

SP88-369 AINAKO RESORT ASSOCIATES AND GROVE FARM PROPERTIES, INC.
(EXHIBITS FILED)

(KAUAI)

SP88-369/AINAKO RESORT ASSOCIATES
and GROVE FARM PROPERTIES, INC.

EXHIBITS FILE

Smead®

No. 1536G

HASTINGS, MN
LOS ANGELES-CHICAGO-LOGAN, OH
MCGREGOR, TX-LOCUST GROVE, GA
U.S.A.

Applicant's Exhibits File
SP88-369

COUNTY OF KAUAI --
PLANNING COMMISSION

Petition No.: _____

Party: APPLICANT

LIST OF EXHIBITS

OBJECTIONS

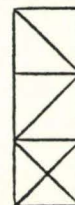
LAND USE COMMISSION
STATE OF HAWAII
Aug 18 3 07 PM '88
CTIONS

[illegible]

Symbols: OBJECTION TO AUTHENTICITY

OBJECTION TO ADMISSIBILITY

OBJECTION TO AUTHENTICITY & ADMISSIBILITY



CASE & LYNCH

ATTORNEYS AT LAW

A PARTNERSHIP INCLUDING LAW CORPORATIONS

1ST NATIONWIDE PLAZA

4334 RICE STREET, SUITE 202

LIHUE, KAUAI, HAWAII 96766-1388

(808) 245-4705

FOUNDED 1888

W. O. SMITH (1848-1929)
C. DUDLEY PRATT (1900-1970)

HONOLULU OFFICE:

SUITE 2600 MAUKA TOWER
GROSVENOR CENTER
737 BISHOP STREET
HONOLULU, HAWAII 96813

POST OFFICE BOX 494

HONOLULU, HAWAII 96809-0494

TELEPHONE: (808) 547-5400

CABLE: LOIO

TELEX: 7238523

TELECOPIER: (808) 523-1920

MAUI OFFICE:

THE KAHULUI BUILDING
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KAHULUI, MAUI, HAWAII 96732-1681
(808) 871-8351

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KONA OFFICE:

KUAKINI TOWER
75-5722 KUAKINI HIGHWAY, SUITE 108
KAILUA-KONA, HAWAII 96740-1733
(808) 329-4421

JUN 13 1988

LETTER OF TRANSMITTAL

June 13, 1988

TO: Mr. Rick Tsuchiya
Planning Department
4280 Rice Street
Lihue, Kauai, Hawaii 96766

RE: Grove Farm Properties, Inc.
Kawailoa Bay Resort/6390-9

Aug 18 3 12 PM '88
LAND USE COMMISSION
STATE OF HAWAII

We are sending you (X) attached () under separate cover the following:

First Amended List of Witnesses

- | | |
|----------------------------|-----------------------------|
| (X) For your information | () For necessary action |
| (X) For your files | () For signature in BLACK |
| () For review and comment | INK and RETURN |
| () For correction | () For signature in BLACK |
| () For distribution | INK and FORWARD TO |
| () Per your request | |
| () Per our agreement | |
| () Per our conversation | () For filing or recording |
| () Approved | () Check enclosed to cover |
| () Approved as noted | filing or recording fee |
| () Disapproved | \$ |
| () For payment | () See remarks below |

REMARKS:

CASE & LYNCH

By *Dennis M. Lombardi*
Dennis M. Lombardi

COUNTY OF KAUAI
PLANNING COMMISSION

Petition No. Special Permit SP-88-6; Use Permit U-88-31; Special Management Area Use Permit FMA(U)-88-10; Class IV Zoning Permit Z-IV-88-39

Party: Ainako Resort Associates

FIRST AMENDED
LIST OF WITNESSES

LAND USE COMMISSION
STATE OF HAWAII
Aug 18 3 12 PM '88
Length
of
Direct

NAME	(List in Order of Appearance)	EXPERTISE	SUBJECT MATTER	Written Testimony	EXHIBITS
Mel Ventura		Developer	Project concept Project overview Scope of undertaking and related topical issues access plans, etc.	On PIM Transcript	Large scale map (A)
Robert Trent Jones, II, or Don Knott		Golf course design	Golf course routing and related matters - design configuration and ecological sensitivity, etc.		Maps-Routing Plan-Photographs (B & C)
Phillip L. Bruner		Biologist Avifauna Ferral Animals	As outlined in	Survey	Survey of of avifauna ferral mammals (J)
Paul H. Rosendahl, Ph.D.		Archaeologist	As outlined in studies and reports	Study Transcript	Archaeological study and plan of protective measures (to be submitted) (E & F)
Steve Dollar		Ocean Expert Marine Biologist	Golf course use impacts on ocean		Possible written report (G)

COUNTY OF KAUAI
PLANNING COMMISSION

Petition No. Special Permit SP-88-6; Use Permit U-88-31; Special Management Area Use Permit FMA(U)-88-10; Class IV Zoning Permit Z-IV-88-39

Party: Ainako Resort Associates

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NAME	(List in Order of Appearance)	EXPERTISE	SUBJECT MATTER	Written Testimony	EXHIBITS	Length of Direct
Char & Associates Winona Char or George K. Linney		Flora Consultants	Flora	Survey	Botanical survey (E)	
Robert E. Yoxall (Inc.)		Demand Consultant	As outlined in Golf Course Demand Study	Study	Golf Course Course Demand Study (I)	
Joe Vierra		Civil Engineer/ Planning Consultant	outlined in appraisals As outlined in Environmental Assessment	Assessment	analysis (K) Environmental Assessment (D)	
David W. Pratt		Developer	Ag/McBryde issues Lease issues Conformance with state and ag plans	Transcript	As required pursuant to subpoenas issued	

POSSIBLE WITNESSES

Pat Cowell Regional	VP Hyatt Hotels	Hyatt Hotel operation courses and policy re golf	No
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COUNTY OF KAHAI
PLANNING COMMISSION

Petition No. Special Permit SP-88-6; Use Permit U-88-31; Special Management
Area Use Permit FMA(U)-88-10; Class IV Zoning Permit Z-IV-88-39

Party: Ainako Resort Associates

FIRST AMENDED
LIST OF WITNESSES

NAME	(List in Order of Appearance)	EXPERTISE	SUBJECT MATTER	Written Testimony	EXHIBITS	Length of Direct
Jim Halstrom		Appraiser MAI	Financing - income protection - as	Appraisal	Appraisals and income	
Malama O'Mahaulepu Custodian of Records			Standing		Requested Records	
Ohana O'Maha'ulepu Custodian of Records			Standing		Requested Records	

REBUTIAL WITNESSES AS REQUIRED

Petition No.: Special Permit SF-88-6; Use Permit U-88-31; Special Management Area Use Permit FMA(U)-88-10; Class IV Zoning Permit 2-IV-88-39

LIST OF EXHIBITS

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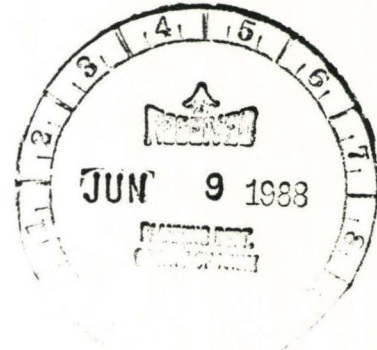
KUAKINI TOWER
75-5722 KUAKINI HIGHWAY, SUITE 108
KAILUA-KONA, HAWAII 96740-1733
(808) 329-4421

LETTER OF TRANSMITTAL

June 9, 1988

TO: Mr. Rick Tsuchiya
Planning Department
4280 Rice Street
Lihue, Kauai, Hawaii 96766

RE: Grove Farm Properties, Inc.
Kawailoa Bay Resort/6390-9



We are sending you (X) attached () under separate cover the following:

A copy of the List of Witnesses and List of Exhibits

- | | |
|----------------------------|---|
| (X) For your information | () For necessary action |
| (X) For your files | () For signature in BLACK INK and RETURN |
| () For review and comment | () For signature in BLACK INK and FORWARD TO |
| () For correction | |
| () For distribution | |
| () Per your request | |
| () Per our agreement | |
| () Per our conversation | () For filing or recording |
| () Approved | () Check enclosed to cover filing or recording fee |
| () Approved as noted | \$ |
| () Disapproved | |
| () For payment | () See remarks below |

REMARKS:

CASE & LYNCH

By Susan M. Lombardi
for Dennis M. Lombardi

Aug 18 3 12 PM '88
LAND USE COMMISSION
STATE OF HAWAII

COUNTY OF KAUAI
PLANNING COMMISSION

Petition No. Special Permit SP-88-6; Use Permit U-88-31; Special Management Area Use Permit FMA(U)-88-10; Class IV Zoning Permit 2-IV-88-39

Party: Ainako Resort Associates

LIST OF WITNESSES

Aug 18 3 12 PM '88
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COUNTY OF KAUAI
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POSSIBLE WITNESSES

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Jim Halstrom	Appraiser MAI	Financing - income protection - as	Appraisal	Appraisals and income	

COUNTY OF KAUAI -

PLANNING COMMISSION

Petition No.: Special Permit SP-88-6; Use Permit U-88-31; Special Management Area Use Permit FMA(U)-88-10; Class IV Zoning Permit 2-IV-88-39

Party: Aínako Resort Associates

LIST OF EXHIBITS

[illegible]

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COUNTY OF KAUAI
PLANNING COMMISSION

Petition No. _____

Party: APPLICANTLIST OF WITNESSESAug 18 3 07 PM '88
LAND USE COMMISSION
STATE OF HAWAII

NAME (List in Order of Appearance)	EXPERTISE	SUBJECT MATTER	Written Testimony	EXHIBITS	Length of Direct
MEL VENTURA	PRESIDENT, AINAKO DEVELOPMENT CORPORATION (HOTEL/GOLF COURSE DEVELOPER)	PROPOSED PLANS FOR AINAKO GOLF COURSE & RESORT		1, C	
STEVEN DOLLAR	CONSULTING OCEANOGRAPHER (CHEMICAL OCEANOGRAPHER)	EFFECTS OF LAND-BASED ACTIVITIES ON THE OCEAN; 6/18/88 MARINE BIOLOGY REPORT TO JOE VIERA OF BELT, COLLINS & ASSOC.		2, 3	
WINONA CHAR	BOTANICAL & ENVIRONMENTAL CONSULTANT	BOTANICAL REPORT IN ENVIRONMENTAL ASSESSMENT FOR AINAKO GOLF COURSE; ENDEMIC & INDIGENOUS PLANT SPECIES IN GOLF COURSE AREA		4	
PAUL ROSENDAHL	ARCHAEOLOGIST	ARCHAEOLOGICAL RECONNAISSANCE SURVEY FOR HYATT REGENCY KAUAI PROPOSED GOLF COURSE PROJECT AREA; RECOMMENDED PRESERVATION MEASURES		5, 6, 7, D	
ROBERT TRENT JONES, JR.	GOLF COURSE ARCHITECT	DESIGN, LAYOUT, & CONFIGURATION OF PROPOSED AINAKO GOLF COURSE		E17-24	
PHILLIP BRUNER	ASST. PROF. OF BIOLOGY @ BYUH; ORNITHOLOGY	AVIFAUNA & FERAL MAMMALS AT GROVE FARM PROPERTIES, POIPU, KAUAI		8, 9, 10	
ROBERT YOXALL	GOLF COURSE DEVELOPMENT	GOLF COURSE DEMAND STUDY FOR HYATT RESORT, POIPU, KAUAI (GROVE FARM)		-	
DAVID PRATT	PRESIDENT, GROVE FARM PROPERTIES; CO-APPLICANT; AGRONOMICS (SUGAR); SUGAR PRODUCTION	AGRICULTURAL PRODUCTIVITY OF GROVE FARM PROPERTIES, POIPU, KAUAI & GROVE FARM'S MASTER PLAN FOR PAA-MAHAULEPU AREA		-	

Party: APPLICANT

[illegible]

CASE & LYNCH

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KUAKINI TOWER

75-5722 KUAKINI HIGHWAY, SUITE 108

KAILUA-KONA, HAWAII 96740-1733

(808) 329-4421

LETTER OF TRANSMITTAL

June 21, 1988

HAND DELIVERED

TO: Stephen Levine, Esq.
4365 Kukui Grove Street
Suite 103
Lihue, Kauai, HI 96766

RE: Kawailoa Golf Course

We are sending you (x) attached () under separate cover the following:

1. Marine Biology Report, dated June 18, 1988, prepared by Steven Dollar, Ph.D., and
2. Recommended Preservation Measures Report, dated June 20, 1988, prepared by Paul H. Rosendahl, Ph.D.

(X) For your information/files

By


Dennis M. Lombardi

dmst

cc: Lorna Nishimitsu
Rick Tsuchiya ✓

APPL.
EXHIBIT 2

MARINE RESEARCH CONSULTANTS

1720-A PA'ULA DRIVE • HONOLULU, HAWAII 96818 • 808-948-7631, 737-0681

EXHIBIT 2

June 18, 1988

Mr. Joe Vierra
Belt, Collins & Assoc.
680 Ala Moana, Suite 200
Honolulu, HI 96813



Dear Joe:

Following our inspection of the proposed Hyatt Regency Kauai golf course site on June 8, 1988 I have prepared an assessment of the potential effects from the golf course on the nearshore marine environment. The overall intent of the assessment is to compare the effects from golf course fertilization/irrigation with the effects from the sugarcane crop that presently occupies the site.

The planned scenario for the Hyatt Regency golf course is to use sewage effluent, treated at the secondary level, for irrigation of the golf course. Such effluent, owing to lack of industrial wastes, consists essentially of carbon, (C), nitrogen (N) and phosphorus (P). Secondary effluent retains a considerable amount of N and P present in raw sewage because secondary treatment processes are not intended to effectively remove these nutrients. Nitrogen and phosphorus are also the primary elements of importance in commercial fertilizer mixes, and are required for optimal plant growth. There is no qualitative difference in N and P that originates from sewage effluent sources or commercial agricultural fertilizers.

The possibility exists that application of fertilizing substances in excess of the uptake capacity of the plant-soil complex will leach to groundwater. Such leachate could cause changes in the chemical properties of nearshore marine waters and associated biotic communities. Typically, such changes are termed "eutrophication", and result when nutrient subsidies enable plant growth to change the balance of indigenous community integrity.

In order to evaluate the magnitude of such effects for both the golf course and sugarcane fields, I have assembled all relevant parameters in Table 1. Sewage effluent concentrations are typical values from secondary treatment plants on Oahu published in existing literature. Sugarcane fertilization rates were provided by Hawaii Sugar Planters Assn. records. Percentage removal of nutrients by various crops are also published in existing literature. It is noted that values of sugarcane fertilization cover a two-year cycle. However, all fertilizer is

applied during the first year of growth. Thus, the rates of sugarcane fertilization in Table 1 can be considered as an annual input on an alternating yearly basis.

Several points emerge when examining the data and calculations in Table 1. First, even when the entire projected capacity of the Hyatt Regency sewage treatment plant (approximately 900,000 liters per day) is used as golf course irrigant, the magnitude of N and P application is still about 5 and 3 times less, respectively, than is used on the present sugarcane crop. It can also be seen that golf course grass is more efficient than sugar cane in the uptake of N; both crops remove essentially all P from percolate reaching groundwater. According to Lau (1975), "Bermuda grass, with periodic cutting and harvesting, proves to be an excellent utilizer of sewage effluent applied nitrogen and, thus, excels sugarcane from the standpoint of groundwater protection. Essentially no nitrogen was recovered from the percolate at the 5-ft. depth below the grassed surface, while nearly 25% of the total nitrogen applied from chemical fertilizers and sewage effluent was recovered at the same depth in the sugarcane culture."

Chang and Young (1977) report 95-98% of N to be taken up by golf course grasses on a course in Kaneohe, Hawaii. Using the most liberal percentage (95%), and the typical uptake percentage cited above for sugar cane (75%) it can be seen in Table 1 that approximately 20 times more N is potentially added to groundwater from the present sugar cane crop than from the planned golf course.

Table 2 shows values of dissolved inorganic N and P collected from 6 sites off the proposed golf course on June 8, 1988. Samples were collected as near as possible to the shoreline in order to show the maximal effect of groundwater input to the nearshore zone, and also at a distance of approximately 10 meters offshore. In addition, a control sample was collected approximately 1 km offshore, beyond the influence of groundwater input.

It can be seen in Table 2 that PO_4^{3-} concentrations show little variation with distance from the shoreline. This result corroborates the supposition that essentially all P is taken up by biochemical and physical processes in the plant/soil zone. On the other hand, all of the nearshore samples show elevated DIN and Si concentrations relative to the open ocean. There is also a definite increase in DIN and Silica (Si) relative to distance from shore at the 1 and 10 meter distances offshore. All samples collected within 1 meter of the shoreline show elevated concentrations relative to the 10 meter samples. Silica, a chemical constituent that exists in high concentration in groundwater, but is not a major component of sewage or fertilizer, shows the greatest increase at the nearshore sites. These increases are undoubtedly a result of groundwater efflux at the shoreline, which is a typical situation on many coastlines of the Hawaiian Islands. It can also be seen that within 10 meters of the shoreline there is a dilution of 60-70% of the shoreline

concentrations. Thus, within a relatively narrow zone physical mixing processes associated with currents, tides and wave motion dilute the increased nutrient input. It can also be seen that when comparing measured values of water quality parameters with State Department of Health standards, that even with the increased nutrient subsidy from groundwater at the land-sea interface, concentrations are within the "not to exceed more than 10% of the time limits".

The relevant point the question at hand is that presently there is no distinguishable negative impacts to water quality with the Hyatt Regency site planted in sugarcane. The calculations shown in Table 1 indicate that the planned golf course will probably contribute substantially less nutrient materials to groundwater flow. Because there is presently no adverse effects, there is no reason to suspect that construction of the golf course will change present conditions for the worse. In fact, if any changes are to occur, they would probably be in the form of lowering nutrient input to the nearshore ocean.

Several other pieces of information also corroborate this conclusion. A study conducted recently by Dollar and Smith (1988) was commissioned to determine the effects to water quality from existing golf courses on the west coast of the Island of Hawaii. Four courses, in operation for 7 to 23 yrs., some using treated sewage effluent for irrigation, were investigated. In all cases, it was demonstrated that as long as the shoreline downstream of the golf course did not contain areas of restricted circulation (enclosed bays) there was no discernible effect to water quality. As the shoreline at the Hyatt Regency is an open coastline, with greater rates of mixing owing to wave and wind forces than occur in West Hawaii, there is no reason to suspect behavior different from results of the Hawaii survey. It may be argued that it is not valid to infer that behavior of golf courses on Kauai will replicate those on Hawaii. However, the younger, and thus simpler, hydrogeological structure of Hawaii results in a more porous aquifer with higher percolation potential than the older, more complex structure of Kauai. Thus, if effects to the marine environment from golf courses are occurring, it is likely that the effects will be more evident on Hawaii than Kauai. In other words, Hawaii represents the most liberal scenario for elucidating impacts.

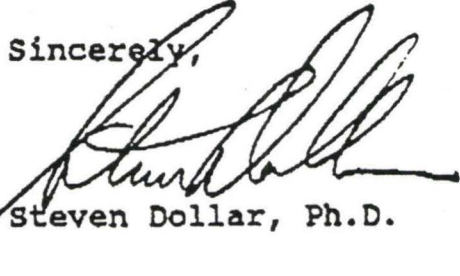
Another relevant finding is reported by Gray, Hong and Assoc. (1979). Dye tracer movement was monitored to determine the potential for treated sewage effluent to reach the shoreline following discharge into injection wells on the Poipu site of the Hyatt Regency. Measurable levels of dye concentration in an observation well indicated that there was a migration in the makai direction, yet monitoring of shoreline stations revealed no dye concentrations above background levels, and hence no violation of water quality standards. As injection wells introduce sewage directly into the water table, there is far greater potential for alteration of water quality than with effluent that is widely dispersed over a golf course, and is largely taken up by biological and physical processes prior to

reaching the water table. Thus, the results of the injection well tests can be interpreted to indicate that there is essentially no potential for increased nutrient concentrations from golf course irrigation.

