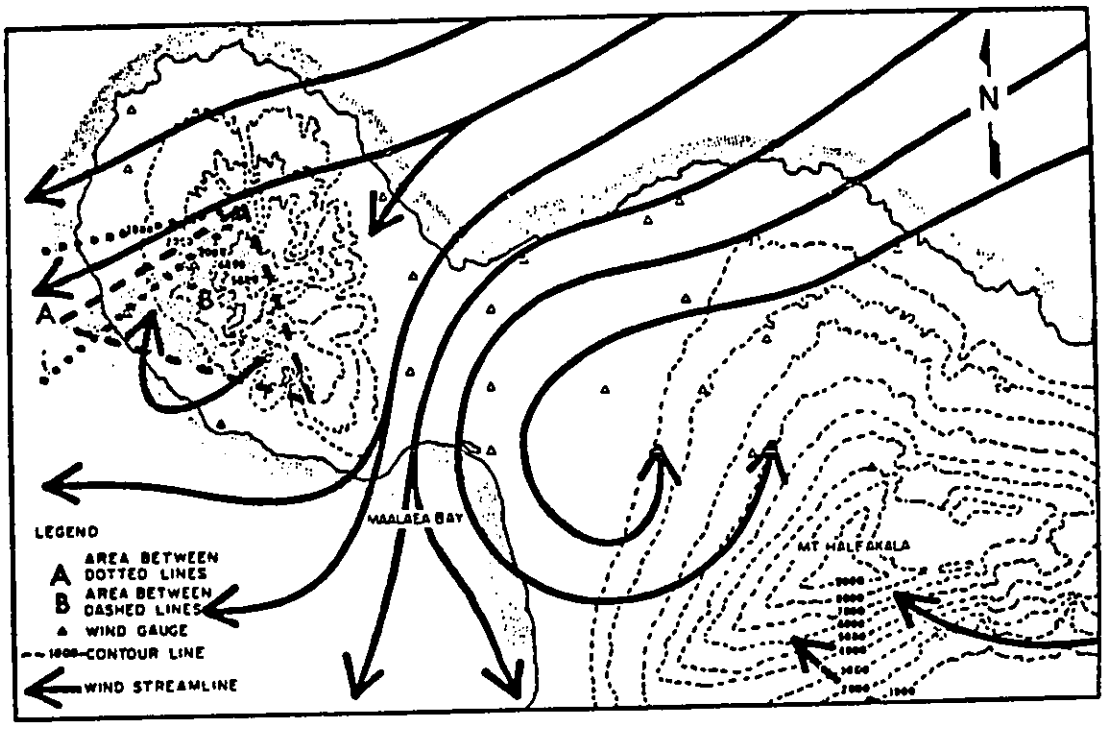


Figure 2. Surface Trade Wind Streamlines During Daytime Hours
Source: National Weather Service

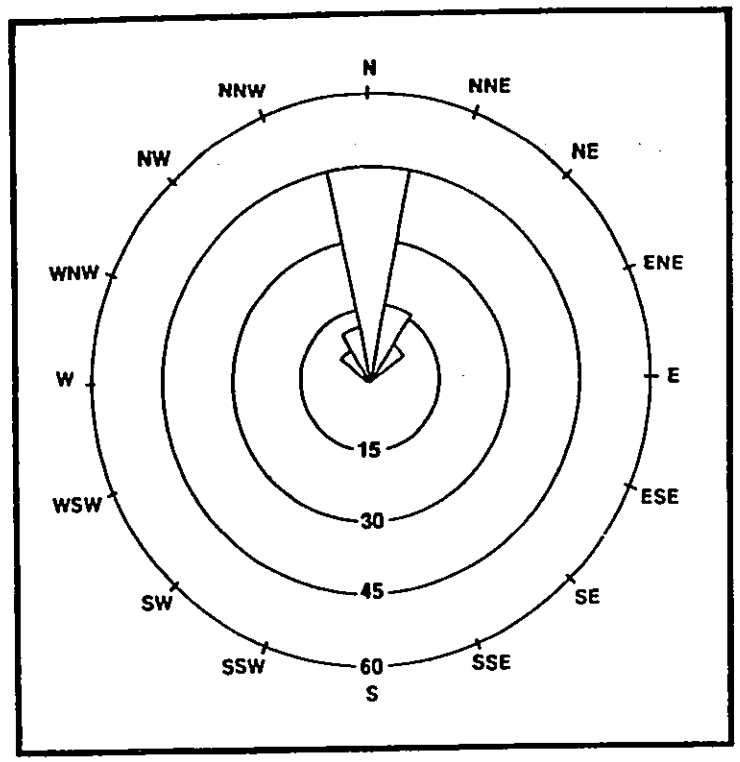


Figure 4. Frequency Distribution Of Wind Direction (%)
Old Maui Airport (1953-57)

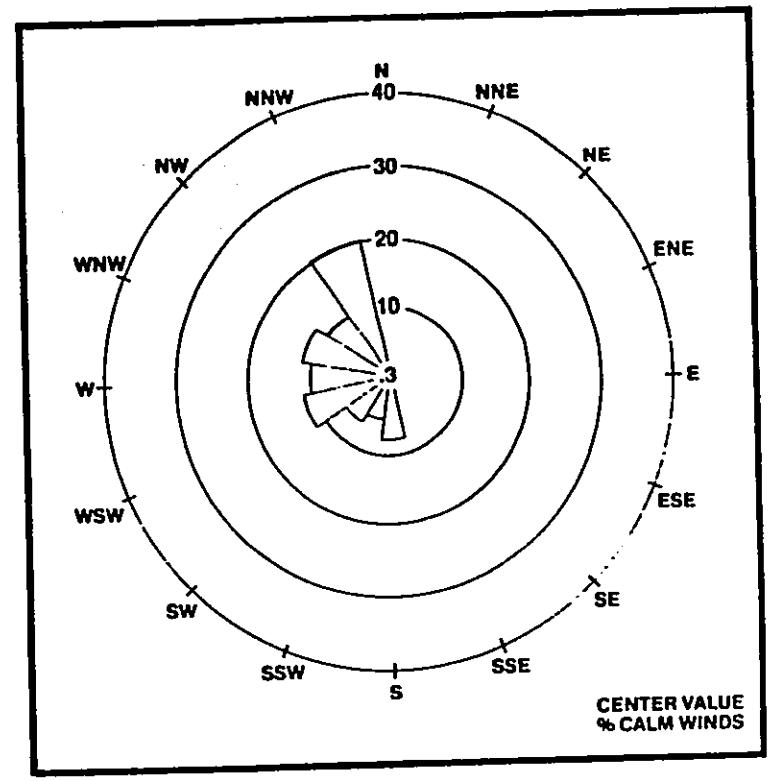


FIGURE 5. FREQUENCY DISTRIBUTION OF WIND DIRECTION (%)
KEAWAKAPU BEACH, MAUI (2:00 P.M.)

FIGURE 6
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PIILANI HIGHWAY
PM-PEAK HOUR (1987)

N ←

Piilani Highway

1.0	1.0	1.0	1.0
0.7	0.7	0.7	0.7
0.6	0.6	0.6	0.6

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 330 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-4
Emissions model: MOBILE-3

FIGURE 7
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PIILANI HIGHWAY
PM-PEAK HOUR (2010 WITHOUT PROJECT)

N ←

Piilani Highway

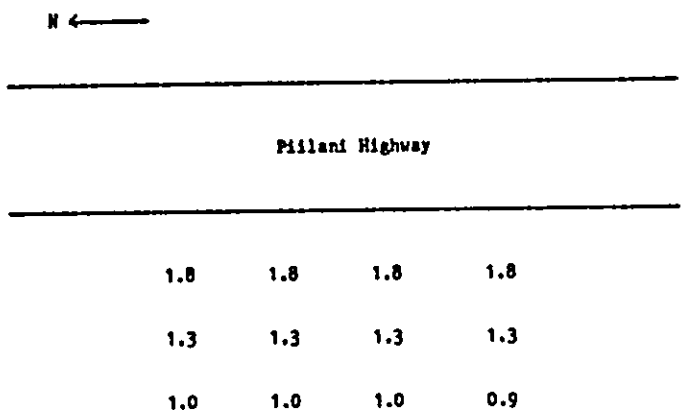
0.9	0.9	0.9	0.9
0.7	0.7	0.7	0.7
0.6	0.6	0.6	0.5

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 330 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-4
Emissions model: MOBILE-3

FIGURE 8
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PIILANI HIGHWAY
PM-PEAK HOUR (2010 WITH PROJECT)

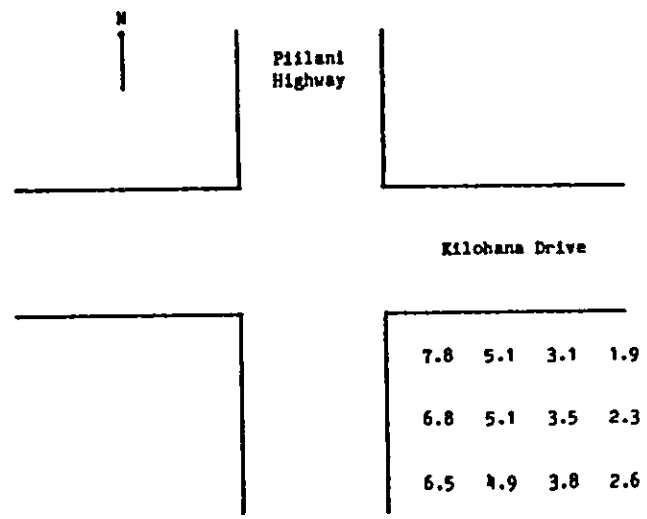


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 330 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-4
Emissions model: MOBILE-3

FIGURE 9
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PIILANI HIGHWAY AT KILOHANA DRIVE
PM-PEAK HOUR (2010 WITH PROJECT)

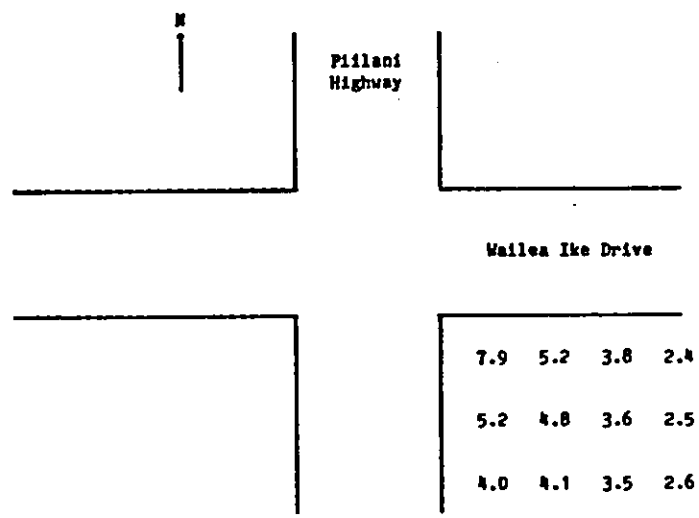


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 330 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-4
Emissions model: MOBILE-3

FIGURE 10
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PIILANI HIGHWAY AT WAILEA IKE DRIVE
PM-PEAK HOUR (2010 WITH PROJECT)



NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 330 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-4
Emissions model: MOBILE-3

APPENDIX D
ARCHAEOLOGICAL RECONNAISSANCE SURVEY

XEROX COPY

ARCHAEOLOGICAL CONSULTANTS
of
HAWAII

59-624 Pupukea Rd.
Haleiwa, Hawaii 96712
(808) 638-7442

JOSEPH KENNEDY
Archaeologist

March 8, 1988

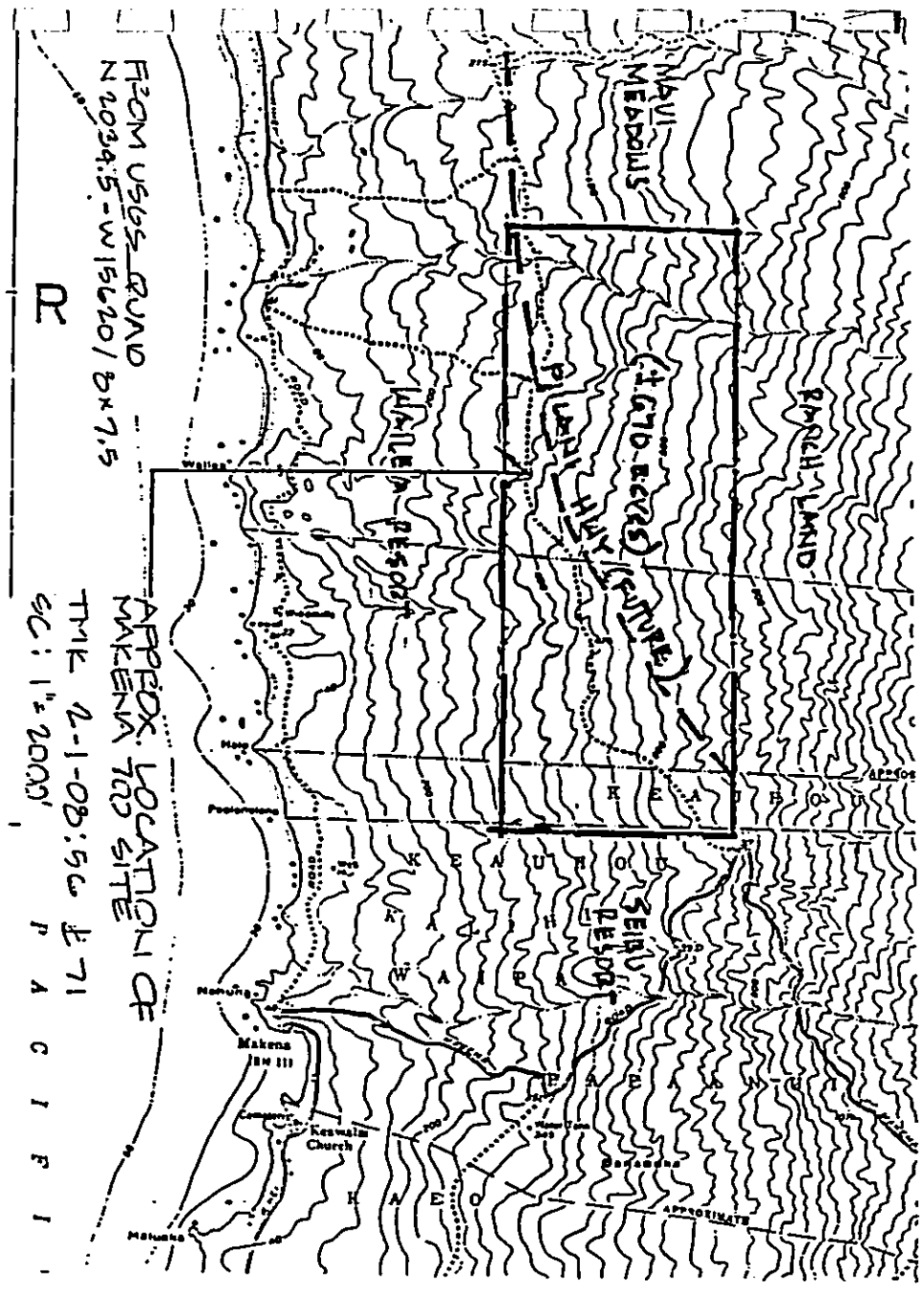
Mr Thomas Whitten
Mr. James Leonard
PBR Hawaii
130 Merchant Suite 1111
Honolulu, Hawaii 96813

Gentlemen:

RE: Archaeological Survey Results Concerning the Proposed Maui Hailea 670 Development. TMK: 2-1-08: 56 & 71. Located near Hailea, Island of Maui.

