March 23, 1989

Dr. Marvin Miura, Director
Office of Environmental Quality Control
465 South King Street
Kekuanaoa Building
Honolulu, HI 96813

Dear Dr. Miura:

Re: Notice of Acceptance of a Final Environmental Impact Statement ("FEIS"), pursuant to Chapter 343, HRS filed by GCR/VMS Maui 670, VMS Realty Partners for the proposed Wailea 670 residential resort project at TMK 2-1-08: 56 and 71, Wailea, Maui.

At its meeting of March 21, 1989, the Maui Planning Commission reviewed the above FEIS and after due deliberation, voted to accept the subject FEIS, in compliance with Chapter 343, HRS and the EIS Rules. The Commission found that:

1. The procedures for assessment, consultation process, a review responsive to comments and the preparation and submission of the subject EIS were completed satisfactorily.

2. The content requirements were satisfied.

3. Comments submitted during the review process received responses satisfactory to the accepting authority and were incorporated or appended to the FEIS at the discretion of the applicant.

4. The Applicant clarified a concern regarding sewage treatment and effluent disposal. During and subsequent to the preparation of the FEIS, the County of Maui and various developers, including the Applicant, have been discussing options to expanding the sewage treatment capacity in the Kihei-Makena area. One option under serious consideration includes constructing a
new sub-regional sewage treatment plant to service the Wailea-Makena area. In light of the current status of planning for sewage treatment facilities in the Kihei-Makena district and the Applicant's commitment to comply with applicable State and County requirements for sewage disposal, the Commission determined that the issue of sewage treatment and effluent disposal was adequately handled in the FEIS.

A copy of the accepted FEIS is enclosed for your reference.

Should further clarification be necessary, please contact John Min of our office at 243-7735.

Very truly yours,

[Signature]
Ralph Masuda
Deputy Planning Director

encl.

cc: Jim Murray, VMS Realty Partners
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

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 Kihel-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.
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 a 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**

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


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/klaaw 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:
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.

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<th>Authority</th>
<th>Approval Required</th>
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<td>COUNTY OF MAUI</td>
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<td>Planning Department</td>
<td>Environmental Impact Statement</td>
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<td>Zone Change Approval</td>
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I-19
10. **LIST OF FINAL EIS PREPARERS**

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<th>Area of Expertise</th>
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<td>GCR/VMS Maui 670</td>
<td>Vice President, Acquisition &amp; Development</td>
<td>Land Development</td>
</tr>
<tr>
<td>J. McGrath</td>
<td>Project Manager, Maui</td>
<td>Project Management</td>
</tr>
<tr>
<td>P. Nottage</td>
<td>Development Coordinator</td>
<td>Infrastructure Planning</td>
</tr>
<tr>
<td>PBR HAWAII</td>
<td>President</td>
<td>Planning</td>
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<td>Wm. F. Brandt</td>
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<td>G. Bergdahl</td>
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<td>L. Warning</td>
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<tr>
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<td>Owner</td>
<td>EIS Preparation</td>
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<td>T. Ishikawa</td>
<td>Owner</td>
<td>Botany</td>
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<tr>
<td>Gordon A. Chapman Consulting Services</td>
<td>Owner</td>
<td>Archaeology</td>
</tr>
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<td>G. A. Chapman</td>
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<td>Char &amp; Associates</td>
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<td>W. Char</td>
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</tr>
<tr>
<td>Phil Bruner</td>
<td>Archaeologist</td>
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<tr>
<td>P. Bruner</td>
<td>Partner-In-Charge</td>
<td>Ecology</td>
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<td>Peat, Marwick, Main &amp; Company</td>
<td>Traffic Engineer</td>
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<tr>
<td>M. Tom</td>
<td>Traffic Engineer</td>
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<tr>
<td>Parsons, Brinckerhoff, Quade &amp; Douglas</td>
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I-20
List of Draft EIS Preparers (Continued)

<table>
<thead>
<tr>
<th>Name/Affiliation</th>
<th>Title</th>
<th>Area of Expertise</th>
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<tbody>
<tr>
<td>Warren S. Unemori</td>
<td>President</td>
<td>Civil, Structural</td>
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<tr>
<td>W. Unemori</td>
<td></td>
<td>Engineering</td>
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<tr>
<td>J. W. Morrow</td>
<td>Owner</td>
<td>Air Quality Analysis</td>
</tr>
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<td>J. W. Morrow</td>
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<td></td>
</tr>
<tr>
<td>John F. Mink</td>
<td>Owner</td>
<td>Water Resources</td>
</tr>
<tr>
<td>J. F. Mink</td>
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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
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. (MEO) 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:

II-4
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>
<thead>
<tr>
<th>TABLE II-1</th>
<th>GENERAL LAND USE ALLOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Approx. Acres</td>
</tr>
<tr>
<td>Village/Mixed Use (includes lodging units)</td>
<td>31</td>
</tr>
<tr>
<td>Commercial</td>
<td>6</td>
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<td>Resort Lodges</td>
<td>27</td>
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<tr>
<td>Residential</td>
<td>233</td>
</tr>
<tr>
<td>Golf Courses (two 18-hole courses)</td>
<td>341</td>
</tr>
<tr>
<td>Parks/Recreation</td>
<td>14</td>
</tr>
<tr>
<td>Open Space/Roads</td>
<td>18</td>
</tr>
<tr>
<td><strong>TOTALS:</strong></td>
<td><strong>670</strong></td>
</tr>
</tbody>
</table>

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 Waiea 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 WAIEA 670 RESORT**  

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th></th>
<th>2000</th>
<th></th>
<th>2005</th>
<th></th>
<th>2010</th>
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<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
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<tr>
<td>Resort Course:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>On-Resort Demand:</td>
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<td></td>
<td></td>
<td></td>
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<td>20</td>
<td>40</td>
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<td>50</td>
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<td>40</td>
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<td></td>
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</tr>
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<td>—</td>
<td>—</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Subtotal:</td>
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<td>30</td>
<td>50</td>
<td>50</td>
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<td>100</td>
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<td>130</td>
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<tr>
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<td>90</td>
<td>60</td>
<td>60</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>90</td>
<td>90</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>160</td>
<td>180</td>
<td>200</td>
</tr>
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<td>Club Course:</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>On-Resort demand:</td>
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<td></td>
<td></td>
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<td>60</td>
<td>60</td>
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<td>60</td>
<td>80</td>
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<td>20</td>
<td>30</td>
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<tr>
<td>Subtotal:</td>
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<td>70</td>
<td>90</td>
<td>100</td>
<td>110</td>
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<td>140</td>
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<tr>
<td>Off-Resort demand</td>
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<td>TOTAL:</td>
<td>70</td>
<td>90</td>
<td>80</td>
<td>100</td>
<td>110</td>
<td>120</td>
<td>120</td>
<td>150</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th></th>
<th>Percent of Total Guests</th>
</tr>
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<tbody>
<tr>
<td>FIT¹</td>
<td>45</td>
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<tr>
<td>Package</td>
<td>35</td>
</tr>
<tr>
<td>Group Tours</td>
<td>10</td>
</tr>
<tr>
<td>Business Meeting and Incentive Groups</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>100%</td>
</tr>
</tbody>
</table>

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

II-11
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

<table>
<thead>
<tr>
<th>Year</th>
<th>Supportable Lodge Units</th>
<th>Occupancy Level</th>
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<tbody>
<tr>
<td></td>
<td>Low¹</td>
<td>High²</td>
</tr>
<tr>
<td>1990</td>
<td>250</td>
<td>290</td>
</tr>
<tr>
<td>1995</td>
<td>320</td>
<td>370</td>
</tr>
<tr>
<td>2000</td>
<td>380</td>
<td>440</td>
</tr>
<tr>
<td>2005</td>
<td>450</td>
<td>510</td>
</tr>
<tr>
<td>2010</td>
<td>500</td>
<td>570</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Golf rounds per day:</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>Club course</td>
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<td>150</td>
</tr>
<tr>
<td>Resort course</td>
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<td>90</td>
<td>140</td>
<td>140</td>
<td>160</td>
<td>180</td>
<td>200</td>
<td>220</td>
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<td><strong>Lodge units:</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort lodges</td>
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<td>370</td>
<td>380</td>
<td>440</td>
<td>450</td>
<td>510</td>
<td>500</td>
<td>570</td>
</tr>
<tr>
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<td>145</td>
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<td>145</td>
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<td>145</td>
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</tr>
<tr>
<td><strong>Total lodge units</strong></td>
<td>465</td>
<td>550</td>
<td>525</td>
<td>620</td>
<td>595</td>
<td>690</td>
<td>645</td>
<td>750</td>
</tr>
<tr>
<td><strong>Projected cumulative unit sales:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condominium units</td>
<td>245</td>
<td>305</td>
<td>540</td>
<td>630</td>
<td>865</td>
<td>1,000</td>
<td>1,190</td>
<td>1,370</td>
</tr>
<tr>
<td>Residential lots</td>
<td>75</td>
<td>100</td>
<td>175</td>
<td>225</td>
<td>300</td>
<td>340</td>
<td>340</td>
<td>340</td>
</tr>
<tr>
<td>Patio homes</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>75</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td><strong>Commercial area(1)</strong></td>
<td>21,000</td>
<td>27,000</td>
<td>28,000</td>
<td>35,000</td>
<td>46,000</td>
<td>55,000</td>
<td>54,000</td>
<td>67,000</td>
</tr>
</tbody>
</table>

(1) Gross leasable square feet.
o Foreseeable crowded conditions on other resort golf courses on the island.

o 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>
<thead>
<tr>
<th>Buyer Markets</th>
<th>Percent of Total Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time Residences</td>
<td>20</td>
</tr>
<tr>
<td>Vacation Residences/Rentals</td>
<td>50</td>
</tr>
<tr>
<td>Full-time Residences</td>
<td>20</td>
</tr>
<tr>
<td>Full-time Rentals</td>
<td>10</td>
</tr>
</tbody>
</table>

TOTAL: 100%

Source: Peat Marwick Main & Co., 1988

II-14
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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Average cumulative hotel units completed over five year period(1)</td>
<td>3,910</td>
<td>3,910</td>
<td>4,425</td>
<td>4,425</td>
</tr>
<tr>
<td>Condominium demand per 100 hotel units</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Total average unit sales over five years</td>
<td>1,560</td>
<td>1,760</td>
<td>1,770</td>
<td>1,990</td>
</tr>
<tr>
<td>Less resales to existing condominiums(2)</td>
<td>(750)</td>
<td>(750)</td>
<td>(800)</td>
<td>(900)</td>
</tr>
<tr>
<td>Total new unit sales</td>
<td>810</td>
<td>1,010</td>
<td>970</td>
<td>1,090</td>
</tr>
<tr>
<td>Less new sales to:(3)</td>
<td>Wailea Resort</td>
<td>(405)</td>
<td>(505)</td>
<td>(485)</td>
</tr>
<tr>
<td></td>
<td>Makena Resort</td>
<td>(160)</td>
<td>(200)</td>
<td>(190)</td>
</tr>
<tr>
<td>Supportable unit sales at the Resort:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In period</td>
<td>245</td>
<td>305</td>
<td>295</td>
<td>325</td>
</tr>
<tr>
<td>Cumulative</td>
<td>245</td>
<td>305</td>
<td>540</td>
<td>630</td>
</tr>
</tbody>
</table>

(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 2-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>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Resort residential lots:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In period</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Cumulative</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>Patio homes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td>15</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>In period</td>
<td>75</td>
<td>100</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>Cumulative</td>
<td>75</td>
<td>100</td>
<td>225</td>
<td>300</td>
</tr>
</tbody>
</table>

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 Waiea 670 is expected to generate
significant demand for retail commercial space at the resort.
Hotel openings at Waiea Resort will also increase the population
of visitors and residents in the general vicinity of Maui Waiea
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 Waiea 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 Waiea Resort site, due to its
location on a major future intersection leading to Waiea, Makena
and the Maui Waiea 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 Waiea 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

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

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.
Market Assessment for the
Planned Maui Wailea 670
Resort Community
Wailea, Maui, Hawaii

Prepared for
GCR/VMS MAUI 670

June 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
center and a tennis facility. The 670-acre property would be divided into two
area main (ocean side) and the highway, consisting of about 300-acres, would
include most of the Resort's high activity uses. The 300-acre main (mountain
side) area is planned to be more private, low density and residential in
class.

Peat Marwick has assessed the market support for golf courses, resort
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 Golf Resort, 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 120 rounds per day in 2010.
- Significant off-Resort sources of demand could be generated by the expected future levels of summer 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 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.
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 4,300 hotel rooms in 1987 to about 12,600 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 1,400 rooms in 2010.

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

Market Assessment

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:

<table>
<thead>
<tr>
<th>Targeted Resort Lodge Guest Markets</th>
<th>Percent of Total Guests</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT</td>
<td>45%</td>
</tr>
<tr>
<td>Package</td>
<td>15%</td>
</tr>
<tr>
<td>Group tours</td>
<td>10%</td>
</tr>
<tr>
<td>Business meeting and incentive groups</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

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 670 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Supportable units</th>
<th>Low (1)</th>
<th>High (2)</th>
<th>Occupancy</th>
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<td>1990</td>
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<td>290</td>
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<td>1995</td>
<td>320</td>
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<tr>
<td>2000</td>
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<tr>
<td>2005</td>
<td>450</td>
<td>510</td>
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<tr>
<td>2010</td>
<td>500</td>
<td>570</td>
<td>80%</td>
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(1) At islandwide occupancy level of 60%.
(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.
- Favorable 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 165 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.
KPMG PricewaterhouseCoopers

Mr. Robert Alley
July 10, 1984

Guests could be expected to primarily represent members of the private golf club, golf instructional school attendees, business conference travelers, and hotel guests.

RESORT CONDOMINIUM UNITS

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

<table>
<thead>
<tr>
<th>Anticipated Resort Condominium Buyer Markets</th>
<th>Percent of total units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time residences</td>
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</tr>
<tr>
<td>Vacation residences/rentals</td>
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</tr>
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<td>Full-time residences</td>
<td>10%</td>
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<tr>
<td>Full-time rentals</td>
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<tr>
<td>Total</td>
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</tbody>
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Projected supportable resort condominium sales have been estimated in terms of sales of condominium sales to visitor units, planned hotel construction in the Wailea area, projected sales and market share of new condominium units at the Maui Wailea Resort. Based on this analysis, the Maui Wailea Resort is expected to support from 1,000 to 1,500 condominium units over the 1985 to 2000 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 Report are expected to be about $230 to $250 per square foot. Individual unit prices would range from about $150,000 to $200,000 in 1982 dollars, with an average sales price of about $180,000.

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 residential lots of about 3,500 to 8,000 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

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 300 lots could be sold between 1993 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 1998 dollars. Individual lot prices, then, would range from about $50,000 to $450,000 in 1988 dollars with an average of about $240,000.

Patio homes, variously elsewhere called cottages, zero-lot or 2-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, and on characteristics of the Maui Wailea Golf 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.

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 2,000 to 3,000 net interior square feet on lots of about 5,000 to 6,000 square feet. Projected achievable sales prices are estimated at about $450,000 to $650,000 per unit, or from about $150 to $250 per interior square foot, in 1988 dollars.
Market Assessment for the Planned Maui Wailea 670 Resort Community
Wailea, Maui, Hawaii

Prepared for
GCR/VMS MAUI 670

June 1988

MAUI WAILEA 670
Table of Contents

INTRODUCTION
Project Description
Objectives and Scope of Market Assessment Assistance

VISITOR INDUSTRY OVERVIEW
Island and County of Maui
Population
Economic Trends and Outlook
Visitor Industry Trends
Statewide Visitor Arrivals
Island of Maui Visitor Arrivals
Visitor Travel Patterns
Characteristics of Westbound Visitors
Visitor Expenditures
Projected State Visitor Arrivals
Projected Maui Visitor Arrivals
Resort and Hotel Industry
Hawaii Resort Overview
Maui Visitor Regions
Maui Hotel Inventory
Hotel Market Performance
Published Room Rates
Achieved Room Rates
Achieved Occupancy Levels
Guest Mix
Average Length of Stay
Guest Origin

GOLF COURSE MARKET ASSESSMENT
Resort Golf Course Overview
Benefits of a Resort Golf Course
Levels of Utilization
Fees at Hawaii Resort Courses
Resort Golf Courses on Maui
Golf Markets
Demand for Golf in the Wailea/Makena Region
Setau Makena Resort Golf Capabilities
Projected Average Daily Population at Wailea Resort
Projected Demand for Golf at Wailea Resort
Projected Daily Wailea Resort Golf Demand
Maui Wailea 670 Golf Course Market Assessment
Expected Golfer Markets for the Resort Course
Demand at the Maui Wailea 670 Resort Course
Expected Golfer Markets at the Club Course
Golf Demand at Club Course
## LODGE MARKET ASSESSMENT

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Maui Hotel Occupancy Levels and Room Requirements</td>
<td>IV- 1</td>
</tr>
<tr>
<td>Projected Demand for Hotel Accommodations</td>
<td>IV- 1</td>
</tr>
<tr>
<td>Projected Maui Occupancy Levels</td>
<td>IV- 2</td>
</tr>
<tr>
<td>Projected Maui Hotel Unit Requirements</td>
<td>IV- 2</td>
</tr>
<tr>
<td>Maui Wailea 670 Resort Lodge Market Assessment</td>
<td>IV- 2</td>
</tr>
<tr>
<td>Resort Market Position</td>
<td>IV- 4</td>
</tr>
<tr>
<td>Anticipated Target Markets</td>
<td>IV- 6</td>
</tr>
<tr>
<td>Supportable Resort Lodge Rooms</td>
<td>IV- 6</td>
</tr>
<tr>
<td>Development Concept and Phasing Recommendations</td>
<td>IV- 6</td>
</tr>
<tr>
<td>Projected Occupancy Levels</td>
<td>IV- 7</td>
</tr>
<tr>
<td>Projected Achieved Room Rates</td>
<td>IV- 8</td>
</tr>
<tr>
<td>U.S. and Maui Golf Vacation Market Review</td>
<td>IV- 8</td>
</tr>
<tr>
<td>U.S. Golfer Market Trends</td>
<td>IV- 8</td>
</tr>
<tr>
<td>U.S. Golf Vacationers</td>
<td>IV- 9</td>
</tr>
<tr>
<td>Selected Comparable Golf Lodge Characteristics</td>
<td>IV-10</td>
</tr>
<tr>
<td>Potential Maui Golf Vacation Market</td>
<td>IV-11</td>
</tr>
<tr>
<td>Maui Wailea 670 Golf Lodge Market Assessment</td>
<td>IV-12</td>
</tr>
<tr>
<td>Target Markets</td>
<td>IV-13</td>
</tr>
<tr>
<td>Recommended Development Concept</td>
<td>IV-13</td>
</tr>
<tr>
<td>Pricing and Occupancy</td>
<td>IV-14</td>
</tr>
<tr>
<td>Proposed Marketing Activities</td>
<td>IV-14</td>
</tr>
<tr>
<td>Projected Achieved Room Rates</td>
<td>IV-14</td>
</tr>
</tbody>
</table>

## CONDOMINIUM MARKET ASSESSMENT

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condominium Development Trends</td>
<td>V- 1</td>
</tr>
<tr>
<td>Private Multifamily Authorization</td>
<td>V- 1</td>
</tr>
<tr>
<td>Resort Condominium Development</td>
<td>V- 1</td>
</tr>
<tr>
<td>Residential Condominium Development</td>
<td>V- 2</td>
</tr>
<tr>
<td>Island of Maui Resort Condominium Inventory</td>
<td>V- 2</td>
</tr>
<tr>
<td>Existing Units</td>
<td>V- 2</td>
</tr>
<tr>
<td>Planned Units</td>
<td>V- 3</td>
</tr>
<tr>
<td>Comparable Project Review</td>
<td>V- 3</td>
</tr>
<tr>
<td>Resort Condominium Site Locations</td>
<td>V- 3</td>
</tr>
<tr>
<td>Comparable Project Review</td>
<td>V- 3</td>
</tr>
<tr>
<td>Project Characteristics</td>
<td>V- 4</td>
</tr>
<tr>
<td>Unit Mix</td>
<td>V- 4</td>
</tr>
<tr>
<td>Unit Size</td>
<td>V- 4</td>
</tr>
<tr>
<td>Facilities and Amenities</td>
<td>V- 4</td>
</tr>
<tr>
<td>Review of Market Performance</td>
<td>V- 4</td>
</tr>
<tr>
<td>Average Unit Sales Absorption in Wailea</td>
<td>V- 4</td>
</tr>
<tr>
<td>Resort Condominium New Unit Sales Absorption</td>
<td>V- 5</td>
</tr>
<tr>
<td>Average Unit Sales Price</td>
<td>V- 5</td>
</tr>
<tr>
<td>Buyer Profiles</td>
<td>V- 6</td>
</tr>
</tbody>
</table>

## CONDOMINIUM MARKET ASSESSMENT, CONTINUED

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maui Wailea 670 Condominium Market Assessment</td>
<td>V- 7</td>
</tr>
<tr>
<td>Anticipated Buyer Markets and Purchase Motivation</td>
<td>V- 7</td>
</tr>
<tr>
<td>Development Concept</td>
<td>V- 8</td>
</tr>
<tr>
<td>Projected Achievable Sales Price</td>
<td>V-10</td>
</tr>
</tbody>
</table>

## SINGLE-FAMILY MARKET ASSESSMENT

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resort Lot Development Trends</td>
<td>VI- 1</td>
</tr>
<tr>
<td>Location and View Orientation</td>
<td>VI- 1</td>
</tr>
<tr>
<td>Lot Sizes</td>
<td>VI- 2</td>
</tr>
<tr>
<td>Amenities</td>
<td>VI- 2</td>
</tr>
<tr>
<td>Planned Resort Lots on Maui</td>
<td>VI- 3</td>
</tr>
<tr>
<td>Market Performance of Resort Lots</td>
<td>VI- 3</td>
</tr>
<tr>
<td>Historical Prices</td>
<td>VI- 3</td>
</tr>
<tr>
<td>Prices</td>
<td>VI- 3</td>
</tr>
<tr>
<td>Buyer Profiles</td>
<td>VI- 4</td>
</tr>
<tr>
<td>Purchase Motivations</td>
<td>VI- 5</td>
</tr>
<tr>
<td>Patio Home Market Review</td>
<td>VI- 6</td>
</tr>
<tr>
<td>Product Concept and Amenities</td>
<td>VI- 6</td>
</tr>
<tr>
<td>Unit and Lot Sizes</td>
<td>VI- 7</td>
</tr>
<tr>
<td>Sales Prices</td>
<td>VI- 7</td>
</tr>
<tr>
<td>Sales Absorption</td>
<td>VI- 7</td>
</tr>
<tr>
<td>Buyer Profiles and Purchase Motivations</td>
<td>VI- 7</td>
</tr>
<tr>
<td>Market Assessment for Maui Wailea 670 Property</td>
<td>VI- 8</td>
</tr>
<tr>
<td>Anticipated Buyer Market Segments</td>
<td>VI- 8</td>
</tr>
<tr>
<td>Proposed Development Concept</td>
<td>VI- 9</td>
</tr>
<tr>
<td>Projected Sales Absorption</td>
<td>VI-10</td>
</tr>
<tr>
<td>Projected Patio Home Sales Absorption</td>
<td>VI-11</td>
</tr>
<tr>
<td>Projected Achievable Patio Home Sales Prices</td>
<td>VI-12</td>
</tr>
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</table>

## MAUI WAALEA 670 COMMERCIAL CENTER MARKET ASSESSMENT

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resort Retail Development</td>
<td>VII- 1</td>
</tr>
<tr>
<td>Relationship to Resort Development</td>
<td>VII- 1</td>
</tr>
<tr>
<td>Physical Characteristics</td>
<td>VII- 2</td>
</tr>
<tr>
<td>Tenant and Market Mix</td>
<td>VII- 3</td>
</tr>
<tr>
<td>Wailea-Kihei Regional Commercial Market Overview</td>
<td>VII- 3</td>
</tr>
<tr>
<td>Regional Market Support Factors</td>
<td>VII- 3</td>
</tr>
<tr>
<td>Existing Shopping Centers</td>
<td>VII- 3</td>
</tr>
<tr>
<td>Planned Shopping Centers</td>
<td>VII- 3</td>
</tr>
<tr>
<td>Maui Wailea 670 Retail Market Assessment</td>
<td>VII- 4</td>
</tr>
<tr>
<td>Expected Market Segments</td>
<td>VII- 5</td>
</tr>
<tr>
<td>Resort Resident Population</td>
<td>VII- 5</td>
</tr>
<tr>
<td>Resort Visitor Population</td>
<td>VII- 5</td>
</tr>
<tr>
<td>Supportable Commercial Area From Resort Population</td>
<td>VII- 5</td>
</tr>
<tr>
<td>Use of Commercial Sites</td>
<td>VII- 6</td>
</tr>
<tr>
<td>EXHIBITS</td>
<td>Page</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>I-A</td>
<td>11-1</td>
</tr>
<tr>
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<td>11-1</td>
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<td>I-C</td>
<td>11-2</td>
</tr>
<tr>
<td>I-D</td>
<td>11-3</td>
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<tr>
<td>I-E</td>
<td>11-4</td>
</tr>
<tr>
<td>I-F</td>
<td>11-5</td>
</tr>
<tr>
<td>I-G</td>
<td>11-7</td>
</tr>
<tr>
<td>I-H</td>
<td>11-7</td>
</tr>
<tr>
<td>I-J</td>
<td>11-8</td>
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<td>11-10</td>
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<td>11-10</td>
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<th>Page</th>
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<tbody>
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<td>IV-A</td>
<td>11-10</td>
</tr>
<tr>
<td>IV-B</td>
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</thead>
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<td>11-10</td>
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<th>EXHIBITS</th>
<th>Page</th>
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<td>11-10</td>
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<tr>
<td>VI-B</td>
<td>11-10</td>
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<td>VI-G</td>
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<td>VI-H</td>
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<td>VI-I</td>
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<td>VI-J</td>
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<td>VI-Y</td>
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<td>VI-Z</td>
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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-Mauna Kea region. The project area includes TMs 2-1-02S:56 and 71. The parcel is located on the relatively gentle lower slopes of Haleakula, and is bisected by property reserved for the extension of the Piiilani Highway, a major State transportation corridor. About 370 acres of the site are located across the planned highway extension, and 300 acres are situated north of the highway. The general location of the property is shown in Exhibit 1-A.

GCR/VMS plans to develop a master-planned resort community at the site. Visitors accommodations could be designed to complement the luxury hotels at Wailea and Makena, with three intimate-scale lodges; one would be operated as a golf lodge located within a private club. 'Mane' 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 Piiilani Highway extension would divide Maui Wailea 670 Resort into two areas, termed the makai and mauna 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 Piiilani 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 Sebu Malena 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 makai area includes about 370 acres. Uses in this part of the property would be of somewhat lower intensity than on the makai property. The makai area would have a more residential character. Features of the makai 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 per 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 Malena 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. Resort facilities could be offered on two sites, in the village/mixed use area and along its boundary with Malena 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 Malena 670 Resort.

To meet this objective, the following assistance was provided:

- Maui and Malena Resort Visitor Industry Review - Reviewed the Maui and the Malena Hotel and Visitor Industries. Assessed the expected future market position of the Maui Malena 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.
II - VISITOR INDUSTRY OVERVIEW

This chapter reviews the regional setting of the island of Maui and Hawai'i 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 Hawai'i 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 southwest 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 Lahaina, Wailuku, Kahului, and Kihei. The resident population of Maui Island grew rapidly during the 1970s, increasing from 39,700 in 1970 to 62,800 in 1980, for an average annual growth rate of 5.8%. This trend continued into the 1980s as the island's population grew 3.7% annually to an estimated 70,000 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 (1986) to increase to 125,000 residents by 2000. 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-A. 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 20% over the past five-year period, as also shown in Exhibit II-A. Growth in visitor arrivals and hotel occupancies have also stimulated the retail and construction industries in Lahaina, Kihei, and Wailuku.

Agriculture on Maui is in a transition period. Changes in the value of sugar and pineapple products 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-A.
GCR/VHS MAUI 670

Major Economic Indicators for Maui County
1982 to 1986

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Compounded annual change percentage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross business receipts (millions)</td>
<td>$1,763</td>
<td>$1,776</td>
<td>$1,613</td>
<td>$1,995</td>
<td>$1,045</td>
<td>11.3 (1)%</td>
</tr>
<tr>
<td>Employment (number)</td>
<td>39,550</td>
<td>41,250</td>
<td>42,250</td>
<td>44,950</td>
<td>45,750</td>
<td>3.7</td>
</tr>
<tr>
<td>Unemployment (percent)</td>
<td>7.0%</td>
<td>6.1%</td>
<td>6.0%</td>
<td>5.0%</td>
<td>5.3%</td>
<td>(8.9)</td>
</tr>
<tr>
<td>Visitation visitors (thousands)</td>
<td>1,560</td>
<td>1,615</td>
<td>1,825</td>
<td>1,831</td>
<td>1,999</td>
<td>6.5</td>
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<tr>
<td>Visitor expenditures (millions)</td>
<td>$540</td>
<td>$793</td>
<td>$1,078</td>
<td>$1,106</td>
<td>$1,196</td>
<td>22.0 (1)</td>
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<tr>
<td>Hotel occupancy rate (percent)</td>
<td>72.9%</td>
<td>76.2%</td>
<td>80.5%</td>
<td>78.5%</td>
<td>81.5%</td>
<td>2.5</td>
</tr>
<tr>
<td>Unprocessed cane sugar (thousands)</td>
<td>$55,000</td>
<td>$73,000</td>
<td>$72,600</td>
<td>$63,600</td>
<td>$67,800</td>
<td>5.2 (1)</td>
</tr>
<tr>
<td>Fresh pineapple (thousands)</td>
<td>36,602</td>
<td>45,099</td>
<td>42,117</td>
<td>38,380</td>
<td>45,540</td>
<td>4.2 (1)</td>
</tr>
<tr>
<td>Other agricultural crops (thousands)</td>
<td>$13,814</td>
<td>$17,335</td>
<td>$18,122</td>
<td>$19,269</td>
<td>$19,496</td>
<td>9.0 (1)</td>
</tr>
</tbody>
</table>

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

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, Kekaʻa isu.
- Keha 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 resi-
dential housing are challenges that remain for the island’s business and govern-
ment 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, characteris-
tics 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-6.

Visitor growth has been strong with average annual increases of 19.4% in the
1980s, 8.3% in the 1970s and 5.7% for 1960 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
DEED 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 75% of state travelers. Westbound arrivals have
  increased at an average annual growth rate of 10.1% from 1980 to 1970,
  8.3% from 1970 to 1980 and 5.7% 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 favor-
able short- and long-term factors:
II-3

- 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 affordability 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.
  - Development of new resort destination areas on the other 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.

---

### 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.

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<table>
<thead>
<tr>
<th>Year</th>
<th>Westbound</th>
<th>Eastbound</th>
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<tbody>
<tr>
<td></td>
<td>Capture</td>
<td>Capture</td>
</tr>
<tr>
<td></td>
<td>Rate(%)</td>
<td>Rate(%)</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>------</td>
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</tr>
<tr>
<td>Historical:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>1,978,000</td>
<td>87,060</td>
</tr>
<tr>
<td>1985</td>
<td>1,831,110</td>
<td>110,290</td>
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<td>1987</td>
<td>1,756,440</td>
<td>144,800</td>
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<tr>
<td></td>
<td>1,459,060</td>
<td>10.0%</td>
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<tr>
<td></td>
<td>1,414,709</td>
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<tr>
<td></td>
<td>2,051,256</td>
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</tr>
<tr>
<td>Projected:</td>
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<td></td>
</tr>
<tr>
<td>1990</td>
<td>2,354,000</td>
<td>150,000</td>
</tr>
<tr>
<td>1995</td>
<td>2,010,940</td>
<td>217,840</td>
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<td>2000</td>
<td>3,501,400</td>
<td>291,280</td>
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<td>2005</td>
<td>4,047,120</td>
<td>320,760</td>
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<td>2010</td>
<td>4,353,490</td>
<td>379,150</td>
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<td>2,704,000</td>
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<td>3,254,310</td>
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<td></td>
<td>3,837,280</td>
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<td></td>
<td>4,367,680</td>
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Compounded annual percentage increase:

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<th>1990-2010</th>
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<tr>
<td></td>
<td>4.7%</td>
<td>7.5%</td>
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<tr>
<td></td>
<td>4.0%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

(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 (Waikiki), capable of competing with Makaha.
- 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%, 8% and 8% came from Japan, elsewhere in the Pacific and others, 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 18% 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, is 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 5.3 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 72% of all visitors in 1986, as shown in Exhibit II-E. Group inclusive tours (GIFs) have declined by 2% over the last decade, representing only 15% of all westbound visitors in 1986. Incentive travel has grown an average of 15% 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.

