

COPY

PLANNING DEPARTMENT
25 AUPUNI STREET

COUNTY OF HAWAII
HILO, HAWAII 96720

July 27, 1976 ⁸⁷

Ms. Anne L. Mapes
Selt Collins and Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Final EIS - The Ritz-Carlton Mauna Lani
Determination of Acceptability

We have reviewed the Final EIS for the proposed Ritz-Carlton Mauna Lani Hotel.

Chapter 343, HRS, requirements were triggered by the proposed use of state-owned lands, and activities nearshore and shoreline areas that lie within the Conservation District.

We find that the Final EIS adequately addresses both the procedural and content requirements of Chapter 343, HRS. The document adequately disclosed and described significant impacts and responded satisfactorily to review comments. Thus, we have determined the EIS to be acceptable.

In accepting the EIS, we concur that the other issues that remain unresolved, as outlined in the Final EIS, Chapter VIII, will be resolved in the context of subsequent regulatory approvals.

Should you have any questions, please feel free to contact our office.

Sincerely,


ALBERT LONO LYMAN
Planning Director

AK:aeb

cc: / OKOC

The Ritz-Carlton Hotel Company

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FINAL
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IMPACT STATEMENT



THE RITZ-CARLTON
MAUNA LANI

MAUNA LANI RESORT
SOUTH KOHALA, HAWAII

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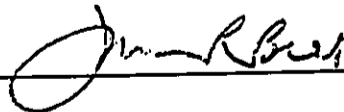
FINAL
ENVIRONMENTAL
IMPACT STATEMENT

PREPARED FOR:
THE RITZ-CARLTON HOTEL COMPANY

PREPARED BY:
BELT COLLINS & ASSOCIATES

FOR SUBMISSION TO:
HAWAII COUNTY PLANNING DEPARTMENT

SUBMITTED BY:



JAMES R. BELL, PRESIDENT
BELT COLLINS & ASSOCIATES
HONOLULU, HAWAII

TABLE OF CONTENTS

	<u>Page</u>
<u>CHAPTER I - INTRODUCTION AND SUMMARY</u>	
1. PURPOSE OF THIS DOCUMENT	I-1
2. PROPOSED GOVERNMENTAL ACTION	I-1
3. PROJECT DESCRIPTION	I-1
4. NEED FOR THE PROJECT	I-2
5. SUMMARY OF IMPACTS	I-2
5.1 Physical Environment	I-2
5.2 Nearshore and Marine Environment	I-2
5.3 Historic and Archaeological Resources	I-3
5.4 Socioeconomic Considerations	I-3
5.5 Transportation Facilities	I-3
5.6 Air Quality and Noise	I-3
5.7 Public Services and Facilities	I-3
5.8 Visual Character	I-4
6. SUMMARY OF PROPOSED MITIGATION MEASURES	I-4
7. SUMMARY OF ALTERNATIVES	I-5
8. SUMMARY OF UNRESOLVED ISSUES	I-5
9. SUMMARY OF COMPATIBILITY OF LAND USE POLICIES AND PLANS	I-5
10. NECESSARY APPROVALS AND PERMITS	I-6
<u>CHAPTER II - DESCRIPTION OF THE PROPOSED PROJECT</u>	
1. REGIONAL SETTING	II-1
2. HISTORY OF MAUNA LANI RESORT	II-3
3. DEVELOPMENT CONCEPT	II-5
3.1 Statement of Objective	II-5
3.2 Description of Proposed Development	II-5
3.2.1 Hotel Concept Plan	II-5
3.2.2 Shoreline and Nearshore Improvements	II-11
3.2.2.1 Seawater Swimming Lagoon	II-11
3.2.2.2 Anchialine Pond Restoration	II-15
3.2.2.3 Expansion of the Shoreline Beach and Creation of a Swimming Area	II-16
3.3 Need for the Project	II-18
3.4 Project Schedule and Construction Cost	II-19

TABLE OF CONTENTS
(continued)

	<u>Page</u>
<u>CHAPTER III - ALTERNATIVES TO THE PROPOSED ACTION</u>	
1. INTRODUCTION	III-1
2. ALTERNATIVES CONSIDERED	III-1
2.1 Proposed Action: Development of Hotel with Shoreline Amenities as Described	III-1
2.2 No Project Alternative: No Development at Project Site.	III-1
2.3 Other Use of Project Site	III-2
2.3.1 Higher Density Resort Use	III-2
2.3.2 Use of Site for Facilities Other Than Hotel	III-2
2.4 Alternatives with Different Shoreline Treatment	III-2
2.4.1 No Shoreline Improvements	III-2
2.4.2 Partially Fill In Fishpond	III-3
2.4.3 Swimming Lagoon with Two Openings	III-3
2.4.4 Swimming Lagoon Elsewhere at Pauoa Bay	III-3
 <u>CHAPTER IV - DESCRIPTION OF THE AFFECTED ENVIRONMENT AND PROBABLE ENVIRONMENTAL CONSEQUENCES</u>	
1. PHYSICAL ENVIRONMENT	IV-1
1.1 Physiography, Geology, Soils and Climate	IV-1
1.1.1 Existing Conditions	IV-1
1.1.1.1 Physiography	IV-1
1.1.1.2 Geology	IV-1
1.1.1.3 Soils	IV-2
1.1.1.4 ALISH Classification	IV-3
1.1.1.5 Climate	IV-3
1.1.2 Physiographic Changes	IV-3
1.1.3 Impact on Soils and Their Use for Agricultural Activities	IV-4
1.2 Tsunamis and Flood Hazard	IV-5
1.2.1 Existing Conditions	IV-5
1.2.2 Probable Impacts	IV-5
1.3 Surface Water and Drainage	IV-7
1.3.1 Existing Conditions	IV-7
1.3.2 Probable Impacts	IV-7
1.4 Nearshore and Marine Environment	IV-8
1.4.1 Existing Conditions	IV-8
1.4.1.1 Coastal Morphology	IV-8
1.4.1.2 Sand Deposits and Other Littoral Material	IV-8
1.4.1.3 Prevailing Waves	IV-8
1.4.1.4 Storm Waves	IV-14
1.4.1.5 Prevailing Currents	IV-14
1.4.1.6 Ocean Water Quality	IV-16
1.4.1.7 Groundwater	IV-16

TABLE OF CONTENTS
(continued)

		<u>Page</u>
	1.4.1.8 Marine Biological Community	IV-19
	1.4.1.9 Anchialine Pond	IV-22
1.4.2	Probable Impacts and Mitigation Measures	IV-23
	1.4.2.1 Temporary Effects of Construction	IV-23
	1.4.2.1.1 Temporary Effects on Ocean Water Quality	IV-23
	1.4.2.1.2 Effects on the Marine Biological Community	IV-23
	1.4.2.1.3 Effects on Anchialine Pond Water Quality and Biota	IV-24
	1.4.2.2 Permanent Impacts	IV-24
	1.4.2.2.1 Shoreline Alteration	IV-24
	1.4.2.2.2 Changes to the Anchialine Pond Environment	IV-25
	1.4.2.2.3 Long-Term Changes to Ocean Water Quality & Resulting Biological Response	IV-26
	1.4.2.2.4 Potential for Movement of Beach Sand	IV-26
	1.4.2.2.5 Monitoring Program	IV-27
	1.4.2.2.6 Changes to Shoreline Access & Recreational Use.	IV-27
1.5	Terrestrial Flora	IV-30
	1.5.1 Existing Conditions	IV-30
	1.5.2 Probable Impacts and Mitigation Measures	IV-31
1.6	Birds and Wildlife	IV-35
	1.6.1 Existing Conditions	IV-35
	1.6.1.1 Birds	IV-35
	1.6.1.2 Mammals	IV-37
	1.6.2 Probable Impacts	IV-38
1.7	Historical and Archaeological Resources	IV-38
	1.7.1 Existing Conditions	IV-38
	1.7.1.1 Historical Setting	IV-38
	1.7.1.2 Findings of the 1973-75 Survey and Excavation	IV-38
	1.7.1.3 Significance Assessment	IV-41
	1.7.2 Probable Impacts	IV-42
	1.7.3 Mitigation Measures	IV-42
2.	SOCIOECONOMIC CONSIDERATIONS	IV-45
2.1	Past and Present Socioeconomic Conditions	IV-45
	2.1.1 Island of Hawaii	IV-45
	2.1.1.1 Economic Activities	IV-45
	2.1.1.2 Settlement Patterns	IV-46
	2.1.1.3 Demographic and Housing Data	IV-46
	2.1.2 Primary Study Area	IV-51
	2.1.2.1 Economic Activities	IV-51
	2.1.2.2 Settlement Patterns	IV-52
	2.1.2.3 Demographic and Housing Data	IV-53

TABLE OF CONTENTS
(continued)

		<u>Page</u>
2.1.3	Secondary Study Area	IV-53
	2.1.3.1 Economic Activities	IV-53
	2.1.3.2 Settlement Patterns	IV-54
	2.1.3.3 Demographic and Housing Data	IV-55
2.2	Probable Socioeconomic Impacts	IV-56
2.2.1	Introductory Statements	IV-56
	2.2.1.1 Methodological Requests from County of Hawaii	IV-56
	2.2.1.2 Original Research Conducted for this Report	IV-57
2.2.2	On-Site Population	IV-57
2.2.3	Employment Impacts	IV-62
	2.2.3.1 Construction Period	IV-62
	2.2.3.2 Operational Period	IV-65
2.2.4	Labor Demand vs. Supply and Worker In-Migration. Off-Site and Total Population Impacts	IV-72
2.2.5	2.2.5.1 Methods for Population and Housing Impact Estimates	IV-79
	2.2.5.2 Off-Site Population Impacts	IV-80
	2.2.5.3 Total Population Impacts	IV-82
2.2.6	Housing Impacts and Requirements	IV-82
	2.2.6.1 Construction Period	IV-82
	2.2.6.2 Operational Period	IV-83
	2.2.6.2.1 Timing and Attribution of Impacts	IV-83
	2.2.6.2.2 Islandwide and Study Area Housing Impacts	IV-84
	2.2.6.2.3 Immediate Demand by On-Site Workers and Affordability	IV-87
	2.2.6.2.4 Future Available Housing	IV-92
2.2.7	Qualitative Social Impacts	IV-95
	2.2.7.1 Forces for Social Change	IV-95
	2.2.7.1.1 Employment in Resort Settings	IV-95
	2.2.7.1.2 Increased Visitor Population	IV-100
	2.2.7.1.3 Worker In-Migration and Related Population Change.	IV-102
	2.2.7.2 Statistical Indicators of Community Cohesion	IV-103
	2.2.7.2.1 Crime Data	IV-103
	2.2.7.2.2 Juvenile Delinquency	IV-104
	2.2.7.2.3 Family Problems	IV-107
	2.2.7.2.4 Mental Health	IV-109
	2.2.7.2.5 Social Consequences of Unemployment	IV-109

TABLE OF CONTENTS
(continued)

	<u>Page</u>
2.2.8 Socio-Economic Mitigations	IV-110
2.2.8.1 Purpose of EIS Socio-Economic Mitigation Discussions	IV-110
2.2.8.2 Steps to Maximize Employment for Current Residents	IV-110
2.2.8.3 Provision of Housing for Employees and New Residents	IV-114
2.2.8.4 Ongoing Community-Resort Communication Mechanisms	IV-116
2.2.8.5 Management-Oriented Research	IV-117
2.2.9 Fiscal Impacts	IV-117
2.2.9.1 Visitor Expenditures	IV-118
2.2.9.2 Output and Income Effects	IV-119
2.2.9.3 Public Revenue Cost Analysis	IV-119
2.2.9.3.1 Study Variables	IV-119
2.2.9.3.2 Results of the Present Value Revenue-Cost Analysis	IV-121
3. TRANSPORTATION FACILITIES	IV-123
3.1 Traffic Impact Analysis	IV-123
3.1.1 Introduction	IV-123
3.1.1.1 Scope of Analysis	IV-125
3.1.1.2 Computer Model	IV-126
3.1.2 Existing Conditions	IV-126
3.1.2.1 Existing Roadway Conditions	IV-126
3.1.2.2 Historic Traffic	IV-127
3.1.2.3 Current Traffic	IV-127
3.1.3 Probable Impacts on Roadways and Traffic	IV-127
3.1.3.1 Trip Generation	IV-128
3.1.3.2 Trip Distribution	IV-129
3.1.3.3 Results of Analysis	IV-132
3.1.3.4 Conclusions and Mitigation Measures	IV-134
3.2 Airports	IV-134
3.2.1 Existing Conditions	IV-134
3.2.2 Probable Impacts	IV-134
3.3 Harbors	IV-134
3.3.1 Existing Conditions	IV-134
3.3.2 Probable Impacts	IV-134
4. AIR QUALITY IMPACTS	IV-135
4.1 Introduction	IV-135
4.2 Existing Conditions	IV-136
4.3 Probable Impacts	IV-136
4.3.1 Short-Term Effects	IV-136
4.3.2 Long-Term Effects	IV-136

TABLE OF CONTENTS
(continued)

	<u>Page</u>
5. NOISE IMPACTS	IV-137
5.1 Introduction	IV-137
5.2 Existing Conditions	IV-137
5.3 Probable Impacts	IV-138
5.3.1 Short-Term Construction Noise	IV-138
5.3.2 Traffic and Other Long-Term On-Site Noise	IV-138
6. PUBLIC SERVICES AND FACILITIES	IV-139
6.1 Schools	IV-139
6.1.1 Existing Facilities	IV-139
6.1.2 Probable Impacts	IV-139
6.2 Health Care Facilities	IV-140
6.2.1 Existing Facilities	IV-140
6.2.2 Probable Impacts	IV-140
6.3 Police Protection	IV-141
6.3.1 Existing Services and Facilities	IV-141
6.3.2 Probable Impacts	IV-141
6.4 Fire Protection	IV-142
6.4.1 Existing Services and Facilities	IV-142
6.4.2 Probable Impacts	IV-142
6.5 Water Supply	IV-143
6.5.1 Existing Conditions	IV-143
6.5.2 Probable Impacts	IV-143
6.6 Wastewater Treatment and Disposal	IV-145
6.6.1 Existing Conditions	IV-145
6.6.2 Probable Impacts	IV-145
6.7 Solid Waste Disposal	IV-145
6.7.1 Existing Conditions	IV-145
6.7.2 Probable Impacts	IV-145
6.8 Electrical Power and Communications	IV-146
6.8.1 Existing Conditions	IV-146
6.8.2 Probable Impacts	IV-146
7. RECREATIONAL FACILITIES	IV-147
7.1 Existing Facilities	IV-147
7.2 Probable Impacts	IV-148
8. VISUAL IMPACTS	IV-149
8.1 Visual Character of the Project Site	IV-149
8.2 Expected Views of the Hotel From the Highway and Shoreline	IV-149
8.3 Visual Impacts of the Development	IV-150

TABLE OF CONTENTS
(continued)

	<u>Page</u>
<u>CHAPTER V - RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA</u>	
1. STATE LAND USE LAW	V-1
2. CONSERVATION DISTRICT RULES	V-1
2.1 Proposal for the Conservation District	V-2
2.2 Existing Subzone	V-2
2.3 Procedures for Permits and Amendments	V-3
2.3.1 Conditions of Conservation District Use	V-3
2.3.2 Guidelines for Reviewing Applications	V-4
3. HAWAII STATE PLAN	V-6
3.1 Part I: Overall Themes, Goals, Objectives, and Policies	V-6
3.2 Relationship of Proposed Action to the State Plan	V-15
Priority Guidelines	V-15
4. STATE FUNCTIONAL PLANS	V-18
4.1 State Agriculture Functional Plan	V-18
4.2 State Conservation Lands Functional Plan	V-18
4.3 State Education Functional Plan	V-20
4.4 State Higher Education Functional Plan	V-20
4.5 State Energy Functional Plan	V-20
4.6 State Health Functional Plan	V-20
4.7 State Historic Preservation Functional Plan	V-21
4.8 State Housing Functional Plan	V-21
4.9 State Recreation Functional Plan	V-21
4.10 State Tourism Functional Plan	V-22
4.11 State Transportation Functional Plan	V-25
4.12 State Water Resources Development Functional Plan	V-25
5. HAWAII COASTAL ZONE MANAGEMENT PROGRAM	V-26
5.1 Recreational Resources	V-26
5.2 Historic Resources	V-26
5.3 Scenic and Open Space Resources	V-26
5.4 Coastal Ecosystems	V-27
5.5 Economic Uses	V-27
5.6 Coastal Hazards	V-27
5.7 Managing Development	V-27
6. COUNTY SPECIAL MANAGEMENT AREA	V-28
7. HAWAII COUNTY GENERAL PLAN	V-31
8. HAWAII COUNTY ZONING	V-31

TABLE OF CONTENTS
(continued)

	<u>Page</u>
9. PLANS OF NEARBY COMMUNITIES	V-33
9.1 North Kohala Community Development Plan	V-33
9.2 Kona Regional Plan	V-33
9.3 Waimea Design Plan	V-33
 CHAPTER VI - RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE OF LONG-TERM PRODUCTIVITY AND IRREVERS- IBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES	
 CHAPTER VII - OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES	
 CHAPTER VIII - UNRESOLVED ISSUES	
 CHAPTER IX - REFERENCES	
 CHAPTER X - CONSULTED PARTIES AND THOSE WHO PARTICIPATED IN THE PREPARATION OF THE EIS	
 CHAPTER XI - COMMENTS RECEIVED DURING THE EIS PREPARATION NOTICE COMMENT PERIOD AND RESPONSES	
 CHAPTER XII - COMMENTS RECEIVED DURING THE DRAFT EIS COMMENT PERIOD AND RESPONSES	
 CHAPTER XIII - OTHER CORRESPONDENCE	
 APPENDICES	
A. Engineering Evaluation of Ocean and Shoreline Conditions at the Ritz-Carlton Hotel Site	
B. Baseline Assessment of the Marine Environment at Pauoa Bay	
C. Traffic Analysis Data and Figures	

LIST OF FIGURES

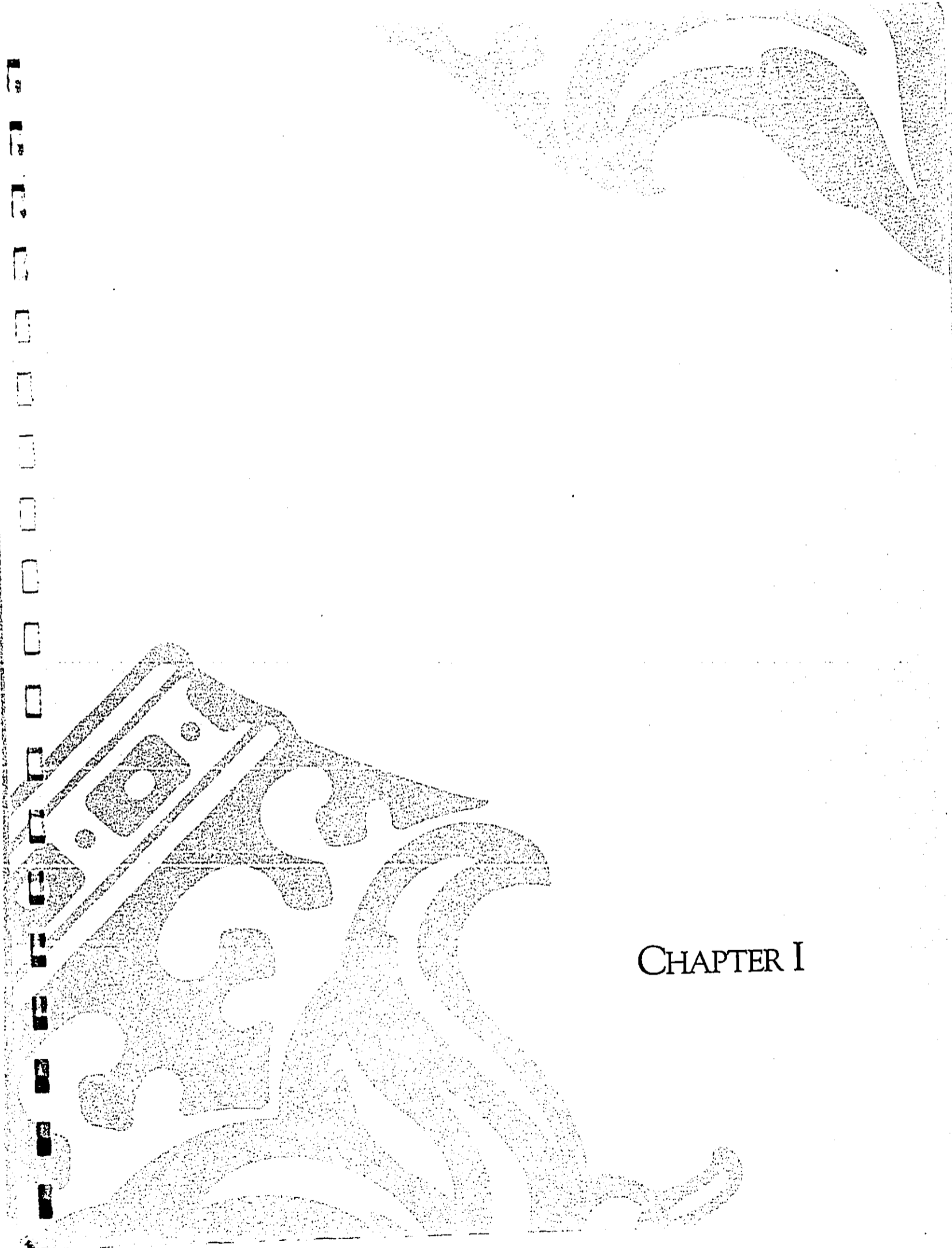
	<u>Page</u>
<u>CHAPTER II</u>	
II-1 Regional Map	II-2
II-2 Mauna Lani Resort Master Plan	II-4
II-3 Concept Site Plan	II-6
II-4 Concept Exterior Elevations	II-7
II-5 Concept Lobby Level Plan	II-8
II-6 Concept Lower Level Plan	II-9
II-7 Concept Section/Elevation	II-10
II-8 Shoreline Access and Public Shoreline Park	II-12
II-9 Proposed Swimming Lagoon and Beach Expansion	II-13
II-10 Sections of the Proposed Swimming Lagoon & Shoreline Beach.	II-14
II-11 Anchialine Pond Restoration Project	II-17
<u>CHAPTER IV</u>	
IV-1 Flood Insurance Rate Map	IV-6
IV-2 Shoreline and Nearshore Features at Pauoa Bay	IV-9
IV-3 Offshore Bathymetry and Shoreline Topography at Pauoa Bay	IV-10
IV-4 Wave Exposure of Pauoa Bay.	IV-11
IV-5 Typical Currents in Pauoa Bay	IV-15
IV-6 Depth Contours & Location of Water Chemistry Sampling Stations, Pauoa Bay	IV-17
IV-7 Depth Contours and Location of Benthic Transects, Pauoa Bay	IV-20
II-7a Public Shoreline Access	IV-28
IV-8 Location of Archaeological Sites.	IV-39
IV-9 Cumulative Numbers of On-Site Construction Workers.	IV-66
IV-10 Resort Units and Housing Units.	IV-93
IV-11 Kohala Area Visitor Units vs. Reported Crime, 1970 - 1985	IV-105
IV-12 Kohala Area Visitor Units vs. Juvenile Arrests for Type I Offenses, 1976 -1985.	IV-106
IV-13 Roadway Network	IV-124
<u>CHAPTER V</u>	
V-1 Hawaii County Zoning.	V-32

LIST OF TABLES

	<u>Page</u>
<u>CHAPTER IV</u>	
IV-1	Keahole Point Deepwater Wave Hindcast Data IV-12
IV-2	Summary of Waverider Data in 130-Foot Deep Water Off Keahole Point IV-13
IV-3	Water Quality Results for Nine Sampling Stations Within and Outside Pauoa Bay, South Kohala. IV-18
IV-4	Substrate Cover and Coral Species Within and Outside Pauoa Bay IV-21
IV-4a	Plant Species Checklist - Mauna Lani IV-32
IV-4b	Relative Abundance and Habitat Preference of Exotic (Introduced) Birds IV-36
IV-5	Total Population and Demographic Breakdowns: County of Hawaii, and Primary and Secondary Study Areas, 1970 & 1980 . IV-47
IV-6	Family Characteristics and Income Level: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980 IV-48
IV-7	Labor Force Size and Characteristics: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980 IV-49
IV-8	Housing Stock and Characteristics: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980 IV-50
IV-9	Assumptions About Total Resort Development, West Hawaii 1988 - 1998. IV-58
IV-10	Assumptions About Resort Unit Use, Occupancy, Party Size, and Employment Multipliers IV-59
IV-11	Example of Procedures for Calculating On-Site Population . . IV-60
IV-12	Projected On-Site Population, Ritz-Carlton and West Hawaii 1988 - 1998. IV-61
IV-13	Example of Procedures for Calculating Total Construction Employment IV-63
IV-14	Average Daily Resort Construction Employment 1988 - 1998 . . IV-64
IV-15	Initial Ritz-Carlton Staffing Plan, by Department. IV-67

LIST OF TABLES
(continued)

	<u>Page</u>
IV-16 Wage/Income Distribution for Mauna Lani Bay Hotel Employees, 1986	IV-68
IV-17 Example of Procedures for Calculating Total Operational Employment	IV-70
IV-18 New Resort Operational Employment - 1988 to 1998	IV-71
IV-19 Estimated New Jobs from Study Area Economic Activities Other Than New Resorts	IV-73
IV-20 Labor Supply/Demand Analysis, Study Area 1988 - 1998	IV-75
IV-21 Distribution of New Study Area Jobs and Workers.	IV-76
IV-22 Total Off-Site Population Impacts.	IV-81
IV-23 Total Off-Site Housing Impacts	IV-85
IV-24 Estimated Housing Demand by On-Site Ritz-Carlton Workers	IV-88
IV-25 Maximum Housing Purchase Price	IV-90
IV-26 Current Housing Location of Luxury Kohala Resort Employees	IV-91
IV-27 Major Proposed Projects in West Hawaii	IV-94
IV-28 Average Statewide and Hawaii County Employment and Annual Wages for Industries Associated with Resorts and Plantation Agriculture, 1985.	IV-96
IV-29 Hawaii Hotel Worker Attitudes Toward Their Jobs.	IV-101
IV-30 Statewide and West Hawaii Child Abuse/Neglect Data, 1980 - 1985.	IV-108
IV-31 Labor Supply Mitigation Measures Related to Potential Sources	IV-113
IV-32 Revenue-Cost Analysis Summary (in 1987 dollars).	IV-12
IV-33 Roadway Level of Service	IV-130



CHAPTER I

CHAPTER I

INTRODUCTION AND SUMMARY

1.0 PURPOSE OF THIS DOCUMENT

This environmental impact statement has been prepared to accompany a Shoreline Setback Variance application and an amended Special Management Area permit application submitted by The Ritz-Carlton Hotel Company to the Hawaii County Planning Department. It is also being prepared to accompany a Conservation District Use Application (CDUA) submitted by The Ritz-Carlton Hotel Company to the State of Hawaii Board of Land and Natural Resources due to the proposed use of state-owned lands and activities nearshore and shoreline areas that lie within the Conservation District. The environmental impact statement is being prepared in compliance with the requirements of Chapter 343, Hawaii Revised Statutes and the regulation adopted pursuant thereto.

2.0 PROPOSED GOVERNMENTAL ACTION

The Ritz-Carlton Hotel Company is requesting that approval be granted for the above three applications to allow it to construct a 450-unit hotel with amenities, including shoreline improvements which would necessitate work in the 40-foot shoreline setback area.

3.0 PROJECT DESCRIPTION

The Ritz-Carlton Hotel Company proposes to construct a 450-unit luxury hotel on a 32-acre site at Pauoa Bay at Mauna Lani Resort. The concept plan focuses on two wings of guest rooms connected to the main lobby in the entrance building. The buildings will be six stories high and enclose a landscaped courtyard and swimming pool; structures will be of classical Hawaiian architectural design, reminiscent of buildings constructed in Hawaii during the early part of the century. As market demand dictates, up to 200 additional units will be added in low-rise clusters around a proposed water feature at the north of the hotel site.

Three projects are proposed for the shoreline and nearshore areas: (1) excavation of a seawater swimming lagoon; (2) restoration of the existing anchialine pond (Keanapou Fishpond); and (3) expansion of the existing shoreline beach.

Construction of the 450-unit hotel and associated facilities, grounds, and shoreline improvements are expected to begin in late 1987 and be complete by late 1989 or the beginning of 1990. The additional 200 units will be built according to market demand, to be completed by 1998. A preliminary estimate of construction cost for the 450 units and associated amenities is \$67,000,000. There is no budget for the 200 additional units, but an order-of-magnitude construction cost is about \$20,000,000 in 1987 dollars.

4.0 NEED FOR THE PROJECT

The Ritz-Carlton Hotel Company's objective is to construct a world-class hotel in Hawaii which would maintain the high standards established by Mauna Lani Resort and those which characterize other Ritz-Carlton hotels. Given that successful luxury resort hotels in Hawaii have all been ocean-oriented developments with shoreline amenities, The Ritz-Carlton Hotel Company feels that it is absolutely essential to have shoreline amenities for its guests in order to compete with similar resort hotels in Hawaii. These amenities include cleanup of the beach area, an expanded shoreline beach, and a new safe swimming lagoon.

The shoreline fronting the hotel site, although attractive in its natural form, does not provide safe access to swimming areas and does not have the type of sand beach suitable for sunning. Development of the hotel with shoreline improvements is necessary for the economic viability of the Ritz-Carlton Mauna Lani in the luxury hotel category.

5.0 SUMMARY OF IMPACTS

5.1 PHYSICAL ENVIRONMENT

The project site has low value as agricultural land and thus the project site will not be lost to potential agricultural development. Construction of the Ritz-Carlton Mauna Lani will actually increase demand for locally grown agricultural products.

The project site will be transformed by grading, the importation of soil and landscaping.

5.2 NEARSHORE AND MARINE ENVIRONMENT

Construction of the three shoreline projects and excavation and embankment work required for the hotel and landscaping on the balance of the hotel site will affect ocean and anchialine pond water. The primary effect of construction on ocean water quality is a temporary increase in turbidity. The effects of temporary loading of suspended and bedload sediment on the marine biological community are not expected to be significant because the community is already chronically subjected to high turbidity events. Construction activity will occur during a relatively short period of time and is expected to have some impact on marine organisms in general, but minor impact on endangered species (humpback whales and green sea turtles). Pumping of accumulated sediment from the fishpond will be accompanied by the release of gases and a high level of turbidity in the pond. Less mobile fauna will be sucked up by the dredge pump in the process.

Permanent impacts on the nearshore and marine environment include alteration of the shoreline, changes to the anchialine pond environment and increased recreational use of the bay. For the proposed swimming lagoon and beach expansion, material will be removed, sand will be brought in, new beach front will be added, and a safe swimming area will be created. The shoreline area will be upgraded through cleanup and expansion of its use.

5.3 HISTORIC AND ARCHAEOLOGICAL RESOURCES

Historic preservation reviews with the State Historic Preservation Office, Department of Land and Natural Resources, are ongoing. One site, E1-305, has been assessed by the Office as being "no longer significant". Sites E1-304, E2-32 and E2-33 are deemed to be significant solely for their information content. There is a "no adverse effect" (or "beneficial effect") determination for Keanapou fishpond, contingent on proper restoration. The State Historic Preservation Office's proposed mitigation plan, as approved by the Hawaii County Planning Department, will be implemented by the applicant.

5.4 SOCIOECONOMIC CONSIDERATIONS

The average daily visitor census at the 450-unit hotel is expected to be about 600 guests; with the additional units, it is expected to be about 865 guests.

Both construction period and operational period employment will be generated as a result of hotel development. There would be an average of 240 on-site workers during construction of the 450-unit hotel and 80 on-site workers during construction of the additional 200 units. There would also be indirect and induced employment generated off-site. Initial staffing of the hotel calls for about 630 full-time jobs plus 66 part-time or casual jobs. Because of the need for immigrants to fill some of the positions, population on-island will increase (employees and their families). Workers new to the island would need housing; because of their household income, some would require assisted housing.

The revenue-cost ratio is favorable: \$3.20 of revenue for every \$1.00 of cost to the State and County of Hawaii.

5.5 TRANSPORTATION FACILITIES

The roadway system will be impacted by the hotel development. There will be increased traffic due to vehicular trips by visitors and residents (employees and their families). The effect due to hotel construction and operation is expected to be minor; however, the cumulative effect of resort and residential development in the West Hawaii region is expected to be significant.

5.6 AIR QUALITY AND NOISE

The greatest impact on air quality will be from increased traffic, both during the construction and operational phases of development. Due to the small scale of the Ritz-Carlton Mauna Lani project, increased air pollution due to the project is not expected to be substantial. Noise impacts are likewise to be temporary or minimal.

5.7 PUBLIC SERVICES AND FACILITIES

Development of the hotel project will increase the demand for public services and facilities, mostly by new residents to the region. It is expected that most of this demand can be met within planned facilities.

5.8 VISUAL CHARACTER

The visual character of the project site will be transformed from a sparsely vegetated lava field to a developed landscaped area with six-story structures. Views of the site from public places will change. From Queen Kaahumanu Highway, the hotel will be over a mile and a half away. From the shoreline, the hotel will be visible, but framed against the gently sloping land behind it.

6.0 SUMMARY OF PROPOSED MITIGATION MEASURES

Mitigation measures to reduce potential significant environmental effects to insignificant levels will be taken both in the short-term during construction and in the long-term during operation of the hotel. The most important of these measures are summarized below.

- o A mitigation plan proposed by the State Department of Land and Natural Resources will be implemented if significant sites are to be impacted. This plan and significance assessments need approval of the Hawaii County Planning Department or County Planning Commission.
- o Offshore waters will be monitored for any potential adverse impacts due to construction of shoreline improvements. Precautions will be taken during construction to minimize impact on the marine environment, including endangered species. If required, silt screens will be used to contain excavation materials and particulates. If used, blasting will be done in a way to minimize impacts on the marine environment.
- o The applicant will implement an appropriate monitoring program for offshore waters after construction as well as during construction, according to government permit conditions.
- o Mauna Lani Resort, Inc. is working with governmental agencies on a housing plan to provide employee housing for those Ritz-Carlton Mauna Lani operational period employees in need of assistance.

7.0 SUMMARY OF ALTERNATIVES

In addition to the proposed alternative, several other alternatives were considered but rejected as not meeting the objectives of the action: to construct a world-class hotel in Hawaii with amenities essential to its success:

- o No development at the project site, which would not allow the Mauna Lani Resort master plan to be implemented.
- o Other use of the hotel site for higher density resort use or for use by facilities other than a hotel.
- o Development of the hotel without shoreline improvements.
- o Development of the site as proposed plus partially filling in the fishpond.
- o Alternative lagoon design with two narrow openings.
- o Location of the swimming lagoon elsewhere at Pauoa Bay.

8.0 SUMMARY OF UNRESOLVED ISSUES

- o Impact of shoreline modifications on Pauoa Bay waters.
- o Impact of shoreline modifications on marine species, including endangered species.
- o Parameters of a shoreline area monitoring program.
- o Availability of adequate employee housing.
- o Location of off-site population growth and facilities.
- o Transportation improvements required.
- o Traffic study assumptions.

9.0 SUMMARY OF COMPATIBILITY OF LAND USE POLICIES AND PLANS

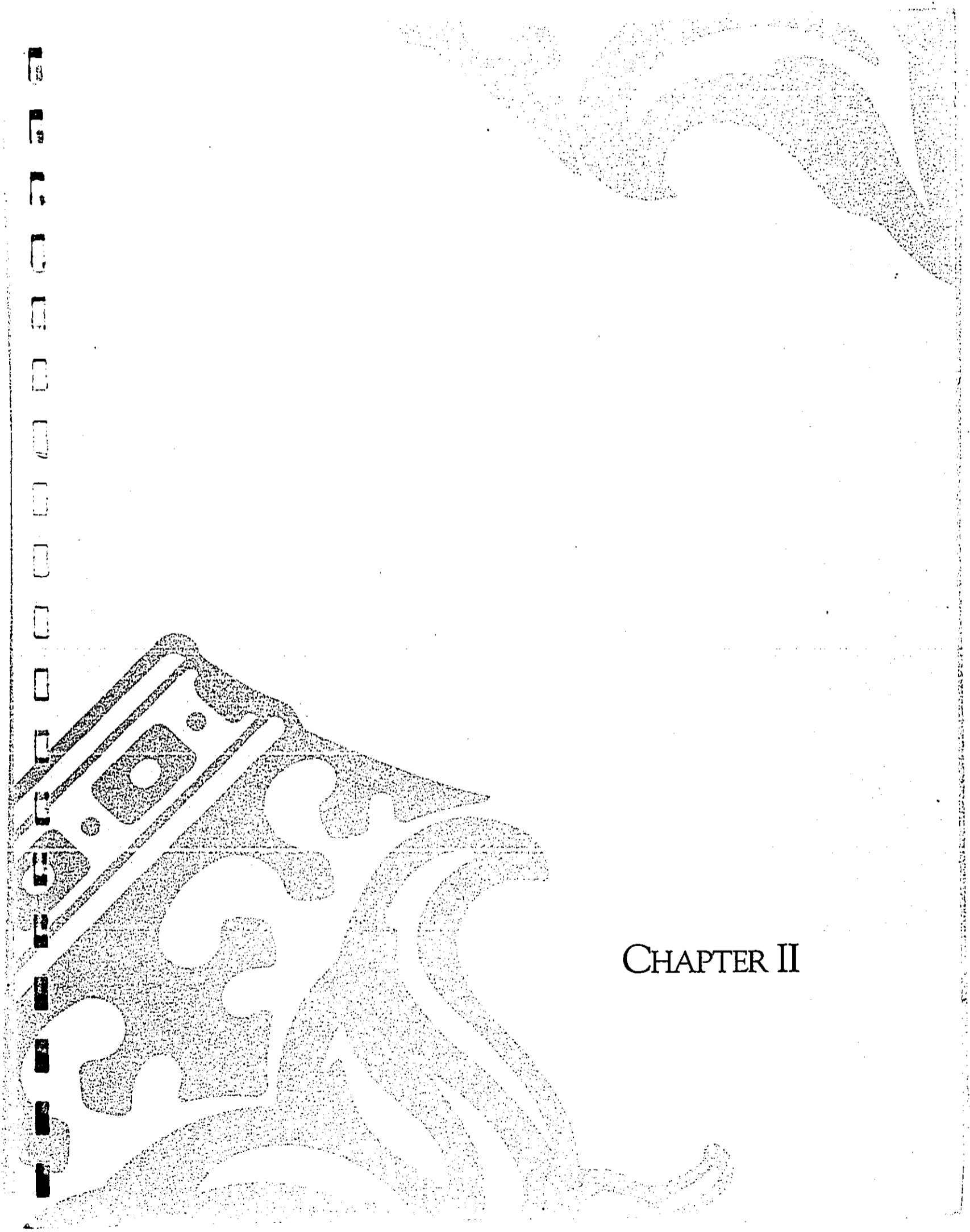
The project is basically consistent with State and County land use plans and policies.

10.0 NECESSARY APPROVALS AND PERMITS

Several approvals and permits are required for the project to proceed. These include plan approval; subdivision approval; building permit; grubbing, grading, excavation, and stockpiling permit; outdoor lighting permit; sign permit; and water system approval; all from agencies of the County of Hawaii. Also needed is drinking water system approval from the State Department of Health.

The major approvals needed are listed below:

<u>Approval Needed</u>	<u>Approving Agency or Body</u>
<u>HAWAII COUNTY</u>	
Change of Zone	County Council
Shoreline Setback Variance	Planning Commission
Amended SMA	Planning Commission
Amended PUD	Planning Department
<u>STATE</u>	
Conservation District Use Permit	Dept. of Land & Natural Resources
Section 401 Permit	Department of Health
CZM Certification	Department of Planning and Economic Development
Construction Right-of-Entry	Board of Land & Natural Resources
<u>FEDERAL GOVERNMENT</u>	
Corps of Engineers Section 10 Permit	U.S. Army Corps of Engineers
Corps of Engineers 404 Permit	U.S. Army Corps of Engineers



CHAPTER II

CHAPTER II

DESCRIPTION OF THE PROPOSED PROJECT

1.0 REGIONAL SETTING

The 32-acre site (identified by Tax Map Key as TMK 6-8-22:08, pors. 07, 09, 10 and 11) of the proposed Ritz-Carlton Mauna Lani fronts the shoreline at Pauoa Bay and is located at the northwestern corner of the Mauna Lani Resort. The existing Mauna Lani Bay Hotel is situated approximately 2,400 feet south of the project site. In general, the 1,432-acre master planned Mauna Lani Resort is located between the Puako Beach Lots and the Waikoloa Beach Resort on the South Kohala coast of the Island of Hawaii (see Figure II-1). South of the Waikoloa Beach Resort, the coastline remains mostly undeveloped for many miles; Hapuna Beach State Park and Mauna Kea Beach Resort are to the north of the Puako Beach Lots. Kawaihae Harbor, West Hawaii's major port facility, is six miles north of Mauna Lani Resort. Waimea, the Kohala district commercial center, is approximately 12 miles to the northeast.

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

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

Mauna Kea Beach Resort was the first of the three major resort projects to establish its presence in South Kohala. The world famous Westin Mauna Kea (formerly the Mauna Kea Beach Hotel) and golf course were constructed in the mid-1960's, and 65 single-family houselots (The Fairways North and South) and 40 condominium units (the Villas) have subsequently been developed. As is Mauna Lani Resort, Mauna Kea Beach Resort is designated as a major resort in the County General Plan. The owner of Mauna Kea Resort, UAL, Inc., is currently seeking final County approvals to develop a separate resort, to be called South Kohala Resort, on its State urban designated lands south and mauka of the existing Mauna Kea Resort. South Kohala Resort will include a 350-room hotel and 700 to 1,000 single-family and multifamily resort-residential units on both sides of Queen Ka'ahumanu Highway.

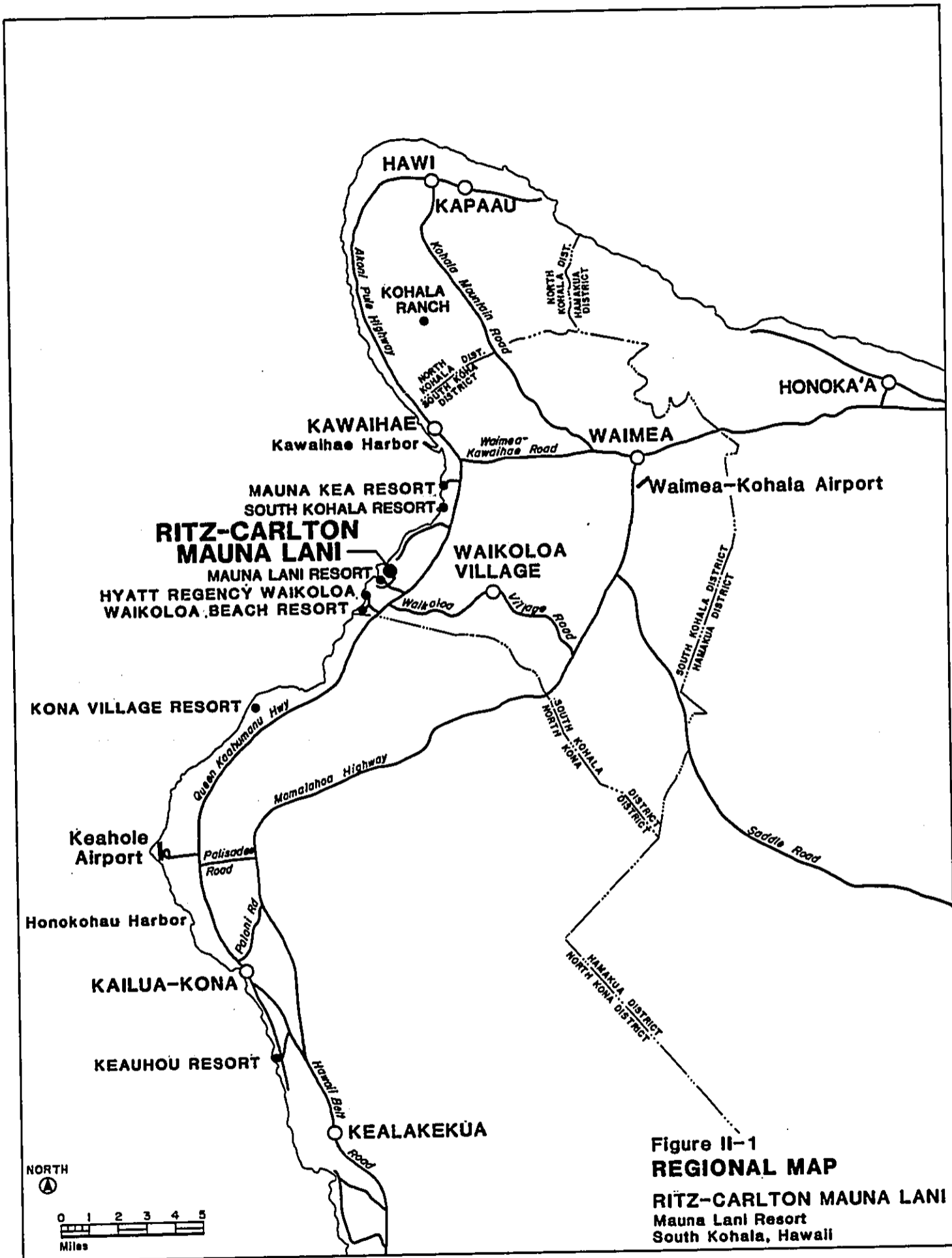


Figure II-1
REGIONAL MAP
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

The third major resort in the Kohala Coast Resort Region, the Waikoloa Beach Resort, is being developed by Transcontinental Development Co., which has been responsible for construction of the resort's infrastructure and provision of common recreational facilities such as the resort golf course. Individual hotel and resort condominium projects are developed on parcels within the resort by separate business entities. The resort includes the 543-room Sheraton Royal Waikoloa hotel and the 114-unit "Shores at Waikoloa" resort condominium project. Under construction is the 1,250-room Hyatt Regency Waikoloa Hotel at Waiulua Bay, which is slated to open by the end of 1988.

2.0 HISTORY OF MAUNA LANI RESORT

Mauna Lani Resort, Inc. views the development of Mauna Lani Resort as a long-term commitment to create a preeminent world-renowned, luxury destination resort at Kalahuipua'a. Envisioned is a very low density, low profile development which incorporates hotel, residential, recreational and support facilities into an integrated high-quality resort community. Mauna Lani Resort, Inc. is carrying forward and refining the original version of a master planned luxury resort residential community first conceived by Francis I'i Brown in the late 1960's.

In 1972, Orchid Island Resorts (the predecessor of Mauna Loa Land, Inc., in turn the predecessor of Mauna Lani Resort, Inc.) acquired fee title to 3,200 acres of land along the South Kohala coast, 175 acres from Francis I'i Brown and the balance of 3,025 acres from Signal Properties (former Parker Ranch land). Also in 1972, Orchid Island Resorts assumed the lease of 775 adjacent acres of State-owned land from Signal Properties.

When the resort property was acquired by Orchid Island Resorts, only 164.5 acres of land immediately surrounding the Kalahuipua'a fishponds were in the State Urban District. In December 1974, the State Land Use Commission reclassified 614 acres slated for resort use to the Urban District. More recently, in 1986, the Commission reclassified an additional 654 acres from Agriculture and Conservation to Urban, which allows Mauna Lani Resort to move forward with development according to its revised master plan (see Figure II-2). A request for rezoning to accommodate the revised master plan is currently being processed by the Hawaii County Planning Department.

Completed to date are the 351-room Mauna Lani Bay Hotel, the 80-unit Mauna Lani Terrace condominium project, and 116 Mauna Lani Point condominium apartment units. Also part of the existing resort are the award winning Francis I'i Brown championship golf course, golf clubhouse, beach club, racquet club, and other recreational amenities. Various archaeological features and refurbished Hawaiian fishponds are integrated into the overall design of the resort.

Near future plans for development at Mauna Lani Resort include the construction of the Ritz-Carlton Mauna Lani hotel and shoreline improvements at Pauoa Bay, a second golf course, and a public shoreline park north of Pauoa Bay; as well as the construction of the next increment of residential units or lots.

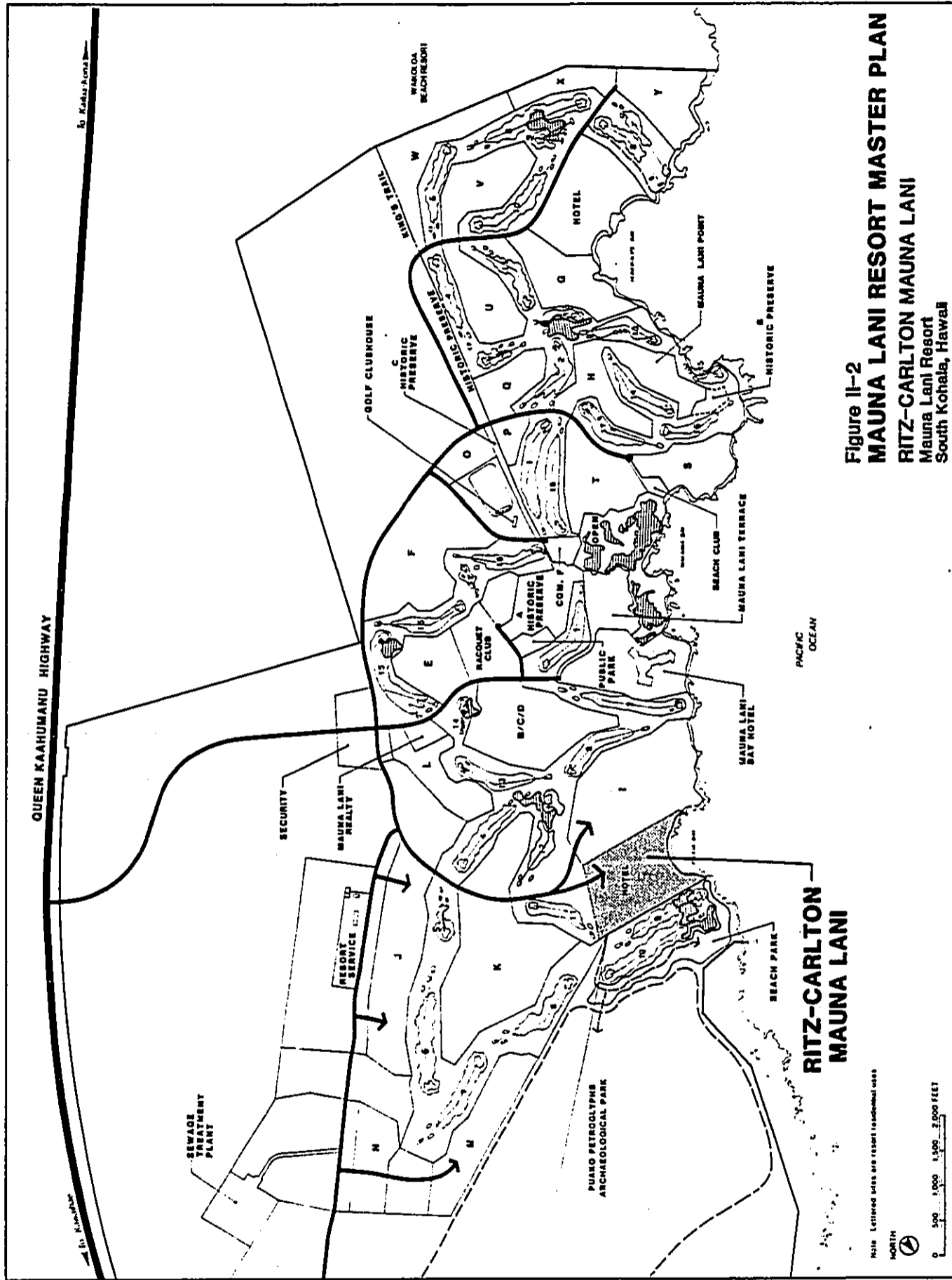


Figure II-2
MAUNA LANI RESORT MASTER PLAN
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

North
 Note: Lettered areas are resort land/development uses
 0 500 1000 1500 2000 FEET

3.0 DEVELOPMENT CONCEPT

3.1 STATEMENT OF OBJECTIVE

The Ritz-Carlton Hotel company proposes to develop a luxury-class hotel at Pauoa Bay which would be an integral part of Mauna Lani Resort as well as an integral part of the Ritz-Carlton family of hotels. The Ritz-Carlton Hotel Company is recognized in the travel and hotel industry as the successful operator of the finest hotels in each of its chosen localities. Ritz-Carlton Mauna Lani will serve the luxury resort market and reflect the relaxed, comfortable ambience characteristic of Ritz-Carlton hotels, be they urban or resort facilities.

3.2 DESCRIPTION OF PROPOSED DEVELOPMENT

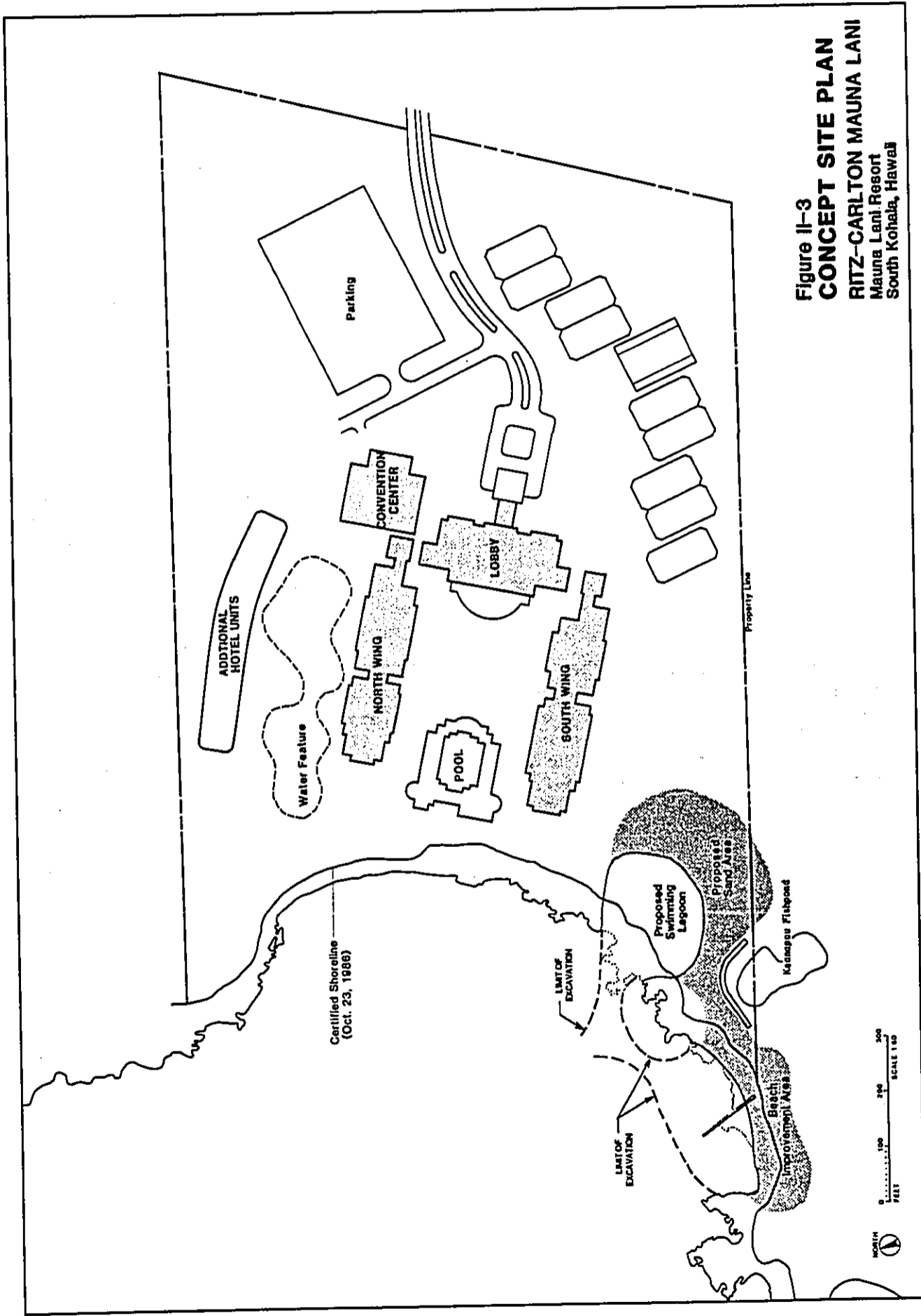
3.2.1 Hotel Concept Plan

The Ritz-Carlton Mauna Lani concept plan focuses on two wings of guest rooms, each perpendicular to the shoreline and connected to the main lobby in the entrance building which will be fronted by a porte cochere. The hotel wings will be six stories and enclose a landscaped courtyard and swimming pool area. Parking will be landscaped and located near the hotel entrance. Amenities at the hotel will include retail shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, a landscape water feature, and a swimming lagoon and swimming area (see Figures II-3 to II-7).

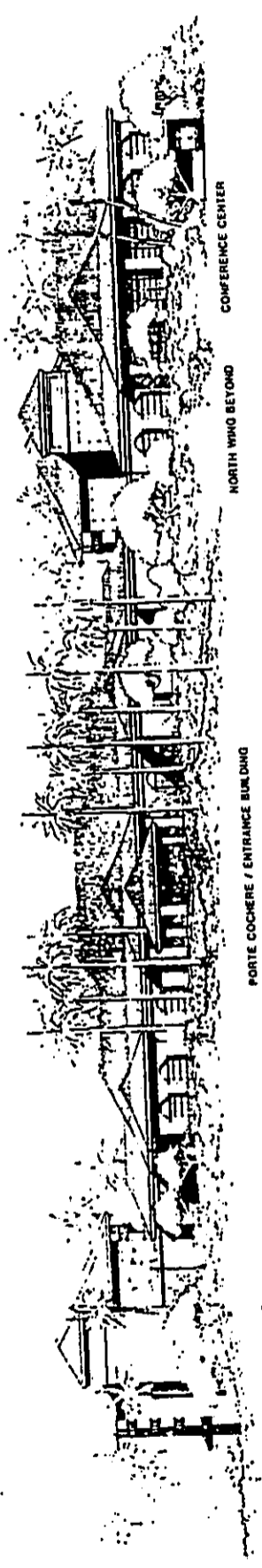
The buildings will be of classical Hawaiian architectural design, reminiscent of buildings constructed during the early part of the century, such as the Honolulu Academy of Arts, the Alexander & Baldwin building, and the Dillingham Transportation building. These buildings successfully integrate both Oriental and European elements into an overall design particularly suited to the Hawaii environment. The proposed Ritz-Carlton Mauna Lani will also reflect this unique blend of design elements in a classical Hawaiian design with strong visual appeal.

Initially, 450 units will be constructed in the two wings of the hotel. As market demand dictates, 200 additional units will be built in low rise clusters around the landscape water feature. Facilities such as restaurants and shops to serve the guests in the additional units will be located in the main hotel buildings. It is anticipated that the additional units will be built 5 to 8 years after completion of the initial construction.

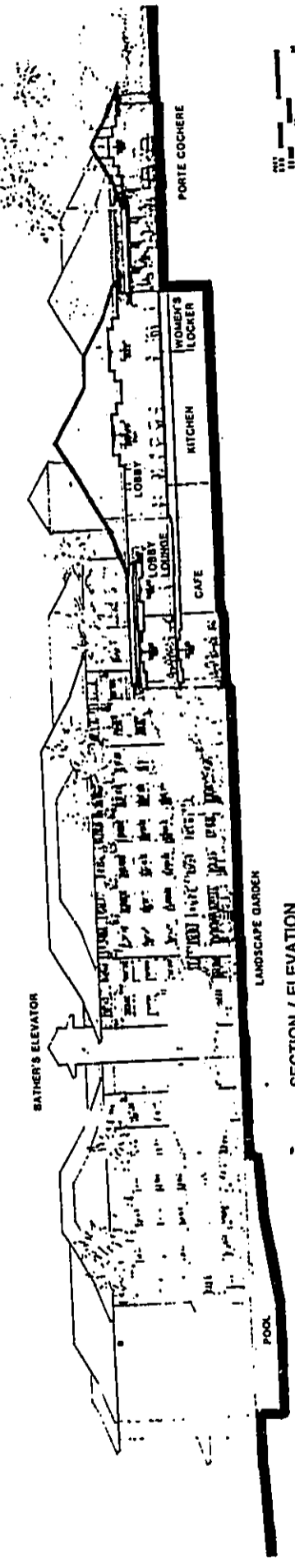
Successful luxury resort hotels in Hawaii are almost without exception water-oriented, that is to say they are built near the shoreline and most often sandy beach areas. The Ritz-Carlton Mauna Lani site presents a natural setting particularly well suited to resort development. Although the shoreline is rocky, it is visually spectacular and portions can be improved to provide the water amenities necessary for a successful Hawaii development aimed toward the first class to luxury market. To enhance the natural environment and to provide beach recreational areas, Ritz-Carlton proposes to excavate a seawater swimming lagoon, restore an adjacent anchialine pond (a historic fishpond as assessed by the State Department of Land and Natural Resources), and expand and improve an existing shoreline beach. The



CONFERENCE CENTER
NORTH WIND BEYOND
PORTE COCHERE / ENTRANCE BUILDING
SOUTH WIND

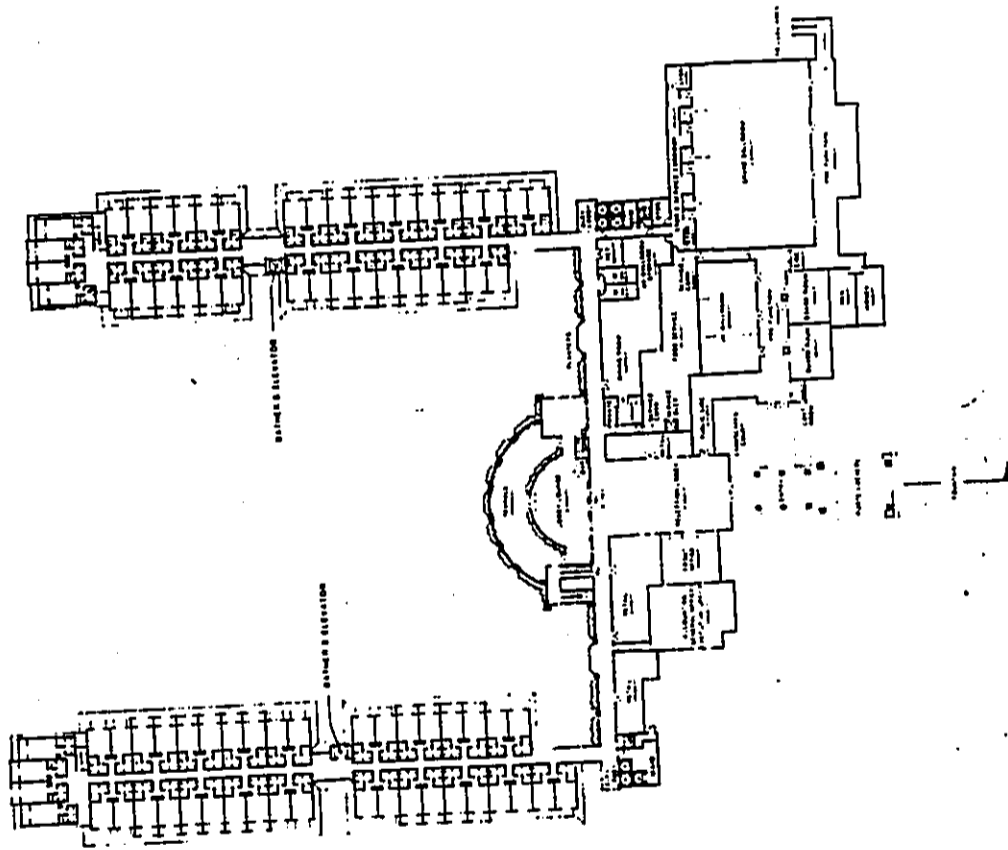


ENTRY ELEVATION



EXTERIOR ELEVATIONS

Figure II-4
CONCEPT EXTERIOR ELEVATIONS
RITZ-CARLTON MAUNA LANI
Mauna Lani Resort
South Kohala, Hawaii



LOBBY LEVEL PLAN

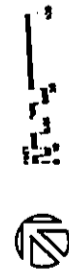
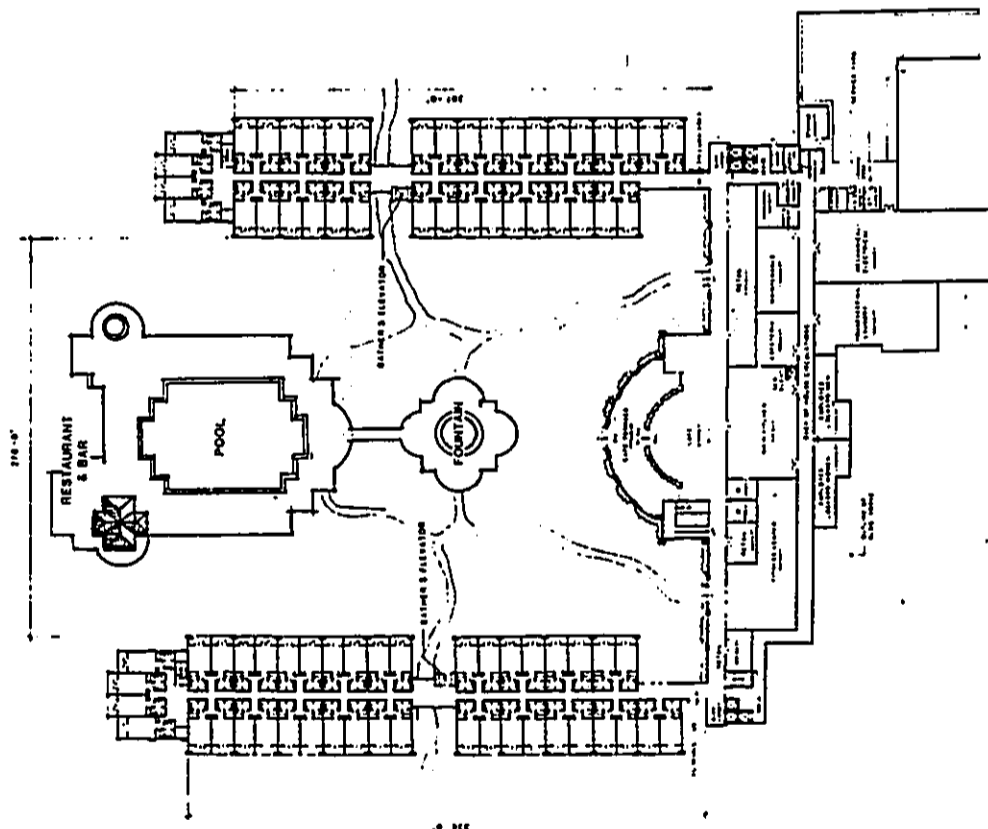


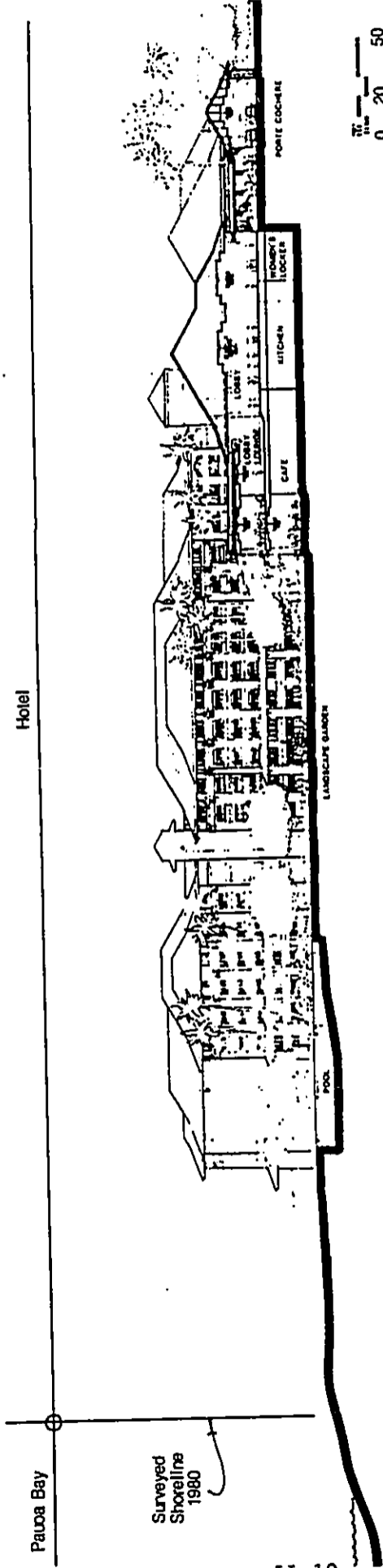
Figure II-5
CONCEPT LOBBY LEVEL PLAN

RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii



LOWER LEVEL PLAN

Figure II-6
CONCEPT LOWER LEVEL PLAN
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

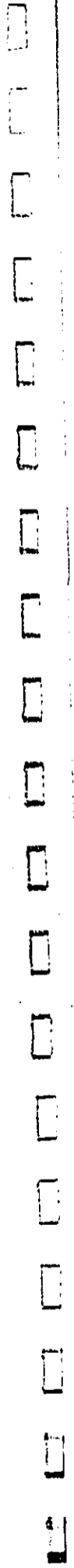


II-10

SECTION/ELEVATION

Figure II-7
CONCEPT SECTION/ELEVATION

RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii



anchialine pond and beach improvement area are partially off the Ritz-Carlton Mauna Lani site and on land owned by Mauna Lani Resort. The shoreline and nearshore improvements are described in detail in Section 3.2.2 of this chapter.

Vehicular access to the Ritz-Carlton Mauna Lani site will be from a landscaped entry drive which will turn off from the main resort road from Queen Kaahumanu Highway, Mauna Lani Drive.

Public access exists along the shoreline of the project site by way of an unimproved pedestrian pathway which extends along the entire Mauna Lani Resort shoreline from Honokaope Bay to north of Pauoa Bay. The shoreline path at the Ritz-Carlton Mauna Lani site will be improved to enhance traversibility and will be rerouted around the swimming lagoon. Since it is the applicant's intent to keep the pedestrian shoreline trail as natural looking as possible, improvements will involve mostly cleaning and raking. Public parking will be available at the public shoreline park to be developed by Mauna Lani Resort on a parcel adjacent to the Ritz-Carlton Mauna Lani site. The park parcel will also include holes 9 and 10 of the new resort golf course (see Figure II-8). Park facilities will include a comfort station and showers, picnic facilities, and parking for 29 vehicles (12 stalls to be built initially). In addition to providing a link to the shoreline trail which passes through the Ritz-Carlton Mauna Lani site, the public park and parking will also improve access to the Puako petroglyph fields, north of the park.

3.2.2 Shoreline and Nearshore Improvements

Three projects are proposed for the shoreline and nearshore area: (1) excavation of a seawater swimming lagoon; (2) restoration of the existing anchialine pond; and (3) expansion of the existing shoreline beach. Although described separately below, these projects are contiguous and have been designed as an integrated improvement for the southwest corner of the site.

3.2.2.1 Seawater Swimming Lagoon

The seawater swimming lagoon would be excavated into the land area behind the existing beach to form an arcuate-shaped embayment of suitable depth for swimming. Its dimensions and design features are shown on Figures II-9 and II-10 and include:

- o a 360-foot long crescent beach with 1.1 acres of sand above mean sea level;
- o a relatively flat (9:1) beach slope from the bottom of the lagoon at -6.0 feet (msl) to the top of the beach slope at 6.0 feet;
- o a 0.8 acre inland swimming area with a flat, sand bottom at -6.0 feet;
- o a 110-foot wide opening to Pauoa Bay through the existing shoreline;
- o a 50-foot wide flushing channel excavated toward the center of Pauoa Bay to a depth of -6.0 feet;
- o and basalt armor stone installed on both sides of the lagoon opening to ensure stability of the existing shoreline.

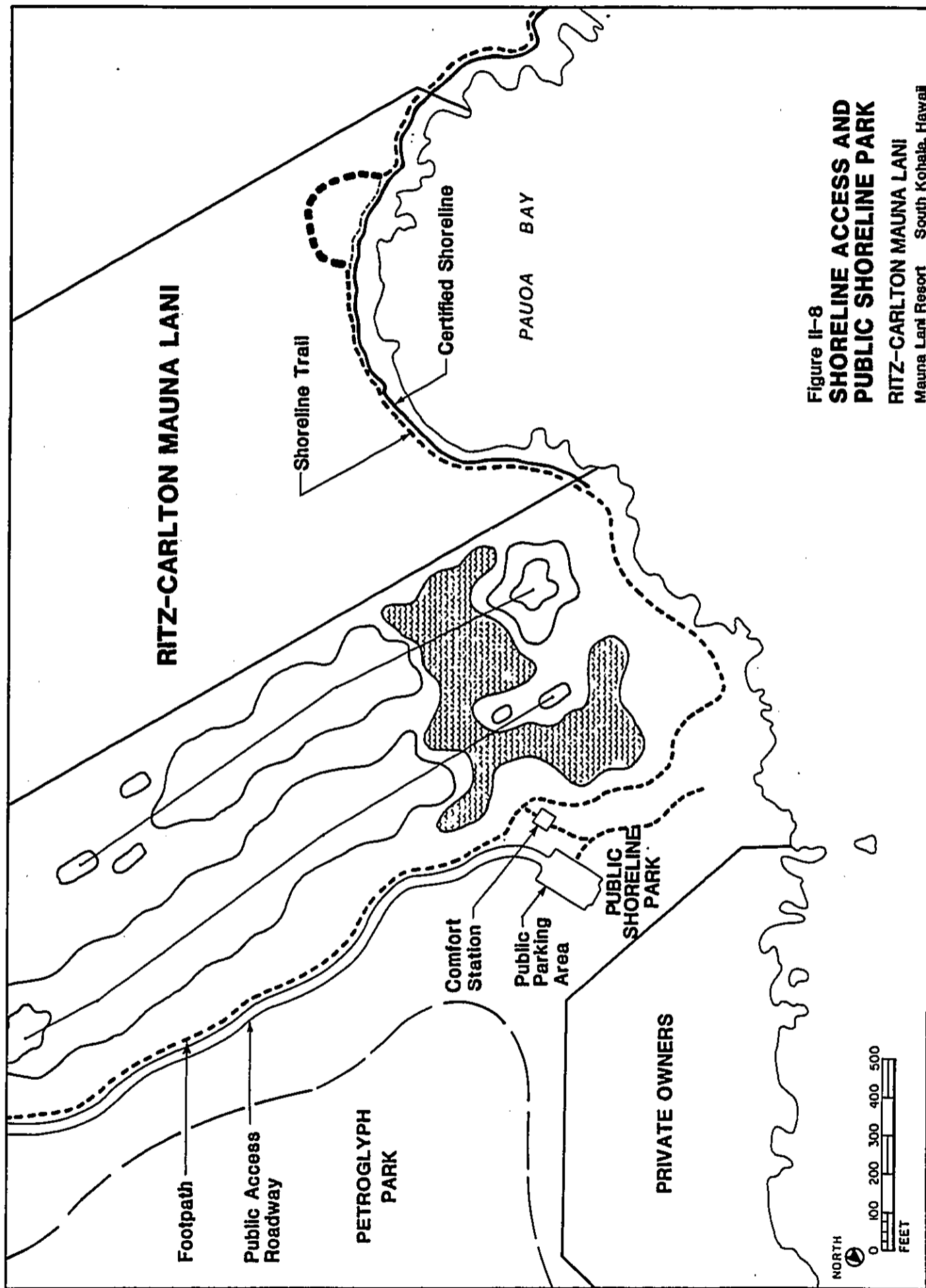


Figure II-8
**SHORELINE ACCESS AND
 PUBLIC SHORELINE PARK**
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort South Kohala, Hawaii

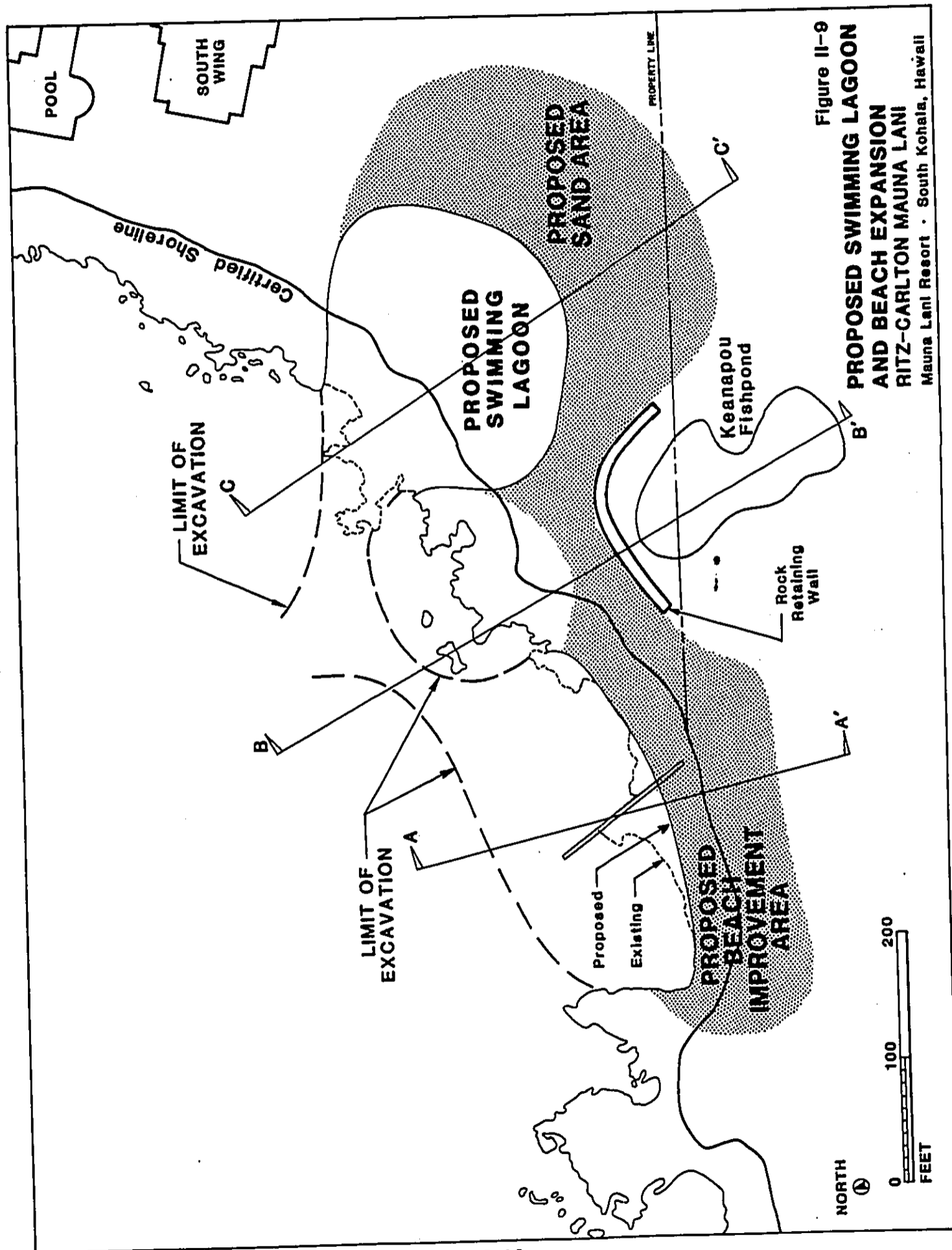


Figure II-9
**PROPOSED SWIMMING LAGOON
 AND BEACH EXPANSION**
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort · South Kohala, Hawaii

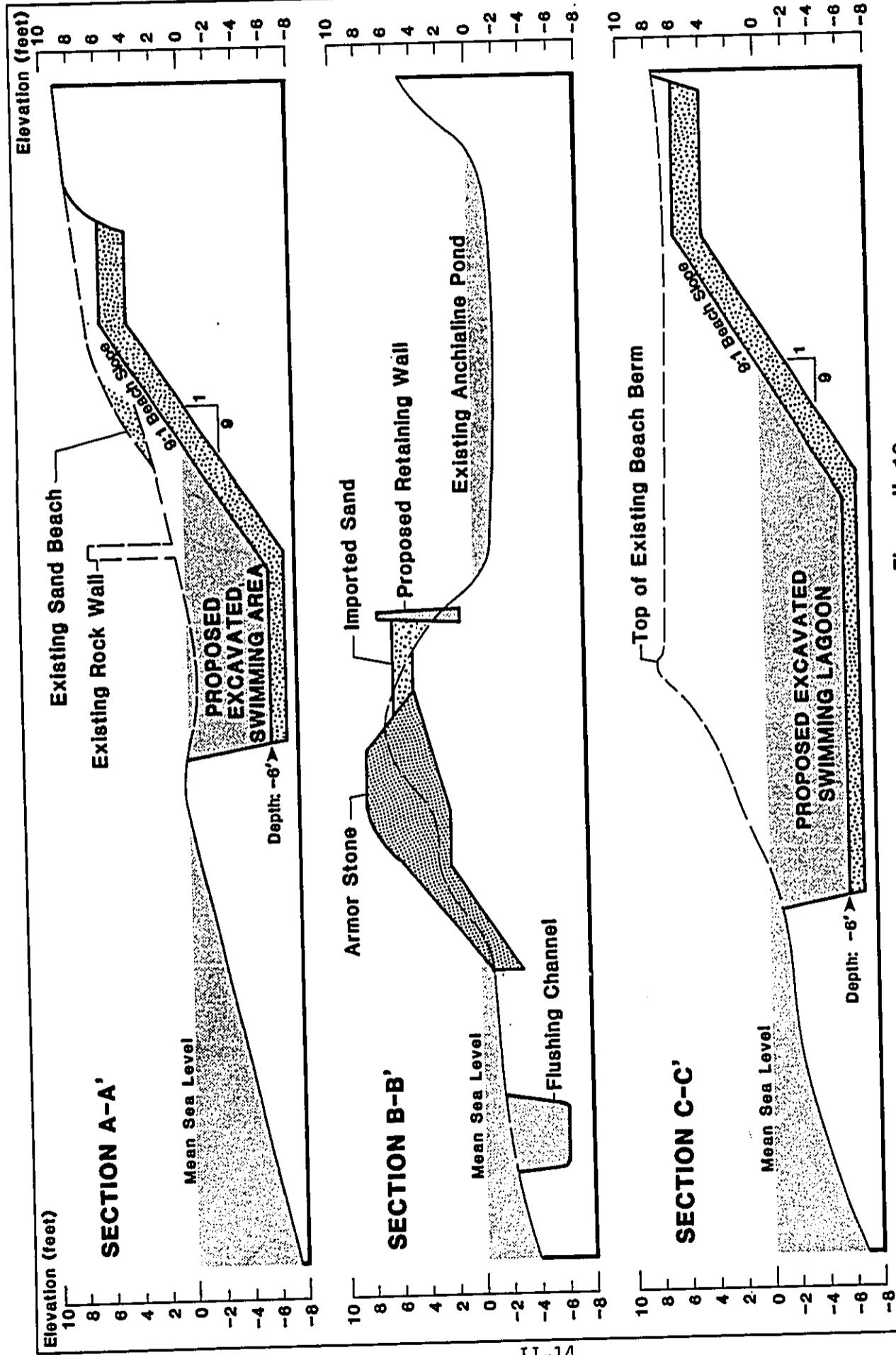


Figure II-10
SECTIONS OF THE PROPOSED SWIMMING LAGOON AND SHORELINE BEACH
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort • South Kohala, Hawaii

Vertical Scale 1"=10'
 Horizontal Scale 1"=60'
 Vertical Exaggeration 1:6

The size of the opening and configuration of the lagoon have been designed to allow sufficient penetration of wave energy to maintain the beach slope, enhance circulation, and remove suspended fines from the lagoon. The flushing channel is an important part of this design. It will also allow access for swimmers to deeper water in the bay.

Total excavation will amount to approximately 18,000 cubic yards. Only 1,600 cubic yards of this will be seaward of the certified shoreline. (For the purposes of this report, the area seaward of the certified shoreline is considered to be State owned land and the area inland to be privately owned land.) Also, 5,000 cubic yards of imported, calcareous beach sand will be required, 300 cubic yards to be placed seaward of the shoreline and the balance inland. The armor stone for the lagoon entrance is likely to be obtained from the material excavated from the lagoon. However, there are other sources of rock within the Mauna Lani Resort property. Construction is likely to proceed as follows:

- o excavation of the inland lagoon, leaving the existing shoreline intact as a barrier to prevent loose material from escaping into the bay;
- o pumping of all settled fines from the excavated area into a temporary settling basin on the Ritz-Carlton site, away from archaeological sites, in preparation for its ultimate land disposal;
- o removal of the natural shoreline berm and excavation of the flushing channel;
- o construction of the rubble masonry wall around the perimeter of the anchialine pond;
- o and placement of the imported clean beach sand on the bottom of the lagoon and on its beach.

Based on experience gained during construction of the Mauna Lani Bay Hotel and beach at Makaiwa Bay, it is expected that most of the excavation can be accomplished by bulldozers equipped with rippers. Some blasting is likely to be required, however. As this is a more expensive construction method, its use would be dictated by necessity. If needed, small 10 to 15-pound explosive charges will be used as a last resort to fracture hard spots which resist breakage by hydraulic ram. Hydraulic shovels would then be used to continue ripping and grading.

The source of sand for the lagoon's beach has not been chosen yet. Specifications will require clean, calcareous, medium to coarse grained sand which is free of fines, organic, and terrigenous material. It is likely that the sand will come from off-island, perhaps Mokuleia on Oahu or from Molokai, although unlikely from Moomomi on Molokai. In the final analysis, economics including the cost of permitting will dictate the source of sand.

3.2.2.2 Anchialine Pond Restoration

Work to restore the anchialine pond (the Keanapou fishpond) would consist of removing the surrounding, thick growth hau trees, sedges, and

coconut trees and pumping out the accumulated sediment in the pond itself. Other tasks related to historic site restoration and preservation are described in Section 1.7.3 of Chapter IV. The pond is actually a series of depressions in a large, elliptical shaped depression which is approximately 200 by 100 feet. Due to the present accumulation of sediment, only a small part of the pond currently has free standing water.

Excavation of the adjacent swimming lagoon will bring the seawater shoreline closer to the pond. The present shoreline is approximately 100 feet from the seaward edge of the pond. The swimming lagoon shoreline would be 45 feet from the edge of the pond. A possible result is an increase of salinity in the pond. The salinity is currently quite low, varying from 2.0 to 4.0 parts per thousand (ppt) seasonally. If it increases above 10 ppt as a result of the lagoon excavation, curtain grouting would be undertaken to reduce the extent of salinity intrusion. Closely spaced holes would be drilled along a line midway between the lagoon and pond and cement grout would then be pumped into these holes (see Figure II-11). Work would proceed in a controlled manner so that the effects can be monitored. The objective would be to achieve a pond salinity of below 10 ppt.

3.2.2.3 Expansion of the Shoreline Beach and Creation of a Swimming Area

The existing beach is limited in size, is bisected by a lava outcrop and grouted rock wall, and is fronted by a shallow, rocky bottom. To improve its appearance and recreational potential, work would include removal of the rock wall and the outcrop on which it is built, excavation of a swimming area and flushing channel in front of the beach, and importation of sand to cover the bottom of the swimming area and the backshore area behind the beach.

The beach improvement is designed to take advantage of the lava outcrops on and offshore which provide protection against waves and wave-driven currents, thereby creating the conditions necessary for beach stability. The swimming area would be deeper than the immediately adjacent areas in the bay, thereby acting as a trap for sand which may be eroded from the beach during occurrences of high waves. However, the flushing channel is also required to aid circulation and to remove silt and clay-sized particles which would otherwise accumulate during normal wave conditions.

The expanded beach would have a 300-foot long shoreline, 1.0 acre of beach area, and a 0.7-acre swimming area with a depth of 6.0 feet. Construction is likely to proceed as follows:

- o if required, installation of a silt curtain around the perimeter of the offshore excavation area;
- o removal and stockpiling of the existing beach sand;
- o excavation of the offshore swimming area and flushing lagoon;
- o shaping of the basement rock beneath the beach to a flatter, 9:1 slope;

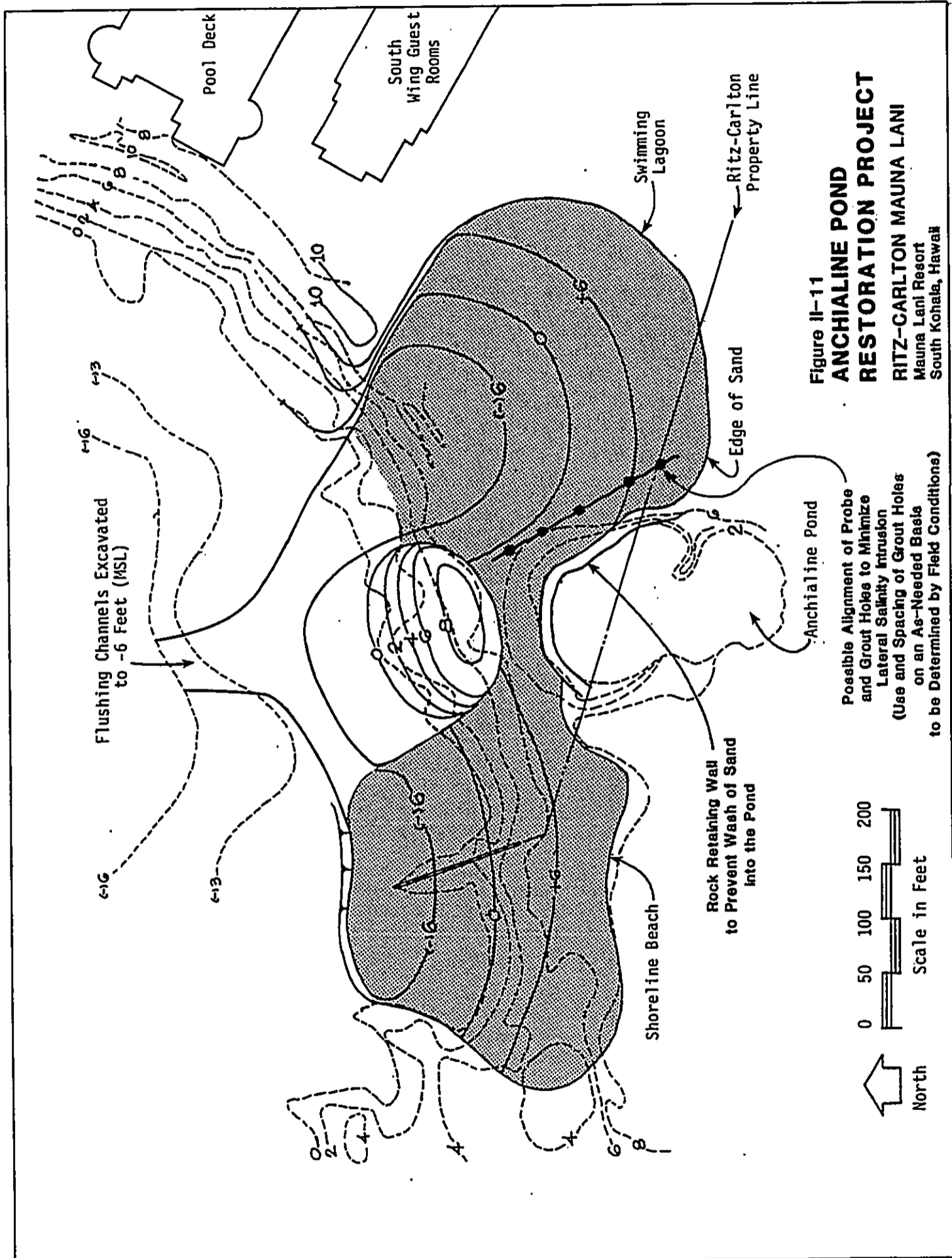


Figure II-11
ANCHIALINE POND RESTORATION PROJECT
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

- o pumping of accumulated fines in the swimming area to a temporary onshore settling basin preliminary to its ultimate land disposal (avoiding archaeological sites); and
- o placement of sand on the beach and in the swimming area.

As with the lagoon project, it is expected that most of the excavation can be accomplished with bulldozer and ripper. Low level blasting may also be required but its use would be limited. Total excavation would be approximately 6,000 cubic yards; 5,000 cubic yards of this will be from areas seaward of the certified shoreline. Sand for the project will amount to 4,200 cubic yards, an estimated 2,300 cubic yards of which will have to be imported from off-island. About 63 percent of the total sand amount will be placed seaward of the shoreline and the balance will be placed inland. The balance of the sand will come from the existing beach.

3.3 NEED FOR THE PROJECT

In conjunction with Mauna Lani Resort, Inc.'s request for State land use reclassification in 1985, Ming Chew Associates prepared a market analysis of the demand for resort facilities at Mauna Lani Resort. Assumptions and conclusions of the market study were used in refining the conceptual land use plan for the resort, which encompasses the Ritz-Carlton Mauna Lani project site. Given the relative abundance of beachfront and oceanfront sites at Mauna Lani Resort and the diminishing number of comparable sites elsewhere in the resort region, Ming Chew Associates estimated the demand for transient units at Mauna Lani to be 600 units by 1990, 1,100 units by 1995, and 1,600 to 2,000 units by 2000 (Ming Chew Associates, 1984:p. 42). Ming Chew Associates anticipated that the next hotel to be built at Mauna Lani Resort would be in the same luxury category as the existing Mauna Lani Bay Hotel.

The proposed Ritz-Carlton Mauna Lani will be targeting a market similar to that of Mauna Lani Bay Hotel. Also, it is anticipated that additional demand will be created by visitors who have been guests at other Ritz-Carlton hotels and who seek Ritz-Carlton accommodations in a Hawaiian setting.

The Ritz-Carlton Hotel Company operates several world-class urban and resort hotels. Given that successful luxury resort hotels in Hawaii have all been oceanfront developments with shoreline water amenities, The Ritz-Carlton Hotel Company finds it essential to have shoreline amenities for its guests in order to compete with similar resort hotels in Hawaii. Moreover, other Ritz-Carlton resort hotel projects have swimming beaches and The Ritz-Carlton Hotel Company wishes to maintain the consistency.

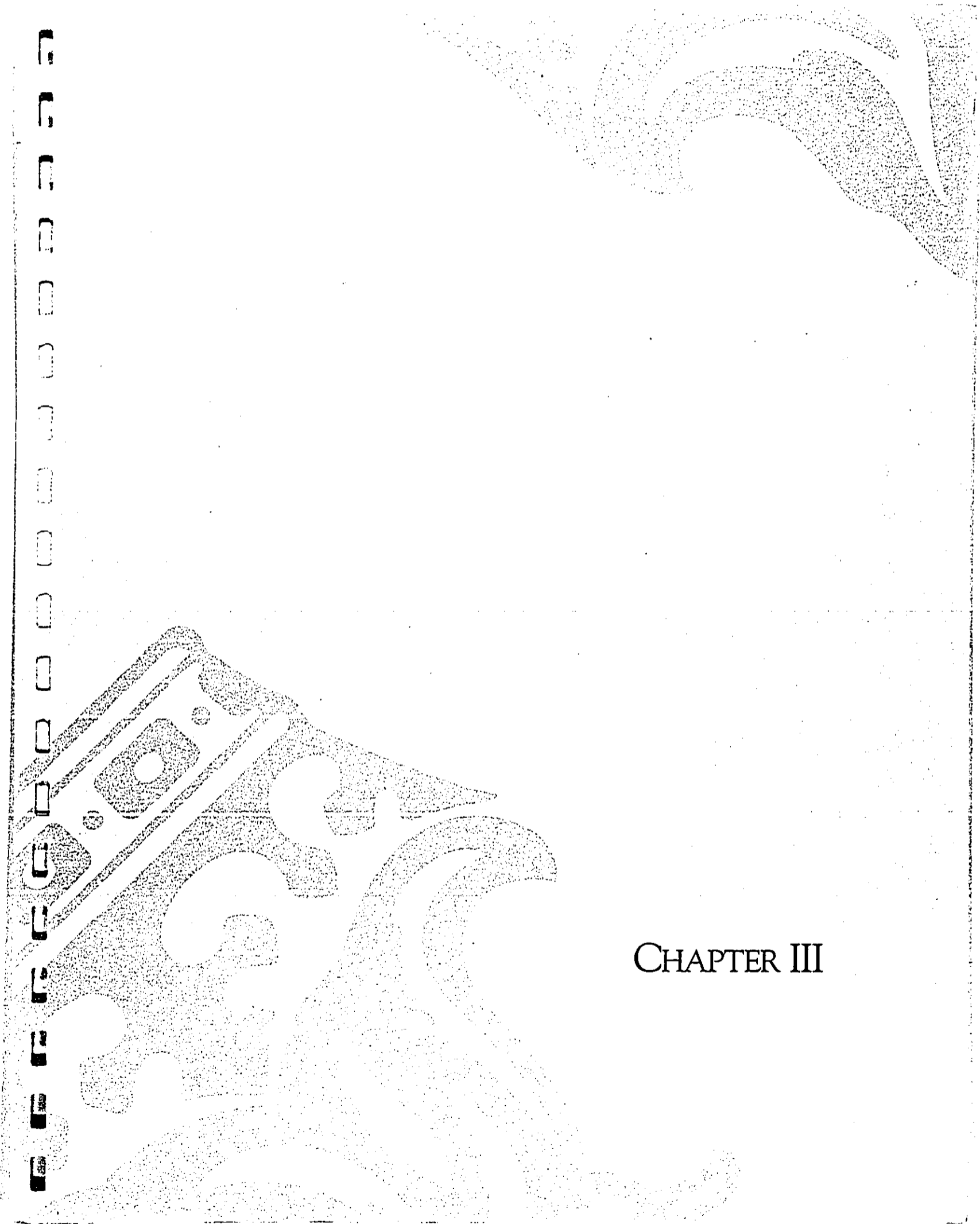
The shoreline fronting the hotel site, although attractive in its natural form, does not provide safe access to swimming areas and does not have the type of sand beach suitable for sunning. Development of the hotel with shoreline improvements is vital for the economic viability of the Ritz-Carlton Mauna Lani in the luxury hotel category. The hotel must provide what is perceived to be a "Hawaii experience" to attract guests for the first time. Providing ocean experiences is necessary to ensure that the hotel will develop a following of guests who will return to the Ritz-Carlton Mauna Lani year after year.

3.4 PROJECT SCHEDULE AND CONSTRUCTION COST

Construction of the 450-unit hotel and associated facilities, grounds, and shoreline improvements are expected to begin in late 1987 and be complete by the end of 1989 or the beginning of 1990. There is no current budget for the construction of the 200 additional units, given the uncertainty of future costs and economic and market conditions. A rough cut estimate for the additional units is on the order of magnitude of \$20,000,000 in 1987 dollars.

A preliminary estimate of construction cost for the first increment is as follows:

Hotel (450 rooms)	\$ 61,000,000
Landscape, hardscape, decks, beaches	<u>6,000,000</u>
TOTAL	\$ 67,000,000



CHAPTER III

CHAPTER III

ALTERNATIVES TO THE PROPOSED ACTION

1.0 INTRODUCTION

Chapter 200 of Title 11, Department of Health Environmental Impact Statement Rules, states that "The draft EIS shall contain any known alternatives for the action. These alternatives which could feasibly attain the objectives of the action (emphasis added) -- even though more costly -- shall be described and explained as to why they were rejected". The Ritz-Carlton Hotel Company's objective is to construct a world-class hotel in Hawaii with amenities which it considers to be essential to the successful operation of such a facility. Various alternatives were considered, but rejected. They were all either not feasible from an engineering viewpoint or did not meet the client's stated objective.

2.0 ALTERNATIVES CONSIDERED

2.1 PROPOSED ACTION: DEVELOPMENT OF HOTEL WITH SHORELINE AMENITIES AS DESCRIBED

The proposed action is described in detail in Chapter II of this report and includes the construction of a luxury hotel and improvements in the shoreline area. The latter consist of excavating a seawater swimming lagoon with a 110-foot wide opening and a 50-foot wide flushing channel, restoring an existing anchialine pond (Keanapou Fishpond), and expansion of an existing shoreline beach. This action is thought to be the optimal solution in meeting the development objective while minimizing the long-term impact to the environment. No significant adverse impacts are expected; at the same time, with such amenities, the project is expected to be an economically viable one.

2.2 NO PROJECT ALTERNATIVE: NO DEVELOPMENT AT PROJECT SITE

This alternative precludes any development at the project site, leaving the parcel in its natural state. No further expenditures by the resort developer, hotel operator, or public agency would be required. The nearshore waters and archaeological sites would be undisturbed. At the same time, any economic benefits that would be derived from the development of the site would not be realized.

The alternative of no development at the project site was rejected because it does not allow the Mauna Lani Resort master plan to be implemented. The master plan has been approved by government agencies and Mauna Lani Resort is committed to moving forward with the plan, which includes development of the project site by a hotel operator.

2.3 OTHER USE OF PROJECT SITE

2.3.1 Higher Density Resort Use

County zoning allows development of the project site at much higher density than proposed. Higher density hotel development would not be in character with existing development at Mauna Lani Resort, nor would it be appropriate for the type of luxury facility with which The Ritz-Carlton Hotel Company is associated. This alternative was rejected as not being a viable, marketable economic solution.

2.3.2 Use of Site for Facilities Other Than Hotel

The Ritz-Carlton Mauna Lani could locate to another site at Mauna Lani Resort planned for hotel development. The Pauoa Bay parcel, under V-1.25 zoning, would be permitted by the County zoning ordinance to be put to other uses. These include residential development, open-air theaters, and tourist information facilities and offices. Mauna Lani Resort had considered other uses for the beachfront property during its original planning prior to the 1980's and has since determined that a resort hotel is the most suitable use for the property. The current master plan designates the subject parcel for hotel use. Further, given the choice of other Mauna Lani Resort development parcels, the Ritz-Carlton Hotel Company found the proposed Pauoa Bay site to best suit its development needs for an ocean-oriented luxury resort hotel.

2.4 ALTERNATIVES WITH DIFFERENT SHORELINE TREATMENT

2.4.1 No Shoreline Improvements

With this alternative, a hotel would be developed at the project site and no improvements made to the shoreline area. All of the shoreline at the Pauoa Bay site would remain in its natural state. Although no significant long-term impacts are expected as a result of the proposed improvements to the shoreline area, without them there would be no impacts except for those associated with increased use of the natural shoreline area by hotel and resort guests and the general public.

Under this alternative, however, public shoreline access would not be improved and there would be no safe swimming area and sandy beach areas for guest and public use. Moreover, the Ritz-Carlton Hotel Company's overall concept for a luxury resort hotel at the Pauoa Bay site includes shoreline improvements which it sees as essential to ensure its competitiveness with similar oceanfront resort hotels in Hawaii, and to maintain consistency with other Ritz-Carlton resort hotel projects. The Ritz-Carlton Hotel Company would not undertake the development of the Pauoa Bay site without improving the shoreline area. The alternative of no shoreline improvements was thus rejected as infeasible with The Ritz-Carlton Hotel Company as hotel developer and operator. This alternative might be possible with another hotel operator, but is not likely to be. It should be noted that Mauna Lani Resort has signed an agreement with The Ritz-Carlton Hotel Company to develop the Pauoa Bay site, which precludes consideration of other hotel proposals.

2.4.2 Partially Fill In Fishpond

This option is essentially the same as the proposed action modified by filling in half of Keanapou Fishpond. The result would be a slightly larger swimming lagoon and beach area -- 1.3 acres of sand beach above the shoreline as opposed to 1.1 acre, and 1.1 acre of swimming area below the shoreline as opposed to 0.8 acre. This alternative would entail excavating 24,500 cubic yards of material versus 18,000 cubic yards, and importing 6,100 cubic yards of sand versus 5,050 cubic yards according to the proposed action. Partially filling in the fishpond would also be more costly.

This alternative was rejected because the anchialine pond, Keanapou Fishpond, is considered by the State Department of Land and Natural Resources (DLNR) to be significant for its information content and as a good example of a site type. DLNR states that there would be a beneficial effect, a "no adverse" effect if the fishpond is restored properly (Ralston Nagata, April 13, 1987).

Essentially the same result of providing a safe swimming area and attractive sandy beach area, although at a somewhat smaller scale, would be achieved with the proposed action rather than this alternative, without sacrificing the aesthetic and recreational values of the swimming lagoon.

2.4.3 Swimming Lagoon with Two Openings

After detailed engineering study, the alternative originally proposed and described in the EIS Preparation Notice has since been rejected in favor of the proposed action as described in this report. The earlier design concept included two openings from a 1.3-acre lagoon to the ocean -- a 30-foot opening and a 50-foot opening -- with pedestrian bridges. Also part of this alternative was a well near the lagoon to be installed to pump salt water into the inland water feature to aide the natural tidal exchange between the lagoon and ocean.

The engineering study ascertained that the two openings were too narrow to allow sufficient penetration of wave energy to maintain the beach slope, enhance circulation and remove suspended fines from the lagoon. There would be no flushing channel to allow swimmers access to the deeper bay water.

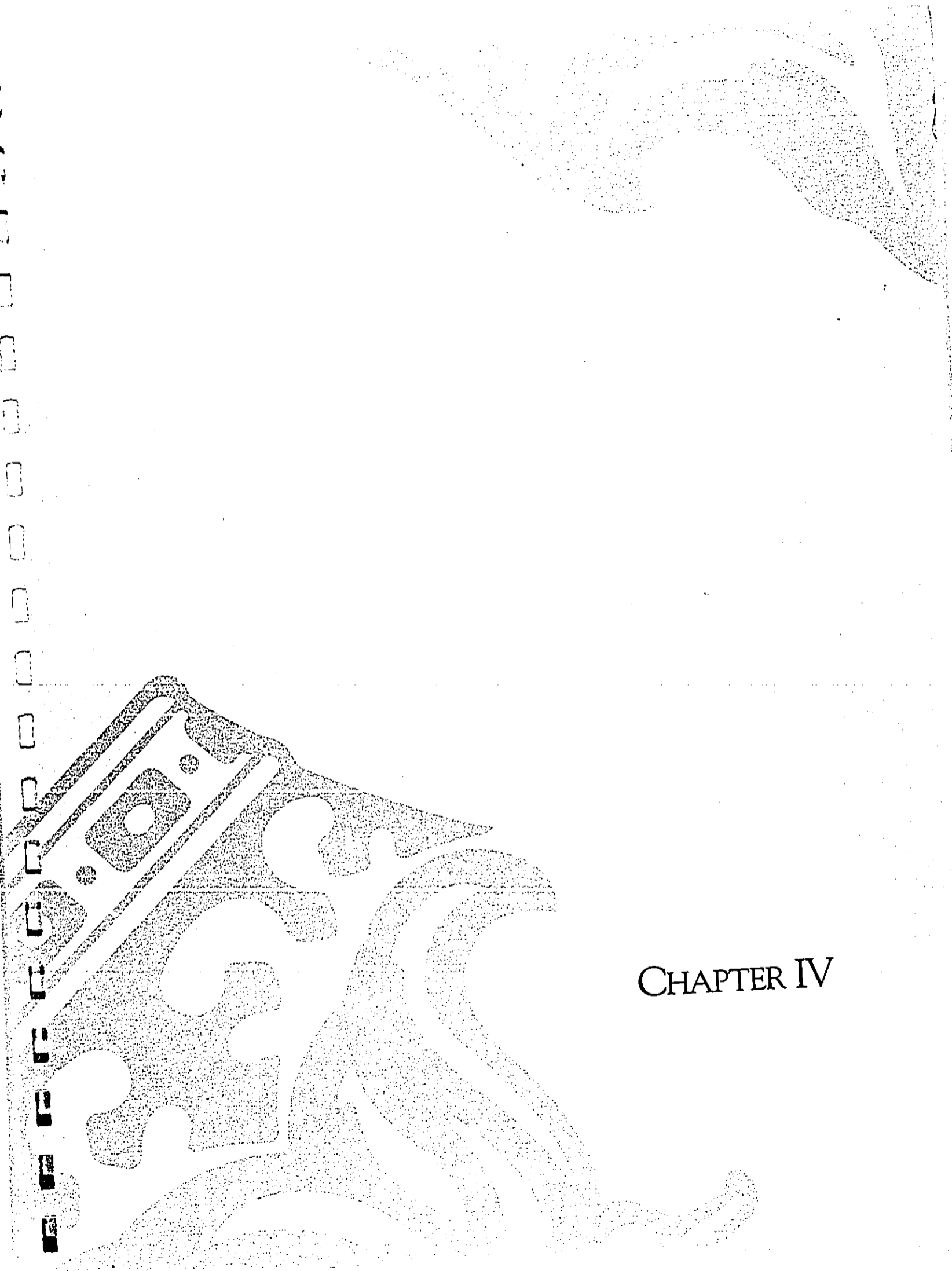
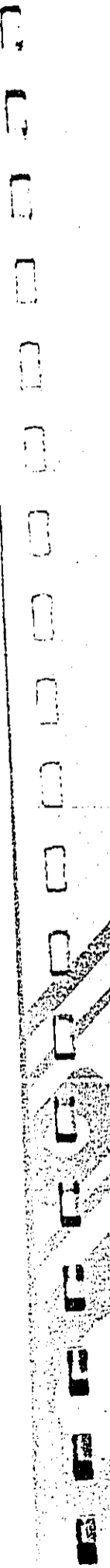
Given the disadvantages of this alternative, the shoreline improvements were redesigned to optimize hotel guest and public use of the shoreline while presenting a viable engineering solution to providing water related amenities with minimal long-term effect.

2.4.4 Swimming Lagoon Elsewhere at Pauoa Bay

After engineering evaluation of the hotel site, it was concluded that the proposed location of the swimming lagoon is the only location feasible for constructing and maintaining such a lagoon. At a location further north along the shoreline, there are no natural features where rocks could be installed on both sides of the lagoon opening to ensure stability of the existing shoreline. These natural features are present at the proposed lagoon site. Also, further north, a sandy beach would have to be created to provide a shoreline

beach, whereas at the proposed site, an existing beach would be improved. The location of the existing beach and the presence of the shoal area directly offshore would ensure stability of the beach, which would not be the case further north at the project site.

The overriding design concern is the stability of sand beaches, which led to the rejection of this alternative and the recommendation to construct the proposed improvements as described in this report.



CHAPTER IV

CHAPTER IV

DESCRIPTION OF THE AFFECTED ENVIRONMENT AND PROBABLE ENVIRONMENTAL CONSEQUENCES

1.0 PHYSICAL ENVIRONMENT

1.1 PHYSIOGRAPHY, GEOLOGY, SOILS AND CLIMATE

1.1.1 Existing Conditions

1.1.1.1 Physiography

Mauna Lani Resort is situated on the South Kohala coast of the island of Hawaii at the base of a gradually rising plain surrounded by four volcanoes: the Kohala Mountain (5,480 feet), Mauna Loa (13,677 feet), Mauna Kea (13,796 feet), and Hualalai (8,271 feet). The 32-acre Ritz-Carlton project site is located at Pauoa Bay in the northwestern portion of the Mauna Lani property, in an area that slopes gently seaward. The overall slope of the land is generally less than 10 percent. Its topographic relief results from the layering and buckling of successive lava flows rather than from erosion. Construction of the existing Mauna Lani Bay Hotel, its adjoining golf course, the Mauna Lani Terrace and Mauna Lani Point condominiums, various roadways, and additional site improvements, have contributed to the modification of the natural topography in the general resort area.

1.1.1.2 Geology

All of the surrounding mountains are of volcanic origin. Kohala Volcano is considered by many to be extinct, not having erupted for at least 10,000 to 15,000 years. Mauna Kea, the next oldest, has not erupted in historic times, but there is evidence that it has been active within the past 5,000 years. Hualalai last erupted during 1800-1801 and will probably erupt again within the next two hundred years according to geologist Richard Moore of the Hawaiian Volcano Observatory; however, due to the general topography of the surrounding area, none of the more recent Hualalai flows have come within five miles of the Mauna Lani Resort site.

There have been 36 historic eruptions of Mauna Loa, the last multi-phased eruption occurring in 1985. Of these, however, only the 1859 eruption flowed to the South Kohala coastline via the Hualalai-Mauna Kea saddle. This flow reached the sea just south of 'Anaeho'omalua Bay, some three miles south of the Mauna Lani Resort. Most of the more recent flows from Mauna Loa have been either to the west toward the South Kona District or to the east toward Hilo (Mullineaux and Peterson, 1974; Stearns, 1946; and MacDonald, 1970).

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

The only exposed lava on the site that is not from the Mauna Loa volcano is also the oldest. It is an extensive pahoehoe flow from the Mauna Kea volcano, that reached the sea from Makaiwa Bay on the south to at least Puako Bay on the north. The entire Ritz-Carlton project site is set in this flow.

The United States Geological Survey (USGS) has assessed the relative risk from volcanic hazards for most areas of the Island of Hawaii (Mullineaux and Peterson, 1974). Its classification includes six degrees of risk, with "A" being the lowest and "F" the highest. Because it is on the flank of Mauna Loa, the island's second most active volcano, the southern portion of the Mauna Lani Resort property is in zone "E". Mauna Kea, which has a very low probability of erupting, protects the northern portion of the Mauna Lani Resort site from Mauna Loa eruptions. As a result, that portion is in zone "B".

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

1.1.1.3 Soils

As suggested by its geologic history, soils on the Ritz-Carlton site are thin and poorly developed. Two different soil and land types have been identified on the site by the U.S. Department of Agriculture Soil Conservation Service (SCS) (December 1973). Neither is agriculturally significant. Although not identified on the SCS map, sand is present at the Pauoa Bay boundary of the project site.

- (1) Pahoehoe Lava Flows: Pahoehoe lava flows (rLW), a miscellaneous land type with meager soil covering, extends over nearly the entire hotel site. The surface of the pahoehoe lava is generally much smoother than that of adjacent a'a lava flows, but it is also broken and pockmarked by numerous pressure domes, cracks, and lava tubes. The only soil in this land type is generally found in these cracks and depressions, having been transported there by wind and storm water runoff. However, the aged pahoehoe flows on the Ritz-Carlton site have slowly eroded over time, and are now almost entirely covered by fountain grass. In addition, a dense Kiawe forest covers the northeastern portion of the site.
- (2) Rock Land: Also a miscellaneous land type, rock land (rRO) consists of pahoehoe bedrock covered in places with a thin layer of transported soil. Lava outcrops are exposed over 50 to 90 percent of the surface. The little soil that is present is generally confined to holes and cracks in the bedrock. Rock Land covers a small portion of the Ritz-Carlton property extending northeast from the rear property line into the Mauna Lani Resort.
- (3) Beach Areas: Pauoa Bay is the seaward boundary of the project site and contains a sand lined beach (BH) area interrupted by lava outcrops. The sand is coarse-grained and well sorted, with a "salt and pepper" appearance, indicative of its mix of particles of marine origin and black basalt chips. The northern portion of the bay's shoreline is covered with an accumulation of coral rubble washed ashore during periodic storm wave activity.

1.1.1.4 ALISH Classification

Three classes of agriculturally important lands have been established within the Agricultural Lands of Importance to the State of Hawaii (ALISH) system: (1) Prime Agricultural Land, (2) Unique Agricultural Land, and (3) Other Important Agricultural Land. None of the land within the proposed project site is classified in the ALISH classification system due to its unsuitability for agricultural use.

1.1.1.5 Climate

The Ritz-Carlton resort site has a hot, arid, savanna-like climate. Close to the shoreline, sea breezes serve as a moderating influence on temperature. Mean annual temperature in the area is about 78 degrees F., with relatively small daily and seasonal fluctuations. Daytime temperatures above 90 degrees F. or nighttime lows below 63 degrees F. are extremely rare. Average summer temperatures are only four degrees higher than those in winter.

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

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

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

1.1.2 Physiographic Changes

The land on which development will occur is relatively flat, and the mass grading that will be required will be related to fill activities. Although the surface of pahoehoe, as opposed to a'a, is generally smoother, reshaping it by rough grading for building pads, roadways, and landscaped areas may pose some problems at the Ritz-Carlton site. In general, at Mauna Lani Resort, in some places the lava is too tough to be bladed or ripped by bulldozers or graders; there are many bulbous upheavals and depressions; and there are a number of lava tubes, some of which have already collapsed and others which will collapse under the weight of earth-moving equipment. To the extent that similar conditions are encountered at the Ritz-Carlton site, reshaping the terrain will be more or less difficult.

It is assumed that excavation of the swimming lagoon and shoreline beach swimming area will be accomplished with a bulldozer and ripper. This is described further in a following section of this chapter.

There is insufficient soil cover on the project site to support the proposed hotel grounds landscaping. Because of this, the importation of soil, most likely from elsewhere on Mauna Lani Resort's property, will be required.

It is likely that crushed a'a cobbles will be used as fill material for the hotel development on pahoehoe; they were used at the Mauna Lani Bay Hotel site. The existing golf course was constructed using crushed lava from the Waikoloa quarry and soil excavated from the Puako Flats area of the Mauna Lani Resort site. It is likely that the same sources of soil and crushed rock would be used for landscaping within the development area. The soil from the Puako Flats area is Kamakoa sandy loam. This soil is adequate for landscaping uses, but in its natural extremely dry condition, it could create a potential dust problem when being transported. Moistening the soil prior to moving it would reduce the potential problem.

1.1.3 Impact on Soils and Their Use for Agricultural Activities

None of the land at the project site has agricultural potential, nor has it been known to have been used for agricultural purposes. Hence, development of the proposed hotel would have no impact on the actual or potential agricultural productivity of the site.

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

1.2 TSUNAMIS AND FLOOD HAZARD

1.2.1 Existing Conditions

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

The Ritz-Carlton property shoreline lies within the special flood hazard area as indicated in the Flood Insurance Rate Map for the area (Federal Emergency Management Agency; May 3, 1982). The flood insurance rate maps, which define hazard areas, are based on the Federal Flood Insurance Administration's scientific and engineering report, The Flood Insurance Study for the County of Hawaii, dated February 1, 1982. A seaward portion of the project site lies within the flood hazard boundary for the 100-year coastal flood (see Figure IV-1). The 100-year tsunami elevation at the project site is eight feet at the shoreline and declines slightly with distance inland. The 100-year flood has a one percent chance of being equalled or exceeded in any given year.

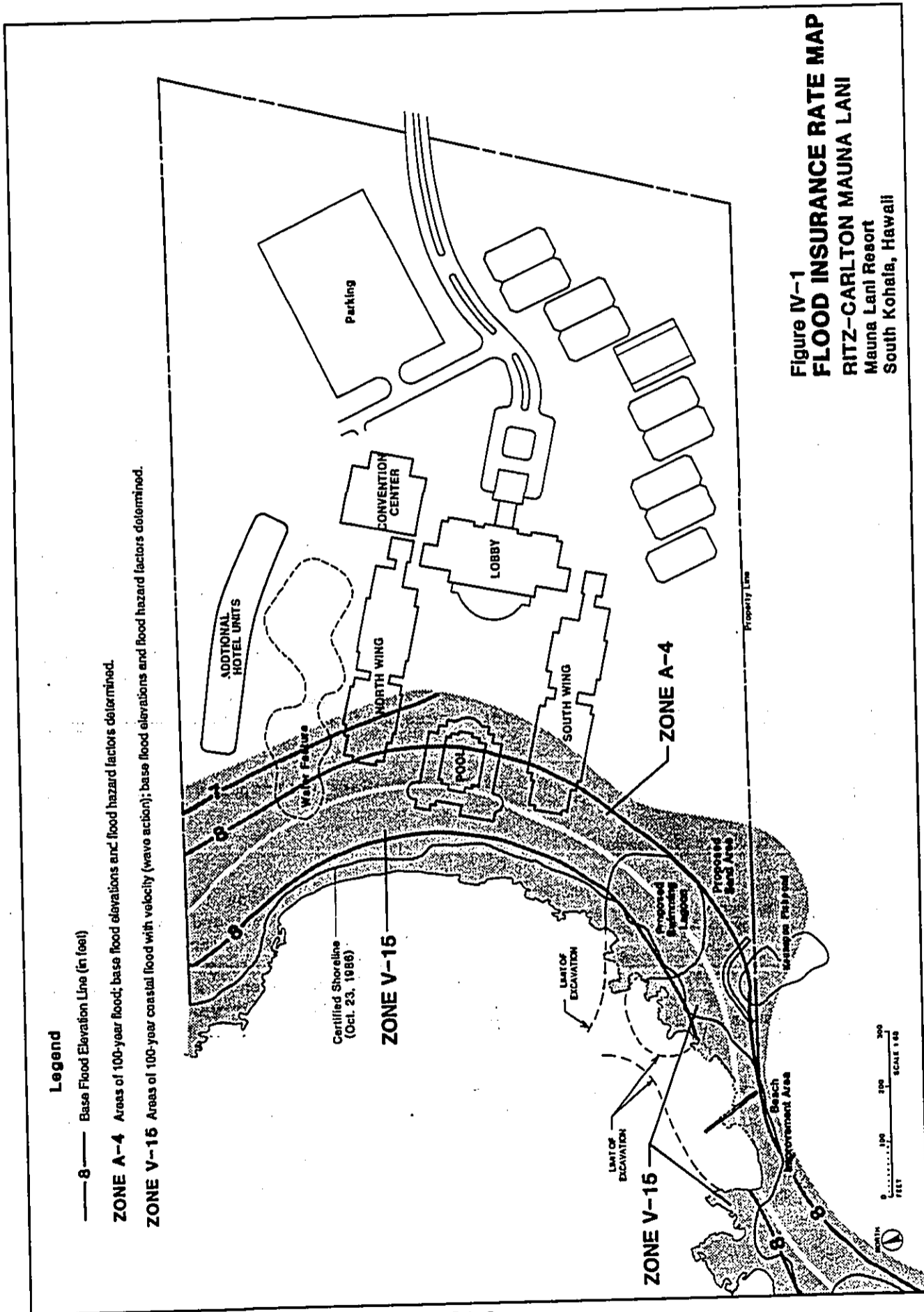
The coastal area of the property falls into designated zone V15. Areas zoned V1 to V30 (the "V" stands for velocity -- a measure of wave action) are termed "coastal high hazard" (tsunami) zones, or V zones, in the County Code, and structures to be built within these zones must meet specified construction standards.

As shown in Figure IV-1, most of the Ritz-Carlton property is in Zone C, defined as an area of minimal flooding.

1.2.2 Probable Impacts

Resort structures on the property will be sited taking into consideration hazardous coastal zones. Should a facility be in a hazard zone, design will comply with all County requirements applicable to structures in the coastal high hazard area. The engineering evaluation study of the Ritz-Carlton site (Belt Collins & Associates, 1986:27) recommends a conservative tsunami height of 12 feet for habitable structures. This was the maximum height in Kawaihae Bay during the 1946 tsunami and also the highest recorded in the region.

The coastal hazard emergency siren warning system is operated by the County of Hawaii. It has been learned through the Hawaii County Planning Department that the County Civil Defense is in the process of formalizing procedures for emergency management. As a mitigation measure, the hotel operator and Mauna Lani Resort will coordinate with County Civil Defense to implement the procedures.



1.3 SURFACE WATER AND DRAINAGE

1.3.1 Existing Conditions

There are no streams or natural drainageways crossing the subject property. The characteristic buckles and fissures interrupting the otherwise smooth and relatively level pahoehoe lava surface prevent any significant surface runoff from occurring.

1.3.2 Probable Impacts

Landscaping at the Ritz-Carlton site will require irrigation with the water being drawn from new brackish water wells located on Mauna Lani Resort property. Withdrawal of water from a new well may affect the flow of groundwater toward the coastline and has the potential to affect salinity levels. Should a new well be required, its design will incorporate measures to preserve the integrity of the brackish water source.