At the request of your office and Mr Bill Hogarty of the VMS Realty Partners, Archaeological Consultants of Hawaii, Inc. has conducted a surface survey of roughly 670 acres at the location described above.

The subject property is mostly comprised of relatively flat or gently sloping pasture land covered with low grasses and scattered kiawe trees. The only exception to this is an a'a lava flow located at, or very near, the southern border. Visibility at the time of this survey was excellent as far as the pasture land was concerned and poor on the a'a flow due to an increase in vegetation along this formation. There was no water present on the property during the time of our survey, however, no less than three major gulches are present on the property and all indications point to periodic and dramatic energy flows through each one. Except for these infrequent happenings, the property is hot and dry and must be considered very marginal in terms of its ability to support the aboriginal Hawaiian lifestyle.


FROM USGS QUAD
N 2034.5-W 15620/8x7.5
APPROX. LOCATION OF
MAKENA 670 SITE
TMK 2-1-08:56 & 71
SC: 1" = 2000'
MAUI MEADOWS
PORCH LAND
HAILEA RESORT
SEIBU RESORT
Makena
Keawala Church
Wailea
Palauea
Kihei
Kalepolepo
Kaonoulu
Kanaio
Kaupakalua
Kaiwiki
Kaeo
Kaeleku
Kaeo
Kaeo
Kaeo

XEROX COPY

A necessary component of all reports of this nature is a review of the archaeological literature. To begin, the reader should know that this particular piece of property has been the object of archaeological attention in the past. This work begins with Kirch's work in nearby, coastal Palauea in 1971. There are many interesting archaeological insights in this document, however, for the purpose of this report, suffice it to say that Kirch reported evidence of only a small and transiet population and mentioned that the conditions at this coastal location were unsuited to permanent occupation. This portion of Kirch's report has been singled out in order to make the comment that if conditions suited to aboriginal occupation were bad in Kirch's area, they must be considered terrible on the subject property; it is simply not the type of place consistent with significant site occurance.

The next work of consequence is a document entitled Archaeological Survey Palauea and Keahou Section Piilani Highway Island of Maui written by Beth Walton in 1972. In this report, Walton surveyed the yet-to-be constructed Piilani Highway extention and a section of this road corridor crosses through the subject property in a diagonal fashion, stretching, nearly, from one boarder to another (see site location map for approximate location.

In the course of her survey, Walton identified 12 sites. Two of these were outside the highway corridor and two more were '...completly insignificant.' The sites which are mapped and described are numbers 200 through 209, and 211. These are four stone walls, a feature complex, three platforms, a C-shaped structure, an a'a boulder alignment, and a small deteriorated structure.

While Walton's paper seems thorough and is fairly well written, there is a capitol flaw. There is no overall site map included in her report, thereby making it impossible to tell where these sites are located. There are verbal locations that correlate with what she calls 'stations'; we only know that the sites are located somewhere between station 195+00 and station 250+00 - where ever these are. An attempt was made to determine the location of these stations by checking with the Department of Transportation but with little success. The fact that Walton's report was prepared sixteen years ago surely has contributed to the recollection factor.

There is a third archaeological report that must be mentioned and this one is perhaps the most important for it is a previous survey of the subject property in its entirety. This very brief document (just under a page and a half) is authored by Hallett H. Hammatt of the now defunct Archaeological Research Center Hawaii and was prepared in 1979. A partial explanation for the length of this report is that, like this author, Hammatt found no sites and consequently had very little to write about.

Hammatt does mention that he was unable to relocate Walton's sites - not surprising given the lack of meaningful map references - and assumes that these sites were destroyed by the bulldozing associated with the construction of the many jeep roads on the property. This paper concludes by recommending an archaeological clearance for the entire property.

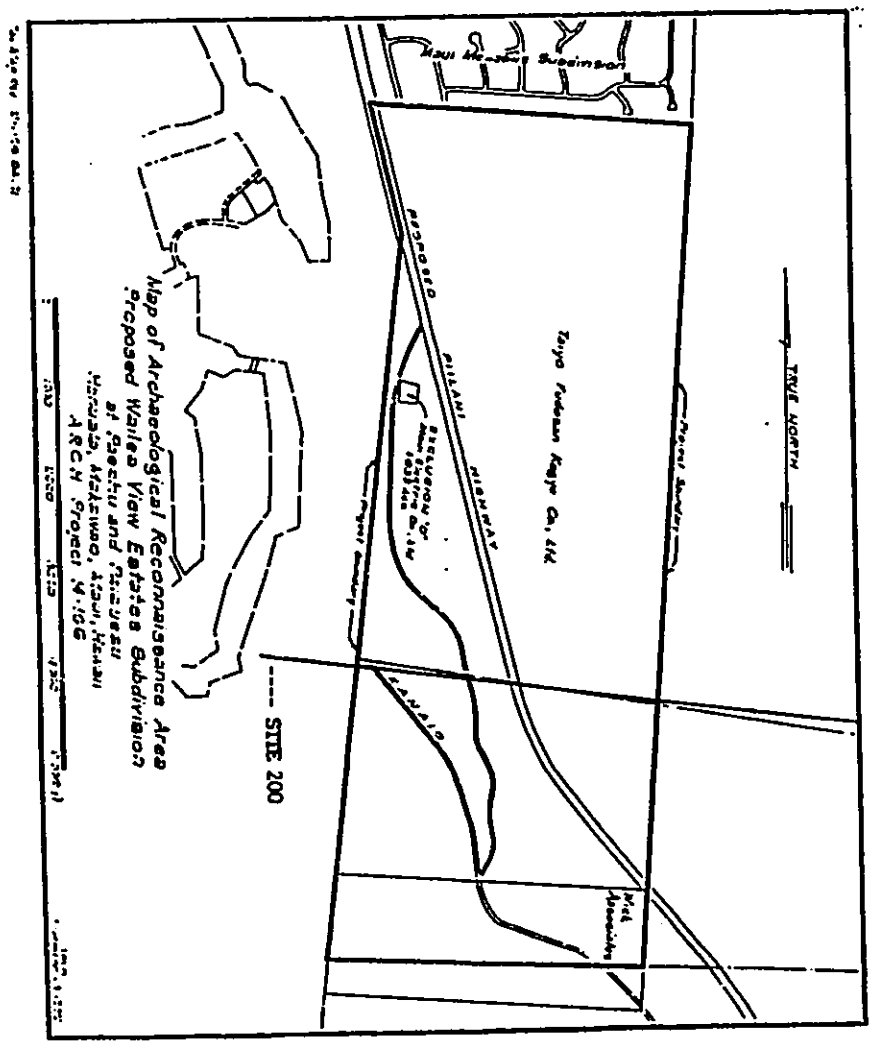
Something must be said concerning the methodology used in this 1988 survey report. Before entering the field, the Kirch, Walton and Hammatt reports were examined. A visit was made to Mr Charles Okino, able curator of the map archives at the State of Hawaii Survey Office. There was nothing in the way of map information that would indicate any precontact settlement for this area.

The State of Hawaii Archives were checked for Land Commission Awards. The only one listed is that to Kekauonohi, M. (LCA 11,216, Apana 21) and this award, while in Palauea ahupua'a, is located off the subject property.

The survey itself took place over a seven day period. Two archaeologists conducted a number of mauka/makai sweeps in an organized fashion using a four-wheel drive jeep, when possible, and covering the remainder of the property on foot.

Special attention was given to areas that matched verbal descriptions in Walton's report but, like Hammatt, we were unable to relocate a single one of her sites (with the exception of, maybe Site 200 - a long cattle wall running along the northern side of the a'a flow. This is a stacked lava rock wall ranging in height from 1.5 meters to 2.0 meters. It runs in a general E/W direction through the entire property, and beyond. As mentioned in the report, it is uncertain if this is an ahupua'a boundary or a historic wall constructed to keep cattle from the nearby a'a flow).

Perhaps, as Hammatt suggests, some of Walton's sites



LOCATION OF WALTON'S SITE 200, MARKED IN RED

LOCATION MAP FROM HAMATT 1979

D-3

have been cleared away in favor of jeep trails, but I suspect that most, if not all, were located off the property to the south.

In addition to the methodological steps mentioned above, informant testimony was also solicited. Mr Andrew Kauai is foreman for Ulupalakua Ranch and has been a paniolo both living and working there for 32 years. By general consensus, Mr Kauai knows the subject property as well as anyone alive.

I was fortunate to have had a somewhat protracted conversation with this gentleman although this took place after we had completed the physical portion of the survey. Portunatly, the timing was not of great importance as Mr Kauai only confirmed what we already knew.

After the first ten minutes of our conversation, I had the feeling that I could have learned more about the property in that amount of time than I could with a platoon of archaeologists in ten weeks. When an individual with this degree of familiarity confirms the results of two seperate studies - namely that there are no modified stone structures on the property that are not of somewhat recent ranch construction - one is compelled to agree!

It is worth mentioning that we did encounter some stone work that was suspicious. For example, just south of the beginning of the a'a flow and alongside the jeep road, a level, stone platform-like structure is visible. At first glance, this would appear to be associated with the prehistoric period. It is not. The stones are too small, there is a 3/4 braided metal cable buried deep in the structure and there are other discrete indications that this formation was constructed by a bulldozer and not a precontact Hawaiian.

Likewise, there is a modified bluff area with carefully placed stones (of the correct size) arranged in a circular fashion. Again, at first glance, this arrangement is consistant with a prehistoric Hawaiian site. Upon closer examination, it became clear that this stone configuration was assembled for the purpose of supporting a water tank. Evidence of the deteriorated wooden tank was present on the structure, similiar structures were noticed with tanks still atop them, and lastly, Mr Kauai said that is what they were.

As mentioned earlier, a very long stone wall runs the northern length of the a'a flow and this may be Walton's site 200. I am uncertain if this was built to keep cattle from attempting to enter this rough lava segment or if was constructed as a boundary between Palauea and Keauhou ahupua'a. In either case, this wall appears on several maps of the area, and I believe this is all that would be necessary in terms of mitigation. It is not unique and has little or no scientific or interpretive value. The current landowners may wish to consider preserving a portion of this wall as part of the landscape plan.

I am convinced that there are no surface features that would be jeopardized by the proposed construction. Beyond this, it is my opinion that there is also little chance for subsurface deposits to be encountered. Burials are always a possibility although, again, they are usually not associated with this type of area.

In view of the combined information presented above, we suggest that no further archaeological work is necessary at this location. In the event that human osteological material present itself, work should be halted at once and a archaeologist contacted. Beyond this, I have no hesitation in recommending an archaeological clearance for this property.

If there are any question regarding this report, please feel free to contact me. Until that time,

Aloha,

Joseph Kennedy

JK:kd

BIBLIOGRAPHY

Hammatt, H 1979 Archaeological Reconnaissance of the Proposed Wailea View Estates Subdivision and Other Lands in a 700 Acre Parcel at Paeahu and Palauea. Letter Report, ARCH 14-166. Lawai.

Kirch P.V. 1971 Archaeological Excavations in Palauea, South East Maui. Archaeology and Physical Anthropology in Oceania, Vol VI, No. 1 April 1971, pp 62-86.

Walton, B. 1972 Archaeological Survey of Palauea and Keauhou Sections, Island of Maui. Department of Transportation Report 72-2. Honolulu.

APPENDIX E
AVIFAUNAL AND FERAL MAMMAL SURVEY

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS
AT MAUI WAILEA 670 PROPERTY, MAKENA, MAUI

Prepared for

Phillips Brandt Reddick

Phillip L. Bruner
Assistant Professor of Biology
Director, Museum of Natural History
BYU-H
Laie, Hawaii 96762

5 February 1988

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS
AT MAUI WAILEA 670 PROPERTY, MAKENA, MAUI

INTRODUCTION

The purpose of this report is to summarize the findings of a three day (29-31 January 1988) bird and mammal field survey conducted at Maui Wailea 670 Property, Makena, Maui. References to pertinent literature are also included. Finally, the report provides some suggestions as to the possible changes in the faunal community that may occur following development along with recommendations regarding habitats essential to wildlife.

The objectives of the field survey were to:

1- Document what bird and mammal species occur on the property or may likely occur given the type of habitats available.

2- Provide some baseline data on the relative density of each species and where possible, within the constraints of the available time, determine the extent to which each species is dependent on the resources located on the property.

3- Compare these findings with published and/or unpublished data.

4- Assess the possible changes in the bird and mammal communities that might occur as a result of habitat alteration.

GENERAL SITE DESCRIPTION

The project site is located on the SW coast of Maui (see Fig. 1). This 670 acre site contains a mix of exotic and native plants with Kiawe (Prosopis pallida) and Wiliwili (Erythrina sandwicensis) the dominant trees and an understory of grass and Ilima (Sida spp.). Elevation of the property is between 300 and 700 feet. This region of Maui is quite dry most of the year. The effect of recent winter rains, however, was noticeable. Kiawe and Wiliwili trees were in leaf and the understory was green and dense.

The site is traversed by ranch roads and cattle graze over much of the property. Game animals abound and posted signs indicate the area is used for sport hunting.

Weather during the field survey was clear with little or no wind. Daytime temperatures were in the 80's.

STUDY METHODS

Field observations were made with the aid of binoculars and listening for vocalizations. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity. Existing roads around and through the property were followed as well as transects across sections of the property not served by roads. At various points (Fig. 1) eight minute counts were made of all birds seen or heard. Between these count stations walking tallys of birds and mammals seen or heard were also kept. These counts provide the basis for the population estimates given in this report. Data on habitat preferences come from these observations plus information provided in Berger (1972), Hawaii Audubon Society (1984) and Pratt et al. (1987). Unpublished reports of similar habitats elsewhere on Maui were consulted in order to acquire a more complete picture of the birdlife activity in the area (Bruner 1981, 1986).

Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative density

XEROX COPY

and distribution. Ueoka (1982) Tomich (1986) were also consulted for additional information on mammal activity.

Scientific names used herein follow those given in the most recent American Ornithologist's Union Checklist (A.O.U. 1983), Hawaii's Birds (Hawaii Audubon Society 1984) and Mammal Species of the World (Honacki et al. 1982).

RESULTS AND DISCUSION

Resident Endemic (Native) Birds:

No endemic birds were recorded during the survey. Given the present nature of the property the only likely endemic bird that might occur would be the Short-eared Owl (*Asio flammeus sandwichensis*). Quarterly waterbird counts on Maui by State of Hawaii Department of Land and Natural Resource personnel do not provide data for this specific site since no permanent wetlands are to be found here.