In summary, it appears unequivocally that the planned scenario of utilizing secondary treated sewage for golf course irrigation/fertilization does not present the possibility for negative alteration of nearshore marine waters. In fact, if any charges occur with this scenario relative to existing conditions of sugarcane planting, it is that less land-derived nutrient material will reach the marine environment.

I think that the above consideration of the questions at hand adequately address all concerns. However, if you have any additional questions, do not hesitate to contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "Steven Dollar", written over a horizontal line.

Steven Dollar, Ph.D.

REFERENCES CITED

- Belt, Collins & Assoc. 1988. Environmental assessment: proposed golf course at the Hyatt Regency Kauai, Poipu, Kauai, Hawaii.
- Chang, S. Y. K. and R. H. F. Young. 1977. An investigation into environmental effects of sewage effluent reuse at the Kaneohe Marine Corps Air Station Klipper golf course. Tech. Mem. Rpt. No. 53. Water Resources Research Center, University of Hawaii.
- Chun, M. J., R. H. F. Young and G. K. Anderson. 1972. Wastewater effluents and surface runoff quality. Tech. Rpt. No. 63. Water Resources Research Center, University of Hawaii.
- Dollar, S. J. and S. V. Smith. 1988. The effects of golf course irrigation and fertilization on nearshore marine water off West Hawaii. In. preparation.
- Gray, Hong & Associates. 1979. Poipu Kai sewage effluent disposal well testing.
- Lau, L. S. 1975. Recycling of sewage effluent by irrigation: a field study on Oahu. Final progress report for August 1971 to June 1975. Tech. Rpt. 94. Water Resources Research Center, University of Hawaii.

TABLE 1. Comparison of fertilization parameters for proposed golf course irrigated with treated sewage effluent and sugar cane crop at Poipu, Kauai.

	Golf Course	Sugar Cane
Acreage	210	190
STP capacity ¹ (10 ⁶ gal/day)	2.5 x 10 ⁵	
Sewage effluent composition ² (mg/L)		
Nitrogen (N)	20	
Phosphorus (P)	15	
Fertilization ^{1,3} (kg/acre/yr)		
Nitrogen	34	Irrigated - 139 Unirrigated- 182
Phosphorus	25	Irrigated -45 Unirrigated-91
Percentage removal ^{4,5} by plants		
Nitrogen	95	75
Phosphorus	100	100
Calculated increase to groundwater (kg/acre/yr)		
Nitrogen	1.7	Irrigated - 40 Unirrigated - 45
Phosphorus	0	0

References:

- ¹ Belt, Collins & Assoc.
- ² Chun et al. 1972
- ³ Hawaii Sugar Planters Assn. Records
- ⁴ Chang and Young, 1977
- ⁵ Lau, 1975

TABLE 2. Dissolved nutrient parameters in the vicinity of the Hyatt Regency Kawai. DOH Water Quality standard values are the "Not to exceed more than 10% of the time" criteria for open coastal waters. Dissolved inorganic nitrogen (DIN) is the sum of $\text{NO}_3 + \text{NO}_2$ and NH_4 . For station locations, see Figure 1.

Station	Distance from shore (m)	PO_4 (μM)	$\text{NO}_3 + \text{NO}_2$ (μM)	NH_4 (μM)	DIN (μM)	Si (μM)
1	1	0.15	1.16	0.15	1.31	5.91
	10	0.11	0.19	0.17	0.36	1.99
2	1	0.12	0.62	0.20	0.82	5.53
	10	0.10	0.16	0.15	0.31	2.00
3	1	0.15	0.86	0.27	1.13	6.30
	10	0.10	0.19	0.17	0.36	1.99
4	1	0.15	0.51	0.22	0.73	4.77
	10	0.10	0.09	0.10	0.19	1.99
5	1	0.14	0.76	0.18	0.94	4.76
	10	0.11	0.16	0.20	0.36	1.80
6	1	0.12	0.62	0.19	0.81	5.43
	10	0.11	0.16	0.20	0.36	1.80
OPEN OCEAN	1000	0.09	0.01	0.05	0.06	0.84
DOH WATER QUALITY STANDARDS			1.00	0.36	1.36	

FIGURE 1. Water sampling station locations off the proposed Hyatt Regency Kauai golf course.

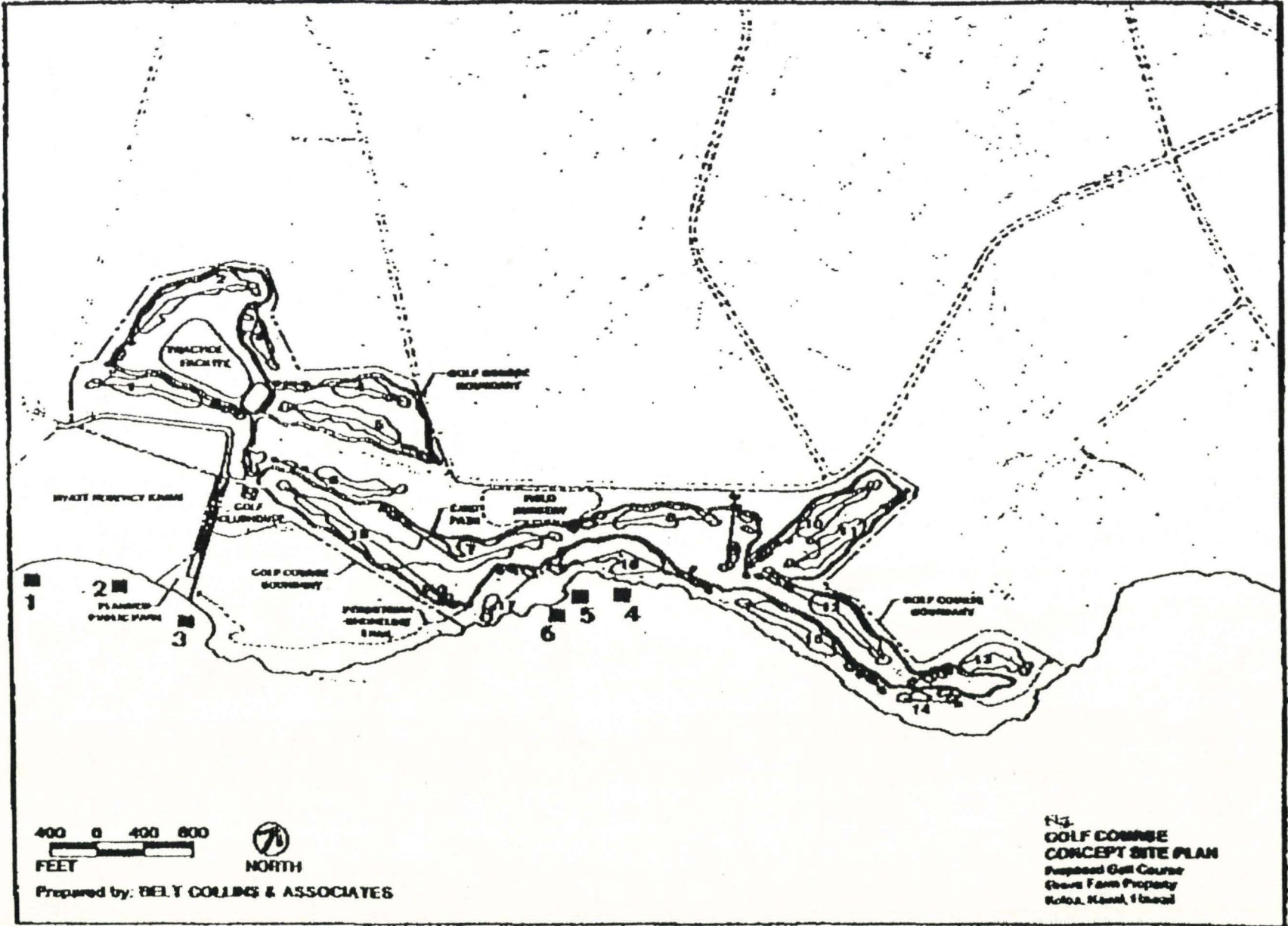


EXHIBIT 3 IN
EVIDENCE

RESUME

Steven J. Dollar

1720-A Paula Dr.
Honolulu, Hawaii 96816
(808) 948-7631



ACADEMIC EXPERIENCE

- B.S. 1971., University of Miami, Coral Gables, Fla. Majors in Biology and Chemistry, Graduated with honors, magna cum laud
- M.S. 1975., University of Hawaii, Honolulu, Hi. Biological Oceanography. Thesis title: Zonation of Reef Corals off the Kona Coast of Hawaii.
- Ph.D. 1986., University of Hawaii, Honolulu, Hi. Dept. of Oceanography, Dissertation title: Response of Benthic Ecosystems to Deep Ocean Sewage Outfalls in Hawaii: Nutrient Cycling at the Sediment-Water Interface.

PROFESSIONAL EXPERIENCE

- 1980 - present PRINCIPAL
MARINE RESEARCH CONSULTANTS
Honolulu, Hawaii
- 1975 - present ASSOCIATE RESEARCHER
Hawaii Institute of Marine Biology &
Department of Oceanography
University of Hawaii, Honolulu, HI

PUBLICATIONS

- Russo, A. R., Dollar, S. J. and E. A. Kay. 1976. An ecological survey of the Mokapu Point sewage treatment plant outfall area. Water Resources Research Center, Univ. of Hawaii. Tech. Rpt. No. 101.
- Kay, E. A., Lau L. S., Stroup, E. D., Dollar, S. J. Fellows, D. P., Young, R. H. F. 1977. Hydrologic and ecological inventory of coastal waters of West Hawaii. Water Resources Research Center, Univ. of Hawaii. Tech. Rpt. No. 105.

- Dollar, S. J. 1978. Guide to research logistics in the Northwestern Hawaiian Islands. University of Hawaii Sea Grant Working Paper No. 33.
- Russo, A. R. Dollar, S. J. and E. A. Kay. 1979. Ecological observations off the Mokapu, Oahu ocean outfall: a post-installation study. Water Resources Research Center, Univ. of Hawaii. Tech Rpt. No. 122.
- Dollar, S. J. 1979. Sand mining in Hawaii - research, restrictions and choices for the future. Sea Grant Technical paper, UNIHI-SEAGRANT-TP-79-01, Univ. of Hawaii.
- Dollar, S. J. 1979. Ecological response to relaxation of sewage stress off Sand Island, Oahu, Hawaii. Water Resources Research Center, Tech. Rpt. No. 124.
- Russo, A. R., Dollar, S. J. and E. A. Kay. 1980. Benthic ecosystem and fish populations off the Mokapu outfall: a second post-installation study. Water Resources Research Center, Univ of Hawaii. Tech Rpt. No. 132.
- Grigg, R. W. and S. J. Dollar, 1980. The status of reef studies in the Hawaiian Archipelago. In: Proceedings of the Symposium on the Status of Resource Investigations in the Northwest Hawaiian Islands. Sea Grant Miscellaneous Report UNIHI-SEAGRANT-MR-80-04, Honolulu, Hawaii.
- Dollar, S. J. and R. W. Grigg. 1981. Impact of a kaolin clay spill on a coral reef in Hawaii. Marine Biology 65:269-276.
- Dollar, S. J. 1982. Wave stress and coral community structure in Hawaii. Coral Reefs 1:71-81.
- Dollar, S. J. 1982. Sand Island, Oahu: Assimilative capacity at a tropical ocean outfall. In: Proceedings, Marine Pollution Sessions OCEANS '82. Washington, D.C.
- Smith, S. V., S. J. Dollar, plus 6 others. 1987. Stoichiometry of C, N, P and Si fluxes in a temperate-climate embayment. Journal of Marine Research 45:427-460.
- Smith, S. V., and S. J. Dollar, 1987. Response of benthic ecosystems to deep ocean outfalls in Hawaii: a nutrient cycling approach to biological impact assessment and monitoring. EPA Report No. EPA/600/3-87/006 ERLN-NX02.
- Grigg, R. W., and S. J. Dollar, 1987. Natural and anthropogenic disturbance on coral reefs. In press.
- Dollar, S. J. Response of the benthic ecosystem to deep ocean sewage outfalls in Hawaii: Comparison of the functional community metabolism approach to community structure analysis as methods for assessing impact. In prep.

Dollar, S. J. The influence of anthropogenic organic loading on benthic nutrient fluxes in an oligotrophic subtropical environment. In prep.

Dollar, S. J. Deep ocean sewage discharge in Hawaii: a case history of effective waste disposal. In prep.

Dollar, S. J. A deep ocean sewage outfall in Hawaii acts as a natural trickling filter. In prep.

PAPERS PRESENTED AT SYMPOSIA

Dollar, S. J. 1980 Ecological response of benthic communities to relaxation of sewage stress off Sand Island, Oahu. Environmental Survey Techniques for Coastal Water Assessment Conference, Honolulu, Hawaii.

Dollar, S. J. 1981. Wave stress and coral community structure in Hawaii. IV International Coral Reef Symposium, Manila, Philippines.

Dollar, S. J. 1982. Sand Island, Oahu - Assimilative capacity at a tropical ocean outfall. OCEANS '82, Washington, D.C.

Dollar, S. J. 1988. Effects of deep ocean sewage discharges on benthic biogeochemical fluxes in Hawaii. Ocean Sciences Meeting, ASLO/AGU, New Orleans, LA.

Smith, S. V., J. T. Hollibaugh, and S. J. Dollar. 1988. Net heterotrophy in Tomales Bay, California. Ocean Sciences Meeting, ASLO/AGU, New Orleans, LA.

ENVIRONMENTAL IMPACT ASSESSMENTS

Grigg, R. W. and S. J. Dollar. 1980. Environmental impact assessment of nearshore marine life at Princeville, Kauai, Hawaii. Prepared for Princeville Development Corp.

Dollar, S. J. 1980. Environmental impact assessment of nearshore marine life at Ninini Point, Kauai, Hawaii. Prepared for Belt, Collins & Assoc.

Dollar, S. J. 1980. Impacts of the nearshore marine community at Mahukona, Island of Hawaii. Prepared for Belt, Collins & Assoc.

Dollar, S. J. 1981. Environmental impact assessment of nearshore marine community structure at Kohala, Hawaii, in the

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vicinity of the Kohala Makai development. Prepared for Belt, Collins and Assoc.

Dollar, S. J. 1983. Preliminary assessment of the marine environment at prospective seawater intake/outfall sites for the solid waste processing and resource recovery facility. Prepared for the City and County of Honolulu.

Dollar, S. J. 1983. Preliminary assessment of the marine environment in the vicinity of Nanuku Inlet, Mauna Lani Resort, South Kohala, Hawaii. Prepared for Mauna Lani Resort, Inc.

Dollar, S. J. 1983. Baseline Assessment of the Marine environment and fishponds at the Mauna Lani Resort, South Kohala, Hawaii. Prepared for Mauna Lani Resort, Inc.

Dollar, S. J. 1984. Marine biological impact assessment for the proposed Ford Island Causeway, Pearl Harbor, Hawaii. Prepared for Belt, Collins and Associates.

Dollar, S. J. 1984. Baseline assessment of the marine environment in the vicinity of the Hapuna Beach Resort, South Kohala, Hawaii. Prepared for Belt, Collins and Associates.

Dollar, S. J. 1984. Baseline assessment of the marine environment at Halepalaoa Landing, Lanai, Hawaii. Prepared for Belt, Collins and Associates.

Dollar, S. J. 1984-present. Marine biological impact assessment of the Hawaii Kai Ocean Sewage Outfall - A continuing monitoring program. Prepared for M & E Pacific.

Dollar, S. J. 1984. Baseline assessment of the marine environment in the vicinity of Makaiwa Bay, Mauna Lani Resort, South Kohala, Hawaii. Prepared for Belt, Collins and Associates.

Dollar, S. J. 1984. Submersible investigations of the deep marine environment in the vicinity of French Frigate Shoals and Necker Island, Northwestern Hawaiian Islands. Prepared for the State of Hawaii, Dept. of Planning and Economic Development, and the U. S. Dept. of Interior Minerals Management Service.

Dollar, S. J. 1985. Environmental assessment of Hilo Bay: Marine biological community structure in the vicinity of the proposed Hilo sewage outfall extension. Prepared for M & E Pacific, Inc.

Dollar, S. J. 1985. Baseline assessment of the offshore marine environment in the vicinity of Kaupulehu Developments, North Kona Hawaii. Prepared for Belt, Collins & Assoc.

- Dollar, S. J. 1986. Effects to the marine ecosystem from beach construction at Makaiwa Bay, Mauna Lani Resort, South Kohala, Hawaii (Phase I). Prepared for Mauna Lani Resorts, Inc.
- Dollar, S. J. 1986. Baseline assessment of the marine environment in the vicinity of the O'oma II Resort Development. Prepared for Helber, Hastert, Van Horn and Kimura, Planners.
- Dollar, S. J. 1986. Baseline assessment of the marine environment and anchialine ponds at Awake'e, North Kona, Hawaii. Prepared for Helber, Hastert, Van Horn and Kimura, Planners.
- Dollar, S. J. 1986. Baseline assessment of the marine environment at Pauoa Bay, South Kohala, Hawaii. Prepared for Belt, Collins & Assoc.
- Dollar, S. J. 1987. Baseline assessment of the water chemistry of the Hilton Hawaiian Village Lagoon, Honolulu, Hawaii. Prepared for Belt, Collins & Assoc.
- Dollar, S. J. 1987. Effects to water quality and marine community structure from beach reconstruction at Makaiwa Bay, Mauna Lani Resort, South Kohala, Hawaii. Prepared for Mauna Lani Resort, Inc.
- Marine Research Consultants. 1987. A second baseline assessment of the marine environment in the vicinity of the South Kohala Resort, South Kohala, Hawaii. Prepared for Belt, Collins & Assoc.
- Marine Research Consultants. 1987. Baseline assessment of the marine and anchialine pond environments in the vicinity of the Hawaiian Riviera Resort, Ka'u, Hawaii. Prepared for Belt, Collins & Assoc.
- Marine Research Consultants. 1987. Marine environmental assessment of cooling water discharge and offshore diffuser construction associated with the addition of Unit 7, Kahe Generating Station, Hawaiian Electric Company. Prepared for Belt, Collins & Assoc.
- Marine Research Consultants, 1987. Baseline assessment of the marine environment at Waiulua Bay, South Kohala, Hawaii. Prepared for Belt, Collins & Assoc.
- Marine Research Consultants, 1988. Marine environmental survey in the vicinity of the Waikane golf course, Oahu, Hawaii. Prepared for Group 70, Planners.
- Marine Research Consultants, 1988. Baseline assessment of the marine environment in the vicinity of the Kohana-iki marina, North Kona, Hawaii. Prepared for Engineering Concepts, Inc.

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Marine Research Consultants, 1988. The effects of golf course irrigation and fertilization on nearshore marine waters off West Hawaii. Prepared for Helber, Hastert and Kimura, Planners.

Marine Research Consultants, ongoing. Marine environmental monitoring for construction of the Ritz-Carlton Mauna Lani Hotel, South Kona, Hawaii. Prepared for Belt, Collins & Associates.

Marine Research Consultants, 1988. Baseline assessment of the marine environment offshore of the Kauai Lagoons golf course, Lihue, Kauai, Hawaii. Prepared for Belt, Collins & Associates.