Surface water runoff from the development will be altered slightly. The extent of change will depend upon the amount of paving and other impermeable surfaces that will occur within the proposed hotel site, and the configuration of the storm drainage system that will be installed. The design intent of the drainage system will be to avoid stormwater runoff to the shoreline and handle what runoff there is on-site. Surface water will be handled by the natural porous lava terrain and perhaps by a dry well, if needed.

1.4 NEARSHORE AND MARINE ENVIRONMENT

1.4.1 Existing Conditions

This summary description of nearshore and marine environmental conditions is primarily drawn from "Engineering Evaluation of Ocean and Shoreline Conditions at the Ritz-Carlton Site, Pauoa Bay, South Kohala" (Belt Collins & Associates, 1986) and "Baseline Assessment of the Marine Environment at Pauoa Bay, South Kohala, Hawaii" (Steven Dollar, 1986). The reports are included as appendices to this environmental impact statement.

1.4.1.1 Coastal Morphology

Pauoa Bay is approximately 850 feet wide at its mouth and is a 650-foot indentation from the general northeast to southwest trend of the South Kohala coastline. Unweathered lava flows from Mauna Kea volcano create the form of the shoreline and ocean bottom within and outside the bay. Nearshore physical features are illustrated on Figure IV-2. Shoreline elevations and bathymetric contours are depicted on Figure IV-3.

1.4.1.2 Sand Deposits and Other Littoral Material

Wave deposited material occurs all along the bay's shoreline. Along the northern third of the bay, this material consists of wave-abraded boulders and cobbles of basalt and coral. Stone size is indicative of focusing of wave energy which occurs there. Shorelines of the central and southern thirds of the bay consist of sand deposited on emerged and partially submerged lava outcrops. In three short sections of this portion of the shoreline, the sand extends below water level into the wash zone of typical, prevailing waves.

The floor of the bay is generally devoid of sand-sized material except for limited quantities in well protected depressions and in the naturally occurring central channel which leads offshore. Occurrences of strong wave surge and wave-driven currents move coarse sand and gravel onto the shoreline beaches and finer sand offshore beyond the 50-foot depth contour. Fine sand covers the entire ocean floor in deeper water.

1.4.1.3 Prevailing Waves

Islands to the northwest and the land mass of Hawaii island itself provide substantial shielding from waves, limiting the direct wave exposure of Pauoa Bay to the sector from bearing 225° to 300° . For this exposure, only relatively small segments of the spectrum of North Pacific swell and Kona storm waves can reach the bay without significant loss of height and energy (see Figure IV-4). Data on the actual waves off Pauoa are not available but hindcasting and wave measurements done for the OTEC coldwater pipe testing program off Keahole Point provide data which are reasonably indicative of prevailing conditions. Tables IV-1 and IV-2 summarize the Keahole hindcasting and waverider buoy information.

The waverider buoy data, although missing the incident direction and based on only one year of measurement, are considered to be most indicative of actual conditions. Wave heights less than two feet occurred 47 percent of the time, wave heights less than four feet for 94 percent of the time, and higher

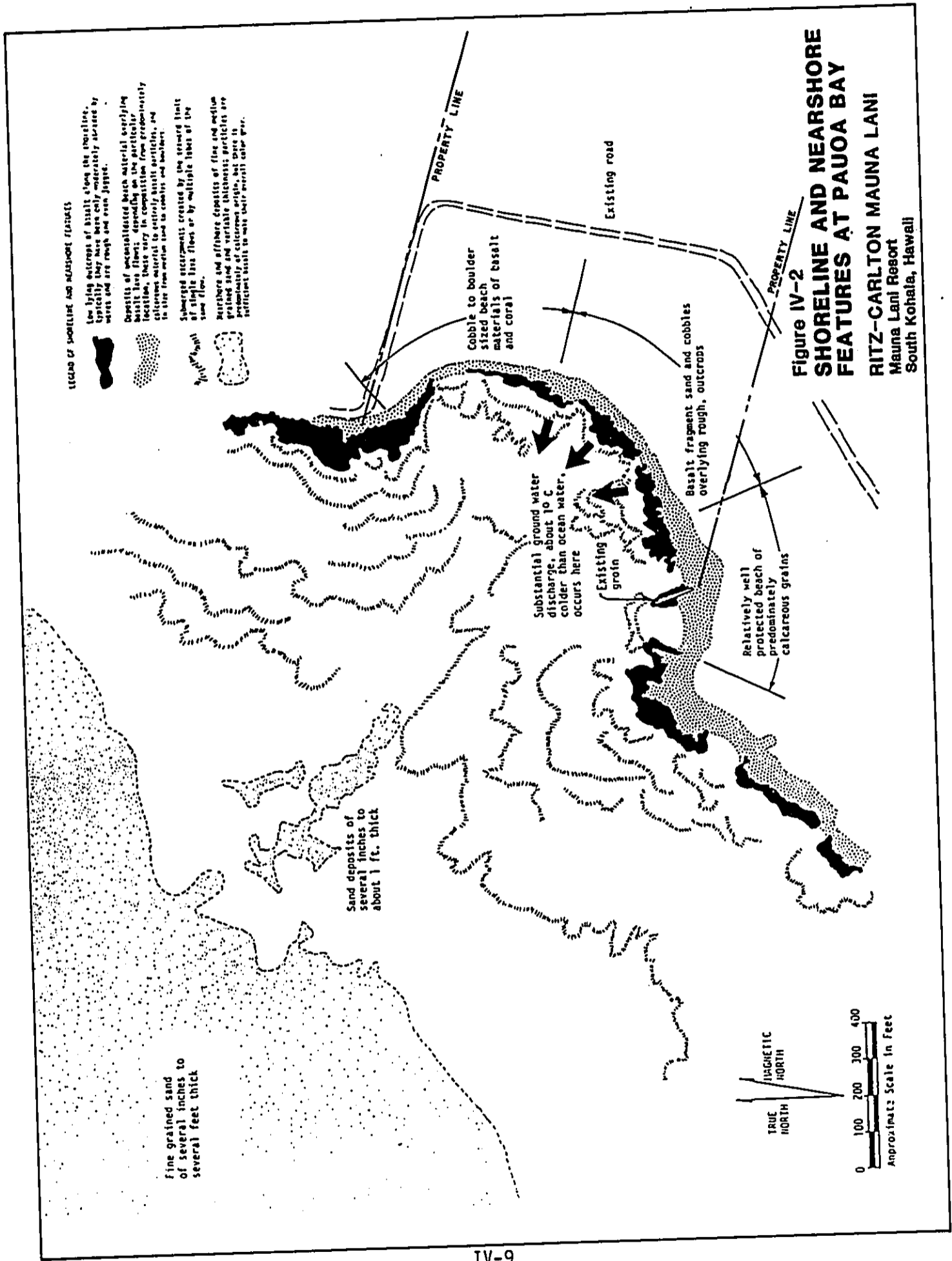
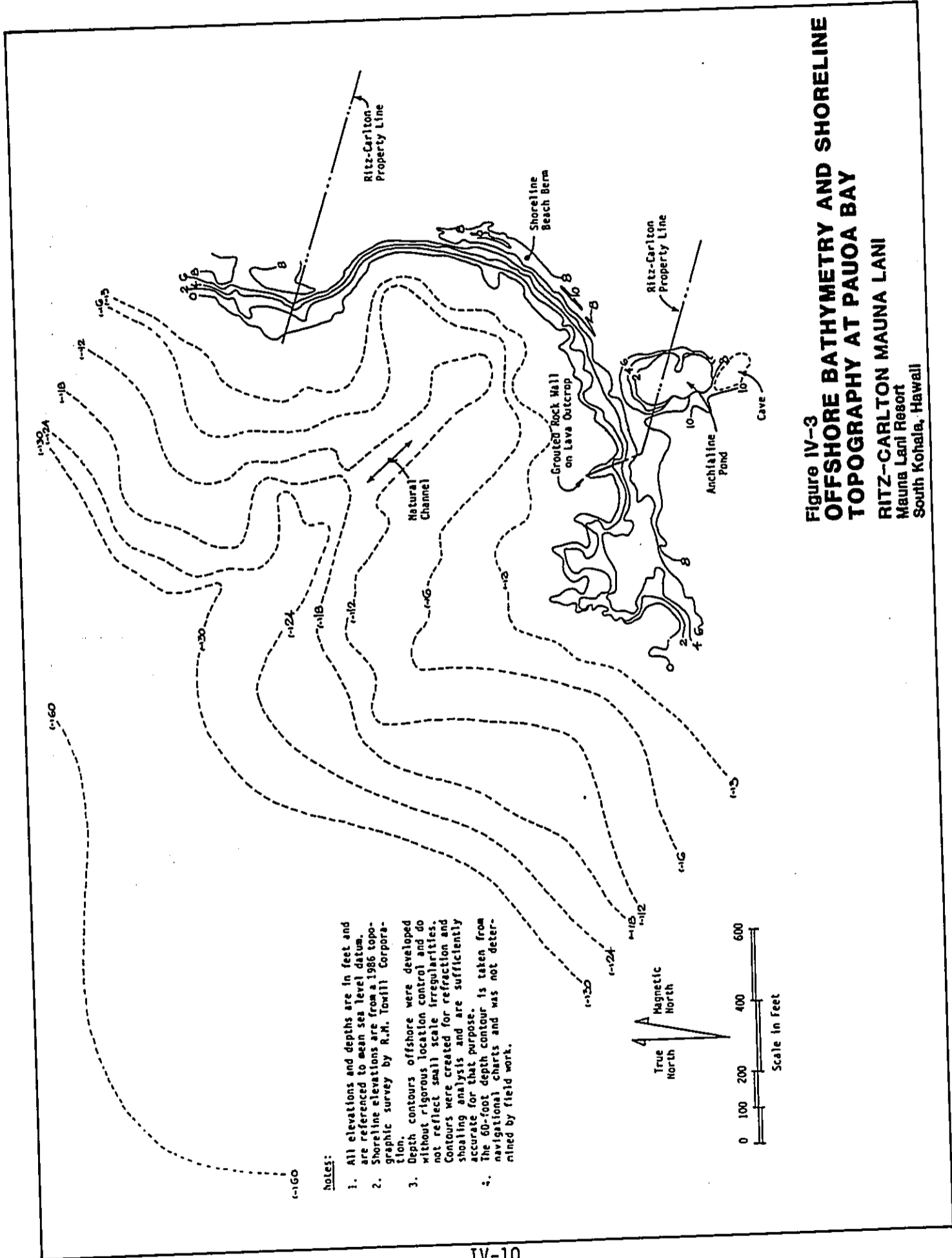
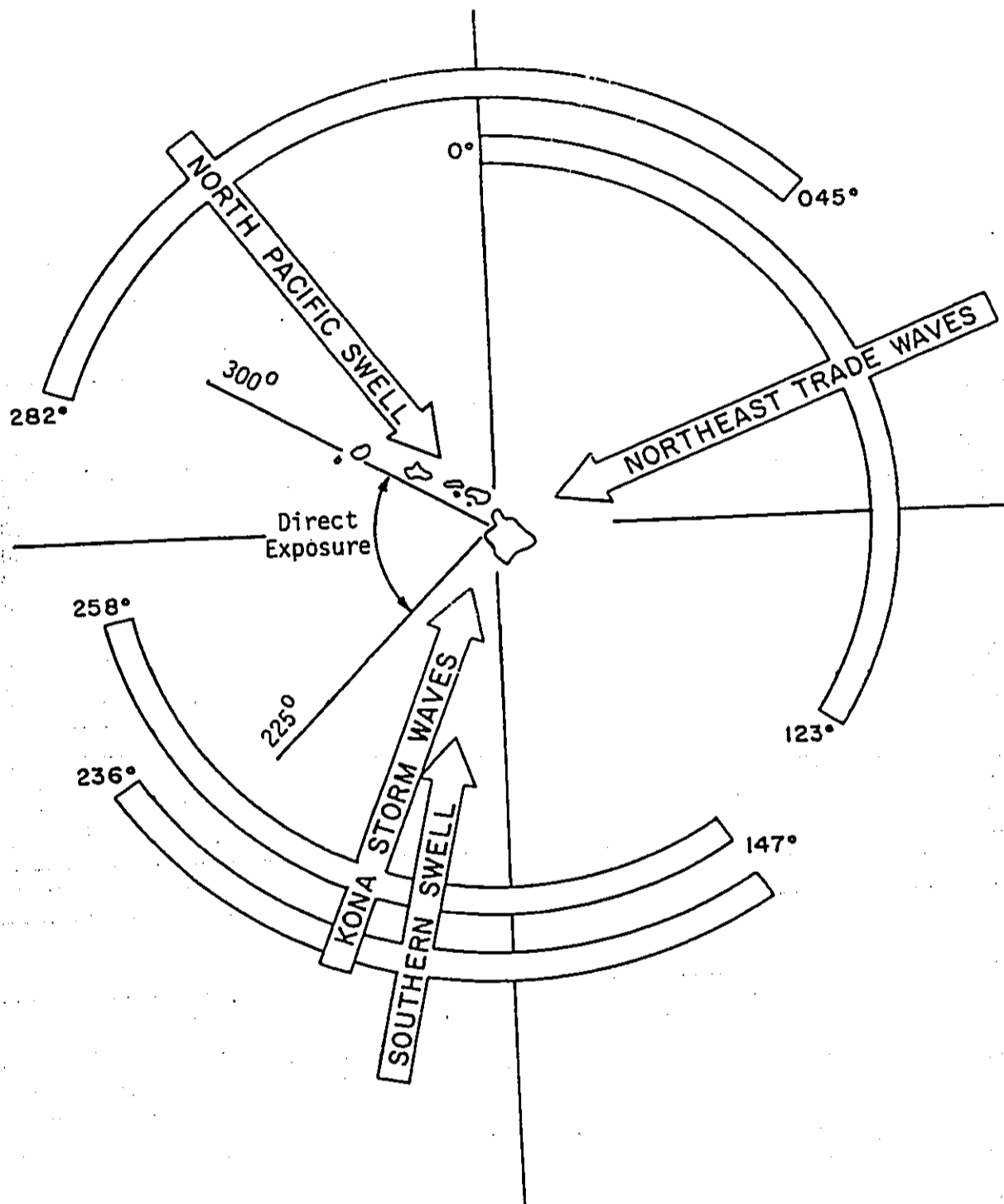


Figure IV-2
SHORELINE AND NEARSHORE FEATURES AT PAUOA BAY
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii



- NOTES:**
1. All elevations and depths are in feet and are referenced to mean sea level datum.
 2. Shoreline elevations are from a 1986 topographic survey by R.M. Towill Corporation.
 3. Depth contours offshore were developed without rigorous location control and do not reflect small scale irregularities. Contours were created for refraction and shoaling analysis and are sufficiently accurate for that purpose.
 4. The 60-foot depth contour is taken from navigational charts and was not determined by field work.

**Figure IV-3
 OFFSHORE BATHYMETRY AND SHORELINE
 TOPOGRAPHY AT PAUOA BAY
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii**



Adapted From Moberly and Chamberlain (1964)

Figure IV-4
WAVE EXPOSURE OF PAUOA BAY
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

TABLE IV-1

Keahole Point Deepwater Wave Hindcast Data as Developed
by the Corps of Engineers Waterways Experiment Station
and Modified in Evans-Hamilton, Inc. (Undated)

Direction	Percent Occurrence of Significant Wave Height (Feet)										Total
	Calm	0.1- 1.9	2.0- 3.9	4.0- 5.9	6.0- 7.9	8.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	>16.0	
Calm	31.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	31.1
N	.0	.3	.3	1.4	2.1	1.3	.6	.2	.0	.0	6.2
NNE	.0	.1	.2	1.1	1.7	.8	.4	.1	.0	.0	4.4
NE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
ENE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
E	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
ESE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
SE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
SSE	.0	.0	.7	2.5	.0	.0	.0	.0	.0	.0	3.2
S	.0	.8	14.3	1.9	.1	.1	.0	.0	.0	.0	17.2
SSW	.0	9.8	16.2	.2	.1	.1	.0	.0	.0	.0	26.4
SW	.0	.2	3.0	.1	.1	.1	.0	.0	.0	.0	3.5
WSW	.0	.2	.2	.1	.0	.0	.0	.0	.0	.0	.5
W	.0	.2	.2	.0	.1	.1	.0	.1	.0	.0	.7
WNW	.0	.2	.2	.0	.2	.9	.9	.7	.4	.1	3.6
NW	.0	.2	.1	.1	.4	.8	.6	.3	.2	.1	2.8
NNW	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.4
Total	31.1	12.2	35.6	7.5	4.8	4.2	2.5	1.3	.6	.2	100.0

Period (Second)	Percent Occurrence of Significant Wave Height (Feet)										Total
	Calm	0.1- 1.9	2.0- 3.9	4.0- 5.9	6.0- 7.9	8.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	>16.0	
Calm	31.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	31.2
0.1- 1.9	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1
2.0- 3.9	.0	1.7	.0	.0	.0	.0	.0	.0	.0	.0	1.7
4.0- 5.9	.0	.0	2.1	.4	.2	.0	.0	.0	.0	.0	2.7
6.0- 7.9	.0	.0	.1	1.3	1.1	.4	.3	.1	.0	.0	3.3
8.0- 9.9	.0	.0	.0	1.2	1.6	.6	.1	.0	.0	.0	3.5
10.0-11.9	.0	2.7	6.8	1.9	1.6	1.8	.6	.2	.0	.0	15.6
12.0-13.9	.0	5.1	15.6	2.1	.2	1.1	1.5	.7	.2	.1	26.6
14.0-15.9	.0	2.3	10.0	.6	.0	.1	.2	.4	.3	.2	14.0
>16.0	.0	.0	1.3	.0	.0	.0	.0	.0	.0	.0	1.3
Total	31.2	11.9	35.9	7.5	4.7	3.9	2.7	1.4	.5	.3	100.0

TABLE IV-2

Summary of Waverider Data in 130-Foot Deep Water
Off Keshole Point, June 1984 to May 1985
(Adapted from Edward K. Noda and Associates, 1986)

Wave Period (Seconds)	Percent Occurrence of Significant Wave Heights (Feet)							Total For All Heights
	0	0.1 to 2	2 to 4	4 to 6	6 to 8	8 to 10	>10	
Calm	.3	.0	.0	.0	.0	.0	.0	.3
<6	.0	4.5	4.0	.0	.0	.0	.0	8.5
6 to 8	.0	23.9	18.7	.4	.2	.0	.0	43.2
8 to 10	.0	14.3	10.9	1.1	.6	.2	.0	27.1
10 to 12	.0	4.3	8.8	1.1	.0	.0	.0	14.2
12 to 14	.0	.1	3.9	2.0	.0	.0	.0	6.0
14 to 16	.0	.1	.0	.6	.0	.0	.0	.7
>16	.0	.0	.0	.0	.0	.0	.0	.0
Total	.3	47.2	46.3	5.2	.8	.2	.0	100.0

waves for the remaining six percent of the time. Wave periods were generally less than 12 seconds. Shorter periods are typical of waves generated by local winds. Since Keahole Point has a wider exposure than Pauoa Bay to both the north and south, conditions at Pauoa are even calmer than Tables IV-1 and IV-2 indicate.

1.4.1.4 Storm Waves

Storm waves approach Pauoa Bay on occasion in winter and very infrequently in other seasons. Storm wave heights and frequencies of occurrence as listed in previous studies of this area are summarized below. For Pauoa, North Pacific swells from west-northwest are considerably more significant than Kona storm waves. Their expected heights for a given recurrence interval are greater and localized effects of refraction provide less protection than for Kona storm waves.

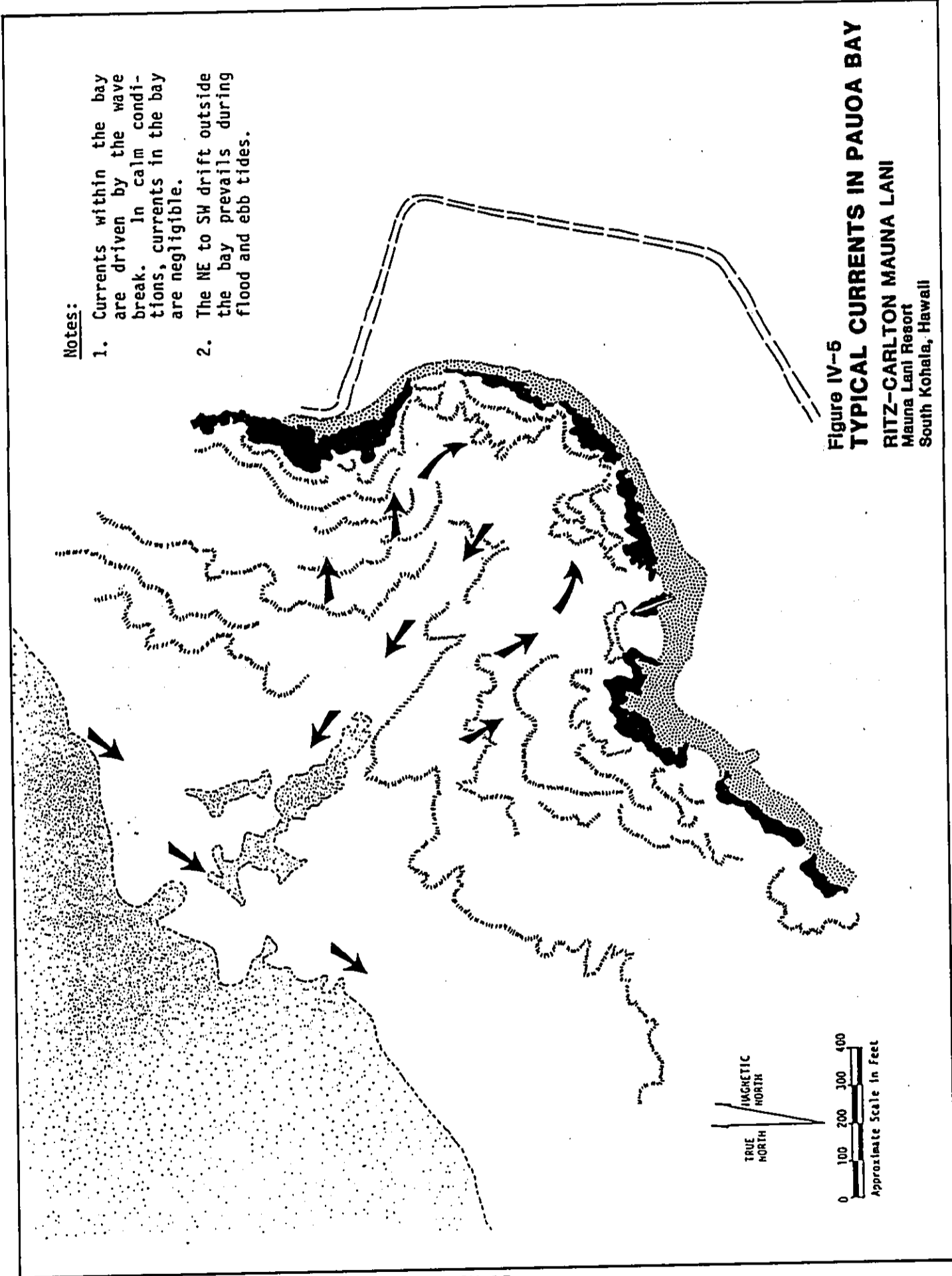
Summary of Storm Wave Heights and Frequencies of Occurrence

Return Period (Years)	Evans-Hamilton, Inc. (Undated)		Sea Engineering (1984)		Rocheleau (1977)
	WNW Swells (Feet)	Kona Storm (Feet)	WNW Swells (Feet)	Kona Storm (Feet)	All Deepwater Waves (Feet)
2	17.0	10.2	10 to 15		15.7
10	19.7	13.1	20 to 25		25.2
25	21.6	14.8	25 to 30	17.0	29.8
50	22.6	16.2	30+		33.0
100	23.8	17.5	--		36.5

Refraction and shoaling analyses of these deepwater storm waves indicate that there is a pronounced convergence or focusing of wave energy at each point of the bay and a divergence or diminishing of wave energy in the center of the bay. The highest waves break outside the bay or on its points. Smaller waves and reformed waves which break offshore can penetrate the central third of the bay to a collapsing or surging break at or near the shoreline. Calculations indicate that wave setup during high waves concurrent with high tide can raise the bay's water level to between four and five feet above mean sea level (msl). Wave runup above this level on the beach may reach 8 to 10 feet (msl), overtopping the natural beach berm. This condition occurred in February 1986. Debris lines indicating the upper wash of these waves are still visible almost a year later.

1.4.1.5 Prevailing Currents

Net current drift is depicted on Figure IV-5. Outside the bay, there is a persistent, relatively slow (0.5 knot or less) northeast to southwest drift parallel to the trend of the shoreline. It occurs during both ebb and flood tides but may vary in strength with tidal phase. Within the bay, water movement is dominated by the prevailing wave condition. Breaking of waves on the north and south points of the bay and subsequent translation along the



Notes:

1. Currents within the bay are driven by the wave break. In calm conditions, currents in the bay are negligible.
2. The NE to SW drift outside the bay prevails during flood and ebb tides.

Figure IV-6
TYPICAL CURRENTS IN PAUOA BAY
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

shoreline toward the center of the bay set up a rip current out the bay through its central channel. For breaking wave heights of three to five feet, the rip current velocity exceeds one knot.

1.4.1.6 Ocean Water Quality

State water quality standards for ocean water are specified in Chapter 54 of Title 11, Administrative Rules of the Department of Health. The bay is Class AA Open Coastal Water. (The objective of Class AA waters is that they remain as close to their natural pristine state as possible.) It is not considered an embayment as the ratio of its volume to cross sectional entrance area is just 150, substantially less than the 700 or greater ratio required for this classification. It is also a "wet" coastal area, meaning that it is one which receives more than 3.0 million gallons per day (MGD) of freshwater discharge per coastal mile. Surface runoff to the ocean is virtually nil in this area, even during infrequent rainstorms. However, groundwater discharge has been estimated at between 3.0 and 7.0 MGD in the several hydrologic evaluations done for the region.

Analyses of water samples collected within and outside the bay have been completed. Results can be compared with the State standards for nine parameters. Figure IV-6 identifies the sample locations and Table IV-3 is a tabulation of the resulting parameter concentrations. Most of the concentrations are at or below the standard's geometric mean values not to be exceeded. The exceptions are nitrate and nitrite nitrogen for samples within the bay, and chlorophyll a and turbidity for all of the samples. The relatively high inorganic nitrogen concentration is likely due to the substantial groundwater discharge into the bay. The chlorophyll a concentration may be a biologic response to this input. Most of the material contributing to turbidity has organic origin. Prevailing wave conditions create substantial variations in this parameter.

1.4.1.7 Groundwater

Groundwater along the South Kohala coast occurs as a basal lens in hydraulic continuity with the ocean. Calculations of the total groundwater flow have established a probable range of from 3.0 to 7.0 MGD per coastal mile. At distances of four or more miles inland of the shoreline, groundwater is of potable quality and wells have been developed to supply the domestic water requirements of the coastal region. Closer to the shoreline, groundwater is brackish but a number of wells have been successfully developed for golf course irrigation. Around the periphery of the bay, there is a pond and several other small holes where groundwater can be directly sampled. Salinities were measured at 3.8 to 4.5 parts per thousand (ppt), about one tenth the 33 to 35 ppt of ocean water.

Shoreline discharge of groundwater tends to concentrate at cracks and other small scale, localized fissures. At Pauoa, three such locations occur in the center of the bay (refer back to Figure IV-2). The discharge is noticeable by temperature difference and visually by the refraction effects. Measured salinities at the surface of the bay's waters has varied from 10 to 33 ppt depending on distance from the three concentrated discharge points and the prevailing wind and wave mixing mechanisms. When the baywater is extremely calm, brackish groundwater can form a one- to two-foot thick surface layer over the inner third of the bay.

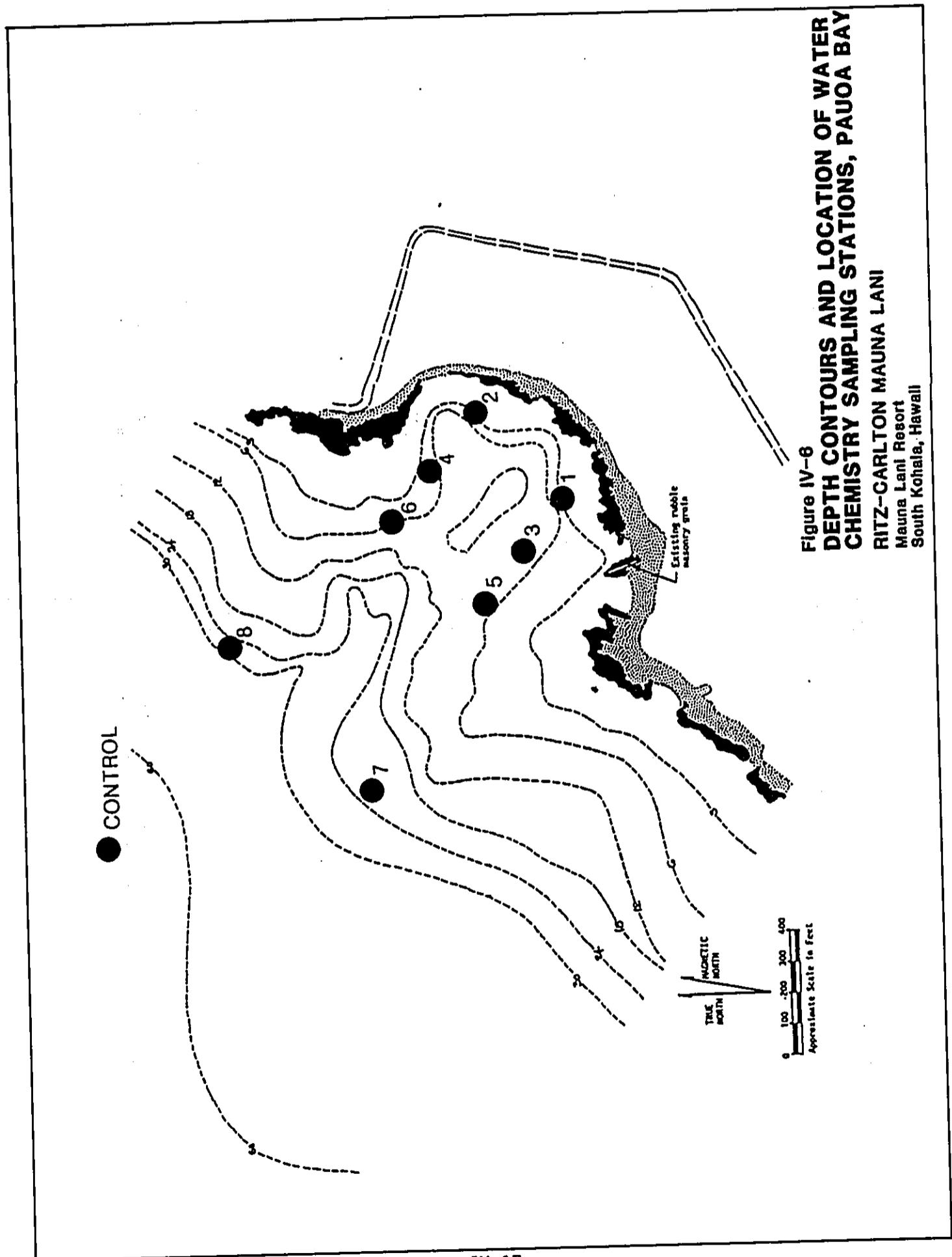


Figure IV-6
**DEPTH CONTOURS AND LOCATION OF WATER
 CHEMISTRY SAMPLING STATIONS, PAUOA BAY**
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

TABLE IV-3

Water Quality Results for Nine Sampling Stations Within and Outside Pauoa Bay, South Kohala

Parameter	Units	Chap. 54 of Title II Parameter Values Not to Exceed		Pauoa Bay Water Samples										Geometric Mean For All Nine Stations		
		Geometric Mean	Not More Than 10% Occurrence	Maximum	Sampling Stations Inside the Bay					Sampling Stations Outside of the Bay						
					1*	2	3	4	Geometric Mean	5	6	7	8		Control	Geometric Mean
Total Kjeldahl Nitrogen	ugl	150	250	350	180	161	123	155	153	164	171	176	144	150	161	157
Ammonia Nitrogen	ugl	3.5	8.5	15	7	3	2	2	3.0	4	2	4	2	1	2.3	2.6
Nitrate and Nitrite Nitrogen	ugl	5.0	14	25	23	25	6	25	17.1	8	8	8	7	1	5.1	8.8
Orthophosphate Phosphorous	ugl	7	12	17	6	8	7	7	7.0	6	6	6	6	4	5.7	6.2
Total Phosphorous	ugl	20	40	60	8	8	7	9	8.0	1.1	9	1.1	7	8	3.6	5.1
Light Extinction Coefficient	K-units	0.20	0.50	0.85	--	--	--	--	--	--	--	0.12	0.15	0.06	--	--
Chlorophyll <i>a</i>	ugl	0.30	0.90	1.75	0.33	0.57	0.38	1.10	0.50	0.90	0.94	0.23	0.28	0.19	0.40	0.44
Turbidity	NTU	0.50	1.25	2.00	0.83	0.88	0.91	1.32	0.97	1.46	2.30	0.86	0.62	0.32	0.89	0.93
Nonfilterable Residue	mg/l	20	30	40	3.2	5.4	8.3	9.4	6.1	21.1	24.1	7.2	5.0	0.8	6.8	6.5

01-11

Notes

1. Light extinction (in K_{d3} units) was measured in situ using a Licor integrating photometer. All other parameter values are laboratory analyses by AECOS Environmental Laboratory. Samples were collected during samll to moderate northwest swell wave conditions.
2. Shallow depths and wave surge within and just outside Pauoa Bay prevented measuring the Light Extinction Coefficient at Stations 1 through 6. The measurement requires access with a boat.

1.4.1.8 Marine Biological Community

The survey and analysis in Dollar (1986) utilizes corals as the keystone to evaluating the biological community. Corals provide reef structure and habitat. As they are immobile, they must adapt to the prevailing water quality and wave stress or die. They tend to have high tolerance to short-term fluctuations of water quality but provide definite indications of longer term changes.

Dollar (1986) utilizes a detailed survey of 12 two-hundred-foot long transects to quantitatively assess the coral community. Figure IV-7 locates these transects and Table IV-4 summarizes the quantitative results. The tabulated values identify the several habitat zones which occur within and outside Pauoa Bay. The floor within the bay (profiles PC-7, PC-11, and PC-8) consists of a shallow limestone and basalt pavement with substantial coverage by rubble and boulders. The extent of coral cover is low (an average of just 3.6 percent of the area). Boring sea urchins and a fine algal turf are the most prominent biota. This biologic community is typically found in areas chronically stressed by wave surge and scour.

Outside the bay, there are three distinct reef zones which are roughly parallel with bathymetric contours. The most shoreward zone is a basaltic-limestone terrace with scattered boulders (transects PN-15, PC-15, and PS-15). Limestone exists as a veneer on the basalt basement. Coral cover is low compared to the seaward zones. Pocillopora meandrina, a species which flourishes in a high wave energy environment, is dominant. Differences in the 15-foot depth transects illustrate the local effects of wave refraction. PN-15 is in the area of highest wave-focused energy; it has the lowest coral cover, fewest coral species, and greatest amount of rubble. In contrast, PC-15, directly outside the bay, benefits from dispersion of wave energy. Coral coverage and species diversity are greater.

The second reef zone is 200 to 400 feet wide and lies between depths 15 and 50 feet (transects PN-30, PC-30, and PS-30). Due to reduced wave scour energy, coral coverage is higher than in the shoreward zone. Porites lobata, in massive lobed colonies, is the dominant coral species. Further seaward, the third zone is the reef slope zone (PN-60, PC-60, PS-60). The typical dominance of the relatively fragile Porites compressa, or finger coral, shows clearly in transect PS-60, an area of low wave energy. PN-60, on the other hand, is an area of high wave energy. It shows the effects of the February 1986 storm waves which reduced the Porites compressa there to rubble. The PN-60 and PS-60 transects were surveyed in both 1983 and 1986. Coral cover increased in the south transect over the three-year period but was significantly reduced along the north transect:

Transect	% Coral Coverage		% Change
	1983 Survey	1986 Survey	
PN-60	70.4	51.4	-19.0
PS-60	72.5	85.0	+12.5

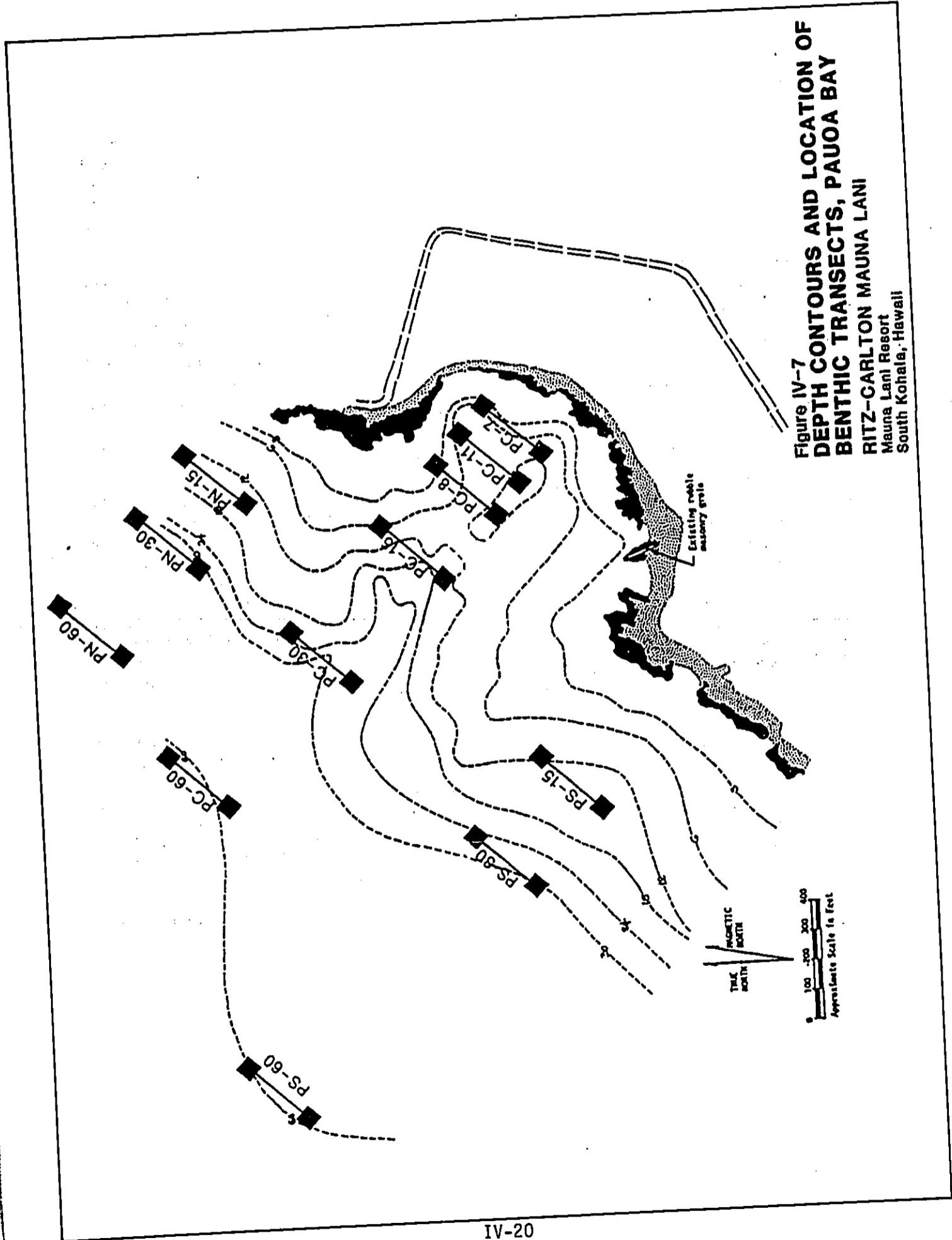


Figure IV-7
DEPTH CONTOURS AND LOCATION OF
BENTHIC TRANSECTS, PAUOA BAY
RITZ-CARLTON MAUNA LANI
 Mauna Lanai Resort
 South Kohala, Hawaii

TABLE IV-4

Substrate Cover and Coral Species Within and Outside Pauoa Bay (from Dollar, 1986:22)

Percentages of Substrate Cover

Type of Substrate Cover	Pauoa Bay Transect											
	PN-15	PN-30	PN-60	PC-7	PC-11	PC-8	PC-15	PC-30	PC-60	PS-15	PS-30	PS-60
Coral	16.8	26.1	51.4	1.1	4.5	5.3	56.0	49.1	50.9	8.4	48.4	85.0
Limestone	34.1	68.3	0.0	21.6	42.0	10.0	42.4	41.0	0.0	28.3	31.6	12.0
Rubble	0.0	0.0	46.4	44.8	25.4	84.7	0.0	2.0	48.9	34.4	0.0	0.0
Sand	0.0	5.6	2.2	0.0	0.0	0.0	1.6	3.9	0.0	0.0	0.0	2.9
Basalt	49.1	0.0	0.0	32.5	28.2	0.0	0.0	4.1	0.0	28.9	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Percentages of Coral Cover by Species

Coral Species	Pauoa Bay Transect											
	PN-15	PN-30	PN-60	PC-7	PC-11	PC-8	PC-15	PC-30	PC-60	PS-15	PS-30	PS-60
<u>Porites lobata</u>	5.3	23.6	31.9	0.4	3.9	4.7	39.0	33.2	39.7	6.4	27.8	35.9
<u>Porites compressa</u>	10.9	0.8	0.8	0.3	0.3	0.5	5.8	14.2	9.3	1.0	17.9	46.3
<u>Pocillopora meandrina</u>	0.3	0.7	0.2	0.3	0.1	0.5	6.8	0.3	1.3	1.0	0.1	1.0
<u>Montipora verrucosa</u>	0.1	0.3	1.0	0.1	0.1	0.5	0.5	0.7	0.4	1.0	1.7	0.1
<u>Montipora patula</u>	0.2	0.1	0.1	0.4	0.1	0.2	3.6	0.5	0.2	0.2	0.2	1.6
<u>Pavona varians</u>	0.2	0.5	0.2	0.4	0.2	0.1	0.2	0.1	0.2	0.3	0.3	0.1
<u>Cyphastrea ocellina</u>		0.1	0.2		0.2		0.1	0.1			0.1	
<u>Leptastrea purpurea</u>												
<u>Fungia scutaria</u>												
Total for Coral	16.8	26.1	51.4	1.1	4.5	5.3	56.0	49.1	50.9	8.4	48.4	85.0
Number of Coral Species	5	7	6	3	5	2	7	7	5	3	8	6

Dollar (1986) also contains survey information of the reef fish community. Along transects outside the bay, species and counts of individuals were typical for undisturbed locations along the West Hawaii coast. Both reef fish and "food fishes" were observed during the survey. The latter included schools of goatfish (weke), opelu, and bluelined snapper (taape), as well as fair numbers of squirrelfish (u'u). Other food fishes seen were jacks (papio), parrotfishes (uhu), goatfishes (moana kea), grand-eyed porgys (mu), and grouper. The reasonable abundance of food fishes is indicative of low fishing pressure. Inside the bay, however, fish diversity and number were found to be markedly impoverished.

In December 1986, a National Marine Fisheries Service biologist made an underwater site inspection of Pauoa Bay, including the nearshore area which consists of a scoured limestone platform with few live coral colonies. Large numbers of juvenile reef fish (particularly parrotfish and surgeonfish) were observed in schools foraging on the fine algal turf.

Three species of marine animals that are known to seasonally inhabit Hawaiian waters (off this coastline in particular) are on the Federal threatened or endangered list. They are the threatened green sea turtle, which occurs commonly along the Kona Coast, the endangered hawksbill turtle, and the endangered humpback whale. During the survey, a single green sea turtle was seen. Pauoa Bay is not known as a hawksbill sea turtle resting, breeding or aggregating area.

1.4.1.9 Anchialine Pond

An anchialine pond, Keanapou fishpond, which has been used as a fishpond for mullet, exists in a natural lava depression along the southern part of the bay (refer back to Figure IV-3). The pond was apparently first surveyed in 1972 (Maciolek and Brock, 1974). Recently it has been examined again (Brock, 1985 and Dollar, 1986). Surrounding vegetation, which was a heavily overgrowth in 1972, now completely hides the pond. The accumulation of sediment and detrital organic material in the pond has also significantly increased.

Based on the paucity of shrimp, fish, and mollusks in the pond, it appears that the anaerobic (reducing) environment is now toxic to biota. In the Dollar (1986) survey, no shrimp and only two types of fish which are representative of anchialine ponds were seen. Only two types of mollusks were observed. No encrusting algae or vascular plants were seen.

Despite its present condition, the pond has the high natural values of size, relatively freshwater (2 to 4 ppt), potential aesthetic appearance, and potential habitat for endemic aquatic life such as small red shrimp and encrusting algae.

Keanapou fishpond was examined by a State Department of Land and Natural Resources staff archaeologist as part of historic preservation review on May 18, 1987. The pond was confirmed to be a good example of a site type, significant for its information content. It was determined that there would be "beneficial effect" if the pond is properly restored. Recommended tasks are described in Section 1.7 of this Chapter of the EIS.

1.4.2 Probable Impacts and Mitigating Measures

1.4.2.1 Temporary Effects of Construction

Construction of the three shoreline projects and excavation and embankment work required for the hotel and landscaping on the balance of the Ritz-Carlton site may affect ocean and anchialine pond water quality. These effects and mitigating measures that will be employed are discussed below.

1.4.2.1.1 Temporary Effects on Ocean Water Quality

The primary effect of construction on ocean water quality will be a temporary increase in turbidity. Sources of turbidity will be the excavation in nearshore waters for the shoreline beach, swimming lagoon, and flushing channels and wind-borne material during earthwork activities on the remainder of the Ritz-Carlton site. No siltation by stormwater runoff is anticipated as the shoreline berm is higher than the adjacent ground and there are no drainageways through the shoreline berm.

During construction of the swimming lagoon, dispersion of particulate material will be minimized by delaying breakthrough at the shoreline until excavation within the lagoon is completed and loose material on the bottom of the lagoon has been pumped to settling basins. If required as a condition for permit approval, during excavation in the nearshore waters for the flushing channel and shoreline beach, silt screens will be used to retard dispersion of particulate material. Loose material would be pumped from the excavated area prior to removal of the silt screens.

Even with these mitigating measures, substantial temporary increases in turbidity will occur. Based on experience in constructing the beaches at Makaiwa Bay and Nanuku Inlet at the Mauna Lani Resort, virtually all of the finer particulate material (fine silt, clay, and colloidal sized particles) will remain in suspension and be dispersed offshore in 24 hours or less, particularly in view of the far greater flushing action that prevails at Pauoa than at Makaiwa or Nanuku. Sand-sized sediment particles will take longer to be moved offshore. The wave surge and wave-driven current transport mechanisms will move this material offshore through the bay's central channel.

1.4.2.1.2 Effects on the Marine Biological Community

Construction activities, including dredging and blasting (if used), and other construction activities, are expected to have a temporary effect on the marine environment in Pauoa Bay. It is possible that some reef fish and other marine organisms will be destroyed during construction, but most fish will be able to swim away to other nearby areas of the ocean with similar habitat, and thus be only temporarily dislocated.

The effects of temporary loading of suspended and bedload sediment on the marine biological community are not expected to be significant for the following three reasons: (1) the marine community within the bay is extremely limited in diversity and abundance; (2) the community is already chronically subjected to high turbidity events caused by wave suspension and is thus limited to species of high tolerance; and (3) the rapid flushing in the bay and directly outside will limit the duration of the sediment loading. In

other words, the effects of construction will not be significantly different than natural events and, as such, are within the limits of tolerance of the marine community.

Construction activity will occur during a relatively short period of time and is expected to have a negligible impact on endangered species. Humpback whales are not prone to swim in areas of shallow limestone shelves such as are found in Pauoa Bay. Green sea turtles may potentially be exposed to impacts of construction activity. To mitigate impacts, no blasting would be done if endangered species or major marine animals are within view of the shoreline. Pre- and post-blast surveys will be conducted to ensure that protected marine species are cleared from the area and to determine whether any are injured as a result of blasting. If used, blasting will be restricted to periods of low tide to reduce the likelihood of the presence of endangered species. It will not be done during the migratory season of the humpback whale (from December through April). Controlling the size of detonation charges and how they are used can mitigate the potential impact of blasting on marine life. Smaller charges can be detonated prior to the main charge, as a means of dispersing marine life in the immediate area.

Excavation and grading will be done by bulldozers and backhoes and hard spots will be worked with hydraulic rams to break the material. The applicant is aware of the potential adverse impacts due to the use of explosives in the nearshore area and intends to avoid the use of explosives as much as possible. Only as a last resort, if hard spots resist breakage by hydraulic ram, will small 10 to 15-pound explosive charges be used to fracture the rock. The rock would then be ripped and removed by hydraulic shovels. This would minimize potential adverse effects due to blasting.

1.4.2.1.3 Effects on Anchialine Pond Water Quality and Biota

Pumping of accumulated sediment and detrital organic matter from the pond will be accompanied by the release of gases and a high level of turbidity in the pond. Less mobile fauna will be sucked up by the dredge pump in this process. Pumping will be continued until all sediment has been removed and the clarity of the pond water has been restored, a period estimated to be one to several days long. These temporary effects are unavoidable if the natural aquatic and aesthetic values of the pond are to be restored. Present conditions severely limit the area of free standing water and have created a reducing environment which is apparently toxic to much of the endemic biota.

1.4.2.2 Permanent Impacts

Permanent impacts on the nearshore and marine environment will include alteration of the shoreline, changes to the anchialine pond environment, and increased recreational use of the bay. These effects are discussed below.

1.4.2.2.1 Shoreline Alteration

The proposed swimming lagoon and beach expansion projects in the southern half of the bay will create the following changes along the shoreline;

- o 24,000 cubic yards of material will be permanently removed, approximately 6,600 cubic yards of which will be from seaward of the State-certified shoreline;

- o 7,300 cubic yards of medium to coarse grained carbonate sand will be brought in to supplement the 1,900 cubic yards on-site for a total sand volume of 9,200 cubic yards;
- o 2,950 cubic yards of the sand will be placed seaward of the State certified shoreline and the balance will be inland;
- o 430 feet of new shoreline beach frontage will be added to the existing 230 feet;
- o 1.6 acres of beach area will be added to the existing 0.5 acre; and
- o 1.5 acres of safe swimming area will be created along the shoreline.

The overriding design concern is the stability of the new sand beaches. This concern dictates project location, excavated slope of the basement rock on which the beach sand will be placed, grain size of the imported carbonate sand, width of the lagoon opening, use of existing bathymetric relief to establish the limits of the excavated swimming area, and the addition of flushing channels. These choices are particularly critical in view of the prevailing transport mechanisms in the bay. If sand is eroded from the beaches and deposited beyond the excavated swimming areas or flushing channel, it may be permanently removed from the inner bay via its central channel to the reservoir of sand in deeper water beyond the reef zone. On the other hand, since the swimming areas will be deeper than adjacent areas in the bay, they are potential traps for silt and other undesirable fine particulate matter. Flushing channel dimensions are chosen to achieve sufficient velocity to move these fines without disturbing the coarser, beach sand deposits.

1.4.2.2.2 Changes to the Anchialine Pond Environment

The area of free standing water in the pond will be increased substantially, sediment will be permanently removed, and aerobic conditions in the water column and on the bottom of the pond will be restored. Another less obvious potential change is an increase in pond salinity due to excavation of the swimming lagoon. Some change is probable although its extent is virtually impossible to predict. Movement of groundwater and its mixing with seawater this close to the shoreline occurs in localized cracks and fissures which cannot be detected.

Currently, the pond's salinity of 2 to 4 ppt is at the extreme fresh end of the range of anchialine pond salinity. The approach that will be used for this project will be to monitor pond salinity during and after excavation of the swimming lagoon. If the salinity rises above 10 ppt, a change which is beyond that which is expected but still in the mid-range for anchialine pond, measures would be implemented to limit the salinity increase. Holes would be drilled along a line between the pond and lagoon and grout pumped into these holes. Work would be controlled by constant monitoring of salinity. The objective would be to keep the pond's salinity at or below 10 ppt. The number of holes to be drilled is currently unknown. If salinity rises above the acceptable level, a determination of the number of holes to be drilled will be made based on the results of salinity monitoring and the engineer's recommendations. The appropriate number of holes would then be drilled and filled with grout.

Once all work has been completed, the typical biological community of shrimp, fish, mollusks, vascular plants, and encrusting algae is expected to establish itself. Shrimp will be the first to appear in a matter of days or weeks and the remainder of the community will be established more slowly over several years.

1.4.2.2.3 Long-Term Changes to Ocean Water Quality and Resulting Biological Response

Minor long-term nutrient loading of water in the bay may occur. Sources of the nutrient loading will be fertilizer. Landscaping around the hotel and a second, 18-hole golf course will be added to the resort, in part due to the demand of the Ritz-Carlton project. Percolating irrigation water may enter the basal lens and ultimately be discharged into the ocean at the shoreline. A number of processes will be at work to reduce the rate of nutrient loading. Nutrient up-take by grass and other vegetation is the most significant. In the soil layer, cation exchange, fixation, denitrification, and absorption will also limit the nutrient concentration in percolating irrigation water.

Biological response to the small nutrient increase in shoreline-discharged groundwater is expected to be nil. Such an outcome has been demonstrated previously along the West Hawaii Coast at the Mauna Lani Bay Hotel, Kailua-Kona, and the Keauhou Resort. The lack of biologic response is primarily attributed to the small rate of loading and its rapid dilution and dispersion. Within and just outside Pauoa Bay, there is another critical factor. The impact of breaking waves and resulting wave surge restricts the biologic community to the few species of relatively low abundance which can survive in this physically harsh environment.

Although some impact to nearshore waters are anticipated due to shoreline construction activities and operation of the hotel and resort amenities, there may be others unknown at present. Mitigation measures such as precautions to be taken during construction and operation may need to be supplemented by others. In order to ascertain what these mitigation measures might be, some form of monitoring during construction and afterwards might be appropriate. Monitoring could range from simple visual inspection to a systematic program of testing and analysis.

1.4.2.2.4 Potential for Movement of Beach Sand

Existing conditions in that portion of the bay proposed for the construction of lagoon/beach improvements include an existing very stable sand beach which does not move seasonally, either in and out or laterally. Contributing factors of stability are the orientation of the embayment, the relatively shallow water in the bay, and the extensive emerged and submerged outcrops which will not be modified during construction. All work will be done inside, thus leaving the outcropping in place to ensure stability. The existing beach is actually a full-scale prototype of a stable beach and it is expected that sand imported to supplement the existing sand likewise will not move to any significant degree.

1.4.2.2.5 Monitoring Program

The applicant and its consultants have been discussing monitoring measures with governmental agencies during the ongoing permitting process. Agencies include the County Department of Planning, the State Department of Land and Natural Resources, the State Department of Health, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. The applicant intends to implement appropriate monitoring measures, as required by conditions to permits issued by any of these agencies.

Based on anticipated potential impacts, a monitoring plan might include measuring water salinity and surface elevation in the fishpond; monitoring nearshore water turbidity before, during, and after construction; performing a benthic survey; monitoring sand movement; measuring salinity profiles in the bay; and following procedures should blasting be necessary, including restricting the period when blasting is permitted. State Department of Health water quality concerns will be addressed in the monitoring program.

1.4.2.2.6 Changes to Shoreline Access and Recreational Use

By previous agreement between Mauna Lani Resort and the County of Hawaii, a 10-foot wide public access easement runs parallel to the shoreline of the Resort, including the shoreline of the Ritz-Carlton hotel site. The alignment is generally mauka of the October 23, 1986 certified shoreline, just inland of the naturally occurring shoreline berm on privately owned land. The trail is part of the Kawaihae-Kiholo shoreline trail, legally described on Land Court Map #7, Land Court Application 1785 (September 5, 1984) as Easement "B". The reader is referred to Figure IV-7a for the following discussion.

With the creation of the swimming lagoon, a portion of the easement on private land (the shoreline trail) once accessible to the public will be submerged and will no longer be traversible by foot. Public land now seaward of the certified shoreline which is non-submerged will become submerged and likewise be made inaccessible to the public. The existing pedestrian right-of-way will be bisected by the lagoon and the public on the southern segment of the path will be able to join the northern segment by swimming across the lagoon opening. Alternatively, the public will have shoreline access through a proposed right-of-way around the periphery of the lagoon on the sand.

The applicant currently does not intend to ask for recertification of the shoreline after completion of shoreline improvements, including the lagoon construction. The certified shoreline would thus remain that which was certified by the Director of the State Board of Land and Natural Resources on October 23, 1986. Areas mauka of the certified shoreline, including submerged lands in the lagoon, would remain privately owned. The public, however, will have access to the waters within the lagoon and the sand beach as well as access around the lagoon by way of a continuous public shoreline trail.

In accordance with zoning conditions, Mauna Lani Resort, Inc. is required to provide perpetual public lateral shoreline access at the resort and has provided this access by way of the easement described above. After completion of the project, including shoreline improvements, The Ritz-Carlton

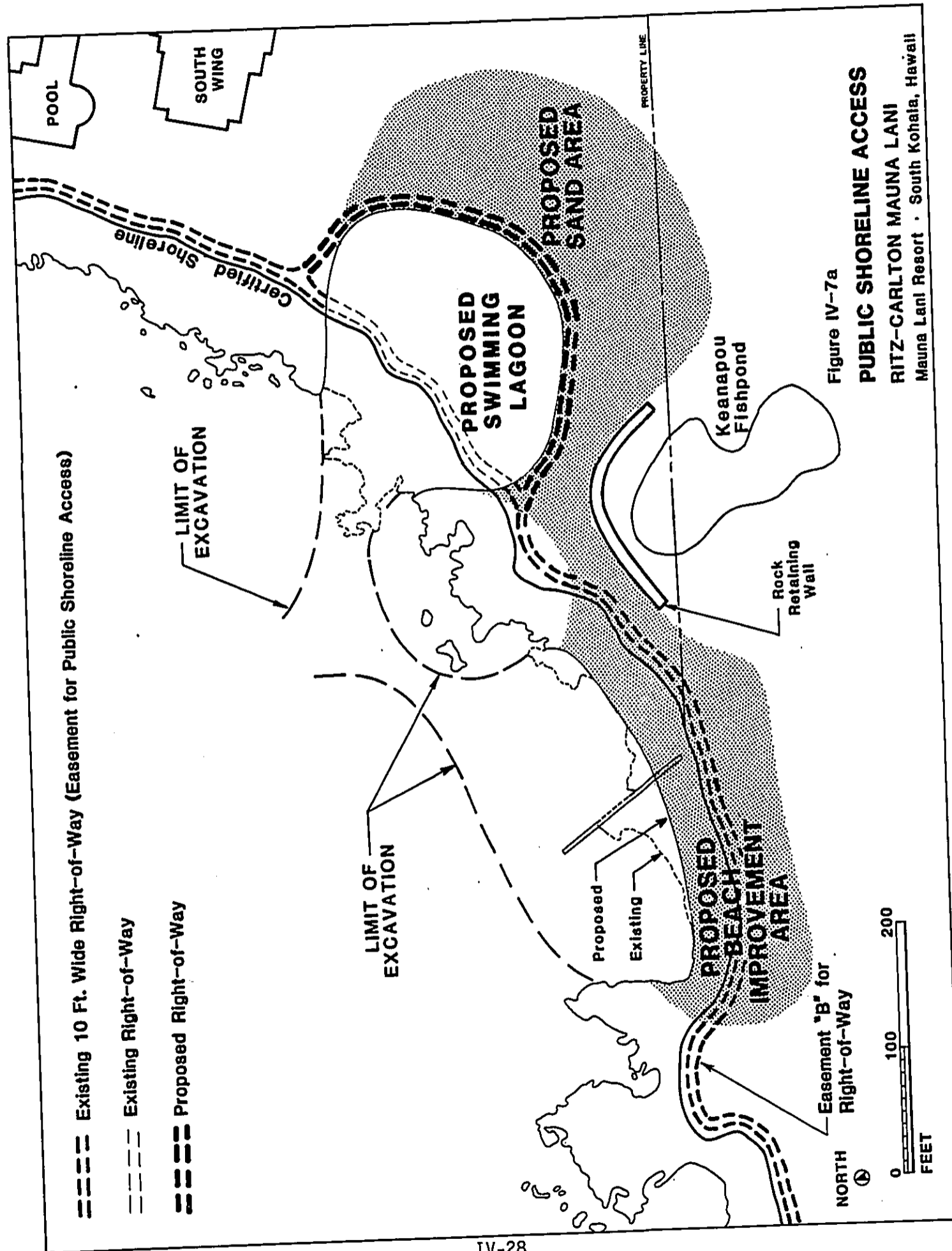


Figure IV-7a
PUBLIC SHORELINE ACCESS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort • South Kohala, Hawaii

Hotel Company will provide public access around the lagoon to ensure continuous lateral access. A legal right will be granted to the public for perpetual use of this right-of-way. The applicant will comply with any procedures required by the State to convey this public right-of-way.

Some fishing in the general area occurs off the shoreline north and south of the bay, but there is virtually no fishing within the bay itself, where fish communities are limited due to the rigorous conditions brought about by wave and sediment stress. The Ritz-Carlton Mauna Lani hotel and shoreline improvement project is not anticipated to substantially affect this pattern of use, although improved shoreline access, including the development of the public shoreline beach park north of the project site -- which is expected to be developed at the same time as the hotel project -- will improve access to the shoreline north and south of the bay.

The lagoon and beach expansion projects will significantly expand the recreational potential of the bay for swimming, snorkeling, and sunbathing. Due to limited access, use of the bay for these activities is currently quite minimal. It will increase substantially with the presence of hotel guests and greater use by the general public. Improved access will also be beneficial to surfers who surf, not in the bay itself, but off the points both north and south of the bay.

1.5 TERRESTRIAL FLORA

1.5.1 Existing Conditions

Existing plant life at the Mauna Lani Resort area was described in the 1975 Environmental Impact Statement, prepared prior to development at the resort. Since then, a golf course, hotel, condominium projects and associated resort amenities have been developed. In general, the earlier description of terrestrial flora remains valid, supplemented by the introduction of other species associated with resort landscaping.

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

Results of the botanical field survey indicated the presence of three major vegetation cover types within the vicinity of Ritz-Carlton project area:

Kiawe Scrub Rockland. This cover type is characterized by smoother, older lava surfaces, usually pahoehoe. Vegetation is sparse, usually less than 50 percent, but definitely more abundant than that found on barren a'a lava. Scattered kiawe shrubs form the dominant cover, although ilima, hi'aloa (Waltheria indica var. americana) and sixweeks threeawn (Aristida adscensionis) were also observed. Other species found in Open Scrub Grassland, described below, also occur here, but less frequently.

Open Scrub Grassland. This cover type is characterized by level to gently rolling grasslands with scattered forbs, shrubs and trees. In the northern sections of the Mauna Lani Resort area, the cover type becomes more dense in the tree layer and grades into Kiawe Woodland. Exotic perennial grasses typical of the grasslands (and of dry leeward grasslands throughout the islands) are buffelgrass (Cenchrus ciliaris), feathery pennisetum (Pennisetum setosum) and stinkgrass (Eragrostis cilianensis). Native plant species observed were the indigenous ilima, hi'aloa and alena (Boerhavia diffusa), and the endemic blue-seeded portulaca of 'ihi (Portulaca cyanosperma).

Coastal Strand. The shoreline of the proposed project area exhibits a variety of physical forms and features. Pauoa Bay is characterized by a rocky lava coast with a narrow cobble beach consisting of smoothed basaltic lava and coralline fragment mixtures. Few plants occur on this substrata, but among those found were two endemic species, the native caper (Capparis sandwichiana var. zoharyi) and 'aheahea (Chenopodium oahuense); and two indigenous species, beach naupaka (Scaevola taccada) and pohuehue or beach morning glory (Ipomoea brasiliensis). Tree heliotrope (Messerschmidia argentea) is also found at Pauoa Bay beach.

During the 1984 Earthwatch survey, no proposed, listed or candidate endangered or threatened plant species were observed within the proposed Ritz-Carlton Mauna Lani development area.

The list of plant species encountered in the survey area is shown in Table IV-4a.

1.5.2 Probable Impacts and Mitigation Measures

Development of the proposed Ritz-Carlton Hotel would entail clearing, grading, construction of buildings and related hotel amenities, and landscaping resulting in an increase in the extent and density of vegetative cover, with change in species composition. This increase would provide additional habitat and food sources for birds and other small animals. At the same time, fauna that are adapted to the naturally arid conditions would be displaced by species better able to take advantage of opportunities in urban and semi-urban environments.

Although extensive earthwork will accompany construction of facilities, it is anticipated that portions of the hotel site will be left intact where feasible, allowing incorporation of natural landscape elements, including endemic species, into the proposed development, particularly along the coastline north of the swimming lagoon and swimming beach.

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

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

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

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

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

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

TABLE IV-4a

Plant Species Checklist - Mauna Lani

Scientific Name	Common Name(s)	Status
MONOCOTYLEDONAE		
GRAMINEAE (Grass Family)		
<i>Aristida adensionis</i> L.	Sixweeks threeawn	X
<i>Cenchrus ciliaris</i> L.	Buffelgrass	X
<i>Chloris divaricata</i> R.Br.	Stargrass	X
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda Grass; manienie	X
<i>Eleusine indica</i> (L.) Gaertn.	Wiregrass; manienie-ali'i	X
<i>Eragrostis cilianensis</i> (All.) Vig.-Lut.	Stinkgrass	X
<i>Eragrostis tenella</i> (L.) Beauv. ex R.&S.	Japanese lovegrass	X
<i>Pennisetum setaceum</i> (Forsk.) Chiov.	Fountaingrass	X
<i>Pennisetum setosum</i> (Sw.)L.C.Rich in Pers.	Feathery pennisetum	X
<i>Rhyncheletrum repens</i> (Willd.)C.E.Hubb	Natal redtop	X
<i>Setaria verticillata</i> (L.)Beauv.	Bristly foxtail	X
DICOTYLEDONAE		
MORACEAE (Mulberry Family)		
<i>Ficus</i> spp.	--	X
CHENOPODIACEAE (Goosefoot Family)		
<i>Atriplex semibaccata</i> R.Br.	Australian saltbush	X
<i>Chenopodium album</i> L.	Lamb's quarters; 'aheahea	X
<i>Chenopodium carinatum</i> R.Br.	Keeled goosefoot	X
<i>Chenopodium murale</i> L.	Nettle-leaved goosefoot	X
<i>Chenopodium oahuense</i> (Meyen) Aellen	'Aheahea	E
<i>Salsola pestifer</i> A.Nels.	Russian thistle	X
AMARANTHACEAE (Amaranth Family)		
<i>Amaranthus spinosus</i> L.	Spiny amaranth; pakai-kuku	X
<i>Amaranthus viridis</i> L.	Slender Amaranth; pakai	X
NYCTGINACEAE (Four o'clock Family)		
<i>Boerhavia diffusa</i> L. var. <i>diffusa</i>	Alena	I
<i>Boerhavia diffusa</i> L. var. <i>tetranda</i> (Forst.f.) Heimerl	Alena	I
<i>Bougainvillea</i> spp.	Bougainvillea	X
PORTULACACEAE (Purslane Family)		
<i>Portulaca cyanosperma</i> Eglér	Blue-seeded portulaca; 'ihi	E
<i>Portulaca oleracea</i> L.	Common purslane; 'ihi	X
CARYOPHYLLACEAE (Pink Family)		
<i>Spergula</i> spp.	--	X

TABLE IV-4a

(Continued)

Scientific Name	Common Name(s)	Status
PAPAVERACEAE (Poppy Family) <i>Argemone glauca</i> Pope	Prickly poppy; pua-kala	E
CAPPARACEAE (Caper Family) <i>Capparis sandwichiana</i> var. <i>zoharyi</i> Deg. & Deg. <i>Gynandropsis gynandra</i> (L.)Brig.	Native caper; pua-pilo Wild spider flower; honohina	E X
LEGUMINOSAE (Pea Family) <i>Leucaena Levcocephala</i> <i>Prosopis pallida</i> (Humb.&Bonpl. ex Willd.)HBK	Mesquite; kiawe	X
EUPHORBIACEAE (Spurge Family) <i>Euphorbia hirta</i> L. <i>Euphorbia glomerifera</i> (Millsp.) L.C. Wheeler <i>Euphorbia prostrata</i> Ait. <i>Ricinus communis</i> L.	Garden spurge; koko-kahiki Graceful spurge Prostrate spurge Castor bean; koli	X X X X
MALVACEAE (Mallow Family) <i>Malvastrum coromandelianum</i> L. Garcke <i>Sida</i> spp. <i>Sida fallax</i> Walp.	False mallow; hauuoi Ilima; 'ilima papa	X I
CUCURBITACEAE (Gourd Family) <i>Cucumis dipsaceus</i> Ehrenb. ex. Spach	Wild spiny cucumber	X
STERCULIACEAE (Cocoa Family) <i>Waltheria indica</i> var. <i>americana</i> (L.)R.Br.	Waltheria; hi'aloa; 'uhaloa	I
CONVOLVULACEAE (Morning glory Family) <i>Ipomoea brasiliensis</i> (L.)Sweet <i>Merremia aegyptia</i> (L.)Urban	Beach morning glory; pohuehue Hairy merremia; koali-kua-hulu	I X
BORAGINACEAE (Heliotrope Family) <i>Messerschmidia argentea</i> (L.f.) Johnston	Tree heliotrope	X
GOODENIACEAE (Naupaka Family) <i>Scaevola taccada</i> (Gaertn.) Roxb.	Beach naupaka; naupaka-kahakai	I
COMPOSITAE (Sunflower Family) <i>Ageratum conyzoides</i> L. <i>Bidens cynapifolia</i> HBK. <i>Bidens pilosa</i> var. <i>pilosa</i> L. <i>Gnaphalium peregrinum</i> Fern.	Ageratum; maile-honono West Indian beggar's tick Beggar's tick; ko'oko'olau	X X X X

TABLE IV-4a

(Continued)

Scientific Name	Common Name(s)	Status
COMPOSITAE (Sunflower Family) - (continued)		
Picris hieracioides L.	Hawksweed	X
Pluchea odorata (L.) Cass.	Pluchea; sourbush	X
Sonchus oleraceus L.	Sow thistle; pua-lele	X
Taraxacum officinale (L.) Weber in Wiggers	Dandelion; lau-lele	X
Wedelia trilobata (L.) Hitchc.	Wedelia	X
Zinnia pauciflora L.	Wild Zinnia; pua-pihi	X
Unidentified	--	--
Unidentified (island record)	--	--

Families are arranged according to St. John (1973). Genera and species are listed alphabetically within each family. Taxonomy and nomenclature generally follows St. John except where more commonly accepted names are listed.

For each species the following information is provided:

1. Scientific name with author citation.
2. Common English name and/or Hawaiian name, when known.
3. Status of the species:

E = Endemic to the Hawaiian Islands; occurring naturally nowhere else in the world.

I = Indigenous: native to the Hawaiian Islands but also occurring naturally elsewhere in the world.

P = Polynesian Introduction: plants brought by the Polynesian immigrants prior to contact with the Western World.

X = Exotic: plants of accidental or deliberate introduction after contact.

1.6 BIRDS AND WILDLIFE

1.6.1 Existing Conditions

Observations made at the time of the 1975 Environmental Impact Statement for the Mauna Lani Resort lands, within which the Ritz-Carlton project is located, led to the conclusion that the more common species of birds were to be found at the resort area. It was stated that the shoreline and brackish ponds of the area did not provide the wetlands suitable for nesting of rare native birds, such as are found in wetlands to the south of the Mauna Lani Resort. Larger mammals sighted were mongooses and feral goats. These observations were in general reconfirmed in two surveys performed by Philip Bruner, the first in 1979 and the second in 1984 and a subsequent site visit to the Ritz-Carlton site in March 1987 by Belt Collins staff.

1.6.1.1 Birds

The only indigenous (native) species of bird recorded during the 1984 survey was the Pacific Golden Plover (Pluvialis fulva), a migratory species of shorebird that typically forages in open short grassy terrain (Johnson, Johnson and Bruner, 1981). A substantial increase in such habitat has occurred with the building of the Francis I'i Brown golf course. Prior to the existence of these golf courses, plovers were probably not common in this area (Bruner, 1984:2). See Table IV-4b for a listing of exotic birds observed during the 1984 survey.

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

1.6.1.2 Mammals

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

Herds of feral goats (Capra hircus linnaeus) ranging in size from as few as 3 or 4 animals to as many as 20 to 30 reportedly roamed the general area prior to its development as a resort (Belt Collins & Associates; 1975). Although a few years later a study concluded that feral goats were "relatively uncommon in the drier, lower elevation areas," three were sighted during an August 1984 Belt Collins field trip to the Mauna Lani Resort site and nearly a dozen were spotted on a similar trip in March 1987.

The endangered Hawaiian hoary bat (Lasiurus cinereus semotus) occurs on the island of Hawaii. Most sightings have been recorded in Hilo and in relatively wet forests at higher elevations. However, on September 24, 1984, a dead specimen was found on the grounds of the Sheraton Royal Waikoloa Hotel. Since then, there have been no reports of Hawaiian hoary bats having been seen in the general Mauna Lani Resort and Pauoa Bay area.

TABLE IV-4b

Relative Abundance and Habitat Preference of Exotic (Introduced) Birds
Mauna Lani Resort

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

Key to Table:

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

A = Abundant (average on 8-minute count: 10+)

C = Common (average on 8-minute count: 5-10)

U = Uncommon (average on 8-minute count: less than 5)

R = Recorded but not on 8-minute count. Number that follows is the actual number seen or heard.

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

G = Grassland (open fields)

K = Kiawe thickets

P = Parkland (mixed grassland and scattered trees)

E = Edge of roads or other breaks in the vegetation

S = Shoreline (exposed rocky shelf)

Source: Phillip Bruner (1984)

1.6.2 Probable Impacts

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

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

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

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

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

1.7 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

1.7.1 Existing Conditions

Mauna Lani Resort is situated at Kalahuipua'a, an ili of Waikoloa. A complex of large and productive fishponds provides a focal point for Kalahuipua'a (Kirch, 1979:1). The area is rich in historic resources and archaeological remains and has been the subject of numerous surveys. Mauna Lani Resort, Inc. has adopted an interpretive and management plan to preserve and display these resources in an orderly manner (Science Management, Inc., 1982). None of the sites so targeted in the plan are in the Ritz-Carlton Mauna Lani project area.

It should be noted however, that there are a number of known sites at Mauna Lani Resort which are not scheduled for interpretive preservation, but which still contain significant information on the prehistory of the area. These sites need to be protected during development or undergo appropriate data recovery prior to construction.

As discussed earlier, the 32-acre project site is dominated by grass-covered pahoehoe lava flows. Aside from the proximity of the property to Pauoa Bay, its only other significant topographical feature is an anchialine pond situated in the southwest corner of the project site just inland of the shoreline berm.

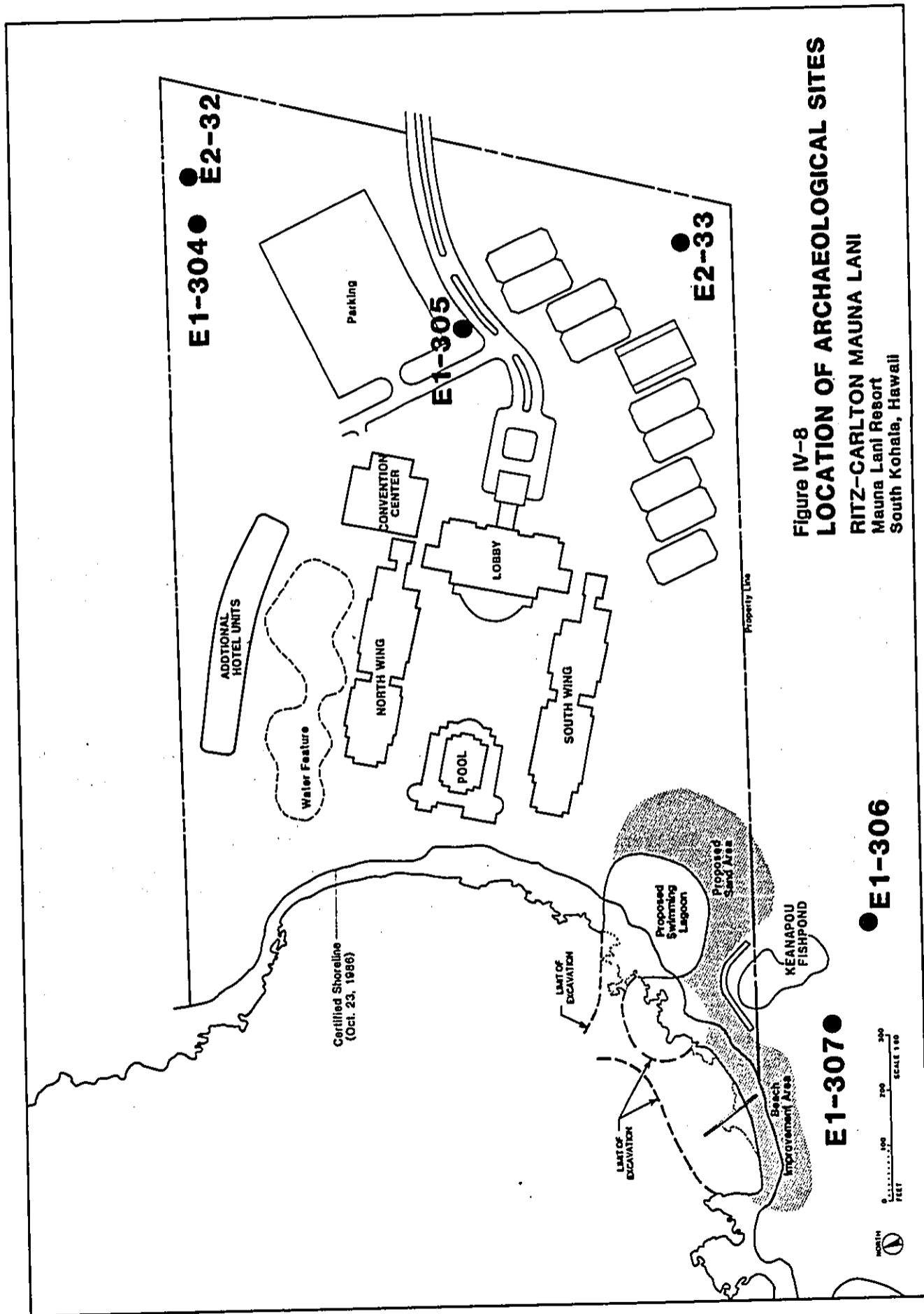
1.7.1.1 Historical Setting

A detailed discussion of the general historical settlement of the Kalahuipua'a district, in which the project site is located, is contained in the EIS for the Revised Master Plan for Mauna Lani (1985). This discussion was based upon a number of archaeological investigations conducted in the Kalahuipua'a area. The first research in 1955 involved examination of sites near the Kalahuipua'a fishponds and the petroglyph field, with excavation of various sites. In 1964, the B.P. Bishop Museum carried out a major examination of the Puako petroglyph field, including mapping (Welch:5). The most extensive work was conducted by Patrick Kirchon 4,000 acres in the Puako and Kalahuipua'a areas between 1973 and 1975, with the final report published in 1979. The research included intensive survey in 1973, an aerial survey in 1974 and an intensive survey and salvage excavation in 1975 (ibid:6). The following discussion of archaeological sites identified on the project site is based largely upon the findings of the 1979 Kirch report.

1.7.1.2 Findings of the 1973-75 Survey and Excavation

The 1979 Kirch report indicates that five separate sites are located on the Ritz-Carlton Mauna Lani and shoreline improvement project sites (see Figure IV-8):

Site 1: El-304 - C-Shaped Structures. A triple C-shaped structure is about 30 meters south of the survey corner for State of Hawaii General Lease 3-4141, just seaward of the edge of the lava flow. The structure is about 7 meters long by 3 meters wide. Each C-shaped section is about 2 meters wide and the walls are about 50 centimeters high. There is a "cupboard" in the south end of the structure, and a fair amount of shell midden occurs on the surface.



Site 2: E1-305 - Alignment. This small alignment encloses the entrance of a shallow lava tube. Made of loosely placed lava cobbles and measuring 1 meter high by 1.5 meters wide, it partially obscures the cave's 1-meter-wide entrance. The cave extends only about 1 meter. No midden or artifacts were found during the survey.

Site 3: E2-32 - Petroglyphs, C-Shaped Structures, Abrader Manufacturing Area, Oval-Shaped Structure. This cluster of features is located on the edge of a pahoehoe lava flow, bordering a thick growth of kiawe. Feature A is a series of four unusual petroglyphs. The most prominent of these is a stick figure, about 30 cm tall by 30 cm wide, with two large, deeply pecked eyes. Just to the north of this cluster are several smaller figures.

Feature B includes about 10 roughly formed C-shapes. Averaging about 2 to 3 meters long by 1 to 1.5 meters wide, they are all built directly on pahoehoe lava. Most are roughly built of lava cobbles with alignments rising no more than 1 meter high. In some cases, natural lava outcroppings were used to form part of the structure.

Feature C is an oval-shaped enclosure with a significant midden deposit. Measuring 4.5 meters long by 2.5 meters wide, it has a 75-cm-high lava cobble alignment incorporated into its natural lava sides. The enclosure is oriented north to south and has some soil on its lava floor. Midden noted includes *Cypraea* spp., *Nerita picea* Recluz, *Echinometra mathaei* Blainville, coral, fishbone, and waterworn pebbles; basaltic glass was also noted. Another low alignment was found below this feature.

Feature D consists of the numerous abrader manufacturing depressions found throughout the site.

The area on which Site E2-32 is located comprises a 50-meter-long stretch of pahoehoe lava. All features were found in this area. There were no surface artifacts.

Site 4: E2-33 - Shelter Cave. This is a 1-meter by 60-cm-high shelter cave with a small C-shaped located about 4 meters north of its entrance. The cave is about 3 meters deep and has sparse midden on its lava floor. The C-shape faces south, has an alignment of loosely piled lava cobbles, and measures 2 meters long. The sparse midden deposit found in and around these two features includes basaltic glass and *Cypraea* sp. There were no surface artifacts.

Site 5: Keanapou Fishpond. The pond appears to have been formed from the collapse of a lava tube and appears as an elliptical-shaped depression which is approximately 200 by 100 feet. Presently, it is surrounded by a dense growth of beach plants, hau trees and palm trees. Standing water in the pond varies in quantity depending upon the tides from a very small area of approximately 30 square feet to an area of several thousand square feet. This pond has been traditionally identified as Keanapou Fishpond. Sources at the Mauna Lani Resort have commented that the existing anchialine pond may have been altered in the 1930's by Francis I'i Brown to enable the raising of mullet. There are some indications of concrete masonry work at the south end of the pond, as observed in a 1987 field trip by Belt Collins staff.

A May 1987 fieldcheck by a Department of Land and Natural Resources staff archaeologist showed that the following two sites are caves attached to the pond:

E1-306 - Shelter Cave Complex: This site is a series of several lava-bubble chambers alongside Keanapou Pond. There is some structural modification inside the caves, as well as scattered midden. Outside the caves, on the pahoehoe surface, are two petroglyphs and numerous abrader manufacturing depressions.

E1-307 - Shelter Cave: This lava-bubble cave is c. 10 to 15 meters deep and 4.5 meters wide inside; the entrance is small and was partially damaged by bulldozing prior to 1975. There is some midden deposit on the damp floor. Several waterworn cobbles were noted inside the cave. The roof of this lava bubble is pahoehoe; the upper surface has several abrader manufacturing depressions and scattered midden -- predominately *Cypraea caputserpentis* L., with some *Drupa ricina* L. and *Nerita picea* Recluz. Unmodified coral (*Porites* sp.) and a fragment of scoriaceous lava abrader were also seen.

1.7.1.3 Significant Assessment

Historic preservation review of sites in the project area by the Historic Sites Section of DLNR is ongoing. The significance of the archaeological sites at the project site has been determined by the Historic Sites Section, according to the criteria of the National and Hawaii Registers of Historic Places. The significant assessments were offered in an April 13, 1987 letter from DLNR to the applicant's consultant, Belt Collins & Associates, and later reaffirmed in a letter of June 17, 1987 from DLNR to Belt Collins, following a May 18, 1987 fieldcheck of the significant historic sites in the project area by a Historic Sites Section archaeologist. (Chapter XIII of this EIS contains copies of these letters.)

The Historic Sites Section's evaluation is that there are four significant historic sites in the hotel parcel and in the shoreline improvement area, and one site which is no longer significant:

E1-305: "No longer significant". This site did contain some information significant on the history of the area, but this information was adequately recorded by Kirch (1979:28).

E1-304, E2-32, E2-33: Significant solely for their information content. These are small sites with some shallow and spatially restricted deposits (Kirch 1979). The significant information in these sites includes the architectural data and information contained in the deposits (including dates).

Keanapou Fishpond: Significant for its information content (architectural details and possible fishpond sediments) and as a good example of a site type, a fishpond established in an anchialine pond.

The applicant agrees with the above evaluations and will check with the County Planning Department for its concurrence.

1.7.2 Probable Impacts

The impacts on the three significant sites, E1-304, E2-32 and E2-33, have yet to be determined. The applicant intends to perform archaeological data recovery to recover the significant information in the sites, according to the mitigation plan proposed by the Historic Sites Section (see section 1.7.3 following). If the archaeological data recovery is acceptable, the Historic Sites Section states that there would be "no adverse effect".

The Historic Sites Section has also determined that there will be a "beneficial effect", if the fishpond is restored properly. The applicant intends to restore the pond as part of its shoreline improvement projects.

The County Planning Department will be consulted as to the effects to the above significant sites.

In addition, should new sites be uncovered during construction, all activity in the immediate area will cease and the appropriate State and County agencies notified. It is expected that at that time a collective decision will be made as to what action should be taken.

1.7.3 Mitigation Measures

The applicant is committed to acceptable mitigation treatments for each significant site. The fishpond will be properly restored and preserved and archaeological data recovery will be conducted for the three inland sites. The Historic Sites Section agrees with this and the County Planning Department will be consulted.

The following mitigation plan proposed by the Historic Sites Section will be the basis for the applicant's treatments. Later, detailed restoration and archaeological data recovery plans will be submitted to the County Planning Department and the Historic Sites Section for review and approval. The applicant expects the same two offices to verify acceptable completion of these plans.

MITIGATION PLAN AS PROPOSED BY HISTORIC SITES SECTION, DLNR, JUNE 17, 1987

Keanapou Fishpond. The following tasks are recommended to ensure proper restoration. Items 2-5 must be done by a professional archaeologist.

1. Clearing of vegetation. This does not need an archaeologist present, as long as no heavy machinery is taken to the edge of the pond. It probably will be desirable not to clear out all the trees; for example, coconuts and others probably can be left for shade and scenic effect.
2. Locate any additional archaeological features (such as abrader grinding basins) on the pahoehoe on the very edge of the pond. This is a very easy task which should take no more than a few hours.
3. Map the fishpond's borders, including sites E1-306 and -307 and any archaeological features found on the edge of the pond.

4. Document the appearance of the pond, with photographs.
5. Take 2 cores of the sediments, analyze the sediments, and attempt to radiocarbon date the initial use of the pond for aquaculture.
6. Produce an archaeological report documenting the archaeological work.
7. Remove sediments as desired, with heavy equipment allowed only where archaeological features are not present and with care to have such vehicles not scar the pahoehoe edge of the pond.
8. Restore the pond to operating conditions with care not to damage the archaeological remains and with care not to alter the visual integrity of the site.

INLAND SITES

The information in these sites will be applicable to a few general research questions on the prehistory of Kalahuipua'a. Such research questions need to be clarified before fieldwork. And it should be clear just what information will be gathered from these sites to answer these questions.

1. E1-304 -- Triple-C-shaped Enclosure. Data recovery should include:
 - a. A scale map of the site.
 - b. Representative collection of archaeological remains on the surface (shell midden, artifacts, manufacturing debris, volcanic glass, etc.).
 - c. Test excavation of 3 m² (15%) if deposits are present. Stratigraphic profiles, with soil descriptions of each layer, must also be given.
 - d. Laboratory analysis and description of food remains, artifacts, etc. -- including radiocarbon and/or volcanic glass hydration dating.
 - e. Interpretations.
2. E2-32 -- Complex with 4-5 C-shaped enclosures, an oval enclosure and terrace, petroglyphs and grinding basins. Archaeological data recovery should include:
 - a. Scale map of the site and its features.
 - b. Detailed map of the oval enclosure and its associated terrace.
 - c. Scale drawings of each petroglyph.
 - d. 3 m² of excavations in the oval enclosure (c. 20% sample). Stratigraphic profiles, with soil descriptions of each layer, must also be given.

- e. Representative test excavations in C-shaped enclosures which include deposits to further establish the range of time over which this site was used.
 - f. Laboratory analysis and description of food remains, artifacts, etc. -- including radiocarbon and/or volcanic glass hydration dating.
 - g. Interpretations.
3. E2-33 -- Cave with external walled area. Data recovery at this site should include:
- a. Scale map of the site.
 - b. 20% excavation sample of the cave and test excavation outside. Stratigraphic profiles, with soil descriptions of each layer, must also be given.
 - c. Laboratory analysis and description of food remains, artifacts, etc. -- including radiocarbon and/or volcanic glass hydration dating.
 - d. Interpretations.

A concluding section in the archaeological data recovery report should discuss the findings of the data recovery work related to the general research questions. This must at least refer back to an evaluation of Kalahuipua'a-wide patterns.

2.0 SOCIOECONOMIC CONSIDERATIONS

2.1 PAST AND PRESENT SOCIO-ECONOMIC CONDITIONS

2.1.1 Island of Hawaii

The Island of Hawaii contains over 4,000 square miles of land area, representing 62% of the total area of the State. The U.S. Census Bureau reports that the island's resident population was 92,691 as of 1980. The estimated population for mid-1985 had grown to 109,159, an 18% increase (Hawaii State Department of Planning & Economic Development, 1986). In general, the economy of Hawaii has been on the upswing. During 1986, gross business receipts and tax collections showed gains over the previous year. The total labor force and the number of people employed also saw substantial increases of 10% and 9%, respectively (First Hawaiian Bank, September/October 1986). As a result, the number of jobs in the county jumped up by 8% during the year. The monthly average unemployment rate during 1986 was 7.8%.

2.1.1.1 Economic Activities

Tourism is quickly becoming the major economic factor on the Island of Hawaii. After several years of decline, the industry has made significant progress since 1985 and the future appears to be even brighter. Total visitor expenditures reached \$285.9 million in 1985, an increase of 60% since 1981. The total inventory of hotel and resort condominium units in February 1986 was 5,226 and 2,041, respectively. During 1985, the monthly average hotel occupancy rate was 57.6%. The most recent figures (November 1986) show that the occupancy rate had risen to 64.4% (Pacific Business News, January 12, 1987, p. 9).

The result of the closing of the Puna Sugar Co. in September of 1984 was an 18% decrease in the island's production of sugar during 1985. The three remaining companies, Hamakua Sugar, Hilo Coast Processing Co., and Ka'u Agribusiness Co., are hoping for improvements in the sugar price support levels in order to maintain stable operations. In the meantime, they are exploring alternative activities such as the production of electricity, sugar cane syrups, macadamia nuts, and cattle feedlot operations (Hawaii Business, November 1986, p. 34).

In contrast to sugar production, diversified crops continued to increase in overall production and value. The \$79.1 million value of production in 1985 represents a 16% increase over the previous year. The livestock industry has remained stable during the 1980's, with production totaling over \$22 million in 1985 (Ibid, p. 36).

The importance of high tech industries to the county's economy is evidenced by the expansion of existing operations and the introduction of new ones. New observatories are under construction atop Mauna Kea, and additional support facilities are underway in Waimea and Hilo. The Natural Energy Laboratory of Hawaii (NELH), adjacent to the Keahole Airport, is increasing the commercialization of aquaculture projects that have until recently been generally experimental in nature. Successful operations are expected to move or expand into the neighboring Hawaii Ocean Science Technology (HOST) Park, which began construction at the end of 1986.

These economic activities, plus others such as retail sales, construction, and the production of energy from alternative energy sources, all combine to form a broad foundation for the island's economy, although tourism remains clearly dominant.

2.1.1.2 Settlement Patterns

Hawaii Island is dominated by five large shield volcanoes (Mauna Kea, Mauna Loa, Hualalai, Kohala, and Kilauea), which create a great diversity in climate. This diversity has strongly influenced the settlement of the island. The eastern, or "windward", slopes of the island are wet, with rainfall exceeding 300 inches per year in some areas. The western, or "leeward", side of the island is largely very dry, with some locations considered to have true desert conditions.

With irrigation less of a requirement, agricultural lands on the windward side of the island became widely used for sugar production. The natural deep-water harbor at Hilo had for many years made the area a center of population on the island. Hilo became the natural port for the shipment of sugar to the west coast and the town grew along with the expansion of the industry. By 1980, Hilo's population of 35,269 represented nearly 40% of the entire county total. Many small communities along the windward side, from North Kohala all the way to the southern part of the island in Ka'u, originated due to the influence of sugar production.

The dry conditions in leeward Hawaii create an ideal situation for ranching activities. Such activities have indeed played a major role in the area and are responsible for growth in the Waimea area. To the south in the Kona area, the production of coffee was a major force for settlement patterns until the 1960's when the area began to experience a tourist industry "boom".

2.1.1.3 Demographic and Housing Data

Tables IV-5 through IV-8 provide detailed demographic and housing data from the U.S. Census Bureau for years 1970 and 1980. Information is shown for the entire County of Hawaii and for individual districts or census tracts that are used for determining the primary and secondary study areas. Some noteworthy characteristics or changes that occurred during the decade of the 1970's in the county include the following:

- o The ethnic composition of the island's population made some relatively large changes during the 10-year period. The number of Hawaiians as a percentage of the total population increased from 12 to 19 percent, while the percentage of Caucasians increased from 29 to 35 percent. The percentage of Japanese in the population decreased from 38 to 27 percent.
- o The percentage of the population with four or more years of college doubled.
- o The percentage of families living below the poverty level rose slightly to over 10 percent.

Table IV-5

Total Population and Demographic Breakdowns: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980

	COUNTY OF HAWAII		SOUTH KOHALA (C.T. 217)		NORTH KOHALA (C.T. 218)		NORTH KONA (C.T. 215-216)		SOUTH KONA (C.T. 213-214)		HONOKAA- KUKUIHAELE (C.T. 219)	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
TOTAL POPULATION	63,468	92,053	2,310	4,607	3,326	3,249	4,832	13,748	4,004	5,914	2,829	3,287
ETHNICITY*	%	%	%	%	%	%	%	%	%	%	%	%
Caucasian	28.8	35.0	39.2	46.5	25.6	27.8	44.0	53.8	17.7	30.0	36.9	37.9
Japanese	37.5	26.6	24.4	14.6	23.8	16.1	23.1	11.8	39.6	27.5	30.0	24.9
Chinese	2.9	1.7	1.3	1.4	4.3	1.0	3.7	1.6	0.8	0.8	2.7	1.9
Filipino	16.5	13.9	6.6	5.6	29.2	24.0	8.4	7.2	26.2	13.0	21.8	21.9
Hawaiian	12.3	18.8	26.4	28.5	15.3	24.7	19.3	22.1	14.7	23.5	7.1	12.2
Other	2.0	4.1	2.0	3.4	1.7	6.4	1.5	3.5	1.0	5.2	1.4	1.9
AGE												
Less than 5 yr.	8.6	9.1	9.3	10.2	10.0	9.2	9.1	9.1	9.0	9.8	7.6	9.4
5 - 17 yr.	27.8	21.5	28.3	23.6	29.4	22.9	27.0	20.3	29.8	20.7	27.1	22.3
18 - 64 yr.	54.4	59.2	56.1	58.6	51.1	54.4	55.7	63.9	48.9	58.8	55.0	54.5
65 or more yr.	9.2	10.2	6.4	7.7	9.5	13.6	8.2	6.7	12.4	10.6	10.3	13.8
Median age (yr.)	28.9	29.4	28.1	29.3	27.3	31.9	28.6	28.9	29.7	29.7	31.6	32.2
PLACE OF BIRTH*	%	%	%	%	%	%	%	%	%	%	%	%
Hawaii	NC	70.5	NC	64.9	NC	75.6	NC	54.4	NC	71.2	NC	77.2
Other U.S.**	NC	20.0	NC	30.4	NC	13.6	NC	39.9	NC	20.8	NC	9.5
Foreign country	NC	9.4	NC	4.7	NC	10.8	NC	5.7	NC	7.8	NC	13.3
RESIDENCE 5 YRS. AGO (people aged 5+)												
Same house	62.5	52.9	45.6	50.7	49.9	68.9	51.1	38.8	56.1	57.4	66.2	68.3
Same island	NC	24.9	NC	17.3	NC	12.1	NC	28.1	NC	22.9	NC	16.5
Different island	NC	8.1	NC	14.9	NC	4.4	NC	7.0	NC	6.5	NC	8.9
Different state	NC	11.1	NC	16.4	NC	11.6	NC	23.1	NC	10.7	NC	4.3
Different country	NC	3.1	NC	0.7	NC	3.1	NC	3.0	NC	1.2	NC	2.0
EDUCATION* (selected- people aged 25+)												
0-8 years only	37.2	20.1	24.1	8.6	44.2	29.0	28.9	8.0	26.1	23.6	45.7	30.3
Hi school only	31.6	35.5	34.2	37.0	30.0	39.0	66.0	40.9	21.9	33.8	27.5	35.7
College, 4+ yr.	7.5	15.2	13.1	20.7	5.9	8.1	8.8	18.8	6.4	12.4	5.3	9.8

Notes: *Figures based on 15% sample; hence, numbers represent estimate.

**Including persons born in U.S. territories, and persons born abroad or at sea to American parent/s.

"NC" = 1970 categories or bases "Not Comparable" to 1980 (1970 Census kept a "non-response" category, while 1980 Census allocated non-responses to other categories shown).

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table IV-6

Family Characteristics and Income Levels: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980

	COUNTY OF HAWAII		SOUTH KOHALA (C.T. 217)		NORTH KOHALA (C.T. 218)		NORTH KONA (C.T. 215-216)		SOUTH KONA (C.T. 213-214)		HONOKAA- KUKUIHAELE (C.T. 219)	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
POPULATION IN FAMILIES	N/A	81,728	N/A	4,114	N/A	2,961	N/A	11,543	N/A	5,235	N/A	3,042
as % of total population	N/A	88.8%	N/A	89.3%	N/A	91.1%	N/A	84.0%	N/A	88.5%	N/A	92.4%
NUMBER OF FAMILIES	14,533	22,825	533	1,204	741	826	1,131	3,339	848	1,378	654	862
HEAD	%	%	%	%	%	%	%	%	%	%	%	%
Husband/wife	87.1	82.1	90.1	79.7	88.0	84.0	87.4	84.0	88.3	83.4	87.8	91.1
Male only	5.2	5.2	3.6	7.6	6.7	6.2	4.1	4.7	4.4	6.1	7.3	2.4
Female only	7.7	12.7	6.4	12.7	5.3	9.8	8.5	11.4	7.3	10.5	4.9	6.5
WITH OWN CHILDREN UNDER 18	57.4	52.7	63.2	51.6	58.0	52.2	53.4	54.4	59.3	51.5	56.4	48.5
Female head	4.0	7.4	4.5	9.1	2.2	5.9	5.0	4.8	3.5	5.4	3.1	4.3
BELOW POVERTY LEVEL	9.7	10.3	11.8	5.7	10.5	12.2	13.0	8.0	17.3	9.8	10.4	9.4
1980 MEDIAN FAMILY INCOME		\$19,132		\$17,924		\$15,7194		\$21,100		\$19,128		\$19,107

Notes: All figures (except "Population in Families") based on 15% sample; hence, numbers represent estimates. "N/A" = "Not Available" in published form. However, other published 1970 and 1980 census data lead to the conclusion that families generally comprised a smaller percentage of Hawaii's 1970 population than of the 1980 total.

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1980 Summary Tape File 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table IV-7
 Labor Force Size and Characteristics: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980

	COUNTY OF HAWAII		SOUTH KOHALA (C.T. 217)		NORTH KOHALA (C.T. 218)		NORTH KONA (C.T. 215-216)		SOUTH KONA (C.T. 213-214)		HONOKAA- KUKUIHAELE (C.T. 219)	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
POTENTIAL LABOR FORCE (aged 16+)	43,075	67,205	1,446	3,290	2,240	2,286	3,632	10,115	2,629	4,265	2,092	2,418
	%	%	%	%	%	%	%	%	%	%	%	%
not in lab. force	39.5	38.7	34.2	35.9	38.4	39.8	44.3	27.8	41.6	33.8	40.6	46.7
armed forces	0.4	0.3	0.0	0.0	1.1	1.0	0.0	0.1	0.0	0.0	0.2	0.0
civil. lab. force	60.1	61.0	65.8	64.1	60.5	59.3	55.7	72.1	58.4	66.2	59.2	53.3
CIVILIAN LABOR FORCE	25,889	41,006	951	2,110	1,355	1,355	2,022	7,293	1,535	2,823	1,238	1,289
% unemployed	2.7	7.0	4.1	6.3	1.9	9.2	4.8	5.2	2.3	5.7	1.9	5.4
TOTAL EMPLOYED	25,180	38,150	912	1,978	1,330	1,230	1,925	6,913	1,500	2,662	1,215	1,220
OCCUPATION	%	%	%	%	%	%	%	%	%	%	%	%
service	16.3	16.5	15.9	18.0	25.9	34.2	19.3	21.5	16.0	17.3	19.5	11.2
manager./profes.	NC	20.0	NC	20.6	NC	15.2	NC	21.2	NC	13.6	NC	12.5
technical, sales & adminis.	NC	26.1	NC	19.2	NC	13.7	NC	28.2	NC	24.8	NC	18.9
farm/fish/forest	NC	10.3	NC	14.0	NC	14.2	NC	7.1	NC	19.5	NC	12.6
precision, craft, repair	NC	12.7	NC	16.5	NC	9.7	NC	12.1	NC	14.8	NC	17.5
operators, fabri-	NC	14.4	NC	11.8	NC	12.9	NC	9.9	NC	10.0	NC	27.3
INDUSTRY (selected)												
agric., forest, fish, mining	12.5	11.2	N/A	16.8	N/A	8.1	N/A	6.2	N/A	19.4	N/A	16.2
construction	10.6	9.1	13.6	12.3	2.6	5.0	23.6	11.2	20.4	14.3	9.9	8.0
manufacturing	15.0	8.3	2.3	5.1	29.3	8.1	1.0	1.9	3.2	1.2	26.4	29.4
retail trade	14.8	17.5	15.9	13.8	2.9	7.0	13.1	23.6	8.9	18.4	10.3	13.8
financial, insur., real estate	2.8	5.7	3.5	7.6	1.1	2.3	4.0	8.6	3.5	4.5	0.4	1.2
personal, entert. & recreat. serv.	11.2	10.9	N/A	16.0	N/A	31.4	N/A	20.7	N/A	15.2	N/A	6.6
health, educ, & professional	14.1	16.7	13.9	14.8	14.7	20.5	7.8	11.4	18.3	13.1	6.9	7.1
public adminis.	6.5	7.3	3.1	2.1	5.5	8.1	4.2	2.7	3.7	4.8	8.6	5.3
COMMUTE TO WORK												
45 minutes + (%)	N/A	6.0	N/A	13.9	N/A	22.6	N/A	4.8	N/A	6.8	N/A	13.4
mean travel (min.)	N/A	16.5	N/A	21.7	N/A	24.1	N/A	16.4	N/A	20.6	N/A	17.6

Notes: All figures based on 15% sample; hence, numbers represent estimates.
 "N/A" = "Not Available" in published form. "NC" = 1970 categories or bases "Not Comparable" to 1980 Census.
 Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-BB; 1980 Summary Tape File 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table IV-8

Housing Stock and Characteristics: County of Hawaii, and Primary and Secondary Study Areas, 1970 and 1980

	COUNTY OF HAWAII		SOUTH KOHALA (C.T. 217)		NORTH KOHALA (C.T. 218)		NORTH KONA (C.T. 215-216)		SOUTH KONA (C.T. 213-214)		HONOKAA- KUKUIHAELE (C.T. 219)	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
TOTAL YEAR-ROUND HOUSING UNITS	18,939	33,954	798	1,959	941	1,121	1,975	6,894	1,131	2,052	880	1,114
vacant (total)	%	%	%	%	%	%	%	%	%	%	%	%
vacant for sale	9.0	13.9	18.5	24.3	6.6	8.8	27.4	33.3	6.4	9.7	8.1	6.5
vacant for rent	0.6	1.3	0.1	2.9	0.7	0.3	3.2	3.2	0.0	2.9	X.X	0.1
	2.0	5.5	1.9	4.1	1.1	1.8	8.3	18.9	0.3	2.1	X.X	1.1
TOTAL YEAR-ROUND OCCUPIED UNITS	17,260	29,237	650	1,483	879	1,022	1,431	4,602	1,059	1,853	809	1,042
TENURE	%	%	%	%	%	%	%	%	%	%	%	%
owner-occupied	56.9	60.6	48.8	59.3	66.6	67.7	44.7	55.1	36.9	52.7	59.7	64.3
renter-occupied	43.1	39.4	51.2	40.7	33.4	32.2	55.3	44.9	63.1	47.3	40.3	35.7
SELECTED CONDITIONS												
lacking some or all plumbing	17.1	6.4	15.4	2.0	17.6	7.3	26.3	7.3	55.8	28.4	17.4	7.9
1.51 or more persons/room	6.5	5.0	8.2	5.3	9.7	3.1	14.1	6.1	13.1	10.1	4.2	4.6
PERSONS/HOUSEHOLD	3.61	3.09	3.51	3.07	3.75	3.16	3.36	2.92	3.71	3.14	3.4	3.1
1980 MEDIAN RENT (renter-occupied)		\$223		\$307		\$153		\$331		\$200		\$128
1980 MEDIAN VALUE* (owner-occupied)		\$70,300		\$95,700		\$64,200		\$114,000		\$102,600		\$60,600

Notes: * Median values are for non-condominium housing units.

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1930 Summary Tape File 1-A; State of Hawaii, 1973, Community Profiles for Hawaii.

- o The size of the civilian labor force grew by more than 15,000, representing a 58 percent increase.
- o The inventory of year-round housing units grew from 18,939 to 33,954, an increase of 79 percent.
- o Home ownership increased during the decade and the percent of units with sub-standard conditions was reduced significantly.

2.1.2 Primary Study Area

The primary study area (North Kohala and South Kohala Districts) is comprised of a single mountain forming a large peninsula on the northern side of the island. The mountain divides the area into a "dry side" on the western slope and a "wet side" to the east. Although ancient Hawaiian society inhabited both portions of the terrain, modern residents have until very recently located most economic and residential activities in the "wet side", which is more suitable for agriculture. The population of the area in 1980 was 7,856. By 1985 it had increased by nearly 25 percent to an estimated 9,761. The increase in tourist activity is generating a growing economy, while creating some strains on the area's infrastructure. The 1986 average unemployment rate in the area was 8.3 percent (Hawaii State Department of Labor and Industrial Relations).

2.1.2.1 Economic Activities

Largely during the last decade, the region's economy has been undergoing a transition from agriculture to tourism. This transition is specific to the South Kohala area, which has an economy very different from that in North Kohala. South Kohala's economy is experiencing rapid growth, while in North Kohala the growth is very limited.

Ranching continues to be a dominant factor shaping the physical character of the primary study area, but tourism has surpassed cattle operations as the leading economic activity during the 1980's. Three hotels along the South Kohala coastline -- the 310-room Mauna Kea Westin, the 543-room Sheraton Royal Waikoloa, and the 351-room Mauna Lani Bay Hotel -- incorporate the great majority of hotel rooms in the area. According to the Hawaii Visitor Bureau's Visitor Plant Inventory of February 1986, there were a total of 1,383 hotel and condominium units in North and South Kohala. A significant proportion of the \$285.9 million generated by the tourist industry in 1985 can be attributed to facilities located in the primary study area.

Diversified agricultural operations play an important role in the economy throughout the primary study area. In North Kohala, the cattle industry utilizes the bulk of the land area and represents a significant source of income for the area. The production of macadamia nuts has recently begun to utilize lands laid fallow with the closing of the sugar plantation in the mid-1970's. Today, there are several hundred acres of macadamia nuts in the area. Flower and nursery products, and to a lesser degree vegetables, are also produced in the area.

Parker Ranch maintains approximately 223,000 owned and leased acres of ranch land and 50,000 head of cattle. Waimea is the most productive area in the State for vegetable crops. Approximately 1,000 acres are used for production in the Lalamilo Homestead area. Major commodities include cabbages, celery, lettuce, daikon (turnip), peppers, broccoli, and carrots. Waimea is also a major producing area of roses.

Kawaihae Harbor is a commercial deep water harbor located in South Kohala. The facility handles receipts and shipments of general cargo, shipments of bulk raw sugar, molasses, lava cinders, petroleum products, and bulk fertilizers. In 1985, the harbor handled 493 million tons of cargo (personal communication, Clement Uemura, Planner, Hawaii State Department of Transportation, August 27, 1986).

The construction industry has grown in the primary study area during recent years. The release of marginal lands by the Parker Ranch has opened the way for residential subdivisions on both the eastern and western sides of Waimea. The availability of Hawaiian Homestead lands has also generated growth. The construction of the Hawaii Belt Highway, the new highway between Kawaihae and Mahukona, and the Queen Kahumanu highway to North Kona have all increased the accessibility throughout the entire primary study area.

Other diverse elements of the area's economy include the basecamp for the Canada-France-Hawaii Telescope Corporation, which operates an observatory on Mauna Kea, and the Hawaii Preparatory Academy.

2.1.2.2 Settlement Patterns

Until 1975, North Kohala was dominated by activities related to the cultivation and processing of sugar cane. The area is actually comprised of six villages (Hawi, Kapaau, Halaula, Makapala, Halawa, and Niulii) and during the past one hundred years hosted a number of sugar mills. As was the case with most sugar plantations throughout Hawaii, waves of immigrants were brought in to cultivate the cane in North Kohala, resulting in today's ethnically varied population.

South Kohala encompasses the high plains area of the Kohala mountain foothills, extending down to the dry coastal region which includes the small residential communities of Puako, Kawaihae Village, and Waikoloa Village. South Kohala is dominated by the Parker Ranch, which creates a ranching lifestyle that is still evident in the area, especially in the town of Waimea (also known as Kamuela).

Founded by John Palmer Parker in the early 1800's, the ranch grew under the supervision of Parker's descendants. Featuring a paternalistic provision of human services such as housing and health care similar to the sugar plantations in North Kohala, the ranch spawned a relatively homogeneous community in Waimea. This homogeneity was perpetuated by the relative absence of imported ethnic groups, other than the Spanish cowboys (Paniolos) originally brought to the ranch by its founder. In recent years, this homogeneity has been altered by an influx of second home owners, young professional families, resort workers, and Hawaiian homesteaders.

2.1.2.3 Demographic and Housing Data

During the 1970's, the most noticeable changes in the character of the primary study area occurred in South Kohala. The following list provides examples of some of the more important observations as seen in Tables 2.1 to 2.4:

- o While the resident population of South Kohala nearly doubled, the population in North Kohala actually declined slightly.
- o As observed in the county as a whole, Caucasian and Hawaiian populations grew significantly faster than other ethnic groups, while the Japanese population declined substantially.
- o The percentage of South Kohala's population having four or more years of college rose to over 20 percent, much higher than the County average or other areas of the West Hawaii region.
- o The percentage of families below the poverty level increased slightly in North Kohala, but significantly decreased in South Kohala. The 1980 median family income in both areas was well below that for the County as a whole.
- o The entire area experienced a 77 percent increase in year-round housing units between 1970 and 1980. A large proportion of this was in South Kohala, where a sizeable increase in home ownership was also observed.

2.1.3 Secondary Study Area

The secondary study area is comprised of two physically and characteristically distinct regions. North and South Kona are located to the south of the primary study area, and Honokaa is located to the east. During the 1970's, the North Kona District had the highest growth rate (185 percent) in the County. South Kona also showed significant growth (48 percent). These increases were due to the visitor industry "boom" which centered on the town of Kailua-Kona. Construction of new hotels is moving northward but Kailua-Kona continues to grow as West Hawaii's major economic center. The 1986 average unemployment rate in North and South Kona was 6.0 percent (Hawaii State Department of Labor and Industrial Relations, 1987).

Honokaa is on the "wet" side of the island and strongly dependent on agricultural operations, primarily sugar. The population grew marginally during the 1970's (an increase of only 458), reflecting the general situation of the sugar industry. Unemployment in the area in 1986 was 6.0 percent.

2.1.3.1 Economic Activities

The town of Kailua-Kona in North Kona is the island's major tourist attraction and visitor destination area. It is characterized by an abundance of visitor-oriented activities and related support services for both visitors and residents. According to the Hawaii Visitor Bureau, there were 4,489 hotel and condominium units in the Kona area as of February 1986 (personal communication, Aqua Higa, Research Specialist, February 19, 1987). Recent growth has also occurred at the Keauhou resort complex south of Kailua.

The Kona region (both North and South districts) has long been recognized for coffee production in its "coffee belt" area. The value of coffee sales during the 1984-85 season totaled \$4.8 million, down from \$6.3 million during the previous season. Despite this decrease, the future prospects of the industry in Kona appear to be promising. Macadamia nuts have become a significant factor in South Kona's economy. A majority of the island's 15,460 acres in crop in 1984 were located in the Honomalino area (Hawaii State Department of Agriculture, 1985). Other major agricultural activities in Kona include cattle ranching, the growing of fruits/citrus crops (avocados, bananas, oranges, and tangerines), and vegetable farming (particularly winter tomatoes).

The Natural Energy Laboratory of Hawaii (NELH) is a major research facility located on 328 acres of shorefront land adjacent to Keahole Airport. It is the only research facility in the world offering both warm and deep cold ocean water for ocean thermal energy conversion (OTEC) research. Several years ago, cold water brought to the surface for OTEC systems was tested to determine if it could be used for growing abalone. The success of these tests led to the initiation of a major commercial demonstration project at NELH. More recently, the Cyanotech Corporation has begun the commercial production of algae for use as food supplements, fertilizers, and pharmaceuticals. Product sales amounted to \$93,000 in 1985. This figure is expected to rapidly increase in the coming years.

Transportation is an important economic activity in Kona. The Keahole Airport, which receives direct scheduled passenger flights from the U.S. mainland, is planned for expansion to facilitate accommodation of return flights overseas and to the mainland. The number of aircraft operations (arrivals and departures) during 1984 totaled 83,320, handling over one million passengers.

In Honokaa, sugar remains the primary economic activity, although an overall smaller source of employment due to mill consolidations and increased mechanization.

Macadamia nut growing and processing has also become an important agricultural activity in the area. The Hamakua Sugar Co. has also recently opened a feed lot on former sugar land for the production of cattle. Secondary wage earners (e.g., housewives) are also believed to commute to resort jobs in Kohala, although the proportion of the labor force in the Honokaa-Kukuihaele census tract which was engaged in service occupations actually declined from 20 percent in 1970 to 11 percent in 1980 (see Table 2.3).

The town of Honokaa has, in recent years, undergone a revitalization of commercial activity. Although quantitative data are not readily available, it would appear that employment opportunities created by both an expanding visitor industry and the new "mac nut" operations, coupled with residential growth in the area, have injected new life into the economy.

2.1.3.2 Settlement Patterns

Before the growth of tourism during the 1960's, the Kona region of the Big Island was primarily agricultural in both character and economy. A majority of all working persons were directly involved in agriculture and most

other were employed in agricultural support services. Principal activities included coffee production and cattle ranching. Smaller fruit and produce operations also were important in the area.

Wide fluctuations in the world coffee market endangered the stability of the area until the introduction of tourism. Hotels flourished in North Kona, while the neighboring district of South Kona has remained primarily agricultural and little-populated.

The Honokaa-Kukuihaele area is the most populous along the Hamakua coast. Honokaa is the principal urban area, marking the northern end of what was once considered the gold coast of the Big Island. The cultivation of sugar has dominated life in this region from the mid-1900's to the present. The construction of the Hamakua ditch in 1876-77 ensured that water from Kohala's "wet side" would be available to irrigate land on the eastern slopes of Mauna Kea. Completion of the irrigation system, together with the development of an elaborate railway network along the Hamakua coast, secured the area as one of the prime cane production regions in the Hawaiian islands.

Similar to plantation in Kohala, waves of immigrant laborers followed, contributing to the multi-ethnic composition of today's population. Also, as with the Kohala plantations, sugar production started becoming less profitable due to falling prices on the world market. However, unlike the Kohala plantations which eventually went out of business, operations on the Hamakua coast consolidated as mills began to close. Out of approximately a dozen mills, only two remain.

2.1.3.3 Demographic and Housing Data

Significant demographic characteristics in the secondary study area in 1980 (as shown in Table 2.1 to 2.4) include:

- o Changes in the ethnic makeup of the population were similar in the Kona region as in the primary study area. The North Kona district, in particular, became more than 50 percent Caucasian by 1980.
- o The North Kona population in particular became characterized by a high degree of transience. Nearly one-third had been living off-island in 1975. In contrast, only 18 percent of residents in South Kona and 15 percent of those in Honokaa had been living off-island in 1975.
- o Although there was improvement during the 1970's, the educational level of residents in Honokaa remained low compared to the County average.
- o The residents of North Kona enjoyed the island's highest median income.

2.2 PROBABLE SOCIO-ECONOMIC IMPACTS

2.2.1 Introductory Statements

Most of the following socio-economic impact sections were prepared on a subcontract basis for Belt Collins & Associates by Community Resources, Inc. Their work is based on data sources available as of April 1, 1987. Environmental Capital Managers, Inc. prepared an analysis of fiscal impacts, which is summarized in Section 2.2.9.

2.2.1.1 Methodological Requests from County of Hawaii

This socio-economic impact assessment uses a number of new methodological approaches, based on several requests from the Hawaii County Planning Department.

Standardized County Methods: The County Planning Department recently contracted with Decision Analysts Hawaii, Inc. (1986) to recommend standard methodological approaches for estimating West Hawaii resort development impacts on employment, population, and housing. The Department requested that the Decision Analysts Hawaii, Inc. (DAHI) approach be utilized in this EIS unless reasons for alternative approaches could be justified.

CRI has generally followed this new DAHI approach for on-site population and islandwide employment estimates. As noted in later sections, variations of the DAHI approach are used for off-site population and housing impacts.

Cumulative Impacts Over Ten Years: The Planning Department also requested that impact work related to the Ritz-Carlton Mauna Lani be conducted in a cumulative context, taking into account other West Hawaii resort developments (and new non-resort development) projected to start up during the ten-year period from 1988 to 1998.

At the present time, resort developer schedules are available only for the Ritz-Carlton, the South Kohala Resort, and the Hyatt Regency Waikoloa. A great number of other projects are planned and proposed, but the long lead time required for resort developments (related to governmental permitting, architectural programming and design, and financial factors) makes it unlikely that many other hotels will open during the initial half of the ten-year timeframe. However, it is probable that one other West Hawaii hotel in the first class to luxury category will become operational during the first five years of impact analysis. For analysis purposes, a 500-unit luxury "Hotel X" is assumed to come on-line in July 1991, between the Ritz-Carlton and South Kohala Resort hotel openings. Accordingly, only these projects which are more likely to be built than others, were included in the analysis for the first five years.

For the second five years, CRI utilized official Hawaii State Department of Planning and Economic Development (1984) forecasts for Big Island resort development to generate a scenario for other new West Hawaii resort openings in the middle and late 1990's. The exact procedure is described in a technical document which has been submitted to the County (Community Resources, Inc., 1987). This method was used for the second five years because, with the exception of the South Kohala Resort residential units and the additional 200 Ritz-Carlton hotel units, resort developer schedules are lacking.

Table IV-9 summarizes the assumed cumulative West Hawaii resort development for the 1988-98 period. It should be noted that the scenario for 1994-98 (based on the official State figures) suggests a sustained level of new resort construction such as the Big Island has never actually historically experienced. This means that impacts for this period may well be overestimated in this report -- i.e., it is in some ways a "worst-case" scenario.

Joint Impact Assessment: Because Belt Collins and Associates (and subcontractor CRI) are preparing assessments for the proposed nearby South Kohala Resort as well as for Ritz-Carlton, it was suggested that a cumulative impact assessment using similar methods would naturally lead to a joint study for both clients. Therefore, many of these socio-economic calculations will appear in both EIS's.

2.2.1.2 Original Research Conducted for this Report

Hotel Employee Survey: Community Resources, Inc. (and Datametric Research, 1987) surveyed employees in the existing two South Kohala luxury hotels -- the Mauna Lani Bay Hotel and the Westin Mauna Kea. Results of this survey (referred to as the "Employee Survey") will be used here to address issues such as housing impacts and social factors related to hotel employment. A copy of the survey report has been filed with the County Planning Department.

Micro-Computer Modeling: CRI has developed a number of inter-related new models in response to the County requests for new methods and a cumulative context. These models include population projection methods, employment forecasts, labor supply/demand analyses, and on-site housing impacts. Key features of each model will be briefly discussed in appropriate following sections, but more complete descriptions of the models are contained in a technical document submitted to the County Planning Department (Community Resources, Inc., 1987).

Social Data for West Hawaii: In Section 2.2.7, CRI presents results of an original analysis of data on social indicators (e.g., crime rates) vs. resort development, in order to indicate possible relationships.

2.2.2 On-Site Population

On-site population includes both visitors and permanent residents of resort condominium and single-family units. The reason for addressing on-site population separately from off-site population (i.e., new employees and their families) is that the DAHI method requested by the County begins by calculating both on-site population and numbers of permanent jobs from a set of common assumptions about use of resort units (for visitors vs. residents), occupancy rates, and average party size.

These basic assumptions are presented in Table IV-10. The following Table IV-11 provides an example of the exact methods for calculating resort population (a procedure which also produces some information required for calculating total employment, which will be discussed in a later section). Finally, Table IV-12 contains projections of on-site population, both for the Ritz-Carlton and for all cumulative new resort development.

Table IV-9:

Assumptions About Total Resort Development
West Hawaii 1988 - 1998

	1988 - 1993:						1994 - 1998:				Sub-Totals			Total 1988- 1998
	Dec. 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998	1988- 1993	1994- 1998	
RITZ-CARLTON														
Hotel Units	0	0	450	0	0	0	0	0	0	0	200	450	200	650
Condominium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single-Family	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER IDENTIFIED PROJECTS														
Hyatt Maikoloa														
Hotel Units	1260	0	0	0	0	0	0	0	0	0	0	1260	0	1260
Condominium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single-Family	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Kohala Resort														
Hotel Units	0	0	0	0	0	350	0	0	0	0	0	350	0	350
Condominium	0	0	0	0	0	50	110	110	110	110	110	50	550	600
Single-Family	0	0	0	0	0	15	20	20	20	20	15	15	95	110
ASSUMED OTHER PROJECTS														
Hotel Units	0	0	0	0	0	0	440	440	440	440	440	500	2000	2500
Condominium	0	0	0	0	0	0	250	250	250	250	250	0	1250	1250
Single-Family	0	0	0	0	0	0	30	30	30	30	30	0	155	155
TOTAL														
Hotel Units	1260	0	450	500	0	350	440	440	440	440	440	2560	2200	4760
Condominium	0	0	0	0	0	50	360	360	360	360	360	50	1800	1850
Single-Family	0	0	0	0	0	15	50	50	50	50	50	15	250	265

* Note: Opening date schedules are likely to be more reliable for 1988-93, whereas the schedule for 1994-1998 is more theoretical, based on CRI interpretation of official State forecasts.