Migratory Indigenous (Native) Birds:

Pacific Golden Plover (*Pluvialis dominica fulva*) - A total of only two plover were recorded during the field survey. Plovers prefer open areas such as mud flats and lawns. Both plover were observed along the

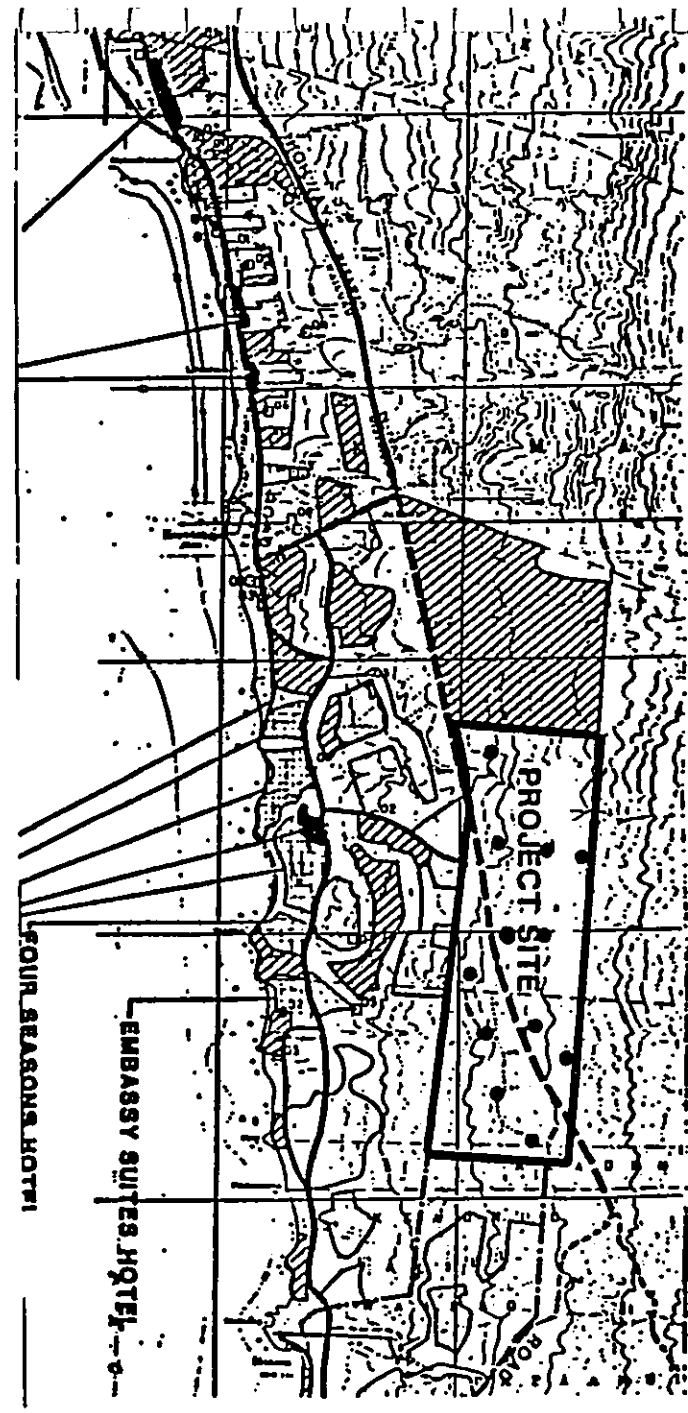


Fig. 1 Project site with eight minute count stations indicated by a ●.

ranch roads that traverse the property. Time did not permit sufficient observations to determine whether these plover were territorial or transient. Johnson et al. (1981) and Bruner (1983) have shown plover are extremely site-faithful on their wintering grounds and many establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. These plover populations likewise remain relatively stable over many years.

No other migratory shorebirds were observed. Given the present habitat none would be expected.

Resident Indigenous (Native) Birds:

No resident indigenous species were recorded nor would any be likely to occur in the present habitat.

Exotic (Introduced) Birds:

A total of 14 species of exotic birds were recorded during the field survey. Table One show the relative abundance of these species. The most abundant bird was Northern Cardinal (*Cardinalis cardinalis*). House Finch (*Carpodacus mexicanus*) a species which is fond of Ironwood trees

Relative abundance of exotic birds, Makena 700 Property, Maui.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*
Wild Turkey	*Meleagris gallopavo*	C = 6
Common (Ring-necked) Pheasant	*Phasianus colchicus*	U = 3
Gray Francolin	*Francolinus pondicerianus*	A = 10
Black Francolin	*Francolinus francolinus*	C = 8
Spotted Dove	*Streptopelia chinensis*	U = 3
Zebra Dove	*Geopelia striata*	C = 8
Common Myna	*Acridotheres tristis*	C = 6
Northern Cardinal	*Cardinalis cardinalis*	A = 14
Northern Mockingbird	*Mimus polyglottos*	C = 6
Japanese White-eye	*Zosterops japonicus*	U = 4
House Sparrow	*Passer domesticus*	U = 3
House Finch	*Carpodacus mexicanus*	A = 13
Nutmeg Mannikin	*Lonchura punctulata*	C = 7
Warbling Silverbill	*Lonchura malabarica*	C = 8

* (See page 14 for key to symbols)

KEY TO TABLE I

Relative Abundance = Average number of individuals observed during walking survey or average frequency on eight minute counts.

A = Abundant (ave. 10=) on 8 min. counts

C = Common (ave. 5-10) on 8 min. counts

U = Uncommon (ave. less than 5) on 8 min. counts

(Casuarina spp.) and Kiawe was also abundant. Northern Mockingbird (Mimus polyglottos) is a species with a patchy distribution in Hawaii. Where it occurs it may be locally common as was the case at this site. Japanese White-eye (Zosterops japonicus) was surprisingly uncommon. This may have been due in part to the lack of flowering Kiawe. Although this species is not entirely nectivorous it is strongly attracted to flowering trees where it forages on both nectar and insects. Red-crested Cardinal (Paroaria coronata) and Cattle Egret (Bubulcus ibis), recorded elsewhere on Maui (Bruner 1981)were not seen on this survey but potentially could occur at this site. Wild Turkey (Meleagris gallopavo) were common on the property. Based on vocalizations adjacent lands to the east appear to have even greater numbers of turkey. Other gamebirds such as Gray Francolin (Francolinus pondicerianus), Black Francolin (Francolinus francolinus) and Common (Ring-necked) Pheasant (Phasianus colchicus) were also common to abundant. Black Francolin and pheasant were most difficult to get population estimates on due to their shyness. Gray Francolin, on the other hand, are more vocal and less hesitant about foraging in the open.

Feral Mammals:

A total of two cats were observed on the survey. No rats or mice were recorded but it would be highly unusual if these ubiquitous mammals did not occur on the property. No mongoose (Herpestes auropunctatus) were seen but scats were observed. This species appears to be somewhat uncommon on the site. Without a trapping program it is difficult to draw firm conclusions about the relative abundance of rats, mice, cats and mongoose. However, it is likely that their numbers are approximately what one would find elsewhere in similar habitat on Maui.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinerus semotus) are sketchy but the species has been recorded from Maui (tomich 1986). None, however, were observed on this field survey despite attempts to locate them by surveying the property at dusk on two separate evenings. Axis deer (Axis axis) were seen on the property and along the fence line on the mauka boundary. This species is relatively abundant at this site with as many as 14 individuals seen within the confines of the property and others on adjacent lands. One large male deer, not Axis Deer, was seen on January 31 along the mauka

fence line. T.Lum of the State of Hawaii Department of Land and Natural Resources is unaware of any other species of deer on Maui, (pers. comm.) and agreed to check into the matter.

CONCLUSION AND RECOMMENDATIONS

A brief field survey can at best provide a limited perspective of the wildlife present in any given area. Not all species will necessarily be observed and information on their use of the site must be sketched together from brief observations and the available literature. The number of species and the relative density of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the ecological picture only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus only long term studies can provide the insights necessary to acquire a definitive perspective of the bird and mammal populations in a particular area. However, when brief field studies are coupled with data gathered from other similar habitats the value of

the conclusion drawn are significantly increased.

In terms of some general conclusions related to bird and mammal activity on the project site the following are offered:

1- The present environment provides a limited range of habitats which are utilized by the typical array of exotic birds one would expect at this elevation and in this type of habitat on Maui.

2- Migrant species, particularly Pacific Golden Plover, are usually benefited by the kind of development that creates large open lawns. It would not be unusual if this specie increased in numbers within the project site.

3- A change of land use of the type proposed will significantly alter the present habitat by creating a more diverse set of living spaces. The planting of fruit bearing trees and the creation of more open areas will provide new habitats which will likely result in an increase of species like plover and Common Myna (Acridotheres tristis). House Sparrow (Passer domesticus), a highly urban species, will become even more common following development of the site. Common (Ring-necked) Pheasant, Wild Turkey, and Black Francolin will be most

impacted by a loss of vegetation cover. These species are much more sensitive to urbanization than is the Gray Francolin. Gray Francolin will likely still occur on the site following development but at lower numbers. As long as some natural cover remains for the birds to seek refuge in they will tolerate a certain amount of development (Bruner 1984, 1985).

4- In order to obtain more data on mammals, a trapping program would be required. The brief observations of this survey did reveal rather low numbers of mongoose. Mammal populations may also change following development. The loss of the dense cover provided by high grass and brush may reduce rat and mice populations while cats, both pets and feral will probably increase. Deer will not occur on the property following development except perhaps when food or water become limiting factors on adjacent lands. At such times the deer might attempt to forage again at this site.

Recommendations:

1- The planting of a wide range of trees would increase the biological diversity of the site for birds.

2- Small ponds would provide water for birds which may be particularly important in the dry summer months in this rather arid sector of Maui.

Phillip L. Bruner
Assistant Professor of Biology
Director, Museum of Natural History
BYU-H
Laie, Hawaii 96762

5 February 1988

SOURCES CITED

American Ornithologist's Union 1983. Check-list of North American Birds. 6th edition. American Ornithologist's Union, Washington, D.C.

Berger, A.J. 1972. Hawaiian Birdlife. The Univ. Press of Hawaii, Honolulu. 270 pp.

Bruner, P.L. 1981. An avifaunal survey of Kanaha Pond and adjacent airport lands, Maui. Unpubl. ms.

——— 1983. Territorial behavior of wintering Pacific Golden Plover in Hawaii. ms. (Paper presented at the 100th meeting of the Amer. Ornith. Union.)

——— 1984. An avifaunal and feral mammal survey of Mauna Kea Properties, Inc. Hawaii. Unpubl. ms.

——— 1985. An avifaunal and feral mammal survey of Waikoloa Beach Resort Property, Coastal area between south property boundary and proposed Hyatt site, Hawaii. Unpubl. ms.

——— 1986. An avifaunal and feral mammal survey of Kapalua Development Subdivision, Honokahau, Lahaina, Maui. Unpubl. ms.

Hawaii Audubon Society. 1984. Hawaii's Birds. Third Edition. Hawaii Audubon Society, Honolulu. 96 pp.

Honacki, J.H., K.E. Kinman and J.W. Koeppl ed. 1982. Mammal species of the world: A taxonomic and geographic reference. Allen Press, Inc. and The Association of Systematics Collections, Lawrence, Kansas. 694 pp.

Johnson, O.W., P.M. Johnson, and P.L. Bruner, 1981. Wintering behavior and site-faithfulness of Golden Plovers on Oahu. 'Elepaio 41 (12): 123-130.

Pratt, H.D., P.L. Bruner, and D.G. Berret. 1987. A field guide to the birds of Hawaii and the tropical Pacific. Princeton Univ. Press 500 pp.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press. Honolulu. 375 pp.

Ueoka, M.L. 1982. Status, trends and utilization of game mammals and their associated habitats in the County of Maui. State of Hawaii, Div. Forestry and Wildlife, Honolulu, Project W-17-R-5. 6 pp., mimeo.

Williams, R.N. 1987. Alien Birds on Oahu 1944-1985. 'Elepaio 47 (9): 87-92.

APPENDIX F
BOTANICAL SURVEY

BOTANICAL SURVEY

MAUI WAILEA 670 PROJECT

WAILEA, MAKAWAO DISTRICT, ISLAND OF MAUI

by

Winona P. Char
George K. Linney

CHAR & ASSOCIATES
Botanical/Environmental Consultants
Honolulu, Hawaii

Prepared for: PBR HAWAII

February 1988

I-3

Table of Contents

	page
List of Figures	ii
INTRODUCTION	1
SURVEY METHODS	1
DESCRIPTION OF THE VEGETATION	2
1. Kiawe/buffel grass pasturelands	3
2. Gully vegetation	4
3. Scrub vegetation	5
RARE, THREATENED OR ENDANGERED SPECIES	6
DISCUSSION AND RECOMMENDATIONS	8
LITERATURE CITED	9
APPENDIX A. PLANT SPECIES LIST	10

List of Figures

page

1. Location of Candidate Endangered Species and Colony of Native Species 21

BOTANICAL SURVEY
MAUI WAILEA 670 PROJECT
WAILEA, MAKAWAO DISTRICT, ISLAND OF MAUI

INTRODUCTION

The Maui Wailea 670 project site consists of approximately 670 acres of relatively gentle sloping lands on the lower flanks of Haleakala, East Maui. It is bound by the Seibu Makena resort on the south; Wailea resort on the west; Kihei and Maui Meadows subdivision on the north; and 'Ulupalakua Ranch on the east. Elevation ranges from roughly 300 to 700 ft. above mean sea level. Most of the vegetation on the site consists of kiawe/buffel grass pasturelands. Gully areas support a mixture of pili grass and various herbaceous species. On the 'a'a lava flow on the southern portion of the site, a scrub vegetation composed primarily of scattered kiawe and wiliwili trees, dense 'ilima shrubs, and a number of other native species is found.

A botanical survey of the site was conducted from 29 January through 02 February 1988 to provide data to be incorporated into the Environmental Impact Statement (EIS). The objectives of the survey were to: 1) prepare a general description of the major vegetation types on the site; 2) conduct an inventory of the plant species; 3) search for rare, threatened or endangered plant species designated by federal and/or state governments; and 4) identify areas of potential environmental problems or concerns.

SURVEY METHODS

Prior to undertaking the survey, a search was made of the pertinent literature to familiarize the principal investigators

with previous botanical studies conducted in the general area. Topographic maps of the project site were studied to determine access, terrain characteristics, and potential logistical and technical problems which might be encountered in the field.

Access onto the Maui Wailea 670 project site was provided by Wailea resort through Kaukahi Street and Wailea Iki Drive, both of which terminate near the western boundary of the project site. A number of abutting cul-de-sacs within the Maui Meadows subdivision also provided access onto the site. Within the project site, ranch roads, overgrown jeep trails, and cattle paths aided the survey work.

In the field, a walk-through survey method was used. Criteria such as structure, composition, and associated plant species were used in identifying and describing each vegetation type. Notes were made of the species found in each of these vegetation types; species which could not be positively identified in the field were collected for later determination in the herbarium and laboratory (University of Hawaii, Manoa, herbarium). The field study focused on those areas which were less accessible to grazing cattle as native species are more likely to be found in such areas. Thus, the gully areas and the 'a'a lava flows were more intensively surveyed.

The species recorded are indicative of the season (wet vs. dry) and environmental conditions at the time of the survey. A survey taken at a different season and under varying environmental conditions would no doubt yield slight variations in the abundance and kinds of species present, especially of the weedy, annual taxa.

DESCRIPTION OF THE VEGETATION

Three major vegetation types are recognized on the project site

and are discussed in detail below. A checklist of all those vascular plant species inventoried during the survey is presented in Appendix A.