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<tr>
<td>Pleasure</td>
<td>74.6%</td>
<td>76.4%</td>
<td>75.4%</td>
<td>80.7%</td>
<td>82.2%</td>
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<tr>
<td>Business and pleasure</td>
<td>9.0</td>
<td>10.7</td>
<td>13.3</td>
<td>10.6</td>
<td>10.1</td>
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<tr>
<td>Business</td>
<td>3.8</td>
<td>2.6</td>
<td>2.9</td>
<td>2.0</td>
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<tr>
<td>Military/government</td>
<td>.6</td>
<td>.3</td>
<td>.4</td>
<td>.5</td>
<td>.5</td>
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<tr>
<td>Relatives</td>
<td>.9</td>
<td>2.7</td>
<td>4.1</td>
<td>2.7</td>
<td>2.4</td>
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<tr>
<td>Children</td>
<td>4.9</td>
<td>6.7</td>
<td>3.5</td>
<td>3.6</td>
<td>2.4</td>
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<tr>
<td>Other</td>
<td>.2</td>
<td>.3</td>
<td>.4</td>
<td>.4</td>
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<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
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<tr>
<td>Hotel</td>
<td>84.2</td>
<td>91.7</td>
<td>71.2</td>
<td>67.7</td>
<td>66.5</td>
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<td>Rented home or condominium</td>
<td>.8</td>
<td>.5</td>
<td>16.4</td>
<td>20.9</td>
<td>22.2</td>
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<tr>
<td>Friends or relatives</td>
<td>12.6</td>
<td>6.8</td>
<td>10.6</td>
<td>7.1</td>
<td>7.5</td>
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<tr>
<td>Other</td>
<td>2.4</td>
<td>1.0</td>
<td>1.8</td>
<td>3.7</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
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<table>
<thead>
<tr>
<th>Length of stay in state</th>
<th>1 - 6 days</th>
<th>7 - 12 days</th>
<th>13 - 18 days</th>
<th>19+ days</th>
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<tbody>
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<td>1970</td>
<td>14.3</td>
<td>9.0</td>
<td>8.3</td>
<td>7.7</td>
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<tr>
<td>1975</td>
<td>9.0</td>
<td>61.1</td>
<td>61.2</td>
<td>67.8</td>
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<td>1980</td>
<td>23.0</td>
<td>24.9</td>
<td>23.9</td>
<td>19.5</td>
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<tr>
<td>1985</td>
<td>23.0</td>
<td>24.9</td>
<td>23.9</td>
<td>19.5</td>
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<tr>
<td>1986</td>
<td>23.0</td>
<td>24.9</td>
<td>23.9</td>
<td>19.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

| Average stay in state (days) | 10.1 | 10.5 | 10.6 | 10.7 | 10.1 |

Source: Hawaii Visitors Bureau, Annual Research Report, annual.
Exhibit 11-5

GCR/VMS MAUI 670
Major Westbound Visitor Market Segments to the State of Hawaii
1978 to 1987

<table>
<thead>
<tr>
<th>Year</th>
<th>FIT</th>
<th>G1T</th>
<th>Incentive group</th>
<th>Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>1,653,746</td>
<td>738,997</td>
<td>68,750</td>
<td>293,273</td>
</tr>
<tr>
<td>1979</td>
<td>1,826,895</td>
<td>632,017</td>
<td>159,639</td>
<td>178,735</td>
</tr>
<tr>
<td>1980</td>
<td>1,914,992</td>
<td>410,646</td>
<td>350,387</td>
<td>230,891</td>
</tr>
<tr>
<td>1981</td>
<td>2,163,121</td>
<td>412,310</td>
<td>90,612</td>
<td>181,662</td>
</tr>
<tr>
<td>1982</td>
<td>2,277,070</td>
<td>398,797</td>
<td>126,615</td>
<td>161,358</td>
</tr>
<tr>
<td>1983</td>
<td>2,277,070</td>
<td>398,797</td>
<td>126,615</td>
<td>161,358</td>
</tr>
<tr>
<td>1984</td>
<td>2,280,550</td>
<td>392,390</td>
<td>129,000</td>
<td>161,152</td>
</tr>
<tr>
<td>1985</td>
<td>2,550,590</td>
<td>482,530</td>
<td>166,520</td>
<td>122,600</td>
</tr>
<tr>
<td>1986</td>
<td>3,317,780</td>
<td>626,130</td>
<td>219,420</td>
<td>95,310</td>
</tr>
<tr>
<td>1987</td>
<td>3,347,740</td>
<td>554,660</td>
<td>194,680</td>
<td>96,370</td>
</tr>
</tbody>
</table>

Compounded annual percentage increase (decrease) - 1978 to 1987: 7.9% (5.2%) 11.0% (8.3%) 4.5%


Characteristics of Westbound Visitors

Characteristics of westbound visitors to the state are shown in Exhibit 11-6 and summarized below:

- **Average party size**: Average party size has increased gradually since 1979, moving from 1.9 persons in 1979 to 2.4 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 far the largest age group to visit Hawaii, representing nearly 45% of all westbound arrivals. The median age has fluctuated between 40 and 44 since 1979.
- **Occupation**: Since 1970, Hawaii has experienced a slight shift to higher paying 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 31% in 1970 to 45% 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%
- **G1T travelers**: 19.8%
- **Median age**: 50.4 years
- **Average length of stay**: 6.4 days
- **Average party size**: 1.9 persons
- **Incentive meeting visitors**: 6% of state’s total
- **Higher proportion of condominium users than for state
- **Business and professional travelers**: 65.1%

Visitor Expenditures

Westbound visitors’ 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 $73 and $22 per day, respectively. The HVB estimates that in 1986, the average Japanese visitor to Hawaii spent $527 per day, or almost three times that of the typical westbound traveler. Japanese tend to spend more on gifts and personal shopping than do their westbound counterparts.

Projected State Visitor Arrivals

Projections of visitor arrivals are based on estimates of additional visitor room requirements for Hawaii. According to preliminary forecasts made by the DIRE in 1990, the state can be expected to receive 6.9 and 10.9 million visitors in 1995 and 2010, respectively. As shown previously in Exhibit 11-C, this represents a growth rate of 2.7% from 1990 to 2010. The expected decline in growth rates is due primarily to the strong base of visitors. Continued growth in visitors to the state could be influenced by the following factors:
 Exhibit 11-6

Shr Maui Visitor Characteristics to the State of Hawaii
1970 to 1986

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average party size</td>
<td>1.95</td>
<td>1.74</td>
<td>1.79</td>
<td>1.85</td>
<td>1.84</td>
</tr>
<tr>
<td>Ages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 20</td>
<td>11.6%</td>
<td>9.2%</td>
<td>10.8%</td>
<td>10.7%</td>
<td>10.6%</td>
</tr>
<tr>
<td>20-29</td>
<td>22.8%</td>
<td>16.2%</td>
<td>17.6%</td>
<td>18.6%</td>
<td>18.0%</td>
</tr>
<tr>
<td>30-49</td>
<td>34.0%</td>
<td>28.0%</td>
<td>28.0%</td>
<td>28.0%</td>
<td>28.0%</td>
</tr>
<tr>
<td>50-59</td>
<td>18.9%</td>
<td>22.8%</td>
<td>19.4%</td>
<td>18.9%</td>
<td>14.9%</td>
</tr>
<tr>
<td>60 and older</td>
<td>12.6%</td>
<td>15.8%</td>
<td>14.5%</td>
<td>16.3%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Median age (years)</td>
<td>40.7</td>
<td>44.5</td>
<td>41.3</td>
<td>39.7</td>
<td>39.7</td>
</tr>
<tr>
<td>Occupations:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional and technical</td>
<td>27.2%</td>
<td>33.5%</td>
<td>35.8%</td>
<td>36.6%</td>
<td>37.0%</td>
</tr>
<tr>
<td>Business, managerial and official</td>
<td>21.6%</td>
<td>26.9%</td>
<td>25.6%</td>
<td>25.3%</td>
<td>25.3%</td>
</tr>
<tr>
<td>Clerical, office and sales</td>
<td>12.2%</td>
<td>11.2%</td>
<td>9.7%</td>
<td>9.8%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Military and dependents</td>
<td>13.7%</td>
<td>9.0%</td>
<td>1.0%</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Other employed</td>
<td>7.2%</td>
<td>8.0%</td>
<td>7.6%</td>
<td>7.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Retired</td>
<td>7.0%</td>
<td>12.5%</td>
<td>11.5%</td>
<td>12.4%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Students and unemployed</td>
<td>9.8%</td>
<td>9.0%</td>
<td>8.6%</td>
<td>8.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Trips to Hawaii:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>67.2%</td>
<td>60.3%</td>
<td>51.6%</td>
<td>53.7%</td>
<td>50.8%</td>
</tr>
<tr>
<td>Second</td>
<td>14.7%</td>
<td>17.1%</td>
<td>18.0%</td>
<td>18.0%</td>
<td>19.3%</td>
</tr>
<tr>
<td>Third</td>
<td>5.6%</td>
<td>7.2%</td>
<td>9.1%</td>
<td>8.7%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Fourth</td>
<td>15.5%</td>
<td>16.6%</td>
<td>20.5%</td>
<td>18.8%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Repeat visitors</td>
<td>32.0%</td>
<td>39.7%</td>
<td>48.4%</td>
<td>46.3%</td>
<td>47.2%</td>
</tr>
</tbody>
</table>

Source: Hawaii Visitors Bureau, Annual Research Report, annual.
Hana:
- Turtle Bay
- Nakaha
- Melville

Holualoa:
- Kalua Koi

Maui:
- Kapalua
- Kaanapali Beach
- Wailea
- Makaha

Hawaii:
- Mauna Kea
- Mauka Lani
- Kukuiola
- Koilau
- Puna’au‘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 1-4 and 1-5 as described below:

Kaanapali - Kaanapali is a 1,160-acre master-planned resort initially developed in the 1950s and is the best known resort on Maui. Existing facilities include about 6,000 visitor units, two golf courses and the 9,000-square-foot Whaler’s Village shopping area. The major hotels in the resort include the Biltmore Hyatt Regency Maui and recently opened 762-room Westin Maui. Kaanapali can be characterized as a higher density recreational activity resort, equally attracting package and independent visitors. The North Beach area of Kaanapali is expected to become the most upscale end of the resort with over 3,100 hotel rooms planned.

Kapalua - Kapalua is a 750-acre master planned resort initially developed in 1976. 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 456-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.
Makaha - Makaha is a 1,450-acre master planned resort initially developed in 1971. Existing facilities include the Hotel Intercontinental Makaha, Marriott's Makaha Beach Resort, and two championship golf courses. Plans for the resort include the 370-room Four Seasons, 450-room Embassy Suites, 476-room Grand Champions and 600-room Grand Hyatt hotels, as well as single-family and multifamily units. Makaha 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 Makaha, west of VMS Realty Partners also has plans for an approximately 1,000-room resort and complex.

Makaha - Makaha is Maui's newest resort. Initially developed in 1981. Existing facilities at the resort include the 316-room Hyatt Prince Hotel and Makaha 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 Kiloa, Koolina, Kapalua, and Lahaina. These visitor areas have developed based on their location on the western coast of the Island and profit from "spill-over 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 MBI in February 1987, Maui has 13,264 visitor units, representing 3,651 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 hotels projects by 2006, as shown in Exhibit II-3. A brief description of the planned hotels follows:

- Four Seasons Hotel, Wailea (378 rooms) - The flagship 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 570 square feet. The hotel is expected to break ground in the spring of 1998 and to be completed by 1999.

- Embassy Suites, Wailea (450 rooms) - This Moorish-style hotel is being designed by Jose Luis Espinosa, architect of the Las Vegas 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 650 square feet with an interior spiral staircase. The hotel is being developed at a cost of more than $100 million and is expected to be completed by 1999.
### Exhibit 11-3

**Existing and Planned Hotel Inventory on the Island of Maui**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Luxury high-personal services:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four Seasons</td>
<td>Wailea Resort</td>
<td>378</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>378</td>
</tr>
<tr>
<td>Embassy Suites</td>
<td>Wailea Resort</td>
<td>450</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>450</td>
</tr>
<tr>
<td>Kapalua Bay</td>
<td>Kapalua Resort</td>
<td>127</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>127</td>
</tr>
<tr>
<td>Ritz-Carlton</td>
<td>Kapalua Resort</td>
<td>450</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>450</td>
</tr>
<tr>
<td><strong>Luxury high-activity:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Champions</td>
<td>Wailea Resort</td>
<td>475</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>475</td>
</tr>
<tr>
<td>Grand Hyatt</td>
<td>Wailea Resort</td>
<td>600</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>600</td>
</tr>
<tr>
<td>Unnamed</td>
<td>Wailea area</td>
<td>1000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1000</td>
</tr>
<tr>
<td>Embassy Suites</td>
<td>Maukawainahua</td>
<td>415</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>415</td>
</tr>
<tr>
<td><strong>Others:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Princess Kiel Hotel</td>
<td>Kiel</td>
<td>275</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>275</td>
</tr>
<tr>
<td>Maui Sun</td>
<td>Kiel</td>
<td>300</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>300</td>
</tr>
<tr>
<td>Maui Comfort Hotel</td>
<td>Kiel</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Diamond Club</td>
<td>Wailea Resort</td>
<td>72</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>72</td>
</tr>
<tr>
<td>North Beach(1)</td>
<td>North Beach</td>
<td>1500</td>
<td>600</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2100</td>
</tr>
<tr>
<td>Unnamed</td>
<td>Kiel</td>
<td>120</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>120</td>
</tr>
<tr>
<td>Unplanned/unknown(2)</td>
<td>Various</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1000</td>
<td>1000</td>
<td>2000</td>
</tr>
</tbody>
</table>

**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 (626 rooms):** This $15 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 $100 million hotel is expected to be a high-activity hotel and includes extensive public areas. It is expected to be completed by 1991.
- **Banyan Tree Hotel Partners hotel (1000 rooms):** Located within Wailea Resort's boundaries, this hotel is expected to include a separate hotel 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 Kiel Hotel, Kiel (275 rooms):** No information available.
- **Embassy Suites Maui Shores, North Beach, Kanapalii (415 rooms):** This hotel is to be managed by Embassy Hotels, 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 1988.
- **North Beach, Kanapalii (3700 rooms):** A joint venture between A.M. 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 currently underway and is expected to be completed by 1990.
- **Ritz-Carlton Hotel, Kapalua (450 rooms):** The hotel is planned to feature a contemporary design in a three-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, Kiel (700 rooms):** This oceanfront hotel is expected to cater to local traffic. The projected completion date is by 1991.
- **Maui Comfort Hotel, Kiel (100 rooms):** Also expected to cater to local traffic, projected to be finished by 1991.
- **Diamond Club, Wailea (12 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.
- **Banyan Tree Development, Inc. hotel, Kiel (120 rooms):** To be a six-story hotel, located west in the Banyan Tree 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 expected to be fairly long-term.
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 Hilo to $2,000 for a suite at the Halekulani, as shown in Exhibit 11-A. Discounts, group and corporate rates, incentives plans, seasonal and kamala 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 $137 in 1987, representing a 11.0X per annum increase since 1980. West Maui which includes the Kaanapali and Wailea resorts achieved the highest rates in the state, at about $130, as shown in Exhibit 11-B. 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% for the second highest in the state next to Kauai, as shown in Exhibit 11-C. 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, 20% GIT, and 10% incentive. First-class hotels average about 45% FIT, 35% GIT and 20% incentive, as shown in Exhibit 11-D. 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 11-E.

Guest Origin

United States mainland visitors accounted for 70% to 90% of all guests at the selected hotels surveyed, as shown in Exhibit 11-F. Japanese guests are the second largest market segment, but there is a greater variance in proportion ranging from about 3% to 20%.

<table>
<thead>
<tr>
<th>Hotel Name</th>
<th>Island</th>
<th>Standard/ Deluxe/Suites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mauka Kea Beach (2)</td>
<td>Hawaii</td>
<td>$300 - $350 - $380 - $420 - $760</td>
</tr>
<tr>
<td>Wailea Beach Resort</td>
<td>Maui</td>
<td>$175 - $200 - $225 - $250 - $280</td>
</tr>
<tr>
<td>Royal Hawaiian</td>
<td>Oahu</td>
<td>$145 - $180 - $215 - $250 - $300</td>
</tr>
<tr>
<td>Hyatt Regency Maui</td>
<td>Maui</td>
<td>$150 - $175 - $200 - $225 - $250</td>
</tr>
<tr>
<td>Sheraton Kona</td>
<td>Kona</td>
<td>$125 - $140 - $165 - $190 - $250</td>
</tr>
<tr>
<td>Princeville Resort</td>
<td>Kauai</td>
<td>$150 - $175 - $200 - $225 - $250</td>
</tr>
</tbody>
</table>

### GCR/HVS MAUI 670

#### Occupancy Levels of Hawaii Visitor Accommodations

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Waikiki: On beach</td>
<td>73.4%</td>
<td>72.1%</td>
<td>72.1%</td>
<td>74.7%</td>
<td>81.1%</td>
<td>82.9%</td>
<td>84.7%</td>
<td>87.4%</td>
</tr>
<tr>
<td>Waikiki: Off beach</td>
<td>72.2%</td>
<td>73.6%</td>
<td>70.6%</td>
<td>79.1%</td>
<td>85.7%</td>
<td>83.8%</td>
<td>86.0%</td>
<td>81.3%</td>
</tr>
<tr>
<td>Waikiki: Other Oahu</td>
<td>65.5%</td>
<td>78.1%</td>
<td>80.1%</td>
<td>74.4%</td>
<td>80.4%</td>
<td>79.4%</td>
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<tr>
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<td>81.9%</td>
<td>85.3%</td>
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</tr>
<tr>
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<td>31.4%</td>
<td>35.3%</td>
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</tr>
<tr>
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<td>59.7%</td>
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<td>64.4%</td>
<td>58.7%</td>
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<tr>
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<td>71.9%</td>
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<td>78.5%</td>
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</tr>
<tr>
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<td>78.0%</td>
<td>77.8%</td>
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<tr>
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<td>73.9%</td>
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<td>63.0%</td>
<td>64.1%</td>
<td>75.4%</td>
<td>74.5%</td>
</tr>
<tr>
<td>South Maui</td>
<td>53.5%</td>
<td>54.2%</td>
<td>52.2%</td>
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<td>69.7%</td>
<td>70.4%</td>
<td>67.4%</td>
<td>69.3%</td>
<td>68.2%</td>
</tr>
</tbody>
</table>

**Note:** January to May.

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

---

### GCR/HVS MAUI 670

#### Average Room Rates of Hawaii Visitor Accommodations

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tr>
<td>Waikiki: On beach</td>
<td>$59.01</td>
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<td>$61.15</td>
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<td>$69.15</td>
<td>$85.01</td>
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<td>Waikiki: Off beach</td>
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<td>35.60</td>
<td>36.30</td>
<td>38.88</td>
<td>40.74</td>
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<td>27.40</td>
<td>26.70</td>
<td>30.67</td>
<td>31.20</td>
<td>30.21</td>
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<td>53.00</td>
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<td>32.53</td>
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<td>32.30</td>
<td>34.88</td>
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<td>57.62</td>
<td>61.26</td>
<td>72.16</td>
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<td>96.78</td>
<td>113.46</td>
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<td>54.67</td>
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<td>57.85</td>
<td>60.48</td>
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</tr>
<tr>
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<td>66.36</td>
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<td>61.53</td>
<td>74.61</td>
<td>69.99</td>
<td>86.22</td>
<td>93.61</td>
<td>97.86</td>
</tr>
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<td>Island of Kauai</td>
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<td>59.09</td>
<td>69.51</td>
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<td>74.78</td>
<td>75.84</td>
<td>65.66</td>
<td>73.20</td>
<td>79.82</td>
</tr>
</tbody>
</table>

**Note:** January to November.

**Source:** Pannell Kerr Forster, *Trends in the Hotel Industry*, monthly.
<table>
<thead>
<tr>
<th>Hotel</th>
<th>United States</th>
<th>Hawaii</th>
<th>Canada</th>
<th>Japan</th>
<th>Europe</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halekulani</td>
<td>81%</td>
<td>4%</td>
<td>2 - 5%</td>
<td>10%</td>
<td>2 - 5%</td>
<td>5%</td>
</tr>
<tr>
<td>Kahala Hilton</td>
<td>80 - 90%</td>
<td>2 - 5%</td>
<td>6 - 31%</td>
<td>2 - 5%</td>
<td>2 - 5%</td>
<td>5%</td>
</tr>
<tr>
<td>Hapuna Beach</td>
<td>78%</td>
<td>5</td>
<td>20</td>
<td>4</td>
<td>2 - 5%</td>
<td>5%</td>
</tr>
<tr>
<td>Mauna Lani Bay</td>
<td>70%</td>
<td>4</td>
<td>4</td>
<td>2 - 5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Kapalua Bay</td>
<td>70%</td>
<td>4</td>
<td>4</td>
<td>2 - 5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Hyatt Regency Maui</td>
<td>100%</td>
<td>4</td>
<td>4</td>
<td>2 - 5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Stouffer's Wailea Beach</td>
<td>100%</td>
<td>4</td>
<td>4</td>
<td>2 - 5%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

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

Note: Relatively high share of Hawaii resident guests may be due to special rates offered in recent years.
III - GOLF COURSE MARKET ASSESSMENT

The Maui Valley 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 Maunakea Valley 670 Resort that are rented for visitor use, Maui visitors staying at accommodations outside of the Maunakea Valley 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 Maunakea Valley 670 Resort property owners, to property owners in the Maunakea Valley 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 Maunakea Valley 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

On 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 new 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

Maui golf resort courses vary widely in terms of hotel guest play. As Exhibit III-4 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, Mauna Kea 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.

Exhibit III-4

Rounds played per 100 guests at selected resort golf courses

<table>
<thead>
<tr>
<th>Resort</th>
<th>Estimated annual rounds per population</th>
<th>Rounds per 100 guests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maui</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kapalua</td>
<td>115,540</td>
</tr>
<tr>
<td></td>
<td>Kaanapali</td>
<td>2,331,800</td>
</tr>
<tr>
<td></td>
<td>Wailea</td>
<td>511,250</td>
</tr>
<tr>
<td></td>
<td>Pauoa</td>
<td>145,650</td>
</tr>
<tr>
<td></td>
<td>Waikoloa Beach</td>
<td>297,400</td>
</tr>
<tr>
<td></td>
<td>Keauai</td>
<td>30,200</td>
</tr>
</tbody>
</table>

| Total/average  | 4,293,915                              |

<table>
<thead>
<tr>
<th>Resort</th>
<th>Estimated annual rounds per population</th>
<th>Rounds per 100 guests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maui</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kapalua</td>
<td>271,200</td>
</tr>
<tr>
<td></td>
<td>Kaanapali</td>
<td>1,076,500</td>
</tr>
<tr>
<td></td>
<td>Wailea</td>
<td>277,400</td>
</tr>
<tr>
<td></td>
<td>Pauoa</td>
<td>145,650</td>
</tr>
<tr>
<td></td>
<td>Waikoloa Beach</td>
<td>297,400</td>
</tr>
<tr>
<td></td>
<td>Keauai</td>
<td>30,200</td>
</tr>
</tbody>
</table>

| Total/average  | 2,755,910                              |

(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 Pratt, Mace & 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 Hawaiian 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 levels represent the highest number of rounds operators experience. Stated maximum and desired levels of play do not vary greatly for most courses, although several (Hilton Bay, Princeville, Waikuna and Kaanapali) have higher criteria. Typically, maximum levels 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, Hawaiian resort courses averaged 144 rounds per day, with courses ranging between 124 and 190 rounds.

Fees at Hawaiian Resort Courses

Greens fees and cart rental charges assessed at selected Hawaiian resorts are shown in Exhibit III-C. Most resorts (other than Kauai) charge daily 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 guest and visitors.

Resort courses generally do not offer memberships. Several resorts, however, make annual memberships available to resort hotel or condominium owners within their projects; Waimea Beach, Kapalua, Princeville and Kaua'i Kai are all use this approach. Membership fees range from $100 to $1,500, represent a prepayment of greens fees, and are subject to yearly adjustments.

Resort Golf Courses on Maui

The island of Maui currently includes seven 18-hole resort courses, with two each at the Wailea, Kapalua and Kapalua resorts. Each of these resorts plans to add an additional 18-hole golf course within the next several years. Seabrook has added 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-B.

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:

<table>
<thead>
<tr>
<th>Daily rounds of golf</th>
<th>Average</th>
<th>Desired</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oahu:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makaha</td>
<td>152</td>
<td>200</td>
<td>200(1)</td>
</tr>
<tr>
<td>Turtle Bay</td>
<td>178</td>
<td>250</td>
<td>320</td>
</tr>
<tr>
<td>Maui:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Course</td>
<td>135</td>
<td>216</td>
<td>216(1)</td>
</tr>
<tr>
<td>Orange Course</td>
<td>135</td>
<td>216</td>
<td>216(1)</td>
</tr>
<tr>
<td>Royal Kaanapali:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Course</td>
<td>173</td>
<td>N/A</td>
<td>250</td>
</tr>
<tr>
<td>South Course</td>
<td>173</td>
<td>N/A</td>
<td>250</td>
</tr>
<tr>
<td>Kapalua Golf Club:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay Course</td>
<td>190</td>
<td>210</td>
<td>280</td>
</tr>
<tr>
<td>Village Course</td>
<td>137</td>
<td>210</td>
<td>240</td>
</tr>
<tr>
<td>Kauai:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Princeville Golf Club:</td>
<td>178</td>
<td>200 - 235(2)</td>
<td>235</td>
</tr>
<tr>
<td>Kiahuna Golf Club</td>
<td>123</td>
<td>250</td>
<td>300</td>
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<td>Hawaii:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Maui: Lot - Francis I'low Brown Course</td>
<td>129</td>
<td>200</td>
<td>250</td>
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<tr>
<td>Maui: Lot - Beach Course</td>
<td>148</td>
<td>230</td>
<td>265</td>
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<tr>
<td>Wailea Beach Resort Golf Course</td>
<td>123</td>
<td>180 - 200</td>
<td>270</td>
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<tr>
<td>Kaanapali Golf Course(3)</td>
<td>187</td>
<td>250</td>
<td>350</td>
</tr>
</tbody>
</table>

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) Including Princeville Golf Club and Kiahuna Golf Course.

Source: Based on interviews with golf professionals or representatives of the respective courses.
### Exhibit III-C

**GCR/MNS HAW 670**

**Fees at Selected Resort Golf Courses in Hawaii**

**1987**

<table>
<thead>
<tr>
<th>Resort</th>
<th>Course</th>
<th>Number of holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In operation:</td>
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<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>Blue Course</td>
<td>18</td>
</tr>
<tr>
<td>Kapalua</td>
<td>North Course</td>
<td>18</td>
</tr>
<tr>
<td>Kapalua</td>
<td>South Course</td>
<td>18</td>
</tr>
<tr>
<td>Makena</td>
<td>Bay Course</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Village Course</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Makena Golf Course</td>
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<tr>
<td>Subtotal</td>
<td></td>
<td>126</td>
</tr>
<tr>
<td>Planned:</td>
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<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>Third Course (1991-1992)</td>
<td>18</td>
</tr>
<tr>
<td>Kapalua</td>
<td>Course (1991)</td>
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</tr>
<tr>
<td>Makena</td>
<td>Makaha Golf Resort - Third Nine (1993)</td>
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</tr>
<tr>
<td>Makena</td>
<td>Waimea Golf Resort - Fourth Nine (no date)</td>
<td>9</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>72</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>198</td>
</tr>
</tbody>
</table>

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

### Exhibit III-D

**GCR/MNS HAW 670**

**Resort Golf Courses in Hawaii**

**1987**

<table>
<thead>
<tr>
<th>Total cart and green fees</th>
<th>Resort guests</th>
<th>Resort guests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oahu:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makena</td>
<td>$ 35.00</td>
<td>75.00</td>
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<tr>
<td>Turtle Bay</td>
<td>32.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Maui:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea - Blue and Orange Courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak season (December - April)</td>
<td>45.00</td>
<td>80.00</td>
</tr>
<tr>
<td>Low season (May - November)</td>
<td>30.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Royal Kaanapali - North and South Courses</td>
<td>70.00</td>
<td>70.00</td>
</tr>
<tr>
<td>Kapalua Golf Club - Bay and Village Courses</td>
<td>55.00</td>
<td>85.00</td>
</tr>
<tr>
<td>Kauai:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Princeville Golf Club:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak season (December - April)</td>
<td>56.00</td>
<td>70.00</td>
</tr>
<tr>
<td>Low season (May - December)</td>
<td>48.00</td>
<td>60.00</td>
</tr>
<tr>
<td>Kahuna Golf Club</td>
<td>50.00</td>
<td>55.00</td>
</tr>
</tbody>
</table>

| Source: Compiled by Peat Marwick Main & Co. based on published information. |
Resort guests and residents:
- Between 20% and 30% 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.

Non-resort 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 1989 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, existing and planned regional courses, such as at Maui Makena 670 Resort and Seabu Makena, can be expected to receive greater patronage.

Seabu Makena Resort Golf Capacities

The Seabu 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 Seabu Makena course opened in 1981, and by 1984 had reached a daily level of play of 90 rounds.

Seabu 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 Seabu 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 if so along with the Maui Makena 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-E, each of the two Wailea courses now averages about 125 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 1995, 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 Maui Makena 670 Resort in Exhibit III-E. The assumptions used are as follows:

Projected Resort Condominium Occupancy by Group

<table>
<thead>
<tr>
<th>Wailea</th>
<th>Wailea 670</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors</td>
<td>65%</td>
</tr>
<tr>
<td>Part-time residents</td>
<td>10</td>
</tr>
<tr>
<td>Full-time residents</td>
<td>25</td>
</tr>
</tbody>
</table>

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.
### Exhibit III-1

**GCR/VMS M001 670**

**Average Daily Resident and Visitor Population at Wailea Resort**

1995 to 2010

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hotels:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total units</td>
<td>4,076</td>
<td>4,076</td>
<td>4,076</td>
<td>4,076</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>72%</td>
<td>72%</td>
<td>72%</td>
<td>72%</td>
</tr>
<tr>
<td>Total hotel population</td>
<td>5,844</td>
<td>5,730</td>
<td>6,230</td>
<td>6,590</td>
</tr>
<tr>
<td><strong>Multifamily condominiums:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total units</td>
<td>1,249</td>
<td>1,734</td>
<td>2,214</td>
<td>2,214</td>
</tr>
<tr>
<td>Full-time resident units</td>
<td>312</td>
<td>434</td>
<td>554</td>
<td>554</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>91%</td>
<td>91%</td>
<td>91%</td>
<td>91%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>740</td>
<td>1,030</td>
<td>1,110</td>
<td>1,110</td>
</tr>
<tr>
<td>Part-time resident units</td>
<td>125</td>
<td>173</td>
<td>221</td>
<td>221</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>160</td>
<td>270</td>
<td>280</td>
<td>280</td>
</tr>
<tr>
<td>Visitor units</td>
<td>817</td>
<td>1,127</td>
<td>1,439</td>
<td>1,439</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>510</td>
<td>700</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td><strong>Total condominium population</strong></td>
<td>1,610</td>
<td>1,950</td>
<td>2,490</td>
<td>2,490</td>
</tr>
</tbody>
</table>

(Continued)

---

### Exhibit III-1, Cont.

**Single-family homes:**

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total units</td>
<td>975</td>
<td>650</td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td>Full-time resident units</td>
<td>341</td>
<td>473</td>
<td>473</td>
<td>473</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>910</td>
<td>1,120</td>
<td>1,120</td>
<td>1,120</td>
</tr>
<tr>
<td>Part-time resident units</td>
<td>131</td>
<td>163</td>
<td>163</td>
<td>163</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>130</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Visitor units</td>
<td>53</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>91%</td>
<td>91%</td>
<td>91%</td>
<td>91%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>49</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Total single-family population</td>
<td>1,049</td>
<td>1,280</td>
<td>1,280</td>
<td>1,280</td>
</tr>
</tbody>
</table>

**Grand total**

<table>
<thead>
<tr>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,050</td>
<td>8,880</td>
<td>10,000</td>
<td>10,350</td>
</tr>
</tbody>
</table>

(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 2.0 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 3 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 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 rating of 110 to 115 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 110 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 completions in this category are projected on 1987 daily play of more than 60 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.

---

### Exhibit III-F

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily resort population (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel visitors</td>
<td>5,580</td>
<td>5,720</td>
<td>6,210</td>
<td>6,580</td>
</tr>
<tr>
<td>Other visitors</td>
<td>750</td>
<td>850</td>
<td>950</td>
<td>950</td>
</tr>
<tr>
<td>Part-time residents</td>
<td>390</td>
<td>390</td>
<td>390</td>
<td>390</td>
</tr>
<tr>
<td>Full-time residents</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Total</td>
<td>8,320</td>
<td>8,620</td>
<td>9,650</td>
<td>10,350</td>
</tr>
<tr>
<td>Resident club members</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condominium units and lots sold</td>
<td>1,775</td>
<td>2,385</td>
<td>2,865</td>
<td>2,865</td>
</tr>
<tr>
<td>Memberships (2)</td>
<td>220</td>
<td>310</td>
<td>370</td>
<td>370</td>
</tr>
<tr>
<td>Resident club member average daily rounds (3)</td>
<td>60</td>
<td>90</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents (4)</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Outside complex players (5)</td>
<td>100</td>
<td>110</td>
<td>120</td>
<td>130</td>
</tr>
<tr>
<td>Projected average daily rounds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel visitors (6)</td>
<td>450</td>
<td>460</td>
<td>500</td>
<td>530</td>
</tr>
<tr>
<td>Other visitors (7)</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>510</td>
<td>540</td>
<td>600</td>
<td>660</td>
</tr>
<tr>
<td>Projected average daily rounds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per 100 visitors</td>
<td>8.2</td>
<td>8.3</td>
<td>8.7</td>
<td>8.7</td>
</tr>
<tr>
<td>Per 100 residents</td>
<td>4.3</td>
<td>4.4</td>
<td>4.6</td>
<td>4.6</td>
</tr>
</tbody>
</table>

(1) As shown in Exhibit III-I.
(2) Assuming 12% of property purchasers also purchase golf memberships.
(3) At 100 rounds per membership per year.
(4) At 1 round daily per 100 properties sold.
(5) Projected at 24% annual growth rate, includes Maui residents.
(6) At 8 rounds per 100 guests.
(7) At 11 rounds per 100 guests.
### Exhibit III-6

**GCR/ENS MAUI 670**

Utulei Resort Golf Demand and Supply

**1995 to 2010**

<table>
<thead>
<tr>
<th>Year</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total daily golf demand, rounds</td>
<td>690</td>
<td>760</td>
<td>850</td>
<td>880</td>
</tr>
<tr>
<td>Daily golf demand per course(i)</td>
<td>230</td>
<td>290</td>
<td>280</td>
<td>300</td>
</tr>
<tr>
<td>Total Utulei Resort capacity:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At maximum use</td>
<td>650</td>
<td>650</td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td>At 75 daily rounds per course</td>
<td>525</td>
<td>525</td>
<td>525</td>
<td>525</td>
</tr>
<tr>
<td>At current use level</td>
<td>405</td>
<td>405</td>
<td>405</td>
<td>405</td>
</tr>
<tr>
<td>Unmet Utulei Resort demands:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At maximum use</td>
<td>40</td>
<td>110</td>
<td>200</td>
<td>240</td>
</tr>
<tr>
<td>At 75 daily rounds per course</td>
<td>165</td>
<td>235</td>
<td>325</td>
<td>365</td>
</tr>
<tr>
<td>At current use level</td>
<td>205</td>
<td>355</td>
<td>445</td>
<td>485</td>
</tr>
</tbody>
</table>

(i) Based on third Utulei 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 Utulei Resort guests and residents have come to expect.