Table IV-10

Assumptions About Resort Unit Use,
Occupancy, Party Size, and Employment Multipliers

	<u>Hotel</u>	<u>Condominium</u>	<u>Single-Family</u>
PERCENT OF UNITS IN VISITOR USE	100%	50%	15%
Occupancy Rate	70%	50%	25%
Average Party Size	1.9	2.1	2.5
On-Site FTE Jobs/Unit*			
--Ritz Add-On	1.2	0.5	0.5
--Other Luxury Units	1.4	0.5	0.5
--Non-Luxury Units	1.0	0.4	0.5
Overall Luxury Adjustment Factor (jobs/unit, applicable to luxury units only)	0.35	N/A	N/A
PERCENT OF UNITS IN PART- TIME RESIDENT USE	0.0%	25%	35%
Occupancy Rate	0.0%	25%	25%
Average Party Size	0.0	2.0	2.5
On-Site FTE Jobs/Unit	0.0	0.2	0.2
PERCENT OF UNITS IN FULL- TIME RESIDENT USE	0.0%	25%	50%
Occupancy Rate	0.0%	95%	95%
Average Party Size	0.0	2.0	2.5
On-Site FTE Jobs/Unit	0.0	0.3	0.3

* For use in estimating on-site employment when no other information is available. For the initial 450-unit phase of the Ritz-Carlton, however, on-site employment figures are given in Table IV-15.

Table IV-11:

Example of Procedures for Calculating On-Site Population

(Example of Initial Ritz-Carlton 450 Units)

[Source:]	Units [A: calculated from assumptions in Table 2.6]	Party Size [B: from Table 2.6]	Peak Population [C: equals A x B]	Average Occupancy [D: from Table 2.6]	Average Population [E: equals A x B x D]
RESORT RESIDENTS					
Condominiums, Part-Time Use	0	2.0	N/A*	25%	0
Condominiums, Full-Time Use	0	2.0	N/A*	95%	0
Single-Family House, Part-Time Use	0	2.5	N/A*	25%	0
Single-Family House, Full-Time Use	0	2.5	N/A*	95%	0
DAILY VISITORS					
Hotel Rooms	450	1.9	855	70%	599
Condominiums, Visitor Use	0	2.1	0	50%	0
Single-Family House, Visitor Use	0	2.5	0	25%	0
TOTAL VISITORS AND RESIDENTS			855*		599
Weighted Averages:**		1.9		70%	

Adjusted Islandwide Employment Multiplier $1.75 \times (70\%/65\%) \times (1.90/1.95) = 1.84^{**}$

* Resident population based only on average, since fluctuations would be minor. "Peak Total" thus is sum of peak visitor population plus standard resort resident population.

** Information calculated at this stage for later use in estimating islandwide employment impacts.

Table IV-12:

Projected On-Site Population
Ritz-Carlton and West Hawaii Resorts 1988 - 1998

	Year						Total 1988- 1993 (incl. Ritz- Carlton)
	1988- 1989 [Hyatt Waikoloa]	1990 [Ritz- Carlton]	1991 [500-unit "Hotel X," unspecified location]	1993 [South Kohala Resort]			
Resort Residents:	0	0	0	51			51
Daily Visitors	1676 2394	599 855	665 950	493 723			3433 4922
Total	1676 2394	599 855	665 950	544 774			3484 4973
	avg.: peak:						
	1676 2394	599 855	665 950	544 774			3484 4973

	Year				Total 1994- 1998 (incl. Ritz)
	1994	1995	1996	1997	
Resort Residents:	286	286	286	286	1430
Daily Visitors	779 1233	779 1233	779 1233	779 1233	3895 6165
Total	1065 1519	1065 1519	1065 1519	1065 1519	5325 7595
	avg.: peak:				
	1065 1519	1065 1519	1065 1519	1065 1519	5325 7595

	Year		Total 1988- 1998
	1998 [Ritz Add-on]	1998 [Other]	
Resort Residents:	0	286	1481
Daily Visitors	266 380	513 853	7328 11087
Total	266 380	799 1139	8809 12568
	avg.: peak:		
	266 380	799 1139	8809 12568

	Year		Total 1988- 1998
	Ritz 1990- 1998	Other 1988- 1998	
Resort Residents:	0	1481	1481
Daily Visitors	865 1235	6463 9852	7328 11087
Total	865 1235	7944 11333	8809 12568
	avg.: peak:		
	865 1235	7944 11333	8809 12568

Results for Ritz-Carlton: No permanent resident population is anticipated for the Ritz-Carlton. When the initial 450 units open in 1990, the average daily visitor census is expected to be about 600 guests, with peak daily visitor count of about 850 should occupancy ever reach 100 percent. With the additional 200 units tentatively assumed to open in 1998, the average daily visitor count would rise to 865, with peak daily count of 1,235 guests.

Cumulative Results: For all new West Hawaii resort units assumed to open by 1993, the average population on any one day would total about 3,500 people (roughly 1.5 percent of whom would be permanent resort residents), and the peak capacity would total some 5,000 people if visitor units should ever reach 100 percent occupancy levels. Extending the timeframe to 1998 -- including the very heavy resort development scenario implied by the official State forecasts -- the average daily on-site population would total about 8,800 people (17 percent of them permanent residents) and peak on-site population would be approximately 12,500 people.

2.2.3 Employment Impacts

Resort development generates both short-term jobs (during the construction phase) and permanent jobs (during the operational phase). In addition to on-site direct jobs, employment is also generated when resorts purchase goods or services from other businesses ("indirect" employment) and when employees spend their wages in the local economy ("induced" employment). Visitors also generate some "off-site direct" jobs when they spend money off the resort grounds (e.g., ground or air transportation, tours, purchases from roadside vendors, etc.); for construction, "off-site direct" jobs might include contractors' administrative personnel in company headquarters.

The DAHI approach ignores some of these distinctions, focusing only on islandwide total employment. However, in order to estimate how much of the islandwide employment will be located in the West Hawaii "Study Area," CRI retains some of the distinctions in employment categories for construction jobs.

2.2.3.1 Construction Period

Using the example of the initial 450-unit Ritz-Carlton hotel, Table IV-13 shows the assumptions and methodology -- generally based on the County's requested DAHI approach -- which are utilized to calculate construction jobs. Table IV-14 shows complete results, for both the Ritz-Carlton and the cumulative West Hawaii resort development scenario.

Results for Ritz-Carlton: For the estimated 24-month construction period from 1988 to 1990, the average daily construction employment is forecast as: about 240 on-site workers, another 150 jobs elsewhere in the West Hawaii Study Area, and another 60 elsewhere on the Big Island, for a Big Island total of about 450.

The later 200-unit add-on will require fewer construction workers, since there will be no need to build additional lobbies, kitchens, etc. From 1996 to 1998, the estimated number of jobs generated by Ritz-Carlton construction would be: 80 on-site workers, 50 elsewhere in the Study Area, and 20 elsewhere on the island, for a Big Island total of about 150.

Table IV-13

Example of Procedures for Calculating
Total Construction Employment

Ritz-Carlton 450 Units in 1990

<u>A. Total Direct Statewide Employment</u>	<u>Units</u>	<u>Multi-plier(1)</u>	<u>Total Direct Jobs(2)</u>
Hotel Units			
--Luxury	450	1.35	304
--Non-Luxury	0	1.00	0
Condominium Units			
--Luxury	0	1.62	0
--Non-Luxury	0	1.20	0
Single-Family Units			
--Luxury	0	2.70	0
--Non-Luxury	0	2.00	0

<u>B. Allocation by Area</u>	<u>Study Area</u>	<u>Rest of Island</u>	<u>BIG ISLAND SUBTOTAL</u>	<u>STATE TOTAL</u>
<u>Direct:</u>				
On-Site	243 (3)	0	243	243
Off-Site	15 (5)	15	30	61
(SUBTOTAL)	258	15	273 (4)	304
<u>Indirect/Induced</u>	<u>133 (7)</u>	<u>45</u>	<u>178 (6)</u>	<u>N/A (8)</u>
TOTAL	391	60	451	N/A

- (1) Employment multipliers for non-luxury units are from DAHI (1986). CRI produced the adjusted luxury multipliers in a parallel manner to DAHI's 0.35 "luxury adjustment factor" for operational jobs. See Table IV-17.
- (2) Statewide direct employment calculated by multiplying the number of units by the employment multiplier, then dividing by the number of years for construction to be completed (two years for the Ritz-Carlton).
- (3) Assumes 80 percent of statewide direct jobs to be on-site.
- (4) Assumes 90 percent of statewide direct jobs to be on-island.
- (5) Assumes 50 percent of off-site direct jobs to be located in Study Area, with the remainder located in rest of island.
- (6) Islandwide indirect/induced jobs assumed to be total islandwide direct jobs multiplied by 0.65. The 0.65 multiplier for on-island indirect/induced employment is from the DAHI methodology.
- (7) Assumes 75 percent of indirect/induced jobs to be located in Study Area, with the remainder located in rest of island.
- (8) The DAHI methodology did not provide a multiplier for calculating indirect/induced jobs on a statewide level.

Table IV-14:

Average Daily Resort Construction Employment -- 1988 to 1988
(All Numbers Represent Annual Equivalent Positions)

	Year or Periods											
	7/87- 6/88	7/88- 12/88	1/89- 6/89	7/89- 6/90	7/90- 6/91	7/91- 6/92	7/92- 6/93	7/93- 6/94	7/94- 6/95	7/95- 6/96	7/96- 6/97	7/97- 6/98
<u>RITZ-CARLTON</u>												
On-Site	0	243	243	243	0	0	0	0	0	0	0	80
Rest of Study Area	0	148	148	148	0	0	0	0	0	0	0	49
STUDY AREA SUBTOTAL	0	391	391	391	0	0	0	0	0	0	0	129
Rest of Island	0	60	60	60	0	0	0	0	0	0	0	20
ISLAND TOTAL	0	451	451	451	0	0	0	0	0	0	0	149
<u>ALL OTHER PROJECTS</u>												
On-Site	627	654	27	297	344	263	308	1013	908	1001	776	715
Rest of Study Area	383	401	18	183	214	165	190	618	556	611	474	342
STUDY AREA SUBTOTAL	1010	1056	45	480	558	428	498	1631	1464	1612	1250	1057
Rest of Island	154	159	5	71	79	59	74	249	239	246	191	176
ISLAND TOTAL	1164	1214	50	551	637	487	572	1880	1703	1858	1441	1233
<u>COMBINED TOTALS</u>												
On-Site	627	897	270	540	344	263	308	1013	908	1001	856	795
Rest of Study Area	383	549	166	331	214	165	190	618	556	611	523	391
STUDY AREA SUBTOTAL	1010	1446	436	871	558	428	498	1631	1464	1612	1379	1186
Rest of Island	154	219	65	131	79	59	74	249	239	246	211	196
ISLAND TOTAL	1164	1665**	501	1002	637	487	572	1880	1703	1858	1590	1382

* Note: Each year or time period begins on the first of July, and ends at the end of the following June. The only exception is the 1988-1989 period, which is separated into two six-month periods. This was done in order to distinguish the last six months of construction at the Hyatt Regency Waikoloa (estimated completion date at the end of 1988) from other ongoing projects during the 1988-1989 timeframe.

** For reasons given in text, this number is likely to prove greatly overstated.

Cumulative Results: Cumulative construction employment numbers depend on assumptions about how many units will be built and in which timeframes. Thus, results of Table IV-14 are directly dependent on the assumptions about total resort development as shown in Table IV-9.

Given these assumptions, Table IV-14 indicates considerable variation in construction employment through 1993 (which reflects historic "busts" and "booms" in the construction industry), but sustained high numbers of construction jobs from 1994 to 1998.

Because Table IV-14 reports average job figures, it suggests there may be a particularly high number of construction workers in the Kohala area during the latter part of 1988, when construction on the Hyatt Regency Waikoloa is concluding and construction on the Ritz-Carlton is beginning, and another very high number in 1989-90, when construction on the Ritz-Carlton is concluding and construction on the hypothetical "Hotel X" is commencing.

In reality, however, on-site employment reaches a peak in the middle part of the construction timeframe, and there are fewer workers required in the early and later stages. Based on actual data from construction of the Mauna Lani Bay Hotel (Mauna Lani Resort, Inc., 1980), CRI modeled separate "construction job curves" for the Hyatt Waikoloa, Ritz-Carlton, and "Hotel X." Figure IV-9 shows the results obtained by superimposing the Hyatt Waikoloa and Ritz-Carlton curves alone from January 1988 (when the Hyatt will actually have passed its peak) to the end of the Ritz construction period. Figure IV-9 adds in the hypothetical "Hotel X."

Under both scenarios, during the Ritz construction period there is a modest peak in construction employment in the second half of 1989 (450 to 600 on-site), but this remains far below the Hyatt peak of 1987 and early 1988 (in excess of 1,000).

2.2.3.2 Operational Period

Number of On-Site Resort Jobs: Table IV-15 reproduces information provided by Ritz-Carlton headquarters in Atlanta, Georgia on initial staffing plans for the first 450 units, categorized by department. The majority of jobs would be in food and beverage capacities, followed by rooms (primarily housekeeping jobs). Approximately 11 percent of all jobs would be in the management/supervisory category, according to the Ritz-Carlton Hotel Company. Initial staffing plans call for 628 full-time jobs plus 66 part-time or casual workers. Ritz-Carlton estimates that the 66 part-time/casual positions are equivalent to 50 full-time positions, and so the total number of "FTE" (full-time equivalent) jobs would be 678.

Based on the 1.2 multiplier set forth in Table IV-10, the number of additional FTE jobs created by the eventual 200-unit add-on would be 240, for a total of 918 for all 650 units.

Wages/Salaries for On-Site Employees: Exact wages for hotel staff depend to a large extent on results of union elections and collective bargaining agreements. However, to provide some indication, the Mauna Lani Bay Hotel has shared payroll data on employee wages as of 1986. As shown in Table IV-16, the median income for union workers was about \$15,000 per year, while

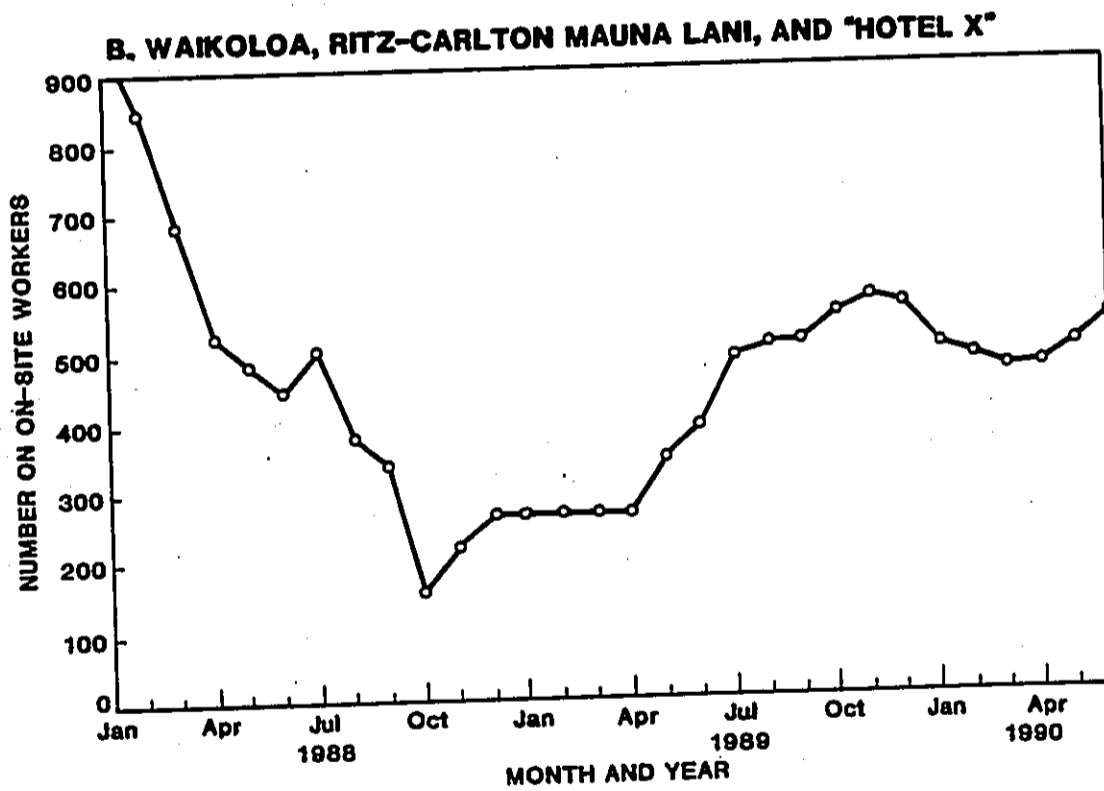
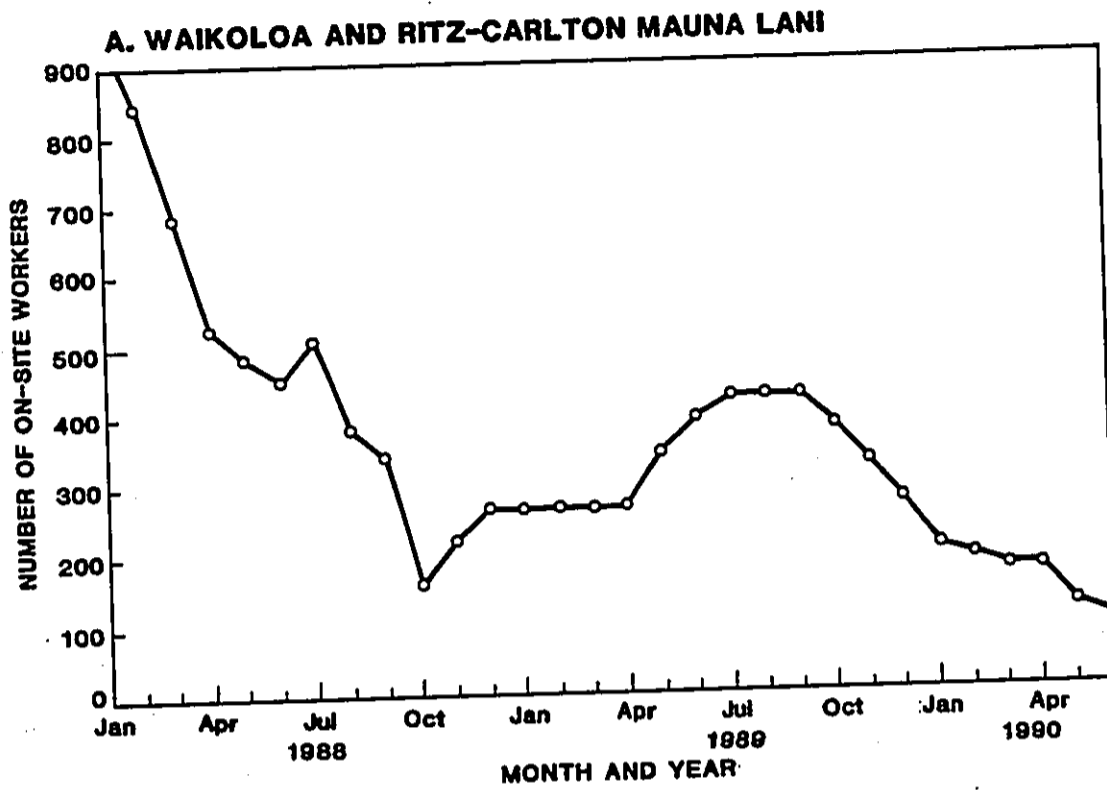


Figure IV-9
**CUMULATIVE NUMBERS OF ON-SITE
 CONSTRUCTION WORKERS**

RITZ-CARLTON MAUNA LANI
 Mauna Lanı Resort
 South Kohala, Hawaii

Table IV-15
Initial Ritz-Carlton Staffing Plan, by Department

Department	Number of Positions		
	Full-Time	Part-Time/Casual	Total
Food and Beverage	322	25	357
Rooms	142	10	152
Administrative & General	44	4	48
Repairs & Maintenance	26	2	28
House Laundry	24	2	26
Garage	8	7	15
Recreation	11	2	13
Employee Cafeteria	10	2	12
Marketing & Sales	11	0	11
Telephone	9	2	11
Retail	9	0	9
Catering & Conventions	8	0	8
Personnel	4	0	4
TOTALS:	628	66	694*

* The 694 positions, including part-time/casual, translate into 678 FTE (full-time equivalent) jobs.

NOTE: A more detailed breakdown of positions supplied by Ritz-Carlton suggests approximately 11 percent of all jobs would be in the management/supervisory category. This is consistent with staffing patterns at the Mauna Lani Bay Hotel (Community Resources, Inc. and Datametric Research, 1987).

Source: Ritz-Carlton Hotels, December 1986.

Table IV-16

Wage/Income Distribution for Mauna Lani Bay Hotel Employees, 1986

	Union Workers			Salaried Workers		
	Full-Time	Part-Time	Casual	Full-Time	Part-Time	Casual
\$ 7,680 or less	13	3	32	0	0	1
\$7,681 - \$ 9,600	28	3	4	0	1	0
\$ 9,601 - \$11,520	17	8	0	0	0	0
\$11,521 - \$13,340	61	7	6	8	1	0
\$13,241 - \$15,360	76	6	7	11	1	0
\$15,361 - \$17,280	50	3	1	15	0	0
\$17,281 - \$19,200	39	1	1	14	0	0
\$19,201 - \$21,120	16	0	2	5	0	0
\$21,121 or more	<u>47</u>	<u>2</u>	<u>4</u>	<u>35</u>	<u>0</u>	<u>0</u>
	347	33	57	88	3	1
APPROXIMATE MEDIAN INCOME:	\$14,870	\$12,300	(under \$7,680)	\$18,650	\$12,430	N/A

Notes:

- (1) Income before taxes and exclusive of fringes or tips.
- (2) Includes only those employees remaining on payroll from 12/16/86 through 12/15/87 -- i.e., excludes people who worked for only part of a year. Thus, total numbers do not completely reflect Mauna Lani's staffing pattern, since turnover is less frequent among salaried workers.
- (3) "Median" refers to the figure in the middle, with 50 percent of employees earning more and 50 percent earning less.
- (4) Income figures reflect earnings of individual workers, not entire households.

Source: Ms. Geordine Nahoopii, Director of Personnel, Mauna Lani Bay Hotel, March 1987.

the median for salaried workers (both management and office support) was about \$18,600. These figures exclude fringes and tips, the amount and value of which are often a source of debate.

More subjective issues surrounding resort wages and working conditions -- such as adequacy of pay and worker satisfaction -- will be discussed in later sections of the EIS.

Number of Jobs Islandwide and in Study Area: Again using the example of the initial Ritz-Carlton 450 units, Table IV-17 shows the assumptions and methodology -- based on the County's requested DAHI approach -- used to calculate new islandwide jobs generated by West Hawaii resort development. Overall results are contained in Table IV-18.

A few things should be noted about the DAHI methodology. First, it provides only islandwide, not statewide, employment totals. The islandwide totals are not always compatible with statewide totals based on standard multipliers developed by the Hawaii State Department of Planning and Economic Development, and so no statewide figures are reported here. Second, an unpublished feature of the DAHI approach involves a "luxury adjustment factor" for hotels such as the Ritz-Carlton; this has been calculated based on discussions with DAHI principal Dr. Bruce Plasch (personal communications, January 1987). These issues are discussed at more length in the Community Resource (1987) technical document.

As indicated in Tables IV-17 and IV-18, the initial Ritz-Carlton 450 units are estimated to generate 984 FTE jobs throughout the Big Island. These include the 678 on-site jobs plus 306 additional jobs elsewhere on the island, of which 80 percent are estimated to be located in the Study Area. The 80 percent assumption may be somewhat high since much of the island's retail and light industrial support facilities are still located in East Hawaii, but it is assumed that more such facilities will gradually develop in West Hawaii as resorts continue to open there.

For the eventual 200 unit add-on in 1998, Table IV-18 shows an islandwide figure of about 440 FTE jobs. Thus, for the total 650-unit Ritz-Carlton facility, the number of islandwide jobs would be about 1,420 -- which breaks down into some 920 on-site, 400 elsewhere in West Hawaii, and 100 in East Hawaii.

Islandwide and Study Area Employment from Cumulative West Hawaii Resort Development: During the 1988-93 period, the assumed new West Hawaii resorts would generate a total of about 5,650 new FTE jobs islandwide. Some 1,100 of these would come from the hypothetical "Hotel X," with the remainder from the three identified projects -- Ritz-Carlton, Hyatt Regency Waikoloa, and the South Kohala Resort. The major source of new jobs during this period will be the Hyatt Regency Waikoloa, producing nearly half the total estimated number. For all new resorts, about three out of every eight jobs would be off-site, with most of these in West Hawaii.

For the 1994-98 period, during which actual development is much more speculative at this point, the assumed scenario produces an additional 1,200 to 1,300 jobs islandwide each year. Should this scenario actually materialize, the total number of new FTE jobs islandwide from new resorts opening

Table IV-17

Example of Procedures for Calculating Total Operational Employment

Ritz 450 Units in 1990

<u>A. Total On-Island Employment</u>	<u>Units/ People</u>	<u>Multi- plier (1)</u>	<u>Jobs</u>
Basic Units	450	1.84	826
Luxury Hotel Unit Adjustment	450	0.35	157
No. of Resort Residents	0	0.29	0
TOTAL			984

<u>B. Allocation by Area</u>	<u>Study Area</u>	<u>Rest of Island</u>	<u>Island Total</u>
On-Site	678 (2)	0	678
Off-Site	245 (3)	61	306
TOTAL	923	61	984

- (1) First multiplier calculated by procedure shown in Table IV-11. Second multiplier from Table IV-10. Third multiplier from DAHI (1986).
- (2) On-site employment from hotel source or calculated from procedures in Table IV-11.
- (3) Assumes 80% of off-site employment in Study Area.

Table IV-18:

New Resort Operational Employment -- 1988 to 1998
(All Numbers Represent Full-Time Equivalent Positions)

	Opening Year										Sub-Totals		Total 1988- 1998	
	1988- 1989(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1988- 1993	1994- 1998		
RITZ-CARLTON														
On-Site (2)	0	678	0	0	0	0	0	0	0	0	240	678	240	918
Rest of Study Area	0	245	0	0	0	0	0	0	0	0	158	245	158	403
STUDY AREA SUBTOTAL	0	923	0	0	0	0	0	0	0	0	398	923	398	1321
Rest of Island	0	61	0	0	0	0	0	0	0	0	39	61	39	100
ISLAND TOTAL	0	984	0	0	0	0	0	0	0	0	437	984	437	1421
ALL OTHER PROJECTS														
On-Site (2)	1700	0	700	0	513	766	568	766	568	486	486	2913	3154	6067
Rest of Study Area	844	0	315	0	246	442	477	442	477	158	158	1405	2153	3558
STUDY AREA SUBTOTAL	2544	0	1015	0	759	1208	1045	1208	1045	801	801	4318	5307	9625
Rest of Island	211	0	78	0	61	127	136	127	136	39	39	350	625	975
ISLAND TOTAL	2755	0	1093	0	820	1335	1181	1335	1181	900	900	4668	5932	10600
COMBINED TOTALS														
On-Site	1700	678	700	0	513	766	568	766	568	726	726	3591	3394	6985
Rest of Study Area	844	245	315	0	246	442	477	442	477	473	473	1650	2311	3961
STUDY AREA SUBTOTAL	2544	923	1015	0	759	1208	1045	1208	1045	1199	1199	5241	5705	10946
Rest of Island	211	61	78	0	61	127	136	127	136	138	138	411	664	1075
ISLAND TOTAL	2755	984	1093	0	820	1335	1181	1335	1181	900	900	5652	6369	12021

Note: Opening date schedules are relatively more fixed for 1988-1993, whereas the schedule for 1994-1998 is more theoretical, based on CRI interpretation of official State forecasts.

- (1) Includes the Hyatt Waikoloa
- (2) On-site figures for initial Ritz-Carlton 450 units and Hyatt Waikoloa obtained from hotel sources; remainder calculated from assumptions in Table IV-10.

between 1988 and 1998 would be about 12,000, nearly 11,000 of which are assumed to be located (eventually if not immediately) in the West Hawaii Study Area.

2.2.4 Labor Demand Vs. Supply and Worker In-Migration

If the demand for workers living in the Study Area exceeds supply, it will be necessary to import workers. This section contains CRI forecasts of labor demand vs. supply and consequent needed worker in-migration (above and beyond in-migration which is expected to be taking place anyway).

The focus in this section will be on in-migration related to permanent (operational) jobs. In-migration related to construction is usually temporary, and assumptions relating to this phenomenon will be discussed in the following Section 2.2.6.1 on Construction Housing Impacts. The focus is also restricted to the West Hawaii Study Area, since the lack of competing job prospects in East Hawaii reduces concern over labor supply there.

CRI has developed several complex micro-computer models to predict levels of available West Hawaii labor supply and required in-migration. These are described in detail in that company's technical document submitted to the County (Community Resources, Inc., 1987). Several key assumptions and methods include the following:

- o It is assumed that construction workers do not represent "available labor" for resort operational employment. Based on 1970 Census figures, 15 percent of the total Study Area labor force is assumed to be involved in construction trades and excluded from following analyses.
- o It is also assumed that "full employment" will always exclude a certain portion of remaining workers who are between jobs even in the best of times -- three percent of on-island unemployed labor force participants, and ten percent of unemployed recent in-migrants.
- o The County's requirement for a cumulative impact assessment requires consideration of new non-resort, as well as new resort, labor demand in the West Hawaii Study Area. Table IV-19 provides CRI estimates of non-resort worker demand through 1998.
- o "Available labor" will consist primarily of (1) new labor force entrants from natural population increase (estimated from an age-sex cohort projection technique, described in CRI's technical submission to the County) and also of (2) in-migrants who will be coming to West Hawaii regardless of economic conditions, although they will ultimately require jobs to remain (e.g., Asian immigrants joining families already in the area, young Mainland transients, "urban refugees" from Honolulu, etc.). The latter group is estimated at 80 percent of the new labor force entrants from natural increase -- considered a fairly conservative estimate in light of Hawaii State Department of Planning and Economic Development (1985, p. 11) estimates that Hawaii County population growth in the 1970's and early 1980's due to in-migration was 200 percent of the amount due to the balance of births over deaths.

Table IV-19:

Estimated New Jobs from Study Area Economic Activities Other than New Resorts

	July 1986	July 1987	July 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998
Increased Occupancy of Existing Units (1)	1135	462	51	0	0	0	0	0	0	0	0	0	0
HOST Park (2)	0	0	0	0	145	145	146	145	145	145	145	145	145
Coffee/Agriculture (3)	0	0	25	25	25	25	25	25	25	25	25	25	25
Other (4)	110	110	110	110	110	135	135	135	135	135	170	170	170
TOTAL	1245	572	186	135	280	305	305	305	305	305	340	340	340

(1) Figures derived by applying DAHI multipliers and treating increased occupancy as equivalent to new units. Assumes occupancies at existing units will plateau at 67.5 percent in 1987 and thereafter, with average party size plateauing at 1.90 in 1988 and thereafter.

(2) Numbers reflect "Medium" Development Scenario from HOST Park EIS (Traverse Group, Inc., 1985, p. IV-52), assuming 20-year timeframe beginning in 1990. The 1990 start date for new jobs is based on estimates from HOST Park consultant Marilyn Metz (personal communication, March 27, 1987).

(3) Assumptions by CRI reflecting recent improved market prospects for coffee.

(4) Application of DAHI multiplier of 0.29 for induced jobs from new population not supported by regional economic activity. This is conservatively estimated as 25 percent of future new Study Area population, extrapolated from estimated 1980-1985 annualized growth rate of 4.69 percent.

(DEFINITIONAL NOTE: In-migrants expected to come to West Hawaii anyway, even before new jobs are available, will be referred to as "Non-Induced In-Migrants." This contrasts with "Induced In-Migrants," the people who must be imported to fill any labor shortages created after new jobs are made available.)

- o Smaller sources of labor supply -- assumed to fill demand before it would be necessary to import any "Induced In-Migrants" -- would include (1) commuters from East Hawaii (constituting two percent of luxury Kohala hotel workers in the 1987 Employee Survey, a figure assumed to rise to a stable four percent by 1993 due to limited job growth prospects in East Hawaii), and (2) additional "moonlighting" by currently employed Study Area residents (assumed to account for possibly three percent of new jobs, based on the Employee Survey finding that nearly 50% of current workers desire additional employment). However, the CRI method allocates jobs to commuters and "moonlighters" only if labor demand exceeds other sources of on-island supply.

Table IV-20 contains results of the CRI analysis for the future situation in which both projected new Study Area resort jobs and non-resort jobs are developed. Table IV-21 shows the assumed distribution of new jobs and of new workers (since observed patterns of multiple jobholding indicate that required numbers of new workers will be slightly less than numbers of new jobs).

While the exact numbers in these tables are highly dependent on foregoing assumptions, the basic principle is that more induced in-migration will be required in years when more new jobs (whether due to resorts or other causes) open up. If there is a period when few new jobs are being created, a surplus of available labor will build up, and little or no induced in-migration will be required.

According to the best information available as of this time, the initial Ritz-Carlton 450 units will open roughly 18 months after the Hyatt Regency Waikoloa. During these 18 months, few other currently foreseeable jobs will become available. Thus, a surplus of available Study Area labor will be developing, so that relatively little induced in-migration may be required to fill labor demand generated by the Ritz-Carlton. (Additionally, it should be noted that off-site jobs generated by the Ritz-Carlton will probably actually develop gradually, not all in the same year.)

However, under the scenario for resort development shown in Table IV-9, the 1998 Ritz add-on of 200 units will generate labor demand during a period when many other resort and non-resort activities will also be creating a demand for labor. Whereas Table IV-21 suggests that only five percent of new 1990 West Hawaii jobs would be filled by in-migrants (or 19 percent; if "Non-Induced In-Migrants" are counted), in 1998 the proportion would be 62 percent (or 73 percent, including non-induced in-migrants).

Looking at the overall timeframe in the context of cumulative West Hawaii resort development, the need for substantial in-migration is also suggested at times when the Hyatt Regency Waikoloa opens in late 1988; to a lesser extent, when the South Kohala Resort hotel opens in 1993; and in other years from 1994 to 1998, due to previously-explained assumptions about ongoing heavy resort development during this period.

Table IV-20:
Labor Supply/Demand Analysis, Study Area 1988 - 1998
[Excludes Construction Sector]

	Opening Date										Sub-Totals			Total 1988- 1998
	Dec. 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998	1988- 1993	1994- 1998	
Total New Study Area Jobs														
Resort Projects	2544	0	923	1015	0	759	1208	1045	1208	1045	1199	5241	5705	
Non-Resort Projects	68	68	280	305	305	305	305	305	340	340	340	1331	1630	
STUDY AREA TOTAL	2612	68	1203	1320	305	1064	1513	1350	1548	1385	1539	6572	7335	
Demand for Workers														
New Workers Living in Study Area	2252	62	1035	1132	280	908	1291	1152	1321	1182	1313	5669	6259	
Commuters from E. Hawaii	78	0	39	46	0	43	61	54	62	55	62	206	294	
Current Workers/ Moonlighting	78	0	36	40	0	32	45	41	46	42	46	186	220	
TOTAL (1)	2409	62	1110	1218	280	982	1397	1246	1429	1279	1421	6061	6773	
New Available Study Area Labor Supply														
Surplus from Past Years (2)	199	152	621	16	71	169	41	81	67	81	69	1228	339	
Natural Population Increase	97	295	205	207	210	210	214	215	208	209	213	1224	1059	
Non-Induced In-Migration	72	219	152	154	156	156	159	160	154	155	158	909	786	
TOTAL AVAILABLE LABOR (2)	369	666	979	377	437	536	413	456	429	446	440	3361	2184	
Study Area Worker Demand Minus Supply (3)	1884	-604	56	756	-157	372	878	696	892	735	873	2307	4074	

(1) Total demand for workers somewhat less than total new jobs due to multiple jobholding factor of 1.09 workers per job (Community Resources, Inc., and Datametric Research, 1987). Demand for commuters and moonlighters is assumed only if total available Study Area is not adequate to fill all new Study Area jobs.

(2) Total available labor excludes ten percent of unemployed in-migrants and three percent of other unemployed on-island workers, reflecting "full employment" assumptions. These become part of the "surplus" category for the subsequent year.

(3) Positive numbers indicate required induced In-Migrant Workers; negative numbers indicate labor surplus and rising unemployment.

Table IV-21:

Distribution of New Study Area Jobs and Workers
[Includes Both Resort and Non-Resort]

	Opening Date												Sub-Totals			Total 1988- 1998
	Dec. 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998	1988- 1993	1994- 1998	1988- 1998		
Distribution of New Jobs Located in Study Area																
Available Labor: On- Island 1 Year or More	323	46	901	244	196	414	277	323	299	317	307	2124	1523	3647		
Available Labor: Non- Induced In-Migrants	79	22	166	167	109	170	173	174	168	169	172	713	856	1569		
Induced In-Migrants	2053	0	61	824	0	406	957	759	972	802	952	3344	4442	7786		
Commuters	78	0	39	46	0	43	61	54	62	55	62	206	294	500		
Current Workers/ Moonlighting	78	0	36	40	0	32	45	41	46	42	46	186	220	406		
TOTAL	2612	68	1203	1320	305	1064	1513	1350	1548	1385	1539	6573	7335	13908		
Distribution of New Study Area Workers Living in Study Area																
Available Labor: On- Island 1 Year or More	297	42	827	223	180	380	254	296	275	291	282	1949	1398	3347		
Available Labor: Non- Induced In-Migrants	72	20	152	154	100	156	159	160	154	155	158	654	786	1440		
Induced In-Migrants	1884	0	56	758	0	372	878	696	892	735	873	3068	4074	7142		
TOTAL	2252	62	1035	1132	280	908	1291	1152	1321	1182	1313	5671	6258	11929		

Source: Community Resources, Inc. (1987) labor supply demand, utilizing key assumptions discussed in text.

It should be noted that the labor supply/demand analysis assumes that most available unemployed Study Area workers will be qualified and motivated to fill new job openings -- whether on-site at resorts, in off-site jobs, or non-resort-related opportunities. As discussed at more length in the following section on "Socio-Economic Mitigations," job training and related programs could both strengthen the basis for this assumption and perhaps further reduce the need for in-migrant workers by increasing the number of West Hawaii people entering the labor force.

While cumulative West Hawaii resort development (if actually carried out to the extent which has been assumed here) would unquestionably require increased levels of in-migration, there are several potential sources of labor supply among current residents which will provide "natural increase" in the West Hawaii workforce (and/or which can be further tapped to reduce in-migration):

Future High School Graduates -- According to estimates provided by the Hawaii State Department of Education (personal communication, Ed Matsushige, Information Specialist, Information System Services Branch, Office of Business Services, April 27, 1987), senior class members from 1987 to 1990 will total about 2,100 for the three Study Area public high schools (Kohala, Honokaa, and Konawaena). From 1991 to 1993, there would be another 1,650 seniors. These numbers do not take into account either the recent Parker School closing in Waimea or the prospect of further in-migration in the next several years.

The issues for manpower development involve how many of these graduates will remain (or return) and whether they will have initial qualifications and motivation for on- or off-site resort-generated jobs. A Department of Education survey of 1985 Big Island high school seniors (unpublished figures provided by Nan Yuen, Educational Specialist for Guidance and Counseling, April 28, 1987 -- individual school results not available) provides only limited evidence. Only 21 percent had definite plans to work full-time, but only about 32 percent had definite plans to attend a four-year college. Until better data sources are available, it may be more appropriate to focus less on forecasts than on action strategies to increase high school seniors' qualifications and interest in future West Hawaii job opportunities.

Females -- U.S. Census data for 1980 indicate West Hawaii females had a labor force participation rate some 20 percentage points lower than the rate for males (57 percent vs. 79 percent -- Community Resources, Inc., 1986, p. 19). Additionally, women with children aged six and under had a particularly low rate. While this may in some cases reflect values and preferences, the particularly high participation rates of women with older children (70 percent) suggest that lack of child care may be a barrier to needed or desired employment on the part of mothers of younger children.

Resort personnel offices also report that lack of child care facilities can be a barrier to promotions, since after-work classes and other upgrade training may require periods of evening or weekend work. Thus, more child care services could increase the availability of those females who want to work.

Elderly and/or Handicapped -- With the aging of the overall American population and an actual reduction in numbers of teenagers, a national concern has emerged over filling service jobs (such as fast-food counter help) normally taken by young people just entering the labor market. Several frequently cited possible replacement sources are the elderly and/or handicapped (Bacas, 1986), and more of these persons are starting to become visible in Hawaii establishments.

For West Hawaii and the state in general, the elderly represent the more numerous potential source. Statewide projections show a 74 percent expected increase from 1980 to 2000 in the population aged 60 or more (Hawaii State Commission on Manpower and Full Employment, 1984). There is a need for better local research on the actual employment needs, interests, and aptitudes among Hawaii's elderly, since the few preliminary surveys conducted to date provide conflicting results about desire for continued work after "retirement" age; however, the one survey which asked about reasons for wanting to work found that the principal motives more often had to do with desires such as "Independence" and "To Be Needed" rather than "Financial" need (ibid., pp. 14-15). Thus, part-time service employment in such occupations as retail sales, hostessing, and other low-pressure people-contact occupations would appear to be in harmony with the level of interest and abilities among some of the active elderly.

The Educationally Disadvantaged (e.g., school drop-outs or non-English speakers) are those for whom chronic unemployment or lack of job preparation has resulted in withdrawal from the labor force. Estimates of exact numbers of such individuals in West Hawaii are not available, but social agency informants suggest these are largely young adults (including some teenaged mothers).

Because many entry-level resort jobs do not require much educational background, resort work provides a good opportunity for integrating such individuals into the labor force. However, for many of the "hard-core" unemployed, deficits are as much or more related to work habits, attitudes, and self-image as to academic abilities. Other persons with educational limitations may be well motivated and actually in the workforce, but have difficulties obtaining promotions due to inadequate English.

The Attitudinally or Culturally Disinclined -- People with simple attitudinal disinterest in resort jobs can still benefit from tourism growth due to the indirect employment generated. However, to the extent that negative attitudes may be based on misperceptions, educational programs would clearly increase the effective available labor supply.

There has been considerable debate -- but little systematic research -- as to whether native Hawaiians and other Polynesians in Hawaii have any particular cultural inclination or disinclination for resort work. It may be noted that Hawaiians and part-Hawaiians currently comprise about one-third of the workforce at both the Westin Mauna Kea and the Mauna Lani Bay Hotel, the largest single ethnic group at each hotel (Community Resources, Inc. and Datametric Research, 1987).

However, there is also a body of evidence suggesting that at least some native Hawaiians still have cultural difficulties with Western work settings in general. Of all major ethnic groups in the state, Hawaiians have the highest unemployment rate (Hawaii State Department of Labor and Industrial Relations, 1985). A variety of studies on Hawaiian "underachievement" in both employment and educational settings has identified several crucial factors -- an affiliation- rather than achievement-oriented motivational structure; emphasis on accumulation of social rather than financial capital; fear of failure; avoidance of personal confrontations; and continued effects of culture loss during the 19th Century (c.f., Howard, 1974; Gallimore, Whitehorn, and Jordan, 1974; Jordan and Tharp, 1979; Kamehameha Schools/Bishop Estate, 1980, 1983; Linnekin, 1985).

Given that part-Hawaiians represent one of the fastest-growing ethnic groups on the Big Island, it is appropriate to consider including cultural factors in any programs aimed at maximizing resident employment at future resorts (see Section 2.2.8 on Socio-Economic Mitigations).

2.2.5 Off-Site and Total Population Impacts

This section will also focus on impacts of the resort operational, as opposed to construction, phase. Unless the hypothetical scenario for the 1990's (involving heavy ongoing resort construction) actually materializes, population growth due to construction is usually temporary and is thus better discussed in conjunction with construction housing impacts (Section 2.2.6.1).

2.2.5.1 Methods for Population and Housing Impact Estimates

Definitions of "Impact": Socio-economic "impacts" are conventionally defined as the difference between the future with the project and the future without the project (rather than the difference between the future vs. present conditions). For most of the topics discussed thus far, this definition has not been particularly important.

However, for population and housing impacts, this definition is important. That is because the County has requested data on two types of "impacts" -- project impacts and cumulative resort development impacts. For jobs, the "cumulative" impact just involved adding up individual project impacts. But the CRI approach to population and housing (see below) assumes different levels of immediate impacts depending on what proportion of the workers are on-island vs. in-migrants (since in-migrants tend to have smaller families and a greater propensity to share housing units). This leads to a need for projecting three different scenarios for the future:

- (A) Scenario of "NO RESORT DEVELOPMENT SINCE BASE YEAR": This assumes no new resort construction since a designated base year -- in this case, 1985, the last year for which data are available regarding both estimated resident population and also visitor inventory in West Hawaii. Under this scenario, there would be no additional resort jobs (not even the Hyatt Waikoloa jobs), although there would be some new non-resort jobs as set forth in Table IV-19, with population and housing growth due to this type of economic growth.

- (B) Scenario of "NO RESORT DEVELOPMENT SINCE PREVIOUS YEAR": This assumes that resort development came to a stop in the preceding year. For example, for 1990, it would assume that the Hyatt Waikoloa did open but that the Ritz-Carlton did not.
- (C) Scenario of "ALL SCHEDULED RESORT CONSTRUCTION": This assumes that all new resort units indicated in Table IV-9 open according to the schedule in that table.

Thus, for any given year, cumulative resort development impact is defined as the result of subtracting Scenario A from Scenario C. Individual project impact is defined as the result of subtracting Scenario B from Scenario C.

Assumptions and Method for Estimating Off-Site Population: The aspect of off-site population growth which can best be identified is "population supported by jobs" -- the number of workers plus other family/household members. Data from the Employee Survey of Mauna Lani and Mauna Kea workers (Community Resources and Datametric Research, 1987) indicate that hotel workers who have in-migrated during the past five years have a relatively low household population per worker (1.46), which is taken as the appropriate multiplier for future in-migrants. For future resort workers coming from the pool of available labor already living in the Study Area, the multiplier used is that recommended by DAHI -- i.e., the 1980 Census figure for West Hawaii of 2.07. (The DAHI approach would use the 2.07 figure for all workers; the difference between CRI and DAHI approaches on population and housing will be further discussed in Section 2.2.6.2.)

Table IV-22 shows: (1) the overall estimated off-site population supported by all new resort and non-resort jobs (i.e., population under the foregoing "Scenario C"); (2) population calculated by the same general procedures, but subtracting out effects due to Scenario B (i.e., project impacts on population); and (3) population calculated after subtracting out effects under Scenario A (i.e., cumulative resort development impacts on population). As previously explained, in-migration assumptions differ for Scenario A and Scenario B; therefore, the cumulative impacts as of any particular year will not necessarily equal the sum of all project impacts through that year.

2.2.5.2 Off-Site Population Impacts

Ritz-Carlton Project Impacts: For the initial 450 units in 1990, Table IV-22 indicates that islandwide jobs generated by the project would support a population of about 1,700 persons, nearly 90 percent of whom would (eventually) live in the West Hawaii Study Area. About 15 percent of this population would be associated with workers who had in-migrated the preceding year or in response to the mild labor shortage expected when the Ritz-Carlton opens in 1990. The remainder would be on-island population which, arguably, might otherwise out-migrate in the absence of new jobs.

Under the EIS assumptions, the population impact of new resort development in 1998 (the estimated year for the 200-unit Ritz add-on) would support about 1,900 residents islandwide, about 70 percent of whom would be associated with either induced or non-induced in-migrants (see "Definitional Note" in Section 2.2.4). This includes impacts of all new resort development for that

Table IV-22:

Total Off-Site Population Impacts

	Opening Date										
	Dec. 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998
Population Supported by All New Study Area Jobs (Both Resort and Non-Resort) (1)											
Available Study Area Labor:											
On-Island 1 Year or More	614	86	1712	462	372	786	528	613	568	602	583
Non-Induced In-Migrants	105	30	222	224	146	228	231	233	225	227	231
Induced In-Migrants	2750	0	81	1103	0	543	1282	1017	1303	1074	1275
STUDY AREA SUBTOTAL	3469	116	2015	1789	518	1557	2040	1862	2096	1903	2089
Rest of Island	549	0	190	236	0	197	356	361	359	363	379
ISLAND TOTAL	4018	116	2205	2025	518	1754	2396	2223	2454	2266	2468
Population Impacts From Development of Resorts in Individual Years (2)											
Available Study Area Labor:											
On-Island 1 Year or More	510	0	1263	119	0	375	170	236	155	182	170
Non-Induced In-Migrants	88	0	164	58	0	109	75	90	61	68	67
Induced In-Migrants	2750	0	81	1103	0	543	1282	1017	1303	1074	1275
STUDY AREA SUBTOTAL	3348	0	1508	1208	0	1027	1626	1343	1518	1323	1512
Rest of Island	549	0	190	236	0	197	356	361	359	363	379
ISLAND TOTAL	3898	0	1698	1515	0	1224	1882	1704	1877	1687	1891
RITZ-CARLTON SHARE											
Percentage of Jobs (3)	0	0	100%	0	0	0	0	0	0	0	32.7%
Number			1698								618
Population Impacts From Cumulative Development of New Resorts (4)											
Available Study Area Labor:											
On-Island 1 Year or More	510	503	1753	1707	1566	1835	1842	1931	1910	1921	1913
Non-Induced In-Migrants	88	93	266	440	539	723	913	1107	1292	1480	1673
Induced In-Migrants	2750	2750	2831	3934	3934	4477	5759	6776	8078	9152	10427
STUDY AREA SUBTOTAL	3348	3346	4850	6091	6040	7036	8514	9813	11280	12553	14012
Rest of Island	549	549	740	975	975	1172	1528	1889	2248	2611	2990
ISLAND TOTAL	3898	3895	5589	7056	7015	8208	10042	11702	13528	15164	17003

(1) For Available Study Area Labor and "Rest of Island," population computed by multiplying number of workers (see Table 2.14) by 1980 Study Area population/workers ratio of 2.07, as recommended by DAHL. For various in-migrant categories, multiplier is 1.46, as determined from Employee Survey figure for "Newcomers" (Community Resources, Inc. and Datametric Research, 1987).

(2) Previous results, minus results of a similar analysis which assumed for each year that new resort construction had stopped in previous year.

(3) Based on Table 2.14.

(4) Initial results, minus results of a similar analysis which assumed no new resort construction since 1985. As explained in text, cumulative impacts are not necessarily equal to sum of incremental impacts.

year alone. Since the Ritz add-on would be responsible for about a third of all these jobs, it is assumed that about a third of the supported population (or roughly 620) can be attributed to the 200-unit add-on.

For the total 650 units, then, the combined off-site population impact would be a little over 2,300 people, roughly 30 percent of whom would be induced or recent non-induced in-migrants.

Cumulative Resort Development Impacts: The total resort development assumed for the period 1988 to 1998 would provide jobs supporting about 17,000 people, more than 80 percent of whom would eventually live in the West Hawaii Study Area. Because of the assumed heavy induced in-migration in the 1990's, more than 60 percent of this population would be associated with workers moving to West Hawaii to fill labor shortages. Including non-induced in-migrants (people expected to move to West Hawaii anyway, even before jobs become available), the proportion of in-migrants would exceed 70 percent. However, the proportion of in-migrants would be much less in particular years (such as 1990) when on-island labor supply has built up due to a relative lack of new jobs in the preceding year or two.

2.2.5.3 Total Population Impacts

Total Hawaii Island population impacts would include both off-site population and the average daily on-site population discussed in Section 2.2.2 ("average" figures from Table IV-12):

(numbers rounded:)	<u>Ritz-Carlton Project</u>			<u>Cumulative Resort</u>	
	<u>1990</u>	<u>1998</u>	<u>Total</u>	<u>1988-1993</u>	<u>1988-1998</u>
Total Resident (including on-site):	1,700	620	2,320	8,260	18,480
Average Daily Visitors	600	260	860	3,440	7,320
Total Population (including Visitors):	2,300	880	3,180	11,700	25,800

2.2.6 Housing Impacts and Requirements

2.2.6.1 Construction Period

Ritz-Carlton: During the current Hyatt Waikoloa construction period, rental housing in the Study Area has become scarce and rents have increased. According to the real estate agent hired to assist construction workers with housing needs (personal communication, India Hoogs, West Hawaii Property Services, March 6, 1987), the current shortage is associated somewhat with out-of-area workers taking housing, but even more with increased visitor levels and a consequent shift in apartment/condominium units from residential to visitor use.

Given the smaller construction workforce required for the Ritz-Carlton (and the possibility that some already-housed Hyatt workers will simply remain in the area a while longer to work on the Ritz), it is expected that construction housing impacts will be significantly less than has been the case for the Hyatt.

Assuming an average three construction workers to a unit, and 20 percent of on-site construction workers in need of Study Area temporary housing, and given average on-site construction employment of 391 (see Table IV-14) there will be demand for 16 Study Area units, on average, during the 1988 - 1990 timeframe for construction of the initial 450 units. As suggested by the construction employment curves contained in Figure IV-9, this figure would actually fluctuate from a low of four units at the beginning of construction to a high of 28 units during construction peak.

The eventual 200-unit add-on would require only one-third as many construction workers as the initial phase. Consequently, the average number of short-term units demanded by out-of-area workers would be five or six during the 1996 - 1998 timeframe, ranging from one to nine depending on exact stage of construction.

Cumulative: During the construction overlap covering Hyatt's conclusion and Ritz's beginning (Figure IV-9), the combined demand by out-of-area workers for both projects is estimated at 20 to 35 units (depending on month). If the hypothetical "Hotel X" begins in the particular timeframe which has been assumed (Figure IV-9, combined demand during the 1989 1990 timeframe would range from 30 to 40 rental units.

The timing of the eventual 200-unit add-on and the extent of other construction at this time is extremely speculative. However, given the assumptions which have been made for illustrative "worst-case" purposes (Table IV-9), there would be an average need for 47 units, reaching 70 to 80 if all projects would peak simultaneously. However, such a sustained construction boom could well encourage permanent relocation and resolution of housing needs through purchase rather than rental.

2.2.6.2 Operational Period

2.2.6.2.1 Timing and Attribution of Impacts

Population and housing impacts of economic development shift over time, in ways that are not always easy to predict. For example, four recently-hired new resort workers might be young singles sharing one housing unit. A generation later, these four young people might each be supporting a family of five or six, living now in four different housing units. Alternatively, the original four young workers might have left, only to be replaced by four other people sharing the same one unit. Little data currently exist to allow reasonable forecasts regarding long-term shifts in impact, even on some average basis.

Past EIS's have generally not addressed the timing question, but have usually calculated resort-related housing impacts in a way which implicitly assumes a short-term timeframe. There has been a traditional distinction between the assumed household sizes and household formation rates of

in-migrants versus on-island available labor. It has been assumed that some new resort workers would come from other hotels or workplaces in the Study Area ("regional turnover"); this would suggest that some needed in-migrant workers and consequent housing needs are displaced, but these displaced impacts have not always been addressed.

The DAHI approach recommended by the County is implicitly long-term in nature. It assumes that all workers will have characteristics similar to the current Study Area population (i.e., no recognition of differences between in-migrants and current available labor in West Hawaii). More significantly, it assumes that new housing units will be required for all employees of new resorts, whether or not these employees are already on-island and are thus already housed.

The housing impact analysis by CRI addresses the timing issue in the following way:

- o The DAHI approach is utilized to present a picture of theoretical eventual impacts, perhaps a generation or two from now ("theoretical" because it is questionable whether 100 percent of currently available on-island labor will ever form totally new households).
- o For more immediate housing impacts, CRI utilizes a procedure similar to that in past EIS's -- i.e., attributing different types of impacts to in-migrants vs. those already in the Study Area -- except that "regional turnover" is not discounted as in the past (i.e., if someone leaves another jobs in West Hawaii to work at the Ritz-Carlton, that person's replacement and his/her housing need is counted as a Ritz-Carlton impact).

Because the CRI approach distinguishes between types of impacts ("non-induced in-migrants" who are assumed to be already in the Study Area, vs. "induced in-migrants" who do not come until new jobs open up), the following analysis of immediate housing impacts gives a range of results. At the low end, it is assumed that, since non-induced in-migrants are already living in the Study Area, they will form new households at the same rate as other current residents. At the high end of the range, it is assumed that housing demand generated by recent in-migrants should be considered a retroactive impact of the project which allows these in-migrants to remain -- i.e., non-induced in-migrants, like induced in-migrants, all require totally new housing which does not now exist.

2.2.6.2.2 Islandwide and Study Area Housing Impacts

Table IV-23 provides assumptions and results of the various approaches for assessing housing impacts related to people supported by new jobs (whether on-site or off-site). As with the population impact table (Table IV-22), there are various categories of "impact" -- the combined effects of new resort and non-resort development, the effects of resort development one year at a time, and the effects of cumulative resort development (excluding non-resort effects expected to occur anyway).

Table IV-23:
Total Off-Site Housing Impacts

	Opening Date										
	Dec. 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998
For Population Supported By											
All New Study Area Jobs											
(Both Resort and Non-Resort)											
Immediate	31	4	87	23	19	40	27	31	29	31	31
Available Study Area Labor:											
On-Island 1 Year or More (1)	5-25	2-7	11-54	11-55	7-36	12-55	12-56	12-57	11-55	12-55	12-56
Non-Induced In-Migrants (2)	671	0	20	269	0	133	313	248	318	262	311
Induced In-Migrants (2)	707-	6-	118-	304-	26-	184-	351-	291-	358-	304-	352-
STUDY AREA SUBTOTAL	728	12	161	347	55	228	396	336	402	348	397
Rest of Island (1)	28	0	10	12	0	10	18	18	18	18	19
ISLANDWIDE TOTAL	756	12	171	359	55	238	414	309-	376-	366	416
Theoretical Eventual (3)	1580	43	726	795	196	759	906	808	927	829	921
Study Area	186	0	64	80	0	305	121	122	122	123	128
Rest of Island	1767	43	790	874	196	1084	1027	931	1048	952	1050
ISLANDWIDE TOTAL											
Housing Impacts From Development of Resorts in Individual Years											
Immediate	26	0	64	6	0	19	9	12	8	9	9
Available Study Area Labor:											
On-Island 1 Year or More (1)	4-21	0	8-40	3-14	0	6-26	4-18	5-22	3-15	3-17	3-16
Non-Induced In-Migrants (2)	671	0	20	269	0	133	313	248	318	262	311
Induced In-Migrants (2)	701-	0	92-	278-	0	167-	325-	265-	329-	275-	323-
STUDY AREA SUBTOTAL	718	0	124	289	0	178	339	282	341	288	336
Rest of Island (1)	28	0	10	12	0	10	18	18	18	18	19
ISLANDWIDE TOTAL	746	0	134	301	0	188	358	300	359	306	355
RITZ-CARLTON SHARE (4)	0	0	102-134	0	0	0	0	0	0	0	112-116
Theoretical Eventual (3)	1537	0	546	598	0	441	709	612	708	610	703
Study Area	186	0	64	80	0	67	121	122	122	123	128
Rest of Island	1723	0	610	678	0	507	830	734	830	734	831
ISLANDWIDE TOTAL	0	0	610	0	0	0	0	0	0	0	272
RITZ-CARLTON SHARE (4)											

CONTINUED

Table IV-23:
Total Off-Site Housing Impacts
(Continued)

	Opening Date										
	Dec. 1988	July 1989	July 1990	July 1991	July 1992	July 1993	July 1994	July 1995	July 1996	July 1997	July 1998
Housing Impacts From Cumulative Development of New Resorts											
<u>Immediate</u>											
Available Study Area Labor:											
On-Island 1 Year or More (1)	26	26	89	87	80	93	94	98	97	98	97
Non-Induced In-Migrants (2)	4-21	5-23	14-65	22-107	27-131	37-176	46-222	56-269	66-315	75-361	85-408
Induced In-Migrants (2)	671	671	690	960	960	1092	1405	1553	1970	2232	2543
STUDY AREA SUBTOTAL	710-	701-	793-	1069-	1087-	1222-	1546-	1807-	2133-	2405-	2726-
	718	719	844	1164	1171	1362	1721	2021	2382	2691	3048
Rest of Island (1)	28	28	38	50	50	60	78	96	114	133	152
ISLANDWIDE TOTAL	729-	729-	831-	1118-	1116-	1282-	1622-	1903-	2247-	2538-	2877-
	746	747	882	1203	1220	1421	1798	2117	2497	2824	3200
<u>Theoretical Eventual (4)</u>											
Study Area	4084	4084	4630	5228	5228	5669	6378	6990	7698	8308	9011
Rest of Island	489	489	553	633	633	700	821	943	1065	1188	1316
ISLANDWIDE TOTAL	4573	4573	5183	5861	5861	6369	7199	7933	8763	9496	10327

- (1) Population divided by 1980 Study Area average household size of 2.95, as recommended by DAHI (1986), times assumed 15 percent household formation rate.
- (2) Population divided by average in-migrant household size of 4.10, as determined from Employee Survey figure for "Newcomers" (Community Resources, Inc. and Datametric Research, 1987). For Induced In-Migrants, a 100 percent household formation rate is assumed. For Non-Induced In-Migrants, alternative assumptions are a 15 percent rate (producing lower number in range) or 100 percent (producing higher number).
- (3) Total workers times resident population per worker (2.07), divided by average 1980 resident household size (2.95). This is the procedure utilized by DAHI (1986).
- (4) Based on percentages indicated in Table IV-22.

Ritz-Carlton Project Impacts: In 1990, the year when the initial 450 Ritz units open, all expected new jobs that year would generate an anticipated immediate demand for about 130 to 170 units (depending on treatment of in-migrants) islandwide, with about 93 percent of these in the West Hawaii Study Area. Subtracting the effects of non-resort jobs expected to come on-line anyway, the impact attributable to the Ritz would be around 100 to 135 units islandwide. The theoretical eventual housing impact -- if and when all on-island workers move out of their current households and start new ones -- would be 610 units attributed to the Ritz, 90 percent of these in the Study Area.

For 1998 (the estimated year of the 200-unit add-on), given the assumptions of many competing projects and subsequent heavy worker in-migration, the immediate housing impacts would be 370 to 420 units islandwide for all new economic development; 340 to 355 units islandwide due to West Hawaii resort development alone; and 110 to 115 units of resort impacts attributable to the Ritz add-on. The theoretical ultimate housing impact for the 200-unit Ritz add-on would be 270 housing units islandwide.

Cumulative Resort Development Impacts: Cumulative impacts are defined as the difference between developing all assumed new resorts vs. no new resorts since 1986. For the various resorts proposed to open by 1993, islandwide housing impacts would range from 1,300 to 1,400 units, with a theoretical ultimate impact of 6,400. Extending the timeframe to 1998, the figures are 2,900 to 3,200, with a theoretical ultimate impact of 10,300 units.

2.2.6.2.3 Immediate Demand by On-Site Workers and Affordability

For EIS purposes, housing demand by on-site Ritz-Carlton workers alone is estimated at two levels: (1) total number of new units demanded, and (2) number of required "assisted" units for workers whose household incomes indicate difficulty in ability to afford market housing. (NOTE: The analysis is limited to more immediate demand, since the DAHI methodology does not extend to on-site workers.)

Table IV-24 provides both methods and results. It should be noted that a somewhat different -- and more conservative -- set of assumptions were used for calculating housing demand by on-site workers alone, resulting in figures which suggest that most of the housing demand created by the Ritz-Carlton would be due to on-site workers alone.

Ritz-Carlton workers are expected to require between 100 and 135 new housing units for the initial 450-unit phase in 1990. For the 1998 200-unit add-on, because proportionately more of the workers are expected to be in-migrants under the scenario of heavy overall resort development in this timeframe, the demand for new housing units is expected to be almost as great as the initial demand: 85 to 95 units. The combined figures total 185 to 230 units.

A common standard for gauging ability to afford for-purchase market housing is whether household incomes reach 80 percent of the median in that area. As indicated in Table IV-24, the estimated number of such households would range from 25 to 33 for the 1990 Ritz-Carlton initial phase, and another 21 to 23 for the 1998 add-on (totaling 46 to 56).

Table IV-24:
Estimated Housing Demand By On-Site Ritz-Carlton Workers

	Jobs [A] (1)	Multiple Jobholding [B] (2)	Required Workers [C = A/B]	Household Formation [D] (3)	Workers Requiring Housing [E = CxD]	House Sharing Rates [E] (2)	Total Units Demanded [G = E/F]	Below 80% of Median Income [H] (4)	Needed Assisted Housing [I = GxH]
YEAR 1990									
Management	68	1.05	65	100%	65	1.5	43	3	
Staff									
--Commuters	18	1.09	17	0%	0	--	--	--	
--Current Worker/ Moonlighting	18	1.09	17	5%	1	1.7	1	0	
					75-	1.7	44-	18-	
					63		37	15	
--Available Labor (5)	543-	1.09	498-	15%	28-		15-	4-	
	458		420		106		56	15	
	31-			100%		1.9			
--In-Migrants (5)	116	1.09	106		168-234		102-136	26-33	
SUBTOTAL (6)			625						
YEAR 1998									
Management	24	1.05	23	100%	23	1.5	15	1	
Staff									
--Commuters	9	1.09	8	0%	0	--	--	--	
--Current Worker/ Moonlighting	6	1.09	6	5%	0	1.7	0	0	
					9-	1.7	5-	2-	
					6		4	2	
--Available Labor (5)	67-	1.09	61-	15%	123-		65-	18-	
	43		39		145	1.9	76	21	
	134-		123-	100%	155-174		85-95	21-23	
--In-Migrants (5)	158	1.09	145		323-408		187-231	46-56	
SUBTOTAL (6)	240		221						
TOTALS	918		781						

(1) Jobs from Table 2.14, with ten percent assumed for management and staff distributed to other categories according to proportions calculated from top of Table IV-21.
(2) Figures derived from Employee Survey (Community Resources, Inc. and Datametric Research, 1987).
(3) CRI assumptions based primarily on figures from past EIS housing studies.
(4) Based on 80 percent of West Hawaii Median Income, which was identical to resort worker household income in Employee Survey.
(5) Ranges indicate alternative treatment of non-induced in-migrants.
(6) Figures sometimes do not add to subtotals due to rounding error.

Based on predicted employee household incomes, 75 percent of the resort workers may be expected to afford units priced above \$70,000 (assuming an interest rate of 8.5 percent and 30 percent of income available for housing), with 65 percent being able to afford housing priced above \$93,000. Seventy-five percent would be able to afford rents in excess of \$525 per month.

Worker households making less than 80 percent of the median will find it extremely difficult to purchase housing due to the lack of housing in this price range, over-extension of household credit, and lack of savings for down payments. Based on predicted household incomes, this may be approximately 25 percent of worker households. For this group, renting may be a more realistic option. Rents would need to be in the range of \$300 to \$500 per month to accommodate this portion of the work force.

The current Federal Home Administration, insured, 30-year fixed rate is between 8.5 percent and 8.85 percent, with adjustable rate loans at seven percent. The current Hula Mae rate is 8.25 percent. While very real issues such as origination points and down payments remain, interest rates in the current range indicate that housing in West Hawaii is within the grasp of the median-income household.

Due to the temporal nature of interest rates and the fact that many people rent, for the purpose of this analysis it is assumed that households making less than 80 percent of the West Hawaii median income of \$25,000 per year are in need of housing assistance. This may take the form of deeply subsidized for-purchase housing or, perhaps more appropriately, rentals with rates based on a percentage of monthly income. Eighty percent of the median (\$1,666 per month) falls within the surveyed range of \$1,501 to \$1,750 per month. Affordability as a function of interest rates is depicted in Table IV-25.

Characteristics and Location of Demanded Units: Employee Survey results indicate that 71 percent of current workers live in single-family housing and 21 percent in multi-family units, although a higher proportion (31 percent) of recent in-migrants live in multi-family units. The average number of rooms per unit reported in the survey was six, indicating a typical unit size of two to three bedrooms. It is therefore concluded that the housing in demand by resort workers will be two- to three-bedroom units -- primarily single-family homes, but with increasing willingness to reside in apartment units as more in-migrants enter the West Hawaii workforce.

In terms of location, State and County planning and zoning policies will ultimately determine where the supply of new housing units will be permitted. The local governments are now exploring a new "support community" at Kealahou north of Kailua-Kona, and there has also been preliminary discussion of other potential support community sites in the Kohala districts. Zoned land is also available at Waikoloa Village, Waimea, and to lesser extents in various North Kohala sites (expansion of existing communities such as Hawi and Kapaau, as well as some subdivision land between Hawi and Kawaihae).

However, some indication of future residential patterns may also be inferred from an understanding of where workers currently live, as determined by the Employee Survey (Community Resources and Datametric Research, 1987). Table IV-26 indicates the residence of various employee groups, including

Table IV-25

Maximum Housing Purchase Price
(Interest Rate Vs. Income)

Income	Interest Rate					
	7.0%	7.5%	8.0%	8.5%	9.0%	9.5%
	Housing Cost					
\$1,000	\$ 37,577	\$ 35,754	\$ 34,071	\$ 32,513	\$ 31,070	\$ 29,732
1,125	44,623	42,458	40,459	38,610	36,896	35,306
1,375	58,714	55,866	53,236	50,802	48,548	46,456
1,625	72,805	69,274	66,012	62,995	60,199	57,605
1,875	86,897	82,682	78,789	75,187	71,850	68,754
2,250	108,034	102,794	97,954	93,476	89,328	85,479
2,750	136,216	129,610	123,507	117,861	112,630	107,777
3,250	164,399	156,426	149,060	142,246	135,933	130,076
3,750	192,582	183,241	174,613	166,631	159,236	152,375

NOTE: Table calculations based on 30 percent of income available for housing, \$100 per month in additional housing expenses, and 30-year loan term. Standard amortization formula used for present value calculation.

Table IV-26
 Current Housing Location of Luxury Kohala Resort Employees

	Overall Sample			Recent (Past Five Years) In-Migrants*		
	Mauna Lani	Mauna Kea	Total	Mauna Lani	Mauna Kea	Total
	%	%	%	%	%	%
Puako/Waikoloa/Kawaihae	12	9	10	12	18	14
Kamuela/Waimea	23	25	24	28	24	27
North Kohala	29	39	34	12	24	16
Hamakua	15	23	19	21	15	17
North Kona	18	3	11	30	9	23
South Kona	1	0	1	1	0	1
East Hawaii	2	1	2	2	3	2
(base:)	(371)	(358)	(729)	(60)	(33)	(94)

* non-management only

Source: Community Resources, Inc., and Datametric Research (1987, pp. 13, 19) -- Survey of Employee Characteristics and Housing Patterns: Westin Mauna Kea and Mauna Lani Resort.

non-management recent in-migrants, whose preferences are the best indicators of the preferences of future in-migrants. As of now, newcomers are tending to live either in North Kona or the Waimea area.

There are some significant ethnic differences in current hotel workers' residential patterns. Caucasians are more likely than other groups to live in Kona and in makai South Kohala (Puako, Waikoloa, etc.) and much less likely than other ethnic groups to live in North Kohala. The other ethnic group with a distinctive pattern consists of Filipinos, who are more likely than most other groups to be living in North Kohala or Hamakua.

The Employee Survey also indicated that the great majority of current workers are satisfied with their current areas of residence. However, those most likely to be happy were workers living close to their workplaces (i.e., in the makai parts of South Kohala). Newcomers were particularly likely to want to live in the makai areas, whereas long-time residents were also interested in mauka residential areas.

In terms of actual housing moves following initial employment with a Kohala luxury resort, most workers originally living on-island have not moved from their original area; those who did move tended to shift to mauka South Kohala. People moving from East Hawaii tended to move to the cooler parts of North Hawaii (mauka South Kohala, North Kohala, or Hamakua). In-migrants from other Hawaiian islands were more likely to settle in South Kohala, while in-migrants originally from the Mainland were relatively more likely to end up in Kona or makai South Kohala.

2.2.6.2.4 Future Available Housing

The future availability of housing is dependent upon a number of complex variables, most of which are beyond the control of individual developers or the government. This section will discuss the current status of planning for residential developments, forces likely to influence the market, and possible responses.

The primary economic activity in West Hawaii is tourism. It is not surprising to find a relationship between the growth of tourism and the production of residential housing. Although yearly housing production has been erratic as previously discussed, there has been a consistent increase in residential housing accompanying the increase in visitor units. This relationship is illustrated in Figure IV-10.

Project List and Descriptions: Table IV-27 lists the major proposed projects in the West Hawaii area (Hawaii County Department of Housing and Community Development and Department of Planning). They are described in terms of location, General Plan status, and the number of single-family, multi-family, and total units. There is no indication as to the planned price range of these units. The numbers involved, however, suggest that a majority will need to be priced to the bulk of the residential market in order to assure their marketability.

Other Potential Market Responses: In addition to traditional single-family and multi-family product, non-traditional housing may be expected to absorb a small percentage of the market. One form often discussed but as of

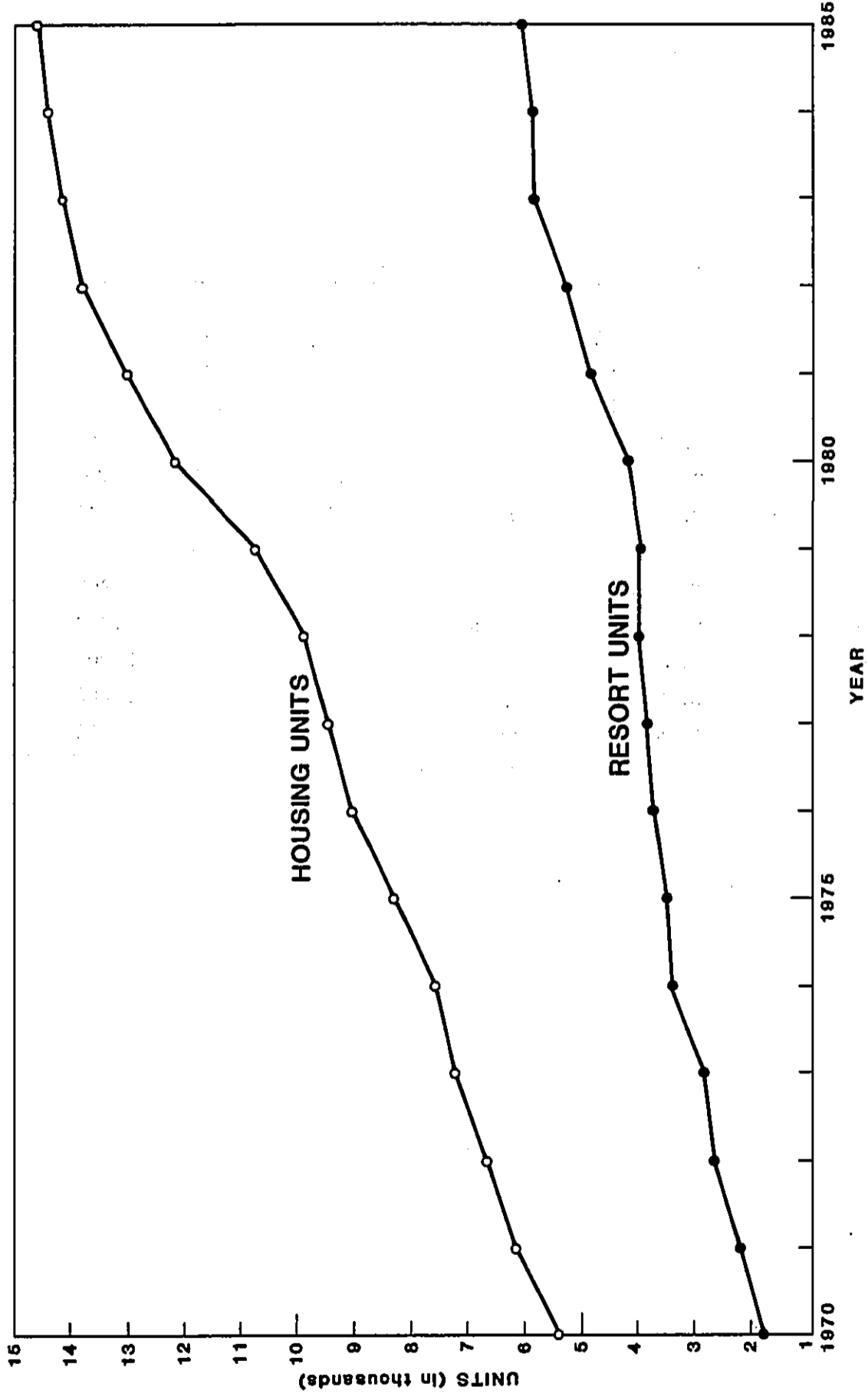


Figure IV-10
RESORT UNITS AND HOUSING UNITS
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

Table IV-27

Major Proposed Projects in West Hawaii

<u>Project</u>	<u>Location</u>	<u>Gen. Plan Status</u>	<u>S. F. Units</u>	<u>M. F. Units</u>	<u>Total Units</u>
Parker 2020	S. Kohala	Approved	500	150	650
Ainakea	N. Kohala	Approved	100	5.4 ac.	120
Waikoloa Village	S. Kohala	Approved	5,800	1,700	7,500
YO, Inc.	N. Kona	Approved	1,093	340	1,433
Gamlon	N. Kona	Approved	215	475	690
Keauhou View Estate	N. Kona	Approved	135	140	275
Kona Coast	N. Kona	Approved	73	439	512
Kohala Ranch	N. Kohala	Pending			3,000
California-Kohala	S. Kohala	Pending			2,000
Puako Heights	S. Kohala	Pending			3,000
Lanihau	N. Kona	Pending			3,000
Kealakehe	N. Kona	Pending			3,500

yet untried in the local market is the dormitory concept. These rooms would be made available at modest rents to mostly transient workers. This would be a large-scale version of the boarding house which is already gaining some popularity in North Kona. Self-help or sweat-equity housing may also find a small market among resort workers due to the relative abundance of reasonably priced lots in the area. A third form, already popular and likely to grow in numbers, is the ohana unit in existing residences, both legal and illegal.

2.2.7 Qualitative Social Impacts

The proposed Ritz-Carlton Mauna Lani is not expected to have any unique social impacts which would differ from those of other resort hotels. Also, the cumulative social effects of resort development often represent more significant impacts than would be expected from any particular project. Therefore, the following discussion will focus on West Hawaii (and/or state-wide) resort development in general.

The discussion is organized in two broad parts: (1) forces for social change, and (2) statistical indicators of community cohesion.

2.2.7.1 Forces for Social Change

Four aspects of resort development have strong implications for social change:

- o resident employment in resort settings;
- o increased visitor population;
- o in-migration of full- or part-time resort residents;
- o in-migration of new workers, leading to changes in population levels or composition.

2.2.7.1.1 Employment in Resort Settings

Some frequent concerns expressed regarding resort employment are (1) whether wages and working conditions are adequate; (2) whether longtime residents have a fair share of better jobs; (3) family and psychological factors; and (4) worker satisfaction.

Economic Quality: Table IV-28 provides 1985 data on average employment and wages for various types of jobs associated with destination resorts (hotels, other services, eating and drinking places, other retail trade, and transportation), as well as plantation agriculture, another primary industry in Hawaii with which tourism is often compared.

Some implications of this table include:

- o While the sorts of service jobs commonly associated with resorts comprise more than 40 percent of Hawaii's jobs statewide and nearly 46 percent of Big Island jobs (although many such jobs would actually serve residents rather than visitors), average wages for most categories fall below the average wage for all private-sector jobs.

Table IV-28

Average Statewide and Hawaii County Employment and Annual Wages for Industries Associated with Resorts and Plantation Agriculture, 1985

	STATEWIDE			HAWAII COUNTY		
	Average Employment no.	Avg. Annual Wage dollars	% of total average	Average Employment no.	Avg. Annual Wage dollars	% of total average
TOTAL PRIVATE SECTOR	343,400	\$16,070	100.0%	27,963	\$13,896	100.0%
Selected Resort-Related Industries						
"Hotels, rooming houses, etc."	28,947	\$13,601*	8.4%	3,931	\$12,056*	86.8%*
"Eating and drinking places"	40,171	\$ 7,486*	11.7%	2,657	\$ 6,561*	47.2%*
"Other retail trade"	56,036	\$13,029	16.3%	4,889	\$11,672	84.0%
"Transportation"	23,439	\$19,508	6.8%	1,266	\$17,092	123.0%
Selected Plantation-Related Industries						
"Agriculture, forestry, fisheries:"						
-- Sugar	3,079	\$18,258	0.9%	181	\$22,200	159.8%
-- Pineapple	2,056	\$16,157	0.6%	N/A	N/A	N/A
-- Other Crops	3,061	\$13,095	0.9%	2,221	\$13,985	100.6%
"Manufacturing:"						
-- Sugar Mills	2,706	\$20,759	0.8%	662	\$23,284	167.6%
-- Pineapple canning	2,016	\$14,577	0.6%	N/A	N/A	N/A
-- Other Food Processing	4,914	\$16,867	1.4%	1,306	\$15,486	111.4%

* Wage figures do not include tips/gratuities.

Source: Hawaii State Department of Labor and Industrial Relations, 1986, pp. 2, 3, 10.

- o Average hotel wages are relatively close to the respective statewide or islandwide averages, but wages for food-and-beverage jobs (which are often just part-time) are below 50 percent of the average private-sector wages. However, note that these figures exclude income from tips/gratuities, which can comprise a substantial portion of income for waiters and some hotel workers.
- o Wages for sugar are higher than the statewide or islandwide average, but relatively few people still work in the sugar industry.

In addition to somewhat low average wages, hotel and other resort-related jobs are subject to seasonal fluctuations and inconvenient and/or split working hours. These problems are particularly acute for entry-level staff workers (who often start on a part-time or casual basis), since workers with seniority are less likely to be laid off in off-season and have more privileges in terms of choosing preferred working hours.

However, it should be noted that the foregoing applies to "average" hotels, and conditions are sometimes different at Kohala luxury hotels such as the Ritz-Carlton is intended to be. Related points regarding economic "quality" include:

- o According to the initial Ritz-Carlton staffing plan (Table IV-15, page IV-67), 90 percent of all on-site jobs will be full-time, rather than part-time or temporary.
- o Tip income -- which represents the unknown factor in determining how well resort employees are actually compensated -- tends to be higher at luxury hotels.
- o According to the Employee Survey of luxury Kohala hotel workers (Community Resources, Inc., and Datametric Research, 1987), the median overall household income of hotel workers is \$25,668 per year -- which is almost identical to the County Housing Office's estimated median income for all West Hawaii residents (personal communication, Bill Moore, deputy director, March 16, 1987). About half the surveyed workers were the primary wage-earners in their households.
- o For particular groups surveyed, median incomes were: management/supervisory personnel -- \$35,256/year; full-time workers -- \$23,496; part-time/casual workers -- \$27,672. The higher household income for part-time/casual workers was due to the fact that there were more wage-earners and more jobs per persons among these households.
- o Tourism also generates off-site employment, including support professions such as lawyers and doctors. The ratio of such off-site jobs to on-site jobs tends to be lower than for sugar plantations; however, the current issue does not involve a choice between tourism and sugar (or any other economic activity) for the Ritz-Carlton site, but rather a choice between new tourism jobs and no economic development there.

Resident Opportunities for Better Jobs at Resorts: Most Hawaii hotels are (as will be the Ritz-Carlton) managed by national or inter national chains which rotate top managers throughout the country or the world. While this can mean an exciting life career for Hawaii-born hotel managers transferred elsewhere, it can also mean that many top managers at Hawaii hotels are not Hawaii-born, sometimes leading to cultural misunderstandings and feelings of resentment by local workers.

At another level, there may be perceptions that some groups -- either Hawaii-born or certain ethnic groups -- tend to end up with the "worst" jobs (such as part-time or casual employment).

Two recent studies which may shed some light on these concerns are the recent Employee Survey of luxury Kohala hotel workers (Community Resources, Inc., and Datametric Research, 1987) and a Cornell University doctoral dissertation by A.M. Bouslog (1985), which utilized ten years worth of Hawaii State Health Surveillance Survey data:

- o Among Mauna Lani and Mauna Kea workers, 63 percent of all employees -- including 55 percent of management/ supervisory personnel -- were raised on the Big Island. About one-half the managers had been working at a non-hotel job before taking jobs at the Kohala hotels. While these figures are likely to change if labor demand from cumulative resort development exceeds local supply, the numbers do indicate that Big Island residents historically have not been closed out of Kohala hotel management positions.
- o The 1987 Employee Survey also found that lifelong Big Island residents were slightly less likely than in-migrants to hold the so-called "best" (management) jobs, but they were also much less likely to hold the so-called "worst" (part-time/casual) jobs. Similarly, Caucasians were more likely than other ethnic groups to hold both managerial and part-time/casual jobs.
- o Part-time/casual jobs at these two Kohala hotels were very likely to be held by young people (53 percent were under age 30) and/or people who had in-migrated in the past five years. As previously noted, household incomes were higher for part-time/casual workers than for full-time workers, due to more second jobs and more wage-earners in the household. This could be interpreted either as meaning that these households must struggle harder to survive, or that part-time/casual work provides opportunities for households of people interested in maximizing incomes.
- o The Bouslog (1985) study also looked at ethnic differences in "primary-sector" vs. "secondary-sector" hotel jobs (roughly equivalent to full-time vs. part-time or casual). She found that Caucasians, Japanese, and part-Hawaiians are more likely than others to hold the better jobs.

Filipinos fared the worst, with 79 percent in secondary-sector jobs. However, this is likely a function less of ethnicity than of immigrant status, since 80 percent of foreign-born employees were working in the secondary sector. The implications of these figures

are subject to varying interpretations. The most negative would be that immigrants and/or Filipinos are being "exploited." The most positive would be that hotel employment represents an opportunity for less educated immigrants to develop work skills and experiences which will permit them over time to advance to higher rungs of the socio-economic ladder.

- o Bouslog also found that, compared to other civilian industries, Caucasians and Japanese are under-represented in hotel jobs, while Hawaiians and Filipinos are over-represented. Further more, age distributions suggest young residents of Japanese ancestry are unlikely to hold hotel jobs, while most of the Caucasians working in hotels are young (and, possibly, transient). The implication, subject to further study, is that Hawaiians and Filipinos are the groups most likely to make hotel work a permanent career and thus to acquire seniority and the better long-range working conditions.

Family and Psychological Factors in Resort Work: Sociological and psychological aspects of resort employment can be categorized as either transitional (aspects related to adjustment to new forms of employment) or permanent (inherent characteristics).

In Hawaii, more attention has been paid to transitional impacts, particularly in communities undergoing a switch from plantation agriculture to tourism as the economic base -- e.g., North Kohala on the Big Island, Kilauea on Kauai, and Kahuku on Oahu. North Kohala's situation resulted in several published studies in the late 1960's and early 1970's (Cottingham, 1969; Hawaii State Department of Planning and Economic Development, 1972; Smith, 1972) focusing on family and psychological impacts. It is important to note that the observed impacts occurred before the sugar plantation shut down (although during a period when there was growing concern that a shutdown was inevitable) and when the new resort jobs were being filled almost entirely by women. The Cottingham study -- although based largely on anecdotes and never formally published -- received the most widespread publicity. Some of the major conclusions from her study and the others focused on serious marital strains attributed to husbands' jealousy over working wives' contacts with male guests; a new and improved self-image for women; problems with child care and, to some extent, juvenile delinquency associated with having two working parents; family financial problems associated with increased income; and problems with supervisors of different ethnic backgrounds.

However, the Smith (1972) follow-up study suggested that the family adjustment problems were serious only in a few already-shakey marriages and that most other working wives said their families had adjusted. More recently, interviews with community leaders in Oahu's Kahuku area (Community Resources Inc., 1985) and Kauai's Kilauea area (Belt, Collins and Associates, 1983) produced reports of only limited and temporary family disruptions when wives of ex-plantation workers there entered the resort workforce. A year-long psychiatric study in Kahuku (Young and Kinzie, 1973) found no apparent family or mental health problems during the period when women were starting initial hotel work.

To the extent that any significant family or self-image impacts did occur in Kohala's transitional period (and it is less certain now that there were such impacts), they would have been primarily associated with wives' initial entry into the labor force in general, and only secondarily with resort employment in particular. As of 1987, most Big Island families have already faced this transition and made their adjustments. However, residents of Hamakua may still be face some adjustments if sugar phases out there and substantial numbers of residents begin commuting to work in West Hawaii hotels for the first time.

Less research, although considerable speculation, has been devoted to apparently inherent problematic aspects of resort work, including shift work, the "glamour-and-gossip" work setting at some hotels that may constitute a challenge to the established values of some rural employees, and the "servant mentality" of resort work alleged by some social critics (e.g., Kent, 1975) to damage employees' self-esteem. However, there has been no published evidence to support this latter concern, and frequent interviews by Community Resources with resort personnel officers and union officials do not indicate that this has been a serious mental health problem.

Worker Satisfaction: In late 1986, the Council of Hawaii Hotels contracted with Strategic Information Research Corp. (1987) to survey hotel workers statewide. CRI requested results for selected items dealing with worker satisfaction, attitudes toward pay, and feelings about Mainland vs. Hawaii management and opportunities for promotion. The Council of Hawaii Hotels, which is involved in contract negotiations with Neighbor Island hotel unions as of this writing, agreed to provide these results on condition that no conclusions be drawn in the EIS text. Therefore, results are presented in Table IV-29 without further comment.

2.2.7.1.2 Increased Visitor Population

The Hawaii State Department of Planning and Economic Development (1981), in its Tourism Plan Technical Reference Document, concludes that increased visitor population has implications for:

- o social interaction between residents and visitors,
- o perpetuation of local arts and handicrafts,
- o changes in lifestyle and standard of living,
- o erosion of "Aloha Spirit",
- o impaired resident access to coastal areas,
- o competition for public facilities and resources,
- o pressures on open space and agricultural lands,
- o cost of living and property values,
- o crime, and
- o population increases and need for employee housing.

Table IV-29

Hawaii Hotel Worker Attitudes Toward Their Jobs

	<u>Agree/ Yes</u>	<u>Disagree/ No</u>	<u>No Opinion/ Don't Know</u>	<u>(No Response)</u>
<u>Job Satisfaction, Pride</u>				
I like my job.	88	5	5	2
Most employees at my hotel don't like their jobs.	17	51	29	3
I am proud to work in the hotel business.	87	4	5	3
Most employees of this hotel have a sense of pride about their work.	71	16	9	3
<u>Attitudes Toward Pay</u>				
I am paid fairly for the work that I do.	57	34	6	3
If I get tired of working in the hotel industry, I could easily find a job elsewhere in Hawaii that pays as well.	28	50	18	4
<u>Local vs. In-Migrant Management</u>				
Not enough people are promoted up through the ranks in my hotel.	46	30	20	3
Supervisors who are not from Hawaii don't understand the needs of employees who are.	55	27	15	3
More people from Hawaii should be advanced into higher managerial positions in my hotel.	65	14	17	3

(base: 5,267 statewide hotel employees)

Source: Strategic Information Research Corp. (1987) -- selected results provided by Council of Hawaii Hotels.

This menu of potential positive and negative outcomes does not indicate which effects are more frequent or more important. Nor does it indicate what aspects of the visitor population (such as level of expenditure or demographic composition) could affect the nature of social impacts.

However, social scientists have devoted considerable time to identifying factors which affect resident-visitor relations, both in Hawaii and elsewhere. These studies and various Hawaii surveys found no relationship between real or perceived direct economic dependence on tourism and attitudes toward either tourists or the visitor industry (although entrepreneurs associated with tourism were more likely to have positive attitudes). Rather, the studies indicate that resident attitudes have more to do with factors such as perceived competition for resources (e.g., beaches and transportation facilities), displaced political resentment, age of respondents, and perceptions of how much visitors respect local residents.

The quality of resident-visitor interaction in West Hawaii will likely also be affected by the extent of visibility for tourists and the situations in which they are encountered by local residents. The Ritz-Carlton will be located in the Mauna Lani Resort, which -- like most existing or planned South Kohala resorts -- is a self-contained destination area. Research for past tourism social impact assessments (Community Resources, 1984, 1985) suggests that no more than about 15 percent of the visitor population at such resorts tours off-site in any given day. To the extent that such off-site visitor presence does not interfere with important resident resources (such as recreational areas or transportation systems), it is unlikely to cause serious problems. Even here, a mitigating effect could be produced if off-site visitor activities are channelized into resident-operated tour or commercial activities, thereby increasing the proportion of residents who are likely to possess the positive attitudes of tourism entrepreneurs.

2.2.7.1.3 Worker In-Migration and Related Population Change

In addition to job-related competition, other social impacts of population growth through immigration are usually felt to consist of (1) strains on infrastructure and services (e.g., housing), with attendant social stress, and/or (2) social adjustment problems between newcomers and longtime residents (Hawaii State Department of Planning and Economic Development, 1981). However, there is frequent debate as to which of these two is more significant.

CRI has interviewed social service agency representatives throughout the state in conjunction with social impact assessments for proposed resort projects on Kauai (Belt Collins and Associates, 1983), rural Oahu (Community Resources, 1985), and West Hawaii (Community Resources, 1980, 1984, 1986). In these interviews, there was only occasional reference to serious social problems relating to conflicts between different types of people, but frequent mention of family and individual stresses resulting from population booms and associated social strains -- particularly shortage of affordable housing. This finding is consistent with the major body of literature from outside Hawaii on sudden population growth in rural areas.

In-migrating new population could also have impacts on existing lifestyles and cultural values, possibly in the direction of more "Mainland/urban" and less "local/rural". However, the extent to which this actually happens will depend on, among other things (1) the location of future new residential development (i.e., whether in-migrants are widely dispersed among existing communities or are concentrated in new communities); and (2) the actual demographics of the newcomers. While Maui and West Hawaii resort expansion in the 1960's and 1970's attracted mostly young Mainlanders, several major Neighbor Island resorts in the 1980's have made an effort to recruit Hawaii-born residents. Such targeted recruitment, as well as job training for disadvantaged West Hawaii residents to minimize need for in-migration, represent one of the major recommended forms of socio-economic mitigations (see Section 2.2.8).

Based on available indirect evidence from Hawaii and elsewhere, CRI concludes that social adjustment problems between longtime residents and newcomers represent a milder although lasting social impact, while the social costs of housing shortages and other strains on infrastructure usually form the more acute but short-term impact. The latter types of impact occur only in cases of very rapid growth. The heavy development scenario for the 1990's set forth in Table IV-9 would certainly fall in this category, as might the impacts of the unusually large Hyatt Waikoloa project.

2.2.7.2 Statistical Indicators of Community Cohesion

To the extent that tourism causes the types of negative qualitative social impacts of which it is often accused, at least some indication should be found in statistical measures of:

- o crime data, and/or
- o juvenile arrests, and/or
- o family problems, and/or
- o individual mental health.

2.2.7.2.1 Crime Data

It has frequently been alleged that resort development is linked with crime, and some studies using Hawaii data (e.g., Fujii and Mak, 1979; Fujii, Mak, and Nishimura, 1978, 1980) have established statistical associations between some measures of tourism and reported crime. Chesney-Lind and Lind (1984) used Kauai crime data from 1978 to 1980 in order to compare victimization for visitors vs. residents. In that period of time, results varied greatly depending on the type of crime. Overall, visitors were less likely to be crime victims than residents, although they were more likely to report a few particular types of crime (robbery, rape, and larceny -- the latter usually being thefts in public settings such as beach parks).

Police in rural Hawaii areas affected by tourism -- including the Kohala area -- say that the major crime impacts generated by resorts involve property crimes, primarily larceny at beach parks and other visitor attractions off-site from resort destination areas themselves.

In an effort to determine whether reported crime has increased following construction of new hotels in the South Kohala area, CRI examined crime data from both the North and South Kohala districts (Hawaii County Police Department Annual Reports, various years). (NOTE: The ideal comparison would have involved crime rates vs. the ratio of visitors to residents in the area. However, for many years, there are no reliable estimates of resident population in Kohala, and so rates cannot be calculated.)

Figure IV-11(a) plots number of Kohala visitor units against total reported "Type I" crimes, which include the major types of criminal violations. "Type II" crimes are less serious and/or involve offenses such as drug abuse, for which reporting and arrests may vary greatly depending on different local policies. While the number of visitor units increased sharply in the early 1980's (due to construction of the Sheraton Royal Waikoloa and the Mauna Lani Bay Hotel), there was no comparable increase in overall crime. Rather, the period during which reported crime rose most sharply was the early 1970's. While it is impossible to determine whether there was any cause-effect relationship, this was the period when the Kohala sugar plantation was phasing out and the economic future was particularly uncertain, at least for the North Kohala area.

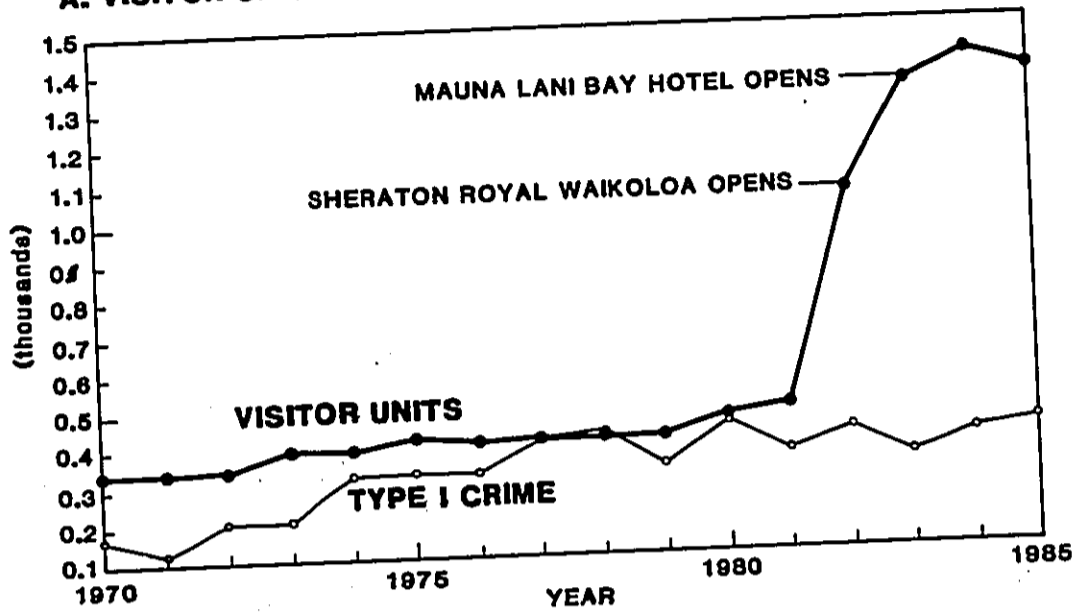
In Figure IV-11(b), CRI also examined the relationship between visitor units and individual crimes often thought to be associated with tourism (rape, robbery, and larceny). The numbers of rapes and robberies in the Kohala area have been so few and so erratic as to be almost unplotable, and so total "Violent" crime (all reported murder, manslaughter, rape, robbery, and assault) is plotted instead. Because the number of individual crimes are so few in number compared to the numbers of visitor units, Figure IV-11(b) uses standardized "Z-scores," a statistical transformation which makes the units comparable by expressing each number as a deviation from the mean for that variable. Also, for the crime data, Figure IV-11(b) employs three-year moving averages to eliminate some of the "noise" from annual fluctuations and bring out any overall trends.

These graphs fail to show any clear relationship between new Kohala visitor units and reported crime of any type, whether total, violent, or simple larceny (theft). This does not conclusively disprove any link between crime and tourism in Kohala, since statistical relationships are complex and can be masked by other variables. However, it does illustrate that any such relationship (if it exists) is not a simple one, and that building new visitor units will not automatically lead to increased crime, except for expected increase as a function of increased population.

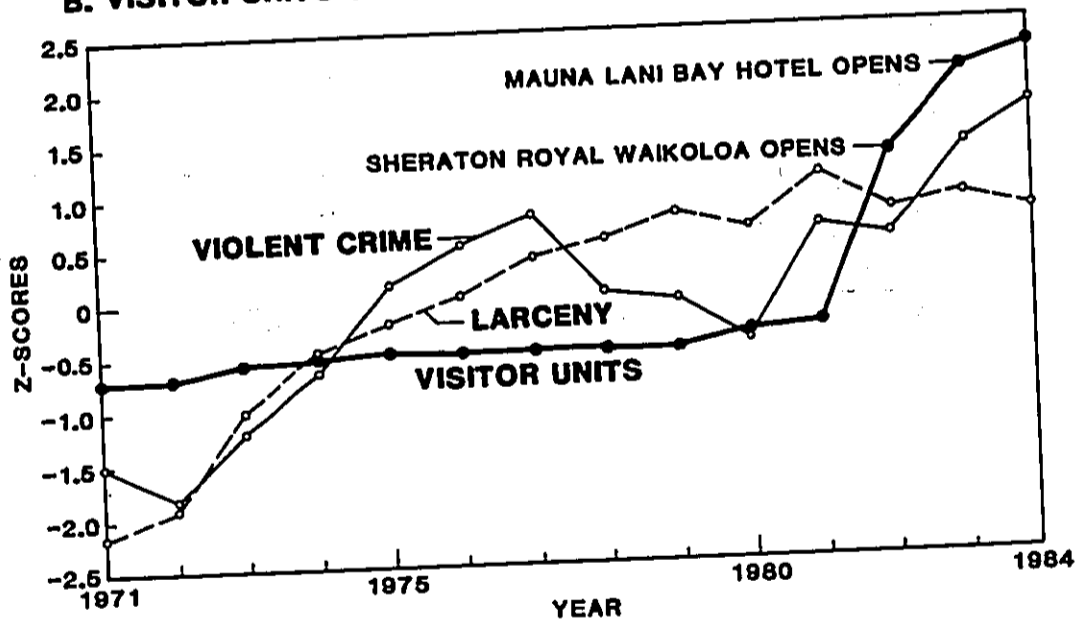
2.2.7.2.2 Juvenile Delinquency

Figure IV-12 plots Kohala visitor units against juvenile arrests in the South and North Kohala districts combined (Total Type I offenses, again using Z-scores to transform both variables to the same scale). According to the South Kohala police operations clerk (personal communication, Mrs. Patricia Lewi, April 24, 1987), the sharp spike in 1978 was due to several repeat offenders rather than to any increase in the overall number of offenders. She also noted that the upturn since 1983 has been associated with overall increased population and that juvenile offenders are increasingly members of newcomer, rather than longtime resident, families.

A. VISITOR UNITS VS. TOTAL TYPE I CRIME (Raw Numbers)



B. VISITOR UNITS VS. VIOLENT CRIME AND LARCENY



NOTE: To allow comparison on the same scale, raw numbers were transformed to Z-scores, and three-year moving averages were used for crime data.

Figure IV-11
KOHALA AREA VISITOR UNITS VS. REPORTED CRIME, 1970-1985

RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

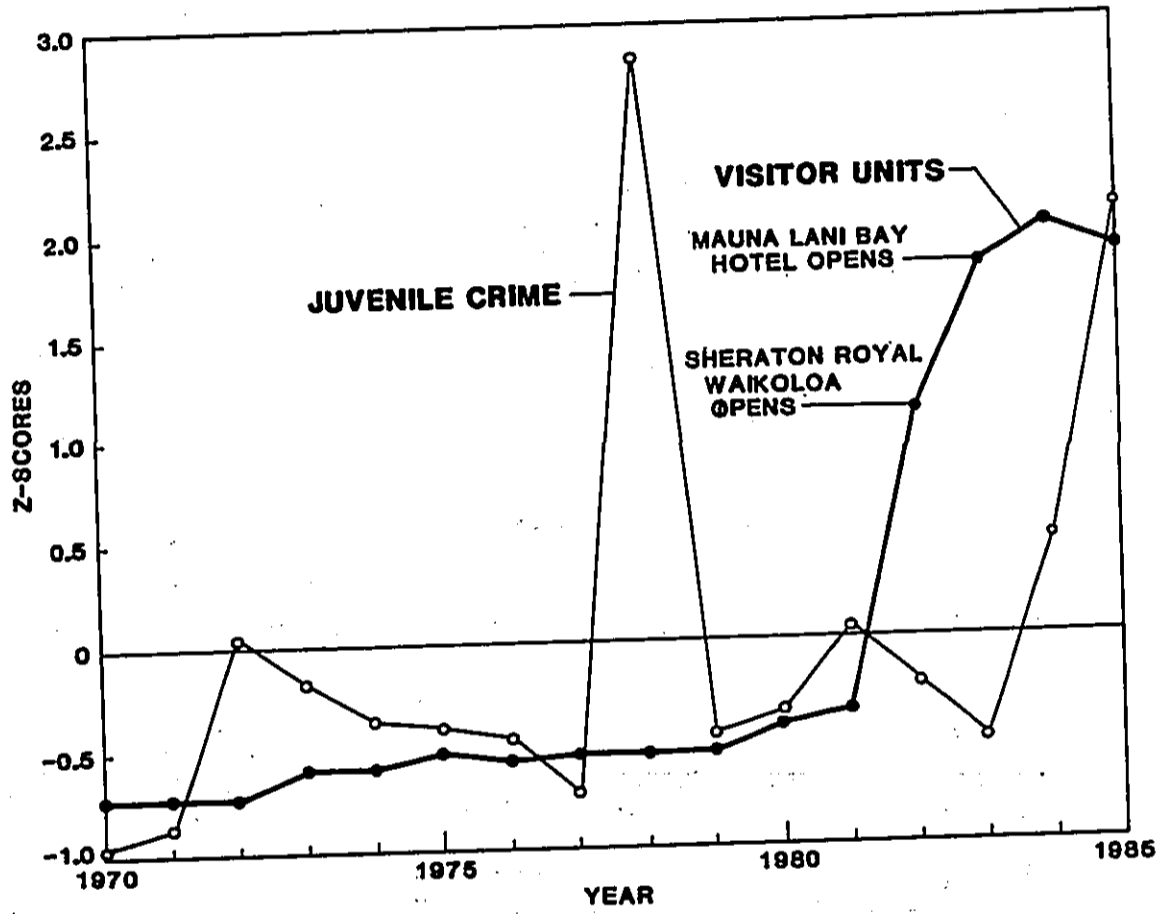


Figure IV-12
KOHALA AREA VISITOR UNITS VS JUVENILE ARRESTS FOR TYPE I OFFENSES, 1976-1985
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

It is possible to interpret Figure IV-12 as suggesting a delayed association between resort development and juvenile crime, since the upturn in North/South Kohala juvenile arrests followed opening of the Sheraton Royal Waikoloa and Mauna Lani Bay Hotel by several years. (Actually, the recent increased juvenile arrests coincide with a period of increased occupancies for all West Hawaii resorts, which could mean more visitors spilling over into South Kohala recreation areas, where juveniles are often responsible for minor thefts.) However, it is also apparent that known juvenile crime actually dropped in the years when the last two new Kohala hotels opened.

In past resort social impact assessments (Community Resources, Inc., 1984, 1985), police officers from Kohala and other rural resort areas throughout Hawaii have been quoted as saying that the major implications of tourism for juvenile delinquency involve (1) increased juvenile opportunities for thefts at beach parks or other public places, and (2) creation of a "street scene" in tourist commercial areas such as Lahaina or Kailua-Kona. Compared to independent hotels in semi-urban complexes, self-contained destination areas such as Mauna Lani contribute relatively little to the first of these factors and even less to the second.

2.2.7.2.3 Family Problems

As noted in Section 2.2.7.1.1, resort employment can theoretically contribute to marital discord or child care problems. The only district-level statistics on such problems relate to child abuse and/or neglect. Table IV-30 shows state wide and Big Island data for child abuse/neglect since 1980.

Child abuse/neglect figures must be treated with great caution because (1) there has been a recent statewide (and national) increase in willingness to report cases, which does not necessarily mean actual increased abuse or neglect, (2) available figures may include repeated reports over time about the same families; and (3) reported cases are also partly a function of the number of caseworkers who are present to record the reports, and an organization of Kona parents recently prepared a report suggesting that -- due to staffing problems -- West Hawaii caseworkers have much higher caseloads than official State statistics would indicate (Families as Allies, 1987).

Given these caveats, it may be seen from Table IV-30 that there has been a sharp islandwide increase in both reported and confirmed child abuse/neglect cases from 1980 to 1985. However:

- o the Big Island rates are essentially identical to state wide rates;
- o the total West Hawaii Study Area's share of confirmed cases islandwide has fluctuated greatly, ranging from 22 percent in 1982 to 55 percent two years later, and a downturn to 41 percent in 1985 (when visitor counts and tourism employment was on the rise);
- o Cases in South and North Kohala have begun to pick up in the mid-1980's, following construction of the most recent two hotels there. While no cause-effect relationship can be established at this time (and while it is uncertain whether any possible cause-effect connection would have more to do with tourism per se or with population increase and in-migration), the figures suggest that this is a topic worth further exploration and monitoring.

Table IV-30

Statewide and West Hawaii Child Abuse/Neglect Data, 1980 - 1985

<u>STATEWIDE</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Reported:	2,104	2,358	2,681	3,631	4,378	4,234
Rate/10,000 Residents:	21.7	24.0	26.9	35.7	42.1	40.2
Confirmed:	1,061	1,134	1,379	1,620	2,181	2,336
Rate/10,000 Res.:	11.0	11.6	13.8	15.9	21.0	22.2
<u>HAWAII</u>						
Reported:	214	209	288	371	477	521
Rate/10,000 Res.:	23.0	21.5	28.8	36.0	45.0	47.7
Confirmed:	83	91	111	155	233	279
Rate/10,000 Res.:	8.9	9.4	11.1	15.1	26.0	25.6
<u>HAWAII CENSUS TRACT REPORTS (CONFIRMED ONLY)</u>						
217 - S. Kohala (as % of County:)	3 (3.6%)	0 (0.0%)	1 (.90%)	5 (3.2%)	13 (5.6%)	7 (2.5%)
218 - N. Kohala (as % of County:)	1 (1.2%)	0 (0.0%)	0 (0.0%)	6 (3.9%)	7 (3.0%)	13 (4.7%)
215, 216 - N. Kona (as % of County:)	22 (26.5%)	14 (15.4%)	14 (12.6%)	56 (36.1%)	65 (27.9%)	71 (25.4%)
213, 214 - S. Kona (as % of County:)	7 (8.4%)	10 (11.0%)	6 (5.4%)	10 (6.5%)	34 (14.6%)	20 (7.2%)
219 - Honokaa/ Kukuihaele (as % of County:)	6 (7.2%)	6 (6.6%)	3 (2.7%)	4 (2.6%)	10 (4.3%)	2 (.72%)
TOTAL STUDY AREA (as % of County:)	39 (47.0%)	30 (33.0%)	24 (21.6%)	81 (52.3%)	129 (55.4%)	113 (40.5%)

Note: Figures are for unduplicated abuse and/or neglect. However, cases reported on different days involving the same individual are listed as separate instances.

Source: Unpublished data, Hawaii State Department of Social Services & Housing. Rates per 10,000 residents calculated by Community Resources, Inc., based on on County population estimates from Hawaii State Department of Planning and Economic Development (1986).

2.2.7.2.4 Mental Health

According to the Chief of the Hawaii County Community Mental Health Center (personal communication, David Wrigley, April 24, 1987), the apparent "decline" in mental health caseloads (as reported in Hawaii State Department of Health published data) actually reflects a reduced number of caseworkers and a more selective screening process. Therefore, it would be inappropriate to use the data for even tentative comparisons with tourism development in West Hawaii.

However, interviews with West Hawaii social service agencies (Community Resources, Inc., 1980, 1986) suggest that (1) any relationship between resort development and either individual or family stress probably has more to do with strains from population growth (e.g., having to "double up" in housing) than with tourism per se; and (2) newcomers are more likely than longtime residents to exhibit psychiatric symptomatology in response to stress -- partially due to lack of support networks and partially because Mainland-raised individuals are culturally more likely to internalize stress while many local residents vent their frustrations externally (i.e., fights, minor crime, family arguments).

Thus, cumulative resort development -- or any other form of economic development generating rapid in-migration -- can be expected to increase demands for mental health services, possibly somewhat out of proportion to population growth rates alone. As indicated in Section 2.2.7.1.3, this would depend to some extent on whether housing and other infrastructure is provided in a timely fashion. The Chief of the Hawaii County Mental Health Community Center states that his agency is now beginning to study this issue, although no planning is yet underway.

2.2.7.2.5 Social Consequences of Unemployment

Preceding discussions of impacts from resort development and resort employment have not explicitly considered alternatives, which for some people -- particularly the educationally and culturally disadvantaged -- may still be unemployment.

There have been many studies nationwide which basically indicate that mental health problems are far more prevalent among the unemployed than among the employed, and poverty is strongly associated with virtually all forms of mental illness.

Crime is a more complicated issue. While crime rates are higher in extremely poor areas, there is no apparent relationship between job loss and increased crime (Horwitz, 1984), and crime rates sometimes drop during economically troubled times.

However, in terms of family stability, studies going back to the Great Depression, as well as more recent ones have demonstrated extreme negative impacts of unemployment and financial crisis on family relationships. Child abuse has also recently been linked to unemployment.

Thus, while resort employment -- like employment in any type of industry -- may have negative as well as positive sociological and psychological aspects, these aspects would generally be less problematic than impacts of widespread unemployment.

2.2.8 Socio-Economic Mitigations

2.2.8.1 Purpose of EIS Socio-Economic Mitigation Discussions

The term "mitigations" refers to actions which can be taken to reduce negative impacts (or enhance positive ones), whether these actions are taken by the developer, local government, or some other party.

A purpose of the EIS is to discuss possible actions, at least in a broad and preliminary way. That is because the actual method for deciding upon mitigations usually involves negotiated conditions attached to government land use approvals (and/or government budget decisions). The function of an EIS is to discuss matters relevant to these decisions, but not to pre-determine the outcome of the political negotiating process which leads to these decisions.

2.2.8.2 Steps to Maximize Employment for Current Residents

To the extent that new resort jobs go to current residents of the Study Area (West Hawaii, including Hamakua), several social purposes would be served:

- o in-migration and attendant social stress would be reduced;
- o housing impacts would be reduced, since many workers would already be housed;
- o the West Hawaii tourism workforce would retain a culturally cosmopolitan make-up;
- o the purpose of economic "development" would actually be served, in the sense of improving quality of life for the disadvantaged and marginally employable.

As a secondary priority, efforts to maximize employment for current residents of East Hawaii would alleviate unemployment in that area. And as a third priority, recruitment among residents of other Hawaiian islands and/or among ex-Big Island residents now on the Mainland would help assure that in-migrants are socially compatible with current residents.

The basic method for maximizing employment among current residents is job training (in the broad sense, including such factors as basic education and attitudinal counseling), as well as support services such as child care or transportation assistance.

Individual hotels typically provide extensive training for their workers. In response to a query from CRI on Ritz-Carlton's plans for training and hiring, Executive Vice-President Douglas McGarrity (personal communication, 12/10/86) replied:

"We are a 'promote from within' company with strong community participation at all organization levels. Key executive positions will be filled by promoting and transferring our most qualified staff members. Departmental management opportunities will be staffed in large part by hiring local talent before hotel opening and training in existing Ritz-Carlton Hotels.

"We are committed to assisting in the ongoing professional development of employees. Training and career enrichment are accomplished through comprehensive orientation and reorientation sessions with emphasis upon cross-training assignments. Lateral service -- which is staff interdepartmental on-the-job-training -- broadens an individual's guest service awareness and experience, thus optimizing promotability."

However, in order to assure that more residents are hired in the first place, more basic job preparation education and training is required -- e.g., training in basic skills and work habits, vocational education, and job-specific occupational training. At higher levels, there is a need for human resource development to assure that area residents are competitive for managerial as well as staff positions. These efforts would necessarily be regional and/or islandwide, not limited to individual resorts.

Numerous existing agencies already provide training, education, and related services -- among them the State Employment Service, Alu Like, and the State Department of Education.

On the statewide level, the 1987 Legislature authorized funding to staff the "Tourism Training Council," which will focus in large part on ways to assure that Hawaii residents have the skills to take on supervisory and management positions.

Perhaps the most involved agency on the local level has been the University of Hawaii at Hilo (UHH) West Hawaii Instructional Facility, which coordinates various course offerings from the UH/Manoa, the UH/Hilo, Hawaii Community College, and the Center for Continuing Education and Community Services (CCECS). The current focus of West Hawaii programs has been on upgrade training, although CCECS in the future will begin to place more emphasis on entry-level job training (personal communication, CCECS director Judith Kirkendall, April 25, 1987). A "Hotel Operations Program" (encompassing current culinary arts courses, plus front desk operations) will soon be offered.

On the private-sector side, the Big Island chapter of the Hawaii Hotel Association has taken the lead in organizing input to West Hawaii college course planning. This group also recently decided to expand its relationship with area high schools, increasing the visibility and effectiveness of such programs as Career Days, Career Shadowing, student hotel tours, liaison with principals and counselors, etc.

Thus, there appears to be little need to create new agencies to provide services. However, numerous private comments to CRI in the course of resort assessments throughout rural Hawaii (including but not limited to West Hawaii) suggest a possible need for better communication and coordination among existing agencies. This need may increase in the future as West Hawaii's population expands and current patterns of loose, informal communication becomes less efficient.

Therefore, socio-economic consultants CRI recommend that consideration be given to regional efforts focusing on:

- o improved coordination of existing education/training resources;
- o job awareness outreach and education programs (both on- and off-island);
- o feasibility studies on managerial modifications to accommodate local cultural aspects;
- o increased attention to entrepreneurial development programs;
- o child care programs;
- o employee transportation assistance.

Table IV-31 relates these potential actions to several of the major potential labor supply sources for future West Hawaii development. Some additional comments on each component:

Improved Coordination of Existing Training/Education Programs: A significant question is: Who will assume the responsibility for such coordination? In West Hawaii, there are numerous destination areas and numerous hotel operators. Hotels compete with one another for labor supply, and there is some history of disagreement between operators and developers as to who should bear responsibility for matters such as training or employee transportation assistance. Therefore, it is recommended that, if a coordinated program is to be designed, government take the lead (although with appropriate input from community organizations and resort interests).

Job Awareness Outreach and Education Programs: On-island efforts would be primarily focused on pockets of potential workers who might not readily consider resort employment without some campaign to attract them (e.g., the elderly); exposing students to resort work; and correcting misperceptions in the general public which can lead to negative attitudes toward resort work.

Off-island campaigns to attract former Big Island residents or workers from Oahu (rather than out-of-state) represent a somewhat more tentative suggestion, since they may also attract job-seekers other than the target population. Word of mouth may ultimately prove most effective.

Changes in Management to Accommodate "Local" Culture: As discussed in Section 2.2.7.1, there are often concerns about cultural value differences between Mainland or Japanese hotel managers and local Hawaii residents, particularly those whose value systems include strong preferences to group approaches to work problems and aversion to competitive, individualistic work practices.

A number of new approaches to education developed by the Kamehameha Schools could theoretically be transferred to the workplace, in the form of greater involvement of entire family groups at work, an emphasis on achievement through group rather than individual incentives, and some de-emphasis on typical Western hierarchical approaches to supervision.

Table IV-31
Labor Supply Mitigation Measures Related to Potential Sources

("XX" represents major potential linkage; "X" represents some linkage.)

	Improved Coordination of Existing Training/ Education Programs	Job Awareness Outreach and Education Programs	Managerial Modifications to Accommo- date Cultural Aspects	Entrepren- curial Development Programs	Child Care Programs	Employee Transporta- tion Programs
<u>Sources Currently in Study Area</u>						
Future high school graduates	X	XX		XX		X
Females	X	X			XX	X
Underemployed (less than full-time workers)	XX	X				X
Attitudinally or culturally disinclined	X	XX	XX	X		
Educationally disadvantaged	XX	X	X		X	X
Elderly	X	XX				X
Handicapped	X	X				XX
<u>Sources Not Currently in Study Area</u>						
East Hawaii residents		XX		X		XX
Immigrants from other islands		XX				
Filipino or other immigrants joining local families		X	X			X
Former Island residents		XX			XX	

Source: Community Resources, Inc.

Entrepreneurial Development Programs: The recent proliferation of visitor-oriented businesses (both retail and recreational activities) in places such as Kona, Hanalei, and West Maui illustrate that tourism's economic opportunities are not limited to wage positions in hotels. The challenge is to assure that such opportunities are maximally known to, and taken advantage of by, West Hawaii residents -- particularly students making career decisions and former residents who may be attracted home readily by business opportunities than by hotel jobs.

Child Care Programs: As discussed in Section 2.2.4, mothers with young children at home have substantially lower labor force participation rates than do mothers of older children. It may be assumed that child care would be a particular concern for females among the educationally disadvantaged, as well.

While recent resort approvals on Oahu have included requirements for land to be used for child care facilities, it is possible that the greater need (in light of existing private-sector day care operations) is for new services, such as coordination of independent babysitting services.

Employee Transportation Assistance: Currently, several South Kohala hotels subsidize worker ridership on County buses. However, the long-term stability of this arrangement is in some doubt. The program could be logically evaluated in the broader context of all the foregoing efforts to increase labor force participation.

Supervisory Upgrade: Once residents possess jobs, many would require a sense of opportunity for upward mobility if they are to remain in the jobs. The prospect of a series of hotel openings over the coming 15 to 20 years would provide "stepping stones" for continual job advancement. While no individual hotel may be expected to train its workers for a better job at a competing new hotel, an ongoing regional training program would be in an excellent position to assist workers in developing needed skills. The University system is already focusing on this objective.

2.2.8.3 Provision of Housing for Employees and New Residents

Mauna Lani Resort has assumed responsibility for meeting employee housing requirements for the Ritz-Carlton Mauna Lani project.

According to Resort officials, Mauna Lani has been and will continue to be involved in providing housing for resort employees. As part of the development of the Mauna Lani Bay Hotel, the Resort established 29 rental units in Waimea. Nineteen of these units -- collectively known as Noelani -- were built by Mauna Lani Resort and turned over to the State of Hawaii, which currently manages them through the Hawaii Housing Authority (HHA). The other ten units, known as Hale Waimea, were leased for three years by Mauna Lani for employee use, and these have now been returned to the owner.

Mauna Lani is currently involved in discussions with the County Planning Department and the Office of Housing and Community Development to establish the housing requirement for the Ritz-Carlton. At this time, Mauna Lani Resort has proposed building a 24-unit, Phase Two expansion to Noelani in Waimea. The developer has also proposed building 200 rental units in Kealakehe, North

Kona on land owned by the HHA. These units would be built to provide employee housing for the Ritz-Carlton Mauna Lani and additional hotels to be constructed at Mauna Lani in the future.

Following are additional possible actions recommended by socio-economic consultants CRI:

Government Measures to Assure Land Availability for Private-Sector Housing Development: State and County officials are planning the development of approximately 3,500 units at Kealakehe, and there has been longstanding general discussion of the possibility of government action to develop some similar "support community" in South or North Kohala.

However, of the approximately 15,000 housing units now existing in West Hawaii, most were privately developed in response to market conditions. As discussed in Section 2.2.6, private-sector housing initiatives historically have kept pace with resort unit development (although residential housing costs are increasing, as they are throughout the state). The primary measures by which local government affects private-sector housing supply are (1) development of regional infrastructure (roads, water, sewer lines, etc.), and (2) provision of zoned lands.

Infrastructure provision represents perhaps the major challenge to continued construction of affordable housing in West Hawaii, since much of the cost of housing development rests in factors such as water and sewer lines. Government provision of main lines would greatly increase the cost-effectiveness of residential developments which can then hook up to the main lines.