Distribution of the major vegetation types is influenced largely by substrate type and, to a lesser degree, by topography and moisture regime. Kiawe/buffel grass pasturelands, the most extensive vegetation cover, occurs where there is soil, although shallow and very stony. These soil types are Oanapuka very stony silt loam (OAD) with a surface layer about 6 in. thick, colored a very dark brown to very dark grayish brown; Makena loam, stony complex (MXC) with a surface layer about 4 in. thick, colored very dark brown, 'a'a lava outcrops may cover as much as 15% of the surface; and Keawakapu extremely stony silty clay loam (KNXD) with a surface layer about 2 in. thick, colored dark reddish-brown (Foote et al. 1972). The substratum under all three soil types is fragmental, stone-size, 'a'a lava. Steeply sloping gullies, which support gulch vegetation, dissect the pasturelands and have been eroded down to the bedrock; boulder-strewn areas are frequently encountered. Scrub vegetation which contains a number of native components is found on a relatively young 'a'a lava flow on the southern portion of the project site; the lava flow covers roughly 25% of the project area. The rough, scoriaceous surface of the 'a'a flow may be lichen-covered in places and, in low-lying areas, some soil, ash, and rubble has accumulated.

1. Kiawe/buffel grass pasturelands

The kiawe/buffel grass pasturelands cover approximately 75% of the ±670-acre site. Vegetation on pasturelands consists of an open forest of kiawe trees (*Prosopis pallida*), with 50 to 60% tree cover. The trees are usually multi-trunked (no main trunk), with trunks 4 to 6 in. in diameter and 15 to 25 ft. tall. Ground cover is dense in most places and consists almost exclusively of buffel grass (*Cenchrus ciliaris*).

Local variation in ground cover, however, occurs where the kiawe has been removed or thinned out, as along fencelines, ranch roads, paddocks, etc. Where the substrate is stony along fencelines, goat grass (Tragus berteronianus) is abundant. Also frequently found in these areas is plush grass (Chloris radiata). Locally common in areas with very thin soil and exposed rocks are mixed patches of malvastrum (Malvastrum coromandelianum), bristly foxtail (Setaria verticillata), virgate mimosa (Desmanthus virgatus), plush grass, abutilon (Abutilon incanum), and cheeseweed (Malva parviflora). In broad, open, grassy areas where cattle frequent and the soil has been disturbed, cheeseweed and two species of chenopodium (Chenopodium carinatum, Chenopodium murale) are abundant.

Where the pasturelands adjoin Maui Meadows subdivision, a number of species used for landscaping have become established, usually from lawn and garden trimmings thrown over the fence and onto the site.

On portions of the project site, especially near the northern one-half of the site, the kiawe trees have died back. In some areas there is evidence of fire, but in most cases the trees have died back without any apparent signs of physical damage. Perhaps, their demise might be attributable to prolonged drought stress.

2. Gully vegetation

Pasturelands are dissected by a number of steeply sloping gullies which define drainage areas. The bottoms of gullies have been eroded down to the solid bedrock; large boulders are often found here. These gully areas may be damper in places and shaded during some part of the day. Where pockets of soil have accumulated, a number of plants have quickly colonized the area. These species include green panic grass (Panicum maximum var. trichoglume), two species of day flower (Commelina benghalensis, Commelina diffusa), bristly foxtail (Setaria verticillata), ageratum (Ageratum conyzoides), and two species of Bidens (Bidens pilosa, Bidens cynapifolia). Among the shady crevices and rocky outcrops, four fern species may be encountered; these are the maiden-hair fern (Adiantum capillus-veneris), doryopteris (Doryopteris decipiens), pellaea (Pellaea ternifolia), and sword fern (Nephrolepis multiflora).

On rocky ledges and gully walls which are exposed to more sun, pili grass (Heteropogon contortus) and portulaca (Portulaca pilosa) are abundant. Lantana (Lantana camara) and koa-haole (Leucaena leucocephala) shrubs, as well as a few trees of Chinaberry (Melia azedarach) and wiliwili (Erythrina sandwicensis) may form small to medium-sized clumps.

3. Scrub vegetation

This vegetation type is found on the geologically recent 'a'a lava flow on the southern portion of the project site. The lava flow is a part of the Hana volcanic series (Macdonald and Abbott 1970). Vegetation cover varies from 30 to 40%, although in some areas it may be as much as 70% cover. In places, the rough 'a'a clinker may be covered with hardy lichens such as members of the Parmeliaceae.

The vegetation is characterized by scattered stands of kiawe (Prosopis pallida), an introduced species, and wiliwili (Erythrina sandwicensis), a native species. Unlike the kiawe on the pasturelands, kiawe trees on the 'a'a flow are usually single-trunked, 1 to 1.5 ft. in diameter and average about 25 ft. in height. No dieback was noted. Wiliwili trees may vary from 18 to 25 ft. in height and 2.5 to 3 ft. in diameter. Saplings, 6 to 8 ft. tall, and numerous seedlings can be found under or around the perimeters of these stands of wiliwili trees. Native 'ilima shrubs, varying from 3 to as much as 6 ft. in height, form a dense layer under and around the stands of trees.

Sprawling over the 'ilima, other shrubs, and fallen trees during the rainy season are dense tangles of the 'anunu vine (Sicyos hispidus), a member of the cucumber family. Also common are vines of koali awahi'a (Ipomoea indica) and ipomoea or Hawaiian moonflower (Ipomoea tuboides).

Other native species found in this vegetation type occur in small, scattered pockets. These include naio (Myoporum sandwicense), nehe (Lipochaeta rockii), puapilo (Capparis sandwichiana), a'ali'i (Dodonaea viscosa), and uhiuhi (Senna gaudichaudii). One such small colony of native plants on the southwest corner of the site contains a Category 1, candidate endangered species, the paunu vine (Canavalia pubescens), a member of the pea or legume family and related to the mauna loa vine (Canavalia cathartica) whose flowers are used in lei making.

Besides the kiawe, other introduced species which form a conspicuous part of the scrub include two species of Bidens (especially noticeable in the wet season), Natal redtop (Rhynchelytrum repens), and buffel grass (Cenchrus ciliaris). As one approaches the 'Ulupalakua Ranch boundary, green panic grass (Panicum maximum var. trichoglume) and koa-haole (Leucaena leucocephala) increase in numbers and become abundant. This may be due to slightly more rainfall, about 20 in./year vs. 15 in./year (State of Hawaii 1973) on the lower boundary, and to changes in the lava flow to smaller fragments of clinker.

RARE, THREATENED OR ENDANGERED SPECIES

No officially listed threatened or endangered plant species protected by the Federal Endangered Species Act of 1973 (16 USC 1531-1543), as amended, and by the State's Threatened and Endangered Species Law (HRS Chapter 124, Title 13) occur on the Wailea 670 project site. Also no taxa which are presently being reviewed by the U.S. Fish and Wildlife Service (USFWS) for

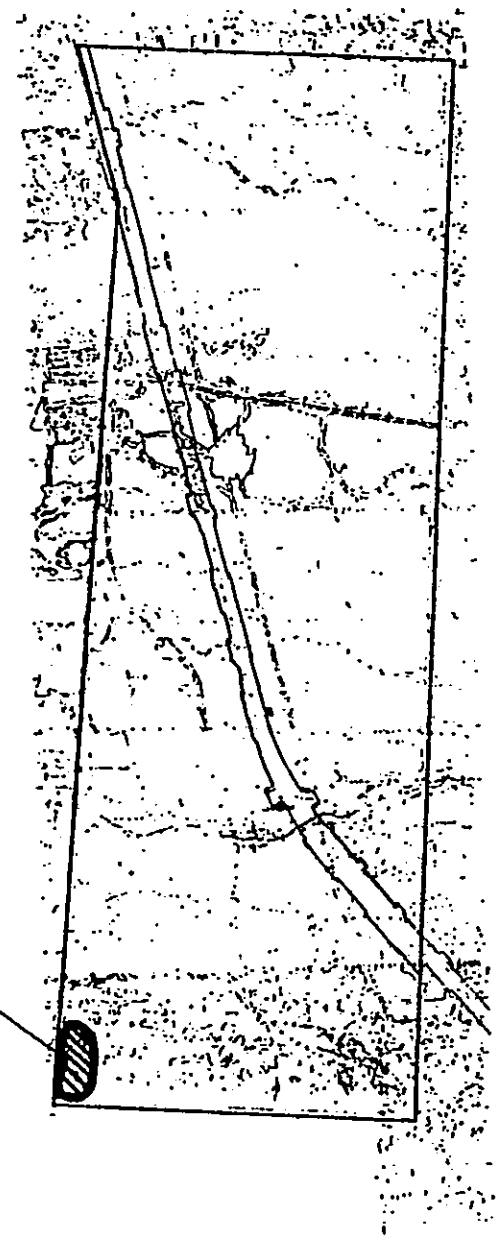
endangered and threatened species status are found on the site (USFWS 1985; Herbst 1987).

One species, the paunu vine (Canavalia pubescens), is listed as a Category 1, candidate endangered species by the USFWS (1985). A Category 1 plant is a taxon "... for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list it as an endangered or threatened species". Because the paunu is a candidate for possible addition to the List of Endangered and Threatened Plants, the Service encourages its consideration in environmental planning.

At present the paunu vine is uncommon in open dry sites such as lava flows, kiawe thickets or dry forest, from elevations of 45 to about 1,620 ft. (Wagner et al., in prep.); it is endemic to the islands of Ni'ihau, the Napali Coast on Kaua'i, Lana'i, and leeward East Maui. Its habitat is threatened by encroaching development in such lowland areas.

Two clumps of plants are found on the southwestern corner of the project site, near the existing 69 kv powerline which runs along the western boundary. The largest and most vigorous clump lies between poles numbered 15 and 16 (Figure 1). In addition, several species considered rare, uncommon or depleted (Fosberg and Herbst 1975) such as the nehe (Lipochaeta rockii), 'anunu vine (Sicyos hispidus), puapilo (Capparis sandwichiana), and uhiuhi (Senna gaudichaudii) also occur in the same area.

This particular, small colony of native species should be left intact if possible. Planned land uses in the area should be adjusted to minimize impact on this colony of plants.



LOCATION OF CANDIDATE ENDANGERED SPECIES AND COLONY OF NATIVE SPECIES

MAUI WAILEA 670

F-6

FIGURE 1

DISCUSSION AND RECOMMENDATIONS

Three vegetation types are recognized on the project site. The most extensive of these is the kiawe/buffel grass pasturelands which cover roughly 75% of the ±670-acre site. This vegetation type as well as the gulch vegetation, which is found in the gullies which dissect the pasturelands, is dominated by introduced species. No rare, threatened or endangered native plants occur here.

On the 'a'a lava flow on the south portion of the project site, native as well as introduced plant species comprise the scrub vegetation. Kiawe and wiliwili trees with a dense 'ilima shrub layer are the conspicuous feature of the scrub. Other native species are found in small, scattered pockets. In one, small colony on the southwestern corner of the site, near an existing powerline, a Category 1, candidate endangered species, the paunu vine (Canavalia pubescens), is found. This particular colony also supports representatives of several, rare, uncommon or depleted native taxa.

It is recommended that the area containing this small colony of native plants be left intact. As the colony is close to the existing 69 kv powerline, this piece of vegetation could serve to buffer the visual impact of the powerlines on parts of the proposed development.

LITERATURE CITED

Foote, D. E., E. L. Hill, S. Nakamura, and F. Stephens. 1972. Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. U. S. Dept. of Agriculture, Soil Conservation Service, Washington, D. C.

Fosberg, F. R. and D. Herbst. 1975. Rare and endangered species of Hawaiian vascular plants. Allertonia 1(1): 1-72.

Herbst, D. 1987. Status of endangered Hawaiian plants. Hawaiian Botanical Society Newsletter 26(2): 44-45.

Macdonald, G. A. and A. T. Abbott. 1970. Volcanoes in the Sea, the Geology of Hawaii. University Press of Hawaii, Honolulu.

State of Hawaii. 1973. Climatologic Stations in Hawaii. Report R42. Dept. of Land and Natural Resources, Div. of Water and Land Development (DOWALD), Honolulu.

U. S. Fish and Wildlife Service, Dept. of Interior. 1985. Endangered and threatened wildlife and plants; Review of plant taxa for listing as Endangered or Threatened Species. Federal Register 50(188): 39526-39527 (+ 57 pp. table).

Wagner, W. H., Jr. and F. S. Wagner. 1987. Revised checklist of the Hawaiian Pteridophytes. Manuscript.

Wagner, W. L., D. Herbst, and S. H. Sohmer. In prep. Manual of the Flowering Plants of the Hawaiian Islands. Bishop Museum Press, Honolulu.

E-7

APPENDIX A. PLANT SPECIES LIST.
MAU'I WAILEA 670 PROJECT, MAKAWAO DISTRICT, ISLAND OF MAU'I.

A list of all the vascular plants found on the project site follows. The plants are divided into two groups: ferns and flowering plants, which are further subdivided into monocots and dicots. Within each of these groups, plants are arranged alphabetically by family, genus, and species. For each species the scientific name with author citation is given; an accepted English or Hawaiian name is provided, when known; and the biogeographic status is indicated by a letter code. The presence (+) or absence (-) of a particular species within each of three major vegetation types recognized on the project site is also provided. Taxonomy and nomenclature of the ferns are in accordance with Wagner and Wagner (1987); flowering plants are in accordance with Wagner *et al.* (in prep.).