Even with a third Utulei 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 Utulei 670 Resort course would be located near the Utulei Resort, it would be expected to capture significant numbers of overflow and relocating golfers from the Utulei Resort courses.

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

### MAUI UTULEI 670 GOLF COURSE MARKET ASSESSMENT

This section identifies projected demand for the two golf courses proposed for the Maui Utulei 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 Utulei 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 Utulei 670 Resort lodges, visitors using Maui Utulei 670 Resort condominium and residential units, property owners who do not belong to the Maui Utulei 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 Maui 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-A.
### Demand at the Maui Waliea 670 Resort Course

Exhibit III-1 indicates future golf demand, in daily rounds, at the Maui Waliea 670 Resort course from 1995 to 2030. 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 Waliea 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 Waliea 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 for 140 rounds, the approximate current level of play at Waliea Resort courses. On the basis of projected demand in 2005, Maui Waliea 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 Waliea 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 Waliea 670 Resort property owners
- Golf lodge guests
- Property owners at the Waliea Resort
- Other Maui residents

It is anticipated that membership rates and charges at the Maui Waliea 670 Resort will be competitive with Waliea Resort course charges.
### Exhibit III-4

**GCR/AMS MAUI 670**

**Projected Average Daily Resort Course**

**Golf Demand**

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>On-Resort population:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort lodge guest population</td>
<td>200</td>
<td>400</td>
<td>290</td>
<td>380</td>
</tr>
<tr>
<td>Other guest population</td>
<td>90</td>
<td>100</td>
<td>170</td>
<td>200</td>
</tr>
<tr>
<td>Apartments and lots sold</td>
<td>250</td>
<td>400</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>On-Resort golf demand:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort lodge guest(1)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Other guest(2)</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Nonclub member(3)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Subtotal</td>
<td>50</td>
<td>50</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Off-Resort market - unmet demand at Wailea courses(4)</td>
<td>150</td>
<td>150</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Maui Wailea 670 share($)</td>
<td>60</td>
<td>60</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Total demand</td>
<td>110</td>
<td>110</td>
<td>170</td>
<td>170</td>
</tr>
</tbody>
</table>

(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 Maal residents.

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

### Fee Structure at Wailea Resort for 1988

- December 31, 1988

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Fees</th>
<th>Occupancy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greens Fees:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea owners</td>
<td>$20</td>
<td>10</td>
</tr>
<tr>
<td>Wailea guests</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Wailea residents</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>General public</td>
<td>65</td>
<td>35</td>
</tr>
</tbody>
</table>

### Annual Membership Rates

<table>
<thead>
<tr>
<th>Category</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>$650</td>
</tr>
<tr>
<td>Single</td>
<td>875</td>
</tr>
<tr>
<td>Family</td>
<td>1,650</td>
</tr>
</tbody>
</table>

- Golf demand on 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 1% to 2% of condominium and residential property owners. From the high level of play registered by property owner-resident 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 1% 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-K. It is expected that golf participation among golf lodge guests will compare with, or exceed, the highest participation rates at Wailea resort courses. Demand was estimated on the basis of 25 daily rounds per 100 guests, a figure currently exceeded only by the Maua Kea Beach Hotel's resort course.
  - Wailea 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% shift to affiliation.

**Golf Demand at Club Course**

Exhibit III-3 estimates daily play on the Maui Wailea 670 Club course. As with Exhibit III-G, 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 2000.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident club members:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condominium units and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>residential lots sold</td>
<td>350</td>
<td>400</td>
<td>700</td>
<td>800</td>
<td>1,100</td>
<td>1,225</td>
<td>1,530</td>
<td>1,920</td>
</tr>
<tr>
<td>Memberships(1)</td>
<td>.45</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.125</td>
<td>.155</td>
<td>.200</td>
<td>.250</td>
</tr>
<tr>
<td>Rounds per day(2)</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>40</td>
<td>40</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Golf lodge guest rounds per day(4)</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>60</td>
<td>60</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Other (5)</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>Total</td>
<td>.70</td>
<td>.90</td>
<td>.80</td>
<td>.90</td>
<td>.110</td>
<td>.120</td>
<td>.130</td>
<td>.150</td>
</tr>
</tbody>
</table>

(1) At 15% 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 Golf 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 nonmembership 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 12% to 15% 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 Valleys 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 91% 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 1991 to 13,300 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.
### Exhibit IV-8

**Projected Hotel Occupancy Levels for the Island of Maui**

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Daily Room Demand</th>
<th>Projected Unit Demand</th>
<th>Projected Occupancy Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>6,700</td>
<td>8,720</td>
<td>78%</td>
</tr>
<tr>
<td>1995</td>
<td>6,660</td>
<td>12,070</td>
<td>72%</td>
</tr>
<tr>
<td>2000</td>
<td>10,190</td>
<td>11,670</td>
<td>75%</td>
</tr>
<tr>
<td>2005</td>
<td>11,250</td>
<td>14,670</td>
<td>81%</td>
</tr>
<tr>
<td>2010</td>
<td>13,380</td>
<td>15,670</td>
<td>85%</td>
</tr>
</tbody>
</table>

(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.

The projected number of hotel units required on the island is based on demand for hotel facilities, assuming 70% to 80% average annual occupancy level for hotel establishments. Typically, 70% to 80% occupancy levels permit visitors to select a wide variety of accommodations and allow hotels to efficiently maintain and operate their facilities profitably through busy and slow tourism 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 in 1990 and 19,100 hotel units in 1990 and 2010, respectively, as shown in Exhibit IV-B.

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 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 market, supportable rooms, development concept and phasing recommendations, occupancy levels and room rates.

**Resort Market Position**

GCR/MVS is planning to develop two resort lodges, representing about 475 to 550 rooms. Both lodges are planned for the lakeside area of the Resort with one incorporated into the lakeside time share complex; the other would stand alone. The potential market for resort lodge development at the Resort is influenced by the following factors:
### Exhibit IV.C

**GCR/WS MAUI 670**

*Projected Market Support for Hotel Rooms on the Island of Maui*

*1990 to 2010*

<table>
<thead>
<tr>
<th>Year</th>
<th>Average daily room demand(1)</th>
<th>Maui hotel room requirements</th>
<th>80% occupancy</th>
<th>70% occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>6,740</td>
<td>8,450</td>
<td>9,660</td>
<td>10,790</td>
</tr>
<tr>
<td>1995</td>
<td>8,460</td>
<td>10,830</td>
<td>12,170</td>
<td>13,370</td>
</tr>
<tr>
<td>2000</td>
<td>10,190</td>
<td>12,740</td>
<td>14,560</td>
<td>15,700</td>
</tr>
<tr>
<td>2005</td>
<td>11,900</td>
<td>14,240</td>
<td>16,070</td>
<td>17,170</td>
</tr>
<tr>
<td>2010</td>
<td>13,380</td>
<td>16,730</td>
<td>19,110</td>
<td>20,320</td>
</tr>
</tbody>
</table>

---

### Exhibit IV.D

**GCR/WS MAUI 670**

*Projected Cumulative Hotel Room Requirements*  

*1990 to 2010*

<table>
<thead>
<tr>
<th>Year</th>
<th>Existing and planned units required</th>
<th>AT 80% occupancy</th>
<th>AT 70% occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cumulative</td>
<td>Cumulative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total additions</td>
<td>Total additions</td>
</tr>
<tr>
<td>1990</td>
<td>8,270</td>
<td>8,450</td>
<td>9,660</td>
</tr>
<tr>
<td>1995</td>
<td>12,070</td>
<td>10,830</td>
<td>12,170</td>
</tr>
<tr>
<td>2000</td>
<td>13,670</td>
<td>12,740</td>
<td>14,560</td>
</tr>
<tr>
<td>2005</td>
<td>14,670</td>
<td>14,240</td>
<td>17,170</td>
</tr>
<tr>
<td>2010</td>
<td>15,670</td>
<td>16,730</td>
<td>19,110</td>
</tr>
</tbody>
</table>

---

(1) As shown in Exhibit IV.A.

(1) Includes 5,550 existing hotel units as reported by the Hawaii Visitors Bureau, Visitor Plant Inventory, February 1990, and planned hotel units, as shown in Exhibit IV.B.
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 outperformed 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 main 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 beachfrontage. However, guests could have beach access through the Wailea 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:
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 3,100 rooms in addition to the inventory currently planned for the Island.

As shown in Exhibit IV-8, hotel occupancy could increase significantly over the final ten years of the projection period from 72% in 1993 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-6.

Based on review of the hotel buildout expected in the Wailea area, as shown in Exhibit II-5 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 38 to 95% of the total Maui market, as also shown in Exhibit IV-6. 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 30% of the demand for hotel rooms in the Wailea area or about 2% of the total Maui visitor room requirements. Therefore, about 500 to 970 resort lodge rooms are anticipated to be supported at the Resort by 2010, as shown in Exhibit IV-6.

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 225 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 designed to support smaller incentive meeting and conference groups which are expected to be an important market segment.

<table>
<thead>
<tr>
<th>Expected Maui Wailea 670 Resort Lodge Target Markets</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT</td>
<td>45%</td>
</tr>
<tr>
<td>Package</td>
<td>35%</td>
</tr>
<tr>
<td>Leisure groups</td>
<td>10%</td>
</tr>
<tr>
<td>Meeting and incentive groups</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
## Exhibit IV.A

### Estimated Market Share of Visitor Room Nights

**Selected Hawaii Resorts**  

**1985**

<table>
<thead>
<tr>
<th>Resort</th>
<th>Estimated Visitor Room Nights</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oahu:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waikiki/Kahala(2)</td>
<td>29,700</td>
<td>93%</td>
</tr>
<tr>
<td>Leeward(2)</td>
<td>640</td>
<td>2</td>
</tr>
<tr>
<td>North Shore(2)</td>
<td>540</td>
<td>2</td>
</tr>
<tr>
<td>Other (airport/downtown)</td>
<td>630</td>
<td>2</td>
</tr>
<tr>
<td>Hawaii:</td>
<td>31,800</td>
<td>100%</td>
</tr>
<tr>
<td>Kona (Kona)</td>
<td>1,220</td>
<td>29</td>
</tr>
<tr>
<td>Hilo (Kona)</td>
<td>1,250</td>
<td>30</td>
</tr>
<tr>
<td>Mauna Kea/Mauna Lani/Waikoloa(2)</td>
<td>930</td>
<td>22</td>
</tr>
<tr>
<td>Hilo/Kilauea/Volcano</td>
<td>600</td>
<td>19</td>
</tr>
<tr>
<td>Maui:</td>
<td>4,240</td>
<td>100%</td>
</tr>
<tr>
<td>Kaanapali</td>
<td>4,480</td>
<td>42</td>
</tr>
<tr>
<td>Kapalua</td>
<td>1,820</td>
<td>17</td>
</tr>
<tr>
<td>Wailea</td>
<td>900</td>
<td>0</td>
</tr>
<tr>
<td>Lahaina</td>
<td>2,680</td>
<td>25</td>
</tr>
<tr>
<td>Kahului/Waikoloa/Hana/Kula</td>
<td>400</td>
<td>4</td>
</tr>
<tr>
<td>Kosra:</td>
<td>10,980</td>
<td>100%</td>
</tr>
<tr>
<td>Princeville</td>
<td>640</td>
<td>17</td>
</tr>
<tr>
<td>Polohu/Kahului/Kokee</td>
<td>1,390</td>
<td>36</td>
</tr>
<tr>
<td>Makena/Kaapea/Lahaina</td>
<td>1,890</td>
<td>47</td>
</tr>
</tbody>
</table>

### Exhibit IV.B

**Supportable Resort Lodge Rooms**  

**at the Maui Wailea 670 Resort**  

**1990 to 2010**

<table>
<thead>
<tr>
<th>Maui Wailea Resort</th>
<th>Maui Hotel Room Requirements</th>
<th>80% Occupancy</th>
<th>70% Occupancy</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80% Occupancy</td>
<td>70% Occupancy</td>
<td>60% Occupancy</td>
<td>Market Share</td>
</tr>
<tr>
<td>Maui Wailea 670</td>
<td>8,450</td>
<td>9,650</td>
<td>10,300</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>10,830</td>
<td>12,370</td>
<td>13,600</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td>12,240</td>
<td>14,560</td>
<td>15,840</td>
<td>440</td>
</tr>
<tr>
<td></td>
<td>14,940</td>
<td>17,010</td>
<td>18,730</td>
<td>510</td>
</tr>
<tr>
<td></td>
<td>19,110</td>
<td>19,730</td>
<td>20,730</td>
<td>570</td>
</tr>
</tbody>
</table>

---

(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.
• Phasing - Due to the expected completion of over 3,000 luxury-class hotel rooms in the Wailea area by 1995, it is recommended that VNS 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 facilities.

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 Wailea 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 Wailea 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Maui Island(1)</th>
<th>Resort</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>75%</td>
<td>60%</td>
</tr>
<tr>
<td>1995</td>
<td>75%</td>
<td>60%</td>
</tr>
<tr>
<td>2000</td>
<td>75%</td>
<td>67%</td>
</tr>
<tr>
<td>2005</td>
<td>81%</td>
<td>75%</td>
</tr>
<tr>
<td>2010</td>
<td>85%</td>
<td>80%</td>
</tr>
</tbody>
</table>

(1) As shown in Exhibit IV-8.

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 $100 per day in 1987 dollars.

U. S. AND MAUI DOLLAR 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 450 million rounds of golf in 1986. This represents 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-6.
• The rapid growth of the female market. In 1988, only 21% of all new golfers were women; whereas by 1988, 37% were, according to Market Facts, Inc. of Chicago.
**Golf Participation and Demographics**

Golf participation is strongly related to income level as 16% and 20% of persons in households with annual incomes of $20,000 to $34,999 and $35,000 or more, respectively, play golf, as shown in Exhibit IV-8.

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

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Percent of Golfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than High School</td>
<td>65</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>25</td>
</tr>
<tr>
<td>Some College</td>
<td>28</td>
</tr>
<tr>
<td>College Graduate</td>
<td>47</td>
</tr>
</tbody>
</table>


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

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percent of Golfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue collar</td>
<td>23%</td>
</tr>
<tr>
<td>Clerical/technical</td>
<td>18</td>
</tr>
<tr>
<td>Professional/managerial</td>
<td>52</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
</tbody>
</table>


### 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-6, 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.

---

**Exhibit IV-C**

Age Profile of the U.S. Golf Market

1986

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Golfers (millions)</th>
<th>Percent distribution</th>
<th>Golf participation rate(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 19</td>
<td>2.32</td>
<td>11.5%</td>
<td>4.5%</td>
</tr>
<tr>
<td>20 - 30</td>
<td>4.58</td>
<td>22.8%</td>
<td>10.7</td>
</tr>
<tr>
<td>30 - 39</td>
<td>4.42</td>
<td>21.9%</td>
<td>11.3</td>
</tr>
<tr>
<td>40 - 49</td>
<td>2.92</td>
<td>14.5%</td>
<td>11.1</td>
</tr>
<tr>
<td>50 - 59</td>
<td>2.58</td>
<td>12.8%</td>
<td>11.8</td>
</tr>
<tr>
<td>60+</td>
<td>2.33</td>
<td>16.5%</td>
<td>8.2</td>
</tr>
<tr>
<td>Total</td>
<td>20.15</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

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

Source: National Golf Foundation.
**Exhibit IV-H**

**GCR/AMS MAUI 670**

**Household Income Profile of U.S. Golf Market**

1986

<table>
<thead>
<tr>
<th>Annual household income (millions)</th>
<th>Golfers (in millions)</th>
<th>Percent distribution</th>
<th>Participation rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $10,000</td>
<td>.60</td>
<td>4.5%</td>
<td>2.65</td>
</tr>
<tr>
<td>$10,000 - $19,999</td>
<td>2.66</td>
<td>14.1%</td>
<td>6.0%</td>
</tr>
<tr>
<td>$20,000 - $29,999</td>
<td>3.85</td>
<td>19.1%</td>
<td>8.7%</td>
</tr>
<tr>
<td>$30,000 - $39,999</td>
<td>3.01</td>
<td>16.0%</td>
<td>10.6%</td>
</tr>
<tr>
<td>$40,000 - $49,999</td>
<td>2.37</td>
<td>16.7%</td>
<td>12.2%</td>
</tr>
<tr>
<td>$50,000 - $74,999</td>
<td>2.75</td>
<td>18.5%</td>
<td>15.5%</td>
</tr>
<tr>
<td>$75,000+</td>
<td>1.63</td>
<td>8.2%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Total</td>
<td>20.17</td>
<td>100.0%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

Source: National Golf Foundation.

- **More avid players** - 41% 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 golf-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 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 London 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 offers 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-1 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 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.
- 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, Kapalua, Kapalua and Kaaawa 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 12% 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 WAILUA 670 GOLF LODGE MARKET ASSESSMENT**

This section presents the market assessment for golf lodge development at the Maui Wailua 670 Resort in terms of target markets, recommended development concepts, 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 45% 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 market would not be expected to be as strong as the Maui Wailua 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 vacation market segments to the state. Many of this group may become members of the private golf club, although 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.
- 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:

<table>
<thead>
<tr>
<th>Guest Market Mix</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leisure</td>
</tr>
<tr>
<td></td>
<td>golf</td>
</tr>
<tr>
<td></td>
<td>50 - 65%</td>
</tr>
<tr>
<td>Hawaii residents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 - 10</td>
</tr>
<tr>
<td>Instructional schools</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 - 10</td>
</tr>
<tr>
<td>Business/incentive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 - 20</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Revised 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 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 market targeted, it is estimated that a small golf lodge, as proposed, could achieve occupancy rates approaching those projected for the resort lodges at Maui Waisa 67D.

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 $50 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 1980s period, as shown in Exhibit V-4. 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 $55,000 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 7,000 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 Kaanapali, Kahana, Mailea and Kaha 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of units</th>
<th>Average value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>2,200</td>
<td>$32,000</td>
</tr>
<tr>
<td>1976</td>
<td>229</td>
<td>48,600</td>
</tr>
<tr>
<td>1977</td>
<td>504</td>
<td>46,000</td>
</tr>
<tr>
<td>1978</td>
<td>1,103</td>
<td>56,800</td>
</tr>
<tr>
<td>1979</td>
<td>1,096</td>
<td>56,700</td>
</tr>
<tr>
<td>1980</td>
<td>1,840</td>
<td>94,200</td>
</tr>
<tr>
<td>1981</td>
<td>1,001</td>
<td>86,200</td>
</tr>
<tr>
<td>1982</td>
<td>122</td>
<td>40,100</td>
</tr>
<tr>
<td>1983</td>
<td>24</td>
<td>129,000</td>
</tr>
<tr>
<td>1984</td>
<td>24</td>
<td>63,300</td>
</tr>
<tr>
<td>1985</td>
<td>18</td>
<td>51,200</td>
</tr>
<tr>
<td>1986</td>
<td>508</td>
<td>65,500</td>
</tr>
</tbody>
</table>

Average annual units: 758

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, Kapalua, Honokohau 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 Wailea 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 44% are in projects located on golf courses. The Maui West 670 condominium sites would generally provide both ocean and golf views. Wailea Resort has typically offered fee simple condominium projects while the Kapalua and Kukuiolani resorts have...
traditionally offered projects with leasehold land tenure. About 70% of the
projects in Kapalua/Kaanapali are leasehold, while the same percentage of
Kaihei/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-2. In the long term, Wailea Resort has urban-
classified zoning potential to develop about 173 more acres of condominium
projects. However, only about 75 acres or 750 to 1,250 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 Kapalua and Wailea resorts also offer ocean views because of
  the topography of the site. Golf-front sites with ocean views are gener-
  ally 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.

Comparative 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)
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 117 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-6. 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 Malena Point projects are the only two that include units with more bedrooms, as shown in Exhibit V-6. Studio units are increasingly rare and are found mostly in 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.

**Average 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-6.

**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 membership 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 Newell 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) IRM database. The Wailea area is defined as IRM number 2-2-1 which primarily represents the Wailea and Makana 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-6. Condominium unit sales have increased in the last four years due to:

<table>
<thead>
<tr>
<th>Project</th>
<th>Number of units</th>
<th>Units per gross acre</th>
<th>Average units per building</th>
<th>Maximum story height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kapalua Bay Villas</td>
<td>141</td>
<td>8.5</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Malena Elua Village</td>
<td>152</td>
<td>6.4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Kapalua Golf Villas</td>
<td>186</td>
<td>11.8</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Kapalua Ridge Villas</td>
<td>161</td>
<td>7.4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Kapalua Ironwoods</td>
<td>40</td>
<td>4.3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Wailea Ekoi</td>
<td>140</td>
<td>13.6</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Wailea Point</td>
<td>130</td>
<td>6.3</td>
<td>13</td>
<td>3</td>
</tr>
</tbody>
</table>

Average: 117, 7.6, 11, 3

Source: Published sources and discussions with developers, realtors and resort representatives.
<table>
<thead>
<tr>
<th>Units</th>
<th>One-bedroom</th>
<th>Two-bedroom</th>
<th>Three-bedroom</th>
<th>Four-bedroom</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Percent distribution</td>
<td>Number</td>
<td>Percent distribution</td>
<td>Number</td>
<td>Percent distribution</td>
</tr>
<tr>
<td>Kapalua Bay Villas</td>
<td>92</td>
<td>65%</td>
<td>49</td>
<td>35%</td>
<td>-</td>
</tr>
<tr>
<td>Waihe'e Elua Village</td>
<td>36</td>
<td>25</td>
<td>98</td>
<td>65</td>
<td>16</td>
</tr>
<tr>
<td>Kapalua Golf Villas</td>
<td>79</td>
<td>42</td>
<td>107</td>
<td>58</td>
<td>-</td>
</tr>
<tr>
<td>Kapalua Ridge Villas</td>
<td>105</td>
<td>65</td>
<td>96</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>Kapalua Ironwoods</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>Waihe'e Ala Kai</td>
<td>40</td>
<td>27</td>
<td>103</td>
<td>73</td>
<td>-</td>
</tr>
<tr>
<td>Waihe'e Point</td>
<td>-</td>
<td>-</td>
<td>26</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>Total or average</td>
<td>256</td>
<td>17%</td>
<td>314</td>
<td>52%</td>
<td>54</td>
</tr>
</tbody>
</table>

(1) Waihe'e 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.
Growing 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 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-6 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 Ewa II, marketed between 1979 and 1982, to 16 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 sales price of 22 luxury units to a Japanese buyer at Wailea Point in late 1980. The latter is reported to be putting about 12 of these units back on the resale 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-5. 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 $299,100.

- Prices by project location - Unit sales prices are strongly affected by a project's location with respect to ocean and golf frontage. However, the Ria Vida project on the island of Maui 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 $500,000 to $515,000 at oceanfront projects, as shown in Exhibit V-4.

W & D NET SELLER'S MARKET

<table>
<thead>
<tr>
<th>Year</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>2</td>
</tr>
<tr>
<td>1986</td>
<td>3</td>
</tr>
<tr>
<td>1987</td>
<td>4</td>
</tr>
</tbody>
</table>
### Exhibit V.10

**Market Time for Selected Resort Condominium Projects**

**As of April 1988**

<table>
<thead>
<tr>
<th>Year</th>
<th>Project</th>
<th>Number of units sold</th>
<th>Number of semianual marketing periods</th>
<th>Average annual sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>Wailea Ekahi I</td>
<td>100</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Wailea Ekahi II</td>
<td>90</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Kapalua Bay Villas</td>
<td>144</td>
<td>1</td>
<td>287</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>234</strong></td>
<td><strong>4</strong></td>
<td><strong>166</strong></td>
</tr>
<tr>
<td>1976</td>
<td>Wailea Ekahi III</td>
<td>104</td>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>Wailea Elua I</td>
<td>54</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>158</strong></td>
<td><strong>5</strong></td>
<td><strong>62</strong></td>
</tr>
<tr>
<td>1977</td>
<td>Wailea Elua II</td>
<td>32</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Kapalua Golf Villas</td>
<td>166</td>
<td>1</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>298</strong></td>
<td><strong>4</strong></td>
<td><strong>109</strong></td>
</tr>
<tr>
<td>1978</td>
<td>Wailea Ekolu</td>
<td>118</td>
<td>4</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Kapalua Ironwoods</td>
<td>40</td>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Kapalua Ridge</td>
<td>161</td>
<td>1</td>
<td>322</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>229</strong></td>
<td><strong>6</strong></td>
<td><strong>116</strong></td>
</tr>
<tr>
<td>1979</td>
<td>Kaanapali Royal</td>
<td>105</td>
<td>1</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>Wailea Elua II</td>
<td>65</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>9</strong></td>
<td><strong>57</strong></td>
</tr>
<tr>
<td>1981</td>
<td>Kaanapali Atii</td>
<td>264</td>
<td>8</td>
<td>66</td>
</tr>
<tr>
<td>1983</td>
<td>Mauna Lani Terrace</td>
<td>79</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>1984</td>
<td>The Villas at Mauna Kea - Phase I</td>
<td>23</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>1985</td>
<td>Mauna Lani Point</td>
<td>96</td>
<td>6</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Wailea Point</td>
<td>116</td>
<td>5</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>The Villas at Mauna Kea - Phase II</td>
<td>17</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>The Shores at Wailea</td>
<td>46</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>315</strong></td>
<td><strong>20</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>

**Sources:** Discussions with representatives of the respective projects.

### Exhibit V.11

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

1986 to June 1987

<table>
<thead>
<tr>
<th>Project</th>
<th>Resort</th>
<th>Location</th>
<th>Average sales price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Luxury projects:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceanfront:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mauna Lani</td>
<td>Wailea</td>
<td>Oceanfront</td>
<td>$619,700</td>
</tr>
<tr>
<td>Mauna Lani Terrace</td>
<td>Wailea</td>
<td>Oceanfront</td>
<td>550,000</td>
</tr>
<tr>
<td>Wailea Point</td>
<td>Kapalua</td>
<td>Oceanfront</td>
<td>719,000</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td>$550,000 - 719,000</td>
</tr>
<tr>
<td><strong>Golf-Front or Interior:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villas at Wailea</td>
<td>Wailea</td>
<td>Golf-Front</td>
<td>947,000</td>
</tr>
<tr>
<td>The Shores at Wailea</td>
<td>Wailea</td>
<td>Golf-Front</td>
<td>395,000</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td>$395,000 - 947,000</td>
</tr>
<tr>
<td><strong>First-class projects:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceanfront:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua at Keahou</td>
<td>Kapalua</td>
<td>Oceanfront</td>
<td>$166,800</td>
</tr>
<tr>
<td>Wailea Elua</td>
<td>Wailea</td>
<td>Oceanfront</td>
<td>412,100</td>
</tr>
<tr>
<td>Wailea Ekahi</td>
<td>Wailea</td>
<td>Oceanfront</td>
<td>201,600</td>
</tr>
<tr>
<td>The Wailei</td>
<td>Kapalua</td>
<td>Oceanfront</td>
<td>280,700</td>
</tr>
<tr>
<td>Kapalua Bay Villas</td>
<td>Kapalua</td>
<td>Oceanfront</td>
<td>290,000</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td>$166,800 - 412,000</td>
</tr>
<tr>
<td><strong>Golf-Front or Interior:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villas at Kapalua</td>
<td>Kapalua</td>
<td>Golf-Front</td>
<td>$200,500</td>
</tr>
<tr>
<td>The Ridge</td>
<td>Kapalua</td>
<td>Golf-Front</td>
<td>264,200</td>
</tr>
<tr>
<td>Kaanapali Royal</td>
<td>Kapalua</td>
<td>Golf-Front</td>
<td>179,210</td>
</tr>
<tr>
<td>Country Club Villas</td>
<td>Keahou</td>
<td>Golf-Front</td>
<td></td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td>$179,000 - 261,000</td>
</tr>
</tbody>
</table>

**Sources:** Hawaii DM 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 oceanfront projects, compared to $19,000 to $284,000 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 3% more than studio units, two-bedroom units were 35% more than one-bedroom units and three-bedroom units were 72% more than two-bedroom units, as shown in Exhibit V-2. Prices per interior square foot at these projects have ranged from about $220 at the interior-located Wailea Eko, to $560 for a luxurious, oceanfront three-bedroom unit at the Wailea Eko.

Buyer Profiles

The characteristics of resort condominium buyers are profiled for first-class and luxury projects. The characteristics of the typical buyer in each category are summarized in Exhibit V-3, 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 $70,000 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:

---

<table>
<thead>
<tr>
<th>Ger/ACB Maui 670</th>
<th>Average Sales Price by Number of Bedroom at Wailea Resort Condominium Projects 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Unit Sales Prices</td>
</tr>
<tr>
<td>Wailea Ekahi</td>
<td>$150,000</td>
</tr>
<tr>
<td>Wailea Eko</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>$150,000</td>
</tr>
<tr>
<td>Average prices per interior square foot:</td>
<td></td>
</tr>
<tr>
<td>Wailea Ekahi</td>
<td>310</td>
</tr>
<tr>
<td>Wailea Eko</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Guideline Corporation, Maui Condominiums, January 1988 and discussions with real estate 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 "busts" 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 WAILAIE 670 CONDOMINIUM
MARKET ASSESSMENT

A total of 1,400 to 1,670 condominium units are planned for the Maui Wailae 670 Resort. The majority, or about 840 to 1,070 units, are planned for the more active market 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 homes - To be kept primarily for the owner's personal use. Purchasers in this category are expected to typify:
  - Successful entrepreneurs or officers of both small and large corporations, with annual household incomes of $100,000 or more.
  - Between the ages of 40 to 50.
  - From a wide geographic area in the United States or from Japan.
  - Repeat FII visitors who have stayed at the hotels at the Resort, or elsewhere at Wailae or Makaha.
  - Persons seeking golf frontage and ocean views.
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, Nis 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 75 and 85
- 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:

<table>
<thead>
<tr>
<th>Projected Condominium Unit Buyer Market Mix at the Maui Wailea 670 Resort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time homes</td>
</tr>
<tr>
<td>Part-time homes/visitor rentals</td>
</tr>
<tr>
<td>Full-time homes</td>
</tr>
<tr>
<td>Full-time rentals</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Projected Unit Sales Absorption</td>
</tr>
</tbody>
</table>

Based on the above assumptions, the Resort is expected to support from about 1,000 to 1,200 condominium units over the 20 year projection period ending in 2030, as shown in Exhibit V-4. 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 sales rates of up to twice as many units per year, as shown previously in Exhibit V-1. 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:

- Density - To range from 6 to 15 and 6 to 8 units per acre with the mid and high-rise 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 800 to 1,100, 1,000 to 1,600 and 2,000 to 2,500 square feet for one-, two- and three-bedroom units, respectively.
- Project amenities - To include: tennis, pool and function rooms and possibly a swimming pool at the current 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 waiea projects.
## Exhibit V-5

**GCR/HMS MAUI 670**

Ratio of Wailea Area Condominium Unit Sales to Hotel Units
1980 to 1987

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales per year</td>
<td>77</td>
<td>52</td>
<td>47</td>
<td>57</td>
<td>133</td>
<td>73</td>
<td>147</td>
<td>110</td>
</tr>
<tr>
<td>Hotel units</td>
<td>950</td>
<td>950</td>
<td>950</td>
<td>950</td>
<td>950</td>
<td>950</td>
<td>1,240</td>
<td>1,240</td>
</tr>
<tr>
<td>Sales per 100 hotel units</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>14</td>
<td>8</td>
<td>11</td>
<td>9</td>
</tr>
</tbody>
</table>

(1) Recorded transactions from the NMLS THK database.
(2) As shown in Chapter II.

## Exhibit V-7

**GCR/HMS MAUI 670**

Projected Supportable Condominium Unit Sales at the Maui Wailea 670 Resort
1991 to 2010

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<td>Average cumulative hotel units completed over five year period</td>
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<td>3,910</td>
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<td>Total average unit sales over five years</td>
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<td>Less re-sales to existing condominiums</td>
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<td>Less new sales to:</td>
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<tr>
<td>Wailea Resort</td>
<td>(405)</td>
<td>(405)</td>
<td>(405)</td>
<td>(545)</td>
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<tr>
<td>Makeka Resort</td>
<td>(100)</td>
<td>(100)</td>
<td>(120)</td>
<td>(120)</td>
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<td>Supportable unit sales at the Resort:</td>
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<td>In period</td>
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<td>Cumulative</td>
<td>245</td>
<td>305</td>
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(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-I.
(2) For the 1991 to 1995 period assumed a historically based 10% resale of condominium units. Therefore, assumed 5% of total sales relate to re-sales.
(3) Assuming the new Wailea Resort condominium projects capture 50% and Makeka Resort projects capture 25% 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-3, 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 $350,000 overall, as shown in Exhibit V-6.
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 Waiau 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 Mauna Kea Resort on Maui. Due to the home custom design possible, resort lots help expand the range of typologies and types of visitor and resident accommodations at a resort as well as contributing to a lower-density and more residential appeal. This section reviews residential lot developments at the following resorts:

- Island of Hawaii:
  - Waikoloa
  - Mauna Lani
- Island of Hawaii
- Kiahou
- 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, 65% of the existing and planned resort lots are classified as interior lots, as shown in Exhibit VI-4. Lots surrounding golf course fairways or greens and on a hillside providing ocean or mountain views represent 23% and 2% of existing and planned lots at the selected resorts, respectively.
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 bushy fairway frontage as well as ocean or mountain views. Similarly, many interior lots at Wailea and Mirage Princetville 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 buyers 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 5,000 to 9,000 square feet. In general, the higher priced golf course lots are larger than the interisland view lot prices 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 resort 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 some type of complimentary or voluntary memberships and the resort's golf courses 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 Kealohi Estates subdivision where access is controlled by a private entry with an automatic and manned security.

Planned Resort Lots on Maui

On Maui, the 50-lot Wailea Golf Villas is expected to be marketed in the near future. The Golf Villas, formerly known as Wailea Golf Estates II, will provide both golf frontage and ocean views. No other planned projects were discovered 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-A. Lot sales had been rapid in 1978, 1979 and 1981 as new inventory was offered at the Mirages Princeville, Wailea 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 high interest rates and the economic slump of 1981 to 1983 which reduced real estate values. Lots sold during this period were typically either lower-priced or offered at discount sales prices with attractive financing terms. Since 1988, sales have increased again, as resort real estate values have stabilized.