The County of Hawaii is now examining different alternatives to the difficult question of financing the infrastructure and of finding ways that new developments, and not just existing residents or businesses, can shoulder this cost. The following is a list of possible alternative solutions, not specific recommendations:

- o Government bonds tied to revenues resulting from the value created by new resort development.
- o Negotiated "exactions" from developers, requirements of cash or in-kind contributions which may be imposed as conditions of land use approvals.
- o Impact fees, an approach which involves predictable formulas for assessing new developments based on pro-rata shares of useage of specified new infrastructure specifically created to serve the various developments which are assessed.
- o User fees levied on individual consumers over time, rather than on developers on an up-front basis.
- o Improvement districts established to permit a special tax levy on property owners benefitting from specific public improvements within the district, with assessments based on street frontage or acreage. A variation is the "special district," which involves government bodies separate from the local government.

- o Tax increment financing which involves earmarking increased tax revenues resulting from a new development to repay public expenditures (or bonds) used to provide infrastructure. The new development in effect pays its own way, using the community's normal tax program as the mechanism for deriving revenues.

Providing residentially-zoned land: The draft updated Hawaii County General Plan provides various locations for urban expansion. Therefore, provision of residentially-designated land is not seen as a major problem, assuming (1) that actual zoning of designated lands is timely, and (2) government is willing to designate future lands as market conditions warrant.

Private-Sector Employer Measures to Assist Employees: Increasing supply of housing does not always address the broader community question of "housing for whom?" To assure that resort workers are among the beneficiaries of new housing development, resorts or other major employers could take certain cost-effective steps to help their workers find market housing, both owner-occupied and rentals.

Counseling -- During the construction and start-up phases of a resort, employee housing counseling may provide an efficient way to assure adequate quarters for resort workers.

A continuation of such a program during initial staffing of the hotel would provide housing information and assistance to both newcomers and also longtime residents seeking new housing. Even after the start-up phase, the occasional services of a real estate agent for employees could be offered.

Employee notices -- The simplest way to provide housing information is through the systematic and institutionalized use of employee notices, through posting on employee bulletin boards or announcements published in an employee newsletter. A program of this nature is best suited once a resort is in full operation and start-up housing concerns have been addressed.

2.2.8.4 Ongoing Community-Resort Communication Mechanisms

Currently, all resort developers and most individual hotel operators maintain separate community relations departments or programs. Kohala-area resorts have made significant contributions to the overall community welfare, such as land for a fire department sub-station at Mauna Lani and Westin Hotels' cash contribution of \$5 million to improve hospital facilities at Waimea. Resort personnel are generally active in community organizations, and community leaders not affiliated with resorts are usually consulted as new plans are formulated.

However, a possible addition to these activities could involve creation of an ongoing forum to promote regular communication between resorts and residents. The value of such a forum would rest largely in the opportunity for residents to pose questions and express concerns to the resorts, rather than only reacting to proposals for new development.

2.2.8.5 Management-Oriented Research

Depending on the exact level and rate of cumulative resort development in West Hawaii, the key socio-economic impact issues will have less to do with forecasting impacts than with managing them. In order to do this effectively, a number of applied research projects would be useful, including:

- o An islandwide study of Hawaii County's unemployed and other potential labor force entrants -- their numbers, characteristics, willingness to move to other parts of the island, and factors affecting that willingness.
- o An ongoing tracking system to monitor changes in the West Hawaii resort and/or general workforce profiles.
- o Survey data to provide more solid quantitative evidence about the true extent and magnitude of any family impacts connected directly with tourism employment or indirectly through rapid population growth.

For the most part, such studies would be appropriately carried out by government. One possible vehicle might be the new "Tourism Impact Management System" which the 1986 State Legislature placed in the Hawaii State Department of Planning and Economic Development. The overall concept of an impact management system represents a significant opportunity for government and the private sector to obtain information useful for future planning in West Hawaii.

2.2.9 Fiscal Impacts

The fiscal impact analysis for the Ritz-Carlton Mauna Lani project focuses on the estimate of potential monetary benefits that would accrue to workers, businesses, and government as a result of the proposed development. The following presents estimates of visitor expenditures, State output and income effects, and a public revenue-cost analysis.

2.2.9.1 Visitor Expenditures

The following set of assumptions was used to estimate the expenditures that could be attributed to visitors to the Ritz-Carlton Mauna Lani:

Occupancy	70%
Average Party Size	1.9
Average Daily Expenditures	
Japanese	\$230
Non-Japanese	90
Visitor Distribution	
Japanese	20%
Non-Japanese	80%

Based on these assumptions, the initial 450-unit hotel will yield annual visitor expenditures of \$25.8-million, in 1987 dollars. When in operation, the 200 additional units are expected to increase annual expenditures by \$11.5-million, given the same assumptions as above.

2.2.9.2 Output and Income Effects

Environmental Capital Managers, Inc. (ECMI) used the State of Hawaii, Department of Planning and Economic Development input-output model to project impacts on the economy as a result of Ritz-Carlton Mauna Lani hotel development. The model shows inter-relationships among all sectors of the State's economy. An application of the model is the formulation of output, income, and employment multipliers which can be applied to estimate direct, indirect, and induced impacts of a given project. The direct effect is the immediate primary impact of a project on the economy, the indirect effect is the secondary impact (when establishments which cater to visitors purchase goods and services for their operations), and the induced effect is the subsequent round of changes in the economy (when employees or owners of businesses catering to visitors spend their earnings).

Employment effects are not included here, as they have been analyzed previously in section 2.2.3 of this EIS. The results below for output effects and income effects should be viewed as the relative magnitudes of impact should the Ritz-Carlton Mauna Lani be constructed and become fully operational. Due in part to the inherent assumptions built into the State input-output model and various estimation errors, the results should be viewed as estimations, and not as predictions.

Output Effects. The impacts here represent the changes that could occur to the Gross State Product, or the effect on the total value of goods and services produced within the State's economy.

Upon full operation of the hotel, it was estimated that the initial 450-unit phase of the project would generate an annual average of \$17.0-million, in constant 1987 dollars. The additional 200 units would contribute another \$6.0-million. The indirect and induced effects were calculated using the following multipliers for the hotel industry:

Indirect	0.453
Induced	0.779

Based on these multipliers, the various effects are estimated as follows:

	<u>450 Units</u>	<u>200 Additional Units</u>
Direct	\$17.0-million	\$ 6.0-million
Indirect	7.7-million	2.7-million
Induced	<u>13.2-million</u>	<u>4.7-million</u>
TOTAL	\$37.9-million	\$13.4-million

Income Effects. This impact represents the income changes that could occur to the household sector of the economy. The various effects were calculated using the following multipliers for the hotel industry:

Direct	0.369
Indirect	0.167
Induced	0.314

The income effects were calculated using these multipliers with the direct output estimate of \$17.0-million.

Based on the above, the estimates of the various income effects are as follows:

	<u>450 Units</u>	<u>200 Additional Units</u>
Direct	\$ 6.3-million	\$ 2.2-million
Indirect	2.8-million	1.0-million
Induced	<u>5.3-million</u>	<u>1.9-million</u>
TOTAL	\$14.4-million	\$ 5.1-million

2.2.9.3 Public Revenue Cost Analysis

Economic activities such as the Ritz-Carlton Mauna Lani project provide the State and County of Hawaii with additional sources of revenues and, simultaneously, increase the burden on available public resources. To assess the impact of the proposed hotel development, incremental revenues and costs were estimated and fully charged to the project to calculate the revenue-cost ratio.

ECMI took the approach of first identifying the kinds of revenue and cost elements to be considered, then estimating the dollar amount which should be associated with each element, and finally comparing the discounted present values of the various revenue and cost totals. The objective of the analysis was to determine whether the additional County and State government revenues generated as a result of the project would offset the necessary additional costs. For the purposes of this analysis, the base period was set at 1987, the start year 1988 and the end year 2000.

2.2.9.3.1 Study Variables. This section presents both the public revenue and public cost variables which were considered for the revenue-cost analysis.

Public Revenue Variables

General Excise/Development. This variable was included to reflect the revenue generation that would occur as a result of the development/construction activities. The development costs include only the initial 450-unit hotel. The excluded 200 units to be constructed at a later date would provide additional revenue dollars to the State of Hawaii.

General Excise/Operations. The rental income derived from the operations of the hotel would be assessed the general excise tax of 4%.

General Excise/Personal Consumption. A portion of the wages earned would be spent on various goods and services. It was assumed that the average employee would spend 60 percent of his or her gross income on consumable goods and services.

Corporate Income Tax/Development. The net taxable income derived from the development of the project would be subject to the corporate income tax. It was assumed that 10% of the estimated income generated by the project would be subject to the corporate income tax.

Corporate Income Tax/Operations. The net taxable income derived from the hotel's operations would be subject to the corporate income tax. Again, it was assumed that 10% of the estimated income generated by the project would be subject to the corporate income tax.

Personal Income Tax. For the fiscal impact analysis, it was assumed that each employee represented an individual household and that each employee would be the sole wage earner for that household.

Real Property Tax. The reclassification and rezoning of the property would increase the relative value of the land. In addition, the improvements would also have value. The budget for the improvements to the initial 450-unit project is \$67-million, and the analysis is based on this amount only. There is currently no budget for the additional 200 units, therefore making the analysis very conservative.

Hotel Room Tax. Effective January 1, 1987, hotel room rentals are subject to a 5 percent hotel room tax. This source of revenue was incorporated into the analysis, assuming 70 percent occupancy and an average room rate of \$195 per night.

Public Cost Variables

Lower Education. The increase in population from operational period employment may increase public education costs if additional teachers, supplies, etc., are needed beyond the level currently being planned. Given that the majority of direct labor required will come from on-island sources, actual cost increases are expected to be small. However, for analysis purposes, an average cost allocation to the project was made.

Higher Education. For analysis purposes, the average costs for the major elements for the Hilo Campus of the University of Hawaii were charged to the project.

Health Services. This variable includes emergency medical service and the Honoka'a, Kohala and Kona Hospital components. The average cost was estimated to be \$104 per person, on the basis of de facto population since hotel guests may require emergency medical care.

Mass Transit Services. Hotel guests are unlikely to use public transportation services; however, it is expected that some employees will commute to work by bus. For the analysis, an average variable cost of \$5 per (de facto) person was used.

Police Services. Employment and related population growth due to the project have the potential to add to the police service workload. An average \$299 was assessed each employee household.

Fire Services. It was estimated that the average variable cost per employee household would be \$166.

Excluded Variables

Certain variables, such as highway maintenance and utilities, were excluded from this analysis. Although these variables might be affected by the Ritz-Carlton Mauna Lani project, they are funded through user fees which keep the providers of these services and facilities solvent. Therefore, the inclusion of these costs, along with the assessed user fees, would result in a "wash."

2.2.9.3.2 Results of the Present Value Revenue-Cost Analysis. As shown in Table IV-32, the Ritz-Carlton Mauna Lani hotel project is expected to have a favorable revenue-cost ratio of 3.2 to 1.0. This indicates that an additional \$3.20 in public revenue will be generated by the State of Hawaii and/or the County of Hawaii for every dollar of public cost caused by the project.

The cumulative discounted public revenues totalled \$23.8-million in constant 1987 dollars. Of these variables, the combined "general excise tax" variable contributed over \$9.7-million or over 40 percent of the total. The second largest factor was the new "hotel room tax" variable: \$6.2-million or over 25 percent of the total.

The cumulative discounted public costs totalled \$7.4-million in constant 1987 dollars, with the two education variables accounting for over 60 percent of the total.

Table IV-32
Revenue-Cost Analysis Summary
 (in 1987 dollars)
Ritz-Carlton Mauna Lani
 1988 - 2000

<u>Variable Description</u>	<u>Present Value</u>	
General Excise Tax/Development	\$ 5,162,882	
General Excise Tax/Operations	3,689,415	
General Excise Tax/Personal Consumption	816,892	
Corporate Income Tax/Development	830,337	
Corporate Income Tax/Operations	592,786	
Personal Income Tax	3,165,518	
Real Property Tax	3,366,364	
Hotel Room Tax	<u>6,197,030</u>	
PUBLIC REVENUES		\$ 23,821,224
Lower Education	\$ 2,929,057	
Higher Education	1,592,527	
Health Services	1,134,969	
Mass Transit Services	57,327	
Police Service	1,107,684	
Fire Service	<u>611,698</u>	
PUBLIC COSTS		\$ 7,433,262
REVENUE - COST RATIO		3.2 to 1.0

3.0 TRANSPORTATION FACILITIES

3.1 TRAFFIC IMPACT ANALYSIS

3.1.1 Introduction

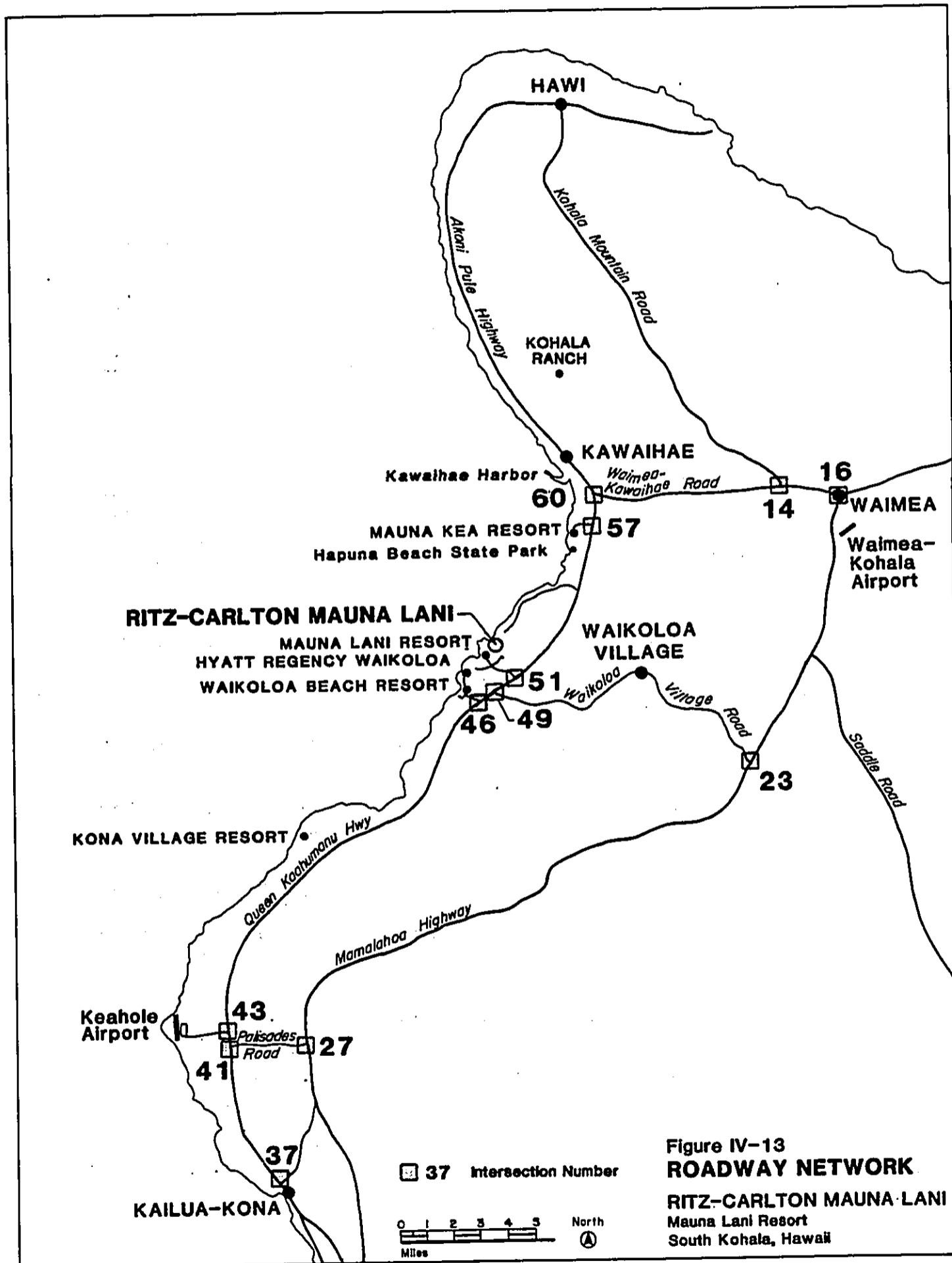
3.1.1.1 Scope of Analysis

The proposed Ritz-Carlton Mauna Lani project is only one among several resort facilities and other development planned for the West Hawaii region and estimates of its impact on transportation facilities and traffic must be conducted with this in mind. It should be noted that long-range forecasts are only as good as the development scenarios on which they are based. To the extent that the rate of development exceeds or falls short of that which is planned, traffic volumes may also increase more rapidly or more slowly than projected. It is therefore perhaps most useful to treat the following discussion as an indication of the potential problems that may arise in the future rather than an attempt to specify exact timetables.

The Hawaii County Planning Department asked that a regional traffic analysis be performed for this EIS, to include potential impacts from the Ritz-Carlton project as well from other development in the West Hawaii region within a 10-year time frame. This traffic analysis projects impacts for the years 1993 and 1998. Assumptions concerning the extent and timing of development (also used in the socioeconomic impacts section of this report are as follows:

- o Ritz-Carlton Mauna Lani: 450 rooms in 1993 and an additional 200 rooms in 1998
- o Hyatt Regency Waikoloa: 1,260 rooms in 1993
- o An assumed Hotel "X" located in the vicinity of Keahole Airport: 500 rooms in 1993
- o South Kohala Resort: 350 hotel rooms, 15 single-family units and 50 multifamily units in 1993; 110 single-family units and 600 multifamily units in 1998
- o Kohala Estates: 47 single-family units in 1993 and 47 units in 1998
- o Kohala Ranch: 1300 single-family units and 360 multifamily units in 1993; and 2,265 single-family units and 690 multifamily units in 1998

Traffic on selected roadway segments and intersections (see Figure IV-13) was analyzed for the existing traffic condition in 1987 and according to six scenarios, or three each for the years 1993 and 1998. The purpose of structuring the analysis this way was to enable projecting the impacts that could be attributed to the Ritz-Carlton Mauna Lani hotel development by itself and also those that could be attributed to regional growth with or without the Ritz-Carlton Mauna Lani. The six scenarios are as follows:



- Scenario 1 Impact of traffic generated by the Ritz-Carlton added to existing traffic (1993)
- Scenario 2 Impact of traffic generated by all other projects listed above added to existing traffic (1993)
- Scenario 3 Cumulative impact of traffic generated by all other projects and the Ritz-Carlton (1993)
- Scenario 4 Impact of traffic generated by the Ritz-Carlton added to existing traffic (1998)
- Scenario 5 Impact of traffic generated by all other projects listed above added to existing traffic (1998)
- Scenario 6 Cumulative impact of traffic generated by all other projects and the Ritz-Carlton (1998)

Included in the regional traffic analysis are vehicular trips made by both visitors and residents. Much of the additional traffic generated can be attributed to operations employees coming and going from their work places, construction workers also coming and going from their work places, residents of the West Hawaii region, material suppliers and others coming and going from various parts of the island.

In the analysis, it was assumed that the traffic generated by the projects noted above constitutes traffic growth in both 1993 and 1998.

3.1.1.2 Computer Model

A computer model was used to perform the analysis: the Impax traffic model developed by PRC Engineering of Orange, California, which is an integrated package of computer programs used to analyze incremental traffic loads on street networks related to specific land uses. Input to the computer program describes the street system, existing traffic, trip generation from projects, intersection information, and distribution of the project traffic on specified travel paths. Traffic generated by the projects is assigned to the road system in the study area, analyses performed for street volumes, intersection turn volumes, and level of service for signalized intersections.

Level of service for unsignalized intersections and roadways were calculated using the methods outlined in the "Highway Capacity Manual" (Transportation Research Board, 1985). "Highway Capacity Software" (U.S. Department of Transportation, Federal Highway Administration, January 1987) are computer programs developed to perform calculations for procedures outlined in the Highway Capacity Manual.

In the traffic analysis, to describe the operational conditions of roadways and intersections, the level of service (LOS) was calculated for the afternoon or PM peak hour, which is more pronounced than the AM peak hour (making for a more conservative analysis). Level of service is a qualitative measure describing the operational condition within a traffic flow. On a descending scale of A to E, level of service A indicates free-flow conditions, with low volumes and high speeds. Level of service E represents the extreme

opposite conditions where a particular roadway is near or at capacity. Below this level is level of service F which is a forced condition involving a breakdown in traffic flow.

3.1.2 Existing Conditions

3.1.2.1 Existing Roadway Conditions

The existing roadway system is shown on Figure IV-13. West Hawaii roads include State highways, County roads and private roads.

Queen Kaahumanu Highway is a State highway which extends along the North Kona and South Kohala coast from Kailua-Kona to Kawaihae. It has two lanes with a posted speed limit of 55 mph. The major intersections on Queen Kaahumanu Highway are at Palani Road, Palisades Subdivision Road, Keahole Airport Road, Waikoloa Beach Resort, Waikoloa Village Road, Mauna Lani Resort, Pauko, Hapuna Beach, Mauna Kea Resort, and Waimea-Kawaihae Road. The intersection with Palani Road is four-way, fully channelized, and signalized. The other intersections are unsignalized, channelized "t"s, except for the intersection with the Waimea-Kawaihae Road, which is not channelized.

Mamalahoa Highway, a two-way State highway which serves the upland areas of North Kona and South Kohala, has as its major intersections those at Lindsey Road, the Saddle Road, Waikoloa Village Road, Palisades Subdivision Road, and Palani Road. The intersection with Lindsey Road is fully channelized, four-way, and signalized, while the remaining intersections are "t" intersections. The intersection with Waikoloa Village Road is fully channelized while the others are not.

Akoni Pule Highway is a two-lane State highway which extends from Kawaihae to Hawi, with fully channelized intersections at Kohala Estates Road and Kohala Ranch Road.

County roads in the region are Palani Road, Palisades Subdivision Road, Waimea-Kawaihae Road, Lindsey Road and Kohala Mountain Road. All of these roads are two-lane roads.

Private roads in the region are Waikoloa Village Road, Waikoloa Beach Resort, Mauna Lani Resort, Mauna Kea Resort, Kohala Ranch and Kohala Estates. All of these roads are two-lane roads.

3.1.2.2 Historic Traffic

Traffic counts have been taken by the Highways Division, Department of Transportation, State of Hawaii, at locations listed below from 1974 to 1984. These counts have been taken at an average of once every two years. These counts do not include turning movements.

<u>Station No.</u>	<u>Description</u>
8 - H	Queen Kaahumanu Highway at Waikoloa Village Road
C-8-M	Queen Kaahumanu Highway at 2.5 north of Kealakehe Pkwy
8-P	Queen Kaahumanu Highway at Keahole Airport Road
9-A	Mamalahoa Highway at Waikoloa Road

<u>Station No.</u>	<u>Description</u>
C-9-C	Queen Kaahumanu Highway at Palani Road
10	Mamalahoa Highway at Kawaihae-Waimea Road
11	Kohala Mountain Road at Kawaihae-Waimea Road
11-E	Queen Kaahumanu Highway at Kawaihae-Waimea Road

The historic traffic data indicates that traffic has grown from 1976 to 1986 by three times in the Kailua area, by two times in the airport area, by 1.8 times in the Waimea area and by 1.6 times in the Kawaihae area.

3.1.2.3 Current Traffic

As part of the traffic study, traffic was counted on January 21, 1987, at 12 intersections shown on Figure IV-13 by Belt Collins & Associates with the aid of the Waimea Hawaiian Civic Club and the Kona Hawaiian Civic Club. Turning movements were counted at all intersections from 6:00 AM to 6:00 PM. The counts were taken at the following locations:

<u>Station No.</u>	<u>Location</u>
14	Waimea-Kawaihae Road and Kohala Mountain Road
16	Mamalahoa Highway and Lindsey Road
23	Mamalahoa Highway and Waikoloa Village Road
27	Mamalahoa Highway and Palisades Road
37	Queen Kaahumanu Highway and Palani Road
41	Queen Kaahumanu Highway and Palisades Road
43	Queen Kaahumanu Highway and Keahole Airport Road
46	Queen Kaahumanu Highway and Waikoloa Beach Resort
49	Queen Kaahumanu Highway and Waikoloa Village Road
51	Queen Kaahumanu Highway and Mauna Lani Resort
57	Queen Kaahumanu Highway and Mauna Kea Resort
60	Queen Kaahumanu Highway and Waimea-Kawaihae Road

Peak traffic generally occurred from 7:00 to 8:30 AM and 3:00 to 5:00 PM. The PM peak hour was the most pronounced and with the greater number of vehicles. The traffic in the region does not have distinct peak hours but is fairly uniform from mid-morning to late afternoon. This traffic profile is characteristic of areas with visitor facilities.

3.1.3 Probable Impacts on Roadways and Traffic

3.1.3.1 Trip Generation

Trip generation rates for hotels were derived from traffic counts taken at the entrance to Mauna Lani and Mauna Kea Resorts on January 21, 1987. The peak hour traffic was correlated to the number of hotel rooms to derive peak hour generation rates. The average trip generation rates per hotel room are as follows:

	<u>Enter</u>	<u>Exit</u>
AM Peak Hour	0.36	0.06
PM Peak Hour	0.31	0.45

Trip generation rates for single-family and multifamily units are based on rates published in the manual, "Trip Generation" (Third Edition, 1982, Institute of Transportation Engineers). Trip generation rates are as follows:

	<u>Enter</u>	<u>Exit</u>
Single Family		
AM Peak Hour	0.21	0.55
PM Peak Hour	0.63	0.37
Multifamily		
AM Peak Hour	0.07	0.37
PM Peak Hour	0.37	0.18

Trips generated by the projects included in the analysis are shown below:

<u>Project</u>	<u>AM Peak Hour</u>		<u>PM Peak Hour</u>	
	<u>Enter</u>	<u>Exit</u>	<u>Enter</u>	<u>Exit</u>
1993				
Ritz-Carlton	162	27	140	202
Hyatt Waikoloa	454	76	391	567
Hotel "X"	140	25	120	175
South Kohala Resort	2	8	8	4
Kohala Ranch	85	245	274	156
1998				
Ritz-Carlton	234	39	202	292
Hyatt Waikoloa	454	76	391	567
Hotel "X"	140	25	120	175
South Kohala Resort	145	106	195	200
Kohala Ranch	207	601	671	382

3.1.3.2 Trip Distribution

The trips generated by the projects were assumed to be distributed to the various locations in the region via the existing street network by the following percentages for the PM peak hour:

<u>Destination</u>	<u>Ritz-Carlton</u>	<u>Hyatt Waikoloa</u>	<u>Hotel "X"</u>	<u>South Kohala</u>
North Kohala	15	10	9	15
Waimea West of Lindsey	15	10	9	15
Mamalahoa Hwy North of Lindsey	20	10	10	20
Lindsey Rd East of Mamalahoa	5	5	1	5
Mamalahoa Hwy South of Lindsey	5	2	2	5
Puako	1	2	2	1
Waikoloa Village	5	10	7	5
Keahole Airport	2	2	2	2
Palisades Subdivision	5	10	11	5

<u>Destination</u>	<u>Ritz- Carlton</u>	<u>Hyatt Waikoloa</u>	<u>Hotel "X"</u>	<u>South Kohala</u>
Palani Road Mauka of Queen Kaahumanu Highway	5	13	14	5
Queen Kaahumanu Highway South of Palani Road	10	15	17	10
Kailua Makai of Queen Kaahumanu Highway	12	15	16	12

Kohala Ranch, being mainly a residential community, would have distribution of traffic that is different from that of the resort projects. PM peak hour traffic from and to Kohala Ranch is assumed to be distributed by the following percentages:

<u>Description</u>	<u>Percentage</u>
Exiting from Kohala Ranch to:	
Waimea	60
South Kohala and Kona	20
North Kohala	20
Entering Kohala Ranch from:	
Waimea	15
South Kohala	83
North Kohala	2

3.1.3.3 Results of Analysis

In the appendix are figures showing regression equations based on counts, taken by the State Department of Transportation, of traffic entering the intersections of Queen Kaahumanu Highway and Palani Road, Queen Kaahumanu Highway and Keahole Airport, Queen Kaahumanu Highway and Waimea-Kawaihae Road, and Mamalahoa Highway and Lindsey Road. Also shown are points of projected traffic entering the intersections for Scenarios 3 and 6. The regression equation shows the trend of traffic growth at each intersection based on historic data. If the assumption is made that future traffic will follow the same trend as past traffic, a regression equation can be used to project future traffic. The projected traffic on the figures can be compared to the regression equation to see the relative difference between historic trends and projected traffic. The projected traffic for Scenarios 3 and 6 is above the regression line for the intersections of Queen Kaahumanu Highway and Keahole Airport and Queen Kaahumanu Highway and Waimea-Kawaihae Road; it is below or at the regression line for the intersection of Mamalahoa Highway and Lindsey Road; and is below the regression line for the intersection of Queen Kaahumanu Highway and Palani Road.

See Table IV-33 for a summary of the roadway level of service by scenario.

Traffic from the Ritz-Carlton Mauna Lani (Scenarios 1 & 4) would cause the level of service of Waimea-Kawaihae Road in Waimea to be reduced from "B" to "C" in 1993 and to "D" in 1998, and on Queen Kaahumanu Highway from Kailua to Kawaihae to remain at the current level of service or be reduced by one.

**Table IV-33
Roadway Level of Service**

<u>Roadway Section</u>	<u>Study</u>	<u>Existing</u>	<u>1993</u>	<u>1998</u>
Waimea-Kawaihae Road	Existing	8-C		
	Scenario 1		C	
	Scenario 2		D	
	Scenario 3		D	
	Scenario 4			D
	Scenario 5			E
	Scenario 6			E
Mamalahoa Hwy South of Lindsey	Existing	B		
	Scenario 1		B	
	Scenario 2		B	
	Scenario 3		B	
	Scenario 4			B
	Scenario 5			C
	Scenario 6			C
Mamalahoa Hwy North of Lindsey	Existing	B		
	Scenario 1		D	
	Scenario 2		D	
	Scenario 3		D	
	Scenario 4			D
	Scenario 5			D
	Scenario 6			D
Queen Kaahumanu Hwy North of Palani Road	Existing	E		
	Scenario 1		E	
	Scenario 2		E	
	Scenario 3		E	
	Scenario 4			E
	Scenario 5			F
	Scenario 6			F
Queen Kaahumanu Hwy South of Keahole Airport	Existing	C		
	Scenario 1		C	
	Scenario 2		E	
	Scenario 3		E	
	Scenario 4			C
	Scenario 5			E
	Scenario 6			E
Queen Kaahumanu Hwy South of Waikoloa Beach	Existing	B		
	Scenario 1		B	
	Scenario 2		D	
	Scenario 3		D	
	Scenario 4			C
	Scenario 5			D
	Scenario 6			E

Table IV-33
Roadway Level of Service
(continued)

<u>Roadway Section</u>	<u>Study</u>	<u>Existing</u>	<u>1993</u>	<u>1998</u>
Queen Kaahumanu Hwy South of Mauna Lani Resort	Existing	B		
	Scenario 1		B	
	Scenario 2		C	
	Scenario 3		D	
	Scenario 4			B
	Scenario 5			D
	Scenario 6			E
Queen Kaahumanu Hwy South of Waimea-Kawaihae Road	Existing	B		
	Scenario 1		C	
	Scenario 2		D	
	Scenario 3		D	
	Scenario 4			C
	Scenario 5			E
	Scenario 6			E

Traffic from all the projects in the area without the Ritz-Carlton (Scenarios 2 & 5) would cause the level of service of the Waimea-Kawaihae Road in Waimea to go to "D" in 1993 and "E" in 1998, and on Queen Kaahumanu Highway from Kailua to the airport to be reduced to "E" in 1993 and "E-F" in 1998, from the airport to Kawaihae to "C-D" in 1993 and "D-E" in 1998.

Cumulative traffic from all the projects in the area (Scenarios 3 & 6) would cause the level of service to be reduced on Waimea-Kawaihae Road in Waimea to "D" in 1993 and "E" in 1998, on Mamalahoa Highway to "D" in 1993 and 1998, on Queen Kaahumanu Highway from the airport to Kawaihae, the level of service would be reduced to "E" in 1998 and north of Palani Road would remain at "E" in 1993 and be reduced to "F" in 1998.

The intersections will also be affected by the increased traffic. The signalized intersections at Mamalahoa Highway and Lindsey Road in Waimea and Queen Kaahumanu Highway and Palani Road in Kailua are currently operating at level of service "A" and "E", respectively. Level of service for Scenarios 1, 2, 4 & 5 will be level of service "A" for Mamalahoa/Lindsey intersection and level of service "E" for Queen Kaahumanu/Palani intersection. For Scenarios 3 & 6 (cumulative impact), level of service for Mamalahoa/Lindsey intersection will be "A" and Queen Kaahumanu/Palani intersection will be "F".

The level of service of the unsignalized intersections can be represented by a selected group as shown in Appendix C. The left turn movement out of a minor road onto a major road is most affected by the growth of traffic within an intersection. The levels of service of the left-turn movements out of a minor street onto a major street are currently at levels of service "B-D", with Scenarios 1 & 4, levels of service will go to "C-F", and with Scenarios 2, 3, 5 and 6, level of service will go to "F".

3.1.3.4 Conclusions and Mitigation Measures

The Ritz-Carlton Mauna Lani hotel development will have an impact on the roadway system in the North Kona/South Kohala area. However, the Ritz-Carlton hotel project by itself will not cause the level of service of the roadway system to be lowered to such an extent as to require improvements to keep traffic flowing smoothly. On the other hand, the cumulative impact of all the projects planned for the region, if they develop on schedule, will cause the operating levels of the roadways and intersections to deteriorate to a point where improvements would be required for smooth traffic operation. Traffic impact is the result of an accumulation of traffic from all generators.

Mitigation measures include the addition of roadway lanes and the construction of intersection improvements, as well as measures not directly related to roadways. These include carpooling, the implementation of staggered work hours, and bussing of employees, all of which would most effectively be approached on a coordinated regional basis by public and private entities.

In the area of roadway and intersection improvements, the following are specific mitigation measures.

Queen Kaahumanu Highway, from Kailua-Kona to Keahole Airport, is expected to operate at level of service F. To improve traffic flow, two lanes could be added to the highway. Such an addition would improve the traffic flow and reduce it to level of service C.

In future, the intersection of Queen Kaahumanu Highway and Palani Road is expected to operate at level of service F. Additional left-hand turns could be added to improve traffic flow through the intersection. Also, the intersection of Queen Kaahumanu Highway and Waimea-Kawaihae Road could be improved by channelizing the intersection.

3.2 AIRPORTS

3.2.1 Existing Facilities

The Kohala Coast region is serviced by three airports: Keahole and Waimea-Kekaha, which are operated by the State Department of Transportation, and the Waikoloa Airport, which is located near the Waikoloa Beach Resort and began operations in 1984.

Keahole Airport is located about 20 miles south of Mauna Lani Resort and the Ritz-Carlton Mauna Lani site. It is served by all three major interisland carriers, as well as by several of the commuter airlines and cargo companies. The airport handles direct flights from the mainland United States. Although Keahole's 6,500-foot long runway is adequate for the largest interisland aircraft, it is too short to permit wide-bodied jet aircraft to take off with a full load of fuel. Return flights to the mainland, therefore, require a stop at General Lyman Field in Hilo or Kahului Airport on Maui, both of which have longer runways to accommodate aircraft with larger loads.

3.2.2 Probable Impacts

The proposed 450-unit hotel, with an additional 200 units to be developed by 1998, is not expected to have a significant effect on Keahole Airport's service. The airport served about 130,000 mainland passengers in 1985 and over 1.3-million interisland passenger during the same year (DPED 1986 Data Book, p. 491). However, the cumulative effect of resort development in West Hawaii will eventually require improvements to Keahole Airport. The master plan for the West Hawaii airport is expected to be updated by the State Department of Transportation and future airport expansion as well as runway extension recommended.

3.3 HARBORS

3.3.1 Existing Facilities

Kawaihae Harbor, north of Mauna Lani Resort, is the only deep water harbor in West Hawaii and is used primarily by interisland barges. Cargo handled includes building materials, consumer goods, large equipment and machinery, as well as the provisions and supplies needed to operate hotels and resorts in South Kohala and Kona. The Honokohau Small Boat Harbor is about 13 miles south of the project site, in the North Kona district.

3.3.2 Probable Impacts

According to the State Department of Transportation, the facilities at Kawaihae are adequate to accommodate the foreseen long-term water transportation needs of West Hawaii.

4.0 AIR QUALITY IMPACTS

4.1 INTRODUCTION

J.W. Morrow prepared an air quality impact assessment for the 1985 Mauna Lani Resort environmental impact statement which was submitted to the State Land Use Commission to accompany an application for land use change. The analysis covered the effects of development at the entire 1,430-acre resort, which includes the Ritz-Carlton 32-acre parcel as one of several elements. Impacts attributable to development of Mauna Lani Resort, in general, can also be attributable to the Ritz-Carlton project, although on a lesser scale. Results of the 1985 analysis represent the cumulative impact of Mauna Lani Resort development, of which the Ritz-Carlton Mauna Lani hotel development is part. The reader is referred to the earlier EIS for a full discussion of potential air quality impacts.

4.2 EXISTING CONDITIONS

The reader is referred to the Mauna Lani Resort EIS for a discussion of air quality standards, noting that Hawaii standards are more stringent than their Federal counterparts.

While there are no continuous air monitoring stations in West Hawaii, the absence of large stationary sources of vehicular traffic and the relatively low levels of traffic make it likely that existing air quality in the region is currently good most of the time. The nearest active State Department of Health air monitoring station is located some 50 miles east at Hilo. Data from that station suggest that the State's stringent standards are being met for sulfur dioxide and total suspended particulates. Unfortunately, the two principal automotive pollutants, carbon monoxide and oxides of nitrogen, are not monitored on the Island of Hawaii.

The worst air pollution episodes experienced on the island are due to periodic volcanic eruptions. Visibility is affected by the presence of fine particulates resulting directly from volcanic activity as well as secondarily from forest fires caused by lava flows. In addition, substantial increases in the ambient concentrations of mercury and sulfur dioxide have been recorded during eruptions.

There is little seasonal or diurnal temperature variation in the vicinity of Mauna Lani Resort; monthly temperature averages vary by only 6 degrees from the warmest months to the coolest. An 18-year rainfall record indicates that the area of Mauna Lani Resort is dry, with an annual average of only 10.65 inches. A strong land-sea breeze regimes apparently dominates air movement in the area.

4.3 PROBABLE IMPACTS

4.3.1 Short-Term Effects

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along Queen Kaahumanu Highway as well as in the vicinity of the Ritz-Carlton Mauna Lani site.

The movement of construction vehicles on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity and moderate soil silt content. There is little soil at the Ritz-Carlton Mauna Lani site and soil that is brought in may have a silt content greater than the 30 percent moderate soil silt content. This, in conjunction with the relatively dry local climate, suggests a potential for even greater fugitive dust emissions such as were experienced during construction of the Mauna Lani golf course.

This potential for fugitive dust make it important for adequate dust control measures to be employed during the construction period. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The Environmental Protection Agency estimates that twice daily watering can reduce fugitive emissions by as much as 50 percent. Early landscaping of completed areas would also mitigate impacts.

4.3.2 Long-Term Effects

For a more detailed discussion of long-term air quality impacts, the reader is referred to the Mauna Lani Resort EIS. Long-term impacts attributable to the total 650 units of the Ritz-Carlton Mauna Lani will be mostly in the form of increased automotive emissions as the principal air pollution source. These emissions would include all three major automotive pollutants in the Mauna Lani Resort area, including carbon monoxide. Increased demand for electricity by the hotel and employee families will necessitate the generation of electricity by power plants, thus contributing to added pollution. Hawaii Island electricity is currently generated primarily by the burning of high sulfur fuel oil, diesel oil, and bagasse, with a small amount coming from a geothermal plant. With the exception of the geothermal plant, all of these result in the emission of various quantities of sulfur oxides, nitrogen oxides, particulates, and hydrocarbons.

The long-term increase in pollutants attributable to the Ritz-Carlton Mauna Lani project by itself is not significant enough to warrant mitigation measures. However, the cumulative impact of development at Mauna Lani Resort, most of which will take place after construction of the Ritz-Carlton Mauna Lani, will be for State standards to eventually be exceeded at the Mauna Lani Drive-Queen Kaahumanu Highway intersection, according to the J.W. Morrow analysis. Less stringent Federal standards would not be exceeded. Increased concentrations would be due primarily to queuing on both roadways by vehicles attempting to make turning movements into or out of Mauna Lani Drive. Mitigation measures include roadway improvements such as additional lanes and signalization.

5.0 NOISE IMPACTS

5.1 INTRODUCTION

Y. Ebisu & Associates prepared a noise impact assessment for the Mauna Lani Resort EIS in 1985. The reader is referred to this document for a full discussion of potential noise impacts due to Mauna Lani Resort development, of which the Ritz-Carlton Mauna Lani is part.

Increased noise generated by the hotel project, both in the short-term and long-term, will be associated mostly with vehicular traffic. Two descriptors used to relate traffic noise levels to land use compatibility and to assess environmental noise in general, are the "Equivalent Noise Level" (Leq) and the "Day-Night Average Sound Level" (Ldn). As a general rule, noise levels of 55 Ldn or less occur in rural areas, or in urbanized areas which are shielded from streets carrying large volumes of traffic. In urbanized areas, noise levels typically range from 55 Ldn to 65 Ldn, and motor vehicle traffic noise is usually the controlling factor.

An exterior noise limit of 65 Ldn is used nationally for purposes of determining noise acceptability for funding assistance from Federal agencies. However, because of Hawaii's living conditions and the widespread use of naturally ventilated dwellings, an exterior noise level of 65 Ldn does not eliminate all risks of adverse noise impacts.

5.2 EXISTING CONDITIONS

Noise level measurements were made by Y. Ebisu for its 1985 analysis at various stations at Mauna Lani Resort and its vicinity. At that time, existing peak-hour noise levels below 55 Ldn beyond 110 feet from the centerline of Queen Kaahumanu Highway and traffic noise levels along the internal roadways of the resort were below 55 Ldn at distances of 50 feet or more.

5.3 PROBABLE IMPACTS

5.3.1 Short-Term Construction Noise

Increased noise levels due to construction vehicles and equipment will be a temporary effect. Mitigation measures to reduce temporary high noise levels include the use of mufflers and the operation of machinery during normal daytime hours and during the regular work week.

5.3.2 Traffic and Other Long-Term On-Site Noise

Traffic noise increases of approximately 2 Ldn per five-year period are expected along the external and internal roadways serving Mauna Lani Resort. Over the full development span of the resort project, traffic noise adjacent to Queen Kaahumanu Highway is expected to rise by 7 to 8 Ldn, and total increases of 10 to 11 Ldn are predicted along the internal roadway to the resort. Increases of 7 to 11 Ldn are significant; however, the Ritz-Carlton Mauna Lani will be constructed during the first five-year period, during which time traffic noise will increase by about 2 Ldn.

It should be noted that the projected noise levels on Queen Kaahumanu Highway are the result of greatly increased traffic from cumulative development in the region, as well as from ongoing development of Mauna Lani Resort.

To reduce noise impacts, buffer zones could be used to shield developed areas and appropriate building setbacks maintained.

6.0 PUBLIC SERVICES AND FACILITIES

6.1 SCHOOLS

6.1.1 Existing Facilities

The majority of students from new employee families associated with direct employment at the Ritz-Carlton Mauna Lani are expected to attend classes at the schools noted below:

Public Schools by Area of Residence

<u>Service Region</u>	<u>Elementary or Intermediate Schools</u>	<u>High Schools</u>
North Kohala	1	1
South Kohala	1	1
North and South Kona	7	1
Hilo	13	2

South Kohala is the location of two of the county's best known private schools, Hawaii Preparatory Academy (grades K through 12) and Parker School (grades 7 through 12), both in Waimea. Although the Parker Ranch announced in early 1987 that the Parker School will begin to phase out and will be accepting no new students, it is expected that the Hawaii Preparatory Academy will expand its services to meet the region's needs. Hawaii Preparatory Academy is currently seeking government permits to allow it to build a new lower school serving grades K through 5 in Keauhou.

6.1.2 Probable Impacts

There will be no direct demand for increased public school service due to the development of hotel units at the Ritz-Carlton Mauna Lani site. However, employment will be generated by the Ritz-Carlton Mauna Lani project, leading to an increase in population islandwide. Community Resources estimates a population increase of 245 in-migrants (induced and non-induced) and 1,698 islandwide in 1990 and 439 in-migrants and 618 islandwide in 1998. In-migrant families are expected to create an incremental increase in the demand for public school service, whereas established families presumably have children in the existing school system.

Community Resources' cohort model suggests that the proportions of total West Hawaii population falling in the school-age years (5 to 17) would be 21.9% in 1990 and 20.0% in 1998. Applying these proportions to the population projected, there would be 54 new students from in-migrant families and 372 students islandwide in 1990 and 88 additional new students from in-migrant families and 124 additional students islandwide in 1998, for a total of 142 and 496, respectively.

6.2 HEALTH CARE FACILITIES

6.2.1 Existing Facilities

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

Kona Hospital is a "full service" health care facility; it has 53 acute care beds, 26 beds for long-term care, and an active staff of 36 physicians. Nevertheless, in 1985, an administrator in the State Department of Health described Kona Hospital's resources as inadequate for the needs of the existing regional population.

In Waimea, the private Lucy Henriques Medical Center provides outpatient health services, including emergency room treatment, x-ray, laboratory services and radiology. Westin Hotels & Resorts contributed \$5-million to the center in November 1986 to encourage long-term planning for upgrading the medical center to a modern hospital with a full range of medical facilities.

6.2.2 Probable Impacts

Existing conditions seem to indicate that the health care facilities in the West Hawaii region will require upgrading with or without additional development, including the proposed Ritz-Carlton Mauna Lani hotel. Visitors to the new hotel will be able to seek emergency care at Lucy Henriques Medical Center or Kona Hospital. New population in the study area generated by the hotel project will add to the already increasing demand for medical services in the Kohalas and Kona. New induced and non-induced in-migrant population due to Ritz-Carlton Mauna Lani development would be about 245 in 1990 and an additional 440 in 1998, a total of 685. This population would generate demand for increased medical care services.

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6.3 POLICE PROTECTION

6.3.1 Existing Services and Facilities

Police services for South Kohala are located in Waimea. Other police facilities in the study area are the Kapa'au station, which serves the North Kohala area, and the Kona station in North Kona. Both the Waimea and Kapa'au police stations are of relatively recent construction, and there is room in both for additional staff.

6.3.2 Probable Impacts

In a letter responding to an environmental impact statement preparation notice for the revised master plan for Mauna Lani Resort in 1985, Hawaii County Police Chief Guy Paul foresaw a greater police workload as a result of general development at the resort and at other Kohala coast resorts, with perhaps the need for the establishment of a police substation that would require capital outlays as well as the cost of additional personnel and equipment. Such costs would be covered by revenue generated by the proposed Ritz-Carlton Mauna Lani and other resort development in West Hawaii.

In a more recent response (see letter from Police Department dated November 7, 1986 in Chapter XI), the Police Department predicted an increase in criminal activity associated with growth, as well as an increase in requests for police services in the resort area. The reader is referred back to section 2.2.7.2.1 of this report for a more detailed discussion of potential crime impacts.

It is expected that demands on County police services will be partially offset by on-site services provided by hotel security personnel. As the resident population increases in the study area as a result of employee immigration, the need for more police personnel will have to be evaluated in the context of a County Police Department needs assessment.

6.4 FIRE PROTECTION

6.4.1 Existing Services and Facilities

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

The County of Hawaii had contracted with Pan Pacific Construction Company to build a fire station at the Mauna Lani Resort. Funding for the facility was provided by municipal bonds floated by the County. By agreement between the County and the Kohala Coast Resort Association, the association will pay the principal and interest on the bonds. The groundbreaking ceremony for the new fire station took place in April 1987. The new \$1.1-million emergency facility will be located on a 1.1-acre parcel of land about one mile north of Mauna Lani Resort, makai of Queen Kaahumanu Highway, and 2.5 miles south of Puako. The facility will include a fire station and a police substation. An emergency medical service vehicle will also be stationed at the new facility. The fire station is planned to become operational by the end of 1987.

6.4.2 Probable Impacts

The construction of the Ritz-Carlton Hotel at Mauna Lani Resort will lead to increased demand for fire protection services and facilities. It is anticipated, however, that construction of the Ritz-Carlton Mauna Lani will not cause fire protection problems given the construction of the new fire station described above and provided that the hotel design and construction comply with current County fire and building codes and requirements. When the Kohala Coast Fire Station becomes operational, response time to emergencies will be greatly reduced from 40 minutes to about 5 minutes.

Regional population growth, indirectly attributable to the project, is also expected to place greater demand upon fire protection services.

6.5 WATER SUPPLY

6.5.1 Existing Conditions

A preliminary analysis of municipal water supply and demand in the South Kohala district was completed by the U.S. Army Corps of Engineers in 1984. Within the South Kohala district, water demand could increase from 2.5-million gallons per day (mgd) to 20 mgd by 2010. The principal cause for increased demand is resort development along the coast. The present supply could be augmented by private development of groundwater. The development of groundwater is regulated by the State of Hawai'i, Department of Land and Natural Resources, Division of Water and Land Development. Approval from the State Department of Health must also be obtained.

The principal current sources of water for the coastal region of the South Kohala district are the Lalamilo water system operated by the County of Hawaii, which services the Mauna Lani Resort, within which the Ritz-Carlton Hotel will be located, and the private Waikoloa water system.

In January 1979, an agreement was signed by the County of Hawaii, Mauna Loa Land, Inc. (the predecessor of Mauna Lani Resort, Inc.) and Olohana Corporation (the predecessor of Mauna Kea Properties, Inc.) to develop a water system utilizing groundwater from the State-owned tract of land known as Lalamilo.

Mauna Lani Resort, Inc.'s reserved water allocation from the system is currently 1.0-million gallons a day (mgd) from Well A and 0.5 mgd from Well B/C. Well D has been drilled, but has not yet been outfitted with a pump. The pump will be installed when development at Mauna Lani Resort necessitates more potable water than can be obtained from wells A and B/C. The results of pump testing for Well D have been submitted to the County of Hawaii. When the well becomes functional, it is expected to yield 1.44 mgd, 1.3 mgd of which will be allocated to Mauna Lani Resort, Inc.

To accommodate projected increasing demand for potable water, five well sites have been designated on Parker Ranch land. Should exploration be successful, four of these wells will serve the water needs of further development at Mauna Lani Resort.

6.5.2 Probable Impacts

No public funds will be expended to provide potable water for the proposed project. Mauna Lani Resort confirms that The Ritz-Carlton Hotel Company will satisfy its demand for water through participation in the Lalamilo water system.

Mauna Lani Resort currently uses about 0.5 mgd (million gallons per day) of potable water, and thus has in reserve an additional 1.0 mgd from Wells A and B/C. An analysis of potable water requirements at Mauna Lani Resort was done in 1985 in conjunction with the preparation of the Mauna Lani Resort revised master plan EIS. Projections were made for domestic and irrigation water demand based on rates of 500 gpd (gallons per day) for each hotel unit and 6,425 gpd per acre. Using these same rates, the 650 hotel units (450 units initially and 200 additional units by 1998) and the grounds at the

32-acre Ritz-Carlton site will require 0.53 mgd of potable water. This amount is well within Mauna Lani Resort's remaining allotment of 1.0 mgd, although it should be noted that actual potable water usage at Ritz-Carlton Mauna Lani may vary from that which is projected.

Water withdrawal from the Lalamilo water system for Ritz-Carlton hotel development is not expected to affect agricultural uses in the surrounding area. There is no evidence that groundwater withdrawal from the Lalamilo wells has had an adverse impact on other water sources.

As a secondary impact, increased population in the study area associated with employment at the proposed Ritz-Carlton will lead to increased water demand in Kohala and Kona communities. This demand, indirectly generated by Ritz-Carlton Mauna Lani development, will be part of a much larger demand generated by other residential, commercial, and industrial projects planned for West Hawaii. Water sources, storage and delivery systems are expected to be developed by both public and private entities. There is currently no surplus capacity to supply Waimea town demand, for example. An exploratory well drilling program is being pursued by the Division of Water and Land Development at three well sites. If the exploration is successful, potable water may be made available to current and future residents of the Waimea area.

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6.6 WASTEWATER TREATMENT AND DISPOSAL

6.6.1 Existing Conditions

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

6.6.2 Probable Impacts

The existing wastewater treatment facility at Mauna Lani Resort has a design capacity of 0.76 mgd and can be expanded to handle 2.1 mgd. Cumulative flow is currently less than 0.2 mgd, a fraction of what the existing wastewater treatment facility is designed to accommodate.

Based on 100 percent unit occupancy and a sewage generation rate of 450 gpd/unit (90 percent of average domestic water use, excluding irrigation), the 450 units at the Ritz-Carlton Mauna Lani will generate 202,500 gpd. The additional 200 units to be built by 1998 will generate another 90,000 gpd, for a project total of 0.29 mgd, well within the remaining existing design capacity of the Mauna Lani Resort wastewater treatment plant.

6.7 SOLID WASTE DISPOSAL

6.7.1 Existing Conditions

The Kailua landfill is located at Kealakehe, near Kailua-Kona, and will serve the North Kona and South Kohala coastal area until it reaches capacity (projected to be in 1990). The County Sewers and Sanitation Bureau has plans to develop a new 300-acre public sanitary landfill at Puuanahulu, east of Mamalahoa Highway in North Kona. The new site is expected to be operational in about three years, and would accommodate solid waste generated by planned resort development in South Kohala (Kuba; March 24, 1987).

6.7.2 Probable Impacts

Solid waste generated at the Ritz-Carlton is expected to be collected by a private contractor and accommodated at the landfill site mentioned above or at other County operated landfills as new sites are designated.

6.8 ELECTRICAL POWER AND COMMUNICATIONS

6.8.1 Existing Conditions

Electrical power for the island of Hawaii is provided by Hawaii Electric Light Company, Inc. (HELCO); its system has a total firm capacity of 26 megawatts (Letter of December 24, 1986 from HELCO in Chapter XI). To decrease dependence on imported oil, HELCO continues to support the development of alternate energy sources. A private enterprise plans to develop a new geothermal plant by 1989. Also, private companies are studying the feasibility of developing hydroelectric power at stream sites along the Hamakua coast.

Following are HELCO's projections of power generated by type of resource, renewable and non-renewable:

<u>Energy Projection</u>		
<u>Source</u>	<u>% 1986</u>	<u>% 1993</u>
Biomass	41	30
Fossil	53	40
Geothermal	3	25
Hydroelectric power	2	3
Wind	1	2
TOTAL	100	100

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

6.8.2 Probable Impacts

Electrical power to Mauna Lani Resort is supplied by HELCO and the resort distribution system is through underground conduits, which extend to the resort under the major roadways. It is expected that the Ritz-Carlton Mauna Lani will be connected to the resort electrical power system when the hotel becomes operational.

HELCO recommends that the proposed hotel take advantage of waste heat recovery equipment to recycle and reuse waste heat rejected by the hotel's air conditioning and refrigeration equipment. A conversation with the project architects (January 14, 1987) confirms that the operator will consider the use of waste heat recovery equipment to reduce the cost of operation and the amount of propane or oil that must be burned onsite to support its operation.

Telephone service at the Ritz-Carlton Mauna Lani will be part of the Mauna Lani Resort system. The Ritz-Carlton Hotel Company will take into consideration a suggestion from Hawaiian Telephone (letter of November 10, 1987 in Chapter XI) that the developer contact Hawaiian Telephone's planning consultants during the facility planning stage to review requirements of the installation of a telephone system.

7.0 RECREATIONAL FACILITIES

7.1 EXISTING FACILITIES

Kohala and North Kona recreational facilities include golf courses, tennis courts, beaches, riding stables, historic sites, small boat harbors, and other amenities and attractions. The County's Samuel Spencer Beach Park and the Hapuna Beach State Recreation Area are the principal developed recreational facilities in the immediate vicinity of the Ritz-Carlton Mauna Lani. They offer white sand beaches, picnic and camp grounds, and restroom and parking facilities. Recreational facilities are also available at Mauna Lani Resort, Mauna Kea Resort, and Waikoloa Resort.

At Mauna Lani Resort, a public right-of-way provided by Mauna Lani Resort leads to the shoreline fronting the Mauna Lani Bay Hotel. Rocky shoreline areas and beaches, as well as waters offshore, are used by the public and resort guests. Recreational activities include fishing, squidding, limu gathering, swimming, snorkeling, scuba diving, sunbathing, beachcombing, surfing, windsurfing and sailing.

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

The shoreline area of the proposed Ritz-Carlton Mauna Lani site is accessible through an unimproved shoreline pedestrian trail. It is currently not easily accessible by vehicle and is used mostly by Mauna Lani Resort employees for picnicking and fishing. According to the State Department of Land and Natural Resources, there are no known shoreline recreation resources of significant value at Pauoa Bay (Letter of January 8, 1987 in Chapter XI).

7.2 PROBABLE IMPACTS

Use of offsite recreational facilities on the island of Hawaii will increase as a result of the Ritz-Carlton Mauna Lani development. Although visitors to the hotel are expected to remain mostly at Mauna Lani Resort to take advantage of golf, tennis and water recreation amenities, they are also expected to make some trips to recreational facilities offsite. However, because of the ample existing and planned facilities at Mauna Lani Resort, the burden on public recreational facilities offsite as a result of increased visitor population is not expected to be significant. Immigrant workers (about 30 to 105 in 1990 and 125 to 145 in 1998) and their families will contribute to the demand for recreational facilities on the island and will increase use of existing facilities.

Development of the Ritz-Carlton Mauna Lani hotel site according to the proposed plan will improve onsite shoreline recreational amenities. The construction of the swimming lagoon and improvements to the beach area will provide safe sandy beach areas for visitors and residents. At the same time, the project will probably lead to the decreased use of the shoreline by fishermen who seek a more solitary environment.

Pedestrian access to the Ritz-Carlton Mauna Lani shoreline area at Pauoa Bay and its recreational amenities will improve. The pedestrian trail which skirts the shoreline along Mauna Lani Resort's seaward boundary will be raked and cleaned at the project site, retaining its natural character; it will be rerouted around the proposed swimming lagoon. Mauna Lani Resort plans to develop a public shoreline park adjacent to the Ritz-Carlton hotel site which will include public parking. The new public park north of Pauoa Bay is projected for completion at about the same time as the Ritz-Carlton Mauna Lani. Pedestrians will have access to the Ritz-Carlton site through the pedestrian shoreline path which will extend from the public park area to the Pauoa Bay shoreline. Resort guests and others at Pauoa Bay will have improved access to the Puako petroglyphs north of the public shoreline park.

There are no surf sites within Pauoa Bay, where shoreline improvements construction will occur. However, there are seasonal surf sites out off both the north and south points of the project site. Mauna Lani Resort staff reports that these surf sites are suitable for surfing only during a few days in the winter when northwest swells are large enough. It is expected that there will be no impact on these surf sites, which are outside the embayment, due to construction activities within the bay. There will be a beneficial impact after completion of the hotel and public beach park projects, due to increased accessibility to the surf sites.

The Hawaii County Department of Parks and Recreation has a target ratio of five acres of developed park land for every 1,000 resident population. This ratio is noted in the County Park Dedication Ordinance. No onsite permanent population will be generated by the proposed hotel development. Immigrant operational period workers and their families are expected to account for up to about 700 new island population. There is enough park and recreation land and developable within Mauna Lani Resort and offsite to accommodate these new residents.

8.0 VISUAL IMPACTS

8.1 VISUAL CHARACTER OF THE PROJECT SITE

The Ritz-Carlton Hotel site encompasses 32 acres of land fronting Pauoa Bay within the Mauna Lani Resort. The proposed facility will be located approximately 8,400 feet (1.6 miles) from Queen Ka'ahumanu Highway, the nearest public highway which will provide a view of the property, and approximately 4,200 feet (.8 mile) from the intersection of Mauna Lani Drive and Kaniku Drive, the resort's two major roadways. This geographical separation is a major factor in minimizing the potential visual impact of the proposed facility.

The general character of the project site is a wide, spacious area gently sloping up from the pristine shoreline of Pauoa Bay. The topography of the entire parcel is relatively uniform with no prominent variations in elevation.

8.2 EXPECTED VIEWS OF THE HOTEL FROM THE HIGHWAY AND SHORELINE

The Ritz-Carlton Hotel will be located on the seaward portion of a 32-acre parcel. Approaching the hotel from the landward side, the six-story guest wings of the structures will be visible, but somewhat concealed from view by the single story port-cochere which will be built on a gentle rise at an elevation equal to the third or fourth floors of the hotel. The cumulative effect will be a low-rise entrance with large, Hawaiian-style roofs that gives way to a spacious central courtyard looking out to the ocean, with a guest wing on either side. The surrounding landscaping and water features will contribute to the overall spaciousness and low-density ambiance of the facility.

From the ocean, the hotel will be framed against the gently sloping land extending nearly two miles back to the highway and beyond. The continuous slope of Mauna Kea creates the distant horizon, providing a relatively continuous background devoid of individual features such as prominent hills or cinder cones.

Beginning at the public shoreline park at the northern end of Mauna Lani Resort, a public access pathway will extend south along the shoreline. Passing makai of the golf course which borders the proposed hotel on the north, the path will reach Pauoa Bay, revealing the first view of the Ritz-Carlton property. The pathway will extend along the bayfront between a large water feature fronting the northern guest wing and the shoreline. At the center point of the bay's shoreline, the view of the hotel will include the central courtyard and pool area, with a guest wing on either side. Passing the hotel, the pathway will continue south around the rear of the proposed swimming lagoon and to the front of Keanapou fishpond. Beyond the fishpond, at the southern point of Pauoa Bay, the Mauna Lani Bay Hotel will come into view to the south about a half mile away.

The overall visual effect will be of a elegant, open-ended structure situated among stately palm trees and surrounded by extensive landscaping and water features. The choice of colors and texture for the hotel will contribute significantly to the appearance and impact of the structure from Queen Ka'ahumanu Highway. Earth or vegetation tones would help to blend the structure more completely with the surrounding landscaping.

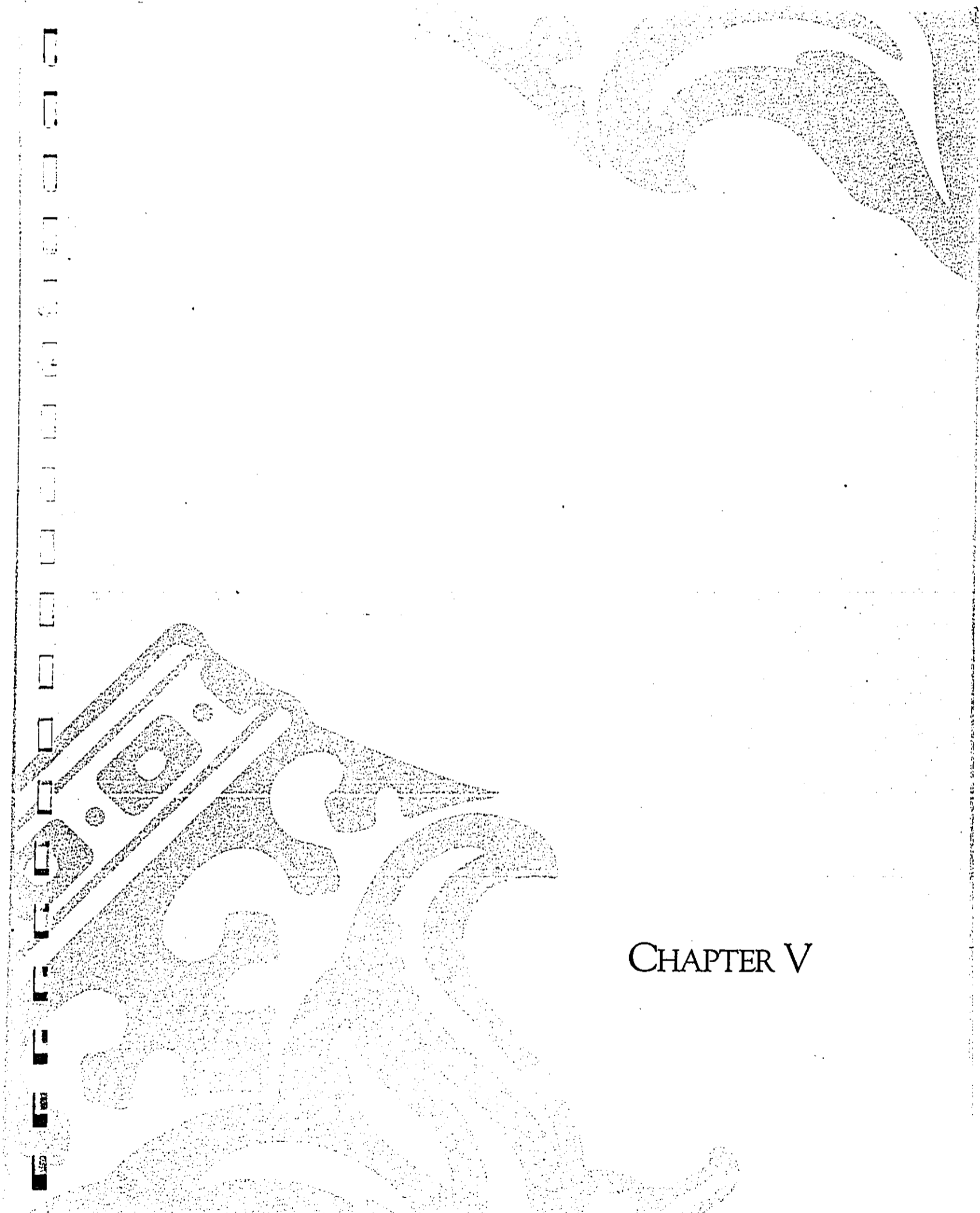
8.3 VISUAL IMPACTS OF THE DEVELOPMENT

The Mauna Lani Resort contains over 3,000 acres of land situated makai of the Queen Ka'ahumanu Highway. The resort presently contains the Mauna Lani Bay Hotel: a six-story, 351-room luxury-class facility; an 18-hole golf course; the 80-unit Mauna Lani Terrace condominiums; a tennis and beach club; and the 116-unit Mauna Lani Point condominium project; as well as various support service facilities including a sewage treatment plant; all located within a 778-acre central core area. From the Queen Ka'ahumanu Highway, the most striking feature of the resort is the lush green landscaping creating the appearance of an oasis in the midst of the surrounding barren lava fields. The Mauna Lani Bay Hotel rises just above the palm trees surrounding it, but because of the great distance of the facility from the highway (nearly two miles), it has a minimal visual impact.

The proposed Ritz-Carlton Hotel constitutes a single new component of this vast resort complex. Located approximately 2,400 feet north of the Mauna Lani Bay Hotel, it will appear from the highway as a distant low-rise structure on the northern fringe of the resort's central core area.

Approaching the intersection of Mauna Lani Drive and Queen Ka'ahumanu Highway, the resort entrance, and looking west toward the Ritz-Carlton property, the view will include the existing light industrial service area, located along Kaniku Drive just under one mile from the highway and buffered by extensive landscaping. Beyond the service area, a new 18-hole golf course will extend seaward nearly 3/4 of a mile, virtually surrounding the Ritz-Carlton property. Consequently, the hotel will appear to be an extension of the existing resort area, thereby further reducing its overall visual impact.

However, it is acknowledged that views of the project site will be changed considerably, particularly from the shoreline where hotel structures will be noticeably visible. The shoreline area is planned to remain as natural looking as possible, but most of the project site will be landscaped, replacing existing vegetation and bulldozed barren or sparsely vegetated lava.



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CHAPTER V

CHAPTER V

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

1.0 STATE LAND USE LAW

All lands in the State have been placed in one of four land use districts (Urban, Agriculture, Conservation, or Rural) by the State Land Use Commission (SLUC). State Land Use District Boundary Reviews are undertaken by the State Land Use Commission to update its Land Use District Maps. Besides this SLUC-initiated review, provisions for applicant-initiated amendments to the district boundaries have been established in Section 205-4 of the Hawai'i Revised Statutes (HRS), and further promulgated in the State Land Use Commission: Rules of Practice and Procedure and District Regulations (12-21-75 as amended).

The site of the proposed Ritz-Carlton Mauna Lani project is in Urban designated land.

2.0 CONSERVATION DISTRICT RULES

The administrative rules of the Hawai'i State Department of Land and Natural Resources (June 1981) Title 13, Chapter 2 (formerly Regulation No. 4) govern land use within the conservation district and provide for four categories, or subzones. The Ritz-Carlton Hotel Company proposes use of the State-owned conservation district land fronting the property site and including the Keanapou Fishpond adjacent to the proposed shoreline improvements. The actions for which it seeks approval from the Board of Land and Natural Resources are summarized below and following that is a discussion of the relationship of the proposed project to the conservation district rules.

2.1 PROPOSAL FOR THE CONSERVATION DISTRICT

As established by State Law, all property located makai of the certified shoreline is designated Conservation. In conjunction with the proposed hotel development, three projects are proposed which are located below the shoreline or in the nearshore area:

- (1) excavation of a seawater swimming lagoon;
- (2) restoration of an existing anchialine pond; and
- (3) improvement of a portion of the existing shoreline beach.

Although described separately below, these projects are contiguous and have been designed as an integrated improvement for the southwest corner of the resort project site. The design is intended to maximize open space, improve natural circulation and flushing of the swimming lagoon, and preserve environmentally sensitive shoreline areas. A baseline study of the marine offshore area and an engineering evaluation study of the proposed improvements appear in this document as appendices. It should be further noted that the existing anchialine pond, while situated within the Urban designated district, is classified as Conservation by the State Land Use Commission. The pond has been traditionally identified as Keanapou Fishpond on various land use and tax maps. Although it lies across the Ritz-Carlton Mauna Lani hotel site boundary, it is being treated as an integral part of the overall beach development project, and is, therefore, pertinent to this document.

2.2 EXISTING SUBZONE

The proposed swimming lagoon and beach improvement projects are located within a Resource Subzone. The anchialine pond, shown as a fishpond in Figure II-3, is not given a subzone classification by the Department of Land and Natural Resources.

The objective of the Resource subzone, within which the swimming lagoon and beach restoration projects are situated, is to develop with proper management, areas to ensure sustained use of the natural resources of those areas.

Pauoa Bay is presently an underutilized recreational resource. The proposed projects will both enhance its recreational potential and contribute to the preservation and enhancement of its natural beauty. Although the lands mauka of the shoreline along Pauoa Bay are classified Urban and zoned for Resort use, the intent of the proposed shoreline projects is to help mitigate the potential impacts which adjacent urban uses may have upon Pauoa Bay and its shoreline.

2.3 PROCEDURES FOR PERMITS AND AMENDMENTS

An application for a Conservation District Use Permit for the uses discussed above was filed in February 1987 with the Board of Land and Natural Resources. This EIS is identified as part of the application materials.

2.3.1 Conditions of Conservation District Use

All allowed uses in the conservation district are subject to the conditions outlined in Section 13-2-21 of the regulations. The conditions relevant to the Ritz-Carlton Hotel's conservation district use application are shown below in quotation marks, and following each is a discussion of the proposed actions' compliance with them.

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

The proposed swimming lagoon and beach improvement projects are compatible with the character of the surrounding shoreline and beach area. Pauoa Bay is a well-formed bay that contains a wide natural beach and normally gentle offshore waves. The beach is comprised of medium grain to coarse sand and rock boulders. The applicant proposes to preserve the shoreline area, as much as possible, improve the sand beach area, and develop an inland lagoon that would focus the beach activities of the hotel away from the bay and near the hotel. The lagoon will be deep enough for swimming and have sand beach along its border for sitting and sunbathing.

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

While enhancing the recreational potential of the area, the swimming lagoon and beach improvement will significantly improve the quality of the coastal area. Although it is proposed that a swimming area be created in the bay, the primary focus of beach activities for hotel guests will be the proposed swimming lagoon. The intention is to provide a safe, easily accessible recreational area for guests relatively unfamiliar with ocean surges and currents. It is expected that more experienced swimmers will use the swimming area in Pauoa Bay. Thus, the creation of the swimming lagoon will help to redirect most recreational activities away from Pauoa Bay, thereby helping to preserve the bay area as a scenic and open space resource.

As established by the State Land Use Commission, all fishponds are classified in the Conservation District. Sources at the Mauna Lani Resort have informed the applicant that the natural fishpond is thought to have been altered in the 1930's by the then land-owner, Francis I'i Brown, to improve it for raising of mullet. Restoration of the pond will entail the removal of the dense vegetation presently surrounding it and pumping out the accumulated silt in the pond. The applicant's intent is to preserve the anchialine pond, which is a designated historic site, and restore its vitality which has been severely undermined by the accumulation of vegetation and silt over the years. The applicant has no intention of operating the pond as an active fishpond.

"(13) Clearing areas for construction purposes shall require prior approval by the chairperson, ground cover of slopes over 40% shall not be removed unless specifically authorized by the chairperson."

Approval of the clearing plan will be obtained before commencing construction. The area that would be cleared for the recreational facilities has slopes much less than 40%.

"(14) Cleared areas shall be revegetated within thirty days unless otherwise provided for in a plan on file with and approved by the department."

The provisions of this condition will be complied with.

"(15) Upon approval of a particular use by the board, any work or construction to be done on the land shall be initiated within one year of the approval of the use and all work and construction shall be completed within three years of the approval of the use."

The provisions of this condition regarding time limits will be met.

2.3.2 Guidelines for Reviewing Applications

The Board of Land and Natural Resources has set out four guidelines that it applies in reviewing applications. These are given below and the proposed actions' consistency with them are discussed following each one.

"(1) All applications shall be reviewed in such a manner that the objectives of the subzone or subzones are given primary consideration."

The subzone objectives are discussed in Section 2.2 of this Chapter, and the actions proposed are consistent with them.

"(2) All applications shall be reviewed so that any physical hazard, as determined by the department shall be alleviated by the applicant when required by the board."

The shoreline area is subject to tsunami inundation. No structures will be located within the Conservation District.

"(3) All applications for subdivision shall address their relationship with the county general plan."

No application for subdivision is being sought at this time.

"(4) All applications shall meet the purpose and intent of the State's conservation district."

The definition of "conservation" in section 1 of the DLNR Title 13, Chapter 2 rules outlines the purpose and intent of the State's conservation district:

"Conservation means a practice, by both government and private landowners, of protecting and preserving, by judicious development and utilization, the natural and scenic resources attendant to land, including territorial waters within the State, to ensure optimum long-term benefits for the inhabitants of the State."

The proposed actions are in accord with this definition. The proposed swimming lagoon and beach improvement would be a means of judiciously developing natural resources for recreational use by both State residents and visitors. These are considered the optimum long-term beneficial uses of this conservation land.

3.0 HAWAII STATE PLAN

The Hawai'i State Plan (Hawai'i, State of, Department of Planning and Economic Development, 1978) consists of a series of broad goals, objectives and policies which are to act as the guidelines for the growth and development of the State. In general, the proposed action is consistent with the overall intent of the State Plan. Discussed below are the specific goals, objectives, policies, and priority actions contained in Part I and Part III of the State Plan which are thought to be most directly related to the proposed project.

3.1 PART I: OVERALL THEMES, GOALS, OBJECTIVES, AND POLICIES

"Section 226-4 State Goals

- (1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.
- (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people."

The proposed project is consistent with the goals of the State Plan. Resort development in the South Kohala district will provide new employment opportunities and enhance economic development. The construction and operation of a new hotel will bring job opportunities to nearby residential communities and will contribute to the growth of much needed commercial development. Urban development on unusable land characterized by barren lava flows does not encroach upon other types of land uses and affords the opportunity to create a physical environment which will greatly enhance the area's ecosystem. While unique flora will be preserved and allowed to flourish, innovative landscaping and design will provide new habitats for native flora and fauna which would otherwise be unable to survive in the arid climate. The end result will be the development of a well-designed, aesthetically pleasing environment providing previously unavailable recreational opportunities to visitors and area residents alike.

"Section 226-5 Population

- (a) OBJECTIVE: It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.
- (b) To achieve the population objective, it shall be the policy of this State to:
 - (2) Encourage an increase in economic activities and employment opportunities on the Neighbor Islands consistent with community needs and desires.
 - (3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

- (7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area."

At a time when employment opportunities are decreasing in the agricultural sector of Hawaii's economy, opportunities are increasing in the visitor industry. The development of the Ritz-Carlton Hotel will contribute to the growth of the Mauna Lani Resort, a major visitor destination area for South Kohala that is consistent with the communities' desire and need as demonstrated in the County General Plan. Resultant primary and secondary employment at the resort will provide new opportunities for socio-economic growth and development. The coordinated planning and development of the proposed hotel and its accompanying infrastructure will result in the optimal use of land and water resources.

"Section 226-6 Economy - General

- (a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:
- (1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.
- (b) To achieve the general economic objectives, it shall be the policy of the State to:
- (6) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.
 - (8) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.
 - (10) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.
 - (13) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy.
 - (14) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy."

Development of the Ritz-Carlton Hotel will provide new employment opportunities in the West Hawaii area. Construction of facilities is expected to occur over a period of two years initially and another two years when the additional units are built, thereby contributing to sustaining a healthy level of construction activity on the island of Hawaii. Both hotel/resort and construction employment have favorable financial multiplier effects. Due to the decline of the sugar industry in North Kohala, local unemployment rates have been higher than statewide rates. Direct and indirect employment related to the Ritz-Carlton Hotel will contribute to alleviating this problem.

"Section 226-7 Economy - Agriculture

- (a) **OBJECTIVE:** Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:
- (1) Continued viability in Hawaii's sugar and pineapple industries.
 - (2) Continued growth and development of diversified agriculture throughout the State.
- (b) To achieve the agricultural objectives, it shall be the policy of this State to:
- (8) Expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.
 - (11) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment."

Local agricultural products are featured at the Mauna Lani Resort food service establishments where, very often, visitors are first introduced to some of these products. The development of the Ritz-Carlton Mauna Lani will provide a new, expanded market for local fruits, vegetables, fish, meat and beverages. At the same time, development of the Ritz-Carlton Hotel will not decrease the inventory of agriculturally suitable lands. The entire project site is covered with aged pahoehoe lava and unsuited to agricultural use, particularly if left unirrigated.

"Section 226-8 Economy - Visitor Industry

- (a) **OBJECTIVE:** Planning for the State's economy with respect to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.
- (b) To achieve the visitor industry objective, it shall be the policy of this State to:
- (1) Support and assist in the promotion of Hawaii's visitor attractions and facilities.
 - (2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.
 - (3) Improve the quality of existing visitor destination areas.
 - (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.

- (5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people.
- (6) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.
- (7) Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.
- (8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values."

The Ritz-Carlton Mauna Lani intends to maintain the high standards of operation established by the Mauna Lani Resort and which are characteristic of other Ritz-Carlton hotels. These include low-density development and the careful blending of hotel structures and amenities into the natural surroundings.

Due to the luxury character of the hotel and its extensive landscaping, the ratio of employees to hotel guests will exceed the average for visitor facilities in Hawaii. The Ritz-Carlton Hotel Company will provide training for employees and further local opportunities for employment.

The goods and services required by the hotel will generate a positive economic benefit for businesses in the region, island and statewide. Businesses stimulated by the new hotel will, in turn, contribute to further economic growth and new opportunities for employment.

Finally, the success of the Ritz-Carlton Mauna Lani will depend in part upon the ability to preserve the scenic beauty of the area. To that end, preservation and enhancement of the natural resources on and around the project site will be a matter of great importance and concern during the construction and operation of the facility.

"Section 226-11 Physical Environment - Land-Based, Shoreline, and Marine Resources

- (a) **OBJECTIVE:** Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:
 - (1) Prudent use of Hawaii's land-based, shoreline, and marine resources.
 - (2) Effective protection of Hawaii's unique and fragile environmental resources.
- (b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:
 - (1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.

- (2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
- (3) Take into account the physical attributes of areas when planning and designing activities and facilities.
- (4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- (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.
- (9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes."

The site of the proposed hotel is located at Pauoa Bay, a pristine body of water fronted by a natural coarse-grained sand and rock beach. The facility, its surrounding landscaping and recreational amenities will all be designed to enhance and protect the existing environment. The creation of a swimming lagoon is intended to focus beach activities away from Pauoa Bay in an effort to reduce impacts upon the shoreline and marine resources. Preservation and restoration of the existing fishpond represents an attempt to integrate compatible natural resources into the overall design of the hotel facility. The public access path along the entire shoreline of Mauna Lani Resort will cross the seaward portion of the project site, thereby providing increased public access to the area.

"Section 226-12 Physical Environment - Scenic, Natural Beauty, and
Historic Resources

- (a) **OBJECTIVE:** Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multicultural/historical resources.
- (b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:
 - (1) Promote the preservation and restoration of significant natural and historic resources.
 - (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
 - (4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.

- (5) Encourage the design of developments and activities that complement the natural beauty of the islands."

Data recovery will be made from the four historic sites identified on the Ritz-Carlton property and the fishpond will be restored. Furthermore, the applicant is committed to the preservation and enhancement of the natural features associated with the project site including, but not limited to, the shoreline and mountain vistas and the natural character of Pauoa Bay.

"Section 226-13 Physical Environment - Land, Air, and Water Quality

- (a) **OBJECTIVE:** Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:

- (1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.
- (2) Greater public awareness and appreciation of Hawaii's environmental resources.

- (b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:

- (2) Promote the proper management of Hawaii's land and water resources.
- (3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.
- (6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.
- (7) Encourage urban developments in close proximity to existing services and facilities.
- (8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors."

The design, construction and management of the Ritz-Carlton Mauna Lani will be in keeping with the standards established for the Mauna Lani Resort and characteristic of all Ritz-Carlton hotels. Landscaping will be designed to intercept and minimize on-site drainage into Pauoa Bay. Construction plans for the proposed swimming lagoon and beach improvement projects will focus on reducing long term impacts on coastal water quality and mitigating short term impacts wherever practicable. The Ritz-Carlton Hotel will utilize existing services and support facilities at the Mauna Lani Resort and will enhance the existing urban development in the area.

"Section 226-15 Facility Systems - Solid and Liquid Wastes

- (a) **OBJECTIVE:** Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:
- (1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.
 - (2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.
- (b) To achieve solid and liquid waste objectives, it shall be the policy of this State to:
- (1) Encourage the adequate development of sewerage facilities that complement planned growth."

The design capacity of the existing wastewater treatment plant planned to serve the entire Mauna Lani Resort is 0.76 million gallons per day (mgd) and is expandable to 2.1 mgd. Cumulative flow at the resort is currently under 0.2 mgd. Based on 100 percent occupancy and a sewage generation rate of 450 gpd/unit, the ultimate 650 units at the Ritz-Carlton Mauna Lani will generate 0.29 mgd. The needs of the Ritz-Carlton will be fully accommodated by the existing facility's planned capacity.

"Section 226-16 Facility Systems - Water

- (a) **OBJECTIVE:** Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.
- (b) To achieve the facility systems water objective, it shall be the policy of this State to:
- (1) Coordinate development of land use activities with existing and potential water supply.
 - (6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs."

The Ritz-Carlton Hotel will utilize the Lalamilo water resources developed by the Mauna Lani Resort. The resort currently has access to adequate potable water supplies to meet resort demand in the short term. Four new well sites have been designated and it is expected that new wells will be developed as new resort facilities such as the Ritz-Carlton are built, and demand for water increases.

"Section 226-18 Facility Systems - Energy/Telecommunications

(c) To further the energy objectives, it shall be the policy of this State to:

- (3) Promote prudent use of power and fuel supplies through conservation measures including education and energy-efficient practices and technologies."

The design, construction and operation of the Ritz-Carlton Hotel will utilize the most appropriate energy technologies and conservation methods.

"Section 226-19 Socio-Cultural Advancement - Housing

(a) OBJECTIVE: Planning for the State's socio-cultural advancement with regard to housing shall be directed towards achievement of the following objectives:

- (1) Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals.
- (2) The orderly development of residential areas sensitive to community needs and other land uses.

(b) To achieve the housing objectives, it shall be the policy of this State to:

- (1) Effectively accommodate the housing needs of Hawaii's people.
- (2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.
- (3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.
- (5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.
- (6) Facilitate the use of available vacant, developable, and under-utilized urban lands for housing.
- (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."

Recognizing that the development of the Ritz-Carlton Hotel will further stimulate economic and population growth in the region, Mauna Lani Resort is presently engaged in discussions with County authorities focused on identifying appropriate alternatives for the provision of employee housing to serve the needs of the employees of the Ritz-Carlton Mauna Lani. Development of employee

housing within existing urban areas that is consistent with the culture and values expressed in the surrounding community will contribute to the lessening of demand for housing in the community. The specific method of providing employee housing to meet future demand will be determined by the current negotiations.

"Section 226-23 Socio-Cultural Advancement - Leisure

- (a) **OBJECTIVE:** Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.
- (b) To achieve the leisure objective, it shall be the policy of this State to:
 - (4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historic, geological, or biological values while ensuring that their inherent values are preserved.
 - (5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.
 - (10) Assure adequate access to significant natural and cultural resources in public ownership."

The identification and preservation of appropriate historic and natural resources onsite will further the public's understanding of their historic, cultural and scientific significance. Development of the proposed swimming lagoon and the beach improvement project will increase recreational opportunities in the area without compromising the integrity of the natural coastal resources at Pauoa Bay. A shoreline access path along the seaward portion of the project site will improve public access to Pauoa Bay from the nearby shoreline park.

"Section 226-25 Socio-Cultural Advancement - Culture

- (a) **OBJECTIVE:** Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.
- (b) To achieve the cultural objective, it shall be the policy of this State to:
 - (1) Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii."

Data will be recovered from four archaeological sites deemed to be significant for their informational content. The historic fishpond will be restored and preserved.

3.2 RELATIONSHIP OF PROPOSED ACTION TO THE STATE PLAN PRIORITY GUIDELINES

The Priority Guidelines of the Hawai'i State Plan are established to provide overall guidelines to address areas of statewide concern. The proposed action is generally consistent with the general intent of the guidelines. Discussed below are the specific Priority Guidelines what are thought to be most directly related to the proposed project.

"Section 226-103 Economic

(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:

(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:

(A) An industry that can take advantage of Hawaii's unique location and available physical and human resources.

(B) A clean industry that would have minimal adverse effects on Hawaii's environment.

(C) An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs.

(D) An industry that would provide reasonable income and steady employment."

Development of the Ritz-Carlton Hotel will contribute to construction employment over a period of at least four years, permanent full-time and part-time operational jobs, and will stimulate the growth of employment in sectors of Hawaii's economy other than the visitor industry. As part of a major visitor destination area, the Ritz-Carlton Hotel will make a significant contribution to the economy of Hawaii County while having a relatively negligible physical impact on the environment.

"(b) Priority guidelines to promote the economic health and quality of the visitor industry:

(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawaii's residents and visitors.

(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provides for adequate shoreline setbacks and beach access.

(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.

- (5) Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions."

Following the high standards established by the Mauna Lani Resort and the Ritz-Carlton Hotel Company, the Ritz-Carlton Mauna Lani will promote visitor satisfaction by offering luxury-class facilities and services that are carefully and sensitively integrated into the natural beauty of the Mauna Lani Resort environment. The low-density character of the facility, with its lush tropical landscaping, will conform to relevant State and County zoning and other regulations. The quality of the hotel development will be further enhanced by its commitment to providing long-term employment and advancement opportunities to its employees.

"(e) Priority guidelines for water use and development:

- (1) Maintain and improve water conservation programs to reduce the overall water consumption.

(f) Priority guidelines for energy use and development:

- (2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy."

The Ritz-Carlton Hotel will implement appropriate conservation programs with regard to water and energy use in a manner consistent with the policies of the Mauna Lani Resort and governmental guidelines.

"Section 226-104 Population Growth and Land Resources

- (a) Priority guidelines to effect desired statewide growth and distribution:
- (b) Priority guidelines for regional growth distribution and land resource utilization:
 - (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.
 - (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.
 - (13) Protect and enhance Hawaii's shoreline, open spaces, and scenic resources."

The development of the Ritz-Carlton Hotel at Mauna Lani Resort will focus new growth in an existing urban area with no significant potential for alternative uses. This implements the policy of maximizing the use of limited land resources. Furthermore, the use of existing infrastructure for water and waste disposal will reduce the need for public expenditures to provide similar services. Finally, the design and construction of the facility will protect and enhance the shoreline, open spaces and scenic resources of the area.

"Section 226-106 Affordable 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."

The provision of affordable housing, especially for employees of the Ritz-Carlton, is a concern that can be adequately addressed through a close working relationship between the resort's owners and the appropriate agencies of the County and State. Working together, the specific needs can be readily identified and appropriate responses and development plans can be formulated which will provide new housing opportunities in the region.

4.0 STATE FUNCTIONAL PLANS

State functional plans are intended to provide more detail to the Hawai'i State Plan in twelve specific areas of concern - agriculture, conservation lands, education, higher education, energy, health, historic preservation, housing, recreation, tourism, transportation, and water resources development. As defined in the Hawai'i State Plan (section 2-10), a functional plan sets forth "the policies, programs and projects designed to implement the objectives of a specific field of activity when such activity or program is proposed, administered, or funded by an agency of the State." The twelve State functional plans were examined to determine the relationship of the proposed Ritz-Carlton Hotel project to each.

4.1 STATE AGRICULTURE FUNCTIONAL PLAN

Nearly the entire 32-acre project site is aged basalt lava that is either barren or has a sparse vegetation cover of grass and kiawe. The entire parcel is designated as Urban by the State Land Use Commission, and is not considered suitable for cultivation. It is not designated as important agricultural land on the ALISH (Agricultural Lands of Importance to the State of Hawaii) map of the area. Subsequently, the implementing actions of the State Agriculture Functional Plan do not pertain either directly or indirectly to the proposed project.

4.2 STATE CONSERVATION LANDS FUNCTIONAL PLAN

There are several implementing actions in the State Conservation Lands Functional Plan (Hawaii, State of, Department of Land and Natural Resources, June 1984) that are relevant to the proposed project, and these are discussed below. Related discussions are also found in the section of this chapter which discusses the Conservation District. This functional plan addresses more than officially designated Conservation District lands, and includes (among a lengthy list) shoreline areas under the coverage of the plan.

"A(1)(c) IMPLEMENTING ACTION: Review the various rules and regulations and permit systems applicable to Conservation District lands for possible simplification and/or consolidation for effective and efficient management controls and compliance with the Coastal Zone Management program."

This implementing action is addressed largely to DLNR, but the issue of compliance with the CZM program is relevant to any shoreline project. On February 19, 1987, a detailed Coastal Zone Management Assessment was submitted to the DPED for review. The purpose of the submittal was to present a detailed evaluation of the the proposed project's relationship to the specific policies of the Coastal Zone Management program. On June 16, 1987, DPED determined that the project is consistent with the Hawaii CZM Program.

"A(1)(d) IMPLEMENTING ACTION: Provide for effective enforcement of rules and regulations and permit system applicable to the Conservation District."

The proposed project will follow the rules and regulations applicable to the Conservation District Use permit system.

"A(1)(e) IMPLEMENTING ACTION: Review applications for use of Conservation lands to control impacts on natural and cultural resources."

This EIS document will allow extensive review by government agencies and the public. Adequate control of impacts on natural and cultural resources can be assured through the conditions placed on the various permits/approvals which the proposed Ritz-Carlton Hotel will require.

"C(2)(b) IMPLEMENTING ACTION: Encourage and support local participation in conservation planning and programming as provided for in the Soil and Water Conservation Districts programs."

Construction of the proposed hotel facility will adhere to all applicable polices and guidelines of the Mauna Kea Soil and Water Conservation District, within which the project is located. Specific construction techniques, as well as proposed landscaping and drainage systems, are intended to minimize soil erosion and prevent the deterioration of water quality on-shore and off-shore.

"C(3)(b) IMPLEMENTING ACTION: Acquire and maintain historic sites for parks and other purposes.

C(3)(c) IMPLEMENTING ACTION: Establish criteria and evaluate areas of public land with historic or natural resource value and establish management practices to ensure the protection of areas from further degradation."

Five archaeological and historic sites have been identified at the project site. The Historic Sites Section of the DLNR has determined that one site is no longer significant and that three inland sites are significant solely for their information content. The fifth site, Keanapou Fishpond, is deemed significant for its information content and as a good example of a site type, a fishpond established in an anchialine pond. The applicant will follow the mitigation plan for the sites established by the Historic Sites Section, as approved by the County Planning Department or County Planning Commission. None of the sites are recommended for acquisition and they are not in public lands.

4.3 STATE EDUCATION FUNCTIONAL PLAN

This functional plan (Hawaii, State of, Department of Education, April 1985) presents high priority implementing actions for education. All of the actions are to be undertaken by the Department of Education. Therefore, they are not applicable to the Ritz-Carlton Mauna Lani project.

4.4 STATE HIGHER EDUCATION FUNCTIONAL PLAN

There are no policies or implementing actions in this functional plan, prepared by the University of Hawaii (June 1984) of direct relevance to the Ritz-Carlton project.

4.5 STATE ENERGY FUNCTIONAL PLAN

The State Energy Functional Plan (Hawaii, State of, Department of Planning and Economic Development, June 1984) has as an objective the promotion of energy-efficient design. This relates both to overall land use planning and to specific building design and equipment selection decisions. While specific building designs have not yet been completed, the proposed project will adhere to energy conservation standards wherever practicable.

4.6 STATE HEALTH FUNCTIONAL PLAN

The State Health Functional Plan (Hawaii, State of, Department of Health, June 1984:5) "focuses primarily on public health programs under the jurisdiction of the State Health Department." Several of the implementing actions relate to operating Department of Health (DOH) permit/approval programs that the proposed project is subject to. These include operating the environmental impact statement process; reviewing private wastewater treatment systems; administering permit programs for discharges to the air, all surface and groundwater, and for treatment and disposal of solid wastes; reviewing plans for new sources of drinking water; and reviewing plans for air conditioning and mechanical ventilation systems for buildings that are used by the public. These topics (wastewater, air quality, water quality, potable water systems, solid waste, and approvals needed) are discussed in terms of the proposed project in various sections of the EIS. The implementing actions also express other areas of concern to the DOH, such as reuse of treated effluent, noise, and medical services, that are covered in this EIS as well. Generally, the proposed project will comply with all necessary requirements related to the Department of Health's permitting procedures.

A Section 401 Water Quality Certification application has been submitted and a public hearing is scheduled for August 4, 1987.

4.7 STATE HISTORIC PRESERVATION FUNCTIONAL PLAN

Essentially all of the policies and implementing actions in the State Historic Preservation Functional Plan (Hawaii, State of, Department of Land and Natural Resources, June 1984b) are directed at State agencies, especially DLNR. The archaeological resources at the Ritz-Carlton project site have been evaluated by the Historic Sites Section of DLNR. The applicant, with approval from the County Planning Department, will implement the mitigation plan suggested by DLNR for three inland sites and Keanapou Fishpond.

4.8 STATE HOUSING FUNCTIONAL PLAN

This State functional plan summarizes the results of the Hawaii Housing Authority (Hawaii, State of, Department of Social Services and Housing, June 1984:ii) study "to formulate a comprehensive plan for the development, operation, and management of housing within the State." Most of the policies and implementing actions apply to the government sector. There is presently no housing component contained in the proposed Ritz-Carlton project. Nevertheless, the need for employee housing and the potential impact of the proposed hotel on economic development and population growth in the general region are all matters of acute concern. The specific alternatives for the provision of employee housing are presently the subject of ongoing discussions between the Mauna Lani Resort and the appropriate County agencies.

4.9 STATE RECREATION FUNCTIONAL PLAN

The State Recreation Functional Plan (Hawaii, State of, Department of Land and Natural Resources, June 1984c) has as Policy D(2) "the securing of public accesses to resources with recreational value." The public access path intended to extend along the entire shoreline of the Mauna Lani Resort will cross the seaward portion of the Ritz-Carlton property.

Policy E(3) of the State Recreation Functional Plan aims to: "coordinate visitor and resident recreation interests to achieve compatible recreation usage." The creation of a public shoreline park adjacent to the Ritz-Carlton Hotel site by Mauna Lani Resort will provide not only specific opportunities for passive recreational activities, but will also provide parking and comfort station facilities for people who utilize the public access path along the shoreline of the entire Mauna Lani Resort, including the Ritz-Carlton property. The development of these facilities will enhance existing recreational activities in the area and facilitate greater access by visitors and residents alike.

4.10 STATE TOURISM FUNCTIONAL PLAN

The Hawai'i State Department of Planning and Economic Development (June 1984b) authored this functional plan and considers it a "guide to help coordinate the various sectors of government and private industry toward achieving statewide objectives of the Hawaii State Plan" (p. 2). The role of government in tourism is seen not only as protecting the economic health of the industry, but also as "advancing the social goals of the community" (p. 8). The policies and implementing actions which are most relevant to the private sector, and particularly to the proposed project, are those concerning physical development.

"B(2) POLICY: Improve the quality of existing visitor destination areas."

The development of the proposed Ritz-Carlton Hotel will expand recreational opportunities available to visitors at Mauna Lani Resort. The specific design proposals for both the hotel and its surrounding landscaping will greatly enhance the quality of the general area by converting an arid, relatively inhospitable and barren lava field into a lush setting of tropical vegetation and water features.

"B(3) POLICY: Encourage greater cooperation between the public and private sectors in developing and maintaining well-designed and adequately serviced visitor industry and related development."

The development of the Ritz-Carlton Hotel represents an expansion of the Mauna Lani Resort, which has been previously designated as a major visitor destination area in the County General Plan. The Environmental Impact Statement process, coupled with the detailed land use permitting process at both the State and County levels of government, provide extensive opportunities for coordination between the public and private sectors.

"B(3)(a) IMPLEMENTING ACTION: Assure that adequate infrastructure and amenities, such as roads, water, drainage and parks, are provided through a reasonable distribution of financial responsibilities between governmental and private parties."

The proposed hotel will utilize the infrastructure already in existence at the Mauna Lani Resort, thereby significantly reducing the need for new government investment in infrastructure. The necessary services and facilities presently exist to adequately serve the needs of the new hotel and its amenities.

"B(3)(c) IMPLEMENTING ACTION: Encourage private development of designated visitor destination areas where capital improvements have been made or are planned before encouraging development of other possible visitor destinations."

As an integral component of Mauna Lani Resort, the Ritz-Carlton Hotel will be a well-designed and adequately serviced development. The infrastructure within the Mauna Lani Resort has all been paid for by the developer and contributions toward the public Lalamilo water system have also been provided

by the developer. Mauna Lani Resort is a designated visitor destination area where extensive capital improvements have been made in anticipation of continued growth to fully implement the County's General Plan.

"B(3)(d) IMPLEMENTING ACTION: Encourage the clustering of hotels and resort condominium developments to provide open space and promote energy conservation."

The proposed Ritz-Carlton Hotel will be the second hotel facility developed within Mauna Lani Resort. The clustering of hotels and condominiums at Mauna Lani Resort, rather than spreading this development over the island, allows for energy conservation by promoting alternative transportation means such as walking or bicycling between the various facilities at the resort. Furthermore, the clustering of multiple resort facilities in a single area provides greater and varied recreational opportunities for resort visitors, thereby reducing the need for travel outside the resort boundaries.

"B(3)(e) IMPLEMENTING ACTION: Encourage the use of regional sewerage systems by hotel and visitor condominium developments rather than use of individual private systems."

Instead of using individual private sewage treatment systems for each development within Mauna Lani Resort, all the parcels will be connected to a resort-wide sewage system. The economies of scale and the greater efficiency of a wastewater treatment plant (WWTP) for the entire resort make it preferable to individual treatment systems for each project.

"B(4) POLICY: Ensure that visitor facilities and destination areas are carefully planned and sensitive to existing neighboring communities and activities."

The Ritz-Carlton Hotel is proposed to be built in a vacant area of the Mauna Lani Resort. As proposed, the luxury facility will be fully compatible with the existing hotel and will greatly enhance the entire resort area. The low-density character of the new hotel will contribute to the existing resort's ambiance. The proposed Ritz-Carlton Hotel has been designed to maximize open space on the property and will be well integrated into the overall architectural flavor of the resort.

"B(4)(e) IMPLEMENTING ACTION: Resort development should take place within designated visitor destination areas."

The Ritz-Carlton Mauna Lani will be within Mauna Lani Resort, which is an area designated by the County for resort development.

"B(4)(b) IMPLEMENTING ACTION: Ensure that new hotel and condominium projects be set back from the shoreline for access which facilitates and permits use of those areas."

The proposed hotel and its related amenities will be set back from the shoreline in accordance with all appropriate regulations. A public access path along the seaward portion of the Ritz-Carlton property will provide opportunities for increased access and use of areas which have been previously limited by the harsh topography of the area.

"B(4)(d) IMPLEMENTING ACTION: Plan development of resorts in a coordinated manner to minimize loss of public recreational opportunities in designated visitor destination areas."

The proposed Ritz-Carlton Hotel facilitates public access along the shoreline. Few, if any, public recreational opportunities would be lost; and public use of the shoreline would greatly increase with the beach improvement project proposed for Pauoa Bay.

"D(3)(a) IMPLEMENTING ACTION: Provide relevant information to visitors to foster their understanding of Hawaii's uniqueness in order to minimize damage of natural, historic, and archaeological resources, promote their personal safety and protection, and foster an appreciation of the contribution of Hawaii's residents to the enjoyment of the visitor's experience in Hawaii."

The preservation of the existing anchialine pond (Keanapou Fishpond), the identification of historic sites, and the tropical landscaping proposed for the area will all provide opportunities for visitor information. The detailed and informative descriptions of points of interest which presently characterize the Mauna Lani Resort will be provided where applicable on the Ritz-Carlton property.

The development of a swimming lagoon is specifically intended to enhance visitor safety and protection by providing an alternative to ocean-related recreation activities at Pauoa Bay. Visitors unfamiliar with the character and force of open ocean surges will find the swimming lagoon to be an enjoyable alternative.

"D(3)(b) IMPLEMENTING ACTION: Provide relevant interpretation of, and public access to, sites of archaeological significance whenever feasible, and establish a program to explain Hawaii's history and values to visitors and residents."

The applicant will recover information from three inland significant sites, as approved by the State Department of Land and Natural Resources and Hawaii County Planning Department. Keanapou fishpond, which will be accessible to the public and hotel guests, will be restored and preserved.

4.11 STATE TRANSPORTATION FUNCTIONAL PLAN

None of the policies or implementing actions in this functional plan (Hawaii, State of, Department of Transportation, June 1984) address specific developments such as the Ritz-Carlton Hotel. The overall objective of the plan is to provide for the efficient, safe, and convenient movement of people and goods. The impacts of the proposed hotel development at Mauna Lani Resort on existing transportation facilities, are addressed in the traffic analysis section of this document.

4.12 STATE WATER RESOURCES DEVELOPMENT FUNCTIONAL PLAN

This functional plan, prepared by the Hawaii State Department of Land and Natural Resources (June 1984d:2) "primarily affects State operations, it also involves some actions of . . . the private sector. It points out where . . . private industry coordination will be needed and . . . can help achieve water resources objectives". As the other State functional plans, it does not mandate private sector actions.

The plan presents general objectives and policies for the management of potable water supply, floodplains, agricultural water, and estuarine environments that could be considered relevant to this project. The proposed Ritz-Carlton Hotel will utilize existing infrastructure at the Mauna Lani Resort. Aside from potential short-range impacts of construction upon existing water resources on the project site, the Ritz-Carlton Hotel is not directly responsible for the general management of the water resources serving the facility.

5.0 HAWAII COASTAL ZONE MANAGEMENT PROGRAM

The Hawaii Coastal Zone Management Act (Act 188, SLH 1977), which became Chapter 205A, Hawaii Revised Statutes, established State policies for any action affecting the coastal zone. The act established specific objectives and policies in seven broad categories. The relationship of the proposed Ritz-Carlton Hotel project to these categories of concern is discussed below.

5.1 RECREATIONAL RESOURCES

In addition to the preservation and improvement of the existing beach at Pauoa Bay, the Ritz-Carlton Hotel Company proposes to develop a lagoon deep enough for swimming which will have a single 110-foot-wide opening to Pauoa Bay. Although Pauoa Bay is used by local residents for diving and shorefishing, access has been traditionally limited by the rugged terrain. Approval of the Mauna Lani Revised Master Plan included provisions for continuous public and guest access along the shoreline from north of Pauoa Bay to Honokaope Bay. This accessway will cross the Ritz-Carlton site just behind Pauoa Bay and the proposed swimming lagoon. Thus, the public accessway, together with the proposed swimming lagoon and beach improvement project, will provide recreational opportunities which are presently unavailable or underutilized.

5.2 HISTORIC RESOURCES

Keanapou Fishpond, in the coastal area, has been identified by a DLNR Historic Sites Section archaeologist as being a good example of a site type (a fishpond established in an anchialine pond), significant for its information content. The applicant will implement a mitigation plan to restore and preserve the fishpond.

5.3 SCENIC AND OPEN SPACE RESOURCES

The overall character of the project site will change; vacant open space will be replaced by low density development, including six-story wings of the hotel.

The Ritz-Carlton Hotel proposes to utilize a variety of water-oriented landscape features to achieve a transition from the barren lava flows which dominate the property to the classical Hawaiian architectural design and verdant landscaping proposed for the resort. Included among these features are a swimming lagoon, a large landscape water feature, a beach improvement project and the preservation of an existing anchialine pond (Keanapou Fishpond). This allows the project to maximize open space amenities, improve natural circulation and flushing of the swimming lagoon and preserve environmentally sensitive shoreline areas. The cumulative effect of these features will be a significant enhancement of the area's open space and scenic resources in some areas of the site, balanced against the effect of the hotel structure.

5.4 COASTAL ECOSYSTEMS

The ecosystems of the nearshore waters and the shoreline area are not expected to be significantly adversely affected by the development proposed for the Ritz-Carlton Hotel. A detailed discussion of the probable impacts of the proposed swimming lagoon and beach improvement projects is included in this document. The development of a shoreline swimming lagoon is intended to allow Pauoa Bay and its related resources to retain their pristine character, by redirecting activity away from those areas of the bay deemed particularly sensitive.

5.5 ECONOMIC USES

Resort development of the Mauna Lani lands has been acknowledged as the most appropriate use of the land by the Hawaii County General Plan and by the actions of State and County agencies (e.g., by the granting of various permits and by cooperating in the Lalamilo Water System). The policies under this heading state that reasonable growth in areas designated for visitor industry facilities (which are recognized as coastal dependent developments) is to be permitted, assuring that adverse impacts are minimized. As demonstrated elsewhere in this document, the proposed Ritz-Carlton Hotel development is not expected to cause any significant adverse impacts. In areas of potential adverse effect, mitigation measures will be taken to avoid or minimize them. In general, the proposed project fully implements the Mauna Lani Resort Revised Master Plan.

5.6 COASTAL HAZARDS

An area along the shoreline area is subject to potential hazards from storm waves and tsunamis as identified on the Flood Insurance Rate Map included in this document. Peak flood elevation is projected to be 8 feet and reduces progressively inland. A minimum building elevation of 12 feet for structures within flood hazard areas is being recommended. Development along the coast will conform to the requirements of the Federal Flood Insurance Program and will incorporate measures to protect against these hazards. Erosion will be controlled to avoid any impacts on coastal waters.

5.7 MANAGING DEVELOPMENT

This EIS is a tool for communicating the impacts of the proposed Ritz-Carlton Hotel at an early stage of planning. It is intended to facilitate participation in the planning and review process. The proposed plan will require a variety of development permits before it can be implemented. These will afford numerous opportunities for the Hawaii Coastal Zone Management Program network authorities to place conditions on the project which will assure the proper management of coastal zone resources.

6.0 COUNTY SPECIAL MANAGEMENT AREA

The entire project area falls within the "Special Management Area" (SMA) and is therefore subject to the SMA Rules and Regulations of the County of Hawaii. Following is a discussion of the relationship of the proposed Ritz-Carlton Hotel to the SMA guidelines in the Hawaii County Planning Commission's Rule No. 9. The guidelines are summarized and brief comments following note the extent to which the proposed project is believed to be consistent with them. The objectives and policies of the State's Coastal Zone Management Act are also discussed in the County's SMA Rule.

"Guideline A.1 This guideline seeks to minimize alterations to any body of water."

Although the proposed swimming lagoon and beach improvement projects may alter the physical character of Pauoa Bay, the projects are intended to expand and enhance the recreational opportunities associated with the bay. Alterations to Pauoa Bay are designed to preserve the existing beach area, improve overall circulation, and generally enhance the bay as an open space and recreational resource. The existing anchialine pond on the project site will be preserved and restored.

"Guidelines A.2 & 3 These guidelines seek to minimize reductions in the availability and/or access to beaches and other recreational areas and shoreline areas due to development."

The Ritz-Carlton Hotel and its accompanying shoreline projects would increase the availability of shoreline recreational resources and access to them by providing a public access path to areas presently of limited access.

"Guideline A.4 This guideline concerns the visual impacts of the proposed development."

The development of the proposed hotel will occur at a distance of more than a mile and a half from Queen Kaahumanu Highway, and thus will not substantially detract from the line of sight between the highway and the sea. Structures will be softened by landscaping which will contrast with the adjacent lava-dominated environment. The overall design of the structures and the surrounding landscaping will combine to present an aesthetically pleasing appearance to the observer. In effect, the landscaping of the Mauna Lani Resort in general, and the proposed hotel in particular, will present the image of a lush oasis surrounded by the barren lava fields of South Kohala.

From the ocean, views of the site will be modified. Open views will be replaced by landscaping and the six-story hotel structures. The hotel will be framed against the gently sloping land extending to the highway and beyond. The continuous slope of Mauna Kea creates the distant horizon, providing a relatively continuous background devoid of individual features such as prominent hills or cindercones.

"Guideline A.5 This guideline aims at minimizing development that adversely affects water, scenic, or wildlife resources, or that adversely affects existing or potential agricultural uses of the land."

The water and scenic resources of the project site are planned to be incorporated into the development and adverse impact on them avoided. There are no significant wildlife resources associated with the project site. • A detailed discussion of the development impacts is presented within this EIS. There are no existing or potential agriculture uses associated with the project site.

"Guidelines B.1, 2 & 3 These guidelines state that no development shall be approved unless it has no significant adverse environmental effects, and is found consistent with Chapter 205A, HRS, the Hawaii County General Plan, the Hawaii County Zoning and Subdivision Codes, and other applicable ordinances."

This EIS analyzes the potential of the proposed project to create adverse effects and outlines the mitigation measures that will be taken to avoid them or minimize them to insignificant levels. The plan's consistency with Chapter 205A, HRS and with the Hawaii County General Plan is discussed in this Section.

"Guideline C.1 & 2 These guidelines seek to ensure access to beaches, recreation areas, and natural reserves, and to ensure that adequate recreation and wildlife preserves are maintained."

Access to Pauoa Bay will be improved by the development of a public access path along the seaward portion of the project site. An anchialine pond on the project site which is in the final stages of deterioration will be preserved and restored. There are no wildlife preserves associated with the project site.

"Guideline C.3 This guideline concerns solid and liquid waste management."

The Ritz-Carlton Hotel will utilize the existing infrastructure and related services of the Mauna Lani Resort for the disposal of liquid and solid waste.

"Guideline C.4 This guideline seeks to minimize adverse impacts resulting from alterations to existing landforms and vegetation."

No specific grading plans for the development site have been prepared, but the proposed project will be characterized by low density resort development that utilizes existing landforms. Existing vegetation within the Ritz-Carlton development area consists primarily of grasses and Kiawe groves covering lava flows. The anchialine pond (Keanapou Fishpond) is surrounded by a Hau tree grove which is encroaching upon the pond to the point of completely obscuring it from view. Restoration of the pond will entail removing some of the surrounding vegetation.

"Guideline C.5 This guideline seeks to minimize adverse environmental or ecological impacts due to the project."

The Ritz-Carlton Hotel Company is committed to minimizing adverse environmental or ecological impacts. Moreover, the multi-level review and permit process that the project must undergo before it is implemented will ensure that mitigation measures are made conditions to development.

"Guideline C.6 This guideline states that the proposed project must be consistent with the General Plan."

As outlined in the following section, the revised master plan is consistent with the Hawai'i County General Plan.

7.0 HAWAI'I COUNTY GENERAL PLAN

The Hawai'i County General Plan (Hawai'i, County of, 1971 as amended) contains both a set of policies and land use maps showing the location of desired land uses for the entire island. The latter are referred to as "Land Use Pattern Allocation Guide Maps" (LUPAG maps). A mixture of resort, medium density urban, low density urban, open, and alternate urban expansion designations are shown within the Mauna Lani Resort boundaries on the General Plan LUPAG map. The general area of the proposed Ritz-Carlton Hotel is designated as Low and Medium Density Urban and Resort. The General Plan (p. 77) states that for the LUPAG maps "the boundaries indicated are long-range guides to general location." On the following page the same idea is reiterated:

The land use pattern is a broad, flexible design intended to guide the direction and quality of future developments in a coordinated and rational manner. The General Plan Land Use Pattern Allocation Map indicates the general location of various land uses in relation to each other (emphases added).

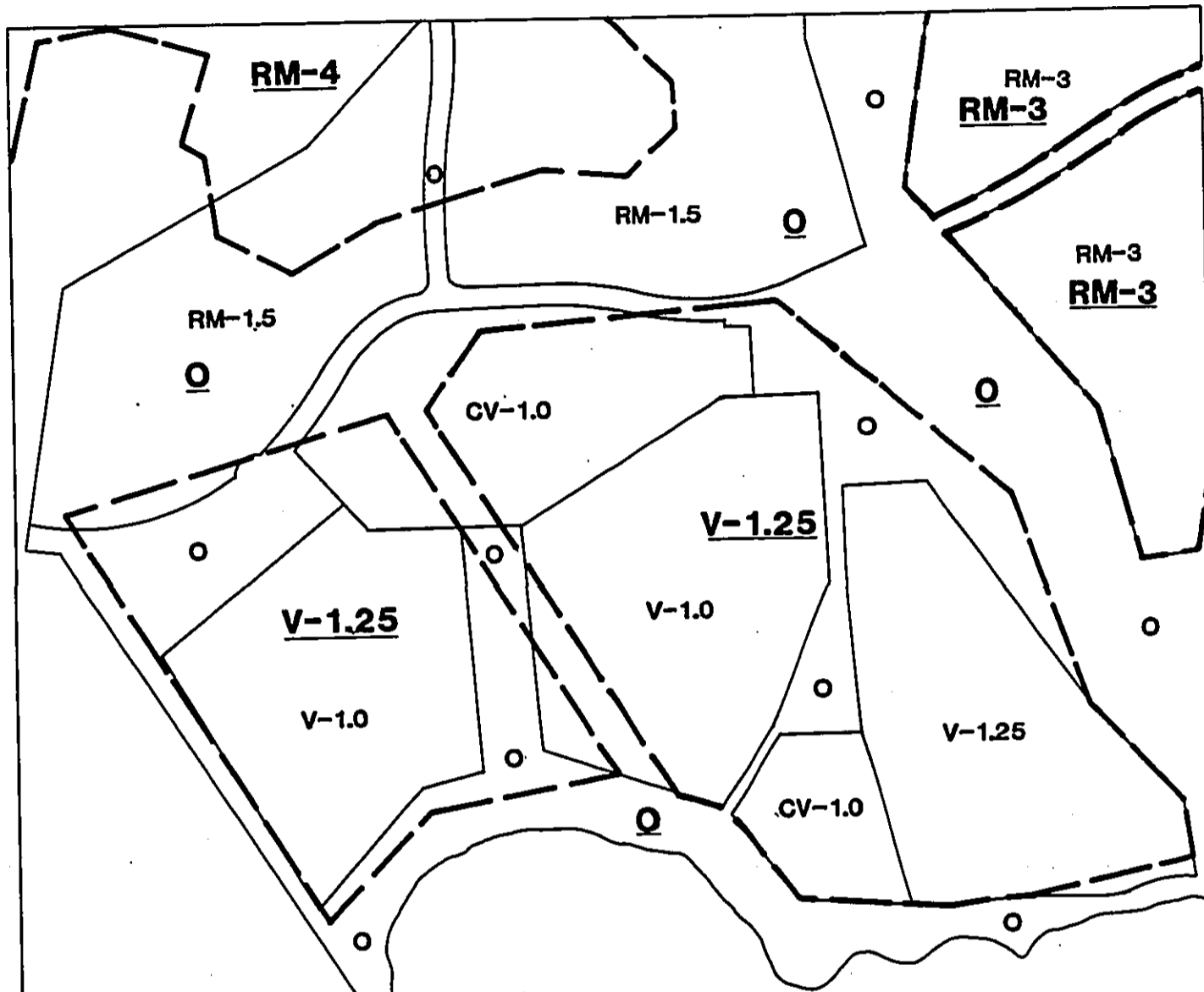
The LUPAG map is not intended to be as detailed and locationally specific as the zoning maps. Thus, the rezonings that have been granted to the resort since the General Plan was adopted and the proposed rezoning do not involve a change to the LUPAG map. The proposed project is consistent with the LUPAG map of the County General Plan.

The project is also consistent with the policies of the General Plan. The Mauna Lani Resort is on the list (as Puako-Honoka'ope Bay) of "major" resorts in the Land Use element (p. 79) of the General Plan. It meets the requirements for a major resort:

A major resort area is a self-contained resort destination area which provides basic and support facilities for the needs of the entire development. Such facilities shall include sewer, water, roads, employee housing, and recreational facilities, etc.

8.0 HAWAI'I COUNTY ZONING

The Ritz-Carlton project site was originally designated as Hotel Site #3 on the Mauna Lani Master Plan and was zoned V-1.0 Resort in August 1978 (see Figure V-1). In late 1986, Mauna Lani Resort, Inc. submitted a zoning request to the County of Hawaii to rezone certain parcels contained in the Mauna Lani Resort to bring them into conformance with the Revised Master Plan, approved by the County in 1985. The Ritz-Carlton project site was included in that request. However, the only change being sought for the project site was a boundary change to reflect the new configuration of the parcel. In late March 1987, the County Planning Commission approved the Mauna Lani Resort's rezoning request, including the Ritz-Carlton parcel from V-1.0 (Resort) to V-1.25 (Resort).



CV-1.0 Existing Zoning
V-1.25 Proposed Zoning

- COUNTY ZONING**
- CV-1.0 Village Commercial
 - Open
 - RM-1.5 Multiple Family (1,500 sq.ft./unit)
 - RM-3 Multiple Family (3,000 sq.ft./unit)
 - RM-4 Multiple Family (4,000 sq.ft./unit)
 - V-1.0 Resort Hotel (1,000 sq.ft./unit)
 - V-1.25 Resort Hotel (1,250 sq.ft./unit)

Figure V-1
HAWAII COUNTY ZONING
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

9.0 PLANS OF NEARBY COMMUNITIES

No regional plan has been prepared for South Kohala. The following plans were examined to note the role of the South Kohala resorts in the planning for these nearby communities.

9.1 NORTH KOHALA COMMUNITY DEVELOPMENT PLAN

There are numerous references in the North Kohala Community Development Plan (Phillips Brandt Reddick, November 30, 1984) to the employment opportunities and economic base which the South Kohala resorts have provided for North Kohala residents. It is reiterated several times that South Kohala tourism development filled the gap left by the closure of the sugar plantations in North Kohala. And in turn, the South Kohala resorts have depended upon North Kohala as a source of employees.

A certain amount of growth in residential housing for visitor industry employees is expected in North Kohala, but the extent to which such development might be directed to the southern portion of the district (in the vicinity of Kohala Estates and Ranch) which is functionally closer to the South Kohala resort employment centers has not been determined.

The plan mentions the need for expanded public bus service between the North Kohala towns and the South Kohala resorts.

9.2 KONA REGIONAL PLAN

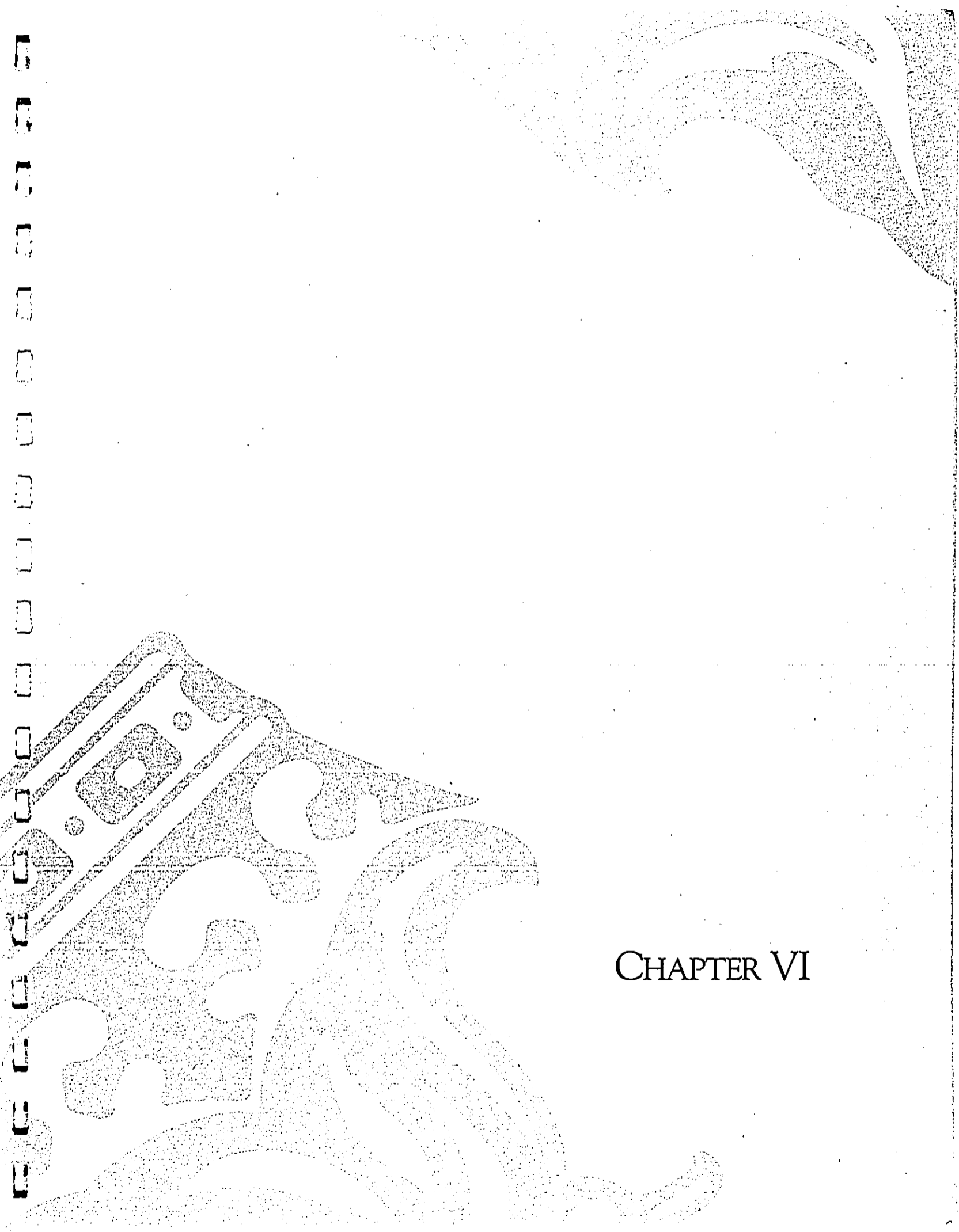
The Kona Regional Plan (Hawaii, County of, Planning Department, November 28, 1983) has references to the South Kohala Resorts only in the Economic Activities and Land Use chapters. The relationship between the visitor facilities in the Kona and Kohala districts is noted several times. The competition that the destination resorts in South Kohala will pose for Kona's visitor industry is stressed. The opportunities for industrial expansion in the area north of Kailua are mentioned, fueled by both the South Kohala resorts and Kona's visitor market/population growth. Indirect employment opportunities related to the industrial and service sectors that the South Kohala resorts will create for Kona residents are in addition to the direct jobs the resorts will provide.