PROFESSIONAL ORGANIZATIONS

International Society for Reef Studies
American Association for the Advancement of Science
American Society of Limnology and Oceanography
American Geophysical Union

SCHOLARSHIPS

Achievement Rewards for College Scientists (ARCS Foundation Inc.) Scholarship Award, 1983 and 1984.

PERSONAL DATA

Born 6-30-49, Single, excellent health, willing to relocate.
SS# 212-54-0845

ADDITIONAL INFORMATION AND REFERENCES ON REQUEST

WINONA P. Char

4471 Puu Panini Avenue
Honolulu, Hawaii 96816

Telephone: 734-7828



EXHIBIT 4
IN
EVIDENCE

EDUCATION

Master of Science (M.S.) degree in the Botanical Sciences, University of Hawaii, Manoa. December 1983. Area of specialization: Plant taxonomy with special emphasis on the native Hawaiian flora. M.S. thesis topic: "A revision of the Hawaiian species of Sesbania (Leguminosae)."

Bachelor of Arts (B.A.) in the Botanical Sciences, University of Hawaii, Manoa. May 1970.

Graduate of Kaimuki High School. June 1965.

EXPERIENCE

Botanical Consultant - 1976 to present; self-employed.

Field investigation, data analysis, and preparation of findings for the biological section in Environmental Impact Statements (EIS). The scope of work involves: (1) a discussion of rare, threatened or endangered plant species found on the study site; (2) a general description of the major vegetation types found on the study site; (3) an inventory of the flora on the study site; (4) the identification of areas of potential environmental problems or concerns; and (5) a summary of the extant botanical knowledge of the study site.

Natural Area Biologist, SR-21 - July 1985 to June 1986. One year funding. Natural Area Reserves System (NARS), State Department of Land and Natural Resources. Major duties: Plan, develop, and direct native and non-native plant and animal surveys within the reserves system. Evaluate existing and potential impact of non-native species within each reserve. Develop site-specific management programs as well as direct on-site management activity. Supervise a lower-level NARS biologist and, when available, part-time and volunteer workers.

Horticulturist, SR-18 - May 1978 to September 1979. Honolulu Botanic Gardens, City and County Department of Parks and Recreation. Major duties: Program director, Exceptional Trees Program. Working with the City Administration and the City Council in establishing a permanent staff organi-

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zation and Arborist Advisory Committee necessary to fulfill the Exceptional Trees' Law; documentation and identification of the Exceptional Trees designated by the City and County Ordinance; identification of additional trees to the list. End of contract; left to complete M.S. degree program.

INTERESTS

Hiking, fishing native plants, bonsai, photography, trivia collector.

Member of the following organizations:

- Hawaiian Botanical Society. Life membership. Served as Chairman, Science Fair Committee, 1981, 1983. Secretary 1978, 1979. Director 1977. Native Coastal Plants Committee 1986.
- The Nature Conservancy. Sponsor 1986.

Community service:

- The Nature Conservancy. Resource person. Scientific Advisory Committee.
- State Department of Education (DOE). Resource person and lecturer, native plants and island ecosystems.
- Marine Advisory Program, Sea Grant, University of Hawaii. Resource person, strand vegetation.

PERSONAL BACKGROUND

One-quarter Hawaiian, that's why the active interest in native plants and island ecosystems. Single, 5 ft. 5 in. tall, roughly 128 lbs. Born 16 May 1947(a baby boomer). References will be furnished on request.

PUBLICATIONS

- Char, W. P. 1976. Field studies of the Sesbania complex on the island of Hawaii. Pacific Tropical Botanical Garden Bulletin 6(2): 41.
- _____. 1977. Strand vegetation of Hawaii. Hawaii Coastal Zone Newsletter 12(1): 4-6.
- _____. 1981. Strand ecosystems in Hawaii. pp. 3-5. In: R. Tabata, ed. Conserving Hawaii's Coastal Ecosystems. Uni. Hawaii Sea Grant Cooperative Report.
- _____ and N. Balakrishnan. 1979. 'Ewa Plains Botanical Survey. U.S. Fish & Wildlife Serv., Honolulu. 119 pp. + maps.
- _____ and C. H. Lamoureux. 1985. Puna Geothermal Area Biotic Assessment, Puna District, County of Hawaii. Prepared for Hawaii State Dept. of Planning and Economic Development, Honolulu. 126 pp. + maps

August 1982
(with Supplement June 1988)

VITA

EXHIBIT 5

IN
EVIDENCE

PAUL HARMER ROSENDAHL

Born: January 8, 1944; Minneapolis, Minnesota
Social Security Number: 477-46-9169
Marital status: married (1976), to Margaret Louise
Kahiwahiwalani Rosendahl



Education

Diploma: Edina-Morningside High School, Edina, Minnesota, 1962
A.B.: Dartmouth College, 1966 (Anthropology)
Museum Trainee: New York State Museum, Albany, N.Y., 1966
(June-Sept.)
Peace Corps Trainee: Micronesia Program (English teacher),
1966 (Nov.-Dec.)
M.A.: University of Hawaii, 1970 (Anthropology)
Ph.D.: University of Hawaii, 1972 (Anthropology)

Fellowships and Awards

Wenner-Gren Museum Fellowship, 1966 (June-Sept.)
Teaching Assistantship, Department of Anthropology,
University of Hawaii, 1967-1970
National Science Foundation Fellowship, Honorable Mention, 1970
National Science Foundation Traineeship, 1970-1971
National Science Foundation Dissertation Improvement
Grant (GS-3167), 1970-1971

Memberships

Society for American Archaeology
American Anthropological Association (Fellow)
The Polynesian Society (New Zealand)
New Zealand Archaeological Association
Society for Hawaiian Archaeology
Hawaii Island Archaeological Group
Anthropology Club, University of Hawaii at Hilo

Employment -- Present Position

President and Principal Archaeologist, Paul H. Rosendahl, Ph.D.,
Inc. (private archaeological and cultural resource management
consulting firm), 1981-present; Affiliate Professor of
Anthropology, University of Hawaii, 1980-present; and Lecturer
in Anthropology, University of Hawaii at Hilo, 1981-present

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LAND USE COMMISSION
STATE OF HAWAII

Vita
Paul H. Rosendahl

2

Employment -- Previous Positions

Principal Archaeologist and Managing Partner, Archaeological Research Associates (private archaeological and cultural resource management firm), 1980-1981

Lecturer in Anthropology, University of Hawaii at Hilo, 1979-1980 (Sept.-June)

Principal Archaeologist (Hawaii and Pacific Basin), Science Applications, Inc. (LaJolla, CA), 1979 (April-Dec.)

Independent consulting archaeologist, 1978-1981

Archeologist, National Park Service, 1978-1979 (July-Jan.)

Anthropologist (Archaeologist), Bernice P. Bishop Museum, 1973-1978; and Administrator for Contract Archaeology Program, Department of Anthropology, Bernice P. Bishop Museum (concurrent, 1974-1977)

Archeologist, National Park Service, 1976 (July-Sept.)

Archeologist, National Park Service, 1975 (April-June)

Associate Anthropologist (Archaeologist), Bernice P. Bishop Museum, 1971-1972

Research Supervisor, University of Hawaii Archaeological Field School, 1970 (June-Aug.)

Technical Officer in Field Archaeology, University of Hawaii Archaeological Field School, 1969 (June-Aug.)

Field Archaeologist, Bernice P. Bishop Museum, 1968-1971

Assistant Field Director, University of Hawaii Archaeological Field School, 1968 (June-Aug.)

Teaching Assistant, Department of Anthropology, University of Hawaii at Manoa, 1967-1970

Vita
Paul H. Rosendahl

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Field Work -- South Pacific

1971 - Archaeologist, Bishop Museum Expedition to the Southeast Solomon Islands (supported by National Science Foundation Grant GS-2977), research on Anuta Island; also research on Kolombangara Island in the Western Solomon Islands (see Rosendahl 1973a, b, c; 1976g)

Field Work -- Western Pacific

1977 - Director and Archaeologist, Kelton-Bishop Museum Expedition to Eastern Micronesia, survey and test excavations in the Marshall and Eastern Caroline Islands (see Rosendahl 1977d, e; 1979i, o; 1982a; In prep. c)

Vita
Paul H. Rosendahl

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Field Work -- Hawaiian Islands

- 1967 - Assistant, State of Hawaii (Parks Division) survey and excavation in North Kona, Hawaii Island (Fall)
(see Rosendahl 1968a)
- 1967 - Assistant, University of Hawaii excavations at the Mission Houses complex, Honolulu, Oahu Island (Fall)
- 1968 - Assistant Field Director, University of Hawaii excavations at Lapakahi, North Kohala, Hawaii Island (June-Aug.)
- 1968 - Field Supervisor, State of Hawaii (Parks Division) excavations at Iolani Palace Barracks, Honolulu, Oahu Island (Sept.)
- 1968 - Director, U. S. Land Co. survey at Anaehoomalu, South Kohala, Hawaii Island (Oct.) (see Rosendahl 1968b)
- 1968-69 - Field Supervisor, Bishop Museum excavations at Makaha Valley, Waianae, Oahu Island (Fall-Spring)
- 1968-69 - Director, Bishop Museum survey and excavations at Ouli, South Kohala, Hawaii Island (Dec.-Jan.) (see Rosendahl 1969a)
- 1969 - Technical Officer (Research Supervisor), University of Hawaii survey and excavations in upland Lapakahi, North Kohala, Hawaii Island (June-Aug.) (see Rosendahl 1971a, c; 1972b, g; 1982b; In prep. a, b)
- 1969 - Director, Bishop Museum excavation at Heeia, Oahu Island (Oct.) (see Rosendahl 1969b)
- 1970 - Director, excavation on University of Hawaii campus, Honolulu, Oahu Island (Feb.)
- 1970 - Participant, inter-disciplinary investigation of prehistoric agricultural systems in upper Makaha Valley, Waianae, Oahu Island, directed by D. E. Yen for Bishop Museum (Jan.-May) (see Rosendahl 1972a)
- 1970 - Research Supervisor, University of Hawaii excavations in upland Lapakahi, North Kohala, Hawaii Island (June-Aug.) (see Rosendahl 1971a, c; 1972b, g; 1982b; In prep. a, b)
- 1970 - Director, survey mapping and excavations in Halawa Valley, Molokai Island, as part of Bishop Museum-University of Hawaii Halawa Valley Project (Aug.-Sept.) (see Rosendahl 1975a, b)
- 1970 - Director, survey mapping in upland Lapakahi, North Kohala, Hawaii Island (Sept.) (see Rosendahl 1971a, c; 1972b, g; 1982b; In prep. a, b)

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Vita
Paul H. Rosendahl

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- 1971 - Field Supervisor, Bishop Museum survey at Pualaa, Puna, Hawaii Island (Jan.)
- 1971 - Director, Bishop Museum excavations at Iolani Palace, Honolulu, Oahu Island (July) (see Rosendahl 1971b)
- 1971 - Director, Bishop Museum excavations in coastal South Kohala, Hawaii Island (Aug.) (see Rosendahl 1972c)
- 1972 - Director, Bishop Museum excavations in coastal North Kona, Hawaii Island (Aug.) (see Rosendahl 1973d)
- 1972 - Director, Bishop Museum survey at Keahuolu, North Kona, Hawaii Island (Sept.) (see Rosendahl 1972d)
- 1972 - Director, Bishop Museum excavation at Kahaluu, North Kona, Hawaii Island (Sept.) (see Rosendahl 1973e)
- 1972 - Director, Bishop Museum survey at Lalamilo, South Kohala, Hawaii Island (Oct.) (see Rosendahl 1972e)
- 1972 - Director, Bishop Museum survey at Lanihau 1st, North Kona, Hawaii Island (Oct.) (see Rosendahl 1972f)
- 1973 - Assistant, Bishop Museum survey mapping at Punaluu, Kau, Hawaii Island (Jan.)
- 1973 - Director, Bishop Museum survey and excavation at Waianae-kai, Waianae, Oahu Island (May)
- 1973 - Director, Bishop Museum survey in Kaluanui Valley, Oahu Island (June) (see Rosendahl 1973g)
- 1973 - Director, Bishop Museum survey at Russian Fort Alexander, Hanalei, Kauai (Aug.) (see Rosendahl 1973f)
- 1973-74 - Consultant Archaeologist (Bishop Museum) to State of Hawaii (Parks Division), Lapakahi State Historical Park Project, Lapakahi, North Kohala, Hawaii Island (Aug. 1973-Sept. 1974) (see Rosendahl 1973h; 1974a, b, c, d, e, f)
- 1973 - Director, Bishop Museum survey and excavations at Kaumalumu-kai, North Kona, Hawaii Island (Dec.) (see Rosendahl 1974h)
- 1974 - Director, Bishop Museum survey at Kahalui 2nd, North Kona, Hawaii Island (March) (see Rosendahl 1974g)
- 1974 - Director, Bishop Museum survey at Kukuipahu, North Kohala, Hawaii Island (June) (see Rosendahl 1974i)
- 1974 - Director, Bishop Museum surveys at Haleakala National Park, Maui Island (Nov.-Dec.) (see Rosendahl 1975d, e)

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Vita

Paul H. Rosendahl

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- 1975 - Director, Bishop Museum survey at Keauhou, North Kona, Hawaii Island (Jan.) (see Rosendahl 1975c)
- 1975 - Director, National Park Service survey mapping at Kipahulu, Maui Island (Kipahulu District-Haleakala National Park) (April-July) (see Rosendahl 1976a)
- 1975 - Director, Bishop Museum survey and excavations in upland Kaneohe, Oahu Island (July-Oct.) (see Rosendahl 1975f; 1976b, c, d, e)
- 1975 - Co-director, Bishop Museum survey at Ke-Ahole Point, North Kona, Hawaii Island (Oct.) (see Rosendahl 1975g)
- 1976 - Director, Bishop Museum survey at Ke-Ahole Point, North Kona, Hawaii Island (May) (see Rosendahl 1976f)
- 1976 - Director, National Park Service survey mapping and List of Classified Structures (LCS) evaluations at Kalapana, Puna, Hawaii Island (Kalapana Extension-Hawaii Volcanoes National Park) (July-Sept.) (see Rosendahl 1977a)
- 1976 - Director, National Park Service salvage inspection and monitoring at Kipahulu, Maui (Kipahulu District-Haleakala National Park) (Sept.)
- 1976-77 - Director, Bishop Museum archaeological site inventory and evaluation survey of all U. S. Army lands in Hawaii (USASCH Inventory Project) (Oct.-March) (see Rosendahl 1977b)
- 1977 - Director, Bishop Museum survey at Haleakala National Park, Maui Island (Aug.) (see Rosendahl 1977c)
- 1978 - Director, National Park Service excavations and stabilization at the John Young Homestead Complex, Puukohola Heiau National Historic Site, Kawaihae, South Kohala, Hawaii Island (July-Dec.) (see Rosendahl 1979a)
- 1978 - Director, independent survey at Kailua-Kona, North Kona, Hawaii Island (Nov.) (see Rosendahl 1978a)
- 1978 - Director, independent survey and excavations at Ke-Ahole Point, North Kona, Hawaii Island (Dec.) (see Rosendahl 1978b; 1980b)
- 1978 - Director, independent survey at Holualoa 1st, North Kona, Hawaii Island (Dec.) (see Rosendahl 1978c)
- 1978 - Director, independent survey at Holualoa 2nd, North Kona, Hawaii Island (Dec.) (see Rosendahl 1978d)

Vita

Paul H. Rosendahl

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- 1979 - Director, independent survey at Holualoa 4th, North Kona, Hawaii Island (March) (see Rosendahl 1979b)
- 1979 - Director, independent survey at Auhauekeae 1st and 2nd, North Kona, Hawaii Island (March-April) (see Rosendahl 1979c)
- 1979 - Director, independent survey at Holualoa 1st, 2nd, and 3rd, North Kona, Hawaii Island (March-April) (see Rosendahl 1979d)
- 1979 - Director, independent survey at Kapua, South Kona, Hawaii Island (April) (see Rosendahl 1979e)
- 1979 - Principal Investigator, Science Applications survey at Holualoa 1st, 2nd, and 3rd, North Kona, Hawaii Island (April) (see Rosendahl 1979r)
- 1979 - Director, independent survey at Keopu 1st, North Kona, Hawaii Island (April) (see Rosendahl 1979f)
- 1979 - Director, independent survey at Lanihau 1st and 2nd, North Kona, Hawaii Island (April) (see Rosendahl 1979g)
- 1979 - Director, independent survey at Keauhou, North Kona, Hawaii Island (May) (see Rosendahl 1979h)
- 1979 - Principal Investigator, Science Applications survey at Keauhou, North Kona, Hawaii Island (June) (see Rosendahl 1979s)
- 1979 - Principal Investigator, Science Applications survey at Kailua-Kona, North Kona, Hawaii Island (June) (see Rosendahl 1979t)
- 1979 - Director, independent survey at Lanihau, North Kona, Hawaii Island (May-June) (see Rosendahl 1979j)
- 1979 - Director, independent survey at Keahuolu, North Kona, Hawaii Island (June-July) (see Rosendahl 1979k)
- 1979 - Director, independent site evaluations project at Auhauekeae 1st and 2nd, North Kona, Hawaii Island (June-Aug.) (see Rosendahl 1979l)
- 1979 - Director, independent site evaluations project at Honokohau, North Kona, Hawaii Island (Aug.) (see Rosendahl 1979m)
- 1979 - Director, independent survey at Holualoa 1st, North Kona, Hawaii Island (Aug.) (see Rosendahl 1979n)

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Paul H. Rosendahl

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- 1979 - Director, independent survey at Ke-Ahole Point, North Kona, Hawaii Island (Aug.) (see Rosendahl 1979p)
- 1979 - Principal Investigator, independent survey at Keauhou 1st, North Kona, Hawaii Island (Oct.) (see Rosendahl 1979q)
- 1979 - Principal Investigator, independent survey at Holualoa 1st, North Kona, Hawaii Island (Nov.) (see Rosendahl 1979u)
- 1979 - Principal Investigator, independent survey of Molokai Airport site, Molokai Island (Dec.) (see Rosendahl 1980s)
- 1979 - Director, independent field inspection and marking of sites at Keauhou, North Kona, Hawaii Island (Dec.) (see Rosendahl 1980a)
- 1980 - Director, independent survey at Auhauekeae 1st and 2nd, North Kona, Hawaii Island (May-June) (see Rosendahl 1980d)
- 1980 - Director, independent survey at Puueo, South Hilo, Hawaii Island (April) (see Rosendahl 1980e)
- 1980 - Director, independent survey at Lanihau, North Kona, Hawaii Island (May) (see Rosendahl 1980g)
- 1980 - Director, independent field inspection at Lanihau, North Kona, Hawaii Island (May) (see Rosendahl 1980h)
- 1980 - Director, independent survey and site evaluation at Moeauoa 2nd, North Kona, Hawaii Island (July) (see Rosendahl 1980i)
- 1980 - Director, independent survey at Waika, North Kohala, Hawaii Island (July) (see Rosendahl 1980j)
- 1980 - Director, independent test excavations at Kahaluu, North Kona, Hawaii Island (Aug.) (see Rosendahl 1980l, m)
- 1980 - Director, independent survey at Holualoa 4th, North Kona, Hawaii Island (Oct.) (see Rosendahl 1980n)
- 1980 - Director, Archaeological Research Associates survey at Bellows Air Force Station, Waimanalo, Koolau-poko, Oahu Island (Nov.) (see Rosendahl 1980o, p; 1981b)
- 1980 - Director, independent survey at Alika Bay, Alika, South Kona, Hawaii Island (Dec.) (see Rosendahl 1980q)
- 1980 - Director, independent survey at Puueo, South Hilo, Hawaii Island (Dec.) (see Rosendahl 1981a)