Except for the Mauna Kea Resort, an annual average of 40 to 50 lots were typically sold at the respective resorts, as also shown in Exhibit VI-A. Resorts that averaged higher rates of sales include the Wailea and the Mirages Princeville resorts which market lower priced lots. They have averaged about 40 to 60 lots respectively, with lot prices ranging from about $35,000 to $65,000. In contrast, only two lots have been sold annually at the Wailea 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 Wailea Village to $200,000 for fairway lots at Makena Golf Estates III, as shown in Exhibit VI-C. Resort lot prices are primarily related to the following factors:

- Lot location and view - Golf course lot prices typically range from 30 to 100% and as much as 95% 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 $17.00 to $20.30 per square foot and golf course lots with ocean views were priced at $20.00 to $26.50 per square foot.
### Resort Subdivision

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<th>Location and View Location and View</th>
<th>Typical Lot Size</th>
<th>Typical Sales Price</th>
<th>Price per Square Foot</th>
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<td>Maui Kea Resort - Fairways at Mauna Kea South</td>
<td>Hillside/ocean view Fairway</td>
<td>16,500</td>
<td>$94,000 to $120,000</td>
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<td>Waikoloa Village</td>
<td>Not available</td>
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<td>35,000 to 45,000</td>
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### Sources
- Discussions with realtors or representatives of the respective projects.
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 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 $20 for fairway lots, as also shown in Exhibit VI-3.

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-4. These characteristics are outlined as follows:

Occupation - Occupational profiles vary according to the quality and price of the subdivision. Purchasers of lots within the $100,000 to $150,000 range, such as at Wailea Golf Estates 1, are typically professionals, business executives or self-employed entrepreneurs and small businessmen.

Purchasers of lots within the $50,000 to $100,000 range, such as at Kamaole Hills and Kihei, are typically 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 Keauhou Estates.

Place of primary residence - Purchasers from California represent the majority of buyers, comprising between 20% and 25% of the total purchasers. Purchasers from other west coast states represent the next largest segment.

Residents of the island on which the resort is located represent between 40% and 45% of total lot buyers. In comparison to other resort areas, Keauhou Estates, Kamaole Hills and Wailea Village and Menehune Shores have attracted a higher proportion of island residents due to their relatively lower prices.

Buyer profiles 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 Wailea Village resorts.
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 non-view 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 represents 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.
Patio Home Market Review

A more recent trend in the resort residential marketplace is the emergence of high-end, pre-built homes developed in clusters or small subdivisions, on relatively small lots. Various terms include patio home or zero-lot line or 2-lot developments. These products encompass a variety of development concepts and 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 at 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:

- Morningstar, Rancho Mirage, California, about 5 miles southeast of Palm Springs.
- The Vintage Club, Indian Wells, California, about 10 miles southeast of Palm Springs.
- Coto de Caza, 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, 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 landscape 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. In the two Palm Springs area resorts, Morningstar 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 2,600 net interior square feet, on a 5,000 square foot lot, as shown in Exhibit VI.2. The largest units are at Morningstar Resort, with about 3,000 to 4,000 square feet. Lot sizes for the Morningstar 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 $355,000, for an average of about $330,000 to $410,000, as shown in Exhibit VI.6. This represents an average of about $140 to $175 per square foot. Prices were highest, at up to $575,000, at The Vintage Club and Morningstar 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 Colleges.

Sales Absorption

Units sold averaged about 70 per year during periods of available inventory, as also shown in Exhibit VI.6. Sales absorption was 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 southern 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 sizable 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 Morningstar) 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 are keen on 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 Morningstar and the...
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**Note:** The above data reflects average sales prices and total sales volume for the specified periods. The data is compiled from various sources, including sales reports and market studies. For a comprehensive analysis, please consult the full report. Updated as of [date].

**Sources:**
1. Local real estate databases.
2. National real estate market reports.
3. Interview data from property developers and experts.

**Contact:**
[Contact information for further inquiries]
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-6.

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

MARKET ASSESSMENT FOR MAUI MAILEA 670 PROPERTY

This section assesses the market support for single-family residential product development at the Maui Mailea 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 72% 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 Mailea 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 Mailea 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 retirees 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 turnover convenience, security and assurance of common area maintenance associated with patio homes.

Proposed Development Concept

As currently planned, the Mailea 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 lofts, 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
maka and maka 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 differenti-
te the Resort's products from those offered at Wailea Resort.

- Mauka area - The maka 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 2,000 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 fair-
    ways of the maka 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.

- Mokulua area - Up to 110 residential lots could be developed in the maka
  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 maka
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-I 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.

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<td>15 100 150 200 200 250 250 250</td>
<td>15 100 150 200 200 250 250 250</td>
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</table>

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 resort developments mature.
- Growing national and international recognition of the Wailea area as a premier visitor destination and second home community.
- Growing awareness of the Resort as a desirable larger density resort and residential community as compared to Wailea Resort.

Thus, all of the 345 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 Pico 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 Maui 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 Wailea Kialoa and Wailea Golf Estates' developments where market conditions are somewhat comparable to the residence, and in the case of the Golf Estates, their golf course frontages.

- **Wailea Kialoa sales** - More than 100 lots have been sold at Wailea Kialoa residences since February 1985. 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 1 sales** - Interior lots at Wailea Golf Estates 1, originally sold for prices similar to those at Wailea Kialoa Estates, in the range of $9.00 to $13.00 per square foot, as shown previously in Exhibit VI-G. 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 265 of lots at Wailea 670 Resort would be expected to have golf frontage. Lot sizes are expected to differ between the Kialoa and Makena residential subdivisions; Kialoa lots could average about 11,000 square feet in size, while Makena lots could average about 29,000 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 $25.00 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 $25,000 to $50,000 for smaller 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 Pico Home Sales Prices

Achievable patio home sales prices are estimated based on comparison of patio home counts to single-family lot and condominium sales prices at the other resorts surveyed in California and Arizona, and the sales prices projected for lots and condominiums at the Maui Wailea 670 Resort.

Achievable patio home sales prices at the selected resort developments are estimated to represent about 25% to 30% of prevailing comparable condominium unit prices, 85% to 95% of condominium per square foot prices, and 1994 to 2000% of resort lot prices. Thus, 2,000 to 3,000 square foot patio homes at the Maui Wailea 670 Resort are projected to be supportive at prices ranging from about $450,000 to $550,000, in 1998 dollars, as also shown in Exhibit VI-I.
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 (Wailea's Village, The Shops at Kukuihaele and the Wailea Shopping Village) are on the island of Maui; others reviewed are Kapalua's Coconut Plantation Marketplace and the Island of Hawaii's Kona Shopping Village.

**Relationship to Resort Development**

Resort retail centers in Hawaii range in size from about 22,000 gross leasable square feet to about 78,000 square feet. The lower figure is for The Shops, which serves a limited and exclusive market at Kapalua Resort; the higher figure is for Wailea's Village which is the primary retail center for the entire Kaanapali Beach Resort.

Exhibit VIIIA 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 underdeveloped, with about 24 square feet of commercial space per visitor unit in 1985. 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. At both the Wailea Resort and Maui Wailea 670 Resort projects and visitor units, the nexus 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 6.6 acres for The Shops at Kapalua to 10.7 acres for the Wailea Shopping Village. Gross leasable areas range from the Shop’s 22,000 square feet to 90,000 square feet at Wailea’s Village. However, when the currently planned expansion at the Kaanapali Shopping Center is completed, that center will include more than 75,000 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 21.3%. The site of the Wailea Shopping Village, which has a 5.2% 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 (KIT) reflects the tropical beach and ocean theme with an oceanfront which adds to the ambiance of the 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, some second floor locations are sought after by restaurants desiring superior view orientations, and both Wailea’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 purchasers, although Kaanapali Shopping Center also caters to residents of the surrounding resort areas, with its anchor a Supermarket. Apparel, gift, craft or jewelry stores and restaurants are generally represented 85% to 95% of total retail space. Wailea’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 as Wailea’s Village to 20% at Kaanapali Shopping Center. Office tenants are geared to serve both the visitor and residential market.
WAIKIKI REGIONAL
COMMERCIAL MARKET OVERVIEW

This section reviews planned shopping centers in the Waikiki-Kahala area. Population trends in Kahala 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 Kahala, Maitena and Kehalua communities increased at a compounded annual rate of 15.5% between 1970 and 1980. Based on historical trends, population is estimated to have grown from 75,000 persons in 1980 to about 117,000 persons in 1987, with an annual growth rate of 6% to 7%. In addition, more than 1,500 new dwelling units could be completed over the next five years, 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 existing and new shopping centers, approximately 2,500 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 Kahala Resort, Maitena Place 570, and in resort condominium projects at Kahala. By 1995, Maitena Place 570 Resort could add as many as 500 visitors and 400 residents to population, as described in Chapter II. Development at Kahala Resort could increase population by 9,000 visitors and 1,300 residents by 1995, as detailed in Chapter III.

Existing Shopping Centers

Exhibit VII-C lists existing shopping centers serving the Kahala-Maitena region. Retail development is concentrated in Kahala; of the eight operating centers shown in the exhibit, only the Maitena Shopping Village is within the resort area, and represents less than 20% of available shopping center space.

Other commercial space in Kahala is available in individual office buildings and on smaller parcels with single use. It can be expected that non-shopping 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, Kahalu Mall and the KCC Shopping Center) already under construction. Other projects are variously involved in financing, planning and development agreements. The largest potential project, the Kahala Gateway, 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.
### Planned Shopping Centers in the Wailea-Kihei Region

**1988 to 1993**

<table>
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<tr>
<th>Project by Location</th>
<th>Expected completion date</th>
<th>Land area</th>
<th>Gross leasable square feet</th>
<th>Developer</th>
<th>Expected market orientation</th>
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<td>Shopping village expansion</td>
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<td>1.1</td>
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<td>Kamaole Beach Plaza (Phase 1)</td>
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<td>Ipoa Center</td>
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<td>Blackfield</td>
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<td>Visitor and resident</td>
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<td><strong>Kihei Gateway</strong></td>
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<td>Village Shops(4)</td>
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<td><strong>Total for region</strong></td>
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<tr>
<td><strong>Wailea Development Co.</strong></td>
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</table>

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.
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 Mala’alae 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 Mala’alae. The Mala’alae Village Shops is also planned to be larger than any of the existing Kailua shopping centers, with 60,000 square foot Phase I and an ultimate buildout of 130,000 square feet.

**MAUI WALLEA 670 RETAIL**

**MARKET ASSESSMENT**

This section identifies market segments likely to support commercial center development at Maui Wallea 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 Wallea 670**

As noted in Chapter I, the Wallea 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 central portion of the community, at the planned major entry to the Wallea area from the Plant 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 Wallea 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. Planning 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 Wallea 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 Kupuna and Sebu-Makana communities.
- Residents of, and visitors to, the neighboring Mala’alae Resort.

**Resort Visitor Population**

Resort residents are expected to constitute a primary source of market support for commercial uses at the Maui Wallea 670 Resort. As detailed in Exhibit VII-B, residents of single-family and multfamily units at Maui Wallea 670 Resort are expected to total from 400 to 440 in 1995, increasing to 1,110 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 person. In Hawaii, regional malls include about 4 to 5 square feet of retail area per person within their primary trade area. Market demand from Maui Wallea 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 Wallea 670 Resort commercial development is expected to come from visitors staying at the Resort site. As shown in Exhibit VII-B, from 305 to 640 visitor units could be in place in 1995. Visitor units refer to lodge rooms, as well as those residential and single-family units likely to accommodate visitors. The number of visitor units could increase to between 1,270 and 1,310 by 2010.

Based on the performance of resort retail centers as summarized in Exhibit VII-A, Maui Wallea 670 Resort could be anticipated to support about 35 square feet of retail area per visitor unit.

**Supportable Commercial Area**

**Exhibit VII-F summarizes supportable commercial space at Maui Wallea 670 Resort. The exhibit calculates supportable commercial area, and shows the relationship to the total commercial area. The additional demand is estimated to include office uses, which are found in all but one of the commercial developments 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**

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<th>2005</th>
<th>2010</th>
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<tr>
<td></td>
<td>Low</td>
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<td>Resort resident demand:</td>
<td>400</td>
<td>460</td>
<td>480</td>
<td>910</td>
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<tr>
<td>Average daily resident population(1)</td>
<td>1,450</td>
<td>1,490</td>
<td>2,870</td>
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<td>Commercial space supported(2)</td>
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<td>Resort visitor demand:</td>
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<td>Visitor units in place(3):</td>
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<td>Lodge units</td>
<td>310</td>
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<td>Visitor condominiums</td>
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<td>320</td>
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<td>Visitor single-family units</td>
<td>10</td>
<td>10</td>
<td>20</td>
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<td>Total visitor units, rounded</td>
<td>545</td>
<td>640</td>
<td>840</td>
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<td>Commercial space supported(4)</td>
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<td>23,400</td>
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<td>Other commercial demand(5)</td>
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<td>8,630</td>
<td>7,270</td>
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<td>Total commercial space supported</td>
<td>25,970</td>
<td>32,030</td>
<td>29,950</td>
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(1) From Exhibit VI-C.
(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.

### GCR/VMS MAUI 670
**Average Daily Resort Resident Population**

**1995 to 2010**

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<thead>
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<th>2000</th>
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<td>Condominium units</td>
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<td>300</td>
<td>500</td>
<td>600</td>
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<tr>
<td>Full-time resident units(1)</td>
<td>50</td>
<td>60</td>
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<td>Occupancy rate</td>
<td>92%</td>
<td>94%</td>
<td>95%</td>
<td>95%</td>
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<tr>
<td>Full-time residents(2)</td>
<td>120</td>
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<td>240</td>
<td>290</td>
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<td>Part-time resident units(3)</td>
<td>75</td>
<td>90</td>
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<td>Occupancy rate</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
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<tr>
<td>Part-time residents(2)</td>
<td>75</td>
<td>110</td>
<td>190</td>
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<td>Subtotal: condominium residents</td>
<td>210</td>
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<td>Single-family unit residents:</td>
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<td>Full-time resident units(4)</td>
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<td>93%</td>
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<td>95%</td>
<td>95%</td>
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<tr>
<td>Full-time residents(5)</td>
<td>120</td>
<td>170</td>
<td>350</td>
<td>350</td>
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<td>Part-time resident units(6)</td>
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<td>50</td>
<td>50</td>
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<td>Occupancy rate</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Part-time residents(5)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
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<tr>
<td>Subtotal: single-family residents</td>
<td>190</td>
<td>190</td>
<td>390</td>
<td>390</td>
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<tr>
<td>Total average daily resident population</td>
<td>400</td>
<td>440</td>
<td>820</td>
<td>910</td>
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</tbody>
</table>

(1) Represent 25% 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.

A-73
Use of Commercial Sites

The Maui Valleya 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 Piliani Highway extension at the major entry to the Resort.

- A 6-acre site planned "Commercial", located on the makai frontage of the Piliani Highway extension, Makena side of Wailea Blvd Drive. This parcel adjoins a 15.6 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 Valleya 670 Resort. Due to its position next to Wailea's planned future business/commercial center and its Piliani 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 PREPARES** .................................. 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)

<table>
<thead>
<tr>
<th>Section</th>
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</thead>
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<td>VISUAL ATTRIBUTES</td>
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<td>IV-26</td>
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(Continued)

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## CHAPTER V

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

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<td>THE HAWAII STATE PLAN</td>
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</table>
# TABLE OF CONTENTS

(Continued)

## 2. STATE FUNCTIONAL PLANS

- State Historic Preservation Functional Plan - Historic Properties .......................................................... V-15
- State Housing Functional Plan ........................................................................................................ V-15
- State Recreation Functional Plan - Access ..................................................................................... V-16
- State Tourism Functional Plan -
  - Physical Development ........................................................................................................ V-17
  - Employment and Career Development ................................................................................. V-17
  - Community Relations ........................................................................................................ V-18

## 3. GENERAL PLAN FOR THE COUNTY OF MAUI .................................................................................. V-19

## 4. KIHEI-MAKEA 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>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-1</td>
<td>General Land Use Allocation</td>
<td>I- 4</td>
</tr>
<tr>
<td>I-2</td>
<td>Necessary Approvals and Permits</td>
<td>I-19</td>
</tr>
<tr>
<td>II-1</td>
<td>General Land Use Allocation</td>
<td>II- 7</td>
</tr>
<tr>
<td>II-2</td>
<td>Projected Golf Course Demand at the Maui Wailea 670 Resort</td>
<td>II-10</td>
</tr>
<tr>
<td>II-3</td>
<td>Targeted Resort Lodge Guest Markets</td>
<td>II-11</td>
</tr>
<tr>
<td>II-4</td>
<td>Projected Market Support for Maui Wailea 670 Resort Lodge Units, 1990 to 2010</td>
<td>II-12</td>
</tr>
<tr>
<td>II-5</td>
<td>Supportable Development at the Maui Wailea 670 Resort, 1995 to 2010</td>
<td>II-13</td>
</tr>
<tr>
<td>II-6</td>
<td>Anticipated Resort Condominium Buyer Markets</td>
<td>II-14</td>
</tr>
<tr>
<td>II-7</td>
<td>Projected Supportable Condominium Unit Sales at the Maui Wailea 670 Resort, 1991 to 2010</td>
<td>II-16</td>
</tr>
<tr>
<td>II-8</td>
<td>Projected Single Family Unit Sales at Maui Wailea 670 Resort, 1991 to 2010</td>
<td>II-18</td>
</tr>
<tr>
<td>IV-1</td>
<td>Maui Wailea Project Area Drainage Basin Runoff</td>
<td>IV- 9</td>
</tr>
<tr>
<td>IV-2</td>
<td>Annual Wind Rose, Old Maui Airport, 1953 - 1957</td>
<td>IV-16</td>
</tr>
<tr>
<td>IV-3</td>
<td>PM-10 &amp; SO2 Monitoring Data, Kihei, Maui, 1987</td>
<td>IV-19</td>
</tr>
<tr>
<td>IV-4</td>
<td>Summary of State of Hawaii and Federal Ambient Air Quality Standards</td>
<td>IV-20</td>
</tr>
<tr>
<td>IV-5</td>
<td>1980 Emissions Inventory, County of Maui</td>
<td>IV-21</td>
</tr>
<tr>
<td>IV-6</td>
<td>Design Criteria Per 1971 Water Master Plan for County of Maui</td>
<td>IV-45</td>
</tr>
<tr>
<td>IV-7</td>
<td>Projected Water Consumption at Build-Out</td>
<td>IV-46</td>
</tr>
<tr>
<td>IV-8</td>
<td>Projected Student Enrollment</td>
<td>IV-52</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II- 1</td>
<td>Island Location Map</td>
<td>II- 2</td>
</tr>
<tr>
<td>II- 2</td>
<td>Regional Location Map, Kihei-Makena Community Plan</td>
<td>II- 2</td>
</tr>
<tr>
<td>II- 3</td>
<td>TMK Map</td>
<td>II- 4</td>
</tr>
<tr>
<td>II- 4</td>
<td>State Land Use/County Zoning</td>
<td>II- 4</td>
</tr>
<tr>
<td>II- 5</td>
<td>Kihei-Makena Community Plan</td>
<td>II- 4</td>
</tr>
<tr>
<td>II- 6</td>
<td>Kihei-Makena Community Plan: Public Facilities</td>
<td>II- 4</td>
</tr>
<tr>
<td>II- 7</td>
<td>Conceptual Development Plan</td>
<td>II- 6</td>
</tr>
<tr>
<td>IV- 1</td>
<td>Slope Analysis</td>
<td>IV- 2</td>
</tr>
<tr>
<td>IV- 2</td>
<td>Soils</td>
<td>IV- 4</td>
</tr>
<tr>
<td>IV- 3</td>
<td>Photo Index Map</td>
<td>IV-26</td>
</tr>
<tr>
<td>IV- 4</td>
<td>Site Photographs</td>
<td>IV-26</td>
</tr>
<tr>
<td>IV- 5</td>
<td>Existing Easements/Drainage</td>
<td>IV-38</td>
</tr>
<tr>
<td>IV- 6</td>
<td>Existing Access</td>
<td>IV-38</td>
</tr>
</tbody>
</table>
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 runoff during storms. Modifications to gullies are constrained by flood hazards and drainage improvements previously installed downstream within Wailea.

IV-2
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-Onapuka association. The US Department of Agriculture Soil Conservation Service (USDA-SCS) designates the four on-site soil types as; Onapuka, 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 Onapuka, 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 Nataal Redtop. This land type is used for pasture and wildlife habitat. Pasture improvement is difficult because of the many stones and Capability classification is VIIIs, 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
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 VIa, 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 VIa, 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

<table>
<thead>
<tr>
<th>Drainage Basin No.</th>
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<th>SCS Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 Yr. (cfs)</td>
<td>100 Yr. (cfs)</td>
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<tr>
<td>33</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>34</td>
<td>-</td>
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</tr>
</tbody>
</table>

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, groundwater 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

IV-13
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.

IV-14
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

<table>
<thead>
<tr>
<th>Direction</th>
<th>0-3</th>
<th>3-6</th>
<th>6-10</th>
<th>10-16</th>
<th>16-21</th>
<th>&gt;21</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>.0602</td>
<td>.0923</td>
<td>.1162</td>
<td>.1417</td>
<td>.0580</td>
<td>.0026</td>
<td>.4491</td>
</tr>
<tr>
<td>NNE</td>
<td>.0231</td>
<td>.0265</td>
<td>.0264</td>
<td>.0564</td>
<td>.0246</td>
<td>.0026</td>
<td>.1596</td>
</tr>
<tr>
<td>NE</td>
<td>.0323</td>
<td>.0344</td>
<td>.0087</td>
<td>.0087</td>
<td>.0031</td>
<td>.0001</td>
<td>.0870</td>
</tr>
<tr>
<td>ENE</td>
<td>.0046</td>
<td>.0048</td>
<td>.0007</td>
<td>.0003</td>
<td>.0000</td>
<td>.0000</td>
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<tr>
<td>E</td>
<td>.0108</td>
<td>.0091</td>
<td>.0008</td>
<td>.0002</td>
<td>.0000</td>
<td>.0000</td>
<td>.0209</td>
</tr>
<tr>
<td>ESE</td>
<td>.0015</td>
<td>.0012</td>
<td>.0003</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0030</td>
</tr>
<tr>
<td>SE</td>
<td>.0044</td>
<td>.0033</td>
<td>.0013</td>
<td>.0006</td>
<td>.0000</td>
<td>.0000</td>
<td>.0096</td>
</tr>
<tr>
<td>SSE</td>
<td>.0011</td>
<td>.0013</td>
<td>.0009</td>
<td>.0004</td>
<td>.0001</td>
<td>.0001</td>
<td>.0039</td>
</tr>
<tr>
<td>S</td>
<td>.0090</td>
<td>.0077</td>
<td>.0157</td>
<td>.0111</td>
<td>.0027</td>
<td>.0006</td>
<td>.0426</td>
</tr>
<tr>
<td>SSW</td>
<td>.0009</td>
<td>.0016</td>
<td>.0032</td>
<td>.0024</td>
<td>.0003</td>
<td>.0000</td>
<td>.0084</td>
</tr>
<tr>
<td>SW</td>
<td>.0010</td>
<td>.0011</td>
<td>.0010</td>
<td>.0004</td>
<td>.0000</td>
<td>.0000</td>
<td>.0036</td>
</tr>
<tr>
<td>WSW</td>
<td>.0002</td>
<td>.0003</td>
<td>.0001</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0005</td>
</tr>
<tr>
<td>W</td>
<td>.0008</td>
<td>.0012</td>
<td>.0006</td>
<td>.0002</td>
<td>.0000</td>
<td>.0000</td>
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<td>.0013</td>
<td>.0013</td>
<td>.0005</td>
<td>.0001</td>
<td>.0000</td>
<td>.0041</td>
</tr>
<tr>
<td>NW</td>
<td>.0154</td>
<td>.0244</td>
<td>.0253</td>
<td>.0147</td>
<td>.0023</td>
<td>.0003</td>
<td>.0824</td>
</tr>
<tr>
<td>NNW</td>
<td>.0156</td>
<td>.0254</td>
<td>.0331</td>
<td>.0314</td>
<td>.0063</td>
<td>.0003</td>
<td>.1121</td>
</tr>
</tbody>
</table>

| TOTAL     | .1776 | .2359 | .2335 | .2587 | .0776 | .0066 | .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 (SO₂) 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 (NO₂) and hydrocarbons (HC) are not routinely monitored
on Maui. The last measurement for NO₂ (1976) ranged from less
than 0 to 39 ug/m³ with an average of 18 ug/m³ 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
cased 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**

<table>
<thead>
<tr>
<th>MONTH</th>
<th>SAMPLES</th>
<th>MIN.</th>
<th>MAX.</th>
<th>MEAN</th>
<th>SAMPLES</th>
<th>MIN.</th>
<th>MAX.</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 87</td>
<td>4</td>
<td>17</td>
<td>49</td>
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<td>&lt;5</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Feb 87</td>
<td>5</td>
<td>11</td>
<td>23</td>
<td>17</td>
<td>4</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Mar 87</td>
<td>5</td>
<td>22</td>
<td>107</td>
<td>45</td>
<td>5</td>
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<td>&lt;5</td>
</tr>
<tr>
<td>Apr 87</td>
<td>3</td>
<td>24</td>
<td>36</td>
<td>29</td>
<td>2</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
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<tr>
<td>May 87</td>
<td>2</td>
<td>20</td>
<td>41</td>
<td>30</td>
<td>3</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Jun 87</td>
<td>4</td>
<td>16</td>
<td>47</td>
<td>25</td>
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<td>&lt;5</td>
<td>6</td>
<td>&lt;5</td>
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<td>Jul 87</td>
<td>5</td>
<td>18</td>
<td>42</td>
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<td>22</td>
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<td>&lt;5</td>
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<td>Data not available</td>
<td>Data not available</td>
<td>Data not available</td>
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<td></td>
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<tr>
<td>Nov 87</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Dec 87</td>
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<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td><strong>MEAN:</strong></td>
<td><strong>36</strong></td>
<td><strong>11</strong></td>
<td><strong>107</strong></td>
<td><strong>29</strong></td>
<td><strong>31</strong></td>
<td><strong>&lt;5</strong></td>
<td><strong>13</strong></td>
<td><strong>&lt;5</strong></td>
</tr>
</tbody>
</table>

**Source:** Department of Health
<table>
<thead>
<tr>
<th>POLLUTANT</th>
<th>SAMPLING PERIOD</th>
<th>FEDERAL STANDARDS</th>
<th>STATE STANDARDS</th>
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<tr>
<td></td>
<td></td>
<td>PRIMARY</td>
<td>SECONDARY</td>
</tr>
<tr>
<td>1. Total Suspended Particulate Matter (TSP)</td>
<td></td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Maximum Average in Any 24 Hours</td>
<td>260</td>
<td>150</td>
</tr>
<tr>
<td>2. PM-10</td>
<td>Annual</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Maximum Average in Any 24 Hours</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>3. Sulfur Dioxide (SO2)</td>
<td>Annual</td>
<td>80</td>
<td>---</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Arithmetinc Mean</td>
<td>365</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 3 Hours</td>
<td>1,300</td>
<td>1,300</td>
</tr>
<tr>
<td>4. Nitrogen Dioxide (NO2)</td>
<td>Annual</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Arithmetinc Mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Carbon Monoxide (CO)</td>
<td>Maximum Average in Any 8 Hours</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>(milligrams per cubic meter)</td>
<td>Maximum Average in Any 1 Hour</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>6. Photochemical Oxidants (as O3)</td>
<td>Maximum Average in Any 1 Hour</td>
<td>240</td>
<td>100</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Lead (Pb)</td>
<td>Maximum Average in Any Calendar Quarter</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source Category</td>
<td>Annual Emissions (tons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>SOx</td>
<td>NOx</td>
</tr>
<tr>
<td>Steam Electric Power Plants</td>
<td>131</td>
<td>2,892</td>
<td>1,353</td>
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<td>Gas Utilities</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Fuel Combustion in Agriculture</td>
<td>1,865</td>
<td>354</td>
<td>677</td>
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<tr>
<td>Mineral Products Industry</td>
<td>158</td>
<td>36</td>
<td>61</td>
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<tr>
<td>Municipal Incineration</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>212</td>
<td>143</td>
<td>2,483</td>
</tr>
<tr>
<td>Construction, Farm and Industrial Vehicles</td>
<td>23</td>
<td>21</td>
<td>300</td>
</tr>
<tr>
<td>Aircraft</td>
<td>5</td>
<td>14</td>
<td>137</td>
</tr>
<tr>
<td>Vessels</td>
<td>14</td>
<td>114</td>
<td>71</td>
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<tr>
<td>Agricultural Field Burning</td>
<td>2,110</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>Total (T/yr)</strong></td>
<td>4,518</td>
<td>3,575</td>
<td>5,088</td>
</tr>
</tbody>
</table>

**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 Pillani 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.

IV-24
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; Klawe 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
SITE PHOTOGRAPHS

MECO SUBSTATION

DISTANT VIEW OF PUU OLAI

FIGURE IV-4

MAUI WAILEA 670
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 (*Meleagris 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 cinereus 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.

IV-30
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.
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

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Person/Acre</th>
<th>Water Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>13 - 18</td>
<td>140</td>
</tr>
<tr>
<td>Apartment</td>
<td>40</td>
<td>140</td>
</tr>
<tr>
<td>Hotel</td>
<td>75</td>
<td>250</td>
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<tr>
<td>Industrial</td>
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<td>-</td>
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<tr>
<td>Commercial</td>
<td>-</td>
<td>-</td>
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<tr>
<td>School &amp; Church</td>
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<td>30</td>
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<tr>
<td>Hospital</td>
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<table>
<thead>
<tr>
<th>Agricultural</th>
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<tr>
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<td>7,000</td>
</tr>
<tr>
<td></td>
<td>GPAD</td>
<td>GPAD</td>
</tr>
<tr>
<td></td>
<td>1,500 gpd/lot</td>
<td>GPAD</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Use</th>
<th>Gross Area</th>
<th>Max. Units</th>
<th>Rated Used</th>
<th>Potable Domestic Demand (Ave./Day)</th>
<th>Non-Potable Irrigation Demand</th>
</tr>
</thead>
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<tr>
<td>Village/Mixed</td>
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<td>Golf Course:</td>
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<tr>
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<td>Irrigation</td>
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<td>2.551</td>
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</tbody>
</table>

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;

IV-46
(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

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>GRADE</th>
<th>PROJECTED ENROLLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kihei Elementary/Intermediate</td>
<td>K - 8</td>
<td>50 to 100</td>
</tr>
<tr>
<td>Baldwin High School</td>
<td>9 - 12</td>
<td>20 to 30</td>
</tr>
</tbody>
</table>

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.

IV-53
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.

IV-54
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 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."

V-1
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."

V-3
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."

V-5
(b) "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.

V-9
"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."

V-10
(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."

V-15
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' 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 its 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.
CHAPTER X

REFERENCES

County of Maui. 1980. The General Plan of the County of Maui.


Dames and Moore. 1986.


Hawaii State Department of Labor and Industrial Relations. May 1988.


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.


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 OROQ 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 *

XI-2
Dr. Mariya Miura, Director
Office of Environmental
Quality Control
465 South King Street, 4104
Honolulu, HI 96813-2910

May 9, 1988

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
THK 2-1-0.56 and 71, Kiholo, 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
Clay Murashige of this office.

Very truly yours,

CHRISTOPHER L. HAM
Planning Director

Ann
Ch: Sc
CC: Bill Hogarty

Environmental Assessment/Determination
CCP/VAE Maui 670
Maui, Mailea 670
Tax Map Key: 2-1-0.56 and 71
Mailea, Maui

I. AUTHORITY:
The preparation of the Environmental Assessment/Determination is in
accordance with the provisions of Chapter 343, Hawaii Revised
Statutes, and Title 11, Chapter 200, Environmental Impact Statement,
State of Hawaii Department of Health.

II. APPLICANT:
Mr. Bill Hogarty
CCP/VAE Maui 670
2146 Wailea Street, Suite 101B
Wailea, Maui, HI 96793
Phone (808) 244-9851

III. ACCEPTING AGENCY:
Maui Planning Commission
County of Maui
200 S. High Street
Wailuku, 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 (Kiele 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 Shell Hawaii, Inc. to the south. A
roadway corridor comprising approximately thirty acres is
located on the northeast side of

2. Land Use Designations --
a. State Land Use Classification -- Agriculture
b. Kiele-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 Kihel-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 courses, 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:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acres</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village Mixed Use</td>
<td>31</td>
<td>720-850</td>
</tr>
<tr>
<td>Commercial</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Resort Lodges</td>
<td>27</td>
<td>370-480</td>
</tr>
<tr>
<td>Residential</td>
<td>232</td>
<td>1,060-1,320</td>
</tr>
<tr>
<td>Golf Courses</td>
<td>341</td>
<td></td>
</tr>
<tr>
<td>Parks</td>
<td>14</td>
<td>1,100-1,320</td>
</tr>
<tr>
<td>Open Space/Roads</td>
<td>18</td>
<td>3,700-4,250</td>
</tr>
</tbody>
</table>

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.

Drainage 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 archaeological 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 economic impact the Kihel-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 status 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. However, not enough information has been provided to determine if specific uses will impact public health. Both on and off the site, which could include adequacy of power treatment facilities and drainage facilities.
6. An increase 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 5,000 to 5,500 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 Mililani Highway and the expansion of the Kahi 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, nature trails, and social facilities. Also, establishments 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 upon the intent of the project and the existence of physical limitations associated with the site's geology, geology, 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 Water Reservoir and is intended to be an integral part of said reservoir. 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 interspersed with some visitor accommodations.

What should be further addressed is the project's relationship to the development of Wailea as well as its physical relationship to Wailea. This project is significant 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 types on the site include kiawe, wililili, and halea hoa trees. Low to moderate dense shrub material including juncus, liloa, cactus, and halaq. Also, existing are exotic grasses including matal round tip, fingo grass, sour grass, and low climbing vines including morning glory.

The kiawe and wililili tree species feature some mature specimens which warrant consideration for relocation or preservation. However, additional information needs to be provided including the location and significance of the mature trees.

Confirmed sighting of animal species common to the area of Maui were noted on the site. This includes aki deer, house, 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 habitat 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-processed 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 determinants 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 runoff impact on downstream properties and offshore areas. 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 an Environmental Impact Statement for the proposed project should be required.