The economies of the Kohala and Kona Districts will become more and more interdependent, especially as both are based largely on the tourism industry. Thus the land use planning has to be coordinated also. Thus this plan recognizes that the resort areas that have been started in both South Kohala and in Kona should be firmly established before additional areas are developed.

9.3 WAIMEA DESIGN PLAN

The Waimea Design Plan (Phillips Brandt Reddick, May 1984:17) makes one brief mention of the prospects for continued growth in the town due to the resort developments on the coast.

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CHAPTER VI

CHAPTER VI

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE OF LONG-TERM PRODUCTIVITY AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Because the project site consists largely of sparsely vegetated lava land unsuited to agricultural use and because it is within Mauna Lani Resort, future options for alternate uses of this land, other than resort use, are limited, if any. The land will be committed to a long-term use: hotel operations. The shoreline will be altered to include a swimming lagoon, also a long-term use.

Development of the hotel site is not expected to pose any long-term risks to health and safety. It is obviously in the interest of the hotel site developer and operator to provide a healthful, safe, and enjoyable experience at the hotel and on the hotel grounds.

The improved shoreline access and access from the nearby public park, which is planned to be constructed at about the same time as the hotel, will allow increased use of the site's resources and represent a long-term gain for the public. Proposed shoreline improvements will increase hotel guests' and the public's safe use of the shoreline area.

A man-made environment will replace the natural terrain of lava field. Extensive landscaping of hotel ground will enhance the site, and the shoreline area will be improved to enhance its natural appearance. Development will occur with minimal disturbance to coastal strand vegetation. No significant long-term losses of resources are anticipated. Significant archaeological sites at the project site will undergo archaeological data recovery done to recover significant information.

Long-term benefits of the Ritz-Carlton Mauna Lani development include long-term employment and other economic benefits which the project will bring to the West Hawaii region. De facto and resident population growth will follow the development of the Ritz-Carlton Mauna Lani. The effects of this growth have been weighed and the benefits found to offset the impacts.

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CHAPTER VII

CHAPTER VII

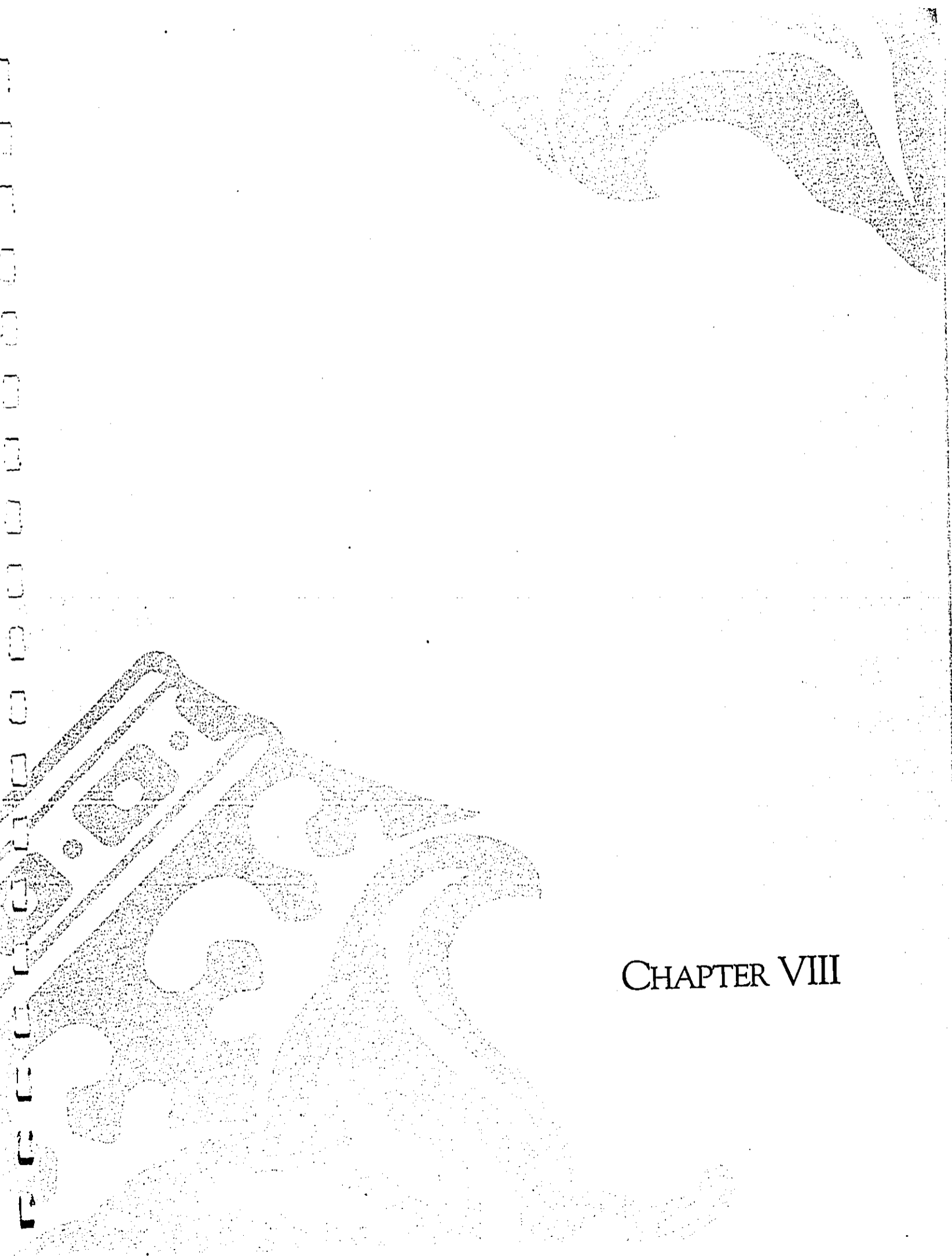
OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

No significant adverse effects are expected to result from the construction and operation of the Ritz-Carlton Mauna Lani and the associated shoreline improvements. There will be some minor impacts, which will be more than offset by the benefits derived from the project. The State and County have invested considerable funds in providing public infrastructure for West Hawaii and have encouraged quality resort development along the West Hawaii coast. Governmental policies support the enhancement of shoreline areas for public use and improved public access. The proposed shoreline improvements and improved pedestrian access will increase the public's safe use of natural resources.

One or more archaeological sites might be lost. However, information recovery will be performed as approved by the State Department of Land and Natural Resources and the Hawaii County Planning Department.

As discussed in Chapter V, the proposed project is in general consistent with all relevant government plans and policies.

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CHAPTER VIII

CHAPTER VIII

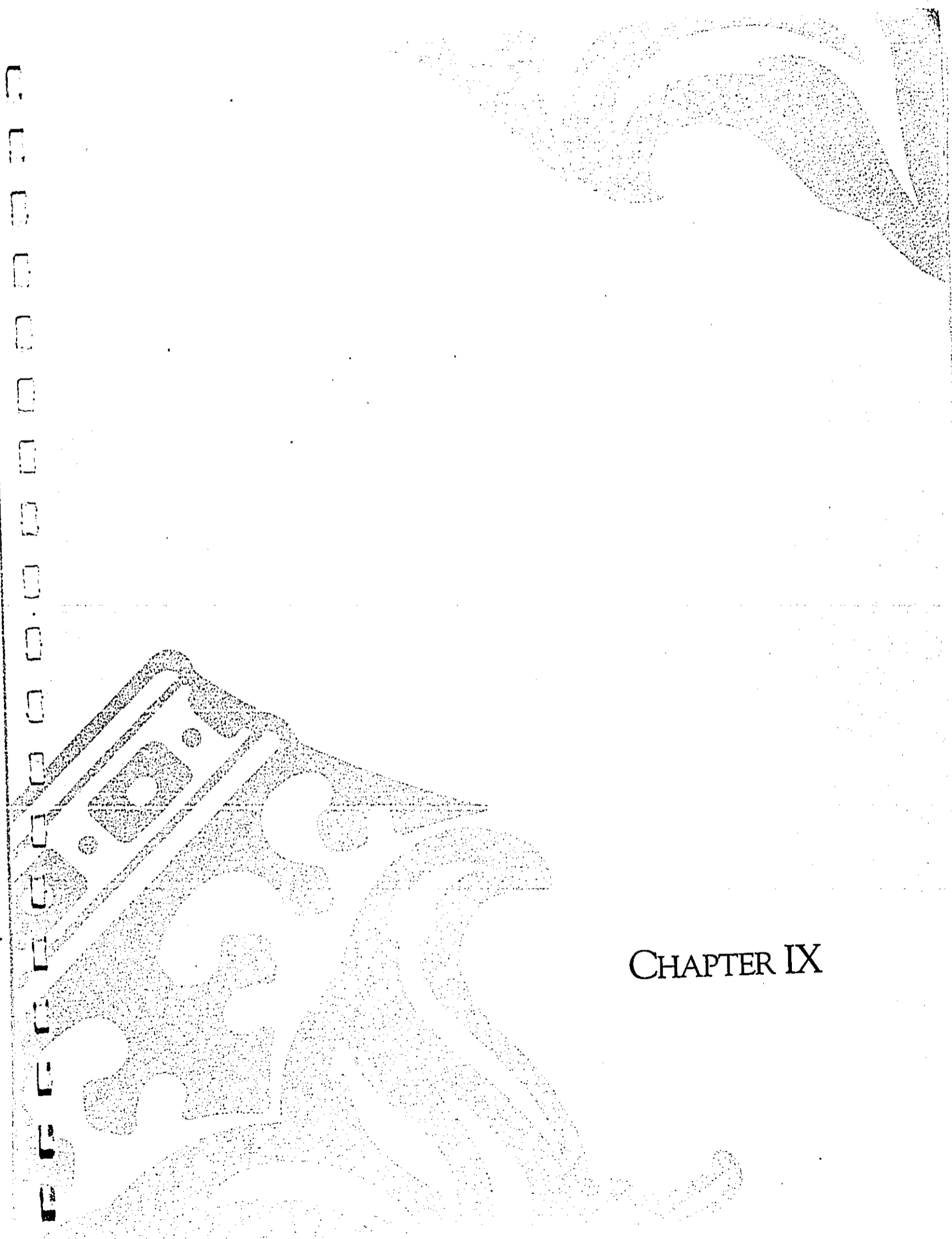
UNRESOLVED ISSUES

The Shoreline Setback Variance application, the Special Management Area application, and the Conservation District Use Application which this environmental impact statement accompanies are three of several permit applications which must be approved before the Ritz-Carlton Mauna Lani can be constructed. Other permit applications are listed in Chapter I, Section 10. Several issues raised by the proposed hotel development and shoreline improvements remain to be resolved. The outcome of some cannot be known in detail until development actually occurs. However, it is expected that all of the issues can be resolved without undue difficulty through mitigation measures. The most important of the issues are identified below.

- (1) Impact of Shoreline Modifications on Pauoa Bay Waters. The potential impacts of excavation and construction of the shoreline swimming lagoon and beach improvement area have been fully explored in this document and in the two technical studies prepared for this project, a baseline assessment of the marine environment and an engineering evaluation of ocean and shoreline conditions, both of which are included as appendices to this EIS. Based on these analyses, no significant adverse impacts are expected on the water quality in Pauoa Bay. However, the exact effects of shoreline area excavation and improvement are unknown at present and cannot be known until construction occurs.
- (2) Impact of Shoreline Modifications on Marine Species. A conclusion of the marine baseline assessment is that the potential for direct impact to the aquatic communities as a result of Ritz-Carlton Mauna Lani development activities appears to be quite small. However, here again, the exact effects of shoreline area excavation and improvement, as well as hotel facilities operations, on the marine environment are currently unknown.
- (3) Parameters of a Monitoring Program. A monitoring plan will be implemented according to governmental permit conditions. Specific tasks to monitor potential impacts to nearshore waters and marine species have not yet been determined.
- (4) Availability of Adequate Employee Housing. Ritz-Carlton Mauna Lani workers are expected to require between 100 and 135 new housing units for the initial 450-unit operation in 1990, and an additional 85 to 95 housing units by 1998 when the 200 hotel units will become operational. Those needing "assisted housing", that is to say those workers from households with incomes lower than 80 percent of the median, are projected to be 25 to 33 in 1990 and 21 to 23 in 1998. The workers with household incomes above 80 percent of the median are expected to find housing within the private housing market. Mauna Lani Resort has assumed responsibility for meeting employee housing requirements for the Ritz-Carlton Mauna Lani project. It is currently involved in discussions with the County Planning Department and the Office of Housing and Community Development to establish the housing requirements for the Ritz-Carlton. At this time, Mauna Lani Resort proposes to expand its existing housing

development in Waimea by 24 units and to build 200 rental units in Kealakehe in North Kona on land owned by the Hawaii Housing Authority. These units would provide employee housing for Ritz-Carlton employees in need of assistance as well as for employees of future Mauna Lani Resort hotel development. The exact outcome of the housing discussions and the resulting implications for the availability of adequate employee housing are presently unknown. However, it is expected that employee housing requirements will be met through a combination of available housing on the open market and employee housing assistance provided by Mauna Lani Resort.

- (5) Location of Off-Site Population Growth and Facilities. The exact location of off-site population growth and facilities as a result of hotel operational period employment is undetermined at this time. State and County planning and zoning policies will ultimately determine where a supply of new housing will be permitted. Also to be taken into account are factors such as where private developers will be willing to build new housing and future employees' preferences for residential location.
- (6) Transportation Improvements. As development continues at Mauna Lani Resort (including the Ritz-Carlton) and at other West Hawaii resort projects, traffic volumes will increase and existing roadways will become congested. The need for improvements to Queen Kaahumanu Highway and other major roadways and critical intersections in the West Hawaii area is a function of projected regional growth, not just the Ritz-Carlton 650-unit (eventual) hotel project. It is expected that the exact design of these improvements and when they will be necessary will be determined by governmental entities concerned with regional infrastructure planning and construction.
- (7) Traffic Study Assumptions. Traffic projections will vary according to the assumptions made. Those assumptions made for the Ritz-Carlton Mauna Lani traffic study are listed in Section 3.1, Traffic Impact Analysis, of Chapter IV of the EIS. It is recognized that other assumptions might be made in another study or by other individuals, resulting in different projections.



CHAPTER IX

CHAPTER IX

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CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

CHAPTER IX

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CHAPTER X

CHAPTER X

PARTIES CONSULTED AND THOSE WHO PARTICIPATED IN THE PREPARATION OF THE EIS

1.0 CONSULTED PARTIES

The notice of availability of the EIS Preparation Notice (EISPN) for the Ritz-Carlton Hotel was published in the OEOC Bulletin by the Office of Environmental Quality Control on October 8, 1986. The agencies, organizations, and individuals listed below were sent copies of the EIS Preparation Notice (EISPN) with the Environmental Assessment (EA) and were asked to comment on the project. Everyone believed to have an interest in the project or who requested consulted party status was included in the mailing. Those who responded to the request for comments are marked with an asterisk (*) and copies of the correspondence with them are reproduced in Chapter XI.

Federal Agencies

- * U.S. Department of the Interior, Water Resource Division
- * U.S. Department of the Interior, Fish & Wildlife Service
- * U.S. Army Engineering Division
- * U.S. Environmental Protection Agency
- * U.S. Department of Commerce, National Marine Fisheries Service

State Agencies

- * Department of Budget and Finance
- * Department of Defense
- * Department of Education
- * University of Hawaii
- * Department of Accounting and General Services (Division of Public Works)
- * Department of Planning and Economic Development
- * Department of Agriculture
- * Department of Social Services and Housing, Hawaii Housing Authority
- * Office of Hawaiian Affairs
- * Department of Transportation
- * Department of Land and Natural Resources
- * Department of Hawaiian Home Lands, Hawaiian Homes Commission
- * Department of Taxation
- * Department of Health, Environmental Protection & Health Services Division
- * Department of Labor and Industrial Relations

County Agencies

- * Department of Parks and Recreation
- * County Police Department
- * Department of Water Supply
- * Department of Research and Development
- * Police Department
- * Planning Department
- * Department of Public Works
- Civil Defense Agency
- Division of Industrial Safety
- Department of Finance
- Hawaii Redevelopment Agency
- Office of Housing and Community Development

Lawmakers

- * The Honorable George R. Ariyoshi, Governor
- * The Honorable Daniel K. Inouye, U.S. Senate
- The Honorable Spark M. Matsunaga, U.S. Senate
- * The Honorable Daniel K. Akaka, U.S. Congress
- The Honorable Neil Abercrombie, U.S. Congress
- The Honorable Richard Henderson, Hawaii State Senator
- The Honorable Richard M. Matsuura, Hawaii State Senator
- The Honorable Malama Soloman, Hawaii State Senator
- * The Honorable Wayne Metcalf, Hawaii State Representative
- The Honorable Virginia Isbell, Hawaii State Representative
- The Honorable Andrew Levin, Hawaii State Representative
- The Honorable Robert Lindsey, Hawaii State Representative
- The Honorable Harvey Tajiri, Hawaii State Representative
- The Honorable Dwight Takamine, Hawaii State Representative
- The Honorable Dante K. Carpenter, Hawaii County Mayor
- The Honorable James L.K. Dahlberg, Hawaii County Council
- The Honorable Frank De Luz, III; Hawaii County Council
- The Honorable Takashi Domingo, Hawaii County Council
- The Honorable Robert Herkes, Hawaii County Council
- The Honorable Lorraine Jitchaku-Inouye, Hawaii County Council
- The Honorable Russel S. Kokubun, Hawaii County Council
- The Honorable Merle K. Lai, Hawaii County Council
- The Honorable Spenser Kalani Schutte, Hawaii County Council
- The Honorable Stephen K. Yamashiro, Hawaii County Council

Other Organizations

- * Hawaii Leeward Planning Conference
- * Life of the Land
- * Puako Community Association
- * Waimea-Kawaihae Community Association
- Hawaii Hotel Association, Hawaii Chapter
- Kohala Community Association
- Kona Conservation Group

Other Organizations

Kona-Kohala Chamber of Commerce
Moku Loa Group, Hawaii Chapter Sierra Club
Na Ala Hele
Waimea Hawaiian Civic Club
West Hawaii Committee

Others

- * Hawaiian Telephone Company
- * Hawaiian Electric Company

2.0 ORGANIZATIONS AND INDIVIDUALS WHO ASSISTED IN THE PREPARATION OF THIS EIS

The Environmental Impact Statement was prepared for the Ritz-Carlton Hotel Company by Belt Collins & Associates with input provided by subconsultants. The following were involved:

Belt Collins & Associates

James R. Bell	-	Principal in Charge
Anne L. Mapes	-	Contributor/Project Manager
Glen T. Koyama	-	Contributor/Planner
Lee William Sichter	-	Contributor/Planner
Ed Iida	-	Contributor/Civil Engineer
Thomas Nance	-	Contributor/Hydrologist
Clyde Kanehiro	-	Cartographer
Karon Uyechi	-	Graphic Designer
Lynn Fukuhara	-	Word Processor

Subconsultants

Steven Dollar	-	Marine Survey
ECMI	-	Fiscal Impact Analysis
Community Resources, Inc.	-	Socioeconomic Impact Analysis

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CHAPTER XI

CHAPTER XI

COMMENTS RECEIVED DURING THE EIS PREPARATION NOTICE COMMENT PERIOD AND RESPONSES

The agencies and individuals listed in Chapter X were all sent copies of the Environmental Impact Statement Preparation Notice (EISPN) with the Environmental Assessment (EA) and a transmittal letter requesting comments. Copies of the EISPN and the transmittal letters sent to these organizations and individuals are reproduced along with copies of our responses to them. Some agencies received individualized transmittal letters, requesting specific information relative to their agency's activities and/or responsibilities. Letters to and from these agencies are reproduced after the group of letters from and to the agencies and individuals responding to the standard transmittal letter. Those agencies and individuals responding to the transmittal letter with a "no comment" received no letter in response.

Standard Transmittal Letter Requesting Comments
Environmental Impact Statement Preparation Notice

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RESPONDING TO THE STANDARD TRANSMITTAL LETTER WITH "NO COMMENT"

Federal Agencies

U.S. Department of the Interior

State Agencies

Department of Budget and Finance
Department of Defense
Department of Education
University of Hawaii
Department of Accounting and General Services (Division of Public Works)

County Agencies

Department of Parks and Recreation
County Police Department

Lawmakers

The Honorable Wayne Metcalf, Hawaii State Representative
The Honorable George R. Ariyoshi, Governor
The Honorable Daniel K. Inouye, United States Senate

**AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RESPONDING TO THE STANDARD
TRANSMITTAL LETTER WITH COMMENTS**

State Agencies

Department of Planning and Economic Development
Department of Agriculture
Department of Social Services and Housing, Hawaii Housing Authority
Office of Hawaiian Affairs
Department of Transportation
Department of Land and Natural Resources

County Agencies

Department of Water Supply
Department of Research and Development
Police Department
Planning Department
Department of Public Works

Lawmakers

The Honorable Daniel K. Akaka, U.S. Congress

Other Organizations

Hawaii Leeward Planning Conference
Life of the Land
Puako Community Association
Waimea-Kawaihae Community Association

Others

Hawaiian Telephone Company

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS SENT INDIVIDUALIZED TRANSMITTAL LETTERS

(++ indicates No Response received)

(●● indicates Response without Comment, see above)

Federal Agencies

U.S. Department of the Interior, Fish & Wildlife Service
U.S. Army Engineering Division
++ U.S. Environmental Protection Agency
U.S. Department of Commerce, National Marine Fisheries Service

State Agencies

Department of Health, Environmental Protection & Health Services
Division
Department of Labor and Industrial Relations

County Agencies

++ Office of Housing and Community Development

Lawmakers

●● The Honorable George R. Ariyoshi

Others

Hawaiian Electric Company



PLANNING DEPARTMENT

25 ALUPUNI STREET • HILO, HAWAII 96720
(808) 931-4200

COUNTY OF
HAWAII

DANIE K. CARPENTER
Mayor
ALBERT LONO LYMAN
Deputy Mayor
HJIMA A. PIANALIA
Deputy Director

October 1, 1986

Office of Environmental Quality Control
Kekuanoa Building, Room 115
465 South King Street
Honolulu, HI 96813

Gentlemen:

Preparation Notice - Environmental Impact Statement

Enclosed please find one original and three copies of an environmental assessment and preparation notice for the proposed resort hotel at Pauoa Bay, north of the existing Mauna Lani Bay Hotel, South Kohala, Island of Hawaii (Tax Map Key: 6-8-22:8, pars. of 7, 9 and 10).

The applicant, The Ritz-Carlton Hotel Company, has filed an application for a Shoreline Setback Variance, thus necessitating compliance with Chapter 343 requirements.

Comments on the EIS Preparation Notice should be sent to the petitioner's consultants:

Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 97813

With copies to:

Mr. Albert L. Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Office of Environmental Quality Control

October 1, 1986
Page 2

Should you have any questions, please feel free to contact our office.

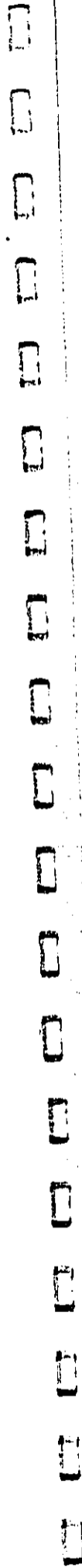
Sincerely,

ALBERT LONO LYMAN
Planning Director

AK:aeb

encl.

cc: Belt, Collins & Associates



ENVIRONMENTAL ASSESSMENT AND NOTICE OF PREPARATION
OF AN ENVIRONMENTAL IMPACT STATEMENT

South Kohala, Island of Hawaii

APPLICANT: The Ritz-Carlton Hotel Company
3414 Peachtree Road, N.E., Suite 300
Atlanta, Georgia 30326

ACCEPTING AGENCY: Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

PROPOSED ACTION: Construction of up to 450-room resort hotel
(with future development of up to 200
additional rooms, or a total of 650 hotel
rooms) and associated improvements including
tennis facility, luau area, swimming pool,
health club, parking, landscaping and two
lagoons (one of which will connect to the ocean
at two points).

DETERMINATION: Environmental Impact Statement, Chapter 343,
HRS, is required.

**REASONS SUPPORTING
DETERMINATION:** The proposed development has the potential to
have a significant impact on the environment as
a result of construction of the proposed lagoon
and its connection to the ocean at two points.

CONTACT PERSON: Glen T. Koyama
Belt Collins & Associates Ltd.
606 Coral Street
Honolulu, Hawaii 96813
Phone: (808) 521-5361

PROJECT LOCATION: Pauoa Bay, Kalanuihua'a
South Kohala, County of Hawaii
Tax Map Key 6-8-22:8, Portion of 7, 9 & 10

I. PROJECT DESCRIPTION
Proposed Project

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort at Kalanuihua'a, South Kohala, Hawaii. The proposed site is situated at Pauoa Bay approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22:8, pors. 7, 9 & 10.

The new hotel will contain up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons (See Figures 2-6). Up to 200 additional rooms may be developed at a latter as yet undetermined date.

The proposed hotel's design theme calls for a classical Hawaiian architecture reminiscent of the "turn of the century." It will have two wings of guest rooms, each perpendicular to the shoreline and connected to a main lobby. The hotel wings will be six stories and enclose a landscaped courtyard and swimming pool area. Parking will be located near the hotel entrance. Construction of the hotel is proposed to begin in the spring of 1987 and be completed in late 1988.

Proposed Lagoon

Pauoa Bay is one of three major bays along Mauna Lani Resort's shoreline. Approximately 80 percent of the 1,600-foot long sand and rock beach within Pauoa Bay fronts the proposed hotel property. Except for a rock jetty constructed by a previous owner, the shoreline area is in its natural state. Access to Pauoa Bay is by

an existing unimproved pedestrian pathway that extends along the shoreline from just north of Pauoa Bay to Honokaope Bay in the southern section of Mauna Lani Resort. The access is opened to the public and is a part of a comprehensive public access program, provided by the resort, that consists also of three mauka-makai vehicular accesses and parking.

Within the hotel grounds, Ritz-Carlton proposes to develop two lagoons as part of the project landscaping. One lagoon will be located to the north of the guest rooms and the other will be located near the shoreline behind Pauoa Bay. The lagoon near the shoreline will serve as a water feature for swimming as well as a visual amenity for the hotel guests. It will encompass an area of approximately 1.3 acres and vary in depth from 4 to 6 feet (See Figures 2 & 7). Its construction will consist of a sand bottom with a subsurface choker layer of gravel and perimeter of sand beach and rock eoginy.

The lagoon will connect to the ocean at two points within Pauoa Bay to provide for internal circulation and water clarity. The 30' to 50' wide connections will be carefully selected to minimize any disturbance to the existing natural processes of the bay area. Additionally, a proposed well near the lagoon will be installed to pump salt water into the inland water feature to aide the natural tidal exchange between the lagoon and ocean.

In preparing the site, maintenance work will be undertaken for the shoreline area. This will involve removal of debris and loose rubble from the beach land and deadwood and unatightly underbrush from existing shoreline vegetation. An existing tack jolly,

constructed prior to the development of the Mauna Lani Resort, will be removed to restore the beach to its original condition, and an upgraded pedestrian pathway will be constructed within an existing easement to provide improved access along the shore area. Additional landscaping is also planned to enhance the overall appearance of the oceanfront environment.

The necessary approvals required for Mauna Lani's proposal are as follows:

- Shoreline Setback Variance Permit
- Change of Zone
- Special Management Area Permit
- Amendment to the Planned Unit Development Permit
- Subdivision Approval
- Conservation District Use Permit
- State Department of Health, Section 401 Permit
- Coastal Zone Management Federal Consistency Determination
- U.S. Army Corps of Engineers Permit

II. DESCRIPTION OF THE AFFECTED ENVIRONMENT

Physical Setting

The 3,200-acre Mauna Lani Resort tee parcel is situated on the South Kohala coast on a gradually rising plain encircled by four volcanoes: the Kohala Mountains, Mauna Loa, Mauna Kea, and Hualalai. The resort property slopes gently seaward from an elevation of about 220 feet along Queen Kaahumanu Highway to sea level at the coastline. The overall slope of the land is generally less than 10 percent.

The project site is located in the northern section of the Mauna Lani property at Pauoa Bay in an area that is relatively level and with an average elevation of 20 feet. The site is comprised of a lava that essentially has no soil cover; the Agricultural Lands of Importance to the State of Hawaii (ALISH) Map shows no classification for the area. Drainage is excellent and erosion of soil is non-existent. There are no discernible drainage patterns nor are there any existing water features, except for a small anchialine pond across the southern boundary line of the property.

The beach area of Pauoa Bay is comprised of carbonate-basalt material. Offshore is a coarse flat, relatively barren, limestone area interspersed with highly eroded coral structures.

Construction of the proposed hotel will result in minimum alteration to the terrain. The site is relatively level and the surface material is extremely pliable. Some grading will be required.

The proposed lagoons will result in alteration to the project site. Preliminary estimates show the lagoons will require excavation of rock material from the western and northern portions of the property. Material removed will be used as fill in other areas of the hotel site or stored on the mauka lands.

Excavation will be required also for construction of the two openings between the ocean and the lagoon. The two openings will result in some effect to the shoreline. The connections will allow for improved internal lagoon circulation and water clarity.

Flora/Fauna

Grass and shrubs predominate the open areas of Mauna Lani Resort between stands of kiawe trees. A greater variety of natural vegetation is found in the shoreline area.

The Mauna Lani Resort site is capable of supporting a variety of birdlife due to the area's diverse and relatively extensive habitat. A number of low-land urban birds and shore birds were observed and recorded during early avifaunal surveys of the project site. Migratory species were also evident in the area. Only one indigenous species, the Pacific Golden Plover, was recorded during a recent survey.

Mongoose, feral cats and feral goats were mammal species observed during a 1984 faunal survey of the project site. No endangered or rare species of wildlife were observed or are expected to inhabit the area.

Marine Environment

The offshore marine waters are relatively flat and barren limestone platform interspersed with highly eroded coral. The barren appearance of this marine environment and the paucity of macro-fauna is due to the seasonal high level of wave stress in the bay.

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

The most seaward zone, typically found on Hawaiian coral reefs, is the Porites compressa-slope zone. At many locales on the west

the historic resources within its property. The plan, which was completed in 1982, was adopted by the owner and is presently being used as a resource management guide for development within the resort.

Viewplane

The proposed hotel will have a maximum height of six stories and thus will be visible from the immediate adjacent lands. On-site landscaping will integrate the proposed hotel improvements with the rest of the site's natural terrain. From the shoreline, the hotel will be setback to provide a gradual transition zone between the shoreline and hotel improvements. The open water element of the lagoon will carry the water character of the shoreline into the hotel site.

Views from the Queen Kaahumanu Highway of the shoreline will not be significantly affected. The highway is more than 8,500 feet from the water's edge and views from the State right-of-way are primarily panoramic.

Infrastructure

Access to the proposed hotel will come from Queen Kaahumanu Highway, Mauna Lani Drive and a new connector road from Mauna Lani Drive to the hotel site. Pedestrian public access available along the shoreline via a described easement. (The latter two roadways are private rights-of-way.) Construction of the connector road by Mauna Lani Resort, Inc. is scheduled simultaneously with the hotel construction. All necessary utilities, including water, sewer, telephone, and electricity, will be provided to the site.

coast of Hawaii, the shoreline boundary of this zone is clearly delineated by a sharp increase in reef slope angle. In the Mauna Lani Resort area, however, this zone is not marked by a sharp drop-off. Rather, the Porites compressa zone integrates gradually with the Porites lobata reef building zone.

Offshore in Pauoa Bay are a variety of reef fish. Other marine life include macroinvertebrates such as sea cucumber, sea stars and sea urchins.

The nearshore waters off the coast of Mauna Lani Resort are classified by the State Department of Health as Class AA. Discharges into such areas are prohibited by the Department of Health. It is the objective of this classification to maintain the natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or action. Compatible recreation and aesthetic enjoyment, among others, are the principal uses to be protected in this marine environment.

Historical/Archaeological Resources

In a 1985 survey of the project area by Bishop Museum, a few archaeological features were found including shelter caves, abrader manufacturing areas, midden, petroglyphs, C-shaped structures, an alignment of loosely placed lava cobbles, and an oval shaped enclosure. The sites were scattered near the eastern and southwestern boundary of the site. No significant archaeological features were found on the proposed hotel site.

At the request of Mauna Lani, Science Management, Inc. was commissioned to formulate an Interpretive and Management Plan for

Socio-Economic Considerations

Operation of the proposed hotel will result in increased direct, secondary and tertiary regional employment. Increased regional employment will also result in an increase in regional population.

The increase in regional population will generate a demand for additional housing in West Hawaii. While it is anticipated that the private housing market is capable of satisfying some of this demand, it is also expected that increased assisted housing will be necessary. Mauna Lani Resort, Inc. is working with the County to determine a mutually satisfactory means of providing additional housing units for the region.

In addition to the beneficial effect of the new jobs, consequential secondary effects would result in the island and state economy. Income earned by the new hotel employees will generate increased consumer spending, increased retail sales and new jobs in the retail, wholesale, and service sectors. Furthermore, operation of the hotel will result in increased orders for suppliers and distributors of hotel goods and services, both on the island and in the state.

The effects of increased income will also result in increased revenues for the state government in the form of sales and income taxes, while improved property values, from the construction of the proposed hotel, will result in substantial increased property tax revenues for the County.

In the short-term, the construction industry would benefit from the mobilization of labor, and suppliers and distributors of

construction materials will benefit from increased construction activity.

As with any new hotel development, there will be a need for public services, such as police and fire protection, medical facilities, and recreational facilities. Since guests of the hotel are transient, public facilities such as schools, libraries, neighborhood parks, and community centers would not be significantly impacted.

III. SUMMARY OF POTENTIAL IMPACTS

Development of the proposed hotel would involve site grading, vegetation removal, building improvements, new landscaping and infrastructure improvements. The potential exists for significant effects to occur, involving the following:

- Transformation of the terrain and shoreline area due to grading, importation/exportation of soil and landscaping;
- Change in the visual character of some of the physical environment from barren lava and scrub vegetation to landscaped areas and resort use;
- Airborne dust and noise during the construction period;
- Withdrawal and recycle of salt water for lagoon circulation;
- Changes in species composition of flora and fauna;
- Impact on archaeological sites that can be mitigated by further research and/or preservation;
- Improved public access to and along the shoreline;
- Increased use of available potable water supplies, as well as public utilities and services;
- Increased short-term and long-term employment;
- Increased personal income and business activity;

- Increased demand for housing; and
- Increased government revenues and expenditures.

IV. ALTERNATIVES TO THE PROPOSED ACTION

NO ACTION

An alternative to the proposed action is to do nothing. This "no action" alternative would result in no hotel, no landscaping, no lagoons and no shoreline improvements. There would be no impacts, positive or negative, on the site and on the surrounding environment.

Alternative Use

The present County zoning permits hotel use on the project site. Although the County zoning ordinance permits other uses under the V-1.25 zoning district, such as residential, open-air theaters, tourist information facilities and offices, the project site is most suitable for hotel development. Mauna Lani resort had considered other uses for the beachfront property during its original planning prior to the 1980's and has since determined that a resort hotel is the most suitable use for the property. Thus, hotel use is and has long been part of Mauna Lani's development plan for the area.

Alternative Location

Although other sites have been considered for the proposed hotel, the present site offers many benefits. It is located on a beachfront property, hotel use is permitted on the site by the present County zoning, and it is situated within the existing resort area of Mauna Lani where plans for roads and utility improvements to the site are currently underway.

Alternative Density

The present proposal for a 450-room hotel represents a density of 14 units per acre. This is well below the density allowed by the existing County zoning for the project site, which is 43 units per acre. Although the applicant earlier considered a larger hotel on the property, the primary objective of the project owner is to develop a low-density, high-quality hotel that would blend with the surrounding environment.

V. MITIGATING MEASURES

Construction of the proposed hotel will generate noticeable impacts on the environment, such as noise, dust and possibly soil erosion. Although some impacts will be major, the effects are expected to be very temporary in nature, lasting only as long as the project's construction period. As an added precaution, mitigating measures are planned to reduce or lessen these impacts through the use of stringent construction practices and environmental control devices on construction equipment.

Prior to construction of the proposed lagoon, studies will be conducted to determine the most suitable location for the lagoon openings. Selecting the most suitable location would result in the least amount of impact on the surrounding environment. Furthermore, construction procedures will be developed and implemented to minimize any alterations to the marine and shoreline area of the project area.

As mentioned above, it is believed that the private housing market is capable of satisfying some of the housing demand generated by the proposed hotel, but some assisted housing will be necessary.

Mauna Lani Resort, Inc. is working with the County to determine a mutually satisfactory means of providing additional housing units for the region.

Recreation

Paoua Bay is frequently used by the local residents for diving and shorefishing. The hotel is expected to increase public use of the beach, but it would not overburden the sand area, as hotel guests will have a number of beach-related options within the hotel premise to choose from including the hotel's swimming lagoon, pool deck, wet bar and lounge area. Guest of the proposed hotel will also have access to the resort's golf course, tennis club, and historic preserves.

The proposed lagoon openings will include a pedestrian bridge to allow continuous public and guest access along the shoreline from north of Paoua Bay to Honokaope Bay. At the northern terminus of this shoreline access near Paoua Bay is a planned public beach park and comfort station. Vehicular access over Mauna Lani Resort roadways will be provided from Queen Kaahumanu Highway to the public park.

Historic/Archaeological

Archaeological surveys conducted on the project site by Bishop Museum have indicated a presence of archaeological features. Necessary procedures will be taken to preserve any sites determined by the County or State to be significant and worthy of preservation.

Scenic and Open Space

The planned shoreline open space for the hotel site will assure a lateral view corridor along the coastal area. Views of the

shoreline from the Queen Kaahumanu Highway are expected to be long-range and panoramic. The State right-of-way is located more than 7,500 feet from the proposed hotel. The design of the hotel is intended to be sensitive to the shoreline area and blend with the surrounding environment.

Coastal Ecosystems

The proposed hotel would not significantly damage valuable coastal ecosystems of significant biological or economic importance. Preserving an approximately 150' wide band of open space along the beach area will minimize disruption or degradation of the coastal ecosystem. The proposed lagoon openings, located within the open space, will result in alteration of a portion of the shoreline area, but careful selection of the proposed connections between the bay and lagoon will minimize the impact to the area.

Surface runoff will be minimized by hotel landscaping and drainage systems and by existing natural drainage conditions.

There will be no dumping of commercial or industrial waste nor sewage effluent into the coastal waters. The proposed project will comply with all Federal and State Department of Health water quality regulations.

Economic

The proposed hotel will be developed by a private interest on a site which is considered suitable for hotel development. The proposed facility is resort-oriented, in terms of function, and is dependent upon the location near the shoreline for a viable operation.

Mauna Lani Resort is being developed in several phases over a period of time. The proposed hotel is part of Mauna Lani's long range plans and is a permissible use under County and State land use regulations. The proposed hotel is not expected to generate significant adverse social impacts in a region that is characterized as significantly visitor-oriented.

The proposed hotel will not, to a large extent, preclude the use and enjoyment of beaches and coastal areas by the general public. To insure the long-term accessibility of the coastal area, existing public beach accesses and open space buffers along the shoreline will be maintained.

The proposed project will benefit from the contribute to the tourist industry which is a vital element of the state's and county's economy. Moreover, it will create new jobs and generate substantial income in the state and county.

Coastal Hazard

The proposed development will not alter any drainage patterns that would adversely affect adjacent development or downstream properties. A portion of the project site is located in a coastal high hazard flood zone. However, no habitable floor areas of the proposed hotel will be developed in elevations affected by a 100-year tsunami inundation. Also, no portion of the proposed hotel is subject to a potential 100-year riverine flood or to extensive damage from mauka run-off.

VI. IRREVERSIBLE AND INTRACTABLE COMMITMENT OF RESOURCES

Development of the property for hotel use will commit the land to long-term uses associated with the proposed project. Private

funds, labor, construction equipment, building materials, landscape materials, energy sources, water resources and other utility services will be committed to the development of the project. Additionally, future employees will be required for hotel management, operations, and maintenance positions. Public and private funds for service utilities and facilities and advertising resources for promotions will be required.

VII. AGENCIES CONSULTED

- o Planning Department, County of Hawaii
- o U.S. Army Corps of Engineers, Pacific Ocean Division

VIII. DETERMINATION

In conformance with Subsection 11-200-12 of the State Environmental Impact Statement Regulations (Significance Criteria), the Planning Department of the County of Hawaii has determined that an environmental impact statement will be prepared in accordance with Chapter 343, Hawaii Revised Statutes.

The proposed development has the potential to have significant impacts on the environment because of the effects that may result from construction of the proposed lagoon and its connection to the ocean.

IX. AGENCIES TO BE CONSULTED IN EIS PREPARATION

Federal Agencies

U.S. Army Corps of Engineers, Pacific Ocean Division
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region IX-San Francisco

State Agencies

Department of Accounting and General Services
Department of Agriculture
Department of Budget and Finance
Department of Defense
Department of Education
Department of Hawaiian Home Lands
Department of Health
Department of Labor and Industrial Relations
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Social Services and Housing
Department of Taxation
Department of Transportation
Office of Environmental Quality Control
Office of the Governor
Office of Hawaiian Affairs

Congressional Representatives

The Honorable Daniel K. Inouye
The Honorable Spark M. Matsunaga
The Honorable Daniel K. Akaka
The Honorable Neal Abercrombie

State Legislators

Senator Richard Henderson
Senator Richard H. Matsunaga
Senator Malama Solomon
Representative Virginia Isbell
Representative Andrew Levin
Representative Robert Lindsey
Representative Wayne Metcalf
Representative Harvey Tajiri
Representative Dwight Takamine

Hawaii County

Mayor Dante K. Carpenter
Department of Public Works
Department of Parks and Recreation
Department of Water Supply
Department of Research and Development

Fire Department
Office of Housing and Community Development
Safety Coordinator
Civil Defense Agency
Finance Department
Hawaii Redevelopment Agency
Planning Department
Police Department

Hawaii County Council

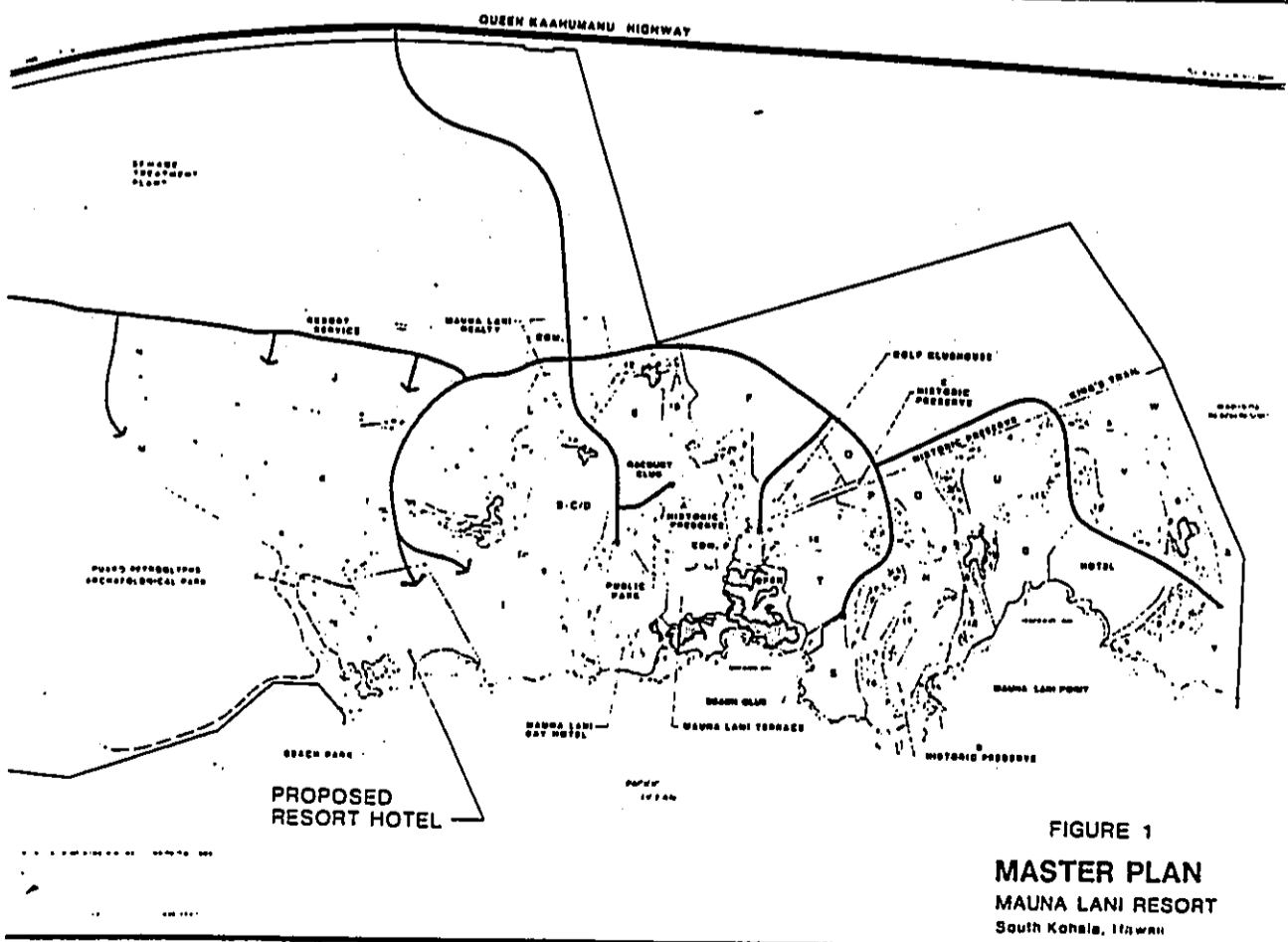
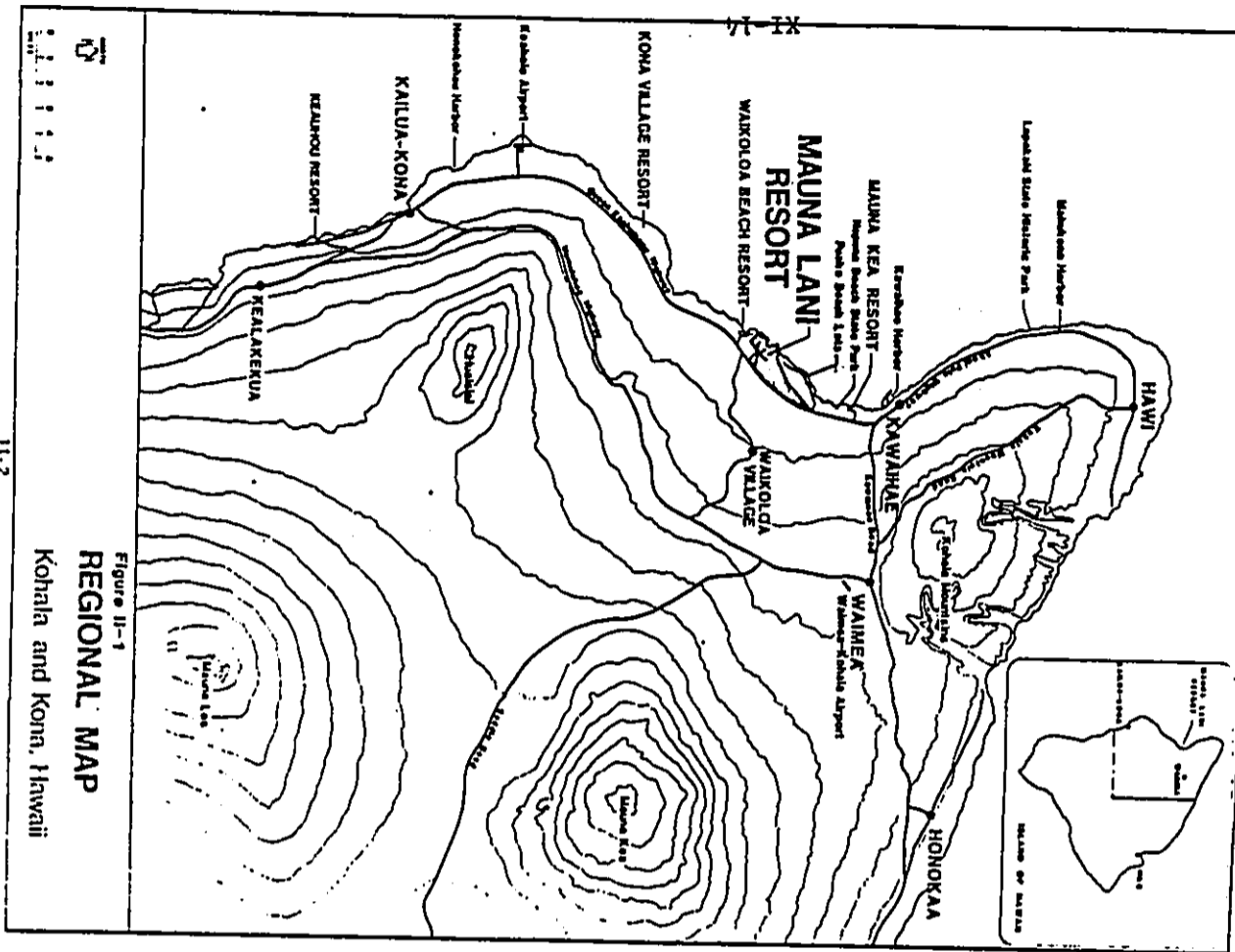
James L. K. Dahlberg
Frank De Luz, III
Takashi Domingo
Robert Herkes
Lorraine Jitchaku-Inouye
Russell Kokubun
Herle K. Lai
Spencer Kalani Schutte
Stephen K. Yamashiro

Public Utilities

Hawaii Electric Light Company
Hawaiian Telephone
Gasco Inc., Hawaii Division

Community Organizations and Other Public Interest Groups

Hawaii Hotel Association
Hawaii Leeward Planning Conference
Kona Community Association
Kona Conservation Group
Life of the Land
Moku Loa Group, Hawaii Chapter Sierra Club
Ma Ala Hele
Puako Community Association
Waimea Hawaiian Civic Club
Waimea-Kawaihae Community Association
West Hawaii Committee



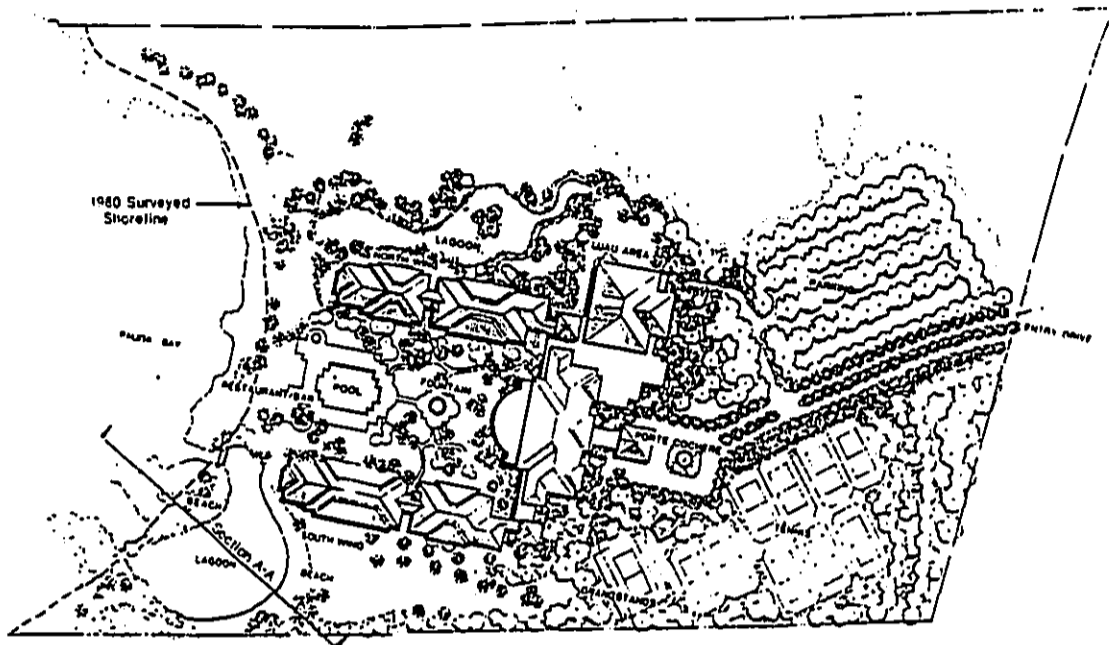
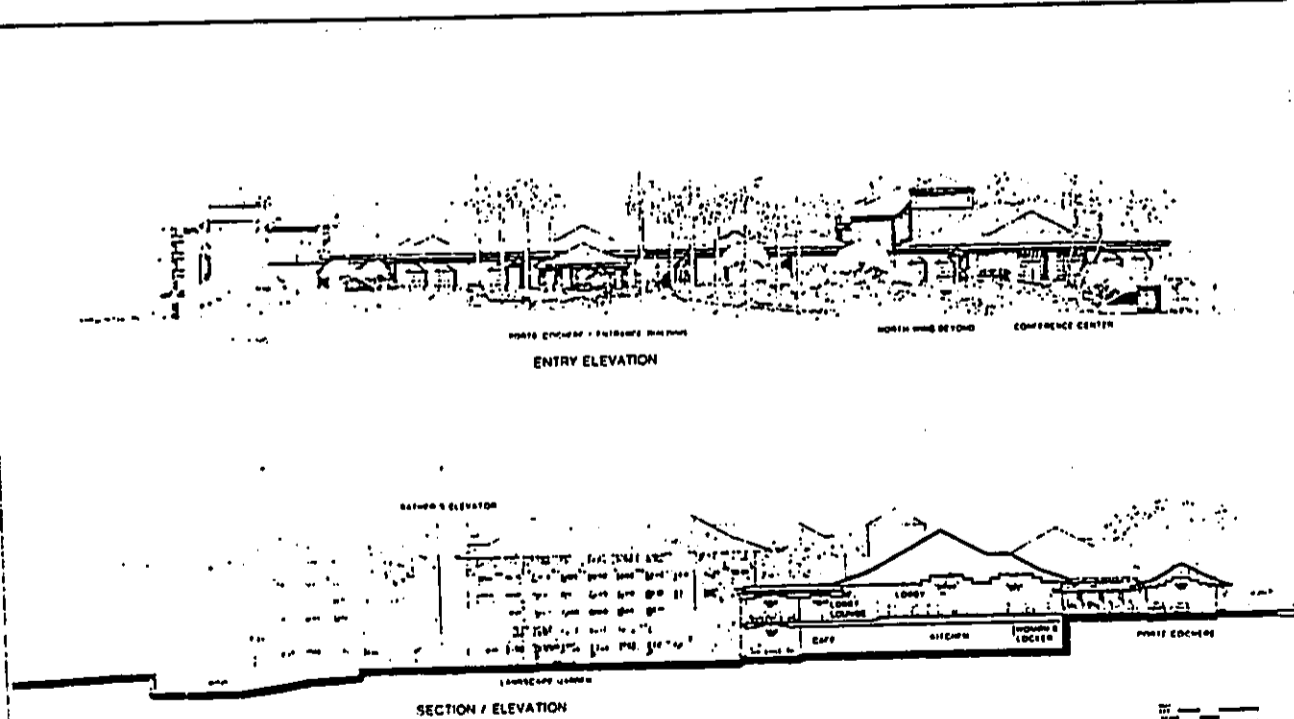
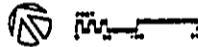


FIGURE 2

SITE PLAN

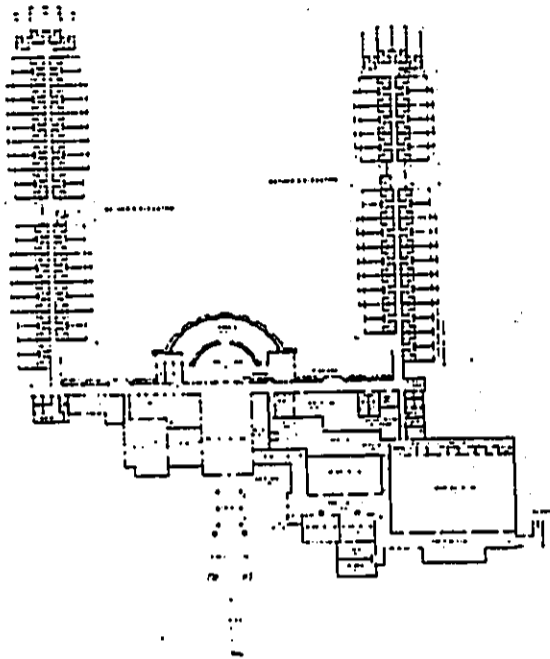


EXTERIOR ELEVATIONS

FIGURE 3

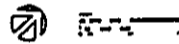
THE RITZ-CARLTON MAUNA LANI
Hawaii XI-15

WAT&G



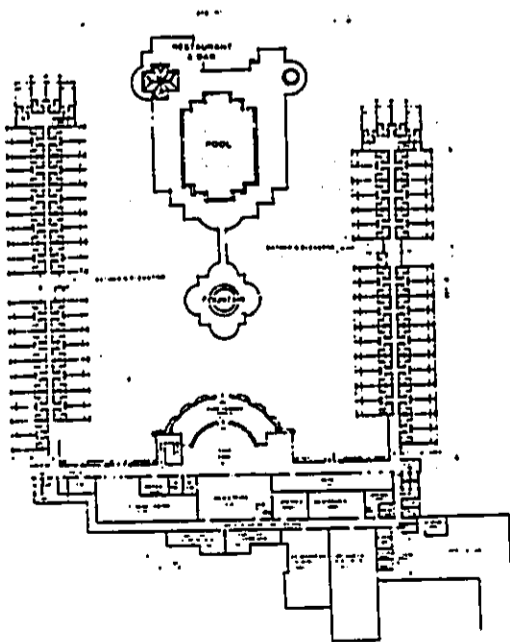
LOBBY LEVEL PLAN

FIGURE 4



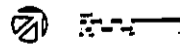
THE RITZ-CARLTON MAUNA LANI
Hawaii

WWT&G



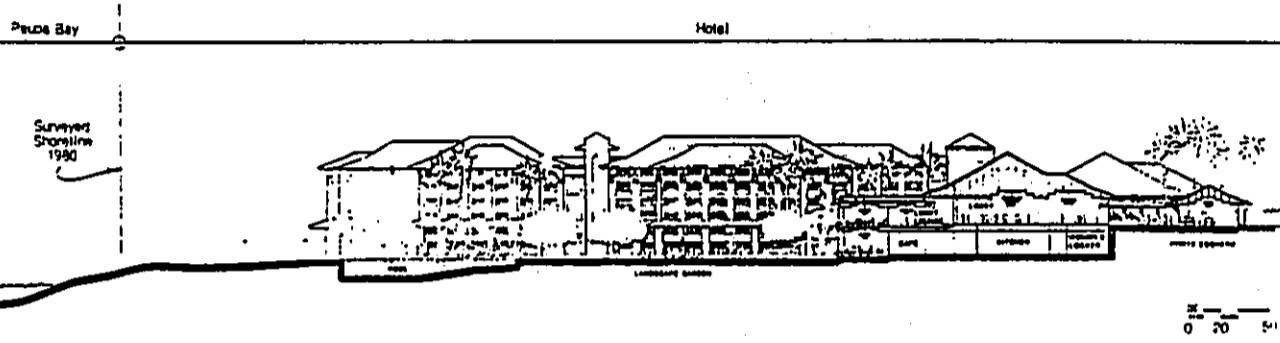
LOWER LEVEL PLAN

FIGURE 5



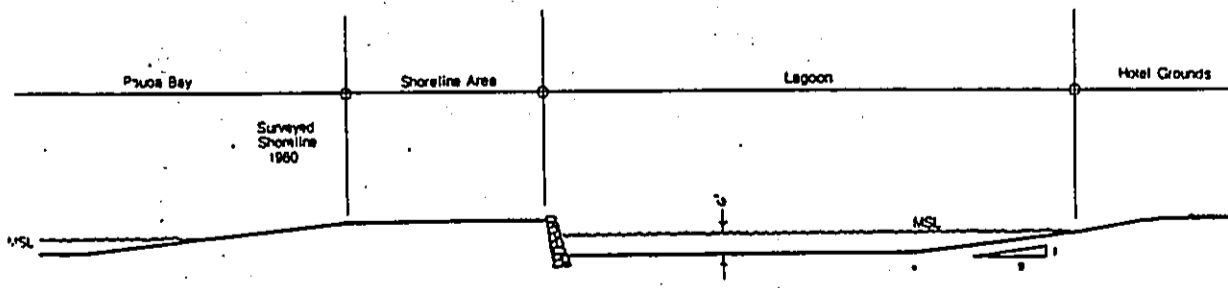
THE RITZ-CARLTON MAUNA LANI
Hawaii XI-16

WWT&G



SECTION/ELEVATION

FIGURE 6



SECTION A-A LAGOON
Scale 1:40'

FIGURE 7

October 24, 1986
86-1977

October 24, 1986
96-1977

Page two

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes

AL:mlf

Attachment

Dear _____:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Pauoa Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22z 8, pars. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.



RECEIVED

DEC 1 1986

United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

November 25, 1986

Ms. Anne L. Mages
Bait, Collins, and Associates
606 Coral Street
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice, Proposed Resort
Hotel, Mauna Lanii Resort, South Kohala, Hawaii

We have examined the subject notice and find that no elements in it impinge upon our competence or responsibilities. We, therefore, have no comments to offer on the notice.

Sincerely,

[Handwritten Signature]
Dan A. Davis
Acting District Chief

RECEIVED
NOV 10 1986
H.L. COLLINS & ASSOCIATES



HOUSE OF REPRESENTATIVES
STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813
November 6, 1986

Dante K. Carpenter
Mayor
Eugene N. Tewanak
Managing Director

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H.L. COLLINS & ASSOCIATES

Patricia G. Engelhardt
Director
Ronald Ohama
Deputy Director

DEPARTMENT OF PARKS & RECREATION
HONOLULU, HAWAII

November 7, 1986

Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for your letter of October 24, 1986, regarding the Environmental Impact Statement Preparation Notice for the Ritz-Carlton Hotel to be developed at Mauna Lani Resort in South Kohala, Hawaii.

At present, I have no comments on the proposed project. But please be assured that I will let you know if anything arises.

With warm personal regards.

Sincerely,

WAYNE METCALF
Hawaii State Representative
Third District

Ms. Ann L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, HI 96813
RE: EIS Preparation Notice for Ritz-Carlton Hotel Co.,
Mauna Lani Resort, South Kohala, Hawaii

Dear Ms. Mapes:

Comments regarding public access were expressed and resolved during our review of the Mauna Lani Resort Master Plan.

We have no additional comments/concerns to offer and we thank you for the opportunity to provide input during the planning stages of the project.

Sincerely,

Patricia Engelhardt
Patricia Engelhardt
Director

PE:GN:al

cc: Planning Dept., County of Hawaii



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OCT 31 1986

JENSEN S. L. HEE
DIRECTOR
BELT, COLLINS & ASSOCIATES
DEVELOPMENT

DIVISIONS:
PROJECT PLANNING AND MANAGEMENT
ELECTRONIC DATA PROCESSING
FINANCE



STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
STATE CAPITOL
P.O. BOX 159
HONOLULU, HAWAII 96810-0159

October 29, 1986

GEORGE B. ANTONIO
MANAGER

HAWAII PUBLIC UTILITIES REGULATORY BOARD
PUBLIC UTILITIES COMMISSION
OFFICE OF THE PUBLIC UTILITIES

FRANCIS E. SMITH
FIRE CHIEF

DON COLOMA
DEPUTY FIRE CHIEF



HAWAII COUNTY FIRE DEPARTMENT
466 KUMU ST. HONOLULU, HAWAII 96813

October 28, 1986

DANIE K. CARPENTER
MAYOR

Ms. Anne L. Mapes
Belt, Collins and Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

This is in response to the draft environmental impact statement preparation notice for the proposed resort hotel by the Ritz-Carlton Hotel Company at Mauna Lani Resort, South Kohala, Hawaii.

Thank you for the opportunity to comment on the proposal, however, I have no comment to make at this time.

Very Truly Yours,

Jensen S. L. Hee
JENSEN S. L. HEE

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Subject: Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

We have no objections to the proposed project. However, the developer shall comply with all provisions of the Uniform Fire and Building Codes and the regulations of the Department of Water Supply.

Thank you for giving us the opportunity to submit our comments.

Very truly yours,

Francis E. Smith
FRANCIS E. SMITH
FIRE CHIEF

FES/RO

GEORGE B. ANTONIOM
SUPERVISOR



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
240 DULANEY WELD ROAD, HONOLULU, HAWAII 96814-0000

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NOV 7 1986

ERT, COLLINS & ASSOCIATES
PAUL E. MALLINBERG
COLLEGE OF ENGINEERING
UNIVERSITY OF HAWAII

GEORGE B. ANTONIOM
SUPERVISOR



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2200
HONOLULU, HAWAII 96810

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NOV 14 1986

ERT, COLLINS & ASSOCIATES

FRANCIS M. HATANAKA
SUPERINTENDENT

NOV 8 5 1986

OFFICE OF THE SUPERINTENDENT

November 5, 1986

HIENG

Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Gentlemen:

Proposed Resort Hotel
Mauna Lani Resort,
South Kohala, Hawaii

Thank you for providing us the opportunity to review the above subject project.

We have no comments to offer at this time regarding this project.

Yours truly,

Jerry M. Matsuda
Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

cc: County of HI, Planning Dept.

Ms. Anne L. Mapes
c/o Belt, Collins and Associates
606 Coral Street
Honolulu, HI 96813

Dear Ms. Mapes:

SUBJECT: Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

Our review of your proposed hotel development indicates negligible student impact on Waimea Elementary - Intermediate School and Honokaa High School.

Please keep us informed if there are changes in your development plans so that we can continue to be sensitive to the future classroom needs of this area.

Should you require any clarification, please call Mr. Richard Inouye at 737-4743.

Sincerely,

Francis M. Hatanaka
Francis M. Hatanaka
Superintendent

FMH:dk

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NOV 18 1986

U.S. DEPT. OF AGRICULTURE



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 285 • 2540 Dole Street
Honolulu, Hawaii 96822

13 November 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
608 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Subject: Environmental Impact Statement Preparation Notice,
Proposed Ritz-Carlton Resort Hotel, Mauna Lani Resort,
South Kohala, Hawaii

We have reviewed the subject EISP and have no comments at this time. Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabeyaah
Edwin T. Murabeyaah
EIS Coordinator

ETM:jm

cc: A.L. Lyman, Planning Dept.
County of Hawaii

AN EQUAL OPPORTUNITY EMPLOYER

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NOV 14 1986

U.S. DEPT. OF AGRICULTURE



EXECUTIVE CHAMBERS

HONOLULU

GEORGE R. AITOUSHI
GOVERNOR

November 12, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
608 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for your letter of October 27, 1986, to Governor Ariyoshi, regarding the environmental impact statement preparation notice for the proposed resort hotel at Mauna Lani Resort, South Kohala, Hawaii. We have shared your letter with the appropriate state agencies.

Sincerely,

Robert H. Mernet
Robert H. Mernet
Press Secretary

DANIEL K. INOUE
HAWAII

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OCT 31 1986

United States Senate

BELT, COLLINS & ASSOCIATES

DAVID M. PETERS
DIRECTOR

GEORGE R. ANTONIO
CONSULTANT



STATE OF HAWAII

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

DIVISION OF PUBLIC WORKS

P. O. BOX 111, HONOLULU, HAWAII 96810

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NOV 6 1986

BELT, COLLINS & ASSOCIATES

CONSULTANTS

1000 KUMUWAI
HONOLULU

LETTER NO. (P)2031.6

NOV 3 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

I wish to acknowledge receipt of the copy of the Preparation Notice of the Environmental Impact Statement of the proposed Mauna Lanai Resort Hotel.

I appreciated receiving the copy of this preparation notice, and would like to receive a copy of the EIS when it is completed.

Again, thank you for sharing a copy of the preparation notice and the Environmental Assessment Report with me.

Aloha,

DANIEL K. INOUE
United States Senator

DKI:scv

Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Environmental Impact Statement
Preparation Notice
Mauna Lanai Resort, South Kohala, Hawaii

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

Very truly yours,

TEVANE TOMINAGA
State Public Works Engineer

/jnt
Attachment
cc: Mr. Albert L. Lyman



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NOV 3 1986

BELT, COLLINS & ASSOCIATES

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

25 AUPUNI STREET • HONOOLULU, HAWAII 96820

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October 30, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, HI 96813

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
THE RITZ-CARLTON HOTEL COMPANY
TAX MAP KEY 6-8-22:8, POR. 7, 9 AND 10

The proposed development's water demand should be addressed in more detail. Mauna Lani Resort (MLR) should confirm that the proposed development will obtain its water demand from MLR's allotment through participation in the Lalaialo Water System.

William Sewake
H. William Sewake
Manager

QA

cc - Planning Department
The Ritz-Carlton Hotel Company
Mauna Lani Resort

March 4, 1987
87-457

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

Dear Mr. Sewake:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paooa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of October 30, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

As requested, the proposed hotel's water demand will be addressed in more detail in the Draft EIS. Mauna Lani Resort confirms that the proposed hotel will obtain its water from Mauna Lani Resort's allotment through participation in the Lalaialo Water System.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:llf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

LIFE OF THE LAND



Anne Hapes
Belt Collins & Associates
606 Coral Street
Honolulu, HI 96813

Dear Ms. Hapes:

I appreciate receiving your request for input into the preparation of an EIS for the Ritz-Carlton project at Pauoa Bay in South Kohala. Those of us especially concerned with the environment are glad to see that Mauna Lani continues to follow a policy of early consultation with community organizations.

Our concerns fall into a general uneasiness with the shoreline modification, and a specific concern with well being of the habitat of large marine vertebrates in the area.

- The General Concern. Briefly put, will the proposed creation of a swimming lagoon actually result in the attractive beach and swimming area that is hoped for? The worst result would be for the lagoon to be created as proposed, yet have the end product not turn out very well. Then, either the success of the Ritz-Carlton will be impaired, or else further costly and potentially environmentally significant alterations will be required. It seems possible that a known, satisfactory result might be better achieved with a large, outdoor swimming pool plus some minor shoreline improvements at Pauoa Bay. Then the bay and beach could provide a limited ocean experience for some guests while the pool could nicely service the majority.

The proposed lagoon with two ocean inlets could suffer from less than satisfactory water quality, and also from a bottom condition of siltation. I understand that the extensive pumping of subsurface groundwater is intended to help avoid these problems. Do you folks have some comparable projects that have been successful to look at and study?

- The Specific concern. From extensive personal experience I can say that the rock shelf outside Mauna Lani Resort is one of the best in the leeward area for providing caves and arches that the large fish of the ulua family choose to frequent. The only other comparable areas, from Kiholo northward, are at Keawaiki and at the outmost promontory of the Anaehoomaluu reef. Any degradation of the marine environment at the offshore reef area could harm the suitability of that habitat. In particular, will the large volume of pumped groundwater perhaps increase the introduction of nutrients into the ocean?

NOV 2, 1986
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NOV 4 1986
EIS, CHANGES & REVISIONS

LIFE OF THE LAND



NOV 2, 1986
page 2

I don't think that hotel use of the Pauoa Bay area represents any significant appropriation of a scarce public resource. The creation of the public park area nearby to the north is a valuable contribution to the public's need for facilities by the ocean. However, I hope that the two inlets to the lagoon don't interrupt lateral shoreline access.

I hope these comments prove helpful. Any elaboration or further participation on our part will be gladly given.

sincerely,

Bill Graham
LOL Big Island representative

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Mr. Bill Graham
Life of the Land
250 S. Hotel Street, Room 211
Honolulu, Hawaii 96813

March 4, 1987
87-459

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 2, 1986 commenting on the Environmental
Impact Statement Preparation Notice and Environmental Assessment for the above
project.

We note your aesthetic and technical concerns regarding the proposed lagoon.
The lagoon is an integral part of the overall hotel site design and the need for this
lagoon as well as its potential impacts on the ocean and marine life will be addressed in
the EIS. As for your concern about public access, lateral shoreline access will not be
interrupted due to the lagoon.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:lf

cc: Douglas McCarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

RECEIVED
PUAKO COMMUNITY ASSOCIATION NOV 6 1986

2 Puako Beach Drive, Kamuela, Hawaii 96743
(707) 882-7747
E.H. COLLINS & ASSOCIATES

Ms. Anne L. Mapes
-2-
November 4, 1986

today and as two thousand or more rooms are added in coming years, we are concerned that the helicopter flights will increase in direct proportion.

As you know, the Islands of Kauai and Maui have serious noise problems with the tour helicopters and they are seeking legislation as a means of controlling them. Also, the helicopter companies have agreed to try to alleviate the problem by restricting their routes and flying higher. The big question seems to be: how high is safe, and how does the distance relate to the noise generated at ground level?

Noise pollution is an environmental problem and we hope you will address this in your study.

If you have any questions on my comments, please feel free to call me.

Sincerely yours,



Richard L. Keith
President

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

November 4, 1986

Re: E.I.S.
Ritz-Carlton Hotel

Dear Ms. Mapes:

Thank you for your invitation to have the Puako Community Association provide input that will assist in the preparation of the E.I.S. for this project.

Our organization held a special meeting on November 2, 1986, where we were presented with drawings and information by Roger Harris of the Mauna Lani Resort.

After asking numerous questions regarding the location of the hotel, ingress and egress, height of building, parking, sewage treatment, water supply, petroglyphs, public access to shoreline, lagoon development, etc., we voted to approve the project. It is our understanding that all necessary federal, state and county permits will be received before the construction proceeds.

In regard to any specific items that may affect our community, a long discussion was held on whether or not it would be feasible for the Mauna Lani Resort to someday be able to treat the sewage from Puako. At the present time, our homes are connected to cesspools and, due to our close proximity to the ocean, we are concerned about possible pollution of the ocean water. We certainly don't propose this as a condition of approval for the hotel project but, rather, a query as to whether or not it would be a feasible solution to our problem in the future. It appears their sewage treatment plant has ample excess capacity and it may be that they could charge us for this service and thus reduce their operating costs. If this falls within the scope of your study, we would be interested in any findings.

Another item that affects our community, as more hotels are constructed, is the noise problem with tour helicopters. This is a substantial problem

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& ASSOCIATES**

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March 4, 1987
87-460

Mr. Richard L. Keith, President
Puako Community Association
2 Puako Beach Drive
Kamuela, Hawaii 96743

Dear Mr. Keith:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pauoa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 4, 1986 commenting on the Environmental
Impact Statement Preparation Notice and Environmental Assessment for the above
project.

I have referred your question on the feasibility of treating sewage from Puako at
the Mauna Lani Resort sewage treatment plant to Mauna Lani Resort. Please note that
the applicant for the Pauoa Bay resort hotel project is Ritz-Carlton Hotel Company,
and not Mauna Lani Resort.

The potential for noise impacts will be addressed in the EIS. There are no plans
for a heliport to be constructed at the project site.

Sincerely,

Anne L. Mapes

Anne L. Mapes

ALM:if

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

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NOV 9 1986

WAIMEA-KAWAIHAE COMMUNITY ASSOCIATION
P.O. BOX 685
KAMUELA HAWAII 96743

11/6/86

Ms. Anne L. Hapes
Belt, Collins & Associates
606 Coral St.
Honolulu, HI. 96813

Re: EIS Mauna Lani Resort (Ritz-Carlton)

Dear Ms. Hapes,

In response to your letter of 10/24/86 the Waimea-Kawaihae Community Association has the following comments and requests for information:

Re: EIS Mauna Lani Resort June 1985 Chapter IV-115 Water Supply. It states that the total water demand for South Kohala could increase from 2.5 million gallons per day to 20 mgd by 2010 and that this would be provided by private development of groundwater. Although it may be possible to expand the Lalamilo water system to meet the direct needs of the coastal resorts, our question relates to off-site water needs: What is the projected increase in water demand for the Waimea area as a result of the overall growth fueled by resort development? Since local farmers use both the County and State systems, both agricultural and potable water demands must be taken into account. We see a critical water shortage developing in the Waimea area as coastal growth will lead to growth in the support community of Waimea (unless substantial improvement is made in water source development and distribution by the State and County for Waimea).

Questions on other of-site impacts:

1. The Waimea School appears to be over crowded at 900 students. What is the cumulative effect of all coastal development on the school enrollment at Waimea School as well as Monokaa High School? What are the State's plans for meeting this need and is there any plan for a regional high school to meet this need?
2. We do not expect the addition of traffic signals at the main intersection in Waimea (scheduled for February 1987) will accommodate the traffic congestion we are experiencing. Specifically: What are the projected traffic counts for the main intersection? What are the projected traffic counts assuming the Waimea-Kawaihae Bypass is built. What are the projected traffic counts assuming a Parker Ranch 20/20 plan loop is implemented? What are the projected traffic counts assuming the Mud Lane to Waimea Bypass is built in conjunction with the Waimea-Kawaihae Bypass? Also, if the 20/20 loop ties into it?

We have a gut feeling that this bottleneck will become un-

bearable if some solution is not reached. We feel there needs to be a way for through traffic (Hamakua-to Kohala Coast) to bypass the main intersection. Note: Certain Waimea merchants expressed opposition to a bypass some years ago based on fears that the bypass would "pass them by" and they would lose business. Our feeling is that the overall growth pressures are so great that this would not be the case. Town center traffic will increase even with a bypass due to the nature of Waimea as a regional service center.

We are in support of quality development along the coast. We do not intend to hold a master planned resort "hostage" and expect them to provide off-site improvements. However, we see the straw that broke the infrastructure's back approaching. As a matter of proper planning it is imperative that we recognize all of these off-site impacts by coastal development as a whole. Each resort EIS attempts to reflect their impacts as if they were the only resort. We see the need for a comprehensive compilation of all the resort's impacts. So our comments would apply to each of the other resorts and we are not "picking on" the Ritz-Carlton for any particular reason (we feel it is a good project). It is just that the cumulative effects of prior, present, and many planned future developments must be addressed.

Thank you for the opportunity to comment.

Sincerely,

Willie C. Morris
Willie C. (Neil) Morris
President

cc: A. Lono Lyman

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Mr. Willis C. Morriss, President
Page Two

March 6, 1987
87-461

Cumulative Effect of Resort Development. The EIS for the proposed project will address potential impacts due to the proposed hotel development in the context of other resort development in the region.

Sincerely,

Anne L. Mapes
Anne L. Mapes

Mr. Willis C. Morriss, President
Waimea-Kawaihae Community Association
P.O. Box 685
Kamuela, Hawaii 96743

Dear Mr. Morriss:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pouoa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 6, 1986 containing comments from the Waimea-Kawaihae Community Association on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project. Following are answers to your questions, in the order that they appear in your letter.

Water Supply Availability. We recognize the secondary impacts of resort development, specifically the increase in population due to employment generated by the resort hotel and other resort development in West Hawaii. There will undoubtedly be an increase in population in the Waimea area, as there will be in other Kohala and Kona communities. These communities will need increased services, including potable water supply and distribution. As you know, an exploratory well drilling program is being pursued by the Division of Water and Land Development at three well sites: one deep well site and two shallow well sites. If this exploration is successful, potable water from these sources may be available to residents of the Waimea area.

Waimea and Honokaa Schools. In a recent communication with the State Department of Education, we were informed that the Department plans to construct four classroom buildings for Waimea School in 1988 and six classroom buildings for Honokaa School in 1989. The impact of the proposed development on public school enrollment will be addressed in the EIS.

Vehicular Traffic. We are preparing a regional traffic study and the results will be included in the EIS. Recent communication with the State Department of Transportation confirms that, although there are construction plans for the bypass road, there are no funds in the six-year CIP budget for the road. Further, the Department says that the road will probably not be built within the next 10 years.

AL:mlf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

HAWAIIAN BLDG. 200 SOUTH KING ST. HOONANI, HAWAII
HAWAII ADDRESS: PO BOX 7208 HOONANI HAWAII 96808-1070

RECEIVED
NOV 10 1986
MURRAY E. TOWAL
MURRAY E. TOWAL
MURRAY E. TOWAL

Ref. No. P-5387

November 6, 1986

Mr. Glen T. Koyama
Belt, Collins & Associates, Ltd.
606 Coral Street
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for the Ritz-Carlton Hotel Company, Paoua Bay, South Kohala, Hawaii

We have reviewed the subject EIS preparation notice and offer the following comments.

1. The proposed development may have potentially significant impacts due to the construction of the proposed lagoon and its connection to the ocean. A determination of the significance (e.g., uniqueness, occurrence, and relative size) of the marine communities should be provided. The impacts to nearshore and offshore waters as well as marine and land-based organisms should be thoroughly assessed particularly as they pertain to lagoon-related impacts. A short- and long-term water quality monitoring system should be proposed and implemented.
2. A scenic and open space policy of the Hawaii Coastal Zone Management (CZM) Program is to ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms. The creation of lagoons in conjunction with the resort development will alter the natural shoreline in the area. The necessity for creating lagoons should be explained and the impacts relative to dredging, water quality and circulation patterns should be fully assessed.
3. Anchialine ponds should be inventoried in conjunction with a pond management plan. A small anchialine pond is mentioned across the southern boundary line of the subject property.
4. The EISPN states that the private housing market is capable of satisfying some of the housing demand generated by the proposal hotel, but some assisted housing will be necessary. The EIS

Mr. Glen T. Koyama
Page 2
November 6, 1986

should address the long-term employee housing requirements of the total Mauna Lani Resort area and should also discuss the location of new residential support communities to satisfy the employee housing demand generated by resort development.

5. The EISPN states that existing public beach accesses and open space buffers along the shoreline will be maintained. The proposed hotel development should contribute to a comprehensive plan to improve public access to the shoreline. In support of the CZM policy encouraging the reasonable dedication of shoreline areas with public recreational value, plans for public parks, accessways, and associated facilities such as parking and comfort stations should be fully described in the EIS.
6. The EIS should discuss the relationship of the proposed project to the Hawaii State Plan (Chapter 226, HRS). This review should at a minimum discuss the relationship of the proposed project to the following: Economy (Section 226-8, HRS), Physical Environment (Sections 226-11 through 226-13, HRS), Facility Systems (Section 226-15, HRS) and Socio-Cultural Advancement (Sections 226-19 and 226-23, HRS). Among the relevant Priority Guidelines, the following should be examined: Economic (Sections 226-103(b) and (c), HRS), Regional Growth and Land Resource Utilization (Section 226-104(b), HRS) and Affordable Housing (Section 226-106, HRS). The State Functional Plans should be reviewed to determine relevance to your project and important relationships should be discussed in the EIS.

Thank you for the opportunity to provide these comments.

Very truly yours,

Murray E. Towal
Murray E. Towal
Kent H. Keith

cc: Mr. Albert Lono Lyman, Director
Planning Department, County of Hawaii
Office of Environmental Quality Control

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& ASSOCIATES**
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March 8, 1987
87-462

Mr. Roger A. Ulveling, Director
Dept. of Planning & Economic Development
State of Hawaii
P.O. Box 2339
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Lanai Resort, South Kohala, Hawaii

Thank you for your department's letter of November 6, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project. Following are comments on the concerns identified, in the order that they appear in Mr. Keiiti's letter.

Impacts of Lagoons. A baseline assessment of the marine environment at Paoua Bay and an engineering evaluation of ocean and shoreline conditions at the project site have been completed. The results of these studies and an analysis of potential impact due to the lagoon will be included in the EIS.

Architalline Ponds. There is one architalline pond on-site. It will be retained as part of the overall hotel site development.

Employee Housing Requirements. These requirements will be addressed in the EIS.

Public Access to the Shoreline. Public shoreline access and amenities will be provided at Mauna Lanai Resort, of which the proposed hotel will be part. They will be described in the EIS.

Relationship of Proposed Project and State Plans. The EIS will include a discussion of the proposed project as it relates to the plans and specific sections of plans which you identify.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:ll

cc: Douglas McCarthy, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lanai Resort, Inc.

GEORGE R. ARIYOSHI
GOVERNOR



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NOV 12 1986

ATTY. GENERAL & ASSOCIATES

JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE
SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512
November 6, 1986

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

Ms. Anne L. Mapes
November 6, 1986
Page -2-

resort, we suggest a comprehensive review of the impacts and anticipated from groundwater withdrawal on both domestic and agricultural users in the affected area.

Thank you for the opportunity to comment.
Sincerely,

Ms. Anne L. Mapes
Belt, Collins and Associates
606 Coral Street
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice
(EISPN) for Mauna Lani Resort, South Kohala,
Hawaii
The Ritz-Carlton Hotel Company
TKK: 6-8-22: 8, Pors. 7, 9 and 10
Acres: 32

Jack K. Suwa
JACK K. SUWA
Chairperson, Board of Agriculture

cc: LUC
OEQC
Hawaii County Planning Department

Dear Ms. Mapes:

The Department of Agriculture has reviewed the subject document and offers the following comments.

According to the EISPN, the proposed development would involve the development of a resort hotel and associated improvements including tennis courts, swimming pools, and extensive landscaping. The subject parcel is located in the State Urban District and is zoned for urban uses.

The Draft EIS should include a discussion on the source and quantity of potable and irrigation water needed for the proposed project and whether water withdrawal will affect agricultural uses in the surrounding area.

Based on our review of other resort proposals in the South Kohala area, we note that demand for water is increasing and the trend is likely to continue into the future. Most of the water will be withdrawn from groundwater sources tapped with deep wells further inland along the South Kohala/North Kona coastline. If this method is also utilized for the proposed

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March 4, 1987
87-463

Ms. Suzanne D. Peterson, Chair
Board of Agriculture
State of Hawaii
P.O. Box 22159
Honolulu, Hawaii 96822-0159

Dear Ms. Peterson:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your department's letter of November 6, 1986 commenting on the
Environmental Impact Statement Preparation Notice and Environmental Assessment
for the above project.

As requested, the proposed hotel's demand for water will be addressed in the EIS,
as will be the potential impacts from groundwater withdrawal.

Sincerely,

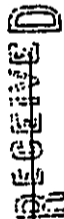
Anne L. Mopes
Anne L. Mopes

ALM:llf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.



DANTE K. CARPENTER, MAYOR
DENNIS M. YAMAMOTO
Director



DEPARTMENT OF RESEARCH AND DEVELOPMENT
COUNTY OF MAUI • 215 MAUI BOULEVARD • MAUI, HAWAII 96709 • TELEPHONE (808) 841-6344

November 7, 1986

U.S. COURT REPORTERS

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, HI 96813

Dear Ms. Mapes:

This is in response to your letter of October 24, 1986, regarding the EIS preparation notice for the proposed resort hotel at the Mauna Lani Resort, South Kohala, Hawaii.

We would like to receive a copy of the EIS when it is completed and will make comment at that time.

Our primary concern in the preparation of the EIS is the section of the socio-economic impact. We would appreciate economic data on the effect on the Big Island economy, e.g. employment, payroll, etc. Also, concerns which should be addressed are external impacts such as the effect upon housing, the educational system, etc.

Another aspect which should be examined is the approach to preparing the EIS. Until recently, there has been a tendency to treat resort projects as being isolated developments. We are beginning to see that the sum of the impacts of all the resorts may be otherwise. There may be economies of scale to benefit from in dealing with problems on an area-wide basis.

We look forward to working with you and seeing your EIS in the near future.

Dennis M. Yamamoto
Dennis M. Yamamoto
Director

BELT COLLINS & ASSOCIATES
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March 4, 1987
87-96A

Mr. Dennis Yamamoto, Director
Department of Research and Development
County of Hawaii
34 Rainbow Drive
Hilo, Hawaii 96720

Dear Mr. Yamamoto:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pawaia Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 7, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

A socioeconomic impact analysis is being done for the project, with emphasis on employment and housing. The results of the study will be included in the EIS. As requested, a copy of the draft EIS will be sent to you for comment when it becomes available.

Sincerely,

Anne L. Mapes
Anne L. Mapes

AL:Milf

cc: Douglas McCarthy, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

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NOV 12 1986

POLICE DEPARTMENT, COLLINS & ASSOCIATES

COUNTY OF HAWAII
349 KAPIOLANI STREET
HILO, HAWAII 96720



GUY A. PAUL
CHIEF OF POLICE
WAYNE G. CARVALHO
DEPUTY CHIEF

BELT COLLINS
& ASSOCIATES
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March 4, 1987
87-465

OUR REFERENCE
YOUR REFERENCE

November 7, 1986

Ms Anne L. Mapes
Belt Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Mr. Guy A. Paul
Chief of Police
Police Department
County of Hawaii
349 Kapiolani Street
Hilo, Hawaii 96720

Dear Mr. Paul:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pauoa Bay,
Mauna Lani Resort, South Kohala, Hawaii

After reviewing the Environmental Impact Statement Preparation Notice (EISP) and the Environmental Assessment (EA), we ask that you consider the following concerns created by the construction of the proposed Ritz-Carlton Hotel at Pauoa Bay, South Kohala:

Thank you for your letter of November 7, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

Your concerns about traffic congestion and criminal activity will be addressed in the EIS.

- 1. The one traffic light at the junction of Waimea and Kawaihae will be installed in early 1987. This will not eliminate congestion resulting from increased traffic due to this construction.
- 2. The Kawaihae Road is narrow and winding. Semi-trailers travel the road daily and contribute to its congestion as there are few passing zones.
- 3. As with any growth, criminal activity also increases. Requests for police services in the resort area will also increase.

Thank you for the opportunity to provide our input in this matter.

GUY A. PAUL
CHIEF OF POLICE

Wayne G. Carvalho
WAYNE G. CARVALHO
DEPUTY CHIEF OF POLICE

WG
sf

cc: Captain Alvin Chong

Sincerely,

Anna L. Mapes
Anna L. Mapes

AL:Mill

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.





COUNTY OF
HAWAII

PLANNING DEPARTMENT

25 ALUANI STREET • HONO, HAWAII 96720
(808) 961-8288

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NOV 11 1986

ENT. COLLEGE & ASSOCIATES

DANTE L. CARPENTIER
Mayor
ALBERT LONG LYMAN
Director
HILMA A. PUKAHALA
Deputy Director

November 7, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, HI 96813

Dear Ms. Mapes:

Environmental Impact Statement Notice of Preparation
The Ritz-Carlton Hotel Company
Mauna Lani Resort, South Kohala, Hawaii

We have reviewed the subject environmental impact statement notice of preparation for the proposed resort hotel project in South Kohala, Island of Hawaii, and submit the following comments.

The creation of the lagoons and the operation/maintenance of the lagoons as described will be a significant environmental impact. Although unstated, it appears that the developers intend to pump "salt water" into the lagoon as a means of having warmer water for the users of the lagoon beach to swim in. The source and quality of the "salt water" will be important. The creation and operation/maintenance of the lagoon with direct connection to the ocean will have some legal questions. Please discuss further the impacts/mitigations on this issue.

Water quality of the near shore waters is an issue which we should closely follow. In paragraph 3 on page 7, in order to achieve what is read to be the developer's objective of maintaining "the natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source of action," a monitoring program is essential.

Ms. Anne L. Mapes
November 7, 1986
Page 2

On page 13 starting at line 6, "The hotel is expected to increase public use of the beach, but it would not overburden the sand area, as hotel guests will have a number of beach-related options within the premise to choose from....." To what extent is it expected that the Ritz-Carlton hotel guests will prefer the hotel's options over the natural beach area?

The consultant's attention is directed to the recently issued draft EIS for the Punaluu Resort prepared by Phillips Brandt Reddick and Associates and dated October 30, 1986. With respect to the EIS being prepared by your firm, we will expect that at a minimum the Ritz Carlton's EIS section concerning socioeconomic considerations will be as comprehensive as that contained in the Punaluu Resort. In the Ritz Carlton's EIS, we shall expect the socioeconomic considerations to be addressed both with respect to those directly attributable to the proposed hotel and the cumulative impacts of resort development in the South Kohala-North Kona region.

Should you have any questions on the above comments, please feel free to contact us.

Sincerely,

ALBERT LONG LYMAN
Planning Director

ALL/RN/AK:ak/aeb

**BELT COLLINS
& ASSOCIATES**
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March 4, 1987
87-466

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 August Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pouoa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 7, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

The EIS will address the impacts of lagoon construction and operation on the environment, particularly the nearshore waters. Relevant socioeconomic impacts are being analyzed in a study being prepared for the project, including cumulative impacts. The analysis is being performed using methodology suggested by your department.

We shall be in contact with your department during the preparation of the EIS to ensure that the report addresses all of your concerns.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:lf

cc: Douglas McCarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

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NOV 13 1986
BELT COLLINS & ASSOCIATES

HAWAIIAN TELEPHONE
(EIS)

November 10, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

RE: RISP - Mauna Lan1 Resort

Hawaiian Tel's support for the proposed development remains steadfast. We recommend that as formal plans for the development are being drafted, the developers contact our Telephone Planning Consultants in Honolulu to go over the telephone facilities (underground conduits, etc) required for any telephone system to be installed.

Hawaiian Tel's primary concern is that often the telephone planning aspects with a project are overlooked and/or limited to intra-building electronic systems and intra-building cabling designs. The facility planning for the cables serving the entire resort needs to be addressed at the outset to avoid possible delays to the activation of a Telephone Network.

If you have any questions, please call me at 935-9589.

Duane Y. Tanouye
Duane Y. Tanouye
Engineering & Construction
Manager - Hawaii

DTT:ph

XI-41

March 8, 1987
87-468

Mr. Duane T. Tanouye
Engineering & Construction Manager - Hawaii
Hawailian Telephone
P.O. Box 4249
Hilo, Hawaii 96720

Dear Mr. Tanouye:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Papea Bay,
Mauna Lan1 Resort, South Kohala, Hawaii

Thank you for your letter of November 10, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

By copy of this letter, your recommendation for early coordination with Hawaiian Telephone is being passed on to the developer. Specifically, you recommend that as formal plans for development are being drafted, the developer should contact your Telephone Planning Consultants in Honolulu to go over the telephone system and facilities required.

Sincerely,
Anne L. Mapes
Anne L. Mapes

AL:Milf
cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lan1 Resort, Inc.

DANIEL K. AKAKA
SECOND DISTRICT, HAWAII

COMMITTEE

APPROPRIATIONS
AGRICULTURE,
RURAL DEVELOPMENT

THEASURY,
POSTAL SERVICE

TOURISM CAUCUS
SPACE CAUCUS
COCHAIRMAN

Congress of the United States
House of Representatives
Washington, DC 20515

November 20, 1986

TELEPHONE OFFICE
1301 Constitution Avenue
Washington, DC 20515
TELEPHONE 202-225-4900
FACSIMILE 202-225-4900
OFFICE OFFICE
1101 Pennsylvania Avenue
Washington, DC 20540
TELEPHONE 202-225-4900

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NOV 21 1986

U.S. HOUSE OF REPRESENTATIVES

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for notifying me of the Ritz-Carlton Hotel Company's proposed resort development plans at the Mauna Laní Resort in South Kohala, Hawaii.

I appreciate the invitation to comment on the Company's proposed resort development. I believe one of the major concerns expressed by my constituents on the island of Hawaii, especially from the community in South Kohala, has been over the need for adequate water supply development to meet both current and future domestic and agricultural demands. I trust that your EIS will include an examination of this particular concern.

I look forward to reviewing your EIS when made available in January of next year. One again, thank you for bringing the Ritz-Carlton Hotel Company's proposed development plans to my attention.

Aloha puehaha,

Daniel K. Akaka

DANIEL K. AKAKA
Member of Congress

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& ASSOCIATES
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March 4, 1987
87-470

The Honorable Daniel K. Akaka
U.S. House of Representatives
Prince Kuhio Federal Bldg., Room 5104
P.O. Box 50144
Honolulu, Hawaii 96850

Dear Congressman Akaka:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Laní Resort, South Kohala, Hawaii

Thank you for your letter of November 20, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project. Your West Hawaii constituents' concern about adequate water supply development will be addressed in the EIS. The draft EIS is expected to be available in April and a copy will be sent to you for review.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:lf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Laní Resort, Inc.

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

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NOV 25 1986
STATE OF HAWAII
RUSSELL N. FUKUMOTO
EXECUTIVE DIRECTOR



STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

BY NEPA REFER
TO:
86:PLNG/6901

November 21, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for the opportunity to provide input to the preparation of the Environmental Impact Statement (EIS) for the subject project.

The Hawaii Housing Authority is concerned with the impact of the proposed project on housing in West Hawaii. We therefore request that the EIS address the following areas.

1. The overall effect on housing demand in West Hawaii resulting from the operation of the proposed hotel and related services.
2. The proposed assisted housing plan, if any, including the number of units to be provided, dwelling type (for sale or rent), and targeted income group.

If you have any questions, please contact Colette Sakoda of my staff.

Sincerely,
Russell N. Fukumoto
RUSSELL N. FUKUMOTO
Executive Director

cc: Mr. Albert Lono Lyman

Mr. Russell N. Fukumoto
Executive Director
Department of Social Services & Housing
Hawaii Housing Authority
State of Hawaii
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Fukumoto:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pouoa Bay,
Mauna Lanai Resort, South Kohala, Hawaii

Thank you for your letter of November 21, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

We note the Authority's concern with the impact of the proposed project on housing in West Hawaii. A housing study is now being performed for the EIS and the results will be summarized in the report. Details for an assisted housing plan or employee housing are being discussed between Mauna Lanai Resort and the appropriate governmental agencies.

Sincerely,
Anne L. Mapes
Anne L. Mapes

AL:Milf
cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lanai Resort, Inc.

March 4, 1987
87-471

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DEC 2 1986



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
427 SOUTH KING STREET, SUITE 140
HONOLULU, HAWAII 96813
12001 548-8960

December 2, 1986

Mr. Glen T. Koyama
Belt Collins & Associates Ltd.
606 Coral Street
Honolulu, Hawaii 96813

Dear Mr. Koyama:

SUBJECT: EIS Preparation Notice, Proposed Resort Hotel, Mauna Lani Resort,
South Kohala, Hawaii. TMA: 6-8-22: 7,8,9,10

Thank you for the opportunity to comment on the proposed resort hotel at the
Mauna Lani Resorts in Kalahaipua'a. The Office of Hawaiian Affairs is
concerned about the project's impact on Hawaiian sites. Please send our
office two copies of the following archaeological reports on which the
findings in the EIS will be based:

- Bishop Museum.
1985. Survey report on proposed hotel site.
- Bishop Museum.
1984. "Archaeological Reconnaissance of the Area South of the
Puako Petroglyph Archaeological District, South Kohala, Hawaii,"
by David J. Welch.
- Science Management, Inc.
1982. "Mauna Lani Resort: An Interpretive and Management Plan for
Its Historic Resources at Kalahaipua'a."
- Tomonari-Tuggle, Myra
1982. A reconnaissance survey and management plan for the Puako
petroglyph field.

Our staff will read these reports carefully and we will send you our
comments. In the interim, we have the following comments to make.

Mauna Lani Resorts should be commended for sponsoring the nomination of the
Puako petroglyph field to the National Register of Historic Places. All
other significant sites in the area should be nominated also. In addition,
Mauna Lani Resorts should be commended for preserving and managing the
Hawaiian sites in the area for public use. We recommend Mauna Lani, in
cooperation with the State, consider creating a special staff position(s),

Mr. Glen T. Koyama
December 2, 1986
Page 2

and/or coordinating with local Hawaiian community organizations who may be
interested and committed, for maintaining the Hawaiian sites: conducting
tours, picking up trash, preventing vandalism, and planting and caring for
endemic Hawaiian plants. The funding for such a position/program should
come from the Dept. of Land & Natural Resources, which is responsible for
managing the State land on which the Puako petroglyph field is located, as
well as being responsible for the preservation and management of
archaeological sites.

At some time in the future, our Cultural Affairs Officer, Malcolm Chum,
would like to visit the petroglyph field to learn more about the proposed
development of the petroglyphs for public use.

The socio-economic section of the preparation notice says that the project
will create new jobs, increase the regional population, and foster new
housing developments. It also says that public facilities such as schools,
libraries, neighborhood parks, and community centers will not be
significantly impacted. This sounds like a contradiction.

We hope these comments will be helpful in preparing the Environmental Impact
Statement for the current Mauna Lani Resorts project. If our office can be
of any further assistance, please feel free to contact Malcolm Chum at
548-8960.

Sincerely,

Frank A. Kanahela III
Frank A. Kanahela III
Administrator

EN

cc: Hawaii County Planning Dept.
Mr. Albert L. Lyman
Mr. Kenneth Brown
Mrs. Francine Duncan
Ms. Annette Amaral

4-11



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& ASSOCIATES**
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Mr. Kamaki A. Kanahele III
Page Two

March 4, 1987
87-674

population at the resort. However, indirect effects will include increased regional population and the associated demand for housing, as well as increased demand for public facilities and services. It is expected that public revenues generated from the project will offset public costs necessary to provide the added services and facilities.

Mr. Kamaki A. Kanahele III
Administrator
Office of Hawaiian Affairs
State of Hawaii
567 S. King Street, Suite 100
Honolulu, Hawaii 96813

Dear Mr. Kanahele:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paooa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 2, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

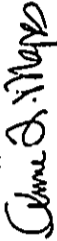
As requested, we are sending you two copies each of the 1984 Welch report and the 1982 Science Management, Inc. Interpretive and management plan. We do not have a copy of the 1982 Tomonari-Tuggle report in our office, but will ask for a copy from Mauna Lani Resort. Two copies of this report will be sent to you later.

You also requested two copies of the 1985 Bishop Museum survey report mentioned in the EIS Preparation Notice. The report referred to is actually the May 1979 B.P. Bishop Museum publication, "Marine Exploration in Prehistoric Hawaii: Archaeological Investigations at Kalahouipa'a Hawaii Island," Pacific Anthropological Records No. 29. The date was inadvertently misstated in the EIS Preparation Notice. Your office most likely has a copy of the B.P. Bishop Museum bound report or you might obtain one from the museum. Please let us know if you are not able to obtain the report.

Please note that the EIS which we are now preparing addresses the development of one project site within Mauna Lani Resort. Potential impacts on archaeological sites within the entire resort have been addressed in the 1985 EIS for the Mauna Lani Resort. We have sent a copy of your letter and suggestions to Mauna Lani Resort for their consideration.

The socioeconomic impact section of the EIS will contain an analysis of the project's effect on public facilities. The EIS Preparation Notice states: "Since guests of the hotel are transient, public facilities such as schools, libraries, neighborhood parks, and community centers would not be significantly impacted." We anticipate that these services would not be greatly affected directly as a result of increased de facto

Sincerely,


Anne L. Mapes

ALM:lf

Enclosures

cc: Douglas McCarthy, Fitz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

JOHN D. WARREN
COUNCILOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
160 KALANOAHI STREET
HONOLULU, HAWAII 96813

December 17, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

EIS Preparation Notice
Proposed Mauna Lani Resort
South Kohala, Hawaii

The EIS should include a discussion on traffic generation and the potential impact that the subject proposal will have, in relation to other developments, on the Queen Kaahumanu Highway corridor.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

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DEC 22 1986
EIS DIVISION

DEC 22 1986

DEC 22 1986

IN REPLY REFER TO:
STP 8.1747

BELT COLLINS
& ASSOCIATES

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March 4, 1987
87-475

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

Dear Mr. Hirata:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pooua Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 17, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

A traffic study is being prepared for the EIS and the analysis will take into consideration other resort developments planned for the region.

Sincerely,

Anne L. Mapes

ALM:llf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

JOHN WAHLEE
Deputy Director



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 521
HONOLULU, HAWAII 96809

JAN 08 1987

DOCUMENT NO.: 2258B

WILLIAM PATT
Director of Land & Natural Resources
DIVISION OF
PLANNING AND DEVELOPMENT
ADMINISTRATIVE SERVICES
CONTRACTS & PROCUREMENT
LAND AND NATURAL RESOURCES
STATE PLANNING
DIVISION AND LAND DEVELOPMENT

Ms. Anne L. Mapes

- 2 -

DOC. NO.: 2258B

We recommended the following:

1. The applicant determine which of 5 known, nearby sites are in the project area, and
2. The applicant work with our office and the County Planning Department in preparing and executing a mitigation plan to handle the significant sites in the parcel.

The significant sites in the project area need to be identified in the EIS, and an acceptable mitigation plan needs to be presented.

Recreation Concerns

There are no known shoreline recreation resources of significant value at Paoua Bay. However, we would like to review and comment on any proposed public park development in the subject area. We note public shoreline access is being retained.

Aquatic Concerns

We suggest that the EIS thoroughly describe the activities planned, the aquatic resources of the project site and nearby areas which may be affected, existing levels of public use of these resources, and the anticipated effects of the proposed activities on these resources and uses. The means which would be used to prevent, reduce or mitigate adverse effects should be addressed.

More specifically, the following resources should be considered: anchialine ponds, beachfront, coastal waters and bottoms, and the aquatic organisms inhabiting them. The following uses should also be examined: fishing, squidding, gathering limu, sightseeing, sunbathing, beachcombing, swimming, surfing and other water-oriented activities. We suggest that these be discussed in light of contaminants, landscaping and agricultural chemicals, wastewater disposal and nutrient enrichment, and modification to existing and customary patterns of access to the shore. This information is necessary to evaluate the development impacts on aquatic resources.

Finally, an outlined plan for constructing and maintaining the two proposed lagoons, and addressing specific mitigation measures on adverse impacts to aquatic communities and ocean activities such as fishing, should be included in the draft EIS.

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

SUBJECT: Environmental Impact Statement (EIS) Preparation Notice, Proposed Resort Hotel, Mauna Lani Resort, South Kohala, Hawaii

Thank you for the opportunity to comment on the subject EIS Preparation Notice. The proposed project will develop 32 acres for resort use including ultimately a 650-room hotel, associated improvements, and two man-made lagoons. Our review has resulted in the following:

Historic Sites Concerns

The Environmental Assessment states that a few historic features were present, but these are not itemized by number or located on a map. Also, it is said none of these features were significant. Our records indicate that there are 5 sites in the immediate vicinity -- E1-304, -305, -306, -309, and -32 (Kitch 1979: 28-29, 56-57). We are not sure which are in the project area. We believe that sites 304, 306, 309 and 32 are significant for their information content; while 305 has had its significant information recorded and is not longer significant.

Given this information, we believe that a mitigation plan should be agreed to which either protects the 4 significant sites or which calls for archaeological data recovery of their significant information. These are small sites, and archaeological data recovery would be small in scale. It should involve full descriptions and scale mapping of each site; a representative surface collection and/or excavation of deposits (artifacts, midden) at 304, 307 and 32; scale drawings of the petroglyphs at 306 and 32; scaled photographs and/or drawings of representative alabaster manufacturing depressions at 306, 307 and 32; laboratory analyses of recovered remains; some dating; and report write-up.

**BELT COLLINS
& ASSOCIATES**
Engineering - Planning
Landscape Architecture

606 Canal Street, Honolulu, Hawaii 96813 • Phone (808) 571-5361 • Telex BELTIN 700074 • Fax (808) 538-7119
Hawaii • Singapore • Australia • Colorado • Hong Kong • Japan

March 31, 1987
87-684

Mr. William W. Paty, Chairman
Board of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of January 8, 1987 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project. Since the Preparation Notice appeared in the OEQC Bulletin, the engineering evolution of ocean and shoreline conditions at the Ritz-Carlton hotel site has been completed, and the proposed beach improvements have been modified based on the study. The engineering study's recommendations include the construction of a swimming lagoon with one 110-foot wide opening to Paoua Bay rather than two connections to Paoua Bay of 30 feet and 50 feet, as described in the Preparation Notice. Also proposed is the expansion of the shoreline beach at the southern end of the bay to provide a safe, natural-appearing swimming area. Further details can be found in the engineering study, which was part of two recent submittals for the Ritz-Carlton Mauna Lani - a Conservation District Use permit application submitted to your department on February 19, 1987, and a U.S. Department of the Army permit application submitted to the U.S. Army Corps of Engineers on February 19, 1987.

Also, since the publication of the Preparation Notice, the metes and bounds description of the Ritz-Carlton Mauna Lani hotel site has been prepared by R.M. Towill, providing a more accurate depiction of the project site.

Historic Sites Concerns. Archaeological features at the project site and vicinity will be identified in the EIS and located on the site plan. Four archaeological sites identified in the 1979 Kirch report seem to be within the 32-acre Ritz-Carlton site: Site EI-304, EI-305, EI-32, all of which you have identified in your letter, and Site EI-33, a shelter cave. In the vicinity of the Ritz-Carlton site are four other archaeological sites: EI-31, C-shaped structures on the edge of the lava flow northeast of the project site, and three sites near the southwestern part of the project site. These latter sites are a destroyed site EI-308 near the beach improvement area on Mauna Lani property; EI-307 which you mention in your letter, near the anchialine pond; and EI-306, a shelter cave complex which you also mention.

Ms. Anne L. Mapes

- 3 -

DOC. NO.: 2258B

Water and Land Development Concerns

The draft EIS should clearly indicate potable and non-potable water sources for the project, anticipated demand and potential impacts to regional water sources.

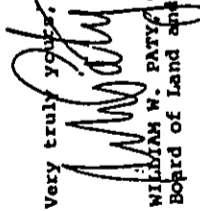
Two saltwater lagoons will be developed, one of which will be connected to the ocean at two points by channels cut through the existing beach. Potential impacts to the shoreline and sandy beaches should be addressed and mitigation measures proposed.

We understand the applicant intends to drill a salt water well near the makai lagoon to supply water to the mauka lagoon. Additional information on the location, depth and quantities of water to be dumped should be provided in the draft EIS. A well drilling permit will also be required from the Department of Land and Natural Resources under Title 13, Chapter 166.

We note that an anchialine pond is mentioned on page 5 of the Preparation Notice in describing the existing physical setting. The location of the pond should be identified on project plans and the applicant's intentions on management of the pond discussed in the draft EIS.

We hope these comments will be of assistance in the preparation of the EIS.

Very truly yours,


WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Mr. Albert L. Lyman, Planning Dept., County of Hawaii

Mr. William W. Paty, Chairman
Page Two

March 31, 1987
87-68A

The location of each archaeological site will be verified before development occurs. An archaeologist will examine the sites and the applicant will work with your office and the County Planning Department in preparing and executing a mitigation plan to handle the significant sites in the parcel. The plan will also be coordinated with the Department of the Army, Honolulu Engineer District.

Recreation Concerns. No public park is planned for the project area. However, Mauna Lani Resort proposes to develop a public shoreline park north of the Paoua Bay hotel site, beyond a golf course site (see Mauna Lani Resort's master plan), in State Conservation land. Your department will undoubtedly have an opportunity to comment when the park plan is submitted to you for review.

Aquatic Concerns. The EIS will address the aquatic and shoreline resources that might be affected by the project. It will include analysis of potential impacts and mitigation measures as described in two studies prepared for permitting associated with the hotel project: a baseline assessment of the marine environment at Paoua Bay and the engineering evaluation previously mentioned. The EIS will contain an outlined plan for constructing and maintaining the shoreline lagoon. The proposed inland lagoon is actually a conceptual landscape water feature.

Water and Land Development Concerns. The EIS will examine potable and non-potable water usage and potential impacts. A salt water well will not be necessary for the current shoreline lagoon plan. The location of the anchialine pond near the swimming lagoon will be identified and the management of the pond will be discussed.

Please let me know if you require further clarification on the above concerns or if you have additional comments. We are available to meet with you or your staff to discuss the project. You can reach me at 521-5361.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:lf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII
HILO, HAWAII

RECEIVED
JAN 17 1987
EIT, CIVIL & ASSOCIATES

BELT COLLINS
& ASSOCIATES
Engineering • Planning
Landscape Architecture

605 Coral Street, Honolulu, Hawaii 96813 • Phone (808) 571-5361 • Telex BELTH 7430674 • Fax (808) 538-7819
Hawaii • Singapore • Australia • Colorado • Hong Kong • Japan

DATE January 15, 1987

March 31, 1987
87-686

Memorandum

TO : Planning Department

FROM : Chief Engineer

SUBJECT: Ritz-Carlton Hotel - EIS Preparation Notice
Mauna Lani Resort, South Kohala, Hawaii
TRK: 6-8-22; 8, 7, 9 and 10

The ocean frontage of this property is in the Coastal High Hazard Area. This means that it is subject to high velocity waves. The extent of the tsunami inundation averages 400' from the shoreline of this location. The proposed shoreline buildings will be within the inundation area. The requirements of Chapter 27 Flood Control of the County Code shall be followed in the design of these buildings.

The shoreline will be interrupted by the 30' and 50' wide connection for the lagoon. The bridge should be designed to withstand a tsunami.

[Signature]
HUGH Y. ONO
Chief Engineer
DHW/sac

cc: Belt Collins & Assoc.

Mr. Hugh Y. Ono, Chief Engineer
Department of Public Works
County of Hawaii
25 August Street
Hilo, Hawaii 96720

Dear Mr. Ono:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pouou Bay,
Mauna Lani Resort, South Kohala, Hawaii

This is in response to your comments of January 15, 1987 to the Hawaii County Planning Department on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

The requirements of Chapter 27 Flood Control of the County Code will be followed in the design of the hotel buildings.

Since the Preparation Notice appeared in the OEGC Bulletin, the engineering evaluation of ocean and shoreline conditions at the Ritz-Carlton hotel site has been completed, and the proposed beach improvements have been modified based on the study. The shoreline lagoon now proposed will have one 110-foot wide opening to Pouou Bay. A bridge is no longer part of the design.

Sincerely,

[Signature]
Anne L. Mapes

Anne L. Mapes

ALM:lf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.



BELT, COLLINS
& ASSOCIATES
Interior - Planning
Landscape Architecture

October 27, 1986
86-1997

The Honorable George R. Ariyoshi
Office of the Governor
State Capitol
Honolulu, Hawaii 96813

Dear Governor Ariyoshi:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Paoua Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22: 8, pors. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

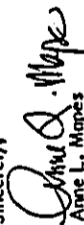
One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your information. Copies of the EISP/N and EA have also been sent to your department heads for their review and comment.

If all goes as planned, the EIS will be available in January 1987, at which time the document will be circulated for public review and comment.

Should you or your staff have any questions regarding the Ritz-Carlton Mauna Lani project, please do not hesitate to contact us.

Sincerely,


Anne L. Mapes

AL:Mill
Attachment

Honolulu: 416.1 Ford Street, Honolulu, Hawaii 96813, Telephone: (808) 521-5101, Telex: 111111 7411174
Singapore: 111 Robinson Road, #1210, International Building, Singapore 06121, Telephone: 215 14071, Telex: 35 50464 DE NUN
Arlington: 1717 East River Pl., Lawrenceville, North Carolina 27051, Telephone: 703-961-1100

October 28, 1986
86-1999

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
Fish and Wildlife Service
U.S. Department of the Interior
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Poaia Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22t-8, pors. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Honolulu (M) 521-1111, Honolulu (H) 521-1111, Honolulu (P) 521-1111, Honolulu (T) 521-1111
Singapore 8001, Honolulu (M) 521-1111, Honolulu (H) 521-1111, Honolulu (P) 521-1111, Honolulu (T) 521-1111
Aurora, Illinois 708-490-0000, New York 212-697-9000, Washington, D.C. 202-462-6000

Mr. Ernest Kosaka, Project Leader
Page two

October 28, 1986
86-1999

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate answers to the following questions:

1. Do you anticipate negative impact to coastal water quality as a result of the project, as described?
2. Based on your experience, is there likely to be an impact on nearshore resources, given the proposed project with lagoon?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes
Anne L. Mapes

AL:mlf

Attachment



United States Department of the Interior

RECEIVED
DEC 1 1986

FISH AND WILDLIFE SERVICE
100 ALA MOANA BOULEVARD
P. O. BOX 50197
HONOLULU, HAWAII 96810

Room 6307
NOV 26 1986

Ms. Anne L. Hapes
Belt, Collins, and Associates
606 Coral Street
Honolulu, HI 96813

Re: Environmental Impact Statement (EIS) Preparation Notice,
Proposed Resort Hotel at Pauoa Bay, South Kohala, Hawaii

Dear Ms. Hapes:

We have reviewed the referenced document and offer the following comments for your consideration.

General Comments

Our primary concern with the proposed project is the potential for adverse impacts to anchialine ponds, water quality, and reef fishery resources from construction of the swimming lagoon and resort.

Specific Comments

The proposed resort includes the construction of a 1.3-acre swimming lagoon that opens into Pauoa Bay at two points. These connections would be approximately 30-50 feet wide and provide for circulation and flushing in the lagoon. The lagoon would consist of a sand bottom with a subsurface choker layer of gravel and a sand beach inside the lagoon. A pump would be installed to increase flushing rates within the lagoon.

To date there is little information on the direct and indirect impacts of constructing a swimming lagoon on nearshore coastal water quality and fishery resources. The proposed resorts at West Beach, Oahu and Waikoloa, Hawaii include lagoons in their designs, however, these lagoons have not yet been constructed. Regarding lagoon construction, we recommend the following topics be discussed in the Draft EIS.

a. The results of the report, *A Decade of Ecological Studies Following Construction of Honokohau Small Boat Harbor, Kona, Hawaii* (U.S. Army Engineer District, Fort Shafter, Hawaii September 1983) may provide information on potential impacts of lagoon construction on water quality and fishery resources in

Pauoa Bay. In addition, we recommend that the results of the lagoon construction monitoring program at West Beach, Oahu be used to identify potential impacts to nearshore water quality and fishery resources and to refine mitigation measures during lagoon construction. The monitoring program for West Beach is described in the Department of Army permit POPCO-0 1612-SD. We also recommend that you discuss the monitoring program with the U.S. Army Corps of Engineers.

b. The potential for sand movement out of the lagoon into adjoining waters should be determined. We are concerned that continuous long-term loss of sand and gravel from the lagoon may smother or scour adjoining coral reef habitats.

c. The effects of lagoon construction on groundwater movement and nearshore biota in the affected area should be discussed. The lagoon may concentrate groundwater discharge and alter the salinity and nutrient conditions in the nearshore areas fronting the lagoon. Changes in water quality may alter existing inshore marine resources, particularly algae resources.

d. The effect of resort and lagoon construction and operation on the endangered humpback whale (*Megaptera novaeangliae*) and the threatened green sea turtle (*Chelonia mydas*) should be discussed. We recommend that lagoon construction and mitigation measures be coordinated with the National Marine Fisheries Service and the State Division of Aquatic Resources.

There is conflicting information on the distribution of anchialine ponds in the project site. The Draft EIS for the Revised Master Plan for Mauna Lani Resort (May 1985) indicates a single anchialine pond in the southwest corner of the proposed hotel site. The Anchialine Pond Survey of the Northwest Coast of Hawaii Island Final Report (OI Consultants, Inc. July 1985) indicates that no ponds occur in the proposed hotel site. The Aquatic Survey of the Kona Coast Ponds, Hawaii Island (J.A. MacIolek and R.E. Brock April 1974) indicates a small cluster of anchialine ponds in the southwestern end of the project site. We suggest that the Draft EIS discuss the following topics regarding anchialine ponds:

- a. Determine conclusively whether anchialine ponds exist on the site.
- b. Direct and indirect impacts to anchialine ponds from construction and operation of the lagoon, resort, and sewage treatment plant, and potential for introduction of alien fish into the ponds should be discussed.

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**BELT COLLINS
& ASSOCIATES**

Engineering - Planning
Landscape Architecture

606 Canal Street, Honolulu, Hawaii 96813 • Phone (808) 571-5361 • Telex BELTIN 740074 • Fax (808) 538-7811
Honolulu • Singapore • Auckland • Christchurch • Hong Kong • Suva

March 4, 1987
87-473

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
Fish and Wildlife Service
U.S. Department of the Interior
300 Ala Moana Boulevard
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 26, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

Your concerns on the potential adverse impacts to shoreline and marine resources will be addressed in the EIS. Dr. Steven Dollar has prepared a baseline assessment of the marine environment at Paoua Bay, which addresses potential impacts due to shoreline modification and project construction and operation. Also, Belt Collins & Associates has prepared an engineering evaluation of ocean and shoreline conditions at the proposed hotel site. The results of both studies will be included in the EIS.

Thank you for bringing to our attention the U.S. Army report on the Hanokohau Small Boat Harbor and the lagoon construction monitoring program at West Beach. For your information, on February 19, 1987, we submitted an application for a Corps of Engineers permit to construct shoreline improvements associated with the construction of the proposed hotel. We expect to address Corps of Engineers concerns during permit processing.

We have identified an anchialine pond at the project site adjacent to the proposed shoreline lagoon. Potential impacts on this pond will be addressed in the EIS.

Stormwater runoff and drainage will be addressed in the EIS.

Sincerely,

John A. Mapes

Anne L. Mapes

AL:mlf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

c. The location of the pump for the lagoon should be identified, and its potential effect on groundwater movement affecting anchialine ponds should be discussed.

A site drainage plan that prevents direct discharge of surface stormwater runoff from the development directly into coastal waters and anchialine ponds should be included in the Draft EIS. We recommend that green areas, dry wells, and sediment ponds be used to collect stormwater runoff.

In addition to the baseline assessment of marine resources conducted for the Revised Master Plan for Mauna Lani Resort, we suggest that information from the paper, The Coastal Resources, Fisheries, and Fishery Ecology of Ewa, West Hawaii (Hawaii Cooperative Fishery Research Unit Technical Report 82-1 March 1982) be included in the Draft EIS.

We appreciate the opportunity to comment.

Sincerely yours,

Ernest Kosaka
Ernest Kosaka
Project Leader
Office of Environmental Services

cc: MNFS - WPPO
DLNR, Planning Office
DAR
DPED, CZM Program
CS, Operations Branch



United States Department of the Interior
 FISU AND WILDLIFE SERVICE
 300 ALA MOANA BOULEVARD
 P.O. BOX 50157
 HONOLULU, HAWAII 96850

RECEIVED

JAN 14 1987

FBI, OFFICE OF RECEIPTS

13 JAN 1987

Ms. Anne L. Mapes
 Belt, Collins & Associates
 606 Coral Street
 Honolulu, Hawaii 96813

Re: Environmental Impact Statement (EIS) Preparation Notice
 Proposed Resort Hotel, Mauna Lanai Resort, South Kohala,
 Hawaii

Dear Ms. Mapes:

Thank you for forwarding a copy of the EIS Preparation Notice to us for our review. We offer the following comments to assist you with preparation of the Draft EIS.

We recommend that the Draft EIS include a full discussion of the fish and wildlife which inhabit terrestrial, intertidal and marine areas within the project area. Specifically, this discussion should address use of the area by the endangered humpback whale (*Megaptera novaeangliae*) and hawksbill sea turtle (*Eretmochelys imbricata*), and the threatened green sea turtle (*Chelonia mydas*). It is advisable to address the direct, secondary and cumulative impacts of all facets of resort construction and operation upon these species and their habitats. A discussion of proposed mitigation measures and site resource management plans would greatly enhance the Draft EIS.

We appreciate this opportunity to comment, and look forward to receiving a copy of the Draft EIS.

Sincerely,

Ernest Kosaka
 Ernest Kosaka
 Project Leader
 Environmental Services

cc: Albert L. Lyman, Hawaii County Planning Department
 HHS-WPFO
 PODOO O
 DLNR, Planning



Save Energy and You Save America!

BELT COLLINS
 & ASSOCIATES
 Engineering • Planning
 Landscape Architecture

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 Hawaii • Singapore • Australia • Colorado • Hong Kong • Japan

March 31, 1987
 87-685

Mr. Ernest Kosaka, Project Leader
 Environmental Services
 U.S. Department of the Interior
 Fish and Wildlife Service
 300 Ala Moana Boulevard
 P.O. Box 50167
 Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Environmental Impact Statement (EIS)
 for the Proposed Resort Hotel at Paoua Bay,
 Mauna Lanai Resort, South Kohala, Hawaii

Thank you for your letter of January 13, 1987 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

The EIS will include a discussion of the fish and wildlife which inhabit the marine and land area of the project site.