Vita
Paul H. Rosendahl

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- 1980 - Director, Archaeological Research Associates survey at Paeahu, Makawao, Maui Island (Dec.) (see Rosendahl 1980r; 1981c)
- 1980-81 - Director, Archaeological Research Associates salvage excavations at Kahaluu, North Kona, Hawaii Island (Dec.-Jan.) (see Rosendahl 1981d)
- 1981 - Director, independent survey at Kapoho, Puna, Hawaii Island (Feb.) (see Rosendahl 1981e)
- 1981 - Director, independent survey at Kaulana Bay, Kamaoa, Kau, Hawaii Island (March) (see Rosendahl 1981f)
- 1981 - Director, independent survey at Paeahu, Makawao, Maui Island (March) (see Rosendahl 1981g, h)
- 1981 - Director, independent survey at Kahaluu, North Kona, Hawaii Island (March-May) (see Rosendahl 1981i)
- 1981 - Director, independent test excavations at Auhauekeae 1st and 2nd, North Kona, Hawaii Island (March) (see Rosendahl 1981j, k)
- 1981 - Director, independent test excavations at Auhauekeae 1st and 2nd, North Kona, Hawaii Island (April) (see Rosendahl 1981l, m)
- 1981 - Director, PHRI survey at Puueo, South Hilo, Hawaii Island (May) (see Rosendahl 1981n)
- 1981 - Director, PHRI survey at Waianae Valley, Waianae, Oahu Island (June) (see Rosendahl 1981o)
- 1981 - Director, PHRI survey at Ouli, South Kohala, Hawaii Island (July) (see Rosendahl 1981p)
- 1981 - Director, PHRI survey at Kalapana, Puna, Hawaii Island (Aug.) (see Rosendahl 1981q)
- 1981 - Director, PHRI surveys at Paeahu, Makawao, Maui Island (Aug.) (see Rosendahl 1981r, s, t)
- 1981 - Director, PHRI survey at Ouli, South Kohala, Hawaii Island (Sept.) (see Rosendahl 1981u)
- 1981 - Director, PHRI survey and feature locations at Lanihau, North Kona, Hawaii Island (Oct.) (see Rosendahl 1981v)
- 1981 - Director, PHRI survey at Waiakea, South Hilo, Hawaii Island (Oct.) (see Rosendahl 1981w)

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- 1981 - Director, PHRI survey at Kawaihae 2nd and Ouli, South Kohala, Hawaii Island (Nov.) (see Rosendahl 1981x)
- 1981 - Director, PHRI survey at Kapoho, Puna, Hawaii Island (Dec.) (see Rosendahl 1981y)
- 1981 - Director, PHRI survey and test excavations at Holualoa 4th, North Kona, Hawaii Island (Dec.) (see Rosendahl 1981z; 1982c)
- 1981-82 - Director, PHRI survey and test excavations at Ouli, South Kohala, Hawaii Island (Dec.-Jan.) (see Rosendahl 1982d, e)
- 1982 - Director, PHRI survey mapping at Ouli, South Kohala, Hawaii Island (Feb.) (see Rosendahl 1982f)
- 1982 - Director, PHRI survey and test excavations at Kupeke, Molokai Island (Feb.) (see Rosendahl 1982g, h)
- 1982 - Director, PHRI survey at Honaunau Bay, Honaunau, South Kona, Hawaii Island (April) (see Rosendahl 1982i)
- 1982 - Director, PHRI survey at Puakea and Honoipu, North Kohala, Hawaii Island (April-May) (see Rosendahl 1982j, k)
- 1982 - Director, PHRI survey at Kawaihae 2nd and Ouli, South Kohala, Hawaii Island (June) (see Rosendahl 1982l)
- 1982 - Director, PHRI survey at Kiholo Bay, Puuwaawaa, North Kona, Hawaii Island (June) (see Rosendahl 1982m)
- 1982 - Principal Investigator, PHRI survey and test excavations at Puakea and Honoipu, North Kohala, Hawaii Island (June) (see Rosendahl 1982n, p)
- 1982 - Director, PHRI survey at Puakea and Honoipu, North Kohala, Hawaii Island (June) (see Rosendahl 1982o)

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Consultant Projects (Independent and PHRI non-field work projects)

- 1978-80 - Consultant to Belt, Collins & Assoc. (Honolulu) for preparation of Hawaii County Cultural Resources Management Plan (Dec.-Sept.) (see Rosendahl 1979r, s, t; 1980c)
- 1979-80 - Consultant to Historic Preservation Office, Trust Territory of the Pacific Islands (Saipan), for completion of analyses and preparation of Final Report on Kelton-Bishop Museum Expedition to Eastern Micronesia (March-Sept.) (see Rosendahl 1979i, o; 1982a)
- 1979 - Consultant to Science Applications, Inc. (LaJolla, CA) for establishment of archaeological division program for Hawaii and Pacific Basin (Jan.-March)
- 1979 - Consultant to Makai Development Corp. (Kailua-Kona) regarding archaeological resources at Kamoa Point, Holualoa 4th, North Kona, Hawaii Island (July)
- 1980 - Consultant to Oda-McCarty Architects, AIA (Hilo) for preparation of preservation plan for archaeological sites at Keauhou, North Kona, Hawaii Island (April) (see Rosendahl 1980f)
- 1980 - Consultant to West Hawaii Housing Foundation (Kailua-Kona) for preparation of data recovery plan for salvage excavation of Site 50-10-37-7702, Kahaluu, North Kona, Hawaii Island (July-Sept.) (see Rosendahl 1980k)
- 1982-84 - Consultant to Hawaii County-Office of Housing and Community Development (Hilo) for analyses and preparation of Final Report on salvage excavation of Site 50-10-37-7702, Kahaluu, North Kona, Hawaii Island (May-Jan.)

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- 1972g Aboriginal Agriculture and Residence Patterns in Upland Lapakahi, Island of Hawaii. Unpublished Ph.D. dissertation (Anthropology), University of Hawaii.

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- 1968a "The Archaeology of North Kona. From the ahupua'a of Kealakehe to the ahupua'a of Puukala. Section I: Archaeological Surface Survey." Hawaii State Archaeological Journal 68-1. Division of State Parks, Department of Land and Natural Resources, State of Hawaii. (with F. Ching, Jr.)
- 1971a "Fossil Sweet Potato Remains from Hawaii." Journal of the Polynesian Society 80(3):379-385. (with D. Yen)
- 1972a "Prehistoric Agriculture in the Upper Valley of Makaha, Oahu." IN Ladd and Yen (eds.): Makaha Valley Historical Project: Interim Report No.3. Pacific Anthropological Records No.18. Honolulu: Dept. Anthropology, B. P. Bishop Museum. (with D. Yen, P. Kirch, and T. Riley)
- 1972b "Archaeology of Halawa and Lapakahi: Windward Valley and Leeward Slope." New Zealand Archaeological Association Newsletter 14(3):101-112. (with P. B. Griffin, H. D. Tuggle, and T. Riley)
- 1972c Archaeological Salvage of the Hapuna-Anaehoomalu Section of the Kailua-Kawaihae Road (Queen Kaahumanu Highway), Island of Hawaii. Departmental Report Series No.72-5. Honolulu: Dept. Anthropology, B. P. Bishop Museum.
- 1973a "A Note on Carbon Dates for Pottery-Bearing Layers on Anuta Island." Journal of the Polynesian Society 82(2): 206-208. (with P. Kirch)
- 1973b "Anuta--An Introduction." IN Yen and Gordon (eds.): Anuta: A Polynesian Outlier in the Solomon Islands. Pacific Anthropological Records No.21. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.1-8. (with D. Yen and P. Kirch)
- 1973c "Archaeological Investigation of Anuta." IN Yen and Gordon (eds.): Anuta: A Polynesian Outlier in the Solomon Islands. Pacific Anthropological Records No.21. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.25-108. (with P. Kirch)

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- 1973d Archaeological Salvage of the Ke-ahole to Anaehoomalu Section of the Kailua-Kawaihae Road (Queen Kaahumanu Highway), Island of Hawaii. Departmental Report Series No.73-3. Honolulu: Dept. Anthropology, B. P. Bishop Museum.
- 1973e "Test Excavations at Site D4-59." IN Kirch: Archaeological Excavations at Kahalu'u, North Kona, Island of Hawaii. Departmental Report Series No.73-1. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.56-63.
- 1975a "Surface Structural Remains in Kapana." IN Kirch and Kelly (eds.): Prehistory and Ecology in a Windward Hawaiian Valley: Halawa Valley, Molokai. Pacific Anthropological Records No.24. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.71-77.
- 1975b "Test Excavations at Site A1-30 (Kapana Heiau)." IN Kirch and Kelly (eds.): Prehistory and Ecology in a Windward Hawaiian Valley: Halawa Valley, Molokai. Pacific Anthropological Records No.24. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.153-160.
- 1976c "Introduction." IN Rosendahl (ed.): Archaeological Investigations in Upland Kaneohe. Departmental Report Series No.76-1. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.I-1-I-12.
- 1976d "Hawaiian Occupation at Kaneohe, Oahu." IN Rosendahl (ed.): Archaeological Investigations in Upland Kaneohe. Departmental Report Series No.76-1. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.1-1-1-4.
- 1976e "Salvage Excavation of the Kamo'oali'i Mound Site (50-Oa-G5-37)." IN Rosendahl (ed.): Archaeological Investigations in Upland Kaneohe. Departmental Report Series No.76-1. Honolulu: Dept. Anthropology, B. P. Bishop Museum, pp.6-1-6-100.
- 1976g "Early Anutan Settlement and the Position of Anuta in the Prehistory of the SW Pacific." IN Green and Cresswell (eds.): Southeast Solomon Islands Cultural History: A Survey of Results. Bulletin of the Royal Society of New Zealand, No.11:225-244. (with P. Kirch)
- 1976h "Basaltic Glass Hydration Dating in Hawaiian Archaeology." IN Taylor (ed.): Advances in Obsidian Glass Studies: Archaeological and Geochemical Perspectives. Park Ridge, N. J.: Noyes Press, pp.141-164. (with M. Morgenstein)
- 1976i "Contract Archaeology in Hawaii." New Zealand Archaeological Association Newsletter 19(3):142-150.

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- 1977d "Bishop Museum Archaeological Expedition to Marshalls and Eastern Carolines." The American Pacific 2(1):8-9.
- 1982a "Reconnaissance Survey in the Marshall and Eastern Caroline Islands." IN Dye and Clause (eds.): Archaeology in Eastern Micronesia. [tentative title] Pacific Anthropological Records. Honolulu: Dept. Anthropology, B. P. Bishop Museum. [in press]
- 1982b "Aboriginal Hawaiian Structural Remains and Settlement Patterns in the Upland Agricultural Zone at Lapakahi, Island of Hawaii." Asian Perspectives [in press]

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- 1976b Archaeological Investigations in Upland Kaneohe. Survey and Salvage Excavations in the Upper Kamo'oali'i Stream Drainage Area, Kane'ohe, Ko'olaupoko, O'ahu, Hawai'i. Departmental Report Series No.76-1. Honolulu:Dept. Anthropology, B. P. Bishop Museum.

Research Reports - Bishop Museum

- 1977e "Archaeological Survey in the Marshall and Eastern Caroline Islands: A Completion-of-Fieldwork Progress Report on the Kelton-Bishop Museum Expedition to Eastern Micronesia." Ms.080577. Dept. Anthropology.

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Publications - In Preparation

- a "The Aboriginal Hawaiian Agricultural System at Lapakahi, Hawaii Island." [Article for journal submission.]
- b Early Hawaiians in Leeward Kohala: Aboriginal Agriculture and Occupation at Lapakahi, Island of Hawaii. [Monograph based on unpublished dissertation research and subsequent research, and additional University of Hawaii research.]
- c "Archaeological Survey and Test Excavations in the Marshall and Eastern Caroline Islands, Eastern Micronesia." [Article for journal submission.]

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Reports (Prepared for Bishop Museum Contract Archaeology Program)

- 1969a "An Archaeological Survey of Ouli Coastal Lands between Hapuna Bay and Kaunaoa Bay, South Kohala, Hawaii; Including Excavations at Site E4-14, Kaunaoa Point." Bishop Museum Ms.040069.
- 1969b "Excavation of a Stone Mound: Heeia, Koolaupoko, Oahu." Bishop Museum Ms.110069.
- 1971b "A Report on the Archaeological Excavation and Exploration of the Old Carriage Road at Iolani Palace." Bishop Museum Ms.082771.
- 1972d "Report on a Walk-Through Archaeological Survey of the Queen Liliuokalani Village--Unit 3 Tract, Keahuolu, North Kona, Hawaii." Bishop Museum Ms.091972.
- 1972e "Report on a Walk-Through Archaeological Survey of the Puako Beach Lots Spur Road Alignment, Lalamilo, South Kohala, Hawaii Island." Bishop Museum Ms.101072.
- 1972f "Report on a Walk-Through Archaeological Survey of the Lanihau Commercial Tract, Lanihau 1st, North Kona, Hawaii Island." Bishop Museum Ms.101172.
- 1973f "Report on a Field Trip to Inspect the Site of Russian Fort Alexander at Hanalei, Kauai." Bishop Museum Ms.080973.
- 1973g "An Archaeological Walk-Through Survey of the Kaluanui Lands, Oahu." Bishop Museum Ms.090673.
- 1973h "First Quarterly Progress and Status Report on the Lapakahi State Historical Park Project." Bishop Museum Ms.120573.
- 1974a "Revised Schedule for Archaeological Consultant Work on the Lapakahi State Historical Park Project." Bishop Museum Ms.010874.
- 1974b "Second Quarterly Progress and Status Report on the Lapakahi State Historical Park Project." Bishop Museum Ms. 030874.
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- 1974h "Survey and Test Excavations at Kaumalumalu Kai, North Kona, Island of Hawaii." Bishop Museum Ms.041874.
- 1974i "Report on the Archaeological Walk-Through Survey of a Coastal Portion of Kukuipahu, North Kohala, Hawaii Island." Bishop Museum Ms.061074.
- 1975c "Report on the Archaeological Reconnaissance Survey of the Alii Highway Extension at Keauhou-Kona, Hawaii." Bishop Museum Ms.012975
- 1975d "Archaeological Reconnaissance Survey of the Haleakala Highway Road Realignment Corridor, Haleakala National Park, Maui." Bishop Museum Ms.101475.
- 1975e "Archaeological Reconnaissance Survey of the Proposed Water System Route, Haleakala National Park, Maui." Bishop Museum Ms.101575.
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- 1975g "Archaeological Reconnaissance Survey of the Ke-Ahole Point Natural Energy Laboratory Site, North Kona, Hawaii Island." Bishop Museum Ms.111775. (with P. Kirch)
- 1976f "Additional Archaeological Reconnaissance Survey of the Ke-Ahole Point Natural Energy Laboratory Site, North Kona, Hawaii Island. Appendix to Bishop Museum Ms.111775.
- 1977b "Archaeological Inventory and Evaluation Report for Installation Environmental Impact Statement for U. S. Army Support Command, Hawaii (USASCH): Parts 1 and 2." Bishop Museum Ms.030177

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- 1977c "Archaeological Reconnaissance Survey Report: Fencing of the Haleakala Northern Boundary from Hanakauhi Peak to the Vicinity of Wai Anapanapa and the Adjacent Grassland Bog." Bishop Museum Ms.092677.
- 1977e "Archaeological Reconnaissance Survey of the Dock Construction Site Project Area at Majuro Atoll, Marshall Islands District, Trust Territory of the Pacific Islands." Bishop Museum Ms.033177.

Other Cultural Resource Management Reports

- 1968b "Preliminary Survey at Anaehoomalu, South Kohala, Hawaii Island." Prepared for U. S. Land Company.
- 1971c "Archaeological Research in the Agricultural Uplands of Lapakahi, Hawaii Island." Prepared for Division of State Parks, Department of Land and Natural Resources, State of Hawaii.
- 1976a "Phase I - Archeological Base Map and Preliminary Cultural Resource Inventory. Kipahulu Historic District, Kipahulu District-Haleakala National Park, Hana, Maui, Hawaii." Prepared for National Park Service, Hawaii State Director's Office.
- 1977a "Report on Reconnaissance Mapping and List of Classified Structures (LCS) Evaluations at the Kalapana Extension of Hawaii Volcanoes National Park." Prepared for National Park Service, Pacific Region Archeologist.
- 1979a "John Young Homestead (Upper Portion), Kawaihae, Kohala, Hawaii Island. Archeological Studies: Excavation of Western-Style Structure 2." Prepared for National Park Service, Hawaii State Director's Office.

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- 1978a "Archaeological Reconnaissance Survey of the Kona Pacific Partners Condominium Site (TMK:3-7-5-09:3,38,49,60,61,62), Kailua-Kona, Island of Hawaii." Ms.1-110578. Prepared for Architects Hawaii Ltd. (Honolulu).
- 1978b "Preliminary Report Upon Completion of Fieldwork: Intensive Archaeological Survey and Salvage Excavations at the Natural Energy Laboratory Hawaii (NELH) Site, Ke-Ahole Point, North Kona, Hawaii Island." Ms.2-122478. Prepared for The Research Corporation of the University of Hawaii (Honolulu).
- 1978c "Archaeological Reconnaissance Survey of the Holualoa Bay Villas Condominium Site (TMK:3-7-6-16:31), Kailua-Kona, Island of Hawaii." Ms.4-120578. Prepared for Gray, Rhee & Assoc. (Honolulu).
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- 1979c "Archaeological Reconnaissance Survey of the Lanihau Corporation Project 30 Site (TMK:3-7-5-09:54,55; and 3-7-5-10:7,10), Kailua-Kona, Island of Hawaii." Ms.12-040979. Prepared for Belt, Collins & Assoc. (Honolulu).
- 1979d "Preliminary Archaeological Reconnaissance Survey at the Komohana Kai Subdivision (Units I and II) Site (TMK:3-7-6-13:7,26,31; and 3-7-7-04:Por.20), Kailua-Kona, Island of Hawaii." Ms.13-041079. Prepared for G. C. Development Co., Inc. (Kailua-Kona).
- 1979e "Archaeological Reconnaissance Survey of the Proposed Mac Farms Husking and Agricultural Facilities Site (TMK:3-8-9-12:8[Por.],9[Por.],18[Por.]), Kapua, South Kona, Island of Hawaii." Ms.14-041579. Prepared for Belt, Collins & Assoc. (Honolulu) and Mac Farms of Hawaii, Inc. (Captain Cook, Hawaii).
- 1979f "Archaeological Reconnaissance Survey of the Lanihau Corporation Potential Purchase Site (TMK:3-7-5-04:6), Kailua-Kona, Island of Hawaii." Ms.15-042779. Prepared for Lanihau Corporation (Honolulu).