- 4 -

- 5 -
June 30, 1988

SAMPLE LETTER

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPW) WAILEA, MAUI, HAWAII

TKKS: 2-1-08:56 AND 71

Dear:

GCR/WMS Maui 670 is requesting the County of Maui Planning Department to consider an amendment to the Kiele-Kehea 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/WMS 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 GOCC 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 EISPW published in the GOCC Bulletin. We would greatly appreciate your assistance in this

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE, WAILEA, MAUI
June 30, 1988
Page 2

process by either responding with written comments to the enclosed EISPW 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 Hoarty
Maui Planning Department
GOCC
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, 445 South King Street, Room 104, Honolulu, Hawaii 96813. Documents addressed otherwise will not be considered for publication.

B1S 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, WIHEI, MAUI

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 (TDS: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 Sables 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 Hurnighs
County of Maui Planning Dept.
300 S. High St.
Wailuku, Maui, Hawaii 96793


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.
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 266, 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 Tax No. 2-3-08:56 and 71 and is owned in fee by GCC/PLD Maui 670 (refer to Figures 1 and 2). Comprised of approximately 670 acres, on the relatively gentle lower slopes of Haleakula volcano on east Maui, adjacent to the existing Wailea resort to the west, Seabrika Ranch to the south, Ulupalaka Ranch to the east, and Kahe 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 375 acres makuu and 300 acres makai of the planned highway. Elevations across the site range from approximately +500 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 Kiea forest which includes native Mililili, Kiea and Moke kea trees, Ilanai, Lepeka and grasses.

Panoramic views of shoreline, upland areas of Haleakula, 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 Use Bureau. The makuu portion (380 acres) of the project area is designated on the County's Kahe-Kahakuloa Community Plan as Project District No. 9 (1050 units). Refer to Figures 4 and 5. It is contiguous to
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 eating 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. 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 mokai 300 acres of the project with vehicular and pedestrian access to Wailea and Palama via Kekaha Street, the village center would be pedestrian oriented and in close proximity to the golf clubhouse and tennis center. The balance of the mokai 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 muke 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 Makena 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 15 to 16 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

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Total</th>
<th>% of Area</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village/Mixed Use</td>
<td>31</td>
<td>5</td>
<td>720-850</td>
</tr>
<tr>
<td>Commercial</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Resort Lodges</td>
<td>27</td>
<td>4</td>
<td>370-480</td>
</tr>
<tr>
<td>Residential</td>
<td>233</td>
<td>35</td>
<td>1060-1320</td>
</tr>
<tr>
<td>Golf Courses (2 18-Hole Courses)</td>
<td>341</td>
<td>51</td>
<td>=</td>
</tr>
<tr>
<td>Parks/Recreation</td>
<td>14</td>
<td>2</td>
<td>=</td>
</tr>
<tr>
<td>Open Space/Roads</td>
<td>10</td>
<td>2</td>
<td>=</td>
</tr>
<tr>
<td><strong>TOTALES</strong></td>
<td><strong>670</strong></td>
<td><strong>100%</strong></td>
<td><strong>2150-2650</strong></td>
</tr>
</tbody>
</table>

The general development objectives that establish the framework for detailed project planning and design for "Maui Waiea 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 Waiea-Makena Region.
- Responsive to current and future residential/resort and commercial market trends and needs of the region;
- Responsive to the physical and environmental qualities of the site; and,
- Appropriate for the island of Maui and its vision of Waiea-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 Waiea 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.
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. Kihel, which stretches along the shoreline from Wailea to Wailea, is a residential and resort community about six miles long with a resident population of about 10,600. Kihel Road serves as the primary linear circulation spine of the area.

Residential and resort development in Kihel is focused along Kihel Road and in proximity to shoreline recreation resources. Sugar Beach and Mauku Resort low-rise resort condominium projects typical of the area. The majority of the resort accommodations in Kihel are condominiums, some with offering of supporting services and amenities of a hotel. It is estimated that there are about 6,000 condominium units in the Kihel 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 Kihel, subdivision of these lands will be long-term.

There are numerous existing and planned commercial developments within Kihel including the Anake Place Shopping Center, Wailea Village, Kihel Town Center, Rainbow Mall, Kealia Beach Plaza, Downhill Shopping Center, and Wailea Beach. Most of these centers are planned or under construction in the Kihel area. Launani Kihel includes the 10,000 square foot Kihel Shopping Center and the 20,000 square foot Downhill Shopping Center.

In Wailea, the existing shopping center, with 40,000 square feet of gross leasable area, has no immediate expansion plans, although the development does allow for additional space. Based on the demand for commercial space, there is a strong feeling that the Kihel area could support significantly more commercial development.

Industrial developments in Kihel are limited to the 300 acre Kihel Research and Technology (R & T) Park, currently planned uses of Kihel Highway. It includes the 18-hole golf course (Silver Sword Golf Course) 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 Kihel are on the seaward side of Kihel Road and include Kamoole Beach Park, Wailea Beach Park, and other shoreline parks. Excursion boat operators at the Wailea Harbor offer sightseeing, diving and fishing charters.

2.2.2 Access

Access to the project site will be provided by Piliwai Highway, which begins north of Kihel at its junction with Moanalua Highway, North Kihel Road, and South Kihel Road. Moanalua Highway and North Kihel Road, both two-lane highways, connect to other parts of Maui; South Kihel Road provides local access to Kihel, parallel to Piliwai Highway.

Increment I of the two-lane Piliwai Highway, completed in 1981, is 6.8 miles long and extends south to Kihel 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 Kihel. No further improvements to Increment I are planned at the present time.

Increment II improvements from Kihel Drive south to Wailea Ike Drive, are planned to begin construction in 1988. This 1.4 mile segment will be similar to Increment I, and will end approximately 1.4 miles south of the northern boundary of the project site and provide access to the project area.

The planned but yet undeveloped Increment III improvements will affect the project site from the northwest to the highway's southeastern corner. 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 II was considered a long-range project with design currently expected to begin in seven to ten years, with construction to follow when funds are made available by the state. With completion of Piliwai Highway, travel times between the Kihel and Ria areas will be reduced.

Connection to Piliwai Highway from the project site would be made at an at-grade intersection. A connection opposite Wailea Drive could serve the project until construction of Increment III of Piliwai 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 Kihel Sewer Treatment Plant (STP) was designed to handle 4.0 million gallons of wastewater per day. According to county...
sources, most recent readings taken at the Kihel STP during December 1987 and January 1988 indicate that flows ranged between 2.3 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 Kihel STP, several alternatives are being considered to serve the "Kahului Makena 670" project. These include participation with other developers and the county in upgrading the existing gravity interceptor, pump stations and force mains between Makena and the Kihel STP; or installing a new interceptor beginning at the southwest corner of the proposed project to the Kihel STP along Pualoea Highway (costs would be shared with other developers); or constructing a private STP in the proposed project or Makena site in cooperation with other developers in Makena and Makena.

2.2.4 Water System

Water for the Kihel region comes from drilled wells located in Iao Valley in Makena and in upper Makena, 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 Kihel-Makena area of Maui. Water from Iao Valley or Makena source is conveyed by means of an 18 inch line. Water from the more recently developed source at upper Makena is conveyed by a 36 inch diameter transmission system.

Water for the Makena and Makena developments located west and south, respectively, of the proposed project, is from the upper Makena source. This source was developed by the Joint Venture of Alexander and Baldwin, Inc., Makena Development Company, Makena Hawaii Inc., and C. Brewer and Company, Ltd. This resource consists of several wells with a current 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 Makena Development and the County of Maui, respectively:

### Table 2

<table>
<thead>
<tr>
<th>Type of Development</th>
<th>Water Rates/Unit/Ave. Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Condo</td>
<td>800 gpd</td>
</tr>
<tr>
<td>S Single Family Residential</td>
<td>1,000 gpd</td>
</tr>
<tr>
<td>H Hotel Room</td>
<td>420 gpd</td>
</tr>
<tr>
<td>B Commercial</td>
<td>6,000 gpd</td>
</tr>
<tr>
<td>C Golf Course Irrigation</td>
<td>5,600 gpd</td>
</tr>
</tbody>
</table>

### Table 3

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Population/acre</th>
<th>EPCD</th>
<th>GPAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>13 - 18</td>
<td>140</td>
<td>1,800 - 2,500</td>
</tr>
<tr>
<td>Apartment</td>
<td>40</td>
<td>140</td>
<td>5,000</td>
</tr>
<tr>
<td>Hotel</td>
<td>75</td>
<td>250</td>
<td>17,000</td>
</tr>
<tr>
<td>Industrial</td>
<td>-</td>
<td>-</td>
<td>6,000</td>
</tr>
<tr>
<td>Commercial</td>
<td>-</td>
<td>-</td>
<td>6,000</td>
</tr>
<tr>
<td>School &amp; Church</td>
<td>70</td>
<td>30</td>
<td>1,700</td>
</tr>
<tr>
<td>Hospital</td>
<td>40</td>
<td>100</td>
<td>1,800</td>
</tr>
<tr>
<td>Agricultural Rural</td>
<td></td>
<td>DWP</td>
<td>5CS</td>
</tr>
<tr>
<td>GPAD - Gallons per Capita Day</td>
<td>5,000 gpd</td>
<td>7,000 gpd</td>
<td></td>
</tr>
<tr>
<td>GPAD - Gallons per Acre Day</td>
<td>1,500 gpd/lot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Use</th>
<th>Gross Area</th>
<th>Max Units</th>
<th>Rated Use</th>
<th>Domestic Demand</th>
<th>Non-Potable Irrigation Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village/Mixed</td>
<td>31</td>
<td>850</td>
<td>6000 gpd</td>
<td>0.186</td>
<td>0.279</td>
</tr>
<tr>
<td>Commercial</td>
<td>6</td>
<td>6000 gpd</td>
<td>0.035</td>
<td>0.054</td>
<td></td>
</tr>
<tr>
<td>Resort Lodge</td>
<td>40</td>
<td>420</td>
<td>0.202</td>
<td>0.303</td>
<td></td>
</tr>
<tr>
<td>MF Residential</td>
<td>39</td>
<td>800</td>
<td>0.696</td>
<td>1.044</td>
<td></td>
</tr>
<tr>
<td>SF Residential</td>
<td>154</td>
<td>450</td>
<td>1000 gpd</td>
<td>0.450</td>
<td>0.675</td>
</tr>
<tr>
<td>Golf Course</td>
<td>10</td>
<td>6000 gpd</td>
<td>0.050</td>
<td>0.050</td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td>311</td>
<td>5600 gpd</td>
<td></td>
<td>1.054</td>
<td></td>
</tr>
<tr>
<td>Parks/Recreation</td>
<td>14</td>
<td>5600 gpd</td>
<td>0.078</td>
<td>0.078</td>
<td></td>
</tr>
<tr>
<td>Roadways</td>
<td>18 (5)</td>
<td>5600 gpd</td>
<td>0.028</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTALS:</strong></td>
<td><strong>670</strong></td>
<td><strong>2650</strong></td>
<td><strong>1.726</strong></td>
<td><strong>2.551</strong></td>
<td><strong>1.894</strong></td>
</tr>
</tbody>
</table>

The following irrigation water alternatives are being considered:

1. Use effluent from the Kihel STP: This option would be attractive if a new sewer collector and transportation system were to be installed between the project site and the Kihel STP. The force main to transport treated effluent back to the site 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 aquifers, 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 Kihel-Kamahele watershed. The contributing 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 500 feet at the head of the (waha) boundary of the project area to 6,400 feet at the ridge on Mount Haleakula, a distance of approximately 10,000 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 contributing 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.

8
Table 5
Drainage Basin Runoff

<table>
<thead>
<tr>
<th>Drainage Basin No.</th>
<th>Rational Method (cfs) 50 Yr.</th>
<th>Rational Method 100 Yr.</th>
<th>SCS Method (cfs) 50 Yr.</th>
<th>SCS Method 100 Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>-</td>
<td>-</td>
<td>1,925</td>
<td>2,716</td>
</tr>
<tr>
<td>34</td>
<td>-</td>
<td>-</td>
<td>700</td>
<td>953</td>
</tr>
<tr>
<td>35</td>
<td>-</td>
<td>-</td>
<td>770</td>
<td>938</td>
</tr>
<tr>
<td>36</td>
<td>115</td>
<td>144</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>37</td>
<td>155</td>
<td>184</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>38</td>
<td>185</td>
<td>204</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>39</td>
<td>-</td>
<td>-</td>
<td>1,960</td>
<td>2,324</td>
</tr>
<tr>
<td>40</td>
<td>103</td>
<td>150</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>41</td>
<td>115</td>
<td>159</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>42</td>
<td>30</td>
<td>42</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>43</td>
<td></td>
<td></td>
<td>497</td>
<td>590</td>
</tr>
<tr>
<td>44</td>
<td>86</td>
<td>111</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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.

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 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 Makena area. The nearest fire station is located in Makena near Kaahumanu 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; Onoa-Puka, very stony silty loam (seven to twenty-five percent slopes); Very Stoney Land (young ae lava flows); Makana Loam, very stoney (three to fifteen percent slopes); and Kauwakau, extremely stoney 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 shrub/well potential, low corrodibility, good permeability, shallow depths to bedrock and fairly good to good suitability for road fill and other structural work.

A previous consulting report 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.

The project site is almost completely covered with typical upland Klaue forest vegetation, which consists of native Will-will trees, Klaue and Alelo Kea trees, significant amounts of the native Ilima, and other species such as Lentan, Cactus and Ninioa. A wide variety of introduced grasses are also common in this area, including Katai 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 Will-will and Klaue 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 Will-will relocates readily with ideal ground conditions and a healthy tree. The mature Klaue tree is more difficult to relocate due to its shallow and fibrous root system.

A botanical survey noted the presence of pauu 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 Grey 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 judged 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 Kalekalea, 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 Makana 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 expense and quality of available views, as the ridges that divide the project site tend to visually obscure lower elevations and level areas away from bluffs. Specific visually prominent features include Pou Olai, the existing 69 kv powerlines to the NCCO substation, the 3 MG reservoir adjacent to the western boundary of the site, the Polo Beach Club, the Wailea Ekahi 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 Maliea and the West Maui Mountains beyond. The upper slopes of Haleakale 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 NCCO substation 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 Pilihi 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 site.

Similarly, the proposed project is not expected to result in any significant negative impacts to the environment.

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 layout 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 of appropriate vehicular and pedestrian traffic 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 accord with the state's and county's long-term environmental policies, goals and guidelines as expressed in Chapter 343, WSH, 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, geologically hazardous land, estuary or coastal waters; and,

- The proposed action appears to be individually limited, but cumulatively may have a considerable affect 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.
June 29, 1988

Mr. Fred Matsumoto
Economic Development Coordinator
County of Maui
Department of Economic Development
250 South High Street
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMN: 2-1-68:56 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 N. Leonard
Project Manager

c/o Mr. Christopher Hert, Planning Director
County of Maui
Office of Environmental Quality Control

June 9, 1988

Clyde Murashige
Planning Department
200 South High Street
Wailuku, HI 96793

Dear Mr. Murashige:

Re: Environmental Impact Statement Preparation Notice (EISPN) Wailea, Maui, Hawaii

TMN 2-1-68:56 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

PBR HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

242-1_19.WP
June 9, 1988

Mr. James H. 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 (EISPAN) for the Maui Waiola 670 Residential/Resort Community in Waiola, Maui, Hawaii, TNK 2-1-06:56 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,

[Signature]

HANIBAL TAVARES
Mayor, County of Maui

cc: Director of Planning
    W.S. Haines, Executive Assistant

June 28, 1988

Honorable Mayor Hannibal Tavares
Mayor, County of Maui
Office of the Mayor
County of Maui
Wailuku, Maui, Hawaii 96793

SUBJECT: MAUI WAIOLA 670 EIS PREPARATION NOTICE (EISPAN)
WAIOLA, MAUI, HAWAII
TNK: 2-1-06:56 AND 71

Dear Mayor Tavares:

Thank you for your letter of June 9, 1988 regarding the EISPAN 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,

[Signature]

James H. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
    County of Maui
    Office of Environmental Quality Control
June 12, 1988

Mr. William Hogarty
DBC/NIK Maui 670
2145 Wells Street, Suite 101B
Wailuku, HI 96793

Dear Mr. Hogarty:


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

THOMAS A. BODDEN LAW CORP.
Alcvvavy Law Firm

June 4, 1988

Thomas A. Bodden
1933 - 2nd St., Kihei, HI, 96753
Telephone: (808) 879-7755

Mr. C. Murashige
County of Maui, Planning Department
205 South High Street
Wailuku, Maui, Hawaii 96793

Re: The: (11) 2-1-8-56 & 71
Environmental Impact Statement

Dear Mr. Murashige:

I wish to be a Consultant Party in connection with the preparation of the Environmental Impact Statement for the proposed Community Plan Amendment from Agriculture to Project District for 310 acres, located at Kihei, Maui and identified by the tax key numbers referenced above, as announced in the May 23, 1986 Bulletin of the Office of Environmental Quality Control.

My address is as indicated above. Thank you.

Sincerely,

Thomas A. Bodden

TAHIAN
3D13H/DG/74P
June 28, 1988

Mr. Thomas A. Bodden
Thomas A. Bodden Law Corp.
1993-200 So. Kihel Road.
P.O. Box 719
Kahului, Maui, Hawaii 96733

SUBJECT: MAUI WAILEA 760 EIS PREPARATION NOTICE (EISPW)
WAILEA, MAUI, HAWAII
TK#: 2-1-08156 AND 71

Dear Mr. Bodden:

By your letter of June 4, 1988 to Mr. Clyde Morashige, we have included you as a consulted party in the preparation of the subject EIS. A copy of the EIS Preparation Notice (EISPW) and Environmental Assessment is enclosed for your review and comment.

Please forward any comments you may have on the EISPW to us by July 8, 1988. Your letter of June 4, 1988, this letter and any comments you have on the EISPW will be appended to the Draft EIS.

Sincerely,

PBR HAWAII

James Leonard
Project Manager

Attachments

cc: Christopher Hart, Planning Director
    County of Maui
    Office of Environmental Quality Control
June 20, 1988

Mr. Roger Ulveling, Director
State of Hawaii
Department of Business and Economic Development
P.O. Box 2399
Honolulu, Hawaii 96804

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
MAUI, HAWAII

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,

Roger A. Ulveling

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control
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) WAIKEA, MAUI, HAWAII

Thank you for giving us the opportunity to review the subject matter and your letter of June 3, 1988.

OGB/VWS 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 questions, please feel free to contact us.

Sincerely,

Vincent M. Magno, Jr., Director
VGB/00

cc: Nolan Perreira, Deputy Director
    Ed Raghibir, Chief Engineer
    Carl Katsane, DWS Engr.

"By Water, All Things Find Life."
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 submission. 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,

[Signature]

Robert O. Starob
District Engineer, Maui

June 20, 1988

Mr. Robert D. Starot
District Engineer
State of Hawaii
Department of Transportation
Highways Division, Maui District
650 Palaepae Drive
Kahului, Hawaii 96732

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
MAILEA, MAUI, HAWAII
TNK: 2-1-08:56 AND 71

Dear Mr. Starot:

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. Don 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
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 (EISPAN)
WAILEA, MAUI, HAWAII
TMS: 2-1-5056 AND 71

Dear Mr. Toguchi:

Thank you for your letter dated June 16, 1988 regarding the EISPAN 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

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER
April 13, 1988

Mr. James M. Leonard
Environmental Planner
PBK Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Maui Wailes 670, Proposed Residential/Resort
Community Development, TMD: 2-1-08156 & 21

Our review of the proposed development indicates that it may have the following enrollment impact on our area schools:

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>Proj. Enroll.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kihei Elem/Inter</td>
<td>K-8</td>
<td>50-100</td>
</tr>
<tr>
<td>Baldwin High</td>
<td>9-12</td>
<td>20-30</td>
</tr>
</tbody>
</table>

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. Toyeiki
Superintendent

CTT:J1
cc OBS
Maul District

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER
June 28, 1988

Mr. Tuanega
State of Hawaii
Department of Accounting and General Services
Division of Public Works
P.O. Box 115, Honolulu, Hawaii 96810

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPAN)
WAILEA, MAUI, HAWAII

THM: 2-1-08154 AND 71

Dear Mr. Tuanega:

Thank you for your letter of June 16, 1988 regarding the EISPAN 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
June 17, 1988

Mr. James M. Leonard, Environmental Planner
PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Environmental Assessment
Maui Wailea 670 Residential/Resort Community
Wailea, Maui

The 2nd increment of our Pillani 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 Pillani 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,

[Signature]

Edward Y. Hirata
Director of Transportation

June 28, 1988

Mr. Edward Y. Hirata
Director of Transportation
State of Hawaii
Department of Transportation
669 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
THRS: 2-1-88 06:56 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

[Signature]

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control
June 20, 1988

Mr. James M. Leonard
Project Manager
PBR Hawaii
Financial Plaza of the Pacific
212 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Re: Environmental Impact Statement Preparation Notice (EISPBN) for the Proposed Maui Waiea
570 Project

Thank you for the opportunity to review the subject EISPBN and related Environmental Assessment for the proposed project.

The EIS should address the provision of affordable housing, more specifically:

1. The number of units affordable to families earning from 50% to 140% of the median income. (The median income for a family of four in the County of Maui is $24,000.)

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,

[Signature]
Executive Director

James M. Leonard
Project Manager

CC: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control
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 CCB/UGS Maui Community Plan Amendment for 170 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

PBR HAWAII
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
PH#: 2-1-06156 AND 71

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
June 28, 1988

Mr. William Meyer
District Chief
U.S. Department of the Interior
Geological Survey
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

SUBJECT: MAUI MAILA 670 EIS PREPARATION NOTICE (EISPN) WAILEA, MAUI, HAWAII TMG: 3-1-08/156 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
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
TMD: 21-08:56 and 71

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,

[Signature]

ALVIN K. FUKUNAGA
Director of Public Works

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 EIS PREPARATION NOTICE (EISPN)
WAILEA, MAUI, HAWAII
TMD: 21-08:56 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,

[Signature]

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
    County of Maui
    Office of Environmental Quality Control
The Department of Agriculture has reviewed the subject EISP 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-Mauna Community Plan.

SOILS INFORMATION

The 670-acre site is not classified according to the Agricultural Land of Importance to the State of Hawaii (ALISH) system. The Soil Conservation Service Soil Survey identifies the soils (in descending order of predominance) as Kamakapu extremely stony silty clay loam (NHK) with 0 to 25 percent slopes, very stony land (FVS) with 7 to 30 percent slopes, Makana loam stony complex (MNC) with 3 to 15 percent slopes, and Kauaupoa very stony silt loam (OAD) with 7 to 25 percent slopes. These soils are used for pasture and have capability classifications of VI or VIIa (soils with severe limitations due to stoniness).
June 29, 1988

Ms. Suzanne D. Peterson
Chairperson, Board of Agriculture
State of Hawaii
Department of Agriculture
1450 Co. King Street
Honolulu, Hawaii 96814-2812

SUBJECT: MAUI MAILA 670 EIS PREPARATION NOTICE (EIS/NE)
MAILA, MAUI, HAWAII
TODAY: 2-1-00-106 AND 71

Dear Ms. Peterson:

Thank you for your comments regarding the EIS/NE for the proposed
residential/resort project.

Your comments are appreciated and will be considered in the
preparation of the Draft EIS.

Sincerely,

PBR HAWAII

[Signature]

James M. Leonard
Project Manager

cc: Mr. Christopher Hart, Planning Director
County of Maui
Office of Environmental Quality Control

342-L_17.WP
Mr. James M. Leonard  
PBK HAWAII

June 23, 1988

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,

SHOBEI TAKAHASHI
Chief of Police
Maui County Police Department

cc: Maui Planning Department
June 28, 1988

Mr. Howard Tagomori
Chief of Police
Hawai‘i County Police Department
55 Mahalani Street
Wailuku, Hawai‘i 96793

SUBJECT: MAUI WAILEA 670 EIS PREPARATION NOTICE (EISPW)
WAILEA, MAUI, HAWAII
TODAY: 2-1-88

Dear Chief Tagomori:

Thank you for your comments regarding the EISPW 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
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

DEADLINES: 2-1-88: 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 HAWAI'I

James M. Leonard
Project Manager

cc: Mr. Christopher Hartz, Planning Director
    County of Maui
    Office of Environmental Quality Control

Mr. James M. Leonard
Project Manager
PBR Hawaii
100 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 honey bat in this area would be valuable in determining potential impacts to this endangered species.

We appreciate the opportunity to comment.

Sincerely,

Ernest Koome, Field Supervisor
Environmental Services
Pacific Islands Office

Save Energy and You Serve America!
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 VHS 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 Wailua, 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 68, 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

Attachment

cc: Joseph Kennedy, ACH
Kirk Li, VHS Realty Partners

April 7, 1988

Mr. James Leonard, Environmental Planner
PBR Hawaii
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Leonard:


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 700, which was previously identified in a 1972 survey as a wall constructed by the Ulupakalino 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.
Should you have further questions, please feel free to contact Ms. Annie Griffin, staff archaeologist handling the island of Maui, at 548-6608.

Sincerely yours,

[Signature]

RAUL V. 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.
April 5, 1988

Mr. Robert O. Siarot
Hawaii District Engineer
State Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Maui, Hawaii 96732

SUBJECT: PROPOSED RESIDENTIAL/RESORT COMMUNITY DEVELOPMENT
TOKU 2-1-88:56 AND 74

Dear Mr. Siarot:

GCR/UHS Maui 670 is proposing development of a residential/resort community in Wailua, Maui, which may affect the roads and traffic in the area.

GCR/UHS Maui 670 is requesting the County of Maui consider an amendment to the Kiala-Makena Community Plan to change the Community Plan designation of approximately 670 acres of land which is accessed from Pilani 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.

Sincerely,

[Signature]

James M. Leonard
Environmental Planner
cc: Bill Hoparty
Attachment

Mr. Robert O. Siarot
PROPOSED RESIDENTIAL AND RESORT COMMUNITY DEVELOPMENT
April 5, 1988
Page 2

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 808-8961.

Sincerely,

PBR HAWAII

362\CL_3\HP

CORRESPONDENCE PRIOR TO EISPN
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, THM 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 Pillani Highway between Mokulele Highway and Kahului town. 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,

[Signature]

ROBERT G. STARR
District Engineer, Maui

CORRESPONDENCE PRIOR TO EISPN
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.

Sincerely,

James Leonard
Environmental Planner

Attachments
cc: Joseph Kennedy, ACH
Bill Hogarty, WMS Realty Partners

CORRESPONDENCE PRIOR TO EISPN
May 4, 1988

Mr. James Leonard, Environmental Planner
PRR 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 Waiea 670 development
Palauea, Makawao, Maui
THK 2-1-08: 56-6-21

Thank you for submitting the addendum to the report on the
archaeological survey conducted in the proposed Maui Waiea 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,

RASTON H. HAGATA
State Parks Administrator and Deputy
State Historic Preservation Officer
April 5, 1988

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

SUBJECT: PROPOSED RESIDENTIAL/RESORT COMMUNITY DEVELOPMENT  
TNB: 2-1-08158 AMD 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 Kiehe-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 1590-1330 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 minimal 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.

Sincerely,

James M. Leonard  
Environmental Planner  
cc: Bill Nagerty

Attachment

FINANCIAL PLAZA OF THE PACIFIC  
150 MERCHANT STREET, SUITE 810  
HONOLULU, HAWAII 96813  
PHONE: (808) 522-6671  
FAX: (808) 522-1077  
HONOLULU DIVISION MANAGER

CORRESPONDENCE PRIOR TO EISP
Mr. James M. Leonard  
Environmental Planner  
PBH Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Leonard:

Subject: Maui Welles 670, Proposed Residential/Resort  
Community Development, T.R.N.: 2-1-08:30 & 71

Our review of the proposed development indicates that it may have the following enrollment impact on our area schools:

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<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>Proj. Enroll.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethel Elee/Inter.</td>
<td>E-8</td>
<td>50-100</td>
</tr>
<tr>
<td>Baldwin High</td>
<td>9-12</td>
<td>20-30</td>
</tr>
</tbody>
</table>

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. Tomich  
Superintendent

CTT: jl  

cc OGS  
Maui District

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

CORRESPONDENCE PRIOR TO EISPN
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.
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<tr>
<th>NAME/AGENCY</th>
<th>DATE OF LETTER</th>
<th>DATE OF RESPONSE</th>
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<th>NON-SUBSTANTIVE</th>
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<td>Jerry M. Matsuda</td>
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<td>Vince G. Bagoyo, Jr.</td>
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<td>Kisuk Cheung</td>
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<td>Hannibal Tavares</td>
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<td>09/22/88</td>
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<td>County reviewing sewer impact fees;</td>
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<td>reduction of solid waste</td>
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<td>Ralston H. Nagata</td>
<td>08/08/88</td>
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<td>Marilyn Moniz-Kahoolanohano</td>
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<td>09/22/88</td>
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<td>William W. Paty</td>
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<td>Richard N. Duncan</td>
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<td>U.S. Dept of Agriculture, Soils Conservation Services</td>
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<tr>
<td>NAME/AGENCY</td>
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<td>DATE OF RESPONSE</td>
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<td>Bruce S. Anderson</td>
<td>08/26/88</td>
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<td>X</td>
<td>Private wastewater treatment systems; wastewater used for irrigation</td>
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<td>State, Dept. of Health</td>
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<td>Neal Shinya</td>
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<td>Location of transmission lines on-site</td>
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<td>Maurice H. Kaya</td>
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<td>09/22/88</td>
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<td>Energy conservation; total energy consumption</td>
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<td>Jaquelin Miller</td>
<td>09/06/88</td>
<td>09/22/88</td>
<td>X</td>
<td>Underground injection within control line use of &quot;Packaged&quot; sewage treatment plant; disposal of solid wastes; archaeological site survey.</td>
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<td>University of Hawaii, Environmental Center</td>
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<td>Robert A. Everingham</td>
<td>09/07/88</td>
<td>09/22/88</td>
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<td>Impacts to groundwater resources, additional water sources, wastewater treatment alternatives.</td>
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<td>Wailea Development Company</td>
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<td>Harold S. Masumoto</td>
<td>09/08/88</td>
<td>09/22/88</td>
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<td>Need for project; availability of workforce; traffic; water quality; affordable housing; public fiscal resources.</td>
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<td>State, Office of State Planning</td>
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<tr>
<td>Joseph K. Conant</td>
<td>09/08/88</td>
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<td>Affordable housing</td>
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<tr>
<td>Alvin K. Fukunaka</td>
<td>09/09/88 - late No response letter Issues addressed in FEIS</td>
<td>X</td>
<td>Housing needs of workers &amp; employees; road requirements; wastewater treatment. Schedule of construction and occupancy</td>
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</tr>
</tbody>
</table>
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 herewith 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)
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 20 01:22

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 □ Action Indicated On Item Transmitted □ For Signature and Return □ For Signature As Noted Below □ For Submittal / Distribution

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<td>7/20/88</td>
<td>Maui Wailea 670 Draft EIS</td>
</tr>
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</table>

REMARKS: Received By:

[Signature]

[Date]  July 20, 1988

COPY TO: SIGNED: James Leonard

TITLE: Project Manager

XII-5
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.

XII-6
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: 

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<td>Dept. of Education (a)*</td>
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<tr>
<td>Dept. of Hawaiian Home Lands (a)*</td>
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<td>Dept. of Health</td>
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Total Distributed: __________
Date: __________
File Copy: __________

(a)* Copy desired only if project involves the agency's responsibilities.

XII-7
| Honolulu Star-Bulletin | 1 |  |
| Honolulu Advertiser | 1 |  |
| Sun Press | 1 |  |
| Hawaii Tribune Herald (b)** | 1 |  |
| W * Hawaii Today - Kona (b)** | 1 |  |
| Ti., Garden Island Newspaper - Kauai (b)** | 1 |  |
| Maui News (b)** | 1 |  |
| Ka Molokai (b)** | 1 |  |

**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 HAWAI'I (b)**

- Planning Dept.
- Dept. of Parks and Recreation
- Dept. of Public Works
- Dept. of Research and Development
- Dept. of Water Supply
- University of Hawaii - Hilo Campus Library

**COUNTY OF MAUI (b)**

- Office of the Mayor
- Planning Dept.
- Dept. of Parks and Recreation
- Dept. of Public Works
- Dept. of Water Supply
- Economic Development Agency
- Maui Community College Library

**COUNTY OF KAULI (b)**

- Planning Dept.
- Dept. of Public Works
- Dept. of Water Supply
- Kauai Community College Library

**NON-GOVERNMENTAL AGENCIES**

- American Lung Association
- Hawaiian Electric Company
- Office of Hawaiian Affairs

**LIBRARIES**

- J.H. Hamilton Library, Hawaiian Collection
- Legislative Reference Bureau

(b)** Copy desired only if project is in respective county.

XII-8
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XII-9
COMMUNITY ORGANIZATIONS AND INDIVIDUALS

Hui Alanui O'Makena
Wailea Development Company, Inc.
Seibu Hawaii, Inc.
Thomas A. Bodden
September 22, 1988

Mr. Tesane Tominaga
State Public Works Engineer
State of Hawaii
Department of Accounting and General Services
P.O. Box 116
Honolulu, Hawaii 96810

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Tominaga:

This is to acknowledge 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,

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
    John McGrath, WES Realty Partners

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 Wailiea 670

We have reviewed the subject document and have no comments to offer.

Very truly yours,

Tesane Tominaga
State Public Works Engineer

cc: Mr. James Leonard
September 22, 1988

Major Jerry H. Matsuda
Department of Defense
Office of the Adjutant General
2049 Diamond Head Road
Honolulu, Hawaii 96816-4495

SUBJECT: MAUI MAILEA 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,

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
    John McGrath, VRS Realty Partners

343FL 8_wp
Mr. Clyde Nurasbige  
County of Maui Planning Department  
200 S. High Street  
Wailuku, Hawaii 96793  

Dear Mr. Nurasbige:  

SUBJECT: Maui Wailea 670  
Draft Environmental Impact Statement  

Our response as shown on page X-28 of the subject document is still valid.  

Thank you for the opportunity to comment.  