An explanation of the abbreviations used (other than author citation) is provided below:

SCIENTIFIC NAME

c. f. = similiar to a certain taxon
s. l. = in the broad sense (*sensu lato*)
sp. = correct species name not determined due to insufficient material
sp. nov. = an, as yet, undescribed new species (*species nova*)
var. = variety

BIOGEOGRAPHIC STATUS

E = endemic, native *only* to the Hawaiian Islands
I = indigenous, considered native to the islands but also found elsewhere
P = Polynesian introduction, not native, thought to have been

SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	BIOGEOGRAPHIC STATUS	VEGETATION TYPE p	g	sc
FERNS					
Adiantaceae					
Adiantum capillus-veneris L.	maiden-hair fern	I	-	+	-
Doryopteris decipiens (Sm.) Hook.	doryopteris	E	-	+	+
Pellaea ternifolia (Cav.) Link	pellaea	I	-	+	+
Aspleniaceae					
Nephrolepis multiflora (Roxb.) Jarret ex Morton	sword fern	X	-	+	+
MONOCOTS					
Cannaceae					
Canna indica L.	Indian shot	X	+	-	-
Commelinaceae					
Commelina benghalensis L.	purple day flower	X	+	+	+
Commelina diffusa N.L. Burm.	blue day flower	X	+	+	-
Gramineae					
Bothriochloa pertusa (L.) A. Camus	hurricane grass	X	+	+	-
Brachiaria subquadripara (Trin.) A.S. Hitchc.	brachiaria	X	+	-	-
Cenchrus ciliaris L.	buffel grass	X	+	+	+
Cenchrus echinatus L.	sandbur	X	+	-	-

I = introduced to the islands by the early Polynesian settlers, prior to Western contact (1778)

X = exotic or introduced, not native, brought to the islands after Western contact by humans either intentionally or accidentally

VEGETATION TYPES (see text for discussion)

p = Kiawe/buffel grass pasturelands

g = Gully vegetation

sc = Scrub vegetation (Kiawe/'ilima)

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
DICOTS					
Amaranthaceae					
Amaranthus spinosus L.	spiny pigweed	y	+	+	+
Asclepiadaceae					
cf. *Asclepias physocarpa* (E. Mey) Schlechter	gomphocarpus	X	+	-	+
Cactaceae					
Opuntia ficus-indica (L.) Mill.	panini	X	+	+	+
Capparaceae					
Capparis sandwichiana DC.	puapilo	E?	-	-	+
Cleome gynandra L.	spider plant	X	+	-	+
Caryophyllaceae					
Polycarpon tetraphyllum (L.) L.	polycarpon	X	+	+	-
Chenopodiaceae					
Chenopodium carinatum R. Br.	chenopodium	X	+	+	+
Chenopodium murale L.	chenopodium	X	+	+	+
Compositae					
Ageratum conyzoides L.	ageratum	X	+	+	+
Bidens cynapifolia HBK.	beggar ticks	X	+	+	+
Bidens pilosa L.	Spanish needle	X	+	+	+
Calyptocarpus vialis Less.	hierba del caballo	X	-	-	+

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Chloris barbata (L.) Sw.	finger grass	X	+	+	+
Chloris radiata (L.) Sw.	plush grass	X	+	+	+
Cynodon dactylon (L.) Pers.	Bermuda grass	X	+	-	+
Digitaria ciliaris (Retz.) Koeler	Henry's crab grass	X	+	-	-
Digitaria insularis (L.) Mez ex Ekman	sour grass	X	+	+	+
Digitaria radicosa (Presl.) Miq.	digitaria	X	+	-	-
Digitaria sp.	crab grass	X	+	-	-
Eleusine indica (L.) Gaertn.	goose grass	X	+	+	+
Eragrostis cilianensis (All.) Vignolo-Lutati	stink grass	X	+	+	-
Eragrostis tenella (L.) Beauv. ex R. & S.	Japanese love-grass	X	+	-	-
Eragrostis sp.	eragrostis	X	+	-	-
Heteropogon contortus (L.) Beauv. ex R. & S.	pili	P	-	+	+
Panicum maximum Jacq. var. *trichoglume* Eyles ex Robyns	green panic grass	X	+	+	+
Panicum torridum Gaud.	kakonakona	E	-	-	+
Rhynchelytrum repens (Willd.) C. E. Hubb.	Natal redtop	X	+	+	+
Setaria verticillata (L.) Beauv.	bristly foxtail	X	+	+	+
Tragus berteronianus Schult.	goat grass	X	+	+	-
Zoysia sp.	zoysia	X	+	-	-
Liliaceae s. l.					
Crinum sp.	crinum	X	+	-	-
Furcraea foetida (L.) Haw.	Mauritius hemp	X	-	-	+
Yucca sp.	yucca	X	+	-	-

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Cruciferae					
Coronopus didymus (L.) Sm.	wart cress	X	+	-	-
Cucurbitaceae					
Cucumis dipsaceus Ehrenb. ex Spach	wild cucumber	X	+	-	+
Momordica charantia L.	bittermelon	X	+	+	+
Sicyos hispidus Hillebr.	sicyos, 'anunu	E	-	-	+
Euphorbiaceae					
Chamaesyce hirta (L.) Millsp.	spurge	X	+	+	+
Chamaesyce hypericifolia (L.) Millsp.	spurge	X	+	-	-
Euphorbia heterophylla L.	spurge	X	+	+	+
Phyllanthus tenellus Roxb.	phyllanthus	X	+	-	-
Ricinus communis L.	castorbean	X	+	+	+
Labiatae					
Ocimum basilicum L.	basil	X	+	-	+
Ocimum gratissimum L.	basil	X	+	+	+
Stachys arvensis L.	staggerweed	X	+	+	+
Leguminosae					
Acacia farnesiana (L.) Willd.	klu	X	-	+	+
Bauhinia blakeana Dunn	Hong Kong orchid tree	X	+	-	-
Calopogonium mucunoides Desv.	calopogonium	X	-	-	+
Canavalia pubescens Hook. & Arnott	paunu	E	-	-	+
Cassia fistula L.	golden shower	X	+	-	-

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Conyza bonariensis (L.) Cronq.	hairy horseweed	X	+	-	-
Conyza canadensis (L.) Cronq.	horseweed	X	+	-	+
Crassocephalum crepidioides (Benth.) S. Moore	crassocephalum	X	+	+	+
cf. Cirsium vulgare (Savi) Tenore	thistle	X	-	-	+
Emilia fosbergii D.H. Nicolson	emilia	X	+	+	+
Galinsoga parviflora Cav.	galinsoga	X	+	+	-
Gnaphalium cf. japonicum Thunb.	cudweed	X	+	+	-
Hypochoeris sp.	cat's ear	X	+	+	+
Lactuca serriola L.	prickly lettuce	X	-	-	+
Lipochaeta rockii Sherff	nehe	E	-	-	+
Sigesbeckia orientalis L.	sigesbeckia	X	+	+	-
Sonchus asper (L.) Hill	spiny sowthistle	X	+	+	+
Sonchus oleraceus L.	common sowthistle	X	+	+	+
Synedrella nodiflora (L.) Gaertn.	synedrella	X	+	+	+
Tridax procumbens L.	coat buttons	X	+	+	+
Verbesina encelioides (Cav.) B. & H.	golden crownbeard	X	+	+	+
Xanthium strumarium L.	cocklebur	X	+	+	+
Zinnia pauciflora L.	wild zinnia	X	+	+	+
Convolvulaceae					
Dichondra repens J. R. & G. Forst.	dichondra	X	+	-	-
Ipomoea indica (J. Burm.) Merr.	koali awahi'a	I	+	+	+
Ipomoea tuboides Deg. & Ooststr.	ipomoea	E	-	-	+
Ipomoea obscura (L.) Ker-Gawl.	yellow bindweed	X	+	-	-
Merremia aegyptia (L.) Urban	hairy merremia	P?	+	+	+

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Moraceae					
Ficus elastica Roxb. ex Hornem.	India rubber tree	X	+	-	-
Ficus microcarpa L. f.	Chinese banyan	X	+	-	-
Myoporaceae					
Myoporum sandwicense Gray	naio	E	-	-	+
Myrtaceae					
Psidium guajava L.	guava	X	+	-	-
Nyctaginaceae					
Boerhavia coccinea Mill.	boerhavia	X	+	-	-
Boerhavia diffusa L.	alena	I	-	-	+
Mirabilis jalapa L.	four-o'clock	X	-	-	+
Oxalidaceae					
Oxalis corniculata L.	yellow wood-sorrel	X	+	+	-
Papaveraceae					
Argemone mexicana L.	prickly poppy	X	-	-	+
Passifloraceae					
Passiflora foetida L.	love-in-a-mist	X	+	-	+
Passiflora cf. *subpeltata* Ortega	white passion flower	X	-	-	+

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Chamaecrista nictitans (L.) Moench	partridge pea	X	+	-	+
Crotalaria incana L.	rattlepod	X	+	-	-
Crotalaria pallida Ait.	rattlepod	X	+	-	-
Desmanthus virgatus (L.) Willd.	virgate mimosa	X	+	-	+
Desmodium tortuosum (Sw.) DC.	beggarweed	X	-	-	+
Erythrina sandwicensis Deg.	wiliwili	E	+	+	+
Indigofera suffruticosa Mill.	indigo	X	+	-	+
Leucaena leucocephala (Lam.) deWit	koa-haole	X	+	+	+
Macroptilium lathyroides (L.) Urb.	wild bush-bean	X	+	-	+
Prosopis pallida (Humb. & Bonpl. ex Willd.) H.B.K.	kiawe	X	+	+	+
Samanea saman (Jacq.) Merr.	monkey pod	X	+	-	-
Senna alata (L.) Roxb.	candlebush, ringworm bush	X	+	-	-
Senna gaudichaudii (H. & A.)	uhiuhi	I	-	-	+
Senna occidentalis (L.) Link	coffee senna	X	-	-	+
Malvaceae					
Abutilon grandifolium (Willd.) Sweet	ma'o	X	+	+	+
Abutilon incanum (Link) Sweet	abutilon	I?	+	+	+
Malva parviflora L.	cheeseweed	X	+	+	+
Malvastrum coromandelianum (L.) Garcke	malvastrum	X	+	+	+
Sida fallax Walp.	'ilima	I	+	+	+
Sida rhombifolia L.	sida	X	+	-	-
Meliaceae					
Melia azedarach L.	Chinaberry	X	-	+	-

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Sterculiaceae					
Waltheria indica L. var. *americana* (L.) R. Br. ex Hosaka	'uhaloa, hi'aloa	I?	+	+	+
Tiliaceae					
Triumfetta semitriloba (L.) Jacq.	burbush	X	-	-	+
Verbenaceae					
Lantana camara L.	lantana	X	+	+	+

SCIENTIFIC NAME	COMMON NAME	STATUS	p	g	sc
Plumbaginaceae					
Plumbago zeylanica L.	'ilie'e	I	+	+	+
Polygonaceae					
Antigonon leptopus H. & A.	coral vine	X	+	-	-
Portulacaceae					
Portulaca oleracea L.	common purslane	X	+	+	+
Portulaca pilosa L.	portulaca	X	+	+	+
Portulaca sp. nov.	portulaca	E	-	+	-
Primulaceae					
Anagallis arvensis L.	scarlet pimpernel	X	+	+	+
Sapindaceae					
Dodonaea viscosa Jacq.	a'ali'i	I	-	-	+
Solanaceae					
Capsicum annuum L.	chili pepper	X	+	-	-
Datura stramonium L.	Jamestown (jimson) weed	X	+	+	+
Lycopersicon pimpinellifolium Mill.	currant tomato	X	+	+	+
Nicandra physalodes (L.) Gaertn.	apple of Peru	X	+	+	+
Nicotiana glauca Grah.	tree tobacco	X	+	+	+
Solanum americanum Mill.	popolo	I?	+	+	+

APPENDIX G
ENGINEERING REPORT

EVALUATION OF EXISTING INFRASTRUCTURE

AFFECTING

MAUI WAILEA 670

WAILEA, MAUI, HAWAII

DEVELOPER: GCR/VMS Maui 670
ADDRESS: Wailuku, Maui, Hawaii

Prepared By:

Warren S. Unemori Engineering, Inc.
Civil and Structural Engineers - Land Surveyors
Wells Street Professional Center, Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii 96793

January 1988

D. Infrastructure

1. Transportation

Access to the project site will be provided by Piilani Highway, which begins north of Kihei at its junction with Mokulele Highway, North Kihei Road, and South Kihei Road. Mokulele Highway and North Kihei Road, both two-lane highways, connect to other parts of Maui; South Kihei Road provides local access to Kihei, parallel to Piilani Highway.

Increment I of the two-lane Piilani Highway, completed in 1981, is 6.8 miles long and extends south to Kilohana Drive, near the north end of Wailea. The highway consists of 12-foot wide lanes with 10-foot wide paved shoulders. Several unsignalized intersections allow traffic to connect to destinations within Kihei. No further improvements to Increment I are planned at the present time.

Increment II, from Kilohana Drive south to Wailea Ike Drive, is programmed for construction in 1988. This 1.4 mile segment will be similar to Increment I, and will end approximately 1,400 feet south of the north boundary of the project site.

Increment III bisects the project site, from the northwest to southeast corners of the property. The State Department of Transportation (SDOT) has developed preliminary horizontal and vertical alignments which

will connect Piilani Highway to Kula Highway in the vicinity of the Makena Dirt Road intersection. The two-lane roadway will be 4.6 miles long and is planned for twelve-foot lanes; however, shoulder widths will be only four to six feet. Increment III is considered a long-range project with design currently expected to begin in eight to ten years. With completion of Piilani Highway, travel times between the Kihei and Kula areas will be reduced; Kula Highway also ties into an unpaved roadway around the south side of the island which connects to Hana.

SDOT traffic counts taken in 1985 show daily traffic volumes of 10,000 vehicles and 8,700 vehicles on Piilani Highway, near the Mokulele Highway intersection and south of Lipoa Street, respectively. Peak hour data indicate that these volumes are approximately 40 percent of the highway's capacity. Conditions at the unsignalized intersections, however, are already approaching capacity. Signalization may be required to adequately serve side street and turning traffic.

Count samples from 1981 and 1983 show highway traffic increasing at a rate of between 10 and 15 percent per year. Estimates of future population in the Kihei-Makena area, which show average growth rates of less than five percent to 1995 and about two percent

thereafter, indicate slower increases in Piilani Highway traffic. At an average increase in traffic of five percent per year, the capacity of the two-lane highway would be exceeded after year 2000.

Connection to Piilani Highway from the project site would be made at several at-grade intersections. A connection opposite Wailea Ike Drive could serve the project until construction of Increment III of Piilani Highway. Other connections should be coordinated with the design of the highway extension. Traffic impacts of the proposed project will be dependent upon the scale and rate of development and other projects in the area.

2. <u>Sewer System</u>

The existing interceptor and transportation system between Kaukahi Drive in Wailea and the Kihei STP was not sized to receive flows from Maui Wailea 670, Seibu or the Palauea/Murray Pacific Site.

The Kihei STP was designed to handle 4.0 millon gallons of wastewater per day. According to County sources, most recent readings taken at the Kihei STP during December and early January indicate that flows ranged between 2.8 and 3.2 MGD. They estimate the remaining capacity in the plant to be approximately 1.0 MGD.

In view of the limited capacity of the existing Kihei wastewater, collection, transportation and diminishing capacity of the treatment facility the following alternatives are being considered by the applicant:

A. Interceptor and Transportation System:

Option 1. Participate with other developers and the County in upsizing the existing gravity interceptors, pump stations and force mains between Wailea and the Kihei STP.

Option 2. Install new interceptor beginning at the southwest corner of Maui Wailea 670 to the Kihei STP along Piilani Highway. Cost to be shared by Maui Wailea 670, Palauea/Murray Pacific and Seibu.

B. Sewage Treatment Plant:

Option 1. Participate with other developers and the County in enlarging existing STP.

Option 2. Construct private STP in Maui Wailea 670 or Seibu site in cooperation with other developers in South Wailea and Makena.

3. Water Supply

a) Potable Water

Potable water for the Kihei region comes from drilled wells located in Iao Valley in Wailuku and in Upper Waiehu where deep well turbine pumps penetrate the underground aquifer near sea level and lift fresh water to the surface. Two transmission lines transport water from these sources to the Kihei-Makena areas of Maui. Water from the Iao Valley or Mokuhau source is conveyed by means of an 18 inch line. Water from the more recently developed source at Upper Waiehu is conveyed by a 36 inch diameter transmission system.

Water for the Wailea and Seibu developments located west and south, respectively, of the proposed Maui Wailea 670 project is from the Upper Waiehu source. This source was developed by the joint venture of Alexander and Baldwin, Inc., Wailea Development Company, Seibu Hawaii Inc. and C. Brewer Company. This source consists of several wells with a present developed capacity of approximately 13.5 million gallons per day (MGD). In their agreement with the County the Joint Venture is obligated to develop up to 19.0 MGD of new water source. However, since the State has determined that the safe yield from the Iao source,

which extends from Iao Valley to Waihee Valley, is 20 MGD the remaining 5.5 MGD of undeveloped source must be developed elsewhere. Exploratory studies, conducted by the County and State as well as C. Brewer Company between Waihee Valley and Kahakuloa Village as a future source of ground water, have been very encouraging.

Presently all areas served by the above mentioned Central Maui sources including Kihei are affected by a Special Rule. This Special Rule mandates that all new water hookups, except for single family detached units and certain category of multi-family units, pay a source assessment fee of $2,700 for each 1,200 gallons per day of water demand. The purpose of this assessment is to fund development of new wells to meet the continuously growing water demands of the Central Maui and Kihei-Makena areas. The Maui Wailea 670 project will pay its share of source development fees to ensure adequate supply of potable water.