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- 1979g "Archaeological Reconnaissance Survey of a Portion of the Lanihau Commercial Park Tract (TMK:3-7-5-04:Por.10), Kailua-Kona, Island of Hawaii." Ms.15-042879. Prepared for Lanihau Corporation (Honolulu).
- 1979h "Archaeological Reconnaissance Survey of the Keauhou Gardens Project Site (Area 4, Keauhou-Kona Resort) (TMK:3-7-8-10:52), Keauhou-Kona, Island of Hawaii." Ms.16-052179. Prepared for Mr. Theo. R. DiTullio and Hogan, Chapman, Cobeen, Weitz, Desai (Honolulu).
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- 1979j "Archaeological Reconnaissance Survey of the Hilton Head Company Kona Property "B" Site (TMK:3-7-5-05:1,10,14-23, 25-47,51,68), Kailua-Kona, Island of Hawaii." Ms.17-061979 and Ms.17-070879. Prepared for Belt, Collins & Assoc. (Honolulu).
- 1979k "Archaeological Reconnaissance Survey of Certain Liliuokalani Trust Properties (TMK:3-7-4-08:Por.1, Por.2, Por.12), Kailua-Kona, Island of Hawaii." Ms.18-071679. Prepared for Belt, Collins & Assoc. (Honolulu).
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- 1979m "Evaluation of Specified Archaeological Sites Located in the Seaward Portion of Lanihau Corporation Lands at Honokohau 1st (TMK:3-7-4-08:10), North Kona District, Island of Hawaii." Ms.20-110179. Prepared for Lanihau Corporation (Honolulu).
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EXHIBIT 6
IN
EVIDENCE

LAND USE COMMISSION
STATE OF HAWAII
AUG 18 3 08 PM '88

**REVISED INTERIM REPORT: SUMMARY OF FINDINGS, AND
GENERAL SIGNIFICANCE ASSESSMENTS
AND RECOMMENDED GENERAL TREATMENTS**

**ARCHAEOLOGICAL RECONNAISSANCE SURVEY
HYATT REGENCY KAUAI PROPOSED GOLF COURSE PROJECT AREA
Land of Pae, Koloa District
Island of Kauai (TMK:4-2-9-01:Por.1)**

Prepared for

Grove Farm Properties, Inc.
and
Ainako Resorts Associates
c/o Belt, Collins & Associates
Honolulu, Hawaii

June 1988

SUMMARY OF FINDINGS

At the request of Mr. Joe Vierra of Belt Collins & Associates, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted a combined surface and subsurface archaeological reconnaissance survey of the c. 210 acre Hyatt Regency Kauai Proposed Golf Course project area located at Poipu in the Land of Paa, Koloa District, Island of Kauai (TMK:4-2-9-01:Por.1). Survey field work was conducted during the period May 8-11, 1988, with limited additional field work being conducted on June 8, 1988. Approximately 97 man-hours of labor were expended on the survey field work. Prior to carrying out the field work, a general scope of work and specific field tasks were discussed with Dr. Ross H. Cordy, chief archaeologist in the Hawaii State Department of Land and Natural Resources--Historic Sites Section (DLNR-HSS), and with Dr. William K. Kikuchi of the Kauai Historic Preservation Review Commission (KHPRC). Additional limited testing was subsequently done at the request of the KHPRC.

Eighteen sites were identified within or immediately adjacent to the project area. These sites are summarized in Table 1 (at end), and their approximate locations are shown on Figure 1 (at end). More detailed site descriptions are presented in Appendix A (at end). Of the 18 sites, seven had been previously identified and 11 were newly identified. Ranging in physical condition from poor to good, the identified sites are all single component feature sites; however, several could be combined into three distinct, multiple feature site complexes.* Formal site types present include terraces, walls, wall foundation, C-shape and box C-shape walled shelters, platforms, and mound/piles. Tentatively identified functional types include habitation, agricultural (historic), ceremonial (*heiau*), possible burials, possible boundary walls, and sites of indeterminate function.

As part of the reconnaissance survey, limited subsurface testing by means of mechanical backhoe and manual excavation was done. Twenty-three backhoe test trenches and one hand-excavated test unit (at Site 3212) were dug in order to determine the presence or absence of potentially significant buried cultural deposits within the project area. The approximate locations of the trenches are shown on Figure 1 (at end). Detailed stratigraphic descriptions for six representative trenches are presented in Table 2 (at end), while summary stratigraphic descriptions for the remaining 17 trenches are summarized in Table 3 (at end). With the possible exception of one trench which may have revealed the inland extent of the partially buried foundation of one site (Trench BT-11 at Site T-9), no subsurface cultural remains of any kind were found.

Upon completion of field work, survey findings and preliminary conclusions—including tentative evaluations and recommendations—were discussed with Dr. Cordy of DLNR-HSS (May 13, 1988). Dr. Cordy condi-

*Complex A (Sites T-10, T-11, 3215, 3216);
Complex B (Sites T-7, T-8, T-9); and
Complex C (Sites T-2, T-3, 3203)

tionally concurred with the evaluations and recommendations presented here, subject to subsequent review of the full final report on the survey. On May 16, 1988, a similar summary of survey findings and preliminary conclusions was present to the KHPRC.

General significance assessments and recommended general treatments for the 18 sites identified within or immediately adjacent to the Hyatt Regency Kauai Proposed Golf Course project area are summarized in Table 4 (at end). Of the 18 sites, ten are assessed as being significant solely for their scientific information content. While no further work is recommended for eight of these sites, archaeological monitoring is recommended for two. Of the remaining eight sites, five are assessed as being significant for information content and cultural value, and as good examples of site types. These sites include three large terraces and two platforms assigned ceremonial functions (possible heiau and burials). For these five sites, further data collection followed by preservation with some level of interpretive development, is recommended as appropriate.

Two sites are assessed as being significant for information content, and are also evaluated as being culturally significant. These sites are in poor physical condition and of indeterminate function; however, due to their large size, location, and associated human remains (sand dune burials), they are possibly ceremonial features. For these two sites, further data collection is recommended, followed by preservation "as is." One site is assessed as being important for information content, and as a good example of a site type. For this site, further data collection, with some level of interpretive development, is recommended.

GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

To facilitate outside review, general significance assessments and recommended general treatments for all identified sites are summarized in Table 4 (at end). Significance categories used in the site evaluation process are based on the National Register criteria for evaluation, as outlined in the Code of Federal Regulations (36 CFR Part 60). The DLNR-HSS/State Historic Preservation Office (SHPO) uses these criteria for evaluating cultural resources. Sites determined to be potentially significant for information content (Category A, Table 4) fall under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites potentially significant as representative examples of site types (Category B) are evaluated under Criterion C, which defines significant resources as those which "...embody the distinctive characteristics of a type, period, or method of construction...or that represent a significant and distinguishable entity whose components may lack individual distinction."

Sites with potential cultural significance (Category C) are evaluated under guidelines prepared by the Advisory Council on Historic Preservation (ACHP) entitled "Guidelines for Consideration of Traditional Cultural

Values in Historic Preservation Review" (Draft Report, August 1985). The guidelines define cultural value as "...the contribution made by an historic property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth." The guidelines further specify that "[a] property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value."

To further facilitate management decisions regarding the subsequent treatment of resources, the general significance of the archaeological resources identified during the reconnaissance survey are also evaluated in terms of potential scientific research, interpretive, and/or cultural value modes (Table 1, at end). Research value refers to the potential of archaeological resources for producing information useful in the understanding of culture history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological resources for public education and recreation. Cultural value, within the framework for significance evaluation used here, refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values.

Of the 18 sites identified within or immediately adjacent to the Hyatt Regency Kauai Proposed Golf Course project area, ten are assessed as being significant solely for information content. No further work is recommended for eight of these sites (3203, 3210 thru 3213, 3215, T-5, T-6). These eight sites--generally consisting of walls, and usually lacking associated cultural deposits and portable remains--have been measured, described, photographed, and plotted, and one tested (T-6). Data collected from them during the present reconnaissance survey is considered to be sufficient; their preservation is not essential, although some sites could perhaps be considered for inclusion into development landscaping. For the remaining two sites, further work in the form of archaeological monitoring is recommended (T-1, -4). For these two sites--probable historic agricultural structures, data collected from them during the present reconnaissance survey is also considered to be sufficient.

Of the remaining eight sites, five are assessed as being significant for information content, cultural value, and as good examples of site types. These sites include three large terraces (T-3, -9, -10) and two platforms (3216, T-11) assigned ceremonial functions (possible heiau and burials). For these five sites, further work in the form of intensive survey-level data collection (i.e., detailed recording, surface collections, and test excavations), followed by preservation with some level of interpretive development, is recommended as appropriate. Two sites are assessed as being significant for information content, and are also evaluated as being culturally significant (T-7, -8). These sites are in poor physical condition and of indeterminate function; however, due to their large size and associated human remains (sand dune burials), they are possibly ceremonial features. For these two sites, further data collection is recommended, followed by preservation "as is." One site is assessed as being important for information content, and as an good

example of a site type (T-2). For this site, further data collection and preservation with some level of interpretive development is recommended.

It should be noted that the above evaluations and recommendations are based on the findings of surface reconnaissance survey with limited subsurface testing. Thus, there is always the possibility, however remote, that potentially significant unidentified cultural remains might be encountered in the course of future development activities involving the modification of the ground surface. In such a situation, archaeological consultation should be sought immediately.

REFERENCES CITED

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- 1985 Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review. Washington, D.C.: Advisory Council on Historic Preservation. (Draft report, August)

CFR (Code of Federal Regulations)

- 36 CFR Part 60. National Register of Historic Places. Washington, D.C.: Dept. Interior, National Park Service.

Table 1.

SUMMARY OF IDENTIFIED SITES

*Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	#CRM Value Mode Assess.			*Field Work Tasks		
			R	I	C	DR	SC	EX
<u>Previously Identified Sites</u>								
3203	Wall	Boundary (?)	L	L	L	-	-	-
3210	Wall	Boundary (?)	L	L	L	-	-	-
3211	Wall	Boundary (?)	L	L	L	-	-	-
3212	Walled Shelter (C-shape)	Habitation	L	L	L	-	-	-
3213	Walled Shelter (C-shape)	Habitation (?)	L	L	L	Not found		
3215	Wall	Boundary (?)	L	L	L	-	-	-
3216	Platform	Ceremonial (Burial?)	H	M	H	+	+	+
<u>Newly Identified Sites</u>								
T-1	Mound/Pile	Agriculture (Historic)	L	L	L	-	-	-
T-2	Walled Shelter (Box C-shape)	Habitation	M	M	L	+	+	+
T-3	Stepped (?) Terrace	Ceremonial (Heiau?)	H	M	H	+	+	+

*Hawaii Register of Historic Places (HRHP) numbers or PHRI temporary site numbers: HRHP numbers are four-digit numbers prefixed by 50-30-10 (50=State of Hawaii, 30=Island of Kauai, 10=USGS 7.5' series quad map ["Koloa, Kauai"]); PHRI temporary numbers are one and two-digit numbers prefixed by "T-".

#PHRI Cultural Resource Management Value Mode Assessment--

Nature: R = scientific research, I = interpretive, C = cultural;
Degree: H = high, M = moderate, L = low.

+Recommended Field Work Tasks: DR = detailed recording (scaled drawings, photographs, and written descriptions), SC = surface collections, EX = test excavations.

Table 1. (Cont.)

*Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	*CRM Value Mode Assess.			*Field Work Tasks		
			R	I	C	DR	SC	EX
T-4	Mound/Pile	Agriculture (Historic)	L	L	L	-	-	-
T-5	Wall Foundation	Boundary (?)	L	L	L	-	-	-
T-6	Mound/Pile	Clearing (?)	L	L	L	-	-	-
T-7	Mound/Pile	Indeterminate	L/H	L	L/H	+	+	+
T-8	Mound/Pile	Indeterminate	L/H	L	L/H	+	+	+
T-9	Terrace	Ceremonial (Heiau?)	H	M	H	+	+	+
T-10	Terrace	Ceremonial (Heiau?)	H	M	H	+	+	+
T-11	Platform	Ceremonial (Burial?)	H	M	H	+	+	+

Table 2.

DETAILED STRATIGRAPHY OF REPRESENTATIVE BACKHOE TEST TRENCHES

Trench	Layer	Description
3	I	0-60 cmbs; brownish-yellow (10YR 6/6 dry) sand; structureless, very fine, single grain; loose, nonsticky and nonplastic consistence; very abrupt and smooth boundary; many, very fine, vesicular roots
	II	60-80cmbs; dark reddish-brown (5YR 3/4 dry) sandy clay loam; weak to moderate, fine to medium, subangular blocky structure; slightly hard, friable, sticky and plastic consistence; clear and wavy boundary; many, very fine, vesicular roots
	III	80-100/115 cmbs; dark reddish-brown (2.5YR 2.5/4 dry) silty clay loam; moderate to strong, fine to medium, subangular blocky structure; hard, firm, sticky and plastic consistence; clear and smooth boundary; no roots
	IV	100/115 to 150/170 cmbs; dark reddish-brown (2.5YR 3/4 dry) silty clay loam; strong, medium to coarse, subangular block structure; very hard, very firm, very sticky and very plastic consistence; very abrupt and irregular boundary; no roots
	V	150-170+ cmbs; bedrock
6	I	0-350 cmbs; reddish-yellow (7.5YR 8/6 dry) aeolian sand; structureless, very fine and single grain; loose, nonsticky and nonplastic consistence; very abrupt and wavy boundary; many, very fine, vesicular roots; common, fine to medium, tubular roots
	II	350+ cmbs; limestone bedrock

*See Table 3 for summary stratigraphy descriptions of remaining Backhoe Test Trenches (BT-) 1, 2, 4, 5, 7, 9, 10, 12, and 14 thru 22.

Table 2. (Cont.)

Trench	Layer	Description
8	I	0-40 cmbs; strong brown (7.5YR 5/8 dry) loamy sand; structureless to weak, very fine, crumb to single grain structure; loose to soft, nonsticky and nonplastic consistence; abrupt and smooth boundary; many, very fine, vesicular and tubular roots
	II	40-80 cmbs; reddish-yellow (7.5YR 8/6 dry) sand; structureless, very fine and single grain structure; loose, nonsticky and nonplastic consistence; very abrupt and smooth boundary; many, very fine, tubular roots
	III	80-135 cmbs; strong brown (7.5YR 4/6 dry) silty clay loam; strong, medium, subangular blocky structure; hard, firm, slightly sticky and slightly plastic consistence; clear and smooth boundary; no roots
	IV	135-200 cmbs; dark reddish-brown (2.5YR 3/4 dry) silty clay; strong, medium to coarse, subangular blocky structure; very hard, friable, sticky and plastic consistence; abrupt and wavy boundary; no roots
	V	200+ cmbs; bedrock
11	I	0-90 cmbs; yellowish-red (5YR 4/6 dry) sandy clay loam; weak to moderate, fine to medium, subangular blocky structure; slightly hard to hard, firm, sticky and plastic consistence; abrupt and wavy boundary; no roots
	II	90-100 cmbs; yellowish-red (5YR 5/8 dry) loamy sand; structureless to weak, very fine, single grain structure; soft, loose, nonsticky and nonplastic consistence; very abrupt and irregular boundary; no roots
	III	100-125 cmbs; dark reddish-brown (5YR 3/4 dry) clay loam; moderate to strong, fine to medium, subangular blocky structure; hard, firm, sticky and very plastic consistence; abrupt and wavy boundary; no roots
	IV	125+ cmbs; bedrock

Table 2. (Cont.)

Trench	Layer	Description
13	I	0-45 cms; yellowish-red (5YR 5/8 dry) sandy clay loam; moderate, fine, subangular blocky structure; slightly hard, friable, sticky and plastic consistence; gradual and smooth boundary; few, very fine, vesicular roots
	II	45-150 cms; red (2.5YR 4/6 dry) clay loam; strong, fine to medium, subangular blocky structure; hard, firm, sticky and very plastic consistence; abrupt and wavy boundary; no roots
	III	150+ cms; bedrock
23*	I	0-50 cms; boulder and cobble fill; wavy and clear boundary
	II	50-120 cms; reddish-yellow (7.5YR 7/6 dry) sand; structureless, very fine, and single grain; loose, nonsticky and nonplastic consistence; wavy and clear boundary; few to common, very fine, vesicular roots
	III	120-150+ cms; brown (7.5YR 4/4 dry) silt loam; moderate, fine to coarse, subangular blocky structure; slightly hard, friable, nonsticky and nonplastic consistence; boundary not reached; few to common, very fine, vesicular roots

*BT-23 excavated through stone mound/pile at Site T-6.

Table 3.

SUMMARY OF BACKHOE TEST TRENCH STRATIGRAPHY*

Trench	Layer	Description
1	I	0-110 cmbs; dark reddish-brown (5YR 3/3 dry) clay; very abrupt and smooth boundary
	II	110-130+ cmbs; bedrock
2	I	0-55 cmbs; strong brown (7.5YR 4/6 dry) sandy clay loam; abrupt to clear and smooth boundary
	II	55-90 cmbs; dark reddish-brown (2.5YR 3/4 dry) clay; clear and smooth boundary
	III	90-135 cmbs; yellowish-red (5YR 4/6 dry) silty clay; abrupt to clear and smooth boundary
	IV	135-200 cmbs; dark brown (7.5YR 3/2 dry) gravelly silty clay; clear to gradual and smooth boundary
	V	200+ cmbs; bedrock
4	I	0-50 cmbs; strong brown (7.5YR 4/6 dry) sandy clay loam; very abrupt to abrupt and wavy boundary
	II	50-70 cmbs; strong brown (7.5YR 5/8 dry) loamy sand; very abrupt to abrupt and wavy boundary
	III	70-130 cmbs; strong brown (7.5YR 4/6 dry) silty clay loam; gradual and smooth boundary
	IV	130-185 cmbs; dark reddish-brown (2.5YR 3/4 dry) silty clay; clear and irregular boundary
	V	185+ cmbs; bedrock

*See Table 2 for detailed stratigraphy descriptions of representative Backhoe Test Trenches (BT-) 3, 6, 8, 11, 13, and 23.

Table 3. (Cont.)

Trench	Layer	Description
5	I	0-270 cmbs; reddish-yellow (7.5YR 7/8 dry) aeolian sand; very abrupt and smooth boundary
	II	270-355 cmbs; strong brown (7.5YR 4/6 dry) silt; abrupt and wavy boundary
	III	355+ cmbs; limestone bedrock
7	I	0-275 cmbs; reddish-yellow (7.5YR 8/6 dry) aeolian sand; very abrupt and wavy boundary
	II	275+ cmbs; limestone bedrock
9	IA	0-20 cmbs; yellowish-brown (10YR 5/8 dry) loamy sand; abrupt and smooth boundary
	IB	20-110 cmbs; reddish-yellow (7.5YR 8/6 dry) aeolian sand; very abrupt and smooth boundary
	II	110-160 cmbs; strong brown (7.5YR 4/6 dry) silty clay loam; abrupt and wavy boundary
	III	160+ cmbs; bedrock
10	I	0-100 cmbs; dark reddish-brown (5YR 3/3 dry) sandy clay loam; abrupt and wavy boundary
	II	100+ cmbs; boulder rocks
12	I	0-80 cmbs; yellowish-red (5YR 5/8 dry) sandy clay loam; abrupt and smooth boundary
	II	80-110 cmbs; yellowish-red (5YR 5/8 dry) loamy sand; abrupt and smooth boundary
	III	110-220 cmbs; red (2.5YR 4/6 dry) clay; abrupt and wavy boundary
	IV	220 cmbs; bedrock

Table 3. (Cont.)

Trench	Layer	Description
14	I	0-35 cmbs; yellowish-red (5YR 5/8 dry) sandy clay loam; gradual and smooth boundary
	II	35-155 cmbs; red (2.5YR 4/6 dry) clay loam; abrupt and wavy boundary
	III	155+ cmbs; bedrock
15	I	0-55 cmbs; yellowish-red (5YR 5/8 dry) sandy clay loam; gradual and smooth boundary
	II	55-90 cmbs; red (2.5YR 4/6 dry) clay loam; abrupt and wavy boundary
	III	90+ cmbs; bedrock
16	I	0-55 cmbs; yellowish-red (5YR 5/8 dry) silty clay loam; abrupt and wavy boundary
	II	55+ cmbs; bedrock
17	I	0-70 cmbs; yellowish-red (5YR 5/8 dry) clay loam; clear and smooth boundary
	II	70-180 cmbs; red (2.5YR 4/6 dry) clay loam; abrupt and wavy boundary
	III	180+ cmbs; bedrock
18	I	0-90 cmbs; yellowish-red (5YR 5/8 dry) silty clay loam; abrupt and wavy boundary
	II	90+ cmbs; bedrock
19	IA	0-40 cmbs; dusky red (10R 3/3 dry) clay loam; abrupt and smooth boundary
	IB	40-160 cmbs; dusky red (10R 3/3 dry) clay loam; very abrupt and wavy boundary
	II	160+ cmbs; limestone bedrock

Table 3. (Cont.)