Sincerely,  

[Signature]  

Mr. Charles T. Toguchi  
Superintendent  

cc: J. Leonard, PBR Hawaii  

September 22, 1988  

Mr. Charles T. Toguchi  
Superintendent  
Department of Education  
P.O. Box 2369  
Honolulu, Hawaii 96804  

SUBJECT: MAUI WAILaea 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,  

[Signature]  

James M. Leonard  
Project Manager  

cc: Christopher Hart, Planning Director  
John McGrath, WAI Realty Partners  

PBR HAWAII  
LANDSCAPE ARCHITECTURE  PLANNING  ENVIRONMENTAL STUDIES  

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER
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)

Please be advised that our response and comments of June 16, 1988 is still valid.

Please keep us apprise of any changes.

Sincerely,

[Signature]

Vince G. Bagoyo, Jr. Director
Division of Water Supply
VGB/1AW

cc: Chris Hart

WES Engineering

---

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,

[Signature]

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director

John McGrath, WRS Realty Partners

---

"By Water All Things Flow"
Mr. Clyde Murashige  
County of Maui Planning Department  
260 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 678, 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 1-6) is accurate.

Sincerely,

Kimuk Cheung  
Chief, Engineering Division

Copy furnished:
Mr. James Leonard  
PBR Hawaii  
Financial Plaza of the Pacific  
138 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

September 22, 1988

Mr. Kimuk 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, VHA Realty Partners
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.
Honorable Hannibal Tavares, Mayor
MAUI WAILA'E 670 DRAFT EIS
September 22, 1988
Page 2

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

[Signature]

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McElvany, VMS Realty Partners
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 Waikea 670 (89-D7)
Paeahu & Palawa, Makawao, Maui
IMK 2-1-08; 56.6.71

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 I-40-4lI, I-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
September 22, 1988

Mr. Railton K. 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
Project Manager

cc: Christopher Hart, Planning Director
    John McGreal, VHS Realty Partners
September 22, 1988

Mrs. Marilyn Mooli-Kahoolavanlino
Director of Parks & Recreation
County of Maui
Department of Parks and Recreation
1580 Kamehameha Avenue
Wailuku, Maui 96793

SUBJECT: MAUI MAILEA 670 DRAFT EIS

Dear Mrs. Mooli-Kahoolavanlino:

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 be appended to the Final EIS.

Sincerely,

PBR HAWAII

James N. Leonard
Project Manager

cc: Christopher Hart, Planning Director
    John McGrath, WRS Realty Partners

August 23, 1988

Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

SUBJECT: EIS FOR MAUI MAILEA 670

Dear Mr. Murashige:

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 Mooli-Kahoolavanlino
Director of Parks & Recreation

cc: Mr. James Leonard
    PBR Hawaii
    Financial Plaza of the Pacific
    130 Merchant Street, Suite 111
    Honolulu, Hawaii 96813
Mr. Clyde Murashige
County of Maui Planning Department
200 South High Street
Wailuku, Maui, Hawaii 96793

SUBJECT: Draft Environmental Impact Statement for Maui
Waikea-670: TRA: 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 Waikea 670 submission the section Historical and Archival 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-60-41, 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 archeologist will be retained to execute the mitigation plan.

Our Department’s Recreation Section points out that ponding basins will be constructed on-site for dissolving 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

Mr. Clyde Murashige
DOC NO: 4050E

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 Waikea 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. PAHO, Chairperson
Board of Land and Natural Resources

cc: Mr. James Leonard
Mr. William W. Paty  
MAUI WAILEA 670 DRAFT EIS  
September 22, 1988  

Page 2

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,

[Signature]

James M. Leonard  
Project Manager

cc: Christopher Harr, Planning Director  
John M. Drath, V & S Realty Partners

---

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: 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 2) 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.
Mr. Clyde Nishishi
County of Maui
Planning Department
200 S. High Street
Wailuku, Maui, Hawaii 96793

August 24, 1988

Dear Mr. Nishishi:

Subject: Draft Environmental Impact Statement (EIS) -
Maui Wailua 670, Wailua, Maui, Hawaii

We have no comments to offer at this time; however, we would appreciate the
opportunity to review the final EIS.

Sincerely,

[Signature]

RICHARD M. DUNCAN
State Conservationist

cc:
Mr. James Leonard, PBR Hawaii, Financial Group of the Pacific, 130 Merchant
Street, Suite 1113, Honolulu, Hi 96813.

September 22, 1988

Mr. Richard M. Duncan
State Conservationist
United States Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

SUBJECT: MAUI WAILUA 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 W. Leonard
Project Manager

cc: Christopher Hart, Planning Director
    John McGrath, VMS Realty Partners
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 Wailas 670 Project, Wailau, 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 corridor 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 fringes 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 Fernihili Tavares which explains our position on the wastewater management problem in the Kiihi-Wailau 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 E. ANDERSON, Ph.D.
Deputy Director for Environmental Health

A/11g
Attachment

cc: Mayor James Leonard, PBIR Hawaii (w/attach)

Shempo County Council

---

August 2, 1988

The Honorable Fernihili Tavares
Mayor, County of Maui
200 S. High Street
Wailuku, Maui, HI 96793

Dear Mayor Tavares:

Subject: Kiihi-Wailau 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 Kiihi wastewater treatment plant and the pending developments in the Kiihi-Wailau area. Due to the heavy concentration of development and vulnerability of coastal water 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 any development in the Kiihi-Wailau 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
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 WAILUA 670 DRAFT EIS

Dear Dr. Anderson:

Thank you for the copy of your letter of August 26, 1988 to Mr. Clyde Murakami, 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 5.2), 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 personal 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.

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 Harte, Planning Director
John McGraith, WMS Realty Partners
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 Waikea 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, Waikea Substation No. 25, located along the western boundary of the subject development. This substation serves the Waikea and Kohala resort areas, and the Kohala community north of the Waikea 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.

Sincerely,

Neal Shinyama
Staff Engineer

cc: C. Kawanoe (MECO)
J. Leonard (PBR Hawaii)
September 22, 1988

Mr. Neal Shinya
Staff Engineer
Mau Electric Company, Ltd.
210 West Kamehameha Avenue
P.O. Box 398
Kahului, Maui 96732-0398

SUBJECT: MAUI WAIKEA 670 DRAFT EIS

Dear Mr. Shinya:

Thank you for the copy of your letter of September 2, 1988 to Mr. Clyde Kanahele, 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 lines that cross the project property as 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 services 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
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 Valleys 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 will be used for both water heating and cooling purposes," other energy efficient methods--including solar water heating and cooling--will be examined (pp. IV-48-50). 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 law 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 364, HRS ("State Environmental Policy") and Chapter 216, HRS ("Hawaii State Planning Act"). In particular,
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 Kurosigi, 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 promote operational efficiencies within
commercial establishments, such as resort lodges, restaurants and
retail outlets. As noted in chapter IV, section 5.1,1,
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 project's total energy
requirements are adequately met.

Alternate Energy Development

Development of an alternate energy source, 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 WECO power plant in Hana. Integration of power

Mr. Maurice H. Kaya
SUBJECT: MAUI WAILEA 670 DRAFT EIS
September 22, 1988

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,

James M. Leonard
Project Manager

cc: Christopher Hart, Planning Director
John McGarish, WEC Realty Partners
September 6, 1988
RE:0505

Mr. Clyde Hurashige
Planning Department
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Hurashige:

Draft Environmental Impact Statement
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 accommodations of Wailea and Kahana. It will include restaurants, visitor information center, arts and crafts center, and theaters.

The Environmental Center has reviewed the above referenced document with the assistance of Michael Gross, Archeology; Roger Pjihoka, Water Resources Research Center; and Nancy Kanuk, Environmental Center.

MARESWATER

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 WWTP in concert with other developers and the county is 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 not 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 only on the basis of the reconnaissance methodology, other than to say that a combination of pedestrian and vehicular modes were adopted. The focus of the survey was to identify known archaeological features in the project area. Yet, there are known archaeological deposits in Hawaii which do not always include obvious healing walls. Dryland agricultural features, including stone walls, false windmills and terraces, are not always visible or accessible. 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 will become valuable to be observed. Hence, it does not appear from the evidence provided that sufficient time or intensity of effort were 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 strongly recommend inclusion of more specific data on the concerns we have voiced in the Final EIS.
Mr. Clyde Murashige

September 6, 1988

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,

Jacqueline Miller
Associate Environmental Coordinator

cc: OEQC
Janna Leonard, PBR Hawaii
L. Stephen Lau
Michael Graves
Roger Fujimoto
Jon Natsuko
Nancy Kanyuk

PBR
HAWAII
LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

September 22, 1988

Ms. Jacqueline Miller
Associate Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

SUBJECT: MAUI MAILA 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 applicable state and county rules and regulations. Should wastewater be used to irrigate the proposed golf course, 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 burden on county personnel, resources, and taxpayers.
Mr. Joaquin Miller
SUBJECT: MAUI WAILEA 670 DRAFT EIS
September 22, 1988
Page 2

Archeology

The archeological 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,

FBR HAWAII

James M. Leonard
Project Manager

Attachment

cc: Christopher Hart, Planning Director
     John McGrath, VIN Realty Partners

342FL_19_HP
Mr. James Leonard
Project Manager
750 Hawaii
130 Merchant Street
Honolulu, HI 96813

Dear Jim:

Mauli-Walae 670: Environmental Impact Statement (EIS)

The following are comments in response to the Mauli-Walae 670 project EIS:

1. Page 1-8, 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 Walae. Thus, the entire quantity flowing beneath the Mauli-Walae 670 site is not available for their sole use. Existing uses of this groundwater resource must not be impacted by the development of additional wells.

2. Page 1-16, last paragraph

   include "brackish water development" in the list of cooperative efforts with neighboring developers.

3. Page 1-19, 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 11-4, State Land Use/County Zoning Exhibit

   The Mauli County Council has taken action to reclassify approximately 15 acres for the Embassy Suite project.

September 7, 1988

Mr. James Leonard
September 7, 1988

5. Page IV-8, last paragraph

   The total flux of 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 (saliency) of water being withdrawn by pre-existing wells.

6. Page IV-2, Water Supply

   The third paragraph states that the "(source assessment) fee is used to develop additional water sources in Upper Malae to meet the continuously growing demands."

   Again, we must note that no additional development will occur in Upper Malae (site of the existing Central Mauli Source Development JV wells). The JV and the County of Mauli 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., Walae Development Company, Inc., Selbu Hawaii, Inc., and C. Brewer Properties, Inc. The EIS citation is slightly incorrect.

7. Page IV-41, 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 Kahului 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 Walae does have other irrigation wells slightly north and west of the northern boundary of the project site. Well development by Mauli-Walae 670 should not impede our utilization of this well as well as our other more southerly Walae 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 5.2.2, Probable Impacts

   Some 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

cc: H. Nakamura
C. Charpentier
M. J. Ching

November 22, 1980

PBR
HAWAII LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

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, WMA Realty Partners

342PL_20.WP
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 Malaia 670, Malaia, Maui

We have reviewed the July 1988 Draft Environmental Impact Statement (DEIS) for Malaia 670, a residential/resort community with golf courses, village center and resort accommodations which is intended to complement the luxury hotel accommodations of Malaia and Hana. 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—a 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 DEIS 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.

Sincerely,

[Signature]

Harold S. Masumoto
Director

cc: James Leonard, PER Hawaii
September 22, 1988

Mr. Harold S. Masunoto
Director
Office of State Planning
Office of the Governor
State Capitol, Honolulu, Hawaii 96813

SUBJECT: MAUI WAILEA 670 DRAFT EIS

Dear Mr. Masunoto:

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 rates of condominium sales to visitor units on Maui, planned hotel construction on Maui in general and specifically the Wailea area, projected resale 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).

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 600 (direct, indirect and induced) construction workers would be required and that approximately 470 to 730 construction employees during the 2001 to 2005 time period would be required with the construction force decreasing to between 500 and 510 during the 2006 to 2010 period. Annual wages paid to these workers during the 1991 to 1995 period projected to range between $5.5 and $6.4 million, $6.7 and $7.5 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 1,900 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 $29.3 million in 2016.

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 fact, 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 Wai'alea 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 relations 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 Kīhei-Wai'alea Areas

Wastewater generation and disposal are described in Chapter IV, Section 5.3 of the Draft EIS. As noted, the developer recognizes that the County's Kīhei Sewage Treatment Plant is operating at or close to capacity at present. In view of the limited capacity of the existing Kīhei STP, several alternatives are being considered to serve the Maui Wai'alea 670 project. These include (1) participation with other developers and the county in upgrading the existing gravity interceptors; pump stations and force mains between Wai'alea and the Kīhei STP; (2) installing a new interceptor beginning at the southwest corner of the proposed project to the Kīhei STP along Pi'ilani Highway (costs would be shared with other developers); (3) participating with other developers and the county in upgrading existing STPs; or (4) constructing a new STP within or near the proposed project in cooperation with other developers in South Wai'alea and Makana. 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-24), 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 Wai'alea 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 factories; demographic conditions for the state, Maui County and Kīhei-Wai'alea areas; population and housing factors; and the present and proposed condition of the project property...
Mr. Harold S. Manamoto
SUBJECT: MAUI WAILEA 670 DRAFT EIS
September 22, 1988
Page 5

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
Project Manager

cc: Christopher Hart, Planning Director
    John McGrath, VHD Realty Partners

X-38
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 Valles 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 accommodates 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 group which comprise the vast majority of the population. The breakdown is as follows:

<table>
<thead>
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<th>% of Total</th>
<th>Target Group</th>
<th>Affordable Units</th>
<th>Sales Price</th>
<th>Affordable Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>&lt;80%</td>
<td>&lt;$83,000</td>
<td>$83,000-120,000</td>
<td>$680/mo</td>
</tr>
<tr>
<td>20%</td>
<td>80-120%</td>
<td>$83,000-120,000</td>
<td>$120,000-154,700</td>
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</tr>
<tr>
<td>30%</td>
<td>120-140%</td>
<td>$120,000-154,700</td>
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Sales price calculations are based on (1) a 1986 median income for a family of four of $24,000; (2) a 20-year loan; (3) an interest rate of 10%; (4) a 10% down payment; (5) an income to payment qualifying ratio of 31%; 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,

[Signature]

Joseph K. Shimabukuro
Executive Director

Mr. Clyde Murashige

September 8, 1988

Page 2
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 22360
Honolulu, Hawaii 96820-1760

SUBJECT: MAUI MAILEA 670 DRAFT EIS

Dear Mr. Conant:

Thank you for the copy of your letter of September 6, 1988 to
Mr. Clyde Nishibori, 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 McRath, VMS Realty Partners
APPENDIX B
FISCAL IMPACT ANALYSIS REPORT
Economic and Fiscal Impact Assessment for the Planned Maui Wailea 670 Resort Community
Wailea, Maui, Hawaii

Prepared for
GCR/VMS MAUI 670

July 1, 1988

July 6, 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 Flynt & 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
Mr. Robert Riley
Mr. Alan F. 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,

[Signature]
Economic and Fiscal Impact Assessment for the Planned Maui Wailea 670 Resort Community
Wailea, Maui, Hawaii

Prepared for
GCR/VMS MAUI 670

July 1988
### 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**

- Construction Employee Housing Demand: IV-4
- Operational Employee Housing Demand: IV-5
- Housing Affordability for Households Requiring Housing: IV-5
- Projected Affordable Housing Unit Demand: IV-6
- Impacts of Operational Employee Housing Demand: IV-7

### FISCAL IMPACTS

Government Revenues:
- County Revenues: V-1
- State Revenues: V-1
- Government Expenditures:
  - County Expenditures: V-2
  - State Expenditures: V-3
- Revenue/Expenditure Comparison:
  - County: V-3
  - State: V-3

### EXHIBITS

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I. INTRODUCTION AND EXECUTIVE SUMMARY

This chapter presents the background and objectives of the assistance provided to GCR/WMS 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 WMS Realty Partners (WMS) through GCR/WMS Maui 670, own approximately 670 acres of land located mauka of Wailea resort on the island of Maui, Hawaii. GCR/WMS Maui 670 seeks to develop the property into a resort and residential community. In January 1988 the resort development was assigned to 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 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 is designed to complement development on 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 complex community for visitors and residents.

The planned Piilani Highway extension would divide the resort into a moku area, two areas designed to possess a distinctive character: the moku area would more private and residential in character.

The moku area of the resort would accommodate a mixed-use village district with commercial, community, visitor center and other activities. Two resort lodge units at each lodge. Several multifamily condominium sites would be located in the moku 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 moku area.

The moku area would include the resort's second golf links, a 10-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 golf course frontage, and an exclusive gated community of patio homes is also planned on 3,500 to 6,000 square foot lots featuring 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:

<table>
<thead>
<tr>
<th>Year</th>
<th>Lodge units</th>
<th>Condominium units</th>
<th>Single-family homes</th>
<th>Commercial space (sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>295 - 455</td>
<td>395 - 455</td>
<td>245 - 305</td>
<td>21,000 - 27,000</td>
</tr>
<tr>
<td>2000</td>
<td>395 - 455</td>
<td>645 - 750</td>
<td>540 - 630</td>
<td>28,000 - 35,000</td>
</tr>
<tr>
<td>2005</td>
<td>645 - 750</td>
<td>865 - 1,000</td>
<td>123 - 170</td>
<td>46,000 - 55,000</td>
</tr>
<tr>
<td>2010</td>
<td>1,190 - 1,370</td>
<td>260 - 297</td>
<td>363 - 402</td>
<td>54,000 - 67,000</td>
</tr>
</tbody>
</table>

ECOLOGICAL 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 1,300 to 1,600 persons in 2010. Direct spending by Resort visitors would amount to $25 to $30 million in 1995, increasing to $70 to $80 million in 2010. Because visitor spending is expected to generate additional visitor 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 Operations 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 1995-2010 project buildout period, with 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.
1.3

with a high of 220 to 260 annual years of employment during the 2001-2005 period. Total employment associated with project construction, including indirect and induced positions, could amount to 300 to 350 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 580 to 670 positions. Onsite resort jobs could increase to 1,310 to 1,500 by 2010. Indirect and induced employment generated by resort operations could produce, with direct jobs included, a total of 1,000 to 1,250 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 in 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 $33 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:

<table>
<thead>
<tr>
<th>Year</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident population</td>
<td>700 - 840</td>
<td>1,000 - 1,470</td>
<td>2,000 - 2,450</td>
<td>2,560 - 2,940</td>
</tr>
<tr>
<td>De facto population</td>
<td>1,330 - 1,740</td>
<td>1,960 - 2,370</td>
<td>3,330 - 4,020</td>
<td>4,020 - 4,600</td>
</tr>
</tbody>
</table>

Relative to the total population growth anticipated in official state projections, growth associated with the Maui Valleya 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 1995 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 60 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 Valleya 670 Resort are determined by comparing anticipated government revenue 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:

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>County of Maui:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net additional revenues</td>
<td>7 - 9</td>
<td>9 - 10</td>
<td>10 - 11</td>
<td>11 - 12</td>
</tr>
<tr>
<td>Revenue/expenditure ratio</td>
<td>1.0 - 1.2</td>
<td>1.2 - 1.4</td>
<td>1.4 - 1.6</td>
<td>1.6 - 1.8</td>
</tr>
<tr>
<td>State of Hawaii:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net additional revenues</td>
<td>1.9 - 2.2</td>
<td>1.5 - 1.6</td>
<td>1.6 - 1.8</td>
<td>1.8 - 2.0</td>
</tr>
<tr>
<td>Revenue/expenditure ratio</td>
<td>1.9 - 2.0</td>
<td>1.9 - 2.0</td>
<td>1.9 - 2.0</td>
<td>1.9 - 2.0</td>
</tr>
</tbody>
</table>
II. REGIONAL ECONOMIC SETTING AND PROJECT DESCRIPTION

This chapter reviews the economic setting in which the Maui Malaena 870 Resort is to be developed, including primary economic activities, population and employment patterns. The Maui Malaena 870 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 Malaena/Kihei/Mailea area.

The Malaena/Kihei/Mailea area is shown in Exhibit II-B. This area, which also includes Hana, consists of Census Tracts 307 and 303.00.

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 1936 to $15 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.
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:

<table>
<thead>
<tr>
<th>Visitor Expenditures and Visitor Unit Inventory</th>
<th>State and Maui County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor expenditures ($ millions):</td>
<td>595</td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Maui County</td>
<td>400</td>
</tr>
<tr>
<td>Maui County share of State</td>
<td>9%</td>
</tr>
<tr>
<td>Visitor unit inventory:</td>
<td>24,309</td>
</tr>
<tr>
<td>State</td>
<td>24,309</td>
</tr>
<tr>
<td>Maui County</td>
<td>2,464</td>
</tr>
<tr>
<td>Maui County share of State</td>
<td>10%</td>
</tr>
</tbody>
</table>

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/Pala/Makena, 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, Kapalua, Kapalua. The Kaanapali resort is the primary resort destination area in West Maui.
- East Maui - Including Kiholo, Maluaka, 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 8,778 in 1986.

The Maluaka/Kihei/Wailea area has also experienced significant growth in visitor unit inventory, increasing from 131 units in 1970 to 3,493 units in 1980 and 5,719 units in February 1988. Development in this area is expected to continue and to shift its focus from resort condominiums in Kihei and Maluaka 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 Makena/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 Makena, Kihei and Wailea areas.

Population

Exhibit II-6 shows population trends for the state, Maui County, the island of Maui, and the Makena/Kihei/Wailea areas. 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 2.5% from the previous year.
- The Makena/Kihei/Wailea area has grown substantially, from about 1,700 residents in 1970 to more than 9,000 in 1985. While the area represented less than 3% of Maui Island's population in 1970, its share had increased to more than 12% in 1985.

Employment Patterns

Labor force participation increased for Maui county between 1970 and 1980, and in the latter year 60.5% 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 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>State</th>
<th>Maui</th>
<th>Makena/Kihei/Wailea area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>769,900</td>
<td>48,200</td>
<td>38,691</td>
</tr>
<tr>
<td>1980</td>
<td>950,700</td>
<td>71,000</td>
<td>62,823</td>
</tr>
<tr>
<td>1985</td>
<td>1,051,500</td>
<td>85,500</td>
<td>76,530</td>
</tr>
<tr>
<td>1986</td>
<td>1,062,300</td>
<td>87,500</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Compo und annual rate of growth:

<table>
<thead>
<tr>
<th>Period</th>
<th>State</th>
<th>Maui</th>
<th>Makena/Kihei/Wailea area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-80</td>
<td>2.2%</td>
<td>4.4%</td>
<td>5.0%</td>
</tr>
<tr>
<td>1980-85</td>
<td>1.7</td>
<td>3.0</td>
<td>4.1</td>
</tr>
<tr>
<td>1985-86</td>
<td>2.1</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>1986-87</td>
<td>1.6</td>
<td>3.5</td>
<td>N/A</td>
</tr>
<tr>
<td>1987-88</td>
<td>2.0</td>
<td>4.1</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(1) Provisional estimate for 1986.
(2) Not available.


**Comparison of Age and Household Income Characteristics**

Makaha Census Tracts and Maui County

<table>
<thead>
<tr>
<th>1980</th>
<th>Census tracts(1)</th>
<th>Maui</th>
<th>[301,000]</th>
<th>[307,000]</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median age</td>
<td></td>
<td>33.4</td>
<td>29.1</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>% under 10 yrs</td>
<td></td>
<td>N/A</td>
<td>15.0%</td>
<td>17.5%</td>
</tr>
<tr>
<td></td>
<td>% 65 yrs and older</td>
<td></td>
<td>N/A</td>
<td>7.5%</td>
<td>6.8%</td>
</tr>
<tr>
<td></td>
<td>Median household income</td>
<td></td>
<td>22,750</td>
<td>20,260</td>
<td>22,570</td>
</tr>
</tbody>
</table>

(1) Location shown in Exhibit II-B.

**Sources:**

This table and Exhibit II-B indicate that the Makaha area's population is considerably different from that of Maui County as a whole, since:

- The region's ethnic breakdown is predominantly 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.
- Makaha/Makaha/Mailea resident population contains relatively fewer children, and greater numbers of older people, than the county as an entity.

**Future Trends in Makaha/Makaha/Mailea Area**

Continued growth is expected in the Makaha/Makaha/Mailea area in the 1980 to 1995 period. The extent of future growth is more fully documented in the "Market Assessment for the Planned Maui Mailea 670 Resort Community" prepared by Peat Marwick Main & Co. A brief summary of these trends includes:

- A substantial increase in the visitor unit inventory both in Makaha and in the Mailea region. Exhibit II-I of the market assessment identifies 1,900 additional planned visitor units by 1990, with 1,748 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.
Residential 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 1980.

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 41,000 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 Makena, 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 Wailea and Makena areas, and each is planned to have a distinct character:

- The Wailea portion would include the village center of the Resort, as well as most of the active, visitor-oriented aspects of the community.
- The Makena part is designed to be more private and residentially-oriented, with single-family and multifamily home sites located around the Makena golf course and golf lodge.

The conceptual land use pattern for the Resort is shown in Exhibit II-F.

**Wailea Resort Area**

The Wailea 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.
- 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.

Mauna Resort Area

The mauna resort area would incorporate about 370 acres located across the planned Pilimanu Highway extension. The mauna resort would emphasize residential uses in an open setting distinguished by the planned club golf course. Planned uses in the mauna resort area include:

- A golf lodge, planned as a 145 to 150 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 Kaua 670 Resort project would be completed by about 2010, although individual residential lots would be built upon thereafter. 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.
III. ECONOMIC IMPACTS

This chapter describes the projected economic impacts of the Kahala Bay 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 Kahala Bay 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 Hawaiian resorts.

Exhibit III-A

<table>
<thead>
<tr>
<th>Assumptions for On-Resort Population Projections</th>
<th>1995 to 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995 2000 2005 2010</td>
</tr>
<tr>
<td>Lodge units:</td>
<td></td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>70%</td>
</tr>
<tr>
<td>Persons per unit</td>
<td>1.9</td>
</tr>
<tr>
<td>Condominium units:</td>
<td></td>
</tr>
<tr>
<td>Percentage in visitor rentals</td>
<td>50%</td>
</tr>
<tr>
<td>Visitor occupancy rate</td>
<td>25</td>
</tr>
<tr>
<td>Percentage in part-time resident use</td>
<td>30</td>
</tr>
<tr>
<td>Part-time resident occupancy rate</td>
<td>50</td>
</tr>
<tr>
<td>Percentage in full-time resident use</td>
<td>20</td>
</tr>
<tr>
<td>Full-time residency occupancy rate</td>
<td>95</td>
</tr>
<tr>
<td>Persons per occupied unit</td>
<td>2.5</td>
</tr>
<tr>
<td>Single-family units:</td>
<td></td>
</tr>
<tr>
<td>Percentage in visitor rentals</td>
<td>10%</td>
</tr>
<tr>
<td>Visitor occupancy rate</td>
<td>25</td>
</tr>
<tr>
<td>Percentage in part-time resident use</td>
<td>25</td>
</tr>
<tr>
<td>Part-time resident occupancy rate</td>
<td>50</td>
</tr>
<tr>
<td>Percentage in full-time resident use</td>
<td>65</td>
</tr>
<tr>
<td>Full-time resident occupancy rate</td>
<td>95</td>
</tr>
<tr>
<td>Persons per occupied unit</td>
<td>2.8</td>
</tr>
</tbody>
</table>

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-8 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 site occupancy rates from 1995 to 2000, visitor population by the latter year is projected to increase only to about 600 to 750 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 1,300 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 westbound visitors (2% of current total visitors to Maui) and Japanese visitors (93% of current total visitors) spend at the 1987 observed level of $129, 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 Waiea 670 resort could range from $52 to $80 million in 1995, and increase to between $117 and $135 million by 2010.

Deployment Impact

Development of the Maui Waiea 670 Resort will create job opportunities for construction and operational employment.

Employment effects, like the income effects of visitor spending, effect the economy with the ripple of an economic multiplier. Thus, employment effects can also be defined as direct, indirect or induced.

<table>
<thead>
<tr>
<th>Year</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low High Low High Low High Low High</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort Lodge</td>
<td>330</td>
<td>370</td>
<td>320</td>
<td>350</td>
</tr>
<tr>
<td>Golf Lodge</td>
<td>190</td>
<td>240</td>
<td>180</td>
<td>230</td>
</tr>
<tr>
<td>Condominium units</td>
<td>80</td>
<td>100</td>
<td>170</td>
<td>200</td>
</tr>
<tr>
<td>Single-Family homes</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td>710</td>
<td>660</td>
<td>790</td>
</tr>
</tbody>
</table>

Source: Exhibit II-6 and III-4.
### Exhibit III-C

**GER/REX MAUI 670**

**Projected Total Annual Visitor Expenditures**

1995 to 2010

*(In millions of 1988 dollars)*

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td><strong>High</strong></td>
<td><strong>Low</strong></td>
<td><strong>High</strong></td>
<td><strong>Low</strong></td>
</tr>
<tr>
<td>Direct(1)</td>
<td>$30.2</td>
<td>35.8</td>
<td>34.3</td>
<td>39.8</td>
</tr>
<tr>
<td>Indirect and Induced</td>
<td>28.6</td>
<td>24.1</td>
<td>22.2</td>
<td>21.1</td>
</tr>
<tr>
<td>Total (rounded)(2)</td>
<td>$58.8</td>
<td>60.1</td>
<td>56.5</td>
<td>61.9</td>
</tr>
</tbody>
</table>

(1) *1987 Hawaii Visitors Bureau expenditures data, weighted to reflect spending for both westbound and eastbound visitors, for $138 daily average.*

(2) *Projected at $3.68 per $1.00 in direct expenditures. Based on 1986 estimates from the DEED Input-Output Model, as reported in the DEED 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 250 to 260.

### Indirect and Induced Construction Employment

Construction of the Maui Valleys 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 0.7 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 Valleys 670 Resort once visitor operations commence. The largest single source of employment would be the resort and golf courses. Estimates for each of the resort facilities were made from comparable Hawaii resorts.

Based on the planned buildout of resort facilities, from 550 to 670 direct operational jobs could be created by 1995. Operational employment could reach from 1,050 to 1,190 by 2010 and would continue to grow by a small amount as additional resort residential units are completed after 2010.
### GCR/VHS Maui 670

**Projected Direct, Indirect and Induced Employment for Facility Construction**

(Average Annual Person-years)

1995 to 2010

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1991 -</th>
<th>1996 -</th>
<th>2001 -</th>
<th>2006 -</th>
<th>2010 -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect and Induced:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-island(2)</td>
<td>36</td>
<td>42</td>
<td>50</td>
<td>44</td>
<td>52</td>
</tr>
<tr>
<td>Elsewhere in state</td>
<td>290</td>
<td>320</td>
<td>340</td>
<td>300</td>
<td>320</td>
</tr>
<tr>
<td>Subtotal(3)</td>
<td>324</td>
<td>372</td>
<td>410</td>
<td>390</td>
<td>434</td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

(1) From Exhibit III-D.

(2) Estimated as 20% of direct employment. Based on Anderson et al., *Kauai Socioeconomic Profile, 1975*.


---

### GC/CR Maui 670

**Projected Direct Employment for Facility Construction**

(Average Annual Person-years)

1995 to 2010

<table>
<thead>
<tr>
<th>Facility type(4)</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resort and residential units:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lodge units(5)</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Independent units</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Room (rooms(6)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Single-family homes(3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>30</td>
<td>33</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>Commercial and recreational:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail/commercial(2)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Village center(7)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Golf courses(8)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Infrastructure and public facilities(8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>33</td>
<td>36</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

(1) Employment calculated at 0.5 person-years per unit and one year construction period.

(2) At 0.7 person-years per unit and one year construction period.

(3) At 2.0 person-years per residence and one year construction period.

(4) At 2.6 person-years per 1,000 gross rentable square feet; retail commercial would have one year period; village center would have two years construction period.

(5) Based on construction cost estimates provided by MAHawaii at $200,000 construction costs per person-year.

(6) Based on construction cost estimates provided by MAHawaii at $100,000 construction cost per person-year.

---

Exhibit III-E

Exhibit III-G

B-17
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 0.63 indirect and induced jobs.

Exhibit III-6 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 1,860 and 1,760 positions by 1995, increasing to between 2,080 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-8. Personal income estimates are based on average wages by industry in Maui County for 1985; income was then updated to 1988 dollars by indexing 1985 earnings to subsequent change in state per capita income.

Direct Construction Employment

Personal income from resort construction is projected to be between $6.5 and $6.8 million in 1995, 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-8 for commercial, hotel and resort and golf and tennis employment. Total income from these activities could amount to $6.4 to $10 million in 1995 and this figure could increase to $7.5 to $17.5 million in 2010.

Household Income

The dispersion of indirect and induced employment effects among many industries makes 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 OEED reports the estimate that each dollar spent by visitors in 1985 generated 62 cents in total income to households in Hawaii.
### Projected Annual Personal and Household Income From Direct Employment

*(In millions of 1988 dollars)*

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Construction(1)</td>
<td>5.5</td>
<td>6.5</td>
<td>4.3</td>
<td>5.5</td>
</tr>
<tr>
<td>Hotel and resort(2)</td>
<td>8.6</td>
<td>9.1</td>
<td>8.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Commercial(3)</td>
<td>0.8</td>
<td>1.0</td>
<td>1.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Golf and tennis(4)</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Total personal income (rounded)</strong></td>
<td><strong>$14.0</strong></td>
<td><strong>16.8</strong></td>
<td><strong>15.6</strong></td>
<td><strong>19.0</strong></td>
</tr>
<tr>
<td><strong>Total household income(5) (rounded)</strong></td>
<td><strong>$20.7</strong></td>
<td><strong>29.2</strong></td>
<td><strong>28.2</strong></td>
<td><strong>37.8</strong></td>
</tr>
</tbody>
</table>

1. Annual average of employment over five-year period ending with year shown. Average annual wage of $79,516, reflecting 32% of workers from off-island and 1988 average income of $27,965 for Maui construction workers and $19,810 for construction workers throughout the state (State of Hawaii, Department of Labor and Industrial Relations, 1997). Updated 1988 dollars.

2. hotel and resort workers of $14,500, 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.