The closest water transmission system to the Maui Wailea 670 project is the 3.0 Million Gallon reinforced concrete reservoir in Wailea Development located approximately 1,200 feet north of Kaukahi Street at elevation 353 feet. This reservoir provides storage for Wailea Development's mid-level distribution system.

Wailea Development Company's ultimate plan for their high level system calls for a new 1.0 MG reservoir being constructed above Wailea Development within the Maui Wailea 670 property. Water would have to be pumped from the 3.0 MG mid-level reservoir at elevation 353 feet to this new 1.0 MG high level tank to be located at about the 500 foot elevation.

The area located below elevation 400 feet in Maui Wailea 670 could be serviced off Wailea Development's 1.0 MG high level tank. However, Maui Wailea 670 may have to participate in enlarging the storage and pumping capacities of this system before doing so. The area above elevation 400 feet within Maui Wailea 670 will be serviced from the new tank that has to be constructed at an approximate elevation of 820 feet. Water would have to be pumped to this tank from the 1.0 MG high level storage tank for Wailea Development Company.

The new distribution system for Maui Wailea 670 would probably be tied into the existing distribution system for Maui Meadows to assure continuity of service and circulation.

Table 4 contains average daily water rates generally approved for use in the Wailea/Makena areas by the County of Maui.

TABLE 4

	Type of Development	Water Rates/Unit/Ave. Day
C	Condo	800 gpd
S	Single Family Residential	1,000 gpd
R	Hotel Room	420 gpd
B	Commercial	6,000 gpAd
GC	Golf Course Irrigation	5,600 gpAd

Table 5 contains average daily rates indicated on the County's adopted water master plan.

TABLE 5

Design Criteria Per
1971 Water Master Plan for County of Maui

Land Use	Population Person/Acre	Water Rate GPCD	Water Rate GPAD
Residential	13 - 18	140	1,800-2,500
Apartment	40	140	5,000
Hotel	75	250	17,000
Industrial	--	---	6,000
Commercial	--	---	6,000
School & Church	70	30	1,700
Hospital	40	100	1,800
		DWS	SCS
Agricultural		5,000 gpAd	7,000 gpAd
Rural		1,500 gpd/lot	

GPCD - Gallons per Capita Day
GPAD - Gallons per Acre Day

b) Irrigation Water

Preliminary investigations (by John Mink, Geo-Hydrologist) indicate that there is a limited supply of groundwater suitable for irrigation within the Maui Wailea 670 site. Salinity would be within the 500 to 800 parts per million range.

Presently the Wailea wells capture much of the sustainable yield over the length where they are located down gradient of Maui Wailea 670. However according to Mink's report in the northerly section of Maui Wailea 670 groundwater flow is available since there are no public records of wells located down gradient of this area. Here wells having capacities of 300 gpm or less may be located. (See Appendix A - John Mink's report.)

The following irrigation water alternatives are being considered:

Option 1. Use effluent from the Kihei STP. This option would be attractive if a new sewer collector and transportation system were to be installed between Maui Wailea 670 and the Kihei STP. The force main to transport treated effluent back

to Wailea could then be installed in the same trench as the gravity interceptor line to the STP.

Option 2: Use of effluent from Private STP. One or two wells would have to be installed onsite to augment the volume of effluent from a private STP.

Option 3: Use potable water. Under this option a water source development fee would have to be paid. The one time "source development fee" for 2.0 MGD based on present rate will be (2,000,000 gals. x 1.5 x $2.25/gal.) about $6,750,000.

With regard to treated sewage effluent being injected into underground aquifer, this practice would not have any detrimental effect since there is no potable water souce downstream of project site. Permits from the State Department of Land and Natural Resources will be required prior to drilling any wells within the project site.

4. Drainage

The Maui Wailea 670 project site is located on the western slope of Mount Haleakala in what is often referred to as the Kihei-Makena watershed. The contributory drainage area above the Maui Wailea 670 project site contains approximately 6 square miles or roughly 3,850 acres. This off-site drainage area rises from an elevation of about 700 feet at the easterly (mauka) boundary of Maui Wailea 670 to 6,400 feet at the ridge on Mount Haleakala, a distance of approximately 30,000 feet. About 85 percent of this watershed area is presently being used for grazing with the remaining 15 percent in conservation use.

A hydrology report prepared by Trans Meridian Engineers for the State Department of Transportation, Highways Division in conjunction with the Piilani Highway project indicates that there are 5 major contributory drainage areas above the project site. Numerically they are designated as Drainage Basins 33, 34, 35, 39 and 43. Runoff from these and other drainage basins above the proposed Piilani Highway Extension are tabulated in Table 6.

TABLE 6

Drainage Basin Runoff

Drainage Basin No.	Stream	Rational Method 50 Yr. (cfs)	Rational Method 100 Yr. (cfs)	SCS Method 50 Yr. (cfs)	SCS Method 100 Yr. (cfs)
33				1,925	2,716
34				790	953
35				770	938
36		109	114		
37		155	188		
38		185	204		
39				1,960	2,324
40		109	150		
41		115	159		
42		30	42		
43				497	598
44		86	111		

Runoff from Drainage Basin 33 flows across the Grand Champions Condominium project site at the Wailea Tennis Complex, through two 7'x12' concrete box culverts on Wailea Alanui, into the drainage channel on Wailea Elua to the ocean. Flow from Drainage Basin 34 drains into the existing ditch on the northerly side of Wailea Ike Drive eastbound lane, through five 40"x65" pipe arches under Wailea Ike Place and Wailea Alanui into the open channel in Wailea Elua.

A pair of 84 inch culvert convey runoff from Drainage Basin 35 across Wailea Ekolu Place in Golf Estates I and Wailea Alanui. Open space has been set aside in Site B north of the public beach access and makai of Wailea Alanui for a drainageway to convey runoff from this basin into the ocean.

Drainage Basin 39 drains into a well defined gully south of the Wailea Golf Clubhouse. Two 10 foot diameter culverts convey runoff across Makena Alanui. This gully discharges into the ocean south of the Polo Beach Condominium.

A 78 inch culvert and three 66 inch culverts were installed to convey runoff from Drainage Basin 43 across the recently completed portion of Makena Alanui.

Preliminary indications are that all of the aforementioned drainage structures on Wailea Alanui and Makena Alanui were sized to handle flows based on a 50 year recurrence interval. Consequently with the County now requiring that 100 year recurrent interval be used, all of these drainage crossings would have to be re-evaluated and possibly modified to handle the 100 year flow.

Design criteria for runoff determination for the County of Maui presently are as follows:

a) For Drainage Areas of 100 Acres or Less

1) Use Recurrent Interval (Tm) of 10 years except:

For drainage areas with sump or tail water effect, Tm (recurrence interval) = 50 years.

For design of roadway culverts and bridges, Tm (recurrence interval) = 50 years.

2) Rational Formula Q = CIA shall be used to determine quantities of flow rate, in which:

Q = flow rate in cubic feet per second

C = runoff coefficient

I = rainfall intensity in inches per hour for a duration equal to the time of concentration

A = drainage area in acres

b) For Drainage Areas 100 Acres of More

1) Use Recurrence Interval (Tm) - 100 year. Although the State Department of Transportation Highways Division used a 50 year recurrence interval on Piilani Highway, the County of Maui is now taking a more conservative approach and requiring that major drainage structures be designed to handle 100 year flows.

2) Since stream flow records are lacking for streams and gullies on Maui, the Synthetic Flood Hydrograph method often referred to as the Soil Conservation Services (SCS) method of hydrograph synthesis shall be used to determine the design runoff for all drainage basins larger than 100 acres. This method utilizes available data on land use, soil characteristics and rainfall.

Although the project site consist of 670 acres, approximately 55% or 370 acres of this acreage will remain in open space in the form of golf courses, parks or roadways. Runoff from these open space areas are expected to decrease due to landscaping and more luxuriant ground cover.

Offsite runoff from contributory areas above the project site will be allowed to flow unimpeded across the project following existing natural drainageways. Additional runoff generated from the built-up areas will be directed into shallow depressions created within the golf course fairways, park sites and other open spaces. These dual purpose man-made retention basins could be designed to control and dampen the

amount of flow released into existing drainageways. Therefore, although some of the downstream drainage structures on Wailea Alanui and Makena Alanui may have to be modified to accommodate the increase in runoff due to the change in recurrence intervals, impact of project-generated flow from Maui Wailea 670 on these structures is not expected to be significant.

2025L

XEROX COPY

JOHN F. MINK
CONSULTANT
WATER RESOURCES EARTH SCIENCES
P.O. Box 4452
WAILUKU, HAWAII 96793
(808) 871-0793

Makena Region, Maui, Hawaii

Groundwater Conditions

John F. Mink

December 12, 1986

APPENDIX "A"

Groundwater Conditions Report by John F. Mink

The parcel within which groundwater development and subsurface water injection are proposed lies north of Makena and inland of Wailea at elevations between approximately 350 and 700 feet. Its seaward boundary is approximately one mile from the coast.

The area of the parcel is semi-arid but contains a continuous aquifer of brackish groundwater having average salinity of 500 to 1000 mg/l chloride (the acceptable limit for drinking water is 250 mg/l). This quality is suitable for most agriculture, particularly those based on grasses. The water table lies about two feet above sea level, or approximately at a depth equal to the surface elevation. The shallowest wells possible in the property would have to be about 400 feet deep. The best quality water lies below the most inland reach of the parcel and would require wells about 700 feet deep to develop.

INVESTIGATIONS • EVALUATIONS • PLANNING • DECISIONS

The volume of groundwater moving through the property toward the coast is substantial and originates from both natural recharge on the upper slopes of Haleakala and return irrigation water on HC&S sugar cane fields. Seaward and downgradient of the parcel several wells serve irrigation needs in the Wailea property, but the total flux of groundwater exceeds withdrawals so that additional development is possible. The effect of inland wells on Wailea's output will depend on location of the new wells and their pumping rates. The Seibu irrigation wells are off the path of flow of groundwater passing below the parcel and would not be affected by new withdrawals.

Not any portion of the aquifer underlying the parcel or down gradient of it is potable. The State recognized the unlikelihood of the water ever being used for domestic purposes by drawing the Underground Injection Control Line along the 600 feet elevation contour, which runs close to the most landward boundary of the property. Injection wells are permitted anywhere seaward of the Injection Line, and thus effluent could be disposed of within the parcel. The effluent would have no deleterious effects on the Wailea wells. The subsurface is highly permeable and would easily accept injection.

The above comments may be summarized as follows.

1. A large basal groundwater lens lies beneath the property and is exploitable by means of wells ranging in depth from 400 to 700 feet.

2. The groundwater is brackish, containing 500 to 1000 mg/l chlorides, and though not suitable for drinking it is adequate for irrigation, especially of grasses.
3. The existing Wailea wells down gradient of the parcel withdraw a portion of the groundwater. The effect on these wells by pumpage from within the parcel will depend on the location and capacity of the new wells. The Seibu wells would not be affected by new wells.
4. Virtually all of the parcel lies seaward of the Underground Injection Line. The subsurface is very permeable and will accept effluent. The Wailea wells would not be adversely affected by the effluent.

XEROX COPY

Groundwater Development for Golf Courses
Makena, Maui, Hawaii

December 22, 1987
John F. Mink

RECEIVED
DEC 23 1987
WARREN S. UNEMORI
ENGINEERING, INC.

In my memorandum of December 6, 1987, I concluded that brackish groundwater suitable for irrigation of golf courses underlies the Makena 700 properties up slope of Wailea golf courses. I further stated that the groundwater could be developed by drilled wells, providing the wells were located so as not to interfere with the Wailea golf course wells down the hydraulic gradient from the proposed golf course.

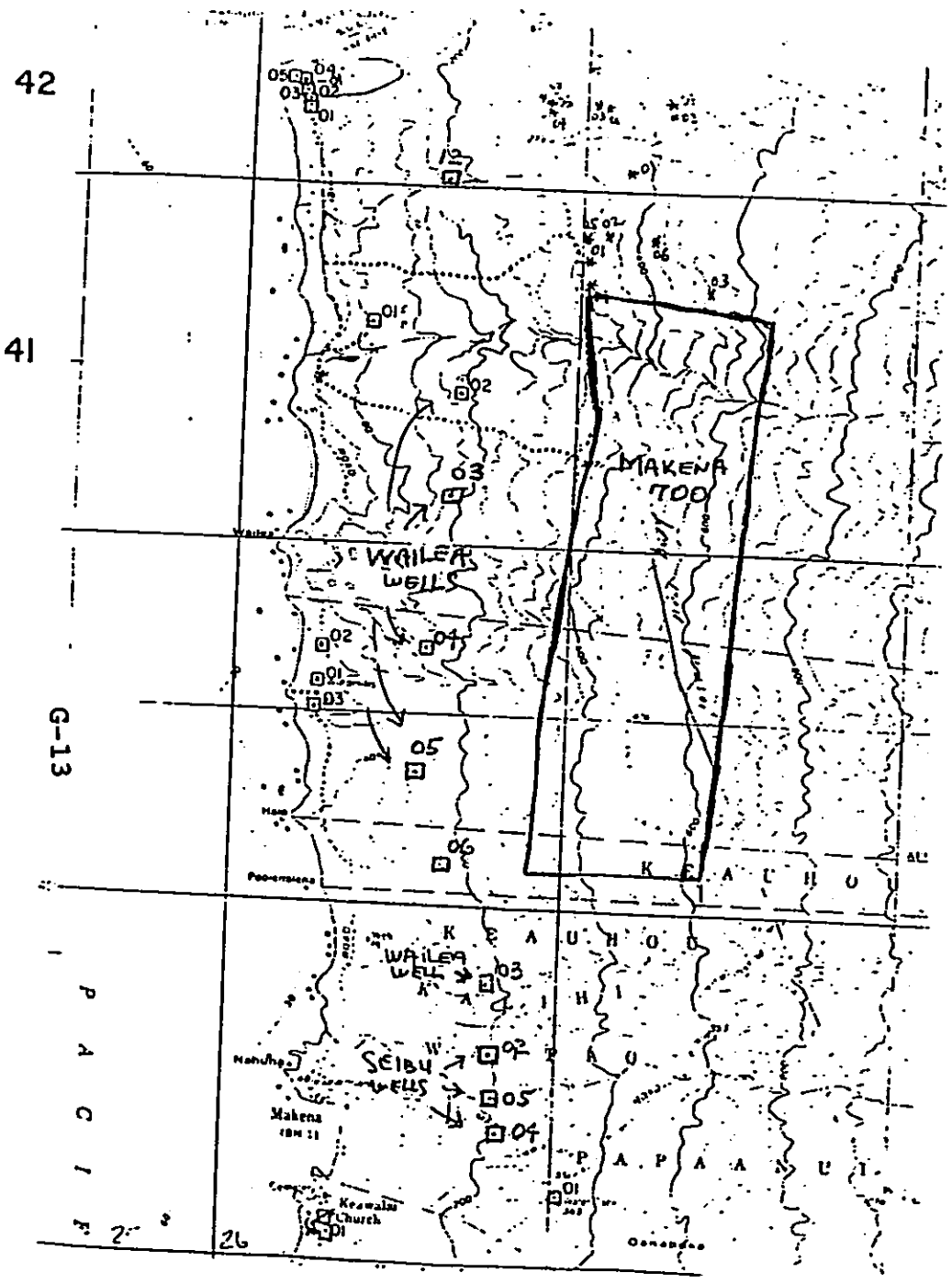
In the Wailea area of interest between Makena 700 and the coast, five wells are located (Wailea nos. 2, 3, 4, 6, 7; State nos. 4126-02,03; 4026-04,05,06), each probably capable of producing 200 to 300 gpm, or about 2 mgd if pumped continuously. The actual output is less, perhaps closer to 1.5 mgd. The wells are sited along a line parallel to the coast about 0.5 miles inland (see attached map). Over a reach of this length (.5 mi) along the Makena coast the total flux perpendicular to the coast line is on the order of 2 to 4 mgd. If this is the case, the Wailea wells have captured the principal share of local sustainable yield. The remaining sustainable yield will have to be carefully exploited to avoid interference with Wailea.