Sincerely,

Anne L. Mapes
 Anne L. Mapes

AL:mfj

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
 Roger Harris, Mauna Lanai Resort, Inc.

October 28, 1986
86-1999

Mr. Kisuk Cheung, Chief
Page Two

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate answers to the following questions:

1. Do you anticipate negative impact to coastal water quality as a result of the project, as described?
2. Based on your experience, is there likely to be an impact on nearshore resources, given the proposed project with lagoons?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:lf

Attachment

BELT, COLLINS
& ASSOCIATES
Interior - Exterior
Landscape Architecture

October 28, 1986
86-1999

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Paoua Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22: 8, pars. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Hawaii State Land Use Commission, Honolulu, Hawaii. Telephone: (808) 531-7411. Fax: (808) 531-7412. Website: www.hawaii.gov/landuse. For more information, contact the Commission at the above address or telephone number.



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 330
FT. SHAFTER, HAWAII 96848-5440

REPLY TO
ATTENTION OF:

Ms. Anne L. Mapes
Belt, Collins and Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for the Resort Hotel, Mauna Lani Resort, South Kohala, Hawaii. The following comments are offered:

a. A Department of the Army permit will be required to construct the lagoon if the lagoon is connected to the ocean as proposed. Belt, Collins and Associates and Mauna Lani Resort representatives have been meeting with Operations Branch concerning the scope of the project with the Corps regulatory authority. No anchialine ponds will be filled nor other work seaward of the existing mean high water mark is currently proposed. Please contact the Operations Branch at 438-9258 for future Corps coordination on this project.

b. According to the National Flood Insurance Study for Hawaii County by the Federal Emergency Management Agency dated May 3, 1982, a portion of the property is situated in the coastal flood plain and is subject to 100-year tsunami inundation (enclosure 1). The 100-year event has a one percent chance of being equalled or exceeded in any given year. Portions of the property are in zone V15 and Zone M (zone designations are explained in enclosure 2). The base flood tsunami elevation is 8 feet above mean sea level in the coastal flood plain.

Sincerely,

[Signature]
Kisauk Cheung
Chief, Engineering Division

Enclosures

RECEIVED

NOV 14 1986

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& ASSOCIATES

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Landscape Architecture

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Hawaii • San Francisco • Anaheim • Chicago • Hong Kong • Nagoya

March 4, 1987
87-467

Mr. Kisauk Cheung
Chief, Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858-5440

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pououa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 10, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

As suggested, we will contact the Operations Branch for future Corps coordination on the proposed hotel project. The project as it relates to the coastal flood plain will be addressed in the EIS.

Sincerely,

[Signature]
Anne L. Mapes

ALM:lf

cc: Douglas McGarrilly, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

October 28, 1986
86-1999

Mr. Shinji Sameda, Chief
Environmental Protection & Health Services Division
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Sameda:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Paooa Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22: 8, pars. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 303, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Honolulu 4085 Canal Street Honolulu Hawaii 96813 Telephone (808) 521-5161 Telex 10111172 B1172
Singapore 10111172/10111173 International Building Singapore 1211 Telephone 21514120 Telex 10111172 B1172
Australia Level 2 First Floor Pittwater Street Neutral Bay Sydney NSW 2059 Telephone 42411101

October 28, 1986
86-1999

Mr. Shinji Sameda, Chief
Page two

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate answers to the following questions:

1. Do you anticipate negative impact to coastal water quality as a result of the project, as described?
2. Based on your experience, is there likely to be an impact on nearshore resources, given the proposed project with lagoon?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:lf

Attachment

GEORGE R. LANTIER
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3173
HONOLULU, HAWAII 96813

RECEIVED

NOV 26 1986

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3173
HONOLULU, HAWAII 96813

IN REPLY, PLEASE REFER TO
EPC-20

November 24, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral St.
Honolulu, Hawaii 96813

Dear Ms. Mapes:

Subject: Environmental Impact Statement Preparation Notice for Proposed Resort Hotel, Mauna Lani Resort, South Kohala, Hawaii

Thank you for allowing us to review and comment on the subject environmental statement preparation notice. We provide the following comments for your consideration:

Air Pollution

The EIS should include the potential impact on the ambient air quality as a result of increased vehicular activity from the proposed project and all other projects which were previously approved but have not started construction. Projections on the increased traffic volume and the impact on the ambient air quality should be compared to the State and Federal ambient air quality standards. Should a potential violation be determined, the EIS should address the mitigating actions which shall be implemented.

Water Quality

Any discharges from the lagoon (not directly connected to the ocean) located north of the proposed hotel guest rooms should be addressed.

For the lagoon located near the shoreline with two connections to the ocean, the two connections should be carefully selected to minimize additional groundwater discharge to the ocean that may affect the benthic community. Monitoring of the water columns should be required before, during and after construction to assess the short-term environmental impact of the construction. The present groundwater discharge and groundwater discharge due to construction should be determined and benthic monitoring should be required to assess the long-term environmental impact. Any effects on anchialine pools should be addressed.

The impact on the coastal water quality will depend on the additional amount of groundwater discharge caused by the construction, assimilative capacity in Punaia Bay, and water circulation in the proposed connected lagoon and Punaia Bay. Impacts on the nearshore resources should not be a problem, except for areas of poor assimilative capacity and substantial increases in groundwater discharge.

Ms. Anne L. Mapes
November 24, 1986
Page 2

Wastewater

The treatment and disposal of wastewater should be addressed.

Drinking Water

The EIS should fully discuss and describe the potable water system for the hotel. This discussion should include:

- a. the general location of the proposed new wells; and
- b. who will be responsible for the proposed well construction and operation.

The above information will be useful to assess any possible groundwater contamination cases, as well as assess operational cost to the government sector should the water system be operated by the county government.

Agency approvals should include our requirements for reviewing new drinking water system improvements.

The Department of Health is vested with the responsibility to assure that public water systems in the State are providing water which is in compliance with the State's drinking water regulations known as Chapter 20, Title 11, Administrative Rules, and are in compliance with all other applicable terms and conditions of Chapter 20. A public water system is defined as a system serving 25 or more individuals at least 60 days per year or having a minimum of 15 service connections. In the event that the new well is intended to serve these minimum numbers of persons or service connections, please be advised that the well and distribution system will be subject to the terms of Section 11-20-29 and Section 11-20-30 of Chapter 20 respectively.

Briefly, Section 11-20-29 of Chapter 20 requires all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set down in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance to all maximum contaminant levels as set down in Chapter 20 when the distribution system or modification is completed.

Should you have any questions regarding Chapter 20, Title 11, Administrative Rules, please contact the Drinking Water Program at 548-2215.

**BELT COLLINS
& ASSOCIATES**
Interior • Planning
Landscape Architecture

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Ms. Anne L. Mopes
November 24, 1986
Page 3

We realize that our comments are general in nature due to preliminary plans being the sole source of discussion. We reserve the right to impose future environmental restrictions on the project when final plans are submitted to this office for review.

Sincerely yours,



SHIJI SONEDA, Chief
Environmental Protection &
Health Services Division

Mr. Shinji Soneda, Chief
Environmental Protection and Health
Services Division
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Soneda:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paooa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of November 24, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

The potential impact on ambient air quality will be assessed based on findings of a traffic study which is currently being conducted for the EIS.

A baseline assessment of the marine environment at Paooa Bay has been performed by Dr. Steven Dallar. The study will serve as the basis for future analysis of impacts due to shoreline modification.

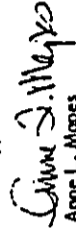
The treatment and disposal of wastewater will be addressed in the EIS.

Potable water for the proposed hotel at Paooa Bay will be obtained from Mauna Lani Resort. Mauna Lani's allocation from the Lalamilo wells is sufficient to supply the hotel.

KS:ao

cc: Mr. Albert L. Lyman,
Hawaii County Planning Department
DHO, Hawaii

Sincerely,



Anne L. Mopes

ALM:ll

cc: Douglas McGerrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

BELT, COLLINS
& ASSOCIATES
PLANNING - DESIGN
LANDSCAPE ARCHITECTURE

October 28, 1986
86-1999

U.S. Environmental Protection Agency
Region IX
215 Fremont Street
San Francisco, California 94105

Gentlemen:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Pauoa Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22:8, pars. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Hawaii: 401 North Street, Honolulu, Hawaii 96813, Telephone: (808) 551-5100, Telex: 081111 BNLN
Vancouver: 8011 Birch Road, #1210, International Building, Vancouver, B.C. V6P 1Y1, Telephone: (604) 681-1111
Auckland: Level 2, First Floor, 101 Lawrence Street, Auckland, New Zealand, Telephone: (06) 461 1111

U.S. Environmental Protection Agency
Page Two

October 28, 1986
86-1999

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate answers to the following questions:

1. Do you anticipate negative impact to coastal water quality as a result of the project, as described?
2. Based on your experience, is there likely to be an impact on near-shore resources, given the proposed project with lagoon?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:llf

Attachment

October 28, 1986
86-1999

Mr. Doyle E. Gates, Administrator
U.S. Department of Commerce
National Marine Fisheries Service
Southwest Region
Western Pacific Program Office
P.O. Box 3830
Honolulu, Hawaii 96812

Dear Mr. Gates:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Paoua Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22: 8, pars. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

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Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present FIS.

Honolulu: 1001 Kalia Road, Honolulu, Hawaii 96813, Telephone: (808) 521-5161, Telex: 00111171 BHTZ
Singapore: 101 Orchard Road, #12-01, International Banking Corporation Building, Singapore 10711, Telephone: 215-6201, Telex: 00111171 BHTZ
Auckland: Level 2, 100 Queen Street, Auckland, New Zealand, Telephone: 09-309-1001

Mr. Doyle E. Gates, Administrator
Page Two

October 28, 1986
86-1999

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate answers to the following questions:

1. Do you anticipate negative impact to coastal water quality as a result of the project, as described?
2. Based on your experience, is there likely to be an impact on nearshore resources, given the proposed project with lagoon?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes
Anne L. Mapes

AL:Mill

Attachment

DEC 24 1986



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region - Western Pacific Program Office
2570 Dale St. - Honolulu, Hawaii 96822-2396

December 24, 1986 F/SWR1:JUN

Belt, Collins and Associates
606 Coral Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Environmental Impact Statement (EIS)
Preparation Notice, Proposed Resort Hotel,
Mauna Lani Resort, South Kohala, Hawaii

The National Marine Fisheries Service (NMFS) has reviewed the subject EIS Preparation Notice for the luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed 32 acre development site is located at Pauoa Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. We offer the following comments for your use in preparing the Draft EIS.

Our major concern with the proposed new resort hotel complex is the planned construction of two lagoons at the site. In particular, we are concerned with the proposed swimming lagoon in the southern portion of the development which will connect to the ocean at two points within Pauoa Bay. A well would be installed near the lagoon to pump salt water into the inland portion of the lagoon to aide in natural tidal exchange between the lagoon and ocean.

The EIS should address the dredging, blasting and other construction activities in Pauoa Bay and their potential impacts on marine resources and habitat within the Bay. On December 3, 1986 an underwater site inspection of Pauoa Bay was conducted by a biologist on my staff. The nearshore area was comprised of a scoured limestone platform with few live coral colonies. However, large numbers of juvenile reef fish, particularly Scarids (parrot fish) and Acanthurids (surgeon fish), were observed in schools foraging on algae in this nearshore zone. Pauoa Bay, like many of the small protected bays along the Kona Coast of Hawaii, apparently contains important juvenile reef fish habitat. Impacts to this habitat from construction and "operation" of the lagoon should be addressed in the EIS.

Potential impacts from construction of the swimming lagoon on threatened and endangered species should be discussed in the EIS. The endangered humpback whale (*Megaptera novaeangliae*) occurs seasonally off this coastline, and the endangered hawksbill turtle (*Eretmochelys imbricata*) and threatened green



turtle (*Chelonia mydas*) can be found year-round in or near Pauoa Bay.

Several man-made lagoons associated with resort development in Hawaii are either under construction (Waikoloa, Hawaii) or will be shortly (West Beach, Oahu). NMFS recommends these projects be discussed with the U.S. Army Corps of Engineers and the respective developers to determine potential impacts, planned mitigation, and monitoring programs established to aid in determining and minimizing impacts on the marine environment from lagoon construction and operation.

Thank you for the opportunity to review the proposed project at this early, pre-EIS stage. Should you require additional information, please contact Mr. John Naughton of my staff. We look forward to receiving a copy of the Draft EIS as soon as it becomes available.

Sincerely yours,

Douglas E. Gates
Douglas E. Gates
Administrator

cc: F/SWR, Terminal Is., CA
E/M4, Washington, D.C.
Corps of Engineers, Honolulu
EPA, Honolulu
Hawaii State Div. of Aquatic Resources
County of Hawaii (Mr. Albert Lyman)

**BELT COLLINS
& ASSOCIATES**
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Hawaii • Singapore • Australia • Colorado • Hong Kong • Japan

March 4, 1987
87-476

Mr. Doyle E. Gates, Administrator
National Marine Fisheries Service
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
2570 Dole Street
Honolulu, Hawaii 96822-2396

Dear Mr. Gates:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Poooa Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your letter of December 24, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project.

We note your particular concerns about the proposed shoreline lagoon and the offshore marine environment. Dr. Steven Dollar has prepared a baseline assessment of the marine environment at Poooa Bay, which addresses potential impacts due to shoreline modification and project construction and operation. Also, Belt Collins & Associates has prepared an engineering evaluation of ocean and shoreline conditions at the proposed hotel site. The results of both studies will be included in the EIS.

For your information, on February 19, 1987, we submitted an application for a U.S. Army Corps of Engineers permit to construct shoreline improvements associated with the construction of the proposed hotel. We expect to address Corps of Engineers concerns during permit processing.

Sincerely,

Anne L. Mopes
Anne L. Mopes

AL:mlf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

October 28, 1986
86-2000

Mr. Robert C. Gilkey, Director
Department of Labor and Industrial Relations
State Office Building No. 2
State of Hawaii
830 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Gilkey:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Paoua Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22: 8, pars. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

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Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Mr. Robert C. Gilkey, Director
Page two

October 28, 1986
86-2000

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate receiving your department's labor market analysis of the Kohala and Kona areas as well as your projections of labor availability.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mapes
Anne L. Mapes

AL:mlf
Attachment

RECEIVED

NOV 13 1986

L. J. COLLINS & ASSOCIATES
Robert C. Gilkey
Director

David Kopori
Deputy Director



STATE OF HAWAII
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
225 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

November 12, 1986

Ms. Anne L. Mapes
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

This is in response to your letter of October 28, 1986, regarding the environmental impact statement preparation notice for a proposed resort hotel at Mauna Lani Resort.

A project as large as this will require a substantial number of workers during the construction period as well as the operational period. Although Hawaii County has had the highest unemployment rate in the state for the past 12 years, unemployment in West Hawaii (census tracts 213-219) has been about 2.0 percentage points lower than in East Hawaii.

This department does not have any projections of labor availability; however, currently there is an abundance of available applicants registered with the Kona Employment Service local office. In the past, finding workers to fill job vacancies has not been a problem, but with the growing importance of the resort industry in West Hawaii, several major development projects are being proposed or are under way in this area. This could result in a shortage of workers in certain occupational areas.

This department's Research and Statistics Office staff prepared a labor market analysis of the Kona-Kohala area in January 1981. Since then, the report has not been updated. While the most current data will reflect different figures, the trends are expected to remain about the same. A copy of the 1981 report is enclosed for your use.

Thank you for providing us the opportunity to review the environmental impact statement preparation notice. If you need more information or have any questions, please call me at 548-3150 or Frederick Pang, Chief, Research and Statistics Office at 548-7639.

Sincerely,

Robert C. Gilkey
Robert C. Gilkey
Director

ENCLOSURE

BELT COLLINS
& ASSOCIATES
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Hawaii • Singapore • Australia • Cebu • Hong Kong • Japan

March 4, 1987
87-669

Mr. Mario Ramill, Director
Dept. of Labor & Industrial Relations
State of Hawaii
830 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Ramill:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Pooua Bay,
Mauna Lani Resort, South Kohala, Hawaii

Thank you for your department's letter of November 12, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project. We will review the labor market analysis of the Kona-Kohala area which you sent us in preparing the EIS.

Sincerely,

Anne L. Mapes
Anne L. Mapes

ALM:iff

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lani Resort, Inc.

**BELT, COLLINS
& ASSOCIATES**
Engineering - Planning
Landscape Architecture

Mr. A. Scott Leithead, Housing Administrator
Office of Housing and Community Development
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Leithead:

Environmental Impact Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Poaia Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22: 8, parts 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Honolulu: 1601 Leialoi Mall, Honolulu, Hawaii 96813, Telephone: (808) 531-5303, Telex: 0011111 748424
Singapore: 161 Robinson Road, Singapore 06210, Telephone: (65) 434-4401, Telex: 835 6401
Arlington: 11111 11th Street, Arlington, Virginia 22203, Telephone: (703) 525-1100

Mr. A. Scott Leithead
Page two

October 28, 1986
86-2001

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate receiving your department's housing market analysis of the Kohala and Kona areas as well as your projections of housing availability.

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Mopes
Anne L. Mopes

AL:mlf
Attachment

October 28, 1986
86-2002

Hawaii Electric Light Company, Inc.
1200 Kilauea Avenue
Hilo, Hawaii 96720

Gentlemen:

Environmental Impact Statement Preparation Notice
Proposed Mauna Lani Hotel
Mauna Lani Resort, South Kohala, Hawaii

The Ritz-Carlton Hotel Company proposes to develop a luxury-class resort hotel at Mauna Lani Resort in South Kohala, Hawaii. The proposed site is situated at Pauoa Bay, approximately 2,400 feet north of the existing Mauna Lani Bay Hotel. It contains an area of 32 acres and is identified by Tax Map Key 6-8-22:8, pors. 7, 9 & 10.

The new hotel will have up to 450 rooms and include such amenities as shops, tennis courts, health club, luau area, banquet and meeting rooms, swimming pool, and two lagoons. Up to 200 additional rooms may be developed at a later as yet undetermined date.

One lagoon will be located in a landscaped setting on the north side of the new hotel structure. The other lagoon will be located near the shoreline and will be designed for recreational use involving swimming and sunbathing activities. Two openings are planned to connect this second lagoon to the ocean to allow improved water circulation and clarity.

An Environmental Impact Statement Preparation Notice (EISP/N) announcing the intention to prepare an EIS in accordance with Chapter 343, Hawaii Revised Statutes, was published in the October 8, 1986 issue of the Office of Environmental Quality Control Bulletin. Copies of the EISP/N and the Environmental Assessment (EA) on which it was based are attached to this letter for your use. The EA provides a description of the proposed development, the governmental permits that are being sought, and the existing environment which would be affected. It also summarizes the kinds of impacts that may result and indicates the kinds of additional analyses that are being conducted for the EIS.

Last year, an EIS was prepared in conjunction with a State Land Use Commission Petition to allow the expansion of the Mauna Lani Resort. The EIS was accepted by the Land Use Commission in August 1985. Because there is substantial material in the EIS that pertains to the project site, we intend to rely, to a large extent, on information already provided in the earlier EIS to prepare the present EIS.

Hawaiian Cultural Center, Honolulu, Hawaii (808) 535-1000
Sugarcane Mill, 1000 Kilauea Avenue, Hilo, Hawaii (808) 935-1000
Aulohale Hotel, 2101 Kilauea Avenue, Hilo, Hawaii (808) 935-1000

Hawaii Electric Light Company, Inc.
Page two

October 28, 1986
86-2002

We request that you or your organization assist us in preparing the current EIS by providing comments on the proposed project as it relates to your jurisdiction and responsibility, special knowledge, or interest. It is our intention that the EIS explore all aspects of the project's probable impacts, but we hope to devote the bulk of our effort to those issues which are of greatest concern. You could help us accomplish this by indicating in writing the specific questions, issues, and topics you believe should be addressed and the reasons why you believe the requested data and/or analyses are important. The more specific you can be, the greater the likelihood that we will be able to respond with satisfaction.

In addition to identifying any particular concerns you may have regarding the proposed project, we would appreciate answers to the following questions:

1. Please briefly describe the existing electrical generation and transmission system serving Mauna Lani Resort. Are there plans to expand the system?
2. Please indicate your projections of the percentage of power generated by non-renewable resources: fossil, fuel, biomass, etc.
3. What energy conservation features might be suitable to lower energy consumption at the hotel?

As you probably know, the Environmental Impact Statement Regulations stipulate that a written response to requests for comments be made within 30 days of their receipt. If all goes as planned, it is expected that the EIS will be available in January 1987. At that time the document will be circulated for public review and comment.

If you have any questions regarding the project or the kinds of input which would be most helpful to us in preparing the EIS, please call me or Glen Koyama at 521-5361. We will be happy to provide any additional information or guidance.

Sincerely,

Anne L. Hayes
Anne L. Hayes

AL:Mill

Attachment

CUST
H-W/G

DEC 24 1986

December 24, 1986



Belt Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Attention: Ms. Anne L. Hapes

Gentlemen:

Subject: Environmental Statement Preparation Notice
Proposed Resort Hotel
Mauna Lani Resort, South Kohala, Hawaii
Tax Map Key 6-8-22:8, pars. 7, 9 & 10, 32 Acres

This is in reply to your letter of October 28, 1986. In that letter you asked our organization to assist you in the preparation of an EIS relating to the proposed development of a 450 room luxury-class resort hotel at the Mauna Lani Resort in South Kohala, Hawaii.

You specifically asked that our reply identify any particular concerns that we might have and also include answers for the three questions listed below.

We have no particular concern regarding this project other than to recommend that this new hotel take full advantage of waste heat recovery equipment to recycle and reuse the waste heat rejected by the hotel's air conditioning and refrigeration equipment. If this equipment is incorporated in the hotel's original design, the amount of energy and resulting costs to operate the hotel will be substantially reduced and the need to burn imported petroleum-based fuels (such as propane or diesel oil) at the site will be substantially reduced or possibly eliminated.

The existing Mauna Lani Hotel, Sheraton Royal Maikoloa and the Mauna Kea Beach Hotel all have installed waste heat recovery, heat exchangers and/or heat pump water heaters to reduce their cost of operation and to reduce the amount of propane or oil that they must burn on-site to support their operation.

The following is our response to the three questions listed below:

1. Please briefly describe the existing electrical generation and transmission system serving Mauna Lani Resort. Are there plans to expand the system?

Belt Collins & Associates
December 24, 1986
Page 2

Existing System

HELCO's power generation system presently has a total firm capacity of 127 megawatts. HELCO purchases a total of 26 megawatts of firm power from two privately-owned biomass generators, Puna Biomass and Hilo Coast Processing Company, and from one geothermal generator owned by Research Corporation of the University of Hawaii. The balance of 101 megawatts is produced by steam units, diesel units, a gas turbine and hydroelectric units at six power plants owned by HELCO. These power plants are located at Keahole, North Kona; Maimea, South Kohala; and Waiau, Puueo, Maitakea Peninsula and Kanoelohua, South Hilo.

HELCO has three levels of transmission voltages to deliver energy to the Big Island. First, there are three 69KV cross-island transmission lines. The northern line connects Pepeekeo to Maimea on the highway along the Hamakua Coastline. A middle line connects Kaunawa to Keamuku along the Saddle Road. On the southern side, several lines connect Kanoelohua to Kealia along the highways through the Puna and Ka'u Districts. Next, there are five 34.5KV transmission lines that serve smaller communities located some distance from the route of the 69KV lines. Finally, there are three 13.8KV tie-lines in Hilo connecting the Shipman and Kanoelohua Plants.

Future Plans

HELCO will continue to support the development of alternate energy to decrease dependence on imported oil. In 1987, additional biomass generation is anticipated with Hamakua Sugar providing 10 megawatts of firm power. A private enterprise is committed to the development of an additional geothermal power plant by 1989. Many private companies are also studying the feasibility of developing hydroelectric power at various stream sites along the Hamakua coast.

In the fall of 1986, HELCO will begin construction of its first 138KV transmission line paralleling the existing 69KV line along the Saddle Road. This line is required to maintain an acceptable voltage level in the West Hawaii area and to improve system reliability. Preliminary planning has also begun to add additional cross-island transmission lines within the next 5-10 years based on projected load growth in the West Hawaii area. A dependable cross-island transmission system is a necessity because while new developments are expected to increase dramatically in West Hawaii, and therefore the demand for electricity, most of the generating sources are in East Hawaii.

2. Please indicate your projections of the percentage of power generated by non-renewable resources: fossil, fuels, buggasse, etc.



Energy Projection

Source	1986	1992
Biomass	41	30
Fossil	53	40
Geothermal	3	25
Hydro	2	3
Wind	1	2
Total	100	100

3. What energy features might be suitable to lower energy consumption at the hotel?

An indicated earlier, this new 450 room hotel should make maximum use of waste heat recovery, heat exchangers and/or heat pump water heaters.

Ideally, the hotel should specify waste heat, recovery heat exchangers (or two bundle condensers) on its main air conditioning chillers, reefer boxes and freezer and also on its ice makers.

The waste heat from these refrigeration devices should be used to preheat this hotel's potable hot water supply to 90° - 110°F. This preheated water should be stored in a "tempered water tank."

The hotel also should be equipped with a "high lift lead chiller heat pump" that will extract waste heat from the chilled water system return line and use this energy to raise the temperature of the water drawn from the tempered water tank to 125°F for use by the hotel kitchen and by its guests. If higher temperature water is needed for dishwashing purposes, a small conventional electric water heater should be located in the immediate vicinity of the dishwasher to boost the 125°F hot water to the required dishwashing temperature.

If these suggestions are followed, the following benefits will be realized:

a. The new 450-room hotel will be competitive with the other hotels in the South Kohala area because these existing hotels are now taking advantage of the waste heat recovery technologies described above.

b. The new hotel will be able to totally eliminate the consumption of imported propane or diesel oil for water heating purposes and will be taking full advantage of recyclable waste heat energy available at the site as well as energy from biomass, geothermal steam, hydropower and wind that will be available through the Hawaii Electric Light Company System.

- c. If the waste heat from the reefer boxes, food freezers and ice machines are recycled and used for water heating purposes, this will reduce the air conditioning load in the kitchen and improve employee comfort in these work areas. If electric cooking equipment is specified, this will further reduce the air conditioning load in the kitchen, because the hot products of combustion from gas or oil fired cooking equipment, will not have to be removed by the air conditioning system.
- d. If properly sized, the "high lift lead chiller heat pump" could handle the total hotel air conditioning load after midnight and, in any event, would minimize the number of hours when the main air conditioning system would have to be operating.

We would also like to suggest that an ice storage air conditioning system be evaluated for this new hotel. A properly sized ice storage air conditioning system could utilize smaller refrigeration chillers that would operate around the clock. At night (while the high lift lead chiller is heating water and cooling the hotel) the main chillers will be making ice. During the day, the ice will melt and assist the smaller chillers with the hotel's air conditioning load.

By utilizing continuously running smaller chillers, the hotel's kw demand charges will be reduced. Also, the hotel will be making better use of alternate energy because, during early morning hours Hawaii Electric Light will not be able to accept the full output of the geothermal, hydro and wind energy that is available at that time. Thus, any additional electric loads that remain on the system after midnight will be utilizing electric energy produced almost exclusively for locally available, renewable, non-fossil fuel energy resources.

In addition, we would also recommend that fluorescent lighting (equipped with high efficiency ballasts) be used throughout the hotel's interior, that metal halide lamps be used for the tennis courts and that sodium lighting be specified for parking lots and roadways. Outdoor lighting fixtures should be carefully specified to insure that very little light is directed up into the night sky. This is important for efficiency reasons and also to minimize the stray light that might interfere with the operation of the astronomical observatories on the summit of Mauna Kea.

We certainly hope these comments and suggestions will be helpful to you and the designers of this new hotel. As you can see, we believe that waste heat recovery technology is a very important consideration in our somewhat unique subtropical service area, you will find enclosed two technical papers and an article describing the performance of these devices in Hawaii.



Belt Collins & Associates
December 24, 1986
Page 5

Please be advised that Hawaii Electric Light Company is fully prepared to serve the electrical loads of this new 450 room hotel and also to work with you and the hotel architect and engineers to provide rate analyses as needed to evaluate the various alternatives discussed in this letter.

Contact Melvin Yamaki at 969-0323 for questions 1 and 2 and Mr. Alan Lloyd of HECO at 548-6870 for question 3.

Very truly yours,

Clyde H. Nagata
Clyde H. Nagata
Sr. Electrical Engineer
Planning Division

CHN:HSY:ts

cc: Alan Lloyd
John Corbelli
Melvin Yamaki

**BELT COLLINS
& ASSOCIATES**
Engineering • Planning
Landscape Architecture

626 Canal Street, Honolulu, Hawaii 96813 • Phone (808) 521-5161 • Telex BELH 700074 • Fax (808) 538-7819
Hawaii • Singapore • Australia • Colorado • Hong Kong • Japan

March 4, 1987
87-877

Mr. Clyde H. Nagata
Senior Electrical Engineer
Planning Division
Hawaii Electric Light Company, Inc.
P.O. Box 1027
Hilo, Hawaii 96721-1027

Dear Mr. Nagata:

Environmental Impact Statement (EIS)
for the Proposed Resort Hotel at Paoua Bay,
Mauna Lanai Resort, South Kohala, Hawaii

Thank you for your letter of December 24, 1986 commenting on the Environmental Impact Statement Preparation Notice and Environmental Assessment for the above project. Your letter was most thorough and I have passed on your comments and concerns to the architectural consultant for the hotel project. We were informed that your recommendations will be taken into consideration in the design of the hotel. In particular, waste heat recovery technology will be incorporated into the project to the extent possible.

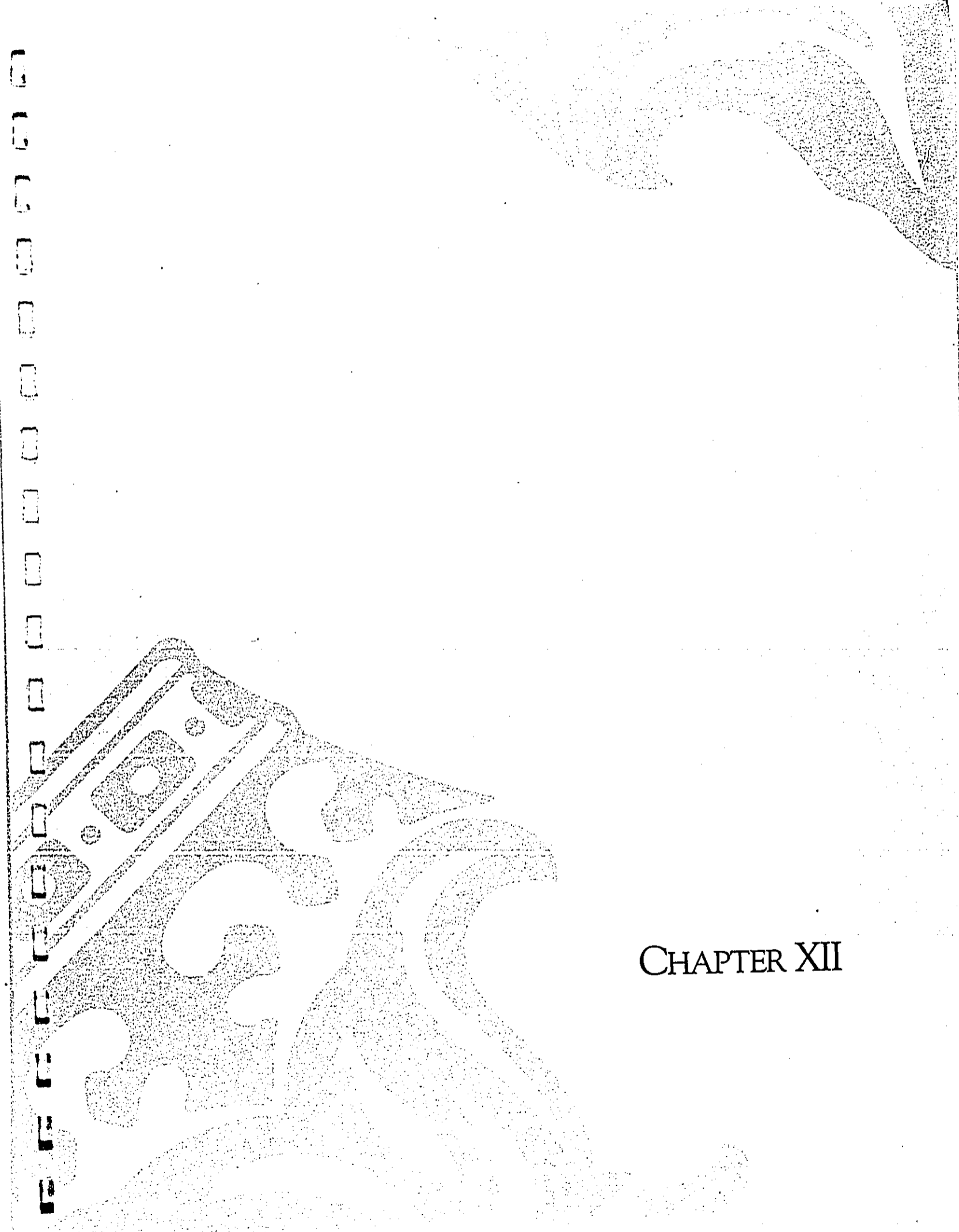
Sincerely,

Anne L. Mages
Anne L. Mages

ALM:lf

cc: Douglas McGarrity, Ritz-Carlton Hotel Company
Roger Harris, Mauna Lanai Resort, Inc.
Donald Goo, Wimberly Whitson & Allison Tong & Goo

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



CHAPTER XII

CHAPTER XII

COMMENTS RECEIVED DURING THE DRAFT EIS COMMENT PERIOD AND RESPONSES

CONSULTED PARTIES

An announcement of the availability of the Draft Environmental Impact Statement (DEIS) for the proposed Ritz-Carlton Mauna Lani hotel project was published in the OEOC Bulletin by the Office of the Environmental Quality Control on May 23, 1987. The agencies, organizations, and individuals listed below were sent copies of the DEIS with a request for their comments on the project. Those believed to have an interest in the project or who requested consulted party status were mailed a copy of the report. Parties that replied with a "no comment" statement are marked with an asterisk. Those marked with two asterisks made substantive comments and these letters are reproduced, along with responses to them, in the following pages. Parties who submitted substantive comments after the June 22, 1987 deadline are indicated with a dashed line. Responses to these letters are also included in this chapter.

Federal Agencies

- U.S. Army Corps of Engineers, Pacific Ocean Division
- U.S. Army, Facilities Engineering - USASCH
- * U.S. Department of Agriculture, Soil Conservation Service
- ** U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Department of Transportation, Coast Guard
- U.S. Navy

State Agencies

- * Department of Accounting and General Services
- * Department of Agriculture
- * Department of Defense
- Department of Health
- ** Department of Land and Natural Resources
 - DLNR, State Historic Preservation Officer
- ** Department of Planning and Economic Development
 - DPED, Energy Division
- Department of Social Services and Housing
- Department of Transportation
- Office of Environmental Quality Control
- Office of Hawaiian Affairs
- State Archives

University of Hawaii - Manoa

- Environmental Center
- Marine Programs
- * Water Resources Research Center

Hawaii County

- * Department of Parks and Recreation
- Department of Public Works
- * Department of Water Supply
- Department of Research and Development
- ** Planning Department
- * Police Department

Community Organizations and Other Groups/Individuals

- American Lung Association
- * Hawaii Leeward Planning Conference
- Life of the Land, Big Island Chapter
- Na Ala Hele
- ** Puako Community Association
- Waimea Kawaihae Community Association
- U.S. Senator Daniel K. Inouye
- U.S. Representative Daniel K. Akaka

Libraries

- Bond Memorial Library
- Department of Planning and Economic Development Library
- Hilo Regional Library
- Kailua-Kona Library
- Kaimuki Regional Library
- Kaneohe Regional Library
- Legislative Reference Bureau
- Lihue Regional Library
- Pearl City Regional Library
- State of Hawaii Main Library
- Thelma Parker Memorial Library, Waimea
- U.H. Hamilton Library, Hawaiian Collection
- U.H. Hilo Campus Library
- Wailuku Regional Library

Media

- Honolulu Star-Bulletin
- Honolulu Advertiser
- Hawaii Tribune Herald
- West Hawaii Today - Kona

John Walker
DIRECTOR



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
415 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

RECEIVED
JUN 5 PM '87
EIL, (OHIC) & AUMAHII

TELEPHONE NO.
548-8813

Mr. Albert Lono Lyman
May 27, 1987
Page 2

4. Anchialine ponds do not have a direct connection with the ocean, but are influenced by tides. We wish to know if the close proximity of the swimming lagoon will affect the anchialine pond especially during excavation.

Thank you for the opportunity to review this EIS.

Sincerely,

John C. Lewin, M.D.
Director of Health
for Director, OEQC

cc: Balt, Collins & Associates

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Subject: Draft Environmental Impact Statement for the
Ritz-Carlton Mauna Lani, Mauna Lani Resort, South
Kohala, Hawaii

We have reviewed the subject EIS and offer the following
comments for consideration:

XII-3

1. Page 11-13, Figure 11-9 indicates that a 110-foot wide channel will be excavated to Pauoa Bay. The purpose and dimensions (length and depth) of this channel should be discussed. Specifically, we wish to know if the purpose of the channel is for flushing or for navigation of thrill craft and other vessels.
2. If explosives will be used in the creation of the lagoon, its use should be restricted during the humpback whale migration and calving season. Sound travels well through water and loud explosions may have an adverse effect upon the whales.
3. Several holes filled with grout are being proposed around the Keanapou Fishpond at intervals of 15 feet. We wish to know the number of these grout-filled holes.

BRIT COCHINS
& ASSOCIATES
Engineers, Planners,
Architects, Interiors

1115 East Street, Honolulu, Hawaii 96813 • Phone: (808) 531-5141 • Telex: 881111 • Cable: BRITCOCHINS • Fax: (808) 531-7074
Hawaii • Singapore • Auckland • London • Hong Kong • Naples

July 13, 1987
87-1443

Mr. John C. Lewin, M.D.
Director of Health
for Director, OEQC
Office of Environmental Quality Control
State of Hawaii
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Lewin:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of May 27, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your letter.

1. As described on page II-11 of the Draft EIS, the seawater swimming lagoon will have a 110-foot wide opening to Pauoa Bay, which would allow incoming wave energy to restore the shape of the lagoon beach. The opening would extend to a narrower 50-foot wide flushing channel offshore which would improve circulation and the cleaning of fines.
2. The applicant fully expects to accomplish excavation without blasting. Excavation and grading will be done by bulldozers or backhoes. Hard spots will be worked with hydraulic rams to break the material. However, explosives might be used if hard spots resist breakage by hydraulic ram. Only then would very small explosive charges (10 to 15 pounds) be used to fracture the rock so that it can be ripped and removed by hydraulic shovels. The use of explosives in offshore waters would be restricted during the humpback whale migration and calving season.
3. and 4. We do not know at present whether the swimming lagoon's proximity to the fishpond will affect the pond and cannot predict in advance the number of grout-filled holes which will be placed around Keanapou Fishpond, or even if they will be needed. If the currently low salinity in the pond (2.0 to 4.0 parts per thousand) increases to an unacceptable level as a result of lagoon excavation, curtain grouting will be undertaken to reduce the extent of salinity intrusion. The number of holes will be determined based on salinity level monitoring and the recommendations of the engineering consultant.

Sincerely,

Anne L. Mapes
Anne L. Mapes



**DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT**

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
150 SOUTH KING STREET, SUITE 300, HONOLULU, HAWAII 96813

KIHEI MARKET
DOUGLAS A. UVELING
MARSHALL E. MOYER
BARBARA THE STANTON
SANDY L. HARRIS
DEBRA A. WEINER
MARKET STREET
KIMBERLY B. LEE
JEANETTE P. MANNING
KAREN L. BROWN
KATHLEEN M. HENNING
KATHLEEN M. HENNING
KATHLEEN M. HENNING
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KATHLEEN M. HENNING
KATHLEEN M. HENNING

Ref. No. P-6579

June 16, 1987

The Honorable Albert Lono Lyman
Planning Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Subject: Draft Environmental Impact Statement, Ritz-Carlton
Hotel, Mauna Lani Resort, South Kohala, Hawaii

We have reviewed the subject Draft EIS and offer the following
comments.

Sand Mining Impacts and Alternatives

On page II-15, the Draft EIS refers to the possible importation of
clean, calcareous, medium to coarse grained sand (approximately 5,000 cubic
yards) mined from "off-island, perhaps Mokuleia on Oahu or Mookoomi on Molokai."
The Final EIS should address the environmental impacts (off-site, on-site) of
mining these sand requirements and specify potential alternative sand mining
and storage sites. Government permits involved in these "off-island"
activities should be identified.

Impacts to Surf Sites

The Final EIS should address the impact of the proposed project,
particularly the excavation of the Flushing channel on any surf sites within
Fauoa Bay.

The Honorable Albert Lono Lyman
Page 2
June 16, 1987

Thank you for the opportunity to comment on this document.

Sincerely,

Roger A. Ulveling

cc: Ms. Anne L. Hapes,
Belt, Collins & Assoc.
Office of Environmental Quality Control
Planning Department, County of Maui

WILL COLEMAN
& ASSOCIATES
Planning • Design
Landscape Architecture

415 Canal Street, Honolulu, Hawaii 96813 • Phone: (808) 521-1363 • Telex: 0011017400174 • Fax: (808) 526-2074
Honolulu • San Francisco • Los Angeles • San Diego • San Jose • Honolulu • Chicago • New York • London

July 14, 1987
87-1444

Mr. Roger A. Ulveling, Director
Department of Planning and Economic Development
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804

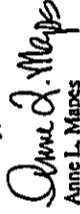
Dear Mr. Ulveling:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 16, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your letter.

1. Sand mining impacts and alternatives. The source of sand for the proposed projects has not yet been determined, but it is currently thought unlikely that sand will be imported from Moonomi on Molokai. Specifications for the sand have to be prepared and in the end, economics (including the cost of permitting) will determine the source of sand to be imported to the site. Since the site where sand will be obtained is unknown, the impacts of removing the sand would be best be addressed at a later date when a specific site has been designated. At that time, a grading permit will be required, and there is a possibility that an application for a Special Management Area permit will need to be submitted.
2. Impacts to surf sites. There are no surf sites within Pauoa Bay. However, there are seasonal surf sites out off the point at the southern boundary of the project site as well as north of the project site. Practically speaking, these surf sites are suitable only during a few days in the winter when the northwest swells are large enough. It is expected that there will be no impact on these surf sites outside the embayment during construction of shoreline improvements. The impact after the Ritz-Carlton Mauna Lani and the shoreline beach park are completed will be to increase accessibility to the surf sites.

Sincerely,


Anne L. Mapes

BELT COLLINS
& ASSOCIATES
Improving - Healthy
Land, Air, Water

100 Canal Street, Honolulu, Hawaii 96813 • Phone: (808) 521-5100 • Telex: 981011 • FAX: (808) 521-5101
Hawaii • Singapore • Australia • Cambodia • Hong Kong • Japan

3 1987



STATE OF HAWAII
DEPARTMENT OF HEALTH
P O BOX 3123
HONOLULU, HAWAII 96801

June 17, 1987

MEMORANDUM

To: Mr. Albert Lono Lyman, Director
Planning Department, County of Hawaii

From: Director of Health

Subject: Draft Environmental Impact Statement (DEIS) for Ritz-Carlton Mauna
Lani, Mauna Lani Resort, South Kohala, Hawaii

Thank you for allowing us to review and comment on the subject DEIS. The following are our comments for the proposed project:

Air Pollution

The DEIS states that an air quality assessment, which was prepared for the 1985 Mauna Lani Resort, included the indirect impacts attributable to the Ritz-Carlton project. The study should be provided in the appendices. Since the study indicated that the State standards for carbon monoxide will be exceeded at the Mauna Lani Drive-Queen Kaahumanu Highway intersection, the DEIS should present those mitigating measures which shall be implemented to prevent the exceedances from occurring.

Water Pollution

The proposed monitoring plan for assessing short-term and long-term impacts on the water quality standards should be addressed.

JOHN C. LEWIN, M.D.

cc: Chief Sanitarian, Hawaii
Ms. Anne L. Mapes, Belt Collins & Assoc. ✓

Mr. John C. Lewin, M.D.
Director of Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your memorandum of June 17, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your memo.

1. Air pollution The maximum 650 hotel units at the Ritz-Carlton Mauna Lani (450 initial units and up to 200 additional units) are approximately one-fifth of the hotel units expected to be ultimately developed at Mauna Lani Resort. An air quality impact analysis for the entire resort was prepared by J. W. Morrow in May 1985. By the year 2000, due to traffic attributable to Mauna Lani Resort development (including the Ritz-Carlton Mauna Lani), State standards for carbon monoxide will be exceeded at the Mauna Lani Drive-Queen Kaahumanu Highway intersection, although concentration levels will remain below the federal limits. Mitigation measures include building housing at adequate distances from vehicles, the source of emissions, and increasing the capacity of the intersection. The J. W. Morrow report was prepared specifically for the Mauna Lani Resort project, which is much larger in scope than the Ritz-Carlton Mauna Lani project, and was thus not included in the Ritz-Carlton Mauna Lani Draft EIS. A copy of the report is enclosed for your information.

2. Water pollution The applicant intends to work with County, State and Federal agencies to implement an appropriate monitoring program, according to permit conditions. Please refer to Chapter IV, Section 1.4.2.2.5 in the Final EIS for a description of what such a plan might entail.

Sincerely,

Anne L. Mapes

Enclosure



United States Department of the Interior

FISHLAND WILDLIFE SERVICE
1500 ALA MOANA DRIVE, WAIKUKU
P. O. BOX 50167
HONOLULU, HAWAII 96850

Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Re: Draft Environmental Impact Statement, The Ritz-Carlton Mauna
Lani Resort Hotel, South Kohala, Hawaii

Dear Mr. Lyman:

We have reviewed the Draft Environmental Impact Statement (EIS)

and offer the following comments for your consideration.

Our letter of April 14, 1987 to the U.S. Army Corps of Engineers
regarding the construction of a swimming lagoon and swimming
beach for the Ritz-Carlton Mauna Lani Resort Hotel at Pauoa Bay
is provided for your information.

We remain concerned about the long-term cumulative impacts to
nearshore fishery habitat and water quality due to shoreline
modifications associated with resort developments along the West
Hawaii coastline. We recommend that a monitoring program be
conducted to evaluate potential changes to water quality,
nearshore fishery and coral resources, and the anchialine pool.
This information will assist in determining the magnitude of
impacts associated with construction and operation of these
shoreline features.

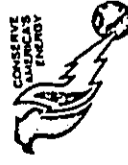
In addition to the construction measures described on page 11-15
of the Draft EIS, we recommend that the shoreline berm be removed
only when the turbidity level of water within the excavated
lagoon basin approximates that of the nearshore waters. This
will insure that the opening of the newly excavated basin will
not introduce excessive amounts of fine sediment into coastal
waters.

We appreciate this opportunity to comment.

Sincerely,

Ernest Kosaka

Ernest Kosaka
Project Leader, Environmental Services
Pacific Islands Office



Enclosure

cc: Anne Mapes, RCA

Save Energy and You Serve America!

REIL COOKINS
& ASSOCIATES

Interior - Hawaii
Landscape Architecture

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July 13, 1987
87-1441

Mr. Ernest Kosaka
Project Leader, Environmental Services
Pacific Islands Office
Fish and Wildlife Service
U.S. Department of the Interior
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 17, 1987 to Mr. Albert Lono Lyman, Director
of the Hawaii County Planning Department, concerning the above project. Your comments are
addressed in their order of appearance in your letter.

1. Monitoring program We concur that some monitoring of the marine environment is
appropriate before, during and after the construction of shoreline improvements. The applicant
will work with County, State and Federal agencies to implement an appropriate monitoring
program, according to various permit conditions.

We have added the following paragraph to Section 1.4.2.2.5 of Chapter IV of the EIS:

Based on anticipated potential impacts, a monitoring plan might include measuring water
salinity and surface elevation in the fishpond; monitoring nearshore water turbidity
before, during, and after construction; performing a benthic survey; monitoring sand
movement; measuring salinity profiles in the bay; and following procedures should
blasting be necessary, including restricting the period when blasting is permitted.

2. Removal of shoreline berm We agree with your recommendation that the shoreline berm be
removed when the turbidity level of water within the excavated lagoon basin approximates that of
the nearshore waters.

Sincerely,

Anne L. Mapes

Anne L. Mapes



PLANNING DEPARTMENT

25 ALI'IHI STREET • HONOLULU, HAWAII 96813

COUNTY OF HAWAII

Ms. Anne L. Mapes
June 22, 1987
Page 2

DANTE K. CARPENTER
Mayor
ALBERT LINO LYMAN
Deputy Mayor
TIMILAU SWAN
Deputy Director

June 22, 1987

Ms. Anne L. Mapes
Belt, Collins and Associates
606 Coral Street
Honolulu, HI 96813

Dear Ms. Mapes:

Draft Environmental Impact Statement (EIS)
The Ritz-Carlton Mauna Lani Hotel
Kalahepu'a, South Kohala, Hawaii

We have reviewed the subject Draft EIS for the proposed Ritz-Carlton Mauna Lani project in South Kohala, Island of Hawaii, and submit the following comments.

1. Purpose of This Document

In Chapter V, the Draft EIS states that a Conservation District Use Permit Application (CDUA) was filed in February 1987 with the Board of Land and Natural Resources due to the proposed use of state-owned lands and activities nearshore and shoreline areas that lie within the conservation district. On page V-3, the document further states that the Draft EIS was included as part of the CDUA application. Section 1.0 of Chapter I needs to be amended to reflect these statements.

2. Historic/Cultural Resources

With respect to the project description and archaeological section, more extensive maps delineating the extent or boundaries of specifically two site complexes (E1-306 and E2-32) are needed. It is difficult to really assess what

the impacts will be due to the close proximity to the proposed swimming lagoon and improved beach/sand area. The discussions within the Draft EIS do not indicate whether, in fact, the applicant and/or Mauna Lani Resort intends to preserve any of the sites. We note that Kirch (1979) recommended the preservation of site E2-32. Other possible mitigative measures should be further considered and discussed. Since the development process is for the Special Management Area level, the applicant needs to be as detailed as possible.

3. State-Owned Lands

The applicant proposes to use state-owned submerged lands as well as lands north and south of the project site for improvements. Alternative development scenarios need to be included if the applicant is not successful in obtaining the necessary approvals to enter, lease, excavate, etc. State of Hawaii property. These approvals from the Board of Land and Natural Resources should also be noted in the permit approval sections. Since the EIS is also intended to be used as CDUA submittal requirements, the issue of use of state-owned lands should be discussed in detail in all of its aspects. The public's legal rights of access along the Kawaihae/Kiholo trail and use of the proposed improvements need to be more fully addressed.

4. Shoreline Access and Public Shoreline Park

The Draft EIS mentions that the shoreline pedestrian trail will be improved to enhance traversability. It further states that the shoreline trail skirts along the seaward boundary and that portion will be rerouted mauka around the proposed swimming lagoon area. However, the Draft EIS has not fully described the extent of the improvements nor has it discussed the approvals necessary for the relocation of the trail. Further, since the existing shoreline and the proposed lagoon is makai of the certified shoreline and the proposal is to reroute mauka of the lagoon, the Draft EIS does not disclose/discuss the compensation, exchange and/or ownership question of the lateral access easement. Further, lateral access should be shown on the mauka side of the certified shoreline.

Further, it has not adequately discussed the impacts on the school system and other infrastructure or services. There was no mention of student population projection and existing conditions or capacity of the affected schools. The Draft EIS has not assessed the potential impact of the off-site population of approximately 2,300 people in determining the impacts. Since the socio-economic impact study also developed age-cohort projections, this information could also be utilized to assess impacts to the schools.

7. Traffic Impact

In the traffic analysis, the methodology assumes that for the years 1993 and 1998 the only increase will be due to hotels and Kohala Ranch. This assumption is incorrect as there will be traffic increases in any event. There is need to project ongoing growth.

If there were any 24-hour counts taken we would like to see the results to compare it with previous DOT counts. We would like to have the A.M. peak counts as well as all other turning movement counts since even during periods of less than maximum peak specific intersections may experience problems.

What was the occupancy for the Mauna Kea and Mauna Lani hotels for the day of the count (1/21/87)? Were there markedly different employment patterns on those days?

Were there any assumptions relating to roadway improvements in the analysis? What, if any, was the relationship between the traffic impact analysis and the employee survey which was also conducted especially as it relates to place of residence?

8. Coastal Hazards and Emergency Management

According to the Draft EIS, on-site population will vary from 599-855 persons (not including employees). Is the current siren warning system sufficient? Have adequate evacuation routes been planned and will they be well posted? The Draft EIS has not discussed in-depth emergency management and planning as it relates to coastal hazards.

On Page IV-137, it states "The new public park north of Pauoa Bay is projected for completion at about the same time as the Ritz-Carlton Mauna Lani." The Draft EIS does not discuss any time schedule when Mauna Lani Resort will be seeking government approvals.

While we recognize the mauka/makai shoreline access and public park to the north of the Ritz-Carlton site, this does not preclude or exclude further consideration of other mauka/makai access to the shoreline or other related improvements in the area.

In particular we note that according to the Draft EIS, Pauoa Bay is approximately 850 feet wide and the public park/parking area is proposed to the north of the project site. Does the public need to travel such distance in order to enjoy the recreational opportunities at the proposed swimming lagoon/beach areas? The applicant should consider and discuss other mauka/makai vehicular public access and parking area/facilities such closer to the proposed lagoon/beach areas.

5. Water Quality

There is concern on the possibility of the numerous planned resort developments along the Kohala and Kona coastlines incorporating similar swimming lagoons and the need to evaluate the cumulative impacts on our nearshore waters and coral reefs. A definitive water quality baseline and monitoring program will be needed to ascertain whether the impacts anticipated/discussed in the EIS pages IV-22 to IV-25 are occurring or whether unanticipated impacts have arisen or that further mitigation measures are to be considered.

6. Public Services and Facilities

The Draft EIS has understated the level of impacts to be generated by the proposed hotel project. It describes impacts which are attributed only to the direct employment to be generated by the hotel, and has not considered indirect and induced employment.

IRI COLLINS
& ASSOCIATES
Engineering, Planning,
Architecture, Interiors

Ms. Anne I. Mapes
June 22, 1987
Page 5

9. Endangered Species

Visual monitoring for endangered species should not be the only mitigative measure. Blasting should occur during off-season migration.

10. Other comments

Page I-6, the approvals for Shoreline Setback Variance and Special Management Area permits are obtained from only the Planning Commission.

Page IV-30, Kalahuipua'a is an ili of Waikoloa (ahupua'a) and not an ahupua'a itself as noted. Reference is made to page 207, Post Contact Period 1830-1860, of the Waikoloa Beach Resort EIS, 1976.

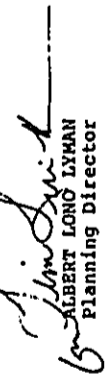
Page IV-106, it should be noted that the updated Hawaii County General plan is still at the draft level and has not been adopted as yet.

Tax Map key identification should be noted in the project description.

Should you have any questions or wish to discuss any of these comments in detail, please do not hesitate to contact us.

XII-11

Sincerely,


ALBERT LONO LYMAN
Planning Director

AK:aeb

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Hawaii • Singapore • Australia • Indonesia • Hong Kong • Japan

July 13, 1987
87-1438

Mr. A. Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 22, 1987 concerning the above project. Your comments are addressed in their order of appearance in your letter.

1. Purpose of this document Section 1.0 of Chapter I will be amended as you suggest.
2. Historic/cultural resources Section 1.7 of Chapter IV, Historical and Archaeological Resources, will be entirely rewritten in light of DLNR's Historic Sites Section recommendations based on continuing consultation with us and a site visit to the Ritz-Carlton Mauna Lani project site along with personnel from your department. The applicant intends to follow the mitigation plan proposed by the Historic Sites Section, as approved by the County Planning Commission or the Hawaii County Planning Department.
3. State-owned lands The applicant, The Ritz-Carlton Hotel Company, seeks a CDUA permit to perform work in state-owned submerged lands. It will also seek construction right-of-entry to be approved by the State Board of Land and Natural Resources. The applicant does not plan to seek exclusive use of the improved area. Mauna Lani Resort proposes to use State land north of the project site to develop two golf holes and a public shoreline park. Lands south of the Ritz-Carlton project site are owned mostly by Mauna Lani Resort, except for the area seaward of the certified shoreline; some of this land will be used for the beach improvement project. The applicant does not, however, intend to lease these lands, which would be for public use. The public's legal rights of access along the shoreline trail and the use of proposed improvements will be addressed in the Final EIS.

If the applicant is unsuccessful in obtaining a CDUA permit, it will have to reevaluate the entire hotel project. Alternatives include abandoning the plan to develop the project site or developing a hotel project totally within privately owned lands. This might include an inland beach-like swimming development or the construction of a very large swimming pool. These alternative improvements are deemed to be far inferior to the proposed project and would probably not be economically acceptable to the applicant, leading it to abandon the project.

Mr. A. Lano Lyman
July 13, 1987 - page 2

There is an existing land court easement in favor of the public for pedestrian access by way of the shoreline trail, identified as the Kawaihae-Kiholo trail. The Kawaihae-Kiholo shoreline trail on the Ritz-Carlton Mauna Lani site is legally described by recorded instrument on Land Court Map #7, Land Court Application 1785, authorized and approved by order of the judge of the Land Court, dated September 5, 1984. The map shows the trail identified as Easement "B", a 10-foot wide footpath for public easement.

4. **Shoreline access and public shoreline park.** It is the applicant's intent to keep the pedestrian shoreline trail as natural looking as possible, and therefore, improvements might include mostly cleaning and raking. After the swimming lagoon is constructed, the applicant will provide public access around the lagoon, on the sand. Any County Planning Department conditions that may be prescribed by the SMA or SSV permits will be followed. Lateral access will be shown on the mauka side of the certified shoreline in the EIS.

Mauna Lani Resort has obtained the necessary planning approvals to proceed with the public shoreline park project north of Pauoa Bay; SMA Use Permit No. 228, issued on October 30, 1985; an accepted EIS in 1985; and a CDUA permit in November 1985. No other planning approvals are required. Grading and building permits are needed before construction begins.

In addition to the existing access through Mauna Lani Resort, Mauna Lani will construct the mauka-makai access to the proposed shoreline park north of the Ritz-Carlton site and, later, another access to Honokaope Bay. We agree that this does not preclude consideration of other mauka-makai access to the shoreline at Mauna Lani Resort, although no other access is planned for the Ritz-Carlton Mauna Lani project. Other mauka/makai access possibilities include an access south of the hotel site on Mauna Lani lands. Access from the area north of Pauoa Bay will be closer than access from the current means of access from the end of Puako Road or from the Mauna Lani Bay Hotel. Furthermore, in addition to mauka/makai access, Mauna Lani Resort has agreed to construct and maintain a public park with parking, restroom, shower, and picnic facilities. It is this public shoreline park which will provide access both to the Ritz-Carlton Mauna Lani lagoon/beach site and the Puako petroglyphs north of the park.

5. **Water quality.** The applicant will work with your department, State and Federal agencies to implement an appropriate monitoring program, according to permit conditions.

6. **Public services and facilities.** The impacts on public services and facilities generated by the proposed hotel project will be more fully addressed in the Final EIS. As suggested, student population projections will be made.

7. **Traffic impacts.** In Scenarios 3 and 6 (cumulative impact of traffic generated by all projects in 1993 and 1998, respectively), the traffic projected is traffic generated by the known projects in the area (the Ritz-Carlton Mauna Lani, South Kohala Resort, the Hyatt Regency Waikoloa, Kohala Ranch, and an assumed 500-room hotel in the vicinity of the Keahole Airport) added to the existing traffic (1987 traffic counts). It was assumed that the identified projects would cause traffic growth in the South Kohala/North Kona area; in essence, they would account for "normal" growth. An assumption was made in the analysis that traffic would not increase without additional development, and we identified the additional development that is likely to occur. If the traffic generated by the identified developments is added to some estimate of "normal" growth, traffic generated by those developments would be added twice, once as "normal" growth and a second time as traffic generated by the developments.

Mr. A. Lano Lyman
July 13, 1987 - page 3

To compare "normal" growth of traffic and traffic projected from the developments, attached are graphs showing regression equations based on traffic counts taken by the State Department of Transportation from 1974 to 1984 and plots of projected traffic from the traffic study for four intersections. These graphs are included in Appendix C of the Final EIS.

The regression equations were derived from counts for vehicles entering the intersections from 1974 to 1984. These equations could be considered an indication of "normal" traffic growth in the area. If the assumption is made that past traffic growth is an indication of future traffic, a comparison of future traffic based on the regression equations and projected traffic from the traffic study can be made.

For the intersection of Waiimea-Kawaihae Road and Queen Kaahumanu Highway, the traffic projected in the traffic study is greater than that projected using the regression equation. Traffic at this intersection should be higher than "normal" growth, since much of the traffic to and from the identified developments is expected to pass through this intersection.

At the intersection of Mamalahoa Highway and Lindsey Road, the projected traffic is slightly below the regression line. This difference is not significant, and therefore it appears that traffic growth at this intersection will continue according to the growth trend of the past.

At the intersection of Queen Kaahumanu Highway and the Road to Keahole Airport, the projected traffic is expected to be higher than indicated on the regression line. It is expected that the traffic growth would be higher than in the past because development along the South Kohala/North Kona coast would cause heavier use of the airport and more traffic from the identified developments would pass through this intersection.

At the intersection of Queen Kaahumanu Highway and Palani Road, the traffic projected is lower than the regression line. This is expected because of the distance from the new developments to this intersection and hence the relatively smaller amount of traffic from the developments to pass through this intersection during the peak hour.

The 24-hour counts taken at the Lindsey Road/Mamalahoa intersection, the Palani Road/Queen Kaahumanu Highway intersection, and on Queen Kaahumanu Highway near the airport, as well as 12-hour turning movement counts taken at 12 intersections, were sent to the Department of Public Works, County of Hawaii. As requested, we will also send you these counts.

On January 28, 1987, the date of the traffic count, occupancy was 86.7 percent at the Westin Mauna Kea and 93.1 percent at the Mauna Lani Bay Hotel. The employment patterns on that day did not appear to be markedly different than they are normally.

In the traffic analysis, it was assumed that no changes to the existing roadway system were made.

The analysis used the Westin Mauna Kea and Mauna Lani Bay Hotel employee survey as the basis for assumptions made on employee trip generation, beginning and end points. The distribution of employee residence location was adjusted according to assumptions on the distribution of future housing.

Mr. A. Louis Lyman
July 13, 1987 - page 4

8. Coastal hazards and emergency management The current siren warning system is operated by the County. It is our understanding that the County of Hawaii is in the process of formalizing procedures for emergency management. The applicant and Mauna Lani Resort will coordinate with Hawaii County Civil Defense to implement these procedures.
9. Endangered species On July 2, 1987, Tom Nance, the author of the shoreline engineering study, and I met with Aquatic Resources staff and a representative of the Conservation Office at the State Department of Land and Natural Resources to discuss Aquatic Resources concerns on potential impacts due to shoreline construction, as stated in DLNR's letter of June 22, 1987 to your department regarding the Draft EIS. We are maintaining ongoing consultation with DLNR to come to an understanding on the concerns. Please see our response to the DLNR comment letter on the Draft EIS for further details.

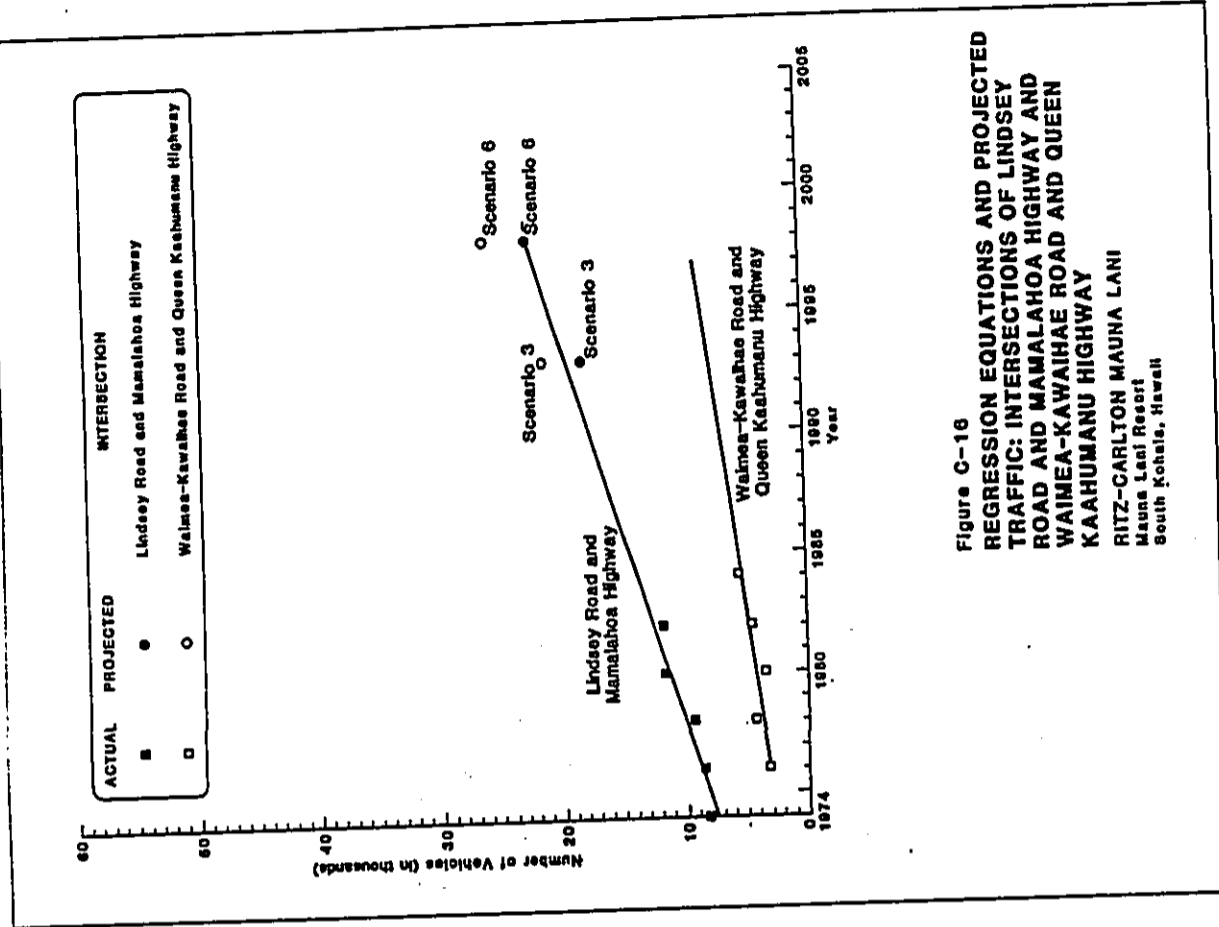
10. Other comments Changes will be made to the Final EIS as suggested.

Sincerely,

Anne L. Mapes
Anne L. Mapes

Attachment

XII-13



C-27

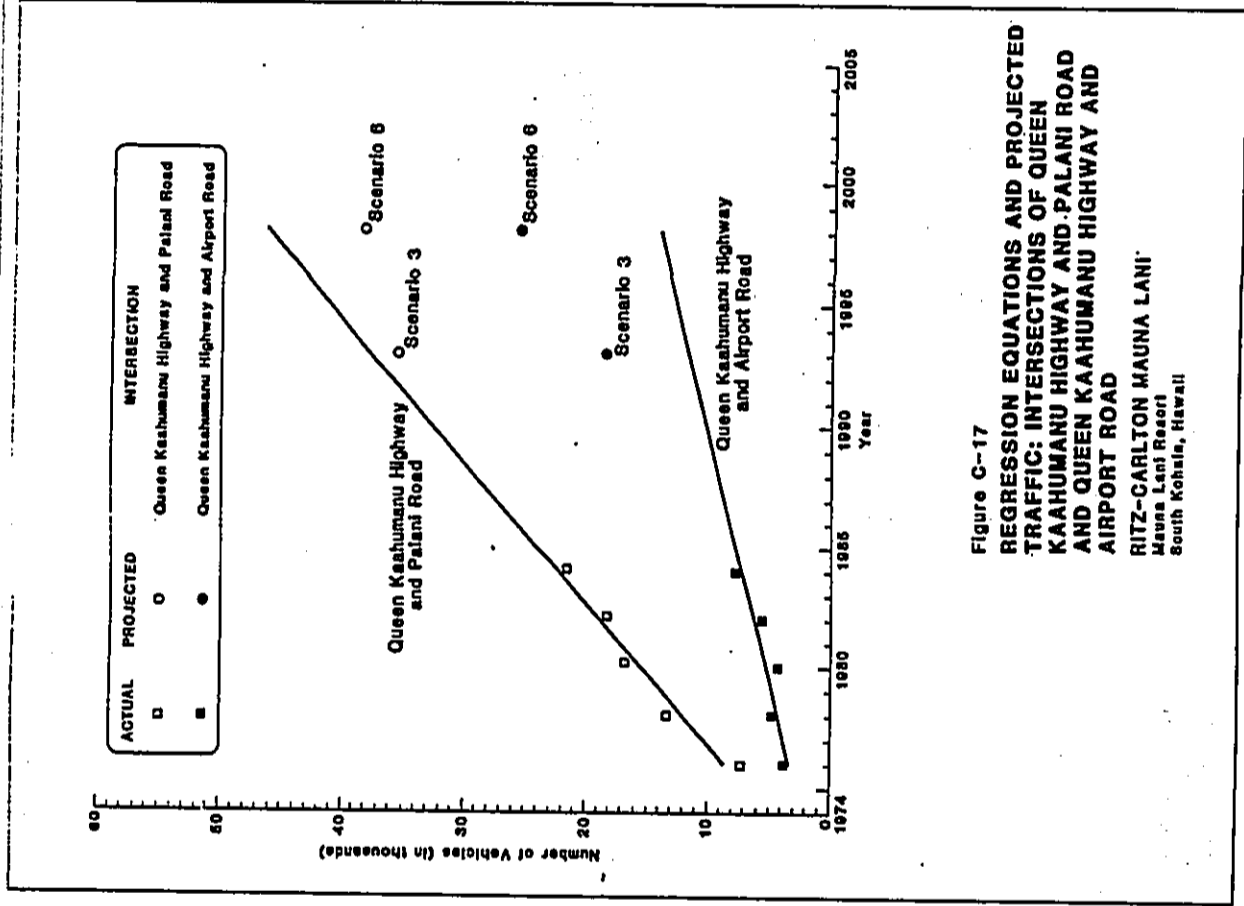


Figure C-17
 REGRESSION EQUATIONS AND PROJECTED
 TRAFFIC: INTERSECTIONS OF QUEEN
 KAAHUMANU HIGHWAY AND PALANI ROAD
 AND QUEEN KAAHUMANU HIGHWAY AND
 AIRPORT ROAD
 RITZ-CARLTON MAUNA LANI
 Mauna Lanai Resort
 South Kohala, Hawaii

C-28

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 481
HONOLULU, HAWAII 96809

WILLIAM W. PAUL, CHAIRMAN
BOARD OF LAND AND NATURAL RESOURCES
LEWIS S. LANGOUAN
SECRETARY

Honorable Albert Lono Lyman

- 2 -

HA-2003

Aquatic Resources:

The Draft EIS has provided some information on mitigating possible impacts on shoreline access and recreational use, nutrient enrichment and wastewater disposal. To further minimize adverse impact at the project site, we suggest the following precautionary measures be implemented:

1. Initial "clearing" should be performed during a period of extreme low tides and as quickly as possible to limit the amount and duration of sediment transport;
2. All shoreline modifications and dredging should be suspended during periods of strong onshore wind or large swells;
3. Clearing should not be conducted beyond 60 feet seaward from the water's edge;
4. A silt curtain should be deployed as necessary to prevent excess sedimentation; and
5. The flushing channel should not be opened to the sea until dredging of the swimming lagoon has been completed and the lagoon water is clear.

Work plans for the two proposed lagoons including opening(s) into Pauoa Bay, specific area(s) of blasting activity, and any changes to shoreline modifications as currently described in the Draft EIS shall be submitted to the Department for review, outlining specific mitigation measures proposed for potential impacts to aquatic communities and public activities.

Precautions should be taken to prevent petroleum products, pesticides, herbicides, construction materials, debris and other contaminants from flowing, blowing or leaching into Pauoa Bay, especially during the shoreline modification operations.

Finally, we suggest that a monitoring plan be established for Pauoa Bay and the restored Keanapou Fishpond, to be conducted annually by the applicant for at least two years after the project is completed, to determine environmental impacts such as the stability of the imported sand, and the possibility of an excessive increase in salinity beyond the normal criteria of anchialine ponds. These reports should be submitted to the Department and the County of Hawaii for review and information.

FILE NO.: HA-4/15/87-2003
DOC. NO.: 0475E

JUN 22 1987

Honorable Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

We have completed our review of the draft Environmental Impact Statement for the proposed Ritz-Carlton Mauna Lani Resort, South Kohala, Hawaii. Our comments are as follows:

Forestry and Wildlife:

Although the section on "Terrestrial Flora" (1.5, Page IV-26) states that there were no proposed, listed and/or candidate endangered and threatened plant species existing within the proposed development area based on a 1984 survey, the draft EIS does not include a botanical survey report to determine the adequacy of the survey. Maps showing the routes surveyed within the proposed development, information on (1) which routes were used to sample vegetation, (2) botanist qualifications in Hawaiian threatened and endangered field surveys, (3) the amount of time spent doing the surveys, the methodology, and the results of the survey including a checklist of flowering plants encountered within surveyed area should be included as an appendix to the EIS.

Disclosure of wildlife present (1.6, page IV-28) appears adequate, but a checklist of wildlife species (birds, mammals) should be included in an appendix. Restoration of the pond should produce benefits to wildlife associated with coastal brackish waters. The Division of Forestry and Wildlife has no records of the presence of non-migratory indigenous birds frequenting the site.

Historic Sites:

Pages IV-20 through -34 cover historic preservation matters. At this time, we do not believe that this EIS adequately identifies significant sites in the project area, impacts to these sites, and acceptable mitigation plans. Our Historic Sites Section has been working with Belt, Collins and Associates and Mauna Lani on this matter. We believe all these matters can be quickly resolved, but it will require considerable revision of the EIS text.

We recommend the following changes for the EIS to be acceptable:

1. Section 1.7.1.1. The Mauna Lani Resort historic preservation interpretive and management plan primarily addresses the significant sites that were targeted for preservation in the early 1980s and how to interpret them. As the Draft EIS states on p. VI-34, none of the sites so targeted are in this project area. Other than a brief statement to this point, we recommend all references to the management plan be deleted as they are not relevant. This also means all of Section 1.7.1.3 should be deleted.
2. The key factor for this area is that a number of known sites not scheduled for interpretive preservation still contain significant information on the prehistory of this area. These sites need to be protected during development or undergo archaeological data recovery prior to construction. This historic preservation concern is clearly stated in the Revised Master Plan for Mauna Lani. This should be noted in Section 1.7.1.1.
3. Section 1.7.1.2. is good. It identifies and describes four sites known in the project area. Five sites, however, are in the area. The fifth known site, the Keanapou Fishpond, must also be discussed here. Much of paragraph 2 under Section 1.7.1. which describes the fishpond must be moved to this section. A mid-May fieldcheck showed that EI-306 and -307 are caves attached to the pond, so these should be kept in the text and discussed with the pond. Sites EI-308 and E2-31 are outside the project area; their discussion should be deleted.

4. A new Section 1.7.1.3. should address the significance of these sites according to the criteria of the National and Hawaii Registers of Historic Places. Our Historic Sites Section believes their significance can be determined without further archaeological work, and offered significance assessments in an April 13, 1987 letter to Ms. Ann Mapes of Belt, Collins & Associates, as follows:

- a. EI-305: "No longer significant". This site did contain some information significant on the history of the area, but this information was adequately recorded by Kirch (1979:28).
- b. EI-304, E2-32, E2-33: Significant solely for their information content. These are small sites with some shallow and spatially restricted deposits (Kirch 1979). The significant information in these sites includes the architectural data and information contained in the deposits (including dates).
- c. Keanapou Fishpond: Significant for its information content (architectural details and possible fishpond sediments) and as a good example of a site type, a fishpond established in an anchialine pond.

In sum, there are four significant historic sites in the hotel parcel, in our opinion.

If the applicant agrees with these evaluations and has checked with the County Planning Department, all that needs to be done is for the applicant to simply present these evaluations in the EIS, and note the Historic Sites Section and the County are in agreement.

Significance needs to be established in an EIS in order for impacts on significant sites to be evaluated. Until this is done, we believe that the EIS process related to historic preservation cannot be completed.

5. Section 1.7.2 on Impacts or Effects. This section needs revision and simplification. Only impacts to the significant historic sites should be discussed here. The permit applications emphasize that the fishpond is to be restored, so it will be affected. This should be clearly stated in this section of the EIS. As the Draft EIS states, our Historic Sites Section has determined that this will be a "beneficial effect" if the restoration is properly done. The impacts on the other three significant sites have yet to be determined. If they are avoided, there will be "no effect", if they are adequately protected. If they cannot be avoided, then a "no adverse effect" would result, if acceptable archaeological data recovery is done. The applicant needs to decide what the impact will be and state it in this EIS.

In brief, this section needs to state what the effects to significant sites will be, and the fact that the Historic Sites Section and the County Planning Department have been consulted and agree.

6. There is no section on Mitigation Measures. Some discussion is given under Section 1.7.2. A section 1.7.3 should be added to cover mitigation measures. This should at least include the fishpond and its two caves. The three inland significant sites should be included only if they are to be affected. In an EIS, minimally, we wish to see a commitment to acceptable mitigation treatments for each significant site -- e.g., a sentence or two that says we will properly preserve/restore the fishpond and conduct acceptable archaeological data recovery for the three inland sites. This is lacking at present. A statement that our office and the County Planning Department have been consulted and agree should also be included. When the mitigation plan section is only a brief summary of acceptable mitigation treatments, we also insist upon two conditions:

- a. Later submittal of detailed restoration and archaeological data recovery plans for review and approval by the County Planning Department and our Historic Sites Section.
- b. Verification of the acceptable completion of these plans by the same two offices.

The EIS does include these latter two conditions (p. IV-34). It simply needs to include the general commitment to appropriate treatments before mentioning the conditions.

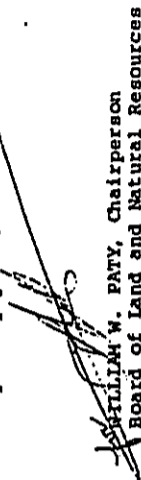
Again, we believe that these concerns can be easily met, but it will require revision of the EIS text.

Recreation Concerns:

We note that public shoreline access is being retained including access to the swimming lagoon being created as part of the development. We will comment on the proposed adjacent public park improvements during CDUA review for that project.

Thank you for this opportunity to comment.

Very truly yours,



WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Ms. Anne Hapes, Belt Collins & Associates

July 13, 1987
87-1440

Mr. William W. Paty, Chairman
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 22, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your letter.

Foresatz and wildlife. In April 1984, Earthwatch conducted a vegetation survey of the areas to be added to the Mauna Lani Resort master plan. A copy of this report is enclosed for your information. The Ritz-Carlton Mauna Lani site is at the edge of the survey area, which encompasses the public shoreline park and two golf holes adjacent to the Ritz-Carlton Mauna Lani site. The vegetation at the Ritz-Carlton site (parts of which have been bulldozed) is similar to that of the shoreline park and golf course area and it is expected that impacts and mitigation measures would be also be similar, as described in the Ritz-Carlton Mauna Lani Draft EIS.

A checklist of exotic birds will be included in the Final EIS.

Aquatic resources. Thank you for your suggestions for precautionary measures to be implemented at the project site. Belt Collins staff met with DLNR Aquatic Resources staff and a representative of the Conservation Office on July 2, 1987 to discuss your concerns. While we had a full discussion of the concerns, some of the issues remain unresolved. We are continuing our consultation with DLNR and expect that the issues will ultimately be resolved in the conditions to various governmental permits we are now seeking on the applicant's behalf. Specific Aquatic Resources concerns, as stated on page 2 of your letter, are addressed as follows:

1. We agree that work should be done as quickly as possible. However, whether work should be performed during a period of extreme low tides is unresolved.
2. Whether all shoreline modifications and dredging should be suspended during periods of strong onshore wind or large swells is an unresolved issue.

Mr. William W. Paty
July 6, 1987 - page 2

3. The applicant plans to work behind the natural outcrops to maintain the stability of the sand, about 110 feet offshore. We discussed the reasons for going beyond the 60 feet suggested in your letter and Aquatic Resources staff agrees that limiting work to the area within the outcrops is reasonable.

4. Whether a silt curtain should be used to prevent excess sedimentation is an unresolved issue. Since our meeting with Aquatic Resources staff, the Corps of Engineers has confirmed that it does not propose the use of silt curtains in the offshore area as a condition for permit approval.

5. As you suggested, the flushing channel will not be opened to the sea until dredging of the swimming lagoon has been completed and the lagoon water is clear.

Work plans for the shoreline area as described in the EIS will be submitted to your department for review, with appropriate mitigation measures. Precautions will be taken to prevent contaminants from entering Pauoa Bay, particularly during construction.

The applicant will work with County, State and Federal agencies to implement an appropriate monitoring program, according to permit conditions. The parameters of the monitoring program have not yet been determined. The applicant does propose to monitor the salinity of Keanapou Fishpond. Reports will be submitted to your department and the County of Hawaii for review.

Historic sites. Based on the recommendations contained in your letter and comments resulting from the historic preservation review process, we will rewrite section 1.7 in Chapter IV of the EIS. We shall consult with the County Planning Department as to agreement with the Historic Sites Section on the evaluation of significant historic sites at the Ritz-Carlton Mauna Lani project site.

The applicant intends to conduct archaeological data recovery for the three archaeological sites identified by your department as being significant solely for their information content. The mitigation plan you propose in the DLNR letter of June 17, 1987 to Belt Collins will be followed, subject to concurrence of the County Planning Department.

Sincerely,

Anne L. Mapes

Anne L. Mapes

Enclosure

PUAKO COMMUNITY ASSOCIATION
118 Puako Beach Drive, Kaneohe, Hawaii 96743

June 22, 1987

ATTN: CHAIRMAN

A. Lono Lyman, Planning Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii

Aloha:

The Puako Community Association has reviewed the Environmental Impact Statement filed by Belt Collins & Associates in behalf of Hauna Lani Resort for the Ritz-Carlton Hauna Lani.

We are extremely concerned over the failure of the applicant to provide any realistic commitment for construction of employee housing. The issue is lodged in Chapter VIII of the EIS entitled "unresolved issues," and essentially indicates that "Hauna Lani Resort has assumed responsibility for meeting employee housing requirements for the Ritz-Carlton." There are vague proposals to build some housing on State land, but there is no firm proposal at all, and no indication that one will be forthcoming before approval is expected.

Our community is now experiencing the impact of developments along the coast. Rents are shooting upward at an alarming rate, and well-paid and sometimes subsidized employees are paying them. Long-term local residents are being priced out of the housing market already, and the problem is just beginning.

We see no reason why this developer should be permitted to begin construction until firm and substantial commitments are made to provide employee housing. That is the Developer's obligation, and it is supposed to be a part of its costs of the project.

We are in exactly this position: to the extent the Planning Director does not require the Ritz and Hauna Lani to live up to their legal obligations here, residents of the surrounding communities are going to suffer. They are already suffering, and the situation can get much worse.

We are unwilling to accept vague promises of

future possible housing action from the developer, and we strongly request that the Planning Director insist upon clear, firm and enforceable commitments from the developer in this respect before any permission is granted to proceed.

We are also concerned over Section 1.3.2. which states that the developer intends to dig "new brackish water wells located on Hauna Lani Resort property." The EIS states here that these will have "the potential to affect salinity levels." We are concerned that there be no adverse effect upon the groundwater of Puako and the area mauka because such of the livability of our community depends upon the keawe forests which grow between us and the highway. The developer should not be permitted to affect anyone's water adversely, and we request that very clear guidelines be imposed to insure that our quality of life is not sacrificed to provide water for the development's shrubs.

Finally, we are concerned with the substantial ocean dredging which is proposed. Although the developer has had a meeting with this Association in the past, it appears that the scope of dredging now envisioned was not discussed with us. We would want to be very sure that no risks are being taken with the underwater habitat and that we can be fully assured that no adverse effects are possible along the coast both north and south. Unless clear and unequivocal assurances can be given, we urge that the proposed dredging not be allowed. It is really not that important to the overall project and those of us who live on the coast should not be obliged to assume risks when the developer could as easily resolve the matter with a large swimming pool.

We appreciate the opportunity to provide our input. We trust our remarks, which have involved a good deal of time and study on our part, will be given serious consideration.

Very truly yours,

Richard Schulze, Jr.
President

cc: Belt, Collins & Associates

HILL COLLINS
& ASSOCIATES
Engineering - Planning
Landscape Architecture

10th Canal Street, Honolulu, Hawaii 96813 • Phone: (808) 531-7141 • Telex: 981011 HILCOL • Fax: (808) 531-7144
Lanai • Napoohoa • Waialeale • Lihou • Lānaʻi • Kāneʻohe • Kaneohe • Kāneʻohe • Kāneʻohe • Kāneʻohe

July 14, 1987
87-1447

Mr. Richard Schulze, Jr., President
Puako Community Association
118 Puako Beach Drive
Kamuela, Hawaii 96743

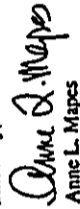
Dear Mr. Schulze:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 22, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your letter.

1. **Employee housing.** Conditions of permit approvals obtained by Mauna Lani Resort, Inc. place it under legal obligation to provide assisted housing associated with the development of parcels at Mauna Lani Resort. Mauna Lani Resort, Inc. has an agreement with The Ritz-Carlton Hotel Company that it will provide assisted housing, as required by conditions placed on any permits obtained by The Ritz-Carlton Hotel Company for the Ritz-Carlton Mauna Lani and as required by conditions of permits previously obtained by Mauna Lani Resort, Inc.
2. **High rents.** Please refer to Figure IV-10 of the EIS and to the accompanying text which discusses periods of shortage.
3. **Brackish water wells.** In general, groundwater flows in a mauka/makai direction. As shown in the Mauna Lani Resort master plan, most of the golf course is south of Puako, and therefore not in the flow lines to Puako. Other than the continued operation of the Puako shaft (5 years of operation without adverse effects), new brackish brackish sources will be south of Puako; therefore, they will not influence the groundwater in the Puako area. Because of the thin basal lens, the amount taken at any single site must be limited; otherwise, the water becomes too salty. This constraint insures that the water will not be overpumped.
4. **Extent of ocean dredging.** We acknowledge that the plan has changed and regret any misunderstanding. We do feel that the change makes for a better project. The applicant's consultant would be happy to meet with association members to explain the technical aspects of the project, if so desired.

Sincerely,


Anne L. Mapes



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 957-7311

June 23, 1987
RE: 0467

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Draft Environmental Impact Statement
Mauna Lani, The Ritz-Carlton
Mauna Lani Resort
South Kohala, Hawaii

The above referenced document proposes building a 450-unit luxury resort hotel on 32 acres at Pauoa Bay. Proposed changes to the shoreline and nearshore beach include expansion of the existing shoreline beach; restoration of an existing anchialine pond; excavation of a seawater swimming lagoon; creating a 110-foot wide flushing channel toward the center of Pauoa Bay; and installation of basalt armor stones on both sides of the swimming lagoon. The 32 acres for the proposed development are part of the Mauna Lani Development Plan which was the subject of a 1985 EIS. This review was prepared with the assistance of Richard Brock, Hawaii Institute of Marine Biology; Hans-Jürgen Krock, Ocean Engineering; Jon Matsunaka, Sociology; and John Harrison, Pamela Behnsen and Steven Armann, Environmental Center.

Anchialine Pond

The Draft EIS lacks valuable information regarding the anchialine pond, without which a comprehensive analysis of the potential impacts is difficult. We suggest the final document include/address the following:

- 1. A complete inventory (as quantitative as possible) and description of the existing pond and its inhabitants, including emergent vegetation, surrounding vegetation, and the aquatic species present.

A Unit of What? National Resources Council
AN EQUAL OPPORTUNITY EMPLOYER

Mr. Albert Lono Lyman

-2-

June 23, 1987

2. The planned methodology for cleanup of the pond should include the amount of material to be removed, whether it will go into a settling pond and if so, where the pond will be located in relation to the other anchialine ponds in the vicinity.

3. Once the pond is cleared, how will it be managed? Who will pay for the management, and how much money will be allocated each year? Will it receive fish? Will it be left in its natural state, and if so, will there be adequate management to keep unwanted fish out?

4. Once completed, what will be the dimensions of the pond? How deep will it be? What is the anticipated vertical salinity gradient in a no-wind situation?

5. What will be the surrounding developments (both fine scale and on a larger scale) relative to the anchialine pond? How will these developments affect the anchialine pond and its biota?

The methods suggested to reduce the salinity if sea water intrusion is increased (p. II-15) are not likely to be needed. Since we do not know the species inventory of the pond, we cannot make a definitive recommendation, however, the aquatic anchialine species that probably occur here are euryhaline and are found in a wide range of salinities, so they should be unaffected by a change in salinity. Further study would be needed on the possible effects of the suggested introduction of trout into bore holes. This action could affect hypogean species that live in the water table. Our anchialine pond specialists would be pleased to assist in offering guidance or suggestions on management options.

Finally, there are a number of developments on the Kona coast that are either in close proximity to or covering (burying) anchialine ponds. This EIS should attempt to delineate the impacts expected by this project and relate these to other projects in the North Kona-South Kohala districts relative to the anchialine pond resource.

Social

The social impact section of this Draft EIS is very thorough in its scope of coverage and is an exceptionally well put together impact assessment. The Final EIS might discuss population mobility and composition in regard to the effects of this development on life styles and cultural values in the area, both for the present and in the future.

A broadly based survey of written comments from Kohala residents regarding their perception of the impacts would be helpful in identifying social issues surrounding this project. Statistics of child abuse and neglect noted in Table IV-30 of the Draft EIS are believed to underestimate actual cases. It is our understanding that social workers in the Kohala area are overworked, which may contribute to some cases not being reported. For your information, we have attached a report compiled by a group of Kona parents that was written in response to the need for permanent staffing for West Hawaii Child Protective Services.

Mr. Albert Lono Lyman

-3-

June 23, 1987

Seawater Swimming Lagoon

Beach sand at the proposed swimming lagoon may be transported beyond the lagoon. As a contingency against this type of impact, the Final EIS should indicate the grain size of the beach sand and introduce either a physical or analytical model indicating wave energy and estimates of potential sand transport.

Thank you for the opportunity to comment on this Draft Environmental Impact Statement. We hope our comments will be helpful in completing the final document.

Yours truly,

Jacquelin N. Miller
Jacquelin N. Miller
Associate Environmental Coordinator

Attachment

cc: OEOC

- Anna L. Hapes, Belt Collins and Associates
- L. Stephen Lau
- Richard Brock
- Hans-Jürgen Krock
- Jon Matsuoka
- John Harrison
- Pamela Bahnsen
- Steven Armann

XII-22



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2520 Campus Road
Honolulu, Hawaii 96822
Telephone (ext) 948 7441

June 24, 1987

Mr. Albert Lono Lyman
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Review of Draft Environmental Impact Statement
Mauna Lani, The Ritz-Carlton

The enclosed document is the referenced attachment for our review on Mauna Lani dated June 23, 1987 which was not included with your copy of the review. We are sorry for any inconvenience this may have caused you.

Thank you very much.

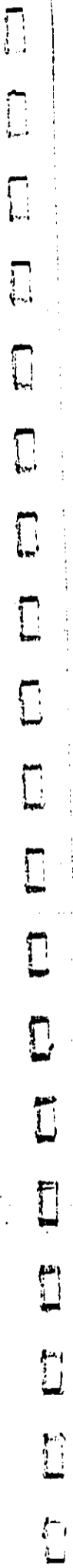
Yours truly,

Jacquelin N. Miller
Jacquelin Miller
Associate Environmental Coordinator

Attachment

cc: Office of Environmental Quality Control
Anne Hapes, Belt Collins & Associates

A Unit of the University of Hawaii
AN EQUAL OPPORTUNITY EMPLOYER



1987 JUN 10 1987

Page 2

West Hawaii's Child Protective Services is Requesting Staff Be Reassigned to the Mainland

IMMEDIATELY!

Who Compiled This Report

This report was written, with the cooperation of D.S.M., - Hawaii Branch, by a newly formed organization of Papa parents, temporarily named, "Families as Allies". This report is motivated by our concern that children in our community are not being adequately protected, a serious problem which requires action on many levels. We consider Child Protective Services to be an essential service, while recognizing that prevention programs and home-based services are also essential in the effort to rid our community of child abuse and neglect. It is alarming that there have been 3 deaths in West Hawaii due to child abuse and neglect in open CPS cases (1987-1987), compared to no such deaths in East Hawaii for the same period!

A. CASELOADS ARE SERIOUSLY UNREPRESENTATIVE IN WEST HAWAII

(Case load numbers are from hand tabulated statistics, as of 3/1/87)

Unit 39 - Crisis, Adult and Family & Child Services (Unit covers North & South Kona, Waimea & Kohala Districts, an area twice the size of the island of Oahu)

Kona District Has:

- 1 crisis CPS worker who has been the sole crisis worker since July 1986, reports a caseload of 87; 10 new cases/ mo./worker is the National Association of Social Workers (NASW) standard.
- Another crisis worker is in process of being hired. An undetermined number of cases should be closed or are not registered, due to worker time spent on crisis demands. However of the 89 cases, 63 are considered in need of further contacts. The supervisor of Unit 39 is carrying 28 CPS cases, 24 of which should be closed!
- 1 adult services worker has 156 cases, 37 of which are in Waimea/Kohala.
- 1 family & child services worker has 52-54 F & C cases and does crisis CPS investigations - 6 handled in February.
- 1 Foster Home and Day Care Recruiter and licensor has 102 cases (including 15 Family Day Care, 13 Group Day Care, 74 pending applications for Foster Homes, 1 each pending applications for a Group Home and Emergency Shelter Home, and 38 "approved" Foster Homes, an undetermined number of which should be closed. This worker is supposed to be servicing Waimea and Kohala's needs for recruiting and licensing.
- By March 11, 1987, 13 new Foster placements had to be made by the Kona office in the month of March.

Waimea/Kohala Has:

- 1 social worker covering CPS and Family & Child Services reports a caseload of 116 which includes 56 crisis CPS and 44 post-crisis CPS; Per NASW standards and the Unit 38 supervisor, 14 crisis CPS workers and 4 post-crisis workers could be justified immediately!
- as with other workers, case closures and transfers from crisis to post-crisis, have lagged due to worker priority on crisis demands and court reports.
- 1 social worker position will be filled soon which will relieve Kona workers of Waimea/Kohala cases, BUT CPS crisis and post-crisis cases will remain with the one senior worker.
- There is less than 1/2 time secretarial help in Waimea/Kohala. Most of that work is done by the 2 secretaries and 1 clerk-typist in Kona. Paperwork began in March to create a clerical position for Waimea/Kohala. The immediate need is for 1 secretary and 1 clerk-typist in Waimea/Kohala.

Kona District (cont.)

- 1 aide is on staff with an immediate need for a second aide.
- Paperwork has just begun to fill the vacant clerk-typist position for Kona. Added to the 2 secretaries and clerk-typist already in place, there should be adequate clerical support for Kona. However overload will still exist as long as Waimea/Kohala requires clerical support from Kona staff.

Unit 24 - Post-Crisis CPS a.k.a. Case Management (Unit covers North & South Kona Dist an area in excess of one and a third the size of the island of Oahu.)

Four full-time case management workers are "managing" 146 cases. Each worker has an average of 37 cases, and 30-45 cases are waiting to be transferred to case management from Unit 38. The NASW standard for case management is 22 cases/worker, and that standard may be too high when cases require extensive documentation and reports for Family Court proceedings. Four workers are presently carrying the load of what should be 7 workers. Counting cases waiting to be transferred (176-191), there should be 8 full-time workers. 1 more position is in process of being filled, but 2 of those 4 existing workers are expected to terminate employment within the next 3-4 months; 3 additional full-time positions need to be created immediately to cover current caseloads!

There is 1 vacant aide position for Unit 24 and an immediate need for 2 aides. Among other duties, aides are essential to supervision of visitations between children in out-of-home placement and their birth parents. For visitations which require supervision, the lack of aides and workers means that parents are being denied more frequent, lengthy visits with their children. Limited manpower and the large turnover of staff severely affects the quantity, quality and continuity of services being delivered in West Hawaii!

B. FLAWS IN THE SYSTEM

- Requests by Hawaii Branch for more permanent positions are being turned down on the basis of computerized statistics. Those "SSIS" statistics are inaccurate due to lack of worker time to update computer forms. Currently SSIS forms are being relayed to East Hawaii for input, due to the lack of trained staff to make input in West Hawaii.
- \$3,000/mo. is allotted for West Hawaii worker overtime. Overtime currently generated continues to exceed this allowance. For \$3,000/mo., 2 new positions could be created!
- Workers are trained by the Department, a substantial financial and time investment, only to be lost and replaced by workers who will require training and time to acquire the competence necessary to handle excessive caseloads and families who can be hostile and resistant. People can't be paid enough to remain overwhelmed and overworked in CPS.
- Under present conditions, workers are not able to specialize. The mixing of investigative and counselor/educator roles is a poor one. It interferes with the establishment of a relationship with the family, a relationship so important to social work methodology. Also with the limited workforce, it is unlikely that a family's worker can be changed in the event that the family is completely unable to relate to the assigned worker or vice versa.

C. WEST HAWAII'S POPULATION GROWTH

North Kona district was the fastest growing district of the Big Island with a resident population that nearly tripled between 1950-1960. Waimea (including South Kohala district) was the third fastest growing district of the island between 1950-1960. Waimea/Kohala had a greater proportion of population in the 17 years and younger age range than Kona (Population figures per the 1960 U.S. Census). West Hawaii's population is expected to increase by more than 50,000 people during the next 20 years due to rapid growth spurred by a healthier infant mortality rate than the County Planning Dept.). The entire Big Island population as of 1960 was 92,000. West Hawaii's human services have not kept pace with its population growth, and the growth trend can be expected to continue!

D. RECOMMENDATIONS

A West Hawaii Branch, independent of East Hawaii Branch, should be created with its own Branch Administrator. Currently official letters need to be signed by the East Hawaii Administrator. This can mean a 2 week delay between completing a letter in West Hawaii and its being signed and ready for mailing. Caseload numbers can justify a West Hawaii Branch with 3 separate units, 3 supervisors, 12 case management workers (4 in Waimea/Kohala), 4 crisis CFS workers (1 workers in Waimea/Kohala, including 1 crisis worker, specializing in sex abuse, to assist all units), 1 adult services worker in Kona, 1 family & child services worker in Kona, 1 non-CFS worker in Waimea/Kohala, 2 licensing and recruiting workers (1 in Waimea/Kohala), 6 aides (2 in Waimea/Kohala), 6 clerical/secretarial workers (2 in Waimea/Kohala, including 1 computer trained to assist all units), and the necessary facilities, equipment and vehicles.

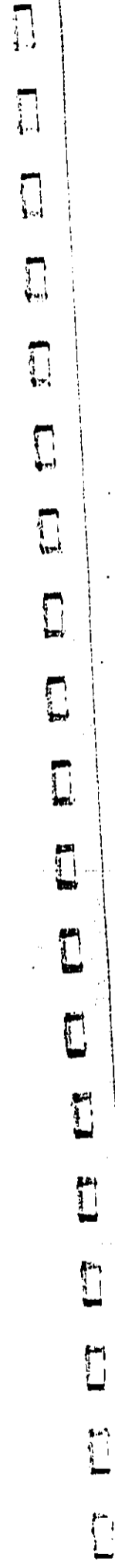
IMMEDIATELY

The above identified positions are needed to meet current caseload demands!

Questions regarding the content of this report can be asked of:

Deborah Cheng Abreu
"Families as Allies"

322-0033



July 13, 1987
87-1439

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

Dear Ms. Miller:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 23, 1987 to Mr. Albert Lono Lyman, Director
of the Hawaii County Planning Department, concerning the above project. Your comments are
addressed in their order of appearance in your letter.

1. Anchialine pond DLNR Historic Sites Section archaeologist Ross Cordy made a fieldcheck
of the significant historic sites in the project area on May 18, 1987. It has been determined that
there will be "beneficial effect" contingent upon proper restoration and preservation of the
fishpond. The proposed mitigation plan for Keanapou fishpond, to be approved by the County
Planning Commission or the Hawaii County Planning Department, is contained in Section 1.7 of
Chapter IV of the Final EIS. The impact of pond cleanup will probably be an increase in the
nutrient level; the impact on biota will probably be unobservable. If salinity in the pond goes
beyond the "acceptable" level, grout will be used to aid in lowering salinity. It is unknown at
present whether grouting will be needed. Management of the pond will be provided by the
applicant.

Regarding your comment on the relationship of Keanapou fishpond and other projects in the
North Kona-South Kohala districts relative to the anchialine pond resource, we direct your
attention to page IV-18 of the accepted Mauna Lani Resort EIS (June 1985):

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

Ms. Jacqueline N. Miller
July 13, 1987 - page 2

2. Social Thank you for the positive comments in regard to the social impact section of the
Draft EIS. As per your suggestions in regard to population impacts on current lifestyles and
cultural values, we will add the following new paragraph at the end of Section 2.2.7.1.3 (Worker
In-Migration and Retired Population Change):

In-migrating new population could also have impacts on existing lifestyles and cultural
values, possibly in the direction of more "Mainland/urban" and less "local/rural."
However, the extent to which this actually happens will depend on, among other things
(1) the location of future new residential development (i.e., whether in-migrants are
widely dispersed among existing communities or are concentrated in new communities);
and (2) the actual demographics of the newcomers. While Maui and West Hawaii resort
expansion in the 1960's and 1970's attracted mostly young Mainlanders, several major
Neighbor Island resorts in the 1980's have made an effort to recruit Hawaii-born
residents. Such targeted recruitment, as well as job training for disadvantaged West
Hawaii residents to minimize need for in-migration, represents one of the major
recommended forms of socioeconomic mitigations (see Section 2.2.8).

In regard to the suggestion that "A broadly based survey of written comments from Kohala
residents ... would be helpful in identifying social issues surrounding this project," we might
note that written responses to the Draft EIS and the original Preparation Notice provide exactly
such a record. The key concerns expressed in these letters have mostly related to shoreline
issues; within the socioeconomic domain, there has been a sensitivity to housing issues (although
more in regard to cumulative impacts than from the Ritz-Carlton Mauna Lani project alone).

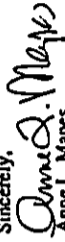
Finally, thank you for the report from "Families as Allies" on West Hawaii child abuse
statistics. In the Final EIS, we will make note of this by modifying the second paragraph of
Section 2.2.7.2.3 in the following fashion:

"Child abuse/neglect figures must be treated with great caution because ... (3) reported
cases are also partly a function of the number of caseworkers who are present to record
the reports, and an organization of Kona parents recently prepared a report suggesting
that -- due to staffing problems -- West Hawaii caseworkers have much higher caseloads
than official State statistics would indicate (Families as Allies, 1987)."

3. Seawater swimming lagoon The grain size of sand will be well sorted, medium to coarse
calcareous (see page II-5 of the Draft EIS).

The existing conditions in the portion of Pauoa Bay where improvements will be made are those
of a very stable sand beach which does not move seasonally, either in and out or laterally. The
factors contributing to stability include (1) the orientation of the embayment, (2) the relatively
shallow water in the bay, and (3) the extensive emerged/submerged outcrops which will not be
changed by construction. All work will be done inside, leaving outcropping in place to ensure
stability. We do not expect the sand to move.

As to your suggestion for modeling, the existing beach is a full-scale prototype of a stable beach.
The light colored sand at the existing beach area does not mix with the dark shoreline sand further
north and it is expected that the non-mixing of elements will be maintained after construction of
shoreline improvements.

Sincerely,

Anne L. Mapes

BRUCE COLLINS & ASSOCIATES
INCORPORATED
1111 KALANANĀʻOHE AVENUE, SUITE 1100, HONOLULU, HAWAII 96813
TELEPHONE: 535-8888 FAX: 535-8889

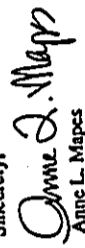
July 14, 1987
87-1446

Mr. Richard N. Duncan
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 23, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your letter.

1. We agree with your suggestions.
2. The project site is almost completely devoid of soil and therefore no groundcover is needed.
3. We agree that the lagoon will be opened to the bay after it is essentially constructed.
4. Sediment will be pumped onto a land site, away from any archaeological sites, and ultimately, will be hauled away.
5. The project area is one of demonstrated stability. The existing conditions in that portion of Paoua Bay where improvements will be made are those of a very stable sand beach which does not move in and out or laterally. Factors contributing to this stability include (1) the orientation of the embayment, (2) the relatively shallow water in the bay, and (3) the extensive emerged/submerged outcrops which will not be changed by construction. All work will be done inside, leaving outcropping in place to ensure stability. We do not expect the sand to move.
6. A site for the sand has yet to be selected, but it is unlikely to be the Moomomi area of Molokai. The site chosen will be based on specifications established for the sand, as well as economic considerations, including the cost of permitting.

Sincerely,

Anne L. Mapes

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. BOX 50004
HONOLULU, HAWAII 96850
June 23, 1987

Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
25 Auani Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

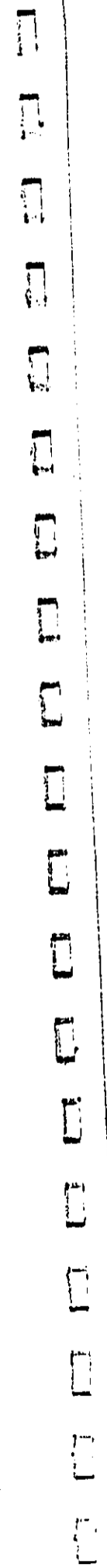
Subject: Draft EIS - Ritz-Carlton Mauna Lani
The above-mentioned document has been reviewed as requested by the Hawaii State Office of Environmental Control. Comments are as follows:

1. Proposed construction will increase sedimentation of neighboring water that makes it important to have a dry well made or "natural lava terrain" (pp IV-7) available before start of major construction; also, to reduce dust problems with use of sprinklers during construction.
2. Until a permanent ground cover can be established, a temporary cover such as annual rye is recommended. This will help protect against wind and water erosion.
3. The lagoons should be opened to the bay only after they are completed to cut down on the amount of sediment that would reach the bay.
4. Page I-2. Deposition of sediment - Sediment pumped out of the pond should not be deposited in the ocean or where it can wash into the ocean.
5. Placement of sand on the beach should be limited because of the possible damage to inshore reef ecosystems.
6. Page II-15. The developer may take sand for the beach from the Moomomi area of Molokai. This area is the site of the Moomomi Dunes which are widely known for their ecological and archeological significance and their environmental sensitivity. The importance of this area was recently highlighted in a special presentation on Hawaii Public Television and also in the February-March 1987 issue of the Nature Conservancy Magazine. Members of the Bishop Museum staff have made several paleontological finds that they regard as significant. If there is any doubt as to the fragility of this ecosystem, we would suggest that the developer contact the Bishop Museum in Honolulu.

Sincerely,

RICHARD N. DUNCAN
State Conservationist

cc: Anne L. Mapes, Belt, Collins & Associates, 605 Coral St., Honolulu, HI 96813



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19.002(i)(3)

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STP 8.2134

June 24, 1987

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Draft Environmental Impact Statement (DEIS)
Ritz-Carlton Mauna Lani
Mauna Lani Resort, South Kohala, Hawaii

We have the following comments concerning the subject proposed development:

1. Normally, we forecast traffic impacts over a 20-year time frame rather than the 10-year time frame requested by the County of Hawaii. The results of a 20-year analysis will be significantly more adverse than for a 10-year analysis.
2. Were all proposed developments in this region included in the traffic analysis? If not, how was it determined which developments should be included in the traffic analysis?
3. We are interested in the traffic counts taken by the developer's consultant which should have been included in the DEIS.
4. For scenarios 1, 2, 3 & 5, what are the "existing traffic" conditions for the years 1993 & 1998? Also, how were these "existing traffic" values derived?
5. Level of Service B for a rural area is normally considered unacceptable. If the consultant's analysis is correct, then we will have significant problems on Waimea-Kawaihae Road and Queen Kaahumanu Highway from Paiani Road to the Waimea-Kawaihae Road. All major intersections in this region will also be affected. Funding constraints will no doubt preclude us from

Mr. Albert Lono Lyman
Page 2

STP 8.2134

completing the improvements needed to accommodate the traffic projected by the consultant. Therefore, we will be seriously considering methods to obtain developer assistance in funding these necessary transportation improvements.

6. Mitigation measure(s) for the Ritz-Carlton Mauna Lani Resort Hotel access at Queen Kaahumanu Highway will be required, based on scenario 6 for the year 1998. The DEIS should contain a discussion on what improvements would be necessary at this intersection and the developer's commitment to fund these improvements in a timely manner.

7. All improvements contemplated within the State highway right-of-way will be subject to review and approval by the State Highways Division.

We appreciate this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

DT:ko

cc: HWY, STP(dt)

Ms. Anne Waples, Belt, Collins & Associates

IRVING COLLINS
& ASSOCIATES
Incorporated - Hawaii
Lasker Building

1015 Third Street, Honolulu, Hawaii 96813 - Phone: (808) 551-1161 - Telex: HIR111 748473 - Fax: (808) 551-7877
Hawaii - Washington - Honolulu - Colorado - Illinois - Oregon - Virginia

July 14, 1987
87-1445

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

Dear Mr. Hirata:

Draft Environmental Impact Statement for
the Ritz-Carlton Mauna Lani, Mauna Lani Resort
South Kohala, Hawaii

This letter is in response to your letter of June 24, 1987 to Mr. Albert Lono Lyman, Director of the Hawaii County Planning Department, concerning the above project. Your comments are addressed in their order of appearance in your letter.

1. Traffic impacts were forecast over a period of ten years at the request of the Hawaii County Planning Department and it was felt that a 10-year forecast would be more accurate than a 20-year forecast. Growth in traffic is a function of development in an area and no development schedules are available for projects beyond the next ten years. We agree that, given continued growth in the region, the traffic impacts in 20 years' time will be greater than in 10 years' time. However, the magnitude of the impact cannot be reliably predicted.
2. Only those projects likely to be developed within the 10-year timeframe were included in the traffic analysis. They are the Ritz-Carlton Mauna Lani, South Kohala Resort, the Hyatt Regency Waikoloa, Kohala Ranch, and an assumed hotel in the North Kona area.
3. The traffic counts will be submitted to your department upon request.
4. "Existing traffic" conditions for 1993 and 1998 are based on traffic counts taken by Belt Collins engineering staff in 1987.
5. We agree that funding for roadway improvements is an issue for discussion and negotiation between public and private entities.

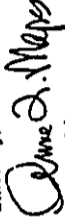
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Mr. Edward Y. Hirata
July 14, 1987

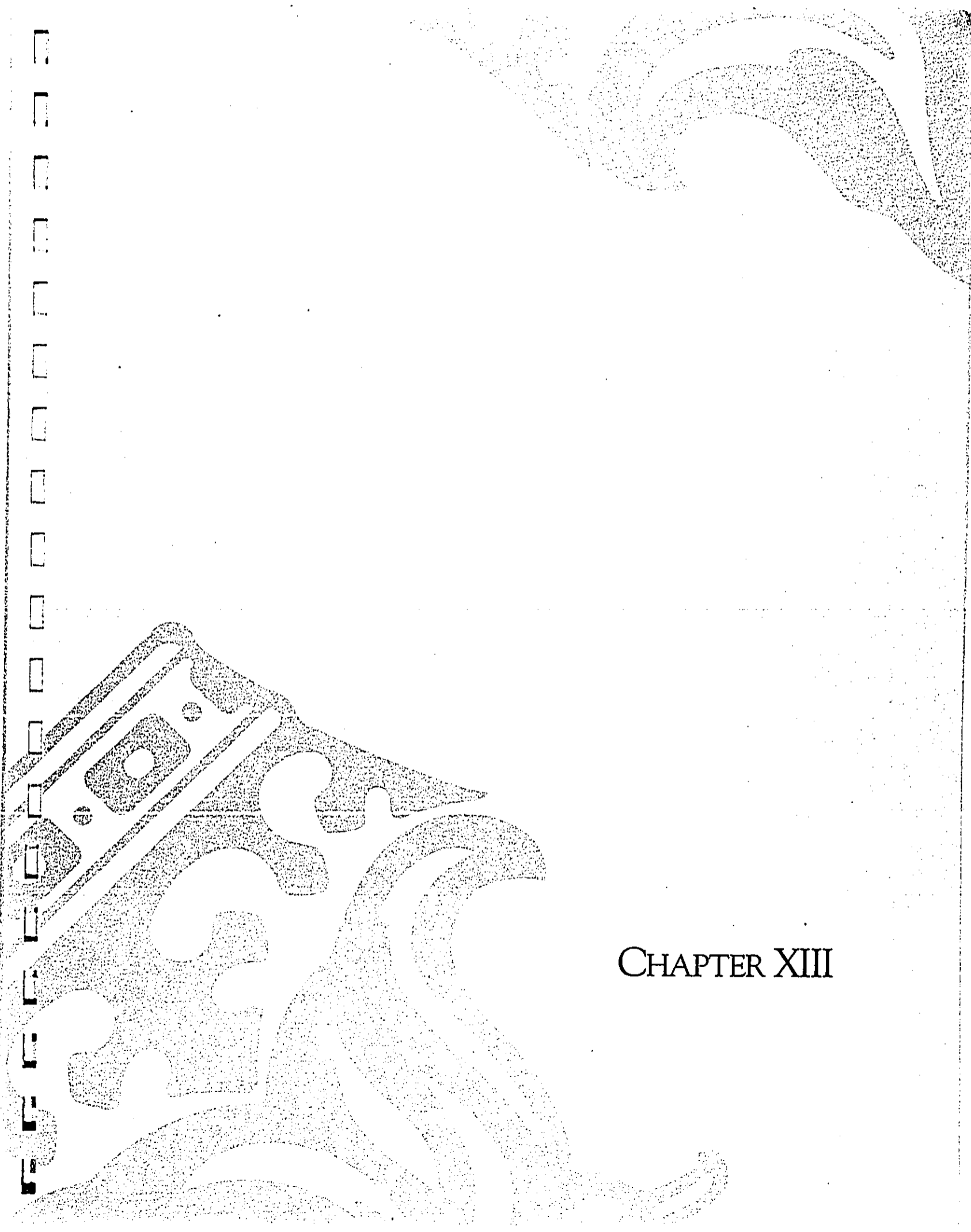
6. The left turn out of Mauna Lani Resort onto the northbound segment of Queen Kaahumanu Highway is expected to operate at level of service "F" in 1998. It is projected that 260 vehicles per hour will make this turn during the PM peak hour. However, the delay will occur on the Mauna Lani Road leg of the intersection and no delay is expected on Queen Kaahumanu Highway. Intersection improvements will be necessary when traffic increases to the point where long delays occur. The developer will work with the Department of Transportation to make the improvements to the intersection when they become necessary.

7. We agree that improvements within the State highway right-of-way will be subject to review and approval by the State Highways Division.

Sincerely,


Anne L. Mapes

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24



CHAPTER XIII

CHAPTER XIII

OTHER CORRESPONDENCE

Letter of April 13, 1987 from State Parks Administrator, DLNR, to Belt Collins & Associates

Letter of June 16, 1987 from State Historic Preservation Officer, DLNR, to Chief, Operations Branch, Construction-Operations Division, U.S. Army

Letter of June 17, 1987 from State Parks Administrator, DLNR, to Belt Collins & Associates

SECTION 5, TITLE 19, HAWAIIAN CONSTITUTION
CHAPTER 1, PART 1, HAWAIIAN CONSTITUTION

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PLANS
HONOLULU, HAWAII 96809

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PLANS
HONOLULU, HAWAII 96809

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PLANS
HONOLULU, HAWAII 96809

Ms. Anne Mapes
April 13, 1987
Page Two

1. E1-305: "No longer significant". This site did contain some information significant on the history of the area, but this information was adequately recorded by Kirch (1979:28).
2. E1-304, E2-32, E2-33: Significant solely for their information content. These are small sites with some shallow and spatially restricted deposits (Kirch 1979). The significant information in these sites includes the architectural data and information contained in the deposits (including dates).
3. Keenapou Fishpond: Significant for its information content (architectural details and possible fishpond sediments) and as a good example of a site type, a fishpond established in an anchialine pond.

In sum, there are 4 significant historic sites in the hotel parcel, in our opinion. All seem to be in the SMA application area; only the fishpond seems to be in the CDUA and Corps permit application areas.

For each permit action, the relevant parties will need to agree in writing on these significance assessments, or meetings need to be held to reach an agreement.

Determinations of Effect

The fishpond is again in all permit application areas. The applicant proposes to preserve and restore the fishpond, so there will be an effect to this site. However, this will be a beneficial effect, a "no adverse" effect, if the restoration is done properly. For the Corps of Engineer's permit, this determination of effect must be in writing (from the Corps to our office) in order to comply with the National Historic Preservation Act. Also, the U.S. Advisory Council on Historic Preservation must review the materials leading to this decision and concur. The Corps submits this documentation.

In our meeting, you were unsure if the 3 inland sites in the SMA application area would be effected or not. If they will be avoided, "no effect" to these 3 sites will occur, and historic preservation review ends for these sites. If they will be impacted, then an "adverse effect" will occur.

April 13, 1987
Ms. Anne Mapes
Senior Planner
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:
SUBJECT: Historic Preservation Review -- Ritz Carlton Hotel at Mauna Lani
Kalahuihua'a, South Kohala, Hawaii
TMK: 6-8-22: 8, 10

This letter follows your April 8, 1987, meeting with Dr. Ross Cordy of our Historic Sites Section.

We have been involved in historic preservation reviews for this hotel project for the following actions: a State Conservation District Use Application (CDUA HA-2003), a U.S. Army Corps of Engineers permit (PODCO-0 1977-D), an EIS Preparation Notice, and a County of Hawaii Special Management Area permit (SMA 86-20). We responded similarly to all these actions (copies attached). Basically, we needed information on which historic sites were in the hotel parcel, so historic preservation review steps could be initiated.

Based on the April 8th meeting, it is now clear that 5 historic sites are within the borders of the hotel's parcel -- E1-304, E2-32, E1-305, E2-33, and the fishpond which is in our records each permit. To cover historic preservation review steps for each permit, it now needs to be determined (1) which sites are significant, (2) if any significant sites will be impacted and, if so, the nature of the impact, (3) what kinds of mitigation plans to any impacted significant sites will be appropriate. We cover these items below.

Significance Assessment

We have limited descriptions of these sites in our Hawaii Inventory of Historic Places (Kirch 1979 for the first 4 sites; Kikuchi 1973 and Apple & Kikuchi 1975 for the fishpond). However, based on this information, we have reached the following significance assessments:

Ms. Anne Mapes
April 13, 1987
Page Three

However, if acceptable archaeological data recovery takes place to recover the significant information in these sites, then we believe a "no adverse effect" determination would result. You should check with the County Planning Department to see if they agree with this determination. Please let us know which option the applicant selects.

Mitigation Measures

For the SMA, if the three inland sites will be impacted and data recovery is to occur, data recovery needs to be acceptable. This means that a short, but concise, data recovery plan should be devised and be reviewed and approved by the County's Planning Department, which usually asks our review also. We can advise you in the preparation of this plan. Also, the Planning Department will need to verify the successful execution of the data recovery plan, again usually asking our verification also. For the EIS, usually the applicant simply has to commit to data recovery, with the stated conditions of plan review and execution verification. The plan review and the execution verification can often simply be a condition of the SMA permit.

Given the small size of these sites, it is quite clear that data recovery will be fairly simple and can be rapidly concluded. (Our letter of November 6, 1986 to Mr. Lyman of the County of Hawaii offers some suggestions for data recovery.)

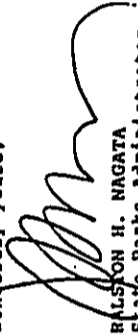
For the fishpond, again, restoration needs to be done properly to avoid damaging the integrity of the site. For all the permits, several steps are needed to ensure proper restoration. One, the pond needs to be better described and studied by an archaeologist in order to establish its dimensions, architecture, the possible presence of fishpond sediments, and other features. Two, given the findings, any resultant restoration plans should ensure that restoration is consistent with the pond's original architecture. Three, if the pond contains fishpond sediments and if these will be dredged out and thus damaged, some very minor archaeological data recovery needs to occur, usually a core or two with laboratory analysis and dating of the sediments. The key step here is clearly the improved archaeological description. The findings and the plans need to be reviewed and approved by our office, the County's Planning Department and the Corps of Engineers.

Ms. Anne Mapes
April 13, 1987
Page Four

The Corps also will have to submit some of this information to the U.S. Advisory Council on Historic Preservation, as part of the "no adverse effect" determination review package.

Thank you for coordinating with our office on these historic preservation matters. If you have any questions on any of the above comments, please feel free to call our Historic Sites Section. Dr. Ross Cordy, our Head Archaeologist, should be able to answer your questions.

Sincerely yours,

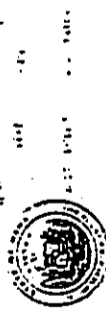


RALSTON H. NAGATA
State Parks Administrator
& Deputy State Historic Preservation Officer

Attachments (4)

cc: Mr. A.L. Lyman, Planning Department, County of Hawaii
Mr. Roger Evans, OCEA, DLNR
Col. F.W. Wanner, U.S. Army Corps of Engineers

OFFICE OF THE ATTORNEY GENERAL
STATE OF HAWAII
LAW OFFICES
150 SOUTH KING STREET
HONOLULU, HAWAII 96813



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 481
HONOLULU, HAWAII 96809

June 10, 1987

Mr. John G. Emerson
Chief, Operations Branch
Construction-Operations Division
Department of the Army
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Emerson:

**SUBJECT: National Historic Preservation Act Compliance --
Permit FODCO-O 1977-SD, Ritz-Carlton Hotel (Mauna
Lani Resort)
Kalahiupuna'a, South Kohala, Hawaii**

Thank you for your letter of June 2, 1987.

We agree with your determination of "no effect". No historic sites are within the permit area. The fishpond which is adjacent to the area is significant and likely to be eligible for the National Register of Historic Places, but the fishpond is outside the permit area and will not be affected by the proposed project.

You are correct in understanding that the fishpond and other historic sites in the Ritz-Carlton parcel will be handled under County and State permits. These permits will ensure that the fishpond will be appropriately restored and that 3 inland sites will be preserved or undergo archaeological data recovery.

In sum, we concur that you have complied with the procedures under Section 106 of the National Historic Preservation Act.

Sincerely yours,

WILLIAM W. PARY
Chairperson and State Historic
Preservation Officer

cc: A. Mape, Belt, Collins & Associates
R. Harris, Mauna Lani
A.L. Lyman, Planning Dept., County of Hawaii

Ms. Anne Mapes
Page Two
June 17, 1987

pond area, so a "no effect" determination to historic sites has been worked out between the Corps and our office, with the notation that the adjacent fishpond will be properly restored in other projects and its visual integrity will be preserved. This means that the federal historic preservation laws will not come into effect. A "no adverse effect" ("beneficial effect") determination contingent on proper restoration still applies for the fishpond for the CDUA and County permits. For the inland sites, again, the applicant will have to decide either to avoid or to conduct archaeological data recovery. The first is "no effect", the second "no adverse effect".