---

### Projected Direct, Indirect and Induced Operational Employment at Maui Wailea 670 Resort

*1995 to 2010*

<table>
<thead>
<tr>
<th>Type of employment</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Direct(1)</td>
<td>560</td>
<td>670</td>
<td>610</td>
<td>740</td>
</tr>
<tr>
<td>Indirect and induced:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lodges and other units</td>
<td>460</td>
<td>490</td>
<td>490</td>
<td>580</td>
</tr>
<tr>
<td>Commercial and recreational(3)</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>500</td>
<td>590</td>
<td>590</td>
<td>640</td>
</tr>
<tr>
<td><strong>Total (rounded)</strong></td>
<td>1,060</td>
<td>1,260</td>
<td>1,260</td>
<td>1,380</td>
</tr>
</tbody>
</table>

1. As shown in Exhibit III-6.

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.

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 $50 million annual 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 Palms 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 Palms 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 Palms 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 workforce 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.
Projected Population Impact from Resort Construction

1991 to 2010 (average annual person-years)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>180</td>
<td>210</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>High</td>
<td>310</td>
<td>420</td>
<td>310</td>
<td>320</td>
</tr>
</tbody>
</table>

Average annual employment (1)

Off-island workers (2)

- 54 105
- 42 75
- 66 130

Off-island workers' dependents (3)

- 27 37
- 51 51
- 27 27

Total (rounded)

- 80 160
- 60 100
- 100 200
- 80 140

(1) From Exhibit III-1.
(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 Waiea 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-8. Depending upon the pace of resort facility development, daily visitor population could grow from 600 to 710 visitors in 1995, and increase to 4,380 to 4,630 visitors in 2010.

Resort resident population, as shown in Exhibit IV-8, is expected to be relatively low during the early years of project development, as in 1995 when 250 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 Waiea 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 25 percent of projected jobs created on Maui, under BIS'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 Waiea 670 would also attract applicants currently employed in the Makaha/Ala/Ala region, seeking either a change in position or additional part-time 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 cause regional turnover. It is anticipated that this turnover would account for 10% of the in-county labor supply, or 7% of total labor.
## Exhibit IV-B

**GCR/MS MAUI 670**  
Projected Average Daily Resort Resident  
Population at Maui Wailea 670 Resort  
1995 to 2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Condominium units</td>
<td>210</td>
<td>260</td>
<td>540</td>
<td>740</td>
<td>920</td>
<td>1,210</td>
<td>1,010</td>
<td>1,160</td>
</tr>
<tr>
<td>Single-family homes</td>
<td>50</td>
<td>60</td>
<td>260</td>
<td>250</td>
<td>540</td>
<td>620</td>
<td>720</td>
<td>840</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>260</td>
<td>320</td>
<td>800</td>
<td>990</td>
<td>1,460</td>
<td>1,840</td>
<td>1,760</td>
<td>2,000</td>
</tr>
</tbody>
</table>

Source: Exhibits II-G and III-A.

## Exhibit IV-C

**GCR/MS MAUI 670**  
Projected Source of Direct Operational Employees  
1995 to 2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>In-county sources:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available labor(1)</td>
<td>220</td>
<td>230</td>
<td>210</td>
<td>260</td>
</tr>
<tr>
<td>Regional turnover(2)</td>
<td>50</td>
<td>60</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>Other turnover(3)</td>
<td>40</td>
<td>50</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td><strong>Subtotal (rounded)</strong></td>
<td>330</td>
<td>410</td>
<td>360</td>
<td>450</td>
</tr>
<tr>
<td>In-migrants(4)</td>
<td>230</td>
<td>260</td>
<td>250</td>
<td>390</td>
</tr>
<tr>
<td><strong>Total (rounded)</strong></td>
<td>560</td>
<td>670</td>
<td>610</td>
<td>740</td>
</tr>
</tbody>
</table>

(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 Maui/Maui/Wailea region. Projected to account for 15% 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 Hawai'i 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 Hawaiian 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 Maui resorts. The surveys, conducted by Community Resources, Inc., were done with workers at the Kaua and Kauai 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 1.6 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 Hawaiian resorts, managerial positions are projected to be one-sixth (1/6) 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 80% of the required work force would consist of nonsupervisory employees. About 90% of nonsupervisory workers were expected to be in-migrants.

Exhibit IV-C indicates that, while the majority of resort jobholders are expected to be local residents, many new jobs could be filled by in-migrants. In 1995, Maui Valley 670 resort jobs could attract 240 to 250 in-migrant employees which could increase to 470 to 460 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 880 to 940 persons by 2010.

Total Potential Population Impact

The Maui Valley 670 Resort's total potential population impact is shown in Exhibit IV-C. Total potential impact would include Resort residents and visitors, in-migrating workers and their families and temporary construction employees and their dependents.
### Exhibit IV-E

**GCR/EMS MAUI 670**

**Summary of On- and Off-Resort Population Impact**

(Average daily population)

1995 to 2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Resort:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitor(1)</td>
<td>600</td>
<td>710</td>
<td>680</td>
<td>790</td>
<td>1,210</td>
<td>1,420</td>
<td>1,380</td>
<td>1,600</td>
</tr>
<tr>
<td>Resident(2)</td>
<td>280</td>
<td>370</td>
<td>270</td>
<td>290</td>
<td>1,280</td>
<td>1,450</td>
<td>1,760</td>
<td>2,000</td>
</tr>
<tr>
<td>Subtotal</td>
<td>880</td>
<td>1,080</td>
<td>1,450</td>
<td>1,680</td>
<td>2,490</td>
<td>2,870</td>
<td>3,140</td>
<td>3,600</td>
</tr>
<tr>
<td>Off-Resort:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction payroll</td>
<td>440</td>
<td>520</td>
<td>480</td>
<td>580</td>
<td>740</td>
<td>880</td>
<td>800</td>
<td>940</td>
</tr>
<tr>
<td>Construction payroll and dependents(4)</td>
<td>80</td>
<td>160</td>
<td>50</td>
<td>110</td>
<td>100</td>
<td>200</td>
<td>80</td>
<td>140</td>
</tr>
<tr>
<td>Subtotal</td>
<td>520</td>
<td>680</td>
<td>530</td>
<td>690</td>
<td>840</td>
<td>1,080</td>
<td>880</td>
<td>1,080</td>
</tr>
<tr>
<td>Total</td>
<td>1,400</td>
<td>1,760</td>
<td>1,980</td>
<td>2,370</td>
<td>3,330</td>
<td>3,950</td>
<td>4,020</td>
<td>4,680</td>
</tr>
</tbody>
</table>

**Total potential impact could represent some future double-counting, especially between resort residents and in-migrating resort employees:**

- As shown in Exhibit II-C, 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 off-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-E 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 prepared by BOED. 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 the increase (residential and visitor) population from 1995 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 generate 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-hotels or resort condominium units offering housekeeping and other services preferable to renting units that would otherwise be used by Maui residents.

Exhibit IV-D indicates the range of rental housing impacts that could be expected based on 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 in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. 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Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. Because the shown in Exhibits IV-D is based on average annual employment levels. 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### Exhibit IV-C

#### Projected Rental Units Required for Off-Island Construction Workers at Maui Waiea 670 Resort

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>At average employment level:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average annual</td>
<td>180 - 210</td>
<td>140 - 150</td>
<td>220 - 260</td>
<td>180 - 190</td>
</tr>
<tr>
<td>employment(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-island construction workers(2)</td>
<td>50 - 110</td>
<td>40 - 80</td>
<td>70 - 130</td>
<td>50 - 100</td>
</tr>
<tr>
<td>Workers requiring rental units(3)</td>
<td>40 - 100</td>
<td>30 - 70</td>
<td>50 - 120</td>
<td>40 - 90</td>
</tr>
<tr>
<td>Rental units required(4)</td>
<td>30 - 80</td>
<td>20 - 60</td>
<td>40 - 100</td>
<td>20 - 70</td>
</tr>
<tr>
<td><strong>At peak employment level:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak employment(5)</td>
<td>320 - 370</td>
<td>250 - 260</td>
<td>390 - 460</td>
<td>320 - 330</td>
</tr>
<tr>
<td>Off-island construction workers(2)</td>
<td>100 - 190</td>
<td>80 - 130</td>
<td>120 - 230</td>
<td>100 - 170</td>
</tr>
<tr>
<td>Workers requiring rental units(3)</td>
<td>80 - 170</td>
<td>60 - 120</td>
<td>90 - 210</td>
<td>60 - 150</td>
</tr>
<tr>
<td>Rental units required(4)</td>
<td>60 - 140</td>
<td>50 - 100</td>
<td>70 - 170</td>
<td>60 - 120</td>
</tr>
</tbody>
</table>

---

### Exhibit IV-H

#### Direct Operational Employees Projected to Demand Additional Housing

<table>
<thead>
<tr>
<th></th>
<th>1995 - 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labor source</strong></td>
<td>1995</td>
</tr>
<tr>
<td><strong>In-county sources:</strong></td>
<td></td>
</tr>
<tr>
<td>Available labor(1)</td>
<td></td>
</tr>
<tr>
<td>Turnover</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
</tr>
<tr>
<td><strong>In-migrants:</strong></td>
<td></td>
</tr>
<tr>
<td>Managerial(2)</td>
<td></td>
</tr>
<tr>
<td>Nonmanagerial(3)</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>170</td>
</tr>
</tbody>
</table>

(1) New household formation projected at 15.6.
(2) At 1.8 workers per managerial employee household.
(3) At 1.7 workers per nonmanagerial employee household.

---

(1) From Exhibit III-D.
(2) Low estimate based on 30% of construction workers originating from off-island; high estimate based on 50% 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.
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 non-supervisory 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 non-supervisory household.

Based on these standards, Exhibit IV-H shows housing demand related to resort employment of about 170 to 200 units in 1985, 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-H projects the household incomes of Maui Vector 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 $80,000 in 1987 dollars. Almost 9 in 10 managerial households are expected to earn more than $32,000 per year.

- The median income of households with non-supervisory workers is projected to be somewhat lower, at $35,400 per year. About one-third of this group (33%) would have annual incomes in excess of $32,000.

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 Vector 670 Resort employees is compared to 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-H 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.
<table>
<thead>
<tr>
<th>Cumulative household income</th>
<th>Percentage of county median income at upper range</th>
<th>Maximum sales below single-family sales</th>
<th>Percent of all single-family sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to $22,500</td>
<td>35%</td>
<td>$81,000</td>
<td>33</td>
</tr>
<tr>
<td>$26,000</td>
<td>45%</td>
<td>$94,000</td>
<td>66</td>
</tr>
<tr>
<td>$32,500</td>
<td>60%</td>
<td>$119,000</td>
<td>170</td>
</tr>
<tr>
<td>Above $32,500</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(1) Based on Exhibit IV-1.
(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-3, when reviewed in conjunction with the income distribution shown in Exhibit IV-1, 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 $35,000 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 nonmanagerial employee households are expected to find single-family homes priced below $119,000 affordable. Additional housing choice might be available to nonmanagerial 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 visitor industry is shown in Exhibit IV-3. The exhibit's calculations are based on several assumptions:

- Available single-family homes for purchase are used as the standard for affordability. In March, 1987, Maui Multiple Listing Service sales data showed an average resale price of $235,000 for single-family homes and $110,000 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-1 and IV-3, it is determined that from 50% to 60% of resort employee households could experience difficulty in finding affordable-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 70 and 170 units in 1995, and could increase to 150 to 210 units by 2010, as shown in Exhibit IV-X.

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/VNS MAUI 670
Project Affordable Range Housing Units Required for
Mauie Worker 670 Resort Operational Employees
1995 to 2010

<table>
<thead>
<tr>
<th>Type of Employee</th>
<th>1995 Low</th>
<th>2000 Low</th>
<th>2005 Low</th>
<th>2010 Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>All households requiring additional units</td>
<td>170</td>
<td>200</td>
<td>180</td>
<td>220</td>
</tr>
<tr>
<td>Share in affordable housing range:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At 50%</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>110</td>
</tr>
<tr>
<td>At 60%</td>
<td>100</td>
<td>120</td>
<td>110</td>
<td>130</td>
</tr>
</tbody>
</table>

(1) From Exhibit IV-K.

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-K. 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 Mauie market, based on these factors:

- Supplying Resort employee housing needs with new homes would require about 30 units annually until 1995, and less than 30 new homes each year from 1995 to 2010.
- The inventory of resident housing units on Mauie increased by about 6,400 from 1980 to 1987, representing more than 500 new homes each year. Resort employees would augment demand by no more than 3% over 1980-1987 levels.
- The Mauie Worker 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 Mauie resort survey indicated that 53% of nonsupervisory workers who had resided on the island for less than 5 years were renters. It is not clear whether this tenure pattern results from lack of affordable-priced ownership units, desire for mobility or decisions about use of disposable income.
- For resort employees at lower income levels desiring homeowner wealth, 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.
IV-9

- The Kuleal subdivision project at Kula, 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 Kuli Pali Village project at Pala, another county-sponsored endeavor, is planned to deliver 201 homes at an average price of $72,000.

- According to information provided by the Housing Division, county assistance programs had delivered 1,140 rental and ownership units through 1980, 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 through 1980, as well. The HFD is developing a master-planned community at Wailea, which will contain 600 units at completion. Single-family homes planned for completion in 1986 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 Villas 670 Resort in meeting employee housing needs. According to county policy, employees 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-1

V. FISCAL IMPACTS

This chapter describes projected state and county tax revenues from Maui Villas 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 values and consequently, assessed valuation for tax purposes is expected to increase substantially.

Exhibit V-4 projects annual real property tax revenues anticipated on the basis of the development schedule from Exhibit I-I-C. Projected assessed values of developed property have been estimated on the basis of comparable developed resort sites in the region, as estimated by the Real Property 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 $18,000 in real property taxes in 1980.
- 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 2015.

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. These 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-6 includes projected state tax revenues from operation of the Maui Villas 670 resort. Revenue sources itemized are:

- General excise tax on direct, indirect and induced visitor expenditures, as shown in Exhibit I-I-C.
## Exhibit V-A

**GCR/MWS MAUI 670**  
Projected Annual County Real Property Tax  
Revenues Attributable to Resort Development  
1995 to 2010  
(In millions of 1988 dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lodges(1)</td>
<td>$0.51</td>
<td>0.57</td>
<td>0.51</td>
<td>0.57</td>
<td>0.82</td>
<td>0.92</td>
<td>0.82</td>
<td>0.92</td>
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<tr>
<td>Condominium units(2)</td>
<td>0.21</td>
<td>0.27</td>
<td>0.47</td>
<td>0.55</td>
<td>0.76</td>
<td>0.94</td>
<td>1.04</td>
<td>1.18</td>
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<tr>
<td>Residential units and patio</td>
<td>0.17</td>
<td>0.21</td>
<td>0.51</td>
<td>0.69</td>
<td>0.89</td>
<td>0.93</td>
<td>0.95</td>
<td>1.00</td>
</tr>
<tr>
<td>homes(3)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial and village</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
<td>0.09</td>
<td>0.10</td>
<td>0.11</td>
<td>0.12</td>
</tr>
<tr>
<td>center(4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golf courses and tennis</td>
<td>0.01</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>center(5)</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Undeveloped acreage(6)</td>
<td>0.58</td>
<td>0.29</td>
<td>0.19</td>
<td>0.12</td>
<td>0.05</td>
<td>0.02</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>$1.69</td>
<td>1.38</td>
<td>1.78</td>
<td>2.04</td>
<td>2.45</td>
<td>2.96</td>
<td>2.58</td>
<td>3.27</td>
</tr>
<tr>
<td>Total in 1988 dollars (rounded)</td>
<td>$1.69</td>
<td>1.48</td>
<td>1.90</td>
<td>2.19</td>
<td>2.64</td>
<td>3.17</td>
<td>3.19</td>
<td>3.49</td>
</tr>
</tbody>
</table>

(1) Based on estimated value of $120,000 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 $3.00 per $1,000 of assessed value.

(2) Based on estimated value of $140,000 per condominium unit, land value of $15 per square foot and combined tax rate of $4.75 per $1,000 of assessed value.

(3) Based on estimated value of $100,000 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 PEB-Hawai'i, $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 PEB-Hawai'i, $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 PEB-Hawai'i, $8,000 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: State of Hawai'i, Department of Finance, Real Property Tax Division.

## Exhibit V-B

**GCR/MWS MAUI 670**  
Projected Annual State Government Revenues  
Attributable to Development of Maui Melia 670 Resort  
1995 to 2010  
(In millions of 1988 dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General excise tax(1)</td>
<td>$2.0</td>
<td>2.4</td>
<td>2.3</td>
<td>2.7</td>
<td>4.1</td>
<td>4.8</td>
<td>4.7</td>
<td>5.4</td>
</tr>
<tr>
<td>Transient accommodations tax(2)</td>
<td>0.4</td>
<td>0.5</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>1.0</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>2.4</td>
<td>2.9</td>
<td>2.8</td>
<td>3.3</td>
<td>4.7</td>
<td>5.4</td>
<td>5.7</td>
<td>6.5</td>
</tr>
<tr>
<td>On-Resort residents(3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General excise tax(4)</td>
<td>0.1</td>
<td>0.1</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Individual income and other taxes(5)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.6</td>
<td>0.7</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>$2.5</td>
<td>3.1</td>
<td>3.1</td>
<td>3.3</td>
<td>5.3</td>
<td>6.1</td>
<td>6.3</td>
<td>7.4</td>
</tr>
</tbody>
</table>

(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 singlefamily unit rentals to visitors, at projected occupancy levels and average daily rates of $80 for lodge units, $70 for condominium units and $110 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 1998 dollars.

State tax revenues are projected to increase by $2.6 to $1.1 million annually in 1995 due to the resort. Annual collections could increase to $7.1 million to $6.2 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 1998 dollars. Exhibit V-C indicates a per capita county cost of approximately $150 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-D. 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 $51 million.

<table>
<thead>
<tr>
<th>Function</th>
<th>Estimated Expenditures</th>
<th>Service Population Allocations</th>
<th>Estimated Expenditure Allocations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>General</td>
<td>$ 7,753</td>
<td>86,500</td>
<td>90.63</td>
</tr>
<tr>
<td>Public safety</td>
<td>14,776</td>
<td>118,000</td>
<td>121.41</td>
</tr>
<tr>
<td>Highways</td>
<td>2,612</td>
<td>118,000</td>
<td>40.47</td>
</tr>
<tr>
<td>Health and sanitation</td>
<td>5,102</td>
<td>118,000</td>
<td>45.00</td>
</tr>
<tr>
<td>Hospitals and Institutions</td>
<td>2,612</td>
<td>118,000</td>
<td>44.80</td>
</tr>
<tr>
<td>Public welfare</td>
<td>211</td>
<td>118,000</td>
<td>1.79</td>
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<tr>
<td>Education</td>
<td>3,503</td>
<td>118,000</td>
<td>3.07</td>
</tr>
<tr>
<td>Recreation</td>
<td>7,927</td>
<td>118,000</td>
<td>6.75</td>
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<tr>
<td>Interest</td>
<td>5,721</td>
<td>118,000</td>
<td>49.30</td>
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<tr>
<td>Bond redemption</td>
<td>1,858</td>
<td>118,000</td>
<td>16.10</td>
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<tr>
<td>Retirement and pension</td>
<td>3,455</td>
<td>118,000</td>
<td>30.60</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>3,668</td>
<td>118,000</td>
<td>32.40</td>
</tr>
<tr>
<td>Cash capital improvements</td>
<td>2,612</td>
<td>118,000</td>
<td>84.17</td>
</tr>
<tr>
<td>Total (1986 dollars)</td>
<td>$ 81,495</td>
<td></td>
<td>592.77</td>
</tr>
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</table>

Per capita expenditure in 1988 dollars(3) $ 633.69 $ 340.74


(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

**Projected County Government Operating Expenditures Attributable to Development of Maui Waiola 670 Resort**

1995 to 2010  
(In millions of 1988 dollars)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Populations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort visitors</td>
<td>660</td>
<td>710</td>
<td>680</td>
<td>790</td>
</tr>
<tr>
<td>Resort residents</td>
<td>2,600</td>
<td>2,700</td>
<td>2,800</td>
<td>3,900</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>3,260</td>
<td>3,410</td>
<td>3,480</td>
<td>4,690</td>
</tr>
<tr>
<td>Off-Resort residents</td>
<td>440</td>
<td>520</td>
<td>480</td>
<td>560</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3,700</td>
<td>3,930</td>
<td>3,960</td>
<td>5,430</td>
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</table>

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Resort visitors(1)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Resort residents(2)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Subtotal (rounded)</strong></td>
<td>0.4</td>
<td>0.4</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Off-Resort residents(2)</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total (rounded)</strong></td>
<td>0.7</td>
<td>0.7</td>
<td>0.8</td>
<td>0.9</td>
</tr>
</tbody>
</table>

(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 $1,440 per resident and $130 per visitor in 1986 dollars. This is shown by functional area in Exhibit V-E.

Some Maui Waiola 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 would amount to from $700,000 to $500,000 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 Waiola 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 growth 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.
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>General government</td>
<td>194,678</td>
<td>1.163,900</td>
<td>79.58</td>
<td>79.58</td>
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<td>1.163,900</td>
<td>49.99</td>
<td>49.99</td>
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<td>Highways</td>
<td>104,534</td>
<td>1.163,900</td>
<td>89.81</td>
<td>89.81</td>
</tr>
<tr>
<td>Natural resources</td>
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<td>1.163,900</td>
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</tr>
<tr>
<td>Health and sanitation</td>
<td>81,762</td>
<td>1.163,900</td>
<td>71.00</td>
<td>71.00</td>
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<tr>
<td>Hospital and institutions</td>
<td>120,827</td>
<td>1.163,900</td>
<td>114.10</td>
<td>-</td>
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<td>Public welfare</td>
<td>122,461</td>
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<td>145.10</td>
<td>-</td>
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<td>Education</td>
<td>733,273</td>
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<td>Recreation</td>
<td>18,731</td>
<td>1.163,900</td>
<td>14.29</td>
<td>14.29</td>
</tr>
<tr>
<td>Utilities and other enterprises</td>
<td>92,582</td>
<td>1.163,900</td>
<td>85.80</td>
<td>-</td>
</tr>
<tr>
<td>Debt service</td>
<td>267,385</td>
<td>1.163,900</td>
<td>248.26</td>
<td>-</td>
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<tr>
<td>Retirement and pension</td>
<td>141,454</td>
<td>1.163,900</td>
<td>133.84</td>
<td>-</td>
</tr>
<tr>
<td>Employees' health insurance</td>
<td>659</td>
<td>1.163,900</td>
<td>0.62</td>
<td>-</td>
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<tr>
<td>Employment compensation</td>
<td>63,072</td>
<td>1.163,900</td>
<td>50.60</td>
<td>-</td>
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<tr>
<td>Urban redevelopment and housing</td>
<td>94,762</td>
<td>1.163,900</td>
<td>80.66</td>
<td>-</td>
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<tr>
<td>Cash capital improvements</td>
<td>13,480</td>
<td>1.163,900</td>
<td>11.58</td>
<td>11.58</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>41,687</td>
<td>1,163,900</td>
<td>35.35</td>
<td>-</td>
</tr>
<tr>
<td>Total (1988 dollars)</td>
<td>2,437,946</td>
<td>2,777.72</td>
<td>205.74</td>
<td></td>
</tr>
</tbody>
</table>

Per capita expenditure in 1988 dollars: $2,437.21

Population and Expenditure Group

<table>
<thead>
<tr>
<th>Population and Expenditure Group</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
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</thead>
<tbody>
<tr>
<td>Resort visitors</td>
<td>600</td>
<td>710</td>
<td>680</td>
<td>790</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort residents</td>
<td>1,210</td>
<td>1,430</td>
<td>1,380</td>
<td>1,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>2,270</td>
<td>2,740</td>
<td>2,780</td>
<td>3,200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Expenditures:

<table>
<thead>
<tr>
<th>Expenditure category (1)</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
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<th>Low</th>
<th>High</th>
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<tbody>
<tr>
<td>Resort visitors (2)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Resort residents (3)</td>
<td>0.5</td>
<td>0.7</td>
<td>1.9</td>
<td>1.9</td>
<td>2.7</td>
<td>2.7</td>
<td>3.7</td>
<td>4.1</td>
<td>3.7</td>
<td>4.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (rounded)</td>
<td>0.7</td>
<td>0.9</td>
<td>2.1</td>
<td>2.1</td>
<td>3.0</td>
<td>3.6</td>
<td>5.1</td>
<td>4.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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.


(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-G

**County Government Annual Revenue and Expenditure Comparison**

1995 to 2010

*(In millions of 1988 dollars)*

*(rounded)*

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
</tr>
<tr>
<td>Additional revenues</td>
<td>$1.6</td>
<td>1.5</td>
<td>1.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>0.7</td>
<td>0.8</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Net additional revenues</td>
<td>$0.9</td>
<td>0.7</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Revenue/expenditure ratio(1)</td>
<td>5.6</td>
<td>4.0</td>
<td>1.9</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*(1) Additional revenues divided by additional expenditures.*

### Exhibit V-H

**State Government Annual Revenues and Operating Expenditures Comparison**

1995 to 2010

*(In millions of 1988 dollars)*

*(rounded)*

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
</tr>
<tr>
<td>Additional revenues</td>
<td>$2.6</td>
<td>2.1</td>
<td>3.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>0.7</td>
<td>0.8</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Net additional revenue</td>
<td>$1.9</td>
<td>1.2</td>
<td>1.6</td>
<td>1.9</td>
</tr>
<tr>
<td>Revenue/expenditure ratio(1)</td>
<td>3.6</td>
<td>2.2</td>
<td>2.0</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*(1) Additional revenues divided by additional expenditures.*
TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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
LIST OF TABLES

1. Summary of State and Federal Ambient Air Quality Standards
2. Emissions Inventory, County of Maui, 1989
3. PM-10 & SO2 Monitoring Data, Kihei, Maui
4. Annual Wind Rose, Old Maui Airport, 1987
5. 2100 P.M. Wind Rose, Keawalu Beach, Maui
6. Estimated Emissions from Diesel Fuel Combustion To Meet Project Electrical Demand
### List of Figures

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>TITLE</th>
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<tbody>
<tr>
<td>1</td>
<td>Project Location</td>
</tr>
<tr>
<td>2</td>
<td>Surface Trade Wind Streamlines During Daytime Hours</td>
</tr>
<tr>
<td>3</td>
<td>Surface Trade Wind Streamlines During Nighttime Hours</td>
</tr>
<tr>
<td>4</td>
<td>Frequency Distribution of Wind Direction (4) Old Maui Airport (1953-57)</td>
</tr>
<tr>
<td>5</td>
<td>Frequency Distribution of Wind Direction (4) Keawakapu Beach, Maui (2:00 p.m.)</td>
</tr>
<tr>
<td>6</td>
<td>Estimates of Maximum 1-Hour Carbon Monoxide Concentrations; Piili Highway, PM-Peak Hour (1987)</td>
</tr>
<tr>
<td>7</td>
<td>Estimates of Maximum 1-Hour Carbon Monoxide Concentrations; Piili Highway, PM-Peak Hour (2010 Without Project)</td>
</tr>
<tr>
<td>8</td>
<td>Estimates of Maximum 1-Hour Carbon Monoxide Concentrations; Piili Highway, PM-Peak Hour (2010 With Project)</td>
</tr>
<tr>
<td>9</td>
<td>Estimates of Maximum 1-Hour Carbon Monoxide Concentrations; Piili Highway at Kilohana Drive (2010 With Project)</td>
</tr>
<tr>
<td>10</td>
<td>Estimates of Maximum 1-Hour Carbon Monoxide Concentrations; Piili Highway at Wailea Ike Drive (2010 With Project)</td>
</tr>
</tbody>
</table>

### Air Quality Impact Report

**MAUI WAILEA 670**

#### 1. Introduction

The partnership of Grand Champions Resort Development (Hawaii), Inc., and Vang Realty Partners (GCR/VRG 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 quality is due to its inherent generation of mobile sources, i.e., motor vehicles, 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 one.

In the case of the automotive pollutants (carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox)) there are only primary standards. Until 1988, 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 ozone standard from 150 to 240 microgram/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.  

3. EXISTING AIR QUALITY

While they are not a direct indicator of ambient air quality, existing inventories do provide some insight into 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 3 miles north of Wailea. A summary of the most recent data from that site is 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 from 19 to 39 ug/m3 with an average of 16 ug/m3 in Kula.  

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 Thornwite precipitation evaporation (P/E) index of 4.6 [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 Haleakula 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-Kula coast the daytime tradewinds appear to have a more northerly component at they pass around the flank of Haleakula (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 Wailuku) 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 western component and predominance of northeasterly winds. These afternoon sea breezes 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 traffic will increase automotive pollutant concentrations along Miliani 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 roadway 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 moving on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions indicate that about 1.2 tons/acre/month of dust is generated per acre. The estimated dust levels are about 1.6 tons/acre/month, which is higher than the EPA's recommended levels.

In this case, the predominant soils on the project site are silty clay loams and silty loams. These soils are not expected to contribute significantly to the particulate emissions.

In addition to the on-site impacts attributable to construction activity, there will also be off-site impacts due to the operation of concrete and asphalt batching plants needed for the construction. The off-site impacts include the emission of particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, and volatile organic compounds. The total emissions are expected to be less than the EPA's recommended levels.

Assuming that the plant would be located near the project site, the emissions would be reviewed (Table 5). If one assumes that the project plant is under the worst case ambient conditions at both the site and in the area, the plant plant's emissions would be approximately 10 times the emissions from the plant itself and 60% of the fugitive dust emissions emitted from the construction process would be due to the operation of the plant. The total particulate emissions (TSF) would be estimated to be 105 micrograms per cubic meter (ug/m^3) due to the plant's operation.

The modeling technique employed for the concrete batch plant was again employed for the asphalt batch plant. The results are shown in the following table.

**Estimated impact of an asphalt concrete batch plant**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>24-hour Conc. (ug/m^3)</th>
<th>Existing Conc. (ug/m^3)</th>
<th>Total Conc. (ug/m^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfur dioxide</td>
<td>34.9</td>
<td>48</td>
<td>83.9</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>33.6</td>
<td>33</td>
<td>66.6</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>44.2</td>
<td>44</td>
<td>88.4</td>
</tr>
<tr>
<td>Volatile organic compounds</td>
<td>36.2</td>
<td>36</td>
<td>72.4</td>
</tr>
</tbody>
</table>
The existing concentrations for particulates and SO2 are 1987 file 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 Valley 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 Mailea Drive intersections with Pillani 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 and County of Honolulu [22] was input in lieu of national statistics. That same age distribution was the basis for the distribution of vehicles miles traveled 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)[22], and it comprises the largest fraction of automotive emissions.

Using the available traffic data, modeling was performed for a segment of Pillani Highway between Kaneana 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-roads 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 northeast 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 Pillani Highway section between Kaneana 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 15 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 northeasterly 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 wind speed, 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 vapors. This was most recently demonstrated in an EPA study of cane burning on Maui [29]. Concentrations of particulates can reach high levels within one mile of the fires [31]. 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 would result in 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 10 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 8.4% 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 diesel units. As the Maui-Wailea 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 demand. The estimated individual impact of a single 12.5 MW diesel unit as derived from that application is shown in the following table.

### IMPACT OF A SINGLE 12.5 MW DIESEL GENERATOR

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>1-Hour</th>
<th>3-Hour</th>
<th>8-Hour</th>
<th>24-Hour</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO2</td>
<td>--</td>
<td>40.8</td>
<td>5.2</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>NO2</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>6.3</td>
</tr>
<tr>
<td>TSP</td>
<td>--</td>
<td>--</td>
<td>3.6</td>
<td>0.2</td>
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<tr>
<td>CO</td>
<td>112</td>
<td>--</td>
<td>15</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>1-Hour</th>
<th>3-Hour</th>
<th>8-Hour</th>
<th>24-Hour</th>
<th>Annual</th>
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<td>--</td>
<td>--</td>
<td>--</td>
<td>29.3</td>
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</tbody>
</table>

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 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 to 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, when complete, will be designed to treat 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 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 intermittent impact that can be mitigated by having sugar companies cooperate in choosing optimum times to burn and in not locating fields upwind of populated areas. The Hawaiian Sugar Planters' Association has recently begun development of an agricultural burning management plan 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 4.4% of that already occurring at the Malia 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
REFERENCES


7. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95) Section 109, National Ambient Air Quality Standards, August, 1977


10. State of Hawaii. Title 11, Administrative Rules, Chapter 60, Air Pollution Control.


12. Anderson, Bruce S. et al., The Lahaina Investigation, Perspectives in Environmental Epidemiology, Issue No. 2, May 1984

REFERENCES (Continued)


18. Rezko, Inc. LO GO 5 Transit Mix Batch Plant, Bulletin No. 1017-283


22. City & County of Honolulu, Department of Data Systems. Act Distribution of Registered Vehicles in the City & County of Honolulu (unpublished report), September, 1986.