However, in the northern part of the Makena tract no wells are located down gradient. Here wells having capacities of 300 gpm can be located without significantly impacting the more southerly Wailea wells.

In the long term a trade off between the use of treated sewage effluent for irrigation and pumped groundwater should be negotiated with Wailea. Typically, golf course irrigation is approximately 75 percent efficient, which means that 25 percent of the applied water infiltrates to the aquifer. If 1 mgd of effluent is applied, 0.25 mgd (175 gpm) will become groundwater that eventually will flow into the Wailea property. An equivalent amount per 1 mgd irrigation should be allowed as pumpage from wells in Makena 700.

In conclusion, the Wailea wells capture much of the sustainable yield over the length where they are located down gradient of Makena 700. The remaining sustainable will have to be carefully developed if interference is to be avoided. But in the northerly sector of Makena 700, groundwater flow is available. Also, when treated sewage is utilized for irrigation of the proposed golf courses, arrangements for withdrawal of groundwater in the main part of Makena 700 should be negotiated.

XEROX COPY


42
41
MAKENA
TOO
WAILEA
WELLS
WAILEA
WELL
SEIBU
WELLS
K E A U H O U
K E A U H O U
H I
P A P A N U I
Makena
Keawalai
Church
05
03
02
01
04
06
26

APPENDIX H
TRAFFIC ASSESSMENT

TRAFFIC IMPACT STUDY

MAUI WAILEA 670

WAILEA, MAUI, HAWAII

Grand Champions
Resort Development Inc.
and VMS Realty Partners

June 1988

Parsons Brinckerhoff

TRAFFIC IMPACT STUDY

MAUI WAILEA 670

Wailea, Maui, Hawaii

Prepared for:

Grand Champions Resort Development
& VMS Realty Partners

Prepared by:

Parsons Brinckerhoff Quade and Douglas, Inc.

Honolulu, Hawaii

June 1988

TABLE OF CONTENTS

	Page
SUMMARY	1
INTRODUCTION	1
EXISTING CONDITIONS	2
FUTURE CONDITIONS WITHOUT PROJECT	4
TRAFFIC GENERATION	7
PROJECT IMPACTS	11
CONCLUSIONS AND RECOMMENDATIONS	15
REFERENCES	16
APPENDIX	17

LIST OF FIGURES

Figure		Page
1	LOCATION MAP	3
2	TRAFFIC ASSIGNMENT (FUTURE WITH PROJECT)	10

LIST OF TABLES

Table		Page
1	TRIP GENERATION	8
2	HIGHWAY LEVELS OF SERVICE	13
3	INTERSECTION LEVELS OF SERVICE	14

TRAFFIC IMPACT STUDY

MAUI WAILEA 670

TMK: 2-1-08:56 & 71

SUMMARY

On a regional basis, traffic in the Kihei-Makena area has been estimated to increase at a rate of five percent per year. Within the estimated time frame of the proposed Maui Wailea 670 project, the regional traffic conditions for future conditions without the project would be as follows:

- Traffic on Mokulele and Piilani Highways would double by year 2002.
- Projected traffic volumes on Mokulele Highway would require two traffic lanes in each direction prior to year 2000.
- The portion of Piilani Highway between Mokulele Highway and Kanani Road would require two traffic lanes in each direction by year 2006.

INTRODUCTION

Grand Champions Resort Development (Hawaii), Inc. and VMS Realty Partners have proposed a residential/resort community on approximately 670 acres adjacent to the existing Wailea Resort area on the island of Maui. This community would have a maximum of 2,650 units for residential and resort use, a village center, two golf courses, parks, a tennis center, and an area for commercial activity. This study evaluates the expected peak hour traffic impacts for future conditions with and without the proposed project.

EXISTING CONDITIONS

The proposed project is located near the Wailea resort area on the island of Maui. The project site, shown in Figure 1, is located south of the existing Maui Meadows residential subdivision and east of the Wailea resort area. The future extension of Piilani Highway bisects the project site.

Roadway System

Piilani Highway is the major north-south arterial roadway serving the Kihei-Makena area. The pavement structure for Piilani Highway generally consists of one twelve-foot traffic lane in each direction and paved shoulders on either side of the roadway. The posted speed limit is 45 to 55 miles per hour (mph) on this high speed facility with the speed limit decreasing to 25 mph where Piilani Highway presently terminates at Kilohana Drive.

Piilani Highway intersects Kilohana Drive at a unsignalized T-intersection with Piilani Highway forming the stem of this intersection. Stop or yield signs at the Piilani Highway/ Kilohana Drive intersection control all movements except the right turn from Piilani Highway to Kilohana Drive.

Approximately seven miles to the north, Mokulele Highway, a two-lane highway, provides the primary link between Kihei and central Maui. Mokulele Highway crosses with Piilani Highway in a signalized cross-intersection.

Traffic Conditions

The description of existing conditions on Piilani Highway is based on manual traffic counts and observations taken in December 1986, June 1987, and supplemented by additional traffic data obtained from the State Department of Transportation[1].

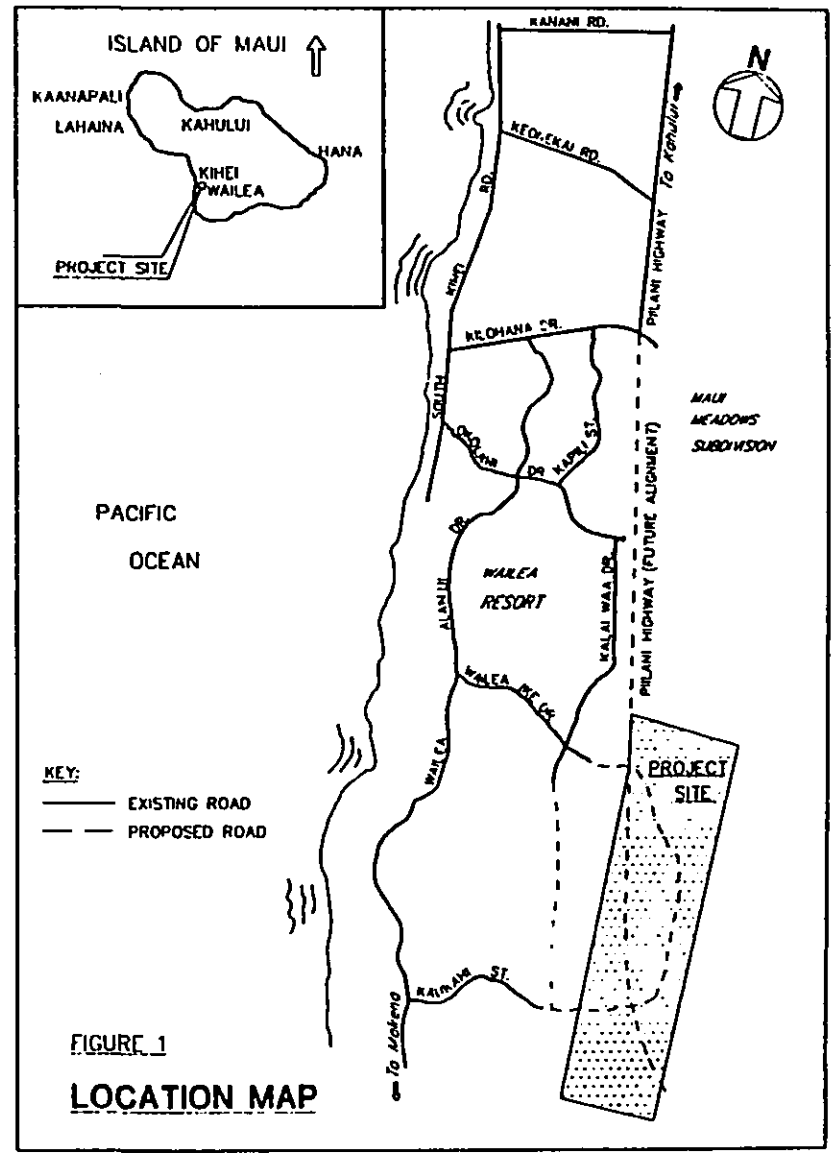


FIGURE 1

LOCATION MAP

The section of Piilani Highway between Mokulele Highway and Kanani Road carries 950 vehicles per hour during the morning (AM) peak hour and 1,020 vehicles per hour during the afternoon (PM) peak hour. The Highway Capacity Manual[2] (HCM) analysis of two-lane highways, which considers potential delays, speed, and capacity utilization, was used to evaluate existing peak hour conditions on Piilani Highway. Piilani Highway operates at Level of Service (LOS) D during both peak hours. Levels of Service are described in the appendix.

The section of Piilani Highway between Kanani Road and Kilohana Drive carries a two-way volume of 590 vehicles per hour (vph) during the AM peak hour and 765 vph during the afternoon PM peak hour. Field observations noted a high percentage of construction-related vehicles using Piilani Highway during both peak periods. This section of Piilani Highway and Kilohana Drive operates at LOS C during both the AM and PM peak hours.

Existing conditions on Mokulele Highway are based on manual traffic counts and field observations taken in December 1986. The segment of Mokulele Highway north of Piilani Highway presently carries 1,005 vehilces per hour (LOS D) during the AM peak hour and 1,150 vehicles per hour (LOS D) during the PM peak hour.

H-4

FUTURE CONDITIONS WITHOUT PROJECT

The proposed project is estimated to be completed in the year 2010. The future conditions evaluated in this study were projected for year 2010. The adjacent Maui Meadows subdivision was assumed to be completely occupied by year 2010 and traffic would be expected to access the subdivision from Piilani Highway.

For future conditions, the highway system was assumed to include a two-lane extension of Piilani Highway to Wailea Ike

drive. Traffic volumes on existing portions of Piilani Highway and Mokulele Highway were estimated to increase at a rate of five percent per year, which correlates to the defacto population growth in the Kihei-Makena area. The five percent growth rate would include traffic increases from other proposed developments in the Kihei-Makena area.

The existing traffic volumes (1986 and 1987) were factored to year 2010 volumes after accounting for the construction-related vehicles observed during the 1987 manual counts; the short-term impact of construction activities would not be expected to affect long-term traffic projections. At this rate of growth, traffic volumes on Mokulele and Piilani Highways will double by year 2002.

Traffic volumes on Mokulele Highway north of the Piilani Highway intersection would exceed capacity of the two-lane highway by year 2000 (LOS F). For year 2010, the projected two-way traffic volumes would be approximately 3,200 vehicles per hour during the AM peak hour and 3,700 vehicles during the PM peak hour. Widening of Mokulele Highway to four lanes would be necessary prior to year 2000 to serve the anticipated traffic demands on this highway.

Analysis of a four-lane Mokulele Highway indicates that the northbound and southbound lanes would operate at LOS E and LOS C, respectively, during the AM peak hour. During the PM peak hour, the northbound lanes would function at LOS C while the southbound lanes would be at LOS E.

The portion of Piilani Highway between Mokulele Highway and Kanani Road would experience over-capacity conditions for a two-lane highway by year 2006. Widening to four lanes would be necessary if the highway were to continue serving peak hour traffic demands. Additional lanes at intersections and

signalization may be needed sooner to maintain adequate service to sidestreet traffic.

A four-lane Piilani Highway would operate at LOS D (northbound) and LOS B (southbound) during the 2010 AM peak hour. The northbound lanes would operate at LOS C while the southbound lanes would be at LOS D during the PM peak hour.

In year 2010, the section of the two-lane Piilani Highway between Kanani Road and Kilohana Drive is projected to carry a two-way volume of approximately 1,440 vph during the AM peak hour (LOS D) and 2,165 vph during the PM peak hour (LOS E).

The extension of Piilani Highway beyond (south of) Kilohana Drive would transform the existing T-intersection into a cross-intersection. The extension of Piilani Highway is expected to result in the diversion of Wailea traffic from Kilohana Drive to Wailea Ike Drive. The HCM unsignalized intersection methodology was used to evaluate operations at this revised intersection. The Piilani Highway approaches were assumed to have a left turn only lane and a shared through-right turn lane while Kilohana Drive approaches would have a single shared lane for all movements.

Southbound left turns off of Piilani Highway would be LOS A during the AM peak hour and LOS C during the PM peak hour. The high left turn traffic projected at the eastbound approach of Kilohana Drive would exceed the available capacity (LOS F) at an unsignalized intersection during both peak hours; the westbound approach on Kilohana Drive would operate at LOS A and LOS B during the AM and PM peak hours, respectively.

The traffic volumes projected at this intersection would satisfy Warrant 11 (peak hour volumes) of the Manual on Uniform Traffic Control Devices[3] (MUTCD) for signalization. With

signalization, the Piilani Highway/Kilohana Drive intersection would operate at LOS C during the AM peak hour and at LOS D during the PM peak hour.

TRAFFIC GENERATION

The estimate of traffic generation for the proposed project includes trip generation which determines the number of trips produced and attracted by the project, trip distribution which determines the origins and destinations of the estimated trips, and traffic assignment which identifies the project traffic roadway usage.

Trip Generation

The proposed project includes single-family units, multi-family units, resort lodges, a village center, parks, golf courses, a tennis center, and commercial development. Use of the single and multi-family units would be divided among employed residents, retired residents, and as resort units for visitors. The project's market study provided a basis for allocating the project's 2,650 units into different catagories for estimating vehicle-trip ends. Table 1 summarizes the trip generation rates based on the Institute of Transportation Engineers' informational report, Trip Generation[4] (Fourth Edition), and trip generation estimate for the project.

The majority of the park, golf course, tennis center, and commercial trip are expected to be internal to the project. In addition, approximately 35 households within the project are expected for employees in the Wailea resort area. These factors when applied to the total trips generated, result in approximately 26 percent and 42 percent of the total trip ends being internal during the AM and PM peak hours, respectively.