Mitigation measures remain unchanged. They can be further specified, and Attachment 1 provides more details on what would be needed for archaeological data recovery of the inland sites and for proper restoration of the fishpond.

In sum, with the Corps of Engineers' permit area having "no effect" on significant historic sites, your applicant will solely have to work with our office and the County Planning Department. This should simplify matters.

If you have any questions or would like to meet with our staff to discuss the project further, please feel free to contact our office. Dr. Cordy will be our contact person, but as you know he is now on vacation until July 7th.

Sincerely yours,

RALSTON H. NAGATA
State Parks Administrator
Attachment

cc: M. Lee, Operations Branch, U.S. Army Corps of Engineers
A.L. Lyman, Planning Department, County of Hawaii

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
UNIVERSITY OF HAWAII SYSTEM
P. O. BOX 401
HONOLULU, HAWAII 96813

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
UNIVERSITY OF HAWAII SYSTEM
P. O. BOX 401
HONOLULU, HAWAII 96813

June 17, 1987

Ms. Anne Mapes
Senior Planner
Belt, Collins & Associates
606 Coral Street
Honolulu, Hawaii 96813

Dear Ms. Mapes:

SUBJECT: Historic Preservation Review -- Ritz Carlton Hotel at
Mauna Lani
Kalahepu'a, South Kohala, Hawaii
TRK: 6-8-22: 8, 10

This letter follows a May 18, 1987 fieldcheck of the significant historic sites in this project area. Ross Cordy of our staff, Michael Gomes of Mauna Lani, and Albert Lono Lyman, Tim Lui-Kwan, and Connie Kiriu from the County Planning Department participated in this fieldcheck. Additionally, Michael Lee of the U.S. Army Corps of Engineers was involved in the check of the coastal fishpond.

The significance determinations for these sites are unchanged from our April 13, 1987 review letter. Some additional information was gathered on the fishpond and its associated sites (E1-306, -307) and on 2 of the 3 inland significant sites, E2-32 and -33. The findings for the inland sites showed them much as described by Kirch in his 1973 study. For the fishpond, it appears that the pond does not include any architectural walls, unless there is a wall on the beach side under the sand which blocks off an original entrance to the sea. Rather it is in a depression with a natural pahoehoe drop-off on one side. There are some minor, unrecorded archaeological features on the edge of this drop-off -- abraded manufacturing basins -- and caves E1-306 and E1-307 are on this side, with 307 actually leading to the pond. Both these sites should be considered a unit with the fishpond. The rest of the pond's edge has been altered by past bulldozing, so no other associated archaeological sites are present. The pond's specific shape and size cannot be determined easily without clearing. It does contain fishpond sediments.

Determinations of effect remain the same, with one important exception. The Corps of Engineers permit does not include the

MITIGATION PLAN

Kuahuipua Fishpond. The following tasks are recommended to ensure proper restoration. Items 2-5 must be done by a professional archaeologist.

1. Clearing of vegetation. This does not need an archaeologist present, as long as no heavy machinery is taken to the edge of the pond. It probably will be desirable not to clear out all the trees; for example, coconuts and others probably can be left for shade and scenic effect.
2. Locate any additional archaeological features (such as abrader grinding basins) on the pahoehoe on the very edge of the pond. This is a very easy task which should take no more than a few hours.
3. Map the fishpond's borders, including sites E1-306 and -307 and any archaeological features found on the edge of the pond.
4. Document the appearance of the pond, with photographs.
5. Take 2 cores of the sediments, analyze the sediments, and attempt to radiocarbon date the initial use of the pond for aquaculture.
6. Produce an archaeological report documenting the archaeological work.
7. Remove sediments as desired, with heavy equipment allowed only where archaeological features are not present and with care to have such vehicles not scar the pahoehoe edge of the pond.
8. Restore the pond to operating conditions with care not to damage the archaeological remains and with care not to alter the visual integrity of the site.

INLAND SITES

The information in these sites will be applicable to a few general research questions on the prehistory of Kalahuipua'a. Such research questions need to be clarified before fieldwork. And it should be clear just what information will be gathered from these sites to answer these questions.

1. E1-304 --- Triple C-shaped Enclosure. Data recovery should include:

- a. A scale map of the site.
- b. Representative collection of archaeological remains on the surface (shell midden, artifacts, manufacturing debris, volcanic glass, etc.).
- c. Test excavation of 3 m² (15%) if deposits are present. Stratigraphic profiles, with soil descriptions of each layer, must also be given.
- d. Laboratory analysis and description of food remains, artifacts, etc. -- including radiocarbon and/or volcanic glass hydration dating.
- e. Interpretations.

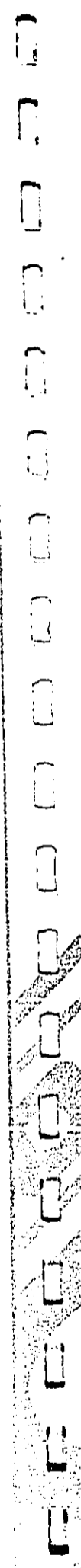
2. E2-32 --- Complex with 4-5 C-shaped enclosures, an oval enclosure and terrace, petroglyphs and grinding basins. Archaeological data recovery should include:

- a. Scale map of the site and its features.
- b. Detailed map of the oval enclosure and its associated terrace.
- c. Scale drawings of each petroglyph.
- d. 3 m² of excavations in the oval enclosure (c. 20% sample). Stratigraphic profiles, with soil descriptions of each layer, must also be given.
- e. Representative test excavations in C-shaped enclosures which include deposits to further establish the range of time over which this site was used.
- f. Laboratory analysis and description of food remains, artifacts, etc. -- including radiocarbon and/or volcanic glass hydration dating.
- g. Interpretations.

3. E2-33 --- Cave with external walled area. Data recovery at this site should include:

- a. Scale map of the site.
- b. 20% excavation sample of the cave and test excavation outside. Stratigraphic profiles, with soil descriptions of each layer, must also be given.
- c. Laboratory analysis and description of food remains, artifacts, etc. -- including radiocarbon and/or volcanic glass hydration dating.
- d. Interpretations.

A concluding section in the archaeological data recovery report should discuss the findings of the data recovery work related to the general research questions. This must at least refer back to an evaluation of Kalahuipua'a-wide patterns.



APPENDICES

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Study Methods	1
Shoreline Characteristics	3
Coastal Morphology	3
Bathymetry and Shoreline Topography	3
Occurrence and Movement of Sand	6
Groundwater Discharge	7
Wave Climate	9
Prevailing Deepwater Waves	9
Deepwater Storm Waves	14
Wave Transformation and Breaking	15
Currents	22
Design Conditions	25
Design Recommendations	27
References	

Engineering Evaluation of Ocean and Shoreline
Conditions at the Ritz-Carlton Hotel Site
Paoua Bay, South Kohala, Hawaii

by
Belt Collins & Associates

December 1986

LIST OF TABLES

No.	Title	Page
1	Keahole Point Deepwater Wave Hindcast Data as Developed by the Corps of Engineers Waterways Experiment Station and Modified in Evans-Hamilton, Inc.	12
2	Summary of Waverider Data in 130-foot Deep Water Off Keahole Point, June 1984 to May 1985	13
3	Summary of Computed Shoaling and Refraction Coefficients for 8, 12, and 20 Second Waves Approaching the Center of Pauoa Bay from Southwest (225°) to Northwest (300°)	21
4	Depth of Breaking as a Function of Wave Height and Period	23

LIST OF FIGURES

No.	Title	Page
1	Preliminary Site Plan, Ritz-Carlton Mauna Lani	2
2	Shoreline and Nearshore Features at Pauoa Bay	4
3	Offshore Bathymetry and Shoreline Topography at Pauoa Bay	5
4	Sand Grain Size and Composition at Pauoa Bay	8
5	Wave Exposure of Pauoa Bay	10
6	Refraction of 20 Second Waves from VM (300°) to Pauoa Bay	16
7	Refraction of 12 Second Waves from VM (300°) to Pauoa Bay	17
8	Refraction of 12 Second Waves from the West (270°) to Pauoa Bay	18
9	Refraction of 8 Second Waves from the West (270°) to Pauoa Bay	19
10	Refraction of 8 Second Waves from SW (225°) to Pauoa Bay	20
11	Typical Current Directions in Pauoa Bay	24
12	Expansion of the Shoreline Beach at Pauoa Bay	29
13	Swimming Lagoon Option to Retain the Anchialine Pond	31
14	Swimming Lagoon Option to Partially Fill the Anchialine Pond	32

INTRODUCTION

Preliminary concepts for the proposed Ritz-Carlton Hotel at Pauoa Bay include several features which would require construction seaward of the shoreline and in the shoreline setback area. One of these is the expansion of the existing beach at the southwest corner of the site. Another is the excavation of an inland swimming lagoon with a direct connection to the shoreline. The general location of these features at the Ritz-Carlton site is shown on Figure 1.

Data and analyses are provided in this report to evaluate the engineering feasibility of these shoreline projects and provide criteria for their detailed design. In addition to these specific objectives, information is provided on waves, currents, groundwater discharge, bathymetric features, and other aspects of the ocean and shoreline environment at Pauoa Bay.

STUDY METHODS

The first phase of study consisted of a number of field tasks: (1) a bathymetric survey was conducted using a continuous depth recorder from a small boat and also by swimming transects with SCUBA gear and recording depths on a slate; (2) sand samples were obtained for sieve analysis and determination of mineral composition; (3) current speeds and directions were observed for several different wave conditions; and (4) salinity and temperature were measured to identify points of significant groundwater discharge along the shoreline and track the movement of this water out of the bay.

The next phase of work was a review of available data and reports for information on waves, currents, and extreme, hurricane and tsunami events. Bathymetry beyond the limits of the field survey was obtained from hydrographic charts. Wave statistics, which consist of hindcasts from meteorological records as well as direct measurements by waverider buoys, were obtained from a number of sources, the most useful of which were developed for

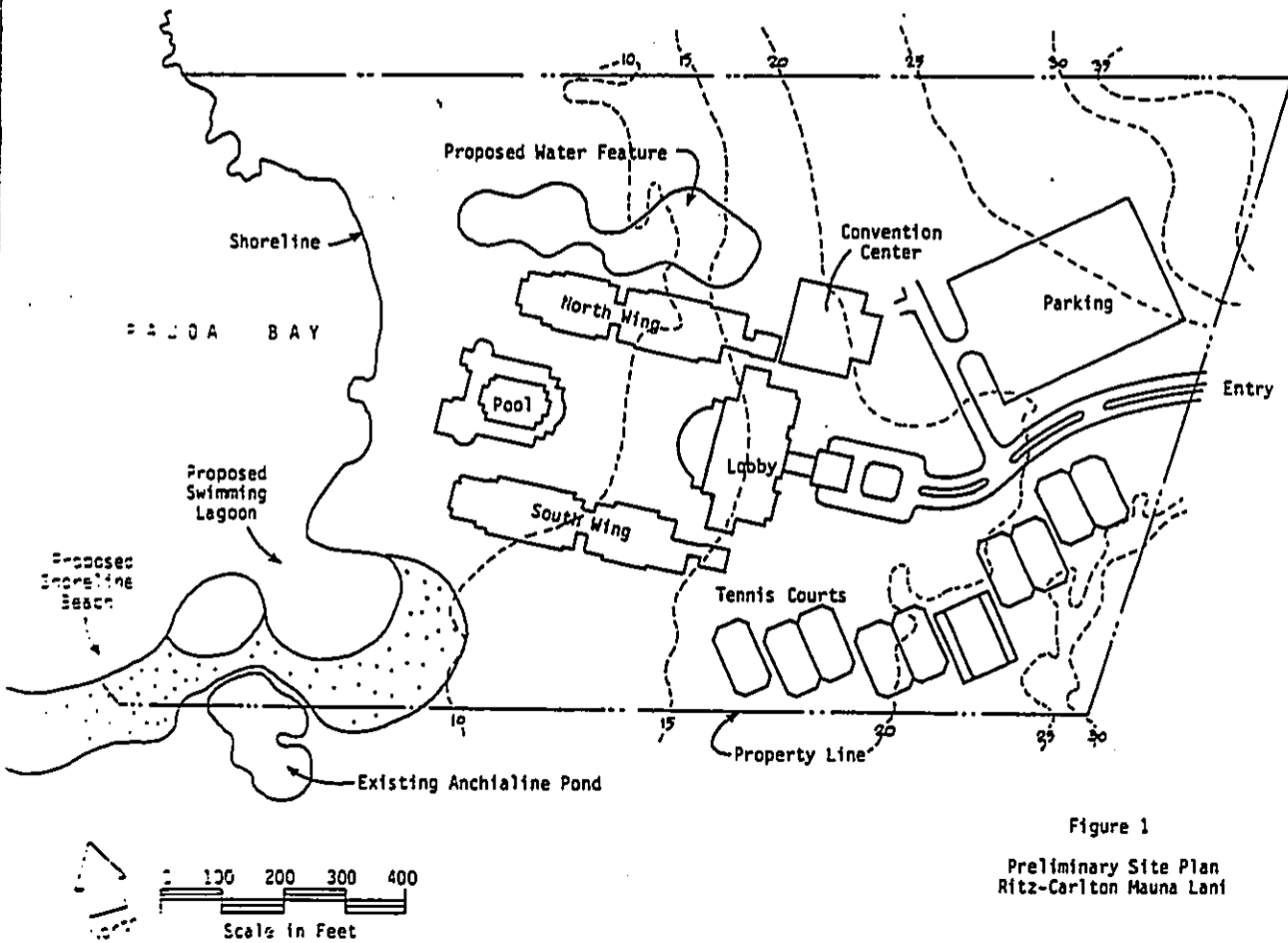


Figure 1
Preliminary Site Plan
Ritz-Carlton Mauna Lani

the OTC coldwater pipe testing program conducted off Keahole Point. Hurricane and tsunami parameters were selected after a review of a number of different references.

The final phase of work consisted of applying standard analytical techniques to the compiled data to develop the required design parameters and recommendations. The analytical process approximates the effects of local bathymetry on deepwater waves as they move into shallower water, break, and then run up on the beach. In turn, these results are translated into the maximum water levels, runup heights, and wave forces which determine the stability of beaches and shoreline structures.

SHORELINE CHARACTERISTICS

Coastal Morphology

Pauoa Bay is located on the island's northwest shoreline. This portion of the coastal area is relatively flat (1 to 3 percent slopes), having been formed by fluid pahoehoe lavas from Mauna Kea volcano. There are steeper slopes toward the inland boundary of the Ritz-Carlton site which delineate the edge of an overlying, irregular pahoehoe flow from Mauna Loa volcano. The shoreline trend is northeast to southwest. Pauoa Bay is a 600- to 700-foot deep indentation from this trend which is 800 to 900 feet across at its widest point.

The general shape and local relief of the ocean bottom within and outside the bay is primarily the form of submerged lava flows (see Figure 2). In shallow water, the edges of these flows are the most prominent features. Coral structures are few in number and limited in size. On steeper slopes further offshore, however, coral and coralline algae growth are more prominent and exert significant influence on wave height and energy entering the bay.

Bathymetry and Shoreline Topography

Shoreline topography and offshore bathymetry in the vicinity of the bay are presented on Figure 3. Shoreline elevations have been taken from a recent

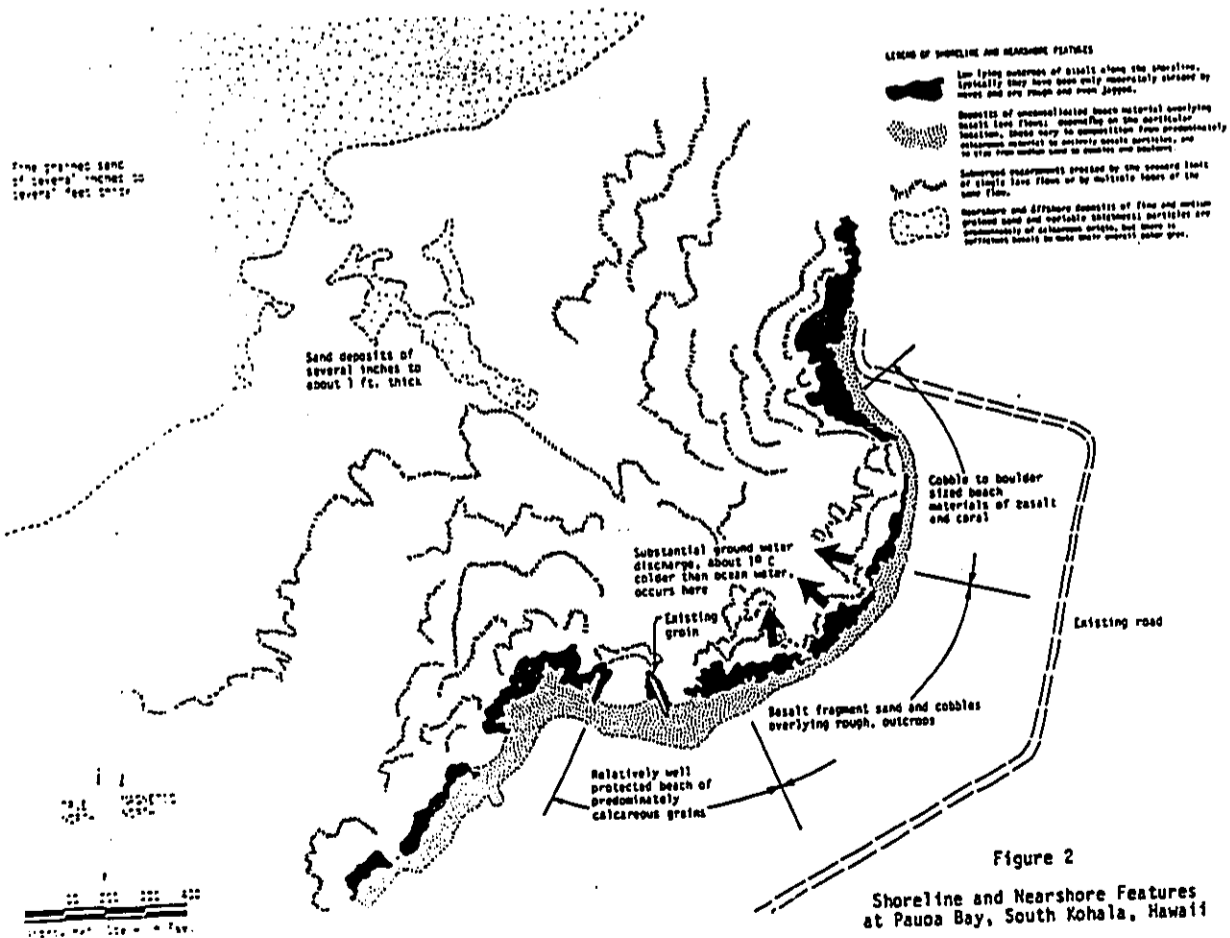


Figure 2
Shoreline and Nearshore Features at Pauoa Bay, South Kohala, Hawaii

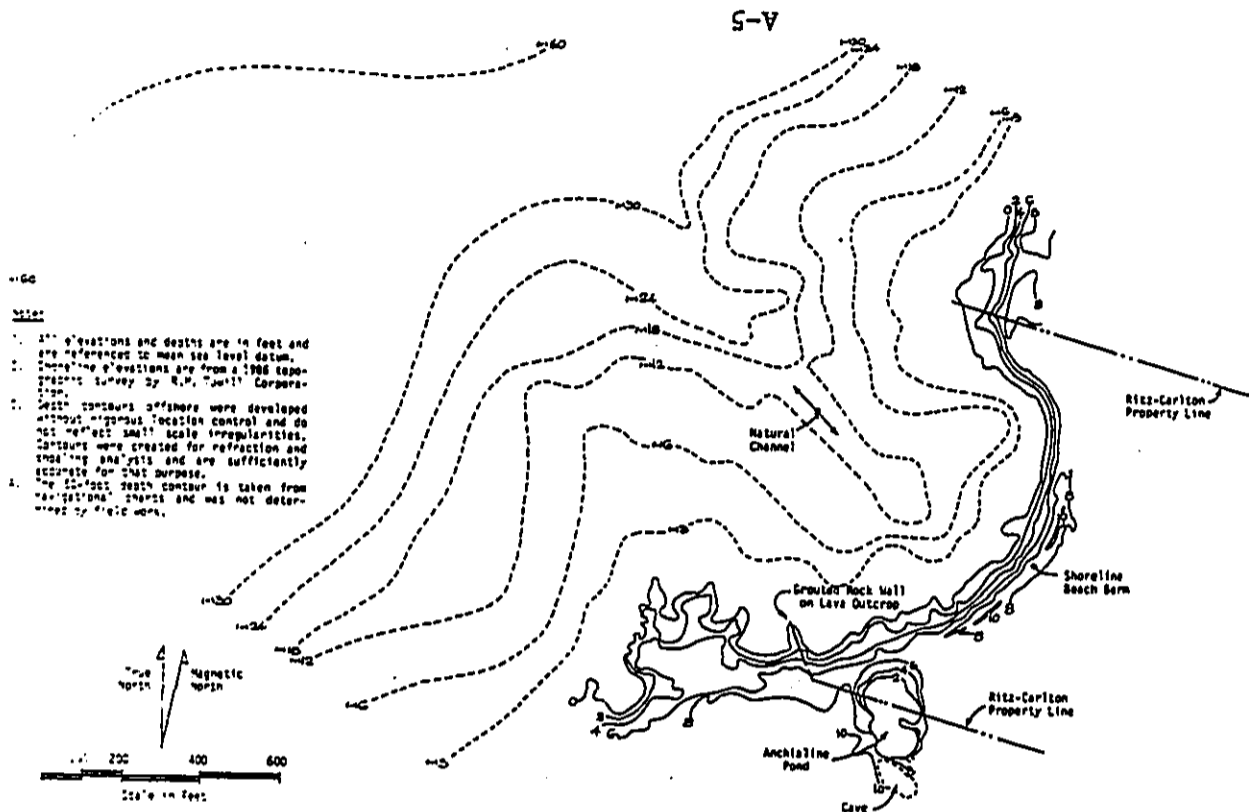


Figure 3
Offshore Bathymetry and Shoreline Topography
at Pauoa Bay, South Kohala

topographic survey by R.M. Towill Corporation. Bathymetric contours to 30-foot depth were developed during field work. The 50-foot contour has been taken hydrographic charts. All elevations are referenced to mean sea level (msl).

The elevation of the wave built berm along the shoreline is typically 6 to 8 feet at the north and south ends of the bay. It is higher, to about 8 to 10 feet, in the center of the bay. Elevations just inland of the shoreline berm are typically one to two feet lower than the berm itself. These differences reflect the protection provided by the prominent shoals off each point in comparison the deeper water in the center of the bay. Offshore, the depth across the entrance of the bay is 10 to 12 feet or less except for the narrow, natural channel leading out the center of the bay. As indicated previously, coral structures and encrusting coralline algae are more significant across the entrance of the bay than in shallower water within the bay.

Occurrence and Movement of Sand

Although lava flows create the general shape of the shoreline and near-shore areas, there are substantial deposits of unconsolidated material which range in size from medium-grained sand to boulders. At the shoreline, most of this material is lying on lava outcrops at or above the normal water line. However, there are several short sections of the shoreline where this material extends below water level into the wave wash zone. All of this material has been deposited by wave runup. The beach berms typically exhibit several wave-cut escarpments.

Along the northern third of the shoreline, the unconsolidated material is cobble to boulder size, has been rounded by wave abrasion, and is a mixture of coral and basalt. Along the middle third of bay's shoreline, the material is medium to coarse-grained sand, typically armored by a thin veneer of gravel and cobbles at the surface. This sand is 90 percent basalt fragments and is dark colored. A whiter, medium to coarse-grained sand is found along the southern third of the bay's shoreline. This sand is 80 to 90 percent calcium carbonate fragments.

Figure 4 presents the sieve analysis results of sand samples. Samples P-1 and P-2, which were taken mid-way up the beach slope in the southern half of the bay, are well sorted and medium to coarse-grained. Sample P-3, taken from a depression in shallow water just offshore, is coarse and not as well sorted as samples from the beach. Sample P-4 was obtained from the channel in the center of the bay. This sample is fine to medium-grained and well sorted. Offshore in depths greater than 50 feet, sand generally covers the entire ocean floor. Grain sizes are finer to either side of the channel (samples P-6 and P-7) than directly offshore of it (sample P-5).

The general absence of sand on the ocean floor within the bay is significant. Wave surges move loose particles toward the center of the bay's shoreline and then offshore in a rip current out the center of the bay. The natural channel is a conduit for this transport offshore. Due to strong wave action, the only loose material on the floor of the bay is either large boulders resistant to wave surge or smaller particles which have fallen into protective depressions.

Groundwater Discharge

There are three locations along the bay's shoreline where groundwater discharge is noticeable by temperature difference and by visual refraction effects (refer back to Figure 2). When low tide occurs in early morning before the daily onshore winds have developed, this discharge forms a brackish lens one to two feet thick over the inner third of the bay's water. As the wind develops or if high waves are occurring, the brackish layer is broken up or never develops.

During field work for this study, typical seawater salinity was 33.5 to 34.0 parts per thousand (ppt) and surface water temperature was 27.0° C (80.6° F). In nearshore areas, measured salinities ranged from 13 to 31 ppt and temperatures from 26.0° to 27.0° C (78.8° to 80.6° F). Lower salinity and cooler water occurred around the three locations of notable groundwater discharge shown on Figure 2. While the slightly colder groundwater can be felt, it is not uncomfortable.

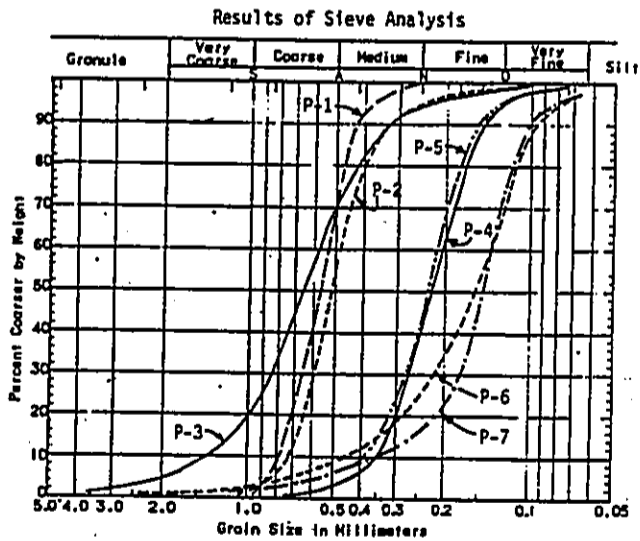
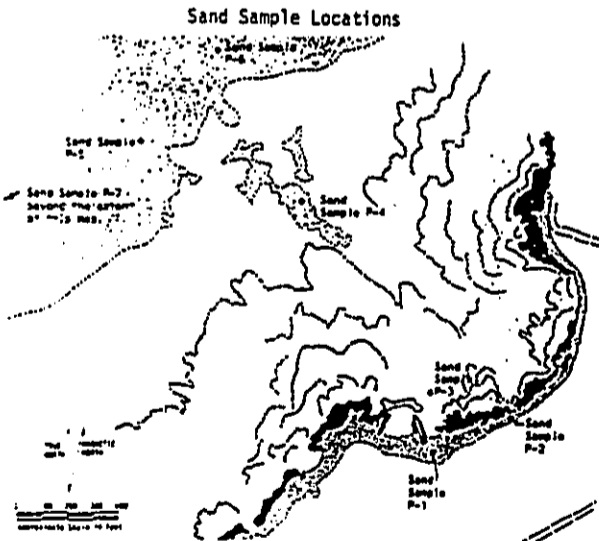


Figure 4
Sand Grain Size and Composition
at Pauoa Bay, South Kohala

Statistic	Sand Sample						
	P-1	P-2	P-3	P-4	P-5	P-6	P-7
W ₅₀ or d_{50} (mm)	0.65	0.50	0.63	0.23	0.24	0.15	0.14
W ₈₀ or d_{80} (mm)	0.24	0.45	0.65	0.48	0.54	0.84	0.69
W ₁₀₀ or d_{100} (mm)	2.71	2.73	2.65	2.68	2.63	2.61	2.68
Percent Coarse	80	12	52	84	87	--	--

Note: Coefficient of Sorting, C_s , is defined as $C_s = \frac{d_{80} - d_{20}}{d_{50}}$

where $d = \text{Log}_2 (d_i)$

d_i = Grain size in millimeters at i th coarser by weight

Smaller C_s values indicate better sorting. Well sorted sands have values below 0.50.

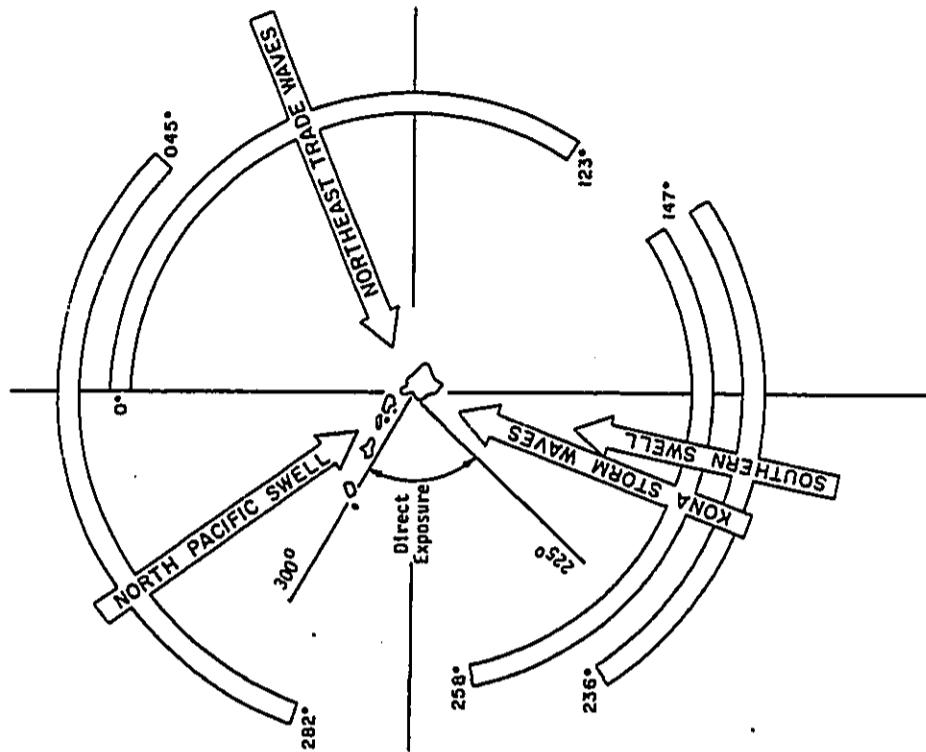
There are several locations in the lava flows around the periphery of the bay where cracks and blisters in the lava extend below the groundwater table. Salinity of groundwater in the anchialine pond on the south side of the bay was 3.8 ppt; at a small hole in the center of the bay and 150 feet from the shoreline, it was 4.0 ppt; and in another hole on the north side and 70 feet from the shoreline, it was 4.5 ppt. All temperatures were from 25.0° to 25.5° C (77.0° to 77.9° F).

Quantifying groundwater discharge into the bay is difficult because it cannot be directly measured and any is of obviously limited accuracy. Studies of groundwater in South Kohala have established the probable range of flow between three and seven million gallons per day (MGD) per coastal mile (Bowles, 1974; Mance, 1981; and Kanehiro and Peterson, 1977). Those wells which are inland of Pauoa Bay and may influence shoreline groundwater discharge currently pump a total of 3.1 MGD (Puako Shaft for the Mauna Lani golf course, 1.4 MGD; Waikoloa Village golf course well, 0.7 MGD; and Waikoloa potable wells, 1.0 MGD). Based on these figures and on observations of the discharge itself, it is estimated that at least one million gallons per day of groundwater is discharged into the 0.15 miles of the coast that the bay occupies.

WAVE CLIMATE

Prevailing Deepwater Waves

Wave types in Hawaiian waters and their relationship to Pauoa Bay are depicted on Figure 5. Keahole Point, which is 25 miles south of Pauoa Bay, intercepts waves from the southwest to bearing 225°. Kauai, Oahu, Molokai and Maui to the northwest provide shielding of waves from north of bearing 300°. This limits the direct wave exposure at Pauoa Bay to the sector from 225° to 300°. Wave types within this sector include North Pacific swells from west-northwest and Kona storm and southern swell waves from west-southwest. When other wave conditions prevail, the ocean off Pauoa Bay is relatively calm.



Adapted from Hoberly and Chamberlain (1964)

Figure 5
Wave Exposure of Pauoa Bay,
South Kohala

Table 1

Keahole Point Deepwater Wave Hindcast Data as Developed by the Corps of Engineers Waterways Experiment Station and Modified in Evans-Hamilton, Inc. (Undated)

Direction	Percent Occurrence of Significant Wave Height (Feet)										Total
	Calm	0.1-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	>16.0	
Calm	31.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	31.1
N	.0	.3	.3	1.4	2.1	1.3	.6	.2	.0	.0	6.2
NNE	.0	.1	.2	1.1	1.7	.8	.4	.1	.0	.0	4.4
NE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
ENE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
E	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
ESE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
SE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
SSE	.0	.8	14.3	19.9	11.1	1.1	.0	.0	.0	.0	3.2
S	.0	9.8	16.2	2.2	1.1	.0	.0	.0	.0	.0	17.2
SSW	.0	.2	3.0	1.1	.0	.0	.0	.0	.0	.0	26.4
SW	.0	.2	2.2	1.0	.0	.0	.0	.0	.0	.0	3.5
WSW	.0	.2	2.2	1.0	.0	.0	.0	.0	.0	.0	.5
W	.0	.2	2.2	1.0	.0	.0	.0	.0	.0	.0	.7
WNW	.0	.2	2.2	1.0	.0	.0	.0	.0	.0	.0	3.6
NW	.0	.2	2.2	1.0	.0	.0	.0	.0	.0	.0	2.8
NNW	.0	.2	2.2	1.0	.0	.0	.0	.0	.0	.0	.4
Total	31.1	12.2	35.6	7.5	4.8	4.2	2.5	1.3	.6	.2	100.0

Period (Seconds)	Percent Occurrence of Significant Wave Height (Feet)										Total
	Calm	0.1-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	>16.0	
Calm	31.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	31.2
0.1-1.9	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1
2.0-3.9	.0	1.7	.0	.0	.0	.0	.0	.0	.0	.0	1.7
4.0-5.9	.0	.0	2.1	.4	.2	.0	.0	.0	.0	.0	2.7
6.0-7.9	.0	.0	.1	1.3	1.1	.4	.3	.1	.0	.0	3.3
8.0-9.9	.0	.0	.0	.0	1.2	1.6	.6	.1	.0	.0	3.5
10.0-11.9	.0	2.7	6.8	1.9	1.6	1.8	.6	.2	.0	.0	15.6
12.0-13.9	.0	5.1	15.6	2.1	2.1	1.1	1.5	.7	.2	.1	26.6
14.0-15.9	.0	2.3	10.0	.6	.0	.1	.2	.4	.3	.7	14.0
>16.0	.0	.0	1.3	.0	.0	.0	.0	.0	.0	.0	1.3
Total	31.2	11.9	35.9	7.5	4.7	4.2	2.7	1.4	.5	.1	100.0

Since the actual waves occurring outside of Paoua Bay have never been directly measured, a review of available wave data for the region was conducted. Wave statistics developed for the OTEC coldwater pipe testing program off Keahole Point were found to be most representative of conditions outside Paoua Bay. Two sets of these wave statistics will be presented. The first is a hindcast of wave directions, heights, and periods derived from meteorological conditions which occurred over the 20-year period from 1956 to 1975. This hindcast was originally developed by the U.S. Army Engineer Waterways Experiment Station (WES) and was subsequently modified by Evans-Hamilton, Inc. (EHI) for conditions along the leeward coast of Hawaii. Modifications by EHI were island sheltering effects and the inclusion of southern swell waves which are missing from the WES data set. Results are summarized on Table 1. Wave heights of two feet or less occur 43 percent of the time, four feet or less for 79 percent of the time, and higher waves for the remaining 21 percent of the time. Wave periods of 10 to 16 seconds predominate. Most of these are associated with relatively low swell waves.

The second set of wave statistics was derived from a waverider buoy which was anchored in 130 feet of water off Keahole Point. Waves measured by the buoy for the year from June 1984 through May 1985 are summarized on Table 2. As well as being a direct measurement, these incorporate diffraction and decay effects which occur as waves move away from their generating winds and interact with the submerged masses of the islands. The summary on Table 2 indicates that wave heights less than two feet occurred 47 percent of the time, wave heights less than four feet for 94 percent of the time, and higher waves for the remaining six percent of the time. Wave periods were generally less than 12 seconds. Major differences of this data with the WES-EHI hindcast are that the percentage of wave heights over four feet is significantly less and that wave periods are generally shorter. Effects of diffraction and decay generally produce lower wave heights. It is also evident that short period waves generated by local winds, which are generally missing from the WES-EHI hindcast, were a significant fraction of the prevailing wave climate measured by the waverider buoy.

To apply the Keahole Point wave data to Paoua Bay, further amplification is appropriate. Keahole Point has a broader exposure, both to the north and

Table 2

Summary of Maverider Data in 130-Foot Deep Water
Off Keahole Point, June 1984 to May 1985
(Adapted From Edward K. Hoda and Associates, 1986)

Wave Period (Seconds)	Percent Occurrence of Significant Wave Heights (Feet)							Total For All Heights
	0	0.1 to 2	2 to 4	4 to 6	6 to 8	8 to 10	>10	
Calm	.3	.0	.0	.0	.0	.0	.0	.3
<6	.0	4.5	4.0	.0	.0	.0	.0	8.5
6 to 8	.0	23.9	18.7	.4	.2	.0	.0	43.2
8 to 10	.0	14.3	10.9	1.1	.6	.2	.0	27.1
10 to 12	.0	4.3	8.8	1.1	.0	.0	.0	14.2
12 to 14	.0	.1	3.9	2.0	.0	.0	.0	6.0
14 to 16	.0	.1	.0	.6	.0	.0	.0	.7
>16	.0	.0	.0	.0	.0	.0	.0	.0
Total	.3	47.2	46.3	5.2	.8	.2	.0	100.0

to the south. Waves from the NNE, N, and NNE directions listed in Table 1 for Keahole would be considerably reduced in height by refraction to arrive at Pauoa Bay. Waves from the SSE, S, and SSW directions would be shielded by Keahole Point itself and would not reach Pauoa Bay at all. In other words, conditions at Pauoa are calmer than depicted in Tables 1 and 2.

Deepwater Storm Waves

Storm waves approaching Pauoa Bay from its 225° to 300° sector of exposure occur intermittently in winter and very infrequently in other seasons. Those of concern are Kona storm waves, high swells from storms in the Pacific northwest, and hurricane waves. Previous studies which were consulted to delineate the range of extreme wave conditions include: Marine Advisors, 1963; U.S. Army Engineer District, 1967; Gayman and Greenbaum, 1968; Rocheleau, 1977; Sea Engineering, Inc., 1984; and Evans-Hamilton, Inc., undated. Storm waves from these references are tabulated below:

Summary of Storm Wave Heights and Frequencies of Occurrence

Return Period (Years)	Evans-Hamilton, Inc. (Undated)		Sea Engineering (1984)		Rocheleau (1977) All Deepwater Waves (Feet)
	WNV Swells (Feet)	Kona Storm (Feet)	WNV Swells (Feet)	Kona Storm (Feet)	
2	17.0	10.2	10 to 15	} 17.0	15.7
10	19.7	13.1	20 to 25		25.2
25	21.6	14.8	25 to 30		29.8
50	22.6	16.2	30+		33.0
100	23.8	17.5	--		36.5

Kona storm waves from southwest to west typically occur once or twice a winter but have occurred as often as six to seven times. Wave heights up to 10 feet in any given year are expectable. Heights in the range of 15 to 20 feet have occurred historically but have an average recurrence of 10 to 25 years. Wave periods of eight to 10 seconds are typical for Kona storm waves. North Pacific storm swells, with periods of 12 to 20 seconds and heights in the 15-foot range, are a normal expectation in any given year. Only those from WNV are of concern at Pauoa Bay, however. More extreme waves with heights

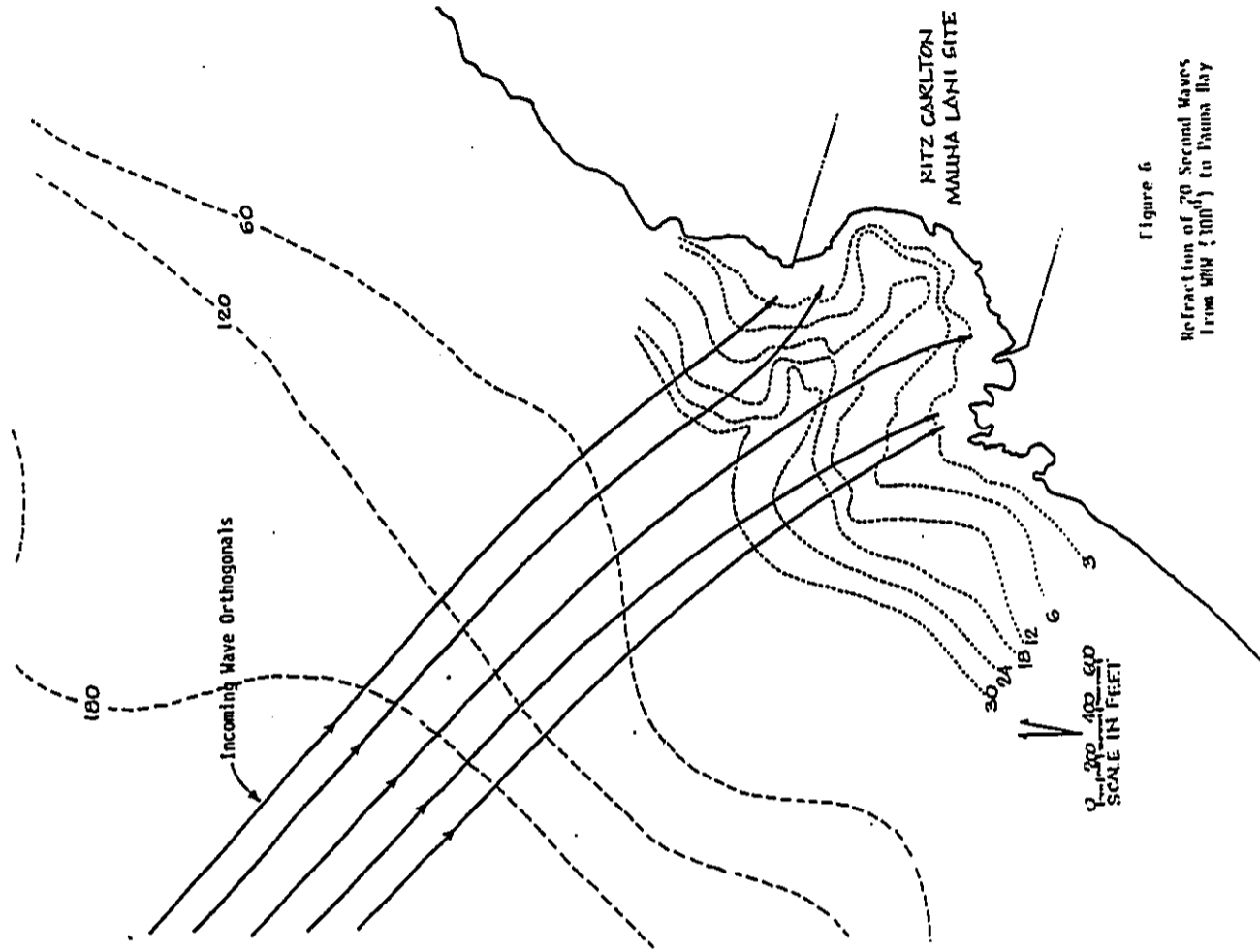
from 20 to 25 feet have an average recurrence of more than 10 years for the entire sector of North Pacific swell waves. Average recurrence at Pauoa Bay would be significantly longer than 10 years.

Hurricane-generated waves at the South Kohala coast are strongly dependent on the path the storm follows. Bretschneider (1973) developed hurricane parameters for a 50-year event: 56 knot sustained winds, 20 nautical mile radius of maximum winds, and a forward speed of 12 knots. Such a storm would produce wave heights of 27 feet and periods of 12 seconds (height and period are for the significant wave, defined as the average height and period of the highest one-third of all waves). If the storm followed the typical track in Hawaiian waters which is to the north and west, its waves would not be significant at Pauoa Bay. However, a track to the northeast similar to the path of Hurricane Iwa in 1982 but at a lower latitude could produce damaging waves. The probability of such an event is obviously more remote than once in 50 years.

Wave Transformation and Breaking

As deepwater waves move into the shallower water near Pauoa Bay, they are altered by refraction and shoaling until they ultimately break. Some of these reform as smaller, shorter period waves which penetrate further into the bay, perhaps to a second break at the shoreline. Refraction, which is the changing of wave direction in response to the shape of the ocean bottom, can result in a convergence or divergence of wave height and energy. Figures 6 through 10 are refraction diagrams for 8, 12, and 20 second waves from SW to WNW. For waves from WNW (300°) and W (270°), there is a pronounced convergence at each point of the bay and a divergence or diminishing of wave height and energy in the center of the bay. This effect is greatest on short period waves. For waves from SW (225°), focusing occurs on the north point and northern third of the bay's shoreline. It is likely that this wave condition is responsible for the steep, cobble and boulder beach which exists there.

Shoaling generally results in higher wave heights in shallow water, an effect which is most pronounced on long period waves. Table 3 shows this effect for periods of 8, 12, and 20 seconds. It also shows the combined



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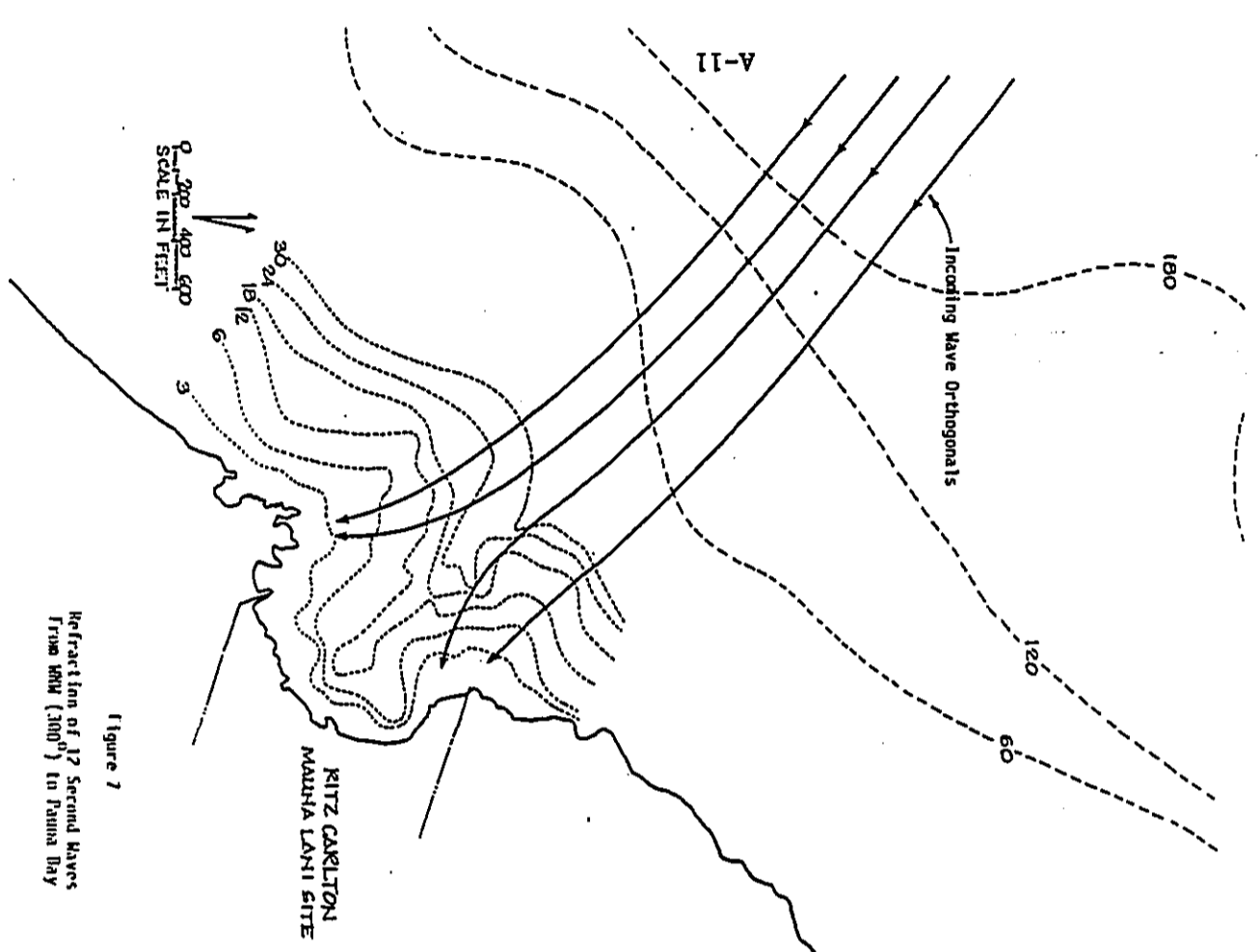


Figure 7
Refraction of 12 Second Waves
From 300° to Pauoa Bay

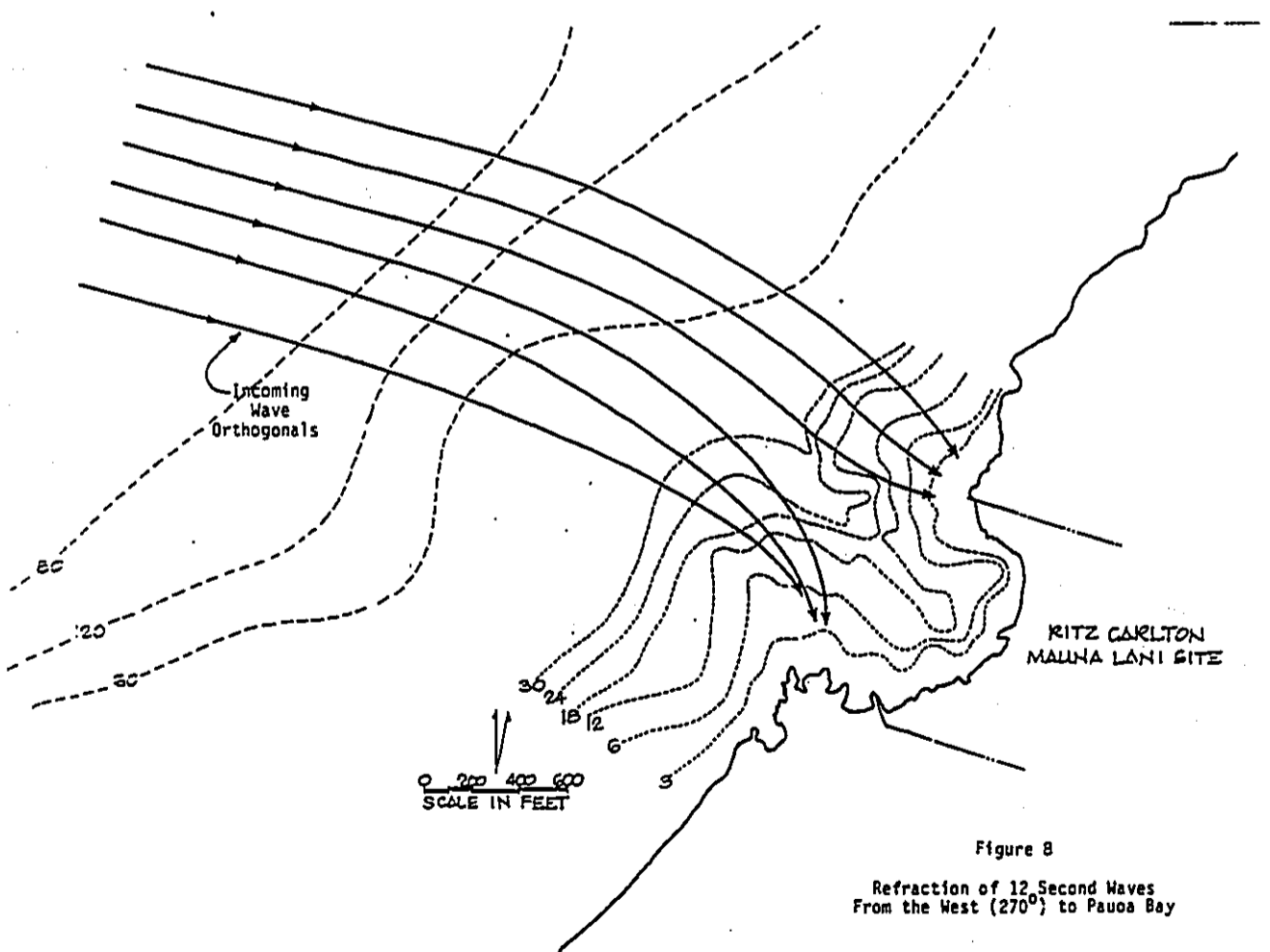


Figure 8
Refraction of 12 Second Waves
From the West (270°) to Pauoa Bay

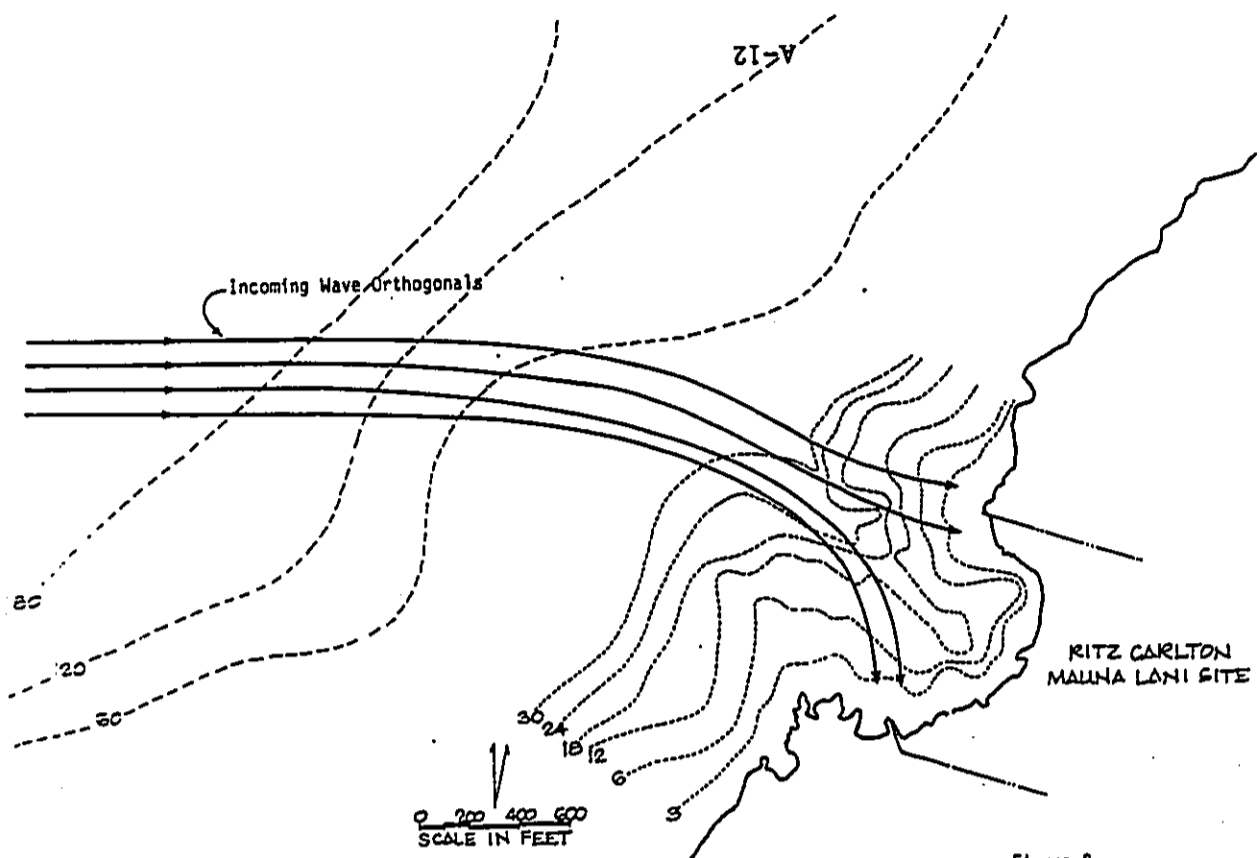


Figure 9
 Refraction of 8 Second Waves
 From the West (270°) to Pauoa Bay

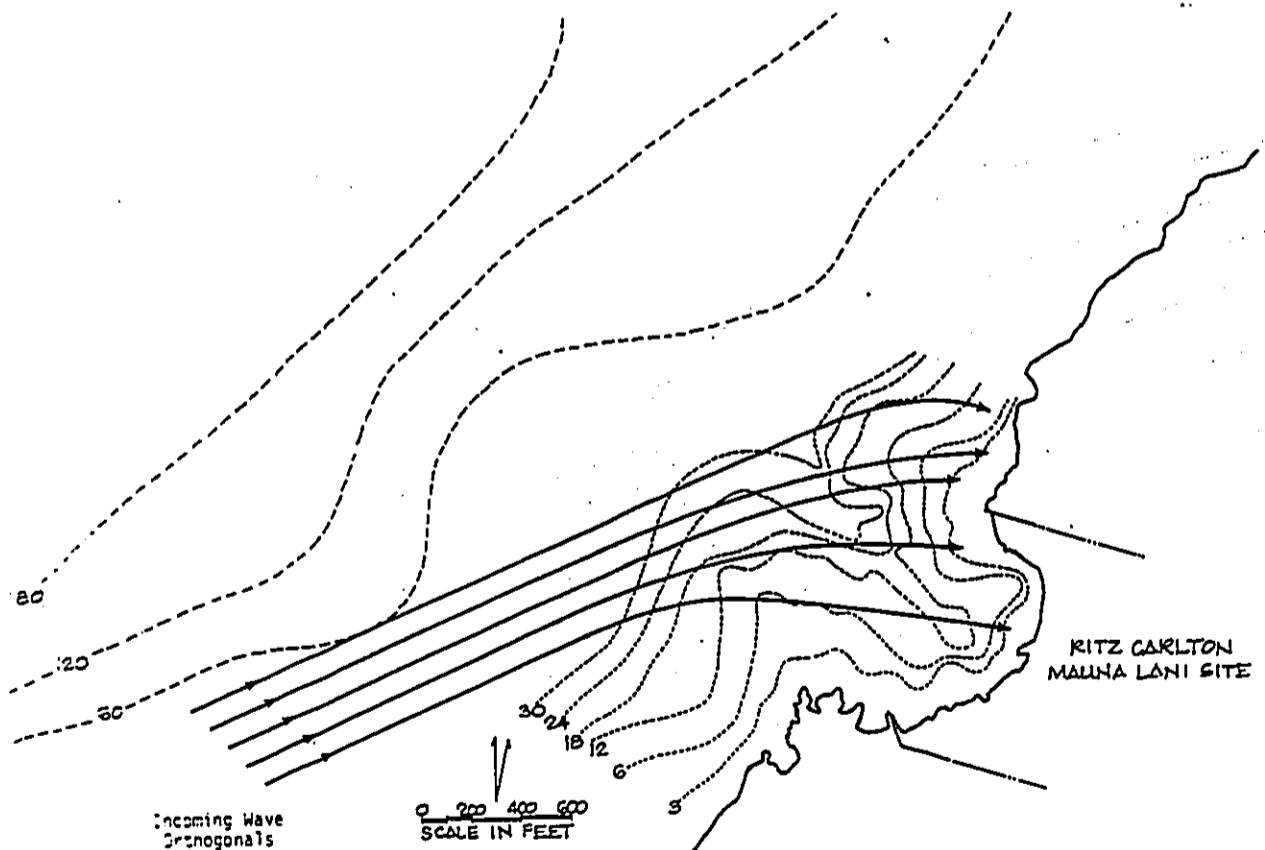


Figure 10
 Refraction of 8 Second Waves
 From SW (225°) to Pauoa Bay

Table 3

Summary of Computed Shoaling and Refraction Coefficients for 8, 12, and 20 Second Waves
Approaching the Center of Pauoa Bay from Southwest (225°) to Northwest (300°)

Depth (Feet)	8 Second Waves From 225°			8 Second Waves From 270°			12 Second Waves From 270°			12 Second Waves From 300°			20 Second Waves From 300°		
	K _S	K _R	H/H ₀	K _S	K _R	H/H ₀	K _S	K _R	H/H ₀	K _S	K _R	H/H ₀	K _S	K _R	H/H ₀
30	0.94	0.57	0.54	0.94	1.00	0.94	1.06	0.77	0.82	1.06	0.85	0.90	1.32	0.77	1.02
24	0.96	0.48	0.46	0.96	1.00	0.96	1.11	0.72	0.80	1.11	0.79	0.88	1.38	0.76	1.05
18	1.01	0.38	0.38	1.01	1.00	1.01	1.17	0.67	0.78	1.17	0.70	0.82	1.48	0.75	1.11
12	1.08	0.29	0.31	1.08	0.69	0.75	1.28	0.55	0.70	1.28	0.45	0.58	1.63	0.71	1.16
6	1.25	0.20	0.25	1.25	0.52	0.65	1.51	0.44	0.66	1.51	0.37	0.92	1.93	0.61	1.18

Notes: 1. Wave height in shallow water relative to height in deepwater, $\frac{H}{H_0}$, is the product of the shoaling (K_S) and refraction coefficients (K_R):

$$\frac{H}{H_0} = K_S \times K_R$$

2. The shoaling coefficient has been taken from Table C-1, Appendix C in Coastal Engineering Research Center (1984).
3. Refraction coefficients have been determined graphically by the method in Coastal Engineering Research Center (1984:2-62 to 2-70).

effects of shoaling and refraction for the central third of the bay. In general, wave heights in shallow water in the center of the bay are generally 0.6 to 1.3 times their deepwater heights. This is definitely not the case at each point of the bay, however, where focusing by refraction is a dominate effect. Doubling or tripling of deepwater wave heights at the points prior to breaking is typical.

Wave breaking is a function of depth, bottom slope, and incident wave steepness. For 8, 12, and 20 second waves at Pauoa Bay, breaking typically occurs in water which is 1.3 to 2.3 times the breaking wave height (refer to the summary of breaking depths in Table 4). The highest waves break outside the bay or on the points of the bay. Smaller waves which penetrate the central third of the bay have a surging or collapsing break near the shoreline and run up the beach slope.

CURRENTS

Current directions within and outside Pauoa Bay are depicted on Figure 11. Directly outside the bay, a slow, northeast to southwest drift was repeatedly observed on both ebb and flood tides during field work and has been reported previously (Laevastu, Avery & Cox, 1964:58). This nearshore, NE to SW drift may be related to wind conditions. It is also likely to be influenced by the tides. Observed speeds were a few tenths to one-half knot.

Currents within the bay are completely dominated by the prevailing wave condition. Wave break at the north and south points and subsequent translation of these broken waves along the shoreline drive a rip current out the center of the bay. The speed of the rip current increases with breaking wave height. For heights of about three to five feet, the rip current velocity exceeds one knot. When calm conditions prevail, the current is insignificant and a brackish groundwater surface layer develops. The groundwater generally moves directly out the center of the bay and the seawater below has almost no movement.

Table 4
Depth of Breaking as a
Function of Wave Height and Period

Breaking Wave Height (Feet)	Breaking Depths in Feet		
	8 Second Waves	12 Second Waves	20 Second Waves
2	3.7	4.4	4.6
4	6.3	7.4	8.9
6	8.6	10.3	13.3
8	11.1	12.7	16.4
10	13.3	15.3	19.6
12	15.5	17.8	22.2
14	18.0	20.2	25.0
16	20.6	22.7	27.4
18	23.4	25.2	29.7
20	26.4	27.6	32.0

Breaking depths have been determined by the method in Coastal Engineering Research Center (1984:2-129 to 2-135).

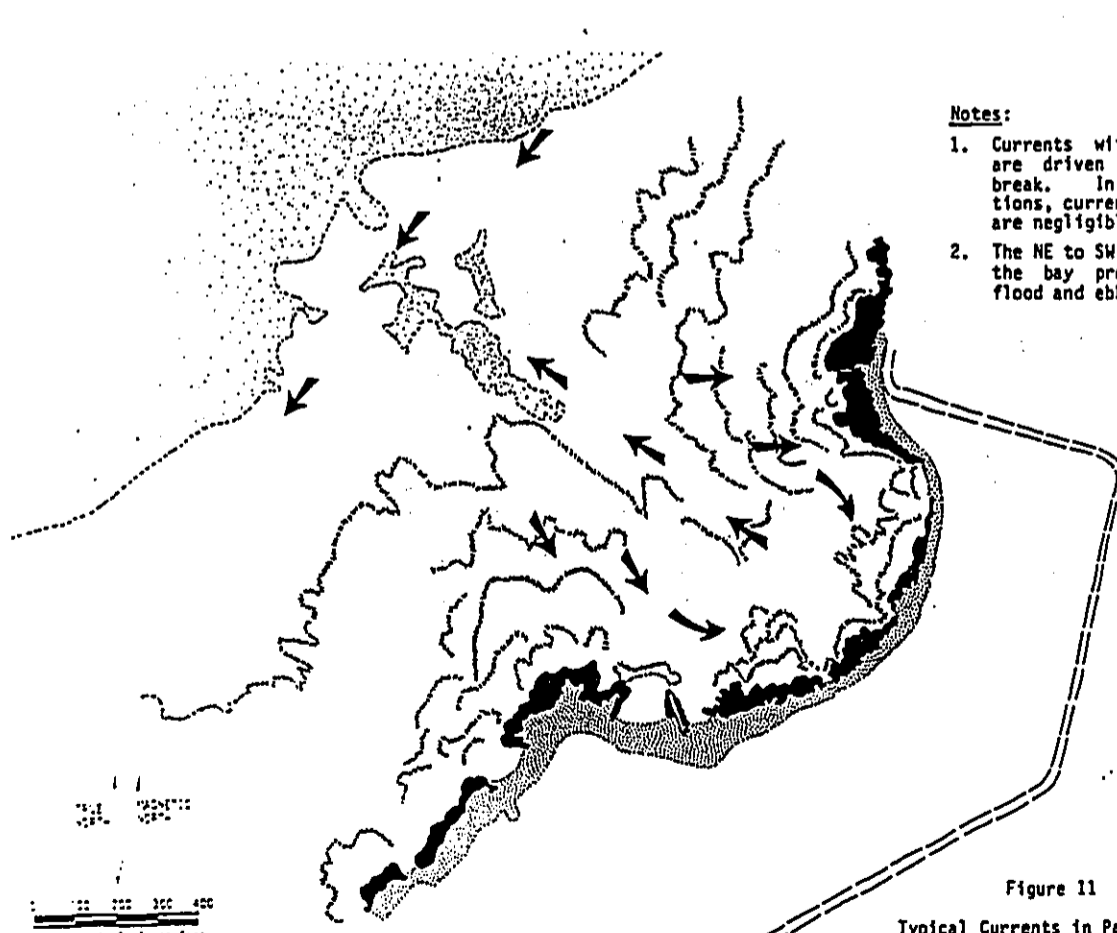


Figure 11
Typical Currents in Pauoa Bay,
South Kohala

DESIGN CONDITIONS

For the range of wave conditions which occur, maximum runup heights and forces on shoreline structures in the center of the bay occur during high swell waves from WNW (300°). Significant wave heights of 15 to 20 feet and periods of 12 to 20 seconds are selected here to develop design parameters. However, a range of wave heights actually occur for any given wave condition. Based on approximating the spectrum of these heights with a Rayleigh distribution, the range of expected heights for 15- and 20-foot significant waves would be:

Statistic	For $H_s = 15$ Feet	For $H_s = 20$ Feet
Maximum Height	27'	36'
Highest 1%	25'	33'
Highest 10%	19'	25'
Average Height	9'	13'

During this selected design condition, the highest waves would break in deeper water outside the bay (refer to the tabulation below and Table 4). Smaller waves, including those reformed after an outside break, would move into the bay to break in shallower water or directly on the beach.

Period (Seconds)	$H_s = 15$ Feet		$H_s = 20$ Feet	
	Breaking (Feet)	Breaking (Feet)	Breaking (Feet)	Breaking (Feet)
12	14	20	18	24
20	16	27	20	32

The offshore break and translation of water shoreward causes a rise in water level referred to as wave setup. This condition enables smaller waves to penetrate further into the bay prior to breaking. It is these smaller waves which produce the highest runup and greatest forces at the shoreline. Calculated wave setup and resulting water levels are tabulated below. These are based on the occurrence of wave setup during a mean higher high water tide level, a prudent choice for design purposes.

Summary of Wave Setup and Resulting Superelevated Water Level

Wave Period (Seconds)	MHM Tide Level (Feet msl)	$H_s = 15$ Feet		$H_s = 20$ Feet	
		Wave Setup (Feet)	Resulting Water Level (Feet msl)	Wave Setup (Feet)	Resulting Water Level (Feet msl)
12	1.26	2.25	3.51	2.82	4.08
20	1.26	2.74	4.00	3.38	4.64

- Notes:**
1. The mean higher high water (MHM) tide level is the average of the highest of two daily high tides.
 2. Wave setup is computed using the technique in Coastal Engineering Research Center (1984:3-101 to 3-104).

Wave runup on the beach above the superelevated water level increases with breaker height but decreases with breaking distance offshore. The spectrum of possible breaking heights and distances offshore must be evaluated to identify the particular waves which produce maximum runup. For the 1.4 percent average bottom slope in the bay itself and the 1:7 slope of the present beach, estimated maximum runups above the superelevated water level are 4.2 to 5.5 feet. This is the result of 8 to 12 second waves breaking 200 feet and less from the foot of the beach slope. Longer and shorter period waves produce lesser runup heights. When added to the design superelevated water level, wave runup between 8 and 10 feet above mean sea level datum is the result. Notably, this corresponds to the maximum elevations of the natural shoreline berm in the center of the bay. Some overtopping there and substantial overtopping to either side are the predicted results.

It is also appropriate to consider potential shoreline inundation by tsunami. Expected inundation by a 100-year tsunami was established for the National Flood Insurance Program (Houston, Carver, & Markle, 1977) and is now incorporated in Hawaii County's subdivision regulations. At Pauoa Bay, this inundation level is eight feet at the shoreline and declines slightly with distance inland. Although this height was established using state-of-the-art techniques, it is based on a limited number of tsunami observations in the

region and none of these in the near vicinity of Paoua Bay. Further, this calculated height is very sensitive to the use of historic data. In view of this, a more conservative tsunami height of 12 feet is recommended. This was the maximum height in Kawahae Bay during the 1946 tsunami. It is also the highest recorded in the region.

DESIGN RECOMMENDATIONS

This section of the report lists recommendations for nearshore elevations, the existing anchialine pond, expansion of the shoreline beach at the southeast corner of the Ritz-Carlton site, and design of the proposed swimming lagoon.

1. Shoreline Access. Access from anywhere along the shoreline to the water in the bay is difficult in calm conditions; surging currents during high waves make it dangerous. Access to deep water should be limited strictly to the proposed improvements along the southern third of the bay's shoreline.
2. Minimum Shoreline Elevation. Adopt 10 feet (msl) as the minimum elevation for landscaping and recreational features along the shoreline which cannot tolerate periodic immersion by storm wave runup.
3. Minimum Floor Elevation. Adopt elevation 12 feet (msl) as the lowest floor elevation of habitable structures. Although higher than required by County ordinance, this is a prudent choice in view of potential tsunami inundation.
4. Structures Seaward of the Shoreline. Construction of piers or groins which extend seaward of the shoreline is not recommended. Forces of the breaking waves and surges which can occur during high tide and wave setup would require relatively massive structures which would not be in keeping with the natural appearance of the bay.

5. Existing Anchialine Pond. The anchialine pond in the southwest corner of the Ritz-Carlton site is described as being in its "final stages of senescence" due to the accumulation of organics and silts (Dollar, 1986:38). Apparently this condition has existed for years. Detailed 1974 aerial photographs show a dense growth of surrounding trees. MacIolek and Brock (1974:24) documents the sediment bottom and vegetation. However, it would be relatively easy to reclaim this potentially attractive feature. The accumulated sediment can be removed by pumping. Surrounding vegetation should also be removed.

6. Shoreline Beach. Expansion of the shoreline beach at the southern end of the bay would provide a safe, natural-appearing swimming area as well as access for snorkeling in deeper water in the bay. Its location and the presence of the shoal area directly offshore would ensure stability of the beach. Also, the natural lava outcrops at each end of the beach will limit lateral movement of sand. Figure 12 illustrates the recommended development concept. It includes the following features:

- a. The existing seawall and outcrop on which it is built would be removed.
- b. The beach would have 300 feet of frontage at its mean sea level shoreline and a minimum 1.0 acres of sand area above this shoreline.
- c. The swimming area would be excavated to -6.0 feet (msl). This would provide a depth of about 5 feet during the mean lower low tide level (MLLW). At present, typical depths are one to two feet. Total excavation is estimated to be 6,000 cubic yards. Based on visual examination and experience with similar pahoehoe lava at the Mauna Lani Bay Hotel shoreline, it is assumed that most or all excavation can be accomplished with a bulldozer and ripper.
- d. The total amount of sand required, including the bottom of the swimming area, is approximately 4,200 cubic yards. Existing sand would be removed, stockpiled, and replaced after the excavation is completed. The balance of the sand requirement, estimated to be 2,100 cubic yards, would have to be imported from Oahu or Molokai.

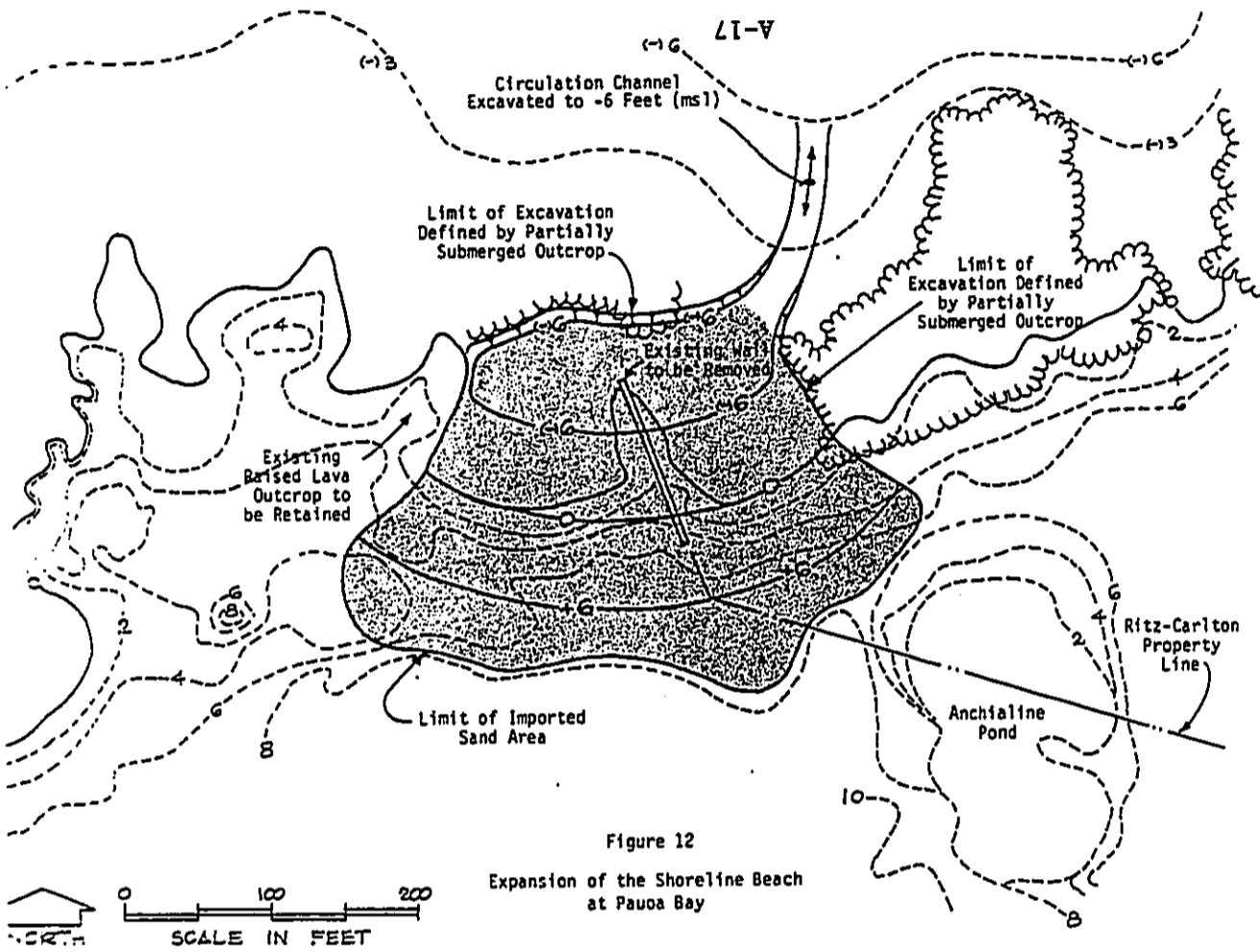


Figure 12
Expansion of the Shoreline Beach
at Pauoa Bay

7. Swimming Lagoon. Construction of a swimming area has been proposed for the southeast corner of the Ritz-Carlton site. Wave surge and depths immediately offshore of this location require a lagoon configuration rather than a shoreline beach to achieve stability. Two alternatives were considered. One would preserve the anchialine pond entirely and the other would entail filling approximately half of it. The alternatives are discussed below and illustrated on Figures 13 and 14.
 - a. The opening of the lagoon at the shoreline would be excavated through lava outcrops which extend seaward of the normal wave wash zone. This will minimize the effect on littoral movement and also avoid development of a sand berm across the opening.
 - b. The beach slope in the lagoon would be 1 (vertical) : 9 (horizontal) and would extend from 6.0 feet (msl) at the top of the beach slope down to -6.0 feet (msl) at the bottom of the lagoon.
 - c. Rocks would be placed on either side of the lagoon's opening. This will minimize the lateral movement of beach sand which lies on and above the lava outcrop.
 - d. Excavation for the lagoon would bring the shoreline closer to the anchialine pond, possibly increasing the pond's salinity. If this happens, curtain grouting can be utilized to limit seawater intrusion and retain the pond salinity close to its present level.
 - e. The outer limit of excavation would be the edge of the partially submerged lava outcrop directly offshore. Excavation would also include a channel leading from the northeast corner of the swimming area toward deeper water in the center of the bay. The channel would provide an outlet for flushing of fine particles which would otherwise be trapped. It would also provide safe access for swimmers to deeper water.
 - f. A budget amount of \$280,000 should be allocated for the beach development project.

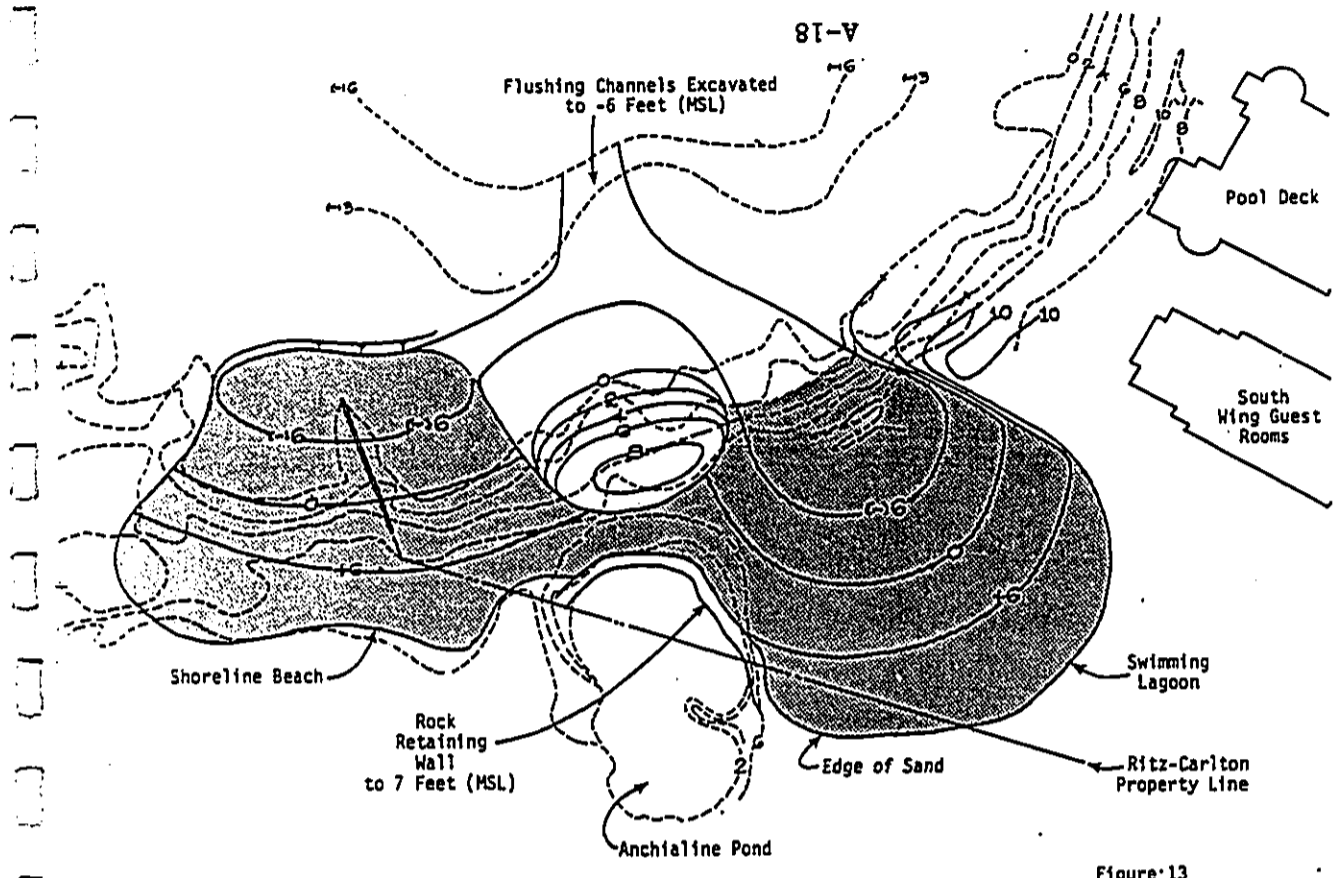


Figure 13
Swimming Lagoon Option to Retain the Anchialine Pond

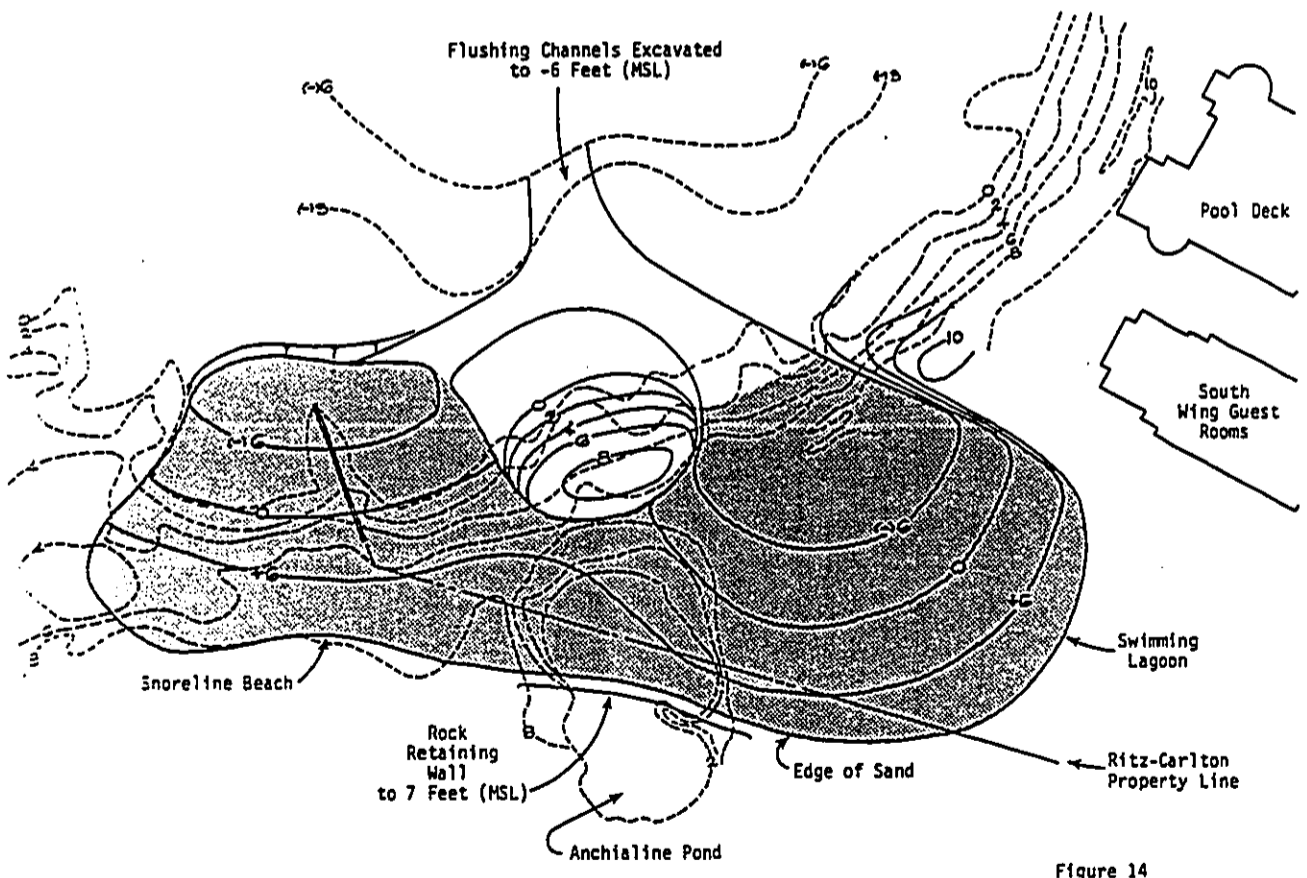


Figure 14
Swimming Lagoon Option to Partially Fill the Anchialine Pond

- e. Both lagoon options would require a rock wall to retain sand around the periphery of the anchialine pond. Recommended elevation of the wall is 7.0 feet (msl).
- f. The option to retain the pond entirely would have a 360-foot long shoreline at mean sea level, 1.1 acres of sand beach above this shoreline, and 0.8 acres of swimming area below it (Figure 13). Excavation is estimated to be 18,000 cubic yards. Approximately 5,050 cubic yards of imported sand would be required. A budget of \$700,000 should be allocated for this project.
- g. The option which would entail filling half of the anchialine pond would provide a slightly larger swimming lagoon and beach area (Figure 14). Its mean sea level shoreline would be 430 feet long. There would be 1.3 acres of sand beach above this shoreline and 1.0 acre of swimming area below it. Required excavation is 24,500 cubic yards. Imported sand would amount to 6,100 cubic yards. A budget of \$880,000 should be established for this project.

Our recommendation is the option which would retain the anchialine pond entirely. The pond is worth rehabilitating and preserving and this can be done without sacrificing aesthetic and recreational values of the swimming lagoon.

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**BASELINE ASSESSMENT OF
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SOUTH KOHALA, HAWAII**

P 1

**PREPARED FOR
BELT, COLLINS & ASSOC.
HONOLULU, HAWAII**

OCTOBER 29, 1986



STEVEN DOLLAR
Marine Environmental Consultants

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TABLE OF CONTENTS

INTRODUCTION.....1

OBJECTIVES.....3

METHODS

WATER QUALITY.....6

COASTAL REEF ENVIRONMENT.....7

RESULTS AND DISCUSSION

PHYSICAL STRUCTURE OF SHORELINE
AND PAUOA BAY.....12

WATER QUALITY.....14

BIOLOGICAL COMMUNITY STRUCTURE
The Benthos - Corals and Invertebrates.....18

Reef Fish Community Structure.....29

Threatened or Endangered Species.....36

ANCHIALINE POND
Pond Morphology and Biota.....37

CONCLUSIONS

DIRECT IMPACTS - SHORELINE MODIFICATION.....40

INDIRECT IMPACTS

Increased Sedimentation and Runoff.....44

Increased Nutrient Loading from Irrigation
and Fertilization.....46

Pesticides and Herbicides.....49

Potential Effects to Protected Species.....50

ANCHIALINE POND.....51

SUMMARY.....52

PLATES.....55-60

REFERENCES CITED.....61

INTRODUCTION

Coral reefs and other marine environments are often some of the most valuable aesthetic and recreational features of coastal tropical and sub-tropical resort developments. Because of the value of these aquatic environments, careful evaluation of the potential for degradation that might arise during construction and the ensuing operation of coastal resorts is an important preliminary step in development.

In the South Kohala District of the Big Island of Hawaii, the Ritz-Carlton Corporation is proposing to build a first class resort hotel at Pauoa Bay, located north of the Mauna Lanii Bay Hotel (see Figure 1). In addition to the hotel and associated shoreline facilities, an 18 hole golf course is planned for the property surrounding the hotel. The shoreline and nearshore marine environment at Pauoa Bay is a pristine coastline that is presently unimpacted by any activities of man. In addition, a single anchialine pond is located near the shoreline at the southern end of the property. Plans for the hotel complex call for the possible construction of a salt-water lagoon, and beach modification for the purpose of improved access to the ocean for swimmers. Before such shoreline modification can be undertaken, however, it is necessary to evaluate the potential for permanent and degradational environmental alteration.

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

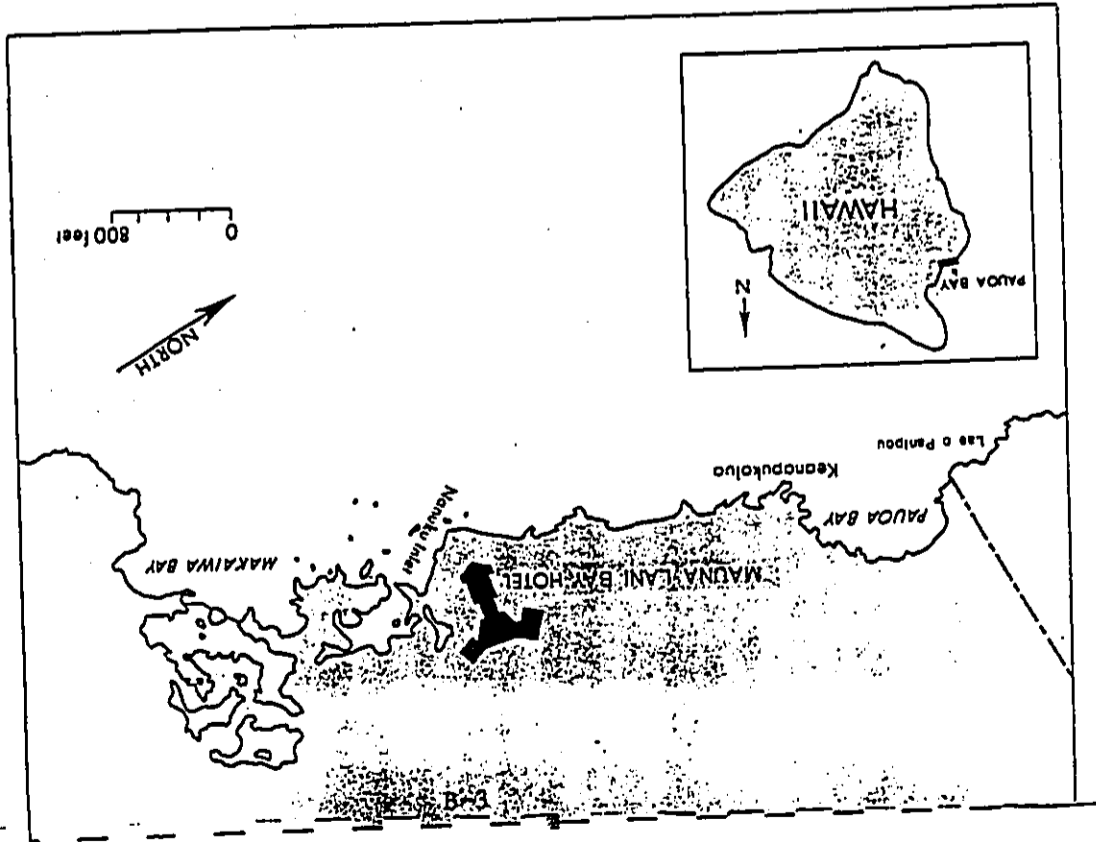
OBJECTIVES

Any potential environmental degradation processes may be minimized if the proper information is assembled early on in the development scheme. Environmental data can serve to identify areas that may be particularly susceptible to man-induced stresses, or conversely, particularly resistant to such stresses. Comparison of the magnitude of natural environmental impacts to anticipated anthropogenic (man-induced) stresses can serve to put into perspective the ultimate effects of the activities of man.

With these considerations in mind, the overall purpose of this report to present a descriptive and quantitative picture of the marine environment and associated biotic communities, and to evaluate the effects that the planned Ritz-Carlton Resort will have on this environment.

A specific objective of the baseline assessment is to gather information that describes the natural physico-chemical structure of the aquatic systems. Because shoreline modification and practices such as golf course irrigation and fertilization present a potential for alteration of natural chemical parameters, establishment of such a baseline is important. Chemical data corresponding to the specific criteria set forth in the State of Hawaii, Department of Health, Water Quality Standards (Chapter 54 of Title 11) have been used, in part, to establish the physico-chemical baseline.

Figure 1. Section of south Kohala coastline showing location of Pauoa Bay in relation to Mauna Kea Bay Hotel. Inset map shows location of Pauoa Bay on island of Hawaii.



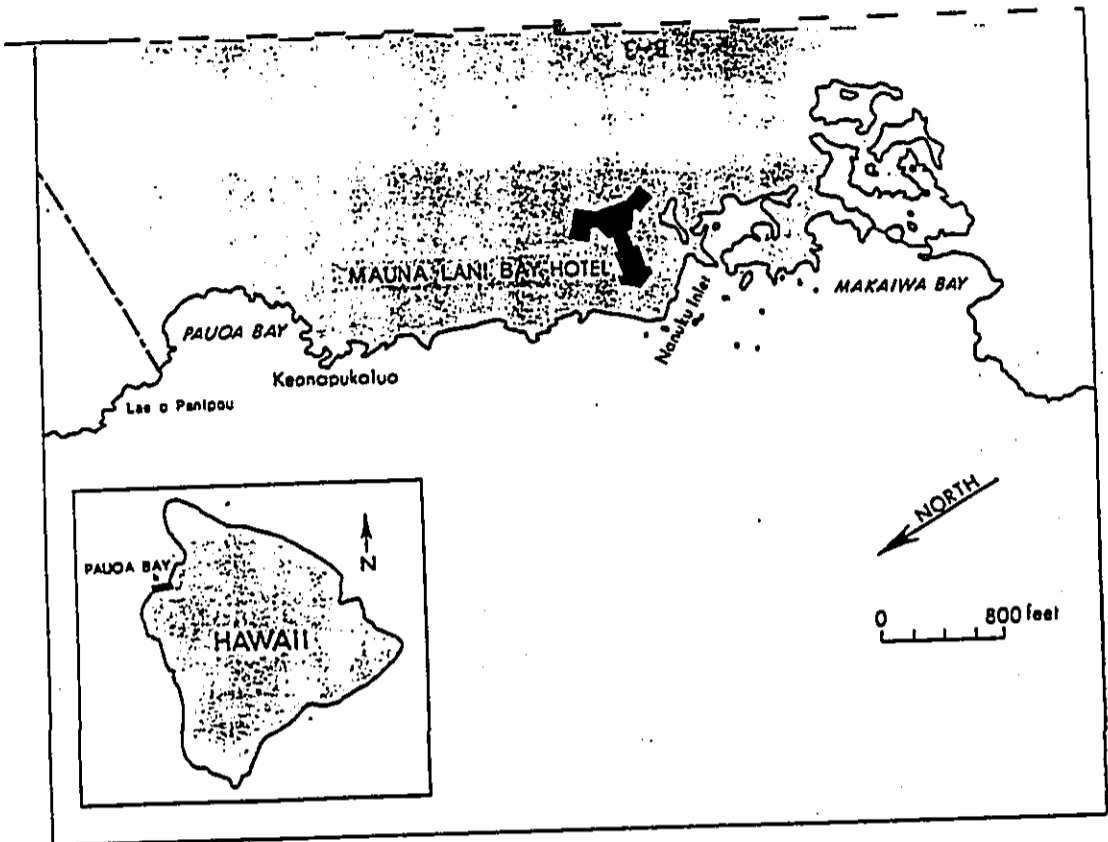


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Another objective of the environmental assessment is to establish quantitative baseline information to accurately depict the community structure of the indigenous populations inhabiting Pauoa Bay and nearby regions. Marine community structure can be defined as the abundance, diversity, and distribution of stony and soft corals, other attached benthic fauna and flora such as algae and sponges, motile benthos such as echinoderms, molluscs, and crustaceans, and pelagic species such as reef fish and sea turtles. This information will serve to identify any living marine resources that may be of significant commercial or recreational value, or that represent rare or unique ecological features that may be especially susceptible to human-induced stress.

The emphasis of this report is not, however, directed at an extensive compilation of either lists of organisms inhabiting the area, or extensive tabulation of chemical measurements, as is often the case with environmental assessments. Rather, emphasis is placed on characterizing the aquatic environments as integrated communities under the influence of specific physio-chemical processes. Describing the cause and effect relationship of these processes in shaping biotic community structure is the major intent of the survey.

With these ideas in mind, permanent baseline stations or "benchmarks" were established in order to allow monitoring of the same stations in the future. This

provision is in accordance with the State of Hawaii, Department of Health (Chapter 54 of Title 11, Administrative Rules entitled "Water Quality Standards", which specify that permanent benchmark stations be established for monitoring of marine biological communities. Water quality standards shall be deemed met if time-series surveys of benchmark stations indicate no relative changes in the relevant biological communities, as noted by biological community indicator organisms which may be applicable to the specific site.

In the context of time-series surveys, the most useful biological assemblages for direct evaluation of environmental impacts to the offshore marine environment are benthic (bottom dwelling) communities. Because benthos are generally long-lived, immobile, and intimately affected by exogenous input of sediments and other potential pollutants, these organisms must either tolerate the surrounding conditions within the limits of adaptability or die. As members of the benthos, stony corals are of particular importance in nearshore Hawaiian environments. They contribute a large portion of the reef biomass and their skeletal structures are vital in providing a complex of habitat space, shelter, and food for other species. Since corals serve in such a keystone function, coral community structure is considered the most "relevant" group in the use of reef community structure as a means of evaluating past and potential impacts associated with land

development. For this reason, and because alterations in coral communities are easy to identify, observable change in coral population parameters is a practical and direct method for obtaining the information that is required to meet existing environmental regulations.

In addition, because they comprise a very visible component of the nearshore environment, detailed investigations of reef fish assemblages are presented.

METHODS

WATER QUALITY

Water quality was evaluated at 8 stations within Paoua Bay as well as at a control station approximately 1 mile offshore (see Figure 2). Water quality parameters evaluated were the nine specific criteria designated for open coastal waters in S11-54-06 of the Water Quality Standards. These criteria include: total Kjeldahl nitrogen, ammonia nitrogen, nitrate + nitrite, orthophosphate phosphorus, total phosphorus, light extinction coefficient, chlorophyll a, nephelometric turbidity, and nonfilterable residue.

Water samples for nutrient analysis were taken in 125 ml. acid-washed polyethylene bottles. These samples were filtered through glass fiber filters in the field and immediately placed on ice. Analysis for ammonium, nitrate plus nitrite, orthophosphate, conducted using standard

techniques on a Technicon Autoanalyzer. Total nitrogen and phosphorus were analyzed in a similar fashion following persulfate digestion. Water for other analyses was collected in 1 liter polyethylene bottles and kept chilled until analysis. Chlorophyll a was assessed by fluorometric methods, turbidity was measured with a Turner nephelometer, and nonfilterable residue was assessed gravimetrically. All laboratory analyses were conducted by AECOS Environmental Laboratory in Honolulu.

Light extinction was measured in situ using a Licor integrating photometer.

COASTAL REEF ENVIRONMENT

All field work was carried out on October 9-12, 1986, and was conducted from a 19 foot boat, as well as from shore. Several methods were employed in the collection of qualitative and quantitative data. Qualitative reconnaissance surveys covering the entire area fronting the development parcel were conducted by slowly towing a diver behind a small boat, and by swimming throughout inner Paoua Bay. These surveys were useful in making relative comparisons between areas, identifying any unique or unusual biotic resources, and providing a general picture of the physiographic structure and benthic assemblages occurring throughout the region of study.

Following the preliminary survey, three quantitative transect sites were selected offshore of the development area (see Figure 3). These sites were designated as P1, P2, and P3.

North (PN), Pauoa Central (PC), and Pauoa South (PS). Two of the sites (PN and PS) corresponded with study sites that were evaluated in 1983 as part of a baseline assessment of the marine environment at Mauna Lani Resort (Dollar and Winn 1983). Re-surveying these sites for the present study allowed for time-series comparisons of the effects of natural processes on community structure.

All site locations were accurately determined and recorded using a hand-bearing compass and triangulation sightings of distinguishable landmarks. At each site, line transects were conducted at depths of approximately 15, 30, and 60 feet. These depths correspond to the three generalized major West Hawaii reef zones. In addition, 3 shallow transects in inner central Pauoa Bay were surveyed. Each transect is designated by the location and the depth. For example PC-7 is the most shoreward transect in central Pauoa Bay located in 7 ft. of water.

Transects were 200 feet long and were oriented parallel to the shoreline in areas deemed to be representative of community structure. When possible, the ends of each transect were permanently marked for possible future monitoring studies by pounding steel stakes into the substrate. A surveying tape was laid out over the reef surface parallel to depth contours between two marker stakes. An aluminum quadrat frame with dimensions of one meter by two-thirds meter was sequentially placed over ten random marks on the transect tape so that the tape bisected

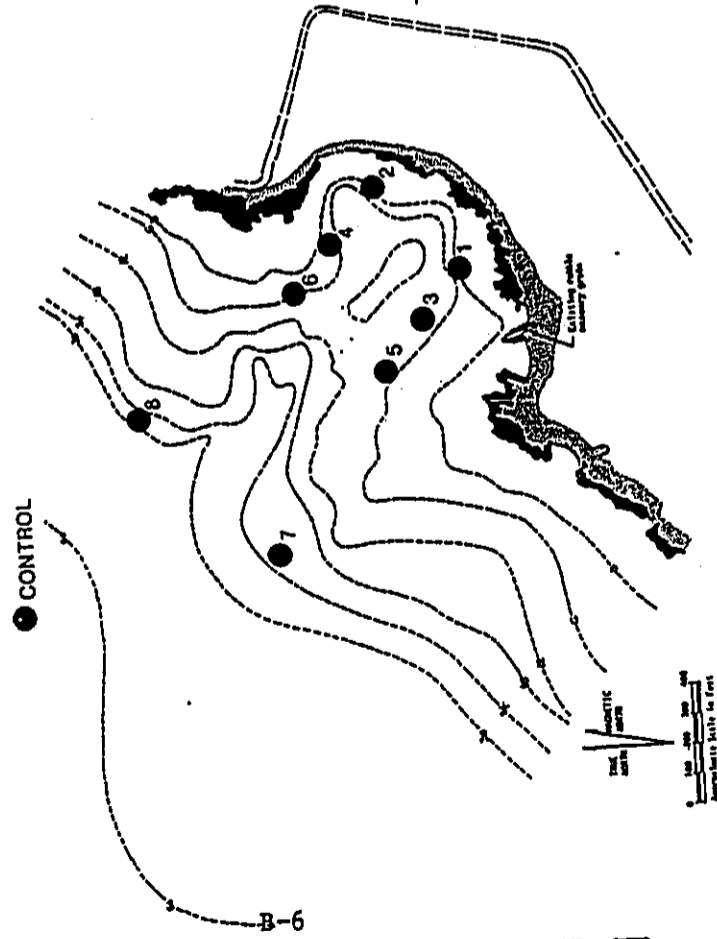


Figure 2. Detailed map of Pauoa Bay showing depth contours and location of water chemistry sampling stations. Location of control station is not to scale and is located approximately 1 mile offshore.

the long axis of the frame. At each quadrat location a color photograph recorded the segment of reef area enclosed by the quadrat frame. In addition, a diver with knowledge of the taxonomy of resident species visually estimated the percent cover and occurrence of organisms and substrata types within the quadrat frame. Only macrofaunal species greater in size than approximately 2 cm were noted; no attempt was made to identify or enumerate cryptic species dwelling within the reef framework, or nocturnal species that inhabit the reef surface only at night.

Following the period of field work, quadrat photographs were projected onto a grid and units of bottom cover for each species and bottom type were calculated. This information was combined with the *in-situ* cover estimates and the combined assessment provided the data base for the benthic community structure analysis. Species diversity was calculated using the Shannon-Wiener index, and can be equated with the equitability, or dominance, of distribution of the species occurring on each transect.

The practical advantages of photo-transects are numerous: most species can be easily and accurately identified from transparencies, and the transparencies provide a permanent record for subsequent time-series comparisons. Also, photo-quadrat sampling is rapid and efficient with respect to time and data collected - an important consideration under conditions where underwater time is restricted by cost, depth and exposure.

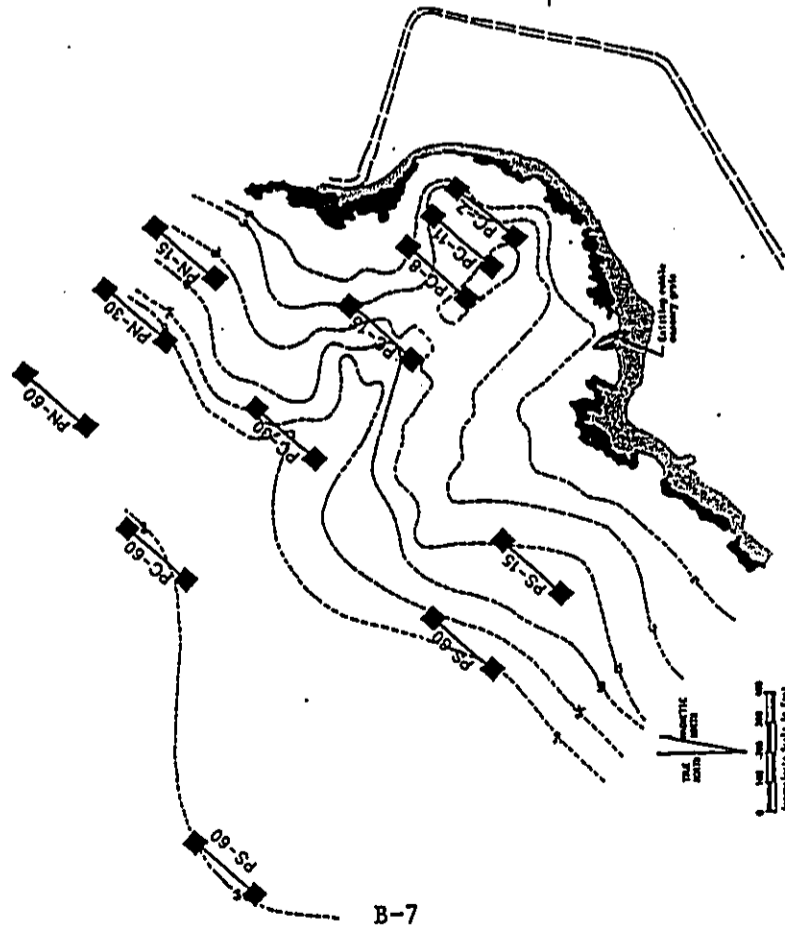


Figure 3. Detailed map of Fauou Bay showing depth contours and locations of benthic transects.

Quantitative assessment of reef fish community structure was conducted in conjunction with the benthic surveys. As the transect tape was being laid along the bottom, all fishes observed within a band approximately six feet wide along the transect path were identified to species and enumerated. Care was taken to conduct the fish surveys so that the minimum disturbance by divers was created, ensuring the least possible dispersal of fish. Only readily visible individuals were included in the census. No attempt was made to seek out cryptic species or individuals sheltered within coral.

RESULTS AND DISCUSSION

PHYSICAL STRUCTURE OF SHORELINE AND PAUOA BAY

Pauoa Bay is a semi-circular indentation in the coastline approximately 1000 feet wide at the mouth bounded on the south by Keanapukaiua, and on the north by Lae o Panipou. Pauoa Bay, however, cannot be classified as a true "bay" according to the Department of Health criteria because the ratio of volume to cross-sectional area is approximately 200. In order to be classified as a bay the ratio must equal or exceed 700.

Structural composition of the approximate one-half mile of shoreline of the Pauoa property is a basaltic ledge interspersed with pocket beaches composed of rounded basaltic rocks, white coral rocks, and grey sand (see Plate

1). The coral rocks have been thrown up on the shoreline after being broken loose by storm action.

Composition of the bottom within the bay is predominantly a basalt and limestone surface covered with a thin veneer of sandy sediment (see Plates 2, and 3). Interspersed in the rock surface are depressions that are often filled with rubble fragments created by impact from storm waves to living coral colonies (see Plate 4).

Hydrographically, the entire inner bay is less than 12 ft deep. A small sill approximately 8 ft. deep occurs across the mouth of the bay. This sill appears to be the area that receives the brunt of impact from long-period swells that cause breaking waves within the bay. The present survey was conducted during a period of moderate wave activity, and the force of breaking waves on the sill was observed.

Seaward of the two points that define the inner bay, bottom topography is typical of much of the offshore region of west Hawaii. A relatively flat reef terrace extends out to a water depth of approximately 50 ft., a distance of approximately 1000 to 1500 ft. offshore. Composition of the reef terrace is predominantly basaltic, and represents the seaward extension of the island mass. Much of the basaltic substrate is covered with a veneer of limestone resulting from the activity of reef organisms.

Beyond the reef terrace, bottom slope increases to 20-40° and extends to abyssal depths. Bottom cover on the

island slope is predominantly white sand.

WATER QUALITY

The location of 8 water quality stations in Pauoa Bay, and the control station are shown in Figure 2. As mentioned previously, according to the criteria defined by the Department of Health, Pauoa Bay is considered open coastal waters that are classed AA. Groundwater extrusion in the region is estimated at about 3 million gallons per mile per day (T. Nance, Belt Collins & Assoc., personal communication). This discharge rate equals the boundary between "wet" and "dry" criteria as defined by the DOH; as a result both wet and dry criteria will be considered applicable to Pauoa Bay water quality.

Table 1 shows the limiting values of the nine specific parameters specified by DOH for wet and dry conditions of open coastal waters. Table 2 shows the values of the water quality parameters from the eight Pauoa Bay stations, the mean and standard deviation for the combined Pauoa Bay stations, and a control station 1 mile offshore. It was not possible to measure light extinction inside Pauoa Bay because that measurement requires access with a boat.

It can be seen by comparing Tables 1 and 2 that the geometric means for all chemical parameters in Pauoa Bay except PO₄ exceed the dry criteria specified by DOH. In addition, four criteria (Total N, NO₃-NO₂, Chl. *a*, and

TABLE 1. Specific criteria for open coastal waters, Department of Health Water Quality Standards.

Parameter	Geometric mean not to exceed the given value	Not to exceed more than 10% of the time	Not to exceed the given value
Total Kjeldahl Nitrogen (ug N/l)	150.00*	250.00*	350.00**
	110.00**	180.00**	250.00
Ammonia Nitrogen (ug NH ₄ -N/l)	3.50*	8.50**	15.00*
	2.00**	5.00**	9.00
Nitrate + Nitrite Nitrogen (ug[NO ₃ + NO ₂]-N/l)	5.00*	14.00*	25.00**
	3.50**	10.00**	20.00
Orthophosphate Phosphorus (ug PO ₄ -P/l)	7.00*	12.00*	17.00**
	5.00**	9.00**	13.00
Total Phosphorus (ug P/l)	20.00*	40.00*	60.00**
	16.00**	30.00**	45.00
Light Extinction Coefficient (k units)	0.20*	0.50*	0.85**
	0.10**	0.30**	0.55
Chlorophyll <i>a</i> (ug/l)	0.30*	0.90*	1.75**
	0.15**	0.50**	1.00
Turbidity (nephelometric turbidity units)	0.50*	1.25*	2.00**
	0.20**	0.50**	1.00
Nonfilterable Residue (mg/l)	20.0*	30.0*	40.0*
	10.0**	15.0**	20.0

*"Wet" criteria apply when the open coastal waters receive more than three million gallons per day of fresh water discharge per shoreline mile.

**"Dry" criteria apply when the open coastal waters receive less than three million gallons per day of fresh water discharge per shoreline mile.

Table 2. Water quality data for Paoua Bay and control sampling stations shown in Figure 2. Geometric means do not include control station. Subscript for light extinction coefficients indicates depth.

PARAMETER	STATION									GEOMETRIC MEAN ± 1 S.D.	
	1	2	3	4	5	6	7	8	CON		
Total Kjeldahl Nitrogen (ug N/l)	180.0	161.0	123.0	155.0	164.0	171.0	176.0	144.0	150.0	158.1 ± 17.8	
Ammonia N (ug NH ₄ -N/l)	7.0	3.0	2.0	2.0	4.0	2.0	4.0	2.0	1.0	3.37 ± 1.68	
Nitrate + Nitrite (ug NO ₃ +NO ₂ -N/l)	23.0	25.0	6.0	25.0	8.0	8.0	8.0	7.0	<1.0	13.75 ± 8.81	
Orthophosphate Phosphorus (ug PO ₄ -P/l)	6.0	8.0	7.0	7.0	7.0	6.0	6.0	6.0	4.0	6.75 ± 0.90	
Total Phosphorus (ug P/l)	8.0	8.0	7.0	9.0	1.1	9.0	1.1	7.0	8.0	8.62 ± 1.68	
Light Extinction Coefficient (k units)	<i>k</i> _{d3}	-	-	-	-	-	-	0.12	0.15	0.06	0.11 ± 0.03
		<i>k</i> _{d10}	-	-	-	-	-	0.09	0.10	0.06	
Chlorophyll <i>a</i> (ug/l)	0.33	0.47	0.38	1.10	0.90	0.94	0.23	0.28	0.19	0.58 ± 0.34	
Turbidity (NTU)	0.83	0.88	0.91	1.32	1.46	2.30	0.86	0.62	0.32	1.15 ± 0.54	
Nonfilterable Residue (mg/l)	3.2	5.4	8.3	9.4	21.1	24.1	7.2	5.0	0.8	10.46 ± 7.78	

16

turbidity) exceed the wet criteria. Mean turbidity in Paoua Bay at the time of the water quality sampling exceeded the absolute limit for dry conditions.

Based on these comparisons, under the pristine conditions that exist for at least some of the time at Paoua Bay, natural influences cause water quality to exceed the limits set forth in the water quality standards. The natural factors that cause the differences between the nearshore stations and the true open ocean control station appear to be groundwater extrusion and sediment suspension from wave activity. There are no streams entering the sea along the development frontage, but a freshwater surface lens within Paoua Bay indicates moderate volumes of groundwater extrusion. Typical groundwater from the Island of Hawaii has NO₃⁻ + NO₂⁻ concentrations of about 700 ug/l, compared to about 1 ug./l in open ocean water. Mixing of groundwater and ocean water is sufficient to cause the pristine waters of Paoua Bay to contain relatively high concentrations of total N and NO₃⁻ + NO₂⁻. On the other hand, groundwater is relatively deficient in phosphorus; as a result mean PO₄ exceeds only the dry criteria, while mean total P is below both mean limits.

Water samples for the present survey were collected during an episode of moderate north swell wave activity. As mentioned above, the force of breaking waves in Paoua Bay is largely absorbed by a shallow sill at the mouth of the bay several hundred feet offshore. In terms of water

17

quality, nearshore wave action causes fine sediments to become suspended. The result of sediment suspension is increased turbidity and light extinction. It can be seen that all of the Pauoa Bay turbidity values and the mean bay value exceed the mean limits for both wet and dry conditions, and three of the inner bay stations (4, 5, and 6) exceed the absolute limits for dry criteria, while station 6 exceeds the absolute limit for wet criteria. While light extinction coefficients were not measured at the inner bay sampling stations owing to the shallow depth, it can be seen that the mean outer bay value is approximately twice the open ocean control, indicating that the effects of wave induced sediment stirring are detectable up to 800 ft. offshore.

The mean bay chlorophyll a value also exceeds both the mean wet and dry criteria, while mean nonfilterable residue exceeds the mean dry criteria.

Values of water quality parameters at the open ocean control station are below the mean wet criteria, while total N and chl. a exceed the dry limits.

BIOLOGICAL COMMUNITY STRUCTURE

The Benthos - Corals and Invertebrates

In general, the geologically young age of the Island of Hawaii limits the development of true "coral reefs". Rather, the majority of the offshore benthic (i. e. bottom)

environment is a "coral community". The distinction is that, for the most part, corals are growing on substrata composed of basement rock, rather than on calcareous rock of organic (reef) origin.

The typical coral community structure of the west coast of Hawaii has been described in detail by Dollar (1975). Three zones, each characterized by a distinctive substratum type, depth range, range of physical conditions, and single dominant coral species make up the coral community. Figure 4 shows a diagrammatic representation of the west Hawaii coral community structure, while Figure 5 and Table 3 summarizes quantitatively the results of the benthic community transects in, and near Pauoa Bay. Community structure in Pauoa Bay corresponds somewhat with the typical pattern presented in Figure 4, although there are some differences.

As described above, the entire region within Pauoa Bay is a shallow pavement of basalt and limestone. Because of the regular frequency of high intensity storm wave activity that is destructive to many corals and other bottom-dwelling organisms, coral cover in the inner bay is low. It can be seen in Table 3 that coral cover is only 1.5% at transect PC-7, closest to shore and increases to 4.5 and 5.3% at transects PC-11 and PC-8, respectively. Much of the substrata in the inner bay is covered with a fine algal turf (Plate 2). The majority of living coral in the inner bay is composed of encrustations of *Porites lobata* and

small heads of *Pocillopora meandrina* growing on solid limestone veneer. At the outermost station inside of Pauoa Bay (PC-8) several large colonies of *P. lobata* were encountered (see Plate 5). Only a very small fraction of the surface of these structures contained living coral tissue; the rest being covered with fine sediment.

The most abundant invertebrate other than corals within Pauoa Bay are the sea urchins *Triploneustes gratilla* (see Plate 4). This species occurs commonly in areas of high scour and water movement.

Beyond the boundaries of inner Pauoa Bay, the marine environment and community structure assumes the characteristic pattern of west Hawaii. The transects at Pauoa north (PN), Pauoa south (PS), and the three outermost of Pauoa central (PC) represent this pattern. Typically, the most shoreward zone is a narrow region comprised of the seaward continuation of the basaltic shoreline terrace, scattered with boulders, and covered in part by a veneer of limestone secreted by a variety of marine organisms. In some areas the reef bench is relatively flat, while in other areas it is characterized by high relief in the form of pits, ledges, and pinnacles.

Pocillopora meandrina, a sturdy hemispherical branching species, and *Porites lobata*, a flat, solid encrusting species are the dominant coral colonizers of the near-shore terrace. *P. meandrina* rapidly colonizes newly cleared surface, has a small adult colony size of

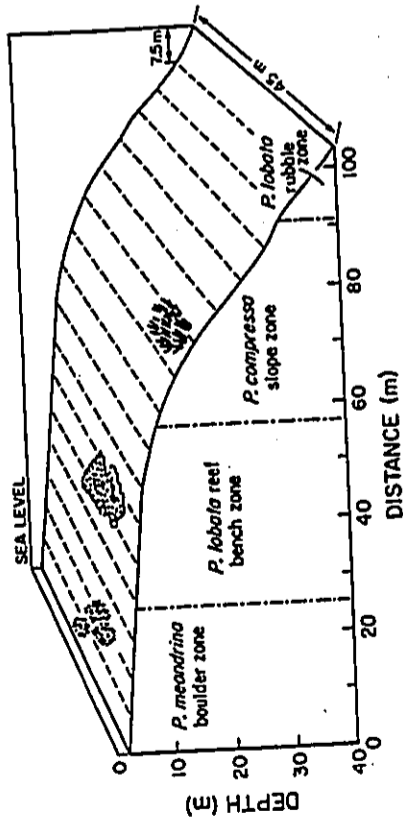


Figure 4. Schematic diagram of typical reef zonation pattern off the west coast of Hawaii. Beyond the mouth of Pauoa Bay, 15 ft. transects were conducted in the *P. meandrina* boulder zone, 30 ft. transects in the *P. lobata* reef building zone, and 60 ft. transects in the *P. compressa* slope zone.

Table 3. Transect data showing coral community structure and substrata composition at Pauoa Bay stations shown in Figure 3.

CORAL SPECIES	TRANSECT STATION											
	PN-15	PN-30	PN-60	PC-7	PC-11	PC-8	PC-15	PC-30	PC-60	PS-15	PS-30	PS-60
<u>Porites</u> <u>coacta</u>	5.3	23.6	31.9	0.4	3.9	4.7	39.0	33.2	39.7	6.4	27.8	35.9
<u>Porites</u> <u>compressa</u>		0.8	0.8				5.8	14.2	9.3		17.9	46.3
<u>Pocillopora</u> <u>meandrina</u>	10.9	0.7	0.2	0.3	0.3	0.5	6.8	0.3	1.3	1.0	0.1	1.0
<u>Montipora</u> <u>verticosa</u>	0.3	0.3	1.0		0.1		0.5	0.7	0.4	1.0	1.7	0.1
<u>Montipora</u> <u>pacula</u>	0.1	0.1	0.1				3.6	0.3	0.2		0.2	1.6
<u>Pavona</u> <u>variata</u>		0.3	0.2		0.1		0.2	0.1			0.3	0.1
<u>Cyphastrea</u> <u>ocellina</u>	0.2			0.4	0.2						0.3	
<u>Leptastrea</u> <u>purpurea</u>		0.1	0.2				0.1					
<u>Fungia</u> <u>scutaria</u>								0.1			0.1	
Limestone	34.1	68.3		21.6	42.0	10.0	42.4	41.0		28.3	31.6	12.0
Rubble			46.4	44.8	25.4	84.7		2.0	48.9	34.4		
Sand		5.6	2.2				1.6	3.9				2.9
Basalt	49.1			32.3	28.2			4.1		28.9		
TOTAL CORAL COVER	(1986) 16.8	26.1	51.4	1.1	4.5	5.3	56.0	49.1	50.9	8.4	48.4	85.0
	(1983) 17.0	49.1	70.4	-	-	-	-	-	-	5.4	44.2	72.5
NO. OF CORAL SPECIES	(1986) 5	7	6	3	5	2	7	7	5	3	8	6
	(1983) 2	5	4	-	-	-	-	-	-	2	5	2
CORAL SPECIES DIVERSITY	(1986) 0.40	0.46	0.51	1.56	0.53	0.40	-	0.79	0.64	0.71	0.91	0.84
	(1983) 0.04	0.62	0.62	-	-	-	-	-	-	0.58	0.89	0.60

short densely packed branches, and is able to flourish in areas that are physically too harsh, particularly in terms of wave scour, for other species. The 15 ft. transects traversed such Pocillopora meandrina-boulder zones (see Plates 6 and 7).