Trench	Layer	Description
20	IA	0-45 cmbs; dusky red (10R 3/3 dry) clay loam; abrupt and smooth boundary
	IB	45-110 cmbs; dusky red (10R 3/3 dry) clay loam; very abrupt and wavy boundary
	II	110+ cmbs; limestone bedrock
21	I	0-50 cmbs; yellowish-red (5YR 5/8 dry) sandy clay loam; abrupt and smooth boundary
	II	50-160 cmbs; red (2.5YR 4/6 dry) clay loam; very abrupt and wavy boundary
	III	160+ cmbs; limestone bedrock
22	I	0-60 cmbs; yellowish-red (5YR 5/8 dry) sandy clay loam; clear and smooth boundary
	II	60-140 cmbs; red (2.5YR 4/6 dry) clay loam; very abrupt and wavy boundary
	III	140 cmbs; limestone bedrock

Table 4.

**SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS
AND RECOMMENDED GENERAL TREATMENTS**

Site Number	Significance Category				Recommended Treatment				
	A	X	B	C	FDC	NFW	PID	PAI	MON
3203	-	+	-	-	-	+	-	-	-
3210	-	+	-	-	-	+	-	-	-
3211	-	+	-	-	-	+	-	-	-
3212	-	+	-	-	-	+	-	-	-
3213	-	+	-	-	-	+	-	-	-
3215	-	+	-	-	-	+	-	-	-
T-5	-	+	-	-	-	+	-	-	-
T-6	-	+	-	-	-	+	-	-	-
Subtotal:	0	8	0	0	0	8	0	0	0
T-1	-	+	-	-	-	-	-	-	+
T-4	-	+	-	-	-	-	-	-	+
Subtotal:	0	2	0	0	0	0	0	0	2

General Significance Categories:

A=Important for information content, further data collection necessary (PHRI=research value);

X=Important for information content, no further data collection necessary (PHRI=research value, SHPO=not significant);

B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and

C=Culturally significant (PHRI=cultural value).

Recommended General Treatments:

FDC=Further data collection necessary (intensive survey and testing, and possibly subsequent data recovery/mitigation excavations);

NFW=No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential (possible inclusion into landscaping suggested for consideration);

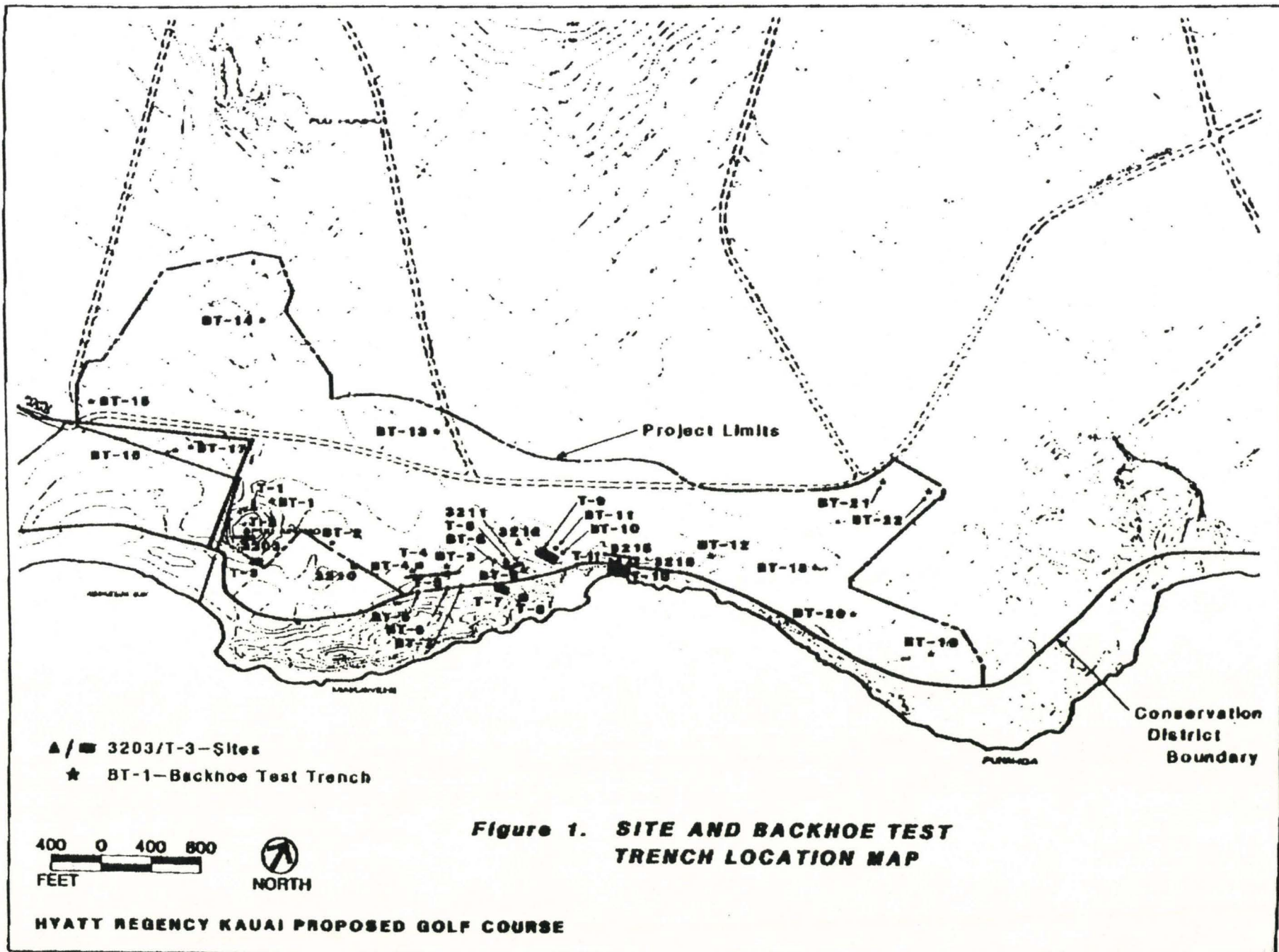
PID=Preservation with some level of interpretive development recommended (including appropriate related data recovery work);

PAI=Preservation "as is," with no further work (and possible inclusion into landscaping), or minimal further data collection necessary; and

MON=Archaeological monitoring during vegetation grubbing and/or initial construction grading.

Table 4. (Cont.)

Site Number	Significance Category				Recommended Treatment				
	A	X	B	C	FDC	NFW	PID	PAI	MON
3216	+	-	+	+	+	-	+	-	-
T-3	+	-	+	+	+	-	+	-	-
T-9	+	-	+	+	+	-	+	-	-
T-10	+	-	+	+	+	-	+	-	-
T-11	+	-	+	+	+	-	+	-	-
Subtotal:	5	0	5	5	5	0	5	0	0
T-7	+	-	-	+	+	-	-	+	-
T-8	+	-	-	+	+	-	-	+	-
Subtotal:	2	0	0	2	2	0	0	2	0
T-2	+	-	+	-	+	-	+	-	-
Subtotal:	1	0	1	0	1	0	1	0	0
Total: 18	8	10	6	7	8	8	6	2	2



APPENDIX A:

SITE DESCRIPTIONS

SITE NO.: State: 3203* PHRI: —

SITE TYPE: Wall (1 Feature)

TOPOGRAPHY: Situated atop Puu Ainako, on south (seaward) side

VEGETATION: Koa-haole, 'ilima

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Boundary (?) wall

DIMENSIONS: 50.00 m by 1.25 m by 1.00 m (approx.)

DESCRIPTION: Constructed of subangular basalt boulders crudely stacked 4-5 courses high. The wall is raised and crudely faced in places. The wall utilizes bedrock outcrops in places. Portions of the structure resembles a terrace retaining wall.

Site 3203 probably associated with Site T-2. Portion of wall possibly functions as a retaining wall for habitation area between Sites 3203 and T-2. Metal washer site tag "3203" found on wall.

SITE NO.: State: 3210 PHRI: --

SITE TYPE: Wall (1 Feature)

TOPOGRAPHY: Gently undulating terrain

VEGETATION: Dense grasses and ironwood

CONDITION: Fair

INTEGRITY: Altered by bulldozing

PROBABLE AGE: Prehistoric/historic

FUNCTIONAL INTERPRETATION: Boundary (?) wall

DIMENSIONS: 20.00 m by 1.00 m by 0.50 m (approx.)

DESCRIPTION: Constructed of stacked subangular basalt boulders. The wall is raised, cobble-filled, and formally faced on both sides. Only wall remnants remain.

Wall is possibly associated prehistorically with large terraces (Sites T-3, T-9, and T-10). Site 3210 is probably a remnant of a once continuous wall presently comprised of individual sections (Sites 3211, 3215, and T-5). Ching (1974) interprets Site 3210 to be a cattle wall. Site 3210 is apparently located immediately adjacent the present project area boundary.

*All State/HRHP (Hawaii Register of Historic Places) Site Numbers prefixed by 50-30-10 (50=State of Hawaii, 30=Island of Kauai, 10=USGS 7.5' series quad map ["Koloa, Hawaii"]).

SITE NO.: State: 3211 PHRI: --
SITE TYPE: Wall (1 Feature)
TOPOGRAPHY: Gently undulating soil and sand dunes.
VEGETATION: Grasses, ironwood, naupaka
CONDITION: Poor-fair
INTEGRITY: Altered by bulldozing
PROBABLE AGE: Prehistoric/historic
FUNCTIONAL INTERPRETATION: Boundary (?) wall
DIMENSIONS: 45.00 m by 0.90 m by 1.10 m (approx.)
DESCRIPTION: Constructed of large subangular basalt boulders stacked 3-4 courses high. Portions of wall appear crudely cobble filled. The wall is raised and formally faced on both sides. Portions of the wall are bulldozed for the jeep road and/or desilting basins.

Wall is possibly associated prehistorically with large terraces (Sites T-3, T-9, and T-10). Site probably a remnant of a once continuous wall presently comprised of individual sections (Sites 3210, 3215, and T-5). Ching (1974) interprets Site 3211 to be a cattle wall.

SITE NO.: State: 3212 PHRI: --
SITE TYPE: Walled Shelter (C-shape) (1 Feature)
TOPOGRAPHY: Roughly level soil surface
VEGETATION: Dense grasses, ironwood, kimwe
CONDITION: Poor-fair
INTEGRITY: Appears unaltered, but rocks possibly robbed/removed
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 4.50 m by 2.50 m by 0.55 m
DESCRIPTION: Constructed of subangular basalt boulders and cobbles crudely stacked 2-3 courses high. The walls are raised slightly and crudely faced on the interior side. The exterior side generally appears collapsed and is rounded or sloping in profile. Wall width is 0.8 m. The C-shape contains a level, interior soil surface. C-shape is open to the southeast. No associated portable remains visible.

A single test unit (TU-1) measuring 0.5 by 0.5 m was excavated within the walled shelter. The test unit revealed Layer I, a 30-35 cm thick soil deposit. The deposit was dark brown (7.5YR 3/2 dry); of sandy clay loam texture; strong, fine to medium, subangular blocky structure; very hard when dry, firm when moist, sticky when wet, and of plastic consistence. No portable remains of any kind were present within Layer I. Due to the absence of portable remains, excavation was terminated c. 30-35 cm below surface in very hard compact clay, within Layer I.

SITE NO.: State: 3213 **PHRI:** —
SITE TYPE: Walled Shelter (C-shape) (1 Feature)
TOPOGRAPHY: Roughly level soil surface
VEGETATION: Dense grasses, ironwood and kiawe
CONDITION: Indeterminate
INTEGRITY: Indeterminate
PROBABLE AGE: Prehistoric (?)
FUNCTIONAL INTERPRETATION: Probably Habitation
DIMENSIONS: 3.50 m by 3.30 m by 0.50 m (approx.)
DESCRIPTION: Site 3213 could not be relocated during the present reconnaissance survey, despite several attempts, and it assumed to have been destroyed over the years since its identification in 1974. According to Ching, "This C-shape enclosure is built of stacked pahoehoe stones. The opening is 1.20 m wide. No midden was noted on the interior dirt floor. The walls appear to be very old with lichen growth on the stones" (1974:71).

SITE NO.: State: 3215 **PHRI:** —
SITE TYPE: Wall (1 Feature)
TOPOGRAPHY: Situated on top edge of slope, overlooking small cove and Site T-10.
VEGETATION: Ironwood, sugar cane, koa-haole, kiawe
CONDITION: Fair-good
INTEGRITY: Altered
PROBABLE AGE: Prehistoric/historic
FUNCTIONAL INTERPRETATION: Boundary (?) wall
DIMENSIONS: 100.00 m by 1.00 m by 1.40 m (approx.)
DESCRIPTION: Constructed of subangular basalt boulders stacked 5-6 courses high. The wall is raised, cobble core-filled, and formally faced on both sides. It is oriented c. 220 degrees azimuth. Portions destroyed by bulldozing. Wall appears to be incorporated into Site 3216.

Wall is possibly associated prehistorically with large terraces (Sites T-3, T-9, and T-10). Site probably a remnant of a once continuous wall presently comprised of individual sections (Sites 3210, 3211, and T-5). Ching (1974) interprets Site 3215 to be a cattle wall.

SITE NO.: State: 3216 PHRI: --
SITE TYPE: Platform (1 Feature)
TOPOGRAPHY: Situated on low ridge overlooking cove and Site T-10
VEGETATION: Liliko'i, lantana, koa-haole, ironwood
CONDITION: Fair
INTEGRITY: Slightly altered-bulldozer push present on north side
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Ceremonial (Burial?)
DIMENSIONS: 9.00 m by 6.00 m by 2.50 m (approx.)
DESCRIPTION: Constructed of crudely stacked subangular basalt boulders and cobbles. The platform is raised on the southwest, south and southeast sides, but not formally faced. The sides are not vertical, but are sloped back from the base foundation. The structure abuts an adjacent wall (Site 3215).

Coral and lithified coral bedrock fragments present on platform surface. Site 3216 is similar in form to Site T-11. Site 3216 was interpreted as a burial monument by Ching (1974).

SITE NO.: State: -- PHRI: T-1*
SITE TYPE: Mound/pile (1 Feature)
TOPOGRAPHY: Situated on inland (north) side of Puu Ainako. Surrounding area consists of sloping soil.
VEGETATION: Koa-haole, grasses, sugar cane
CONDITION: Poor
INTEGRITY: Partially altered by bulldozer push
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Agriculture
DIMENSIONS: 15.00 m by 12.00 m by 1.00 m (approx.)
DESCRIPTION: The mound is amorphous shaped in plan. Its sides are raised, but not formally faced. The sides are collapsed in appearance and rounded or sloping in profile. The mound surface consists of rough, unevenly piled boulders. A possible boulder alignment or stepped terrace-like section is present in the central portion of the mound. The alignment is very vague in appearance and oriented approximately east-west.

Site probably functioned as a clearing mound associated with sugar cane production and is of early historic/historic origin. Bulldozer push present on the east, west and north sides of structure. Portable remains present includes recent historic concrete culvert section and beer can.

*PHRI Temporary ("T-") Field Site Number.

SITE NO.: State: — PHRI: T-2
SITE TYPE: Walled Shelter (Box C-shape) (1 Feature)
TOPOGRAPHY: Situated atop Puu Ainako. Excellent view of the coast.
VEGETATION: Dense koa-haole and 'ilima
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 15.00 m by 15.00 m by 0.80 m (approx.)
DESCRIPTION: The shelter contains walls on the east, west, and north sides. It is constructed of subangular basalt boulders crudely stacked 3-4 courses high. The walls are raised, but not formally faced. Their average width is c. 1.25 m. The sides are collapsed in appearance and rounded or sloping in profile. The walled shelter is open seaward (south). The shelter also has a very low terrace retaining wall (c. 10 cm) on its south side. The terrace retaining wall adjoins the east wall of the shelter.

The interior surface consists of level brownish soil. No definite cultural deposit visible, but is probably present subsurface. Portable remains includes Cypraea spp. shell, coral, and lithified sandstone flakes.

SITE NO.: State: -- PHRI: T-3
SITE TYPE: Stepped (?) terrace (1 Feature)
TOPOGRAPHY: Situated at base of east slope of Puu Ainako
VEGETATION: Koa-haole, kiawe, lantana and grasses
CONDITION: Poor
INTEGRITY: Altered by bulldozing activities
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Ceremonial (Heiau?)
DIMENSIONS: 100.00 m by 30.00 m by 2.50 m (approx.)
DESCRIPTION: The terrace structure is large and amorphous shaped. It is constructed of subangular basalt boulders and cobbles crudely stacked 6-7 courses high on the east side. The east side is raised and crudely faced. This raised side is not vertical, but slopes back from the base foundation. The terrace surface contains several level sections. Several possible pits or depressions are also visible on the surface. Inland (northwest) edge of the terrace contains a low, rubble wall-like feature (possibly a former standing wall).

Bulldozing activities have altered the site on the north and northeast end, partially damaging the terrace foundation. Site T-3 is possibly associated with nearby Site 3206 (wall). Both sites are located outside of the present project area, within the Conservation District. Site T-3 was possibly identified by Kikuchi (1963) as Site 102, and subsequently designated HRHP Site 3092.

SITE NO.: State: -- PHRI: T-4
SITE TYPE: Mound/pile (1 Feature)
TOPOGRAPHY: Flat, level area inland of sand dune and beach road, but seaward of sugar cane field.
VEGETATION: Ironwood, koa-haole, grasses
CONDITION: Poor
INTEGRITY: Altered by bulldozing of sugar cane field
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Agriculture
DIMENSIONS: 15.00 m by 15.00 m by 1.00 m (approx.)
DESCRIPTION: The mound is amorphous shape in plan. Its sides are raised, but not formally faced and appear rounded or sloping (collapsed) in profile. The mound surface consists of rough uneven boulders. A possible internal alignment is present, but it is extremely vague and probably natural.

Site T-4 probably functioned as a clearing mound associated with sugar cane production and is of early historic/historic origin.

SITE NO.: State: -- PHRI: T-5
SITE TYPE: Wall foundation (1 Feature)
TOPOGRAPHY: Gently undulating soil and sand dune terrain.
VEGETATION: Ironwood, grasses, koa-haole, naupaka
CONDITION: Poor
INTEGRITY: Altered-rocks robbed/removed
PROBABLE AGE: Prehistoric/historic
FUNCTIONAL INTERPRETATION: Boundary (?) wall
DIMENSIONS: 150.00 m by 1.30 m by 0.60 m (approx.)
DESCRIPTION: The wall foundation consists of a parallel boulder alignment with an interior fill of cobbles. The boulder foundation is set into the soil surface and contains several upright boulders. The wall foundation is oriented approximately 215 degrees azimuth. Historic rubbish is present on and near site.

Wall is possibly associated prehistorically with large terraces (Sites T-3, T-9, and T-10). Site probably a remnant of a once continuous wall presently comprised of individual sections (Sites 3210, 3211, and 3215). Ching (1974) interprets Sites 3210, 3211, and 3215 to be cattle walls. Site T-5 was possibly identified previously by Ching (1974) as the westernmost extent of Site 3211.