REFERENCES (Continued)


26. California Department of Transportation. CALINE4 — A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadway (Final Report), November, 1984


<table>
<thead>
<tr>
<th>POLLUTANT</th>
<th>SAMPLING PERIOD</th>
<th>FEDERAL STANDARDS</th>
<th>STATE STANDARDS</th>
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<td>1. Total Suspended Particulate Matter (TSP)</td>
<td>Annual Geometric Mean</td>
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<td>(micrograms per cubic meter)</td>
<td>Maximum Average in Any 24 Hours</td>
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<td>150</td>
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<td>2. PM-10</td>
<td>Annual</td>
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<td>50</td>
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<tr>
<td>(micrograms per cubic meter)</td>
<td>Maximum Average in Any 24 Hours</td>
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<td>150</td>
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<td>3. Sulfur Dioxide (SO₂)</td>
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<td>80</td>
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<td>Maximum Average in Any 3 Hours</td>
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<td>4. Nitrogen Dioxide (NO₂)</td>
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<td>(micrograms per cubic meter)</td>
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<td>5. Carbon Monoxide (CO)</td>
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<td>Maximum Average in Any 6 Hours</td>
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<td>(milligrams per cubic meter)</td>
<td>Maximum Average in Any 1 Hour</td>
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<td>6. Photochemical Oxidants (as O₃)</td>
<td>Maximum Average in Any 1 Hour</td>
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<td>100</td>
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<td>(micrograms per cubic meter)</td>
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<td>--</td>
<td>--</td>
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<td>7. Lead (Pb)</td>
<td>Maximum Average in Any Calendar Quarter</td>
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### TABLE 2
1980 Emissions Inventory  
County of Maui

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<td>3,575</td>
<td>5,082</td>
<td>61,250</td>
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**SOURCE:** Department of Health  
Environmental Permits Branch

### TABLE 3
PM-10 & SO2 Monitoring Data  
KIEHI MARU, 1987

| Particulate Matter (PM-10)  
24-Hour Concentrations (ug/m³) | Sulfur Dioxide (SO2)  
24-Hour Concentrations (ug/m³) |
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**SOURCE:** Department of Health
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FRACTION OF CALMS = .0819

SOURCE: Reference 16

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<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
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FRACTION OF CALMS = .0211

SOURCE: National Weather Service
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Note: Estimates based on average emission rate for diesel units at the Maelase Generating Station.
Figure 1. Project Location
Figure 3. Surface Trade Wind Streamlines During Nighttime Hours
Source: National Weather Service

Figure 2. Surface Trade Wind Streamlines During Daytime Hours
Source: National Weather Service

C-16
### Figure 6

**Estimates of Maximum 1-Hour Carbon Monoxide Concentrations**

**Puu Lua Highway**

PM-Peak Hour (1987)

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### Figure 7

**Estimates of Maximum 1-Hour Carbon Monoxide Concentrations**

**Puu Lua Highway**

PM-Peak Hour (2010 Without Project)

<table>
<thead>
<tr>
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<th>0.9</th>
<th>0.9</th>
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<td>0.6</td>
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### NOTES

- CO concentrations = milligrams per cubic meter (mg/m³)
- Receptor spacing = 10 meters
- Wind direction = 190 deg
- Wind speed = 1 meter per second (m/s)
- Atmospheric stability = N* (P-2 Class #)
- Background CO concentration = 0.1 mg/m³
- Diffusion model: CALINE-4
- Emissions model: MOVILE-3

- CO concentrations = milligrams per cubic meter (mg/m³)
- Receptor spacing = 10 meters
- Wind direction = 190 deg
- Wind speed = 1 meter per second (m/s)
- Atmospheric stability = N* (P-2 Class #)
- Background CO concentration = 0.1 mg/m³
- Diffusion model: CALINE-4
- Emissions model: MOVILE-3
### FIGURE 8
ESTIMATES OF MAXIMUM 1-HOUR CARBON MONOXIDE CONCENTRATIONS
PILANI HIGHWAY PM-PEAK HOUR (2010 WITH PROJECT)

<table>
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<td>7.8 7.1 3.1 1.9</td>
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<tr>
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<td>1.3 1.3 1.3 1.3</td>
<td>6.8 5.1 3.5 2.3</td>
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<tr>
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<td>1.0 1.0 1.0 0.9</td>
<td>5.5 4.9 3.8 2.4</td>
</tr>
</tbody>
</table>

### 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" (D class 4)
- Background CO concentration = 0.1 mg/m³
- Diffusion model: CALINE-4
- Emissions model: MOVILS-3
March 8, 1988

Mr. Thomas Whitten
Mr. James Leonard
FTR Hawaii
130 Merchant Suite 1111
Honolulu, Hawaii 96813

Gentlemen:

RE: Archaeological Survey Results Concerning the Proposed
Nanu Valley A1A Development. TRM: 2-A-681 36 A 21, Located
near Halona, Island of Oahu.

At the request of your office and Mr. Bill Bogaty 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 Koa trees. The only exception to this is an
aloe 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 aloe 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.
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 Waiau 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 transitory 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 occurrence.

The next work of consequence is a document entitled Archaeological Survey Paludet and Kauai Section Kauai Island at Haleiwa written by Beth Walton in 1972. In this report, Walton surveyed the yet-to-be constructed Pilihi Highway extension and a section of this road corridor crosses through the subject property in a diagonal fashion, stretching nearly from one boad 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 "completely insignificant." The sites which are mapped and described are numbered 200 through 209, and 211. These are four stone walls, a feature couplets, three platforms, a C-shaped structure, an A'ia boulder alignment, and a small deteriorated structure.

While Walton's paper seems thorough and in fairly well written, there is a capital 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 the station 1950+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 Halsett E. Hammett 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, Hammett found no sites and consequently had very little to write about.

Hammett 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 1978 survey report. Before entering the field, the Kirch, Walton and Hammett 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 Kekauoahi, M. (LCA 11,216, Apas 21) and this award, while in Paelua ahupua'a, is located off the subject property.

The survey itself took place over a seven day period. Two archaeologists conducted a number of surface 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 Hammett, 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 ahaua flow. This is a stacked lava rock wall ranging in height from 1.5 meters to 2.6 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'ia flow).

Perhaps, as Hammett suggests, some of Walton's sites...
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 panola 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. Fortunately, 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 separate 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 gla flow 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 bunched 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 consistent 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, similar structures were noticed with tanks still stop 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 ala 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 Palauas and Keauhou. 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 questions regarding this report, please feel free to contact me. Until that time,

Aloha,

Joseph Kennedy

BIBLIOGRAPHY


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
Kaneohe, Hawaii 96742

5 February 1988

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 Kieve (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. Kieve 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 tallies 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 (1986) 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.
and distribution. Uecks (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 (Monacki et al. 1982).

RESULTS AND DISCUSSION

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 solva)
A total of only two plover were recorded during the field survey. Plovers prefer open areas such as mudflats and lawns. Both plover were observed along the
### Relative abundance of exotic birds, Makena 700 Property, Maui.

<table>
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<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
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</tr>
</thead>
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<tr>
<td>Wild Turkey</td>
<td>Meleagris gallopavo</td>
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<td>Common (Ring-necked) Pheasant</td>
<td>Phasianus colchicus</td>
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<td>Francolinus pennicapsianus</td>
<td>A = 10</td>
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<td>Black Francolin</td>
<td>Francolinus francolinus</td>
<td>C = 8</td>
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<tr>
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<td>Streptopelia chinensis</td>
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<tr>
<td>Warbling Silverbill</td>
<td>Lonchura malabarica</td>
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</tr>
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* (See page 14 for key to symbols)
KEY TO TABLE 1

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 Kiale 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 Kiale. Although this species is not entirely nectarous 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 (Brunner 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 turkeys. 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 polyosoma*) 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 cinereus semotus*) are sketchy but the species has been recorded from Maui (Connor 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 prosperity 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 species 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 cristatellus). 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

-13-

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 (Brummer 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.

PHILIP L. BRUNER
Assistant Professor of Biology
Director, Museum of Natural History
BYU-H
Laie, Hawaii 96762

5 February 1988

SOURCES CITED


Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Figures</td>
<td>11</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>SURVEY METHODS</td>
<td>1</td>
</tr>
<tr>
<td>DESCRIPTION OF THE VEGETATION</td>
<td>2</td>
</tr>
<tr>
<td>1. Kaua/buffel grass pasturelands</td>
<td>3</td>
</tr>
<tr>
<td>2. Gully vegetation</td>
<td>4</td>
</tr>
<tr>
<td>3. Scrub vegetation</td>
<td>5</td>
</tr>
<tr>
<td>RARE, THREATENED OR ENDANGERED SPECIES</td>
<td>6</td>
</tr>
<tr>
<td>DISCUSSION AND RECOMMENDATIONS</td>
<td>8</td>
</tr>
<tr>
<td>LITERATURE CITED</td>
<td>9</td>
</tr>
<tr>
<td>APPENDIX A. PLANT SPECIES LIST</td>
<td>10</td>
</tr>
</tbody>
</table>
INTRODUCTION
The Maui Wailea 670 project site consists of approximately 670 acres of relatively gentle sloping land on the lower flanks of Haleakala, East Maui. It is bounded by the Seba Makena resort on the south; Wailea resort on the west; Kihel and Haal Meko 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 pastureland. Gully areas support a mixture of pill 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 willow 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 1984 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 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 Wai'ale 670 project site was provided by Wai'ale resort through Kaukahi Street and Wai'ale Iki Drive, both of which terminate near the western boundary of the project site. A number of abutting cul-de-sacs within the Hui Meadow 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). 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 I.

Distribution of the major vegetation types is influenced largely by substrate type and, to a lesser degree, by topography and moisture regime. Kiiwe/buffel grass pasturelands, the most extensive vegetation cover, occurs where there is soil, although shallow and very stony. These soil types are Kana'apuka very stony silt loam (OAD) with a surface layer about 6 in. thick, colored a very dark brown to very dark grayish brown; Makana loam, stony complex (NIC) 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 waxy clay loam (KN10) with a surface layer about 2 in. thick, colored dark reddish-brown (Foote et al. 1972). The substratum under all three soil types is fragmented, stone-size, 'a'a lava. Steeply sloping gullies, which support gully 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. Kiiwe/buffel grass pasturelands

The kiiwe/buffel grass pasturelands cover approximately 75% of the 2670-acre site. Vegetation on pasturelands consists of an open forest of kiiwe trees (Prosopis pallida), with 50 to 60% tree cover. The trees are usually multi-trunked (no main trunk), with trunks 6 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 knoll has been removed or thinned out, as along fencelines, ranch roads, paddocks, etc. Where the substrates are in stone along fencelines, goat grass (Tragus hortensianus) is abundant. Also frequently found in these areas is plush grass (Echinochloa crus-galli). Locally common in areas with very thin soil and exposed rocks are mixed patches of wild oat (Avena fatua), bristly foxtail (Setaria parviflora), and Virginia snakeroot (Convolvulus virginicus).

Where the pasturaleends adjoin Hauli 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 knoll 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
Pasturaleands 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 drier 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 malacum var. trichogynum), two species of dayflower (Commelina grandiflora), and Commelina diffusa, bristly foxtail (Setaria verticillata), and two species of Bidens (Bidens pilosa, Bidens crenifera). Among the shady crickets 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 sour fern (Nephrolepis multifida).

On rocky ledges and gully walls which are exposed to more sun, pill grass (Heteropogon contortus) and portulaca (Portulaca oleracea) are abundant. Lastaea (Lastaea camara) and koa-ahole (Koahole lomandrophora) shrubs, as well as a few trees of Chinaberry (Melia azedarach) and willow (Salix planifolia) 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 Kona volcanic series (Macdonald and Abbott, 1970). Vegetation cover varies from 30% to 50%, although in some areas it may be as much as 75% cover. In places, the rough 'a'a clinker may be covered with hard lichens such as members of the Parmeliaceae.

The vegetation is characterized by scattered stands of knoll (Paspalum pallidum), an introduced species, and willow (Salix planifolia), a native species. Unlike the knoll on the pasturaleands, knoll 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. Willow trees may vary from 10 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 willow 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 'iilima, other shrubs, and fallen trees during the rainy season are dense tangles of the 'aname vine (Stemonbispidus), a member of the cucumber family. Also common are vines of ko'olau awhi'a (Ipomoea indica) and ipomea or Hawaiian moonflower (Ipomoea humillida).

Other native species found in this vegetation type occur in small, scattered packets. These include naio (Hypoxis sandwicense), nehe (Lipochaeta rokitii), pupuilo (Coparhia sandwicensis), 'a'ai (Podocarpus viucrens), and 'uhuhi (Senna gaudichaudii). One such small colony of native plants on the southwest corner of the site contains a Category I, candidate endangered species, the puunoo vine (Cencativa pubescens), a member of the pea or legume family and related to the mauna loa vine (Cencativa 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 Rhynchosia (especially noticeable in the wet season), Natal rudgrass (Rhynchosia repens), and buffel grass (Cenchrus ciliaris). As one approaches the 'Uiopala ranch boundary, green panic grass (Panicum maximum var. trichoglomer) and konaoale (Kauaena 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 1975) on the lower boundary, and to changes in the lava flow to smaller fragments of cinder.

**RARE, THREATENED OR ENDANGERED SPECIES**

No officially listed threatened or endangered plant species protected by the Federal Endangered Species Act of 1973 (16 USG 1531-1543), as amended, and by the State's Threatened and Endangered Species Law (HRS Chapter 124, Title 15) occur on the Waimea 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 puunoo vine (Cencativa pubescens), is listed as a Category I, candidate endangered species by the USFWS (1985). A Category I 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 puunoo 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 puunoo vine is uncommon in open dry sites such as lava flows, ka'ibele thickets or dry forest, from elevations of 45 to about 1,620 ft. (Muenzer et al., in prep.); it is endemic to the islands of Ni'ihau, the Napali Coast on Kaua'i, Lāna'i, and north Kaua'i. 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 60-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, uncollectable or depleted (Fonberg and Herbst 1975) such as the naio (Lipochaeta rokitii), 'aname vine (Stemonbispidus), 'uhuhi (Coparhia sandwicensis), and 'nahoku (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.
DISCUSSION AND RECOMMENDATIONS

Three vegetation types are recognized on the project site. The most extensive of these is the klawe/buffel grass pastures, which cover roughly 75% of the 5630-acre site. This vegetation type as well as the shrub vegetation, which is found in the gullies which dissect the pastures, 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 shrub vegetation. Klawe and willow trees with a dense 'ilia'a shrub layer are the conspicuous feature of the shrub. Other native species are found in small, scattered patches. In one, small colony on the southwestern corner of the site, near an existing powerline, a Category 1, candidate endangered species, the puaulu vine (Crematostyles phaneropygma) is found. This particular colony is supported by 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


APPENDIX A. PLANT SPECIES LIST.

MAUI'I WAILEA 670 PROJECT, MA'AYANO DISTRICT, ISLAND OF MAUI'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 citations 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 these 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. = similar to a certain taxon
- m. f. = in the broad sense
- sp. = correct species name not determined due to insufficient material
- sp. nov. = an, an, or undescribed new species
- 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...
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
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<tr>
<td><strong>Ferns</strong></td>
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<tr>
<td>Aspleniaceae</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Adiantum capillus-veneris L.</td>
<td>maiden-hair fern</td>
<td>1</td>
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<tr>
<td>Dryopteris octopetala (Sm.) Hook.</td>
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<tr>
<td>Pellaea ternifolia (Cav.) Link</td>
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<tr>
<td>Aspleniaceae</td>
<td></td>
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<tr>
<td>Nephrolepis multiflora (Hook.) Jarret ex Morton</td>
<td>sword fern</td>
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</tr>
<tr>
<td><strong>Monocots</strong></td>
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</tr>
<tr>
<td>Commelinaeae</td>
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</tr>
<tr>
<td>Commelina diffusa K. L. Brem.</td>
<td>purple day flower</td>
<td>X</td>
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</tr>
<tr>
<td>Commelina diffusa</td>
<td>blue day flower</td>
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</tr>
<tr>
<td>Grasses</td>
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<tr>
<td>Brachiaria decumbens (L.) A. Camus</td>
<td>hurricane grass</td>
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<tr>
<td>Brachiaria subquadriperta (Trin.) A.S. Hitchc.</td>
<td>brechiarla</td>
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<tr>
<td>Cenchrus ciliaris L.</td>
<td>buffel grass</td>
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<tr>
<td>Cenchrus echinatus L.</td>
<td>sandbur</td>
<td>X</td>
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</table>

* Introduced to the islands by the early Polynesians
* Settlers introduced, not native, brought to the islands
* Settlers brought, not native, brought to the islands
* Accidentally
* VEGETATION TYPES (see text for discussion)
  * I = Introduced from Pacific
  * P = Introduced from pastures
  * S = Soil vegetation (Sand/100a)
### SCIENTIFIC NAME

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<td>Y</td>
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<td>hierba del caballo</td>
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<tr>
<td><em>Eragrostis cilianensis</em> (All.) Verno-Lutat</td>
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<tr>
<td><em>Eragrostis tef</em> (L.) Beauv. ex R. &amp; S.</td>
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<td><em>Eragrostis teff</em> sp.</td>
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<td><em>Zostera sp.</em></td>
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<td><em>Cucumis sativus</em> Ehrenb. ex Spenn.</td>
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<td><em>Sicyos asper</em> Hillabr.</td>
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<td>Borrhavia coccinea Mill.</td>
<td>boerhavla</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Borrhavia diffusa L.</td>
<td>alena</td>
<td>I</td>
<td>-</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Mirabilis jalapa L.</td>
<td>four-o'clock</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Oulasis cornutata L.</td>
<td>yellow wood-sorrel</td>
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<td>+</td>
<td>+</td>
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<tr>
<td>Argemone mexicana L.</td>
<td>prickly poppy</td>
<td>X</td>
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<td>-</td>
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<td></td>
<td></td>
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<tr>
<td>Passiflora foetida L.</td>
<td>love-in-a-mist</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Passiflora cf. subulata Ortega</td>
<td>white passion flower</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCIENTIFIC NAME</td>
<td>COMMON NAME</td>
<td>STATUS</td>
<td>p</td>
<td>g</td>
<td>sc</td>
</tr>
<tr>
<td>Charaectris sictiana (L.) Moench</td>
<td>partridge pea</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Crocallis incana L.</td>
<td>rattlepod</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Crocallis pallida Ait.</td>
<td>rattlepod</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Desmanthus virgatus (L.) Willd.</td>
<td>virgate amosa</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Desmanthus coccineus (Sw.) DC.</td>
<td>beggarweed</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Eleonorinae sandeckinsis Deg.</td>
<td>williit</td>
<td>E</td>
<td>+</td>
<td>+</td>
<td></td>
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<tr>
<td>Indigofera suffruticosa Mill.</td>
<td>indigo</td>
<td>X</td>
<td>+</td>
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<td>+</td>
</tr>
<tr>
<td>Leucena leucocephala (Lam.) ewitt</td>
<td>kow-kopelo</td>
<td>X</td>
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<td>+</td>
<td></td>
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<tr>
<td>Macrocestium lathyroides (L.) Urb.</td>
<td>wild bush-bean</td>
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<td>+</td>
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<tr>
<td>Prosopis pallida (Humb. &amp; Bonpl. ex Willd.) M.B.K.</td>
<td>klawe</td>
<td>X</td>
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<td>+</td>
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<tr>
<td>Senna samas (Jacq.) Merr.</td>
<td>monkey pod</td>
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<td>+</td>
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<tr>
<td>Senna alata (L.) Romb.</td>
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<td>+</td>
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<td>+</td>
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<tr>
<td>Senna sargentii (H. &amp; A. L.)</td>
<td>unluhnt</td>
<td>I</td>
<td>-</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Senna occidentalis (L.) Link</td>
<td>coffee senna</td>
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<td>-</td>
<td>-</td>
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<td>Malvaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Abutilon grandifolium (Willd.) Sweet</td>
<td>ma'o</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Abutilon incanum (Link) Sweet</td>
<td>abutilon</td>
<td>I</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<td>Malva parviflora L.</td>
<td>cheeseweed</td>
<td>X</td>
<td>+</td>
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<td>+</td>
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<td>Malvastrum coronifoliumum (L.) Garcke</td>
<td>malavastrum</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Sida fallax Wulp.</td>
<td>'tilmna</td>
<td>I</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sida rhamphifolia L.</td>
<td>side</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<td>Malvaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Malva azedarach L.</td>
<td>Chinaberry</td>
<td>X</td>
<td>+</td>
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P-11
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<th>sc</th>
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<td>Sterculiaceae</td>
<td>'aloha, hi'aloa</td>
<td>I?</td>
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<td>+</td>
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<tr>
<td>Tiliaceae</td>
<td>burbrush</td>
<td>X</td>
<td>-</td>
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<tr>
<td>Verbenaceae</td>
<td>'antana</td>
<td>X</td>
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</table>

<table>
<thead>
<tr>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>STATUS</th>
<th>p</th>
<th>g</th>
<th>sc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plumbaginaceae</td>
<td>'tili'e</td>
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<td>+</td>
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<td>Polygonaceae</td>
<td>coral vine</td>
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<td>common purslane</td>
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<td>+</td>
<td>+</td>
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<tr>
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<td>portulaca</td>
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<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Portulacaceae</td>
<td>portulaca</td>
<td>E</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Itea frutescens</td>
<td>scarlet pimpernel</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td></td>
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<tr>
<td>Sapindaceae</td>
<td>a'ali'i</td>
<td>I</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Solanaceae</td>
<td>chilli pepper</td>
<td>X</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Solanaceae</td>
<td>Jamestown (jinon) weed</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Solanaceae</td>
<td>currant tomato</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Solanaceae</td>
<td>apple of Peru</td>
<td>X</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Solanaceae</td>
<td>tree tobacco</td>
<td>X</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Solanaceae</td>
<td>papalo</td>
<td>I?</td>
<td>+</td>
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<td></td>
</tr>
</tbody>
</table>

F-12
APPENDIX G
ENGINEERING REPORT
D. Infrastructure

1. Transportation

Access to the project site will be provided by Pilani 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 Pilani Highway.

Increment I of the two-lane Pilani 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 Hakena 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. Sewer System

The existing Interceptor and transportation system between Kaahumanu 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 million 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 Kīhei 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 upgrading the existing gravity interceptors, pump stations and force mains between Wai'alea and the Kīhei STP.
   
   Option 2. Install new interceptor beginning at the southwest corner of Māui Wai'alea 670 to the Kīhei STP along Pāilani Highway. Cost to be shared by Māui Wai'alea 670, Palaua/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 Māui Wai'alea 670 or Seibu site in cooperation with other developers in South Wai'alea and Makena.

3. **Water Supply**
   
   a) **Potable Water**

   Potable water for the Kīhei 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 Kīhei-Makena areas of Māui. Water from the Iao Valley or Hokūkau 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 Wai'alea and Seibu developments located west and south, respectively, of the proposed Māui Wai'alea 670 project is from the Upper Waiehu source. This source was developed by the joint venture of Alexander and Baldwin, Inc., Wai'alea Development Company, Seibu Hawai'i 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 Kibi 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
Kibi-Makena areas. The Maui Waiola 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 Waiola 670 project is the 3.0 Million Gallon
reinforced concrete reservoir in Waiola Development
located approximately 1,200 feet north of Kaukahi
Street at elevation 353 feet. This reservoir
provides storage for Waiola Development's mid-level
distribution system.

Waiola Development Company's ultimate plan for
their high level system calls for a new 1.0 MG
reservoir being constructed above Waiola
Development within the Maui Waiola 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 Waiola 670 could be serviced off Waiola
Development's 1.0 MG high level tank. However,
Maui Waiola 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 Waiola 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 Waiola
Development Company.

The new distribution system for Maui Waiola 670
would probably be tied into the existing
distribution system for Maui Meadows to assure
continuity of service and circulation.

-7-
Table 4 contains average daily water rates generally approved for use in the Wailea/Makena areas by the County of Maui.

<table>
<thead>
<tr>
<th>Type of Development</th>
<th>Water Rates/Unit/Ave. Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Condo</td>
<td>800 gpd</td>
</tr>
<tr>
<td>S Single Family Residential</td>
<td>1,000 gpd</td>
</tr>
<tr>
<td>R Hotel Room</td>
<td>420 gpd</td>
</tr>
<tr>
<td>B Commercial</td>
<td>4,000 gpdAd</td>
</tr>
<tr>
<td>GC Golf Course Irrigation</td>
<td>5,600 gpdAd</td>
</tr>
</tbody>
</table>

Table 5 contains average daily rates indicated on the County's adopted water master plan.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Population Person/Acre</th>
<th>GPED</th>
<th>GPD</th>
<th>Water Rate</th>
</tr>
</thead>
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<tr>
<td>Residential</td>
<td>13 - 18</td>
<td>160</td>
<td></td>
<td>1,800-2,500</td>
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<td>Apartment</td>
<td>60</td>
<td>140</td>
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<td>5,000</td>
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<tr>
<td>Hotel</td>
<td>75</td>
<td>250</td>
<td></td>
<td>17,000</td>
</tr>
<tr>
<td>Industrial</td>
<td>--</td>
<td>---</td>
<td>-----</td>
<td>6,000</td>
</tr>
<tr>
<td>Commercial</td>
<td>70</td>
<td>30</td>
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<td>6,000</td>
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<tr>
<td>School &amp; Church</td>
<td>100</td>
<td>100</td>
<td></td>
<td>1,700</td>
</tr>
<tr>
<td>Hospital</td>
<td>40</td>
<td>100</td>
<td></td>
<td>1,800</td>
</tr>
<tr>
<td>DUS</td>
<td></td>
<td></td>
<td></td>
<td>1,800</td>
</tr>
<tr>
<td>SCS</td>
<td></td>
<td></td>
<td></td>
<td>7,000</td>
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</table>

GPED - Gallons per Capita Day  
GPD - Gallons per Acre Day

b) Irrigation Water

Preliminary investigations (by John Hink, Geo-Hydrologist) indicate that there is a limited supply of groundwater suitable for irrigation within the Maui Wailes 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 Wailes 670. However according to Hink's report in the northerly section of Maui Wailes 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 Hink's report.)

The following irrigation water alternatives are being considered:

Option 1. Use effluent from the Kihel STP.

This option would be attractive if a new sewer collector and transportation system were to be installed between Maui Wailes 670 and the Kihel STP. The force main to transport treated effluent back
to Wailua 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 \text{ gals.} \times 1.5 \times $2.35/\text{gal.}) \approx $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 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.

4. Drainage

The Maui Waiola 670 project site is located on the western slope of Mount Haleakala in what is often referred to as the Kibei-Makena watershed. The contributory drainage area above the Maui Waiola 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 Waiola 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 Pillani 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 Pillani Highway Extension are tabulated in Table 6.
TABLE 6

<table>
<thead>
<tr>
<th>Drainage Basin No.</th>
<th>Basin Runoff</th>
<th>Rational Method</th>
<th>SCS Method</th>
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<tr>
<td></td>
<td></td>
<td>50 Yr.</td>
<td>100 Yr.</td>
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<tr>
<td>33</td>
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<td>1,923</td>
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<td>34</td>
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<td>36</td>
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<td>109</td>
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<td>42</td>
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<td>86</td>
<td>111</td>
</tr>
</tbody>
</table>

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 (Tu) of 10 years except:

For drainage areas with sump or tail water effect, Tu (recurrence interval) = 50 years.

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G-7

-12-
For design of roadway culverts and bridges, T = (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 or More

1) Use Recurrence Interval (\( T_a \)) = 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 Valles Alcanul and Makena Alcanul 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 Valles 670 on these structures is not expected to be significant.

-16-
APPENDIX "A"

Groundwater Conditions Report by John F. Mink

Makena Region, Maui, Hawaii
Groundwater Conditions
John F. Mink
December 12, 1986

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 600 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 values 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 downgradient 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 400 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 pumping 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.
In my memorandum of December 6, 1987, I concluded that practicable 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 agd if pumped continuously. The actual output is less, perhaps closer to 1.5 agd. 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 along the Makena coast the total flux perpendicular to the coast line is on the order of 2 to 4 agd. If this is the case, the Wailea wells have control of the principal share of local sustainable yield. The remaining sustainable yield will have to be carefully monitored 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 500 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 agd of effluent is applied, 0.25 agd (175 gpm) will become groundwater that eventually will flow into the Wailea property. An equivalent amount per 1 agd irrigation should be allowed as pumping 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 used for irrigation of the proposed golf courses, arrangements for withdrawal of groundwater in the main part of Makena 700 should be negotiated.

[Signature]
TRAFFIC IMPACT STUDY

MAUI WAILEA 670

SUMMARY

On a regional basis, traffic in the Kehei-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 Pillani 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 Pillani Highway between Mokulele Highway and Keanae Road would require two traffic lanes in each direction by year 2006.

INTRODUCTION

Grand Champions Resort Development (Hawaii), Inc. and VHFS 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 Piliani Highway bisects the project site.

Roadway System

Piliani Highway is the major north-south arterial roadway, serving the Kihei-Makena area. The pavement structure for Piliani 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. The speed limit decreases to 25 mph where Piliani Highway presently terminates at Kilohana Drive.

Piliani Highway intersects Kilohana Drive at a unsignalized T-intersection with Piliani Highway forming the stem of this intersection. Stop or yield signs at the Piliani Highway/Kilohana Drive intersection control all movements except the right turn from Piliani Highway to Kilohana Drive.

Approximately seven miles to the north, Makulele Highway, a two-lane highway, provides the primary link between Kihei and central Maui. Makulele Highway crosses with Piliani Highway in a signalized cross-intersection.

Traffic Conditions

The description of existing conditions on Piliani 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
The section of Piliani Highway between Makulele 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 (HCM) analysis of two-lane highways, which considers potential delays, speed, and capacity utilization, was used to evaluate existing peak hour conditions on Piliani Highway. Piliani Highway operates at Level of Service (LOS) D during both peak hours. Levels of Service are described in the appendix.

The section of Piliani 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 Piliani Highway during both peak periods. This section of Piliani Highway and Kilohana Drive operates at LOS C during both the AM and PM peak hours.

Existing conditions on Makulele Highway are based on manual traffic counts and field observations taken in December 1986. The segment of Makulele Highway north of Piliani Highway presently carries 1,005 vehicles per hour (LOS D) during the AM peak hour and 1,150 vehicles per hour (LOS D) during the PM peak hour.

FUTURE CONDITIONS WITHOUT PROJECT

The proposed project is estimated to be completed by 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 Piliani Highway.

For future conditions, the highway system was assumed to include a two-lane extension of Piliani Highway to Malaekahana Drive. Traffic volumes on existing portions of Piliani Highway and Makulele Highway were estimated to increase at a rate of five percent per year, which correlates to the expected population growth in the Kuhio-Makana area. The five percent growth rate would include traffic increases from other proposed developments in the Kuhio-Makana area.

The existing traffic volumes (1986 and 1987) were factored to year 2010 volumes after accounting for the construction-related vehicles observed during the 1986 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 Makulele and Piliani Highways will double by year 2000.

Traffic volumes on Makulele Highway north of the Piliani 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 Makulele 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 Makulele 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 Piliani Highway between Makulele 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 Pilili 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 Pilili Highway between Kalani 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 Pilili Highway beyond (south of) Kilohana Drive would transform the existing T-intersection into a cross-intersection. The extension of Pilili 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 Pilili 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 Pilili 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 II (peak hour volumes) of the Manual on Uniform Traffic Control Devices (MUTCD) for signalization. With signalization, the Pilili 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 will 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 categories for estimating vehicle-trip ends. Table 1 summarizes the trip generation rates based on the Institute of Transportation Engineers' informational report, Trip Generation (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 area 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**

<table>
<thead>
<tr>
<th>Trip Rates, parameter</th>
<th>AM Peak Hour (tab)</th>
<th>PH Peak Hour (vpd)</th>
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<tr>
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<td>Enter</td>
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<tr>
<td>Resort Hotel (DU)</td>
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<tr>
<td>Retired (DU)</td>
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<td>0.20</td>
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<tr>
<td>Tennis Club (Court)</td>
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<td>0.32</td>
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<thead>
<tr>
<th>Trip Ends Generated [parameter]</th>
<th>AM Peak Hour (tab)</th>
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<td>Recreation Home (860)</td>
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<td>Tennis Club (9)</td>
<td>9</td>
<td>3</td>
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<tr>
<td>Total Trip Ends</td>
<td>832</td>
<td>139</td>
</tr>
</tbody>
</table>

Note: DU = Dwelling Unit, vpd = vehicles per day, vph = vehicles per hour
*Discrepancies are due to round-off errors.

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**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 Elhel-Makena area. External project traffic would be expected to use Pillani Highway as the major access point for the project. Kilohana Drive and Waihee Drive would serve as secondary routes for non-project traffic to/from the existing Waihee Resort area while an extension of Waihee Drive and Kaukah Street would serve the internal project traffic. The traffic assignment at the Pillani Highway/Kilohana Drive intersection represents a worst case condition. Figure 2 shows the traffic assignment for future conditions with the proposed project.

At the intersection of Mokulele Highway and Pillani Highway, project traffic would use Mokulele Highway for trips to/from Kahului. Project traffic with destinations or origins other than Kahului would remain on Pillani Highway.
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, Pi'ilani Highway would be extended to Wailea Ike Drive. Pi'ilani 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 Pi'ilani 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 Pi'ilani 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 Pi'ilani Highway northbound and southbound lanes would experience LOS D and LOS B conditions, respectively, during the PM peak hour.

Analysis of the two-lane Pi'ilani 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 Pillani Highway would also provide sufficient capacities at the Kilohana Drive intersection. Table 2 compares the LOS for highway conditions.

Kilohana Drive would intersect Pillani Highway in a cross-intersection. Traffic volumes for future conditions without the project exceed capacity and warrant signalization at this intersection. The NCH operational analysis was used to determine laneage requirements with a signalized intersection. The signalized Pillani 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 Pillani Highway and Wailea Ike Drive would be a T-intersection. The estimated volumes at this intersection would meet the Warrant II 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 Pillani 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 3
INTERSECTION LEVELS OF SERVICE

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<tr>
<th>Intersection Type</th>
<th>W/O Project</th>
<th>With Project</th>
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<tr>
<td><strong>Future Conditions (Year 2010)</strong></td>
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<tr>
<td><strong>Unsignalized Intersection</strong></td>
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<td></td>
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<tr>
<td>Pillanl Highway/Kilohana Drive</td>
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<td></td>
</tr>
<tr>
<td>AM Peak Hour</td>
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<td></td>
</tr>
<tr>
<td>Eastbound Approach</td>
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<td>Westbound Approach</td>
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<td></td>
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<tr>
<td>Northbound Left Turn</td>
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<td></td>
</tr>
<tr>
<td>Southbound Left Turn</td>
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<tr>
<td>PM Peak Hour</td>
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<tr>
<td>Eastbound Approach</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Westbound Approach</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Northbound Approach</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Southbound Approach</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td><strong>Signalized Intersection</strong></td>
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<tr>
<td>Pillanl Highway/Kilohana Drive</td>
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</tr>
<tr>
<td>AM Peak Hour</td>
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<td>PM Peak Hour</td>
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<td>Pillanl Highway/Malleya Ike Drive</td>
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<td>AM Peak Hour</td>
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<tr>
<td>PM Peak Hour</td>
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</table>

CONCLUSIONS AND RECOMMENDATIONS

The increases in traffic volumes on Pillanl Highway are expected to continue because of on-going development in the Kihel-Makema 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 Pillanl 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 Pillanl Highway to four lanes as far south as Kilohana Drive
- Signalization of the Pillanl Highway intersection of Malaya Ike Drive

The regional traffic planning for the Kihel-Makema 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 Pillanl 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.


APPENDIX

The Highway Capacity Manual defines six levels of service, labeled 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 at the combination 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 40.0 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 (caused vehicles do not clear in one cycle) are frequent occurrences.

LEVEL OF SERVICE F: This level describes operations 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 maneuverability 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 maneuverability 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 of collision 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.