It can be seen in Table 3 and Figure 5 that total coral cover at PN-15 and PS-15 is about 17 and 8%, respectively, while at PC-15 cover is 56%. The substantially larger coral cover in the central sector is apparently due to the hydrography of the bay; wave energy appears to be dissipated in shallower water relative to the regions off the projecting points to the north and south.

Number of coral species on the shallow zone transects ranged from 3 to 7 (see Table 3). Most of the species that occur in the transects are those with large growth forms. Other corals that were observed on the reef bench but did not occur in the transect quadrats were Cyphastrea ocellina, Pocillopora damicornis, Pasiphoera (Stephanaria) stellata, and Montipora flabellata.

Comparison of coral cover between the 1983 and present survey at the north and south 15 foot transects reveals that coral cover has remained relatively constant over the last three years (see Table 3 and Figure 5). Because community structure in this zone is dictated by the normal range of wave stress, it is expected that there would be little temporal variability.

Besides corals, the dominant benthic organisms in the

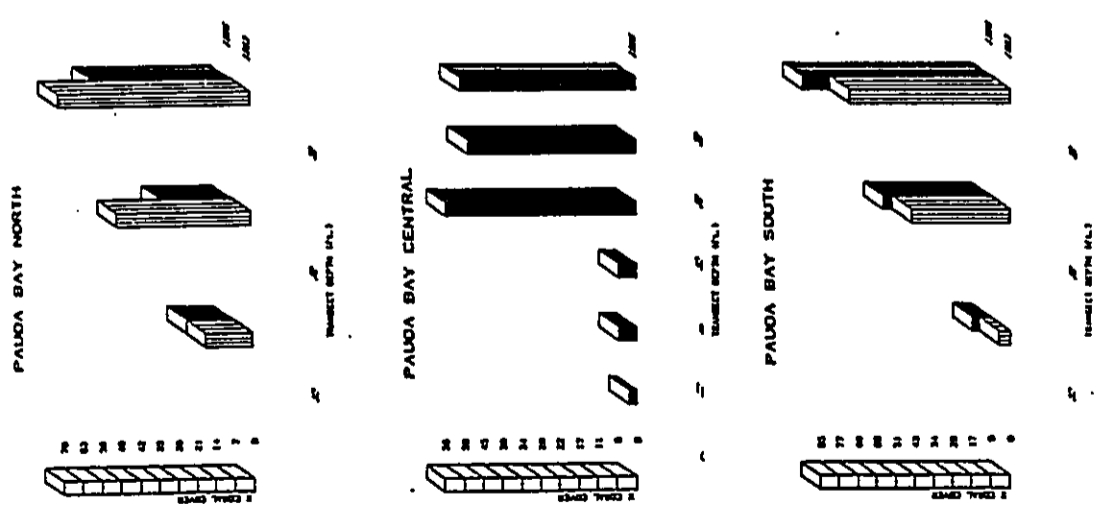


Figure 5. Bar graphs showing coral community structure at Pauoa Bay. At the north and south bay stations data from 1986 is compared to data from 1983.

near-shore surge zone are encrusting coralline algae (*Porolithon* spp.), and the sea urchins *Echinometra mathaei* and *Echinostrephus sciculatus*. These urchins bore into the reef surface and dead coral colonies and give the substrata an irregular pitted appearance. In some areas of the limestone terrace densities of the urchins is on the order of 50 individuals per square meter. Very few other benthic invertebrates occur in the near shore zone owing to the frequent impact of breaking waves and high surge.

Seaward of the edge of the shallow surge zones, the bottom is predominantly a flat basaltic terrace, interspersed with lava extrusions and sand channels (see Plate 8). The reef terrace normally varies from about 200 to 400 feet wide, with a depth range of 15 to 50 feet. *Porites lobata* is the dominant coral in this area, occurring in a variety of growth forms. The species predominantly takes the shape of massive, thick lobed colonies (see Plates 9 and 10). Because of increased water depth and distance offshore, reduced wave scour results in greater proportions of coral cover on the reef bench. It is in this zone that the most number of corals occur, and where early stages of "reef formation" are beginning. The 30 ft. Pauoa Bay transects represent typical *Porites lobata*-reef bench environments.

Comparing coral cover at the 30 ft. transects between the 1983 and present surveys gives a quantitative indication of the changes in community structure induced by

wave action (see Figure 5 and Table 3). At the north bay 30 ft. transect, cover decreased approximately 23% between 1983 and 1986 (from 49 to 26%). At the south bay 30 ft. transect coral cover increased by 4% in 1986 compared to 1983 (44 to 48%). It appears that the reef terrace on the north side of Pauoa Bay was impacted by a very severe winter storm that struck the Kohala and Kona coast in February of 1986. Severe storms with wave heights of 15-20 ft. occur on an infrequent basis, and are of sufficient intensity to cause destruction of areas of the reef that are normally below the depth of destructive force. The effect of these events is to cause large losses in percent coral cover and increase the percentage of rubble and bared surfaces on the reef (see Plate 11). The effects of such storm events has been investigated in detail by Dollar (1982).

The major taxa of benthic organisms, other than corals, occurring on the Pauoa Bay reef terrace are sea urchins (Echinoidea) and sea cucumbers (Holothuroidea). By far the most abundant urchins are the two species that bore into limestone surfaces, Echinometra mathaei and Echinostrephus aciculatus. In the reef bench zones, densities of these urchins is often of the order of 30 individuals per square meter. Less abundant, but ubiquitous across the entire reef, are the larger species of urchins, Triploneustes fistilla, Echinothrix diadema, and Heterocentrotus mammillatus.

Most common of the sea cucumbers are the species Holothuria atra and H. mauritiana, which occur mainly in the P. lobata-reef terrace zone. Encrusting calcareous algae is abundant on bared limestone surfaces, and on the non-living parts of coral colonies.

Fruiting benthic algae are conspicuously rare on the reefs of West Hawaii. Several plants were observed, however, off Pauoa. These included the brown algae Turbinaria ornata, and Padina spp.

Typically, at the seaward edge of the reef bench, the slope of the bottom increases, and substratum consists primarily of unconsolidated rubble and sand. Porites compressa, commonly called "finger coral" covers the reef slope in the form of dense interconnected thickets that extend to a depth of approximately 90 ft. (see Plates 12, 13, and 14). Below the lower limit of coral growth, bottom cover consists of white sand.

At Pauoa Bay, the slope of the deep reef is somewhat less than other parts of the Kona or Kohala coast. Submerged lava flows encountered along much of the deep reef zone caused the bottom to be relatively flat compared to the normal reef slope angle of about 40°. As a result, coral cover on the 60 ft. transects was dominated less by finger coral than in areas with steeper slopes. Rather, coral cover at the 60 ft. transects is a combination of finger coral and massive P. lobata colonies (see Plate 12).

As on the reef terrace, it is possible to

quantitatively assess the effects of the severe winter storm to the deep slope zone. As described above, it appears that the brunt of the destructive force of storm waves was focussed on the northern end of Pauoa Bay. It can be seen in Table 3 and Figure 5 that coral cover decreased 19% on the 60 ft. north bay transects (70 to 51%), and increased 13% (72 to 85%) in 1986 compared to 1983. Because of the delicate nature of finger coral, it is especially susceptible to mechanical stress from shear forces caused by breaking waves. Following storms vast mats of finger coral on the reef slope are reduced to small rubble fragments (see Plate 15). Regrowth of storm-damaged finger coral is generally rapid, as living portions of rubble can regenerate quickly into mature thickets of P. compressa (see Plate 16).

The boring sea urchins found in the reef terrace zones are essentially absent from the slope zone owing to the lack of solid substrate. The sea urchins Echinothrix diadema, Heterocentrotus mammillatus, and Triploneustes gratilla are found on the reef slope, although in reduced abundances compared to the shallow zones. Encrusting red coralline algae, predominantly Porolithon spp. and Peponellia rubra, were commonly observed on the deeper reef slope on the Porites compressa reef framework.

Species diversity is usually another parameter that reflects the degree of stress on coral community structure. With little or no stress, such as wave action, each of the

three reef zones is dominated by a single species; the greater the degree of dominance, the lower the diversity. Moderate storm damage may preferentially reduce the cover of the dominant species, resulting in a more equitable distribution, and hence higher diversity. Storm events of moderate intensity seem to prevent dominance and resource monopolization by differentially affecting the most abundant species or the species highest in competitive ability. Infrequent storms of very high intensity wipe out all corals and return coral communities to a bare pioneering stage. There does not, however, appear to be a pattern to diversity on the Pauoa Bay transects.

The design of the reef survey was such that no cryptic organisms or species living within interstitial spaces of the reef surface were enumerated. Since this is the habitat of the majority of mollusks and crustaceans, detailed species counts were not included in the transecting scheme. No dominant communities of these classes of biota were observed during the reef surveys at any of the study stations.

Reef Fish Community Structure

Reef fish community structure was largely determined by the topography and composition of the benthos. Transect results are presented in Table 4 and Figures 6 and 7.

The reef fish community at Pauoa Bay is typical of that

found along most of the Kona Coast (Hobson 1974, Walsh 1984), and can be grouped into six general categories: juveniles, planktivorous damselfishes, herbivores, rubble-dwelling fishes, swarming tetrodons, and surge-zone fishes.

Juvenile fishes belonged mostly to the family Acanthuridae (surgeonfishes), with representatives from the families Labridae (wrasses), Mullidae (goatfishes) and Chaetodontidae (butterflyfishes). Juveniles were most abundant on the deepest transects of the reef slope zone (60 ft.) in areas dominated by finger coral (*Porites compressa*). The complex habitat created by the growth form of *P. compressa* provides shelter for small fish.

Planktivorous damselfishes, principally of the genus *Chromis* were abundant in several of the areas surveyed. *Chromis* *agilis* and *C. versator* predominated at the outer edge of the shelf and in deeper water, whereas *C. vanderbilti* was the primary shallow water species. Schools of sergeant-major damselfish, *Abudefduf abdominalis*, were conspicuous at several of the central Paoua transects.

Herbivores, primarily the acanthurids *Zebrasoma flavescens* and *Ctenochaetus strigosus* were also abundant. On the shallower reef terrace, adult *Acanthurus olivaceus*, *A. nigrofasciatus* and scarids (parrotfishes) were also common. In areas where coral rubble was abundant, common fishes included the angelfish *Centropyge potteri*, and several species of wrasses, notably *Pseudochilinus*

Table 4. Fish community structure at Paoua Bay.

SPECIES	SPECIES ABUNDANCE									
	1	2	3	4	5	6	7	8	9	10
<i>Chromis</i> <i>agilis</i>	1	1	1	1	1	1	1	1	1	1
<i>Chromis</i> <i>versator</i>	1	1	1	1	1	1	1	1	1	1
<i>Chromis</i> <i>vanderbilti</i>	1	1	1	1	1	1	1	1	1	1
<i>Abudefduf</i> <i>abdominalis</i>	1	1	1	1	1	1	1	1	1	1
<i>Zebrasoma</i> <i>flavescens</i>	1	1	1	1	1	1	1	1	1	1
<i>Ctenochaetus</i> <i>strigosus</i>	1	1	1	1	1	1	1	1	1	1
<i>Acanthurus</i> <i>olivaceus</i>	1	1	1	1	1	1	1	1	1	1
<i>Acanthurus</i> <i>nigrofasciatus</i>	1	1	1	1	1	1	1	1	1	1
<i>Centropyge</i> <i>potteri</i>	1	1	1	1	1	1	1	1	1	1
<i>Pseudochilinus</i>	1	1	1	1	1	1	1	1	1	1

tetractenias and P. octotaenia.

Surge zone fishes were not quantitatively assessed because of the difficulty in working on the wave-swept basalt terraces that these fish inhabit. Visual observations, however, revealed that this biotope supported a large number of fishes, principally herbivores of the genera Xyphosus, Acanthurus, and Naso. The wrasses Thalassoma trilobatum and T. purpuraceum were also abundant in the surge zone. Few juvenile fishes were seen inhabiting the boulder zone environment. Triggerfish of the species Melanichthys niger and M. vidua were also observed congregating in the water column over the reef platform.

The fish community at the three transects within Pauoa Bay (PC-8, 11, 7) was markedly impoverished in relation to other areas of the reef (see Figures 6 and 7). The primary species in the bay were the drab surgeonfish, Acanthurus nigrofuscus, the ubiquitous wrasse, Thalassoma duperreyi, and the goatfish, Mulloidichthys multifasciatus. Individuals of the later species were mostly small juveniles (oama) that are seasonally abundant in inshore waters. In addition to the quantitative transects, several reconnaissance swims traversed the inner bay. Observations from these swims were in accord with the results of the transects. Overall, the inner bay biotope was characterized by having both a low number of species and a low number of individuals. The decreased populations are

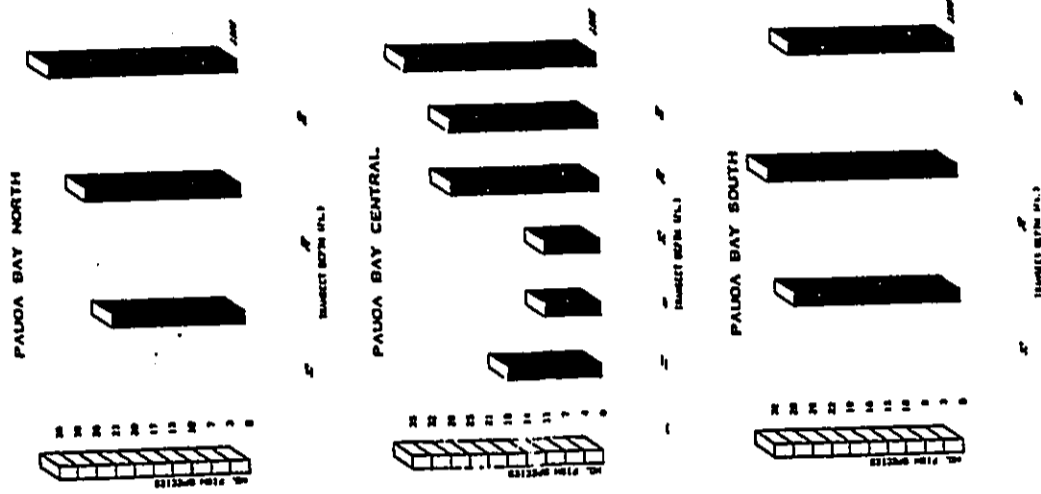


Figure 6. Number of fish species on Pauoa Bay transects.

almost certainly a result of the extreme physical rigor of the inner bay resulting from breaking waves.

Several species of "food fishes" (taken by subsistence, recreational and/or commercial fishermen) were observed during the survey. Schools of several hundred individuals of goatfish (weke) (Mulloidichthys flavolineatus), opelu (Decapterus macarellus), and blue-lined snapper (taspe) (Lutjanus kasmira) were observed while diving. Rocky ledges and large coral heads sheltered fair numbers of squirrelfish (u'u) (Myripristis berndti). Over a dozen jacks (pupio) (Caranx melampygus) were seen during the survey, although most were quite small. Other food fishes included parrotfishes (uhu) (Scarus spp.), goatfishes (moana kea) (Parupaneus cyclostomus), grand-eyed porgeys (mu) (Monotaxis grandoculis), and grouper (Cephalopholis argus). None of these species were particularly abundant. Orange-eyed surgeonfish (kole) (Ctenochaetus strigosus), while abundant, were generally not large enough to be considered suitable for "food fish".

Overall, fish community structure at Pauoa Bay is fairly typical of the assemblages found in relatively undisturbed Hawaiian reef environments. The presence of large schools, and large individuals, of some food fishes indicates that the area has been subjected to only light to moderate amounts of fishing pressure. Abundant small butterflyfishes also indicated that the area is not heavily exploited by aquarium fish collectors. The apparent low

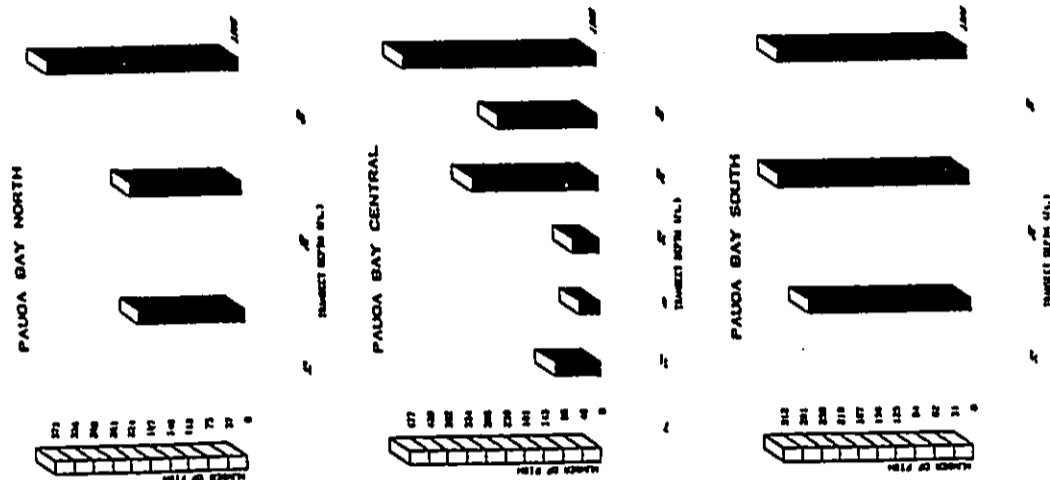


Figure 7. Number of fish on Pauoa Bay transects.

levels of fishing are probably a function of the remote location of the site with respect to shore access and the distance from the nearest harbor or boat launching facility.

Threatened or Endangered Species

Three species of marine animals that occur in Hawaiian waters have been declared threatened or endangered by Federal jurisdiction. The threatened green sea turtle (Chelonia mydas) occurs commonly along the Kona Coast, and is known to feed on selected species of macroalgae. During the course of the present survey a single green sea turtle was observed swimming in Pauoa Bay. The endangered hawksbill turtle (Eretmochelys imbricata) is known infrequently from waters off the Kona Coast. No hawksbill turtles were observed in the vicinity of Pauoa Bay during the course of the present survey. George Balsaz, Zoologist with the National Marine Fisheries Service, who specializes in the study of Hawaiian sea turtles, has said that the Pauoa area is not identified as a hawksbill turtle nesting, breeding, or aggregating site.

Populations of endangered humpback whale (Megaptera novaeangliae) are known to winter in the Hawaiian Islands, from December to April. In general, however, it is not common for whales to occupy the shallow reef areas that are the focus of this survey.

Anchialine Pond

Pond Morphology and Biota

Anchialine ponds are shoreline pools without surface connection to the sea that contain water of measurable salinity, which oscillates with tidal rhythm owing to inland extension of the oceanic water table. Such ponds are known to occur around the world in lavas and elevated fossil reefs. In the Hawaiian Archipelago, anchialine ponds exist almost exclusively along the shorelines of Hawaii and southwest Maui. The term "anchialine" (from the Greek "anchialos" meaning near the sea) was coined by Holthuis (1973).

Until the relatively recent increase in coastal resort development, little work had been done on the biological and chemical structure of Hawaiian anchialine ponds. The first comprehensive survey was carried out by MacIolek and Brock (1974), in which 305 closed (no surface connection with the ocean) ponds on the west coast of Hawaii were inventoried with regard to location, environmental characteristics, biota, and historical relationships. More recently, ponds in the vicinity of several resort developments, especially in the Waikoloa area have been surveyed (OI Consultants, 1984).

The successional cycle of anchialine ponds appears to progress from new ponds that are devoid of any bottom

sediment to ponds with thick accumulations of soft sediment resulting from the growth of benthic algal mats. Deposition of sediment appears to slow the flushing rate, thereby increasing the capacity for sediment retention. At some point, when the level of sediment accumulates to the level of the surface water of the pond, clear standing water will no longer occur, and the pond will become a marshy wet area. In addition, fresh water near the soil or rocky surface surrounding ponds often provides a suitable habitat for land plants. Detrital litter of land plant origin falling into the ponds adds to the organic deposition that eventually causes pond senescence.

A single anchialine pond occurs on the Ritz-Carlton property onshore of the southern portion of Pauoa Bay. The pond appears to have been formed from the collapse of a lava tube. Presently, the pond is surrounded by dense growth of beach plants and palm trees. Pond water had a salinity of 40/00; relatively low for anchialine ponds which average about 10 0/00. Standing water in the pond is limited to a very small area of approximately 30 square feet. The pond can be described as being in the final stages of senescence owing to deposition of plant material that is filling the pond. Decaying plant material has formed a thick sediment layer that eventually will accumulate to the surface level of standing water. Oxidative processes are apparent in the pond sediment as evidenced by the strong smell of reduced sulfides.

Presently, the depth of water above the sediment surface is approximately 6-8 inches.

Typically, the most abundant fauna of anchialine ponds are snails and shrimp. Maciolek and Brock (1974) classify four shrimp, three snails, and two native fish as being "representative" pond organisms. Two of the shrimp species, Halocaridina rubra (opae'ula) and Metabetaeus lohena are considered rare, found only in anchialine areas, but are normally the most common shrimp found in ponds. The other two shrimp species, Palaeomon debilis and Macrobrachium grandimanus, are found in estuaries and streams as well as anchialine ponds.

The three representative snails, Assiminea sp., Melania sp., and Theodoxus cariosa, are typically found in tide pools and anchialine ponds, especially on the undersides of rocks. Representative pond fish are Eleotris sandvicensis and Kuhlia sandvicensis.

While the survey of the Pauoa Bay pond was not exhaustive in that it did not include night surveys, it was apparent that the pond was depauperate in pond biota. None of the representative fish or shrimp were observed, while only two of the mollusks Assiminea and Melania were observed on the rocky walls of the pond. No species of algae or vascular plants were observed growing in the pond. The absence of many of the representative species is likely a result of the advanced stages of succession of the pond. High levels of reduced sulfides resulting from detrital

oxidation probably make the aquatic environment toxic to most biota.

CONCLUSIONS

The ultimate purpose of the data collected during the baseline survey is to provide information on the degree of environmental impact to the marine environment that might occur as a result of construction and operation of the Ritz-Carlton Hotel at Pauoa Bay.

Implementation of the proposed action would involve grading, vegetation removal, new construction and other changes to the existing environment on several hundred acres of land. There are also tentative plans for direct modification of the shoreline for construction of a marine swimming lagoon, and/or modifying both an existing rubble masonry groin and beach at the southern end of the bay in order to make the area more suitable for swimming. Therefore, potential impacts to the marine environment must be considered as direct modification of the shoreline, and indirect processes that come about as results of activities on land.

DIRECT IMPACTS - SHORELINE MODIFICATION

With regard to direct alteration of the shoreline for the purpose of constructing a swimming lagoon, excavation will require the removal of a portion of the shoreline basaltic shelf with heavy equipment. Planning of such work

should require that dredging of the opening of the lagoon entrance should be the last step in construction. Leaving a dike at the lagoon entrance until the inner lagoon is completed will minimize the time that turbid water resulting from excavation will be flushed into Pauoa Bay. The major potential impact from lagoon construction will be in the form of increased turbidity caused by shoreline excavation. Such increased turbidity should be of a temporary nature, lasting only through the actual construction period and a short time after.

As was evidenced in the present survey, Pauoa Bay is subjected to rapid flushing by wave forces, as well as tides and currents. One of the major results of this survey is that inner Pauoa Bay is routinely subjected to natural forces which cause turbidity to range above the level specified by the Department of Health water quality standards. In addition, the wave forces occurring when water samples were collected for the present survey represent moderate conditions, and not the extremes that generally occur several times each winter. Because such events are the norm, rather than the exception, over the annual cycle, the marine communities that exist in Pauoa Bay are limited to species that can tolerate frequent episodes of large amounts of suspended sediment and physical force from breaking waves. The result is an environment within Pauoa Bay that is often severely stressed and is distinctly suboptimal with respect to

serving as a habitat for marine biota.

With this scenario of natural stress, it is possible to predict the effects of additional sediment loading from lagoon excavation. As mentioned above, construction planning will minimize the time additional suspended material will be added to the environment. It is not possible to predict the quantity of material that will become suspended as a result of construction, but owing to the size of the lagoon entrance (less than 110 feet), it is probable that the amount of material will be relatively small in proportion to the amount that is stirred from storm events. Fine sediment from dredging that will become suspended is not qualitatively different than material that is routinely suspended by natural forces. Because the marine communities, and water quality, presently reflect the effects of high turbidity and wave stress, the incremental additions resulting from construction will very likely not have any additional effect to the environment. Most water quality standards are presently exceeded under conditions of moderate wave activity and groundwater extrusion. Biotic communities are severely limited compared to areas with less wave exposure. An additional temporary increase in sediment loading is not likely to cause any significant changes to these characteristics of Pauoa Bay.

While it has been shown that inner Pauoa Bay is severely and routinely stressed, it is also apparent from

the survey that the reef communities outside the bay are not subjected to the same forces. Suspended sediment is retained and recirculated within the bay, and diluted and flushed into the offshore coastal region. Measured turbidity at stations 7 and 8, located approximately 500 ft. from the shoreline points marking the boundaries of Pauoa Bay, exceeded the mean limits but were well below the absolute limits allowed by DOH standards. This level of water column turbidity is not sufficient to affect marine communities, as the survey results indicate that benthic and fish assemblages outside the bay mouth were considered "normal". It is anticipated that any incremental increase in turbidity owing to shoreline construction would likewise not affect the offshore communities.

Other shoreline activities that could impact the nearshore marine environment are modification of an existing rock groin, and a beach at the southern end of Pauoa Bay. Both of these activities might entail creating an increase a temporary increase in suspended sediment if excavation is required. However, the extent of such excavation is likely to be much smaller than that required for construction of the swimming lagoon, and the same arguments would apply. Specifically, when compared to the extent of natural sediment suspension, and the nature of the environment that has resulted from natural stress, incremental additions brought about by shoreline activity are likely to be insignificant.

INDIRECT IMPACTS

The major potential indirect impact to the marine environment associated with shoreline development appear to be increased sedimentation from wind or runoff as a consequence of grading. Changes in groundwater discharge and surface runoff, especially with respect to nutrients from sewage effluent used for irrigation and golf course fertilization are also considered as factors of change. Herbicides and pesticides that might be used on the golf course also present the potential for impacts.

Increased Sedimentation and Runoff

A potential cause of impact to the marine environment resulting from nearshore development is increased sediment loading. Land-derived fine sediment could be transported as wind-borne dust or runoff during the period when ground cover is removed during grading. Increased sedimentation does not appear, however, to be a likely source of environmental alteration for the development scenario at Pauoa Bay. Ground cover to be graded is either barren lava that has not been weathered to any appreciable extent, or scrub brushland with a slightly weathered lava surface layer. When these materials are moved and crushed by bulldozers a smooth surface of cobbles 1 to 4 inches in size generally results. In addition, only a fraction of any wind-blown material generated would be carried in a westerly direction toward the ocean and pond. As the size

distribution of the wind-blown fraction would probably be in the silt-clay range, it would be expected that this material would remain in suspension for some time if it entered the water column, and therefore it is unlikely that any measurable settlement would occur anywhere in the nearshore marine environment.

Most importantly, as discussed above regarding direct impacts, Pauoa Bay is subjected to relatively great sediment stress under normal condition. Slight increases should they occur at all, in sediment loading from wind-blown transport are likely to be insignificant in comparison to natural sediment content of nearshore waters.

It is also not expected that runoff during construction would increase oceanic sediment loads. The climate of the south Kohala region is one of the driest in the Hawaiian Islands; therefore substantial rainfall during construction is rather unlikely. However, in the event of heavy rainfall, the porous nature of the lava and soil ground cover is such that sheet flow carrying suspended sediment toward the ocean is highly unlikely. Rather, most rainwater that enters the ocean as runoff appears to do so following percolation through the surface rock layers to the water table and subsequent groundwater extrusion at the shoreline. Such groundwater flow would not have the effect of transporting sediment to the ocean since the basal rock acts as a filter. Normal volumes of groundwater extrusion is in the neighborhood of 3 mgd per mile; the increase to

this volume owing to direct rainfall and percolation is likely to be insignificant. For a similar development on the Kohala coast at Waikoloa, it was estimated that the annual discharge of stormwater runoff is roughly equivalent to the amount of groundwater which enters the ocean each day (U. S. Army Corps of Engineers 1985). Therefore, a major effect of rain during the period of grading might be to significantly decrease the amount and distribution of airborne dust--a circumstance that would have to be considered a beneficial side effect.

At this time no estimates exist of how drainage patterns might be changed as a result of the development plans. There appear to be no areas offshore of the Ritz-Carlton boundaries where marine systems have been adversely affected by runoff to date. It is expected that this would remain the case. However, if analyses indicate that the proposed changes in land use and drainage patterns might result in substantial changes in water quality, additional field surveys will be conducted to determine the best location for the discharge of drainage and to assess the significance of expected water quality with respect to marine community structure.

Increased Nutrient Loading From Irrigation and Fertilization

Because operation of the Ritz-Carlton calls for construction of a golf course that will be irrigated and

fertilized with treated sewage effluent, the potential for impacts to the aquatic ecosystems owing to high rates of nutrient loading must be considered. When subjected to substantial increases in nutrients, the response of marine and freshwater systems is termed "eutrophication", and consists of increased growth of a portion of the plant (phytoplankton) community that is able to directly utilize the nutrients, generally at the expense of normal community integrity. The overall result of this process is usually a degradation of environmental quality. In the past, coral reefs in some areas of Hawaii, primarily Kaneohe Bay and off Sand Island on Oahu, have been severely damaged in this manner by sewage impacts.

At Paoua Bay, it is not anticipated that such impacts will occur for several reasons. Most importantly, any increased nutrient loads would be rapidly dispersed before effects to the marine communities could be realized. The unrestricted circulation of the offshore zone by tides, current, meso-scale eddies, wind, and wave action promotes rapid dilution and water exchange. Residence time of a parcel of water fronting the development is probably on the order of hours, so buildup of any nutrient materials is unlikely. It was similarly concluded that resort development at Waikoloa would cause no changes in nutrient concentrations in the marine environment owing to rapid mixing and dilution (Corps of Engineers 1985).

Another reason that the marine environment will

probably show no effects as a result of golf course irrigation is that much of the nutrient load is taken up by the vegetation on the golf course. Chang and Young (1977) report that on a golf course on Oahu irrigated with treated sewage effluent 98% of the total nitrogen and 100% of the total phosphorus was taken up by the soil-plant surface layer. Chemical processes that account for the uptake include incorporation into plant biomass, cation exchange, fixation and adsorption on the soil, biological oxidation and denitrification. The important aspect of the study conducted on the Oahu golf course is that essentially none of the nutrient load reaches the marine environment through groundwater runoff.

Another factor that accounts for the lack of potential for impact is the secondary level of sewage treatment planned for the development effluent. Studies done at several of the ocean discharges on Oahu that intentionally discharge much greater volumes of secondary sewage into marine environments indicate there is no detrimental effects whatsoever owing to the discharge. In fact, the impacts that have been reported all can be considered beneficial since they result in increased fish populations. Fish populations benefit from the increased particulate food, as well as from shelter afforded by the outfall structure. Based on these observations, it is probable that even if malfunctions in sewage plants cause discharge directly into the ocean, there will be little or no effect

to water quality or biotic communities.

A most convincing argument for the lack of potential alteration to marine communities by golf course-related factors, is the present condition of reefs offshore of golf courses that use treated sewage effluent. On the Island of Hawaii, golf courses at Keauhou, Waikoloa, Mauna Lani, and Mauna Kea presently use such methods of irrigation. Surveys of the reef environments at all of these locations indicate no adverse effects in any form.

Finally, results of the water quality analyses indicate that Pauoa Bay waters presently have nutrient concentrations that exceed the DOH standards. It is likely that any increases in nutrient concentrations, even if they are detectable, will not change the level of compliance with DOH standards.

Pesticides and Herbicides

Potential for negative alteration to marine ecosystems owing to pesticides and herbicides also seems to be nil. It has not been found necessary to utilize substantial quantities of pesticides on golf courses in Hawaii, and only very small applications of herbicides are periodically made to the greens (N. Bustamente, Mauna Lani Resort, personal communication). Such small quantities do not appear to be of a magnitude great enough to leach through the soil and lava, be carried to the ocean via groundwater extrusions, and then bioaccumulate to the point of

producing a noticeable effect.

Potential Effects to Protected Species

As mentioned in the Results, there are several protected and threatened marine species that may inhabit the offshore environment. Possible plans for modification of the shoreline, are limited to activity very close to, or shoreward of the high tide mark. Potential impacts to marine mammals and turtles from such activity appears to be negligible. Heavy equipment used in construction might produce noise that could be heard by whales. A literature review conducted by Darby-Ebisu & Associates (1984) for the Waikoloa Beach Resort EIS indicated that this kind of low-level noise would have no apparent adverse effects on major marine animals, and would not cause avoidance of the area.

Short term changes in water quality resulting from construction would also not be of a magnitude to affect the behavior of sea turtles that may venture into Pauoa Bay. Increased access to the shoreline, once the hotel is constructed, might affect resident turtles because these animals often do not remain in areas frequented by humans. This potential impact must be considered very slight, however, owing to the infrequent observation of turtles in the area, and the abundant habitat space along the Kohala and Kona coast.

Anchialine Pond

As described in the results section, the single anchialine pond on the Ritz-Carlton site is in the final stages of the "pond life cycle", and will probably cease to exist in the not too distant future. In addition, pond biota is limited by the reducing conditions brought about by oxidizing organic material. Hotel plans currently do not call for filling, or otherwise altering, the pond. Indirect effects, such as increased nutrients from groundwater intrusion by golf course irrigant appears to present little potential for alteration of the pond. Even ponds that appear to be in early successional stages, and are inhabited by the full suite of pond biota, do not appear to be affected by nearby development. Brock (1984) has surveyed the ponds in the vicinity of the Mauna Lani Resort Hotel. Even though these ponds are virtually surrounded by the hotel and condominium units, they remain unaffected in terms of water chemistry and biotic composition. At Waikoloa, time series surveys of water quality parameters of anchialine ponds indicate that a nearby golf course may cause nutrient concentrations to rise, but since the pond flora does not appear to be nutrient limited, there is no apparent effect to pond biotic composition (OI Consultants 1984, 1986).

It appears safe to assume that similar development would also have little effect on the pond on the Ritz-Carlton site.

SUMMARY

The marine environments at Paoua Bay appear to be representative of the Kona and Kohala coast of Hawaii. Within the confines of the bay, macrobenthic and fish communities are limited owing to the rigorous conditions brought about by wave and sediment stress. Beyond the inner bay, offshore coral community development corresponds generally to a three-zone pattern influenced primarily by the degree of destructive force of wave impact. Reef fish communities appear to be relatively unimpacted by fishing pressure. The region does not represent an unusual commercial or recreational resource, and does not appear to be a significant habitat of rare, endangered or protected species.

During a period of moderate wave stress and normal groundwater extrusion, most of the water quality parameters within the bay exceeded the standards specified by the Department of Health for open coastal waters. It is certain that water quality standards would be exceeded even further during episodes of severe wave stress. Shoreline modification, as well as indirect sources of sedimentation and nutrient augmentation appear to present less potential for changes in water quality than the full range of natural environmental influences. Because state guideline criteria are exceeded in the natural state, it is irrelevant to consider the potential for exceeding the criteria by

shoreline development.

The potential for direct impact as a result of development of the Ritz-Carlton to the aquatic communities appears to be very small. None of the developmental activities appear to have the potential to induce changes in physico-chemical water quality parameters of a magnitude sufficient to cause changes in community structure. Marine environments are routinely subjected to stresses of massive proportions that are much more influential (or destructive) than the incremental changes that could result from any development activity.

The single anchialine pond on the development site appears to be a suboptimal pond habitat at present owing to infilling by plant detritus. Pond communities are not nutrient limited, so increased nutrient levels resulting from resort activities would probably have no adverse effect. None of the activities of the hotel, other than removal, would affect the present status of the pond.

If some unexpected event related to development activities does occur, the resulting alterations to marine community structure would probably be reversible, and recovery rapid once the stress factor is mitigated. Tolerance to such changes appears to already be part of the physiological range of the community.

It can be concluded that as long as the normal reasonable steps are taken in construction practices, and operational procedures for the golf course and sewage

treatment systems are carefully maintained, there should be no adverse impacts to the marine environments. However, the baseline marine biological studies were implemented in such a way that replicate surveys conducted in subsequent years can show actual changes in marine and pond community structure. Regardless of how unlikely, there is always the potential for an unexpected event. If any development practices cause changes in physical-chemical parameters which lead to changes in environmental integrity, these effects could be quantified through time-series surveys. Therefore, it is recommended that the Ritz-Carlton planners utilize the bench-mark stations to the fullest by incorporating into their long-range plans subsequent marine surveys. If, and when, development construction near the shoreline commences, it would appear to be a prudent action to initiate a monitoring program at that site during the activity. With such an ongoing program, it would be possible to quickly pinpoint any detrimental processes as they happen and remedy the situation before significant or irreversible environmental damage occurs.



Plate 1. View of Pauoa Bay looking north toward Lae o Panipou. Shoreline is composed of black lava outcrops and grey beach sand. Breaking waves inside the bay can be seen at the upper left.

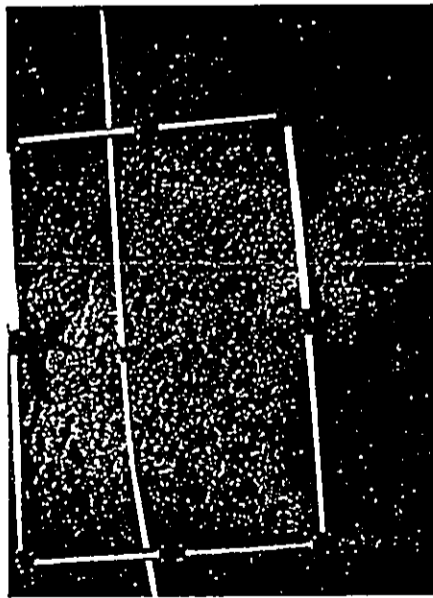


Plate 2. Typical quadrat at inner Pauoa Bay (PC-7). Bottom is composed of basaltic bench covered with sediment-bound algal turf, and is devoid of corals or other macro-invertebrates.

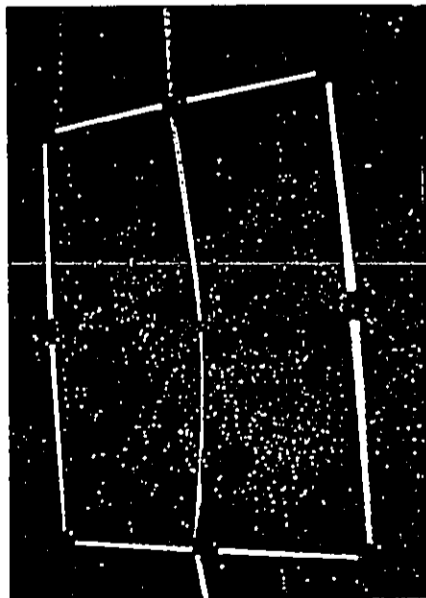


Plate 3. Typical quadrat at inner Pauoa Bay (PC-11). Depressions in the reef bench collect coral rubble broken loose by wave action.

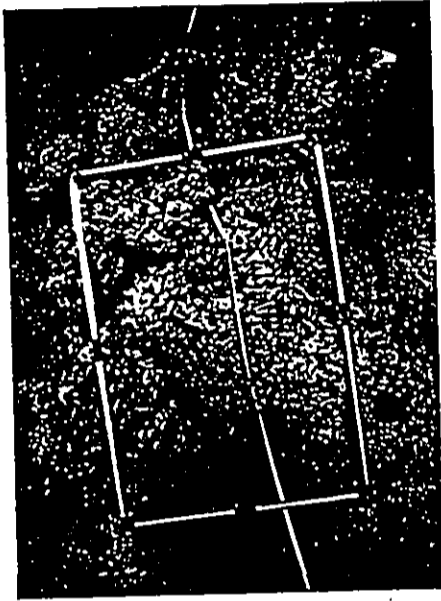


Plate 4. Typical quadrat at inner Pauoa Bay (PC-8). Living coral colonies of *Porites lobata* appear as light green structures within the frame. Dark round objects in lower center are sea urchins, *Tripneustes gratilla*.

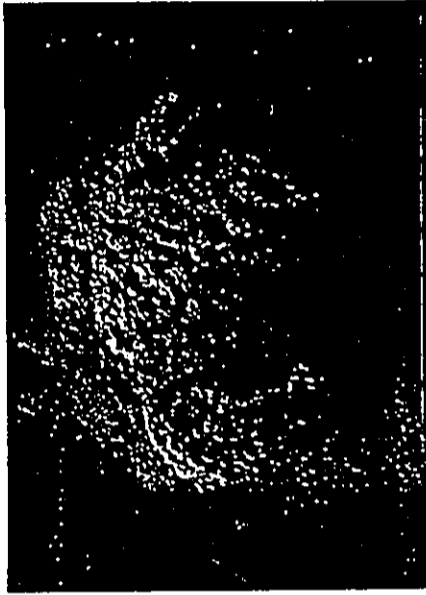


Plate 5. Large colony of *P. lobata* inside Pauoa Bay. Only a small percentage of the structure remains covered with living coral tissue; the remainder is mostly covered with a coating of fine sediment.

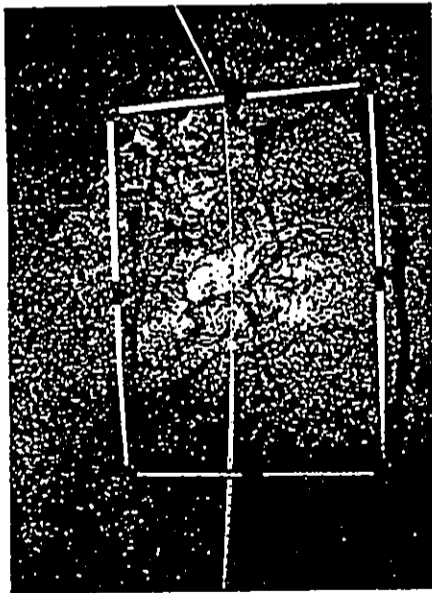


Plate 6. Typical quadrat on basaltic reef terrace at transect PN-15.

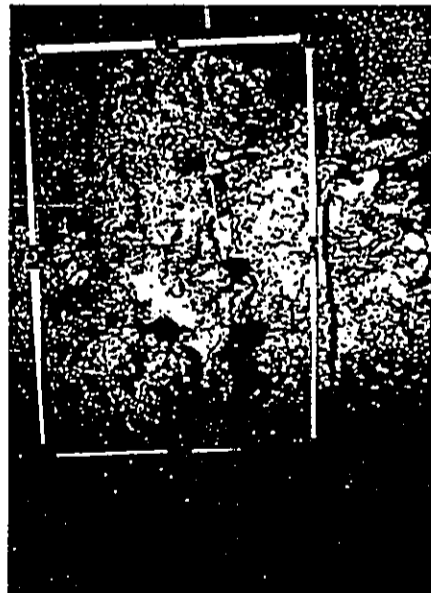


Plate 7. Typical quadrat on basaltic terrace at transect PS-15 showing limestone structures that originated from coral growth.



Plate 8. Sand and boulder channel at transect PC-30.

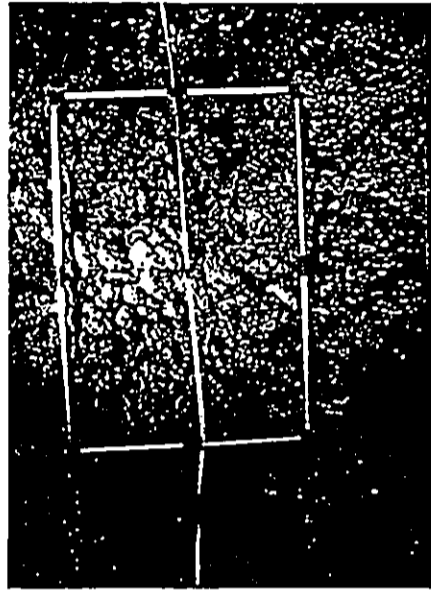


Plate 9. Typical quadrat from *P. lobata* reef building zone at transect PS-30.

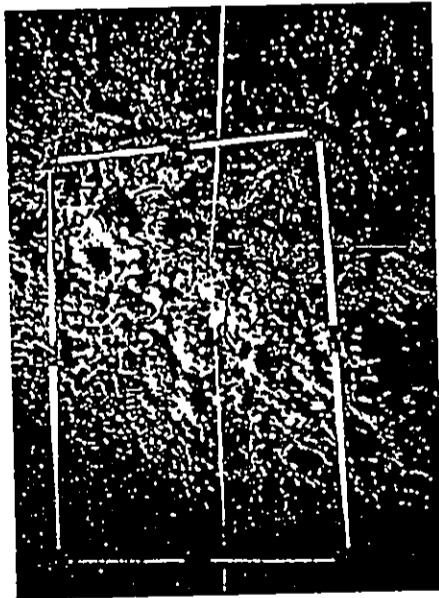


Plate 14. Typical quadrat showing undisturbed finger coral, *P. compressa* at transect PS-60.



Plate 15. Typical quadrat showing storm impacted finger coral community at transect PN-60. Note difference from similar, but undisturbed community in Plate 14.



Plate 16. Closeup of storm-damaged finger coral mat. Fragments of living coral can be seen that are beginning to re-establish. Complete recovery of the mat community is approximately 5-10 years.

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SUMMARY
 RITZ CARLTON TRAFFIC STUDY
 ROADWAY LEVEL OF SERVICE ANALYSIS PM PEAK HOUR
 SCENARIO 1 & 4
 RITZ CARLTON + EXISTING TRAFFIC

	DESCRIPTION	1987	1993	1998
14	KAWAIHAE-MAHUKONA RD E OF QUEEN K HWY	LOS B EB 358 WB 160	C 466 221	C 484 248
15	WAIMEA-KAWAIHAE RD WEST OF KOHALA MTN RD	LOS B EB 229 WB 183	C 317 244	C 355 271
17	WAIMEA-KAWAIHAE RD EAST OF LINDSEY RD	LOS C EB 436 WB 447	C 495 488	D 520 506
18	MAMALAHOA HWY NO OF LINDSEY RD	LOS B NB 489 SB 528	D 528 555	D 545 567
20	MAMALAHOA HWY SO OF LINDSEY RD	LOS B NB 299 SB 262	B 306 272	B 309 276
38	PALANI RD MAUKA OF QUEEN KAAHUMANU HWY	LOS D EB 713 WB 399	D 723 406	D 727 409
39	QUEEN KAAHUMANU HWY SO OF PALANI RD	LOS D NB 472 SB 760	D 486 780	D 492 788
41	QUEEN KAAHUMANU HWY NO OF PALANI RD	LOS E NB 543 SB 1081	E 580 1134	E 597 1157
42	QUEEN KAAHUMANU HWY SO OF PALISADES RD	LOS C NB 349 SB 518	C 386 571	C 403 594
45	QUEEN KAAHUMANU HWY SO OF KEAHOLE AIRPORT	LOS C NB 262 SB 533	C 306 596	C 326 623
48	QUEEN KAAHUMANU HWY SO OF WAIKOLOA BEACH	LOS B NB 146 SB 364	B 193 431	C 214 460

51	QUEEN KAAHUMANU HWY SO OF WAIKOLOA MAUKA	LOS	B	B	B
		NB	196	243	264
		SB	281	348	377
54	QUEEN KAAHUMANU HWY SO OF MAUNA LANI	LOS	B	B	B
		NB	220	274	298
		SB	268	345	378
57	QUEEN KAAHUMANU HWY SO OF SO KOHALA RESORT	LOS	B	C	C
		NB	251	368	419
		SB	269	340	386
60	QUEEN KAAHUMANU HWY SO OF MAUNA KEA RESORT	LOS	B	C	C
		SB	284	401	452
		NB	269	350	386
63	QUEEN KAAHUMANU HWY SO OF WAIMEA-KAWAIHAE	LOS	B	C	C
		EB	345	439	490
		WB	212	343	379

SUMMARY
RITZ CARLTON TRAFFIC STUDY
ROADWAY LEVEL OF SERVICE ANALYSIS PM PEAK HOUR
SCENARIO 2 & 5
SOUTH KOHALA RESORT, HYATT, HOTEL 'X', KOHALA RANCH +
EXISTING TRAFFIC W/O RITZ CARLTON

	DESCRIPTION	1987	1993	1998
14	KAWAIHAE-MAHUKONA RD E OF QUEEN K HWY	LOS B EB 358 WB 160	C 522 276	D 827 624
15	WAIMEA-KAWAIHAE RD WEST OF KOHALA MTN RD	LOS B EB 229 WB 183	C 393 299	D 698 647
17	WAIMEA-KAWAIHAE RD EAST OF LINDSEY RD	LOS C EB 436 WB 447	D 616 544	E 887 871
18	MAMALAHOA HWY NO OF LINDSEY RD	LOS B NB 489 SB 528	D 632 593	D 824 789
20	MAMALAHOA HWY SO OF LINDSEY RD	LOS B NB 299 SB 262	B 312 284	C 362 324
38	PALANI RD MAUKA OF QUEEN KAAHUMANU HWY	LOS D EB 713 WB 399	E 808 465	E 847 507
39	QUEEN KAAHUMANU HWY SO OF PALANI RD	LOS D NB 472 SB 760	D 550 871	D 631 945
41	QUEEN KAAHUMANU HWY NO OF PALANI RD	LOS E NB 543 SB 1081	E 764 1396	F 983 1597
42	QUEEN KAAHUMANU HWY SO OF PALISADES RD	LOS C NB 349 SB 518	D 570 833	E 789 1033
45	QUEEN KAAHUMANU HWY SO OF KEAHOLE AIRPORT	LOS C NB 262 SB 533	E 622 1024	E 795 1160
48	QUEEN KAAHUMANU HWY SO OF WAIKOLOA BEACH	LOS B NB 146 SB 364	D 512 814	D 701 952

51	QUEEN KAAHUMANU HWY SO OF WAIKOLOA MAUKA	LOS	B	D	D
		NB	196	600	789
		SB	281	602	740
54	QUEEN KAAHUMANU HWY SO OF MAUNA LANI	LOS	B	C	D
		NB	220	557	781
		SB	268	543	711
57	QUEEN KAAHUMANU HWY SO OF SO KOHALA RESORT	LOS	B	D	D
		NB	251	874	893
		SB	269	530	712
60	QUEEN KAAHUMANU HWY SO OF MAUNA KEA RESORT	LOS	B	C	E
		SB	284	606	926
		NB	269	537	899
63	QUEEN KAAHUMANU HWY SO OF WAIMEA-KAWAIHAE	LOS	B	D	E
		EB	345	644	964
		WB	212	530	892

SUMMARY
 RITZ CARLTON TRAFFIC STUDY
 ROADWAY LEVEL OF SERVICE ANALYSIS PM PEAK HOUR
 SCENARIO 3 & 6
 RITZ CARLTON, SOUTH KOHALA RESORT, HYATT, HOTEL 'X', KOHALA
 RANCH + EXISTING TRAFFIC
 MAY 6, 1987

	DESCRIPTION	1987	1993	1998
14	KAWAIHAE-MAHUKONA RD E OF QUEEN K HWY	LOS B EB 358 WB 160	D 610 337	E 827 624
15	WAIMEA-KAWAIHAE RD WEST OF KOHALA MTN RD	LOS B EB 229 WB 183	C 481 360	D 698 647
17	WAIMEA-KAWAIHAE RD EAST OF LINDSEY RD	LOS C EB 436 WB 447	D 675 585	E 698 647
18	MAMALAHOA HWY NO OF LINDSEY RD	LOS B NB 489 SB 528	D 671 620	D 824 789
20	MAMALAHOA HWY SO OF LINDSEY RD	LOS B NB 299 SB 262	B 319 294	C 362 324
38	PALANI RD MAUKA OF QUEEN KAAHUMANU HWY	LOS D EB 713 WB 399	E 818 472	E 847 507
39	QUEEN KAAHUMANU HWY SO OF PALANI RD	LOS D NB 472 SB 760	D 564 891	E 631 945
41	QUEEN KAAHUMANU HWY NO OF PALANI RD	LOS E NB 543 SB 1081	E 801 1449	F/C* 983 1596
42	QUEEN KAAHUMANU HWY SO OF PALISADES RD	LOS C NB 349 SB 518	D 607 886	F/C* 789 1033
45	QUEEN KAAHUMANU HWY SO OF KEAHOLE AIRPORT	LOS C NB 262 SB 533	E 666 1087	F/C* 987 1454

48	QUEEN KAAHUMANU HWY SO OF WAIKOLOA BEACH	LOS	B	D	E
		NB	146	559	893
		SB	364	881	1246
51	QUEEN KAAHUMANU HWY SO OF WAIKOLOA MAUKA	LOS	B	D	E
		NB	196	647	981
		SB	281	669	1034
54	QUEEN KAAHUMANU HWY SO OF MAUNA LANI	LOS	B	D	E
		NB	220	611	973
		SB	268	620	1005
57	QUEEN KAAHUMANU HWY SO OF SO KOHALA RESORT	LOS	B	D	E
		NB	251	691	1085
		SB	269	615	1006
60	QUEEN KAAHUMANU HWY SO OF MAUNA KEA RESORT	LOS	B	D	E
		SB	284	723	1118
		NB	269	618	1193
63	QUEEN KAAHUMANU HWY SO OF WAIMEA-KAWAIHAE	LOS	B	E	E
		EB	345	973	1156
		WB	212	966	1186

* LOS FOR FOUR LANE ROADWAY

INTERSECTION LEVEL OF SERVICE ANALYSIS
 UNSIGNALIZED INTERSECTION
 MAY 14, 1987

INTERSECTION NUMBER	DESCRIPTION	MOVEMENT	LOS		
			1987	1993	1998
14	WAIMEA-KAWAIHAE & KOHALA MOUNTAIN RD	EXISTING			
		SCENARIO 1			
		SB LEFT	B	C	
		RIGHT	A	A	
		EB LEFT	A	A	
		SCENARIO 2			
		SB LEFT		F	
		RIGHT		A	
		EB LEFT		A	
		SCENARIO 3			
		SB LEFT		E	
		RIGHT		A	
		EB LEFT		A	
		SCENARIO 4			
		SB LEFT			C
		RIGHT			A
		EB LEFT			A
		SCENARIO 5			
		WB LEFT			F
		RIGHT			A
		SB LEFT			A
		SCENARIO 6			
		WB LEFT			F
		RIGHT			A
SB LEFT			A		

INTERSECTION LEVEL OF SERVICE ANALYSIS
 UNSIGNALIZED INTERSECTION
 MAY 14, 1987

43

KEAHOLE AIRPORT &
 QUEEN KAAHUMANU HWY

EXISTING

SCENARIO 1

EB LEFT	B	D
RIGHT	A	A
NB LEFT	A	A

SCENARIO 2

EB LEFT		F
RIGHT		A
NB LEFT		D

SCENARIO 3

EB LEFT		E
RIGHT		A
NB LEFT		A

SCENARIO 4

EB LEFT		D
RIGHT		A
NB LEFT		B

SCENARIO 5

EB LEFT		F
RIGHT		A
NB LEFT		E

SCENARIO 6

EB LEFT		F
RIGHT		A
NB LEFT		E

INTERSECTION LEVEL OF SERVICE ANALYSIS
 UNSIGNALIZED INTERSECTION
 MAY 14, 1987

46

WAIKOLOA BEACH RESORT
 QUEEN KAAHUMANU HWY

EXISTING

SCENARIO 1

EB LEFT	F
RIGHT	A
NB LEFT	C

SCENARIO 2

EB LEFT	F
RIGHT	A
NB LEFT	D

SCENARIO 3

EB LEFT	F
RIGHT	A
NB LEFT	D

SCENARIO 4

EB LEFT	D
RIGHT	A
NB LEFT	A

SCENARIO 5

EB LEFT	F
RIGHT	A
NB LEFT	D

SCENARIO 6

EB LEFT	F
RIGHT	B
NB LEFT	F

INTERSECTION LEVEL OF SERVICE ANALYSIS
 UNSIGNALIZED INTERSECTION
 MAY 14, 1987

51

MAUNA LANI RESORT &
 QUEEN KAAHUMANU HWY

EXISTING

SCENARIO 1

EB LEFT
 RIGHT
 NB LEFT

E
 A
 A

SCENARIO 2

EB LEFT
 RIGHT
 NB LEFT

F
 A
 A

SCENARIO 3

EB LEFT
 RIGHT
 NB LEFT

F
 A
 B

SCENARIO 4

EB LEFT
 RIGHT
 NB LEFT

F
 A
 A

SCENARIO 5

EB LEFT
 RIGHT
 NB LEFT

F
 A
 C

SCENARIO 6

EB LEFT
 RIGHT
 NB LEFT

F
 A
 D

INTERSECTION LEVEL OF SERVICE ANALYSIS
 UNSIGNALIZED INTERSECTION
 MAY 14, 1987

60

WAIMEA-KAWAIHAE RD &
 QUEEN KAAHUMANU HWY

EXISTING

SCENARIO 1

NB LEFT	E
RIGHT	A
WB LEFT	A

SCENARIO 2

NB LEFT	E
RIGHT	A
WB LEFT	A

SCENARIO 3

NB LEFT	F
RIGHT	C
WB LEFT	B

SCENARIO 4

NB LEFT	E
RIGHT	A
WB LEFT	A

SCENARIO 5

NB LEFT	F
RIGHT	E
WB LEFT	E

SCENARIO 6

NB LEFT	F
RIGHT	F
WB LEFT	F

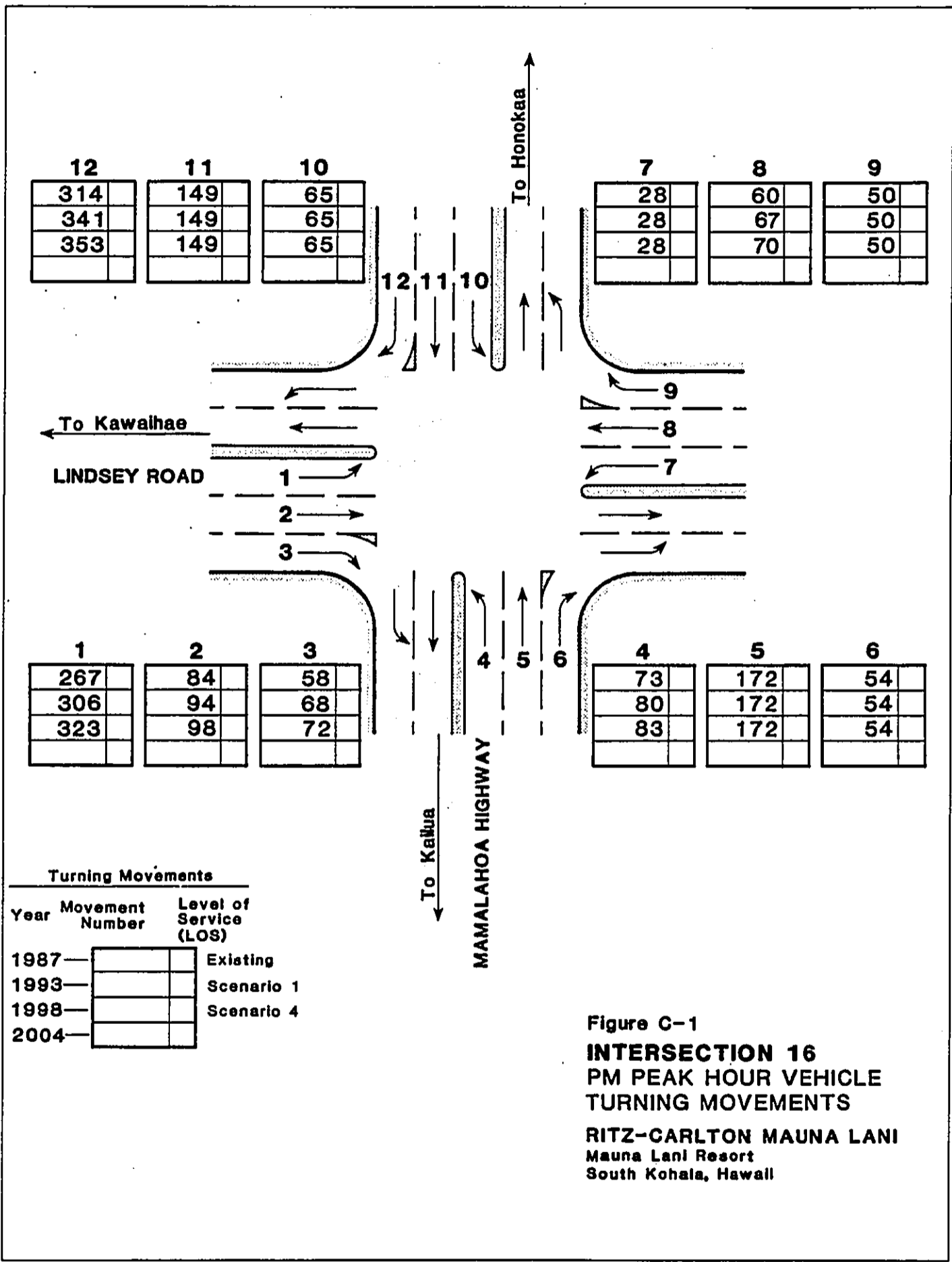


Figure C-1
INTERSECTION 16
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

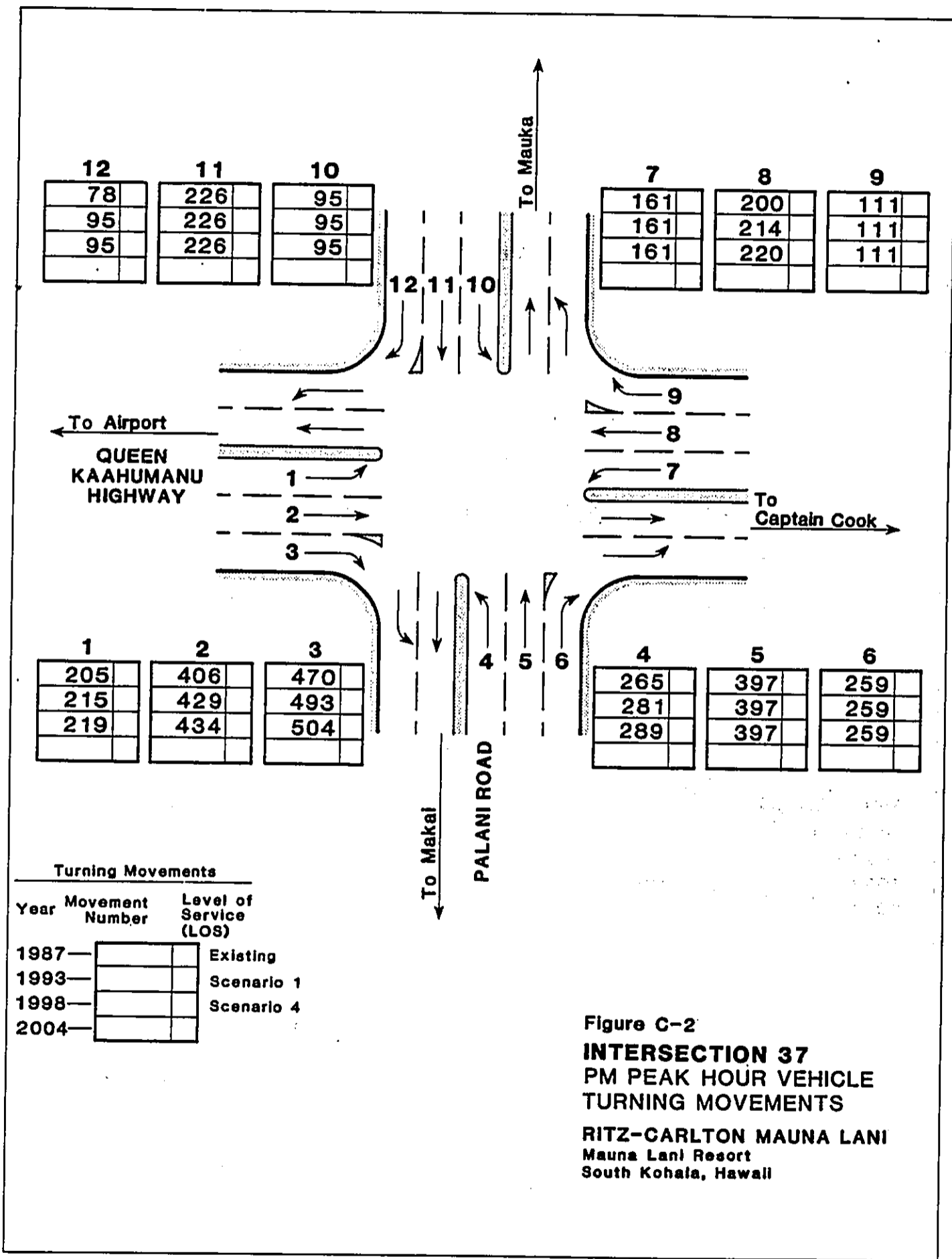


Figure C-2
INTERSECTION 37
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

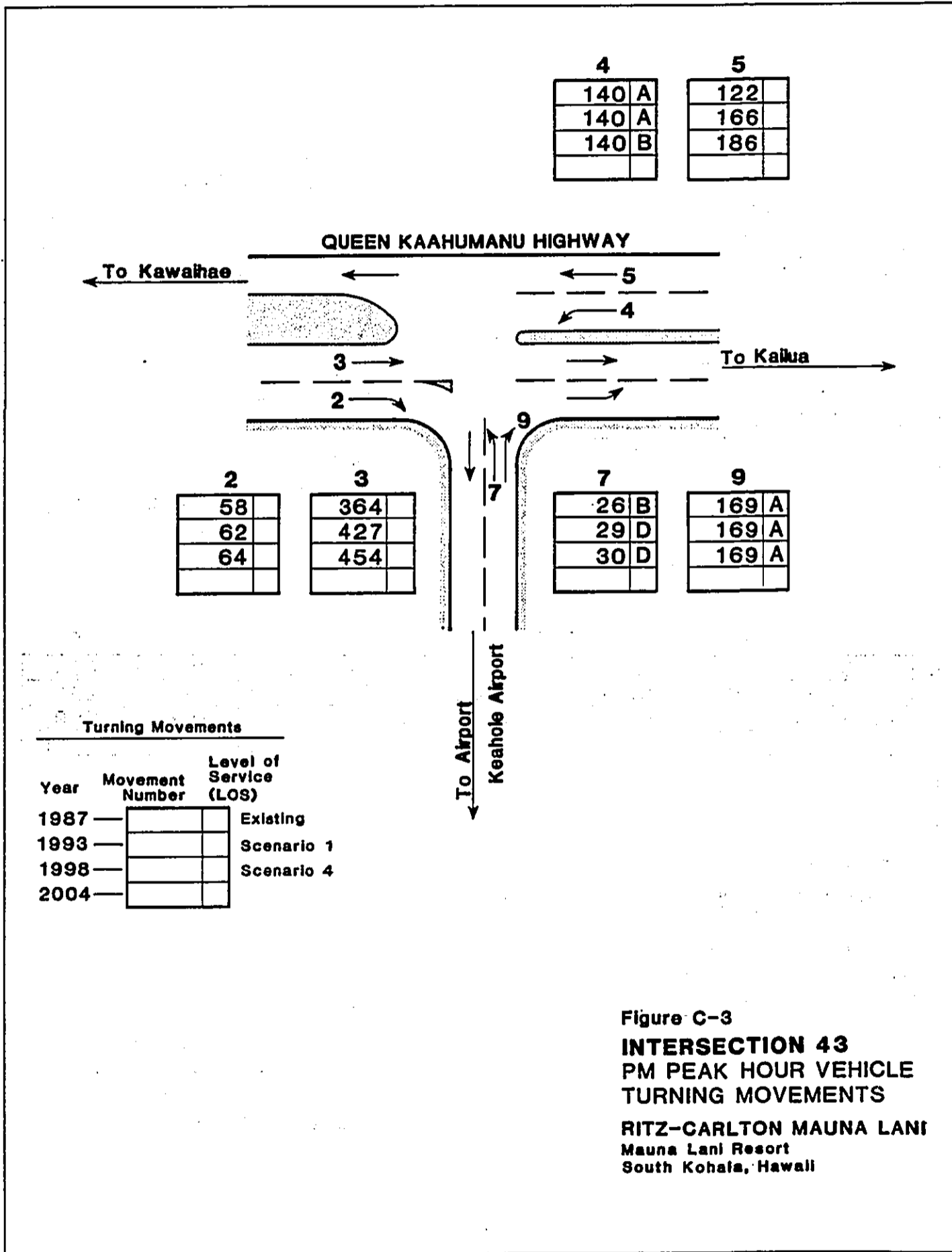


Figure C-3
INTERSECTION 43
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

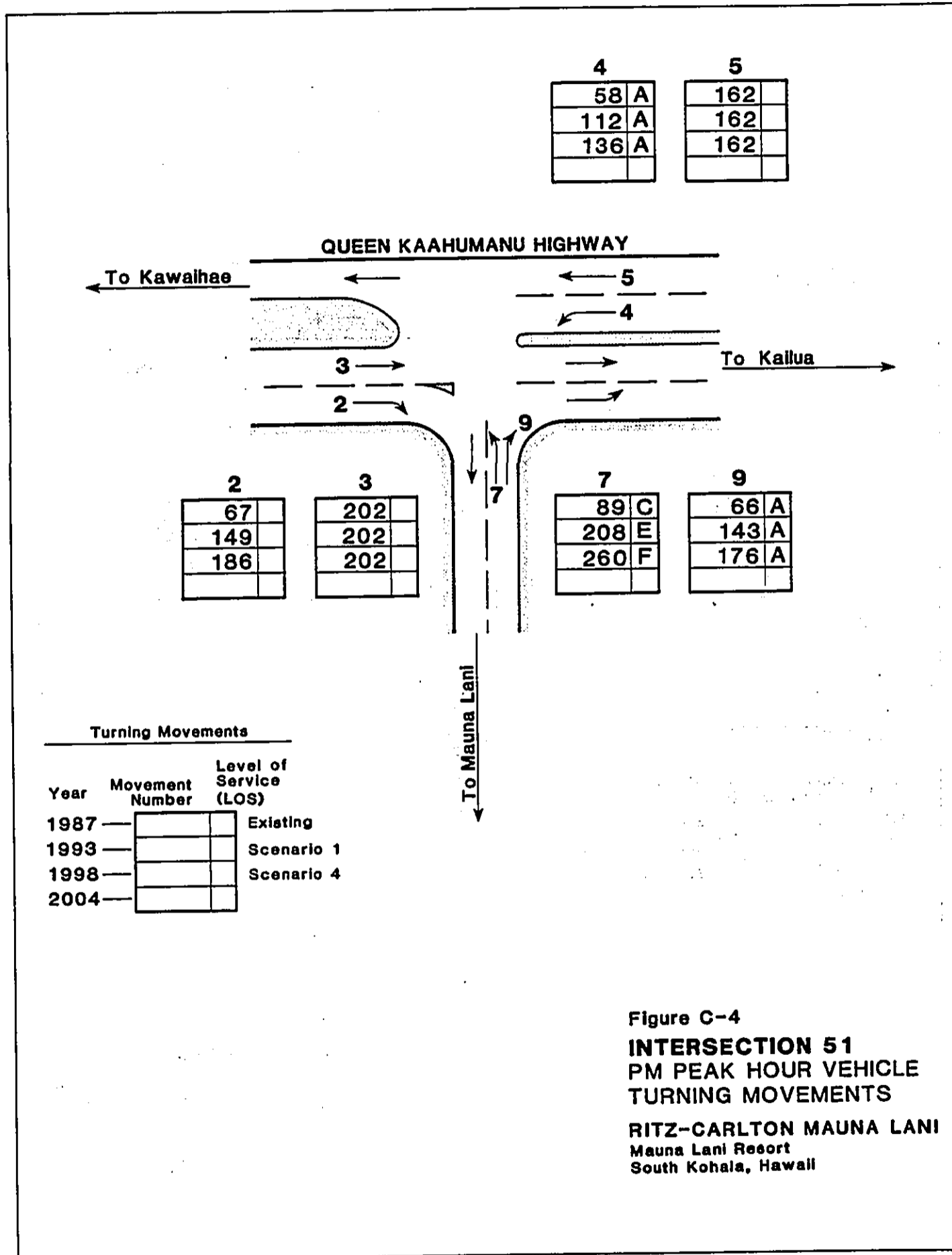


Figure C-4
INTERSECTION 51
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

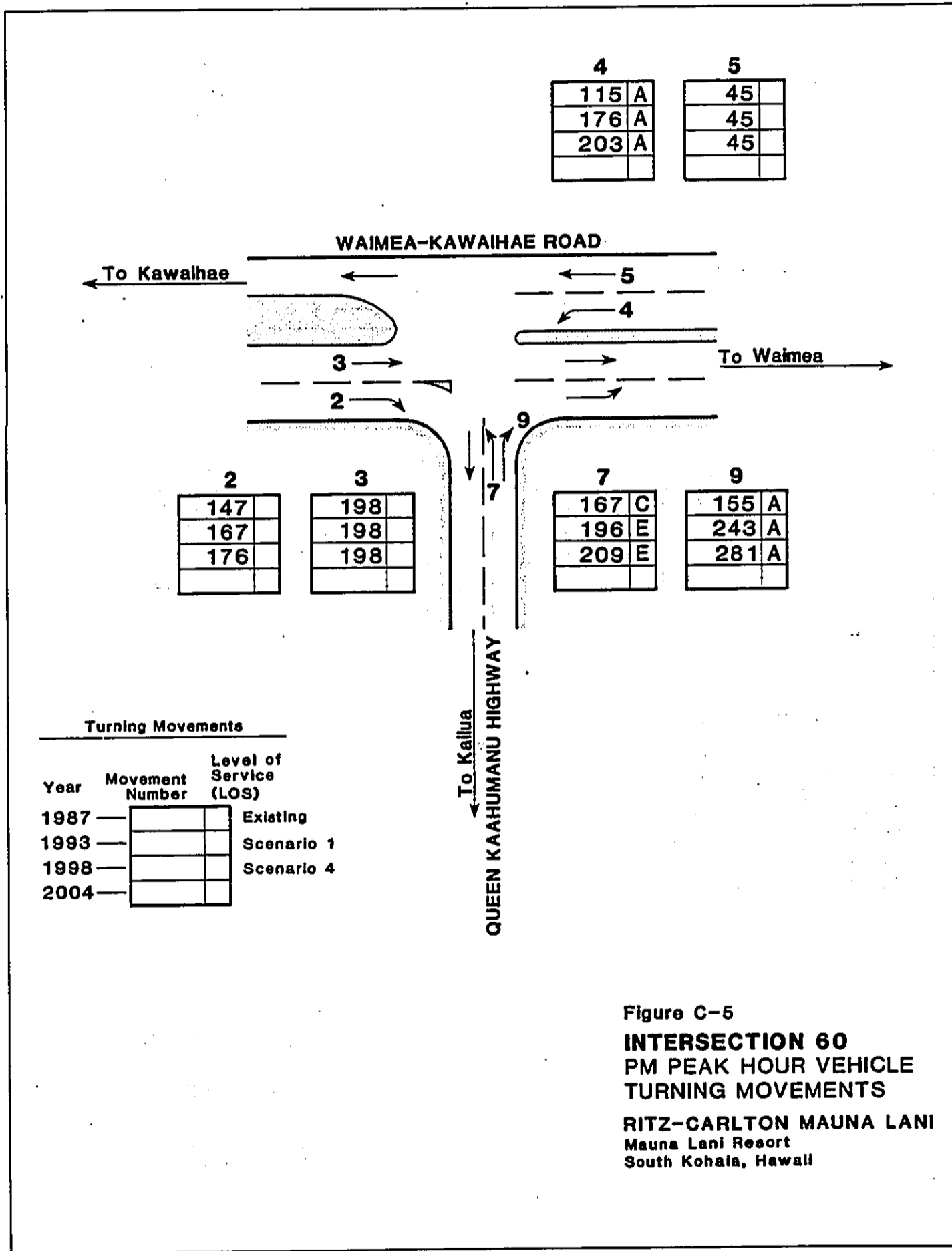


Figure C-5
INTERSECTION 60
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

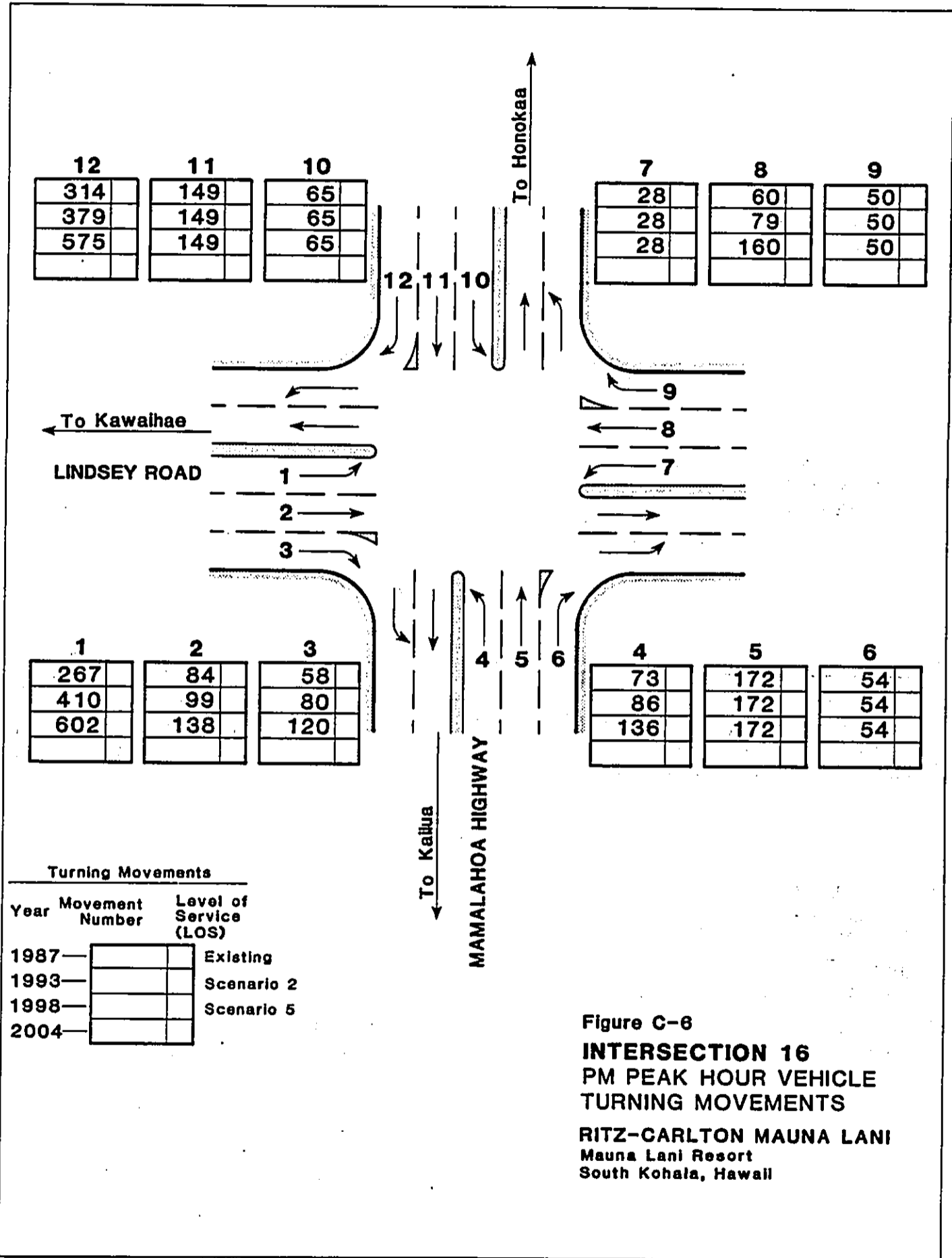


Figure C-6
INTERSECTION 16
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

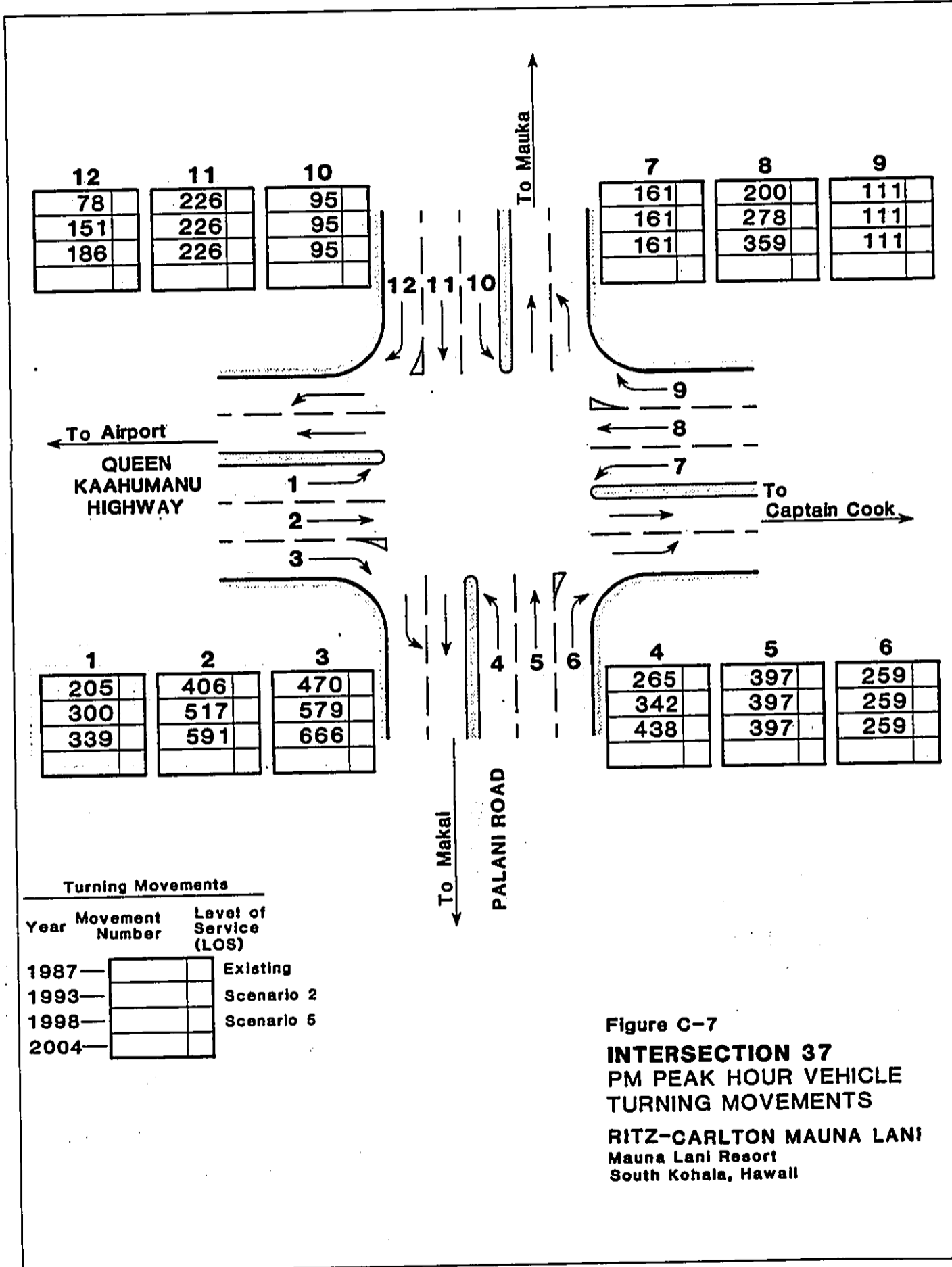


Figure C-7
INTERSECTION 37
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

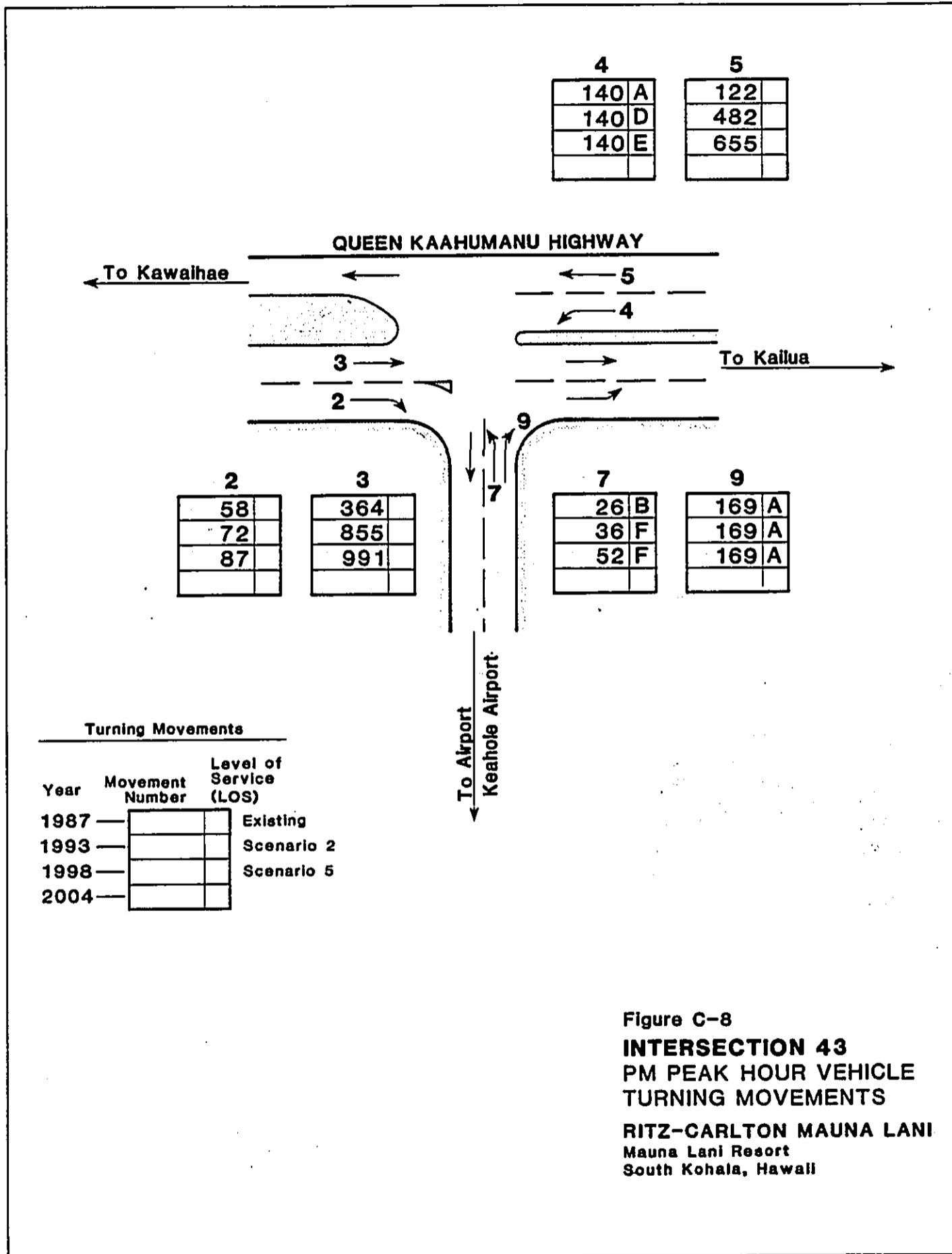


Figure C-8
INTERSECTION 43
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

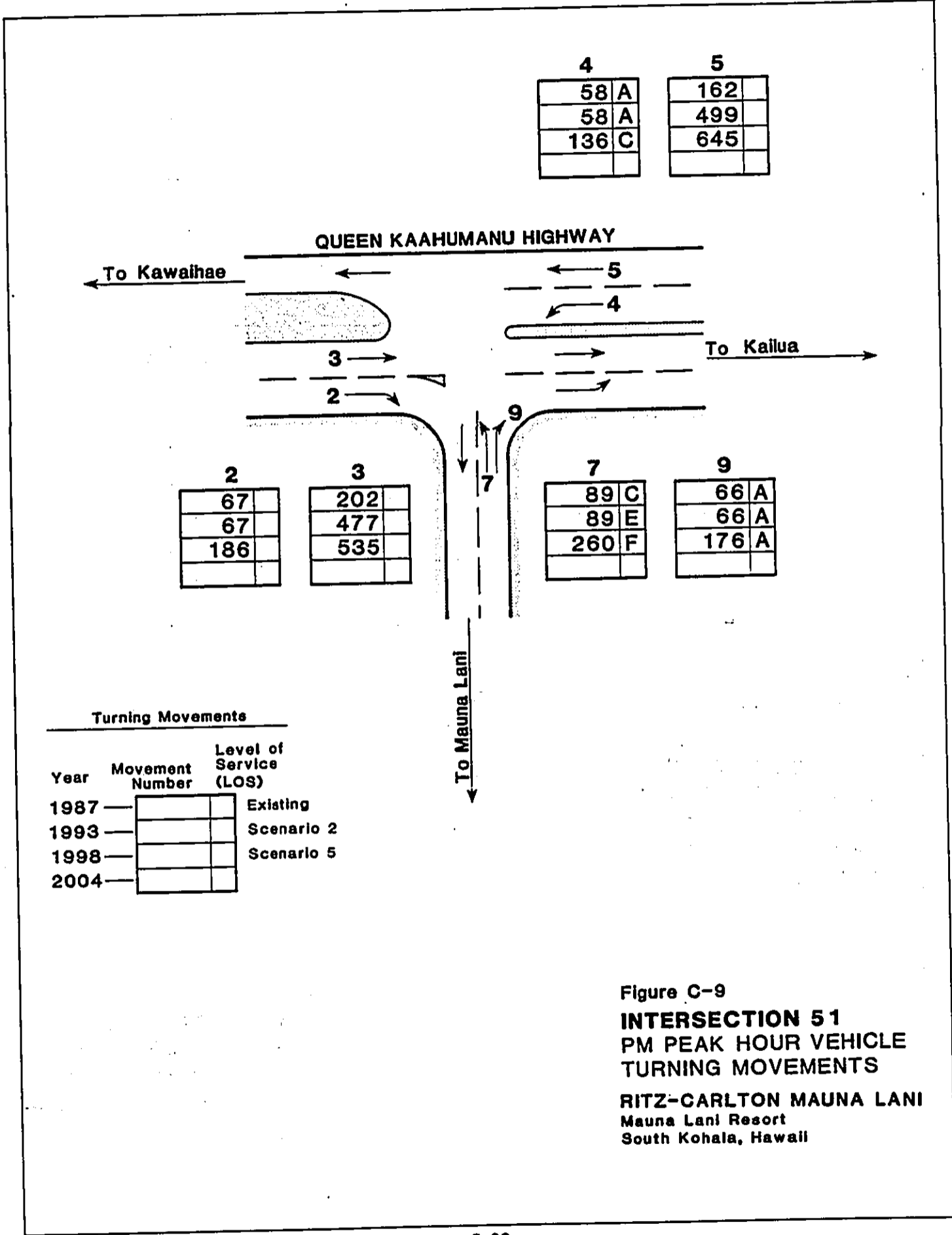


Figure C-9
INTERSECTION 51
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

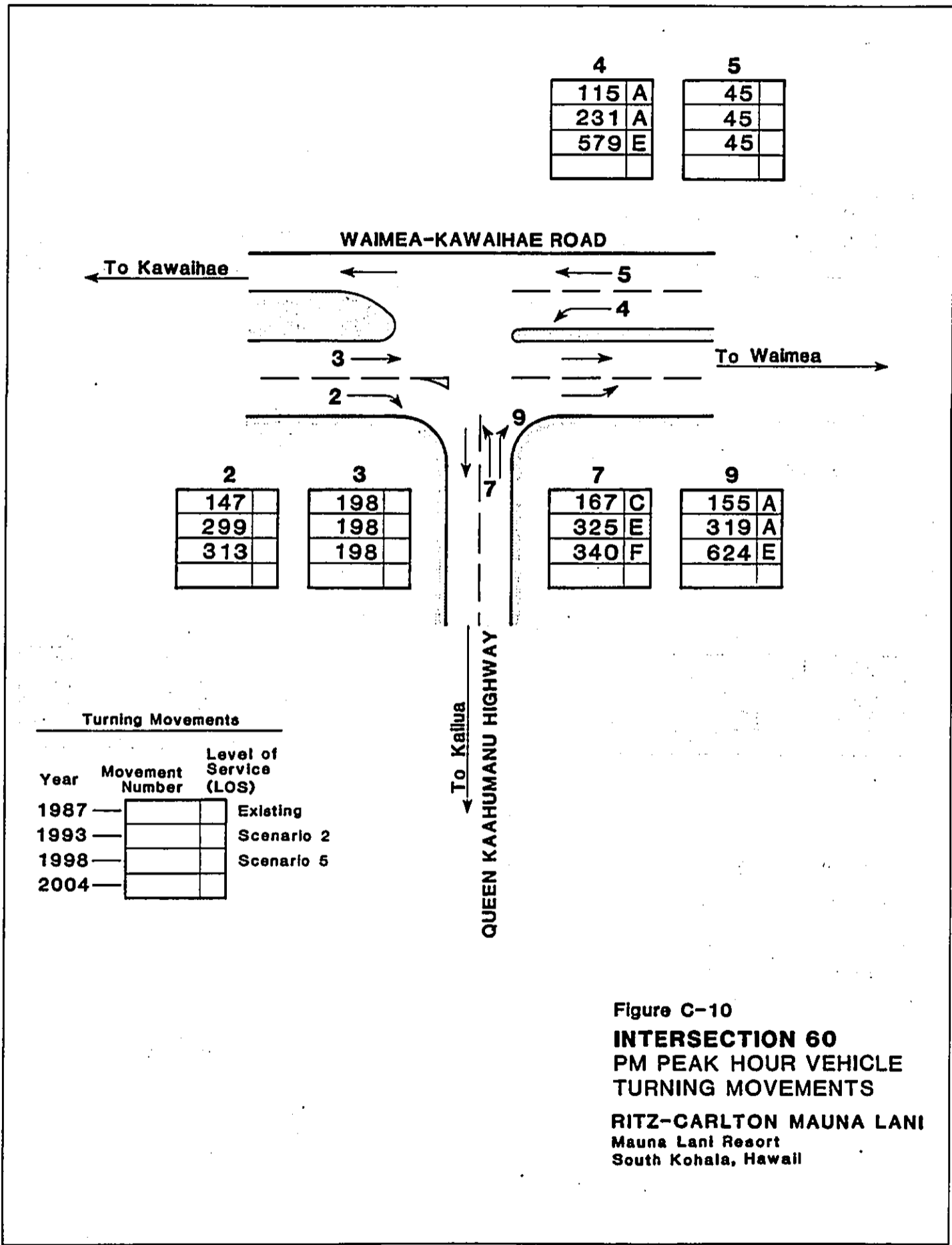
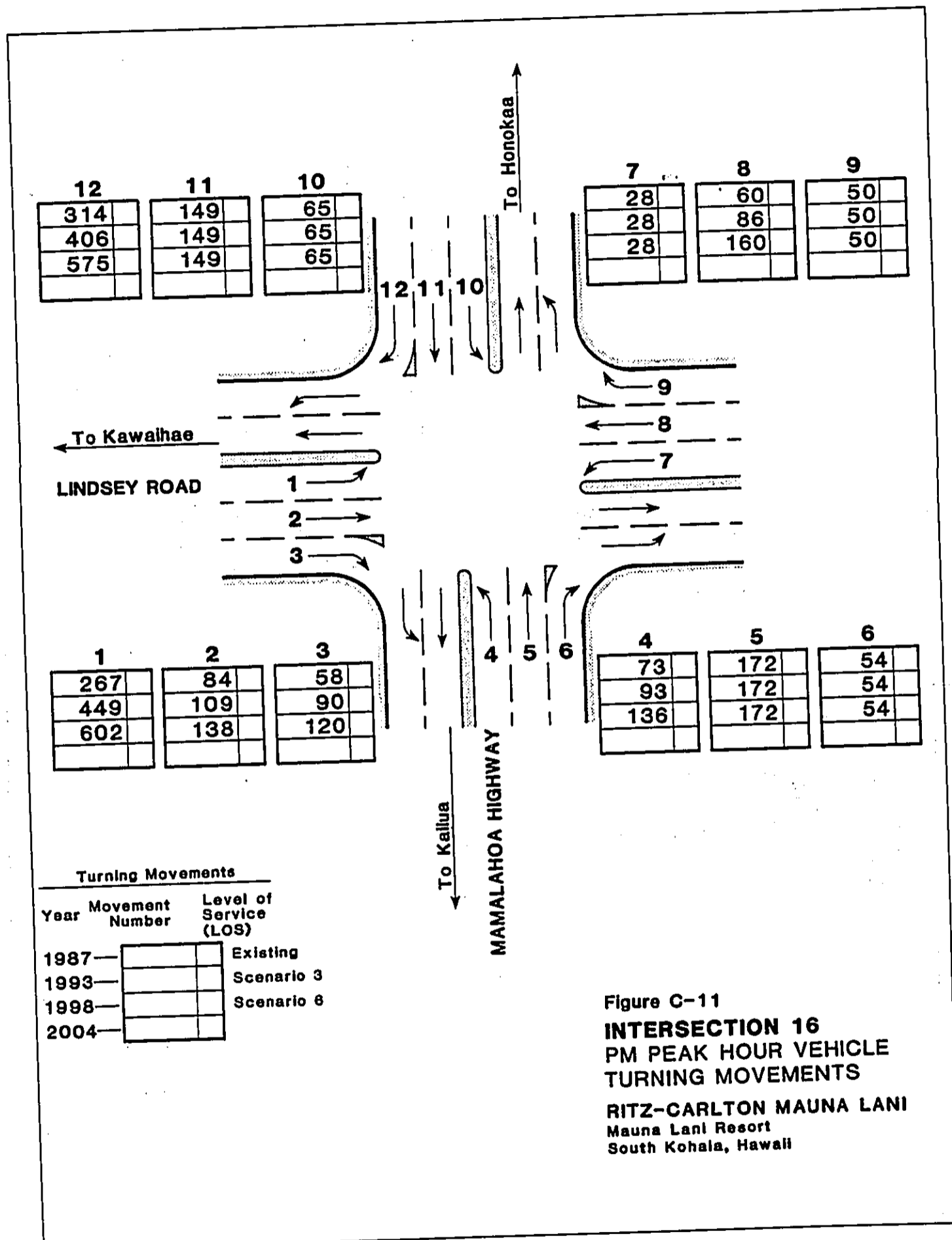
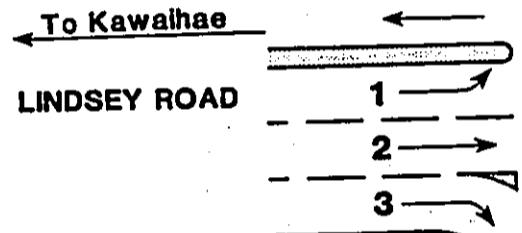


Figure C-10
INTERSECTION 60
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

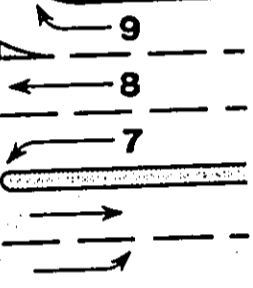
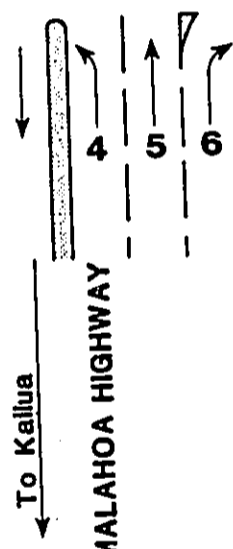


12		11		10	
314		149		65	
406		149		65	
575		149		65	

7		8		9	
28		60		50	
28		86		50	
28		160		50	



1		2		3	
267		84		58	
449		109		90	
602		138		120	



4		5		6	
73		172		54	
93		172		54	
136		172		54	

Turning Movements

Year	Movement Number	Level of Service (LOS)
1987		Existing
1993		Scenario 3
1998		Scenario 6
2004		

Figure C-11
INTERSECTION 16
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

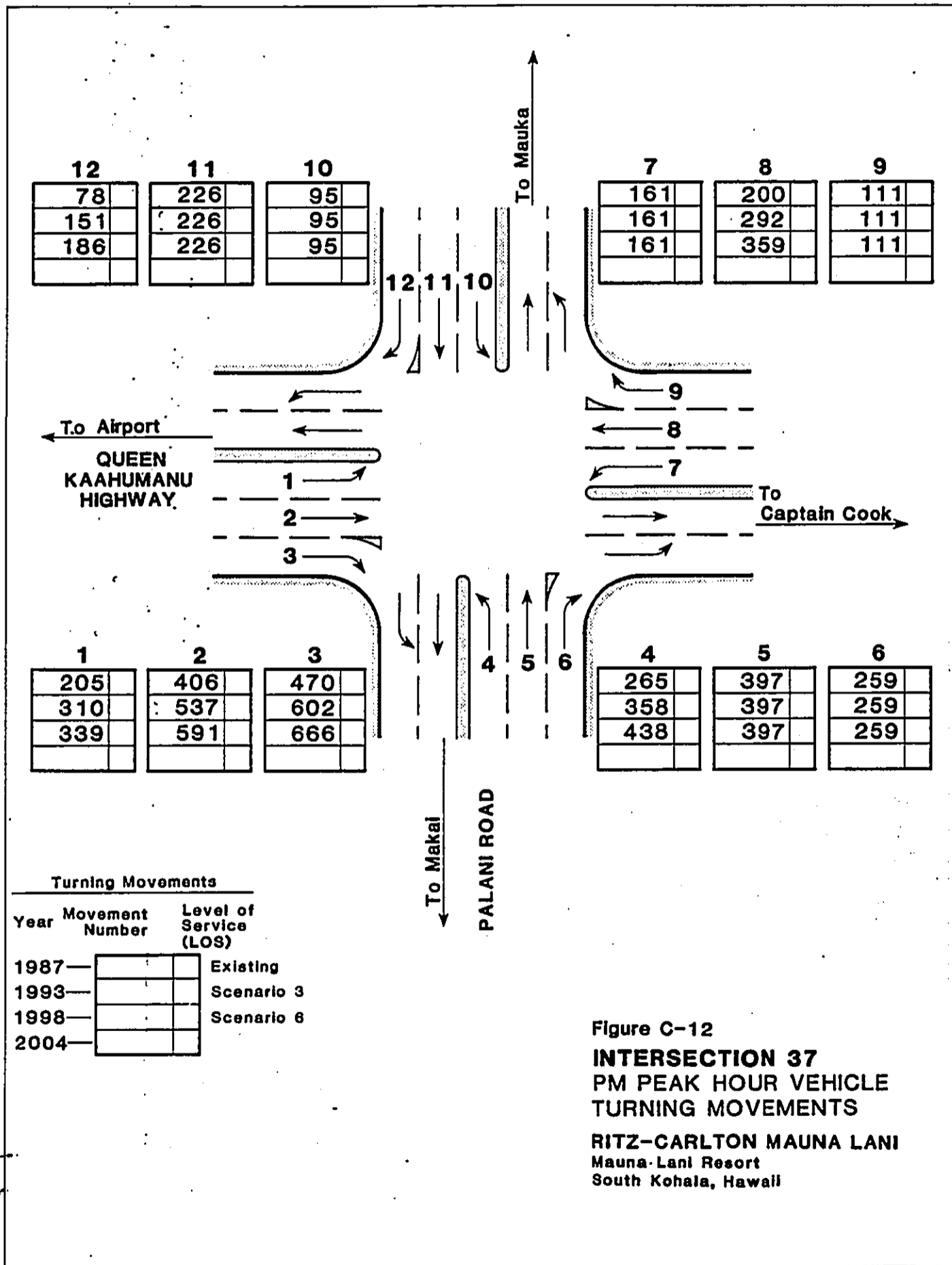


Figure C-12
INTERSECTION 37
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

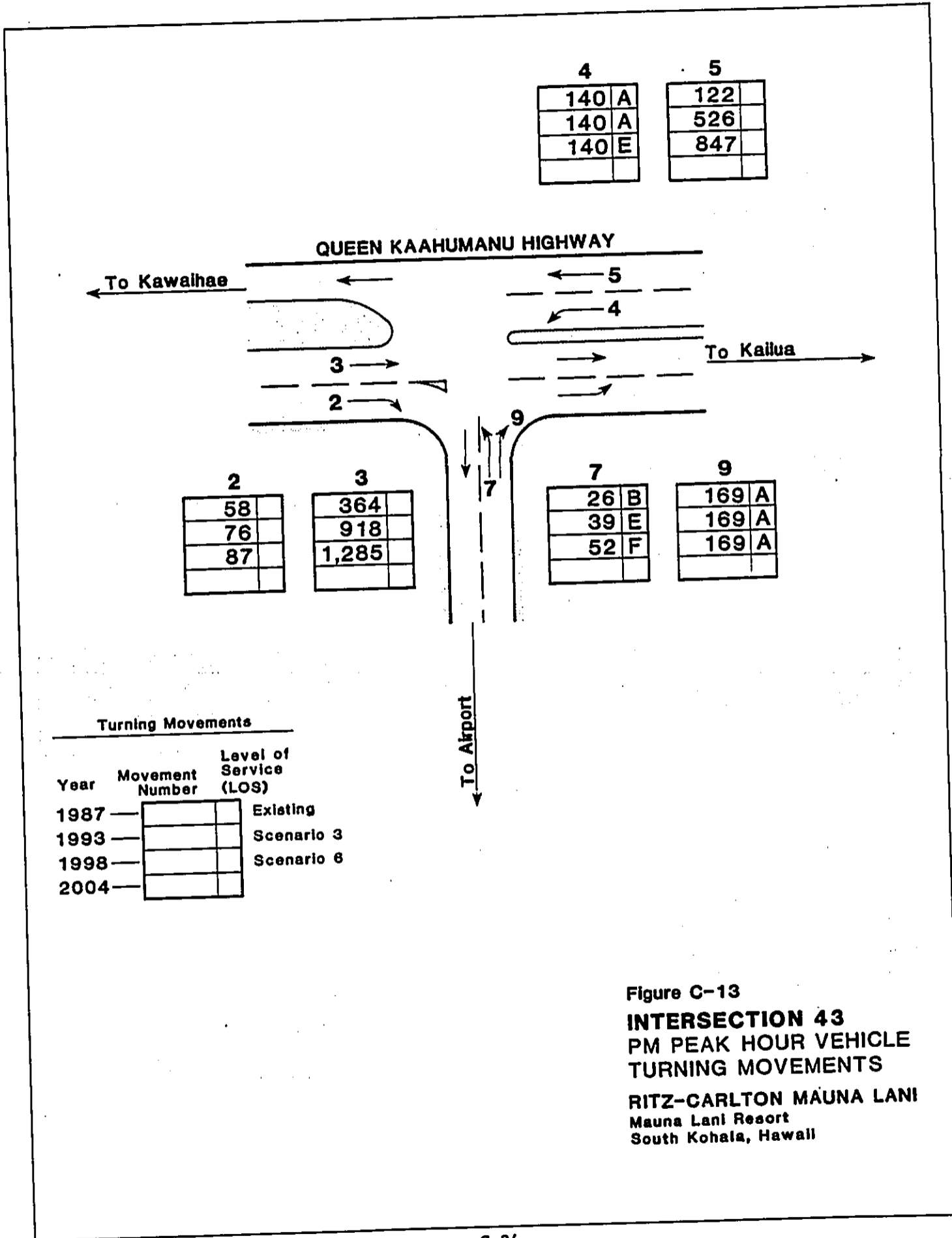
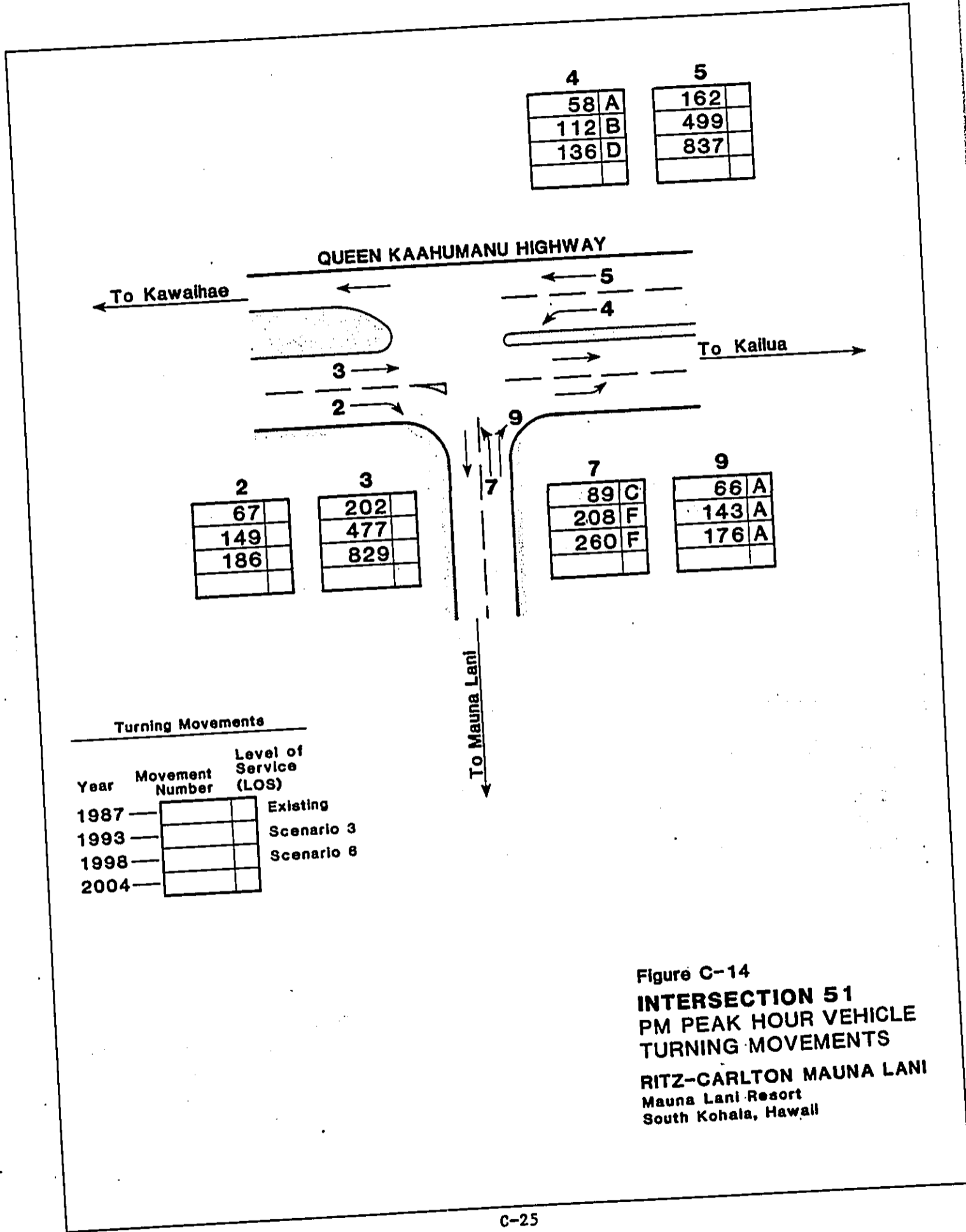


Figure C-13
INTERSECTION 43
PM PEAK HOUR VEHICLE
TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii



4	
58	A
112	B
136	D

5	
162	
499	
837	

2	
67	
149	
186	

3	
202	
477	
829	

7	
89	C
208	F
260	F

9	
66	A
143	A
176	A

Figure C-14
INTERSECTION 51
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

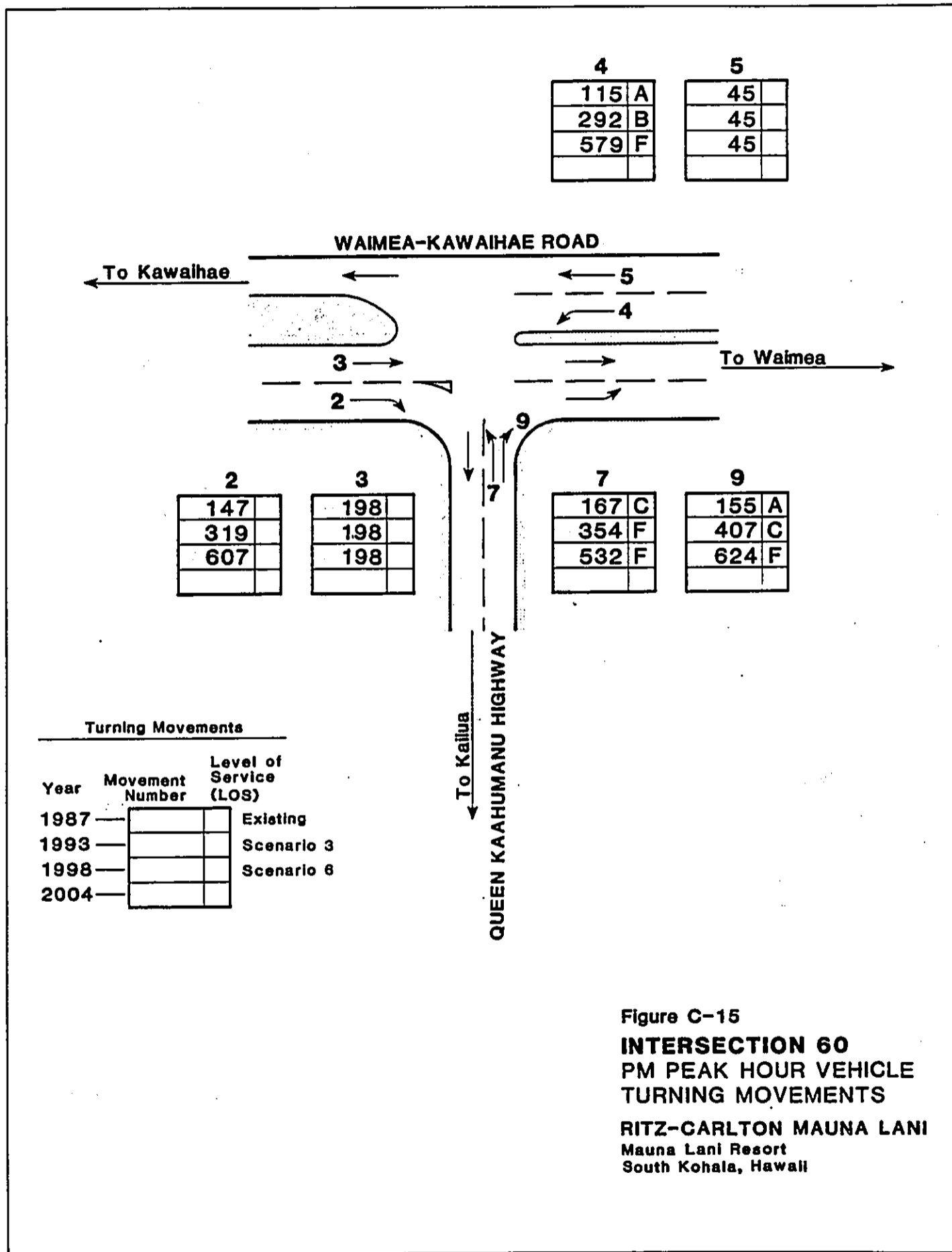


Figure C-15
INTERSECTION 60
 PM PEAK HOUR VEHICLE
 TURNING MOVEMENTS
RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

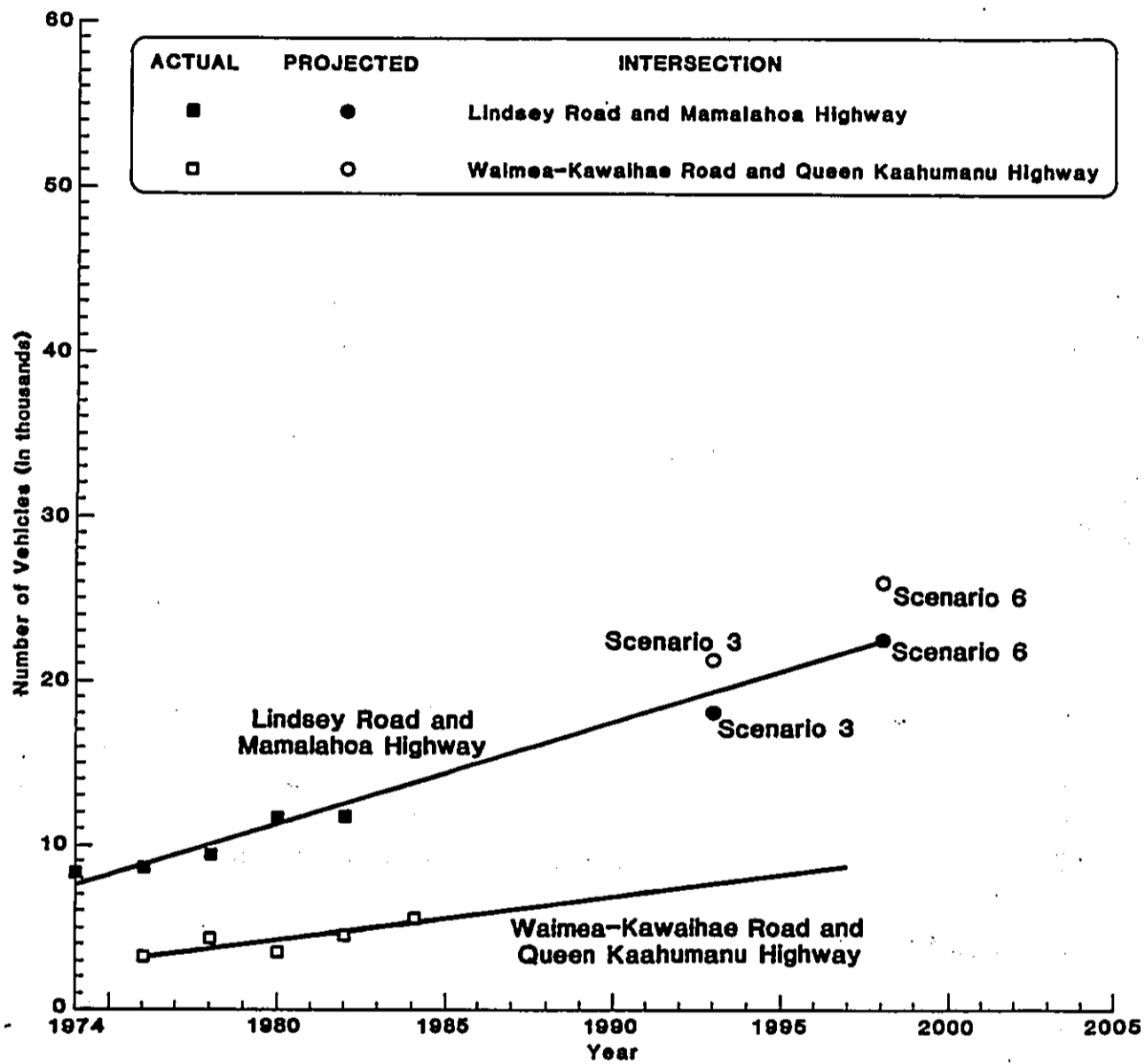


Figure C-16
REGRESSION EQUATIONS AND PROJECTED TRAFFIC: INTERSECTIONS OF LINDSEY ROAD AND MAMALAHOA HIGHWAY AND WAIMEA-KAWAIHAE ROAD AND QUEEN KAAHUMANU HIGHWAY
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii

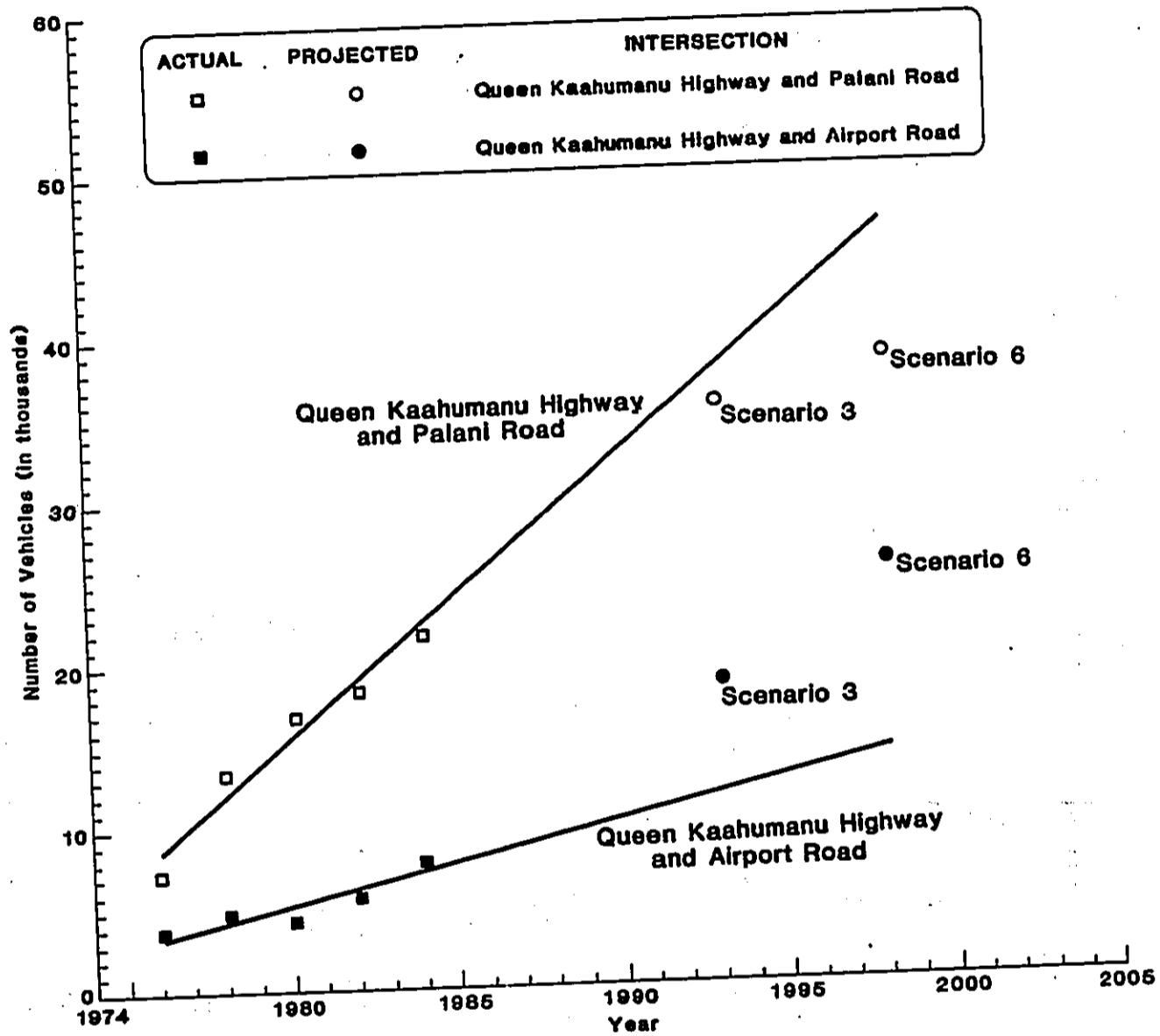


Figure C-17
REGRESSION EQUATIONS AND PROJECTED TRAFFIC: INTERSECTIONS OF QUEEN KAAHUMANU HIGHWAY AND PALANI ROAD AND QUEEN KAAHUMANU HIGHWAY AND AIRPORT ROAD
 RITZ-CARLTON MAUNA LANI
 Mauna Lani Resort
 South Kohala, Hawaii.