SITE NO.: State: — FHRI: T-6
SITE TYPE: Mound/pile (1 Feature)
TOPOGRAPHY: Roughly level terrain of silt/clay and sand
VEGETATION: Dense grasses, ironwood, and naupaka
CONDITION: Poor
INTEGRITY: Slightly altered-bulldozer push on southwest side
PROBABLE AGE: Indeterminate
FUNCTIONAL INTERPRETATION: Indeterminate
DIMENSIONS: 2.50 m by 1.80 m by 0.90 m (approx.)
DESCRIPTION: The mound is amorphous shape in plan. It is constructed of crudely piled subangular basalt boulders and cobbles. The mound is raised, but its sides are not formally faced. The sides appear collapsed in appearance and rounded or sloping in profile. The mound surface consists of roughly level basalt cobbles.

A crude boulder rubble wall (possibly bulldozer origin) extends northwest from mound. Site T-6 abuts Site 3211 (wall) to the northeast side. Site is in very disturbed state, therefore, unable to determine specific research and cultural significance at this time. Site T-6 is in the approximate area of Ching (1974) Site 3213 (C-shape), which could not be found during the present project. T-6 was initially identified as a possible prehistoric burial, or recent bulldozer or clearing pile.

Backhoe Trench 23 (BT-23), measuring 3.0 by 1.3 m, was excavated within Site T-6. All excavated material was carefully inspected upon its removal. A shovel was also used to hand-excavate the sand deposit below the boulder and cobble fill of the mound. Excavation revealed the following layers: (a) I, c. 50 cm thick boulder/cobble fill; (b) II, c. 70 cm thick sand deposit; and (c) III, c. 30 cm thick silt loam soil deposit. Excavation was terminated c. 1.5 m below surface on solid bedrock. No human burial or portable remains of any kind were present within BT-23. Based on the test excavation results, Site T-6 is interpreted to be recently bulldozed material from a nearby wall (Site 3211).

SITE NO.: State: — PHRI: T-7

SITE TYPE: Mound/pile (1 Feature)

TOPOGRAPHY: Situated on inland side of coastal sand dunes

VEGETATION: Naupaka, ironwood, indian pluches

CONDITION: Poor

INTEGRITY: Altered by bulldozing on and around rock mound

PROBABLE AGE: Indeterminate

FUNCTIONAL INTERPRETATION: Indeterminate

DIMENSIONS: 50.00 m by 18.00 m by 1.00 m (approx.)

DESCRIPTION: The mound is amorphous shape in plan. It is constructed of piled basalt boulders and cobbles. The mound contains a rough irregular boulder surface. It also contains no formally faced sides. Human bone fragments (scapula and cranium), probably from a recently disturbed pit burial found in sand dune near east corner of mound.

Site is in very disturbed state; therefore unable to interpret function and/or age at this time. Site T-7 is possibly (a) a prehistoric structure and/or (b) building material from prehistoric structures, bulldozed and piled during sugar cane production. Site T-7 is located within the Conservation District, outside the present project area.

SITE NO.: State: -- PHRI: T-8

SITE TYPE: Mound/pile (1 Feature)

TOPOGRAPHY: Situated on inland side of coastal sand dunes

VEGETATION: Naupaka, ironwood, indian pluches

CONDITION: Poor

INTEGRITY: Altered by bulldozing on and around mound

PROBABLE AGE: Indeterminate

FUNCTIONAL INTERPRETATION: Indeterminate

DIMENSIONS: 35.00 m by 15.00 m by 1.00 m (approx.)

DESCRIPTION: The mound is amorphous shape in plan. It is constructed of piled basalt boulders and cobbles. The mound contains a rough irregular boulder surface. It also contains no formally faced sides.

Site in very disturbed state, therefore unable to interpret function and/or age at this time. Site T-8 is possibly (a) a prehistoric structure and/or (b) building material from prehistoric structures, bulldozed and piled during sugar cane production. Site T-8 is located within the Conservation District, outside of the project area.

SITE NO.: State: -- PHRI: T-9

SITE TYPE: Terrace

(1 Feature)

TOPOGRAPHY: On south side of raised ridge overlooking cove/sand dune area

VEGETATION: Sugar cane and grasses

CONDITION: Fair to good

INTEGRITY: Altered by bulldozing

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial (Heiau?)

DIMENSIONS: 50.00 m by 6.00 m by 5.00 m (approx.)

DESCRIPTION: Terrace is constructed of crudely stacked subangular basalt boulders and cobbles. The terrace is not formally faced, but is raised 4.0-5.0 m on the south side. This raised side is not vertical, but slopes back from the base foundation. The terrace surface is roughly level, with several areas on the west end appearing very level and possibly intentionally paved. Possible pit/depression features noted on terrace.

Site is disturbed with large boulders and soil pushed atop terrace on the north side by sugar cane bulldozing. According to the backhoe operator, old time residents of Poipu told him this was a heiau structure (S. Potts, pers. comm.). Limited interpretive significance due to altered condition; extensive restoration needed if interpretive development desired. Site T-9 was possibly identified by Kikuchi (1963) as Site 102, and subsequently designated HRHP Site 3092.

SITE NO.: State: -- PHRI: T-10

SITE TYPE: Terrace

(1 Feature)

TOPOGRAPHY: Constructed on slope at ocean edge. Bottom base foundation of terrace is at waters edge.

VEGETATION: Kiawe and ironwood trees

CONDITION: Fair to good

INTEGRITY: Slightly altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial (Heiau?)

DIMENSIONS: 100.00 m by 25.00 m by 6.00 m (approx.)

DESCRIPTION: The terrace is constructed of stacked subangular basalt boulders and cobbles. The terrace is raised c. 6.0 m high on the seaward (southeast) side, but is not formally faced. This raised side is not vertical, but is sloped back from the base foundation. The terrace surface is roughly level and portions appear crudely paved with cobbles and a few boulders. A series (possibly three) of boulder/rubble alignments (possibly collapsed walls or stepped terraces) are present on the southwest end of the large terrace. Two pit/depressions (possible cupboards) are present on the terrace. Several recently excavated pits/depressions are also present on the terrace surface.

According to the backhoe operator, several old-time Poipu residents told him this was a heiau structure (S. Potts, pers. comm.). A shoreline trail crosses the structure. Most of Site T-10 is apparently situated outside the project area, within the Conservation District. Site T-10 was possibly identified by Kikuchi (1963) as Site 102, and subsequently designated HRHP Site 3092.

SITE NO.: State: -- FHRI: T-11

SITE TYPE: Platform (1 Feature)

TOPOGRAPHY: Situated on low ridge, overlooking cove and Site T-10

VEGETATION: Ironwood, koa-haole, lantana

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial (Burial?)

DIMENSIONS: 5.00 m by 3.50 m by 2.00 m (approx.)

DESCRIPTION: The platform is constructed of crudely stacked subangular basalt boulders and cobbles. It is raised on the southwest, south and southeast sides, but not formally faced. The sides are not vertical, but appear sloped back from the base foundation. The structure abuts a wall (Site 3215).

The platform contains a rough, uneven boulder surface. Lithified coral bedrock fragments are present on the platform surface. Site T-11 is similar to Site 3216. Site T-11 is situated c. 15.0 m/225 degrees from Site 3216. Site 3215 (wall) abuts the platform on inland (north) side.

RECEIVED JUN 20 1988

MEMORANDUM

Date: June 20, 1988
Project 88-447
88-447-2

EXHIBIT 7

IN EVIDENCE

To: Grove Farm Properties, Inc.
and Ainako Resorts Associates
c/o Mr. Joseph Vierra
Belt, Collins & Associates
680 Ala Moana Blvd., Suite 200
Honolulu, Hawaii 96813

From: Paul H. Rosendahl, Ph.D.
President and Principal
Archaeologist

Subject: Recommended Preservation Measures
for Identified Archaeological Sites
Hyatt Regency Kauai Proposed Golf Course Project Area
Land of Paa, Koloa District, Island of Kauai
(TMK:4-2-9-01:Por.1)



The purpose of this memo is to provide, in response to the request of the Kauai Historic Preservation Review Commission, a more explicit summary of protective measures recommended for the preservation of sites identified during the recent archaeological survey of the Hyatt Regency Kauai Proposed Golf Course Project Area. As indicated in the previously submitted Revised Interim Report on the survey findings (PHI 1988), 18 sites were identified within or immediately adjacent to the project area. Table 4 in the Revised Interim Report outlined general significance assessments and recommended general treatments for the 18 identified sites. While no further archaeological work of any kind was recommended for eight of the sites—sufficient data having been collected during the survey work, further work in the form of monitoring was recommended for two sites, and preservation—either "as is", or with some level of interpretive development—was recommended as appropriate for the remaining eight sites.

Based on (a) general considerations for site conservation and interpretation, and (b) the nature of the individual sites themselves, specific recommended preservation measures for the treatment of eight sites within the project area have been made. The recommendations are outlined in the attached Table 1. Two basic categories of further work have been recommended: (a) further data collection, which is intended to provide a detailed and accurate record of each site, and to generate the information content necessary for actual interpretive development; and (b) conservation and interpretation treatments. Within each category, a variety of appropriate specific activities are listed.

One final comment might be made regarding the other ten sites identified during the survey of the project area for which no further work or specific interpretive development has been recommended. Sufficient data were collected from them during the survey work, and their continued preservation is not essential; however, several of them (mainly stone walls) could be considered for inclusion into development landscaping as attractive structural elements.

REFERENCE CITED

Paul H. Rosendahl, Ph.D., Inc. (PHRI)

- 1988 Revised Interim Report: Summary of Findings, and General Significance Assessments and Recommended General Treatments. Archaeological Reconnaissance Survey, Hyatt Regency Kaula Proposed Golf Course Project Area, Land of Paa, Koloa District, Island of Kaula (TMK:4-2-9-01;Por.1). PHRI Report 447-061488. Prepared for Grove Farm Properties, Inc. and Ainako Resorts Associates.

Table 1.

**SUMMARY OF RECOMMENDED PRESERVATION MEASURES
HYATT REGENCY KAUAI PROPOSED GOLF COURSE PROJECT AREA**

Preservation Measures	Site Number							
	T-2	T-3	T-7	T-8	T-9	T-10	T-11	3216
<u>Further Data Collection</u>								
Detailed Recording	+	+	+	+	+	+	+	+
Planetable mapping	+	+	+	+	+	+	+	+
Surface profiles	+	+	+	+	+	+	+	+
Photographs	+	+	+	+	+	+	+	+
Written description	+	+	+	+	+	+	+	+
Surface Collections (artifacts/midden)	+	+	+	+	+	+	+	+
Test Excavations	+	+	-	-	+	+	+	+
Structural data	+	+	-	-	+	+	+	+
Dating samples	+	+	-	-	+	+	+	+
Portable remains	+	+	-	-	+	+	+	+
Human burials	-	-	-	-	-	-	?	?
<u>Treatments - Conservation</u>								
Resource Banking	-	-	+	+	-	-	-	-
Clearing/Cleaning	-	-	+	+	-	-	-	-
<u>Treatments - Interpretation</u>								
Level								
Off-site	+	+	-	-	+	+	+	+
Mechanisms								
Printed materials	+	+	-	-	+	+	+	+
Exhibits/signage	+	+	-	-	+	+	+	+
Themes								
Habitation	+	-	-	-	-	-	-	-
Religion	-	+	-	-	+	+	-	-
Burial	-	-	-	-	-	-	?	?
Aesthetics	-	-	-	-	+	+	+	+
Site Preparation								
Clearing/Cleaning	+	+	-	-	+	+	+	+
Stabilization	+	+	-	-	+	+	+	+
Restoration	?	-	-	-	?	?	?	?

Key: + = recommended; - = not recommended; ? = needs further consideration.

EXHIBIT 8

Division of Mathematics, Natural Science & Technology

Brigham Young University
Hawaii Campus



TO WHOM IT MAY CONCERN:

The following is a brief resume of the educational and occupational background of Phillip L. Bruner.

EDUCATION: BS in Biology from Church College of Hawaii - 1970.
MS in Zoology and Physiology from Louisiana State University - 1974.
Graduate studies at University of Hawaii - 1977-present.

RESEARCH INTERESTS: Has worked extensively on Pacific birds. Spent one year in French Polynesia and produced a book - Guide to the Birds of French Polynesia. Has spent a total of four months in Micronesia conducting research on birds. Is currently working on a book which will be a guide to the birds of the Pacific.

OCCUPATIONAL BACKGROUND: Museum Curator - Louisiana State University
Lecturer in Natural Science Dept. Honolulu Community College.
Instructor of Biological Sciences BYU-Hawaii.
Environmental Consultant:
Have worked for Ahuimanu Productions on both the Ornithological Survey of Hawaiian Wetlands for the U.S. Army, Corps of Engineers and the Avifaunal Survey of the Central Koolau Range, Oahu - for the the E.I.S. for the proposed H-3 Highway.

Independently has done a Ornithological Survey of Punahoolapa Wetlands - for Belt, Collins and Associates.

Should further information be required Mr. Bruner may be reached at 293-9211 ext. 254 (work) or 293-1022 (home).

Phillip L. Bruner

Box 694

Division of Math, Natural Science, Technology
BYU-H

Laie, HI 96762
Brigham Young University-Hawaii Campus, Laie, Hawaii 96762 (808) 293-9211

RECEIVED MAY 18 1988 JV ✓

Caldwell
File 583-4207

cc: [redacted]

27 April 1988

Glenn Koyama
Belt Collins & Associates
680 Ala Moana Blvd.
Suite 200
Honolulu, Hawaii 96813



EXHIBIT 9
IN
EVIDENCE

Dear Glenn:

This memo should be added to my report on the Survey of the Avifauna and Feral Mammals at Grove Farm Properties, Poipu, Kauai. This note is a followup on the occurrence of Wedge-tailed Shearwater (*Puffinus pacificus*) mentioned on page eight of the original report of the faunal survey.

On 21 April 1988 I visited the sand dune and sea cliff area of the Grove Farm Project site at Poipu, Kauai in order to ascertain the extent to which the area was utilized by Wedge-tailed Shearwater. I found on the seaward facing slope more than 25 burrows that were in active use based on the tracks left by the birds. In addition I found one freshly killed Wedge-tailed Shearwater that was surrounded by dog tracks which likely indicates that it had fallen prey to dogs the night before. There were large areas of the cliff face that are virtually inaccessible to dogs and humans and likely contain active shearwater burrows. The colony may exceed 100 birds given the amount of burrows I observed and the potential area that I was not able to access. I found no burrows or evidence of shearwater on the top of the cliffs or sand dunes nor on the mauka facing slopes of these cliffs. The shearwater colony thus is utilizing the seaward facing habitat only and this is likely due to the protection this steep rugged site provides. No shearwater were actually seen in the burrows which is not unexpected since they forage at sea during the day and only return to the burrows at dusk and usually depart at dawn. I would recommend that this area of the project site be afforded protection and that any development be kept back from the edge of the cliffs and dunes.

Sincerely,

[Signature]
Phillip Bruner
Assistant Professor of Biology
Director, Museum of Natural History
BYU-H
Laie, Hawaii 96762

Aug 18 3 08 PM '88
LAND USE COMMISSION
STATE OF HAWAII

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS
AT GROVE FARM PROPERTIES, POIPU, KAUAI

LAND USE COMMISSION
STATE OF HAWAII
AUG 18 3 08 PM '88

Prepared for

Belt Collins & Associates

By

EXHIBIT 10



IN
EVIDENCE

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

20 January 1988

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS
AT GROVE FARM PROPERTIES, POIPU, KAUAI

INTRODUCTION

The purpose of this report is to summarize the findings of a two and one half day (15-17 January 1988) bird and mammal field survey conducted at Grove Farm Properties, Poipu, Kauai. Also included are references to pertinent literature. Finally, the report provides some suggestions as to the possible changes in the faunal community that may occur following development along with recommendations regarding habitats essential to wildlife.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely occur given the type of habitats available.
- 2- Provide some baseline data on the relative density of each species and where possible, within the constraints of the available time, determine the extent to which each species is dependent on the resources located on the property.

- 3- Compare these findings with published and/or unpublished data.
- 4- Assess the possible changes in the bird and mammal communities that might occur as a result of habitat alteration.

GENERAL SITE DESCRIPTION

The project site is located on the SW coast of Kauai (see Fig.1). About half of the area is presently under cultivation with sugar cane. The makai (coastal) portion is covered with second growth wooded patches of Ironwood (Casuarina spp.), Kiawe (Prosopis pallida), Koa Haole (leucaena glauca) and Milo (Thespesia populnea). Much of this sector of the project site is marred by roads and trails made by off-road vehicles and joggers. Several small drainage ponds occur along the makai edge of the property. Two of these ponds contained water the others were overgrown with grass. The site presently is frequently visited by fisherman, hikers, joggers and off-road vehicles. This creates significant amounts of disturbance both to the wildlife and habitat. On the 16th of January the portions of the site in sugar cane

were sprayed with herbicides/pesticides with the use of a helicopter. This activity also created a major disturbance to birds which forage in these fields.

Weather during the field survey was variable with rain and easterly winds on the 16th of January and partly cloudy with light breezes on the 15th and 17th of January.

STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity. Existing roads around and through the property were followed and at various points (see Fig.1) eight minute counts were made of all birds seen or heard. Between these count stations walking tallies of birds seen or heard were also kept. These counts provide the basis for the population estimates given in this report. Data on habitat preferences come from these observations plus information provided in Berger (1972), Hawaii Audubon Society (1984) and Pratt et al. (1987). Unpublished reports of similar habitats

elsewhere on Kauai were consulted in order to acquire a more complete picture of the birdlife activity in the area (Bruner 1985, 1986).

Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative density and distribution.

Scientific names used herein follow those given in the most recent American Ornithologist's Union Checklist (A.O.U. 1983) and Hawaii's Birds (Hawaii Audubon Society 1984).

RESULTS AND DISCUSSION

Resident Endemic (Native) Birds:

No endemic birds were recorded during the survey. Given the present nature of the property the only likely endemic bird that might occur would be the Short-eared Owl (Asio flammeus sandwichensis). Quarterly Waterbird counts on ^{Kauai.} ~~Oahu~~ by State of Hawaii Department of Land and Natural Resource personnel do not provide data for this specific site since no permanent wetlands are to be found here. It is possible that temporay

flooding of the drainage ponds, by heavy rains, may attract the Black-necked Stilt (Himantopus mexicanus knudseni) which often take advantage of these opportunities to forage.

Migratory Indigenous (Native) Birds:

Pacific Golden Plover (Pluvialis dominica fulva) -

A total of 16 plover were recorded during the field survey. Plovers prefer open areas such as mud flats and lawns. Most plover were observed along roads and in the recently plowed sugar cane fields. Some were also observed foraging along the rocky coastal shelf at low tide and around the edges of the two drainage ponds which contained water. Time did not permit sufficient observations to determine whether these plover were territorial or transient. Johnson et al. (1981) and Bruner (1983) have shown plover are extremely site-faithful on their wintering grounds and many establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. These populations likewise remain relatively stable over many years.

Ruddy Turnstone (Arenaria interpres) -

Flocks of up to 60 turnstone were observed foraging

in recently cleared sugar cane fields. Small flocks of five to ten birds were observed along the rocky intertidal shelf. The population of this species at the project site may exceed 200 birds. Fleisher (1985) and Sullivan (1986) report that this species shows some degree of site-faithfulness, thus a relatively stable wintering population likely occurs on or near the project site. Turnstone forage in flocks and prefer the same habitats utilized by Pacific Golden Plover. The two species are often seen foraging together on the same lawn, mud flat or agricultural field.