TABLE 1

TRIP GENERATION

	AM Peak Hour (vph)		PM Peak Hour (vph)	
Trip Rates (parameter)	Enter	Exit	Enter	Exit
Resort Hotel (DU)	0.59	0.24	0.36	0.31
Recreation Home (DU)	0.13	0.20	0.24	0.25
Retired (DU)	0.20	0.20	0.24	0.25
Single-Family Residential (DU)	0.20	0.55	0.63	0.37
Multi-Family Residential (DU)	0.10	0.44	0.44	0.23
Commercial (Acre)	1.76	0.76	4.74	4.93
Park (Acre)	3.10	2.20	0.40	5.00
Golf Course (Acre)	0.21	0.05	0.03	0.36
Tennis Club (Court)	0.97	0.32	0.58	0.71
Trip Ends Generated (parameter)				
Resort Hotel (526)	310	126	189	163
Recreation Home (860)	112	172	206	215
Retired (855)	171	171	205	214
Single-Family Residential (160)	32	88	101	59
Multi-Family Residential (249)	25	110	110	57
Commercial (40)	70	30	190	197
Park (10)	31	22	4	50
Golf Course (341)	72	17	10	123
Tennis Club (9)	9	3	5	6
Total Trip Ends	832	739	1,020	1,084

Note: DU = Dwelling Unit, vpd = vehicles per day
vph = vehicles per hour
*Discrepencies are due to round-off errors

Trip Distribution/Traffic Assignment

The project's non-internal traffic would be distributed to/from the north which includes origins or destinations in areas beyond the Kihei-Makena area. External project traffic would be expected to use Piilani Highway as the major access point for the project. Kilohana Drive and Wailea Ike Drive would serve as secondary routes for non-project traffic to/from the existing Wailea Resort area while an extension of Wailea Ike Drive and Kaukahi Street would serve the internal project traffic. The traffic assignment at the Piilani Highway/Kilohana Drive intersection represents a worst case conditon. Figure 2 shows the traffic assignment for future conditions with the proposed project.

At the intersection of Mokulele Highway and Piilani Highway, project traffic would use Mokulele Highway for trips to/from Kahului. Project traffic with destinations or origins other than Kahului would remain on Piilani Highway.

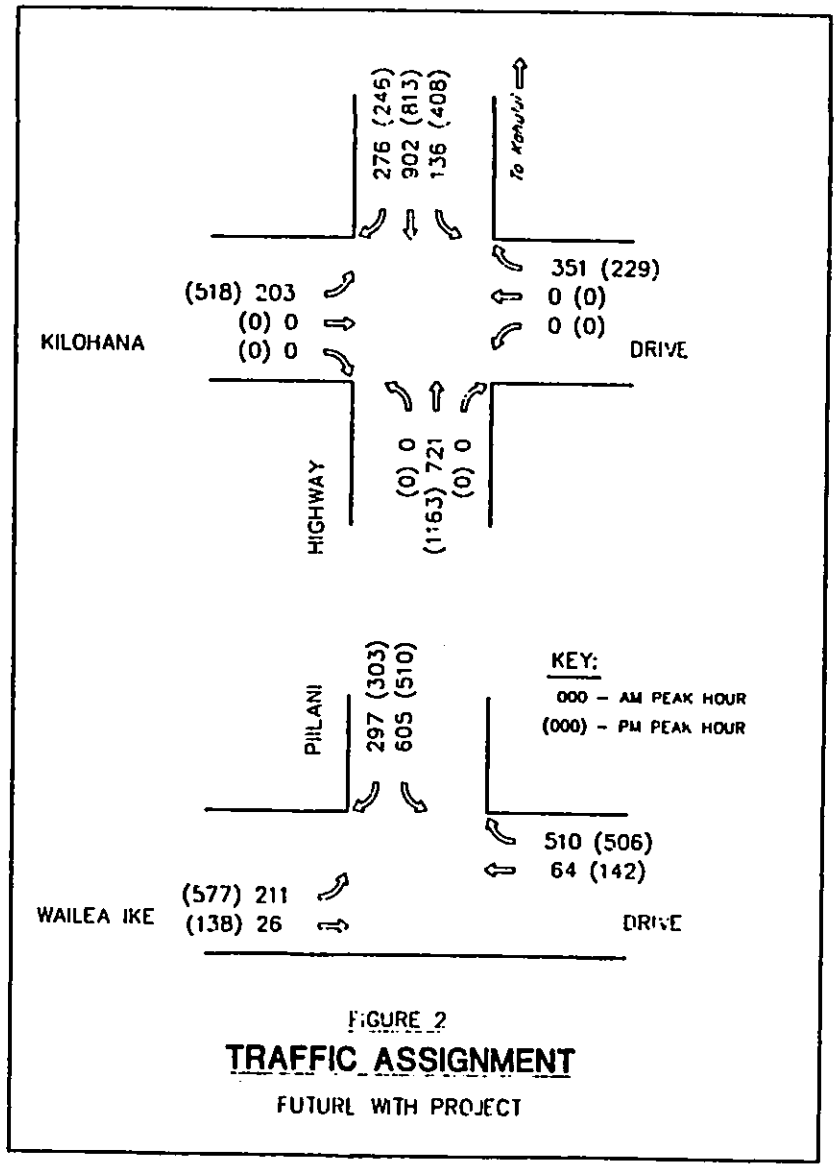


FIGURE 2
TRAFFIC ASSIGNMENT
FUTURE WITH PROJECT

PROJECT IMPACTS

The analysis of future conditions without the project indicated that widening of Mokulele Highway would be needed. With the project, a four-lane Mokulele Highway would operate at LOS E (northbound lanes to Kahului) and LOS D (southbound lanes to Kihei) during the AM peak hour. During the PM peak hour, the northbound lanes would function at LOS D while the southbound lanes would be at LOS E.

Before the completion of the proposed project in the year 2010, Piilani Highway would be extended to Wailea Ike Drive. Piilani Highway would intersect Wailea Ike Drive in a T-intersection with the highway forming the stem of the intersection.

Similarly, four lanes would be needed on Piilani Highway between Mokulele Highway and Kanani Road without the project. With the additional traffic generated, the four-lane highway would function at LOS E and LOS D (northbound and southbound lanes) during the AM peak hour and at LOS D and LOS E during the PM peak hour.

Capacity would be exceeded on the existing two-lane Piilani Highway between Kanani Road and Kilohana Drive. With widening to four lanes (two in each direction) starting from the north and continuing through its intersection with Kilohana Drive, the northbound and southbound lanes would operate at LOS C during the AM peak hour. The Piilani Highway northbound and southbound lanes would experience LOS D and LOS B conditions, respectively, during the PM peak hour.

Analysis of the two-lane Piilani Highway between Kilohana Drive and Wailea Ike Drive indicates LOS E conditions for both peak hours. Widening to four lanes could improve the Level of

Service to LOS B for the northbound and southbound lanes during both peak hours; four lanes on Piilani Highway would also provide sufficient capacities at the Kilohana Drive intersection. Table 2 compares the LOS for highway conditions.

Kilohana Drive would intersect Piilani Highway in a cross-intersection. Traffic volumes for future conditions without the project exceed capacity and warrant signalization at this intersection. The HCM operational analysis was used to determine laneage requirements with a signalized intersection. The signalized Piilani Highway/Kilohana Drive intersection would operate at LOS C during the AM peak hour and LOS E during the PM peak hour. The northbound and southbound approaches at this intersection would require a left turn only lane, a through lane, and a shared through-right turn only lane. The eastbound approach would include two left turn only lanes and a shared through-right turn lane, while the westbound approach would be striped for a right turn only lane and a shared through-left turn lane. Table 3 compares the Levels of Service for intersections.

The intersection of Piilani Highway and Wailea Ike Drive would be a T-intersection. The estimated volumes at this intersction would meet the Warrant 11 criteria of the MUTCD for signalization. As a signalized intersection, LOS B and LOS C conditions would be expected during the AM and PM peak hours, respectively. The southbound approach on Piilani Highway would include a left turn only lane and a right turn only lane. The eastbound approach would require separate lanes for left turn and through movements. The westbound approach would have a through lane and a right turn only lane.

TABLE 2

HIGHWAY LEVELS OF SERVICE

Highway Width (Lanes)	Existing Condition 2	Future Conditions (Year 2010) W/O Project 2	W/O Project 4 (SB)	W/O Project 4 (NB)	With Project 2	With Project 4 (SB)	With Project 4 (NB)
Mokulele Highway							
AM Peak Hour	D	F	C	B	-	-	-
PM Peak Hour	D	F	E	B	-	-	-
Piilani (Mokulele to Kanani)							
AM Peak Hour	D	F	B	D	E	D	E
PM Peak Hour	D	F	D	C	-	E	E
Piilani Highway (Kanani to Kilohana)							
AM Peak Hour	C	D	B	B	E	C	B
PM Peak Hour	C	E	B	C	F	C	D
Piilani Highway (Kilohana to Wailea Ike)							
AM Peak Hour	-	B	-	-	E	B	B
PM Peak Hour	-	C	-	-	E	B	B

Note: SB = Southbound, NB = Northbound

TABLE 3

INTERSECTION LEVELS OF SERVICE

	Future Conditions (Year 2010) W/O Project	With Project
Unsignalized Intersection		
Piilani Highway/Kilohana Drive		
AM Peak Hour		
Eastbound Approach	F	-
Westbound Approach	A	-
Northbound Left Turn	A	-
Southbound Left Turn	A	-
PM Peak Hour		
Eastbound Approach	F	-
Westbound Approach	B	-
Northbound Approach	A	-
Southbound Approach	C	-
Signalized Intersection		
Piilani Highway/Kilohana Drive		
AM Peak Hour	C	C
PM Peak Hour	D	E
Piilani Highway/Wailea Ike Drive		
AM Peak Hour	-	B
PM Peak Hour	-	C

H-9

CONCLUSIONS AND RECOMMENDATIONS

The increases in traffic volumes on Piilani Highway are expected to continue because of on-going development in the Kihei-Makena area. The increasing traffic volumes on the highway have created the need for improvements such as widening or signalization so that cross-street traffic can be accommodated. With development of the entire Wailea Resort area a self-contained community could evolve, resulting in slower rates of growth of traffic on Piilani Highway and Mokulele Highway.

The proposed project, which would be developed over a 15 to 20 year period, is expected to add to the regional traffic demands. Roadway improvements which would need to be implemented to serve the regional traffic needs at full development include:

- widening of Piilani Highway to four lanes as far south as Kilohana Drive
- signalization of the Piilani Highway intersection of Wailea Ike Drive

The regional traffic planning for the Kihei-Makena area needs to be an on-going process to ensure that the transportation facilities keep pace with the projected community growth. Other traffic studies have identified the need for improvements on Piilani Highway within the same time frame as this project. With proper planning, roadway improvements would be planned, funded, and constructed in a timely manner in anticipation of the planned community growth.

REFERENCES

1. State of Hawaii, Department of Transportation, Highways Division, Planning Branch, Count Station 13-C.

2. Transportation Research Board, National Research Council, Highway Capacity Manual, Special Report 209, Washington, D.C., 1985.

3. U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways, 1978, as amended.

4. Institute of Transportation Engineers, Trip Generation, Fourth Edition, Washington, D.C., 1987.

APPENDIX

The Highway Capacity Manual defines six Levels of Service, labelled A through F, from best to worst conditions. Levels of Service for signalized and unsignalized intersections are defined in terms of average user delays. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

Unsignalized Intersections

For unsignalized intersections, the Highway Capacity Manual evaluates gaps in the major street traffic flow and calculates capacities available for left turns across oncoming traffic and for left and right turns onto the highway from the minor street.

LEVEL OF SERVICE A: Little or no delay.
LEVEL OF SERVICE B: Short traffic delays.
LEVEL OF SERVICE C: Average traffic delays.
LEVEL OF SERVICE D: Long traffic delays.
LEVEL OF SERVICE E: Very long traffic delays.
LEVEL OF SERVICE F: Demand volume exceeds capacity, resulting in extreme delays with queuing that may cause severe congestion and affect other movements at the intersection.

Signalized Intersections

For signalized intersections, the Operational Analysis measures signal operations by two separate indicators, volume-to-capacity (v/c) ratios and Level of Service. The v/c ratios provide a comparison of the traffic demands to the theoretical capacity of the intersection while levels of service are determined from the estimated delay. These two indicators do not necessarily correlate to each other.

LEVEL OF SERVICE A: This level describes operations with very low delay, i.e., less than 5.0 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LEVEL OF SERVICE B: This level describes operations with delays in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher average delays.

LEVEL OF SERVICE C: This level describes operations with delays in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear as the number of vehicles stopping is significant; many vehicles, however, still pass through the intersection without stopping.

LEVEL OF SERVICE D: This level describes operations with delays in the range of 25.1 to 40.00 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from a combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LEVEL OF SERVICE E: This level describes operations with delays in the range of 40.1 to 60.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures (queued vehicles do not clear in one cycle) are frequent occurrences.

LEVEL OF SERVICE F: This level describes operation with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle length may also be major contributing causes to such delay levels.

Two-Lane Highways

The analysis of two-lane highways evaluates percent time delay with speed and capacity utilization serving as secondary measures.

LEVEL OF SERVICE A: Motorists are able to drive at their desired speeds. Passing demand is well below capacity and almost no platoons of three or more vehicles are observed. Drivers would be delayed no more than 30 percent of the time by slow-moving vehicles.

LEVEL OF SERVICE B: Passing demand approximately equals passing capacity. Drivers may be delayed up to 45 percent of the time, the number of platoons forming in the traffic stream begins to increase dramatically.

LEVEL OF SERVICE C: Traffic flows increase, resulting in noticeable increases of platoon formation, platoon size, and frequency of passing impediment; chaining of platoons and significant reductions of passing capacity begin to occur. Traffic flows are stable, but is susceptible to congestion caused by turning movements and slow-moving vehicles. Motorists may be delayed up to 60 percent of the time.

LEVEL OF SERVICE D: Traffic flows become unstable. The two opposing traffic streams essentially begin to operate separately as passing becomes extremely difficult. Passing demand is high,

while passing capacity approaches zero. Average platoon sizes of 5 to 10 vehicles are common. Turning vehicles and/or roadside distractions cause major shock waves in the traffic stream. Delays for motorists may approach 75 percent of the time. This is the highest flow rate that can be maintained without a high probability of breakdown.

LEVEL OF SERVICE E: Traffic flows experience delays more than 75 percent of the time. Passing is virtually impossible and platooning becomes intense when slower vehicles of other interruptions are encountered. Traffic volumes may reach capacity of the highway. Operating conditions at capacity are unstable and difficult to predict or maintain; Level of Service E is a transient condition and perturbations in traffic flows would cause a rapid transition to Level of Service F.

LEVEL OF SERVICE F: Heavily congested flow with traffic demand exceeding capacity. Volumes are lower than capacity and speeds are below capacity speeds.

Multilane Highways

The analysis of multilane highways evaluates the maneuverability of vehicles within the traffic stream which is quantified as density.

LEVEL OF SERVICE A: This service level represents unrestricted free-flow conditions. Minor incidents or breakdowns on the highway will have little effect on the traffic at this level.

LEVEL OF SERVICE B: This service level is characterized by smooth or stable free-flow conditions. Flow deterioration due to minor incidents or breakdowns is slightly more severe than LOS A.

LEVEL OF SERVICE C: Highway flows are stable but are more sensitive to increases in traffic volumes. Restriction of manueverability becomes noticeable at this level. Minor incidents or breakdowns may cause queues to form which will have a significant impact on traffic flow.

LEVEL OF SERVICE D: This service level borders on unstable flow on the highway. Driver manueverability becomes very limited. Minor incidents or breakdowns can cause substantial queuing.

LEVEL OF SERVICE E: This service level describes capacity conditions. The operation of the highway becomes very unstable because usable gaps in the traffic stream are virtually non-existent. At this LOS, the traffic stream loses its ability to dissipate minor disruptions.

LEVEL OF SERVICE F: Capacity of the highway is exceeded and motorists experience forced flow conditions.