Wandering Tattler (Heteroscelus incanus) - This solitary shorebird was recorded at three locations during the survey. All three sightings were of tattler foraging along the edges of the drainage ponds and on the exposed rocky intertidal shelf. Studies of site-faithfulness in this species have not been conducted. Sheila Conant [Ornithologist and Chairperson of General Science at the University of Hawaii] (pers. comm.) has some limited unpublished data from her work in the NW Hawaiian Islands that would suggest tattler

may be site-faithful but are not territorial on their winter foraging grounds. Probably no more than six tattler occur on the project site.

No other migratory shorebirds were observed. The only other common species which might occur would be the Sanderling (Calidris alba). This species forages most often along sandy beaches and coastal mud flats. Behavioral ecology studies of this species reveal that environmental changes markedly alter territorial and site-faithfulness responses (Myers et al. 1981).

Resident Indigenous (Native) Birds:

Three seabird species were recorded flying along the coast adjacent to the project site. One Laysan Albatross (Diomedea immutabilis), a species which has in historical times only recently begun to nest on Kauai (Moriarty et al. 1986) was observed late in the afternoon of the 16 of January flying over the sand dunes at the SW end of the site. On the 16th of January two Great Frigatebirds (Fregata minor) were observed soaring over the project site. Two White-tailed Tropicbirds (Phaethon lepturus) were seen on all three days of the survey. Both birds repeatedly flew back and forth along the sea cliffs

at the SE portion of the site. Whether these two individuals represent a mated pair which were nesting on the cliff face was not determined. No other resident indigenous birds were recorded during the survey. Black-crowned Night Heron (Nycticorax nycticorax) may occasionally occur around the drainage ponds although none were recorded.

Exotic (Introduced) Birds:

A total of 14 species of exotic birds were recorded during the field survey. Table one show the relative abundance and typical habitat preferences of these species. The most abundant species during the two and one half day survey was surprisingly the Chestnut Mannikin (Lonchura punctulata), Robert Pyle (Hawaii Audubon Society annual Christmas Bird Count organiser) reports (pers. comm.) that the Lihue, Kauai 1987 Christmas Bird Count showed a marked increase in this species over past years. The reasons for this population explosion are presently unknown. Flocks of over 250 individuals were seen on the project site. House Finch (Carpodacus mexicanus) a species which is fond of Ironwood trees was also abundant along with the ever

ubiquitous Japanese White-eye (Zosterops japonicus). Northern Cardinal (Cardinalis cardinalis) was much more common than the Red-crested Cardinal (Paroaria coronata). Four species recorded elsewhere on Kauai (Bruner 1985, 1986) were not seen on this survey but potentially could occur. They include: Western Meadowlark (Sturnella neglecta), Common Barn-Owl (*Tyto alba*), Common (Ring-necked) Pheasant (Phasianus colchius) and Greater Necklaced Laughing-Thrush (Garrulax pectoralis).

Feral Mammals:

The only feral mammal observed during the survey were cats. Tracks of dogs were seen but likely represent pets that accompany joggers. No rats or mice were recorded but it would be highly unusual if these ubiquitous mammals did not occur on the property. Without a trapping program it is difficult to conclude anything about the relative abundance of rats, mice and cats. However, it is likely that their numbers are similar to what one would find elsewhere in similar habitat on Kauai.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinerus semotus) are sketchy but the species has been recorded from Kauai

(Tomich 1986). None were observed on this field survey.

CONCLUSION AND RECOMMENDATIONS

A brief field survey can at best provide a limited perspective of the wildlife present in any given area. Not all species will likely be observed and information on their use of the site must be sketched together from brief observations and the available literature. The number of species and the relative density of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the ecological picture only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus only long term studies can provide the insights necessary to acquire both a broad view as well as a more definitive perspective of the bird and mammal populations in a particular area. However, when brief field studies are coupled with data gathered from other similar habitats the value of

the conclusions drawn are significantly increased.

In terms of broad conclusions related to bird and mammal activity on the project site the following are offered:

- 1- The present environment provides a fairly diverse range of habitats which are utilized by the typical array of exotic birds one would expect at this elevation on Kauai.
- 2- Migrant species particularly Pacific Golden Plover and Ruddy Turnstone, are usually benefited by the kind of development that creates large open lawns. It would not be unusual if populations of these two species increased within the project site. The small drainage ponds provide foraging habitat for shorebirds as well as sources of drinking water for other birds. The ephemeral nature of these ponds, however, preclude their use as habitat for nesting waterbirds.
- 3- A change of land use of the type proposed will likely alter the present habitat by creating even more diversity of living spaces than are available at present. The planting of fruit bearing trees and the creation of more open areas will provide new habitats which will likely result in an increase of species like

plover and Common Myna (Acridotheres tristis). House Sparrow (Passer domesticus), a highly urban species, will become more common following development of the site. Although not recorded on the survey game birds such as Common (Ring-necked) Pheasant (Phasianus colchicus) would also be impacted by a loss of vegetation cover. This species is widespread and relatively common in second growth habitats on all main islands in Hawaii.

- 4- In order to obtain more data on mammals, a trapping program would be required. The brief observations of this survey did not reveal any unusual mammal activity. Mammal populations may also change following development. The loss of the dense cover provided by high grass and brush will likely reduce rat and mice populations.

Recommendations:

- 1- The planting of a wide range of trees would increase the biological diversity of the site for birds.
- 2- The preservation of the drainage pond at the SW end of the site by Keoniloa Bay would provide habitat for migratory shorebirds.

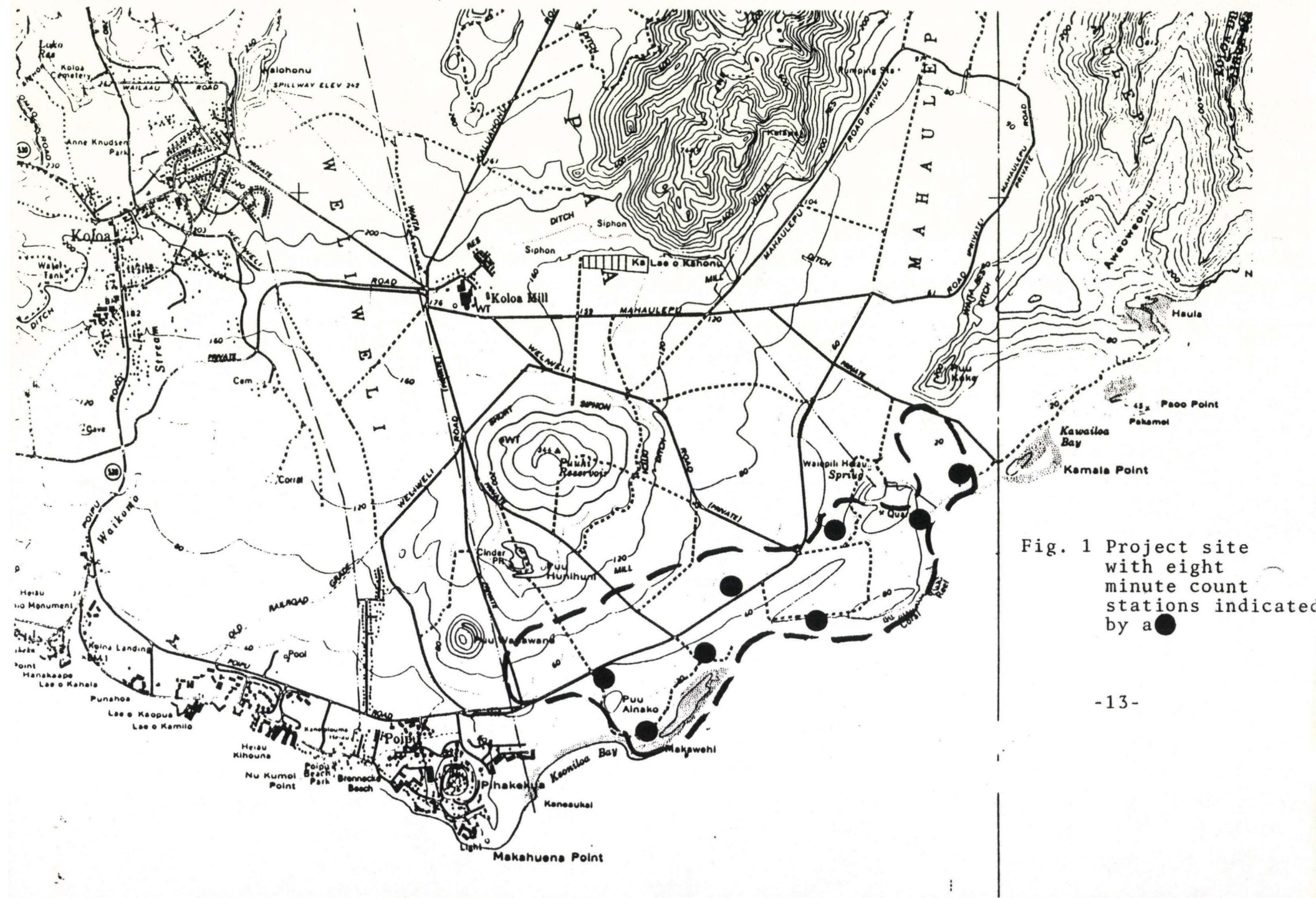


Fig. 1 Project site with eight minute count stations indicated by a ●

TABLE I

Relative abundance and general habitat preferences of exotic birds, Grove Farm Properties, Poipu, Kauai.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*	HABITAT
Cattle Egret	<u>Bulbucus ibis</u>	C = 6	G
Spotted Dove	<u>Streptopelia chinensis</u>	U = 3	P,G
Zebra Dove	<u>Geopelia striata</u>	C = 9	P,G
White-rumped Shama	<u>Copsychus malabaricus</u>	R = 2	T
Melodious Laughing-Thrush	<u>Garrulax canorus</u>	R = 4	T
Common Myna	<u>Acridotheres tristis</u>	C = 6	G,P
Northern Cardinal	<u>Cardinalis cardinalis</u>	C = 6	T
Red-crested Cardinal	<u>Paroaria coranata</u>	U = 2	T,P
Northern Mockingbird	<u>Mimus polyglottos</u>	R = 1	P
Japanese White-eye	<u>Zosterops japonicus</u>	A =16	T,P
House Sparrow	<u>Passer domesticus</u>	U = 4	G,P
House Finch	<u>Carpodacus mexicanus</u>	A =19	P
Nutmeg Mannikin	<u>Lonchura punctulata</u>	U = 3	G
Chestnut Mannikin	<u>Lonchura malacca</u>	A =120	G

* (See page 15 for key to symbols)

KEY TO TABLE I

Relative Abundance = Average number of individuals observed during walking survey or average frequency on eight minute counts in appropriate habitat.

A = Abundant (ave. 10+) on 8 min. counts

C = Common (ave. 5-10) on 8 min. counts

U = Uncommon (ave. less than 5) on 8 min. counts

R = Rare (recorded number which follows is total)

Habitat Preference = Area most likely to occur

G = Grassland, cleared agricultural fields

P = Parkland (grass and scattered trees)

T = Thickets of dense vegetation

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Museum Press. Honolulu. 375 pp.

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BILL

Bill for field survey, report preparation and incidental expenses for an Avifauna and Feral Mammal Survey of Grove Farm Properties, Poipu, Kauai.

Field Work 2.5 days @ \$200.00/day = \$500.00

Report Preparation 2 days @ \$200.00/day = \$400.00

Incidental Expenses:

Travel costs (airfare, car, hotel, food, parking)
= \$284.51 (an advance of \$300.00 was given
thus a difference of \$15.49)

Total travel costs = minus \$15.49 (this amount to be
subtracted from total bill see
below)

Report Typing = \$50.00

State Excise Tax .005% = \$6.17

Subtotal = \$956.17 less \$15.49 from cash advance = \$940.68

TOTAL = \$940.68

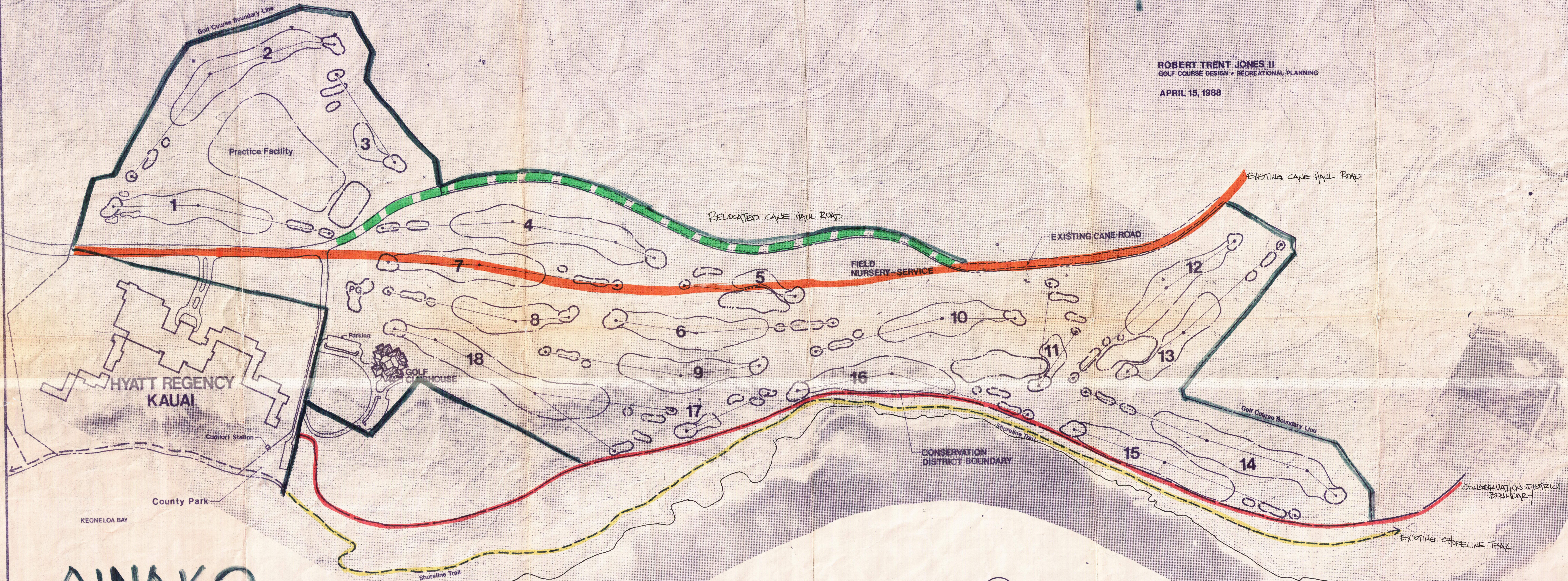
Pay to:

Phil Bruner
Box 1775
BYU-H
Laie, Hi 96762

20 January 1988

PLANNING DEPT.
COPY

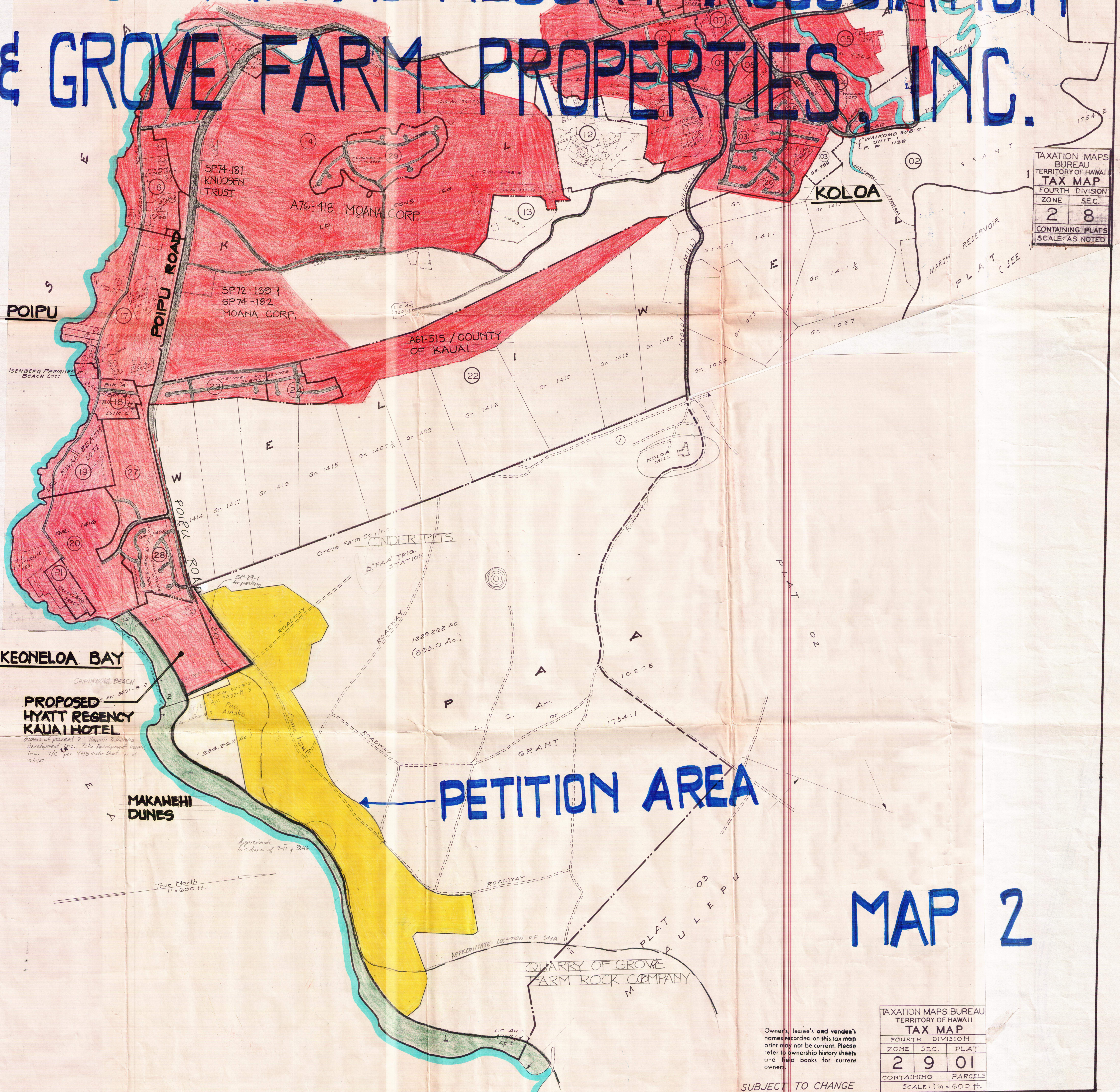
ROBERT TRENT JONES II
GOLF COURSE DESIGN • RECREATIONAL PLANNING
APRIL 15, 1988



AINAKO
SCHEMATIC ROUTE PLAN
PROPOSED GOLF COURSE
POIPU, KAUAI, HAWAII

EXHIBIT 1

SP88-369 AINAKO RESORT ASSOCIATION & GROVE FARM PROPERTIES, INC.



TAXATION MAPS BUREAU TERRITORY OF HAWAII	
TAX MAP	
FOURTH DIVISION	
ZONE	SEC.
2	8
CONTAINING PLATS	
SCALE: AS NOTED	

MAP 2

TAXATION MAPS BUREAU		
TERRITORY OF HAWAII		
TAX MAP		
FOURTH DIVISION		
ZONE	SEC.	PLAT
2	9	01
CONTAINING		PARCELS
SCALE: 1 in = 600 ft.		

SUBJECT TO CHANGE

Dwg. No. 3066
Source: Tax Maps Bureau
By: G.B. & R.B. - Oct. '36

For PAA, KOLOA, KAUAI - (KOLOA SUGAR CO.)

SP88-369 AINAKO RESORT ASSOCIATION & GROVE FARM PROPERTIES, INC.

